In-Water Site Isolation

October 2025

1.0 About this standard

A standard specifies how to implement a specific mitigation measure to achieve its objective and maximize its effectiveness. This standard provides national guidance from Fisheries and Oceans Canada (DFO) on how to implement the following mitigation measure:

- Conduct all operations in isolation of open or flowing water

It is intended for use in the installation, maintenance, monitoring and removal of in-water isolation methods occurring within freshwater (including rivers, streams, lakes, ponds) and marine environments.

By following this standard, project proponents can reduce the risk of harmful impacts to fish and fish habitat to an acceptable level.

In-water site isolation creates a temporary dry working environment in order to manage sediment laden water. It may be required to support works, undertakings and activities (projects) such as the construction of new infrastructure or to support maintenance or removal activities associated with existing infrastructure. Some examples of projects that typically involve in-water site isolation include:

- cast-in-place concrete work associated with water intake or outfall structures, boat ramp construction
- bridge and culvert installation, maintenance, replacement or removal activities
- linear infrastructure (for example, pipeline and telecommunication lines) installation, maintenance, integrity assessment, replacement, or removal activities
- shoreline or in-water dredging or excavation activities
- other in-water projects that require a temporary dry working environment

2.0 User guide

Standards are one of a suite of tools used by the Fish and Fish Habitat Protection Program to manage the risk of harmful impacts to fish and fish habitat from projects carried out in or near water. They create efficiencies in the regulatory process by standardizing requirements for certain types of common projects.

Standards are not considered stand-alone documents. The conditions under which they can be applied, other applicable management measures (for example, carry out the project in accordance with timing windows) and any engagement or consultation requirements are dictated by the instrument within which the standards are referenced (for example, *Fisheries Act* authorization).

Project proponents can indicate their intention to follow one or more Fisheries and Oceans Canada (DFO) standards in their request for review or in their application for authorization. Submissions should indicate specific sections of the standards that apply to the proposed project and include any additional site-specific management measures related to the method used.

The type of watercourse or water body and site-specific conditions will inform the preferred method of in-water site isolation. Some examples include:

- in-water work within watercourses with large or coarse channel substrates may limit or prevent the effective use of steel plates to isolate the in-water work area

- in-water work within a watercourse that flows within a steep valley or bedrock may limit or prevent the effective use of a diversion channel to isolate the in-water work area

If you are uncertain about what methods should be applied based on site-specific conditions, or whether you can meet the standard, consult a qualified environmental professional.

Standards do not remove nor replace the obligation to comply with all applicable statutory and regulatory requirements of the *Fisheries Act*, the *Species at Risk Act*, or other federal, provincial, territorial or municipal legislation and policy including guidance regarding species and habitats managed by these jurisdictions.

Up to date information on DFO standards can be found on the Projects Near Water website.

3.0 Methods

This in-water site isolation standard includes guidance related to the following methods for:

- working in the dry:
  - cofferdam
  - pump around
  - flume
  - diversion channel
- working in the wet:
  - turbidity curtain

3.1 Cofferdam

A cofferdam (also referred to as an isolation dam) is an in-water site isolation method typically used along the margins of a water body or watercourse and that does not impede downstream flow. A cofferdam can also be installed across a watercourse upstream and downstream of the work area. In this case, water from upstream is either pumped downstream (see section 3.2) or directed into a temporary pipe (see section 3.3) or temporary diversion channel (see section 3.4). A cofferdam can be constructed using a variety of materials including rock, steel sheet pile, sandbags, concrete blocks, poly, or inflatable barrier. If a completely dry working environment is required within the isolation area, the cofferdam materials will need to be able to create a water-tight seal. Water from within the isolation area is pumped outside of the isolation area.

3.1.1 Installation

- Design cofferdam elevation or crest height based on a reasonable expectation of water levels or typical ice elevations for the duration of the in-water work. It is recommended to consult a hydrotechnical engineer.
- Install the cofferdam using materials appropriate for the site conditions (for example, rock, steel sheet pile, sandbags, concrete blocks, poly, or an inflatable barrier). Do not use earthen material (for example, soil).
- Select appropriate materials to create a water-tight seal around the isolation area accounting for bank

and substrate morphology and type. Do not use grout.

- Install the cofferdam from upstream to downstream, to direct flow away from the in-water work area.
- If ice is present, remove it carefully to reduce scour of the bed and banks.
- Size the dewatering system to accommodate the expected level of seepage for the duration of in-water work.
- Install a filtration system (for example, settling basin, straw bales, filter fabric, filter bags, dewatering bags) or use a vegetated area that is set-back from the watercourse or water body to filter any sediment laden water from the isolated area during dewatering.

3.1.2 Dewatering

- Capture fish trapped within the isolated or enclosed area and relocate them to the same watercourse or water body.
  - Dewater gradually to reduce the potential for stranding fish.
  - Capture and relocate fish as per applicable permits.
- Screen intake pipes during all phases of the project.
  - Follow the interim code of practice for end-of-pipe fish protection screens for small water intakes in freshwater.
- Dewater the isolation area.
  - Pump sediment laden water from the isolation area into a filtration system or a vegetated area.
  - Release filtered water gradually to reduce risk of erosion.
  - Return water downstream, within the same watercourse or water body.
- Continue dewatering for the duration of in-water work or for as long as water continues to enter the isolation area.

3.1.3 Maintenance and monitoring

- Regularly inspect cofferdam(s) and dewatering system during in-water work.
- Repair, as needed, deficiencies observed with the cofferdam and dewatering system during in-water work.
- Regularly monitor the watercourse or water body for signs of suspended sediment during all phases of the project and take corrective action when and where required.
- Conduct additional capture and relocation of fish if a breach to the isolation occurs during construction or the dewatering process.

3.1.4 Removal and restoration

- Remove the cofferdam and the dewatering system following completion of in-water work.
  - Remove the cofferdam from downstream to upstream, to maintain water flow away from the in-water work area while allowing equalization of water levels inside and outside of the isolation area (if working in a watercourse).

- Remove all materials from the watercourse or water body following completion of in-water work.
- Continue to manage sediment laden water during the removal process.

- Restore the bed and banks, gradient and contour affected by the project.
- Re-vegetate the affected riparian zone with native species suitable for the project site.

3.2 Pump around

A pump around (also referred to as a dam and pump method) is an in-water site isolation method that is used when it is necessary to block the watercourse from one bank to the other to undertake work in the dry. Downstream flow is maintained using pumps. A cofferdam for example, rock, steel sheet pile, concrete blocks, poly, inflatable barrier) is installed at the upstream end of the work site. If the slope of the watercourse is relatively flat, another cofferdam may be required at the downstream end to isolate the work site. Water is pumped from upstream of the isolation area to a location immediately downstream of the isolation area.

3.2.1 Installation

3.2.1.1 Pumps

- Size the pumping system to accommodate the reasonable expectation of water flow for the duration of the in-water work.
  - Have back-up pump(s) available on-site in case of unanticipated precipitation events or primary pump failure.
- Install and operate the water pumping system to transfer the natural water flow directly downstream of the in-water work site.
  - Install pump intakes upstream of the in-water work area with sufficient space to install the upstream cofferdam.
  - Install pump outlet hoses downstream of the in-water work area with sufficient space to install the downstream cofferdam.
- Install and operate the pump intakes and outlet hoses in a manner that prevents disturbance to the channel bed.
- Screen intake pipes during all phases of the project.
  - Follow the interim code of practice for end-of-pipe fish protection screens for small water intakes in freshwater.
- Install energy dissipating materials (for example, filter fabric) at the hose outlet to reduce scour and erosion of the channel substrate and bed.
- Maintain water flow at all times.
  - Operate the water pumping system continuously, whenever there is water flow, and until the in-water work is completed.

3.2.1.2 Cofferdam

- Design cofferdam elevation or crest height based on a reasonable expectation of water levels or typical ice elevations for the duration of the in-water work. It is recommended to consult a hydrotechnical

engineer).

- Install cofferdam using materials appropriate for the site conditions (for example, rock, steel sheet pile, sandbags, concrete blocks, poly, or an inflatable barrier). Do not use earthen material (for example, soil).
- Select appropriate materials to create a water-tight seal around the isolation area accounting for bank and substrate morphology and type. Do not use grout.
- Install the cofferdam from upstream to downstream, to direct flow away from the in-water work area.
- If ice is present, remove it carefully to reduce scour of the bed and banks.
- Size the dewatering system to accommodate the expected level of seepage for the duration of the in-water work.
- Install a filtration system (for example, settling basin, straw bales, filter fabric/bags) or use a vegetated area that is set-back from the watercourse or water body to receive sediment laden water from the isolation area during dewatering.

3.2.2 Dewatering

- Capture fish trapped within an isolated or enclosed area and relocate them to the same watercourse or water body.
  - Dewater gradually to reduce the potential for stranding fish.
  - Capture and relocate fish as per applicable permits.
- Screen intake pipes during all phases of the project.
  - Follow the interim code of practice for end-of-pipe fish protection screens for small water intakes in freshwater.
- Dewater the isolation area.
  - Pump sediment laden water from the isolation area into a filtration system or a vegetated area.
  - Release filtered water gradually to reduce risk of erosion.
  - Return water downstream, within the same watercourse or water body.
- Continue dewatering for the duration of in-water work or for as long as water continues to enter the isolation area.

3.2.3 Maintenance and monitoring

- Regularly inspect the water pumping system, cofferdam(s) and dewatering system during in-water work.
- Repair, as needed, deficiencies observed with the water pumping system, cofferdam(s) and dewatering system during in-water work.
- Regularly monitor the watercourse or water body for signs of suspended sediment during all phases of the project and take corrective action when and where required.
- Conduct additional capture and relocation of fish if a breach to the isolation occurs during construction or the dewatering process.

3.2.4 Removal and restoration

- Remove the pumping system, cofferdam(s) and dewatering system following completion of in-water work.
  - Remove the downstream cofferdam first (if it was required), while maintaining water flow around the in-water work area to allow equalization of water levels inside and outside of the isolation.
  - Remove the upstream cofferdam.
  - Remove all materials from the watercourse or water body following completion of in-water work.
  - Continue to manage sediment laden water flowing during the removal process.
- Restore the bed and banks, gradient and contour affected by the project.
- Re-vegetate the affected riparian zone with native species suitable for the project site.

3.3 Flume

A flume or elevated pipe (also referred to as a dam and flume method) is an in-water isolation method that is used when it is necessary to block the watercourse from one bank to the other to undertake work in the dry. Downstream flow is maintained using a pipe, and water is conveyed downstream by force of gravity. A cofferdam (for example, rock, steel sheet pile, sandbags, concrete blocks, poly, inflatable barrier) is installed at the upstream end of the work site. If the slope of the watercourse is relatively flat, another cofferdam may be required at the downstream end to isolate the work site.

3.3.1 Installation

3.3.1.1 Flume

- Design a flume or elevated pipe system to accommodate a reasonable expectation of water flow for the duration of the in-water work.
- Install the flume in a manner that prevents disturbance to the channel bed.
  - Install flume intake upstream of the in-water work area with sufficient space to install the upstream cofferdam.
  - Install flume outlet downstream of the in-water work area with sufficient space to install the downstream cofferdam.

3.3.1.2 Cofferdam

- Design cofferdam elevation or crest height based on a reasonable expectation of water levels or typical ice elevations for the duration of the in-water work. It is recommended to consult a hydrotechnical engineer.
- Install cofferdam using materials appropriate for the site conditions (for example, rock, steel sheet pile, sandbags, concrete blocks, poly, or an inflatable barrier). Do not use earthen material (for example, soil).
- Select appropriate materials to create a water-tight seal around the isolation area accounting for bank and substrate morphology and type. Do not use grout.
- Install the cofferdam from upstream to downstream, to direct flow away from the in-water work area.

- If ice is present, remove it carefully to reduce scour of the bed and banks.
- Size the dewatering system for the cofferdam to accommodate the expected level of seepage for the duration of the in-water work.
- Install a filtration system (for example, settling basin, straw bales, filter fabric, filter bags, dewatering bags) or use a vegetated area that is set-back from the watercourse or water body to filter sediment laden water from the isolated area during dewatering.

3.3.2 Dewatering

- Capture fish trapped within an isolated or enclosed area and relocate them to the same watercourse or water body.
  - Dewater gradually to reduce the potential for stranding fish.
  - Capture and relocate fish as per applicable permits.
- Screen intake pipes during all phases of the project.
  - Follow the interim code of practice for end-of-pipe fish protection screens for small water intakes in freshwater.
- Dewater the isolation area.
  - Pump sediment laden water into a filtration system or a vegetated area.
  - Release filtered water gradually to reduce risk of erosion.
  - Return water downstream, within the same watercourse or water body.
- Continue dewatering for the duration of in-water work or for as long as water continues to enter the isolation area.

3.3.3 Maintenance and monitoring

- Regularly inspect the flume, cofferdam(s) and dewatering system during in-water work.
- Repair deficiencies seen with the flume, cofferdam(s) and dewatering system during in-water work, as needed.
- Regularly check the watercourse or water body for signs of suspended sediment during all phases of the project and take corrective action when and where needed.
- Conduct more capture and relocation of fish if a breach to the isolation occurs during construction or the dewatering process.

3.3.4 Removal and restoration

- Remove the flume, cofferdam(s) and dewatering system following completion of in-water work.
  - Remove the downstream cofferdam first (if it was needed), while maintaining water flow around the in-water work area to allow equalization of water levels inside and outside of the isolation.
  - Remove the upstream cofferdam.
  - Remove all materials from the watercourse or water body following completion of in-water work.
  - Continue to manage sediment laden water during the removal process.

- Restore the bed and banks, gradient and contour affected by the project.
- Re-vegetate the affected riparian zone with native species suitable for the project site.

3.4 Diversion channel

A diversion channel is an in-water site isolation method that uses a temporary channel constructed to convey water around the isolation area and does not impede downstream flow. Use of this method is usually limited by the availability of space within which to construct a diversion channel. A cofferdam (for example, rock, steel sheet pile, sandbags, concrete blocks, and poly, inflatable barrier) is installed at the upstream end of the work site. If the slope of the watercourse is relatively flat another cofferdam may be needed at the downstream end to isolate the work site. This method is often used to maintain fish passage.

3.4.1 Installation

3.4.1.1 Diversion channel

- Design diversion channel to maintain in-situ hydraulic conditions within the channel and downstream during all phases of the project.
- Excavate a stable temporary channel parallel to, and as close as possible to the existing channel, working from the downstream end to the upstream point of diversion.
- Line the diversion channel (for example, poly, filter fabric, rock) if it consists of fine and/or erodible materials.
- Stabilize and ensure diversion channel is free of sediment before allowing water to enter.

3.4.1.2 Cofferdam

- Design cofferdam elevation or crest height based on a reasonable expectation of water levels or typical ice elevations for the duration of the in-water work. It is recommended to consult a hydrotechnical engineer.
- Install the cofferdam using materials appropriate for the site conditions (for example, rock, steel sheet pile, sandbags, concrete blocks, poly, or an inflatable barrier). Do not use earthen material (for example, soil).
- Select appropriate materials to create a water-tight seal around the isolation area accounting for bank and substrate morphology and type. Do not use grout.
- Install the cofferdam from upstream to downstream, to direct flow away from the in-water work area.
- If ice is present, remove it carefully to reduce scour of the bed and banks.
- Size the dewatering system for the cofferdam to accommodate the expected level of seepage for the duration of the in-water work.
- Install a filtration system (for example, settling basin, straw bales, filter fabric, filter bags, dewatering bags) or use a vegetated area that is set-back from the watercourse or water body to filter sediment laden water from the isolation area during dewatering.

3.4.2 Dewatering

- Capture fish trapped within an isolated or enclosed area and relocate them to the same watercourse or

water body.

- Dewater gradually to reduce the potential for stranding fish.
- Capture and relocate fish as per applicable permits.

- Screen intake pipes during all phases of the project.
  - Follow the interim code of practice for end-of-pipe fish protection screens for small water intakes in freshwater.
- Dewater the isolation area.
  - Pump sediment laden water from the isolation area into a filtration system or a vegetated area.
  - Release filtered water gradually to reduce risk of erosion.
  - Return water downstream, within the same watercourse or water body.
- Continue dewatering for the duration of in-water work or for as long as water continues to enter the isolation area.

3.4.3 Maintenance and monitoring

- Regularly inspect the diversion channel, cofferdam(s), and dewatering system during in-water work.
- Repair, as needed, deficiencies observed with the diversion channel, cofferdam(s), and dewatering system during in-water work.
- Regularly monitor the watercourse or water body for signs of suspended sediment during all phases of the project and take corrective action when and where required.
- Conduct additional capture and relocation of fish if a breach to the isolation occurs during construction or the dewatering process.

3.4.4 Removal and restoration

- Remove the cofferdam(s), dewatering system and fill the temporary diversion channel when no longer in use following completion of in-water work.
  - Remove the downstream cofferdam first (if it was required), while maintaining water flow around the in-water work area to allow equalization of water levels inside and outside of the isolation.
  - Remove the upstream cofferdam.
  - Remove all materials from the watercourse or water body upon completion of in-water work.
  - Remove liner (if applicable) and fill in and stabilize the diversion channel only after the original channel is stabilized.
  - Continue to manage sediment laden water during the removal process.
- Restore the bed and banks, gradient and contour affected by the project.
- Re-vegetate the affected riparian zone with native species suitable for the project site.

3.5 Turbidity curtain

A turbidity curtain (also referred to as a floating turbidity curtain or silt curtain) is an in-water site isolation

method that is typically used along the margins of a water body or watercourse and does not impede downstream flow. This method is also used in the marine environment. A turbidity curtain is used in areas of low or no current that are not prone to high winds and waves. A turbidity curtain has a floating headline to keep the top of the curtain above the water level and a weighted bottom, an anchor line or a ballast chain to maintain contact with the bottom substrate. They are not intended to be installed across an entire water course or water body and are different from a staked sediment control method because they are always floating. A turbidity curtain is not designed to create a dry in-water working area. Their purpose is to limit the dispersion of sediments in the aquatic environment during the construction period and to favour their deposition at the bottom of the water body, within an isolated area.

3.5.1 Installation

- Design the turbidity curtain to be an appropriate dimension to manage anticipated water levels and adequately isolate the site during construction.
- Install the turbidity curtain around the in-water work area in a manner that prevents disturbance to the bed and banks.
- Deploy the turbidity curtain in a manner that excludes fish from the isolation area.
- Capture fish trapped within the isolated or enclosed area and relocate them to the same watercourse or water body.
    - Capture and relocate fish as per applicable permits.
- Anchor the turbidity curtain to the water body substrate to deter fish from entering and reducing release of sediment laden water.

3.5.2 Maintenance and monitoring

- Regularly inspect the turbidity curtain during in-water work.
- Repair, as needed, deficiencies observed with the turbidity curtain during in-water work.
- Monitor for the presence of fish within the isolation area.
- Capture fish trapped within the isolated or enclosed area and relocate them to the same watercourse or water body.
    - Capture and relocate fish as per applicable permits.
- Conduct additional capture and relocation of fish if a breach to the isolation occurs.
- Regularly monitor the watercourse or water body for signs of suspended sediment during all phases of the project and take corrective action when and where required.

3.5.3 Removal

Carefully remove the turbidity curtain from the watercourse or water body following completion of in-water work and only after suspended sediments have settled in order to avoid re-mobilizing sediments.

4.0 Glossary

Hydraulic conditions

Streamflow characteristics at a specific location including factors such as flow depth, velocity and direction.

Marine environment

Comprises all ocean, coastal waters, and estuaries, including intertidal zones and salt water marshes, and extending, in the case of watercourses, up to the freshwater limit.

Ordinary high water mark

The usual or average level to which a body of water rises at its highest point and remains for sufficient time to change the characteristics of the land. In flowing waters (for example, rivers and streams) this refers to the 'active channel/bank-full level' which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments, it refers to those parts of the water body, bed and banks that are frequently flooded by water, leaving a mark on the land. It's where the natural vegetation changes from mostly aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (meaning, full supply level).

Qualified environmental professional (QEP)

A person experienced in identifying and analyzing risks to fish and fish habitat generated from various works, undertakings or activities conducted in or near water, and in implementing management measures to avoid and mitigate those risks. They typically possess a post-secondary degree or diploma in biological, geophysical or environmental sciences and are referred to as:

- applied scientists
- aquatic biologists
- environmental consultants
- fisheries biologists
- fisheries technicians
- fluvial geomorphologists
- natural resource consultants

Riparian zone

Area located between a watercourse or water body's ordinary high water mark and upland area. The width of the riparian zone may be further defined by provincial, territorial or municipal regulations or guidelines.

Sandbags

A term for bags that are most commonly filled with washed sand, but they may be filled with other aggregate materials (for example, pea-sized gravel).

Cat. No. Fs23-758/2025E-PDF ISBN 978-0-660-74898-6