EXECUTIVE SUMMARY

Introduction and Background

On April 8, 2015, a fuel oil spill was detected and reported by the public at 16:48 Pacific Time. It was later determined to be originating from the M/V *Marathassa* anchored in English Bay, Vancouver, British Columbia (B.C.). Canadian Coast Guard (CCG), as the Lead Agency, activated the Unified Command (UC) as per the Incident Command System for the response. Containment and recovery of the oil by West Coast Marine Response Corporation (WCMRC) started at 21:25 and on-water recovery operations continued for approximately four days. Further search, recovery, and vessel cleaning and decontamination continued until April 23. Shoreline assessment and cleanup conducted using the Shoreline Cleanup and Assessment Technique (SCAT) took place from April 9 to 24 when the SCAT team reached consensus that all segments had reached their selected operational endpoints. Various surveys and monitoring programs in addition to SCAT took place during the response including: i) aerial overflights and underwater surveys to determine surface and subtidal oiling extent, ii) oil, sediment, water and biological sampling and analyses, and iii) wildlife rescue and rehabilitation.

Hemmera Envirochem Ltd. (Hemmera) was retained by the M/V *Marathassa*, the Responsible Party, to complete an independent environmental impact assessment (EIA) of the spill. The Environmental Unit (EU) established under the unified command response led by the CCG, conducted various surveys, sampling programs and cleanup support efforts as their role of scientific support to the response. Those data are also used to inform this EIA. This EIA is based on a "weight of evidence" approach and includes as understanding of the spill and spilled product, post-spill monitoring and sampling results, the spill area and pre-spill conditions, valued components and human health receptors selected to assess effects, endpoint selection and confirmation and recommendations for additional cleanup or monitoring.

Given that the spill originated from a ship of international origin in waters under the navigational jurisdiction of Port Metro Vancouver (PMV), it is subject to a number of international, federal and provincial regulations. Non-governmental agencies, including Aboriginal groups, and multiple agencies from all levels of government were involved in managing the spill. In Canada, CCG has ultimate responsibility for ship-source and mystery-source spills. CCG led the unified command and activated the EU. The EU included representatives of the following agencies and organisations: Environment Canada, Fisheries and Oceans Canada, B.C. Ministry of Environment, the Cities of Vancouver and North Vancouver and Districts of North and West Vancouver, Squamish Nation, Tsleil-Waututh Nation, Vancouver Coastal Health, the Vancouver Aquarium and Polaris Applied Sciences Inc., representing the Responsible Party. The EU was co-chaired by the B.C. Ministry of Environment and Environment Canada. The EU's role is to provide guidance, support and direction for the oil spill response and to ensure that all the appropriate and reasonable mitigation actions to protect the environment were undertaken.

The M/V *Marathassa* spill occurred in English Bay and spread over to areas of the inner Vancouver Harbour, both of which form part of Burrard Inlet. Burrard Inlet opens onto the Strait of Georgia and receives freshwater input from a number of rivers and creeks. The watershed around Burrard Inlet is one of the fastest growing urban areas in North America with a population in the Vancouver metropolitan area of over 2 million. Vancouver Harbour is bordered by eight municipalities and three Aboriginal groups (the Squamish, Tsleil-Waututh and Musqueam Nations) occupying lands along its shores. It is also home to port facilities and terminals, commercial, industrial and recreational activities. Extensive urban activities extending upland of the harbour contribute to an accumulation of contaminants in its waters and sediments. Despite its highly urbanised nature and extensive shoreline modifications, Burrard Inlet supports important areas for several species of fish, invertebrates, aquatic vegetation, marine mammals and birds. The ecological and cultural importance of the inlet is recognised locally through various parks and conservation areas including an international Important Bird Area, and a marine protected area and a rockfish conservation area near Whytecliff Park at the outer extent of the inlet.

The area is also considered important for local First Nations that have traditionally used and continue to use its resources. Several sites are considered to be cultural and spiritual sites. Burrard Inlet is fringed by several beaches, parks and marinas. Community and recreational uses of the shoreline and waters are primarily in English Bay and False Creek and include boating, walking along beaches, sunbathing, swimming, fishing and scuba diving. Commercial, recreational and aboriginal fisheries and harvesting also take place for various species of fish, and invertebrates (e.g. crab and prawns) in different areas.

Oil Spill Extent and Exposure

The exact amount of fuel oil released from the M/V *Marathassa* is not precisely known and is still the subject of further investigation by Transport Canada. For the purposes of the EIA, the volume of the release is an estimate of 2,800 litres of IFO 380. This is based on the National Aerial Surveillance Program (NASP) overflights and the largest estimated oil volume observed during the spill response of 2,800 litres at 12:20 on April 9. WCMRC provided an estimate of 1400 litres recovered during the response. This estimate is both a semi-quantitative and a subjective recovery estimate provided by WCMRC based on analyses of the quantity of oil-in-water recovered from skimming vessels, experienced spill responders estimates of oil accumulated on boom, the vessel, sorbent pads, and other materials.

IFO-380 is a heavy oil among numerous fuel oils referred to as Bunker C. Sinking of most fuel oils is rarely observed beyond areas of near shore shallow waters and typically occurs as a result of shoreline interaction between particulate oil and suspended sediments. This interaction depends primarily on the levels of energy to which the shoreline is exposed and the nature and size of the shoreline substrate. Once spilled, oil is weathered through various processes including physical transport, evaporation, reaction with sunlight, dispersion, dissolution, oxidation and emulsification. Since the oil from the M/V *Marathassa* is viscous at ambient temperature and had washed ashore as tarballs within a few days of

the initial spill, weathering was not predicted to be sufficient to result in changes that would promote sinking since the oil was on the water surface for a short period. This was supported by ADIOS 2.0 modelling results suggesting that approximately 12% of the oil would have evaporated within five days of the release and remaining IFO-380 was expected to float on fresh water and seawater. Some oil attached to surfaces and sediments in the intertidal zone may have become submerged and/or buried under higher tides or by wave action.

Polycyclic aromatic hydrocarbons (PAHs) are typically the major focus of oil spill investigations because PAHs and similar aromatic compounds are more persistent in the physical environment than either monoaromatic hydrocarbons or aliphatic compounds, and have greater potential for resulting in toxic responses in aquatic life at lower exposure concentrations. PAHs are of concern from a human health perspective because some of the constituents have been identified as carcinogenic, mutagenic, and teratogenic. Source oil (from the M/V *Marathassa*) was tested for unsubstituted and alkyl-PAH. The composition and physicial properties of the source oil were found to be consistent with those documented for IFO-380.

Surveys and Monitoring Programs

Several surveys and monitoring programs were initiated by the unified command and the EU following the spill including: National Aerial Surveillance Program (NASP) overflights, Shoreline Cleanup Assessment Technique (SCAT), sorbent dragging surveys, water and sediment sampling, fish and invertebrate biological sampling, weathered oil (tarball) sampling, wildlife monitoring, and intertidal surveys. These programs were conducted by a number of agencies, organisations and consultants much of which were under the direction of the EU.

In Canada, the NASP, operated by TC, is used to monitor and enforce ship compliance with maritime regulations. Waters in the vicinity of the M/V *Marathassa* were surveyed by NASP twice daily during the spill response until no further oil was observed. Estimated oil volumes on the water ranged from approximately 2,800 litres on April 9, 2015 to 0.3 litres on April 11, 2015. It is likely a small amount of oil evaporated or dispersed prior to the first overflight.

Shoreline surveys using SCAT is a well-established and internationally recognized component of spill response that catalogues habitat characteristics and oiling attributes on discrete shoreline segments including data such as oiled habitat length and width, oil character, thickness, and distribution. SCAT teams containing members from the Responsible Party, MOE, Aboriginal groups and local municipalities surveyed over 85 kilometres of shoreline between April 9 and April 23, 2015. The majority of shoreline exposure to oil occurred on the west side of Stanley Park (i.e., near Siwash Rock and Third Beach) and in North and West Vancouver (i.e., near Lions Gate Bridge, John Lawson Park and Dundarave Park). Defined oiling categories observed were: Light, Very Light, Trace and No Oil Observed. Light and Very Light oiling is generally less than a 1 metre and 0.3 metre wide band respectively with less than 10% oil

distribution within it. Trace oiling consists of discreet drops of oil or tarballs at less than 1% distribution. Light oiling was limited to a 305 metre stretch of industrial shoreline east of Lions Gate Bridge. All other oiling was categorized as Very Light or Trace. Widely distributed tarballs was the common exposure observed during SCAT surveys.

Observed tar balls were recovered and removed from the marine environment as part of the spill cleanup. Small tacky droplets (i.e., tardrops) seen on rocks between beaches were also wiped by cleanup crews when observed. Some oil may have been undetected in various areas, particularly in porous substrate. Verbal reports from park users indicated residual staining of some bedrock faces. The remaining weathered material is likely comprised of hydrophobic compounds such as asphaltenes which are non-volatile, and resistant to sunlight degradation. Their toxicity to aquatic life or humans is expected to be very low. All shorelines were determined to be clean as defined by the UC endpoint criteria and inspected by SCAT teams by April 23, 2015, with no further cleanup recommended.

Potential for subtidal oil occurrence was investigated by SCAT teams by searching for any traces of sunken oil at five locations where oil was observed on the surface or nearby shoreline (vessel anchorage, offshore of Siwash Rock and Erwin Park, John Lawson Park and Ambleside Park). The method involved dragging weighted sorbent pads (SPC ENV 300) across the seafloor along 200 to 400 metres tracks at each location. After each track, the pads were inspected by the SCAT team for presence of oil. No oiling was observed on the pads at any of the sampling locations.

Hemmera compiled and reviewed data collected as part of the response. Samples of water, sediment, mussels, crabs, fish, surf smelt embryo, prawn and hydrocarbon product were collected from selected sites in Burrard Inlet and analysed for relevant parameters. Sampling was completed according to the Environmental Monitoring Plans provided by the EU and relevant federal and provincial guidelines by various qualified consultants and analysed by accredited laboratories (i.e., Maxxam and ALS). Water samples collected to inform reopening of beaches were included to provide additional information. Sediment and tissue samples typically consisted of composite samples (e.g., numerous individuals for biota) from the same location.

The total number of samples analysed by medium was:

- Water: 13
- Sediment: 60
- Source oil: 1
- Tarballs (weathered oil): 1
- Mussels: 10
- Flatfish: 4
- Surf smelt embryo: 25
- Crab: 13
- Prawn: 8

A Wildlife Response Plan was developed and implemented by Focus Wildlife. The plan outlined initial and on-going activities needed to minimize animal suffering and remove pollutants from the environment. It included an impact assessment to find oiled animals and identify potential threat to other wildlife based on oil trajectory and movement relative to known wildlife locations. Search, collection and monitoring were conducted both on foot and by boat by one to four members of the wildlife team between April 9 and 19. Oiled wildlife were captured where possible, rehabilitated and released.

Intertidal surveys were conducted by Hemmera at four sites in early July to determine whether visible oil was still present and assess whether intertidal habitat appeared to differ between oiled sites and a similar non-oiled reference site in Burrard Inlet. Slope, intertidal zone length, substrate composition, algal percent cover and invertebrate abundance and oil observations were recorded at each site.

Effects Assessment and Recommendations

The EIA assessed the potential effects of the oil spill to identified valued components (VCs) for Burrard Inlet based on endpoints (i.e., criteria used to determine when the environment is "clean"), and identified any follow-up monitoring to assess when the Burrard Inlet ecosystem is no longer exposed to the oil released from the M/V *Marathassa* spill or otherwise impaired by the M/V *Marathassa* oil. VCs are defined as the environmental element of the ecosystem identified as having scientific, social, cultural, economic, historical, archaeological or aesthetic importance. Water and sediment quality are indicators of potential oil spill effects on the receiving environmental and exposure pathways to possible biological VCs. For this assessment, the term Intermediate Component (IC) is used to refer to these physical components of the environment that can be affected by the spill and indirectly affect VCs. Because a valued component may be exceeded is not an indicator of adverse ecological effects, but a potential for adverse effects.

The assessment used two intermediate components (sediment and water) and four valued components (intertidal habitat, fish and invertebrates, marine mammals and birds) as representatives of components potentially affected by the spill. The assessment area included all shorelines surveyed by the SCAT teams and captured the maximum extent of observed oiling and adjacent areas. The assessment also identified and summarised potential effects to two components of the human environment (Aboriginal use and community and recreational use) and included a human health effects discussion.

Sediments were selected as an intermediate component because they are likely to be impacted by oiling of shoreline and are a potential source of contaminant exposure for intertidal organisms and humans. The assessment focussed primarily on intertidal sediment because the potential for subtidal oiling was deemed unlikely or limited based on oil properties, small spill volume, subtidal searches and environmental conditions after the spill. The assessment approach focused on evaluating concentrations of PAHs in relation to relevant sediment quality guidelines (i.e., Canadian Council of Ministers of the Environment (CCME) Interim Sediment Quality Guidelines (ISQG) and Probable Effects Levels (PELs) and B.C. Approved Sediment Quality Guidelines). Because the sediment samples were largely collected in oiled areas only, the results reflect a worse-case scenario for the assessment area. Burrard Inlet sediments are influenced by 2 million people with cars, non-point residential, urban and industrial sources of PAHs and background levels in intertidal soft sediment range from <0.01 to 0.40 µg/g dry weight (or more as parent TPAH). For the majority of sediment samples analysed (53 of 60), PAH levels did not exceed applicable guidelines. Further, no sediment samples exhibited PAH concentrations that were higher than CCME PEL levels. Resampling at two of the locations also showed an appreciable decline in PAH sediment concentrations over a period of approximately two weeks. Exceedances of ISQG were found at three of the 11 sites: Capilano I.R. No. 5 (3 of 12 samples), John Lawson Park (1 of 2 samples) and New Brighton Beach (3 of 10 samples). Endpoints for sediment are considered to have been reached except at those three sites where follow-up monitoring should confirm no further M/V Marathassa contamination above guidelines. Double ratio plot analyses indicate there is contribution from other sources in the samples and more detailed review of source determination may be required to allocate potential future exceedances to causation.

Water was also selected as an IC because of its potential for contamination through surface oil and through contaminated sediment and is a potential source of contaminant for aquatic life. Water quality in Burrard inlet is influenced by various urban and industrial discharges including wastewater, stormwater permitted discharges which are monitored by BCMOE and EC through receiving environment monitoring programs. These programs generally indicate that water quality in Burrard Inlet is within acceptable ranges for urban coastal marine environments. The majority (11 of 13) water samples collected shortly after the oil spill showed no evidence of detectable levels of PAHs. In a minority of samples collected near West Vancouver beaches, elevated levels of naphthalene and a few other PAHs were detected. Water quality 33 days post-spill indicated that levels were likely back to pre-spill conditions or below applicable guidelines at all locations sampled. No further water sampling is recommended.

Intertidal habitat was selected as a valued component because of its importance as fish habitat for various species-specific life stages and its protection under several acts. Intertidal habitat was also one of the ecological components directly affected through shoreline oiling. Macroalgal cover, intertidal community composition and presence of visible oil were used to determine potential changes. No oil was observed during the surveys. Survey results indicated variability between sites but values for indicators appeared within normal ranges for the area. Given i) the total length of shoreline affected by trace to light levels of oiling (14.5 km or 17% of the shoreline in the assessment area), ii) that cleanup occurred and SCAT endpoints were reached shortly after the spill, iii) the ability of intertidal species to recover post-disturbance and iv) lack of evidence of changes observed in intertidal habitat during the intertidal surveys, effects from the spill on intertidal habitat were considered to be short and of low magnitude (i.e., minor). No follow-up intertidal habitat monitoring is recommended.

Fish and invertebrates were selected as a VC because they are critical components of estuarine and marine food webs and hold social, economic, and cultural importance to local communities and Aboriginal groups. Five sub-components of marine fish and invertebrates were chosen to structure and streamline the assessment: crabs (Dungeness and red rock crabs), bivalves (mussels), prawns (spot prawns), flatfish (starry flounder), and forage fish (surf smelt). Indicators chosen were tissue PAH concentrations and surf smelt embryo mortality rates. Endpoints selected were: i) PAH tissue concentrations within the range of background levels reported for English Bay, Burrard Inlet, or nearby areas, ii) observed tissue concentrations of potentially carcinogenic PAHs below BC tissue quality guidelines; and for surf smelt, embryo mortality rates consistent with unoiled areas.

Contaminant (PAH) uptake into hepatopancreas of Dungeness crabs was detected in samples from Ambleside, Dundarave Park, and Jericho Beach. Data for Dungeness hepatopancreas indicate that total PAH levels range from below the limits of quantification to 145 ng/g, showing considerable within-site and among-site variation. These concentrations overlap with the low range of those observed following the Westridge spill in Burrard Inlet in 2007 (135 to 178 ng/g) which decreased over time, meeting measurement endpoints in 2011. DFO reopened the fishery based on these results and therefore, follow-up sampling and analysis of Dungeness crab tissue is not warranted.

Overall, the concentrations of TPAHs in mussel collections associated with the M/V *Marathassa* oil spill are in the range of reference concentrations for elsewhere in Burrard Inlet or at Alaska sites in general, with the exception of the New Brighton samples. However, concentrations of total unsubstituted PAHs in mussel samples were greater than selected endpoints at certain sites. Follow-up monitoring of mussel PAH tissue concentrations will occur at five sites: New Brighton Beach, Harbourview, Ambleside, English Bay, and Capilano I.R. No. 5. to confirm that the tissue PAHs concentrations have decreased and are now lower than the assessment endpoints or one otherwise unrelated to the M/V *Marathassa*. Double ratio plot analyses indicate there is contribution from pyrogenic sources in the samples and more detailed

review of source determination may be required to allocate potential future exceedances to causation. Several of these sites were not among the most oiled intertidal areas which raises the question as to source allocation.

The analytical detection limits achieved for alkyl-PAH were too high to facilitate adequate quantification in the crab and mussel samples. It was difficult, therefore, to assess the degree of congruence between PAH composition in IFO-380 and the shellfish tissue samples. The greater amounts of LPAH than HPAH in most samples (e.g. in Dungeness crab hepatopancreas) is consistent with the composition IFO-380; however, the ratios of individual PAH concentrations in the biological samples departed markedly from that of the M/V *Marathassa* fuel oil sample, suggesting the influence of other source inputs – both petrogenic and pyrogenic.

For prawn, total PAH levels could not be calculated because levels of alkyl (substituted) PAHs were not measured. However, concentrations of parent (unsubstituted) PAHs ranged from 2.6 to 7.3 ng/g wet weight. With the exception of one prawn tail collected at Lions Gate, these concentrations are all below the laboratory blank (6.516 ng/g). Additionally, concentrations of benzo(a)pyrene in all samples were well below the provincial high consumption thresholds (i.e., all <1 µg/kg). Two starry flounder were collected from both Ambleside Park (trace to very light oiling) and Jericho Beach (no oiling). Overall, total parent PAH concentrations (unsubstituted) were similar at the oiled and un-oiled. Benzo(a)pyrene and alkyl concentrations were below the detection limit for all samples. Given the observed low concentrations of PAHs in the tissues of spot prawn and starry flounder samples relative to existing data and guidelines, and reopening of the fisheries by DFO based on these results, endpoints are considered met and no follow-up monitoring is recommended.

Surf smelt embryo mortality rates showed no statistically significant differences between oiled and control beaches. Overall, while it is possible that oil exposure and thermal shock – or a combination of both - contributed to the mortality and truncated development of surf smelt embryos, the data do not provide strong enough evidence to support or reject the hypothesis, given that a) embryo mortality rates observed were similar between fouled and unfouled beaches; b) there was a lack of correlation between embryo mortality rates and air/sediment temperatures; and, c) worst-case scenario (i.e., New Brighton Beach) interstitial water PAH concentrations are well below published concentrations of harm. Therefore, the endpoint is considered met and no follow-up monitoring is recommended.

Overall, given the abundance of invertebrate and fish biota throughout Burrard Inlet and English Bay, the relatively low concentrations of PAHs in tissue samples, the limited pathways of exposure based on sediment and water quality sampling, and the relatively small quantity of oil released, it is highly unlikely that any sublethal adverse effects associated with the spill will manifest at the population level for any of the sub-components assessed.

Marine Mammals were selected as a VC because they occur in or near the affected area, are top predators in the Strait of Georgia marine ecosystem, are the focus of a substantial wildlife viewing and ecotourism industry, and hold an important cultural value to the public and Aboriginal groups. Killer whales, grey whales, and harbour seals have been selected as representative species of sub-components to focus the assessment. For killer whales, a small number of killer whales observed near the spill may have been exposed to the release. Baleen whales are not common in Burrard Inlet and no large baleen whales were observed in Burrard Inlet before, during or after the M/V *Marathassa* oil spill event and there were no reports of stranded or distressed individuals. Harbour seals are abundant and common in Burrard Inlet. However, there were no reports of any oiled, stranded or distressed marine mammal. Overall, given that no visibly affected marine mammals were observed throughout Burrard Inlet and English Bay, the relatively low concentrations of PAHs in tissue samples in fish and invertebrates that are potential marine mammal prey, the limited pathways of exposure of contamination based on sediment and water quality results, and the relatively small quantity of oil released (~2,800 litres), it is unlikely that any adverse effects occurred from the spill or will occur for any of the sub-components assessed. No follow-up monitoring is required.

Birds were selected as a VC because at least some individuals were oiled and they are important components of estuarine and marine food webs and hold social, economic, and cultural importance to local communities and Aboriginal groups. Endpoints selected were the same as those for sediment and water because chronic effects to birds would be related. Five birds were recovered during the response; however, one later died and one was euthanized. Three of the five birds were successfully rehabilitated and released into the wild. A small number of other birds appeared to have been oiled, but remained flighted and could not be captured. Due to their ability to fly, it was assumed that the degree of oiling was sub-lethal and the birds had potential to recover in the wild. Benzo(a)pyrene levels that could be of biological concern were only detected within sediments collected at John Lawson Pier. No direct or indirect effects were documented on any federally or provincially listed species of conservation concern. The small number of mortalities (2) is determined to result in no effect to any species abundance at the population level or effect species diversity. Endpoints are therefore considered to have been met except where sediment require follow-up monitoring.

The spill temporarily affected the use of the shoreline and waters within parts of the assessment area by aboriginal groups and local communities. Burrard Inlet is considered important to Aboriginal groups and is used extensively by the local community for recreational purposes. Based on information and input provided during meetings with Aboriginal groups, no events or activities were cancelled as a result of the spill. No shoreline alterations or removal of potential artifacts were reported or likely to have occurred during the beach cleanup of oil. Fishing and beach use including for spiritual bathing, were likely restricted for a period of time after the spill in certain areas. The duration of these closures ranged from 10 to 37 days depending on location. Because the spill occurred in April, before the start of the summer

season (typically from late May to September), potential disruption of beach activities and bathing rituals is expected to have been minimal. Precautionary fisheries closures were in effect from April 14 to May 14 for a total of up to one month. The effect of these closures is expected to be relatively small given all other fishing closures in the area, and the relatively short duration (one month). Potential health effects of limited access to fish and shellfish and beach use for traditional or recreational uses were short-term.

Potential human health effects of fuel through direct exposure could occur through inhalation of volatilised constituents of IFO-380, intake of contaminated water, or dermal contact to free product based on exposures in the area of the slick or on shorelines. Indirect exposure pathways include consumption of fish and shellfish with elevated levels of various contaminants as a result of the fuel spill. Given the size of the *Marathassa* fuel spill and air quality reported for larger spills, any influence on air quality and subsequent potential human health effects were expected to have been minimal and of very short duration (i.e. less than 48 h). While individuals could have been dermally exposed to spilled oil water or beaches, this potential was likely reduced by the beach advisories. Also, cleanup efforts removed oil from areas where contact was most likely to occur. It is concluded that humans were unlikely to be exposed to IFO-380 derived contaminants at levels that would cause toxicological health concerns based on the likely short-term and transient exposures.

Concentrations of potentially carcinogenic PAHs in fish and shellfish from the area collected after the spill were primarily below the BCWQG for PAHs of 1 ng/g ww of benzo[a]pyrene as a threshold for the protection of human consumers of fish and shellfish, assuming a high consumption rate. There are existing health concerns about consumption of mussels from Vancouver Harbour independent of any incremental contamination that may have been contributed from the M/V *Marathassa* spill. Observed concentrations of PAHs in mussel tissues were within the range of concentrations observed in reference samples collected elsewhere or prior to the fuel spill. No toxicological effects on human health are expected in association with fish and shellfish consumption because i) observed tissue concentrations of PAHs were generally low, ii) fishing closures were initiated by DFO shortly after the spill to limit human consumption potential, and iii) edible resource tissue concentrations of contaminants resulting from the spill are expected to decrease over a period of days to a month or two following cleanup activities based on rapid reduction of contaminants bioaccumulated shortly after the spill event.

Conclusions

The M/V *Marathassa* spill occurred in a heavily populated area with important ecological resources where potential for commercial and ecological losses are substantial. However, the spill was of a relatively small volume (~2,800 litres) and was contained and partially recovered promptly through on-water activities and beach cleanup (estimated recovery of 1400 litres), thereby minimising its potential effects on humans and the environment. Data collected post-spill in the most oiled areas indicate no prolonged effects on water quality and minor effects to sediment with potential local uptake in tissues of some fish and invertebrates.

Oil from the M/V *Marathassa* presence in sediment and marine organisms is expected to decline over time due to a variety of metabolic and physical degradation pathways. Potential effects to human use and health were limited through precautionary beach and fisheries closures. No toxicological effects are anticipated in humans based on the EIA and the limited temporary access of people to the beach it is concluded to have been of no long-term consequence. Follow-up monitoring is recommended and will be conducted for specific intermediate and valued components at sites where endpoints were not met at the time of sampling (i.e., sediment and mussels) and will be confirmed with additional sampling to be conducted in Autumn 2015.