WCMRC
Western Canada Marine Response Corporation

SHORELINE RESPONSE PLAN

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ABBREVIATIONS

Abbreviation	Definition
API	American Petroleum Institute
BC	British Columbia
BCENV	British Columbia Ministry of Environment & Climate Change Strategy
ECCC	Environment and Climate Change Canada
GRS	Geographic Response Strategy/Strategies
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
IOGP	International Association of Oil & Gas Producers
IPIECA	International Petroleum Industry Environmental Conservation Association
m	Metres
NEB	National Energy Board
NEBA	Net environmental benefit analysis
NEBA	Net Environmental Benefit Analysis
OSC	On-Scene Commander
OSRP	Oil Spill Response Plan
PPE	Personal Protective Equipment
RO	Response Organization
SCAT	Shoreline Cleanup Assessment Technique
SIMA	Spill Impact Mitigation Assessment
SRM(s)	Spill Response Manager(s)
SRP(s)	Strategic Response Plan(s)
TC	Transport Canada
WCMRC	Western Canada Marine Response Corporation

STRATEGIC DOCUMENT CONNECTIVITY

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

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1 INTRODUCTION

This plan is one of multiple Strategic Response Plans (SRPs) which Western Canada Marine Response Corporation (WCMRC) has developed to support its operations, namely:

- Marine Response Plan
- Shoreline Response Plan
- Waste Management Plan
- Wildlife Response Plan
- Sunken & Submerged Oil Plan
- Communications Plan
- Surveillance Plan
- Alternative Countermeasures Plan
- Convergent Volunteer Plan
- Decontamination Plan
- Coastal Response Program
- Vessel of Opportunity Program
- Staging Area Program
- Tier 5 Operational Response Plan

These plans cover all major areas of response operations and aim to support WCMRC in identifying:

- The appropriate incident management structure and response organization for the applicable response strategy
- The likely resource requirements
- The likely logistical and support requirements.

As illustrated by Figure 2, all SRP's above are underpinned by the principles and response methodology outlined in the WCMRC Incident Management Plan (IMP) and wider response fundamentals outlined in the WCMRC Oil Spill Response Plan (OSRP)

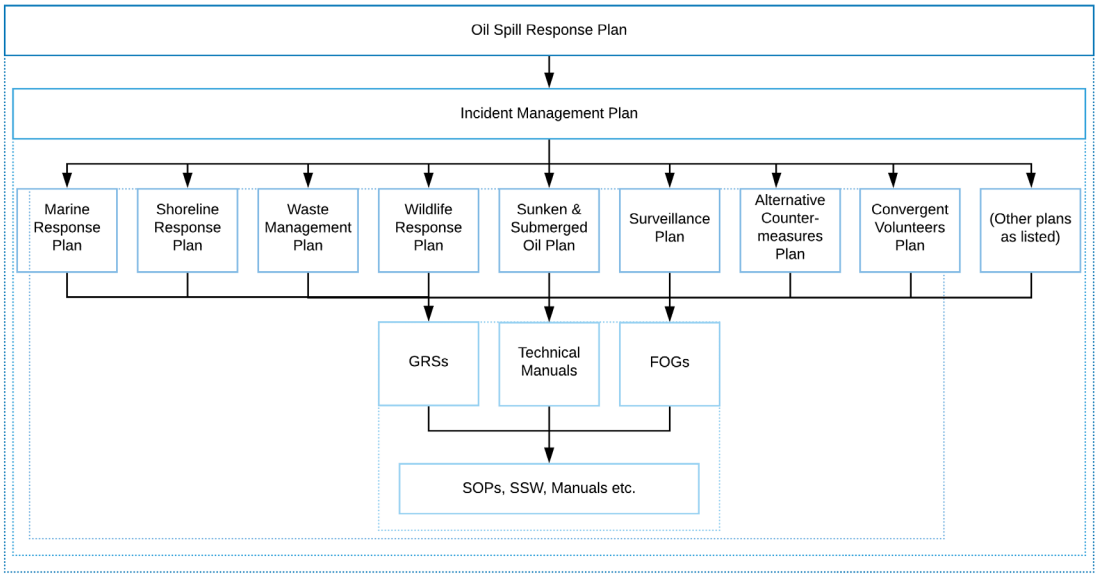


Figure 2 – WCMRC response documentation framework and hierarchical plan linkage

There are also several technical manuals in place which assist with implementing the strategies outlined in each SRP. The following technical manuals are relevant to this SRP and are used by WCMRC to enact the measures outlined in this plan.

- At Sea Containment and Recovery
- Shoreline Assessment – SCAT
- Shoreline Clean up
- Inland Response
- Dispersants and In-Situ Burning (strategy not currently undertaken by WCMRC).

Additional technical manuals which may be referred to in support of operations are:

- Wildlife Response
- Waste management
- Net Environmental Benefit Analysis (also known as Spill Impact Mitigation Assessment [SIMA])
- Logistics.

1.1 PURPOSE

This Shoreline Response Plan (SRP) demonstrates the procedure in place to allow WCMRC to carry out shoreline response operations on 3000 meters (m) of shoreline per day.

This requirement, as determined by the Canadian Energy Regulator (CER), is in addition to Transport Canada's (TC) Response Organization (RO) Standard TP 12401 which has a required response area of 500m of shoreline per day.

The purpose of this document is to demonstrate WCMRC's level of capability by:

- Describing the resources required for different response strategies on different shoreline types
- Describing how WCMRC will implement those response strategies (thereby demonstrating a response capability which meets CER and TC requirements)
- Describing the framework WCMRC will establish to manage shoreline response operations.

1.2 USE

This plan should be used by WCMRC personnel to, as effectively and efficiently as possible, establish and enact shoreline response strategies and cleanup techniques appropriate to the requirements of the incident and in line with CER requirements. It provides a clear guidance on choosing response organization structure and shoreline cleanup technique. This plan is an operational document and as such acts as a guide to establishing shoreline response activities in the 24-48 hours which follow initial notification of an incident, particularly when escalating to a Level 2/3 response (see Section 3). This plan does cover specific tasks and arrangements required during the shoreline response operations nor does it cover operations as they move into the 'project phase' as sites become established for long term recovery.

This SRP is applicable to all WCMRC response personnel at strategic level and above and is shared internally as 'required reading'. This ensures all response personnel are aware of the procedures and guidance which have been put in place to ensure any response is conducted in accordance with that described in the OSRP.

1.3 BACKGROUND

Planning for Shoreline Response and 'cleanup' can be problematic. There are a huge number of variables which must be considered as no two spill scenarios are the same. Factors such as

location, shoreline type, pollutant quantity, properties, degree of oiling and accessibility will, amongst others, influence the selection of cleanup technique.

The Planning Section of the Incident Management Team (IMT) are likely to have to prioritize certain areas and/or revisit areas for further cleaning in phases as the response progresses.

Given the inaccessibility of vast areas of the coastline within WCMRC's jurisdiction, WCMRC have developed the capability to carry out marine accessed shoreline cleanup operations (see Section 5.3.1).

The International Petroleum Industry Environmental Conservation Association (IPIECA) and the International Association of Oil & Gas Producers (IOGP) guide to shoreline cleanup techniques[1] identifies several guiding principles for shoreline cleanup as follows:

1. *Shoreline cleanup is a local issue calling for local support*
2. *Minimize the movement of stranded oil*
3. *Plan comprehensive contingency arrangements in anticipation of potential incidents*
4. *Build an organizational structure that provides effective support and strong oversight, to ensure both the safety of personnel working on the shoreline and that cleanup techniques are properly executed*
5. *Adopt a standardized protocol for reporting shoreline oiling (Shoreline Cleanup Assessment Technique—SCAT)*
6. *Select cleanup techniques on the basis of a Spill Impact Mitigation Assessment (SIMA) considering shoreline type, degree of oiling and oil characteristics*
7. *Agree realistic end points, achievable by available cleanup techniques and matched to shoreline 'use' or 'services'*
8. *Work with the weather and tides*
9. *Minimize secondary contamination by maintaining separation between hot (dirty) and cold (clean or treated) zones*
10. *Manage and minimize oily waste and, where possible and appropriate, segregate waste streams at the source.*

All WCMRC cleanup operations will consider these principles which are summarized as a checklist in Section 2.2.

[1] *A guide to oiled shoreline clean-up techniques. Good practice guidelines for incident management and emergency response personnel.* IPIECA, OGP – June 2015

2 ESTABLISHING THE RESPONSE

2.1 SHORELINE RESPONSE PROCESS

The steps shown in Figure 3 and detailed in the following sections outline the process used by WCMRC for shoreline response. This process is based on the IPIECA/IOGP guidelines referenced in Section 1.3 of this SRP.

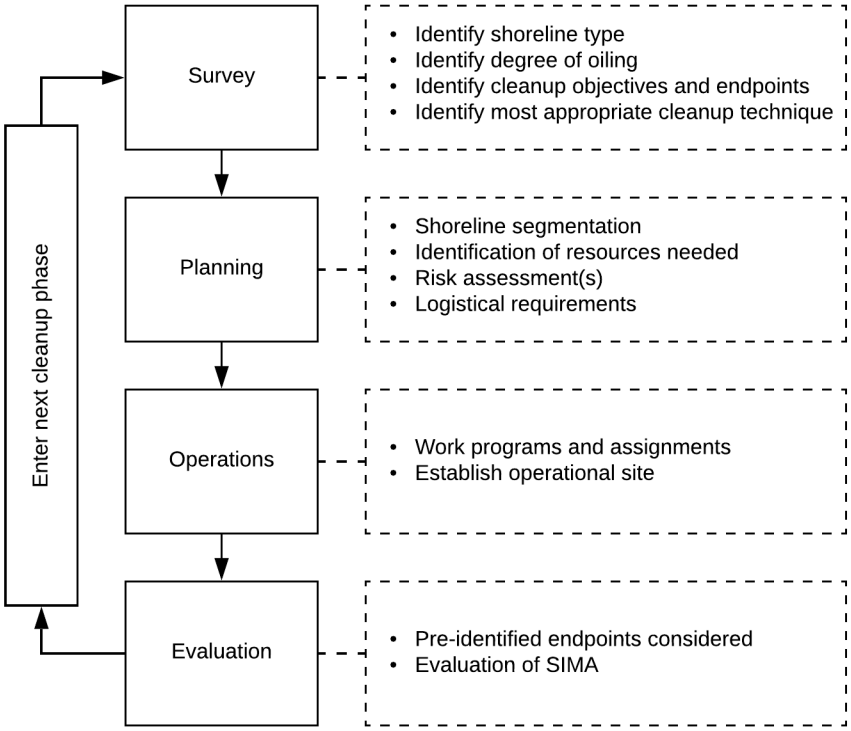


Figure 3 – Shoreline response management cycle

In the context of the Incident Command System (ICS), steps 1 to 3 of this process will first be undertaken as part of the initial response phase, with an immediate spill assessment based on whatever information is available at the time (e.g., eyewitness reports, oil spill plans, visual estimation) and operational response within the remit of existing emergency response plans using readily available resources.

In the event of an offshore incident shoreline clean up may not initially be considered to allow the IMT to focus effort and resources on marine response. It is likely, however, that shoreline response planning may be initiated once the planning cycle has been established.

2.1.1 Survey

The first step in the process for establishing shoreline response operations is to identify the extent and severity of oiling. This is done using information from a number of sources. The circumstances of the incident will initially provide some insight into the severity of the spill and the likely extent (e.g., quantity/type of pollutant, ongoing release etc.). This information can then be used to determine actual or likely areas of impact which can then be surveyed by means of SCAT to determine the following factors:

- Shoreline type (including accessibility)

- Degree of oiling (both actual and potential)
- Cleanup objectives and endpoints (noting any particular sensitivities and what 'normal' looks like)
- Appropriate and inappropriate cleanup techniques (including whether pre-clean is required) based on the guidance in this plan.

The information gathered in this stage is crucial to conducting an accurate SIMA (as outlined in Section 4.4.2), the next step in the response, which will provide a means of qualitatively assessing and justifying the most appropriate shoreline response strategy/strategies and cleanup technique(s).

2.1.2 Planning

Once the impacted shorelines have been identified and shoreline response strategies selected (based on the SIMA), each shoreline should be segmented (see Section 4.2) as required to allow effective equipment deployment and scaling as outlined in Section 5.1. Any high-priority sites will be identified and given precedence as appropriate and a risk assessment will be carried out in all cases.

It is at this stage in the process where the actual logistical requirement of the response will become evident. Arrangements should be made to source and deploy resources additional to the estimates included in this plan.

2.1.3 Operations

During the operations stage, a site will be established as per the guidance in Section 5.3 of this plan and the chosen strategy and cleanup technique will be implemented by means of work assignment with support from an ICP (where applicable).

The effectiveness response operations are constantly monitored and feedback throughout this stage to allow the IMT to continue with the process and plan for the next operational period.

2.1.4 Evaluation

Once operations have been established and regular feedback is being received from the field, the IMT can begin to evaluate the success of the chosen response strategy/strategies and cleanup technique(s). Progress can be compared to the expected outcome by referencing SIMA findings and ongoing survey data.

Based on this evaluation, the IMT can assess whether or not a different approach is required or whether they can enter the next phase of the response and begin the process again based on the current shoreline conditions now that the first phase is complete.

2.2 SHORELINE RESPONSE PRINCIPLES

Table 1 outlines the principles of shoreline response. These principles apply throughout the life of an incident and can be used as a checklist in the Initial Response Phase or as an aid to developing objectives in the Planning Cycle.

Table 1 – Principles of shoreline response operations

Build appropriate organizational structure	
Engage with local communities	
Develop SCAT process for all impacted shorelines[2]	
Select most appropriate clean up technique for each shoreline type	
Conduct shoreline response operations safely and responsibly	
Minimize remobilization of stranded oil	
Agree realistic end points for each clean up segment	
Minimize secondary contamination	
Minimize and manage oily waste	

[2] WCMRC will at all times use the principles and practices outlined in the ECCC SCAT manual (*Shoreline Cleanup Assessment Technique (SCAT) manual, third edition* – Environment and Climate Change Canada (ECCC), 2018*)* when conducting shoreline surveys and assessment.

3 RESPONSE STRUCTURE

3.1 SCALE OF RESPONSE

In the initial stages of a response, WCMRC will use the methodology outlined in the IMP to assess the requirements of the incident and select the appropriate response level based on incident complexity and Polluter requirement.

Generally speaking, for small scale and less complex incidents a core 'Level 1' response organization (Figure 4) will be required, comprising predominantly of 'essential' response personnel who support on-water (or 'on-scene') operations. This 'essential' IMT will act as support to the On-Water Supervisor (who manages the response at tactical level) and manage all aspects of the strategic response as required.

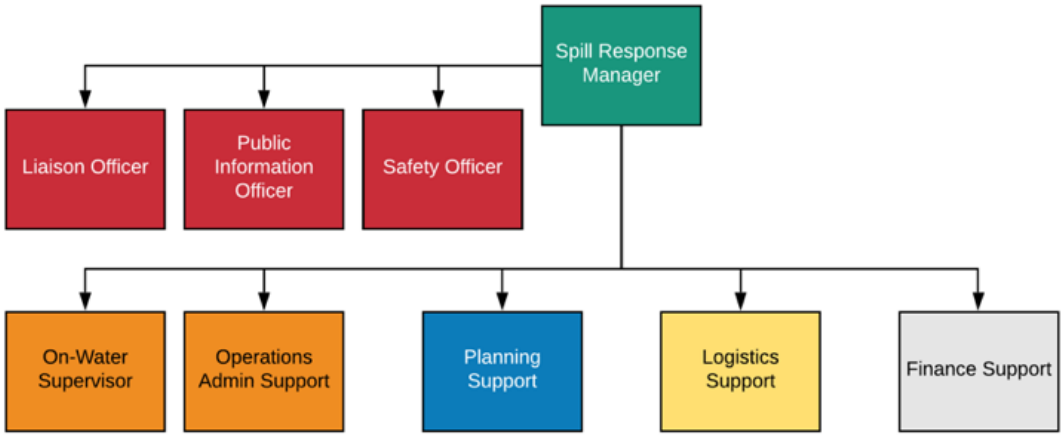
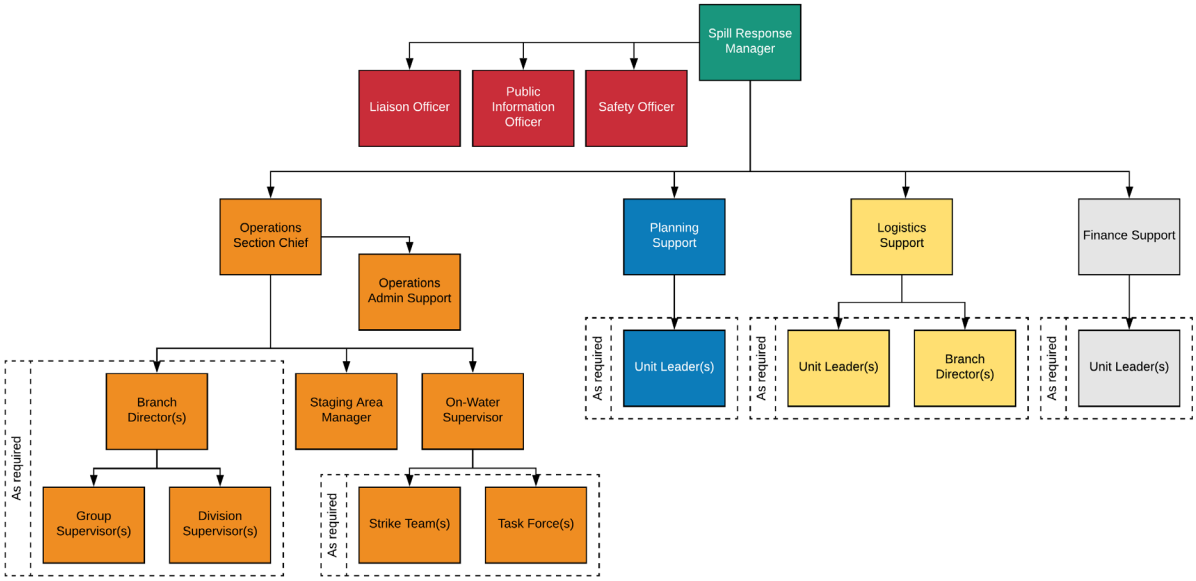


Figure 4 – Recommended Initial IMT Organization: Essential Response ('Level 1')

For larger and more complex incidents, a 'enhanced' or 'expanded' response organization (Figure 5) is likely to be required. Given the additional complexity factors, Polluter requirements and/or limitations and constraints which impact the required scale of response, IMS functions specific to the nature of the incident will be required. It is within these 'enhanced' and 'expanded' response organizations that functions specific to shoreline response will be established.



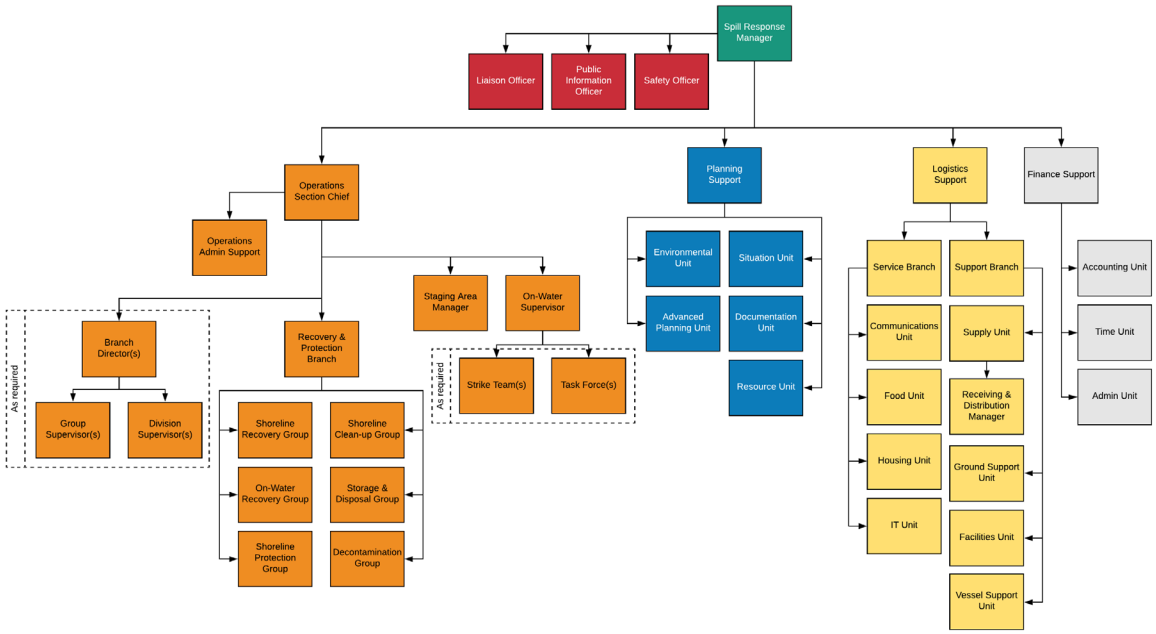


Figure 5 – Recommended Initial IMT Organizations: Enhanced Response ('Level 2') and Expanded Response ('Level 3')

3.2 IMT FUNCTIONS FOR SHORELINE RESPONSE

The ICS Functions outlined in Table 2 are key to conducting successful shoreline response operations and are therefore likely to be required as part of an enhanced or expanded response organization (should shoreline cleanup be required).

In particular, the Shoreline Recovery Group Supervisor has the critical role of overseeing the establishment of key response sites, based on information from both aerial survey teams and SCAT teams.

Complete job aids and checklists for all IMT functions listed in Table 2 are contained within tactical plans and supporting documentation (e.g. 'Field Operator Guides) as part of the WCMRC document hierarchy outlined in Section 1

Table 2 – Key IMT functions for Shoreline Response

POSITION/SECTION	SHORELINE RESPONSE ROLE
Initial Response Phase	
On-Scene Supervisor	**Begin initial assessment of spill and establish process for bulk oil removal (if safe to do so)**
Operations Section	
Recovery and Protection Branch	Oversee and implement the protection, containment and cleanup activities established in the IAP.
Shoreline Recovery Group	Establish shoreline response sites as required
Shoreline Clean-up Group	Oversee and manage all shoreline clean-up operations as required
Shoreline Protection Group	Responsible for the deployment of containment, deflection, and adsorbent/absorbent materials in designated locations
Staging Area Manager	Manages staging areas for equipment to be used for shoreline cleanup.
Air Operations Branch	Aerial surveillance – assess extent and severity of oiling (together with SCAT Coordinator)
Planning Section	
Environment Unit	Assessment of environmental implications of response options/strategies
Environment Unit Leader	Determines the need (or potential need) to implement and subsequently monitor a SCAT Program
Resources Unit	Maintaining the status of all assigned tactical resources and personnel
Situation Unit	Ensure all spill information is recorded to facilitate spill decision making
SCAT Coordinator	Ensure SCAT surveys are conducted in appropriate locations and a timely manor followed by assessment of the information provided
SCAT Operations Liaison	Ensures that field operations fully understand the recommendations, objectives, and constraints of the Shoreline Treatment Recommendations (STRs) so that any questions and concerns can be addressed directly

Logistics Section	
Service Branch	Management of all service activities (e.g. communications, food, medical provision etc.)
Supply Unit	Ensure distribution of all supplies for the incident and maintaining an inventory
Faculties Unit	Ensure set-up, maintenance, and demobilization of incident facilities
Vessel Support Unit	Responsible for implementing the Vessel Routing Plan for the incident and coordinating transportation on the water and between shore resources
Ground Support Unit	Repair of primary tactical equipment, vehicles, mobile ground support equipment and fuelling services; transportation of personnel, supplies, food and equipment in support of incident operations
Finance Section	
Accounting Unit	Ensure all costs recorded

3.2.1 Cleanup during the Initial Response Phase

The majority of incidents which WCMRC respond to will undoubtedly be dealt with during the Initial Response Phase and without the requirement to enter into the Planning Cycle and therefore mobilize an enhanced or expanded response as outlined in Section 2.

In recognition of this, WCMRC response personnel are adequately trained to take direct action to recover easily manageable amounts of spilled oil. This action, based on established tactical and site-specific procedures, will only be taken in circumstances where the recovery can be done safely and where an obvious net environmental benefit exists.

The ICS Functions listed in Table 2 (with the exception of 'On-Scene Supervisor') are therefore unlikely to be required in the majority of instances and will only be mobilised in circumstances where the spill exceeds the current scale of response, as per the methodology outlined in the WCMRC IMP.

3.3 EXAMPLE ORGANIZATION INCLUDING SHORELINE RESPONSE

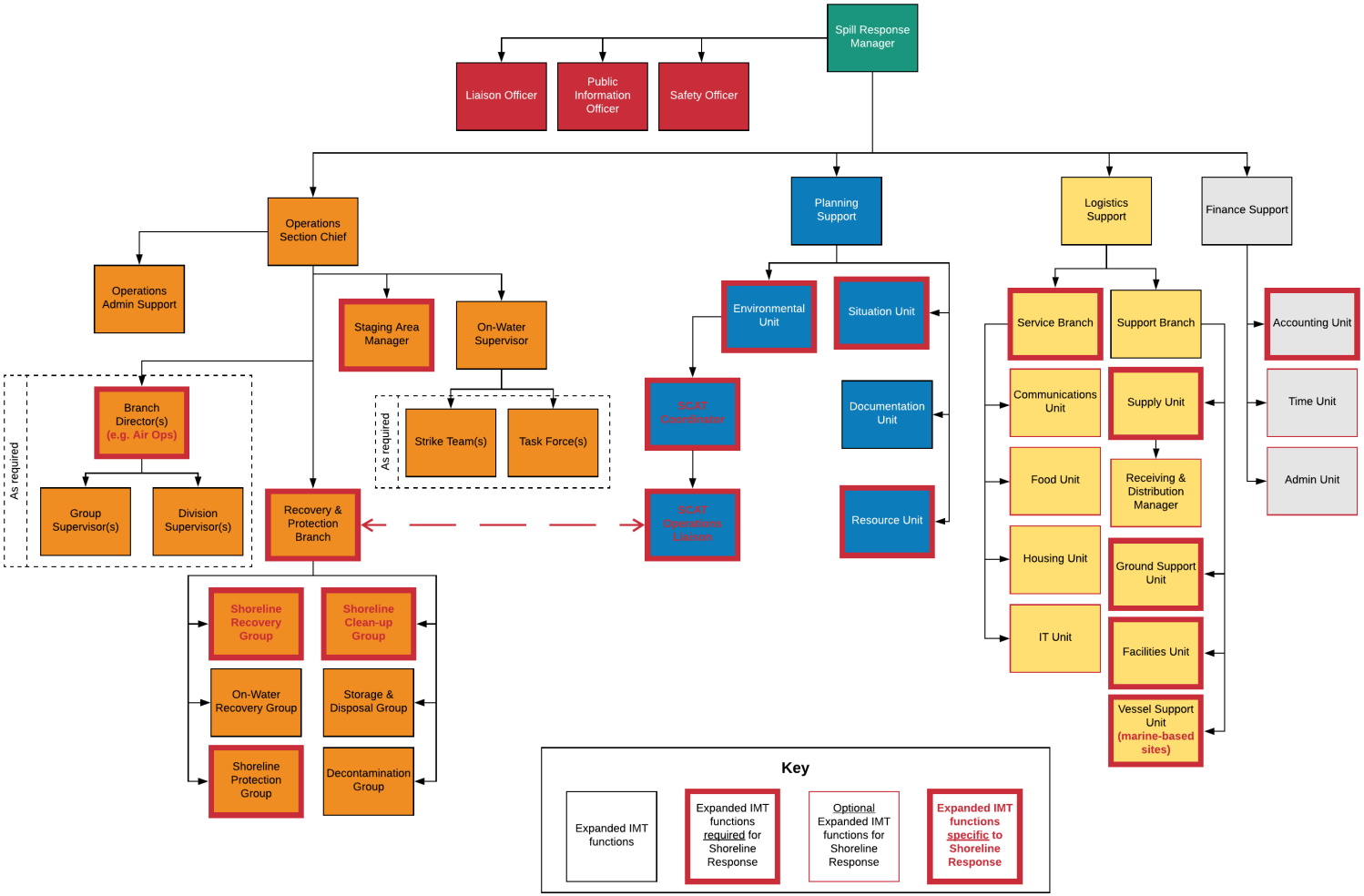


Figure 6 – Expanded IMT response organization showing functions required to carry out shoreline response operations

4 RESPONSE STRATEGIES

4.1 SHORELINE CLEAN UP ASSESSMENT TECHNIQUE

Shoreline Clean-up Assessment Technique (SCAT) surveys provide information to build a spatial or geographic picture of the regional and local shoreline type and oiling conditions. Understanding the nature and extent of shoreline oiling is key to the development of an effective response; SCAT teams can recommend appropriate clean-up methods and to define constraints or limitations on the application of clean-up techniques, so that the treatment operations do not result in additional damage to the shoreline. This information is provided in a format that can be interpreted easily and applied by planners and decision makers.

SCAT is a regular part of the oil spill response operation. Surveys continue throughout the response to verify shoreline oiling, clean-up effectiveness, and eventually, to conduct final evaluations of shorelines to ensure they meet clean-up endpoints.

In the initial stages of a response WCMRC will conduct gross removal of oil from shorelines as a basic response strategy, to prevent remobilization and further penetration into the substrate. Once the IMT is firmly established and the response begins to transition into the formal Planning cycle, WCMRC will support and conduct shoreline clean-up operations based on STRs developed by SCAT.

4.1.1 SCAT Teams

SCAT teams will be managed by the Environment Unit within an IMT and supported by WCMRC through the provision of a SCAT/Operations Liaison.

SCAT teams in the field will typically be formed by representatives of Unified Command on the understanding that the Polluter will employ the services of a professional SCAT contractor[3] to lead the process (often at the direction of Unified Command). In smaller incidents, however, BCMoE or ECCC may elect to lead the process and fulfil the role of SCAT Coordinator, Data Manager and Team Leader(s).

SCAT teams will typically be made up of personnel from the following organizations/agencies:

- Contracted SCAT professional (typically fulfilling the role of SCAT Team Leader but may also fulfil the role of SCAT Operations Liaison)
- Federal representative (typically provided by ECCC and may also fulfil the role of SCAT Team Leader)
- Provincial representative (provided by BCENV and may also fulfil the role of SCAT Team Leader)
- First Nations representative (of First Nation represented in Unified Command)
- Local community representative (of community represented in Unified Command)
- Polluter representative

WCMRC does have the capacity to deploy SCAT trained individuals into SCAT teams if required, but this is unlikely to be an operational priority in an enhanced/expanded response.

[3] Details of professional SCAT contractors are contacted within the WCMRC Oil Spill Response Plan

4.2 SEGMENTATION

Once cleanup and protection priorities have been identified as part of the shoreline response strategy, shoreline segmentation will be carried out and worksites within each segment established.

Shoreline Segmentation in British Columbia has already been carried out by ECCC) and BCMoE. This data, in conjunction with initial feedback from SCAT teams and pre-existing Geographic Response Strategies (GRS) will assist the SCAT Coordinator in planning for shoreline survey and assessment operations. This data is readily available to WCMRC and will form the basis of any clean-up planning.

A worksite (established within a segment) may cover an entire segment, which may then be subdivided according to the cleanup technique, access required (e.g. by equipment) or by the nature of work being carried out.

4.3 CLEANUP TECHNIQUES

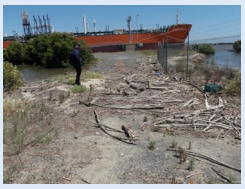
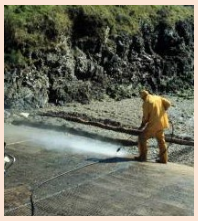
There are several clean up techniques which may be selected, the most suitable technique depends primarily on shoreline type, but also on other factors such as:

- Oil type
- Oil quantity / properties
- Weather conditions
- Shoreline topography.

Table 3 provides a summary of the cleanup techniques available to WCMRC. Further information relating to these techniques can be found in the OSRP. Specific guidance on how to implement these techniques is provided by individual tactical plans as outlined in Section 1.

4.3.1 Summary of Cleanup Techniques

Table 3 – Summary of available shoreline cleanup techniques

CLEAN UP TECHNIQUE	SUMMARY OF OPERATIONS
 Passive Cleaning (Natural Cleaning)	▸ Leave oiled area to clean up naturally. ▸ Monitoring the surrounding areas for remobilized oil. ▸ Monitor effectiveness. ▸ Used for areas of poor access, high energy or extremely soft sediment.
 Passive Cleaning (Debris Removal)	▸ Removal of debris from shoreline prior to oiling, which limits the requirement for specialised waste disposal. ▸ Other response techniques may then be used to clean, once the beach is impacted.
 Shoreline Booming, including Containment and Recovery	▸ Containment of oil on a shoreline using booms and recovery using skimming device. ▸ Using booms to protect sensitive resources ▸ Booms used to recover oil remobilize by flushing.
 Flushing	▸ Low-pressure high-volume water used to remobilize oil, including that which may have become buried or trapped. ▸ Used together with containment and recovery if appropriate.
 High Pressure Washing	▸ High pressure washing of areas that may be high used and/or of little biological value typically port or harbour walls, slipways, sea walls etc. ▸ Used together with containment and recovery if appropriate.
 Surf Washing	▸ Mechanical equipment used to push large volumes of sediment (sand, pebbles, cobbles) back in to the surf zone to be washed by wave action. ▸ May be repeated over several tidal cycles.
 Harrowing/Ploughing	▸ Use a plough to bring buried oil to the surface on a sandy beach. The oil is then 'available' for washing by wave action. ▸ May repeated over several tidal cycles.
 Manual Recovery	▸ Manual recovery using primarily hand tools and large numbers of personnel. ▸ Typically produces large quantities of waste.

Treatment Agents	▸ A shoreline treating agent is applied to oil stranded on shore, water is then used to flush the affected area mobilizing oil into a contained area to be recovered.

4.4 SELECTING CLEANUP TECHNIQUES

4.4.1 By Shoreline Type

Table 4 offers guidance on selecting of the most suitable cleanup technique based on the type of shoreline impacted.

4.4.2 Spill Impact Mitigation Assessment

In the early stages of shoreline response planning, it is important to begin the SIMA process to ensure that the chosen strategy or strategies for shoreline response:

a) Are likely to be effective based on the circumstances of the spill
b) Have the greatest net-benefit to the environment
c) Can be justified as the best possible option based on a recognised decision model.

Based on lessons learned from using a net environmental benefit analysis (commonly referred to as 'NEBA'), the SIMA process has been developed by IPIECA, the IOGP and the American Petroleum Institute (API) as an established means of facilitating "the selection of the most appropriate response options to effectively combat an oil spill"[4]. The SIMA process is illustrated by Figure 7 and is used by WCMRC when choosing shoreline clean up techniques and establishing shoreline response operations as outlined in Section 2.

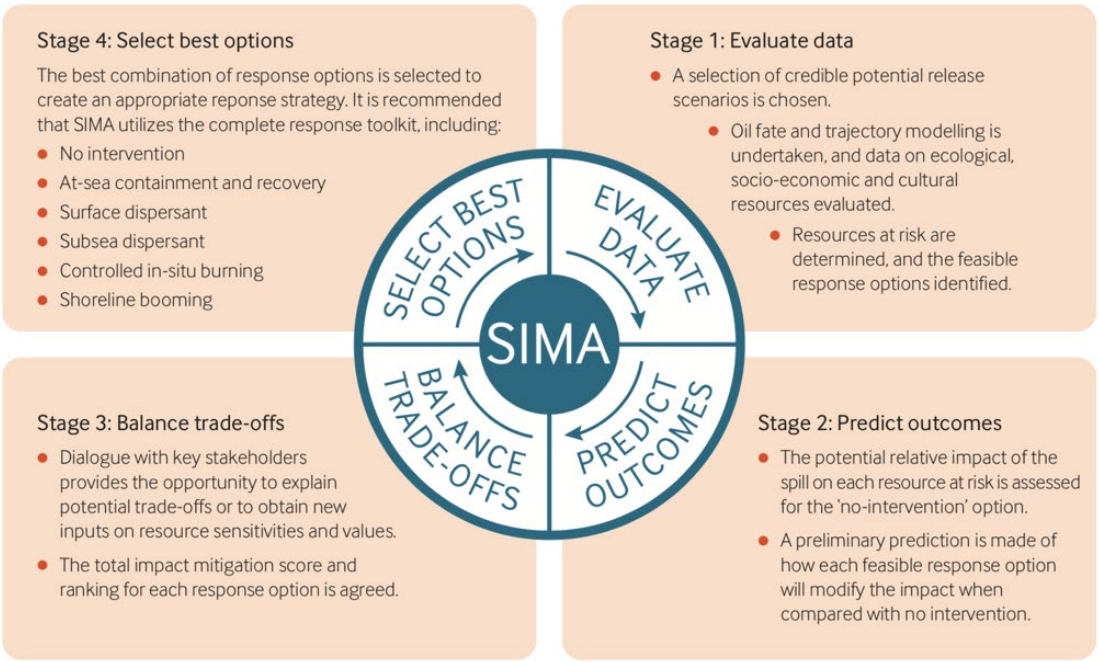


Figure 7 – Summary of SIMA process as depicted in IPIECA, IOGP and API guidelines

[4] *Guidelines on implementing spill impact mitigation assessment (SIMA): A technical support document to accompany the IPIECA-IOGP guidance on net environmental benefit analysis (NEBA)* – IPIECA, IOGP, API, January 2018

4.4.1 Summary of Cleanup Techniques by Shoreline Type

Table 4 – Summary of appropriate shoreline cleanup techniques based on shoreline type

Cleanup Techniques Figure 7	Shoreline Types (based on Environmental Sensitivity Index)																			
	EXPOSED					→									SHELTERED					
	Exposed Rocky Shore	Exposed solid man-made structure	Exposed rocky cliffs with boulder talus base	Exposed wave-cut platform in bedrock, mud or clay	Exposed scarps and steep slopes in clay	Fine to medium grained sand beaches	Scarps and steep slopes in sand	Course grained sand beaches	Mixed sand and gravel beaches	Gravel beaches (granules and pebbles)	Riprap structure/gravel beaches (cobbles and boulders)	Exposed tidal flats	Sheltered scarps in bedrock, mud or clay	Sheltered solid manmade structures	Sheltered rocky rubble shores	Peat shorelines	Sheltered tidal flats	Vegetated low banks	Hypersaline tidal flats	Salt and brackish water marshes
Passive Cleaning (Natural Cleaning)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Passive Cleaning (Debris Removal)						✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Containment and Recovery						✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				
Flushing						✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
High pressure washing														✓						
Surf Washing						✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				
Harrowing/Ploughing						✓	✓													
Manual Recovery						✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

5 RESPONSE SUPPORT

Planning for shoreline response can be difficult due to the large number of variables. This difficulty extends to resource planning in support of shoreline clean-up and as such it is impossible to provide and exhaustive list of required resources and logistical support for each response scenario.

Where Section 2 outlines the **managerial** requirement for shoreline response, this section provides guidance on the **logistical** requirements of shoreline response operations in the Initial Response Phase and/or the first (and possibly following) operational period of the Planning Cycle[5].

5.1 RESOURCE REQUIREMENT

A nominal shoreline distance (or 'segment') of 500m has been used for all estimations, allowing for operations to be scaled as required up to the 3000m whilst remaining adaptable to different shoreline types. The following resource requirements per 500m of shoreline have been estimated and included in this plan as Resource Summary Sheet (Section 5.1.1):

- Personnel requirements
- Specialized equipment
- Support (including welfare and decontamination) equipment
- Manual equipment
- Logistics (i. e., vehicles)

WCMRC will always initiate response operations with the least invasive shoreline clean-up strategy, taking guidance from technical specialists and the ECCC SCAT manual and Field Guide to Oil Spill Response on Marine Shorelines[6]. More invasive strategies will be used only as required in order to minimize environmental impact.

For planning purposes WCMRC has identified Shoreline Flushing as the most labour and equipment intensive operation and has applied the following assumptions:

- Typically, one shoreline treatment team will cover a 60m segment of shoreline. This may vary greatly depending on then length and shorelines type, natural barriers, and access routes. See Section 4.2 for further information on segmentation).
- The shoreline will be boomed off to prevent oil migration to adjacent shorelines and will require a workboat to maintain boom and assist with recovery of oil collecting within booms
- Flushing will be installed to float oil back into the water to be recovered by skimmer or sorbents
- Flushing will consist of a deluge system pumping ambient seawater through perforated hoses and hand flushing lines to target heavy oil concentrations
- Deluge flushing systems are placed in upper line of oil contamination

[5] The ICS 'Initial Response Phase' is the period immediately following initial notification to WCMRC that a spill has occurred. This phase covers the first hours of a response and may be short in duration. The Planning Cycle follows the Initial Response Phase and is a highly structured process based on a series of meetings to facilitate the development of an 'Incident Action Plan' which defines the actions to be taken during the next 'operational period' (e.g. following 24 hours). The Initial Response Phase and Planning Cycle are described in more detail in the IMP and OSRP.

[6] WCMRC will at all times refer to guidance provided by the ECCC Field Guide to Oil Spill Response on Marine Shorelines (*A Field Guide to Oil Spill Response on Marine Shorelines* – Environment and Climate Change Canada July 2016, 2nd print).

- Low pressure washing will carry oil downslope back into the water where it can be recovered
- Hand flushing lines will be used to move high concentrations of oil back into the water recovery.
- A landing craft will be used to deliver shoreline crews and equipment to the beaches at the beginning of each shift.
- Landing craft will be responsible for the collection of solid and liquid waste.
- Solid waste collected from shoreline will be bagged and transferred to supersacks onboard landing craft or to waste bins established at nearest staging area
- If solid waste is stored on landing craft a crane onboard the waste barge will be used to lift supersacs off the vessel
- Liquid waste will be stored in sea slugs or mini barges
- Workers will be responsible for the following tasks collection of solid waste, deploying snare and sorbents used in the flushing operations, manual cleaning of large sediment, and transfer of solid waste from shore to vessels or staging areas
- Decontamination areas will be established as required. Labour intensive operations will require multiple areas running simultaneously to avoid bottlenecks and delays.

A typical set of equipment and services required for a 60 metre shoreline clean up team are illustrated in (Section 5.1.1) to provide an indication of the possible resource requirements. The actual requirements will depend on many variables and will be documented in the site-specific Shoreline Treatment Recommendations supported by the ICS 204 assignments. WCMRC maintains 7 dedicated 53ft shoreline response trailers that provide work teams with the essential equipment to initiate a shoreline response. Additional supplies, equipment and services are mobilized through WCMRC's internal resources, contractor and supplier network.

5.1.1 Typical Shoreline Flush Requirements (60m Segment)

PRIMARY CLEAN UP TECHNIQUE	PERSONNEL	SERVICES	LARGE EQUIPMENT SUPPORT	SMALL EQUIPMENT SUPPORT	PERSONNEL SUPPORT
Manual clean up Supported by containment and recovery and flushing operations if appropriate	1 Shoreline Supervisors 9 Workers 1 Safety Watch	Meals Decontamination Washroom Shelter	Vessel Support Vehicle Excavator Vacuum truck	Boom (inshore, shore seal) Hand Flushing Kit Deluge Flushing Kit Stakes Anchor Equipment Skimmer Pumps Liquid Storage Tank Hand Tools (shovel, rake, bucket) Garbage bags, super sacks Rolls plastic sheeting Sorbent Waste bins	Personal Protective Equipment Personnel Decontamination Equipment Water

5.2 MOBILIZATION

In the early stages of a response, WCMRC personnel support on-scene requirements by mobilizing equipment and liaising with the On-Scene Commander (OSC). In the event of a Level 2/3 response, the Logistics Section has responsibility for equipment (including mobilization, transportation, staging/storage) and providing resources to support the response (e.g., welfare, shelter, food, Personal Protective Equipment [PPE] etc.).

Logistical support requirements will include:

- Acquiring and/or constructing and managing response and staging facilities
- Securing and arranging for the housing, clothing and feeding of response personnel
- Providing strategic and tactical air, land and water transportation resources
- Obtaining communications equipment and setting up and maintaining communications networks
- Ensuring the security of personnel and equipment
- Providing medical services and input to the development of safety plans
- The handling of waste materials.

5.2.1 Vessel of Opportunity

As outlined in the WCMRC OSRP, the Vessel of Opportunity (VOO) program is designed to *"support spill responders, deploy geographic response strategies and provide invaluable marine expertise during a spill"*[7].

A VOO is a vessel whose crew have been trained by WCMRC to respond to marine oil spills. Several vessels have been on boarded into the WCMRC VOO program and are thus available to mobilize as resources in the event of shoreline response.

The mobilization of VOO as part of an incident response is the responsibility of the Logistics Section, supported by the appropriate Response Readiness Specialist as required.

Further information on the VOO program and a list of vessels can be found within the WCMRC OSRP.

5.2.2 Convergent Volunteers

In the event of a large oil spill, it is a possibility that members of the local community and/or non-profit groups will ask to participate in shoreline response operations as volunteers. Where health and safety considerations initially prohibit the use of volunteers in direct response operations, it is important to consider the positive impact incorporating concerned parties can have on the response and thus it may be appropriate to utilize volunteer manpower for in-direct spill response activities.

Should volunteer support be made available to the IMT (as offered or upon request), **all volunteers remain the responsibility of the Polluter throughout the life of the response.**

There are significant considerations required in respect of health and safety and legality when utilizing a volunteer workforce as 'temporary workers'. This being the case, a 'Convergent

[7] *WCMRC Oil Spill Response Plan 2019 to 2022, Revision 2* – WCMRC, July 2019

Volunteer Management Guide' is used by WCMRC to assist in the use of volunteers should the requirement occur. This guide should be referred to for further information on the use of volunteers for shoreline response activities. All volunteers would be required to follow all just time training guidelines outlined in section 5.5.1

5.3 SHORELINE EQUIPMENT

WCMRC maintains equipment to support shoreline clean-up operations internally as well as relies on local suppliers at the time of an incident specifically related to use of any heavy machinery such as backhoes and tillers.

5.3.1 Shoreline Flush-kits

For planning purposes WCMRC has determined that each shoreline flush kit can support 60 meters of shoreline, and to support 3000m of shoreline we require a total of 50 shoreline flush kits. For redundancy 72 shoreline flush kits are available within WCMRC's inventory. These flush kits have been staged at each operational base, distributed between trailers, and stored in warehouses, for a total of 72 flush kits strategically stationed along the BC coast. This posture allows WCMRC to have a resident capacity in each base's Zone of Responsibility to respond to smaller spills and provide an initial response during a larger incident where additional resources and responders will be cascaded into the impacted area to meet the cleanup requirements. Distribution of kits is as follows:

Location	Warehouse	Trailer
North Coast Base	4	4
Fraser River Base	4	4
Kensington Base	8	6
Campbell River		2
Port Hardy		2
Nanaimo Base	8	6
Port Alberni Base	4	4
Sidney Base	4	4
Beecher Bay Base	4	4
Total 72 Shoreline Flush Kits		

5.3.1 Shoreline Treatment Agents

WCMRC also keeps small quantities of the shoreline treatment agent COREXIT 9580 in inventory if needed for a shoreline response.

Location	COREXIT Drums	Spray Kits	Barrel Transfer Pump
North Coast Base	4	1	1
Fraser River Base	4	1	1
Kensington Base	8	1	1
Nanaimo Base	8	1	1
Port Alberni Base	4	1	1
Sidney Base	4	1	1
Beecher Bay Base	4	1	1
Total	**36**	**7**	**7**

5.4 SITE SETUP

Establishing a well-organized response site, regardless of the specifics of the operation, is key to:

- Minimizing secondary contamination
- Maximizing the effectiveness of cleanup operations
- Maintaining a safe and well-run site

There are three key zones which must be defined during site set up; a 'hot' zone, 'warm' zone and 'cold' zone. The purpose and contents of these zones is outlined in Table 9 below. The typical layout of these zones is illustrated by Figure 8 and Figure 9 in Section 5.3.1.

Table 5 – The purpose and contents of the zones found within spill response sites

ZONE	PURPOSE	CONTENTS
HOT	▸ The area where cleanup operations are carried out ▸ This area is heavily contaminated and full PPE should be worn	▸ Temporary storage, including storage pits ▸ Responders and oiled cleanup equipment ▸ Equipment laydown if necessary (oiled equipment only)
WARM	▸ Provides a 'buffer' between dirty and clean areas ▸ Ensures that secondary contamination does not occur through decontamination of equipment and personnel leaving the site	▸ Decontamination facilities (low tanks, degreasers, bins, bags, water, brushes, rags and sorbent pads etc.) ▸ Temporary storage areas ▸ Decontamination team(s)
COLD	▸ A clean area where personnel are able to rest and eat	▸ Site security and clear site entrance ▸ Communications and Command Center ▸ Welfare area and shelter ▸ Toilets ▸ Equipment laydown areas ▸ First aid

5.4.1 Land Accessed Sites vs. Marine Accessed Sites

Shoreline response operations can be logistically supported using land and/or water access. Each incident will develop and site specific tactical plan so that response operations are conducted in a safe and efficient manner commensurate with the Shoreline Treatment Recommendations. WCMRC will call upon the use of its own resources or those externals through the contractor and vessel of opportunity programs. The site-specific plans will need to consider responder safety, as well as personnel, equipment and waste transport.

Examples of land accessed and marine accessed sites and their respective components are illustrated by Figure 8 and Figure 9.

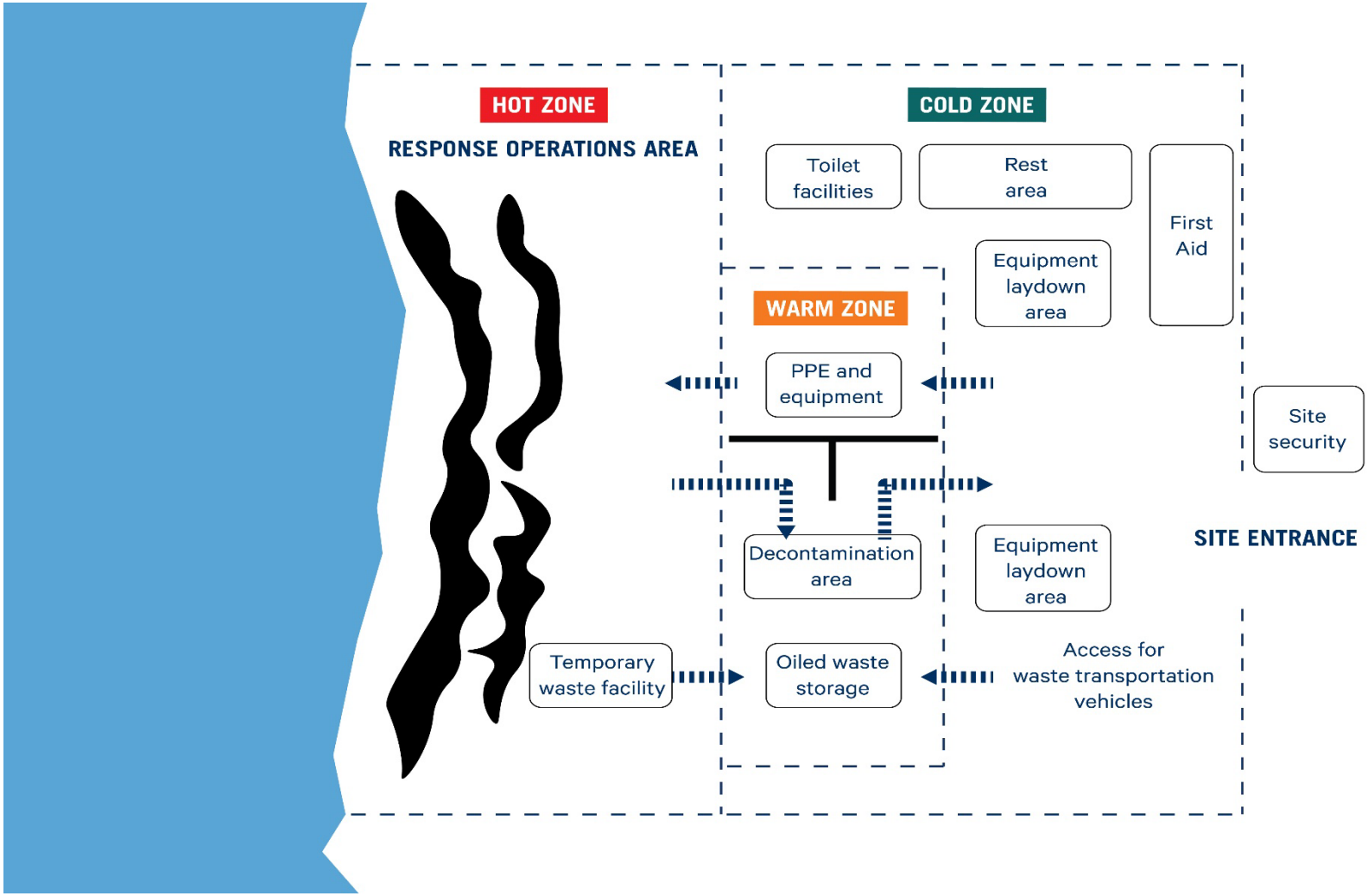


Figure 8 – An example of a land-accessed response site setup and its components

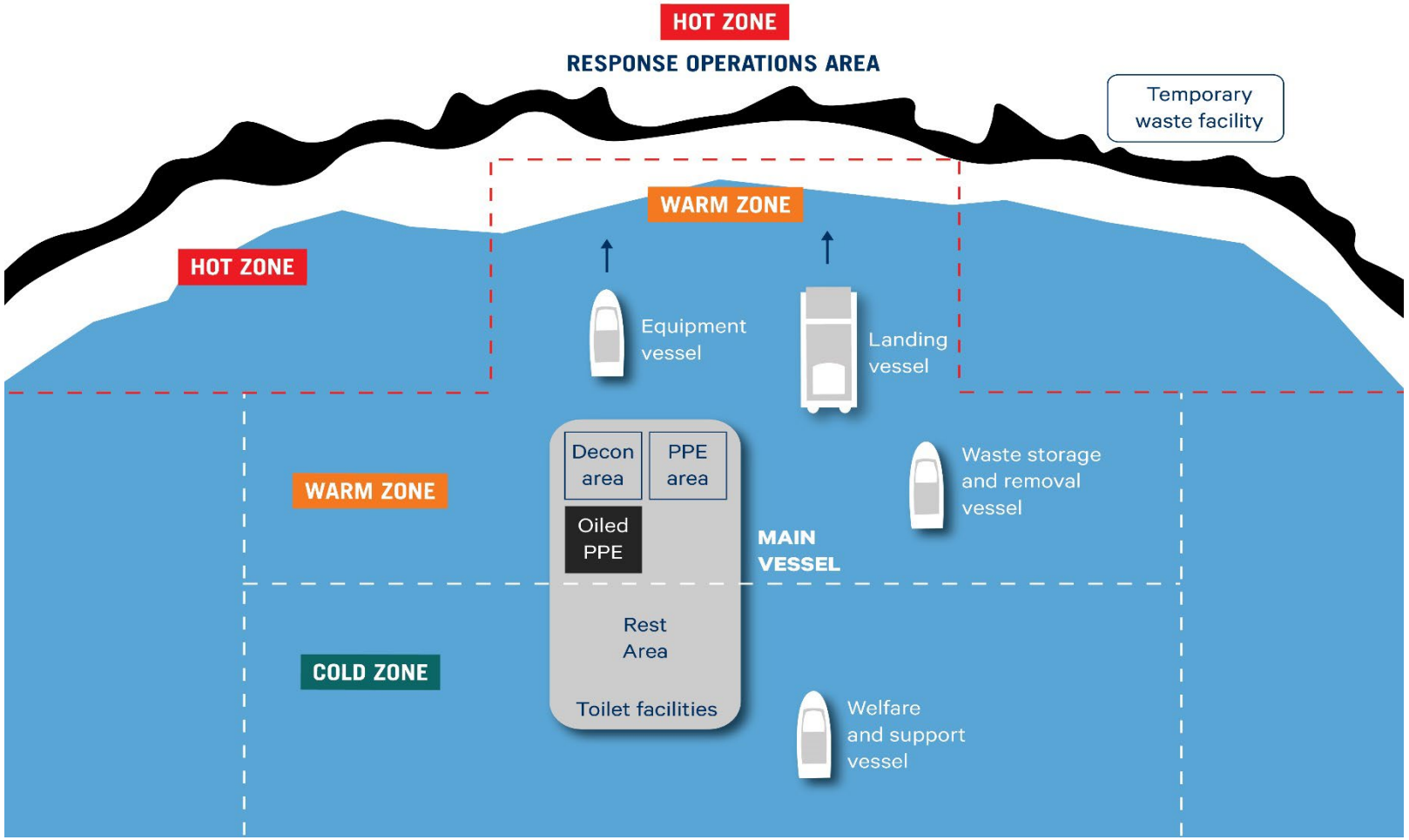


Figure 9 – An example of a marine accessed response site setup and its components

5.5 SAFETY

Shoreline operations vary in size and scope; however, they are always likely to involve relatively large numbers of personnel, often from different companies and organizations.

Ensuring safety at these sites is critical to success. WCMRC will ensure that all safety procedures are followed, or where appropriate, develop site specific process to ensure the safety of responders.

WCMRC will:

- Develop site specific health and safety plans, including the requirement for 'tailgate' and task specific Hazard Risk Assessments during safety briefings
- Introduce appropriate safety measures
- Ensure safety watch personnel are present and enforce a safety program
- Ensure first aid personnel are available to all shoreline teams and dedicated first aid stations are established.
- Ensure all personnel in cleanup areas are trained in basic spill response and safety practices.

5.5.1 Training

Prior to assignment, **all** personnel involved in shoreline response will be adequately trained to a level which allows them to conduct their assignment safely. WCMRC will, if required, establish on-site training facilities to ensure they are complying with this requirement.

WCMRC focuses shoreline training on supervisory positions such as Shoreline Supervisors, Divisional Supervisors, and Branch Managers. Shoreline workers will undergo the just in time training program that will allow for local communities to get involved in supporting the incident.

WCMRC has both internal and external trainers that can be brought in at the time of spill to conduct these just in time training sessions.

5.5.2 Safety Briefings

On site communication is key to a safe and successful operation. Briefings, in particular, are critical to ensure personnel understand the hazards associated with their assignment and the wider operation. Briefings ('Tailgate' safety briefings) will be carried out at the start of each shift and cover:

- Work zone characteristics
- Product hazard information
- Assembly points and evacuation routes
- First aid locations
- Location of staging areas
- Command post locations
- Operation specific hazards (e.g., product, equipment, vessels, helicopters etc.)
- PPE requirements and location
- Rest locations and shift patterns and welfare provision
- Importance of decontamination
- Weather
- Media messaging
- Environmental considerations.

5.5.3 Logistics and Welfare Provisions

Responders who are well fed, hydrated, adequately clothed and clearly understand their assignment will be motivated and effective in their work. Additional welfare provisions to ensure their continued commitment include but are not limited to:

- Hygienic wash facilities and toilets
- Robust and comfortable shelter and/or temporary accommodation
- Well-fitting and good quality PPE
- Established shift patterns and regular breaks.

5.6 COMMUNICATIONS

Communications are often challenging, particularly during complex incidents which require a large-scale response. WCMRC employs the following methods to ensure clear and effective communication between all shoreline response sites and with the IMT:

- Dedicated communications facilities and equipment at shoreline response sites
- Use of working/shared radio channels/frequencies
- Established communications protocols as specified by the relevant tactical plan/guide
- Use of a formal communications plan as developed by the IMT (during large-scale response).

5.7 INCIDENT COMMAND POST

The shoreline response will, always, be supported by the IMT from the Incident Command Post (ICP). Functions specific to shoreline response will be incorporated into the IMT as required (see Section 3.2). These functions will provide strategic guidance to shoreline response personnel and feedback to the IMT on the effectiveness of the shoreline response.

As outlined in Section 3.2.1, in the initial stages of a response or in the event of a small-scale incident, shoreline response is likely to be managed and coordinated by on-scene personnel or 'first responders'. As an incident progresses and/or escalates and moves into the Planning Cycle, the IMT will take over coordination of shoreline response and direct all activities by means of the Incident Acton Plan (IAP) and associated work assignments based on the planning information available to them (e.g., oil spill modelling, satellite imagery etc.).

The same principle applies to the mobilization and management of all resources associated with shoreline response. In the initial stages if an incident, pre-existing and readily available resources are likely to be deployed and managed by on-scene personnel. Should the requirement for resources extend beyond the immediate capability, consideration should be given handing coordination of shoreline response over to the IMT at the ICP. This is because the requirement for additional resources often indicates a requirement to expand the current scale of response. Resource requirement, procurement and logistics management will thereafter be managed by the ICP (possibly via a Staging Area) and on-site management of resources will remain the responsibility of on-scene personnel.

DOCUMENT HISTORY

REVISION NO.	REVISION DATE	DESCRIPTION OF CHANGE	DOCUMENT OWNER
1.0	29 July 2020	Initial Version	RRT

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