



Oiled Wildlife Strategic Response Plan

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ABBREVIATIONS

Abbreviation	Definition
BC FLNRRD	British Columbia Ministry of Forests, Land, Natural Resource Operations and Rural Development
BRRGS	Bird Recovery & Rehabilitation Group Supervisor
CCG	Canadian Coast Guard
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
DBD	Deputy Branch Director
DFO	Department of Fisheries and Oceans
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
EU	Environmental Unit
EUL	Environmental Unit Leader
FMO	Federal Monitoring Officer
GAR	Geographic Area of Response
ICS	Incident Command System
IMH	Incident Management Handbook
IMT	Incident Management Team
JIC	Joint Information Center
MBCA	Migratory Bird Convention Act
MMRRGS	Marine Mammal Recovery & Rehabilitation Group Supervisor
OSC	On-Scene Commander
OWRO	Oiled Wildlife Response Organization
PIO	Public Information Officer
PPE	Personal Protective Equipment
SARA	Species At Risk Act
SDS	Safety Data Sheet
SRM	Spill Response Manager
UC	Unified Command
UTV	Utility Task Vehicle
WBD	Wildlife Branch Director
WRF	Wildlife Rehabilitation Facility
WRG	Wildlife Reconnaissance Group Supervisor
WRP	Wildlife Response Plan
WHMIS	Workplace Hazardous Materials Information System

STRATEGIC DOCUMENT CONNECTIVITY



Figure 1 – Representation of the connections between strategic plans and their association to the central plan

INTRODUCTION

1. PURPOSE

This Wildlife Response Plan (WRP) guidance document was developed to inform WCMRC Spill Response Managers (SRM) and advise the Polluter through immediate actions and decision-making in the event of an oil spill threatening or impacting wildlife. WCMRC's role as described in the Canada Shipping Act is related to the protection of wildlife, generally using response actions such as booming strategies and protection of sensitive wildlife habitat. WCMRC may support some aspects of wildlife response through equipment provision or other support services but does not have responsibility for wildlife response operations or planning. This WRP provides documentation about how oiled wildlife response fits into overall response structure and operations, the phases of wildlife response, regulatory requirements, agency interactions, initial actions in the first 24-48 hours of an incident, and decision-making process for wildlife response.

1.1. SCOPE AND APPLICATION

This scope of this plan relates specifically to WCMRC's Geographic Area of Response (GAR), which includes the waters covering the coastal portions of the Province of British Columbia (BC) and extending throughout the Exclusive Economic Zone, 200 nautical miles offshore. (WCMRC 2017). While this WRP discusses overall phases of a wildlife response, the focus of this plan is on the key decisions and actions that should be taken during the first 24-48 hours of an incident impacting (or having the potential to impact) wildlife in British Columbia.

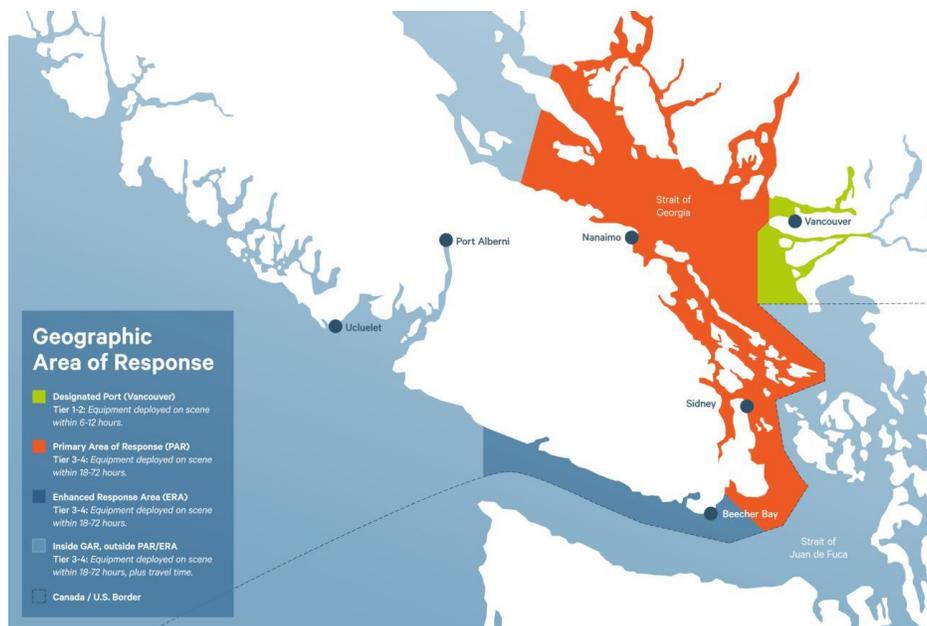


Figure 1: WCMRC Geographic Area of Response (WCMRC 2017)

1.2. USING THIS PLAN

This plan may be used as a tool by WCMRC SRMs and Duty Officers (DO) to guide initial actions and understand wildlife response phasing. This WRP is not intended to be used as an all-encompassing document about wildlife response, nor as an incident specific WRP, but as a guide to understanding the actions and decisions making processes that support a successful wildlife response. This strategic plan may be a companion plan to WCMRC's Wildlife Tactical Plan, which details response operations on a detailed tactical level.

The WRP includes:

- ▶ Information regarding procedures to be implemented immediately after a release of oil with the potential to impact wildlife.
- ▶ Information on significant human health and safety considerations and wildlife health issues inherent in dealing with wildlife contaminated by hazardous materials.
- ▶ Basic information on regulatory compliance and wildlife permitting requirements.
- ▶ The function and structure of an effective professional oiled wildlife response including direction on responsibilities and timing of actions.
- ▶ Information needs and procedures that will facilitate the assessment of a situation, the identification of response options, the development of an incident-specific wildlife response plan, and decision-making.

2. RESPONSE STRUCTURE

2.1. INITIAL WILDLIFE RESPONSE ACTIONS: 0–48 HOURS



Figure 2: WCMRC Basic Response Timeline

The first 24–48 hours of a response impacting wildlife are critical to the success of operations (i.e., reducing or avoiding impacts to wildlife). Several critical steps should be completed as soon as possible after a release. Below is an infographic depicting WCMRC’s basic spill response timeline (WCMRC 2020), showing professional wildlife response activation occurring immediately after establishing Incident Command and deployment of shoreline protection strategies.

2.2. OILED WILDLIFE RESPONSE ACTIVATION

Any release of oil into the marine environment has the potential to impact wildlife. Even small releases of oil, under the right conditions (e.g., near a seabird colony during breeding season) have the potential to impact wildlife. Initial contact with an OWRO can help to determine the potential risk and need for an initial Wildlife Impact Assessment. Rapid establishment of the Wildlife Branch, activation of a wildlife response contractor (OWRO), and the immediate implementation of wildlife response actions are in the best interest of both mitigating the impact to wildlife and responding to oiled animals through capture and rehabilitation.

2.3. TRIGGERS FOR ACTIVATING WILDLIFE RESPONSE

Any time oil is released into a water source it has the potential to negatively impact aquatic and semi-aquatic wildlife. Incident Command, through the Environmental Unit (EU) should establish a Wildlife Branch (WB) and activate a designated professional oiled wildlife response organization (OWRO) immediately as early as possible in the response timeline.

It is imperative to implement wildlife operations as soon as possible within the first 48 hours. The immediate activation and mobilization of an OWRO, along with the rapid acquisition of resources, directly correlates to both the effectiveness and full engagement of the response. The WB and wildlife response personnel can be stood down with approval of IC if conditions do not warrant developing further wildlife response planning and implementation.

One of the following OWROs should be contracted for wildlife response.

Oiled Wildlife Response Organizations

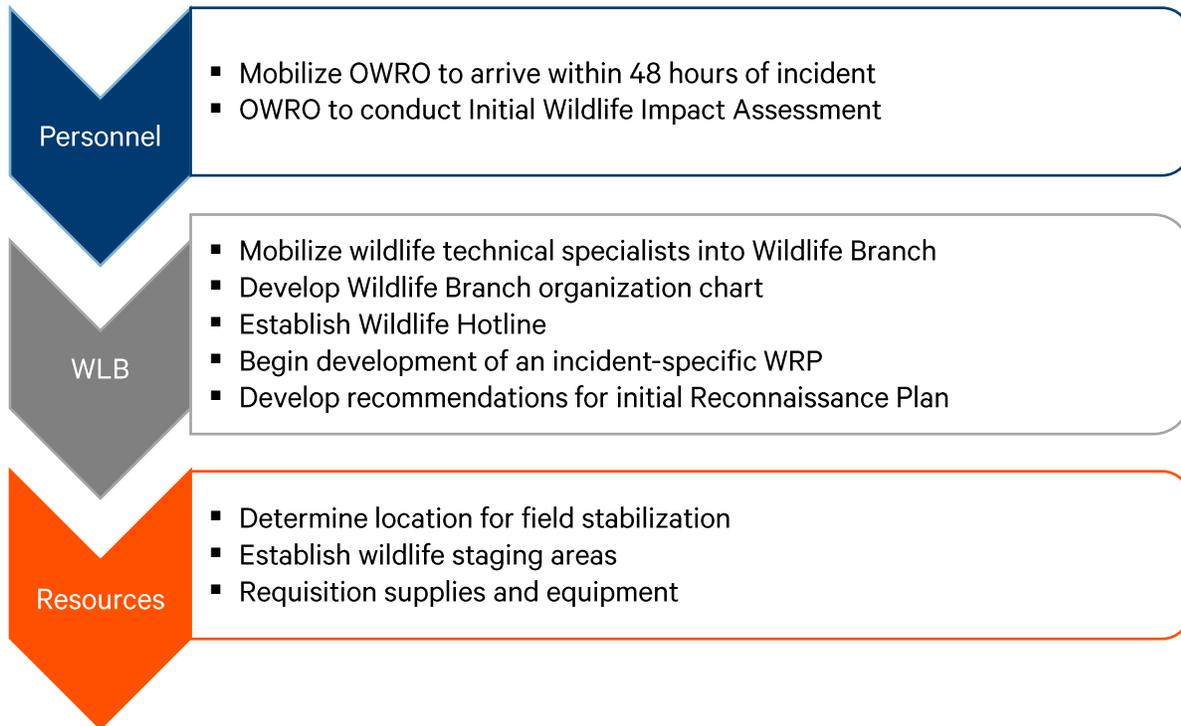
- ▶ Focus Wildlife Canada/Focus Wildlife International
- ▶ Oiled Wildlife Care Network/UC Davis Wildlife Health Center
- ▶ Tri-State Bird Rescue and Research

Within the first 24 hours of an incident, the Polluter's Environmental Unit Leader (EUL) should:

- ▶ Report the incident to the Provincial Emergency Program (PEP)/ Emergency Management British Columbia (EMBC).
- ▶ Report incident to wildlife regulatory agencies (ECCC-CWS), both federal and provincial
- ▶ Activate designated professional Oiled Wildlife Response Organization (OWRO) immediately
- ▶ Complete Resources At Risk (ICS 232)
- ▶ Establish the Wildlife Branch under the Operations Section of ICS
- ▶ Designate a Wildlife Branch Director (WBD)

Following is a list of action items to be initiated in within 24-48 hours of an incident. Additional action items are included in the Wildlife Branch Position Descriptions Checklist, Appendix C.

Within 24-48 hours of an incident, the Wildlife Branch will:



2.4. TIERED ACTIVATION

To facilitate the appropriate level of emergency response, tiered response levels are used. The need for greater or fewer resources and response personnel will be based on incident specific factors including the type of oil, the severity of oiling, the species involved, and the time of year. The Wildlife Branch will determine the appropriate scale and scope of tiered response levels based on specific needs of an incident. That information will support recommendations to UC regarding the level of resources required for a successful response.

Movement of surface oil will in large part determine the scale and scope of wildlife response action needed to address a specific incident. Releases that have a potential to impact nearshore areas, breeding colonies, and wildlife concentration areas require a higher level of response. It must be recognized that tiered response levels may change during the course of an incident. The Wildlife Branch will make recommendations for appropriate levels of wildlife response actions throughout an incident.

2.5. ESTABLISHING A WILDLIFE HOTLINE

The Wildlife Hotline is a critical initial step and should be established by the Wildlife Branch within the first 24 hours of a spill. The hotline provides a mechanism for collecting information on impacted

wildlife sightings from the public as well as response personnel. The information will continually be used to help determine the geographic scope of wildlife response efforts. The Wildlife Branch will manage the hotline and develop protocols for how information will be collected and submitted to the Wildlife Branch. The hotline should be manned by workforce personnel or may be filled by agency personnel depending on the size of the incident.

Most wildlife observations reported through the wildlife hotline will likely be from WCMRC personnel and subcontractors, regulators, or other personnel actively working within the spill site. Public sightings of oiled, distressed, or deceased wildlife will occur when oil strands on or near the shoreline or when oiled wildlife come ashore after impact. During a response, the hotline should also be used as a resource to provide instructions to callers for safe handling and containment of wildlife.

2.6. WILDLIFE REPORTING

During the initial phase of the response, the Wildlife Branch should establish reporting procedures to ensure accurate and timely communication of information. Accurate reporting is critical for proper dissemination of information throughout the UC and to the public. Maintaining accurate up-to-date wildlife information can be very difficult due to the constantly changing status of impacted wildlife as they move through the response process. The WBD must coordinate reporting times and requirements with the Planning Section Chief. It is preferable to establish one point in time each day to submit the daily reporting numbers to the Situation Unit. Otherwise, wildlife reporting numbers will be constantly changing throughout the day and will rapidly become very confusing.

End of day reports from the Capture and Monitoring and Rehabilitation Group Supervisors will be combined into a daily summary of rehabilitation and recovery activities. Unit Activity Logs (ICS 214) should be turned into the WBD with daily summary.

2.7. PUBLIC INFORMATION AND MEDIA RELATIONS

When the WB is activated, media statements regarding the ongoing wildlife response should be provided to inform the public and raise awareness regarding wildlife concerns, public safety concerns, and the hazards of handling wildlife. These statements should be jointly developed by the WBD, the Polluter's PIO and the JIC, and may be done in a manner to be shared across multiple media platforms. The opportunity may also be used alert the public to requests for volunteer assistance. Scheduled visits to the wildlife facility by media and VIPs may also be considered but must be approved by the WBD and UC. Visits to the wildlife facility should not impede ongoing response operations.

2.8. WORKING WITH THE JIC AND PIO

The JIC and PIO are tasked with managing dissemination of information on a response, including information regarding wildlife response objectives, wildlife impacts, and general information on oiled wildlife rehabilitation. The OWRO will share daily summary reports detailing tasks and operations with the JIC and/or PIO. The OWRO may be tasked with drafting a press release, providing staff to create a joint press release with the PIO, or participate in a press conference. All press releases must be submitted through the JIC and approved by UC.

2.9. COORDINATING WILDLIFE INFORMATION

It is important to get wildlife information out to the general public and others involved in response operations as soon as impacts are known. Oiled wildlife capture requires skilled and experienced personnel in order to be done safely and successfully. Attempts by individuals without specific oiled wildlife capture skills often results in human injury, injury to wildlife including death, and reduced success in overall and individual wildlife capture success. Information on what to do if oiled wildlife (live or dead) is spotted should be stated clearly and concisely and shared on multiple platforms. These platforms may include, but are not limited to: with operations management, on Facebook or Twitter, within a press release, and on the response website. In order for the most uniform, coordinated information to be shared, it is important that the OWRO consult state/federal wildlife trustees and other local stakeholders regarding shared, reportable information. An inclusive, uniform message will help to limit duplication of information or misinformation.

3. WILDLIFE BRANCH STRUCTURE AND FUNCTION

Typically, in Canada, the Lead Agency and the Polluter Incident Management Team (IMT) will employ the ICS to coordinate emergency response strategies and actions. Within the initial few hours of an incident the EUL, with approval from the Incident Management Team / Unified Command, will establish the Wildlife Branch within the Operations Section in the ICS and designate a Wildlife Branch Director.

The Wildlife Branch planning group plays a pivotal role within the first 48 hours of the response. The WB is most effective when “over-responding” to an incident. Under-responding can cause significant delays that bottleneck the process of acquiring and mobilizing equipment and resources necessary for response. Significant delays can correspond to poor wildlife outcomes. Objectives for the WB planning group include:

- ▶ Staffing of the Wildlife Branch;
- ▶ Developing initial safety procedures;
- ▶ Developing initial reconnaissance plan;

- ▶ Developing incident specific wildlife response plan (with the contracted OWRO);
- ▶ Engagement with regulatory agencies, Indigenous communities, and stakeholders; and
- ▶ Setting up a wildlife hotline for reporting oiled wildlife.

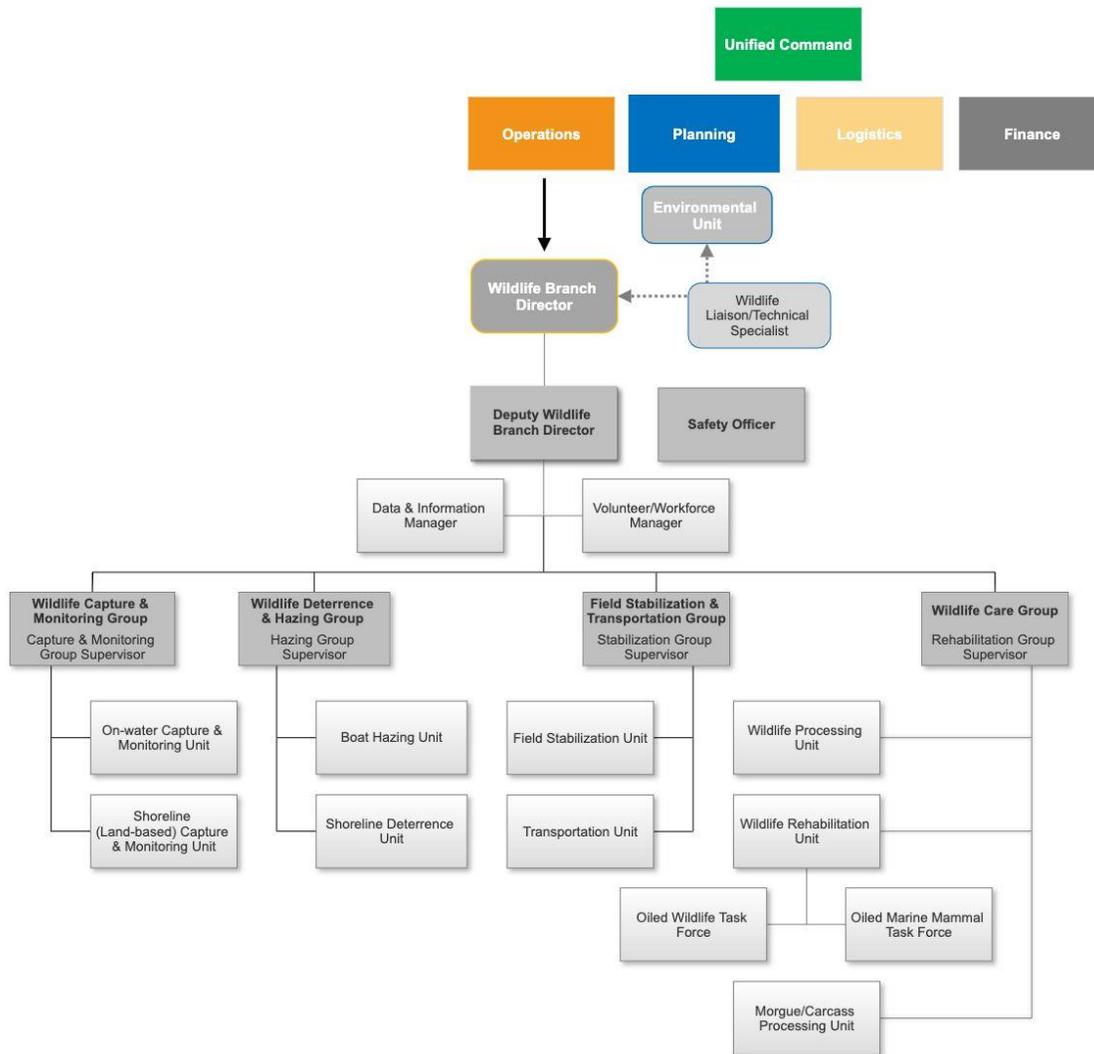
Important decisions to be made early in the response

- ▶ Planning for wildlife response primary activities:
 - ▶ WB command, wildlife technical specialists/liason, deterrence, search and capture, field stabilization, transport, rehabilitation, cleaning, conditioning, release, and security.
 - ▶ How many people are needed and with what qualifications and skill sets?
 - ▶ Agency
 - ▶ Indigenous governments
 - ▶ Professional contractors (OWROs and others)
 - ▶ Security
- ▶ Planning for primary facilities and management
 - ▶ Field stabilization facility, rehabilitation facility, equipment management, search and capture vehicles and vessels, ancillary needs (fuel, accommodations, etc.)
 - ▶ What type of rehabilitation facility will be needed (scaled to potential incident impact)
 - ▶ Where should it be located?
 - ▶ Where should the field stabilization unit be established? Is more than one unit required?
 - ▶ Where will equipment and personnel be staged/deployed?

3.1. WILDLIFE BRANCH STRUCTURE AND COORDINATION

Typically, wildlife expertise will be housed within the WB and the wildlife planning team. The WB is one of the few branches that does its own planning, under the Operations Section, rather than in the Planning Section or the EU. The WB will function as a part of the Operations Section but will liaise with the EU to build a successful wildlife response. Wildlife agencies, Canadian Wildlife Services (CWS) and Fisheries and Oceans (DFO) will provide essential information to develop appropriate plans and response actions to minimize wildlife impacts from the spill. An ICS organizational chart showing basic organizational structure is below.

3.2. WILDLIFE BRANCH PERSONNEL ROLES AND RESPONSIBILITIES



The Wildlife Branch will be composed of personnel from the Polluter, a wildlife response contractor, Federal and Provincial wildlife and regulatory agencies, and Indigenous representatives. Indigenous inclusion in the Wildlife Branch is important for transparency of operations, local area knowledge, and determining operational objectives when Indigenous resources are impacted or threatened. Stakeholder organizations may also participate when expertise is available. Additionally, specific wildlife subject matter experts may be utilized when needed to address specific species issues. Wildlife expertise is essential to building a successful wildlife response.

Designation of the Wildlife Branch Director will be determined by the Incident Command in each specific oil spill incident. It is imperative that the Wildlife Branch Director has wildlife expertise as well as a clear understanding of ICS roles and functions. The Wildlife Branch Director may be

required to be an agency employee. When that is the case, a Deputy Wildlife Branch Director should be designated from Polluter or from the wildlife response contractor.

The Wildlife Branch has two main functions in ICS. The first function is a planning function, which requires specific knowledge and expertise to accomplish the myriad of on-going planning efforts throughout the response. The planning team portion of the Wildlife Branch requires wildlife and planning expertise. The Wildlife Branch planning team should be consistent throughout the incident if possible.

The second function of the Wildlife Branch is implementation of on-the-ground wildlife response actions. Personnel conducting oiled wildlife response actions are supplied by the wildlife response contractor and may, when appropriate, be supplemented by other wildlife experts. Proper reporting structure will be critical to ensure coordination of activities and relaying critical information to the Wildlife Branch. Federal and provincial agencies may choose to provide personnel to participate in on-the-ground response actions and can become part of wildlife field teams. Occasionally, a wildlife agency may want to lead the wildlife field operations while relegating animal care and rehabilitation to the wildlife response contractor. Delineation of duties will be specified in the incident-specific Wildlife Response Plan.

The WB has the functional responsibility for all aspects of oiled wildlife response operations and incorporates:

- ▶ Wildlife impact assessment
- ▶ Wildlife deterrence
- ▶ Monitoring
- ▶ Oiled wildlife search and capture
- ▶ Collection and documentation of live and dead oiled wildlife
- ▶ Oiled wildlife rehabilitation and decontamination, including the facilities to support these efforts
- ▶ Wildlife release and monitoring
- ▶ Reporting to the Incident Management Team (IMT)

Overall objectives and priorities for the Wildlife Branch are agreed upon within the IMT and the Unified Command (UC), with recommendations from the Wildlife Branch Director (WBD) and the Environmental Unit Leader (EUL). Depending on the size of the response, some positions may not be necessary, or several positions may be filled by one person, as appropriate to the scale of the wildlife response.

3.2.1. ROLE OF WILDLIFE TECHNICAL SPECIALIST

The Wildlife Technical Specialist is a critical position which coordinates information sharing between the WB and the EU. The Wildlife Technical Specialist position is generally housed in the EU and provides valuable expertise to the EU on a myriad of wildlife and resources at risk issues. Additionally, the Wildlife Technical Specialist should serve as the wildlife liaison position, providing a critical link and coordination between the EU and the WB. Coordination of wildlife data gathering, and information sharing is crucial to successful response on any large-scale response.

3.2.2. ROLE OF WILDLIFE RESPONSE CONTRACTOR (OWRO)

Oiled Wildlife Response Organizations (OWROs) are engaged on an as required basis to provide oiled wildlife expertise in planning and implementing appropriate response actions. Professional OWROs can provide personnel to accomplish all aspects of wildlife response. It is essential that the OWRO participate on the WB planning team to ensure development of appropriate recommendations and implementation of approved response actions. The OWRO should fill many of the key roles in the WB organizational structure when determined appropriate. Additionally, the OWRO may serve as a liaison or point person for logistics to assist with understanding wildlife resource needs. Wildlife resources are often highly specialized and available only from specific vendors. The use of the OWRO in this position can help to prevent bottlenecks with resource acquisition or mobilization. Agency coordination with OWRO is critical and should start at very beginning of an incident.

3.3. WILDLIFE IMPACT ASSESSMENT

The first objective for the OWRO is to conduct an Initial Wildlife Impact Assessment. This objective is threefold:

1. Determine potential to impact sensitive wildlife or wildlife habitat in the release area.
2. Determine if there is directly impacted wildlife.
3. Based on findings, make recommendations as to initial scope and scale of wildlife response needs.

The wildlife impact assessment must be conducted by qualified OWRO in order to assure that the full impact of the spill on wildlife is assessed. Visual observations and wildlife species characteristics must be considered in the assessment. Often, observations of behavioral changes in wildlife populations are the best indicators of impacts. The wildlife impact assessment may be accomplished by aircraft, boat-based, and/or shore-based observations, as appropriate for the incident.

The initial wildlife impact assessment can be conducted in cooperation with wildlife or regulatory agency personnel as available. However, the assessment should not be postponed to allow for

agency personnel inclusion when they are not available. The initial assessment will generally take one to two days to accomplish and should be the first wildlife task assigned to the wildlife team.

Information collected in the initial wildlife impact assessment will be used to determine the scope and scale of the required response, activate additional resources (personnel and equipment), and help determine response priority areas. The Initial wildlife impact assessment will also provide information to determine what immediate response actions should be taken. The assessment will involve continual reconnaissance and monitoring of the incident situation.

3.3.1. RECOMMENDATIONS AND IMPLICATIONS FOR PLANNING

The initial wildlife impact assessment is critical to determining the most appropriate response actions, personnel, resources, and facilities needed for a wildlife response. The WB with input from DFO and ECCC-CWS will make recommendations to IC based on the initial wildlife impact assessment. The timely approval of recommendations to implement wildlife response is *critical* to the success of the overall wildlife response effort. Delays in starting on-the-ground wildlife response efforts will reduce the survival of impacted wildlife and may increase the number of animals impacted by the spill.

Information provided in the initial wildlife impact assessment will be used by the Wildlife Branch to determine the scope of appropriate wildlife response actions and strategies. Response recommendations will then be written into the incident-specific Wildlife Response Plan. Ongoing wildlife reconnaissance and wildlife impact assessment reports will be used by the WB planning team to continually assess needs and adjust scale and scope of response actions as needed throughout the incident

In some cases, the initial wildlife impact assessment may indicate that no wildlife response above and beyond the wildlife impact assessment is needed. When that occurs, the OWRO will make recommendations through the WB or EU to the Incident Command. The OWRO should be engaged on the spill until a clear decision has been reached by the IC that wildlife response actions are not warranted in an oil spill incident. Additionally, the OWRO may be engaged to monitor potential wildlife impacts for a period, as determined by the IC.

3.4. WILDLIFE RESPONSE PLANNING

The Wildlife Branch has large planning requirements, as do all other operational activities in an oil spill response. The Wildlife Branch is one of the few operational units that does its own planning. Wildlife planning requires oiled wildlife expertise to develop effective plans—expertise that is only available from personnel in the Wildlife Branch. It is important to have the right personnel dedicated to completing the planning. The wildlife planning team must include oiled wildlife response experts,

as well as DFO and ECCC-CWS personnel. The wildlife planning team is housed within the Wildlife Branch of the Operations Section and works in coordination with the Environmental Unit (EU).

The Wildlife Branch is responsible for two distinct planning efforts.

1. Development of a long-range incident specific WRP.
2. Develop recommendations for a wildlife daily work plan to be included in the Incident Action Plan (IAP). The IAP then defines the specific work activities for each operational component of wildlife response daily (or other designated operational period).

Wildlife response is composed of several phases or distinct operational components. Each operational component must be considered in the incident-specific wildlife response plan. Incident specific protocols and procedures will be developed for each phase. Separate strategies and protocols are required to deal with different species groups. Birds and marine mammals will have different tactics and protocols. DFO and ECCC-CWS input is critical to developing effective strategies and tactics.

It is important to understand the distinct operational phases of wildlife response that will be implemented throughout the incident. Those operational phases include:

- ▶ Wildlife Impact Assessment
- ▶ Reconnaissance
- ▶ Monitoring
- ▶ Deterrence
- ▶ Search and capture
- ▶ Carcass collection and morgue storage
- ▶ Field stabilization (medical stabilization)
- ▶ Wildlife transport
- ▶ Wildlife rehabilitation
- ▶ Release of healthy animals
- ▶ Demobilization

The Wildlife Branch planning team should consider the following general planning guidelines for oiled wildlife response regardless of species:

- ▶ Preventing animals becoming oiled is preferable to mitigating the effect of their oiling
- ▶ Proactive actions that capitalize on the short windows of opportunity to save animals are critical

- ▶ If wildlife rehabilitation is recommended, the necessary resources must be readily *available* and immediately mobilized to where they are needed
- ▶ Animal carcasses should be collected from the impact area
- ▶ A proactive policy must be adopted with regard to media reports on the wildlife response and its results
- ▶ Public communication strategies should be clear, concise, and transparent
- ▶ Provide opportunities for the public to assist as a workforce volunteer with specific duties

Table 1. Overview of Key Issues, Objectives and Related Challenges to be Considered

(Adopted from IPIECA 2014)

OPERATIONAL QUESTIONS	OBJECTIVES	WILDLIFE CHALLENGES
▶ Can the oil be kept away from the animals?	<ul style="list-style-type: none"> ▶ Keep pollution at, or close to, the source. ▶ Recover oil quickly and efficiently. ▶ Protect sensitive areas. ▶ Use priority protection ranking for habitat for wildlife congregation areas. 	<ul style="list-style-type: none"> ▶ Is there timely capability to combat oil at the source/at sea? ▶ Are sufficient data for a reliable risk assessment available? ▶ Are seasonal sensitivity maps available as well as information on migration patterns and breeding behavior of species? ▶ Can real-time information of animal distributions be obtained in relation to the oil?
▶ Can animals be kept away from the oil?	▶ Move animals (or their eggs/nests if appropriate) away from oil or a threatened location via: hazing / deterrence; pre-emptive capture or collection.	<ul style="list-style-type: none"> ▶ Is there timely capability for interaction with appropriate knowledge and understanding? ▶ Which species are present? ▶ How will animals react to methods (is there a potential for adverse impacts?) ▶ What should be done with captured/collected animals: how can animals be kept alive and healthy during captivity; is there a safe place to move the animals to; where/when/how should they be released? ▶ What measures are needed to follow up the release?
▶ How should animals be treated when they are oiled?	<ul style="list-style-type: none"> ▶ Collect/remove dead animals. ▶ Treat live animals according to the most acceptable method 	<ul style="list-style-type: none"> ▶ Who will carry this out? ▶ Can systematic and scientific methods for collection be established? ▶ Are reliable and approved methods for rehabilitation of oiled wildlife available that

OPERATIONAL QUESTIONS	OBJECTIVES	WILDLIFE CHALLENGES
	(rescue/rehabilitation or euthanasia).	define the (species- specific or quantitative) limits of these methods? ▶ Have euthanasia methods been approved that are considered effective and acceptable (humane), and selective (i.e. not killing/disturbing animals that are not targeted)?
▶ How can the response itself minimize damage to people, the environment, and the animals?	▶ Always prioritize human safety (no or postponed response if considered unsafe). ▶ Collect/remove dead animals (collect and store safely as these constitute valuable scientific data; avoid scavenging and collection for necropsy purposes). ▶ Always ensure animal welfare. ▶ Consider the net environmental benefit.	▶ Is there awareness of the potential damaging effects of a response (health and safety; secondary pollution; disturbance of unoiled animals; and unnecessary suffering or killing of animals) and do methods exist to avoid such effects? ▶ Are there methods in place to discourage the public from undertaking activities on their own outside of the coordinated response?
▶ How can the media and public be informed so that the response will be understood and supported?	▶ Communicate the response plan and immediate challenges. ▶ Provide daily updates on the response. ▶ Allow public to participate (allow volunteers; provide consumables such as towels). ▶ Provide a public action perspective (what to do if an oiled animal is found). ▶ Allow the media to report on the wildlife response.	▶ Are strategies for mass communication (e.g., using dedicated websites with a wealth of background information) developed and easily implemented? ▶ Have lessons from past experiences been included in media information? ▶ Do baseline data exist (e.g., population size and strength before the spill happened)?

3.5. WILDLIFE DECISION MAKING PROCESS

The Wildlife Branch planning team uses wildlife and planning expertise to review all available incident information. The planning team then develops recommendations for the most appropriated response actions based on incident-specific conditions. The most effective and efficient response will be accomplished by having the right mix of expertise and agency personnel developing,

reviewing, and approving wildlife response recommendations. Regulatory agency participation is critical to assuring response recommendations adequately address wildlife impacts.

While wildlife agency/regulatory participation is important to developing recommendations, their participation in the decision-making process is critical. All wildlife response actions must be approved by the appropriate wildlife agencies or regulators, preferably before recommendations are forwarded to Incident Command for approval.

3.5.1. RESPONSE SIZING

Based on all available information, the Wildlife Branch planning team must make recommendations to the Incident Command on the scope and scale of wildlife response efforts necessary to implement an effective wildlife response. The Wildlife Branch utilizes the collective oiled wildlife expertise of the planning team to develop strategies and determine the amount of resources (personnel and equipment) needed to accomplish strategies, goals, and objectives. These recommendations should be fully vetted through the entire planning team, wildlife agencies, and Indigenous community representatives.

The wildlife planning team will continually assess incident conditions to appropriately size the wildlife response efforts. Right sizing the wildlife response may mean increasing or decreasing efforts as needed. Appropriate scale of response effort may not be consistent during an incident. Typically, search and capture of oil-impacted wildlife will be initiated before rehabilitation efforts are fully implemented. Similarly, search and capture may ramp down while animal care and rehabilitation are ongoing. Recommendations for adjusting wildlife response actions should be fully coordinated with wildlife regulatory agencies and approved by Incident Command prior to implementation.

It is preferable to initially overrespond by rapidly mobilizing wildlife personnel (OWRO) and equipment to the response site. Once a wildlife impact assessment has been conducted, the scope and scale of the resources required for a successful response can be established. Additional resources may be required to support the full range of operations. The initial impact assessment may also determine that no further response is needed, and resources may be demobilized. Delays in mobilizing personnel and resources to the response site can create bottlenecks in the operational flow and negatively impact the success of the response.

To make decisions appropriate to the size, scale, and potential threat to wildlife from the spill, the following information should be used to help determine the best strategies:

- ▶ Health and safety of responders in field operations
- ▶ The spill location, impact time and magnitude
- ▶ Type of oil and toxicity

- ▶ Expected behavior of the released oil according to environmental conditions
- ▶ Wildlife habitat in or near the impact zone, identifying the most sensitive or limited habitat in the area as a priority including, wildlife species at risk
- ▶ Location of the released oil in relation to seasonal distribution/behavior of wildlife (breeding, migration)
- ▶ Weather forecast and season
- ▶ Information on water depth, tides, and currents in the potential response zone
- ▶ Resource availability (facilities, equipment, specific expertise)
- ▶ Availability of personnel, equipment, and facilities to support marine mammal response

3.6. INCIDENT SPECIFIC WILDLIFE RESPONSE PLAN DEVELOPMENT

The incident-specific Wildlife Response Plan should be developed and approved early in the incident, based on known conditions and issues. The plan can then be modified or amended throughout the incident as needed when conditions change.

Tactical response strategies will be developed by the Wildlife Branch. Specific tactics will be developed as part of the Incident Action Plan (IAP) process. Tactics will be implemented in the IAP as necessary to accomplish effective response strategies. Wildlife operations strategies and tactics must be developed in coordination with wildlife agencies.

Numerous additional plans and protocols may need to be developed by the wildlife planning team with to address specific issues during the incident. Specific additional wildlife response plans may include:

- ▶ Species-specific deterrence plans
- ▶ Species-specific capture plans
- ▶ Carcass collection protocols
- ▶ Reconnaissance and monitoring plans
- ▶ Oiled wildlife transport plan

RESPONSE SUPPORT REQUIREMENTS

4. REGULATORY COMPLIANCE

4.1. REGULATORY COORDINATION

All oiled wildlife response efforts must be coordinated, enacted, and carried out in compliance with federal and provincial law. Of concern is compliance with the *Migratory Bird Convention Act* (MBCA) Act, the *Species at Risk Act* (SARA), and existing provincial regulations regarding wildlife handling and rehabilitation. All migratory birds are protected under the MBCA of 1994. The act does not specifically address oil spill response requirements for species managed by Canadian Wildlife Service (CWS), but combined with the response plans of other agencies, it forms a blueprint for dealing with all wildlife species affected by oil spills. All bird species listed pursuant to the MBCA are the sole statutory responsibility of the federal government and are covered by this act. All other bird species, as well as all other wildlife (reptiles, amphibians, mammals) are the responsibility of the provincial government and are subject to provincial regulations. Marine mammals fall under the jurisdiction of the Department of Fisheries and Oceans and are subject to strict federal regulation.

4.2. ROLE OF FEDERAL AND PROVINCIAL AGENCIES

4.2.1. ENVIRONMENT AND CLIMATE CHANGE CANADA—CANADIAN WILDLIFE SERVICE

The Canadian Wildlife Service (CWS), a branch under Environment and Climate Change Canada (ECCC), is responsible for the management and conservation of migratory bird populations through administering and enforcing the *Migratory Birds Convention Act*, 1994 (MBCA). The MBCA and associated regulations provide protection to all birds listed in the CWS Occasional Paper No. 1, Birds Protected in Canada under the MBCA. Migratory birds protected by the Act generally include all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds, and most land birds (birds with principally terrestrial life cycles).

CWS also has mandated responsibility for all bird species, terrestrial species on federal lands, and the associated habitats listed as at risk under the *Species at Risk Act* (SARA). Wildlife species that are protected federally under SARA are listed in Schedule 1 of the Act.

Wildlife response planning will follow guidance as specified in ECCC-CWS's National Policy on Wildlife Emergency Response (ECCC-CWS 2016). As waterfowl and seabirds are the species most often affected by oil spills, it is most commonly the CWS that is engaged following an oil spill impacting wildlife. In association with spill response, responsibilities of CWS include, but are not limited to:

- ▶ Permitting of wildlife recovery and care inclusive of responders and rehabilitators under the MBCA Regulations
- ▶ Assessing adequacy and compliance of wildlife response and permitted operations, taking over if the response is determined to be inadequate
- ▶ Providing information, recommendations and advice on marine birds monitoring and appropriate response strategies, including standardized marine bird surveys.
- ▶ Approving emergency response actions taken with regard to marine birds and species at risk under its jurisdiction
- ▶ Minimizing the damage to birds by deterring unoiled birds from becoming oiled; and
- ▶ Ensuring the humane treatment of captured migratory birds and species at risk by determining the appropriate response and treatment strategies which may include euthanasia or cleaning and rehabilitation.

4.2.2. FISHERIES AND OCEANS CANADA

Fisheries and Oceans Canada (DFO) is the mandated authority for the protection and recovery of marine mammal species and habitats designated as at risk under SARA. In addition, DFO has overarching authority for the management, conservation, and protection of Canada's marine resources inclusive of all marine mammal, fish, and sea turtle species as defined under Section 2 of the *Fisheries Act*.

4.2.3. BRITISH COLUMBIA MINISTRY OF FORESTS, LAND, AND NATURAL RESOURCE OPERATIONS AND RURAL DEVELOPMENT

Bird species (and other wildlife) may also be protected under the British Columbia Wildlife Act and the BC *Endangered Species Act* (BC ESA). The BC ESA provides protection to species listed as endangered, threatened, or vulnerable under the Act as well as their core habitat.

4.3. REGULATORY PERMIT AND REPORTING REQUIREMENTS

Permitted wildlife rehabilitation professionals are authorized to carry out wildlife rehabilitation activities as guided by established and accepted assessment protocols and under the endorsement of a licensed veterinarian. This will include the cleaning and rehabilitation of any protected species with attention towards those designated as endangered or threatened as defined under federal legislations and regulations (MBCA & SARA).

Permits to allow wildlife rehabilitation will only be issued to applicants who can demonstrate they have the expertise and logistical capacity to carry out those functions humanely and competently, and if facilities and personnel for rehabilitation are available. CWS and BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (BC FLNRRD) will ensure the competence and effectiveness of organizations involved in the collection, cleaning, rehabilitation, and euthanasia of

migratory birds (federally protected), provincially protected birds, mammals, reptiles and amphibians. Permits may be issued to allow oiled wildlife to be held temporarily in captivity for rehabilitation, or to euthanize those animals whose health status indicates they will be unlikely to survive.

4.3.1. MIGRATORY BIRD WILDLIFE REHABILITATION PERMIT

A valid Federal Migratory Bird Permit (Scientific Collection—Take Permit) must be held by the OWRO. A federal permit may be applied for and granted prior to an incident; however, incident specific authorization must still be obtained from CWS for the capture, recovery, and rehabilitation of oiled wildlife, and the collection of dead oiled wildlife. If a federal permit is not already held by the OWRO at the time of the incident, it must be applied for by the OWRO immediately after conducting the initial wildlife impact assessment.

4.3.2. CAPTURE AND COLLECTION PERMIT

Authorization for the capture and recovery of both live and dead oiled wildlife will be issued to the OWRO at the time of the incident. The authorization will be specific to the incident and will be jointly issued by ECCC-CWS and BC FLNRRD.

4.3.3. SCIENTIFIC COLLECTION AND RESEARCH PERMITS

An incident-specific Scientific Collection and Research Permit may be required by BC MOE. Requirements for this permit will be determined by the proposed response strategies. If a permit is required, the Wildlife Branch or OWRO will apply for this permit at the time of the incident.

5. RESOURCES AT RISK

The Wildlife Impact Assessment Report (and continued reconnaissance) combined with the EU's completed ICS-232 Resources at Risk (RAR) form the basis of determining what species might be impacted in a specific incident. It should be noted that the intent of the RAR is to compile a list of species (along with other natural and cultural resources) that *may be present in the spill impact area*. Some of the RAR species are either not susceptible to oil impacts or not likely to come in contact with oil.

Species lists included in the incident specific WRP should focus on wildlife species that are susceptible to oil impacts and likely to become oiled in the incident (occur in the spill impact area). Generally, the most susceptible species groups include birds that use the water or water interface (pelagic sea birds, waterfowl and shorebirds); sea turtles, seals and other marine mammals, and aquatic mammals (beaver, muskrat). Terrestrial mammals, reptiles and amphibians, and songbirds may use the spill impact area but generally are not as susceptible or likely to become oiled.

5.1. SPECIES OF CONCERN

Many species that are likely to be found in a spill impact area are protected by the *Species At Risk Act* (SARA). These species, commonly termed as 'listed' species are afforded the highest level of federal and provincial protection. The list of protected species is extensive and is updated regularly as species are added or removed.

Similar to federally listed species, many species are classified as species of concern by different provinces. Additionally, species that are under consideration for federal/provincial listing are also generally considered a species of concern. Species of concern may or may not have any additional legal protection. The incident-specific Wildlife Response Plan should list any known species of concern that may be present in the spill impact area. This will be coordinated with the EU's efforts to determine Resources At Risk (ICS-232) within the release area, including any critical habitat that is legally protected.

5.2. IMPLICATIONS FOR RESPONSE PLANNING

Efforts should be made to determine if listed species or species of concern are present in the spill impact area, keeping in mind that some listed species are migratory (or mobile) and may be present in the impact area later in the spill incident. Daily reconnaissance and monitoring should provide information on listed species through the incident.

Response planning should be adjusted to give higher priority to response actions that protect listed species. Any impacted listed species would have the highest priority for capture and care.

All response recommendations for listed species should be closely coordinated through the appropriate wildlife/regulatory agencies. Deterrence actions targeting listed species will need specific authorization from wildlife agencies. Listed species may also require a higher standard for monitoring and reporting as required or mandated by wildlife agencies. The Wildlife Branch should assist the EU with documentation for compliance for the response.

5.3. SPECIES OF CONSERVATION INTEREST

Appendix I lists species of conservation interest in British Columbia and their susceptibility to oil impacts.

RESPONSE STRATEGIES FOR WILDLIFE RESPONSE MANAGEMENT

6. OPERATIONAL BOTTLENECKS

The success or failure of wildlife operations largely relies on the immediate mobilization of skilled and experienced personnel, rapid mobilization of oiled wildlife-specific equipment and facilities, and timely decision-making and approval of response activities. Common bottlenecks or delays include, but are not limited to, the following:

- ▶ Mobilization of OWRO delayed beyond 24-48 hours, resulting in loss of important initial assessment data related to capture, species matrix, and equipment needs
- ▶ Lack of equipment needed for capture, field stabilization, and transport including vessels and vehicles
- ▶ Delays in facility siting and establishment
- ▶ Lack of appropriate power and water infrastructure required in the rehabilitation facility
- ▶ Lack of equipment to support the cleaning phase, including wastewater management
- ▶ Lack of basic husbandry supplies, including species-specific food
- ▶ Delays in approval of release sites or delays due to impact zone oiling status

7. FIELD OPERATIONS

Wildlife field operations encompass all aspects of on-the-ground wildlife response activities:

ASSESSMENT	PREVENTION	MITIGATION	ANIMAL HEALTH
			
 Reconnaissance	 Wildlife deterrence	 Search and capture	 Field stabilization
 Monitoring (ongoing)	 Preemptive capture	 Carcass collection	 Transport

7.1. WILDLIFE RECONNAISSANCE AND MONITORING

The Capture and Monitoring Group Supervisor has responsibility for all wildlife reconnaissance and monitoring activities. Reconnaissance may entail land, water, and/or aerial surveys. Information gained from these surveys is key to mounting effective deterrence, search and capture, and response efforts and will be used to determine the scope and scale of wildlife response.

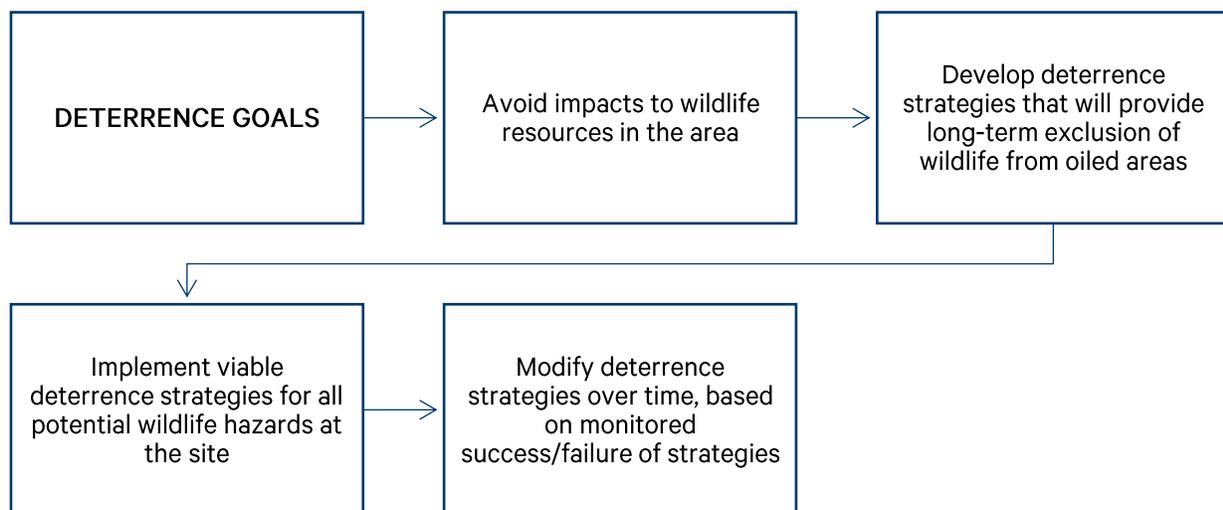
- ▶ Reconnaissance efforts:
- ▶ Focus on the immediate and potential impact to wildlife
- ▶ Assess potential wildlife impact based on spill trajectories, type and volume of oil
- ▶ Evaluate the effect of weather patterns
- ▶ Calculate wildlife dispersal patterns and behaviors
- ▶ Direct effective search and collection and deterrence actions

Wildlife reconnaissance and monitoring efforts are ongoing throughout the course of a response. Risk and threat of wildlife impacts and current on-site conditions are assessed daily throughout the spill by the wildlife field teams. The WB will continually assess information needs and determine appropriate levels and types of reconnaissance needed. Wildlife reconnaissance and monitoring, along with updated incident information from the Situation Unit are used to build a clear daily picture of current onsite wildlife issues.

Wildlife monitoring will include aerial observations (aerial over-flights), on-water boat observations, and land-based shoreline observations.

7.2. WILDLIFE DETERRENCE

The Wildlife Hazing Group Supervisor has responsibility for all wildlife hazing and deterrence activities. Deterrence programs proactively safeguard wildlife from the effects of an accidental product release by dispersing and excluding animals away from contaminated areas, thereby reducing wildlife contamination and mortality.



Deterrence strategies should be determined and planned by the WB after an initial reconnaissance survey is conducted. Hazing or deterrence may be conducted by the WB to keep unoiled wildlife away from oil. Deterrence activities must be authorized and coordinated within IC. No federal permits are required for non-lethal deterrence of migratory birds unless using firearms and/or aircraft (Note: this exemption does not apply to endangered species.) Canada's *Species At Risk Act* (SARA) does not specifically authorize deterrence and preemptive capture of endangered species. Specific authorization for hazing of marine mammals would be required from DFO. Authorization for deterrence may also be required by provincial regulatory or wildlife agencies.

Deterrence actions are most effective in areas already made unattractive to wildlife through vegetation clearing, on-going cleanup operations, and continual hazing operations. Birds that are well habituated to existing deterrence actions will not likely be dissuaded from continued use of oiled areas without the implementation of further deterrence, in which case rotation and combination of visual and auditory deterrence is recommended. It should be noted that historic use factors will be programmed in some birds and their offspring, likely resulting in the instinct for repeated annual usage of these areas.

Deterrence programs can be effective in small, well-defined areas such as sand bars, back eddies, inlets, or the immediate oil impact area. It is important to note that deterrence strategies will only be effective if there are equally attractive adjacent habitat areas into which birds and mammals can be hazed.

Only trained and experienced personnel should conduct deterrence techniques. Inexperienced personnel can worsen the situation by ineffectively deploying deterrents, inadvertently disturbing animals into oiled areas, or causing debilitated oiled animals to scatter. Deterrence activities should be initiated as soon as possible following an accidental release in order to prevent animals from establishing or continuing regular use patterns within a contaminated area. Delays may increase the number of oiled animals.

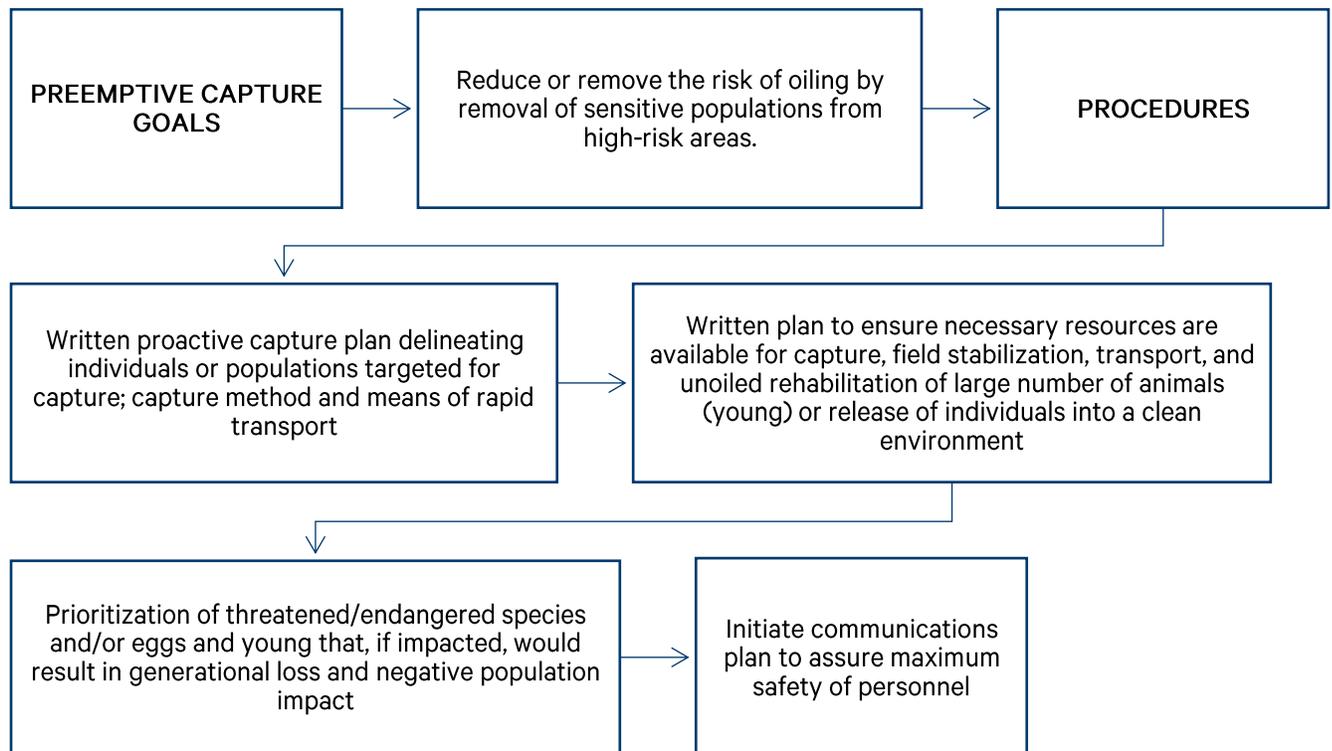
7.3. DETERRENCE METHODS AND STRATEGIES

Methods and strategies will be selected by the Wildlife Branch based on the above guidance. Knowledge and experience of trained deterrence specialist should be used to determine criteria for selecting effective incident-specific deterrence strategies. Specific strategies will be developed in the incident-specific Deterrence Plan by the Wildlife Liaison/Technical Specialist in cooperation with the EUL.

Effectiveness of deterrent methods ranges widely according to studies conducted on several deterrence methods in a variety of settings. Most of the studies conducted to assess the effectiveness of deterrence on wildlife populations have been conducted using bird deterrents.

There is little evidence that deterrence, other than exclusionary devices such as fencing and silt barriers, are effective with many terrestrial mammals. Similarly, data is lacking with regard to effective deterrents for reptiles, including sea turtles, and many marine mammals.

7.4. PRE-EMPTIVE CAPTURE

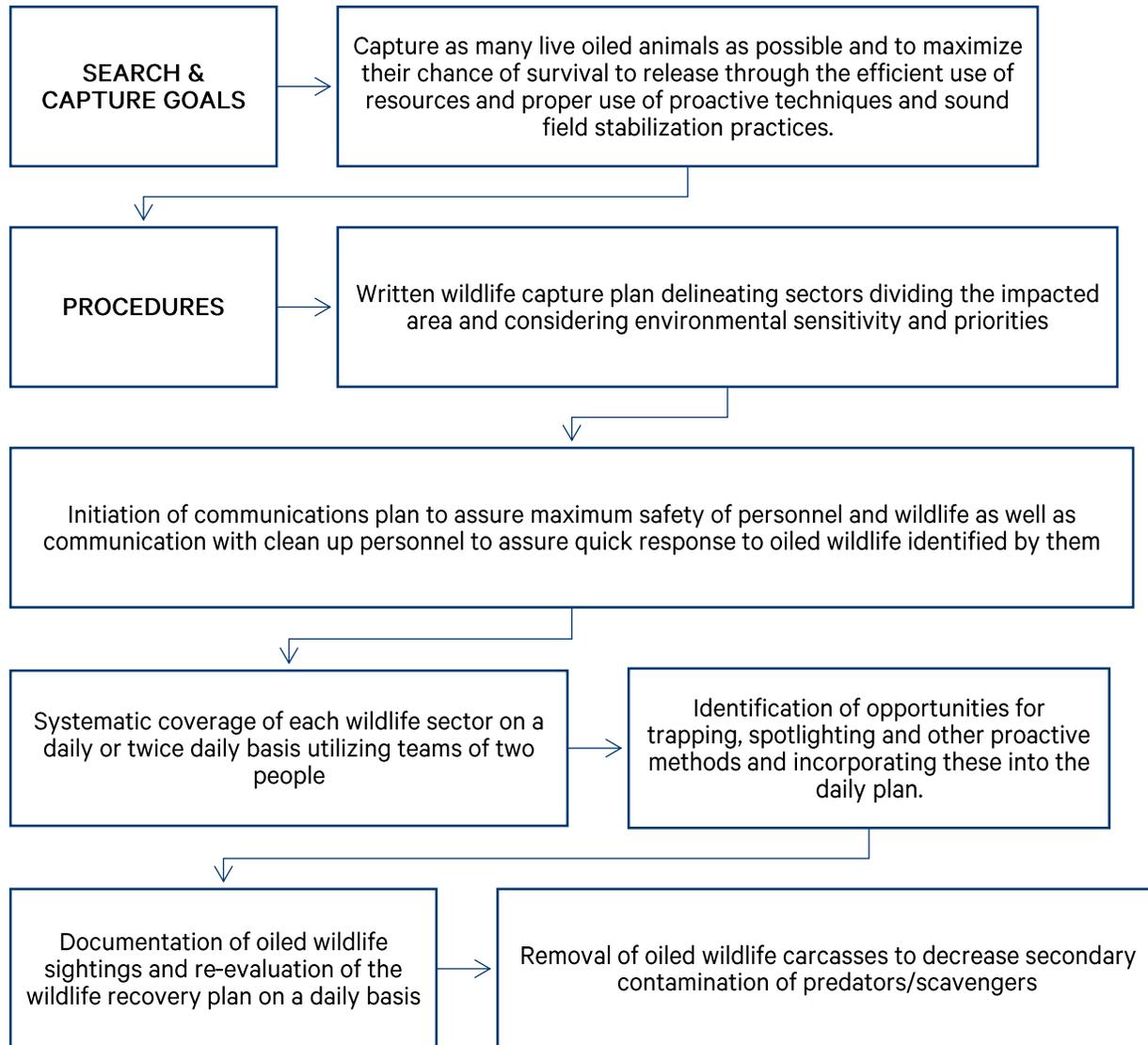


The Capture and Monitoring Group Supervisor has responsibility for all pre-emptive capture activities. Pre-emptive capture techniques may be considered for a limited number of species identified as at risk of impact. Any pre-emptive capture effort requires rapid and coordinated deployment of resources and thorough planning. Each aspect of the capture, transport, relocation, and release must be planned and resources to support successful execution of the plan must be available. Pre-emptive capture efforts must be coordinated with the appropriate regulatory agency. Incident-specific authorization and permits for the capture of migratory bird species and non-migratory bird Species at Risk are required.

Pre-emptive capture should be considered when deterrent use is not appropriate (young animals with limited mobility); when population is of high conservation value or where there is a high potential of oiling and associated risk of mortality from oiling, where circumstances are conducive to successful capture. The following factors shall be considered to identify potential candidates for pre-emptive capture:

- ▶ Population health and vulnerability; vulnerability to oiling
- ▶ Response to deterrent/hazing tactics
- ▶ Availability of appropriate housing and husbandry to ensure humane care
- ▶ Appropriate relocation habitat

7.5. SEARCH AND CAPTURE



The Capture and Monitoring Group Supervisor has responsibility for all capture activities. Search and capture field teams focus on daily reconnaissance and assessment of oil-impacted wildlife; prioritizing capture based on individual animal health condition or potential for rapidly declining

health secondary to oiling; and, determining appropriate capture methods for these species. Search and capture activities will be directed by the WB; the number of capture teams should be scaled to ensure effective coverage of both the geographic extent of the spill and unimpacted areas in which wildlife are known to congregate (loafing, foraging and night roost areas). Wildlife search and capture efforts will be focused in areas where there are known concentrations of impacted animals. As time allows search efforts may be extended to locate oiled animals that may have moved some distance from the spill impact area.

Wildlife capture strategies will be developed based on species, location, degree of oiling and mobility of oiled wildlife (in particular birds). Capture will be prioritized based on species susceptibility to oil impacts and availability of resources and personnel.

Each shoreline capture team should be composed of two or more wildlife staff; on-water teams require a designated boat driver. The OWRO will, when possible, make use of local personnel and equipment resources.

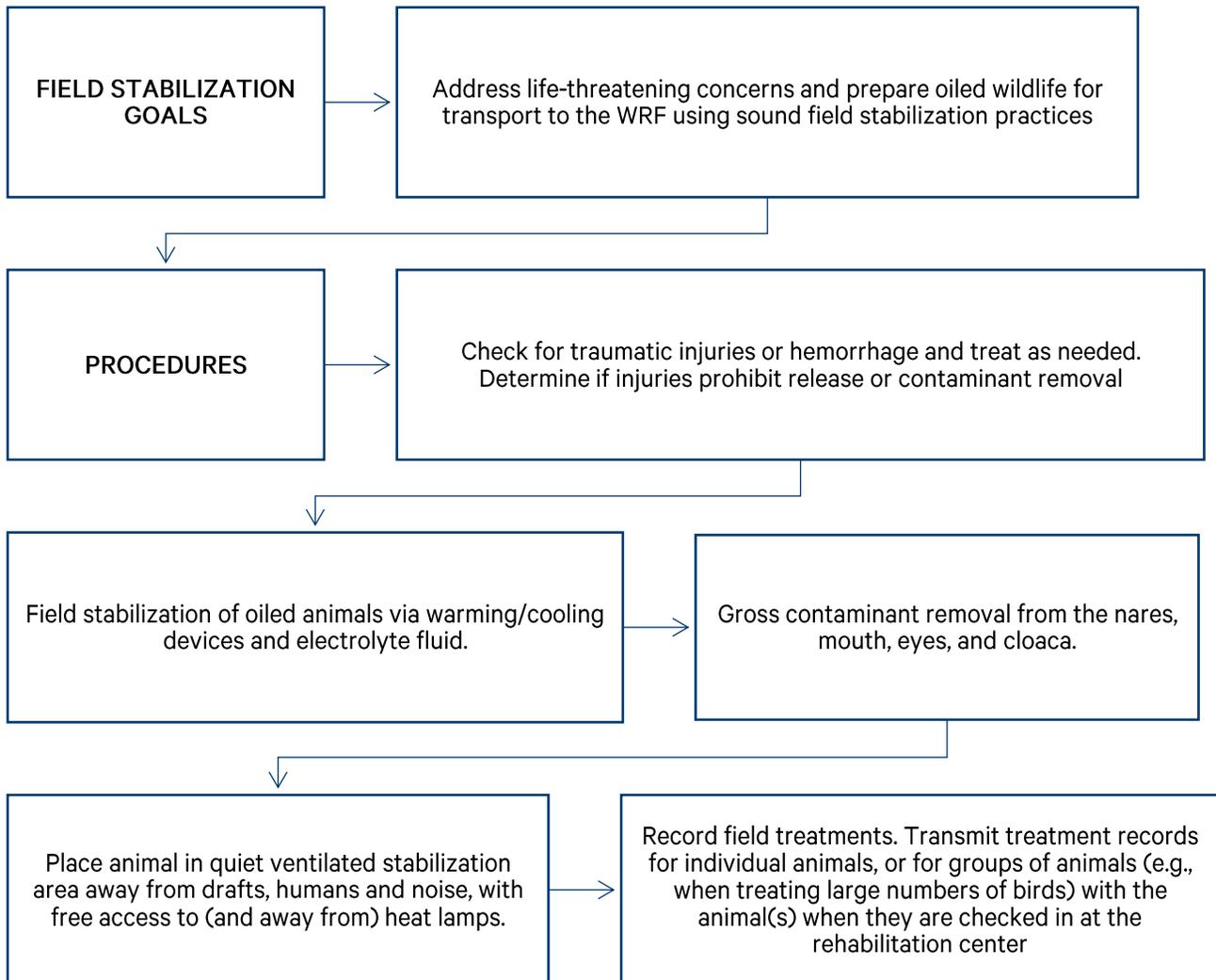
Captured animals are documented on field capture forms and then transported to either the field stabilization unit or the rehabilitation facility. To ensure that human health and safety guidelines are met, there are certain species whose capture should never be attempted by anyone other than wildlife professionals with skill and experience in their capture (e.g., cetaceans, raptors). It should also be noted that any animal captured must also be able to be safely and securely transported and housed.

7.5.1. CHAIN OF CUSTODY AND EVIDENCE STORAGE

All animals (live and dead) collected by wildlife field teams should be documented on an approved Chain of Custody form provided by the OWRO. Chain of Custody and wildlife handling protocols will be coordinated and approved by federal and provincial wildlife law enforcement for each oil spill incident. The Chain of Custody will remain with the animal throughout the transport process (signed by each person that has possession of the animal). Chain of Custody will be transferred to the OWRO when the animal is delivered to the Wildlife Rehabilitation Facility. Chain of Custody records will also be maintained by the OWRO until the wildlife response is complete, at which time the Chain of Custody records will be transferred to the appropriate wildlife law enforcement or regulatory agency. Copies of all records should be retained as part of the spill documentation records for the incident.

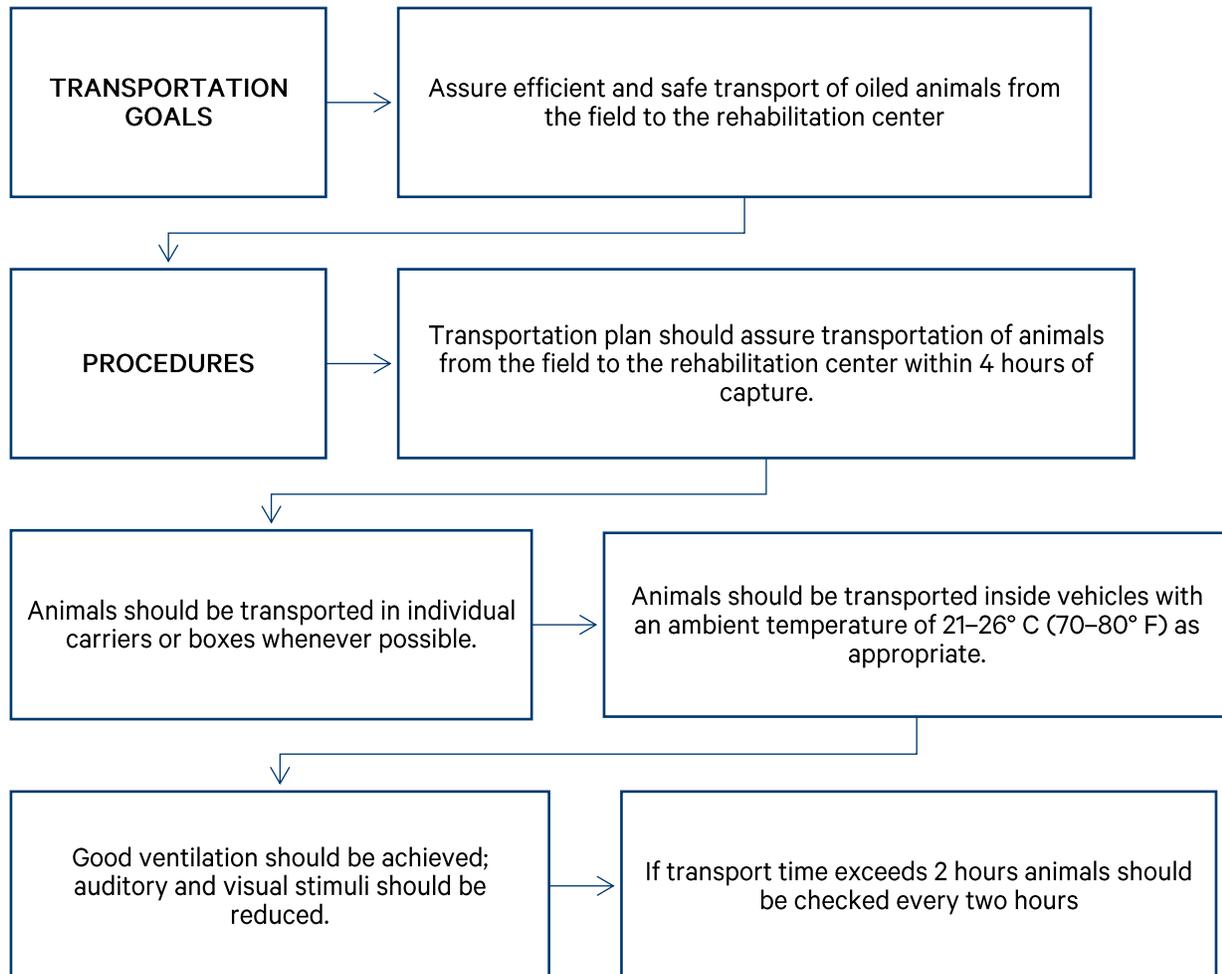
Specific protocols for handling oiled wildlife carcasses will be developed and approved by the Wildlife Branch. Protocols will also be developed to provide clear direction to response workers to deal with wildlife carcasses they may encounter as part of normal oil cleanup operations.

7.6. FIELD STABILIZATION



The Field Stabilization Group Supervisor has responsibility for all field stabilization activities. The field stabilization unit accepts oiled animals directly from field capture teams and provides basic first aid measures to ensure that animals are stabilized prior to transport (fluid administration and gross decontamination as needed, depending on species and degree of oiling). Field stabilization units for sea turtles, pinnipeds, and marine mammals should be separate from those for birds due to facility and space requirements and safety considerations. Field stabilization sites are established when transport times from the field to the rehabilitation facility exceeds two hours.

7.7. WILDLIFE TRANSPORT



Transportation procedures are established by the Wildlife Branch and put into practice by search and capture teams in coordination with the field stabilization unit. These groups coordinate transport times with the Wildlife Rehabilitation Group Supervisor to ensure that facility staff is prepared to receive incoming wildlife.

8. REHABILITATION OPERATIONS

8.1. BEST ACHIEVABLE CARE STANDARDS IN OILED WILDLIFE RESPONSE

Professional oiled wildlife response organizations follow best practice documents for oiled wildlife response and rehabilitation. While methods and techniques may differ between spills, the principles and ethics of best practices remain consistent. “Best achievable care” practices take into consideration the realities of individual incidents; successful rehabilitation is defined as the application of best practices within the context of available equipment, facilities, personnel, and

other resources. Early, full support of the Wildlife Branch and wildlife response activities play a defining role in the success of those efforts. The Wildlife Branch should assure that best achievable oiled wildlife care standards are utilized during an incident.

Guiding best practice documents include the following:

- ▶ IPIECA: Wildlife Response Preparedness: Good Practice Guidelines for Incident Management and Emergency Response Personnel, 2014
- ▶ IPIECA: Key Principles for the Protection and Care of Animals in an Oiled Wildlife Response, 2017
- ▶ USFWS: Best Practices for Migratory Bird Care During Oil Spill Response, 2003
- ▶ ECCO-CWS: National Policy on Wildlife Emergency Response (in draft)
- ▶ NOAA: Pinniped and Cetacean Oil Spill Response Guidelines, 2015
- ▶ NOAA: Oil and Sea Turtles: Biology, Planning and Response, 2010
- ▶ Oiled Wildlife Care Network–UC Davis Wildlife Health Center: Protocols for the Care of Oil-Affected Birds, 2016
- ▶ NWRA/IWRC Minimum Standards for Wildlife Rehabilitation 4th edition, 2012

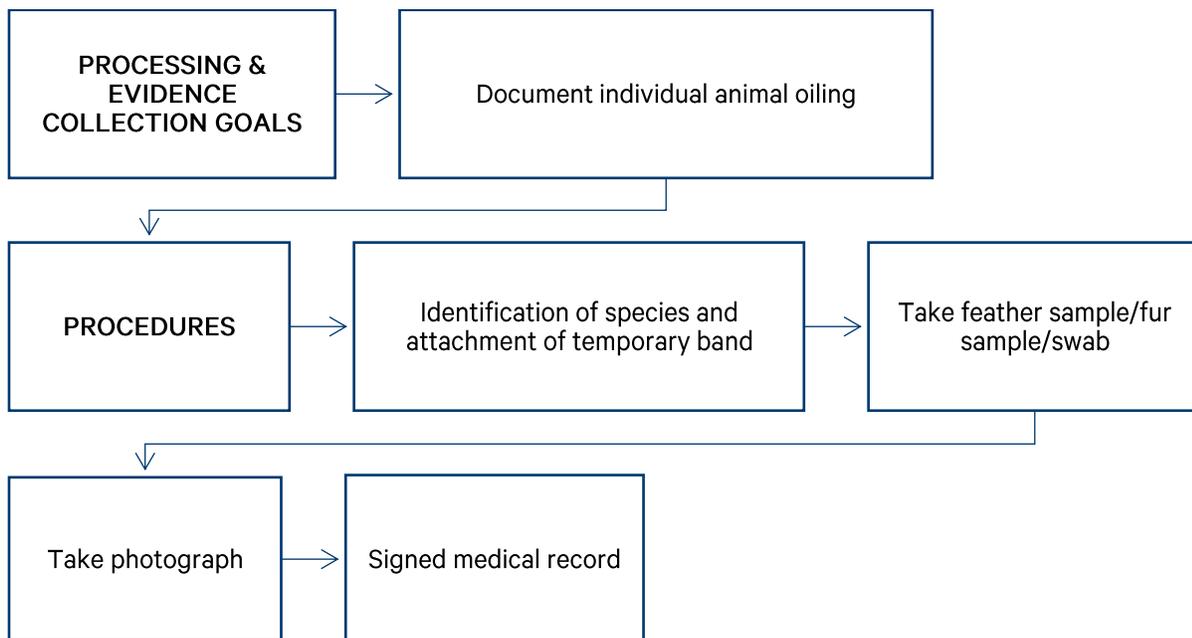
8.2. WILDLIFE REHABILITATION PHASES

Permitted OWROs are authorized to carry out wildlife rehabilitation activities as guided by established and accepted protocols (USFWS 2003; NOAA 2015; IPIECA 2014, 2017). The capture, stabilization, cleaning, and conditioning of oiled wildlife require that care begin immediately after an incident. The success of rehabilitation efforts differs based on the number of animals and numerous other variables, including: the immediacy of the response effort, the species involved, the care and husbandry requirements, the time of year, the type of contaminant affecting wildlife, and the extent and duration of contamination. The Rehabilitation Group Supervisor has responsibility for all phases of rehabilitation activities.

INTAKE & EVIDENCE	MEDICAL CARE	CLEANING	CONDITIONING & RELEASE
■ Processing	■ Stabilization	■ Pretreatment	■ Waterproofing
■ Evidence	■ Fluid therapy	■ Wash & rinse	■ Federal banding
■ Intake	■ Nutrition	■ Drying	■ Release
■ Medical exam	■ Stabilize for cleaning		■ Post-release monitoring
■ Critical care, triage			
■ Euthanasia			

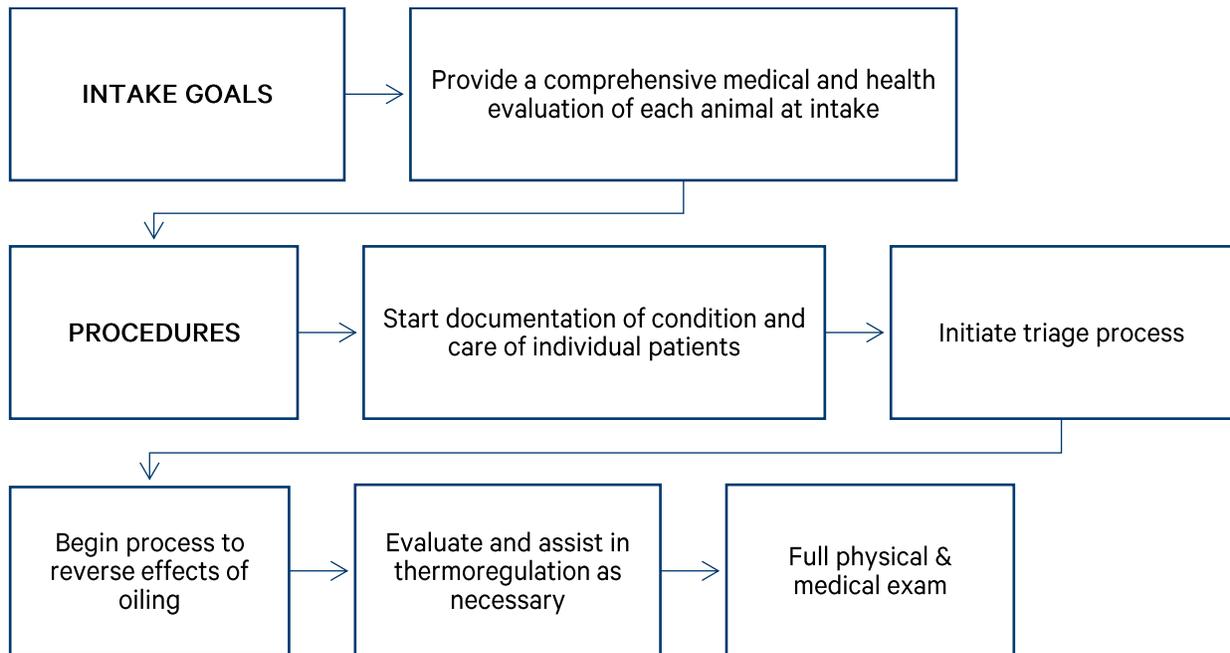
OWROs should work according to international standards for best achievable care of oiled birds (USFWS 2003; OWCN 2015; IPIECA 2016) sea turtles (NOAA 2010) and marine mammals (NOAA 2015). The condensed and general procedures for rehabilitating oiled wildlife are as follows and must be understood in order to facilitate a successful wildlife response.

8.3. PROCESSING AND EVIDENCE COLLECTION



Upon arrival at the rehabilitation center, wildlife goes through a processing procedure. Processing is how evidence is collected from each wild animal, dead or alive. The four pieces of evidence legally required for collection include a product sample (generally conducted via feather or fur sampling), photo documentation, identification/logging and tagging each animal, and a signed medical record, which is then completed during the intake process.

8.4. WILDLIFE INTAKE



Following processing, the oiled wildlife proceeds to intake, where each animal receives a thorough medical examination, initial in-house bloodwork is taken. A comprehensive initial treatment plan is then laid out for each animal. Triage, either based on medical health status or conservation value, also takes place at this point. In cases where the medical condition of the animal indicates that it will be unable to recover from its current condition and will not be able to survive the rehabilitation process to release, the individual should be humanely euthanized.

Exposure to petroleum products has numerous, significant, and often fatal consequences for wildlife (see Appendix A). Exposure effects can lead to debilitation and fatality (including euthanasia) for wild animals. Euthanasia guidelines are generally based on several factors relating to each individual animal's condition and will include behavior, secondary complications, blood values, thermoregulatory ability, GI tract function, waterproofing issues, etc. Agonal state, seizing, extreme hyper/hypothermia, and severe traumatic injuries also require immediate euthanasia evaluation.

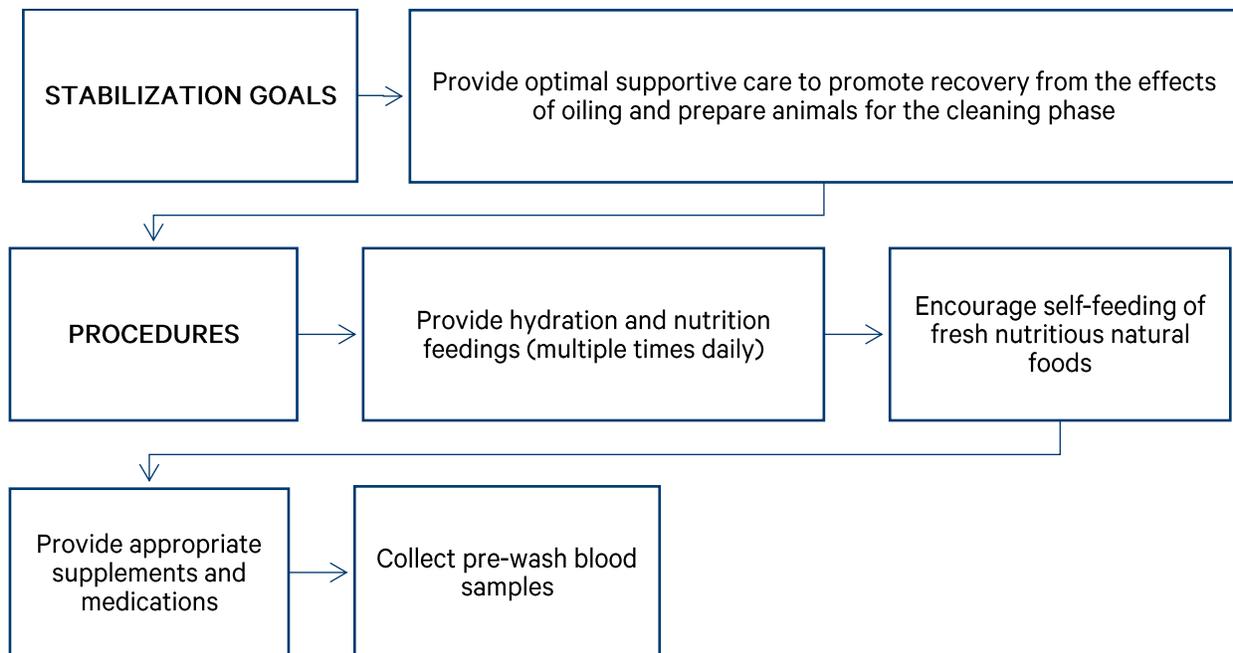
8.5. TRIAGE AND EUTHANASIA CONSIDERATIONS

The number of animals oiled may exceed the resources available to effectively rehabilitate all of the animals presented for care. In this case the most humane course of action is to euthanize those animals with a poor chance for survival so that the remaining animals' chances for survival are optimized.

Euthanasia should be considered whenever the prognosis for release back to the wild is poor. Each case should be considered individually. Priority should be given to animals with a high conservation value, with fair to good prognosis for release. Animals exhibiting symptoms of infectious diseases that may be transmissible to the larger group or to the wild population should be isolated immediately and considered for euthanasia. Based on experience it has been found that under current treatment protocols, birds with the following characteristics are poor candidates for rehabilitation, especially if exhibiting multiple symptoms.

Euthanasia decisions are made based on a combination of these factors for each animal on an individual basis. These parameters have been developed through extensive experience on survivability of animals through the rehabilitation process. The Wildlife Branch will coordinate with ECCC-CWS and/or DFO to develop and approve euthanasia protocols. Permitted wildlife rehabilitators and wildlife veterinarians with species-specific expertise are the only personnel authorized to implement euthanasia protocols and perform euthanasia.

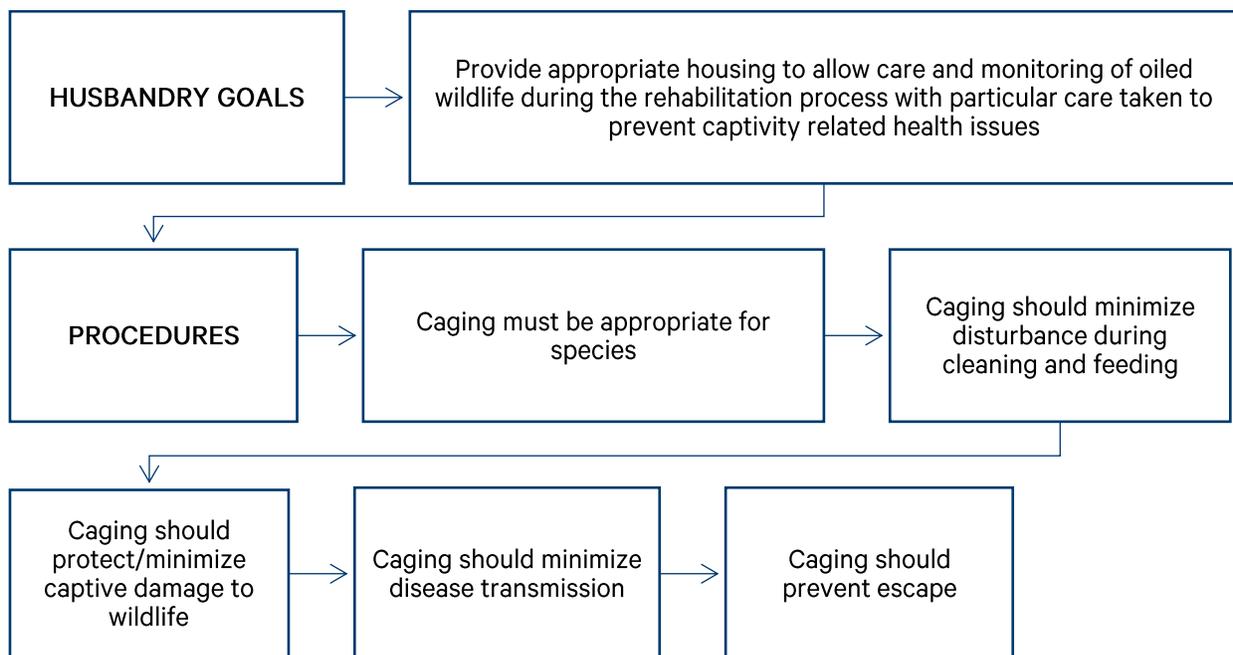
8.6. STABILIZATION



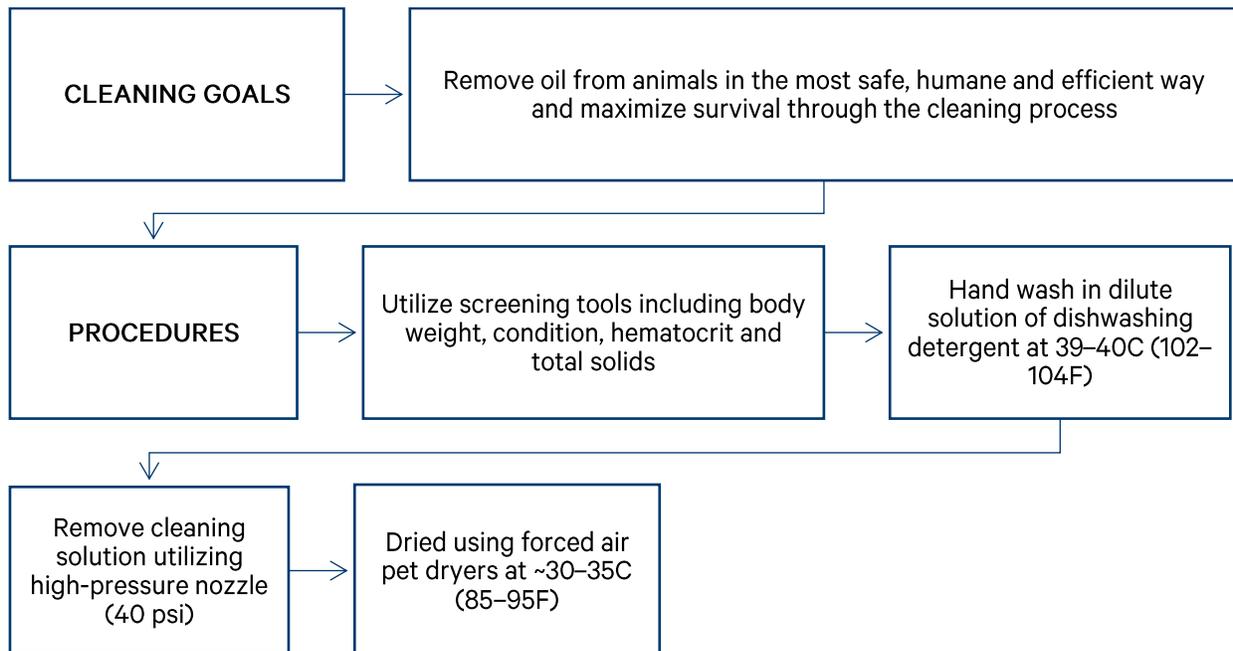
After intake, the animal moves into the stabilization phase, where it is appropriately housed, provided with medical, nutritional, and husbandry support to treat its condition, until it is deemed medically stable enough to be processed to the cleaning (decontamination) phase. This stage of the rehabilitation process is crucial to the animal's overall survival. If a bird is moved through the cleaning process prior to it being medically cleared to do so, it may die during the cleaning process or it will not have the strength following the cleaning process to recondition for release to the wild. Each individual

animal generally remains in stabilization for a minimum of 48 hours; some will require 72 hours or more. Reptiles differ from birds and mammals in this regard. Due to their unique physiology, reptiles should be decontaminated immediately after intake, with stabilization taking place after cleaning. Some individuals may require numerous cleaning sessions, or cleaning may need to be halted and resumed later if the individual's medical health is in jeopardy.

During the medical stabilization phase of the rehabilitation process, wildlife is medically monitored on a regular basis (including bloodwork), to determine its progress. Species-specific husbandry techniques are used to mitigate secondary complications due to captive care. Some species are particularly susceptible to the complications and have a very short "window of opportunity" before secondary issues become evident. Secondary complications in birds can include, but are not limited to: aspergillosis (fungal respiratory disease, exacerbated by stress and ventilation of a captive environment); keel, hock and foot lesions caused by being off water-based environments (i.e. pressure lesions); feather damage; and feather ball impactions for species that regularly ingest feathers. These secondary complications are often fatal to waterbirds. Thus, extremely specialized care, husbandry, caging, and facility development are mandatory components of oiled wildlife rehabilitation. Humane euthanasia is a necessary component of this phase of the rehabilitation process for wildlife that is not medically able to meet criteria for ongoing rehabilitation.



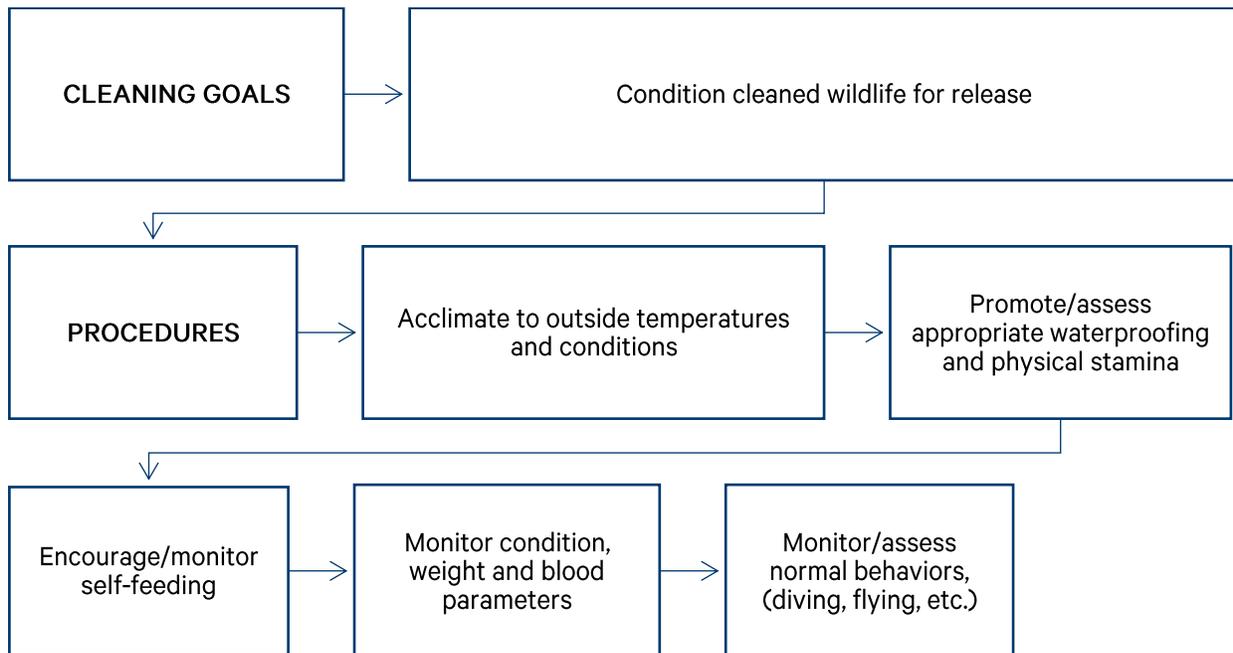
8.7. WILDLIFE CLEANING



All wildlife receives a “wash evaluation” before proceeding to the cleaning/decontamination process. Wildlife must meet strict medical criteria in order to be cleared to go through the decontamination process. The cleaning process may include pre-treatment to assist with breaking down weathered or heavy product prior to cleaning. Wildlife then goes through a series of specialized washes at specific temperatures, using specific detergent dilution, and with specific technique to remove the contaminant. Once the contaminant is thoroughly removed, wildlife receives a high-pressure rinse treatment to ensure that all detergent residue, also considered a contaminant to bird feathers, is completely removed. The cleaning process is slightly modified from the above for mammals, and further modified for reptiles and amphibians depending on the specific species in care.

Facility water volume, pressure and hardness requirements must be appropriate to the needs of the cleaning process. After being washed, birds move to the drying area where they are fully dried using high-velocity pet dryers and are carefully monitored for overheating, shock, and other complications. Pinnipeds are dried with heat lamps; sea turtles and cetaceans should not be dried.

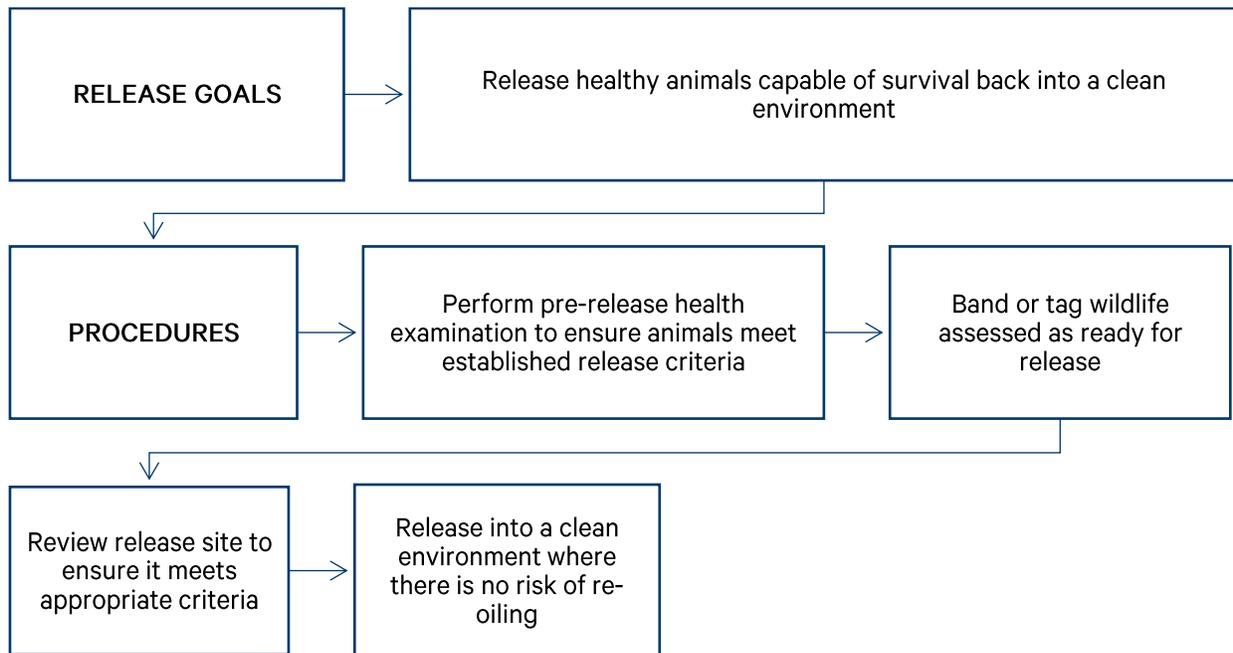
8.8. CONDITIONING



Once fully dried, wildlife moves into the conditioning phase of the rehabilitation process. During this phase animals are returned to environments appropriate to their species (generally water-based environments), allowing them to regain their waterproofing, endurance, acclimation, nutritional status, and medical status. Water volume, pressure and hardness requirements are mandatory for this stage of the rehabilitation process to ensure adequate conditioning. Each animal must enter the conditioning phase with a great deal of strength and health in order to reach potential for release. Due to the microscopic architecture of bird feathers, each feather's microscopic barbs and barbules must be preened back into waterproof alignment during this time. This process generally takes between 7–10 days.

All individuals continue to be provided with veterinary medical and nutritional support as required. All wildlife is medically monitored on a regular basis to determine progress (including bloodwork). Humane euthanasia can be a necessary component of this phase of the rehabilitation process for wildlife that is not medically able to meet criteria for ongoing rehabilitation to release.

8.9. RELEASE



Each animal will receive a pre-release evaluation prior to release to the wild, which includes a full medical examination, blood-work and waterproofing assessment. Waterproofing assessment generally takes place up to 72 hours of conditioning pool access, species dependent. Strict criteria must be met for wildlife to be considered for release to the wild. Only wildlife that meets these criteria will be released, to ensure survivability once returned to the wild. Wildlife is released in a location appropriate to its species, time of year and migration status, and into a location that has minimal risk of re-oiling. All birds should be banded prior to release by an authorized and permitted bird bander.

Specific alterations to above procedures and unique requirements based on resource availability, facility infrastructure, and unpredictability of wildlife in captivity are dealt with on a case-by-case basis according to the humane treatment and welfare of wildlife in captivity.

9. PERSONNEL

Skilled and experienced wildlife response personnel are a vital component in oiled wildlife response. The number of personnel required for field operations and wildlife rehabilitation is dependent on the scope of impacted wildlife. Below is a general guideline that may be used to consider personnel levels. The actual personnel levels will be assessed at the time of an incident and will be evaluated throughout the response process.

9.1. WORKFORCE PERSONNEL/VOLUNTEERS

Volunteers form an important part of oiled wildlife response and are often involved in larger oil spill events. Members of the local wildlife rehabilitation community, wildlife and domestic animal veterinarians, biologists, wildlife enthusiasts and members of the public interested in wildlife frequently request to be of assistance during a spill.

Pre-response planning for the use of volunteers is highly recommended. Wildlife is often the “face” of an oil spill, particularly in incidents impacting populated and/or politically active populations. Members of the public or people associated with wildlife or environmental organizations often want to assist on behalf of wildlife and may “self-deploy” during a response. This can include attempts to capture or clean wildlife, particularly those animals that have come to shore after becoming oiled. While well-intentioned, these efforts can impede the wildlife response, making it more difficult to capture or stabilize animals and causing a public health concern. Trainings offered to the public in advance of an incident can provide opportunities to bring pre-trained volunteers into a response. Trainings can provide an understanding of the context and structure of an oil spill response and, ideally, act as a way to both limit the number of people who self-deploy while creating a group of trained personnel who can readily deploy to provide support for the response. Support tasks can be pre-defined to include support services such as animal or supply transport, food preparation, cleaning, data input, etc.

Due to the potential for liability issues, it is preferable to hire volunteers as workforce staff under the Wildlife Branch. Planning considerations that detail conditions under which volunteers will be used, training and experience required of volunteers, methods for volunteer management and training, delineation of duties, and addressing liability concerns will assist with integrating volunteer teams into the overall response. Local resources can be of assistance in larger events with a high need for manpower, particularly in the WRF. The use of volunteers will be at the discretion of the Incident Commander.

9.2. LOCAL AREA RESOURCES

The OWRO may request support from local organizations. Decisions regarding support from local organizations are best made in conjunction with the OWRO to ensure fluid response operations, maintenance of human health and safety requirements, and high quality of care. Local organizations and stakeholders may be able to assist the OWRO with specific wildlife response operations. They should be managed and coordinated by the OWRO through the Wildlife Branch to ensure a consistent approach to implementing approved response actions. The organizations listed as local area response resources may not have specific oil spill response capacity but do have expertise in the types of activities in which they would be engaged during a wildlife response. Below is a selection

of organizations that may be asked to assist during an incident. Contact information for these organizations should be verified and updated annually.

9.3. HUMAN HEALTH AND SAFETY

Human health and safety is the first priority in any oil spill response. In addition to hazards from oil, numerous physical hazards may be associated with wildlife rescue and rehabilitation activities. Safety for all responders, as well as the safety of each individual animal must be considered. All personnel involved in oiled wildlife response must maintain proper levels of safety and wildlife training.

Wildlife Branch personnel will comply with all health and safety trainings as required by the incident Safety Officer. Workforce personnel may be given specific on-site safety training as identified by the Safety Officer and Wildlife Branch Director. Levels of training for individuals involved in the various areas within the wildlife response will be defined and approved by the UC. Safety measures vary depending on, but not limited to, the following conditions:

- ▶ 'Right to Know' issues (potential hazards of the spilled product)
- ▶ Location of spill or release
- ▶ Environmental conditions, including weather
- ▶ Biological hazards (vegetation and wildlife)
- ▶ Potential hazards when working with impacted wildlife
- ▶ Location of WRF and field stabilization sites

9.3.1. RECOMMENDED PPE FOR WILDLIFE PERSONNEL

Appropriate personal protective equipment (PPE) is specific to each phase of oiled wildlife response, this includes, but is not limited to: safety glasses, oil-protective suits, nitrile gloves, and protective footwear. In addition, search and capture will be required to undergo more extensive safety training and may be required to wear other forms of PPE, including Personal Flotation Devices (PFDs). To guard against injury from wildlife, all workers should wear approved personal protective equipment appropriate to their task. These include:

- ▶ Full eye protection, e.g., safety glasses, goggles, or face shield
- ▶ Oil resistant rain gear or oil protective clothing (coated Tyvek, Saranex, etc.)
- ▶ Gloves (neoprene or nitrile) that are oil resistant and waterproof
- ▶ Non-skid shoes/boots, that are oil resistant and waterproof
- ▶ Ear protection (muff and/or ear plug type) when using pyrotechnic devices, operating machinery or on boats

- ▶ Personal flotation device when working on or near water

Respiratory protection from organic vapor hazards may also be required for some operations. If respirators are required by the Site Safety Officer, respiration training and fit testing will also be required. All workers must be trained on the proper use and limitations of all personal protective equipment prior to using equipment.

To protect against injury from wildlife, appropriate clothing (closed-toed shoes, long sleeved shirts, long pants, etc.) and equipment should be worn underneath the oil protective equipment whenever necessary. Workers should be aware of temperature, weather, and other environmental conditions and use personal protective equipment to guard against dangerous waters, frostbite, hypothermia, heat-stress disorders, and infectious diseases.

9.4. WILDLIFE SAFETY PLAN

Wildlife Operations will comply with the Site Safety Plan developed by the Safety Officer. Incident specific wildlife safety plans will be developed by the Wildlife Branch in coordination with the Safety Officer. The Plans will be specific to Wildlife Branch operations, both field and rehabilitation operations, and will be in accordance with overall Site Safety Plans. Standard human health and safety issues (hydrocarbon toxicity and related air quality, fire hazards, weather and marine hazards, slips/trips and falls, fatigue, hypo- and hyperthermia) will be discussed as they relate to field and facility safety. Wildlife-specific issues such as zoonotic disease and wildlife handling injuries will also be discussed.

A Field Safety Plan should identify hazards associated with the work being done in respect to geographic location, topography of terrain, and the resources being used in the field. Wildlife Facility Safety Plans should be specific to the wildlife species being handled in the Wildlife Response Facility and the techniques used to rehabilitate those species. The plan should address the pertinent and highest risk hazard with each animal as well as ways to mitigate risks. All individuals who will be handling oiled wildlife must be trained in proper capture and restraint techniques. Each shift should be briefed on the field or facility safety plan before they begin their tasks/work orders, as tasks change, and/or locations and species change.

Site-specific safety plans will be maintained on site for inspection by all people at that place of work or about to commence work. The Wildlife Safety Plan should address the following components:

- ▶ **Risk management:** identification of the hazards (associated with the locations to be surveyed and the contaminant) and assessment of the risks associated with the work (specific to resources being used - long-handled nets, boats, snare, etc.), and documentation of the risk control measures to be taken.

- ▶ **Species-specific risk management:** identification of the hazards associated with each species and assessment of the risks associated with the tasks involving those species.
- ▶ **Safe handling:** detailed outline of how each species should be handled safely for both the animal and the caregiver. PPE that may be required. Diagrams and photos can be helpful but are not necessary.
- ▶ **Safety Data Sheet (SDS):** a detailed informational sheet that thoroughly describes the hazards, safety measures, and chemical composition of the product or products that have been spilled or released.
- ▶ **Statement of responsibilities:** a statement that nominates individuals who will be responsible for the site-specific Occupational Health and Safety (OHS) and (Workplace Hazardous Materials Information System) WHMIS aspects of the work, and who will be available to deal with illness/injury and OHS incidents.
- ▶ **Occupational health and safety training:** a statement identifying the training needs of the personnel conducting fieldwork and using specific resources in the field, including WHMIS training for the work and arrangements to address these needs.
- ▶ **Equipment-specific safety measures:** if boats or airplanes/helicopters are being used, field personnel must have specific safety details for procedures associated with the use of this equipment, and well as points of contact for individuals specializing in the safe use of this equipment during this response.
- ▶ **Incident management and reporting measures:** a statement identifying the reporting protocol used and personnel available to prevent, prepare for, respond to, and recover from illness/injury and incidents.
- ▶ **PPE rules:** rules that specify PPE and how it should be donned and doffed in prominent areas at the field site [including Stabilization Site(s)].
- ▶ **Weather report:** a detailed weather report describing any significant weather impacts that may impede the work being done in the field and the timing of the weather impacts.

10. FACILITIES

10.1. RECOMMENDATIONS FOR SITE SECURITY

Site security is an important component of any wildlife rehabilitation facility. Site security ensures that the public, members of the press or other individuals (including industry and cleanup contractors) are not able to access areas where wildlife is housed without being on a designated tour or guided by wildlife response personnel. This is vital to reduce stress on wildlife in recovery. It also ensures a general reduction in foot traffic, and potential theft of or damage to rehabilitation equipment and supplies. Security should be provided physically, by means of fencing around enclosures and by 24-hour security personnel in larger incidents. In smaller incidents, site security may be maintained by nighttime security personnel. A single entrance should be used for all non-wildlife personnel; a visitor log noting entry and exit times should be maintained in larger events.

10.2. FACILITY STANDARDS

It is critical to a successful response effort that the wildlife facilities are established as immediately as possible. Facilities should meet or exceed established requirements. Facilities that do not meet these requirements jeopardize response efforts and increase wildlife mortality. Establishing a site for the facility should happen within the first 24–72 hours of a response, with the goal of the center being completely up and running within 72 hours.

Processing, intake, stabilization, and isolation areas should be operational within 48 hours of wildlife response activation. Wildlife cleaning and conditioning areas should be operational within 72 hours of wildlife response activation. Delay in the establishment and appropriate operation of these areas negatively impacts mortality rates and the success of response efforts.

The use of an existing wildlife rehabilitation center for an incident is often considered for convenience and expediency. However, this can present significant difficulties for the response and generally should not be considered for other than initial housing while establishing an incident-specific wildlife rehabilitation facility.

Oiled wildlife requires specialized rehabilitation, including specialized facilities. Because facility requirements can vary significantly, a permanent facility is not always advisable and may be an impediment to providing appropriate facility design for the incident. Suitable facilities must have a large open space on the ground floor that can easily be configured and reconfigured to accommodate the changing needs of this unique form of wildlife rehabilitation.

Animals impacted by an oil spill must be cared for separately from the in-house population. Oiled wildlife is immunocompromised and debilitated by the effects of oil, making them more susceptible to infectious disease (parasites, bacterial, fungal and viral infections.) commonly seen in wildlife

centers rehabilitating multiple species. Proper precautions such as quarantine areas, footbaths, and separate ventilation systems must be used to limit the impact to oiled wildlife. Injured, ill or neonate wildlife that is not oiled may be further compromised by inhalation of volatile hydrocarbons, cross-contamination of care areas, caging, and instruments. Stress is common to all wildlife in a rehabilitation setting—increased caseload, staff, and foot traffic in care areas heighten this stress for wildlife patients. In addition, most multiple species centers do not have the ability to fully segregate predator and prey species throughout the course of their rehabilitation, which is also a stress factor for wildlife.

Facility standards for marine mammals are complex and are not included within this WRP. Specific marine mammal rehabilitation and facility guidelines were developed by the National Marine Fisheries Service (*Policies and Best Practices for Marine Mammal Response, Rehabilitation, and Release* [2009] available at <www.nmfs.noaa.gov/pr/pdfs/health/health/rehab_standards.pdf>). These policies set minimum facility, husbandry and veterinary standards for rehabilitating marine mammals. It should be noted that temporary facilities that are established at the time of an oil spill response may not be able to follow every aspect outlined in these documents due to the emergent nature of the incident (NOAA 2015).

The facility requirements listed below are specific to avian care. Minimum facility requirements include the following spatial components to meet regulatory requirements:

Table 2. Facility Space Considerations

DYNAMIC SPACE	
Space requirements change in direct relation to the volume of birds in-house. A general guideline is 6 sq. ft. per 1 kg bird. (Intake, holding, cleaning, drying/conditioning, pools)	
CARE AREAS	
▶ Field stabilization area	▶ Drying
▶ Processing area	▶ Pools/outdoor conditioning areas
▶ Intake	▶ Food preparation
▶ Holding	▶ Lab/pharmacy
▶ Critical care and isolation	▶ Morgue/necropsy
▶ Wash and rinse	▶ Storage
SEMI-STATIC SPACE	
▶ Space requirements increase in a non-linear fashion according to the volume of birds in-house. Requirements for these areas will be based mainly on severity of spill. (Food preparation, morgue/necropsy, storage, freezers, training room, rest area, office, restrooms/hand wash stations)	
NON-CARE AREAS	
Separate contaminated and uncontaminated areas, including a decontamination area	

Administration area (e.g., sign in, volunteer orientation, training, record keeping)
 Break areas and rest rooms for staff and workforce
 Space for human food storage, preparation, and dining

STATIC SPACE

Space requirements do not necessarily change with the volume of animals in-house. (ICU, laboratory, laundry, electrical, mechanical)

Table 3. Preliminary Facility Checklist for Oiled Bird Preparedness

GENERAL REQUIREMENTS
<p>Minimum of 10–15 air exchanges per hour with outside air in all animal areas Air temperature adjustable and maintainable to any given temperature within 30-32C (65-85F) with ventilation system running Electrical capacity to support heat lamps, pet dryers, etc. Sufficient staff and volunteer support to handle extra workload</p>
OILED BIRD REQUIREMENTS
<p>Intake and assessment area that is separate from regular patients (recommended 40 ft²) Area to house oiled patients separate from regular rehabilitation patients (recommended 6 ft. [2 per average sized bird]); the ability to prevent cross contamination through At least one pre-wash holding pen no smaller than 2'x2'x2' with appropriate net bottom (1/2 "stretched, no-knot mesh) at least 1" off the ground At least one post wash holding pen no smaller than 3'x2'x2' (other specs same as above)</p>
WASH REQUIREMENTS
<p>Wash/rinse area (recommended 100 ft²) 300 gallons of fresh water available per wash Water maintainable at 39-41C (102-108F) Water hardness of 2-5 GH (34-85 mg/L) up Water pressure sustainable at 40-60 psi for the duration of the rinse process Ability to collect and safely dispose of oily wastewater</p>
POST-WASH SUPPORT
<p>At least one warm water pool Conditioning pool with a minimum of 7.5 ft² of surface area, 3' depth and constantly running water that drains from the surface to exchange the volume of the pool 4.25x/day</p>

10.3. SITE LOCATION

The location of the wildlife center should consider the following:

- ▶ Ensure adequate access to supplies, human resources, transportation corridors, etc.
- ▶ Ensure adequate utilities and infrastructure (see below)

- ▶ Ensure restricted perimeter access to outdoor/indoor facility areas to facilitate appropriate visitor and media control and site security
- ▶ Ensure outdoor facility areas adequate for conditioning pool expansion requirements
- ▶ Ensure facility location that minimizes visual and auditory stress to wildlife
- ▶ Ensure adequate vehicle, trailer, storage access, and parking
- ▶ Develop and maintain predator exclusion and pest control plans
- ▶ Ensure adequate access to phones, faxes, computers, Internet access, etc.

Non-Wildlife Areas

- ▶ Don/Doffing areas and decontamination areas
- ▶ Volunteer area (for volunteer sign-in, orientation, training, etc.)
- ▶ Office area (for meetings, record keeping, communications, etc.)
- ▶ Staff/volunteer rest areas
- ▶ Restrooms and hand wash stations
- ▶ Human food storage, preparation, catering, and dining areas

10.4. FACILITY COMPONENTS

In addition to the above spatial components, requirements regarding the functioning of those areas also exist. Facilities must meet requirements regarding ventilated/heated interior space; air exchange; air temperature and circulation; water volume, pressure and hardness; volume of potable water; and electrical voltage allowances.

10.4.1. UTILITIES

Water is one of the most important fundamental requirements of a functional oiled wildlife rehabilitation facility. The following specifications are required for adequate water:

- ▶ Quality: 2–3 grains of hardness for wash and rinse water and initial conditioning pools. Water hardness can increase through pre-release pools
- ▶ Quantity: 18 liters/minute to all indoor outlets and an additional supply for pools (3500 gallons) and overflows. A 1 kg bird requires approximately 455-1400 Liters of water to complete one wash and rinse process
- ▶ Temperature: 40–41C (104 –106F) is required for washing and rinsing
- ▶ Pressure: 40–60 psi is required for the rinsing process
- ▶ Adequate air quality and temperature is also required to provide best achievable care to oiled wildlife

- ▶ Temperature: 18–32C (65–90F), adjustable to two-degree increments is required for intake, holding and conditioning areas
- ▶ Ventilation: 8–12 air exchanges per hour are recommended; however, humidity levels must also be monitored to ensure air exchange rate does not lead to patient dehydration
- ▶ Electricity

In order to maintain all facility operations consistently, a very large amount of energy is required

Amps: 800–1000 amps, preferably at 220/3 phase (with ground fault interrupt circuits)

10.4.2. WASTE MANAGEMENT

The Wildlife Branch will work with the EU to ensure that the incident-specific waste management plan will include all needs specific to wildlife response efforts in the field and in the rehabilitation facility. The Waste Management Plan (WMP) must include the supply and procurement of waste disposal containers for wildlife operations, as well as appropriate methods for disposal. WCMRC's Strategic Waste Management Plan documents wildlife specific waste management needs, these should be accounted for within the incident specific WMP.

WASTEWATER

- ▶ Wastewater resulting from oiled wildlife rehabilitation operations requires specific and specialized disposal methods. Wastewater is to be handled in accordance with the waste management plan (WMP) for the incident.
- ▶ Oily wastewater (water from decontamination process): Must be collected during the decontamination (wash) process managed in accordance with the WMP.
- ▶ Grey water: (ex. rinse water, pool overflow water) must be disposed according to federal, provincial, and municipal regulations. Grey water from pool overflows can be managed by routing the water to a cistern where it is then collected.
- ▶ Storm water/runoff: Must be appropriately controlled to prevent contact with grey water and oily wastewater.

SOLID WASTE

- ▶ The wildlife rehabilitation facility generates considerable solid waste. Disposal of all solid waste must be in accordance with the WMP for the incident.
- ▶ Disposal of carcasses must be in accordance with designated regulatory agencies, evidentiary protocols, and best management practices for biosecurity. Carcass disposal protocols are frequently site-dependent and will be developed by the Wildlife Branch for incorporation into the WMP for the incident.
- ▶ Migratory bird carcasses must be transferred to Canadian Wildlife Services Law Enforcement; other carcasses (subject to provincial regulations and incident-specific requirements) may need to be maintained or must be treated as biohazards during disposal.

11. REFERENCES

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APPENDICES

A EFFECTS OF CONTAMINANTS ON WILDLIFE

A.1 SPECIES OF CONSERVATION INTEREST

Table 4. Species of Conservation Interest

TAXONOMIC GROUP	OILING CODE ¹	COSEWIC COMMON NAME	SCIENTIFIC NAME	COSEWIC STATUS	SCHEDULE STATUS	SARA SCHEDULE
REPTILES	ID/U	Desert Nightsnake	<i>Hypsiglena chlorophaea</i>	Endangered	Endangered	Schedule 1
	ID/U	Great Basin Gophersnake	<i>Pituophis catenifer deserticola</i>	Threatened	Threatened	Schedule 1
	ID/U	Northern Rubber Boa	<i>Charina bottae</i>	Special Concern	Special Concern	Schedule 1
	ID/U	Sharp-tailed Snake	<i>Contia tenuis</i>	Endangered	Endangered	Schedule 1
	M	Western Painted Turtle Intermountain - Rocky Mountain population	<i>Chrysemys picta bellii</i>	Special Concern	Special Concern	Schedule 1
	M	Western Painted Turtle Pacific Coast population	<i>Chrysemys picta bellii</i>	Threatened	Endangered	Schedule 1
	ID/U	Western Rattlesnake	<i>Crotalus oreganus</i>	Threatened	Threatened	Schedule 1
	ID/U	Western Skink	<i>Plestiodon skiltonianus</i>	Special Concern	Special Concern	Schedule 1
	ID/U	Western Yellow-bellied Racer	<i>Coluber constrictor mormon</i>	Threatened	Special Concern	Schedule 1
AMPHIBIANS	ID/U	Coastal Giant Salamander	<i>Dicamptodon tenebrosus</i>	Threatened	Threatened	Schedule 1
	ID/U	Coastal Tailed Frog	<i>Ascaphus truei</i>	Special Concern	Special Concern	Schedule 1
	ID/U	Coeur d'Alene Salamander	<i>Plethodon idahoensis</i>	Special Concern	Special Concern	Schedule 1
	ID/U	Great Basin Spadefoot	<i>Spea intermontana</i>	Threatened	Threatened	Schedule 1
	M	Northern Leopard Frog Rocky Mountain population	<i>Lithobates pipiens</i>	Endangered	Endangered	Schedule 1
	M	Northern Red-legged Frog	<i>Rana aurora</i>	Special Concern	Special Concern	Schedule 1
	M	Oregon Spotted Frog	<i>Rana pretiosa</i>	Endangered	Endangered	Schedule 1
	ID/U	Rocky Mountain Tailed Frog	<i>Ascaphus montanus</i>	Threatened	Threatened	Schedule 1

TAXONOMIC GROUP	OILING CODE ¹	COSEWIC COMMON NAME	SCIENTIFIC NAME	COSEWIC STATUS	SCHEDULE STATUS	SARA SCHEDULE
AMPHIBIANS	ID/U	Wandering Salamander	<i>Aneides vagrans</i>	Special Concern	Special Concern	Schedule 1
	ID/U	Western Tiger Salamander Southern Mountain population	<i>Ambystoma mavortium</i>	Endangered	Endangered	Schedule 1
	ID/U	Western Toad Calling population	<i>Anaxyrus boreas</i>	Special Concern	Special Concern	Schedule 1
	ID/U	Western Toad Non-calling population	<i>Anaxyrus boreas</i>	Special Concern	Special Concern	Schedule 1
BIRDS	H	Ancient Murrelet	<i>Synthliboramphus antiquus</i>	Special Concern	Special Concern	Schedule 1
	L	Band-tailed Pigeon	<i>Patagioenas fasciata</i>	Special Concern	Special Concern	Schedule 1
	L	Bank Swallow	<i>Riparia riparia</i>	Threatened	Threatened	Schedule 1
	L	Barn Owl Western population	<i>Tyto alba</i>	Threatened	Threatened	Schedule 1
	L	Barn Swallow	<i>Hirundo rustica</i>	Threatened	Threatened	Schedule 1
	L	Black Swift	<i>Cypseloides niger</i>	Endangered	Endangered	Schedule 1
	L	Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened	Schedule 1
	M	Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	Special Concern	Special Concern	Schedule 1
	L	Burrowing Owl	<i>Athene cunicularia</i>	Endangered	Endangered	Schedule 1
	L	Canada Warbler	<i>Cardellina canadensis</i>	Threatened	Threatened	Schedule 1
	H	Cassin's Auklet	<i>Ptychoramphus aleuticus</i>	Special Concern	Special Concern	Schedule 1
	L	Coastal Vesper Sparrow	<i>Pooecetes gramineus affinis</i>	Endangered	Endangered	Schedule 1
	ID/U	Common Nighthawk	<i>Chordeiles minor</i>	Special Concern	Threatened	Schedule 1
	L	Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Special Concern	Special Concern	Schedule 1
	L	Flammulated Owl	<i>Otus flammeolus</i>	Special Concern	Special Concern	Schedule 1

TAXONOMIC GROUP	OILING CODE ¹	COSEWIC COMMON NAME	SCIENTIFIC NAME	COSEWIC STATUS	SCHEDULE STATUS	SARA SCHEDULE
BIRDS	M	Great Blue Heron fannini subspecies	<i>Ardea herodias fannini</i>	Special Concern	Special Concern	Schedule 1
	H	Horned Grebe Western population	<i>Podiceps auritus</i>	Special Concern	Special Concern	Schedule 1
	M	Hudsonian Godwit	<i>Limosa haemastica</i>	Threatened	No Status	No schedule
	L	Lewis's Woodpecker	<i>Melanerpes lewis</i>	Threatened	Threatened	Schedule 1
	M	Long-billed Curlew	<i>Numenius americanus</i>	Special Concern	Special Concern	Schedule 1
	H	Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Threatened	Threatened	Schedule 1
	L	Northern Goshawk laingi subspecies	<i>Accipiter gentilis laingi</i>	Threatened	Threatened	Schedule 1
	L	Northern Saw-whet Owl brooksi subspecies	<i>Aegolius acadicus brooksi</i>	Threatened	Threatened	Schedule 1
	L	Olive-sided Flycatcher	<i>Contopus cooperi</i>	Special Concern	Threatened	Schedule 1
	L	Peregrine Falcon pealei subspecies	<i>Falco peregrinus pealei</i>	Special Concern	Special Concern	Schedule 1
	H	Pink-footed Shearwater	<i>Ardenna creatopus</i>	Endangered	Endangered	Schedule 1
	H	Red Knot roselaari type	<i>Calidris canutus roselaari</i>	Threatened	Threatened	Schedule 1
	H	Red Knot rufa subspecies	<i>Calidris canutus rufa</i>	Endangered	Endangered	Schedule 1
	H	Red-necked Phalarope	<i>Phalaropus lobatus</i>	Special Concern	Special Concern	Schedule 1
	M	Rusty Blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	Schedule 1
	L	Sage Thrasher	<i>Oreoscoptes montanus</i>	Endangered	Endangered	Schedule 1
	L	Short-eared Owl	<i>Asio flammeus</i>	Special Concern	Special Concern	Schedule 1
	H	Short-tailed Albatross	<i>Phoebastria albatrus</i>	Threatened	Threatened	Schedule 1
L	Spotted Owl caurina subspecies	<i>Strix occidentalis caurina</i>	Endangered	Endangered	Schedule 1	

	OILING CODE ¹	COSEWIC COMMON NAME	SCIENTIFIC NAME	COSEWIC STATUS	SCHEDULE STATUS	SARA SCHEDULE
	L	Streaked Horned Lark	<i>Eremophila alpestris strigata</i>	Endangered	Endangered	Schedule 1
BIRDS	H	Western Grebe	<i>Aechmophorus occidentalis</i>	Special Concern	Special Concern	Schedule 1
	L	Western Screech-owl kennicottii subspecies	<i>Megascops kennicottii kennicottii</i>	Threatened	Threatened	Schedule 1
	L	Western Screech-owl macfarlanei subspecies	<i>Megascops kennicottii macfarlanei</i>	Threatened	Threatened	Schedule 1
	L	White-headed Woodpecker	<i>Picoides albolarvatus</i>	Endangered	Endangered	Schedule 1
	L	Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>	Endangered	Endangered	Schedule 1
	H	Yellow Rail	<i>Coturnicops noveboracensis</i>	Special Concern	Special Concern	Schedule 1
	L	Yellow-breasted Chat auricollis subspecies Southern Mountain population	<i>Icteria virens auricollis</i>	Endangered	Endangered	Schedule 1
	MAMMALS (MARINE)	ID/U	Grey Whale Pacific Coast Feeding Group population	<i>Eschrichtius robustus</i>	Endangered	No Status
ID/U		Grey Whale Western Pacific population	<i>Eschrichtius robustus</i>	Endangered	No Status	No schedule
H		Harbour Porpoise Pacific Ocean population	<i>Phocoena phocoena vomerina</i>	Special Concern	Special Concern	Schedule 1
H		Northern Fur Seal	<i>Callorhinus ursinus</i>	Threatened	No Status	No schedule
H		Sea Otter	<i>Enhydra lutris</i>	Special Concern	Special Concern	Schedule 1
M		Steller Sea Lion	<i>Eumetopias jubatus</i>	Special Concern	Special Concern	Schedule 1
MAMMALS (TERRESTRIAL)	L	American Badger jeffersonii subspecies Eastern population	<i>Taxidea taxus jeffersonii</i>	Endangered	Endangered	Schedule 1
	L	American Badger jeffersonii subspecies Western population	<i>Taxidea taxus jeffersonii</i>	Endangered	Endangered	Schedule 1
	L	Caribou Boreal population	<i>Rangifer tarandus</i>	Threatened	Threatened	Schedule 1

OILING CODE ¹	COSEWIC COMMON NAME	SCIENTIFIC NAME	COSEWIC STATUS	SCHEDULE STATUS	SARA SCHEDULE
L	Caribou Central Mountain population	<i>Rangifer tarandus</i>	Endangered	No Status	No schedule
L	Caribou Northern Mountain population	<i>Rangifer tarandus</i>	Special Concern	No Status	No schedule
L	Caribou Southern Mountain population	<i>Rangifer tarandus</i>	Endangered	No Status	No schedule
L	Collared Pika	<i>Ochotona collaris</i>	Special Concern	Special Concern	Schedule 1
ID/U	Ermine haidarum subspecies	<i>Mustela erminea haidarum</i>	Threatened	Threatened	Schedule 1
L	Grizzly Bear Western population	<i>Ursus arctos</i>	Special Concern	Special Concern	Schedule 1
ID/U	Little Brown Myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	Schedule 1
L	Mountain Beaver	<i>Aplodontia rufa</i>	Special Concern	Special Concern	Schedule 1
ID/U	Northern Myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered	Schedule 1
L	Nuttall's Cottontail nuttallii subspecies	<i>Sylvilagus nuttallii nuttallii</i>	Special Concern	Special Concern	Schedule 1
ID/U	Pacific Water Shrew	<i>Sorex bendirii</i>	Endangered	Endangered	Schedule 1
ID/U	Pallid Bat	<i>Antrozous pallidus</i>	Threatened	Threatened	Schedule 1
L	Plains Bison	<i>Bison bison bison</i>	Threatened	No Status	No schedule
ID/U	Spotted Bat	<i>Euderma maculatum</i>	Special Concern	Special Concern	Schedule 1
L	Townsend's Mole	<i>Scapanus townsendii</i>	Endangered	Endangered	Schedule 1
L	Vancouver Island Marmot	<i>Marmota vancouverensis</i>	Endangered	Endangered	Schedule 1
L	Western Harvest Mouse megalotis subspecies	<i>Reithrodontomys megalotis</i>	Endangered	Special Concern	Schedule 1
L	Wolverine	<i>Gulo gulo</i>	Special Concern	Special Concern	Schedule 1
L	Wood Bison	<i>Bison bison athabasca</i>	Special Concern	Threatened	Schedule 1

KEY: Susceptibility to the effects of oil. H=Highly susceptible; M=Moderately susceptible; L=Low susceptibility; ID/U=Insufficient data/ Susceptibility poorly understood

A.2 EFFECTS OF OIL ON WILDLIFE

Wildlife affected by a hydrocarbon release may be debilitated to varying degrees depending on several factors: species vulnerability, the type of product released, weather, time of contact, weathering of the oil, the degree to which the animal has been oiled, whether the animal has ingested oil, the length of time before affected animals were captured and stabilized and, the overall health of the animal at the time of the oil spill. The success of rehabilitating contaminated animals is extremely variable, depending on species affected, the breeding or biological state of those species, the nature of the contaminant, weather, temperature, and quality and immediacy of wildlife care. Oil has numerous effects on the anatomical and biological systems of all species, including the disruption of the normal interlocking waterproofing mechanism of feathers or fur, damage and toxic effects to the lining of the gastrointestinal tract, liver and pancreas and, disruption in the normal behavior and reproductive ability of wildlife.

Species most susceptible to the impacts of an oil spill are those that make use of the entire water column; pelagic birds in particular are most susceptible due to the relatively fragile nature of their waterproofing as well as behaviors that make use of all levels of the water column. Neritic species are similarly highly susceptible. Although cetaceans and pinnipeds make similar use of the water column, they may be less susceptible to the external effects of oil based on thermoregulatory systems.

Environmental effects may include long or short-term contamination of food sources, contamination of breeding and foraging habitat, and potential reduction in reproductive success due to oil contamination of adults and eggs.

Table 5. Species-Specific Effects of Oil

TAXONOMIC GROUP	OVERVIEW OF EFFECTS OF OIL
REPTILES	
Sea Turtles	<ul style="list-style-type: none"> ▶ Sea turtles at all life stages are at risk from oil exposure. Direct oil exposure to eggs can result in developmental deformity of scutes and a decrease in survival to hatching, depending on the duration of exposure and egg developmental stage. ▶ Ingestion of weathered oil or tarballs may cause starvation due to gut blockage or impaction; decreased absorption efficiency, absorption of toxins; intestinal ulceration and necrosis; interference with fat metabolism; and buoyancy problems which, in turn, prevents turtles from feeding and increases vulnerability to predators and boat traffic. ▶ Ocular lesions and dermatitis and or necrosis ▶ Esophageal irritation and potential deleterious effects to lung tissue due to exposure and inhalation of petroleum vapors ▶ Significant changes to blood chemistry including decreased red blood cell volume leading to reduced oxygen carrying capacity.
BIRDS	
Pelagic and neritic birds, waterfowl	<ul style="list-style-type: none"> ▶ Decreased thermoregulatory regulation and hypothermia due to loss of waterproofing. Loss of buoyancy and mobility, inability to feed leading to starvation, exhaustion from excessive preening ▶ Severe dehydration, hypoglycemia, hypoproteinemia, ▶ Skin and ocular burns, leading to additional waterproofing issues and risk of infection. ▶ Trauma to keel, feet, and legs from beaching due to diminished waterproofing; these injuries can require surgical intervention or euthanasia. ▶ Ingestion of contaminated water leading to internal complications including gastrointestinal dysfunction (hemorrhagic gastroenteritis), reduced GI tract motility and absorption of nutrients toxicity, hematological changes, and organ damage. ▶ Reduction in reproductive success due to oil contamination of adults and eggs. Colonial species with low reproductive rates (e.g. alcids) are particularly susceptible ▶ Many of the species in this group are highly susceptible to captive stress and the resultant decline in health
Shorebirds	<ul style="list-style-type: none"> ▶ Shorebirds are less susceptible to oil releases than obligate marine or freshwater birds, with the exception of phalaropes. Heavy oil impacts from the water’s surface can lead to rapid death. ▶ Other species of shorebirds are susceptible during feeding and may become oiled by wading through contaminated water or may ingest oiled food sources. ▶ Potential effects of oil are similar to other species; due to body size, shorebirds may become hypothermic rapidly.

TAXONOMIC GROUP	OVERVIEW OF EFFECTS OF OIL
	<ul style="list-style-type: none"> ▶ Shorebirds, including phalaropes, are highly susceptible to the effects of captive stress
Raptors	<ul style="list-style-type: none"> ▶ Raptors are less susceptible to oil releases than obligate marine or freshwater birds; predation of oiled birds can result in becoming oiled, with similar effects as above, and/or ingestion of oil. ▶ Many raptor species (including Peregrine Falcons) are highly susceptible to captive stress
Passerines	<ul style="list-style-type: none"> ▶ Passerines are less susceptible to oil releases than other birds. ▶ Consumption of oiled food sources can lead to gastrointestinal damage and oil toxicity ▶ Ground nesting species may see reduced reproductive success if eggs or hatchlings are oiled. Developmental deformities may also be seen.
MARINE MAMMALS	
Pinnipeds	<ul style="list-style-type: none"> ▶ Insufficient data to fully understand the effects of oil on pinnipeds or to be able to correlate degree of oiling to causes of morbidity and mortality in oiled pinnipeds due to confounding factors of captive care and stress ▶ Pinnipeds thermoregulate via fat stores; pups and young seals who have not yet built up sufficient fat stores are most susceptible to oil impacts. ▶ External oiling is generally not observed to disrupt seal locomotion or mother-pup interactions. ▶ Direct contact may result in corneal lesions and edema; interfere with hearing if oil accumulates in ear canals; dermal irritation, burning and ulceration ▶ Inhalation of hydrocarbons may result in chemical or bacterial pneumonitis; may cause central nervous system dysfunction ▶ Oil ingestion from consumption of oiled prey species, grooming and nursing can result in rapid hydrocarbon absorption and internal organ damage.
Cetaceans	<ul style="list-style-type: none"> ▶ Relatively little is known about the effects of oil on cetaceans. Experimental studies have found that cetacean skin may be an effective barrier to petroleum compounds during short-term contact. ▶ Some cetacean species may detect and actively avoid large surface slicks; experimental findings and spill data provide inconclusive results. ▶ Injuries from internal exposure can include anemia and immunotoxicosis; gastrointestinal erosions/ulceration; hepatic/renal lipidosis and necrosis; adrenal gland dysfunction; reproductive dysfunction.

A.3 EFFECTS OF DISPERSANTS ON WILDLIFE

While there are clear benefits to the use of dispersants, namely reducing the amount of oil reaching the shoreline, there are other, often poorly understood or documented effects of dispersant use, that can add to the complexity of oiled wildlife response.

The safety of chemical dispersants used during oil spill responses is largely unknown in birds. Chemical dispersants such as Corexit EC9500a are comprised of a proprietary mixture of surfactants, solvents, and petroleum distillates. Previous studies have found varying levels of toxicity to marine invertebrates and fish, but evaluation of toxicity to birds and mammals are lacking (Ramachandran et al., 2004; Wise and Wise, 2011; Agamy, 2013; Hansen et al., 2014). Recent studies have shown that some mammalian cells suffer acute toxicity when exposed to Corexit EC9500a and other dispersants (Wang et al., 2012; Shi et al., 2013; Wise et al., 2014; Zheng et al., 2014). A theoretical concern is the finding that smaller droplet sizes may be more disruptive to feather structure than larger droplets (Duprat et al., 2012); while not a toxic effect, this has the potential for serious negative impacts on seabirds (Fiorello et al., 2016) that may dive through dispersed oil. A 2011 study conducted by the Oiled Wildlife Care Network Wildlife Health Center at the University of California School of Veterinary Medicine (Duerr et al., 2011) found similar disruption of waterproofing when birds were subjected to petroleum contamination alone, both petroleum and dispersant, and dispersant alone. This finding is consistent with subjective observations from professional oiled wildlife responders regarding the need to remove all surfactants used during the wash process in order to restore waterproofing. Recent studies have also found that exposure to oil or dispersant was related to the development of conjunctivitis and corneal ulcers (Fiorello et al., 2016).

Similarly, little is known about the effects of dispersants on sea turtles or marine mammals. Inhalation of petroleum vapors can irritate lungs; dispersants can interfere with lung function through their surfactant effect (NOAA 2010). Dispersant components absorbed through the lungs or gut may affect multiple organ systems, interfering with digestion, respiration, excretion, and/or salt gland function—similar to the effects of oil alone. However, dispersants reduce adherence of oil droplets to solid particles and surfaces and may reduce the tendency of oil to stick to turtle or cetacean skin.

B ZOO NOTIC DISEASE

B.1 ZOO NOSES

Zoonoses are infectious diseases that may be transmitted between animals and humans under natural conditions. Personnel handling or coming into contact with wildlife have the potential of exposure to zoonoses. Veterinarians, technicians, search and collection staff, animal handlers, and other animal care personnel who come into direct or indirect contact with animals and any body fluids are at risk of contact with disease agents that may have zoonotic potential. Organisms that may cause or transmit zoonotic diseases include many classifications from viruses and bacteria to internal and external parasites.

Anyone whose immune system is compromised (including, but not limited to conditions such as pregnancy, HIV/AIDS, patients undergoing chemotherapy, organ transplant recipients, splenectomized individuals, or persons under acute or chronic high levels of stress) is highly susceptible to opportunistic and secondary infections with zoonotic disease agents.

Table 6. Zoonotic Disease

DISEASE	ETIOLOGY	HOSTS	TRANSMISSION	SYMPTOMS
MYCOSES				
Aspergillosis	Aspergillus fumigatus	Birds, mammals	Airborne	Respiratory disorders
Dermatophytosis/ Ringworm	Microsporum and Trichophyton	Mammals, birds	Direct contact	Dermatitis
CHLAMYDIAL AND RICKETTSIAL				
Chlamydiosis	Chlamydia psittaci	Psittacines, pigeons, sea turtles	Aerosol	Respiratory disorders
VIRUSES				
Avian Influenza	Highly pathogenic H5N1 avian influenza virus	Birds, certain mustelids	Direct contact; fecal-oral	Influenza-like
Encephalitides	Arbovirus	Mammals, birds	Mosquito bites	Influenza-like
Newcastle Disease	Avian paramyxovirus-1	Birds (esp. juvenile cormorants and gulls)	Direct contact; inhalation or ingestion of contaminated material	Conjunctivitis; mild influenza-like symptoms
Rabies	Rhabdo virus	Warm blooded vertebrates	Bite wounds	Neurological signs
West Nile Virus	Flavivirus	Birds, mammals	Mosquito vector	Influenza-like, paralysis, encephalitis
PARASITIC				
Giardia	Giardia spp.	Beaver, waterfowl	Direct contact, fecal-oral	Asymptomatic to influenza-like
Mange	Sarcoptes scabiei Demodex follicularum	Mammals	Direct contact	Pruritic dermatitis
Toxoplasmosis	Toxoplasma gondii	Felids, warm blooded vertebrates	Fecal-oral	Congenital toxoplasmosis
BACTERIAL				
Botulism	Clostridium botulinum	Ducks, mink	Ingestion, wound infection	Neurological signs
Brucellosis	Brucella spp.	Seals, cervids	Direct contact	Septicemia, fever
Campylobacteriosis	Campylobacter fetus subspp.	Cervids, birds	Fecal-oral	Gastroenteritis
Leptospirosis	Leptospira interrogans serovars	Seals, cervids, rodents, carnivores; sea turtles	Contact with infected urine	Septicemia, renal failure
Pasteurellosis	Pasteurella multocida	Mammals, birds	Bite wounds, aerosol	Infected wounds, respiratory disorders
Salmonellosis	Salmonella spp.	Mammals, birds, reptiles including sea turtles	Fecal-oral	Gastroenteritis
Seal Finger	Bisgaardia hudsonensis	Seals	Bite wounds	Dermatitis, infection
Tuberculosis	Mycobacterium bovis and avium	Cervids, birds	Aerosol	Respiratory disease
Tularemia	Francisella tularensis	Rodents, lagomorphs, ticks	Tick bites, wound infection	Mesenteric lymphadenitis enteritis

DOCUMENT HISTORY

REVISION NO.	REVISION DATE	DESCRIPTION OF CHANGE	DOCUMENT OWNER
1.0	05 August 2020	Initial Version	RRT

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