



Rehabilitation of 'orphan' pinniped pups: input from species biology

Informal workshop held on December 11, 2013

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DRAFT MINUTES OF MEETING

Introduction

There is a case for greater biological input into the design of rehabilitation procedures. Veterinary expertise has led to great improvements in physical and clinical care of pups undergoing rehabilitation. However, rehabilitation procedures often do not manage to mimic the essential components of the pup's normal social and physical environment and developmental timetable. This has led to concerns for pup psychological welfare during rehabilitation and also that pups after release may be physically healthy, but their behaviour may not be normal. This concern particularly affects pups rescued as neonatal 'orphans' or young pups of nursing age.

Speakers were invited on following or related topics

- rehabilitation philosophy in context of wild populations (in different species)
- Problems and practical solutions for mimicking natural development in rehab, particularly of neonatal or nursing-age orphans
- Methods of welfare assessment (including physiological biomarkers)
- Types of research needed to design rehab procedure and environment to maximise welfare and normal development in different species
- Results of post-release monitoring

Workshop participants

Atkinson, Shannon (UAF/SFOS, USA)
Bahr, Janine (Seal Centre Föhr, Germany)
Barbieri, Michelle (TMMC, California, USA)
Brasseur, Sophie (IMARES, Netherlands)
Bodrov, Semyon (Zoological Institute, Russia)
Clee, Marie (S. Cross Univ, NSW, Australia)
Gulland, Frances (TMMC, California, USA)
Hofmeyer, Greg (Port Eliz. Museum, S.Africa)
Howard, Maureen (Otago Access Radio, NZ)
Ijichi, John (Tokyo, Japan)

Jüssi, Ivar (Est. Fund for Nat., Estonia)
Jüssi, Mart (Est. Fund for Nat., Estonia)
McConnell, Bernie (SMRU, UK)
McKnight, Chris (SMRU, UK)
Milne, Ryan (SMRU, UK)
Sipilä, Tero (Metsähallitus, Finland)
Trukhanova, Irina (Baltic Fund for Nat., Russ)
Wilson, Sue (Tara Seal Research, UK)

Workshop proceedings

Introductory presentation

The workshop began with an introductory presentation by Sue Wilson on behalf of the Seal Conservation Society. This introduced the circumstances when intervention leading to seal pup rehabilitation commonly occurs, the species to be considered during this workshop and their present IUCN conservation status. Issues arising from rehabilitation practices with neonatal pups were outlined (eg imprinting on human carers, difficulties in making a transition to foraging on live fish and abnormal dispersal patterns after release). Some differences between the impact of rehabilitation practices on pups admitted as neonatal 'orphans' of nursing age and pups of post-weaning age were proposed for further consideration.

Ice-associated seal rehabilitation in the marine mammal Rehabilitation Centre of the Leningrad region, St Petersburg, Russia

This was followed by a presentation by Irina Trukhanova (Baltic Fund for Nature) on rehabilitation in the St Petersburg rehabilitation centre of pups of ice-associated species from Lake Ladoga and the Russian Baltic. These species are the Ladoga and Baltic ringed seals (IUCN status is *Endangered* and *Vulnerable* respectively), Baltic grey seal (IUCN status – *Endangered*). The differences in the timetable of pup development in these ringed seal and grey seal pups and the main causes for mother-pup separation and pup stranding were summarised. Challenges for grey seal rehabilitation include the very rapid growth to high weaning weight in wild pups, which is difficult to emulate in rehabilitation, together with issues of pups in rehabilitation learning to feed on dead fish from human carers and forming attachments to humans. Specific challenges for rehabilitation of ringed seal pups are the pups' social intolerance of contact with other conspecifics and humans, sensitivity to environmental conditions – and the need to release pups near summer haul-out sites. Key principles followed at the St Petersburg centre are minimizing rehabilitation time and minimizing interaction with public. Possible scientific benefits of a rehabilitation programme include studies of behavior and pathology of these little-studied subspecies. Scientists should advocate the necessity of seal pup rehabilitation procedures based on available scientific data on pup development, physiology and behaviour.

Saimaa ringed seal

The next presentation continued with the theme of ice-breeding seals, on the subject of the Saimaa ringed seal (IUCN - *Critically Endangered*). This talk was by Tero Sipilä of Metsähallitus (Natural Heritage Service, Finland). The principal conservation aim for the Saimaa seal is to save the Lake Saimaa ecosystem and thus allow the Saimaa seal to survive 'naturally'. The population is believed to be physiologically healthy, with the main problem for its survival being fisheries by-catch and coastal developments. However, during past 30 years attempts have been made to care for stranded seals with a variety of traumas or pathologies, but with no success – all seals died shortly after being taken into care. Saimaa seal biologists consider that rehabilitation is not at the present time a very effective method to protect the small, scattered and isolated Saimaa seal population. However, there has been one success story concerning a small orphan pup found at its birth lair beside its dead mother

(death accidental, probably due to asphyxiation). The scientists caught small fish which they partially inactivated by shaking in a barrel before throwing to the pup in the water beside the lair. The pup ate 4–7 fish twice a day for three weeks until the ice melted and the pup swam away. The main principle which Finnish specialists follow during the rehab process was formulated as “Do it as naturally as possible”.

[Post-comment SW](#): This successful *in-situ* rehabilitation of an orphan Saimaa seal pup suggests the possibility that this method might be tried elsewhere with orphan ringed seal pups if the need is identified.

Hawaiian monk seal

Michelle Barbieri (Veterinarian at the Marine Mammal Center, Sausalito, California) spoke briefly of the role of orphan pup rehabilitation in conservation efforts for the Hawaiian monk seal (IUCN – *Critically Endangered*). There have only been two attempts at rehabilitating Hawaiian monk seal orphan pups – the first pup died after 16 days, and the second (known as KP2) survived, but after release he initially appeared to forage and behave normally, but subsequently sought human attention, took food from fishermen - and his rambunctious behaviour in the water with people – together with recurrent ocular problems – meant he had to be taken permanently into captivity. A NOAA programme began in 2012 of experimental translocation of weaned female pups from areas of low pup survival in the NW Hawaiian Islands (the main stronghold of the monk seal) to areas with better survival, with the aim of increasing the number of reproducing females in the NWHI.

Some discussion followed on issues of monk seal pups being conditioned to seek human attention. The question arose whether imprinting matters at all for the animals providing that pups survive in the wild after being kept in captivity. The meeting considered that imprinting with monk seal pups might become an issue for human safety, and also might increase interactions between seals and fisheries leading to negative consequences both to fishermen and the population.

It is possible that a translocation programme (and other programmes such as the ‘Head Start’ project (1981-95), where undersized weaned female pups were held for several months in captive shore pens until they were sufficiently old and robust to forage successfully in the wild) may be a more effective conservation and welfare tool for this species than traditional rehabilitation in a captive environment. However, a dedicated monk seal rehabilitation centre is now being prepared with TMMC. Experience and insights into juvenile monk seal behavior gained from the Head Start project and previous rehabilitation attempts, combined with experience of rehabilitation of Mediterranean monk seal pups, may make orphan Hawaiian monk seal pup rehabilitation a viable option in the future. There are specific problems for juvenile monk seals – unique to these seals, especially in the NWHI – including food limitation and competition from other predators such as Galapagos sharks.

[Post-comment SW](#): An investigation (from the Med. Monk seal literature as well as from the hms experience) of the critical period or length of period during which deleterious ‘imprinting’ occurs could be valuable in helping to make monk seal pup rehab a viable option for the future?

Early survival of stranded and released Cape fur seal pups

The next presentation was given by Greg Hofmeyer of the Port Elizabeth Museum at Bayworld, South Africa on actions taken to rescue pups of the Cape fur seal (*IUCN – Least Concern*) stranded en masse due to storms in Algoa Bay. Although the Cape fur seal is relatively numerous along the west coast of S. Africa and Namibia, the small and isolated population in Algoa Bay, close to the city of Port Elizabeth is considered to be one twentieth of pre-exploitation size and it has been suggested that it may be decreasing further in recent years.

The seals breed on small rocks vulnerable to surges produced by a combination of spring tides and summer storms, and high pup mortality has been recorded in the past following such events. Many pups that have been washed up on the mainland have been collected and returned to their rookery, but it is not known whether they were able to reunite with their mothers and thus survive, or whether, in fact, euthanasia of such stranded pups would be a more humane option. Information on the biology of this species indicates that mothers regularly reunite with their pups after absences of several days indicating that return of pups to their natal rookery should be a valid option. In 2008 following a severe storm 200 pups, with estimated age of between a few days and five weeks, and were stranded and taken to the museum, where they were held for four days, intubated with rehydration salts, and tagged on the fore-flippers. A total of 169 surviving pups, including 52 appropriately tagged, were then returned by boat to the sea surrounding the colony and allowed to swim ashore. Observers visited the site by boat on five occasions during the next four months and photographed (from the boat) all visible tagged pups for later ID. While 27 % of pups were resighted alive during the course of monitoring, only 17% were resighted three months later – with a minimum survival rate adjusted for tag loss of 23%. These findings justify the continuation of the research programme in the event of future mass strandings. During these various interventions will be assessed, such as the desirability of administering rehydration fluids.

Long-term rehabilitation of stranded pups has also been attempted at the Museum, and while there have been successes, these are few.

Post-comment SW: The consensus of several studies of maternal attendance in *Arctocephalus* sp. seems to be that mothers remain onshore with their pups for 5–10 days after birth, nursing them frequently, before making their first foraging trip to sea and leaving the pup for a few days. Very young pups swept off the rock in a storm and carried to the mainland shore may therefore not have sufficient energy and fat reserves to survive the sea immersion and several days from the storm to rescue, holding at the museum, return to the island and reuniting with mother. Possibly the potential for survival of very young stranded pups might be enhanced by intubating them with a multimilk-based formula (to simulate the mother's milk of ~26% fat) rather than only with rehydrating fluids?

Response GH: Pups at this age are easily able to last 10 days without food under the arduous conditions on a rookery, so I don't think that short-term lack of food their survival as much as abandonment by their mother following their absence from their rookery. However, intubating the pups with formula is a valuable suggestion and can be tested. One of the difficulties with long term rehabilitation of fur seal pups is their response to formula and it is a risk that attempting to feed pups may worsen their condition.

Release of captive weaned grey seal pups from temporary holding facility

Ryan Milne (Sea Mammal Research Unit, St. Andrews, UK) gave a brief impromptu talk on the success of release of grey seal pups which had been captured as weaned pups and held (for research purposes) at the SMRU captive facility at St Andrews, UK for up to 6 months. Before release the pups were encouraged to follow fish trailed in the water from a line and were fitted with SRDL tags before release. The results are not yet published, but the pups were apparently able to engage in normal foraging dives after release.

[Post-comment SW](#): This could be especially interesting if this study shows that weanling grey seals hand fed dead fish in captivity for several months can successfully develop normal foraging skills after release.

Research into welfare of seal pups during and after rehabilitation (harbour seal study)

Sue Wilson (Tara Seal Research, UK) gave a talk summarising previous and ongoing studies of rehabilitation procedures for harbour seal 'orphans'. The original study aim (1997-2004) was to 'fast-track' pup growth to allow release close to natural weaning period in the wild. This was achieved for 10 pups, by means of tube-feeding with high fat/protein milk formula and without feeding whole fish. All pups were kept in pairs, or single pups allowed contact with human carer. Post-release radio-tracking indicated that the foraging locations and dive times of these pups was similar to previously tracked wild weanling pups.

More recent studies (2010 to present) have focused on harbour seal pup welfare in rehabilitation. Many or most pup rehab facilities in the UK and Ireland keep orphan pups of nursing age in isolated cells with no conspecific contact, minimal contact with a human carer and sometimes with no water access. This has given rise to concerns over pup welfare and normal social development, since in the wild pups are in virtually continuous social contact with their mother and proximity to other animals, and also spend a large proportion of their active time in shallow water or at the water's edge, where much social interaction with the mother occurs. The ongoing research programme involves quantifying pups' activity budget including – for wild pups and orphan pups reared socially – time spent in contact and in active interaction. Pups reared socially spend almost all of their time in close contact, either asleep or interacting – some aspects of this contact suggest that pups act as mother-surrogates for each other. Orphan pups kept in isolation for the first 3-4 weeks did not interact normally when finally allowed contact. Preliminary studies to quantify the 'need' for conspecific contact have also been carried out. Corticosteroid concentrations in urine and faeces are also being analysed, and it is hoped to extend this biomarker investigation to include urinary oxytocin.

It is hoped that the results of this research programme may provide the basis for designing rehabilitation facilities and procedures to maximize welfare and ensure normal socialisation of pups.

A study of the effects of maternal presence in reducing stress in wild harbour seal pups in Alaska is currently being carried out by Shannon Atkinson and colleagues, and this work is expected to be published shortly.

Formation of an online seal rehabilitation forum

At the end of the meeting the few remaining participants (many people had to leave early to attend other talks!) suggested it would be a good idea to have an informal forum to keep sharing ideas and experience – a facebook page for the Seal Conservation Society was suggested, and Ira Trukhanova said she would be willing to set this up for all the workshop participants and other colleagues who were unable to come to Dunedin

Thanks to SMM and all participants in the workshop

We would like to thank SMM for facilitating the workshop during the conference week – and to all the participants who made the time to come to the meeting.