



DRAFT: Requirements and Best Management Practices for Making Changes In and About A Stream in British Columbia

Understanding your obligations under the Water Sustainability Act and Water Sustainability Regulation



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Version 2026.01

Note to reviewers

This document does not represent published guidance for use or distribution.

The information contained in this document is draft and is intended for the purpose of engagement and feedback only.

This draft document is currently undergoing internal review. Following engagement and review, draft content and format will be edited to incorporate feedback.

It is anticipated that the final version of this document will contain changes based on feedback received. The final version will be published to the Water Policies webpage: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-policies>.

The end date for submitting feedback is September 4, 2026. Feedback received after this date is welcome, but may be delayed to future updates.

Notes

This working version contains updates to previous versions listed below. A hard copy of the working version has not been published.

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Disclaimer: Some of the information provided in this document summarizes sections of legislation. If a discrepancy arises between this document and legislation, the legislation takes precedence. While this guidance document relates primarily to the Water Sustainability Act, instream works are also regulated by a number of other federal, provincial and municipal acts, regulations and bylaws. Some of these are referenced within this document. It is an individual's responsibility to ensure they are compliant with all applicable legislation.

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Amendments or updates to this document since release:

New Version #	Date Amended	Amendment Description
2026.01	(insert date it takes effect)	Multiple changes made to reflect up to date best practices, improve support for applicants and decision makers, and alignment with regulations. Key additions include Sections 2, 3.3, 3.7, 3.9, 3.10, 3.11, & 3.13.

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Appendix: [Scope-specific Best Management Practices for CIAS under the WSA](#) (available separately)

1. Introduction

1.1. Purpose and Scope

This document describes best management practices (BMP) for making **changes in and about a stream** (CIAS) under British Columbia's (B.C.) [Water Sustainability Act](#) (WSA). It is designed to help individuals mitigate and avoid impacts to streams, stream channels, aquatic ecosystems, and private property when undertaking CIAS work. The included BMPs can be adopted or built upon in work or environmental management plans to support a WSA submission, such as a change approval application or notice of authorized change.

The purpose of this document is to:

- provide an overview of relevant legislation, legal requirements, and other expectations and considerations related to making CIAS;
- describe general BMPs that typically apply to all types of CIAS work;
- describe scope-specific BMPs for certain types of CIAS work; and,
- provide additional resources and contact information for planning.

Note: Works that will, or may, impact a stream or stream channel require permission under the WSA or must be authorized by its regulations, such as [Part 3 of the Water Sustainability Regulation](#) (WSR). You **must obtain all required permissions** to conduct CIAS before beginning work to avoid contravening the law. It is recommended that you read this document in its entirety before work begins.

IMPORTANT: Companion Document

[A User's Guide for Changes in and About a Stream](#) (the "User's Guide") is the companion guidance to this document. Refer to the User's Guide for an overview of the legislative requirements and types of permissions associated with making a CIAS. **It is recommended that individuals read the User's Guide before reading this document.**

1.2. Intended Audience

This document is intended for readers who understand basic principles related to hydrology, biology and environmental policy in B.C. It is prepared for proponents intending to make CIAS such as governments, companies, organizations or individuals. This guidance can be used during the planning, designing, undertaking, or monitoring of CIAS work in B.C. Specifically, this document is designed to help those who are:

- submitting a Change Approval application under [WSA s.11](#);
- submitting a notice of an Authorized Change in accordance with [WSR Part 3](#);
- authorized to make a CIAS under a WSA authorization (water licence or use approval);
- ordered to make CIAS by an appropriate decision-maker; or
- authorized to make CIAS by legislation.

Note: If you are unfamiliar with any of the concepts described in this guidance, please consult someone who has a foundational understanding of common CIAS disciplines (e.g., a qualified professional (QP)).

1.3. Limitations and Use

Using this Document

The approaches described in this document are not exhaustive. Projects may require different methods tailored to site-specific characteristics. This document does not replace professional judgment or experience, and cannot be relied upon exclusively to satisfy investigations into environmental requirements of a specific site.

The government of B.C. (the Province) recommends that proponents consider these BMPs when planning CIAS work and to refer to them when preparing reports (e.g., an environmental management plan) as part of a CIAS submission, such as a change approval application or notice of authorized change. These BMPs highlight factors that may be relevant when decisions are made under the WSA.

Depending on the circumstances of the project proposal, clients may choose not to adopt these BMPs or may choose to adapt these BMPs to suit site-specific characteristics and needs. These included BMPs are not legislated requirements specified by a statute. However, these **BMPs may be given legal effect** by incorporation as **terms and conditions** of an authorizing instrument like a water licence or change approval. If a BMP is not incorporated through legislation or an authorizing instrument, then it is best understood as non-mandatory guidance.

This document **supports, and does not replace, the requirements of the WSA** and its associated regulations. Individuals must ensure they are in accordance with **all applicable sections of WSA legislation** and must follow specific **terms and conditions** included in any authorizing instrument or order issued to them. Where a discrepancy occurs between what is described in legislation and what is described in this document, legislation takes precedence.

While this guidance document relates primarily to the WSA, instream works are also regulated by a number of other federal, provincial and municipal acts, regulations and bylaws. Some of these are referenced within this document. **It is an individual's responsibility to ensure they are compliant with all applicable legislation.**

To determine what sections of this document are applicable to their CIAS work, individuals may find it useful to retain the services of a QP (e.g., with adequate training and knowledge of hydrology, biology, engineering and/or environmental policies in B.C.).

IMPORTANT: Mandatory vs. Non-Mandatory

BMPs are widely accepted and recognized approaches that, when adopted and implemented, help individuals to avoid and mitigate potential adverse impacts. It is recommended that you use provincial BMPs for your work planning as applicable.

BMPs should be interpreted as **non-mandatory guidance if they are NOT made mandatory by being required in a legal instrument** (term or condition in an authorization, change approval or order). If, however, they ARE referenced as a term or condition, then you **must adhere to any BMPs required in the legal instrument.**

1.4. Terms and Definitions

Defined under the WSA

Several terms used in this document are defined in WSA legislation including:

“stream” means:

- a) a natural watercourse, including a natural glacier course, or a natural body of water, whether or not the stream channel of the stream has been modified, or
- b) a natural source of water supply, including, without limitation, a lake, pond, river, creek, spring, ravine, gulch, wetland or glacier, whether or not usually containing water, including ice, but does not include an aquifer.

“stream channel”, in relation to a stream, means:

the bed of the stream and the banks of the stream, both above and below the natural boundary and whether or not the channel has been modified, and includes side channels of the stream.

“changes in and about a stream” means:

- a) any modification to the nature of a stream, including any modification to the land, vegetation and natural environment of a stream or the flow of water in a stream, or
- b) any activity or construction within a stream channel that has or may have an impact on a stream or a stream channel.

More Definitions and Information

For other definitions and descriptions of which activities may constitute a CIAS under the WSA, refer to the [WSA](#), [WSR](#), and the [User's Guide](#).

Definitions for the Purpose of this Document

The following general definitions are not defined in legislation, but rather, are intended to provide clarity in this document as well as guidance. These terms are not defined in the WSA or WSR and the definitions below do not carry legal authority. They should not be interpreted as the definitive description of the concepts below.

“best management practice” (BMP): A recommended or suggested approach which, if followed, should serve to avoid or mitigate potential impacts of an activity or work.

“qualified professionals” (QP): This usually refers to a qualified environmental professional such as an engineer, technologist, technician or scientist, registered in a professional association regulated by the [Professional Governance Act](#). For CIAS, the QP required is often an engineer or geoscientist. Sometimes the appropriate QP may be a professional geomorphologist, hydrologist, biologist, agrologist or forester. QPs may also be qualified in other disciplines or persons with other qualifications. The decision maker may specify a QP with different or additional qualifications (e.g., expertise in floodplain geomorphology).

Professional Governance Act (PGA) and CIAS Guidance under the WSA

The PGA describes the requirements for regulatory oversight of qualified professionals (registrants) by professional associations (regulatory bodies) to ensure public protection. See the [User's Guide](#) for more information on the PGA.

1.5. Contact Us and More Information

More information on working around water in B.C. is available on the Province's [water webpage](#) or by contacting the FrontCounter BC office or regional offices. Regional offices may have additional region-specific guidance on making CIAS.

FrontCounter BC Contact Centre

Tel.: 1-877-855-3222 (Toll-Free)

Email: frontcounterbc@gov.bc.ca

Website: www.frontcounterbc.gov.bc.ca

FrontCounter BC Offices

Please call to make an appointment at one of our many locations. More information, including phone numbers for each office, is [available online](#)

1.6. The Water Sustainability Act

The [Water Sustainability Act](#) (WSA) is the main statute regulating streams and other water resources in B.C. This legislation outlines, among other things, the requirements for using stream water or groundwater, and drilling wells or other works for diversion and use of water.

The WSA regulates the specific requirements for making changes to streams and stream channels, as further described in the definition of “changes in and about a stream” (CIAS), [WSA s.11](#), and [Part 3 of the Water Sustainability Regulation](#) (WSR).

Authority to Make CIAS

CIAS activities or works **must occur in accordance with the WSA and associated regulations**.

The authority to make CIAS typically comes from:

- an authorization (water licence or use approval) ([WSA s. 9 or s.10](#));
- a change approval ([WSA s.11](#));
- an order from an appropriate decision maker (e.g., Assistant Water Manager) ([WSA s.93](#)); or
- an authorized change under [WSR Part 3](#).

What Permission do I Need?

Refer to the [User's Guide](#) for more information on the different types of permission.

Mandatory Requirements

The WSA and WSR set out legal requirements that apply to changes in and about a stream (CIAS). These requirements vary depending on the type of activity and the permission required (e.g., change approval, authorization, or notification of authorized change). This document summarizes some that are common to CIAS activities or work, as seen in Table 1. Refer to the [WSA](#) and [WSR](#) for a full description of the statutory requirements.

The requirements that apply to a CIAS activity or work depend on two main things:

1. the specific **requirements of legislation** for the CIAS work or activity, and
2. the **terms and conditions** associated with an issued authorizing instrument, such as a change approval.

Note: CIAS activities may also be regulated under federal, provincial, and municipal legislation. It is your responsibility to ensure that your project complies with all applicable requirements. Refer to the [Users' Guide](#) for more information on what other enactments and mandatory requirements can apply.

Change Approval, Water Licence, Use Approval or Order

In addition to mandatory requirements in the legislation (shown in Table 1 below), CIAS that are authorized through a WSA change approval, water licence, use approval or order also include **terms and conditions**. Terms and conditions are legal requirements that must be followed.

Table 1: Summary of statutory requirements under the WSA that apply to CIAS. Refer to the full legislation for complete details.

WSA Section	Summary
	Refer to the Water Sustainability Act for a full description.
8(1) OR (2)	The exercise of permission given under a change approval or authorization is subject to the WSA and the regulations, the terms and conditions of the change approval or authorization, the orders of the comptroller, a water manager or an engineer, and the prior rights of authorization holders and other change approval holders.
11	CIAS may only be made in accordance with a) the terms and conditions of a change approval, b) the regulations (such as Authorized Changes under Part 3 of the WSR), c) the terms and conditions of an authorization, or d) an order.
13	Decision makers are required to direct applicants of a change approval to give notice to any individuals whose rights are likely to be detrimentally affected by the proposed works, including authorization holders, change approval holders, applicants for an authorization or change approval, riparian owners, and/or land owners whose land is likely to be physically affected if the application is granted. This section also describes what information is to be shared, how it is to be shared, if or how a hearing is to be held and how the decision maker is to consider information provided by affected parties.
29	A person making CIAS must: • exercise reasonable care to avoid damage • properly inspect, maintain, and repair works • deactivate or decommission works no longer in use A person is liable to owners of land or premises for damage or loss resulting from the construction, maintenance, use, operation or failure of their works.
93	A designated WSA engineer can require construction, alteration, installation, replacement, repair, maintenance, improvement, sealing, deactivation, decommissioning or removal of any works, as well restoration or remediation of CIAS, in accordance with this section. An officer, acting in accordance with the directions of a WSA engineer, may take certain actions.
122	The termination of a change approval does not relieve the holder from liability for damage resulting from the works or their failure.

Authorized Changes (Notifications)

[WSR Part 3](#) describes CIAS that are authorized changes and the mandatory requirements relating to authorized changes. An authorized change may be made without a change approval, authorization or order unless a designated WSA engineer determines that one of these instruments is required. Authorized changes are subject to restrictions under WSR s.40 - s.45 unless specifically exempted from those requirements.

There are two types of authorized changes:

1. those that are regulated **solely under the WSR** (WSR s.39(1)); and,
2. those that are regulated in **combination with other legislation** (WSR s.39(2)-(6)).

Authorized changes require notice to a habitat officer 45 days prior to the commencement of the works per WSR s. 38, with the exception of works undertaken in s. 39 (1) (o) to (s), (2)-(6). Notice to a habitat officer provides the ministry the opportunity to review the proposed work to determine that it meets the requirements of the WSR and/or for a habitat officer to specify project-specific terms and conditions to mitigate potential impacts of the proposed works.

If a Statutory Decision Maker (SDM) considers that a proposed authorized change has the potential for significant adverse impact on the aquatic ecosystem or the nature of the stream, including the flow of water in the stream or the stream channel, then the SDM has authority under WSR s.37(2), to require the proponent to apply for and obtain a change approval or authorization despite meeting the criteria for an authorized change.

Important: The terms and conditions provided by a habitat officer in relation to an authorized change are legal requirements that must be followed. Refer to the [User's Guide](#) for more information on authorized changes.

Table 2 provides a summary of the standard requirements applicable to authorized changes, as listed in WSR Part 3.

Table 2: Summary of statutory requirements for authorized changes under WSR Part 3.

WSR Section	Summary
	Refer to the Water Sustainability Regulation (Part 3) for a full description.
37(2)	If an engineer considers that an authorized change may have a significant adverse impact on the nature of the stream (including the flow of water in the stream) or the stream channel, they may require an application for a change approval or an authorization to be made in connection with the change.
38	A person proposing to make an authorized change, other than an authorized change described in section 39 (1) (o) to (s), (2) and (5), must provide notice (i.e., a notification) to a habitat officer at least 45 days before beginning the authorized change, and obtain from a habitat officer a statement of terms and conditions.
39	For a CIAS to be an authorized change, the CIAS must meet the criteria, specifications and standard requirements outlined in this section and, where applicable, the associated legislation outlined in this section including but not limited to the Forest and Range Practices Act , Mines Act , and Energy Resources Activities Act (ERAA) .
40	A person must not enter onto any private land or premises, or use any privately owned works, without the written consent of the owner of the land, premises or works.
41(1)	A person making or proposing to make an authorized change must provide information requested by an engineer, officer or habitat officer, unless it is a CIAS activity authorized by permit under the Energy Resources Activities Act (ERAA) .
41(2)	Once an authorized change begins, it must be completed without delay unless the delay is necessary to preserve the nature of the stream or stream channel.
41(3)	An authorized change must be designed, constructed and maintained so that the change does not pose a significant risk of harm to public safety, the environment, land or other property.

42	A person who fails to comply with Part 3 must report the non-compliance within 72 hours and comply with the direction of an engineer and habitat officer.
43	A person making an authorized change must take measures to protect water quality as described in this section, including not causing significant adverse impact on the ambient water quality of the stream, etc.
44	A habitat officer may provide a written statement specifying terms and conditions for authorized changes in accordance with this section and the person making the authorized change must adhere to these terms and conditions. If the person making the authorized changes causes damage to the aquatic ecosystem, they must report the damage to a habitat officer within 72 hours and repair the damage as directed by the habitat officer. In the case of damage arising from activities under Energy Resources Activities Act (ERAA) permit, the damage is to be reported to the B.C. Energy Regulator (BCER) .
45	A person who is making an authorized change, other than a change described in s.39(1)(o) to (s), (2) or (5), must ensure that the water supply and works of other water users will not be adversely affected. If the water supply may be adversely affected, the person proposing to make the change must provide three days' notice and provide an adequate supply of water to the persons affected.

2. Project Planning & Design Best Management Practices

2.1. Rationale – Understanding Purpose and Need

To reduce the risk of unnecessary impacts to environmental values and/or safety to people, infrastructure or property, water managers seek to understand the rationale of each proposed project. Including a clear project rationale as part of your application is strongly recommended, and in some cases, may be required by a Water Manager.

2.2. Impact Avoidance

A general principle of planning work near water, such as in and about a stream, is that environmental impacts should be avoided or mitigated to the greatest degree possible. Decision makers will consider how individuals have planned to mitigate environmental impacts when reviewing an application or notice of an authorized change.

When planning a project near water, individuals should follow the environmental mitigation hierarchy (as summarized in Figure 1). It is expected that all feasible measures are considered and applied at one level before moving to the next. An application may not be approved if sufficient planning to avoid environmental impacts is not demonstrated.

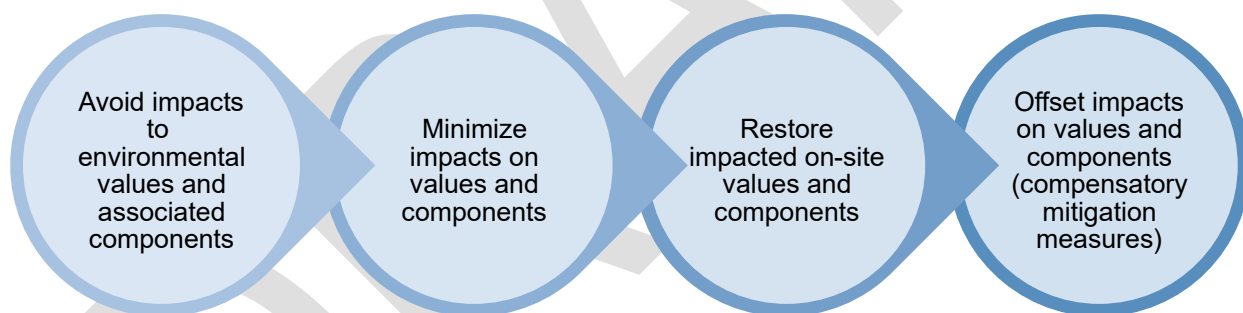


Figure 1: Environmental mitigation hierarchy.

The BMPs described in Section 4 of this document and the Appendix provide operational approaches for environmental mitigation that can be incorporated into your work planning and CIAS submission. Guidance and strategic approaches on how to incorporate environmental mitigation in work planning is available in the [Environmental Mitigation Policy and Procedures](#).

2.3. Project Objectives & Benefits

Given the inherent risks associated with working in or about streams, it is important that the benefits of the proposed changes are clearly understood and appropriately considered. Generally, decision makers seek to understand the following:

- If and/or how the proposed changes will contribute positively to socioeconomic outcomes such as:
 - Public safety (safe transportation, emergency access/egress, etc.);
 - Public infrastructure (public transportation, healthcare, education, etc.);

- Social priorities (housing needs, etc.); or
 - Economic development opportunities (jobs, public revenue generation, etc.); and
- Whether the project has support or alignment with plans or priorities from other levels of government (e.g., local, Indigenous, or federal), such as:
 - community or land use plans
 - permits or approvals
 - letters of support

2.4 Safety of People, Property and/or Infrastructure

Poorly designed or constructed works in or about streams can pose a significant risk to the safety of people, infrastructure or property. Decision makers seek to ensure that works are designed to an appropriate standard to avoid creating or exacerbating risks to public safety, infrastructure, property or the environment. The level of detail and supporting information provided in an application should be commensurate with the scale, complexity, and potential impact of the proposed works. Where applicable, inclusion of public safety considerations and how risks have been addressed may support review of the application.

The following considerations may support a decision maker in understanding the scale and risk associated with a proposed project:

- If an appropriately qualified professional has been a part of designing or overseeing the works to an acceptable safety standard;
- If hydraulic capacity of the stream and floodplain will be impacted by the works;
- Whether or not anticipated impacts from climate change on stream flows and channel shape and capacity were considered in the design process;
- Potential impacts on the stream channel, and aquatic and riparian ecosystem; and
- Potential direct and indirect impacts of the works on water users, the public, and infrastructure have been appropriately considered and mitigated through project design.

2.5 Environmental/Ecological Considerations

Potential Impacts

Changes in or about a stream may affect streams and aquatic and riparian ecosystems by altering habitat, natural channel processes, and connectivity, including but not limited to:

- permanent loss of riparian vegetation that supports healthy stream banks, organic contributions, and microclimate conditions;
- permanent hardening of stream banks resulting in the loss of habitat features and the inadvertent transfer of energy to downstream reaches;
- inadvertent release of substances (e.g. fine sediments, metals, PAHs, etc.) into the stream that can be deleterious to aquatic life;
- increased risk of forming a migration barrier for fish, wildlife and/or stream sediments under certain flow conditions;
- reduced opportunity for a stream to naturally flow and/or laterally migrate; and
- temporary or permanent impacts to the stream channel and ecosystem complexity.

Mitigation

To ensure potential impacts to streams and aquatic ecosystems are minimized, proposed changes in or about streams should be designed to:

- Avoid disturbance of sensitive habitats and stream channel features;
- Avoid disturbance to stream channel bed and banks;
- Minimize aquatic and riparian footprint required to conduct works;
- Limit impacts to onsite and adjacent aquatic ecosystems and riparian areas; and
- Include opportunities to enhance the surrounding environment or to reduce the impact of the existing structures.

Compensation

Section 16 of the WSA clarifies that if the decision maker considers that the proposed changes in and about a stream are likely to have a significant adverse impact on the water quality, water quantity or aquatic ecosystem that cannot be fully addressed in the design of the project itself, the decision maker may consider other measures to compensate for the residual impacts. Section 17 of the WSA requires that proposals with potential to cause a significant adverse impact on any protected fish population or the aquatic ecosystem of a designated sensitive stream must be adequately compensated for.

Approaches to compensating for long-term impacts should be completed to achieve no net loss or greater with improved site conditions. Decision makers may consider factors to help guide the appropriate types and scales of compensation or mitigation, which include but are not limited to:

1. Watershed condition,
2. Local functioning condition of a stream, river, wetland or reach, and
3. Presence of critical or unique habitat or features for priority or at-risk species and populations.

In heavily impacted watersheds, mitigation or compensation may focus on targeting cumulative effects that are driving the hydrological or ecological processes giving rise to the functional condition of the stream. In watersheds with limited historic cumulative effects, mitigation or compensation may focus on addressing localized impacts in the stream.

Land use, watershed and integrated stormwater plans may be informative in directing appropriate restoration or compensation activities. These plans may have explicit or implicit watershed-scale objectives around riparian conditions, landcover metrics, and stormwater practices that should be considered for strategic approaches to watershed management or restoration. Compensation and mitigation efforts should be appropriately managed and effective in achieving their stated objectives.

3. Operational Best Management Practices

Once a project has been properly rationalized and designed, proponents must consider how to reduce the impacts of the operational construction and/or works in the stream. These activities can involve land clearing, the use of heavy machinery and the introduction of foreign materials in or adjacent to streams.

Scope-specific Best Management Practices

Scope-specific BMPs include best practice approaches for more specific CIAS activities and works in B.C. that are often unique to a given project and are not as broadly applicable as General BMPs. All **Scope-specific BMPs and a useful one-sheet checklist** is available in the [Appendix](#) to this document.

IMPORTANT: Scope-specific BMPs applicable to your project are intended to be **used together with every General BMP** listed in this document. General BMPs are typically recommended for CIAS projects in B.C., and Scope-specific BMPs include provisions that complement the general approaches for particular CIAS activities.

3.1 Environmental Monitoring of Activities or Works During Construction

Environmental monitoring during construction ensures that an authorized activity follows the requirements of legislation and the terms and conditions of an authorizing instrument, such as a change approval or a licence. It is important that the person undertaking any environmental monitoring has the appropriate qualifications and expertise. This will depend on the circumstances but could involve monitoring by a qualified professional with adequate training and knowledge of hydrology, biology, engineering and/or environmental policies in B.C. to determine whether these requirements are properly considered in planning activities or works and followed in implementation. Depending on the nature of the activities or works, an environmental monitor may be on-site continually or may make periodic site visits.

Best Management Practices for Environmental Monitoring During Works or Construction

The following provisions represent BMPs for monitoring practices in relation to CIAS activities or works under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

- a) An environmental monitor must be retained with respect to CIAS who is appropriately qualified to monitor the activities and works to assure compliance with WSA and WSR legislation and the terms and conditions of the authorizing instrument.
- b) CIAS activities and works must be monitored by an environmental monitor during any period where there is a risk that they may adversely impact the proper functioning of the stream, stream channel or aquatic ecosystem, or that they may be inconsistent with the terms and conditions of the authorizing instrument.

- c) The holder of an approval or authorization, a proponent or site manager must confer an environmental monitor with the authority to halt and modify work activity if it is necessary to prevent or manage a risk to the stream, stream channel, aquatic ecosystem, private property or authorized uses of water.
- d) A copy of authorizing instruments authorizing the CIAS (e.g., change approval or licence) and relevant BMPs related to the work must be available at the worksite at all times.
- e) A pre-construction meeting must be held between the approval holder or proponent, site manager, environmental monitor, and any contractors managing activities and works to ensure a common understanding of the legal requirements and relevant BMPs for the project.
- f) Within 60 days of the project's completion, the environmental monitor must:
 - i complete and submit at least one copy of an environmental monitoring report to the person authorized to make the CIAS (e.g., the approval holder, proponent or key contractor); and,
 - ii make the report available at the request or direction of a WSA official or as required by the authorizing instrument.

Environmental Monitoring Report Components

Table 3 lists common components for preparing an environmental monitoring report. Your monitoring report may differ, depending on the characteristics of the project or specific directions provided by an authorizing instrument.

Table 3: Common environmental monitoring report components.

Section	Components
Project Description	☐ Project name ☐ Site location ☐ Description of activities or works (CIAS) ☐ Description of stream (e.g., channel width, wetted width, depth) ☐ Person or organization undertaking the activities or works, including contact information ☐ Proponent, approval holder or authorization holder, including contact information
Site Inspections	☐ Monitoring characteristics (e.g., streamflow, water quality measurements) ☐ Frequency of monitoring ☐ Person(s) conducting the monitoring ☐ Dates and times of monitoring ☐ Monitoring locations ☐ Weather at the time immediately preceding each monitoring visit ☐ Summary description of each inspection visit, as applicable
Construction Stage	☐ A brief description of the CIAS activities or works that occurred and how they fit into the larger work project, if relevant.
Mitigation Measures/	☐ Review of the mitigation measures and/or compensatory mitigation measures required by an authorizing instrument or listed in a client's

Structures	environmental management plan, and whether these measures were achieved.
Salvage Results	☐ Results of any fish and amphibian salvages conducted prior to activities or works, if applicable. This section should include at a minimum the specific site location(s), list of species, and numbers salvaged.
Comments/ Other	☐ Description of any incidents related to environmental issues or emergencies that occurred on the site and how they were monitored, mitigated and remediated. ☐ Description of any outstanding mitigative measures or monitoring programs needed for the completion of site restoration.
Photographs	☐ Representative date stamped photographs should be taken pre-construction, during each site inspection, during and after all incidents, and after completion of site restoration.

3.2 Minimize Riparian Impacts

The removal of riparian vegetation is detrimental to the proper functioning of streams. In some cases, the removal of riparian vegetation is inevitable, creating potential conflict between environmental values and human interests. It is important for projects to make and implement a plan to protect vegetation during CIAS works.

Authorized Change under WSR Part 3

It may be possible to conduct mechanical or manual cutting of annual vegetation within a stream channel as an authorized change if the work is done in accordance with [WSR s.39.\(1\)\(i\)](#) under [Part 3 of the Water Sustainability Regulation](#) (WSR). If the project specifications **do not meet** WSR requirements, and the work is not authorized under another section of WSR Part 3, then the work may require a change approval or authorization. WSR s.39(1)(i) covers cutting of annual vegetation, cutting and removal of perennial riparian vegetation is not authorized under this section.

Best Management Practices for Riparian Areas

The following provisions represent BMPs for managing riparian vegetation when conducting CIAS activities under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

- a) Areas of work and access routes must be clearly marked onsite prior to starting work, e.g., for work, staging, storage, access, and the route taken must minimize disturbance to riparian vegetation.
- b) No riparian vegetation is removed other than what is needed for site access and to complete the CIAS activities or works.
- c) Removal of roots or trees that are embedded in the stream bank must be avoided, and root protection zones must be described in advance for any tree that can be retained. These trees must be delineated and protected at the onset of works.
- d) Vegetation clearing for site and work area access must be limited by using existing trails, roads or cut lines as access routes.
- e) Trees and shrubs with roots embedded in the stream or stream channel are only removed if there are concerns about human safety or the activities or works cannot be completed without their removal.
- f) Salvage seed or live stakes from the natural vegetation prior to disturbance for site restoration following the work.
- g) If vegetation on both sides of the stream or stream channel must be cleared, strategies must be used to limit fording by equipment. Removal of trees used by birds and other wildlife while they are breeding, nesting, roosting or rearing young should be avoided to the greatest extent possible. Protected trees (e.g., raptor nest sites) must not be removed.
- h) Where proposing to top or remove trees, a person who is appropriately qualified to assess impacts to avian species must be consulted (e.g., a professional biologist).
- i) Felling or topping trees must be carried out by someone who is appropriately qualified (e.g., a professional forester) to assess and mitigate the impact of the activities or works.
- j) Pruning or removing tree limbs must be prioritized over removing the entire tree.

- k) Falling or pruning of trees must occur in a manner that will not disturb aquatic organisms and does not damage the banks and the bed of the stream.
- l) Large wood debris and the stumps of large diameter trees must be left in place where it is safe to do so.
- m) Micro-habitats such as tree snags, basking logs, and rock piles (hibernacula) must be retained on the landscape where it is safe to do so.
- n) Tree protection measures are used, including horizontal root protections and vertical trunk and crown protections, where potential adverse impacts to tree parts are identified.
- o) Trees are felled away from the stream or stream channel, unless there are public or worker safety concerns. Trees that are felled into the stream or stream channel are removed during the instream work timing window in a manner that does not damage the bed or banks of the stream (stream channel) and are placed at a site where they will not enter the stream channel during high flows.
- p) Removal of riparian trees and shrubs using hand tools/saws is preferable over use of heavy equipment to minimize ground disturbance. Where equipment must be used, a machine-free zone adjacent to the stream or stream channel to protect the bank from ground compaction is followed, where practicable.
- q) Wildlife is excluded (such as through fencing) from the project's disturbance area where activities or works could adversely impact wildlife habitat.

3.3 Instream Isolation and Temporary Diversion of Flows

This section describes best management practices (BMPs) to protect aquatic ecosystem habitats when instream work temporarily requires dry or isolated conditions to install or repair infrastructure under the WSA.

Temporarily isolating work areas from streams is a mitigation strategy to reduce potential impacts to the stream, stream channel and its aquatic ecosystem environment. Work area isolation techniques maintain the flow of the stream while stopping water from flowing through an active work area or contain water within an active work area. Isolation measures can significantly affect water quality and aquatic species, so a robust plan to avoid or mitigate environmental impacts must be developed in advance of construction.

A Qualified Professional should be retained to determine the most appropriate design, construction method, operational approach, and removal method, based on the site-specific conditions and circumstances

Authorized Changes (Notifications)

Temporary diversion around or through a worksite can be completed as an authorized change in support of specific bridge and pier related works if the work can be done in accordance with [Part 3 of the Water Sustainability Regulation](#) (WSR). [WSR s.39\(1\)\(w\)](#) specifically outlines the criteria to be met for the construction of a temporary diversion around or through a worksite to be considered authorized changes under WSR, including design specifications. If the design specifications do not meet WSR requirements, and the work is not authorized under another section of WSR Part 3, then the work requires a change approval, water licence, order, or use approval in order to be authorized to proceed.

Worksite Isolation Methods

Isolation of the worksite is typically accomplished by one of the following methods. A summary of the common uses and advantages/disadvantages for each is summarized in Table 4 below.

Cofferdam Method

This method involves isolating the work area in the stream by installing a temporary dam (e.g., aqua-dam, sheet piling, sandbags, plywood, etc.) which is placed to enclose a portion of the stream channel, including bed and banks (such as of watercourses and lakes) where the work is taking place. Cofferdams can also be constructed to completely encircle a work area that is in the middle of a stream/stream channel (e.g., bridge pile).

Dam and Flume Method

This method involves isolating the work area in the stream by installing a temporary upstream dam (e.g., aqua-dam, sheet piling, sandbags, plywood, etc.) placed perpendicularly across the entire stream, upstream of the work area. Where necessary, a temporary dam on the downstream side of the work area is also used to prevent the work area from back flooding. The stream's natural flow of water is conveyed passively across the isolated area by flume or temporary pipe (plastic or metal), discharging the water back into the stream channel below the downstream dam, mirroring the quantity and rate of water inherent to the stream.

Dam and Pump Method

This method involves isolating the work area in the stream by installing a temporary upstream dam (e.g., aqua-dam, sandbags, etc.), placed perpendicularly across the entire stream and upstream of the work area. Where necessary, a temporary dam on the downstream side of the work area is also used to prevent the work area from back flooding. The water is pumped, using one or more pumps, to move water around the isolated area and discharge it back into the stream below the downstream dam.

Stream Diversion Method

This method involves isolating the work area in the stream by installing a temporary upstream dam (e.g., aqua-dam, sandbags, plastic sheeting, etc.) which diverts the flow of water in the stream into an existing off-channel or a newly excavated diversion channel. Where necessary, a temporary dam on the downstream side of the work area is also constructed to prevent the work area from back flooding. The natural flow of water present in the stream is conveyed passively around the isolated area through the diversion channel, discharging the water where the diversion channel rejoins the stream channel below the downstream dam.

Sediment Curtain Method

This method involves the isolation of the worksite in a lake or stream (including features, such as watercourses and lakes) with slow moving water by temporarily installing a heavy non-permeable “curtain” that’s suspended at the top with buoyant floats and weighted at the bottom to seal sediment within a work area.

Table 4: Work area isolation method summary.

Method	Common Applications	Advantages	Disadvantages
Cofferdam	- Instream bridge piers - Boat launches - Large pipeline crossings	- Works well for larger bodies of water - Can be used for long term projects - Can be used to dam off a portion of a stream or lake - Fish passage may continue around the site	- Tend to be more expensive to install, particularly if using sheet piles - Additional measures may be required if pile driving to prevent vibrations causing death to fish - Can be difficult to get a good seal if substrate is cobbles and/or boulders
Dam and Flume	- Culverts - Bridges - Pipeline crossings	- Can be left in place for longer term projects - May support fish passage with careful design	- Requires sufficient gradient for passive flow around the site - Requires careful design and installation to support fish passage

			• Could result in fish stranding during installation; salvage is required
Dam and Pump	• Small stream crossing replacements (culvert to culvert or culvert to bridge) • Small pipeline crossings	• Easy to install • Works well for smaller streams	• Not ideal for projects longer than a day (i.e., require overnight pumping) • Not recommended for freezing temperatures • Pumping requires continuous monitoring to ensure there is no downstream fish stranding • Possible fuel and oil spills from pumps or generators • Fish passage is blocked and could result in fish stranding during installation; fish salvage is required • Large streams require excessive pump sizing and could cause excessive erosion if discharge is not controlled
Stream Diversion	• Bridges • Larger culverts	• Works well for diversions over multiple days • Can be used during freezing conditions • Works well for streams of all sizes • Typically maintains fish passage	• Requires additional area to be allocated to excavation and restoration activities • Area required for diversion may infringe on construction site activities
Sediment Curtain	• Bank Protection projects	• Allows projects to work “in the wet” • Curtains can often be reused	• Care must be taken when removing the curtain to avoid sediment flush • May not work well with all substrates

	- Stream channel maintenance - Boat launches	Typically maintains fish passage around the work area	
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Best Management Practices for Instream Work Area Isolation and Temporary Diversion of Flows

The following provisions represent BMPs for five commonly used work area isolation techniques: cofferdams, dam and flume method, dam and pump method, stream diversion, and sediment curtain as CIAS under the WSA. Best management practices relevant to all methods are described first, followed by practices specific to each of the five techniques. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the **corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Planning and Set-up

- Determine the diversion method that will work best for your site and duration of project. If the site is dry at the time of construction, groundwater can be encountered that must be managed.
- The diversion must be sized to account for additional flows and water levels that can result from precipitation events, snow melt, or wave action in the case of lakes.
- Determine the best area to set up the diversion to avoid high quality habitat (e.g., spawning grounds) and natural occurring areas of instability (e.g., braided channels, steep eroding banks, alluvial fans, etc.).
- When diverting water around a site, the natural rate and quality of water flow must be maintained at all times.
- The isolated work area must be defined and marked, with sufficient space to complete all of the required construction work, the placement of pumps and hoses, and for equipment to move around.
- All materials and equipment must be on site prior to commencing work to minimize the amount of time the diversion is in place; this includes contingencies such as extra pumps.

Dewatering the Isolated Area

- If the area is in a fish-bearing stream, a fish and wildlife salvage must be completed first.
- Pumps must be set in spill trays while working within thirty (30.0) metres of the water and monitored regularly to ensure they are operating continuously, particularly for dam and pump sites.
- Sumps must be installed to allow pumps to capture sediment laden water and pump it to a vegetated area to allow for sediment to settle or filter out prior to re-entering the stream.
- The outlet of any diversion (hose outlet, flume, pipe, diversion channel etc.) must include energy dissipation measures to protect against erosion where the water rejoins the stream. This can include energy dissipaters such as diffusers, sandbags, plastic, and riprap.

- k) Downstream water flow levels must be sufficient at all times to support the aquatic life present.

Work Completion and Site Remediation

- l) Water must be returned to the stream channel slowly to avoid flushes of sediment. A pump can be used downstream to temporarily direct sediment-laden water away from the stream until it clears.
- m) The work area must be deactivated and recontoured to the original ground as best as possible (e.g., restore sumps, rutting and depressions if present).

Installation and RemovalCofferdam

- n) If sheet piles are being driven in fish-bearing water, additional exclusion measures such as bubble curtains must be used as required to protect fish from vibrations and shock waves.
- o) When installing a cofferdam in a flowing stream, work must start at the upstream end and progress downstream until the work area has been isolated from the stream. The upstream face must be installed at an angle to the flow rather than perpendicular to deflect flow from the site.
- p) Dam installation in flowing streams must not constrict the channel such that it unsafely impedes the flow of water or restricts fish passage.
- q) When installing a dam from the shore in still water (e.g., lakes) systems, work must take place from the shore in an outward direction until the work area has been isolated from the water.
- r) The ends of the cofferdam must be stable prior to working in the isolated work area.
- s) When removing the dam in flowing systems, work must be done from the downstream side of the work area in an upstream direction until the cofferdam is completely removed.
- t) When removing the dam in non-flowing systems, work must be done towards the bank in an inward direction until the until the cofferdam is completely removed.

Dam and Flume Method

- u) The flume must be installed parallel to the steam. Depending on the volume of water, multiple flumes/pipes can be used.
- v) An upstream dam must be built perpendicular to the stream at the upstream end of the flume to direct water towards it.
- w) A downstream dam must be installed, perpendicular to the stream, when necessary to prevent backwatering; and it must be constructed upstream of the flume outlet.
- x) The dam(s), flume, and associated works must be removed once the water is returned to the stream channel.

Dam and Pump Method

- y) The pump intake(s) must be located upstream of the dam, preferably in a natural pool or depression in the streambed.
- z) The hoses must be placed where they will not be in the travel path of equipment.

- aa) The dams must be constructed upstream and downstream of the worksite isolation area once the pumps and hoses are set up and ready.
- bb) The pumps must be monitored full time during diversion to ensure they are fuelled and maintain flow downstream at all times.

Stream Diversion Method

- cc) Existing off-channels or ditches must be used as a diversion channel as practicable. If no existing off-channel or ditch is available, a new diversion channel may be excavated that ties into the existing stream channel and is sized for the flows with contingency capacity. For bridge projects, the trench excavated for riprap placement must be used prior to riprap placement if it is of sufficient size. The channel must be excavated starting from the downstream end and working upstream.
- dd) The diversion channel must be lined (e.g., with rock, geotextile, plastic) and weighted down with rock or sandbags to prevent erosion.
- ee) A dam to help divert water to the diversion channel must be installed upstream prior to moving the water to the diversion channel. A dam must be installed downstream to prevent water back flooding the work area if necessary.
- ff) After the work is completed, water must be allowed to flow slowly into the stream channel. A pump must be used at the downstream end to collect sediment-laden water and pump it away from the stream. Once the water clears, the full flow must be returned to the stream and the dams and diversion channel deactivated.

Sediment Curtain Method

- gg) If installing a sediment curtain in moving water, installation must begin at the upstream end by attaching it securely to a fixed anchor on shore.
- hh) The sediment curtain must encircle the entire work site allowing enough room for works to occur such that the curtain does not need to be moved during the project.
- ii) The top of the sediment curtain must not be allowed to become submerged during any anticipated water levels. The bottom of the sediment curtain must be 'fit' to the substrate as well as practicable to contain all sediment within the worksite.
- jj) The sediment curtain must not be physically impacted by equipment or flows that could allow turbid water from inside of the worksite to escape into the stream (e.g., watercourse or lake).
- kk) Prior to removing the sediment curtain, as much sediment as possible must be removed and the site must be stabilized.
- ll) The sediment curtain must be removed slowly, starting at the downstream end while constantly maintaining control of it.

Additional Resources

- [Projects Near Water](#), Fisheries and Oceans Canada (DFO)
- [Fish Stream Crossing Guidebook, Revised Edition](#), FLNRO, MoE, 2012
- [B.C. HabitatWizard tool](#)
- [Best Management Practices for Pile Driving and Related Operations](#), BC Marine and Pile Driving Contractors Association, 2003

3.4 Reduce Risks to Water Quality

Water quality supports the proper functioning of streams and aquatic ecosystems and is relied upon by downstream water users. Degradation of water quality can adversely affect aquatic life and users who depend on these sources for drinking water, irrigation, and other purposes. Water quality may be impacted by a range of factors, including contaminants, sedimentation, turbidity, and changes in pH, dissolved oxygen, and water temperature.

Best management practices (BMPs) should be implemented to avoid adverse impacts to water quality and to protect both aquatic ecosystems and downstream water users. This includes complying with applicable legislation, such as the *Water Sustainability Act*, which prohibits the introduction of foreign matter into a stream in quantities or manners that could cause significant adverse impacts to the stream or stream channel, existing water uses, property of riparian owners, hydraulically connected aquifers, or the aquatic ecosystem.

The [BC Approved Water Quality Guidelines: Aquatic Life, Wildlife and Agriculture](#) provide guidelines for water quality and contaminants in streams and aquatic ecosystems.

Best Management Practices for Water Quality

- a) Work during favorable weather and low water flow conditions by avoiding work during wet and rainy periods;
- b) Use equipment that is clean of contaminants (eg. biodegradable, non-toxic hydraulic fluids, etc.);
- c) When working within the wetted perimeter of the channel, surficial water flow at the crossing location is to be controlled (eg. coffer dams etc.) such that works are conducted in the dry as much as possible;
- d) Apply sediment and erosion control practices on and around exposed soils or fill;
- e) Install effective erosion and sediment control measures before starting work to prevent the entry of sediment into the watercourse;
- f) Inspect erosion and sediment control measures regularly to ensure they are functioning properly;
- g) Make all necessary repairs to erosion and control measures if any damage occurs and to maintain functionality;
- h) Ensure all material introduced is free of substances deleterious to aquatic life;
- i) Complete works, as much as possible, in the dry (eg. using cofferdams to diver stream flows, etc.);
- j) Clean and remove debris and sediment from the bridge deck and drainage devices and dispose of the material in a way that will prevent it from entering the watercourse;
- k) Install ground covers and/or vertical drapes such as sheets of plastic or air-permeable cloth (e.g., burlap or canvas) prior to removal activities to capture falling debris (floating barges may be deployed in watercourses to capture falling debris, such as paint flakes and dust);
- l) Avoid use of toxic liquid paints, primers, solvents, degreasers and rust inhibitors;
- m) Use water without cleaning agent additives if grease film removal is necessary;
- n) Waste materials collected during removal and application of protective coatings operations (e.g., blasting abrasives, paint particles, rust and grease) should be collected and retained for disposal at appropriate locations. Waste materials must not be deposited into watercourses or riparian areas;
- o) Minimize spill potential by storing, mixing and transferring paints and solvents on land; and
- p) Equipment must never be cleaned in watercourses and contaminated water flowing from onshore cleaning operations must not enter the watercourse.

q) Follow the [BC Approved Water Quality Guidelines: Aquatic Life, Wildlife and Agriculture](#)

Additional Resources:

- [Approved water quality guidelines](#), BC Government
- [Water Quality](#), BC Government
- [Water Quality Parameters](#), BC Government

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3.5 Erosion and Sediment Control

Erosion is defined under the [WSR s.1](#) as the wearing away by the action of water of the stream channel or the materials used in works. Sedimentation, while not defined under the WSR, is commonly understood as the action or process of forming or depositing sediment (matter that settles to the bottom of a liquid). The initial act of clearing vegetation and exposing erodible soils to rain (impact erosion) or flowing water is the principal source of sedimentation in streams.

Managing the erosion potential of a site as a first step and retaining as much of the riparian area as possible are the best ways to reduce sedimentation during changes in and about a stream (CIAS). Where riparian disturbance is unavoidable, individuals should adopt measures to minimize sediment run-off into streams to protect water quality and the surrounding aquatic ecosystem.

Best Management Practices for Erosion Control

The following provisions represent BMPs for mitigating sedimentation, runoff, and erosion associated with CIAS activities under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

- a) Equipment must operate from outside the stream channel, wherever possible.
- b) Fill, excavated material, debris, or other erodible materials must be contained and placed at least thirty (30.0) metres outside of the bank of the stream and to an area where the material will not result in sediment run-off into the stream or another stream.
- c) Materials that are placed on the stream banks or within the active stream channel or floodplain (such as rock or riprap) must be free of fine particulates, overburden, debris, and or other substances that are potentially harmful to aquatic life and water quality.
- d) Machinery must be operated outside the bank of the stream and away from the edge of the streambank to avoid soil compaction, disturbance and potential transport of sediments to the stream channel.
- e) Sediment, runoff, and erosion control measures must be developed and implemented before CIAS activities and works begin, including details on the steps that will be taken to reduce sedimentation when significant precipitation or overland flow events occur. Efficacy of these measures is monitored during construction and adjustments are made, if needed.
- f) If activities or works occur during periods of heavy or persistent precipitation, these must be halted if sedimentation from them poses a significant risk of harm to the stream, stream channel or aquatic environment.
- g) Ditches, water bars, or water diversions in the work area must be constructed so they do not directly discharge sediment-laden surface run-off into the stream unless the discharge is authorized (e.g., waste discharge permit).
- h) Any diverted flow is carried to a vegetated area or area (e.g., settling basin) where fine particulates and/or sediment can settle out before the water can be returned to the stream.
- i) Disturbance to existing vegetation on and adjacent to the stream or stream banks must be avoided.

- j) Where excavated or disturbed material remains within the work area, these must be graded to a stable angle of repose and sediment mobilization mitigation measures must be employed.

Additional Resources

- [Erosion and Sediment Control Association of British Columbia](#)
- [International Erosion Control Association](#)
- [B.C. Water Quality Guidelines](#)

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3.6 Reducing the Risk of Discharge of Deleterious Substances and Spill Management

[WSA s.46](#) prohibits the introduction of debris, refuse, carcasses, human or animal waste, pesticides, fertilizers, contaminants or another matter or substance into a stream, stream channel or an area adjacent to a stream. These are often referred to as deleterious substances. Unless allowed by a permit or piece of legislation, a person must not introduce or allow the introduction of such contaminants or substances into a stream, a stream channel or an area adjacent to a stream in such quantity or manner as to cause significant adverse impact to:

- the stream or stream channel,
- the existing uses of the water from the stream,
- the property of riparian owners on the stream,
- an aquifer that is hydraulically connected to the stream or the existing uses of the water from that aquifer, or
- the aquatic ecosystem of the stream.

Common spills that contravene the law include but are not limited to gas leaks, oil, diesel or chemical spills and any other release of hazardous material to the environment. The [Environmental Management Act](#) and the federal [Fisheries Act](#) also prohibit the introduction of deleterious substances into a watercourse without proper authority.

Spill Management

A spill of a deleterious substance into a stream may trigger the provisions of the [Environmental Management Act \(EMA\), Part 7, Division 2.1 – Spill Preparedness, Response and Recovery](#) that both require responsible persons and allow the government to take immediate action to prevent (or prevent the continuation of) the hazard or threat caused by the spill and resolve immediate and long-term impacts. Depending on the circumstances, other permissions may also be required. If a spill response action would cause more harm to the stream, stream channel or aquatic ecosystem than the threat or hazard created by a spill, it is not considered necessary, and is not required by EMA Division 2.1.

Ongoing or subsequent remediation work to the stream, stream channel and the aquatic ecosystem will need to be authorized as a CIAS under the WSA. The [Spill Reporting Regulation](#) prescribes the information that is required, as well as the time and manner in which it is required, for reporting a spill.

The responsible person(s) acting under government direction may take necessary spill response steps without obtaining normally required WSA change approvals, if:

- immediate response action is needed to prevent, or prevent the continuation of the hazard or threat caused by the spill;
- the immediate response action is a CIAS that is not authorized by WSA/WSR; and,
- any harm to the stream, stream channel or aquatic ecosystem caused by the response action is outweighed by the hazard or threat caused by the spill.

Spills or Incidents

The [BC Energy Regulator \(BCER\)](#) incident and spill reporting guidelines and instructions require the ERAA permit holder to report incidents to the BCER within 24 hours.

Reporting Spills

Report spills immediately – Mandatory at all times

When a spill occurs, or there is the risk of one occurring, it must be reported immediately to Emergency Management British Columbia (EMBC) by calling **1-800-663-3456**. More information can be found on the government's [Report A Spill](#) webpage.

It is best practice to notify a WSA engineer and habitat officer of spills as soon as practicable to ensure the actions taken are necessary and appropriate (and thus avoid non-compliance under the WSA).

Best Management Practices for Reducing Risk of Deleterious Substances

The following provisions represent BMPs for avoiding or managing the introduction of deleterious substances into a stream while conducting CIAS activities under the WSA. If an authorizing instrument, such as an approval or licence, requires you to follow these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

- a) Equipment must operate from outside the stream channel, wherever possible. Mechanized equipment and machinery must not be operated within the water without appropriate mitigation measures.
- b) Steps must be taken to prevent the introduction of silt, debris, refuse, sediment or sediment-laden water, raw concrete or concrete leachate, or any other deleterious substances into streams, ditches and storm sewer systems so that the quality of water is not adversely affected.
- c) Equipment and machinery must be clean and in good operating condition (e.g., power washed and free of leaks or excess oil and grease). No equipment refueling or servicing is undertaken within thirty (30.0) metres of any stream or surface water drainage.
- d) Hydraulic machinery that is in and about a stream must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and are biodegradable.
- e) Paints and solvents must be stored, mixed and transferred in spill containment trays on land at least thirty (30.0) metres from any stream or surface water drainage.
- f) All waste materials must be stored outside of the riparian area until appropriate disposal. All excess drilling mud, cuttings and other waste materials must be stored a minimum of thirty (30.0) metres away from the stream on flat ground to prevent sediment and other deleterious substances from entering the stream.
- g) To prevent the release of substances toxic to fish, there must be no use of treated wood products within the stream or stream channel or ditch lines.
- h) Fill, road crush, riprap or other materials used in or about the stream must be inert, clean and free of contaminants. Processed rock must not be acid generating or metal leaching.
- i) A spill response plan and spill kit suitable for all substances on-site must be readily accessible on-site in the event of a release of a deleterious substance to the environment.

Additional Resources

- [BCER Incident Reporting Instructions and Guidelines.](#)
- [Soil Relocation](#), BC Government
- [Site Remediation](#), BC Government
- [Remediation of Sites Contaminated by a Spill](#), Ministry of Environment, 2009

For more information on spill reporting, please contact the Environmental Emergency Program at SpillReports@gov.bc.ca or refer to the [Spill Reporting Fact Sheet](#) and [Spill Reporting Regulation](#) of the [Environmental Management Act](#).

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3.7 Concrete Use

This section describes best management practices (BMPs) for preventing concrete materials or concrete leachate from entering watercourses during the use of concrete in and about a stream.

Concrete, cement, mortars, grouts and other Portland cement or lime-containing construction materials are basic (alkaline) materials. They are highly toxic to fish and other aquatic life and must only be used near water with extreme care.

Authorized Change (Notification)

A person making an authorized change in accordance with Part 3 of the Water Sustainability Regulation must ensure that all cast-in-place concrete and grouting is completely separated from fish-bearing waters for a minimum of 48 hours (WSR s. 43(1)(d)). If the proponent cannot meet the requirements, the work will require a change approval, water licence, use approval or order.

Best Management Practices for Concrete Use

The following provisions represent BMPs for using concrete in CIAS activities under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

- a) Use pre-cast concrete structures where practicable.
- b) All works involving the use of concrete, cement, mortars, and other Portland cement or lime containing construction materials (concrete) must not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any stream. Concrete materials cast-in-place must remain inside formed structures.
- c) A carbon dioxide (CO₂) tank with regulator, hose and gas diffuser must be readily available during any work involving the mixing or pouring of concrete. Operators must have appropriate training to operate such equipment and to release carbon dioxide gas and neutralize pH levels should a concrete (and/or derivative) spill occur.
- d) Wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment must be contained in a manner that prevents wash-down water from entering a stream, stormwater runoff or aquifer.
- e) Concrete work must be isolated from any water within any watercourse or stormwater system and/or be prevented from entering into any watercourse or stormwater system.
- f) Where concrete work occurs within the stream or stream channel, a location immediately downstream of the work must be monitored regularly for pH.
- g) Concrete work must stop if downstream pH:
 - i. has changed by more than 1.0 pH unit, measured to an accuracy of +/- 0.2 pH units from the background level; or,
 - ii. where applicable, is recorded to be below 6.0 or above 9.0 pH units and may only resume when pH levels have returned to levels within this range.
- h) Water that contacts uncured or partly cured concrete during activities, such as exposed aggregate wash-off, wet curing, or equipment washing, must be prevented from directly or indirectly entering any stream, stormwater system, or aquifer if it will adversely alter the water quality as compared to the pre-disturbed state.

- i) All cast-in-place concrete and grouting must be isolated from fish-bearing waters for a minimum of 48 hours if ambient air temperature is above 0°C and for a minimum of 72 hours if ambient air temperature is below 0°C.

Additional Resources

To be added in draft review

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3.8 Conduct Work During Reduced Risk Timing Windows

A reduced risk timing window, in relation to a stream, is a period of the year where CIAS can be made with minimized risk to fish, wildlife or the aquatic ecosystem of the stream (see Table B).

Reduced risk timing windows are specified by a habitat officer and can vary across regions (see [Regional Timing Windows B.C.](#)). [WSR s.44](#) describes a habitat officer's authority to specify timing windows on notice of authorized changes. A WSA decision maker may receive similar recommendations from a habitat officer when making a decision on a change approval or authorization application.

Additional timing windows may apply for specific species. Some species-at-risk (i.e., organisms designated provincially or federally as vulnerable, threatened or endangered), rare species, or species of cultural value may not have established reduced risk timing windows and identification of a timing window may require input from a QP with qualifications and expertise related to such species.

Table 5: Examples of benefits from adhering to a reduced risk timing window.

Wildlife	Potential Benefits of Timing Windows or Description
Fish and fish habitat	Avoids harm to spawning habitat, fish eggs, and juvenile fish while preventing impacts to fish that may be migrating, over-wintering, or rearing. Prevents harmful alteration, disruption or destruction of spawning habitat, sediment introduction, fish egg and alevin destruction, and behavioural impacts (e.g., displacement).
Amphibians	Amphibians can be especially sensitive to CIAS impacts. Using appropriate timing windows can mitigate impacts to amphibians and their habitats. Appropriate timing windows depend on the habitats and potential for species presence.
Beaver dams	Avoids unintended mortality of beaver kits in the lodge and adult beavers during the winter. Prevents unintended impacts to other overwintering aquatic organisms and fish. ¹
Birds	Reduces the risk of impacting bird eggs, nests, and young. Timing windows are site-specific, depending on which species may be present and habitat sensitivity.

Advice on Identifying Species

To determine the reduced risk timing window, you might need to determine which species and life stage are present in the stream, stream reach or aquatic ecosystem at varying times of year. Also, depending on how CIAS related activities are carried out, both terrestrial and aquatic ecosystems may be impacted. The following steps may help individuals identify species that may be impacted.

- Identify the location where CIAS activities and works are planned.
- Use online or physical resources to identify aquatic and terrestrial species within the project area. A QP may be useful in identifying species.

- If there is no data about the presence of fish species available, treat the stream as if it is fish-bearing.
- If there is no data about the presence of fish species available and the stream converges with a fish-bearing stream, use the reduced risk timing window for the receiving stream.
- Where the presence of species at risk in the stream, stream channel or aquatic ecosystem are identified, instream work should be avoided or comprehensive mitigation measures or compensatory mitigation measures should be considered. More information is available through associated [species recovery planning](#).

Determining Reduced Risk Timing Windows

Once the potentially impacted species are identified, use the reduced risk timing windows to inform your work plan. Regional information, possible related terms and conditions, and timing windows can be viewed [online](#) (or searched using “regional timing windows B.C.”).

Working Outside of Reduced Risk Timing Windows

If working outside the reduced risk timing window is unavoidable, then it may be appropriate to incorporate additional monitoring into the project plan. A rationale may be required for an alternative timing window, detailing how potential adverse impacts will be avoided, mitigated or compensatory mitigation measures considered. This rationale should be prepared by a qualified person (QP) with appropriate qualifications and expertise to assess the impacts of the works and activities and may include:

- a) Rationale for why work cannot occur during approved regional timing windows.
- b) List of potentially impacted species.
- c) Description of pre-disturbance habitat quality at the proposed worksite and expected post-disturbance habitat quality.
- d) How impacts will be avoided, mitigated or, if not mitigable, addressed by compensatory mitigation measures (e.g., restoration).
- e) How work will be planned and implemented to avoid fish bearing sections of the stream (when feasible) or to achieve fish absence in the work area(s) by salvage or other approaches.

Best Management Practices for Reduced Risk Window

The following provisions represent BMPs for considering reduced risk timing windows when planning a CIAS project under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

- a) Work must occur during the reduced risk timing window for the identified species or appropriate steps taken to implement mitigation measures or compensatory mitigation measures to prevent or address impacts of the CIAS activities if occurring outside the reduced risk timing window.
- b) Work must be planned for favourable weather and low flow water conditions within the approved work timing window.
- c) Species that may be impacted by the CIAS activities must be identified and plans must be in place to minimize and mitigate any impacts in the event of an incident.

Additional Resources related to Timing Windows:

- [Regional Timing Windows B.C.](#)
- [Species and Ecosystems at Risk in B.C.](#)
- [Brochures for Species and Ecosystems at Risk in B.C.](#)
- [Recovery planning documents for species at risk](#)
- [Wildlife Habitat Features](#)
- [Accounts and Measures for Managing Identified Wildlife \(by species\)](#)
- [Accounts and Measures for Managing Identified Wildlife \(by forest region\)](#)
- [DFO Timing Windows \(marine and estuarine timing windows\)](#)

3.9 Salvage of Fish and/or Wildlife

Causing severe stress, disturbance and/or death of fish or wildlife without authority (permit, licence, etc.) is an offence under the [Wildlife Act](#). On some projects, certain wildlife species must be removed before work begins to avoid contravening the *Wildlife Act*. By ensuring any fish or wildlife found within your isolated work area are transferred to adjacent, non-impacted areas, you can help to protect aquatic and terrestrial life. The capture and relocation of fish and wildlife require a permit under the [Wildlife Act](#).

Permits and Responsibilities

Fish or wildlife salvage requires a permit or other legal authorization and is typically carried out by a Qualified Professional (QP) in accordance with the terms and conditions of a permit issued under the *Wildlife Act*. Applications for such permits are submitted through [FrontCounter BC](#):

- [general wildlife permits](#) require completion of an [Animal Care Application form](#) to ensure safe capture, handling, and relocation of species encountered, and
- anyone intending to collect freshwater fish from non-tidal B.C. inland waters is also required to have a scientific [Fish Collection Permit](#) (*Wildlife Act*). The permit is not valid for species listed as threatened or endangered under the *Species at Risk Act* (SARA) or for eulachon or salmon other than kokanee.

Note: Contact the Department of Fisheries and Oceans for fish collecting permits for salmon, eulachon or SARA listed species.

A person who was required to obtain a wildlife permit before conducting a CIAS, and does not do so, risks contravening the *Wildlife Act* and the WSA if aquatic habitat is adversely affected. If the person completing a fish or wildlife salvage is different than the person completing the CIAS, then the persons should ensure that the work is properly coordinated.

Best Management Practices for Fish & Wildlife Salvage

The following provisions represent BMPs for fish and wildlife salvage CIAS activities under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

Capture and Release

Salvage activities and sampling methods must be conducted to the [Resources Information Standards Committee \(RISC\) standards and guidelines](#) for capture, data collection, handling and release (see resources below).

- a) All fish are to be removed from the isolated area. Death or harm to fish and wildlife without prior authorization is prohibited under the BC *Wildlife Act* and the federal *Fisheries Act*. Achieving total removal can often include but not limited to:
 - i) At least three collection methods on a risk hierarchy of passive (e.g., minnow traps, fyke nets) and active techniques (e.g., beach and pole seines, electrofishing, angling) and low risk to higher risk to fish health are used in fish salvage.
 - ii) For active collection methods a minimum of two consecutive passes that produces a zero catch must be completed, as per total population removal methodology (95% or greater fish removal to be achieved).

- b) All aquatic species must be released into the same stream they were removed from and downstream of the work areas or with enough distance upstream into waters of equivalent baseline quality and habitat type (e.g., pool, riffle, run) (distance is recommended as five channel widths to a maximum of 100 metres).
- c) Caution must be applied when completing salvages that might involve species at risk (SAR). If species at risk are expected to be present, contact the Ministry office in your area for more information regarding assessment and salvage requirements.

Sampling Data

- d) All data fields (reference and location, fish collection methods, individual fish, stream site) under scientific [Fish Collection Permits](#) are to be completed in full.
- e) Data entered into a Fish Data Submission Template must be submitted to the appropriate agency following the completion of a fish salvage within 90 days of permit expiry.
- f) Sampling fish species under a Fish Collection Permit for fish salvage must follow the best practices outlined in Table A for the minimum individual fish data information to be included when conducting fish salvages.

Table 6. Best practices for sampling fish species under a Fish Collection Permit for fish salvage.

Fish Species	Age Class	Size Range	Recommended specimens sampled and data fields to be populated ¹					
			Measuring and counting the fish caught	Species	Length (mm)	Weight (g)	Sex ³	Maturity ³
Salmonids² (RB, CT(CCT), DV, BT, EBT, GR, LT, KO)	Fry	20-80 mm	First 30 fish: measure After 30 fish: count	✓	✓			
	Juvenile	81-250 mm	Measure all fish caught	✓	✓	✓		
	Adult	>250 mm	Measure all fish caught	✓	✓	✓	✓	✓
Listed Species (Salish sucker, sturgeon, etc.)	All	All	Refer to SAR permit specifications for requirements					
Coarse Fish (shiner, dace, stickleback, carp, cyprinids, pikeminnow)	All	<200 mm	First 30 fish: measure After 30 fish: count	✓	✓			
		>200 mm	Measure all fish caught	✓	✓	✓	✓	
Sport/other (perch, bass, sunfish, northern pike, walleye)	All	All	First 30 fish: measure After 30 fish: count	✓	✓	✓		

Sculpin species	All	0-150 mm	First 30 fish: measure After 30 fish: count	✓	✓			
		>150 mm	Measure all fish caught	✓	✓	✓		
Burbot, Lamprey	All	All	Measure all fish caught	✓	✓	✓		✓
All fishes not listed above	All	All	First 10 fish: measure After 10 fish: count	✓	✓	✓		

¹More information on [Fish Data Submission](#) form.

²RB-Rainbow, CT(CCT)-Cutthroat, DV-Dolly Varden, BT- Bull Trout, EBT- Eastern Brook Trout, GR- Arctic Grayling, LT- Lake Trout, KO- Kokanee

³Sex and Maturity only if possible through visual observation.

Additional Resources

- [Projects Near Water](#), Fisheries and Oceans Canada (DFO)
- [Resources Information Standards Committee \(RISC\)](#): Inventory standards and background, including but not limited to aquatic and terrestrial ecosystems.
- [Natural Resource Best Management Practices](#): including but not limited to regions-specific guidelines and timing windows.
- [Fish Stream Identification Guidebook](#) (for guidance on identifying fish bearing streams)
- [BMPs for Amphibian and Reptile Salvages in British Columbia](#) (FLNRORD, 2016)
- [Fish Stream Crossing Guidebook](#) (FLNRORD, 2012)
- [Federal Species at Risk Act: Recovery Strategies](#)
- [Submitting Fish Data](#): Questions regarding the fish data submission process can be made to: fishdatasub@gov.bc.ca

3.10 Whirling Disease Decontamination

Whirling disease is a fish disease caused by the parasite *Myxobolus cerebralis*, which affects juvenile salmonids, including rainbow trout, cutthroat trout, and brook trout. The parasite damages cartilage and the nervous system, causing affected fish to swim in a distinctive "whirling" pattern.

The parasite *M. cerebralis* has a two-host lifecycle requiring salmonid fish (trout or salmon) and a small aquatic worm (*Tubifex tubifex*). Infected fish shed thick-walled *myxospores* into the water and sediment, where they can remain viable for years or even decades. Tubifex worms ingest the myxospores and, after development, release a free-swimming infective stage (triatinomyxon or TAM) into the water. These spores attach to and penetrate young salmonids, migrating into cartilage and nervous tissue where the parasite multiplies. Once inside fish, *M. cerebralis* produces thousands of new myxospores, which exit the fish (via gills, feces or decomposition) and re-enter the environment, completing the cycle. Infected fish – especially juveniles – often exhibit deformities (e.g. shortened jaw, spinal kinks) and erratic "whirling" swimming behavior. Mortality can be very high (up to 90% in young fish) in susceptible populations. Importantly, whirling disease is not spread directly fish-to-fish; spread requires contact with the parasite via water, sediment or infected hosts.

Key transmission pathways for whirling disease include:

- **Movement of infected fish or fish products:** Stocking, transport or natural migration of infected trout or salmon carries the parasite into new waters. Even parts of infected fish (e.g. carcasses, roe used as bait) can contain transmissible spores.
- **Aquatic equipment and gear:** Boats, trailers, pumps, dredges, nets, waders, boots, and other equipment used in streams can trap mud and water containing whirling disease spores. If moved between water bodies without cleaning, these spores hitchhike to uninfected site.
- **Water and sediment transport:** Water currents, flooding or even stormwater runoff can carry free spores downstream. Sediment dredging or disturbance of infected streambeds (which harbor tubificid worms and myxospores) can spread spores over a wide area. Spores may persist in river mud for 10–20 years, posing a long-term reservoir of infection.

Ecological and Operational Risk Factors

Spread of whirling disease is most likely in areas where both hosts are abundant and human disturbances occur. Key ecological factors include susceptible host fish (especially stocked rainbow, cutthroat, or brook trout) and abundant Tubifex worms in organic, silty streambeds. Tubifex populations thrive in warm, slow-moving, nutrient-rich waters – one survey found as many as 10,000 tubificid worms in a single square yard of muddy river bottom.

Watersheds with diverse populations of young trout and silty spawning or rearing habitats are high-risk for parasite establishment. Warmer water temperatures (e.g. 10–15°C) accelerate parasite development, so temperate to warm spring flows further increase the risk. Operational (human) risk factors include any activity that moves organisms, mud or water between sites. For example: frequent equipment crossings of streams (common in logging, pipeline or bridge construction); irrigation or firefighting pumps drawing untreated river water; lack of wash stations for heavy machinery; and use of live bait or improper disposal of fish carcasses.

Road building and maintenance often disturb streambeds and generate muddy run-off. Forestry operations (e.g. skid trails, culvert installations) and mining can expose fine sediment and tubificid habitat. In general, work that stirs up sediments or transfers wet soil (on tires, tracks or footwear)

greatly raises the chance of spreading whirling disease. Conversely, fast-flowing, cold streams with coarse substrates and minimal tubificid worms are relatively lower risk.

Once established in a stream, whirling disease is essentially irreversible. There is no cure or effective treatment, so preventing introduction is critical. Good industry practice – including careful site planning, routine equipment cleaning and rigorous decontamination – breaks the chains of transmission. Adopting the “Clean, Drain, Dry” regimen and responding promptly to any detections of whirling disease keeps the parasite out of new waters.

In short, responsible operations that prioritize early detection and prevention are the best safeguard against the devastating impacts of whirling disease on wild trout and salmon fisheries.

Stay Informed on Current Whirling Disease Extent. Waterbodies where whirling disease has been detected and stay up to date on BMPs regarding whirling disease. The most current provincial information can be found here: <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/fish/aquatic-species/aquatic-invasives/whirling-disease>

While this BMP covers many common types of in-stream activities, more specific planning or speciality equipment decontamination protocols may want to reference resources found: <https://www.alberta.ca/decontamination-protocol-engagement-for-industry-and-construction>

Best Management Practices for Whirling Disease Decontamination

The following provisions represent BMPs for the prevention of whirling disease infection transmission when undertaking activities authorized under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

- a) Before coming on to a job site, follow the Clean, Drain, Dry protocol listed below for any items placed in or near the water. This includes ensuring all equipment, tools, clothing, materials (rip rap, coarse woody debris, pumps, etc.) and vehicles (excavators, boats, water tankers) entering or leaving the site are free of soil, invasive species material, and water to avoid cross-contamination between water bodies.

1. CLEAN

- Clean and inspect all equipment, vehicles, watercraft, trailers, and transitory materials (temporary materials moved between sites) on dry land away from storm water drains, ditches, and waterways.
- Remove all mud, sand, and plant materials before leaving the shore.
- Rinse or wash the equipment and materials away from storm drains, ditches, or waterways.

2. DRAIN

- Before leaving a waterbody, drain all water on dry land (including all internal compartments such as tanks, ballasts, bilges, livewells, water tanks), and other gear or materials that have contacted water.
- Raise and lower outboard engines several times to ensure all water has drained out.
- Drain non-motorized watercraft by inverting or tilting the watercraft, opening compartments, and removing seats if necessary.

- **Pull the plug, it's the law in BC.** It is illegal to transport any watercraft on land without first removing the drain plug and draining all water on dry land, including from compartments like bilges, live wells, and ballasts.
Alternatively, the boat can be transported in an inverted manner such that the interior of the boat is drained, including draining any ballast tanks, bilge areas or compartments.

3. DRY

- Dry the equipment and materials completely between trips and allow the wet areas to air dry. Leave compartments open on boats and equipment.
 - Allow boats and equipment to dry completely before entering new waters.
 - If use of water is required for the work, use water from a groundwater source (i.e. a well) or a waterbody where whirling disease has not been detected if possible. If water from a waterbody where whirling disease has been detected must be used for a project, obtain water from as close as possible to the location where the water will be used. Note that municipal water treatment systems may not destroy or remove the parasite or its spores.
- b) If work must occur in an area that whirling disease has been detected, plan to begin work in areas of low risk and end in areas of higher risk, i.e. work from upstream to downstream.
 - c) Avoid equipment entering waterbodies where whirling disease has been detected. Equipment includes heavy machinery such as excavators, dozers, vehicles, tools such as pumps and hoses, gear and personal protective equipment (PPE).
 - d) Reduce the amount of equipment and vehicles entering water where whirling disease has been detected and use dedicated equipment wherever possible in these areas.
 - e) Avoid the use of water from, and use of equipment in, multiple sources during a single operational period to allow all parts of equipment to completely dry between uses (a minimum of 24 hours is recommended), or decontaminate all equipment following the Decontamination Protocol prior to moving between water sources.
 - f) If equipment must enter water, reduce the parts of equipment that must contact water. To the extent practicable, avoid contacting water with parts of equipment that are difficult to decontaminate. This includes large equipment, equipment with inaccessible compartments, soft and porous materials, materials which can be damaged by chemicals.
 - g) If working in a stream where whirling disease has been identified, or if required to under the terms and conditions of an authorization, follow the Decontamination Protocol below:

Decontamination Protocol

- Ensure that all organic material, including mud, is removed prior to application of chemical treatment. Not doing so can make the application of chemicals ineffective.
- Follow the decontamination procedures in **Table 7**.
- Soaking:
 - Small submersible items must be immersed (consider using a rigid rubber tote) such that all surfaces which were in contact with potentially contaminated water, mud, or fish, are submerged for 10 or 15 minutes depending on which chemical is used.
- Wiping and Spraying:
 - Wiping and spraying can be used for non-submersible, sensitive, non-waterproof items or large equipment. This includes items that were **not** submerged in the waterbody (e.g. backpack electrofishing units, boat mounted electrofishing control boxes, probes, sensors, truck boxes, etc.). Items that were not submerged in the waterbody should

be thoroughly wiped or sprayed rather than submerged in disinfectant to reduce drying time.

- Surface disinfection can be accomplished by wiping wetted surfaces with a heavy-duty towel which has been soaked in a disinfectant or using a pump-style sprayer.
- Surfaces must be kept damp with disinfectant for 10 or 15 minutes depending on which chemical is used.
- Any disposable items (e.g. shop towels) used for this purpose must be disposed of in the garbage away from water.
- When using a pump-up style sprayer the solution should be liberally sprayed on both the outside and the inside of the equipment, keeping surfaces moist for 10 or 15 minutes depending on which chemical is used. Avoid letting the disinfectant dry on items as it is harder to rinse off once dry.
- Take care to protect electronic components that are not water resistant.
- Thoroughly rinse the items using water (not from the exiting waterbody) following the application of disinfectant to prevent the buildup of disinfectant residue.
- Once treatment and rinse are completed, allow items to dry as long as possible (24 hours minimum recommended).

Pumps

- Elevate foot valves above the bottom of the waterbody for clean, sediment-free operation—for example, duct tape foot valve to a shovel or place the valve in a hardhat or bucket.
- Remove water drain plug(s) from self-priming pumps (e.g. trash pumps) to empty pump housing before moving to a new waterbody.
- When finished using the pump, remove all mud and organic debris before subsequent use. This may be done by entering deeper water and cleaning mud off the pump and foot valve. In particular, mud should be removed from equipment before it is used at any other site.
- Decontaminate pumps, hoses and foot valves after being used in a water body with known whirling disease (or use source dedicated pumps).

Table 7: Summary of chemicals used for decontamination

	Household Bleach	Quaternary Ammonium Compounds (eg. Quat Plus)
Concentration	Soaking, wiping & spraying: 5000ppm <i>1 cup (240mL) 6% bleach mixed with 2.5L water</i>	Soaking: 1500ppm <i>2.5 cups (624 mL) of quat plus to 20 L of water</i> Wiping & spraying: 3000ppm <i>1 cup (240 mL) diluted with 3.75 L of water</i>
Contact Time	15 minutes	10 minutes
Disposal	• Sodium thiosulphate can be used to neutralize prior to disposal or small quantities of solution may be disposed into a sanitary sewer with an equal volume of water.	• Small quantities may be discarded in sanitary sewer if indicated on the product label.

Cautions	• Can cause corrosion to fabrics, plastics, rubber, and metal. • Bleach is quickly inactivated by organics, so organic materials should be removed before disinfection.	• Quaternary ammonium compounds products can cause corrosion when used on aluminum. Alternative cleaning methods should be utilized for aluminum equipment.
Additional Info	• Bleach dissipates rapidly in solution and should be refilled after each use. • Sodium hypochlorite, the active ingredient in bleach, is a powerful oxidizer and can be corrosive. • Use in a contained area can cause eye and respiratory irritation, a full-face respirator is recommended. • Store in cool, dry place, away from direct sunlight and freezing temperatures. Not flammable but can become unstable if mixed with other chemicals. Not considered a dangerous good. Do not ingest. Do not dispose of near any standing water or waterbody. Bleach will become less effective over time (20% less effective per year) and has a shelf life of six months if unopened. • PPE should be worn when using bleach.	• Quat Plus is a common cleaning agent for homes and restaurants. • Quat Plus can retain effectiveness after repeated use and can be reused for up to 5 days; using a lid over the solution can help extend the longevity. If solution gets dirty, refill with fresh solution. • Quat Plus is an ammonium quaternary compound based disinfectant certified for reduced environmental impact. Not flammable. Not considered a dangerous good. Do not ingest. • Store between 4° - 40° C. Quat Plus is toxic to aquatic organisms but is immobile in soil. • For more information: https://www.dustbane.ca/products/quat-plus • PPE should be worn when using Quat Plus.

Additional Resources

- [Whirling Disease](#)
- [I.D Guide to Prohibited Aquatic Invasive Species in B.C.](#)
- [Invasive Species Management in B.C.](#)
- [Invasive Species Online Training](#)
- [Invasive Species Resources and Publications](#)
- [Priority Invasive Species in B.C.](#)

[B.C Aquatic Invasive Plant Survey & Sampling Protocols](#)

3.11 Invasive Species Prevention

Invasive species pose significant threats to aquatic, riparian and terrestrial environments by outcompeting native species, habitats, and altering ecosystem functions. Invasive species can be spread through the movement of contaminated soil, water, and equipment, as well as through disturbed vegetation and soil that carry seeds or fragments. Improperly cleaned machinery, boots, and tools are also common vectors for their introduction.

Prevention remains the most effective and cost-efficient strategy for managing invasive species. Once established, they can spread rapidly and are difficult to eradicate. Preventing their introduction and limiting their spread is essential to conserving biodiversity, safeguarding natural resources, and minimizing both environmental and economic impacts.

Authorized Change under WSR Part 3

It may be possible to conduct removal or control of invasive aquatic vegetation as an authorized change if the work is done in accordance with [Part 3 of the Water Sustainability Regulation](#) (WSR). [WSR s.39.\(1\)\(m\)](#) specifically outlines the criteria that must be met for invasive species control to occur as an authorized change. If the project specifications do not meet these WSR requirements, and the work is not authorized under another section of WSR Part 3, then the work may require a change approval or authorization.

Relevant Legislation

The following statutes, regulations, and bylaws may apply to your project depending on the location, activity type, and invasive species present, this is not exhaustive and additional regulations and statutes may apply to invasive species management projects. Ensure compliance with applicable local, provincial, and federal regulations for the control of invasive species:

- **Pull the Plug Regulation** – Prohibits the transportation of watercraft with the drain plug installed. The drain plug must be removed and all water drained on dry land, including all internal compartments such as ballasts, bilges and live wells.
- **BC Weed Control Act** – Requires land users to control provincially and regionally listed noxious weeds.
- **Forest and Range Practices Act** – Requires tenure holders to prevent the spread of invasive plants during forest and range operations.
- **Integrated Pest Management Act** - Regulates pesticide use and promotes integrated pest management, including invasive species.
- **Fisheries Act** - Prohibits the introduction of deleterious substances and invasive species that affect fish habitat.
- **Wildlife Act** - Prohibits release, breeding or transport of non-native species without a permit.
- **Local Government Bylaws** – Regulates invasive species control, soil movement restriction and development permit conditions.

Best Management Practices for Invasive Species Prevention

The following provisions represent BMPs for preventing the spread or introduction of invasive species while conducting CIAS activities under the WSA. If an authorizing instrument, such as an approval or

licence, requires you to follow these BMPs, the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.

- a) Conduct a desktop review and/or field survey for invasive species presence within project area. If invasive species are present, an invasive species management plan specific to the project area is to be developed by a qualified professional.
- b) Follow species-specific protocols for invasive species removal and management.
- c) All equipment including vehicles, machinery, clothing, boots, and tools, must be inspected for mud, sand, and plant material before entering and leaving the site. Any material found must be removed, bagged, and disposed of properly.
- d) Ensure clearing activities do not result in the introduction and/or spread of invasive weed species into previously undisturbed areas. Under Section 2 of the provincial *Weed Control Act*, an occupier of land is responsible for controlling noxious weeds growing or located on that land.
- e) Prevent soil and plant material from entering watercourse during and after equipment cleaning.
- f) Minimize soil disturbance and removal of native vegetation. Limit the size and duration of disturbed areas and exposed soils to reduce opportunities for invasive species to establish. Whenever possible, use access routes and work areas that avoid known invasive species populations.
- g) Avoid parking, driving through or staging equipment in areas where invasive plant species are present.
- h) If knotweed is present, follow current best practices for the excavation, containment, transport, and disposal of knotweed and infested soils.
- i) Do not plant or introduce invasive species. Do not use invasive species in erosion control or revegetation (e.g. reed canary grass, yellow flag iris, black locust).
- j) Any areas that are disturbed during the work (such as exposed soil) must be promptly restored at a minimum to the pre-disturbance condition using a certified weed-free seed mix. Ensure a Seed Analysis Certificate is available and reviewed for each lot of seed mix.
- k) Restore disturbed areas using native vegetation suitable for site conditions.
- l) Any areas that are disturbed during the work (such as exposed soil) must be promptly restored at a minimum to the pre-disturbance condition using a certified weed-free seed mix. Ensure a Seed Analysis Certificate is available and reviewed for each lot of seed mix.
- m) Follow [Clean, Drain, Dry](#) protocol for any items placed in or near the water. This includes ensuring all equipment, tools, clothing and vehicles entering or leaving the site are free of soil, invasive species material, and water to avoid cross-contamination between water bodies.
- n) Engage a Qualified Professional to restore any disturbed areas in accordance with ecological restoration best practices.
- o) Properly contain and dispose of invasive species. Ensure that any invasive species removed from the site are securely contained and disposed of at designated facilities.
- p) Do not move fish or aquatic wildlife from one waterbody to another.
- q) Regularly monitor areas for invasive species and [report sightings](#). Early detection is crucial for effective management and control.

Additional Resources:

- [BC Government – Invasive Species](#)
- [Invasive Species Council of BC](#)
- [Invasive Species Management in B.C.](#)
- [Invasive Species Online Training](#)
- [Invasive Species Resources and Publications](#)
- [Priority Invasive Species in B.C.](#)
- [B.C Aquatic Invasive Plant Survey & Sampling Protocols MOF 2024](#)
- [Whirling Disease](#)
- [B.C. Invasive Species Early Detection Rapid Response Plan \(EDRR\)](#)
- [I.D Guide to Prohibited Aquatic Invasive Species in B.C.](#)
- [Reporting invasive species - Province of British Columbia](#)

3.12 Restoration and Compensation

Adverse impacts to water quality, water quantity, and the aquatic ecosystem should first be avoided or mitigated to the extent practicable. For works proposed under a change approval where impacts cannot be fully addressed through project design, compensation for impacts to habitat and stream function may be required by an SDM as a condition of an approval or authorization.

Site restoration refers to the process of returning a work area to an augmented condition or a condition resembling its original pre-disturbance ecological state. Post-construction restoration can help ensure that a stream can maintain adequate flow to support a healthy ecosystem and human activities; prevent further disturbance to the stream channel; and enhance, create or re-establish habitat or natural conditions. Compensation refers to the on-site or off-site creation or enhancement of a stream channel, stream function, or aquatic or riparian habitat to counteract, or make up for, an impact on an environmental component.

Conducting site restoration or compensation activities correctly can help minimize the risk of long-term impacts to the stream, stream channel, and aquatic ecosystem, such as those caused by erosion or loss of riparian habitat. Restoration and compensation plans should aim to improve the condition of the stream channel, aquatic and riparian habitat at the site. Restoration or compensation for project impacts should achieve no net loss of stream function, aquatic ecosystem values, and aquatic and riparian habitat. An SDM may require compensation at a ratio greater than no net loss to mitigate significant adverse impacts.

Restoration and compensation work involves careful planning as it may require long-term, complex monitoring and data collection to ensure the works are functioning as intended. Restoration and compensation plans should include objectives for re-establishing or improving stream and aquatic ecosystem function and conditions. Plans should consider temporal delays in the establishment and function of compensation works and be designed, planned and conducted with consideration of species biology, habitat ecology, hydrology, and geomorphology. As such, restoration and compensation plans should be designed by a qualified professional.

Best Management Practices for Site Restoration and Compensation

The following provisions represent BMPs for site restoration related to CIAS activities or works under the WSA. If a legal instrument, such as a change approval or licence, requires that you follow any of these BMPs, **the corresponding terms listed below are the mandatory conditions of that requirement and must be followed unless otherwise specified in the instrument.**

- a) Where water-based operations are required, the placing of spuds, anchors or other equipment outside the footprint of the project area (e.g., dredge area) must be avoided.
- b) The topsoil must be protected from compaction and admixing. Replace topsoil over root networks at a stable angle of repose without compaction at the completion of the work.
- c) The planting of live stakes must be timed for the dormant season in the spring (prior to leaf out) or in the fall (once the leaves have dropped).
- d) Disturbed areas (including riparian areas) must be restored to an augmented or ecologically similar state with suitable species to restore the vegetative cover and prevent surface erosion and subsequent siltation of the stream. This may include hydroseeding the banks

and areas adjacent to the stream with a heavy mulch, tackifier and local, ecologically suitable seed mix (i.e., does not include undesirable or invasive species).

- e) Revegetation must include a diverse mix of native ecologically suitable trees, shrubs, and herbaceous plants appropriate to the site conditions. In addition to tree replacement quantities, shrub and herbaceous species must be replaced on the landscape to their natural assemblage.
- f) All equipment, supplies, and non-biodegradable materials must be removed from the site and disposed of at an approved facility, including non-permanent sediment control works once they are no longer required, or any suspended sediment has settled (e.g., nonbiodegradable silt fences).
- g) Soil amendments and/or mulch must be used, where appropriate, to promote growth of newly planted vegetation, particularly in well drained soils. Regular watering is conducted, where appropriate, until plants and stakes become established.
- h) A plan must be in place to monitor the effectiveness of the restoration and site stability over time (e.g., over one or more growing seasons or one or more freshets).

Additional Resources

- [Watershed Restoration Project and Management Reports, BC Government](#)
- [Erosion and Sediment Control Association of BC Best Management Practices](#)
- [Guidelines for Planning Watershed Restoration Projects, Watershed Restoration Technical Circular No.1](#), BC Government, 1995
- [Fish Habitat Rehabilitation Procedures, Watershed Restoration Technical Circular No. 9](#), BC Government, 1997
- [Lands Near Water: Riparian Restoration and Enhancement](#) (updated 2018)
- [Stream, Riparian, and Watershed Restoration](#)
- [Stewardship Centre BC: Stewardship Practice Guides](#)
- [Stream Stewardship – A Guide for Planners and Developers \(1993/94\)](#)
- [The British Columbia Watershed Restoration Program: Summary of the Experimental Design, Monitoring and Restoration Techniques Workshop \(Table 3\) 1994](#)
- [Watershed Restoration Planning and Priority Setting: An Emphasis on Fish Habitat 2004](#)
- [Wetland Mitigation in Washington State Part 2: Developing Mitigation Plans, 2006.](#)
- [Projects Near Water](#), Fisheries and Oceans Canada (DFO)
- [Mitigating the Impacts of Channel Maintenance in the Lower Fraser Valley](#), MOE, 2006
- [Provincial Tree Replacement Criteria](#)

3.13 Long-term Effectiveness Monitoring and Adaptive Management

Effectiveness monitoring and adaptive management ensure that projects are functioning as intended following construction or implementation and that issues are addressed through adaptive measures in a timely manner to avoid impacts. An effectiveness monitoring and adaptive management plan may be required by a decision maker as a condition of an approval or authorization where a project involves restoration or compensation works to address significant adverse impacts or where there is uncertainty for the effectiveness of implementation or performance of works.

Where effectiveness monitoring identifies that the works are not performing as intended, proponents should be prepared to implement adaptive management measures to address deficiencies and achieve project objectives. The effectiveness monitoring plan would normally need to be provided to the ministry prior to the commencement of works for review and approval. A monitoring plan may include assessment of:

- Stability of the stream channel and structural elements, including evidence of erosion or scour, or displacement of materials;
- Conditions at upstream and downstream tie-ins, where flanking or erosion may occur;
- Changes in channel conditions or flow patterns that may indicate unintended impacts;
- Parameters and metrics (where applicable) for assessment of objectives of the works, including restoration or compensation works, to ensure the project functioning as intended;
- Vegetation establishment of riparian and aquatic restoration planting necessary to achieve the intended level of function and habitat value;
- Monitoring and removal of invasive species.

Best Management Practices for Effectiveness Monitoring and Adaptive Management

- The monitoring and adaptive management plan (the plan) is prepared and signed off by a Qualified Professional (an applied scientist or technologist, acting alone or together) experienced in the collection, analysis and interpretation of the subject data (eg. hydrological, physical, chemical, biological, etc.); and experienced in the design, construction, and/or restoration of the subject works or activities being assessed.
- Effectiveness monitoring defines measurable performance objectives with associated parameters and/or metrics to be monitored, and clear thresholds for corrective action.
- Effectiveness monitoring confirms that the number and location of monitoring sites, and the frequency of data to be collected are all designed such that the Qualified Professional will be equipped to conclude with confidence, whether the specific parameters of the project objectives have been achieved within the expected time frame.
- The plan provides a clear commitment to take specific adaptive management actions based the results of the monitoring work to achieve the project objectives.
- Monitoring and adaptive management efforts may be necessary for periods of up to 10 years following the completion of construction for large or complex projects. Where project

objectives are not met and adaptive management is implemented, the monitoring term may be extended by an SDM to assess the success of adaptive management works.

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4. Additional Links and Resources

4.1 Provincial Resources

- [B.C. Water Policies](#)
- [B.C. Water Webpage](#)
- [Apply for a Change Approval or Submit Notification of Instream Work](#)
- [Apply for Change Approval](#)
- [Submit Notification of Authorized Changes](#)
- [Environmental Mitigation Policy for B.C.](#)
- [Provincial Danger Tree Methodologies](#)
- [Provincial Tree Replacement Criteria](#)
- [Apply for a Scientific Fish Collection Permit](#)
- [Water Rights Database](#)
- [Wetlands of British Columbia: A Guide to Identification](#)
- [Wetlands in B.C. Website](#)

4.2 Federal Resources

- [Projects Near Water, Fisheries and Oceans Canada \(DFO\)](#)
- [Navigation Protection Program under Canadian Navigable Waters Act](#)