

INVENTORY OF POTENTIAL IMPACTS AND MITIGATION MEASURES

OCEAN DISPOSAL OF WRECKS AND CONSTRUCTION WASTES

PHASE A IMPACTS OF LAND TRANSPORTATION, LOADING AND WATER TRANSPORTATION

On hydrodynamics, ice and sedimentology

Ref. ¹	POTENTIAL IMPACTS	CUMULATIVE ²	MITIGATION MEASURES
N/A	The transportation of wrecks or construction wastes to the dumping site is not likely to have an impact on hydrodynamic or sedimentological conditions.	--	N/A

On the characteristics and quality of the ocean floor

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	The transportation of wrecks or construction wastes to the dumping site is not likely to have an impact on the characteristics or quality of the ocean floor.	--	N/A

On water quality

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	The transportation of wrecks or construction wastes to the dumping site is not likely to have an impact on water quality.	--	N/A

1 The reference numbers correspond to the numbers in Section 2 of the questionnaire (ENVIRONMENTAL ASSESSMENT).

2 In the column 'Cumulative', the word "Potential" indicates that the impact is likely to combine with similar impacts associated with the same or other projects in the area. The numbers refer to the sections following the tables that provide more detailed information.

On terrestrial flora and fauna

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-1	Land transportation of wrecks or construction wastes is not likely to have an impact on terrestrial flora or fauna, since few vehicles are involved and since they use existing roads.	--	N/A

On marine wildlife and habitats

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-2a	<p>Land transportation of wrecks or construction wastes is not likely to have an impact on marine wildlife or habitats. Only water transportation is likely to have an impact.</p> <p>a) <u>Disturbance of marine mammals</u> The transportation of wrecks or construction wastes to the dumping site could disturb marine mammals (whales or seals in the area, seal haulouts). However, given that marine mammals can avoid the disturbed areas and that the transportation of the wrecks or construction wastes requires few, infrequent trips, this impact will generally be negligible.</p>	Potential 1.01	<ul style="list-style-type: none"> As a precaution, if marine mammals are observed in the vicinity, reduce the speed of the ship or delay the trip by a few minutes.
A-2b	<p>b) <u>Effects on fish and marine habitat</u> The transportation of wrecks or construction wastes by boat is not likely to have an impact on fish or marine habitat.</p>	--	N/A

On birds and coastal habitat

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-3	<p><u>Disturbance of birds by noise and traffic</u> During the transportation of the materials to the dumping site, birds (gatherings or colonies) may be disturbed by ship traffic or by the noise of the engines.</p> <p><i>Case 1: There are important staging areas on the route taken.</i> The transportation equipment may disturb marine birds (e.g., colonies, rafts of male eider ducks in summer). However, the impact will be minor to negligible, given the short-term nature and infrequency of the disturbances.</p> <p><i>Case 2: There are no bird staging areas in the vicinity.</i> There are no particular bird staging areas or habitats in the vicinity or on the route to the dumping site. No impact is anticipated.</p>	<p>Potential 1.02</p> <p>--</p>	<ul style="list-style-type: none"> Avoid marine bird staging areas or periods. <p>N/A</p>

On recreational activities (swimming, water sports, sport fishing, hunting, etc.)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-4	<p>a) <u>Disturbance of recreational activities during land transportation</u> Land transportation of wrecks or construction wastes involves few vehicles and the routes taken are major thoroughfares. No impact is anticipated on recreational activities.</p>	--	N/A
	<p>b) <u>Disturbance of recreational activities during loading</u> <i>Case 1: Activities on the dock.</i> During the loading of wrecks or construction wastes, activities on the dock (fishing, underwater diving, boarding ships for cruises, etc.) could be disturbed by congestion on the dock and by restricted access to docking areas. The significance of the impact will depend on the duration of the loading activities and on the level of congestion on the dock and its approaches.</p>	Potential 3.01	<ul style="list-style-type: none"> • Avoid periods and areas of heavy recreational use. • Minimize the duration of loading activities. • Inform dock users of the date and duration of the operations.
	<p><i>Case 2: Activities are carried out in the vicinity of the dock.</i> Activities carried out in the vicinity of the dock could be disturbed, particularly by the noise caused by the loading activities. The impact will be minor, even negligible, since the operations will be short term and will be carried out in designated locations generally used for this purpose.</p>	Potential 3.01	<ul style="list-style-type: none"> • No particular measures, given the insignificance of this impact.
	<p>c) <u>Disturbance of activities during water transportation</u> <i>Case 1: Recreational activities are carried out in the vicinity.</i> The transportation equipment may disturb recreational activities (water sports, diving, swimming, etc.) carried out in the vicinity (noise and congestion). The impact will be minor, even negligible, since the trips required for transporting wrecks or construction wastes are few and far between.</p> <p><i>Case 2: No recreational activities are carried out in the vicinity.</i> No impact is anticipated on these elements.</p>	Potential 3.01	<ul style="list-style-type: none"> • Avoid periods and areas in which recreational activities are carried out.
		--	N/A

On commercial activities (fishing, navigation and aquaculture)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	a) <u>Disturbance of commercial activities by land transportation operations</u> Land transportation of wrecks or construction wastes is not likely to have an impact on commercial activities.	--	N/A
A-5	b) <u>Disturbance of commercial activities by loading operations</u> The presence and operation of equipment at the dock (trucks, barges, ships) could cause temporary problems for commercial navigation and fisheries activities (e.g., docking, unloading of catches, refueling, etc.) due to total or partial restriction of access to the dock, approaches and docking areas. The significance of the impact will depend on the duration of the operations, the level of congestion on the dock and the extent of the commercial activities carried out on the dock.	Potential 4.01	<ul style="list-style-type: none"> • Avoid sites and periods of intensive commercial activity. • Inform users of the dock and approaches of the date and scope of the operations.
	c) <u>Disturbance of commercial activities by water transportation operations</u> The transportation equipment may disturb commercial activities (fishing, aquaculture, water transportation, etc.) carried out in the area (congestion of shipping channels). The impact will be negligible, since the transportation of wrecks or construction wastes involves very few, very infrequent trips which are carried out in sectors designated for navigation.	Potential 4.01	<ul style="list-style-type: none"> • Avoid areas and periods of intensive activity. • In cases where disturbances of specific fishing or aquacultural activities are inevitable, give the individuals concerned prior notice of the operations.

On heritage and protected areas

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	The transportation of wrecks or construction wastes is not likely to have an impact on heritage or protected areas.	--	N/A

On aesthetic and scenic resources

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-6	The transportation and loading of wrecks or construction wastes are unlikely to have a significant impact on aesthetic or scenic resources, since the activities are short-term, involve little equipment and are carried out in areas designated for this type of activity.	--	N/A

On quality of life

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-7a	a) <u>Disturbance by noise and dust generation</u> The transportation and loading of wrecks or construction wastes are likely to have an impact on the quality of life of nearby residents, due to the noise of the vehicles and equipment or to dust generation. However, given the small number of trips involved, the impact may be considered negligible.	--	<ul style="list-style-type: none"> Avoid working at night and on weekends.
A-7b	b) <u>Traffic</u> The traffic caused by the project may cause high levels of congestion of thoroughfares and access roads to the dock, particularly if wide loads are involved (in the event of a wreck). In general, however, the impacts will be minor given their short duration and the fact that the work will be carried out at sites designed for this type of traffic.	--	<ul style="list-style-type: none"> Inform users of the dock and main access roads in advance.

On existing infrastructure (sea water intakes, outfalls, etc.)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-8	The equipment will not go near the water intakes or drainage channels. As a result, no impact is anticipated.	--	N/A

Risk of spills

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
A-9	During loading and transportation, it is likely that leaks, equipment breakdowns (trucks, barges, ships, etc.) or accidents will occur, causing a potential hazardous materials spill (petroleum products, fuel, oil, etc.). However, given the small amount of equipment and short distances involved, this impact can be considered negligible. The risk of spills can be minimized through rigorous and frequent maintenance of the equipment used.	--	<ul style="list-style-type: none"> In the event of a spill, immediately inform the authorities of the situation. Ensure proper maintenance of equipment and machinery.

PHASE B IMPACTS OF THE DISPOSAL AND PRESENCE OF WRECKS OR CONSTRUCTION WASTES

On hydrodynamics, ice and sedimentology

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-1	a) <u>Modification of the bathymetric profile</u> The disposal of wrecks or construction wastes will modify the bathymetric profile of the dumping site. However, the impact in itself is negligible. The wreck or construction wastes will occupy a small area and will be stable.	Potential 1.01, 1.02	<ul style="list-style-type: none"> • Ensure that this parameter is taken into consideration in the selection of a site. • Ensure that the site conditions are such that the dumped wreck or materials will be stable.
	b) <u>Modification of the ice regime</u> The disposal of materials in shallow water could result in changes in freeze-up conditions (duration of ice cover, thickness, area, etc.). Disposal in shallow waters and the freeze-up of materials could affect their long-term stability (displacement of structures by movement of the ice cover). However, no impacts are anticipated since the site is selected such that the depth is sufficient to ensure total immersion of the wreck or construction wastes, even under ice cover.	--	<ul style="list-style-type: none"> • Ensure that the site selected allows for total submersion and that specified depth conditions are met. • Ensure that the dumping site corresponds fully with what is authorized.
	c) <u>Modification of currents and erosion and sedimentation patterns</u> The presence of the wreck or construction wastes could result in localized changes in currents, leading to slight changes in erosion and sedimentation patterns on and near the site. These effects would, however, be very localized and of limited scope, such that the impact would be minor, even negligible.	--	<ul style="list-style-type: none"> • Select a site that promotes the stability of the materials disposed of.

On the nature and quality of the ocean floor

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-2	a) <u>Modification of ocean floor associated with the presence of materials</u> The presence of the wreck or construction wastes will modify the characteristics of the ocean floor. The modification will be limited to the actual area occupied. No significant effects are anticipated.	--	<ul style="list-style-type: none"> • Use rocks of the same geological formation as the ocean floor and ensure that the other materials are clean.
	b) <u>Modification of the substrate due to changes in sedimentation</u> The presence of the wreck or construction wastes could lead to localized changes in erosion and sedimentation patterns, gradually resulting in localized or site-specific changes in the characteristics of the substrate.	--	<ul style="list-style-type: none"> • No particular measures.

On water quality

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-3	a) <u>Disturbance by increased turbidity</u> If the ocean floor comprises fine sediments, the disposal of a wreck or construction wastes can bring about a slight increase in turbidity and in the level of suspended solids at the time of disposal. However, the re-suspension of fine particles will be short-term and will have only minor, even negligible, impacts on water quality.	--	<ul style="list-style-type: none"> Use rocks having the same geological formation as the ocean floor and ensure that the other materials are clean.
	b) <u>Disturbance of water quality by the introduction of contaminants</u> Water quality could be affected by the introduction of contaminants from the wreck or construction wastes. All potential contaminants are generally removed before disposal, thereby minimizing this impact.	--	<ul style="list-style-type: none"> Ensure that the dumped wrecks or construction wastes are free of contaminants (including contaminants that may be released over the long-term).

On marine wildlife and habitat

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-4a	a) <u>Direct impact on organisms</u> Ocean disposal of wrecks or construction wastes that are free of all contamination will have no direct adverse effects on organisms.	--	<ul style="list-style-type: none"> Ensure that the wrecks or construction wastes dumped are free of contaminants.
B-4b	b) <u>Impact on the quality of habitats</u> The potential changes in the characteristics of the ocean floor will result in the modification of marine habitats. The scope and extent of the impacts on marine resources will depend on the significance of the changes caused. It should be noted that the disposal of wrecks or construction wastes could have a beneficial effect, by providing a substrate for several benthic organisms, particularly in environments where hard substrates are rare. The creation of marine wildlife habitats may promote increased biomass of certain species, particularly crustaceans (e.g., lobster) or a very localized increase in wildlife diversity at biologically impoverished sites.	Potential 1.03	<ul style="list-style-type: none"> Choose dumping sites in a manner that promotes the creation of habitats. Locate the dumping site in a unproductive sector.

On terrestrial flora and fauna

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	Ocean disposal of wrecks or construction wastes will have no impact on terrestrial flora or fauna.	--	N/A

On birds and coastal habitat

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	Ocean disposal of wrecks or construction wastes will have no impact on birds or coastal habitat.	--	N/A

On recreational activities (swimming, water sports, sport fishing, hunting, etc.)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-5a	The disposal of wrecks or construction wastes is unlikely to have adverse effects on recreational activities in the sector, given the short duration of the actual dumping operations and the small area occupied by the dumped materials.	--	<ul style="list-style-type: none"> Select a location for the dumping site that promotes sports activities (proximity and easy, safe access). Inform boaters in the region of future operations.
B-5b	The presence of the wreck or construction wastes could have positive effects on such activities as diving, by providing an interesting dive site, or on sports fishing, by promoting the development of certain prized species.		

On commercial activities (fishing, navigation and aquaculture)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-6	<p>a) <u>Disturbance of commercial activities during disposal</u> <i>Case 1: Commercial activities at (or near) the dumping site.</i> The physical presence of equipment stationed at the dumping site may temporarily hinder commercial activities (e.g., hauling in of fishing gear, aquacultural activities, etc.). The impact will be minor and short term.</p> <p><i>Case 2: Disposal operations may obstruct access to certain sites.</i> Depending on the location of the dumping site, the disposal of the materials could block access to the dock or fishing grounds.</p>	<p>Potential 4.01, 4.02</p> <p>Potential 4.01, 4.02</p>	<ul style="list-style-type: none"> Inform port users of the extent and duration of the activities. Inform the operators of aquacultural facilities. Select a dumping site that does not interfere with navigation. Avoid periods of intensive commercial activities (e.g., lobster fishing season, etc.). Ensure that the site selected is not located in an important fishing area; contact local fishermen beforehand.
	<p>b) <u>Disturbance of the fishery due to the presence of the materials</u> <i>Case 1: Materials located in a fishing area.</i> The presence of the wreck or construction wastes may hinder fishing activities, navigation, setting of fixed gear (lobster traps, nets, etc.) or the use of certain towed gear (scallop dredges, trawl nets, etc.).</p>	<p>Potential 1.02, 4.01, 4.02</p>	

On commercial activities (cont'd)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-6	<i>Case 2: Presence of materials results in conflicting uses.</i> The presence of the wreck or construction wastes gives rise to recreational activities that conflict with commercial fishing activities.	Potential 4.01, 4.02	<ul style="list-style-type: none"> Select a dumping site that does not promote conflicts between recreational and commercial activities.

On heritage and protected spaces

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-7	<u>Presence of dumped wreck or construction wastes in a protected area</u> The disposal of wrecks or construction wastes could have impacts if the dumping site is located in protected areas: modification of local marine fauna and flora and indirect effects created by recreational or commercial activities resulting from the presence of a dumped wreck or construction wastes.	Potential 5.01	<ul style="list-style-type: none"> Avoid disposing of wrecks in protected spaces.

On aesthetic and scenic resources

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	The presence of a dumped wreck or construction wastes is not likely to have an impact on aesthetic or scenic resources.	--	N/A

On quality of life

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
N/A	The disposal operations and presence of a dumped wreck or construction wastes are not likely to have effects on the quality of life.	--	N/A

On existing infrastructure (sea water intakes, outfalls, etc.)

Ref.	POTENTIAL IMPACTS	CUMULATIVE	MITIGATION MEASURES
B-8	The disposal operations or the presence of a dumped wreck or construction wastes could affect local infrastructure, by resulting in changes in freeze-up conditions, erosion and sedimentation patterns, etc. However, the potential effects are unlikely.	--	<ul style="list-style-type: none"> In determining the location of the dumping site, avoid all infrastructure, such as sea water intakes, outfalls, etc.

POTENTIAL CUMULATIVE IMPACTS

Where it is indicated that there are potential cumulative impacts, it is important to evaluate the possibility that other activities associated with the project or with other projects will have similar impacts or affect the same resource or the same component of the environment. An impact considered minor within the framework of a project may become more significant if the analysis of the other activities carried out in the sector indicates that the resource or element in question is already affected in different ways.

1. Changes in bathymetry

- 1.01** If construction wastes are disposed of in a non-random manner at a given dumping site on an ongoing basis, there could be gradual changes in bathymetry at the dumping site.
- 1.02** In the long term, such changes could interfere with navigation by creating shoals that could make it necessary to alter the navigation channel usually used by certain ships.

2. Disturbance of marine mammals and birds

- 2.01** Given their mobility, marine mammals are able to avoid disturbances of the environment. However, if their movements are disturbed by several factors, they may be forced to avoid a particular sector and be prevented from feeding properly.
- 2.02** Birds leave their habitat as soon as it is disturbed. They return soon after the disturbance and generally undergo no effect. However, if they are disturbed repeatedly by various factors, they may be prevented from feeding properly (particularly since repeated displacements require additional energy) or their reproductive success may be affected (e.g., when females abandon their nest momentarily, there is an increased risk of predation, or when females are disturbed too often during nest building, they may abandon the breeding site completely).

3. Disturbance of recreational activities

- 3.01** The disturbance of recreational activities is an impact that is likely to be cumulative. It is important to evaluate multiple disturbances that can make an activity unattractive to users. Recreational activities that are carried out in aquatic environments are often limited in space and time (short period of the year), which makes the impact more significant.

4. Disturbance of fishing or aquacultural activities

4.01 The disturbance of fishing activities may be associated with the deterioration of navigation conditions (obstacles, conflicts, etc.), disturbances of the fishing conditions at the fishing grounds, declines in fish stocks, etc. Fishermen who are affected by several types of disturbances may see a significant decline in their catch.

4.02 The success of aquacultural activities is often random and depends on a combination of elements specific to the natural environment; the adverse effects of disturbances caused by human activities in the sector may sometimes be more significant than anticipated.

5. Modification of protected areas

5.01 The modification of protected areas, regardless of how minor, contributes to the gradual degradation of the natural environment.

REFERENCES

- Biorex inc. (1992). *Grille d'évaluation des impacts potentiels de différents types de projets en relation avec les habitats du poisson*. Prepared for the Department of Fisheries and Oceans, 62 pages.
- Centre Saint-Laurent (1992). *Guide pour le choix et l'opération des équipements de dragage et des pratiques environnementales qui s'y rattachent*. Document prepared by Les Consultants Jacques Bérubé Inc in collaboration with Public Works Canada and the Quebec Department of the Environment. Catalogue No. En 40-438/1992F. 81 p.
- Environment Canada (1994). *Environmental Impacts of Dredging and Sediment Disposal*. Prepared by Les Consultants Jacques Bérubé inc. for the Technology Development Section, Environmental Protection Branch, Quebec and Ontario Regions, Environment Canada. 97 pp.