Wildpro
Wildlife: Oil Spill Response

Debra Bourne
Wildlife Information Network
www.wildlifeinformation.org
dbourne@wildlifeinformation.org

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"... disseminate knowledge of the health and management of free-ranging and captive animals and their environments, together with emerging infectious diseases, to professionals and decision-makers worldwide."

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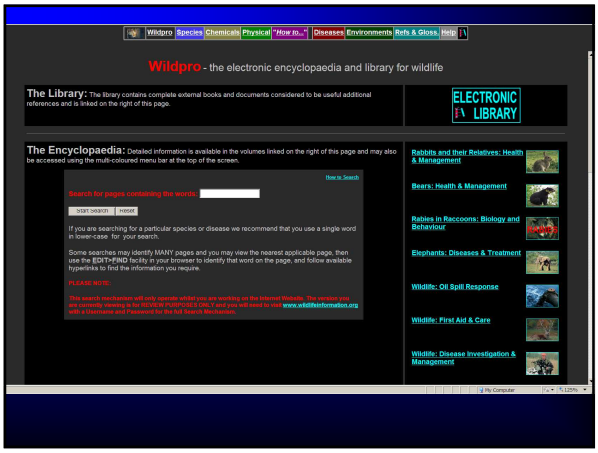

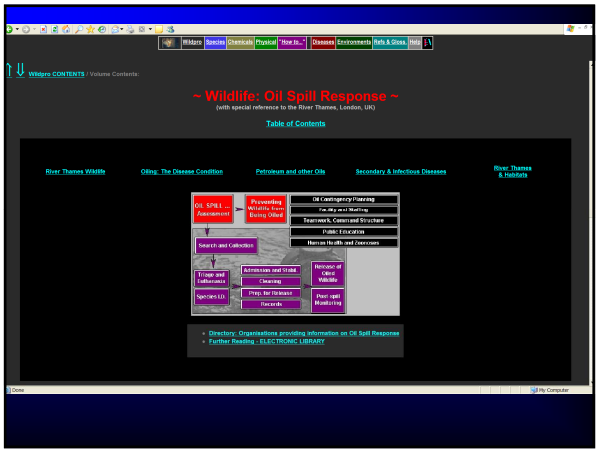

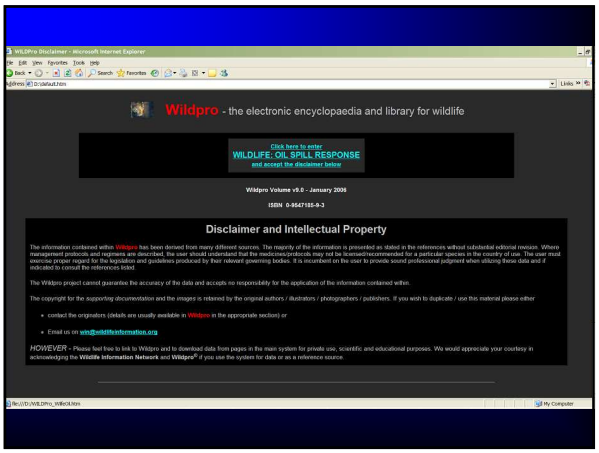
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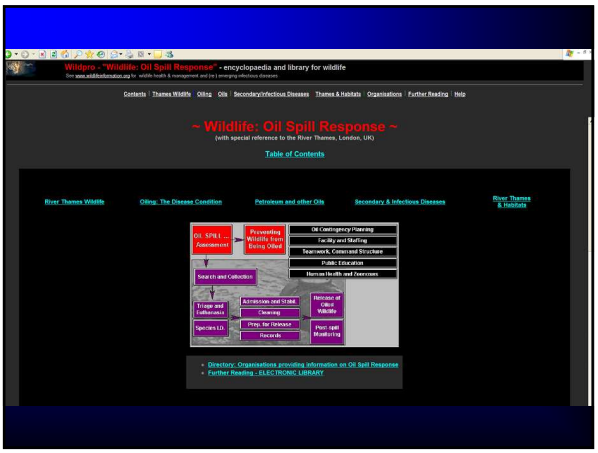
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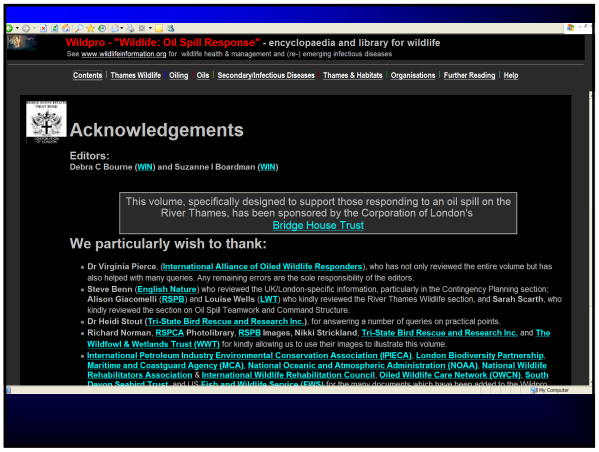
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We particularly wish to thank:


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NOTE: The information in this volume is intended as a resource to assist anyone planning for, or undertaking, oiled wildlife response, in particular on the River Thames in London, UK, to provide the best possible response. However, it is NOT a substitute for proper, hands-on training in oiled wildlife rescue, cleaning and rehabilitation. While every attempt has been made to include the most up-to-date, effective, procedures, it is important to remember that practical knowledge of oiled wildlife rehabilitation is constantly being developed and improved, using lessons learned in previous spills.
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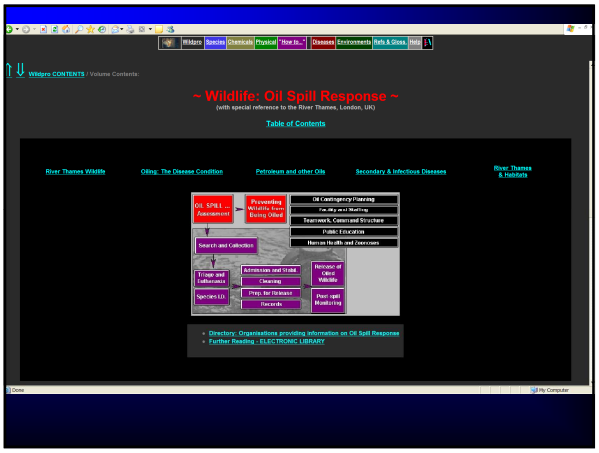
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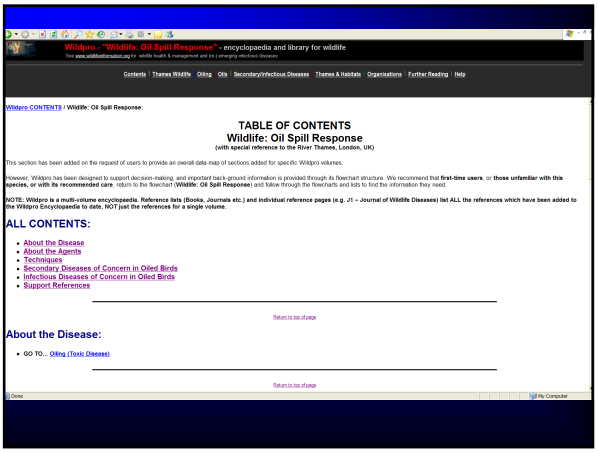
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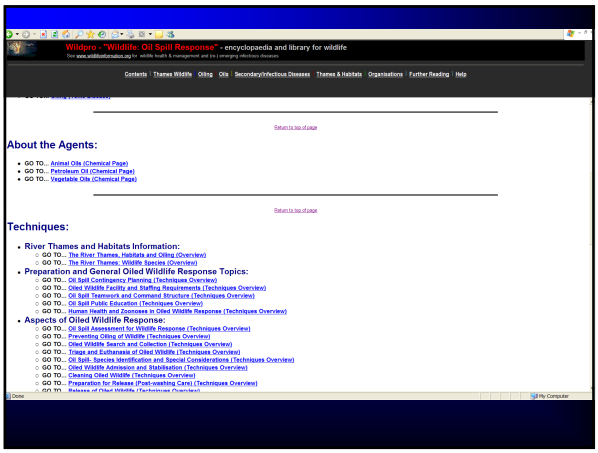
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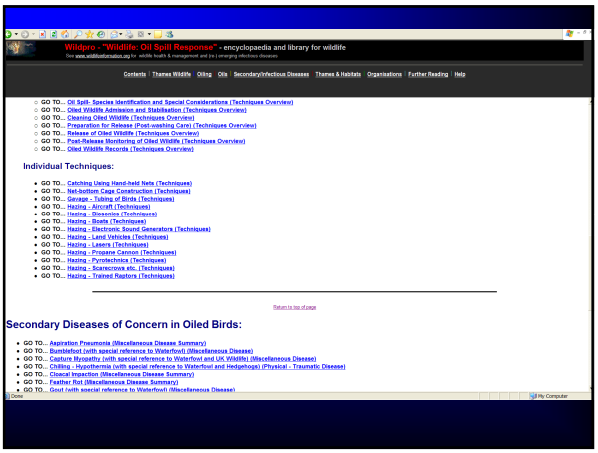
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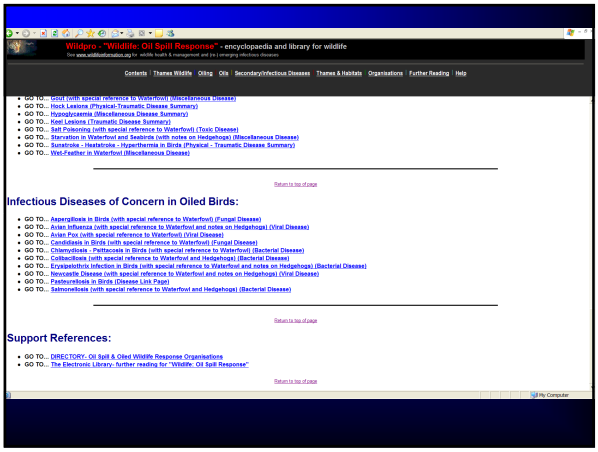
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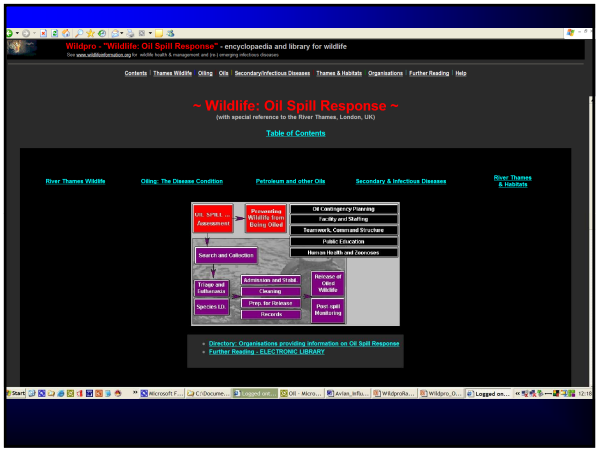
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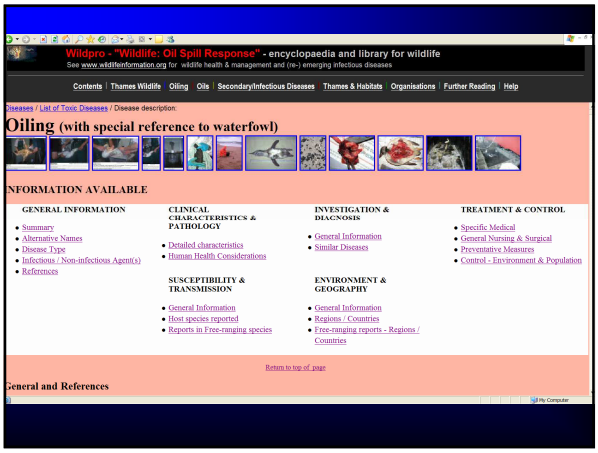
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Severely oiled bird.


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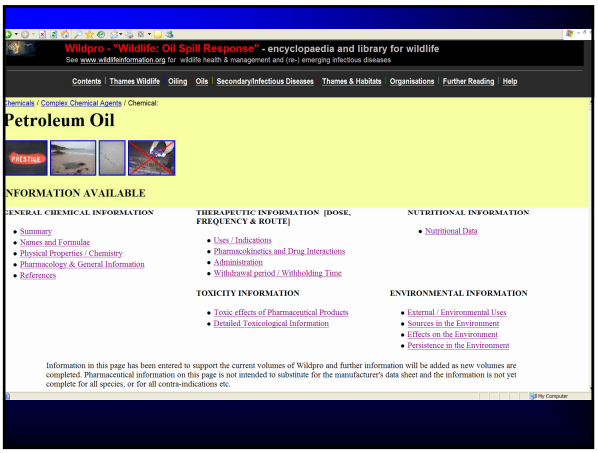
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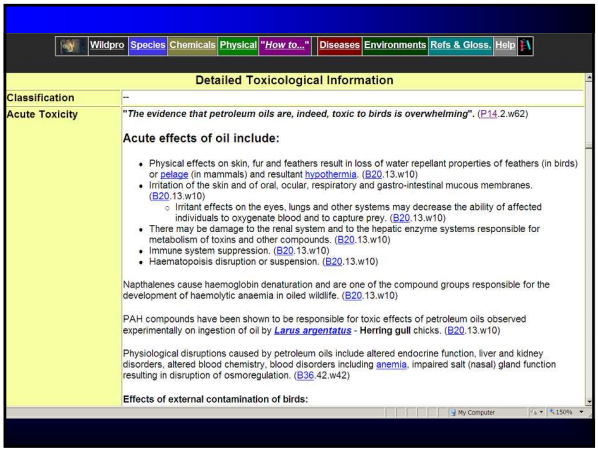
Persistence in the Environment
Information in this page has been entered to support the current volumes of Wildpro and further information will be added as new volumes are completed. Pharmaceutical information on this page is not intended to substitute for the manufacturer's data sheet and the information is not yet complete for all species, or for all contra-indications etc.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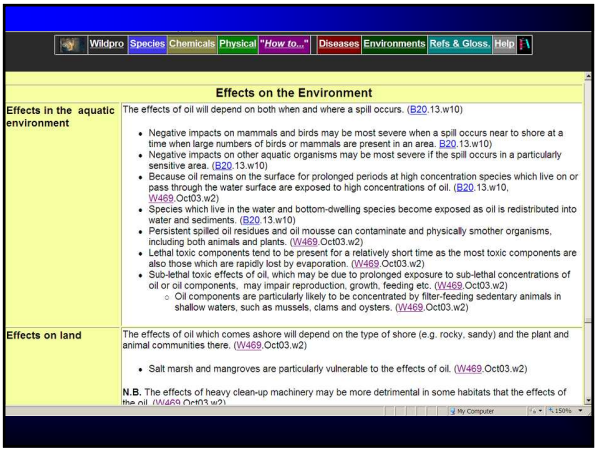
Detailed Toxicological Information
Classification
Acute Toxicity
"The evidence that petroleum oils are, indeed, toxic to birds is overwhelming". (P14.2.w62)
Acute effects of oil include:
Physical effects on skin, fur and feathers result in loss of water repellant properties of feathers (in birds) or pelage (in mammals) and resultant hypothermia. (B20.13.w10)
Irritation of the skin and of oral, ocular, respiratory and gastro-intestinal mucous membranes. (B20.13.w10)
Irritant effects on the eyes, lungs and other systems may decrease the ability of affected individuals to oxygenate blood and to capture prey. (B20.13.w10)
There may be damage to the renal system and to the hepatic enzyme systems responsible for metabolism of toxins and other compounds. (B20.13.w10)
Immune system suppression. (B20.13.w10)
Haematopoisis disruption or suspension. (B20.13.w10)
Napthalenes cause haemoglobin denaturation and are one of the compound groups responsible for the development of haemolytic anaemia in oiled wildlife. (B20.13.w10)
PAH compounds have been shown to be responsible for toxic effects of petroleum oils observed experimentally on ingestion of oil by Larus argentatus - Herring gull chicks. (B20.13.w10)
Physiological disruptions caused by petroleum oils include altered endocrine function, liver and kidney disorders, altered blood chemistry, blood disorders including anemia, impaired salt (nasal) gland function resulting in disruption of osmoregulation. (B36.42.w42)
Effects of external contamination of birds: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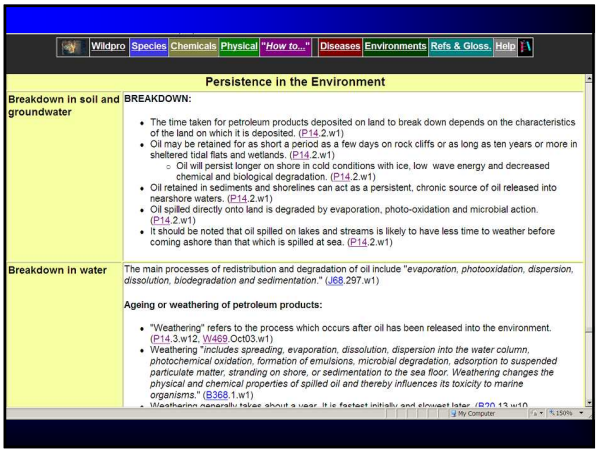
Effects on the Environment
Effects in the aquatic environment
The effects of oil will depend on both when and where a spill occurs. (B20.13.w10)
Negative impacts on mammals and birds may be most severe when a spill occurs near to shore at a time when large numbers of birds or mammals are present in an area. B20.13.w10)
Negative impacts on other aquatic organisms may be most severe if the spill occurs in a particularly sensitive area. (B20.13.w10)
Because oil remains on the surface for prolonged periods at high concentration species which live on or pass through the water surface are exposed to high concentrations of oil. (B20.13.w10, W469.Oct03.w2)
Species which live in the water and bottom-dwelling species become exposed as oil is redistributed into water and sediments. (B20.13.w10)
Persistent spilled oil residues and oil mousse can contaminate and physically smother organisms, including both animals and plants. (W469.Oct03.w2)
Lethal toxic components tend to be present for a relatively short time as the most toxic components are also those which are rapidly lost by evaporation. (W469.Oct03.w2)
Sub-lethal toxic effects of oil, which may be due to prolonged exposure to sub-lethal concentrations of oil or oil components, may impair reproduction, growth, feeding etc. (W469.Oct03.w2)
Oil components are particularly likely to be concentrated by filter-feeding sedentary animals in shallow waters, such as mussels, clams and oysters. (W469.Oct03.w2)
Effects on land
The effects of oil which comes ashore will depend on the type of shore (e.g. rocky, sandy) and the plant and animal communities there. (W469.Oct03.w2)
Salt marsh and mangroves are particularly vulnerable to the effects of oil. (W469.Oct03.w2)
N.B. The effects of heavy clean-up machinery may be more detrimental in some habitats that the effects of the oil. (W469.Oct03.w2)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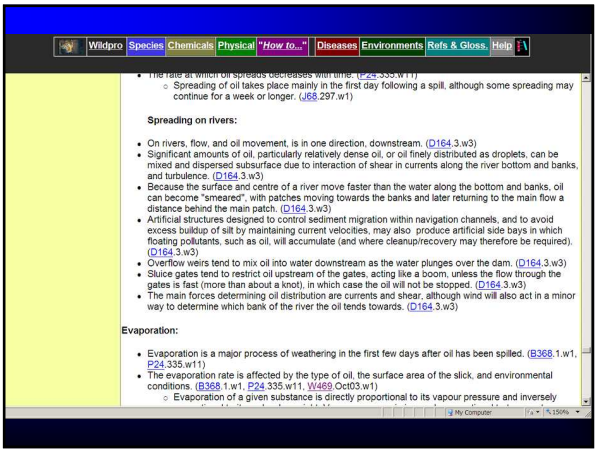
Persistence in the Environment
Breakdown in soil and groundwater
BREAKDOWN:
The time taken for petroleum products deposited on land to break down depends on the characteristics of the land on which it is deposited. (P14.2.w1)
Oil may be retained for as short a period as a few days on rock cliffs or as long as ten years or more in sheltered tidal flats and wetlands. (P14.2.w1)
Oil will persist longer on shore in cold conditions with ice, low wave energy and decreased chemical and biological degradation. (P14.2.w1)
Oil retained in sediments and shorelines can act as a persistent, chronic source of oil released into nearshore waters. (P14.2.w1)
Oil spilled directly onto land is degraded by evaporation, photo-oxidation and microbial action. (P14.2.w1)
It should be noted that oil spilled on lakes and streams is likely to have less time to weather before coming ashore than that which is spilled at sea. (P14.2.w1)
Breakdown in water
The main processes of redistribution and degradation of oil include "evaporation, photooxidation, dispersion, dissolution, biodegradation and sedimentation." (J68.297.w1)
Ageing or weathering of petroleum products:
"Weathering" refers to the process which occurs after oil has been released into the environment. (P14.3.w12, W469.Oct03.w1)
Weathering "includes spreading, evaporation, dissolution, dispersion into the water column, photochemical oxidation, formation of emulsions, microbial degradation, adsorption to suspended particulate matter, stranding on shore, or sedimentation to the sea floor. Weathering changes the physical and chemical properties of spilled oil and thereby influences its toxicity to marine organisms." (B368.1.w1)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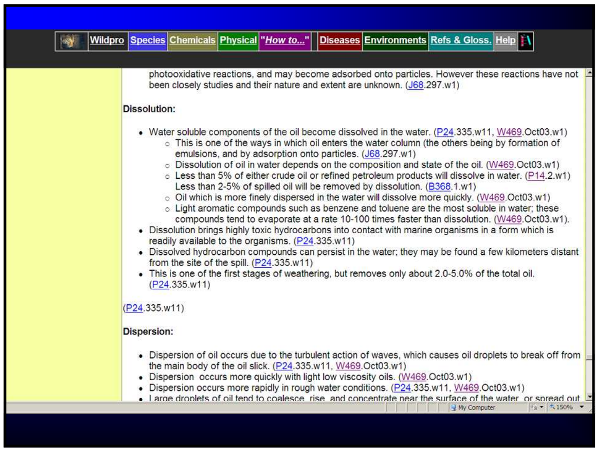
Spreading of oil takes place mainly in the first day following a spill, although some spreading may continue for a week or longer. (J68.297.w1)
Spreading on rivers:
On rivers, flow, and oil movement, is in one direction, downstream. (D164.3.w3)
Significant amounts of oil, particularly relatively dense oil, or oil finely distributed as droplets, can be mixed and dispersed subsurface due to interaction of shear in currents along the river bottom and banks, and turbulence. (D164.3.w3)
Because the surface and centre of a river move faster than the water along the bottom and banks, oil can become "smeared", with patches moving towards the banks and later returning to the main flow a distance behind the main patch. (D164.3.w3)
Artificial structures designed to control sediment migration within navigation channels, and to avoid excess buildup of silt by maintaining current velocities, may also produce artificial side bays in which floating pollutants, such as oil, will accumulate (and where cleanup/recovery may therefore be required). (D164.3.w3)
Overflow weirs tend to mix oil into water downstream as the water plunges over the dam. (D164.3.w3)
Sluice gates tend to restrict oil upstream of the gates, acting like a boom, unless the flow through the gates is fast (more than about a knot), in which case the oil will not be stopped. (D164.3.w3)
The main forces determining oil distribution are currents and shear, although wind will also act in a minor way to determine which bank of the river the oil tends towards. (D164.3.w3)
Evaporation:
Evaporation is a major process of weathering in the first few days after oil has been spilled. (B368.1.w1, P24.335.w11)
The evaporation rate is affected by the type of oil, the surface area of the slick, and environmental conditions. (B368.1.w1, P24.335.w11, W469.Oct03.w1)
Evaporation of a given substance is directly proportional to its vapour pressure and inversely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photooxidative reactions, and may become adsorbed onto particles. However these reactions have not been closely studies and their nature and extent are unknown. (J68.297.w1)
Dissolution:
Water soluble components of the oil become dissolved in the water. (P24.335.w11, W469.Oct03.w1)
This is one of the ways in which oil enters the water column (the others being by formation of emulsions, and by adsorption onto particles. (J68.297.w1)
Dissolution of oil in water depends on the composition and state of the oil. (W469.Oct03.w1)
Less than 5% of either crude oil or refined petroleum products will dissolve in water. (P14.2.w1) Less than 2-5% of spilled oil will be removed by dissolution. (B368.1.w1)
Oil which is more finely dispersed in the water will dissolve more quickly. (W469.Oct03.w1)
Light aromatic compounds such as benzene and toluene are the most soluble in water; these compounds tend to evaporate at a rate 10-100 times faster than dissolution. (W469.Oct03.w1).
Dissolution brings highly toxic hydrocarbons into contact with marine organisms in a form which is readily available to the organisms. (P24.335.w11)
Dissolved hydrocarbon compounds can persist in the water; they may be found a few kilometers distant from the site of the spill. (P24.335.w11)
This is one of the first stages of weathering, but removes only about 2.0-5.0% of the total oil. (P24.335.w11)
(P24.335.w11)
Dispersion:
Dispersion of oil occurs due to the turbulent action of waves, which causes oil droplets to break off from the main body of the oil slick. (P24.335.w11, W469.Oct03.w1)
Dispersion occurs more quickly with light low viscosity oils. (W469.Oct03.w1)
Dispersion occurs more rapidly in rough water conditions. (P24.335.w11, W469.Oct03.w1)
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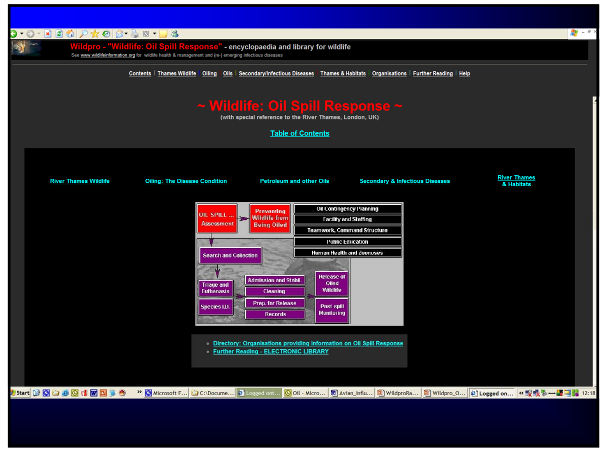
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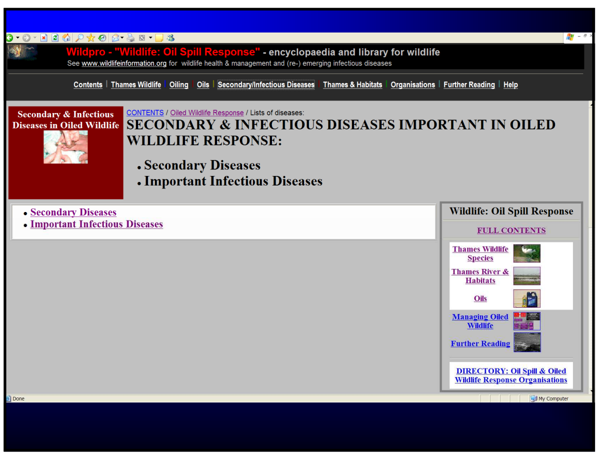
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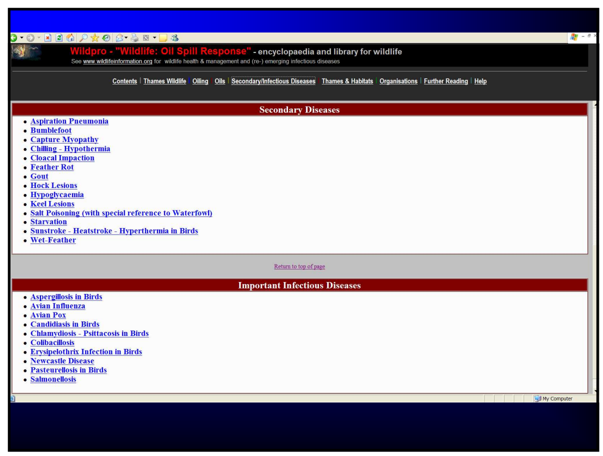
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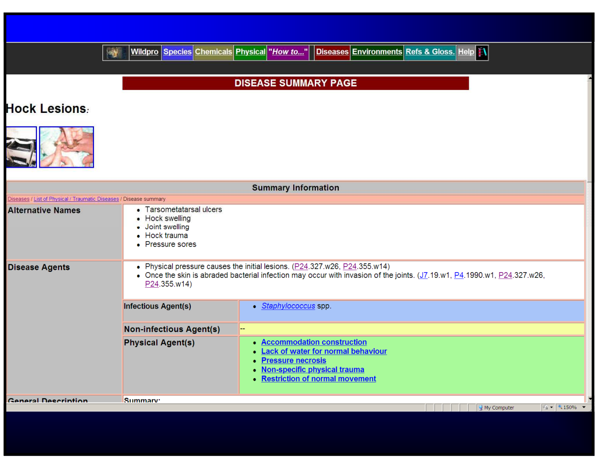
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Hock trauma
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Disease Agents
Physical pressure causes the initial lesions. (P24.327.w26, P24.355.w14)
Once the skin is abraded bacterial infection may occur with invasion of the joints. (J7.19.w1, P4.1990.w1, P24.327.w26, P24.355.w14)
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Lack of water for normal behaviour
Pressure necrosis
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Restriction of normal movement
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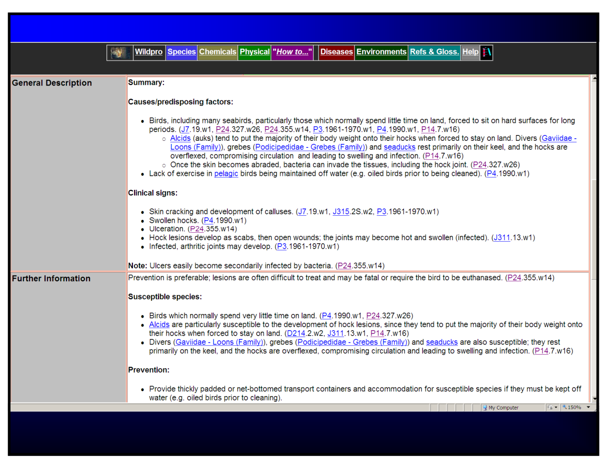
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Summary:
Causes/predisposing factors:
Birds, including many seabirds, particularly those which normally spend little time on land, forced to sit on hard surfaces for long periods. (J7.19.w1, P24.327.w26, P24.355.w14, P3.1961-1970.w1, P4.1990.w1, P14.7.w16)
Alcids (auks) tend to put the majority of their body weight onto their hocks when forced to stay on land. Divers (Gaviidae - Loons (Family)), grebes (Podicipedidae - Grebes (Family)) and seaducks rest primarily on their keel, and the hocks are overflexed, compromising circulation and leading to swelling and infection. (P14.7.w16)
Once the skin becomes abraded, bacteria can invade the tissues, including the hock joint. (P24.327.w26)
Lack of exercise in pelagic birds being maintained off water (e.g. oiled birds prior to being cleaned). (P4.1990.w1)
Clinical signs:
Skin cracking and development of calluses. (J7.19.w1, J315.2S.w2, P3.1961-1970.w1)
Swollen hocks. (P4.1990.w1)
Ulceration. (P24.355.w14)
Hock lesions develop as scabs, then open wounds; the joints may become hot and swollen (infected). (J311.13.w1)
Infected, arthritic joints may develop. (P3.1961-1970.w1)
Note: Ulcers easily become secondarily infected by bacteria. (P24.355.w14)
Further Information
Prevention is preferable; lesions are often difficult to treat and may be fatal or require the bird to be euthanased. (P24.355.w14)
Susceptible species:
Birds which normally spend very little time on land. (P4.1990.w1, P24.327.w26)
Alcids are particularly susceptible to the development of hock lesions, since they tend to put the majority of their body weight onto their hocks when forced to stay on land. (D214.2.w2, J311.13.w1, P14.7.w16)
Divers (Gaviidae - Loons (Family)), grebes (Podicipedidae - Grebes (Family)) and seaducks are also susceptible; they rest primarily on the keel, and the hocks are overflexed, compromising circulation and leading to swelling and infection. (P14.7.w16)
Prevention:
Provide thickly padded or net-bottomed transport containers and accommodation for susceptible species if they must be kept off water (e.g. oiled birds prior to cleaning).
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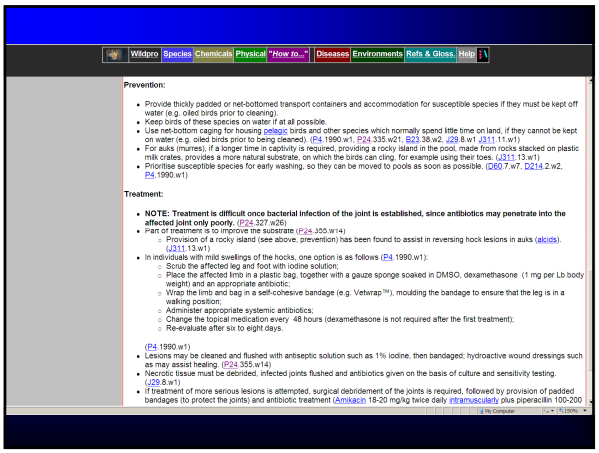

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Prevention:

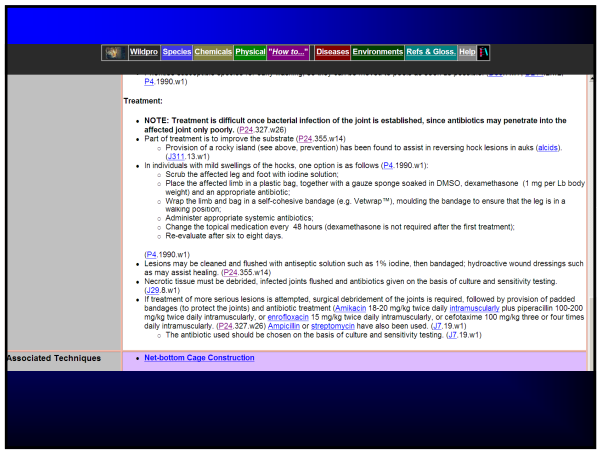
- Provide thickly padded or net-bottomed transport containers and accommodation for susceptible species if they must be kept off water (e.g. oiled birds prior to cleaning).
- Keep birds of these species on water if at all possible.
- Use net-bottom caging for housing pelagic birds and other species which normally spend little time on land, if they cannot be kept on water (e.g. oiled birds prior to being cleaned). (P4.1990.w1, P24.335.w21, B23.38.w2, J29.8.w1 J311.11.w1)
- For auks (murres), if a longer time in captivity is required, providing a rocky island in the pool, made from rocks stacked on plastic milk crates, provides a more natural substrate, on which the birds can cling, for example using their toes. (J311.13.w1)
- Prioritise susceptible species for early washing, so they can be moved to pools as soon as possible. (D60.7.w7, D214.2.w2, P4.1990.w1)

Treatment:

- **NOTE: Treatment is difficult once bacterial infection of the joint is established, since antibiotics may penetrate into the affected joint only poorly.** (P24.327.w26)
- Part of treatment is to improve the substrate (P24.355.w14)
  - Provision of a rocky island (see above, prevention) has been found to assist in reversing hock lesions in auks (alcids). (J311.13.w1)
- In individuals with mild swellings of the hocks, one option is as follows (P4.1990.w1):
  - Scrub the affected leg and foot with iodine solution;
  - Place the affected limb in a plastic bag, together with a gauze sponge soaked in DMSO, dexamethasone (1 mg per Lb body weight) and an appropriate antibiotic;
  - Wrap the limb and bag in a self-cohesive bandage (e.g. Vetwrap™), moulding the bandage to ensure that the leg is in a walking position;
  - Administer appropriate systemic antibiotics;
  - Change the topical medication every 48 hours (dexamethasone is not required after the first treatment);
  - Re-evaluate after six to eight days.

(P4.1990.w1)

- Lesions may be cleaned and flushed with antiseptic solution such as 1% iodine, then bandaged; hydroactive wound dressings such as may assist healing. (P24.355.w14)
- Necrotic tissue must be debrided, infected joints flushed and antibiotics given on the basis of culture and sensitivity testing. (J29.8.w1)
- If treatment of more serious lesions is attempted, surgical debridement of the joints is required, followed by provision of padded bandages (to protect the joints) and antibiotic treatment (Amikacin 18-20 mg/kg twice daily intramuscularly plus piperacillin 100-200



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P4.1990.w1)

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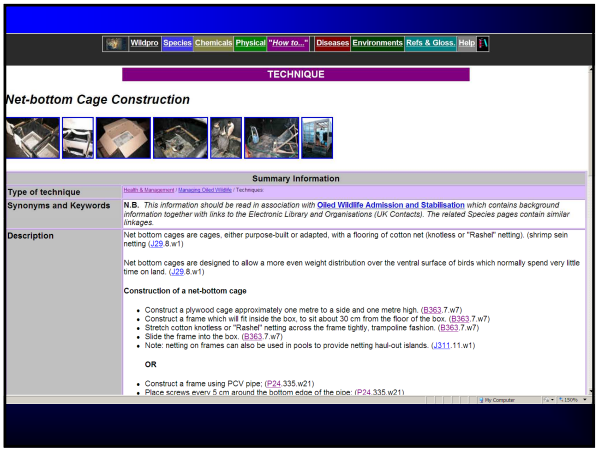
  - The antibiotic used should be chosen on the basis of culture and sensitivity testing. (J7.19.w1)

Associated Techniques	• Net-bottom Cage Construction



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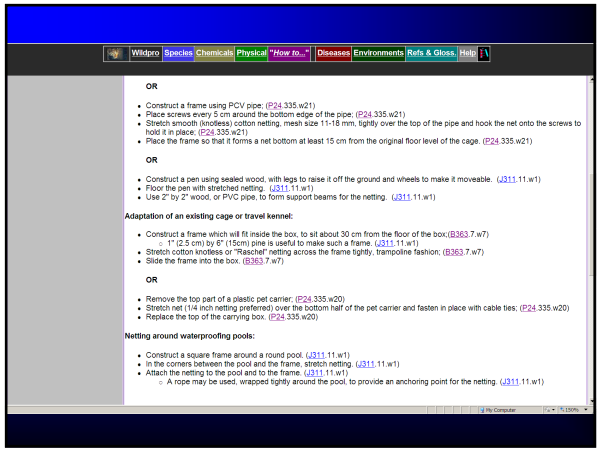
TECHNIQUE

Net-bottom Cage Construction

Summary Information

Type of technique	Health & Management / Managing Oiled Wildlife / Techniques
Synonyms and Keywords	**N.B.** *This information should be read in association with* **Oiled Wildlife Admission and Stabilisation** *which contains background information together with links to the Electronic Library and Organisations (UK Contacts). The related Species pages contain similar linkages.*
Description	Net bottom cages are cages, either purpose-built or adapted, with a flooring of cotton net (knotless or "Rashel" netting), (shrimp sein netting (J29.8.w1) Net bottom cages are designed to allow a more even weight distribution over the ventral surface of birds which normally spend very little time on land. (J29.8.w1) **Construction of a net-bottom cage** • Construct a plywood cage approximately one metre to a side and one metre high. (B363.7.w7) • Construct a frame which will fit inside the box, to sit about 30 cm from the floor of the box. (B363.7.w7) • Stretch cotton knotless or "Rashel" netting across the frame tightly, trampoline fashion. (B363.7.w7) • Slide the frame into the box. (B363.7.w7) • Note: netting on frames can also be used in pools to provide netting haul-out islands. (J311.11.w1) **OR** • Construct a frame using PCV pipe; (P24.335.w21) • Place screws every 5 cm around the bottom edge of the pipe; (P24.335.w21)



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OR

- Construct a frame using PCV pipe; (P24.335.w21)
- Place screws every 5 cm around the bottom edge of the pipe; (P24.335.w21)
- Stretch smooth (knotless) cotton netting, mesh size 11-18 mm, tightly over the top of the pipe and hook the net onto the screws to hold it in place; (P24.335.w21)
- Place the frame so that it forms a net bottom at least 15 cm from the original floor level of the cage. (P24.335.w21)

OR

- Construct a pen using sealed wood, with legs to raise it off the ground and wheels to make it moveable. (J311.11.w1)
- Floor the pen with stretched netting. (J311.11.w1)
- Use 2" by 2" wood, or PVC pipe, to form support beams for the netting. (J311.11.w1)

Adaptation of an existing cage or travel kennel:

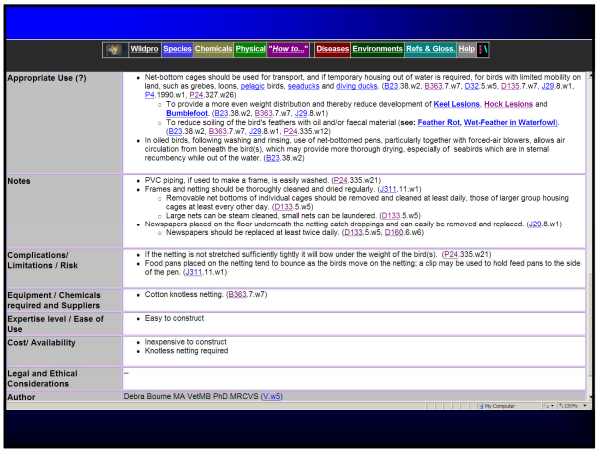
- Construct a frame which will fit inside the box, to sit about 30 cm from the floor of the box;(B363.7.w7)
  - 1" (2.5 cm) by 6" (15cm) pine is useful to make such a frame. (J311.11.w1)
- Stretch cotton knotless or "Raschel" netting across the frame tightly, trampoline fashion; (B363.7.w7)
- Slide the frame into the box. (B363.7.w7)

OR

- Remove the top part of a plastic pet carrier; (P24.335.w20)
- Stretch net (1/4 inch netting preferred) over the bottom half of the pet carrier and fasten in place with cable ties; (P24.335.w20)
- Replace the top of the carrying box. (P24.335.w20)

Netting around waterproofing pools:

- Construct a square frame around a round pool. (J311.11.w1)
- In the corners between the pool and the frame, stretch netting. (J311.11.w1)
- Attach the netting to the pool and to the frame. (J311.11.w1)
  - A rope may be used, wrapped tightly around the pool, to provide an anchoring point for the netting. (J311.11.w1)



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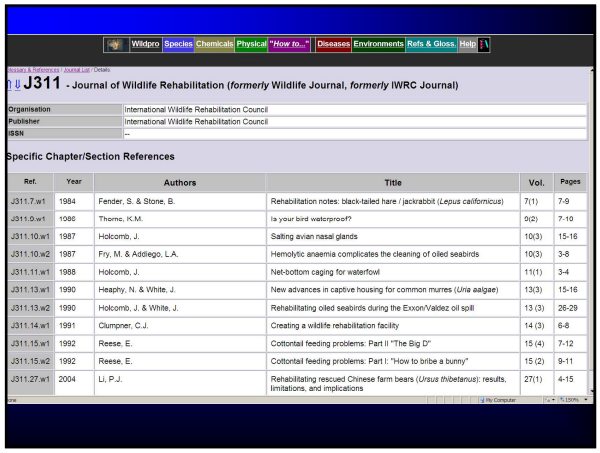
Appropriate Use (?)	• Net-bottom cages should be used for transport, and if temporary housing out of water is required, for birds with limited mobility on land, such as grebes, loons, pelagic birds, seaducks and diving ducks. (B23.38.w2, B363.7.w7, D32.5.w5, D135.7.w7, J29.8.w1, P4.1990.w1, P24.327.w26)
	  ○ To provide a more even weight distribution and thereby reduce development of **Keel Lesions**, **Hock Lesions** and **Bumblefoot**. (B23.38.w2, B363.7.w7, J29.8.w1)
	  ○ To reduce soiling of the bird's feathers with oil and/or faecal material (**see: Feather Rot**, **Wet-Feather in Waterfowl**). (B23.38.w2, B363.7.w7, J29.8.w1, P24.335.w12)
	• In oiled birds, following washing and rinsing, use of net-bottomed pens, particularly together with forced-air blowers, allows air circulation from beneath the bird(s), which may provide more thorough drying, especially of seabirds which are in sternal recumbency while out of the water. (B23.38.w2)

Notes	• PVC piping, if used to make a frame, is easily washed. (P24.335.w21)
	• Frames and netting should be thoroughly cleaned and dried regularly. (J311.11.w1)
	  ○ Removable net bottoms of individual cages should be removed and cleaned at least daily, those of larger group housing cages at least every other day. (D133.5.w5)
	  ○ Large nets can be steam cleaned, small nets can be laundered. (D133.5.w5)
	• Newspapers placed on the floor underneath the netting catch droppings and can easily be removed and replaced. (J29.8.w1)
	  ○ Newspapers should be replaced at least twice daily. (D133.5.w5, D160.6.w6)

Complications/ Limitations / Risk	• If the netting is not stretched sufficiently tightly it will bow under the weight of the bird(s). (P24.335.w21) • Food pans placed on the netting tend to bounce as the birds move on the netting; a clip may be used to hold feed pans to the side of the pen. (J311.11.w1)
Equipment / Chemicals required and Suppliers	• Cotton knotless netting. (B363.7.w7)
Expertise level / Ease of Use	• Easy to construct
Cost/ Availability	• Inexpensive to construct • Knotless netting required
Legal and Ethical Considerations	--
Author	Debra Bourne MA VetMB PhD MRCVS (V.w5)



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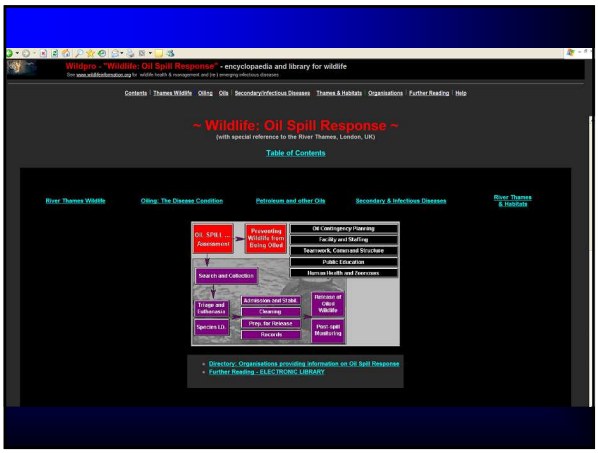
Publications & References | Journal List | Details

J311 - Journal of Wildlife Rehabilitation (*formerly* Wildlife Journal, *formerly* IWRC Journal)

Organisation	International Wildlife Rehabilitation Council
Publisher	International Wildlife Rehabilitation Council
ISSN	--

Specific Chapter/Section References

Ref.	Year	Authors	Title	Vol.	Pages
J311.7.w1	1984	Fender, S. & Stone, B.	Rehabilitation notes: black-tailed hare / jackrabbit (*Lepus californicus*)	7(1)	7-9
J311.0.w1	1986	Thorne, K.M.	Is your bird waterproof?	0(2)	7-10
J311.10.w1	1987	Holcomb, J.	Salting avian nasal glands	10(3)	15-16
J311.10.w2	1987	Fry, M. & Addiego, L.A.	Hemolytic anaemia complicates the cleaning of oiled seabirds	10(3)	3-8
J311.11.w1	1988	Holcomb, J.	Net-bottom caging for waterfowl	11(1)	3-4
J311.13.w1	1990	Heaphy, N. & White, J.	New advances in captive housing for common murres (*Uria aalgae*)	13(3)	15-16
J311.13.w2	1990	Holcomb, J. & White, J.	Rehabilitating oiled seabirds during the Exxon/Valdez oil spill	13 (3)	26-29
J311.14.w1	1991	Clumpner, C.J.	Creating a wildlife rehabilitation facility	14 (3)	6-8
J311.15.w1	1992	Reese, E.	Cottontail feeding problems: Part I! "The Big D"	15 (4)	7-12
J311.15.w2	1992	Reese, E.	Cottontail feeding problems: Part I: "How to bribe a bunny"	15 (2)	9-11
J311.27.w1	2004	Li, P.J.	Rehabilitating rescued Chinese farm bears (*Ursus thibetanus*): results, limitations, and implications	27(1)	4-15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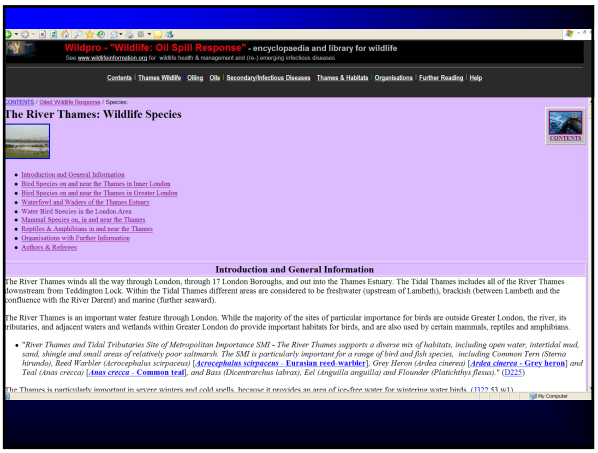
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Bird Species on and near the Thames in Greater London
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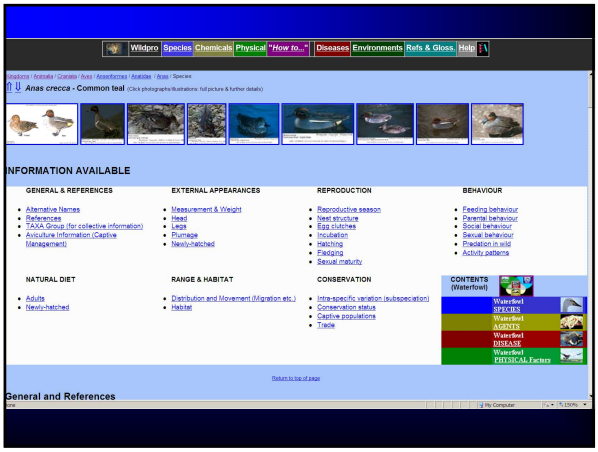
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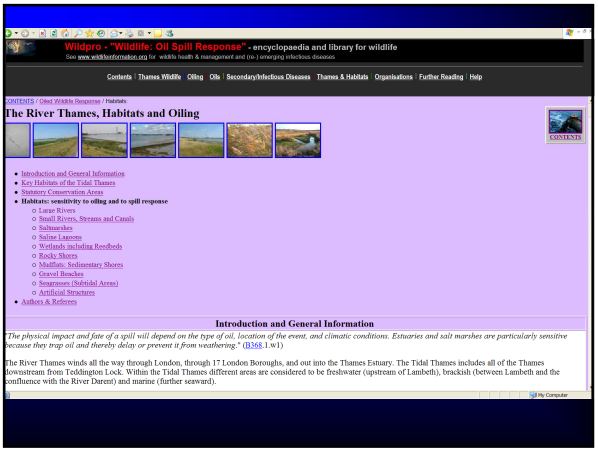
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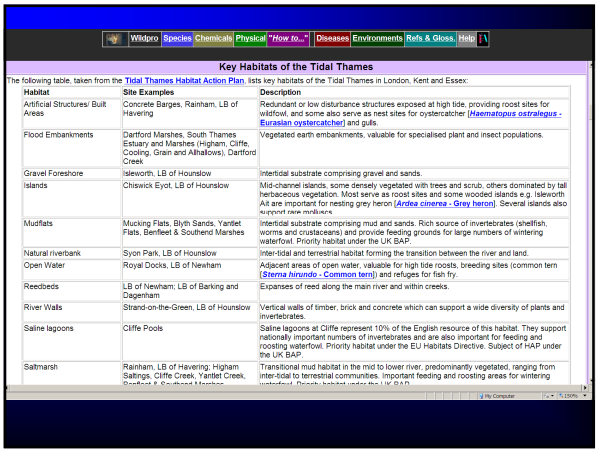
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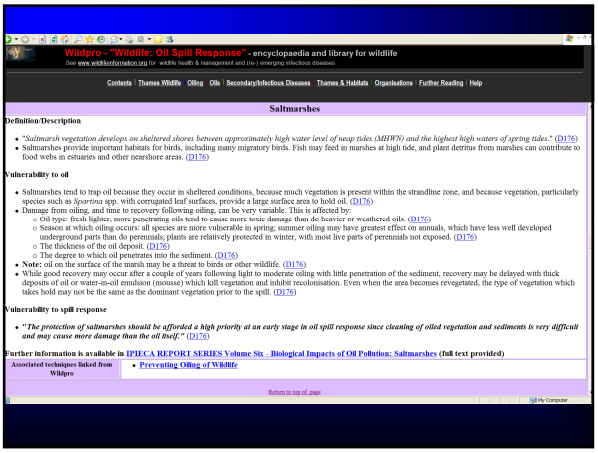
Key Habitats of the Tidal Thames
The following table, taken from the Tidal Thames Habitat Action Plan, lists key habitats of the Tidal Thames in London, Kent and Essex:
Habitat
Site Examples
Description
Artificial Structures/ Built Areas
Concrete Barges, Rainham, LB of Havering
Redundant or low disturbance structures exposed at high tide, providing roost sites for wildfowl, and some also serve as nest sites for oystercatcher [Haematopus ostralegus - Eurasian oystercatcher] and gulls.
Flood Embankments
Dartford Marshes, South Thames Estuary and Marshes (Higham, Cliffe, Cooling, Grain and Allhallows), Dartford Creek
Vegetated earth embankments, valuable for specialised plant and insect populations.
Gravel Foreshore
Isleworth, LB of Hounslow
Intertidal substrate comprising gravel and sands.
Islands
Chiswick Eyot, LB of Hounslow
Mid-channel islands, some densely vegetated with trees and scrub, others dominated by tall herbaceous vegetation. Most serve as roost sites and some wooded islands e.g. Isleworth Ait are important for nesting grey heron [Ardea cinerea - Grey heron]. Several islands also support rare molluscs
Mudflats
Mucking Flats, Blyth Sands, Yantlet Flats, Benfleet & Southend Marshes
Intertidal substrate comprising mud and sands. Rich source of invertebrates (shellfish, worms and crustaceans) and provide feeding grounds for large numbers of wintering waterfowl. Priority habitat under the UK BAP.
Natural riverbank
Syon Park, LB of Hounslow
Inter-tidal and terrestrial habitat forming the transition between the river and land.
Open Water
Royal Docks, LB of Newham
Adjacent areas of open water, valuable for high tide roosts, breeding sites (common tern [Sterna hirundo - Common tern]) and refuges for fish fry.
Reedbeds
LB of Newham; LB of Barking and Dagenham
Expanses of reed along the main river and within creeks.
River Walls
Strand-on-the-Green, LB of Hounslow
Vertical walls of timber, brick and concrete which can support a wide diversity of plants and invertebrates.
Saline lagoons
Cliffe Pools
Saline lagoons at Cliffe represent 10% of the English resource of this habitat. They support nationally important numbers of invertebrates and are also important for feeding and roosting waterfowl. Priority habitat under the EU Habitats Directive. Subject of HAP under the UK BAP.
Saltmarsh
Rainham, LB of Havering; Higham Saltings, Cliffe Creek, Yantlet Creek, Benfleet & Southend Marshes
Transitional mud habitat in the mid to lower river, predominantly vegetated, ranging from inter-tidal to terrestrial communities. Important feeding and roosting areas for wintering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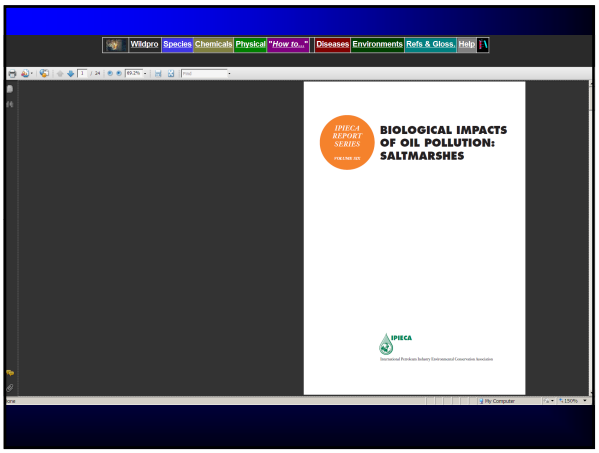
Saltmarshes
Definition/Description
"Saltmarsh vegetation develops on sheltered shores between approximately high water level of neap tides (MHWN) and the highest high waters of spring tides." (D176)
Saltmarshes provide important habitats for birds, including many migratory birds. Fish may feed in marshes at high tide, and plant detritus from marshes can contribute to food webs in estuaries and other nearshore areas. (D176)
Vulnerability to oil
Saltmarshes tend to trap oil because they occur in sheltered conditions, because much vegetation is present within the strandline zone, and because vegetation, particularly species such as Spartina spp. with corrugated leaf surfaces, provide a large surface area to hold oil. (D176)
Damage from oiling, and time to recovery following oiling, can be very variable. This is affected by:
Oil type: fresh lighter, more penetrating oils tend to cause more toxic damage than do heavier or weathered oils. (D176)
Season at which oiling occurs: all species are more vulnerable in spring; summer oiling may have greatest effect on animals, which have less well developed underground parts than do perennials; plants are relatively protected in winter, with most live parts of perennials not exposed. (D176)
The thickness of the oil deposit. (D176)
The degree to which oil penetrates into the sediment. (D176)
Note: oil on the surface of the marsh may be a threat to birds or other wildlife. (D176)
While good recovery may occur after a couple of years following light to moderate oiling with little penetration of the sediment, recovery may be delayed with thick deposits of oil or water-in-oil emulsion (mousse) which kill vegetation and inhibit recolonisation. Even when the area becomes revegetated, the type of vegetation which takes hold may not be the same as the dominant vegetation prior to the spill. (D176)
Vulnerability to spill response
"The protection of saltmarshes should be afforded a high priority at an early stage in oil spill response since cleaning of oiled vegetation and sediments is very difficult and may cause more damage than the oil itself." (D176)
Further information is available in IPIECA REPORT SERIES Volume Six - Biological Impacts of Oil Pollution: Saltmarshes (full text provided)
Associated techniques linked from Wildpro
Preventing Oiling of Wildlife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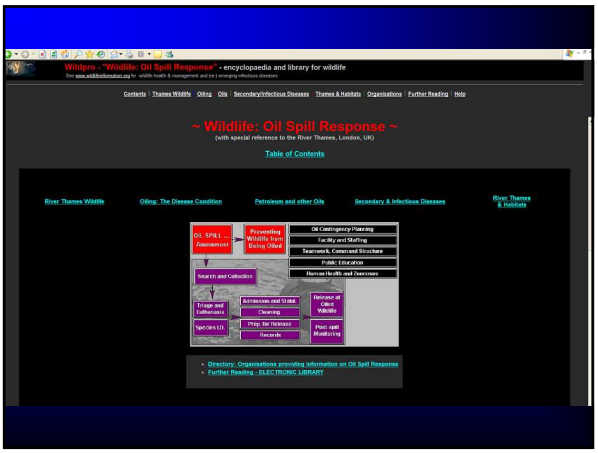
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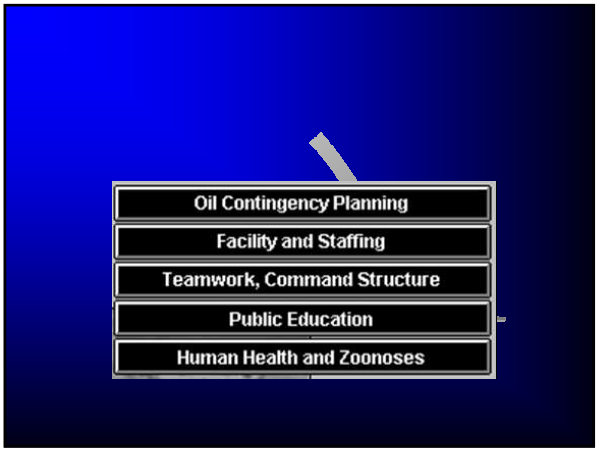
Oil Contingency Planning
Facility and Staffing
Teamwork, Command Structure
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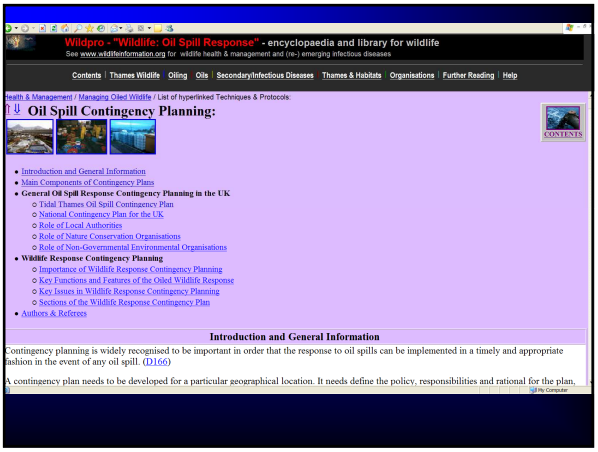
Wildpro - "Wildlife: Oil Spill Response" - encyclopaedia and library for wildlife
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Oil Spill Contingency Planning:
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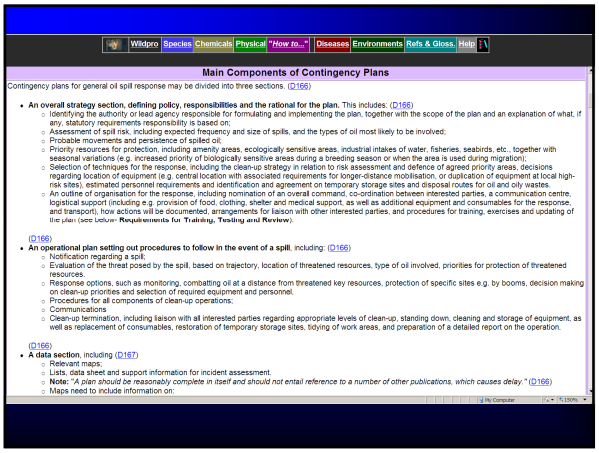
Introduction and General Information
Contingency planning is widely recognised to be important in order that the response to oil spills can be implemented in a timely and appropriate fashion in the event of any oil spill. (D166)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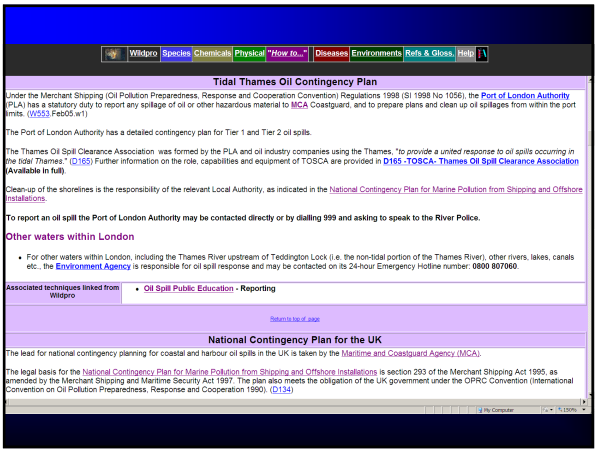
Main Components of Contingency Plans
Contingency plans for general oil spill response may be divided into three sections. (D166)
An overall strategy section, defining policy, responsibilities and the rational for the plan. This includes: (D166)
identifying the authority or lead agency responsible for formulating and implementing the plan, together with the scope of the plan and an explanation of what, if any, statutory requirements responsibility is based on;
Assessment of spill risk, including expected frequency and size of spills, and the types of oil most likely to be involved;
Probable movements and persistence of spilled oil;
Priority resources for protection, including amenity areas, ecologically sensitive areas, industrial intakes of water, fisheries, seabirds, etc., together with seasonal variations (e.g. increased priority of biologically sensitive areas during a breeding season or when the area is used during migration);
Selection of techniques for the response, including the clean-up strategy in relation to risk assessment and defence of agreed priority areas, decisions regarding location of equipment (e.g. central location with associated requirements for longer-distance mobilisation, or duplication of equipment at local high-risk sites), estimated personnel requirements and identification and agreement on temporary storage sites and disposal routes for oil and oily wastes.
An outline of organisation for the response, including nomination of an overall command, co-ordination between interested parties, a communication centre, logistical support (including e.g. provision of food, clothing, shelter and medical support, as well as additional equipment and consumables for the response, and transport), how actions will be documented, arrangements for liaison with other interested parties, and procedures for training, exercises and updating of the plan (see below- Requirements for Training, Testing and Review).
(D166)
An operational plan setting out procedures to follow in the event of a spill, including: (D166)
Notification regarding a spill;
Evaluation of the threat posed by the spill, based on trajectory, location of threatened resources, type of oil involved, priorities for protection of threatened resources.
Response options, such as monitoring, combatting oil at a distance from threatened key resources, protection of specific sites e.g. by booms, decision making on clean-up priorities and selection of required equipment and personnel.
Procedures for all components of clean-up operations;
Communications
Clean-up termination, including liaison with all interested parties regarding appropriate levels of clean-up, standing down, cleaning and storage of equipment, as well as replacement of consumables, restoration of temporary storage sites, tidying of work areas, and preparation of a detailed report on the operation.
(D166)
A data section, including (D167)
Relevant maps;
Lists, data sheet and support information for incident assessment.
Note: "A plan should be reasonably complete in itself and should not entail reference to a number of other publications, which causes delay." (D166)
Maps need to include information on: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Tidal Thames Oil Contingency Plan
Under the Merchant Shipping (Oil Pollution Preparedness, Response and Cooperation Convention) Regulations 1998 (SI 1998 No 1056), the Port of London Authority (PLA) has a statutory duty to report any spillage of oil or other hazardous material to MCA Coastguard, and to prepare plans and clean up oil spillages from within the port limits. (W553.Feb05.w1)
The Port of London Authority has a detailed contingency plan for Tier 1 and Tier 2 oil spills.
The Thames Oil Spill Clearance Association was formed by the PLA and oil industry companies using the Thames. "to provide a united response to oil spills occurring in the tidal Thames." (D165) Further information on the role, capabilities and equipment of TOSCA are provided in D165 -TOSCA- Thames Oil Spill Clearance Association (Available in full).
Clean-up of the shorelines is the responsibility of the relevant Local Authority, as indicated in the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations.
To report an oil spill the Port of London Authority may be contacted directly or by dialling 999 and asking to speak to the River Police.
Other waters within London
For other waters within London, including the Thames River upstream of Teddington Lock (i.e. the non-tidal portion of the Thames River), other rivers, lakes, canals etc., the Environment Agency is responsible for oil spill response and may be contacted on its 24-hour Emergency Hotline number: 0800 807060.
Associated techniques linked from Wildpro
Oil Spill Public Education - Reporting
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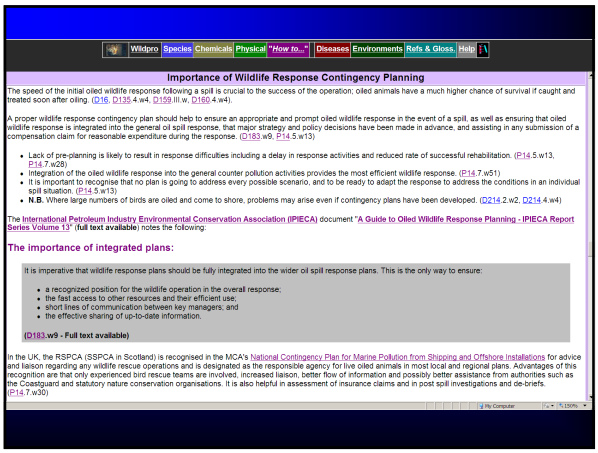
National Contingency Plan for the UK
The lead for national contingency planning for coastal and harbour oil spills in the UK is taken by the Maritime and Coastguard Agency (MCA).
The legal basis for the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations is section 293 of the Merchant Shipping Act 1995, as amended by the Merchant Shipping and Maritime Security Act 1997. The plan also meets the obligation of the UK government under the OPRC Convention (International Convention on Oil Pollution Preparedness, Response and Cooperation 1990). (D134)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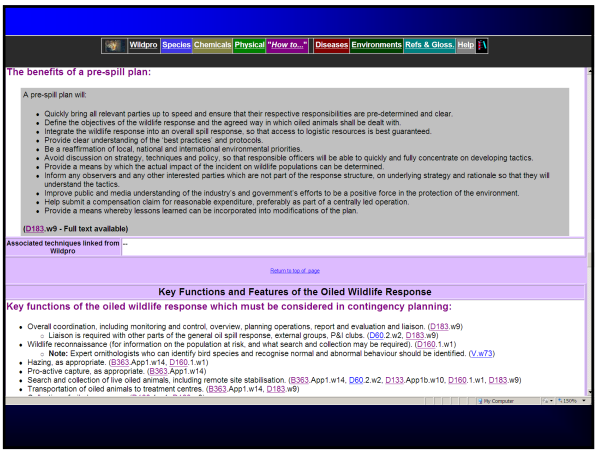
Importance of Wildlife Response Contingency Planning
The speed of the initial oiled wildlife response following a spill is crucial to the success of the operation; oiled animals have a much higher chance of survival if caught and treated soon after oiling. (D16, D135.4.w4, D159.III.w, D160.4.w4).
A proper wildlife response contingency plan should help to ensure an appropriate and prompt oiled wildlife response in the event of a spill, as well as ensuring that oiled wildlife response is integrated into the general oil spill response, that major strategy and policy decisions have been made in advance, and assisting in any submission of a compensation claim for reasonable expenditure during the response. (D183.w9, P14.5.w13)
Lack of pre-planning is likely to result in response difficulties including a delay in response activities and reduced rate of successful rehabilitation. (P14.5.w13, P14.7.w28)
Integration of the oiled wildlife response into the general counter pollution activities provides the most efficient wildlife response. (P14.7.w51)
It is important to recognise that no plan is going to address every possible scenario, and to be ready to adapt the response to address the conditions in an individual spill situation. (P14.5.w13)
N.B. Where large numbers of birds are oiled and come to shore, problems may arise even if contingency plans have been developed. (D214.2.w2, D214.4.w4)
The International Petroleum Industry Environmental Conservation Association (IPIECA) document "A Guide to Oiled Wildlife Response Planning - IPIECA Report Series Volume 13" (full text available) notes the following:
The importance of integrated plans:
It is imperative that wildlife response plans should be fully integrated into the wider oil spill response plans. This is the only way to ensure:
a recognized position for the wildlife operation in the overall response;
the fast access to other resources and their efficient use;
short lines of communication between key managers; and
the effective sharing of up-to-date information.
(D183.w9 - Full text available)
In the UK, the RSPCA (SSPCA in Scotland) is recognised in the MCA's National Contingency Plan for Marine Pollution from Shipping and Offshore Installations for advice and liaison regarding any wildlife rescue operations and is designated as the responsible agency for live oiled animals in most local and regional plans. Advantages of this recognition are that only experienced bird rescue teams are involved, increased liaison, better flow of information and possibly better assistance from authorities such as the Coastguard and statutory nature conservation organisations. It is also helpful in assessment of insurance claims and in post spill investigations and de-briefs. (P14.7.w30)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The benefits of a pre-spill plan:
A pre-spill plan will:
Quickly bring all relevant parties up to speed and ensure that their respective responsibilities are pre-determined and clear.
Define the objectives of the wildlife response and the agreed way in which oiled animals shall be dealt with.
Integrate the wildlife response into an overall spill response, so that access to logistic resources is best guaranteed.
Provide clear understanding of the 'best practices' and protocols.
Be a reaffirmation of local, national and international environmental priorities.
Avoid discussion on strategy, techniques and policy, so that responsible officers will be able to quickly and fully concentrate on developing tactics.
Provide a means by which the actual impact of the incident on wildlife populations can be determined.
Inform any observers and any other interested parties which are not part of the response structure, on underlying strategy and rationale so that they will understand the tactics.
Improve public and media understanding of the industry's and government's efforts to be a positive force in the protection of the environment.
Help submit a compensation claim for reasonable expenditure, preferably as part of a centrally led operation.
Provide a means whereby lessons learned can be incorporated into modifications of the plan.
(D183.w9 - Full text available)
Associated techniques linked from Wildpro --
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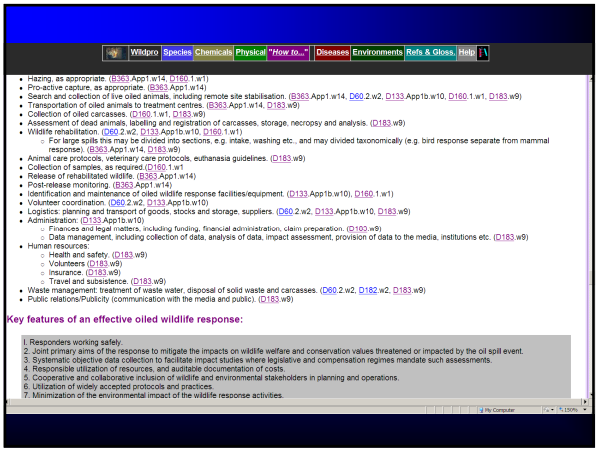
Key Functions and Features of the Oiled Wildlife Response
Key functions of the oiled wildlife response which must be considered in contingency planning:
Overall coordination, including monitoring and control, overview, planning operations, report and evaluation and liaison. (D183.w9)
Liaison is required with other parts of the general oil spill response, external groups, P&I clubs. (D60.2.w2, D183.w9)
Wildlife reconnaissance (for information on the population at risk, and what search and collection may be required). (D160.1.w1)
Note: Expert ornithologists who can identify bird species and recognise normal and abnormal behaviour should be identified. (V.w73)
Hazing, as appropriate. (B363.App1.w14, D160.1.w1)
Pro-active capture, as appropriate. (B363.App1.w14)
Search and collection of live oiled animals, including remote site stabilisation. (B363.App1.w14, D60.2.w2, D133.App1b.w10, D160.1.w1, D183.w9)
Transportation of oiled animals to treatment centres. (B363.App1.w14, D183.w9)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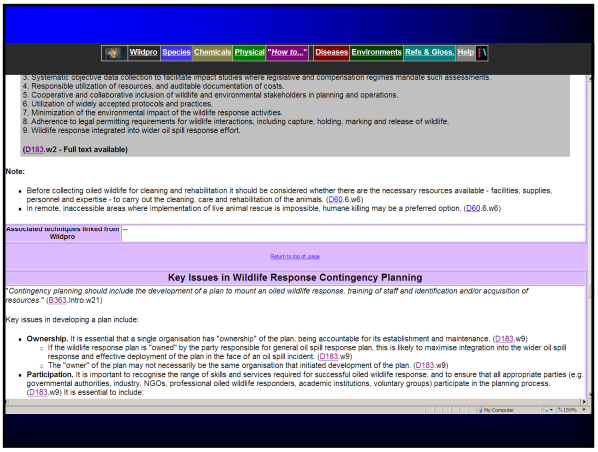
Transportation of oiled animals to treatment centres. (B363.App1.w14, D183.w9)
Collection of oiled carcasses. (D160.1.w1, D183.w9)
Assessment of dead animals, labelling and registration of carcasses, storage, necropsy and analysis. (D183.w9)
Wildlife rehabilitation. (D60.2.w2, D133.App1b.w10, D160.1.w1)
For large spills this may be divided into sections, e.g. intake, washing etc., and may divided taxonomically (e.g. bird response separate from mammal response). (B363.App1.w14, D183.w9)
Animal care protocols, veterinary care protocols, euthanasia guidelines. (D183.w9)
Collection of samples, as required.(D160.1.w1
Release of rehabilitated wildlife. (B363.App1.w14)
Post-release monitoring. (B363.App1.w14)
Identification and maintenance of oiled wildlife response facilities/equipment. (D133.App1b.w10), D160.1.w1)
Volunteer coordination. (D60.2.w2, D133.App1b.w10)
Logistics: planning and transport of goods, stocks and storage, suppliers. (D60.2.w2, D133.App1b.w10, D183.w9)
Administration: (D133.App1b.w10)
Finances and legal matters, including funding, financial administration, claim preparation. (D100.w9)
Data management, including collection of data, analysis of data, impact assessment, provision of data to the media, institutions etc. (D183.w9)
Human resources:
Health and safety. (D183.w9)
Volunteers (D183.w9)
Insurance. (D183.w9)
Travel and subsistence. (D183.w9)
Waste management: treatment of waste water, disposal of solid waste and carcasses. (D60.2.w2, D182.w2, D183.w9)
Public relations/Publicity (communication with the media and public). (D183.w9)
Key features of an effective oiled wildlife response:
1. Responders working safely.
2. Joint primary aims of the response to mitigate the impacts on wildlife welfare and conservation values threatened or impacted by the oil spill event.
3. Systematic objective data collection to facilitate impact studies where legislative and compensation regimes mandate such assessments.
4. Responsible utilization of resources, and auditable documentation of costs.
5. Cooperative and collaborative inclusion of wildlife and environmental stakeholders in planning and operations.
6. Utilization of widely accepted protocols and practices.
7. Minimization of the environmental impact of the wildlife response activities.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3. Systematic objective data collection to facilitate impact studies where legislative and compensation regimes mandate such assessments.
4. Responsible utilization of resources, and auditable documentation of costs.
5. Cooperative and collaborative inclusion of wildlife and environmental stakeholders in planning and operations.
6. Utilization of widely accepted protocols and practices.
7. Minimization of the environmental impact of the wildlife response activities.
8. Adherence to legal permitting requirements for wildlife interactions, including capture, holding, marking and release of wildlife.
9. Wildlife response integrated into wider oil spill response effort.
(D183.w2 - Full text available)
Note:
Before collecting oiled wildlife for cleaning and rehabilitation it should be considered whether there are the necessary resources available - facilities, supplies, personnel and expertise - to carry out the cleaning, care and rehabilitation of the animals. (D60.6.w6)
In remote, inaccessible areas where implementation of live animal rescue is impossible, humane killing may be a preferred option. (D60.6.w6)
Associated techniques linked from Wildpro --
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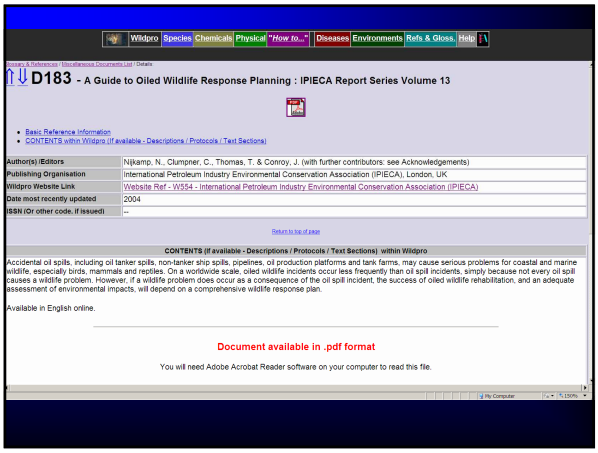
Key Issues in Wildlife Response Contingency Planning
"Contingency planning should include the development of a plan to mount an oiled wildlife response, training of staff and identification and/or acquisition of resources." (B383.intro.w21)
Key issues in developing a plan include:
Ownership. It is essential that a single organisation has "ownership" of the plan, being accountable for its establishment and maintenance. (D183.w9)
If the wildlife response plan is "owned" by the party responsible for general oil spill response plan, this is likely to maximise integration into the wider oil spill response and effective deployment of the plan in the face of an oil spill incident. (D183.w9)
The "owner" of the plan may not necessarily be the same organisation that initiated development of the plan. (D183.w9)
Participation. It is important to recognise the range of skills and services required for successful oiled wildlife response, and to ensure that all appropriate parties (e.g. governmental authorities, industry, NGOs, professional oiled wildlife responders, academic institutions, voluntary groups) participate in the planning process. (D183.w9) It is essential to include: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D183 - A Guide to Oiled Wildlife Response Planning : IPIECA Report Series Volume 13
Basic Reference Information
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Author(s) /Editors: Nijkamp, N., Clumpner, C., Thomas, T. & Conroy, J. (with further contributors: see Acknowledgements)
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Accidental oil spills, including oil tanker spills, non-tanker ship spills, pipelines, oil production platforms and tank farms, may cause serious problems for coastal and marine wildlife, especially birds, mammals and reptiles. On a worldwide scale, oiled wildlife incidents occur less frequently than oil spill incidents, simply because not every oil spill causes a wildlife problem. However, if a wildlife problem does occur as a consequence of the oil spill incident, the success of oiled wildlife rehabilitation, and an adequate assessment of environmental impacts, will depend on a comprehensive wildlife response plan.
Available in English online.
Document available in .pdf format
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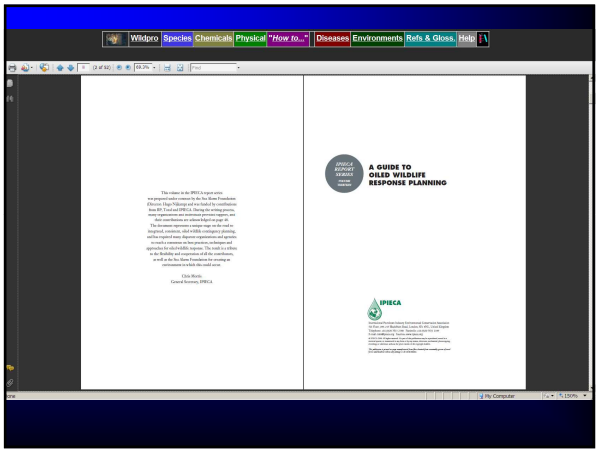
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A GUIDE TO OILED WILDLIFE RESPONSE PLANNING
IPIECA


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See www.wildlifeinformation.org for wildlife health & management and (re-) emerging infectious diseases
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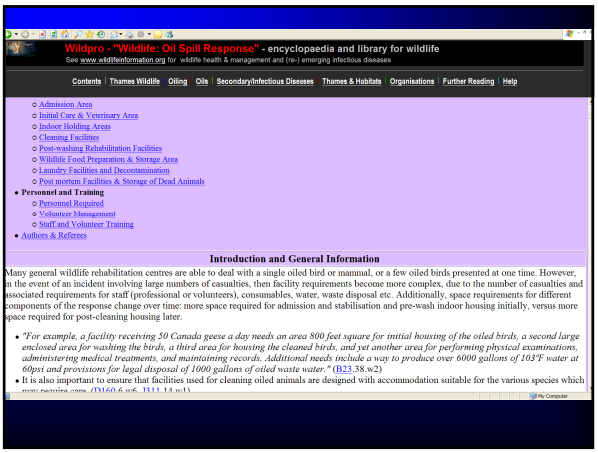
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Post mortem Facilities & Storage of Dead Animals
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Personnel Required
Volunteer Management
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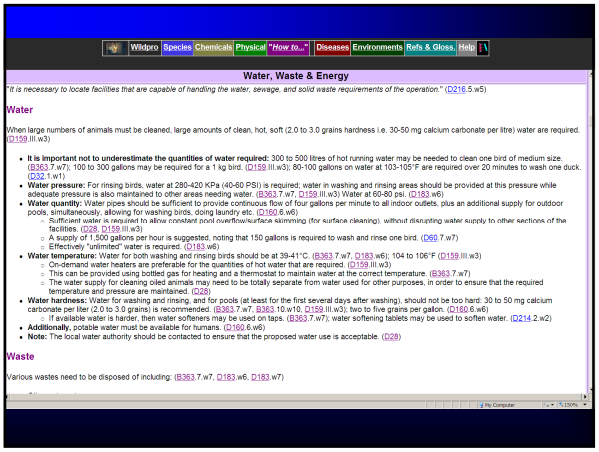
Introduction and General Information
Many general wildlife rehabilitation centres are able to deal with a single oiled bird or mammal, or a few oiled birds presented at one time. However, in the event of an incident involving large numbers of casualties, then facility requirements become more complex, due to the number of casualties and associated requirements for staff (professional or volunteers), consumables, water, waste disposal etc. Additionally, space requirements for different components of the response change over time: more space required for admission and stabilisation and pre-wash indoor housing initially, versus more space required for post-cleaning housing later.
"For example, a facility receiving 50 Canada geese a day needs an area 800 feet square for initial housing of the oiled birds, a second large enclosed area for washing the birds, a third area for housing the cleaned birds, and yet another area for performing physical examinations, administering medical treatments, and maintaining records. Additional needs include a way to produce over 6000 gallons of 103°F water at 60psi and provisions for legal disposal of 1000 gallons of oiled waste water." (B23.38.w2)
It is also important to ensure that facilities used for cleaning oiled animals are designed with accommodation suitable for the various species which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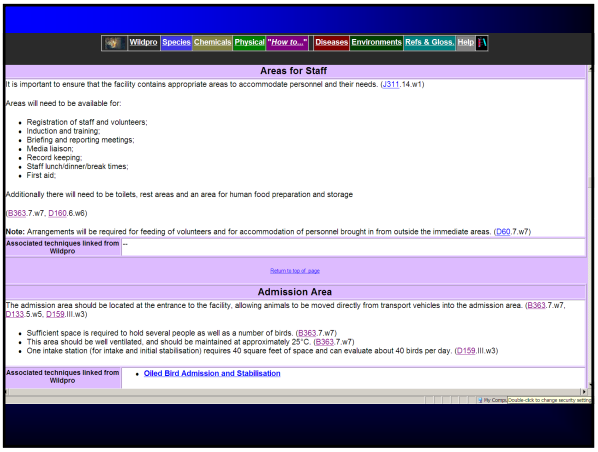
Water, Waste & Energy
"It is necessary to locate facilities that are capable of handling the water, sewage, and solid waste requirements of the operation." (D216.5.w5)
Water
When large numbers of animals must be cleaned, large amounts of clean, hot, soft (2.0 to 3.0 grains hardness i.e. 30-50 mg calcium carbonate per litre) water are required. (D159.III.w3)
It is important not to underestimate the quantities of water required: 300 to 500 litres of hot running water may be needed to clean one bird of medium size. (B363.7.w7); 100 to 300 gallons may be required for a 1 kg bird. (D159.III.w3); 80-100 gallons on water at 103-105°F are required over 20 minutes to wash one duck. (D32.1.w1)
Water pressure: For rinsing birds, water at 280-420 KPa (40-60 PSI) is required; water in washing and rinsing areas should be provided at this pressure while adequate pressure is also maintained to other areas needing water. (B363.7.w7, D159.III.w3) Water at 60-80 psi. (D183.w6)
Water quantity: Water pipes should be sufficient to provide continuous flow of four gallons per minute to all indoor outlets, plus an additional supply for outdoor pools, simultaneously, allowing for washing birds, doing laundry etc. (D160.6.w6)
Sufficient water is required to allow constant pool overflow/surface skimming (for surface cleaning), without disrupting water supply to other sections of the facilities. (D28, D159.III.w3)
A supply of 1,500 gallons per hour is suggested, noting that 150 gallons is required to wash and rinse one bird. (D60.7.w7)
Effectively "unlimited" water is required. (D183.w6)
Water temperature: Water for both washing and rinsing birds should be at 39-41°C. (B363.7.w7, D183.w6); 104 to 106°F (D159.III.w3)
On-demand water heaters are preferable for the quantities of hot water that are required. (D159.III.w3)
This can be provided using bottled gas for heating and a thermostat to maintain water at the correct temperature. (B363.7.w7)
The water supply for cleaning oiled animals may need to be totally separate from water used for other purposes, in order to ensure that the required temperature and pressure are maintained. (D28)
Water hardness: Water for washing and rinsing, and for pools (at least for the first several days after washing), should not be too hard: 30 to 50 mg calcium carbonate per liter (2.0 to 3.0 grains) is recommended. (B363.7.w7, B363.10.w10, D159.III.w3); two to five grains per gallon. (D160.6.w6)
If available water is harder, then water softeners may be used on taps. (B363.7.w7); water softening tablets may be used to soften water. (D214.2.w2)
Additionally, potable water must be available for humans. (D160.6.w6)
Note: The local water authority should be contacted to ensure that the proposed water use is acceptable. (D28)
Waste
Various wastes need to be disposed of including: (B363.7.w7, D183.w6, D183.w7)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Areas for Staff
It is important to ensure that the facility contains appropriate areas to accommodate personnel and their needs. (J311.14.w1)
Areas will need to be available for:
Registration of staff and volunteers;
Induction and training;
Briefing and reporting meetings;
Media liaison;
Record keeping;
Staff lunch/dinner/break times;
First aid;
Additionally there will need to be toilets, rest areas and an area for human food preparation and storage
(B363.7.w7, D160.6.w6)
Note: Arrangements will be required for feeding of volunteers and for accommodation of personnel brought in from outside the immediate areas. (D60.7.w7)
Associated techniques linked from Wildpro: --
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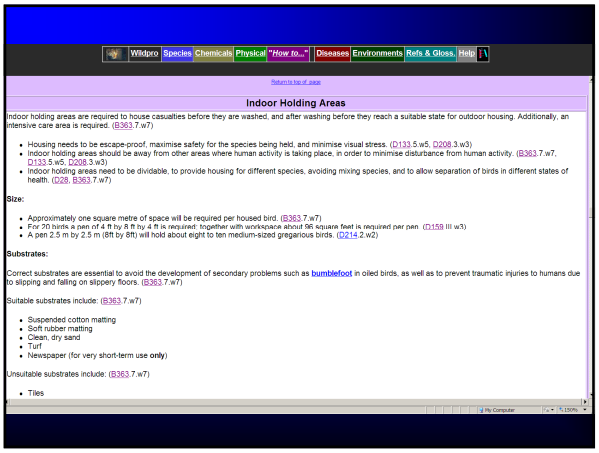
Admission Area
The admission area should be located at the entrance to the facility, allowing animals to be moved directly from transport vehicles into the admission area. (B363.7.w7, D133.5.w5, D159.III.w3)
Sufficient space is required to hold several people as well as a number of birds. (B363.7.w7)
This area should be well ventilated, and should be maintained at approximately 25°C. (B363.7.w7)
One intake station (for intake and initial stabilisation) requires 40 square feet of space and can evaluate about 40 birds per day. (D159.III.w3)
Associated techniques linked from Wildpro: Oiled Bird Admission and Stabilisation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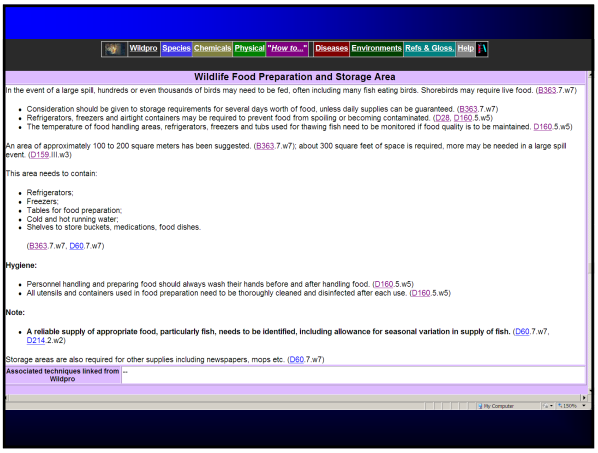
Indoor Holding Areas
Indoor holding areas are required to house casualties before they are washed, and after washing before they reach a suitable state for outdoor housing. Additionally, an intensive care area is required. (B363.7.w7)
Housing needs to be escape-proof, maximise safety for the species being held, and minimise visual stress. (D133.5.w5, D208.3.w3)
Indoor holding areas should be away from other areas where human activity is taking place, in order to minimise disturbance from human activity. (B363.7.w7, D133.5.w5, D208.3.w3)
Indoor holding areas need to be dividable, to provide housing for different species, avoiding mixing species, and to allow separation of birds in different states of health. (D28, B363.7.w7)
Size:
Approximately one square metre of space will be required per housed bird. (B363.7.w7)
For 20 birds a pen of 4 ft by 8 ft by 4 ft is required; together with workspace about 96 square feet is required per pen. (D159.III.w3)
A pen 2.5 m by 2.5 m (8ft by 8ft) will hold about eight to ten medium-sized gregarious birds. (D214.2.w2)
Substrates:
Correct substrates are essential to avoid the development of secondary problems such as bumblefoot in oiled birds, as well as to prevent traumatic injuries to humans due to slipping and falling on slippery floors. (B363.7.w7)
Suitable substrates include: (B363.7.w7)
Suspended cotton matting
Soft rubber matting
Clean, dry sand
Turf
Newspaper (for very short-term use only)
Unsuitable substrates include: (B363.7.w7)
Tiles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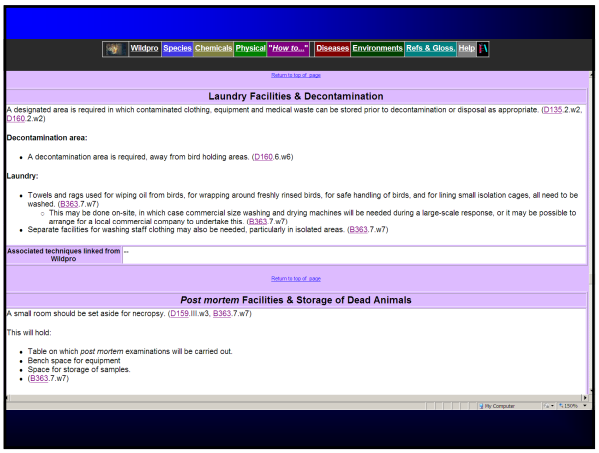
Wildlife Food Preparation and Storage Area
In the event of a large spill, hundreds or even thousands of birds may need to be fed, often including many fish eating birds. Shorebirds may require live food. (B363.7.w7)
Consideration should be given to storage requirements for several days worth of food, unless daily supplies can be guaranteed. (B363.7.w7)
Refrigerators, freezers and airtight containers may be required to prevent food from spoiling or becoming contaminated. (D28, D160.5.w5)
The temperature of food handling areas, refrigerators, freezers and tubs used for thawing fish need to be monitored if food quality is to be maintained. D160.5.w5)
An area of approximately 100 to 200 square meters has been suggested. (B363.7.w7); about 300 square feet of space is required, more may be needed in a large spill event. (D159.III.w3)
This area needs to contain:
Refrigerators;
Freezers;
Tables for food preparation;
Cold and hot running water;
Shelves to store buckets, medications, food dishes.
(B363.7.w7, D60.7.w7)
Hygiene:
Personnel handling and preparing food should always wash their hands before and after handling food. (D160.5.w5)
All utensils and containers used in food preparation need to be thoroughly cleaned and disinfected after each use. (D160.5.w5)
Note:
A reliable supply of appropriate food, particularly fish, needs to be identified, including allowance for seasonal variation in supply of fish. (D60.7.w7, D214.2.w2)
Storage areas are also required for other supplies including newspapers, mops etc. (D60.7.w7)
Associated techniques linked from Wildpro: --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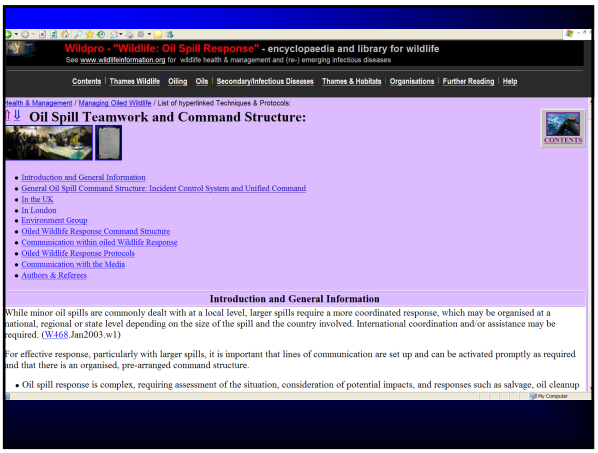
Laundry Facilities & Decontamination
A designated area is required in which contaminated clothing, equipment and medical waste can be stored prior to decontamination or disposal as appropriate. (D135.2.w2, D160.2.w2)
Decontamination area:
A decontamination area is required, away from bird holding areas. (D160.6.w6)
Laundry:
Towels and rags used for wiping oil from birds, for wrapping around freshly rinsed birds, for safe handling of birds, and for lining small isolation cages, all need to be washed. (B363.7.w7)
This may be done on-site, in which case commercial size washing and drying machines will be needed during a large-scale response, or it may be possible to arrange for a local commercial company to undertake this. (B363.7.w7)
Separate facilities for washing staff clothing may also be needed, particularly in isolated areas. (B363.7.w7)
Associated techniques linked from Wildpro --
Post mortem Facilities & Storage of Dead Animals
A small room should be set aside for necropsy. (D159.III.w3, B363.7.w7)
This will hold:
Table on which post mortem examinations will be carried out.
Bench space for equipment
Space for storage of samples.
(B363.7.w7)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See www.wildlifeinformation.org for wildlife health & management and (re-) emerging infectious diseases
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Oil Spill Teamwork and Command Structure:
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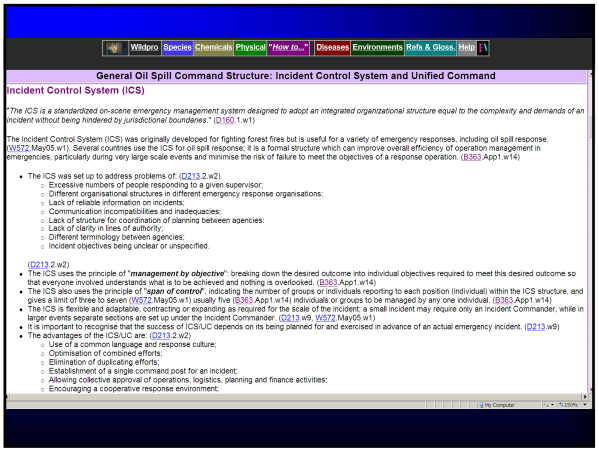
Introduction and General Information
While minor oil spills are commonly dealt with at a local level, larger spills require a more coordinated response, which may be organised at a national, regional or state level depending on the size of the spill and the country involved. International coordination and/or assistance may be required. (W468.Jan2003.w1)
For effective response, particularly with larger spills, it is important that lines of communication are set up and can be activated promptly as required and that there is an organised, pre-arranged command structure.
Oil spill response is complex, requiring assessment of the situation, consideration of potential impacts, and responses such as salvage, oil cleanup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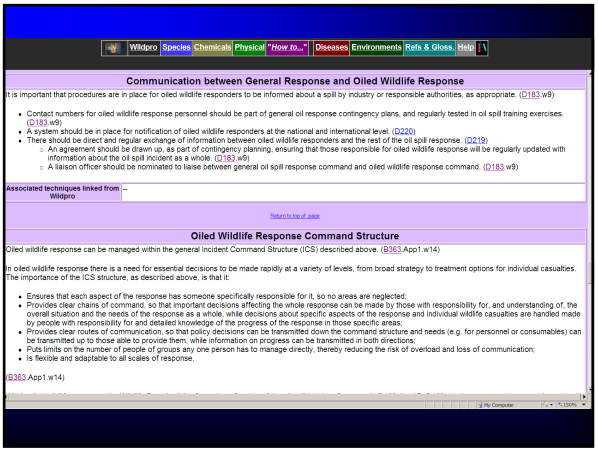
General Oil Spill Command Structure: Incident Control System and Unified Command
Incident Control System (ICS)
"The ICS is a standardized on-scene emergency management system designed to adopt an integrated organizational structure equal to the complexity and demands of an incident without being hindered by jurisdictional boundaries." (D160.1.w1)
The Incident Control System (ICS) was originally developed for fighting forest fires but is useful for a variety of emergency responses, including oil spill response. (W572.May05.w1). Several countries use the ICS for oil spill response; it is a formal structure which can improve overall efficiency of operation management in emergencies, particularly during very large scale events and minimise the risk of failure to meet the objectives of a response operation. (B363.App1.w14)
The ICS was set up to address problems of: (D213.2.w2)
Excessive numbers of people responding to a given supervisor;
Different organisational structures in different emergency response organisations;
Lack of reliable information on incidents;
Communication incompatibilities and inadequacies;
Lack of structure for coordination of planning between agencies;
Lack of clarity in lines of authority;
Different terminology between agencies;
Incident objectives being unclear or unspecified.
(D213.2.w2)
The ICS uses the principle of "management by objective": breaking down the desired outcome into individual objectives required to meet this desired outcome so that everyone involved understands what is to be achieved and nothing is overlooked. (B363.App1.w14)
The ICS also uses the principle of "span of control", indicating the number of groups or individuals reporting to each position (individual) within the ICS structure, and gives a limit of three to seven (W572.May05.w1) usually five (B363.App1.w14) individuals or groups to be managed by any one individual. (B363.App1.w14)
The ICS is flexible and adaptable, contracting or expanding as required for the scale of the incident: a small incident may require only an Incident Commander, while in larger events separate sections are set up under the Incident Commander. (D213.w9, W572.May05.w1)
It is important to recognise that the success of ICS/UC depends on its being planned for and exercised in advance of an actual emergency incident. (D213.w9)
The advantages of the ICS/UC are: (D213.2.w2)
Use of a common language and response culture;
Optimisation of combined efforts;
Elimination of duplicating efforts;
Establishment of a single command post for an incident;
Allowing collective approval of operations, logistics, planning and finance activities;
Encouraging a cooperative response environment;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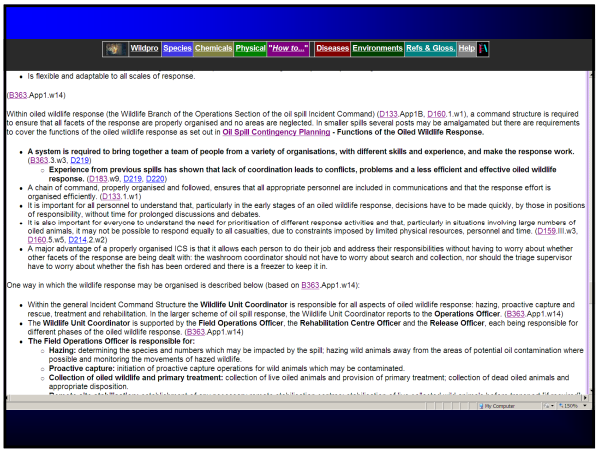
Communication between General Response and Oiled Wildlife Response
It is important that procedures are in place for oiled wildlife responders to be informed about a spill by industry or responsible authorities, as appropriate. (D183.w9)
Contact numbers for oiled wildlife response personnel should be part of general oil response contingency plans, and regularly tested in oil spill training exercises. (D183.w9)
A system should be in place for notification of oiled wildlife responders at the national and international level. (D220)
There should be direct and regular exchange of information between oiled wildlife responders and the rest of the oil spill response. (D219)
An agreement should be drawn up, as part of contingency planning, ensuring that those responsible for oiled wildlife response will be regularly updated with information about the oil spill incident as a whole. (D183.w9)
A liaison officer should be nominated to liaise between general oil spill response command and oiled wildlife response command. (D183.w9)
Associated techniques linked from Wildpro --
Oiled Wildlife Response Command Structure
Oiled wildlife response can be managed within the general Incident Command Structure (ICS) described above. (B363.App1.w14)
In oiled wildlife response there is a need for essential decisions to be made rapidly at a variety of levels, from broad strategy to treatment options for individual casualties. The importance of the ICS structure, as described above, is that it:
Ensures that each aspect of the response has someone specifically responsible for it, so no areas are neglected;
Provides clear chains of command, so that important decisions affecting the whole response can be made by those with responsibility for, and understanding of, the overall situation and the needs of the response as a whole, while decisions about specific aspects of the response and individual wildlife casualties are handled made by people with responsibility for and detailed knowledge of the progress of the response in those specific areas;
Provides clear routes of communication, so that policy decisions can be transmitted down the command structure and needs (e.g. for personnel or consumables) can be transmitted up to those able to provide them, while information on progress can be transmitted in both directions;
Puts limits on the number of people of groups any one person has to manage directly, thereby reducing the risk of overload and loss of communication;
Is flexible and adaptable to all scales of response.
B363.App1.w14)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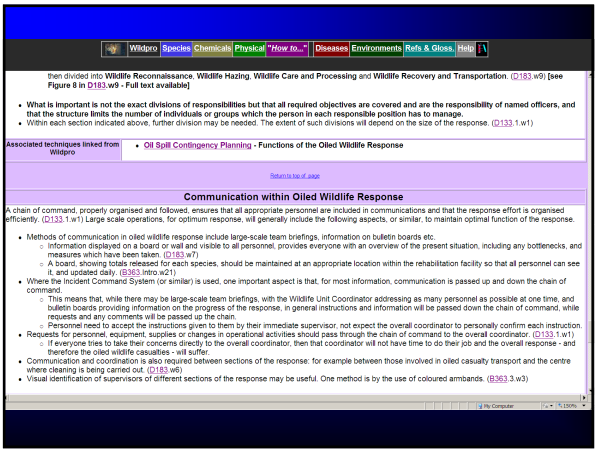
Is flexible and adaptable to all scales of response.
(B363.App1.w14)
Within oiled wildlife response (the Wildlife Branch of the Operations Section of the oil spill Incident Command) (D133.App1B, D160.1.w1), a command structure is required to ensure that all facets of the response are properly organised and no areas are neglected. In smaller spills several posts may be amalgamated but there are requirements to cover the functions of the oiled wildlife response as set out in Oil Spill Contingency Planning - Functions of the Oiled Wildlife Response.
A system is required to bring together a team of people from a variety of organisations, with different skills and experience, and make the response work. (B363.3.w3, D219)
Experience from previous spills has shown that lack of coordination leads to conflicts, problems and a less efficient and effective oiled wildlife response. (D183.w9, D219, D220)
A chain of command, properly organised and followed, ensures that all appropriate personnel are included in communications and that the response effort is organised efficiently. (D133.1.w1)
It is important for all personnel to understand that, particularly in the early stages of an oiled wildlife response, decisions have to be made quickly, by those in positions of responsibility, without time for prolonged discussions and debates.
It is also important for everyone to understand the need for prioritisation of different response activities and that, particularly in situations involving large numbers of oiled animals, it may not be possible to respond equally to all casualties, due to constraints imposed by limited physical resources, personnel and time. (D159.III.w3, D160.5.w5, D214.2.w2)
A major advantage of a properly organised ICS is that it allows each person to do their job and address their responsibilities without having to worry about whether other facets of the response are being dealt with: the washroom coordinator should not have to worry about search and collection, nor should the triage supervisor have to worry about whether the fish has been ordered and there is a freezer to keep it in.
One way in which the wildlife response may be organised is described below (based on B363.App1.w14):
Within the general Incident Command Structure the Wildlife Unit Coordinator is responsible for all aspects of oiled wildlife response: hazing, proactive capture and rescue, treatment and rehabilitation. In the larger scheme of oil spill response, the Wildlife Unit Coordinator reports to the Operations Officer. (B363.App1.w14)
The Wildlife Unit Coordinator is supported by the Field Operations Officer, the Rehabilitation Centre Officer and the Release Officer, each being responsible for different phases of the oiled wildlife response. (B363.App1.w14)
The Field Operations Officer is responsible for:
Hazing: determining the species and numbers which may be impacted by the spill; hazing wild animals away from the areas of potential oil contamination where possible and monitoring the movements of hazed wildlife.
Proactive capture: initiation of proactive capture operations for wild animals which may be contaminated.
Collection of oiled wildlife and primary treatment: collection of live oiled animals and provision of primary treatment; collection of dead oiled animals and appropriate disposition.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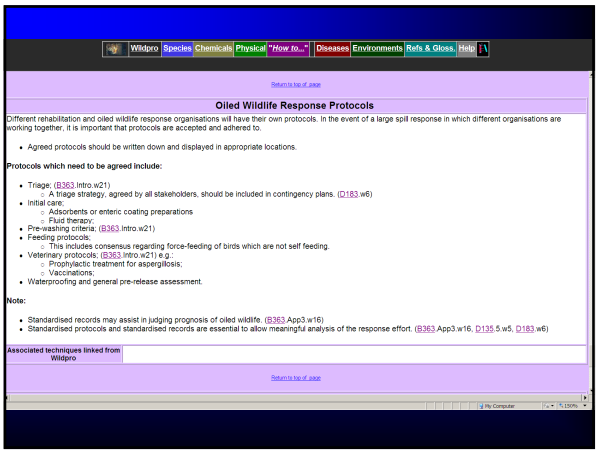
then divided into Wildlife Reconnaissance, Wildlife Hazing, Wildlife Care and Processing and Wildlife Recovery and Transportation. (D183.w9) [see Figure 8 in D183.w9 - Full text available]
What is important is not the exact divisions of responsibilities but that all required objectives are covered and are the responsibility of named officers, and that the structure limits the number of individuals or groups which the person in each responsible position has to manage.
Within each section indicated above, further division may be needed. The extent of such divisions will depend on the size of the response. (D133.1.w1)
Associated techniques linked from Wildpro Oil Spill Contingency Planning - Functions of the Oiled Wildlife Response
Communication within Oiled Wildlife Response
A chain of command, properly organised and followed, ensures that all appropriate personnel are included in communications and that the response effort is organised efficiently. (D133.1.w1) Large scale operations, for optimum response, will generally include the following aspects, or similar, to maintain optimal function of the response.
Methods of communication in oiled wildlife response include large-scale team briefings, information on bulletin boards etc.
Information displayed on a board or wall and visible to all personnel, provides everyone with an overview of the present situation, including any bottlenecks, and measures which have been taken. (D183.w7)
A board, showing totals released for each species, should be maintained at an appropriate location within the rehabilitation facility so that all personnel can see it, and updated daily. (B363.intro.w21)
Where the Incident Command System (or similar) is used, one important aspect is that, for most information, communication is passed up and down the chain of command.
This means that, while there may be large-scale team briefings, with the Wildlife Unit Coordinator addressing as many personnel as possible at one time, and bulletin boards providing information on the progress of the response, in general instructions and information will be passed down the chain of command, while requests and any comments will be passed up the chain.
Personnel need to accept the instructions given to them by their immediate supervisor, not expect the overall coordinator to personally confirm each instruction.
Requests for personnel, equipment, supplies or changes in operational activities should pass through the chain of command to the overall coordinator. (D133.1.w1)
If everyone tries to take their concerns directly to the overall coordinator, then that coordinator will not have time to do their job and the overall response - and therefore the oiled wildlife casualties - will suffer.
Communication and coordination is also required between sections of the response: for example between those involved in oiled casualty transport and the centre where cleaning is being carried out. (D183.w6)
Visual identification of supervisors of different sections of the response may be useful. One method is by the use of coloured armbands. (B363.3.w3)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Oiled Wildlife Response Protocols
Different rehabilitation and oiled wildlife response organisations will have their own protocols. In the event of a large spill response in which different organisations are working together, it is important that protocols are accepted and adhered to.
Agreed protocols should be written down and displayed in appropriate locations.
Protocols which need to be agreed include:
Triage; (B363.Intro.w21)
A triage strategy, agreed by all stakeholders, should be included in contingency plans. (D183.w6)
Initial care;
Adsorbents or enteric coating preparations
Fluid therapy;
Pre-washing criteria; (B363.Intro.w21)
Feeding protocols;
This includes consensus regarding force-feeding of birds which are not self feeding.
Veterinary protocols; (B363.Intro.w21) e.g.;
Prophylactic treatment for aspergillosis;
Vaccinations;
Waterproofing and general pre-release assessment.
Note:
Standardised records may assist in judging prognosis of oiled wildlife. (B363.App3.w16)
Standardised protocols and standardised records are essential to allow meaningful analysis of the response effort. (B363.App3.w16, D135.5.w5, D183.w6)
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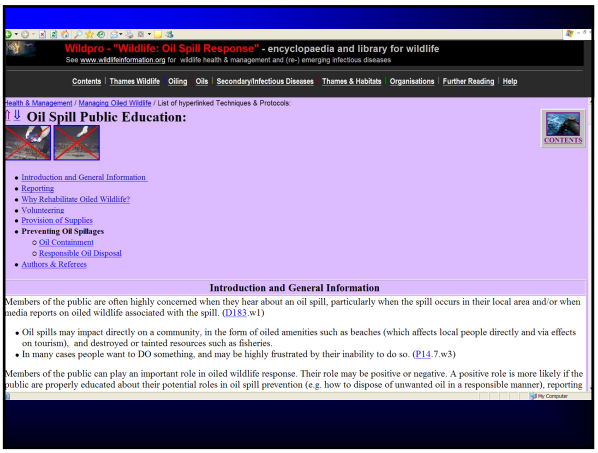
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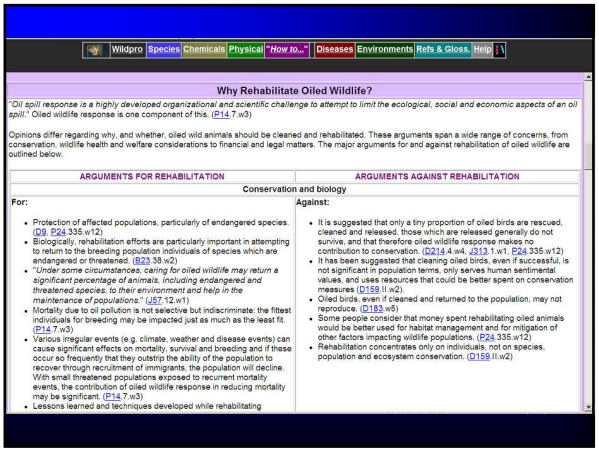
Introduction and General Information
Members of the public are often highly concerned when they hear about an oil spill, particularly when the spill occurs in their local area and/or when media reports on oiled wildlife associated with the spill. (D183.w1)
Oil spills may impact directly on a community, in the form of oiled amenities such as beaches (which affects local people directly and via effects on tourism), and destroyed or tainted resources such as fisheries.
In many cases people want to DO something, and may be highly frustrated by their inability to do so. (P14.7.w3)
Members of the public can play an important role in oiled wildlife response. Their role may be positive or negative. A positive role is more likely if the public are properly educated about their potential roles in oil spill prevention (e.g. how to dispose of unwanted oil in a responsible manner), reporting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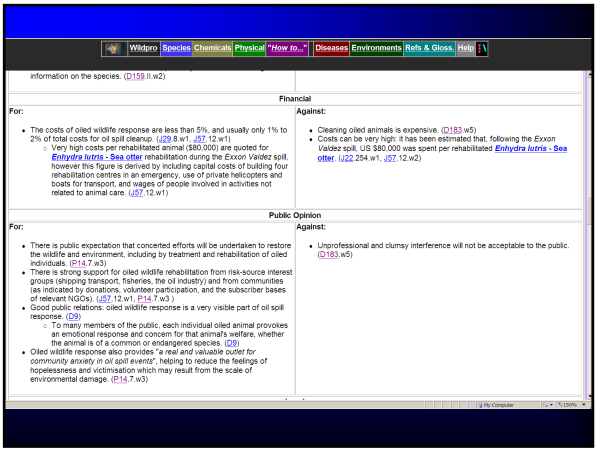
Why Rehabilitate Oiled Wildlife?
"Oil spill response is a highly developed organizational and scientific challenge to attempt to limit the ecological, social and economic aspects of an oil spill." Oiled wildlife response is one component of this. (P14.7.w3)
Opinions differ regarding why, and whether, oiled wild animals should be cleaned and rehabilitated. These arguments span a wide range of concerns, from conservation, wildlife health and welfare considerations to financial and legal matters. The major arguments for and against rehabilitation of oiled wildlife are outlined below.
ARGUMENTS FOR REHABILITATION
ARGUMENTS AGAINST REHABILITATION
Conservation and biology
For:
Protection of affected populations, particularly of endangered species. (D9, P24.335.w12)
Biologically, rehabilitation efforts are particularly important in attempting to return to the breeding population individuals of species which are endangered or threatened. (B23.38.w2)
"Under some circumstances, caring for oiled wildlife may return a significant percentage of animals, including endangered and threatened species, to their environment and help in the maintenance of populations." (J57.12.w1)
Mortality due to oil pollution is not selective but indiscriminate; the fittest individuals for breeding may be impacted just as much as the least fit. (P14.7.w3)
Various irregular events (e.g. climate, weather and disease events) can cause significant effects on mortality, survival and breeding and if these occur so frequently that they outstrip the ability of the population to recover through recruitment of immigrants, the population will decline. With small threatened populations exposed to recurrent mortality events, the contribution of oiled wildlife response in reducing mortality may be significant. (P14.7.w3)
Lessons learned and techniques developed while rehabilitating
Against:
It is suggested that only a tiny proportion of oiled birds are rescued, cleaned and released, those which are released generally do not survive, and that therefore oiled wildlife response makes no contribution to conservation. (D214.4.w4, J313.1.w1, P24.335.w12)
It has been suggested that cleaning oiled birds, even if successful, is not significant in population terms, only serves human sentimental values, and uses resources that could be better spent on conservation measures (D159.II.w2).
Oiled birds, even if cleaned and returned to the population, may not reproduce. (D183.w5)
Some people consider that money spent rehabilitating oiled animals would be better used for habitat management and for mitigation of other factors impacting wildlife populations. (P24.335.w12)
Rehabilitation concentrates only on individuals, not on species, population and ecosystem conservation. (D159.II.w2)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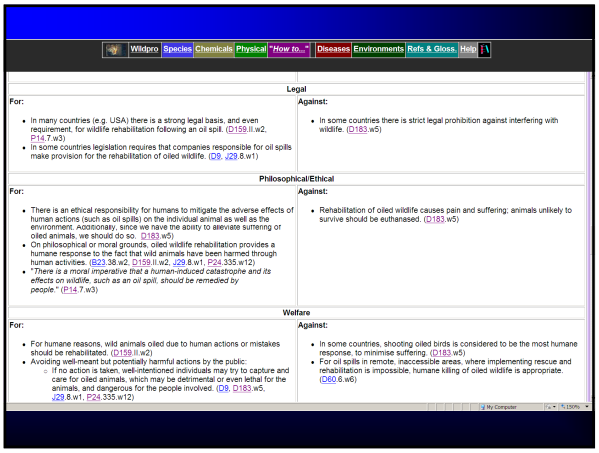
information on the species. (D159.II.w2)
Financial
For:
The costs of oiled wildlife response are less than 5%, and usually only 1% to 2% of total costs for oil spill cleanup. (J29.8.w1, J57.12.w1)
Very high costs per rehabilitated animal ($80,000) are quoted for Enhydra lutris - Sea otter rehabilitation during the Exxon Valdez spill, however this figure is derived by including capital costs of building four rehabilitation centres in an emergency, use of private helicopters and boats for transport, and wages of people involved in activities not related to animal care. (J57.12.w1)
Against:
Cleaning oiled animals is expensive. (D183.w5)
Costs can be very high: it has been estimated that, following the Exxon Valdez spill, US $80,000 was spent per rehabilitated Enhydra lutris - Sea otter. (J22.254.w1, J57.12.w2)
Public Opinion
For:
There is public expectation that concerted efforts will be undertaken to restore the wildlife and environment, including by treatment and rehabilitation of oiled individuals. (P14.7.w3)
There is strong support for oiled wildlife rehabilitation from risk-source interest groups (shipping transport, fisheries, the oil industry) and from communities (as indicated by donations, volunteer participation, and the subscriber bases of relevant NGOs). (J57.12.w1, P14.7.w3)
Good public relations: oiled wildlife response is a very visible part of oil spill response. (D9)
To many members of the public, each individual oiled animal provokes an emotional response and concern for that animal's welfare, whether the animal is of a common or endangered species. (D9)
Oiled wildlife response also provides "a real and valuable outlet for community anxiety in oil spill events", helping to reduce the feelings of hopelessness and victimisation which may result from the scale of environmental damage. (P14.7.w3)
Against:
Unprofessional and clumsy interference will not be acceptable to the public. (D183.w5)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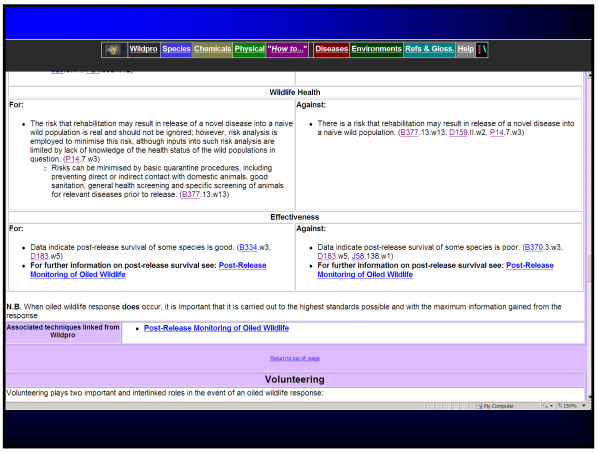
Legal
For:
In many countries (e.g. USA) there is a strong legal basis, and even requirement, for wildlife rehabilitation following an oil spill. (D159.II.w2, P14.7.w3)
In some countries legislation requires that companies responsible for oil spills make provision for the rehabilitation of oiled wildlife. (D9, J29.8.w1)
Against:
In some countries there is strict legal prohibition against interfering with wildlife. (D183.w5)
Philosophical/Ethical
For:
There is an ethical responsibility for humans to mitigate the adverse effects of human actions (such as oil spills) on the individual animal as well as the environment. Additionally, since we have the ability to alleviate suffering or oiled animals, we should do so. (D183.w5)
On philosophical or moral grounds, oiled wildlife rehabilitation provides a humane response to the fact that wild animals have been harmed through human activities. (B23.38.w2, D159.II.w2, J29.8.w1, P24.335.w12)
"There is a moral imperative that a human-induced catastrophe and its effects on wildlife, such as an oil spill, should be remedied by people." (P14.7.w3)
Against:
Rehabilitation of oiled wildlife causes pain and suffering; animals unlikely to survive should be euthanased. (D183.w5)
Welfare
For:
For humane reasons, wild animals oiled due to human actions or mistakes should be rehabilitated. (D159.II.w2)
Avoiding well-meant but potentially harmful actions by the public:
If no action is taken, well-intentioned individuals may try to capture and care for oiled animals, which may be detrimental or even lethal for the animals, and dangerous for the people involved. (D9, D183.w5, J29.8.w1, P24.335.w12)
Against:
In some countries, shooting oiled birds is considered to be the most humane response, to minimise suffering. (D183.w5)
For oil spills in remote, inaccessible areas, where implementing rescue and rehabilitation is impossible, humane killing of oiled wildlife is appropriate. (D60.6.w6)


Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
Wildlife Health
For:
The risk that rehabilitation may result in release of a novel disease into a naive wild population is real and should not be ignored; however, risk analysis is employed to minimise this risk, although inputs into such risk analysis are limited by lack of knowledge of the health status of the wild populations in question. (P14.7.w3).
Risks can be minimised by basic quarantine procedures, including preventing direct or indirect contact with domestic animals, good sanitation, general health screening and specific screening of animals for relevant diseases prior to release. (B377.13.w13)
Against:
There is a risk that rehabilitation may result in release of a novel disease into a naive wild population. (B377.13.w13, D159.II.w2, P14.7.w3)
Effectiveness
For:
Data indicate post-release survival of some species is good. (B334.w3, D183.w5)
For further information on post-release survival see: Post-Release Monitoring of Oiled Wildlife
Against:
Data indicate post-release survival of some species is poor. (B370.3.w3, D183.w5, J58.138.w1)
For further information on post-release survival see: Post-Release Monitoring of Oiled Wildlife
N.B. When oiled wildlife response does occur, it is important that it is carried out to the highest standards possible and with the maximum information gained from the response.
Associated techniques linked from Wildpro
Post-Release Monitoring of Oiled Wildlife
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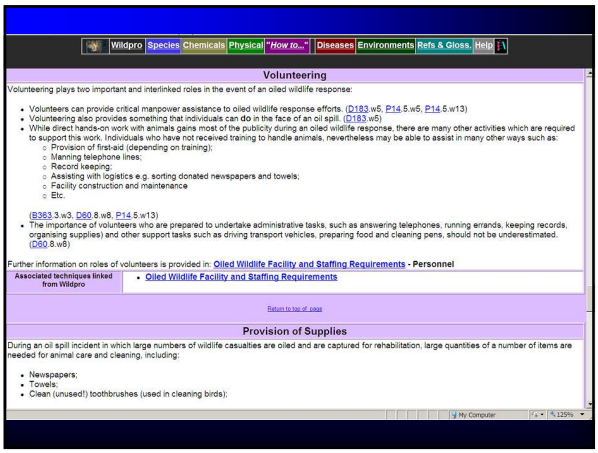
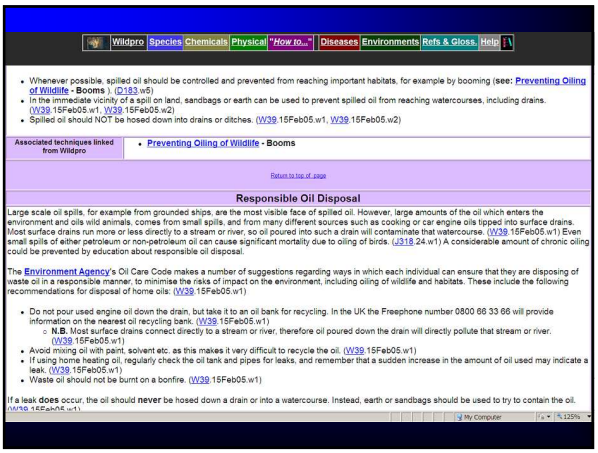
Volunteering
Volunteering plays two important and interlinked roles in the event of an oiled wildlife response:


Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
Volunteering
Volunteering plays two important and interlinked roles in the event of an oiled wildlife response:
Volunteers can provide critical manpower assistance to oiled wildlife response efforts. (D183.w5, P14.5.w5, P14.5.w13)
Volunteering also provides something that individuals can do in the face of an oil spill. (D183.w5)
While direct hands-on work with animals gains most of the publicity during an oiled wildlife response, there are many other activities which are required to support this work. Individuals who have not received training to handle animals, nevertheless may be able to assist in many other ways such as:
Provision of first-aid (depending on training);
Manning telephone lines;
Record keeping;
Assisting with logistics e.g. sorting donated newspapers and towels;
Facility construction and maintenance
Etc.
(B363.3.w3, D60.8.w8, P14.5.w13)
The importance of volunteers who are prepared to undertake administrative tasks, such as answering telephones, running errands, keeping records, organising supplies) and other support tasks such as driving transport vehicles, preparing food and cleaning pens, should not be underestimated. (D60.8.w8)
Further information on roles of volunteers is provided in: Oiled Wildlife Facility and Staffing Requirements - Personnel
Associated techniques linked from Wildpro
Oiled Wildlife Facility and Staffing Requirements
Return to top of page
Provision of Supplies
During an oil spill incident in which large numbers of wildlife casualties are oiled and are captured for rehabilitation, large quantities of a number of items are needed for animal care and cleaning, including:
Newspapers;
Towels;
Clean (unused!) toothbrushes (used in cleaning birds);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Whenever possible, spilled oil should be controlled and prevented from reaching important habitats, for example by booming (see: Preventing Oiling of Wildlife - Booms). (D183.w5)
In the immediate vicinity of a spill on land, sandbags or earth can be used to prevent spilled oil from reaching watercourses, including drains. (W39.15Feb05.w1, W39.15Feb05.w2)
Spilled oil should NOT be hosed down into drains or ditches. (W39.15Feb05.w1, W39.15Feb05.w2)
Associated techniques linked from Wildpro
Preventing Oiling of Wildlife - Booms
Return to top of page
Responsible Oil Disposal
Large scale oil spills, for example from grounded ships, are the most visible face of spilled oil. However, large amounts of the oil which enters the environment and oils wild animals, comes from small spills, and from many different sources such as cooking or car engine oils tipped into surface drains. Most surface drains run more or less directly to a stream or river, so oil poured into such a drain will contaminate that watercourse. (W39.15Feb05.w1) Even small spills of either petroleum or non-petroleum oil can cause significant mortality due to oiling of birds. (J318.24.w1) A considerable amount of chronic oiling could be prevented by education about responsible oil disposal.
The Environment Agency's Oil Care Code makes a number of suggestions regarding ways in which each individual can ensure that they are disposing of waste oil in a responsible manner, to minimise the risks of impact on the environment, including oiling of wildlife and habitats. These include the following recommendations for disposal of home oils: (W39.15Feb05.w1)
Do not pour used engine oil down the drain, but take it to an oil bank for recycling. In the UK the Freephone number 0800 66 33.66 will provide information on the nearest oil recycling bank. (W39.15Feb05.w1)
N.B. Most surface drains connect directly to a stream or river, therefore oil poured down the drain will directly pollute that stream or river. (W39.15Feb05.w1)
Avoid mixing oil with paint, solvent etc. as this makes it very difficult to recycle the oil. (W39.15Feb05.w1)
If using home heating oil, regularly check the oil tank and pipes for leaks, and remember that a sudden increase in the amount of oil used may indicate a leak. (W39.15Feb05.w1)
Waste oil should not be burnt on a bonfire. (W39.15Feb05.w1)
If a leak does occur, the oil should never be hosed down a drain or into a watercourse. Instead, earth or sandbags should be used to try to contain the oil.


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See www.wildlifeinformation.org for wildlife health & management and (re-) emerging infectious diseases
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Toxic Hazards
Zoonoses and Allergies
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First Aid Provisions
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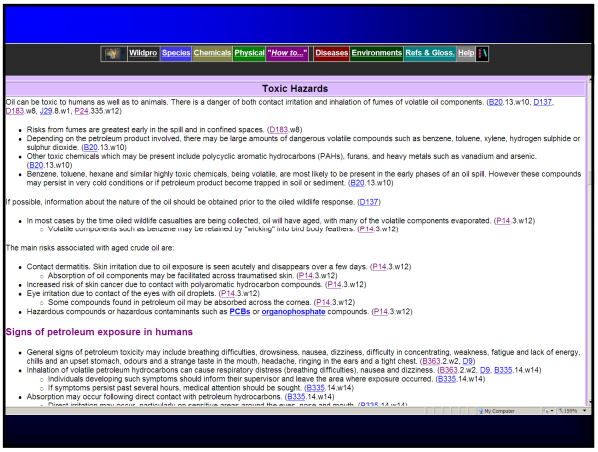
Introduction and General Information
There are a variety of potential hazards to human health and safety associated with oil spill response, including physical hazards, toxicity, psychological hazards such as burn-out, and zoonoses.
It is important to recognise that any oil spill response operation is a potentially hazardous working environment. (B363.2.w2)
Stress and fatigue are general hazards of oiled wildlife response. (D183.w8)
Human safety must be the first priority in oiled wildlife response, with the safety of the oiled casualty as the next priority. (B335.14.w14, D9, D133.2.w2, D133.3.w3, D183.w8, J29.8.w1)
It should be remembered, by anyone tempted to take risks with their own safety, that if they are injured or incapacitated then resources will have to be diverted to assist them and that such incidents may lead to further rescue efforts being stopped. (D137)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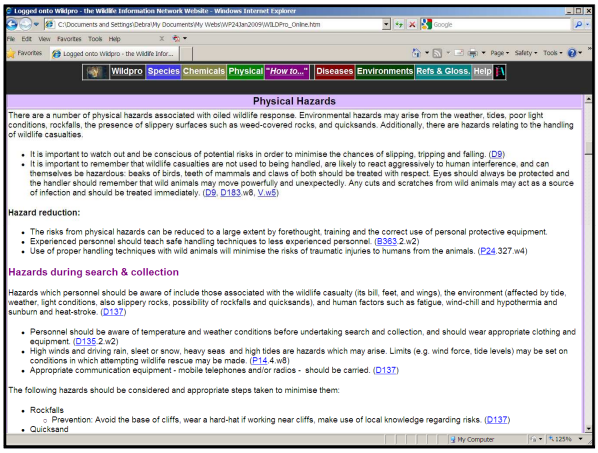
Toxic Hazards
Oil can be toxic to humans as well as to animals. There is a danger of both contact irritation and inhalation of fumes of volatile oil components. (B20.13.w10, D137, D183.w8, J29.8.w1, P24.335.w12)
Risks from fumes are greatest early in the spill and in confined spaces. (D183.w8)
Depending on the petroleum product involved, there may be large amounts of dangerous volatile compounds such as benzene, toluene, xylene, hydrogen sulphide or sulphur dioxide. (B20.13.w10)
Other toxic chemicals which may be present include polycyclic aromatic hydrocarbons (PAHs), furans, and heavy metals such as vanadium and arsenic. (B20.13.w10)
Benzene, toluene, hexane and similar highly toxic chemicals, being volatile, are most likely to be present in the early phases of an oil spill. However these compounds may persist in very cold conditions or if petroleum product become trapped in soil or sediment. (B20.13.w10)
If possible, information about the nature of the oil should be obtained prior to the oiled wildlife response. (D137)
In most cases by the time oiled wildlife casualties are being collected, oil will have aged, with many of the volatile components evaporated. (P14.3.w12)
Volatile components such as benzene may be retained by "sticky" into and body feathers. (P14.3.w12)
The main risks associated with aged crude oil are:
Contact dermatitis. Skin irritation due to oil exposure is seen acutely and disappears over a few days. (P14.3.w12)
Absorption of oil components may be facilitated across traumatised skin. (P14.3.w12)
Increased risk of skin cancer due to contact with polyaromatic hydrocarbon compounds. (P14.3.w12)
Eye irritation due to contact of the eyes with oil droplets. (P14.3.w12)
Some compounds found in petroleum oil may be absorbed across the cornea. (P14.3.w12)
Hazardous compounds or hazardous contaminants such as PCBs or organophosphate compounds. (P14.3.w12)
Signs of petroleum exposure in humans
General signs of petroleum toxicity may include breathing difficulties, drowsiness, nausea, dizziness, difficulty in concentrating, weakness, fatigue and lack of energy, chills and an upset stomach, odours and a strange taste in the mouth, headache, ringing in the ears and a tight chest. (B363.2.w2, D9)
Inhalation of volatile petroleum hydrocarbons can cause respiratory distress (breathing difficulties), nausea and dizziness. (B363.2.w2, D9, B335.14.w14)
Individuals developing such symptoms should inform their supervisor and leave the area where exposure occurred. (B335.14.w14)
If symptoms persist past several hours, medical attention should be sought. (B335.14.w14)
Absorption may occur following direct contact with petroleum hydrocarbons. (B335.14.w14)
Direct irritation may occur, particularly on sensitive areas around the eyes, nose and mouth. (B335.14.w14)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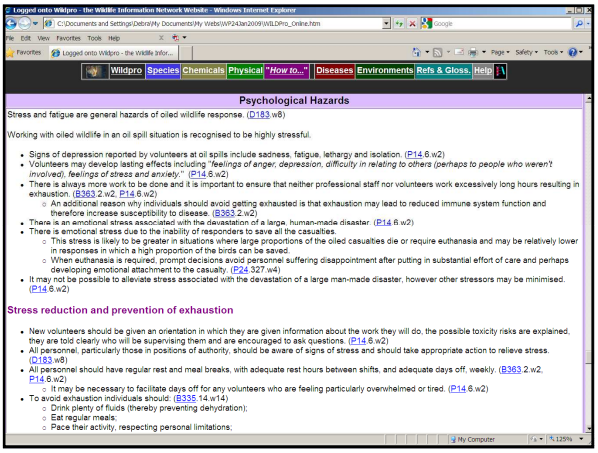
Physical Hazards
There are a number of physical hazards associated with oiled wildlife response. Environmental hazards may arise from the weather, tides, poor light conditions, rockfalls, the presence of slippery surfaces such as weed-covered rocks, and quicksands. Additionally, there are hazards relating to the handling of wildlife casualties.
It is important to watch out and be conscious of potential risks in order to minimise the chances of slipping, tripping and falling. (D9)
It is important to remember that wildlife casualties are not used to being handled, are likely to react aggressively to human interference, and can themselves be hazardous: beaks of birds, teeth of mammals and claws of both should be treated with respect. Eyes should always be protected and the handler should remember that wild animals may move powerfully and unexpectedly. Any cuts and scratches from wild animals may act as a source of infection and should be treated immediately. (D9, D183.w8, V.w6)
Hazard reduction:
The risks from physical hazards can be reduced to a large extent by forethought, training and the correct use of personal protective equipment.
Experienced personnel should teach safe handling techniques to less experienced personnel. (B363.2.w2)
Use of proper handling techniques with wild animals will minimise the risks of traumatic injuries to humans from the animals. (P24.327.w4)
Hazards during search & collection
Hazards which personnel should be aware of include those associated with the wildlife casualty (its bill, feet, and wings), the environment (affected by tide, weather, light conditions, also slippery rocks, possibility of rockfalls and quicksands), and human factors such as fatigue, wind-chill and hypothermia and sunburn and heat-stroke. (D137)
Personnel should be aware of temperature and weather conditions before undertaking search and collection, and should wear appropriate clothing and equipment. (D135.2.w2)
High winds and driving rain, sleet or snow, heavy seas and high tides are hazards which may arise. Limits (e.g. wind force, tide levels) may be set on conditions in which attempting wildlife rescue may be made. (P14.4.w8)
Appropriate communication equipment - mobile telephones and/or radios - should be carried. (D137)
The following hazards should be considered and appropriate steps taken to minimise them:
Rockfalls
Prevention: Avoid the base of cliffs, wear a hard-hat if working near cliffs, make use of local knowledge regarding risks. (D137)
Quicksand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Psychological Hazards
Stress and fatigue are general hazards of oiled wildlife response. (D183.w8)
Working with oiled wildlife in an oil spill situation is recognised to be highly stressful.
Signs of depression reported by volunteers at oil spills include sadness, fatigue, lethargy and isolation. (P14.6.w2)
Volunteers may develop lasting effects including "feelings of anger, depression, difficulty in relating to others (perhaps to people who weren't involved), feelings of stress and anxiety." (P14.6.w2)
There is always more work to be done and it is important to ensure that neither professional staff nor volunteers work excessively long hours resulting in exhaustion. (B363.2.w2, P14.6.w2)
An additional reason why individuals should avoid getting exhausted is that exhaustion may lead to reduced immune system function and therefore increase susceptibility to disease. (B363.2.w2)
There is an emotional stress associated with the devastation of a large, human-made disaster. (P14.6.w2)
There is emotional stress due to the inability of responders to save all the casualties.
This stress is likely to be greater in situations where large proportions of the oiled casualties die or require euthanasia and may be relatively lower in responses in which a high proportion of the birds can be saved.
When euthanasia is required, prompt decisions avoid personnel suffering disappointment after putting in substantial effort of care and perhaps developing emotional attachment to the casualty. (P24.327.w4)
It may not be possible to alleviate stress associated with the devastation of a large man-made disaster, however other stressors may be minimised. (P14.6.w2)
Stress reduction and prevention of exhaustion
New volunteers should be given an orientation in which they are given information about the work they will do, the possible toxicity risks are explained, they are told clearly who will be supervising them and are encouraged to ask questions. (P14.6.w2)
All personnel, particularly those in positions of authority, should be aware of signs of stress and should take appropriate action to relieve stress. (D183.w8)
All personnel should have regular rest and meal breaks, with adequate rest hours between shifts, and adequate days off, weekly. (B363.2.w2, P14.6.w2)
It may be necessary to facilitate days off for any volunteers who are feeling particularly overwhelmed or tired. (P14.6.w2)
To avoid exhaustion individuals should: (B335.14.w14)
Drink plenty of fluids (thereby preventing dehydration);
Eat regular meals;
Pace their activity, respecting personal limitations;


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~ Wildlife: Oil Spill Response ~
(with special reference to the River Thames, London, UK)
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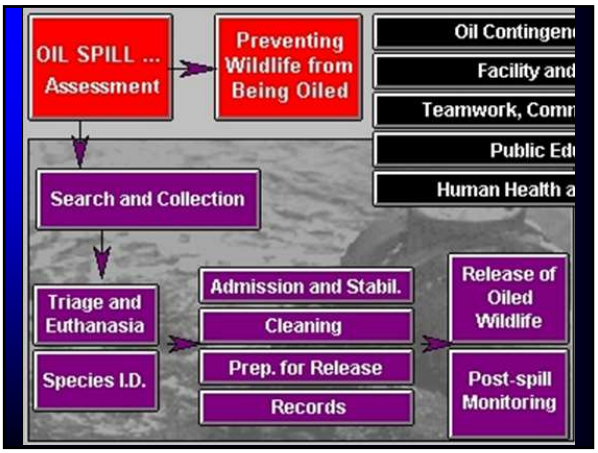
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Wildpro - "Wildlife: Oil Spill Response" - encyclopaedia and library for wildlife
Oil Spill Assessment for Wildlife Response:
Introduction and General Information


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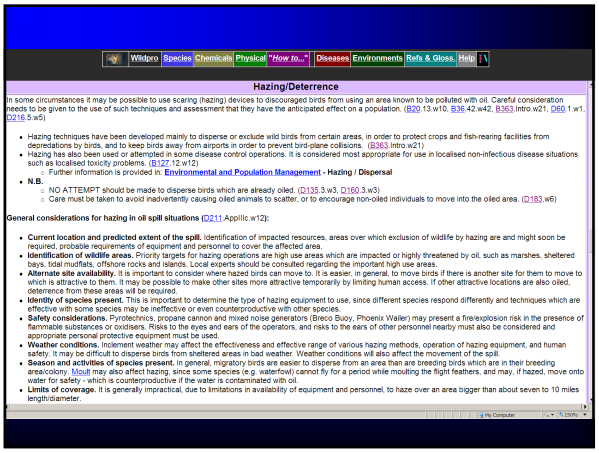
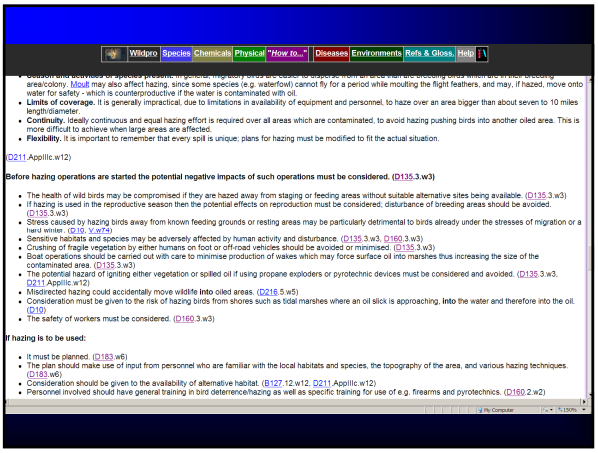
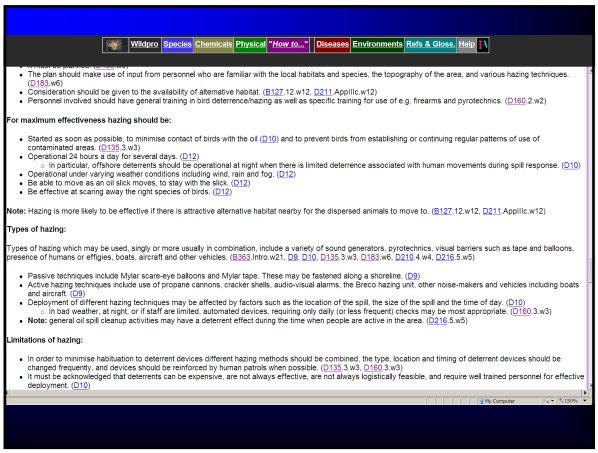

Hazing/Deterrence

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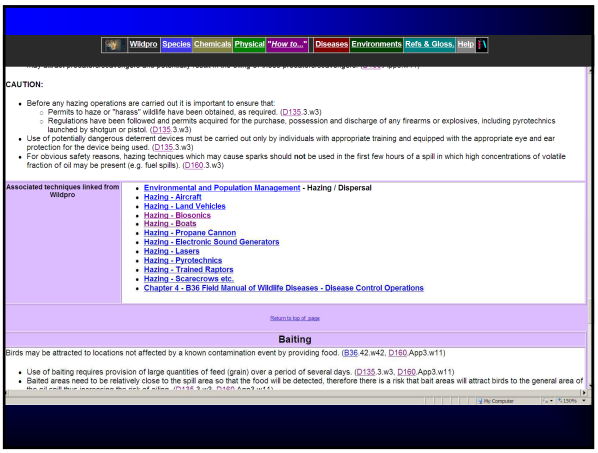
The plan should make use of input from personnel who are familiar with the local habitats and species, the topography of the area, and various hazing techniques. (D183.w6)
Consideration should be given to the availability of alternative habitat. (B127.12.w12, D211.AppIIIc.w12)
Personnel involved should have general training in bird deterrence/hazing as well as specific training for use of e.g. firearms and pyrotechnics. (D160.2.w2)
For maximum effectiveness hazing should be:
Started as soon as possible, to minimise contact of birds with the oil (D10) and to prevent birds from establishing or continuing regular patterns of use of contaminated areas. (D135.3.w3)
Operational 24 hours a day for several days. (D12)
In particular, offshore deterrents should be operational at night when there is limited deterrence associated with human movements during spill response. (D10)
Operational under varying weather conditions including wind, rain and fog. (D12)
Be able to move as an oil slick moves, to stay with the slick. (D12)
Be effective at scaring away the right species of birds. (D12)
Note: Hazing is more likely to be effective if there is attractive alternative habitat nearby for the dispersed animals to move to. (B127.12.w12, D211.AppIIIc.w12)
Types of hazing:
Types of hazing which may be used, singly or more usually in combination, include a variety of sound generators, pyrotechnics, visual barriers such as tape and balloons, presence of humans or effigies, boats, aircraft and other vehicles. (B363.Intro.w21, D9, D10, D135.3.w3, D183.w6, D210.4.w4, D216.5.w5)
Passive techniques include Mylar scare-eye balloons and Mylar tape. These may be fastened along a shoreline. (D9)
Active hazing techniques include use of propane cannons, cracker shells, audio-visual alarms, the Breco hazing unit, other noise-makers and vehicles including boats and aircraft. (D9)
Deployment of different hazing techniques may be affected by factors such as the location of the spill, the size of the spill and the time of day. (D10)
In bad weather, at night, or if staff are limited, automated devices, requiring only daily (or less frequent) checks may be most appropriate. (D160.3.w3)
Note: general oil spill cleanup activities may have a deterrent effect during the time when people are active in the area. (D216.5.w5)
Limitations of hazing:
In order to minimise habituation to deterrent devices different hazing methods should be combined, the type, location and timing of deterrent devices should be changed frequently, and devices should be reinforced by human patrols when possible. (D135.3.w3, D160.3.w3)
It must be acknowledged that deterrents can be expensive, are not always effective, are not always logistically feasible, and require well trained personnel for effective deployment. (D10)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CAUTION:
Before any hazing operations are carried out it is important to ensure that:
Permits to haze or "harass" wildlife have been obtained, as required. (D135.3.w3)
Regulations have been followed and permits acquired for the purchase, possession and discharge of any firearms or explosives, including pyrotechnics launched by shotgun or pistol. (D135.3.w3)
Use of potentially dangerous deterrent devices must be carried out only by individuals with appropriate training and equipped with the appropriate eye and ear protection for the device being used. (D135.3.w3)
For obvious safety reasons, hazing techniques which may cause sparks should not be used in the first few hours of a spill in which high concentrations of volatile fraction of oil may be present (e.g. fuel spills). (D160.3.w3)
Associated techniques linked from Wildpro
Environmental and Population Management - Hazing / Dispersal
Hazing - Aircraft
Hazing - Land Vehicles
Hazing - Biosonics
Hazing - Boats
Hazing - Propane Cannon
Hazing - Electronic Sound Generators
Hazing - Lasers
Hazing - Pyrotechnics
Hazing - Trained Raptors
Hazing - Scarecrows etc.
Chapter 4 - B36 Field Manual of Wildlife Diseases - Disease Control Operations
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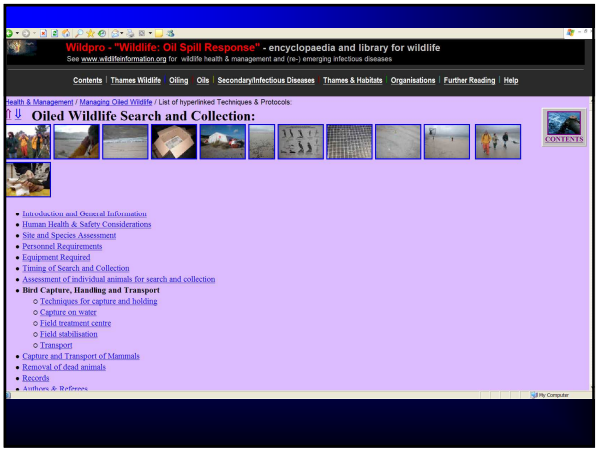
Baiting
Birds may be attracted to locations not affected by a known contamination event by providing food. (B36.42.w42, D160.App3.w11)
Use of baiting requires provision of large quantities of feed (grain) over a period of several days. (D135.3.w3, D160.App3.w11)
Baited areas need to be relatively close to the spill area so that the food will be detected, therefore there is a risk that bait areas will attract birds to the general area of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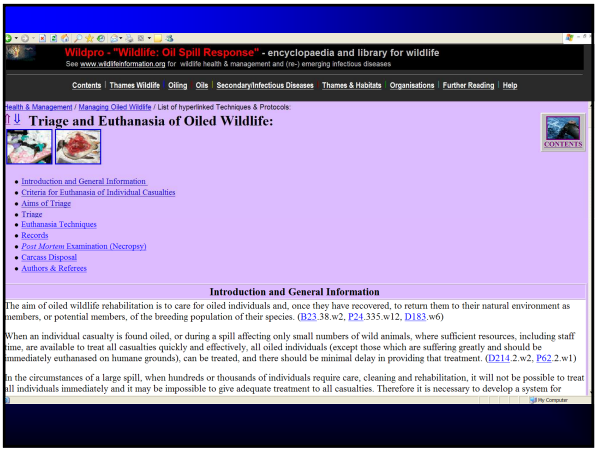
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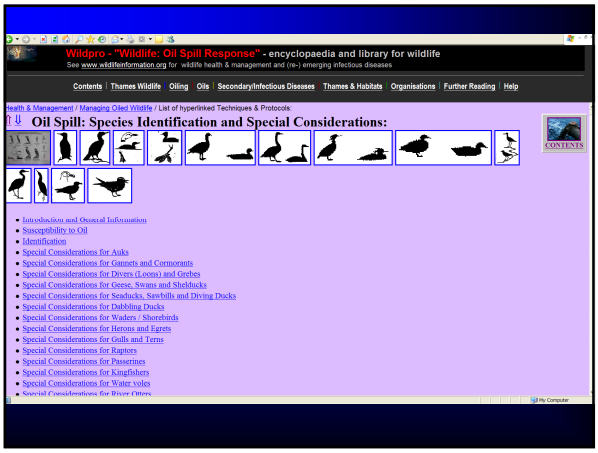
Introduction and General Information
The aim of oiled wildlife rehabilitation is to care for oiled individuals and, once they have recovered, to return them to their natural environment as members, or potential members, of the breeding population of their species. (B23.38.w2, P24.335.w12, D183.w6)
When an individual casualty is found oiled, or during a spill affecting only small numbers of wild animals, where sufficient resources, including staff time, are available to treat all casualties quickly and effectively, all oiled individuals (except those which are suffering greatly and should be immediately euthanased on humane grounds), can be treated, and there should be minimal delay in providing that treatment. (D214.2.w2, P62.2.w1)
In the circumstances of a large spill, when hundreds or thousands of individuals require care, cleaning and rehabilitation, it will not be possible to treat all individuals immediately and it may be impossible to give adequate treatment to all casualties. Therefore it is necessary to develop a system for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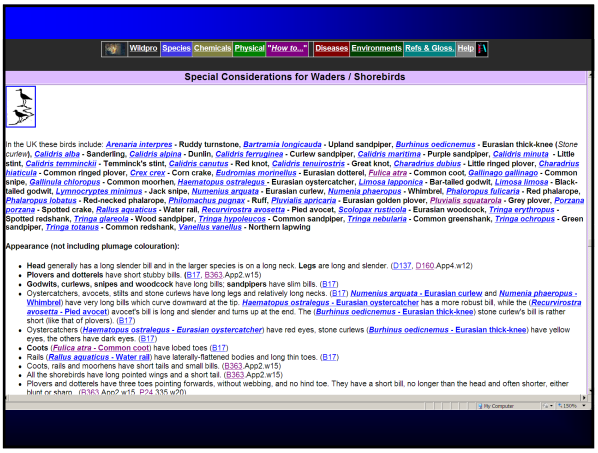
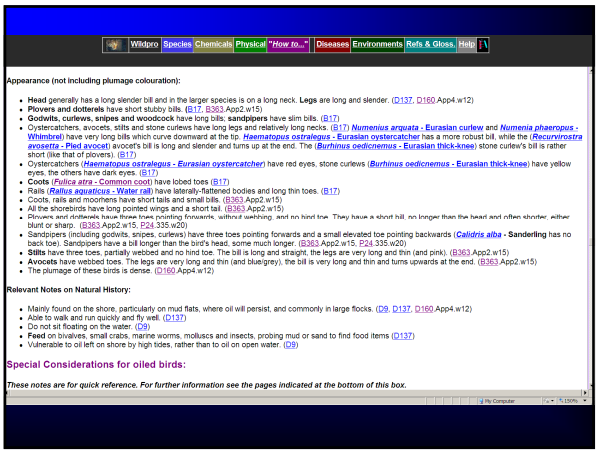
Special Considerations for Waders / Shorebirds
Special Considerations for Herons and Egrets
Special Considerations for Gulls and Terns
Special Considerations for Raptors
Special Considerations for Passerines
Special Considerations for Kingfishers
Special Considerations for Water voles
Special Considerations for River Otters


Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
Special Considerations for Waders / Shorebirds
In the UK these birds include: Arenaria interpres - Ruddy turnstone, Bartramia longicauda - Upland sandpiper, Burhinus oedicnemus - Eurasian thick-knee (Stone curlew), Calidris alba - Sanderling, Calidris alpina - Dunlin, Calidris ferruginea - Curlew sandpiper, Calidris maritima - Purple sandpiper, Calidris minuta - Little stint, Calidris temminckii - Temminck's stint, Calidris canutus - Red knot, Calidris tenuirostris - Great knot, Charadrius dubius - Little ringed plover, Charadrius hiaticula - Common ringed plover, Crex crex - Corn crake, Eudromias morinellus - Eurasian dotterel, Fulica atra - Common coot, Gallinago gallinago - Common snipe, Gallinula chloropus - Common moorhen, Haematopus ostralegus - Eurasian oystercatcher, Limosa lapponica - Bar-tailed godwit, Limosa limosa - Black-tailed godwit, Lymnocryptes minimus - Jack snipe, Numenius arquata - Eurasian curlew, Numenia phaeopus - Whimbrel, Phalaropus fulicaria - Red phalarope, Phalaropus lobatus - Red-necked phalarope, Philomachus pugnax - Ruff, Pluvialis apricaria - Eurasian golden plover, Pluvialis squatarola - Grey plover, Porzana porzana - Spotted crake, Rallus aquaticus - Water rail, Recurvirostra avosetta - Pied avocet, Scolopax rusticola - Eurasian woodcock, Tringa erythropus - Spotted redshank, Tringa glareola - Wood sandpiper, Tringa hypoleucos - Common sandpiper, Tringa nebularia - Common greenshank, Tringa ochropus - Green sandpiper, Tringa totanus - Common redshank, Vanellus vanellus - Northern lapwing
Appearance (not including plumage colouration):
Head generally has a long slender bill and in the larger species is on a long neck. Legs are long and slender. (D137, D160.App4.w12)
Plovers and dotterels have short stubby bills. (B17, B363.App2.w15)
Godwits, curlews, snipes and woodcock have long bills; sandpipers have slim bills. (B17)
Oystercatchers, avocets, stilts and stone curlews have long legs and relatively long necks. (B17) Numenius arquata - Eurasian curlew and Numenia phaeopus - Whimbrel have very long bills which curve downward at the tip. Haematopus ostralegus - Eurasian oystercatcher has a more robust bill, while the (Recurvirostra avosetta - Pied avocet) avocet's bill is long and slender and turns up at the end. The (Burhinus oedicnemus - Eurasian thick-knee) stone curlew's bill is rather short (like that of plovers). (B17)
Oystercatchers (Haematopus ostralegus - Eurasian oystercatcher) have red eyes, stone curlews (Burhinus oedicnemus - Eurasian thick-knee) have yellow eyes, the others have dark eyes. (B17)
Coots (Fulica atra - Common coot) have lobed toes (B17)
Rails (Rallus aquaticus - Water rail) have laterally-flattened bodies and long thin toes. (B17)
Coots, rails and moorhens have short tails and small bills. (B363.App2.w15)
All the shorebirds have long pointed wings and a short tail. (B363.App2.w15)
Plovers and dotterels have three toes pointing forwards, without webbing, and no hind toe. They have a short bill, no longer than the head and often shorter, either


Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
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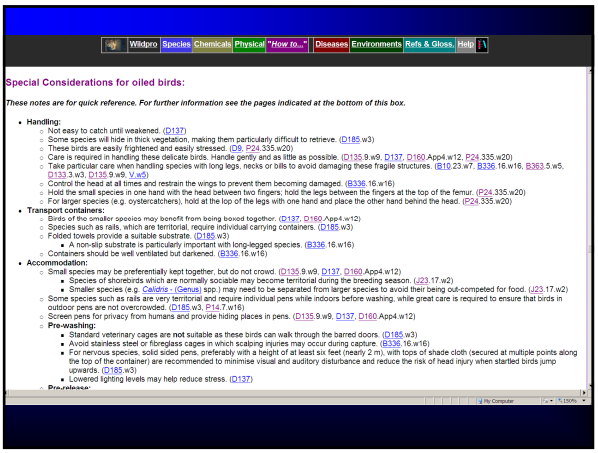
Coots, rails and moorhens have short tails and small bills. (B363.App2.w15)
All the shorebirds have long pointed wings and a short tail. (B363.App2.w15)
Plovers and dotterels have three toes pointing forwards, without webbing, and no hind toe. They have a short bill, no longer than the head and often shorter, either blunt or sharp. (B363.App2.w15, P24.335.w20)
Sandpipers (including godwits, snipes, curlews) have three toes pointing forwards and a small elevated toe pointing backwards (Calidris alba - Sanderling has no back toe). Sandpipers have a bill longer than the bird's head, some much longer. (B363.App2.w15, P24.335.w20)
Stilts have three toes, partially webbed and no hind toe. The bill is long and straight, the legs are very long and thin (and pink). (B363.App2.w15)
Avocets have webbed toes. The legs are very long and thin (and blue/grey), the bill is very long and thin and turns upwards at the end. (B363.App2.w15)
The plumage of these birds is dense. (D160.App4.w12)
Relevant Notes on Natural History:
Mainly found on the shore, particularly on mud flats, where oil will persist, and commonly in large flocks. (D9, D137, D160.App4.w12)
Able to walk and run quickly and fly well. (D137)
Do not sit floating on the water. (D9)
Feed on bivalves, small crabs, marine worms, molluscs and insects, probing mud or sand to find food items (D137)
Vulnerable to oil left on shore by high tides, rather than to oil on open water. (D9)
Special Considerations for oiled birds:
These notes are for quick reference. For further information see the pages indicated at the bottom of this box.


Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
Special Considerations for oiled birds:
These notes are for quick reference. For further information see the pages indicated at the bottom of this box.
Handling:
Not easy to catch until weakened. (D137)
Some species will hide in thick vegetation, making them particularly difficult to retrieve. (D185.w3)
These birds are easily frightened and easily stressed. (D9, P24.335.w20)
Care is required in handling these delicate birds. Handle gently and as little as possible. (D135.9.w9, D137, D160.App4.w12, P24.335.w20)
Take particular care when handling species with long legs, necks or bills to avoid damaging these fragile structures. (B10.23.w7, B336.16.w16, B363.5.w5, D133.3.w3, D135.9.w9, V.w6)
Control the head at all times and restrain the wings to prevent them becoming damaged. (B336.16.w16)
Hold the small species in one hand with the head between two fingers; hold the legs between the fingers at the top of the femur. (P24.335.w20)
For larger species (e.g. oystercatchers), hold at the top of the legs with one hand and place the other hand behind the head. (P24.335.w20)
Transport containers:
Birds of the smaller species may benefit from being boxed together. (D137, D160.App4.w12)
Species such as rails, which are territorial, require individual carrying containers. (D185.w3)
Folded towels provide a suitable substrate. (D185.w3)
A non-slip substrate is particularly important with long-legged species. (B336.16.w16)
Containers should be well ventilated but darkened. (B336.16.w16)
Accommodation:
Small species may be preferentially kept together, but do not crowd. (D135.9.w9, D137, D160.App4.w12)
Species of shorebirds which are normally sociable may become territorial during the breeding season. (J23.17.w2)
Smaller species (e.g. Calidris - (Genus) spp.) may need to be separated from larger species to avoid their being out-competed for food. (J23.17.w2)
Some species such as rails are very territorial and require individual pens while indoors before washing, while great care is required to ensure that birds in outdoor pens are not overcrowded. (D185.w3, P14.7.w16)
Screen pens for privacy from humans and provide hiding places in pens. (D135.9.w9, D137, D160.App4.w12)
Pre-washing:
Standard veterinary cages are not suitable as these birds can walk through the barred doors. (D185.w3)
Avoid stainless steel or fibreglass cages in which scalding injuries may occur during capture. (B336.16.w16)
For nervous species, solid sided pens, preferably with a height of at least six feet (nearly 2 m), with tops of shade cloth (secured at multiple points along the top of the container) are recommended to minimise visual and auditory disturbance and reduce the risk of head injury when startled birds jump upwards. (D185.w3)
Lowered lighting levels may help reduce stress. (D137)
Pre-release:


Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
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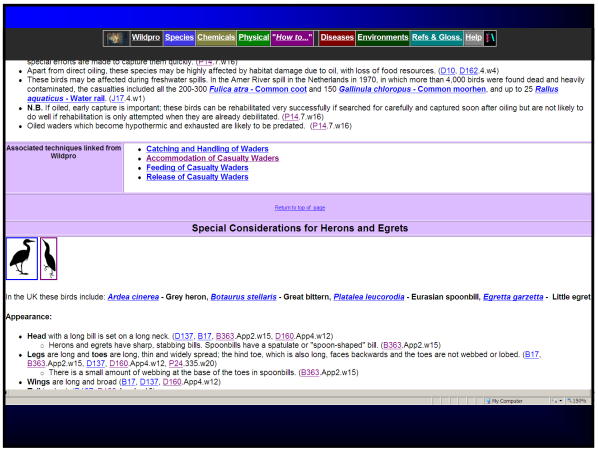
Lowered lighting levels may help reduce stress. (D137)
Pre-release:
Provide cleaned birds with shallow pools and spray with water to encourage preening and restoration of waterproofing. (D135.9.w9)
Solid walls are recommended to provide privacy, while netting tops allow sunlight and rain into the enclosure. (D185.w3)
Providing a naturalistic habitat is suggested, e.g. with reeds and other marsh vegetation for marshland birds. (D185.w3)
Pea gravel may be a better substrate than sand in enclosures for cleaned birds, providing better drainage and being less likely to harbour bacteria. (D185.w3)
A small observation hole with a removable cover is recommended to allow observation without the birds being disturbed. (D185.w3)
Feeding:
Worms, chopped fish, soaked grains, mealworms, proprietary insectivorous food. (D137) Provide food in dishes, in water, on sand, and on soil. (D135.9.w9)
Multiple feeding stations may be used to minimise aggression between group-housed birds. (P14.7.w16)
For further information see the relevant pages linked below.
Secondary diseases of particular importance:
Easily stressed. (P14.7.w16)
Very susceptible to hypothermia. (D160.App4.w12) See: Chilling - Hypothermia
Bumblefoot. (B336.16.w16)
Vulnerability to oil:
Waders or shorebirds are generally considered to have relatively low susceptibility to oil spills, flying away from oiled areas unless taken by surprise in the dark. They are probably most susceptible when roosting at night or when going to feed as the tide turns. (D10)
These birds will avoid oil if suitable unoiled areas are available for feeding and resting. (D162.4.w4)
These species can often survive for months despite oiling. (D10)
Waders may get oil on their legs and abdomen, while their wings remain clean and they can still fly. The oil may affect these birds more slowly until they weaken and die from hypothermia or are predated. (D185.w3)
Small birds (body mass no more than 100 g) which become oiled are likely to suffer high mortality, due to hypothermia and toxic effects of petroleum oils, unless special efforts are made to capture them quickly. (P14.7.w16)
Apart from direct oiling, these species may be highly affected by habitat damage due to oil, with loss of food resources. (D10, D162.4.w4)
These birds may be affected during freshwater spills. In the Amer River spill in the Netherlands in 1970, in which more than 4,000 birds were found dead and heavily contaminated, the casualties included all the 200-300 Fulica atra - Common coot and 150 Gallinula chloropus - Common moorhen, and up to 25 Rallus aquaticus - Water rail. (J17.4.w1)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N.B. If oiled, early capture is important; these birds can be rehabilitated very successfully if searched for carefully and captured soon after oiling but are not likely to do well if rehabilitation is only attempted when they are already debilitated. (P14.7.w16)
Oiled waders which become hypothermic and exhausted are likely to be predated. (P14.7.w16)
Associated techniques linked from Wildpro
Catching and Handling of Waders
Accommodation of Casualty Waders
Feeding of Casualty Waders
Release of Casualty Waders
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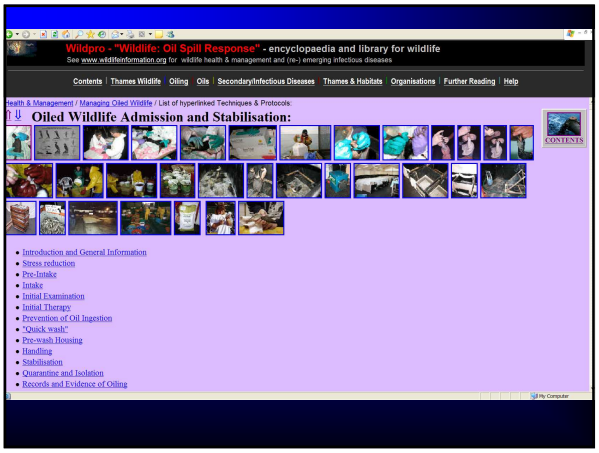
Special Considerations for Herons and Egrets
In the UK these birds include: Ardea cinerea - Grey heron, Botaurus stellaris - Great bittern, Platalea leucorodia - Eurasian spoonbill, Egretta garzetta - Little egret
Appearance:
Head with a long bill is set on a long neck. (D137, B17, B363.App2.w15, D160.App4.w12)
Herons and egrets have sharp, stabbing bills. Spoonbills have a spatulate or "spoon-shaped" bill. (B363.App2.w15)
Legs are long and toes are long, thin and widely spread; the hind toe, which is also long, faces backwards and the toes are not webbed or lobed. (B17, B363.App2.w15, D137, D160.App4.w12, P24.335.w20)
There is a small amount of webbing at the base of the toes in spoonbills. (B363.App2.w15)
Wings are long and broad (B17, D137, D160.App4.w12)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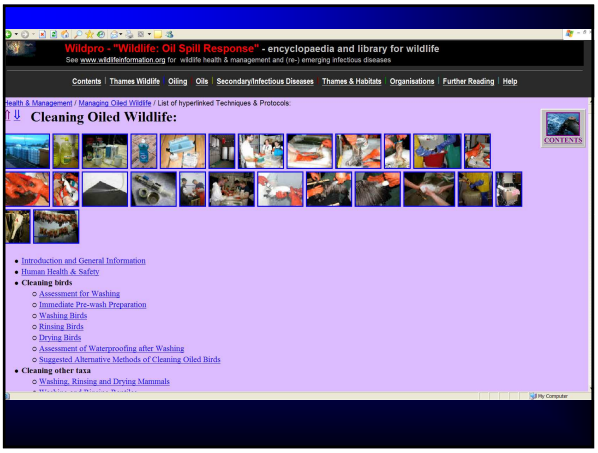
"Quick wash"
Pre-wash Housing
Handling
Stabilisation
Quarantine and Isolation
Records and Evidence of Oiling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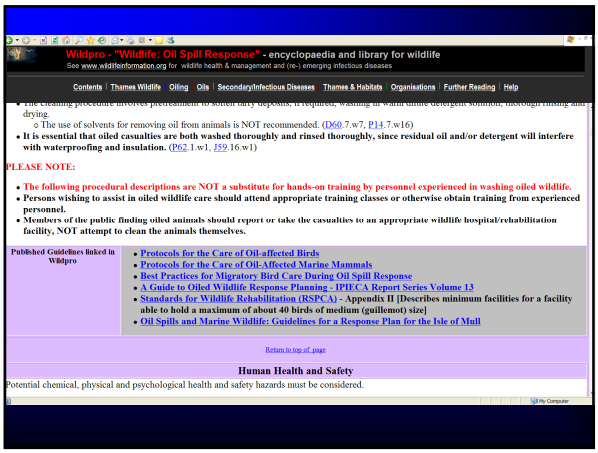
Suggested Alternative Methods of Cleaning Oiled Birds
Cleaning other taxa
Washing, Rinsing and Drying Mammals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drying.
o The use of solvents for removing oil from animals is NOT recommended. (D60.7.w7, P14.7.w16)
• It is essential that oiled casualties are both washed thoroughly and rinsed thoroughly, since residual oil and/or detergent will interfere with waterproofing and insulation. (P62.1.w1, J59.16.w1)
PLEASE NOTE:
• The following procedural descriptions are NOT a substitute for hands-on training by personnel experienced in washing oiled wildlife.
• Persons wishing to assist in oiled wildlife care should attend appropriate training classes or otherwise obtain training from experienced personnel.
• Members of the public finding oiled animals should report or take the casualties to an appropriate wildlife hospital/rehabilitation facility, NOT attempt to clean the animals themselves.
Published Guidelines linked in Wildpro
• Protocols for the Care of Oil-affected Birds
• Protocols for the Care of Oil-Affected Marine Mammals
• Best Practices for Migratory Bird Care During Oil Spill Response
• A Guide to Oiled Wildlife Response Planning - IPIECA Report Series Volume 13
• Standards for Wildlife Rehabilitation (RSPCA) - Appendix II [Describes minimum facilities for a facility able to hold a maximum of about 40 birds of medium (guillemot) size]
• Oil Spills and Marine Wildlife: Guidelines for a Response Plan for the Isle of Mull
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Human Health and Safety
Potential chemical, physical and psychological health and safety hazards must be considered.


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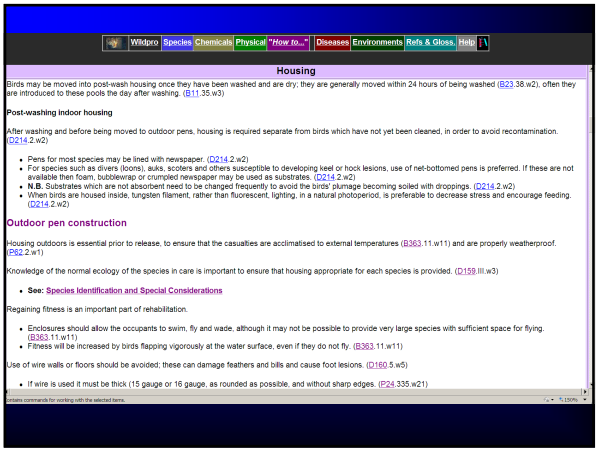
Wildpro Species Chemicals Physical "How to..." Diseases Environments Refs & Gloss. Help
Housing
Birds may be moved into post-wash housing once they have been washed and are dry; they are generally moved within 24 hours of being washed (B23.38.w2), often they are introduced to these pools the day after washing. (B11.35.w3)
Post-washing indoor housing
After washing and before being moved to outdoor pens, housing is required separate from birds which have not yet been cleaned, in order to avoid recontamination. (D214.2.w2)
• Pens for most species may be lined with newspaper. (D214.2.w2)
• For species such as divers (loons), auks, scoters and others susceptible to developing keel or hock lesions, use of net-bottomed pens is preferred. If these are not available then foam, bubblewrap or crumpled newspaper may be used as substrates. (D214.2.w2)
• N.B. Substrates which are not absorbent need to be changed frequently to avoid the birds' plumage becoming soiled with droppings. (D214.2.w2)
• When birds are housed inside, tungsten filament, rather than fluorescent, lighting, in a natural photoperiod, is preferable to decrease stress and encourage feeding. (D214.2.w2)
Outdoor pen construction
Housing outdoors is essential prior to release, to ensure that the casualties are acclimatised to external temperatures (B363.11.w11) and are properly weatherproof. (P62.2.w1)
Knowledge of the normal ecology of the species in care is important to ensure that housing appropriate for each species is provided. (D159.III.w3)
• See: Species Identification and Special Considerations
Regaining fitness is an important part of rehabilitation.
• Enclosures should allow the occupants to swim, fly and wade, although it may not be possible to provide very large species with sufficient space for flying. (B363.11.w11)
• Fitness will be increased by birds flapping vigorously at the water surface, even if they do not fly. (B363.11.w11)
Use of wire walls or floors should be avoided; these can damage feathers and bills and cause foot lesions. (D160.5.w5)
• If wire is used it must be thick (15 gauge or 16 gauge, as rounded as possible, and without sharp edges. (P24.335.w21)


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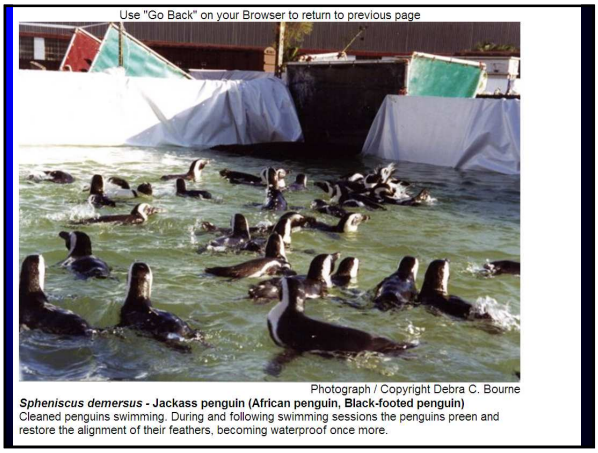
Photograph / Copyright Tri-State Bird Rescue & Research
Pre-release accommodation must be suitable for the species being housed. This enclosure for shorebirds has a substrate of natural sand, areas of matting as an alternative, non-abrasive substrate, shallow feed and water trays, and plants for birds to hide behind. Several birds may be kept together, but avoid overcrowding.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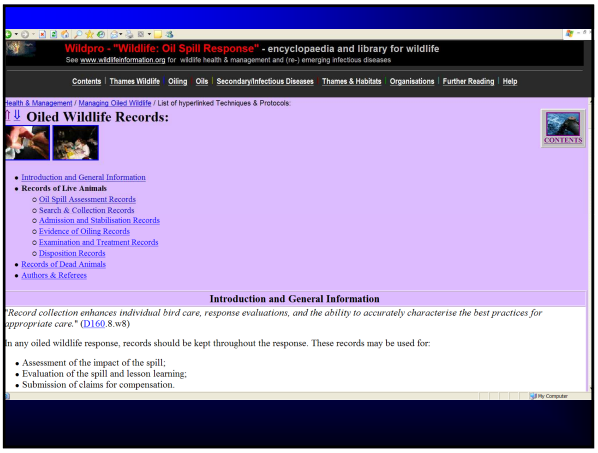
Spheniscus demersus - Jackass penguin (African penguin, Black-footed penguin)
Cleaned penguins swimming. During and following swimming sessions the penguins preen and restore the alignment of their feathers, becoming waterproof once more.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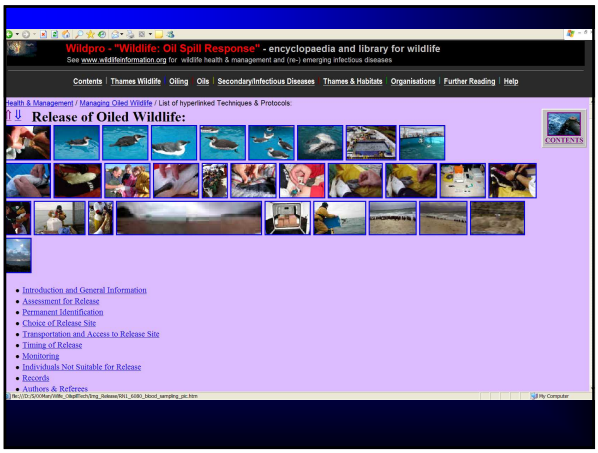
Introduction and General Information
"Record collection enhances individual bird care, response evaluations, and the ability to accurately characterise the best practices for appropriate care." (D160.8.w8)
In any oiled wildlife response, records should be kept throughout the response. These records may be used for:
• Assessment of the impact of the spill;
• Evaluation of the spill and lesson learning;
• Submission of claims for compensation.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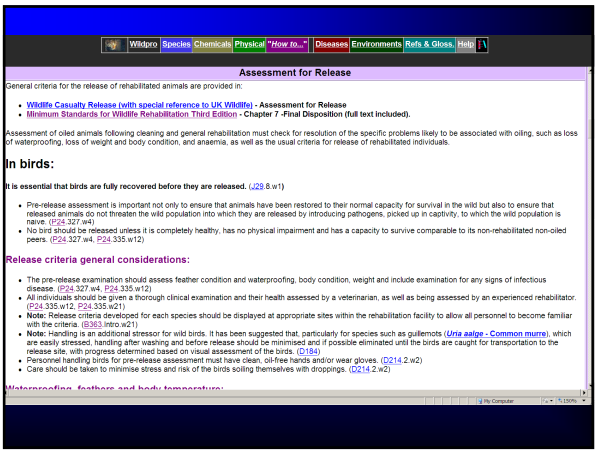
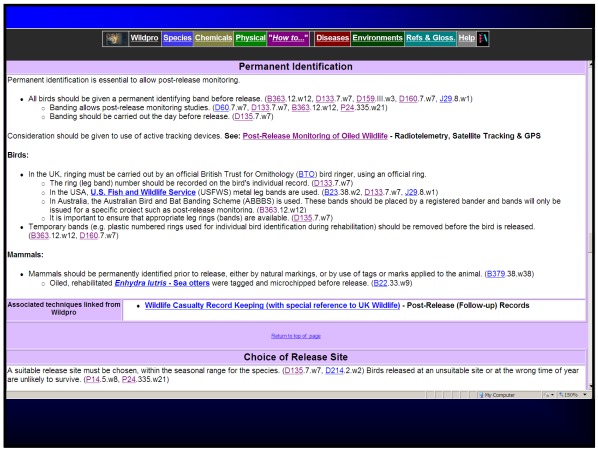
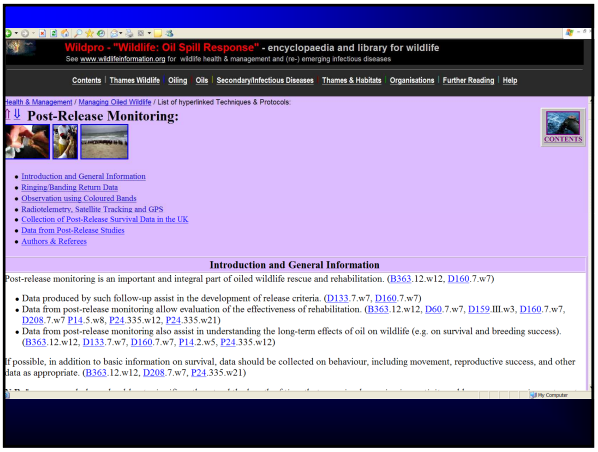
Assessment for Release
Permanent Identification
Choice of Release Site
Transportation and Access to Release Site
Timing of Release
Monitoring
Individuals Not Suitable for Release
Records
Authors & Referees


Assessment for Release
In birds:
Release criteria general considerations:


Permanent Identification
Choice of Release Site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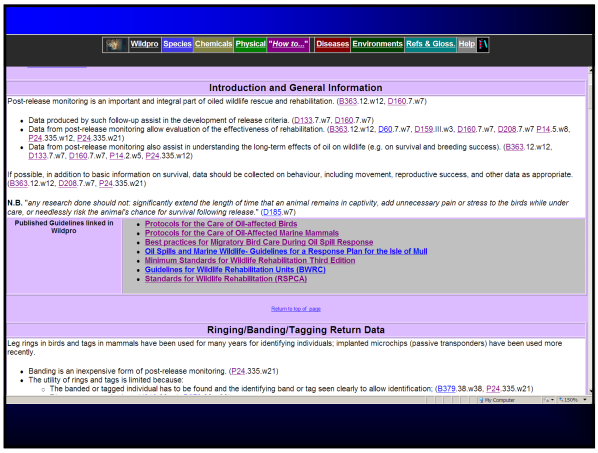
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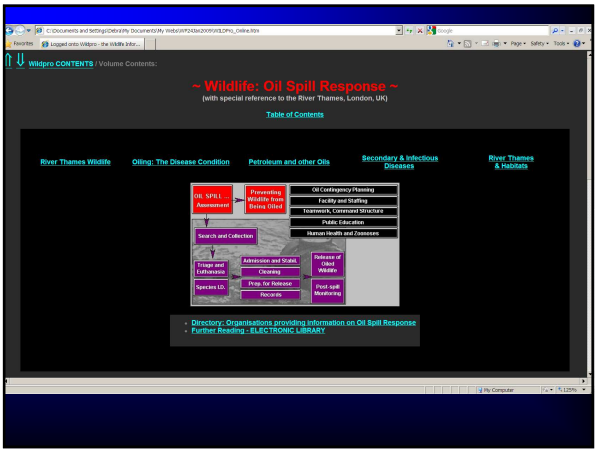
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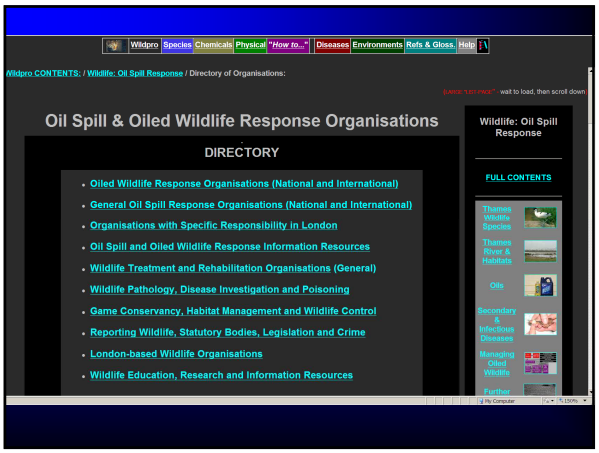
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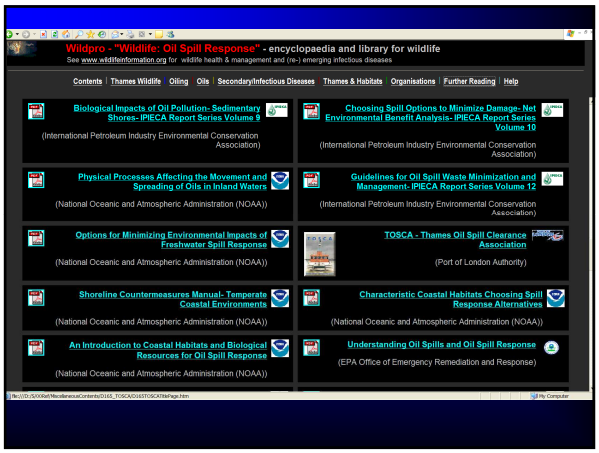
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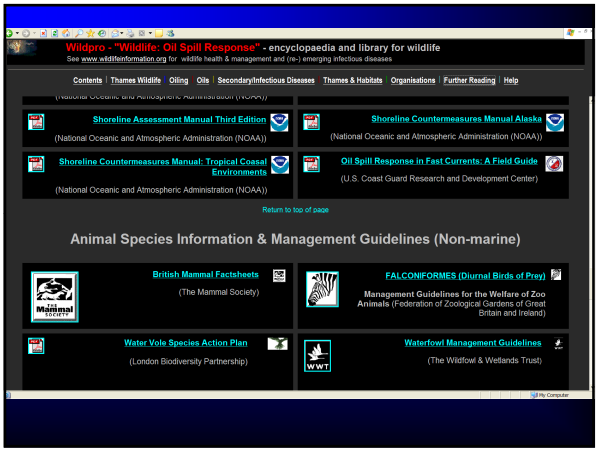
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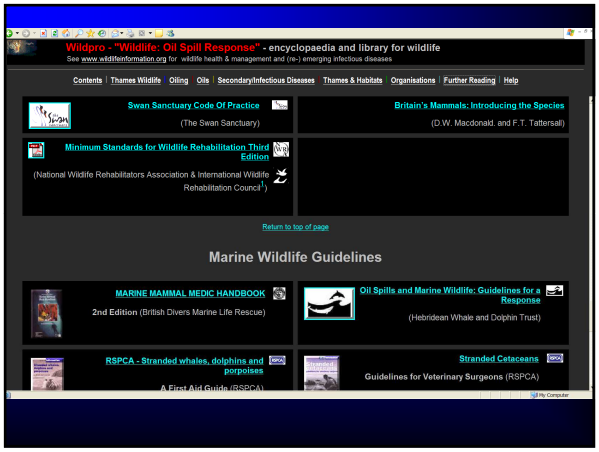
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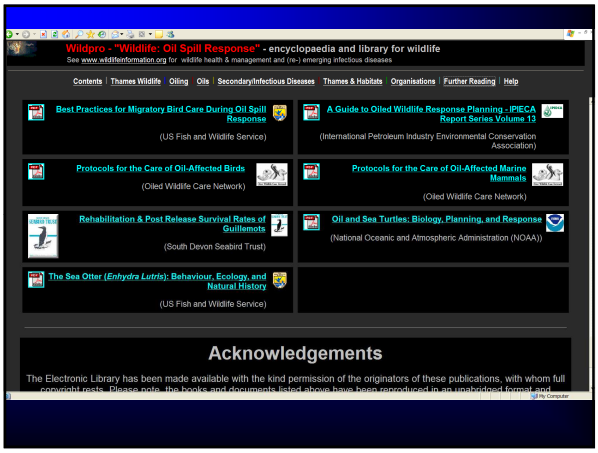
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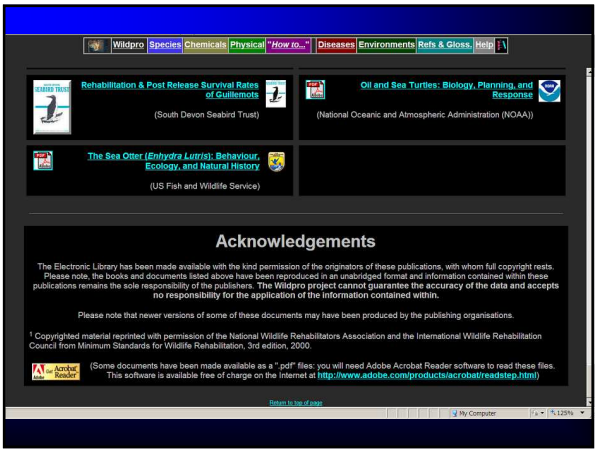
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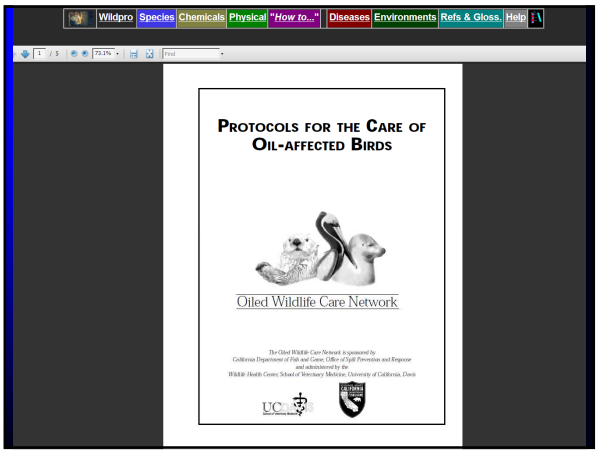
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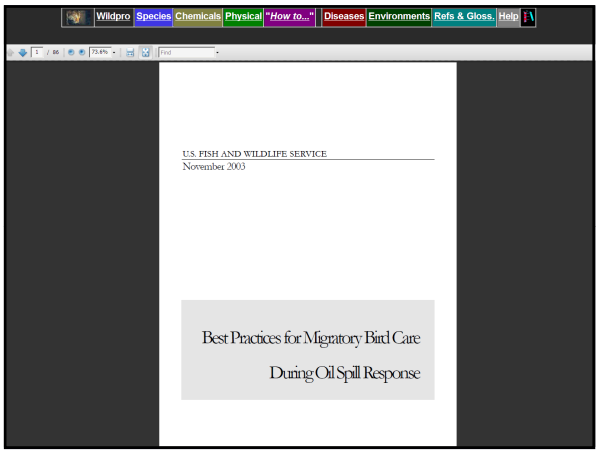
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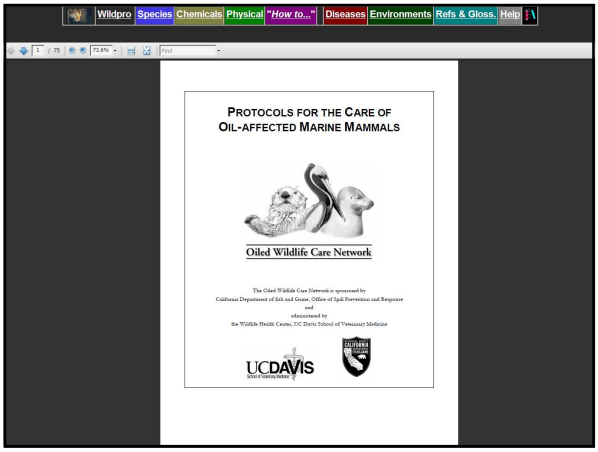
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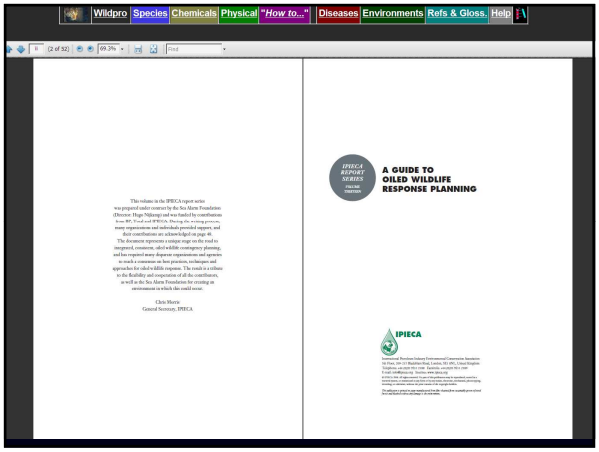
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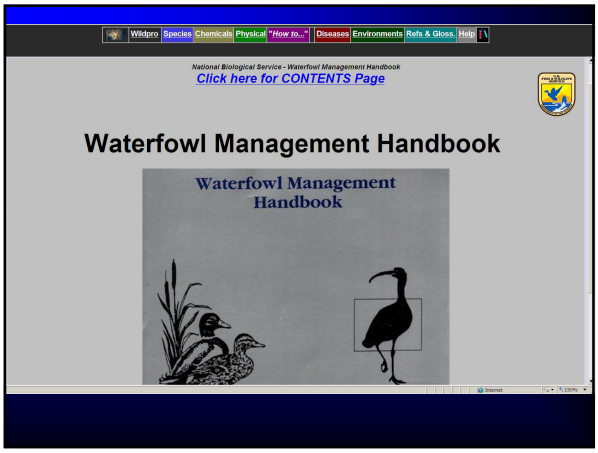
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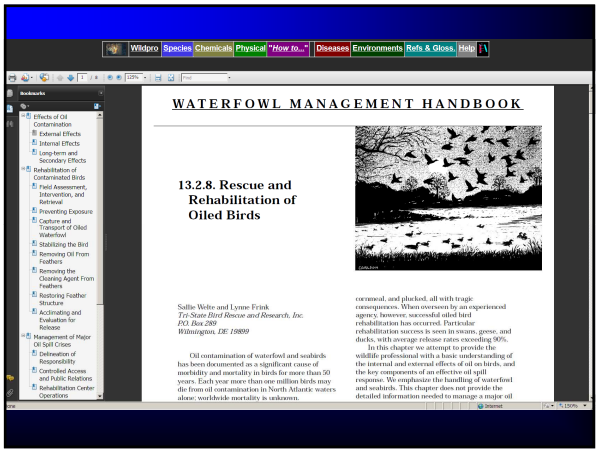
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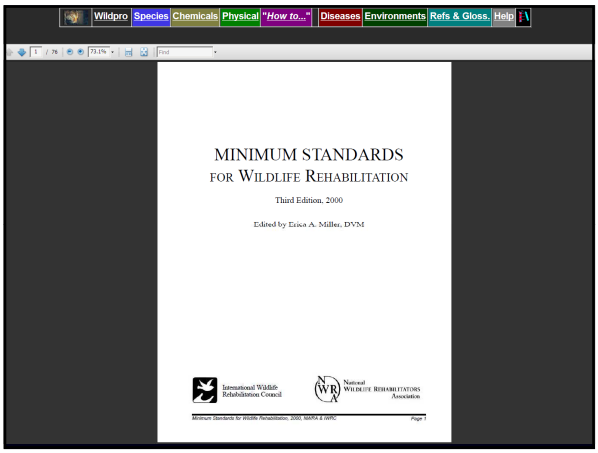
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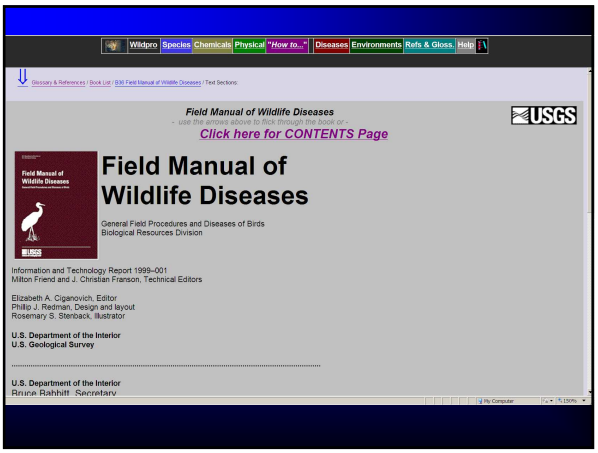
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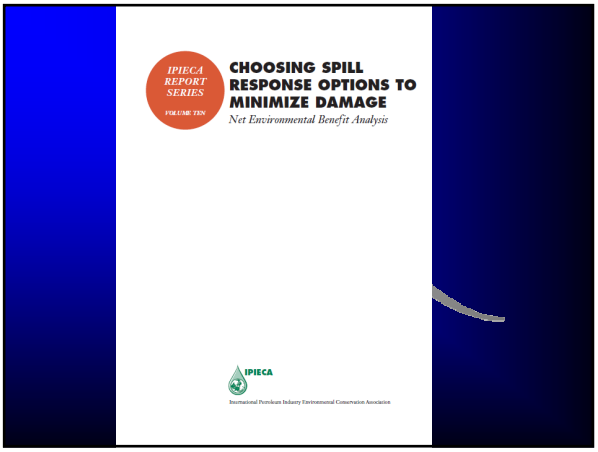
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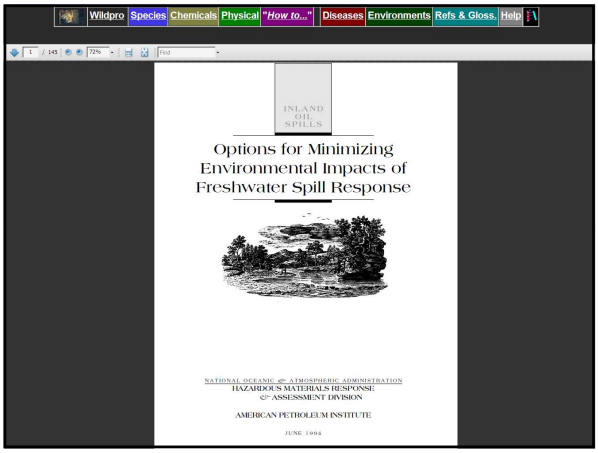
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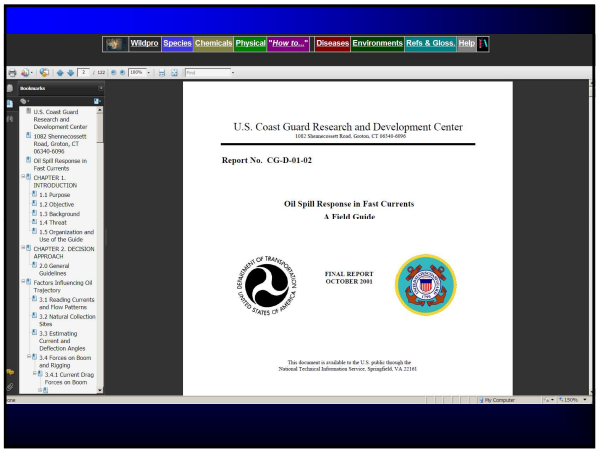
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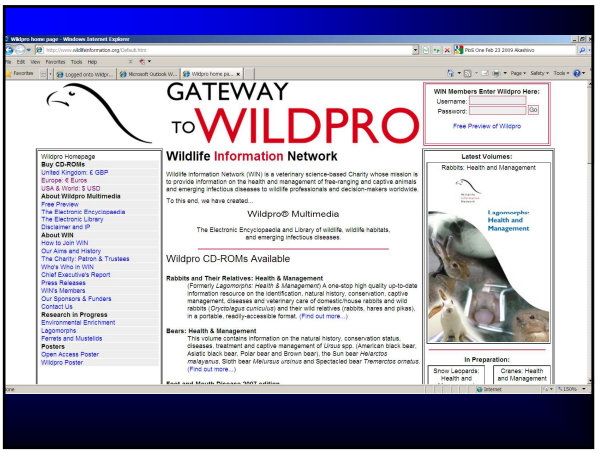

Future developments

- More pictures
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