“Jessica”
Oiled wildlife response Galapagos Islands
January-February 2001

SEA ALARM FOUNDATION
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Hugo NIJKAMP

SEA ALARM FOUNDATION
Summary

January 2001, the “Jessica” ran aground in the Galapagos Islands, causing an oil spill threatening one of the world’s most vulnerable environments and its wildlife. Sea Alarm Foundation sent an expert team of three sea mammal specialists to the archipelago to assist local organisations with the wildlife rescue and rehabilitation activities.
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Introduction

Stranding of the “Jessica”, causing an oil spill in the Galapagos Islands

On Tuesday, January 16, 2001, the Ecuadorian registered “Jessica” ran aground half a mile from the Galapagos’ main port, Puerto Baquerizo Marenos, situated on San Cristóbal, the easternmost island in the archipelago. The Jessica was carrying fuel for use by the Ecuadorian Navy, who have a base at the port, and also a private tour boat operator. On Saturday and Sunday following the incident, strong waves caused structural damage to the hull of the ship and about 144,000 gallons of diesel and bunker oil spilled into the sea, threatening some of the world’s rarest coastal and marine animals, including birds, mammals and reptiles. Another 96,000 gallons of fuel remained aboard the ship and could be stabilised and removed.

The oil spilled caused a direct impact on the environment of two islands, San Cristóbal and Santa Fé, where oiled wildlife was recovered by staff of the National Park Service and the Charles Darwin Station. On Sunday 21 January, the Charles Darwin Institute called out via the Internet for international assistance with wildlife rescue and rehabilitation.

Sea Alarm Foundation’s wildlife response in the Galapagos: marine mammals

In reaction to a call through the international sea mammal network, Sea Alarm Foundation assembled a ‘first wave’ team of sea mammal experts. It consisted of experts from the Seal Rehabilitation and Research Centre (NL), Emmen Zoo (NL) and RSPCA (UK) and was co-
ordinated by Sea Alarm Foundation (B). Personal details can be found in Annex 1. A marine reptile specialist from Acquario di Genova (I) was placed on stand-by in Europe and could be flown in if necessary.

The Galápagos islands and their wildlife

The Galápagos Archipelago is located ca 960 km west of mainland Ecuador and straddles the equator at the 90th meridian west. It consists of thirteen large islands (>10 km²) six smaller islands and over forty islets with official names and numerous unnamed rocks and islets. The Galapagos islands have a volcanic origin, and their relative physical isolation forms the background of an extraordinary environmental setting and natural history.

The Galápagos islands have become inextricably linked with Charles Darwin’s voyage with HMS Beagle. Darwin’s wildlife observations on the different islands stimulated him in developing his theory of evolution described in “The Origin of species”. Over the last century since Darwin, the Galápagos islands have remained largely undeveloped, and are famous for their undisturbed nature and wildlife. They have often been called a “laboratory of evolution” and are scientifically one of the most interesting and best studied of the world’s archipelagos.

Marine mammals of the Galapagos islands

The Galapagos sea lion and fur seal are among the six mammals that are native to the islands. They both belong to the Otaridae, or eared seal family.
The Galapagos sea lion

The Galapagos sea lion is a subspecies of the Californian sea lion. They are common in the islands where there are sandy beaches and gentle rocky shores. Their number is estimated at about 50,000 individuals. Little is known about their life at sea, but on land they form colonies at their haul-out areas.

The Galapagos fur seal

The Galapagos fur seal is closely related to the southern fur seal which is widely distributed in the cool waters of South America and Antarctic islands. Their population is estimated about the same size as the Galapagos sea lion (ca 50,000). However, they are less often seen. They are nocturnal feeders, and while hauled out during the day they prefer steeper more rugged shores with plenty of shade.

Sea Alarm Foundation

Sea Alarm Foundation (SAF) was founded in 2000 in the Netherlands after two years of preparation and many years of experience in international wildlife emergency assistance. Sea Alarm Foundation aims to bring together international expertise and the best available techniques on wildlife emergency responses, especially to major oil spills. Its major objective is to respond to major oil spills within 24 h anywhere in the world by offering tailor-made oiled wildlife rescue and rehabilitation expertise, materials and funds to cover a cost-effective wildlife response operation that meets internationally accepted standards.

Preparation

Notification and response

The international call for help by the Darwin Institute was received by Peter Haddow (Seal Conservation society) who notified the international marine mammal rescue network. This message was received by the Seal Rehabilitation and Rescue Centre (SRRC) in the Netherlands. On Monday morning 22 January, Sea Alarm Foundation, through the SRRC, offered assistance with the rehabilitation of marine mammals to the Charles Darwin Station. This offer was immediately accepted and the next day officially confirmed by Robert Bensted.
Smith, director of the Charles Darwin Station. SAF sent its team to the Galapagos on Tuesday evening 23 January. The team arrived at Galapagos Thursday morning 25 January.

Arrangements made

Financial arrangements

On Monday 22 January, after having received Charles Darwin Station’s emergency call, SAF, through the SRRC, submitted a request for the financial support to His Royal Highness Prince Bernhard of the Netherlands. This request for FL 20,000 was almost immediately approved by the Prince.

Logistics and organisation of the operation

Sea Alarm Foundation recruited the experts for the first wave response from the SRRC, Emmen Zoo and the RSPCA and provided a co-ordinator from its own staff. The SRRC arranged the flight bookings and, together with Emmen Zoo, prepared a first aid kit for marine mammal rescue and rehabilitation. RSPCA Norfolk Wildlife Hospital prepared the veterinary equipment.

The Dutch Ministry of Foreign Affairs, informed by the SRRC, secured diplomatic assistance by the Dutch Council in Guayaquil and informed the Ecuadorian Ministry of Environment. The Dutch Councillor and Ecuadorian Vice Minister welcomed and assisted the team at Guayaquil Airport.

Response

Arrival and Briefing

After arrival on Thursday 25 January, the SAF team was welcomed at the airport by a Charles Darwin Station Representative. Together with the SAF team, IFAW’s International Team arrived, who were invited by the Charles Darwin Station to assist with bird rescue and rehabilitation. Both teams were briefed on Thursday afternoon 16.00 by Hernan Vargas, senior scientist at the Charles Darwin Station in Santa Cruz.

Organisation Wildlife response

Through the Charles Darwin Station, two international teams had officially been invited by the national authorities: Sea Alarm Foundation to assist with the marine mammal rescue and rehabilitation and IFAW’s International Oiled Wildlife Team to assist with the bird rescue and rehabilitation.
The Minister of Environment, together with the Ecuadorian Navy Commander led the total oil spill response operation (Annex 3). Under this authority, The National Park Service, assisted by the Charles Darwin Research Station, was responsible for clean up operations and wildlife rescue and rehabilitation activities. The wildlife operation was co-ordinated by a National Park Service representative and an international counterpart. These co-ordinators developed an organisation and communication strategy for the wildlife operation (Annex 4).

Wildlife inspections and observations

Wildlife inspection and observation expeditions (Annex 5) generally were carried out by the SAF team on request of the coordinating team. The expeditions were always attended by local experts of the Charles Darwin Centre and the National Park Service and volunteers of the Charles Darwin Centre who offered logistic assistance. Resources (boats, gasoline, captain, crew) were made available by the National Park Service, the Charles Darwin Centre, or both. In some cases, transportation from one island to the other had to be arranged by the SAF on a commercial basis with private operators.

Termination of the response activities

Termination of the marine mammal response activities was decided January 31 between the Sea Alarm Foundation coordinator and the International coordinator. The reasons for this decision were:

• To that day, no real oiled mammal emergencies had been encountered in any part of the archipelago, neither by the international coordinator, nor by the SAF team.
• Although almost daily the wildlife response team received alarm calls that oil was
threatening beaches in the archipelago, each undertaken inspection mission to a reported location demonstrated that there was no oil and that marine mammals were not at risk.

- Reports from the aerial surveys demonstrated that the spilled diesel had evaporated and most of the heavy bunker oil had been carried away by wind and currents and ceased to cause a major threat to marine wildlife.
- An algal bloom with a oily surface appearance occurred in the western coastal waters of Isabella, and it was known that this massive algae abundance could not be easily distinguished from oil by the aerial surveys.

**Results**

**Protocols**

Two protocols were developed regarding the wildlife rescue and rehabilitation operation. A general protocol was developed by the overall wildlife coordination team, consisting of a operational strategy and guidelines from internal and external communication (Annex 4). A protocol on sea lion capture and rehabilitation was first drafted by local experts and approved with an extension on medication and euthanasia by the SAF experts and the coordinating team (annex 5). This latter protocol contained the criteria for the selection of oiled animals whose recovery would require capture and rehabilitation. A conservative approach formed the basis of these criteria: it was agreed among the experts that the disturbance of capture could cause more harm to slightly affected animals than the expected benefits of rehabilitation.

**Oiled wildlife rescue and rehabilitation**

**Before arrival experts**

Before the international experts had arrived, the National Park Service and the Charles Darwin Station had caught, washed and released 6 sea lion pups and a few Pelicans at Santa Fé.

**After arrival of the wildlife experts**

From the surveillance actions undertaken by the SAF team and the International Coordinator it quickly appeared that the Galapagos archipelago had escaped from a major wildlife emergency (Annex 6).
contamination was observed within colonies at Santa Fé and San Cristóbal, mainly among pups and juveniles (Annex 7). Also at Isabella island a few individuals were found affected. In none of these cases did the amount of oil on the fur of these animals meet the criteria for capture and rehabilitation that were laid down in the protocol. Therefore no sea lions have been caught by the SAF team. Only one pup was caught by the international coordinator in the presence of the SAF team during the inspection mission to Santa Fé. The pup had earlier been washed and was caught to examine its eye infection and general health status.

Eye infections and educational expedition

During the different surveillances in the archipelago, eye disease of apparently infectious origin was observed in many pups and juvenile animals. These observations were made by the SAF team on different islands, including San Cristóbal, Santa Cruz (Isla Caamaño), Santa Fé and Isabella. Local experts confirmed that this eye infection already existed before the Jessica oil spill, although it was assumed that oil contamination could have worsened the situation for individual sea lions. The SAF team, in co-operation with the coordination team and local experts of the National Park and Charles Darwin Centre attempted to organise an educational expedition in order to take eye swabs and blood samples. Originally the expedition was planned to Santa Fé but unfortunately access at this island was not possible on the planned day. The National Park offered Isla Caamaño as an alternative location to take the samples. However, due to the rough sea conditions which made landing on the island impossible, this expedition had to be cancelled. No samples could be taken.

Although the infection does not at present appear to pose a serious threat to the survival of affected individuals, the presence of disease in such a small and isolated population is
always a cause for concern, and worthy of investigation. It was felt among the local and SAF experts that in the near future sampling should be undertaken within the context of a follow-up strategy.

Preparedness training San Cristóbal

The idea to organise a preparedness training at San Cristóbal came from the local Charles Darwin Research Station and was supported by the National Park. The aim of the initiative was to involve and train local people in post spill monitoring and how to respond to small wildlife emergencies that would affect sea lions. Together with the Charles Darwin Research Centre, Sea Alarm Foundation’s representative organised two training sessions. A theoretical session (February 9th) included species recognition, behaviour, observations, exchange of experience, team building, importance of prevention, response techniques, possible approaches, examples of emergencies. A practical session (February 13th) was a field exercise on observation and monitoring, behaviour, recognition of social structures and habitat characteristics. After these training sessions, the participants discussed ideas for a follow-up programme.

Follow-up activities

A number of follow-up activities were discussed with representatives and experts of the National Park Service and the Charles Darwin Station.

Wildlife emergency planning

When the Jessica ran aground, the Galapagos islands did not have a contingency plan in place, let alone a wildlife contingency plan. The complex spatial character of the archipelago, its highly natural character with scarce human settlements, poor communication and transport facilities but unique flora and fauna requires thorough thought on how to respond to a future wildlife contingency, taking the Jessica incident as a warning experience.

Wildlife contingency planning is one of the mainstream activities of Sea Alarm Foundation, a field in which co-operation with industry is anticipated. Sea Alarm Foundation could offer assistance to the local authorities in the development of contingency planning in general and wildlife contingency planning in particular.

Contact person: Mauricio Velasquez. National Park Service

Preparedness training

San Cristobal’s Charles Darwin Station is keen to assist with a local programme on preparedness training. This programme would involve local experts, volunteers and local residents who are to be trained in emergency wildlife response activities, including:
• Base line education on population dynamics and ethology
• Monitoring and surveillance programmes
• Catching and veterinary sampling techniques
• Characteristics of oil spill emergency operations
Contact person: Maria Eugenia Proano. Charles Darwin Station San Cristóbal

Eye infection sea lion pups

The eye infection in sea lion pups is worth a systematic approach of ongoing veterinary monitoring.
Contact persons: Marilyn Cruz, David Cruz and Sandie Salazar.

General veterinary co-operation

From veterinary discussions it was concluded that the general health situation of the Galapagos’ wildlife would benefit from more thorough veterinary attention to support the existing conservation programme. Due to the lack of human and material resources, no base line studies exist concerning the bacteriological and virological background of sea lions, fur seals and other wildlife populations, including the terrestrial species. Urgent attention is stressed, because domestic animals (dogs and cattle) are frequently seen to interface with wildlife population, posing a serious threat. The potential transfer of diseases from domestic dogs to the sea lion population in the different islands requires immediate attention.
Contact persons: Marilyn Cruz and David Cruz, National Park Service, Santa Cruz

Training programmes

For individual professionals, Sea Alarm Foundation could organise training programmes in Europe, in co-operation with Sea Alarm Foundation’s network organisations.
Contact persons: Sandie Salazar, Maria Eugenia Proano, Mauricio Velasquez

Evaluation

Worldwide, wildlife emergency planning is only exceptionally part of contingency planning. The disaster in the Galápagos islands illustrated how important it is to have plans and resources in place as a matter of preparedness for wildlife emergencies. Fortunately, the size of the Jessica disaster was limited because of a natural coincidence in which seasonal winds and currents took the bulk of the pollutants away from the fragile coasts to open sea. However, should it have been otherwise, then the incident probably would have caused major wildlife losses. The combination of limited local resources (boats, gear, materials), the absence of a robust contingency plan with clear command structures and trained professionals, poor communication facilities, and the complex natural characteristics of the archipelago would have seriously limited an effective emergency response.
Because the Jessica was not a major spill, and did not cause a major environmental threat, both the oil spill response operation and the wildlife rescue activities retrospectively could be
considered as a realistic contingency drilling exercise. It is important that lessons are drawn from this experience. These lessons are not only important to national Ecuadorian authorities and agencies, but also to responsible authorities in many other remote areas in the world, both in undeveloped and developed countries. The international community has in its hands now a highly symbolic example that demonstrates how natural heritage can be at risk if proper arrangements and regulations are not in place or maintained.

Acknowledgements

The Sea Alarm Foundation would like to thank the Galapagos National Park Service, the Charles Darwin Research Station, the Ecuadorian Ministry of Environment, IFAW’s International Team, the Dutch Consulate Guayaquil and the Dutch Ministry Foreign Affairs. A grant by Bernhard, Prince of The Netherlands, made it possible for Sea Alarm Foundation to assist with the oil spill response activities at the Galapagos Islands.

List of Annexes

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2. Organisation of response
3. Organisation strategy
4. Overview activities
5. Protocol on capture and rehab
6. Official list of affected animals
7. Monitoring Report
Annex 1

Personal details Sea Alarm Foundation Galapagos Team

Lenie ‘t Hart
Director Seal Rehabilitation and Research Centre
Netherlands

Andreas van Gemmert
Head of Care Emmen Zoo
Netherlands

Ian Robinson
Director RSPCA Norfolk Wildlife Hospital
United Kingdom

Hugo Nijkamp (Coordinator)
Project director Sea Alarm Foundation
Director Argo Sea Use and Wildlife Consultancy
Belgium

Annex 2

Organisation of the oil spill and wildlife response
Annex 3
Organisation and communication strategy for the wildlife operation

ESTRATEGIA PARA EL RESCATE DE VIDA SILVESTRE

MARCO ADMINISTRATIVO

El organismo encargado del manejo y conservación de la vida silvestre, de acuerdo a lo definido para el manejo de la Contingencia, es el Parque Nacional Galápagos a través de los funcionarios que designe para cumplir los objetivos de este operativo.

Todas aquellas personas que deseen conformar el equipo o tener acceso a las operaciones que éste realice, deben seguir los lineamientos establecidos en esta estrategia.

El manejo y distribución de los equipos de trabajo estarán a cargo del personal que el Parque Nacional Galápagos designe para este propósito.

OBJETIVOS Y METODOLOGÍA

- El objetivo fundamental de esta estrategia es recuperar la mayor cantidad de animales que, de acuerdo a su condición general, puedan tener una mayor probabilidad de supervivencia.

- Para tratar a los animales que están afectados por el derrame de petróleo y para proteger su hábitat, vamos a limpiar y rehabilitar a los animales de esta manera ellos podrán ser devueltos luego de un período de cuarentena de cinco días.

- Para cumplir este se ha decidido organizar equipos de especialistas que se encargaran de un manejo apropiado y rehabilitación de animales.

- Los especialistas entrenaran a un personal local en las tareas arriba especificadas para que ellos sean capaces de tener un manejo apropiado y humano. Luego de esto se liberara a los animales en los sitios en los cuales el personal halla realizado ya las labores de limpieza de playas.

- Los equipos de trabajo estarán integrados por un guarda parque, una persona de la ECCD con experiencia en una taxa determinada, de preferencia bilingüe.

PROTOCOLO DE COMUNICACIÓN

- Establecer horarios de visitas de periodistas.

- Contar con un equipo de apoyo de comunicación, definido por el PNG, que mantenga un registro visual constante de las actividades y hallazgos.

- La voz autorizada para el manejo de las operaciones de captura, limpieza, rehabilitación y monitoreo de animales es el Parque Nacional Galápagos, únicamente a través de los funcionarios que designe para esta labor. Cualquier miembro que emita criterios que no hayan sido previamente consensuados o aprobados por los coordinadores de este operativo, serán separados del equipo.

- Todos los sub-coordinadores de los equipos de trabajo deberán llenar un formulario de registro de actividades y de hallazgos.
## Annex 4
### Overview activities (day to day)

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>Activities</th>
<th>Contacts with co-ordination team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 25</td>
<td>Th</td>
<td>Arrival Baltra/Sta Cruz, team split up</td>
<td></td>
</tr>
<tr>
<td>Jan 26</td>
<td>Fr</td>
<td>Inspection locations at Sta Cruz, San Cristobal, Sta Fe</td>
<td>Meeting with Coordination Team, Strategy</td>
</tr>
<tr>
<td>Jan 27</td>
<td>Sa</td>
<td>Team reunited at San Cristobal</td>
<td>Meeting with Coordination Team</td>
</tr>
<tr>
<td>Jan 28</td>
<td>Su</td>
<td>Material and equipment</td>
<td>Meeting with Coordination team</td>
</tr>
<tr>
<td>Jan 29</td>
<td>Mo</td>
<td>Transport to Sta Cruz</td>
<td>Merge with international coordinator</td>
</tr>
<tr>
<td>Jan 30</td>
<td>Tu</td>
<td>Expedition to Isabella Island, team split up at Isabella</td>
<td>Inspection Isabella Island</td>
</tr>
<tr>
<td>Jan 31</td>
<td>We</td>
<td>Team reunited at Sta Cruz</td>
<td>Inspection Isabella, Fernandina, Santiago, Pinzon and Sta Cruz islands</td>
</tr>
<tr>
<td>Feb 1</td>
<td>Th</td>
<td>Return LH to Europe</td>
<td>Assistance, monitoring, advice</td>
</tr>
<tr>
<td>Feb 2</td>
<td>Fr</td>
<td>Assistance, monitoring, advice</td>
<td>Termination of marine mammal response action</td>
</tr>
<tr>
<td>Feb 3</td>
<td>Sa</td>
<td>Veterinary exercise El Caamaño island (cancelled due to sea and weather conditions)</td>
<td></td>
</tr>
<tr>
<td>Feb 4</td>
<td>Su</td>
<td></td>
<td>International coordinator returns to Canada</td>
</tr>
<tr>
<td>Feb 5</td>
<td>Mo</td>
<td>Return IR and HN to Europe</td>
<td></td>
</tr>
<tr>
<td>Feb 6</td>
<td>Tu</td>
<td>AG to San Cristobal</td>
<td>Preparation Friday's educational session</td>
</tr>
<tr>
<td>Feb 7</td>
<td>We</td>
<td></td>
<td>Preparation Friday's educational session</td>
</tr>
<tr>
<td>Feb 8</td>
<td>Th</td>
<td></td>
<td>Educational session</td>
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<td>Feb 9</td>
<td>Fr</td>
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<td>Feb 10</td>
<td>Sa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 11</td>
<td>Su</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 12</td>
<td>Mo</td>
<td></td>
<td>Field excursion</td>
</tr>
<tr>
<td>Feb 13</td>
<td>Tu</td>
<td></td>
<td></td>
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<tr>
<td>Feb 14</td>
<td>We</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb 15</td>
<td>Th</td>
<td>Return AG to Europe, End of Sea Alarm Foundation's Galapagos mission</td>
<td></td>
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LH: Lenie 't Hart; IR: Ian Robinson; AG: André van Gemmert; HN: Hugo Nijkamp
Annex 5
Protocol for the handling, cleaning and treatment of the
Galapagos Sea lion (Zalophus wollebaeki)

Charles Darwin Research Station
Department of Marine Research and Conservation

Contingency Plan for the Shipwreck of the Cargo Boat Jessica

Protocol for the Handling, Cleaning and Treatment of the Galapagos Sea Lion (Zalophus wollebaeki).

Sandie Salazar, Godfrey Merlen

1. Evaluation terms for the capture of marine sea lions

History: The shipwreck of the fuel ship Jessica took place in the Bahia Naufragio, San Cristobal Island on Tuesday 16th January, 2001.

Objective: to ensure the well-being and the recovery of the colonies of marine sea lions, possibly affected by the spill of fuel from the ship Jessica.

Considerations for the capture and cleaning of the affected animals. Recommendations from personnel qualified in veterinary treatment of pinnipeds have also been taken into account.

It is advisable also, to keep in mind that the cleaning of the environment that surrounds the animal is extremely important. For this reason, environmental clean-up should be executed immediately in order to avoid recontamination of the treated animals.

1.1 Priorities for the capture and treatment of sea lions.

As a general recommendation, medium and long term handling in captivity should be avoided. The treated animals should be returned as soon as possible to the location where they were captured. They should only be transferred to a different location if the sea water and the coast at the colony have a high level of contamination (>60%); in this circumstance, it is recommended to relocate the pup to the nearest part of the coastline which is clean.

1.1.1 Pups (1) and Juveniles (2)

(1) Animals younger than a year of age, between 50 and 85 cm of body length. They are also recognized by their “lanugo” (fine and fluffy coat).

(2) Animals between 1 and 2 years of age, whose size is between 90 and 110 cm. There are no external differences allowing determination of the sex of an individual.

a) Severely stained: more than 50% of the body is stained or shows presence of bunker and/or diesel is present on and/or around the head or face.

b) Deep staining on part of the body (except the front and back fins): when the hydrocarbon (diesel or bunker) is in direct contact with the skin.

c) Slightly stained individuals which are DEHYDRATED: (if they are not dehydrated, the slight staining should not present a priority for capture and treatment). Weak individuals, with signs of inanition (emaciation) and staining.

1) Criteria for euthanasia

a) An animal which is impacted by oil but showing systemic signs which would require prolonged rehabilitation. (e.g. a pup showing moderate or worse emaciation, CNS signs or other significant disease.)

b) A pup which becomes orphaned and therefore in need of prolonged rehabilitation because of the consequences of oiling, either directly or as a result of the rescue attempt. (e.g. a pup which has been oiled or oiled and washed and after monitoring is found to be abandoned, loosing weight and becoming emaciated.

1) Criteria for drug use

a) Following handling and washing there may be indications for use of drugs and other medicines. The stress and muscular activity of struggling during handling for a prolonged time (maybe 20mins) during washing, and the effects of oil and detergent, could result in dehydration and increased susceptibility to infections. It may be appropriate to administer drugs and medicines: rehydration fluids, long acting antibiotics, eye ointments.

b) Marine mammals are prone to exhibiting apnoea and bradycardia under stress and there may be a need to use emergency resuscitation drugs: dexamethasone, adrenaline, respiratory stimulants.

We would like to agree with the National Park to this protocol, and establish the ground rules within which the veterinarian in attendance can take immediate action. For example, if after the agreed monitoring period it was found that a washed pup had been abandoned and was suffering emaciation.

Only animals which have been affected by oil, or suffer as a result of our intervention are included. These animals should be considered separate to natural mortality: As representatives of animal welfare organizations (SRRC, RSPCA) our intention is to prevent suffering, and if intervention is impossible or unsuccessful, it is unacceptable to allow that victim of the oilspill to continue to suffer.

Actions taken and drugs administered would be fully recorded as part of the standard monitoring and recording procedure for all rescue activities.
Annex 6
Official list of affected animals

(received from Galapagos National Park Service)

<table>
<thead>
<tr>
<th>Species</th>
<th>Number</th>
<th>Date</th>
<th>Location</th>
<th>Island</th>
<th>Killed</th>
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<tbody>
<tr>
<td>Brown Pelican</td>
<td>4</td>
<td>25-Jan</td>
<td>Isla Lobos</td>
<td>Cristóbal</td>
<td>1 (Euthanasia)</td>
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<td></td>
<td>7</td>
<td>26-Jan</td>
<td>La Paredial</td>
<td>Cristóbal</td>
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<tr>
<td></td>
<td>5</td>
<td>27-Jan</td>
<td>La Paredial</td>
<td>Cristóbal</td>
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<tr>
<td></td>
<td>2</td>
<td>28-Jan</td>
<td>Bahía naufragio</td>
<td>Cristóbal</td>
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<tr>
<td></td>
<td>4</td>
<td>29-Jan</td>
<td>La Paredial</td>
<td>Cristóbal</td>
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<tr>
<td></td>
<td>1</td>
<td>30-Jan</td>
<td>Manglecito</td>
<td>Cristóbal</td>
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<tr>
<td></td>
<td>1</td>
<td>1-Feb</td>
<td>Pelican Bay</td>
<td>Sta. Cruz</td>
<td></td>
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<tr>
<td></td>
<td>1</td>
<td>2-Feb</td>
<td>Pelican Bay</td>
<td>Sta. Cruz</td>
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<td></td>
<td>3</td>
<td>30-Jan</td>
<td>La Paredial</td>
<td>Cristóbal</td>
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<td>13-Feb</td>
<td>Las Cueva</td>
<td>Floreana</td>
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<td>27-Jan</td>
<td>Tijeretas</td>
<td>Cristóbal</td>
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<td>27-Jan</td>
<td>Pta. Carola</td>
<td>Cristóbal</td>
<td></td>
</tr>
<tr>
<td>Pacific Green Turtle</td>
<td>2</td>
<td>25-Jan</td>
<td>Playa Ochoa</td>
<td>Cristóbal</td>
<td></td>
</tr>
<tr>
<td>Lava Gull</td>
<td>1</td>
<td>26-Jan</td>
<td>La Paredial</td>
<td>Cristóbal</td>
<td></td>
</tr>
<tr>
<td>Franklin’s Gull</td>
<td>1</td>
<td>29-Jan</td>
<td>La Paredial</td>
<td>Cristóbal</td>
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<tr>
<td>Audubon’s shearwater</td>
<td>2</td>
<td>25-Jan</td>
<td>Floreana</td>
<td>Floreana</td>
<td></td>
</tr>
<tr>
<td>Red Lava Crab</td>
<td>3</td>
<td>26-Jan</td>
<td>Floreana</td>
<td>Floreana</td>
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<tr>
<td>Galapagos Sea Lion</td>
<td>1</td>
<td>27-Jan</td>
<td>El Muerto</td>
<td>Cristóbal</td>
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<tr>
<td></td>
<td>1</td>
<td>30-Jan</td>
<td>Puerto Ochoa</td>
<td>Cristóbal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>23-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td>(died of natural causes)</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>24-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>25-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>26-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>27-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>28-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>29-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>30-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>31-Jan</td>
<td>Bahía</td>
<td>Santa Fé</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>27-Jan</td>
<td>Pta. Carola</td>
<td>Cristóbal</td>
<td></td>
</tr>
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</table>

TOTAL affected animals = 84
TOTAL killed: 10
Thursday 25/01/01
Accompanied the Bird Rescue Team by bow to Isla Lobos and Punta Manglecito along with Sandie Salazar. As this took place during the day an accurate count did not take place as many animals were in the water. However, no oiled animals were observed. No observations on land were carried out. Evidence of both fuel oil (mousse) and diesel were observed, especially in Playa del Muerto.

In our opinion the quantity of oil observed did not pose an immediate threat to sea lions.

In the late afternoon, Zone 2 (the Naval base) was visited before going to La Loberia. In the company of Sandie Salazar. An accurate count was not performed as time was short and we wanted an overview of the situation.

No oiled animals were observed in either of these locations.

At La Loberia, many pups were affected by what appeared to be an infectious, possibly bacterial, conjunctivitis. There were varying degrees of purulent greenish yellow discharge from the eyes, usually bilaterally. Ulceration was not a marked feature. The disease had been previously noted by Sandie Salazar and is discussed in her report. We support her recommendation that this outbreak is worthy of further investigation but is not considered to be related to the oil spill.

Friday 27/01/01
In the late afternoon veterinarian I Robinson was called to examine one juvenile sea lion on the Naval base pier. This animal had a wound of c.15 cm diameter surrounded by a large area of hair matted with discharge, on the left side of the neck. The wound did not appear to penetrate beyond the skin to the blubber layer but did appear to be irritant, causing scratching which was exacerbating the damage. In the opinion of the above, this wound is most likely a localised chemical burn due to contact with a highly irritant substance such as gasoline and is therefore unlikely to be related to the oil spill.

Saturday 28/01/01
Visit to La Loberia in the late afternoon, with Godfrey Merlen and Vanessa Francisco.

Total count of individuals: 94
Juveniles: 16
Females: 38
Pups: 30
Males: 10

In the small colony near La Loberia, there were 5 juveniles, 4 females and 1 adult male. No oiled animals were observed in either colony.

On the beach of La Loberia many pups were observed with conjunctivitis. It was estimated that over 50% of pups were affected. However, only six individuals were classed as moderate to severe.

In contrast to La Loberia, a high incidence of corneal oedema and superficial ulceration was observed in four animals but was considered to be less severe than that observed at Santa Fe. No oiled animals were observed.

Sunday 28/01/01
Count and observation of the colony in Zone 2, at the Naval base in the early morning.

Adult Males: 6
Adult females: 17
Juveniles: 36
Pups: 15

No oiled animals were seen. The juvenile observed on 27/01/01 was seen again. The wound appeared improved, reduced to approx 10cm diameter, with the area of hair matted with discharge around the wound also reduced. It was considered that no further action was necessary.

In the green pool and front beach, 25 individuals were counted, principally sub-adult males. No oiled animals were observed.

In the afternoon an impromptu visit was made to Santa Fe whilst en route to Santa Cruz in the company and on the direction of Earl Peterson (wildlife rescue co-ordinator). Animals on the rocky point and on the beach were examined. An accurate count was not performed. As at La Loberia on San Cristobal, a high incidence of eye lesions (over 50%) was noted in pups and juveniles. However, in contrast to La Loberia, a number of individuals with significant corneal oedema and shallow ulceration were observed. Also some animals with corneal oedema showed little pussy discharge. This colony contained oiled animals washed and treated by National Park and Darwin Institute staff prior to our arrival in Galapagos. However, as animals were unmarked it was impossible to determine if the animals with more severe eye lesions were those which had been washed and treated. No animals showed visible oil remnants at this stage. It was considered advisable that further monitoring of these animals should take place, preferably at 3-4 day intervals. However, circumstances were to make it impossible for the Marine Mammal Team to perform this monitoring.

Tuesday 30/01/01
Isabella Island.
A visit was made to La Loberta Island in the early afternoon. An accurate count was not performed because of the time of day, and the need to obtain a rapid overview. No oiled animals were observed. Again, eye lesions in pups were present in high numbers of juveniles and pups, and considered to be primarily of infectious origin. Corneal oedema and superficial ulceration was observed in four animals but was considered to be less severe than that observed at Santa Fe. No oiled animals were observed.

Wednesday 31/01/01
Circumnavigation of Isabella and return to Santa Cruz on the National Park vessel ‘Guadalupe River’.
In response to reports from overflights, a check was to be made on the Sound between Isabella and Fernandina. Members of the Marine Mammals Team accompanied National Park and Darwin Station staff on this voyage. Fortunately, no oil was discovered, the cause for concern proving to be an algal bloom. No oiled animals or birds were observed.

Friday and Saturday 02/02/01 and 03/02/01
Attempts were made to arrange a further monitoring trip and training exercise in conjunction with National Park and Darwin Institute staff, firstly at Santa Fe, then at El Caamaño Island. The prime objective of this exercise was to work together and share expertise in handling, examination and sampling techniques. Also we hoped to obtain clinical samples from pups affected by eye disease for further laboratory analysis. Unfortunately, a combination circumstances made this exercise impossible.