

**SPRINGBANK OFF-STREAM
RESERVOIR PROJECT
Fish Rescue and Fish Health
Monitoring and Mitigation**



Prepared for:
Alberta Transportation

Prepared by:
Stantec Consulting Ltd.

December 2021

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

Table of Contents

ABBREVIATIONS..... II

1.0 INTRODUCTION 1

1.1 PLAN OBJECTIVES 2

2.0 REGULATIONS, APPROVALS AND GUIDELINES..... 3

2.1 RESPONSIBILITIES AND REPORTING REQUIREMENTS 5

3.0 INDIGENOUS AND PUBLIC STAKEHOLDER INPUT..... 6

4.0 FISH RESCUE PROGRAM..... 7

4.1 METHODS TO RESCUE STRANDED FISH..... 7

4.2 TEMPORARY HANDLING AND HOLDING OF RESCUED FISH 8

4.3 RELEASE OF RESCUED FISH INTO THE ELBOW RIVER 9

4.4 COLLECTION OF BIOLOGICAL DATA 10

5.0 DOWNSTREAM FISH HEALTH MONITORING AND MITIGATION PROGRAM 11

5.1 FISH HEALTH INDICATORS 11

5.2 MONITORING OF FISH HEALTH AND MITIGATION 13

6.0 CLEANING AND DECONTAMINATION 14

7.0 REFERENCES..... 15

LIST OF TABLES

Table 2.1 Summary of Approval Conditions for Fish Rescue and Fish Health 3

Table 5.1 Fish Health Indicators and Ranking System 12

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

Abbreviations

AEP	Alberta Environment and Parks
CEAA	<i>Canadian Environmental Assessment Act</i>
DFO	Department of Fisheries and Oceans Canada
EIA	Environmental Impact Assessment
QAES	Qualified Aquatic Environment Specialist
the Project	Springbank Off-stream Reservoir

SPRINGBANK OFF-STREAM RESERVOIR PROJECT

FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Introduction
December 2021

1.0 INTRODUCTION

This document describes the Fish Health and Fish Rescue Monitoring and Mitigation Plan (the Plan) for the Springbank Off-stream Reservoir Project (the Project, SR1). Mitigation and monitoring of fish health and fish rescue has been developed consistent with the measures identified in the Environmental Impact Assessment (EIA) and in accordance with approval conditions identified by the Impact Assessment Agency of Canada (IAAC) and the Natural Resources Conservation Board (NRCB). The Plan outlines the high-level process for fish rescue activities and how effects to fish health will be mitigated and monitored during Project operations and fish rescues. The Fish Health and Fish Rescue Monitoring and Mitigation Plan is current as of December 2021, and is subject to change.

Entrainment of fish into the reservoir during flood operation may cause harm to fish as they are transported along the diversion channel and into the reservoir. Furthermore, graded areas within the reservoir do not form part of the Project design and construction plans and the topography of the reservoir may result in the formation of disconnected pools. Fish stranding may result from flood operation as water levels recede.

For the purposes of this Plan, flood operation refers to when water is diverted from Elbow River to the diversion channel, into the reservoir and the release of stored water from the reservoir. Post-flood operations include partial sediment clean-up and maintenance activities on project infrastructure. Dry operation refers to project operation between floods.

Mitigation for potential fish mortality are presented in Volume 3B, Section 8.2.2.2 of the EIA, and are summarized as follows:

- Water flows at the low-level outlet could be gradually reduced if required (i.e., flows at the low-level outlet can be regulated from 1 m³/s to 27 m³/s) to facilitate the movement of fish from the reservoir back into Elbow River with the receding water.
- The low-level outlet will be designed and operated in a manner that allows fish egress out of the reservoir and downstream into the outlet channel and the Unnamed Creek.
- Drainage areas within the reservoir may be selectively graded to reduce stranding of fish during release of retained flood water from the reservoir. The reservoir will be re-graded during post-flood operation, as needed, to ensure the Project is functioning as intended.
- During draining of the reservoir, monitoring will be undertaken to identify isolated pools and the potential that fish may become stranded. If potential fish stranding is identified, further action will be taken to reduce the potential mortality of fish.

Fish rescue activities summarized in this Plan are proposed to reduce harm and ultimately mortality of stranded fish as a result of flood operation.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT

FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Introduction
December 2021

1.1 PLAN OBJECTIVES

This Fish Rescue and Fish Health Monitoring Plan expands on the commitments described in the EIA and conditions that are listed in the Decision Statement issued under the Canadian Environmental Assessment Act (2012) to rescue fish that have entered the reservoir, as well as monitoring of fish in Elbow River following relocation. This Plan has been progressed for regulatory reviews as they pertain to the *Water Act* and *Fisheries Act*. This Plan will be finalized through discussion with DFO and Indigenous groups for Project operation as part of the *Fisheries Act* authorization.

Fish rescues will be required during the construction phase of the Project and protocol that directs these construction fish rescue activities are dealt with separately and is outlined in Alberta Transportation's Specification 3.16 for Fish Capture and Release. This Specification includes:

- Fish rescue activities will be led by a Qualified Aquatic Environment Specialist (QAES).
- Application for necessary Fish Research Licence (FRL) permits.
- Development of a Fish Capture and release Management Plan prepared by the QAES.
- Fish captures will be completed within isolated workspaces prior to dewatering and completed in a manner to avoid injuring fish.
- Captured fish will be released in an approved suitable downstream location approved by AEP Fisheries Management stipulated in the FRL.

This specification described above has been included in the construction tender documents for the Project and will be finalized by the Contractor prior to construction. This document is limited to the project commitments that will be undertaken for fish rescues and fish health monitoring during flood operation of the Project.

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

Regulations, Approvals and Guidelines
December 2021

2.0 REGULATIONS, APPROVALS AND GUIDELINES

The Plan has been prepared to meet NRCB approval condition 10 as described in approval NR 2021-01, and IAAC approval condition 3.16 of the Decision Statement under Section 54 of the Canadian Environment Assessment Act (CEAA, 2012). The approval conditions as defined by IAAC and NRCB are provided in Table 2.1. Commitments made by Alberta Transportation related to fish and fish habitat throughout the regulatory approvals process have been considered. IAAC approval condition 3.18 forms part of the *Fisheries Act* application for Authorization and Alberta Transportation continues to work with Fisheries and Oceans Canada to develop the fish rescue plan.

Table 2.1 Summary of Approval Conditions for Fish Rescue and Fish Health

Project Phase	Reference	Approval Condition
Flood Operation and Post-Flood Operation	NRCB Decision Statement Condition 10	The Operator shall, subject to privacy protection requirements, make Project monitoring results for: <ul style="list-style-type: none"> • Aquatic ecology, • Hydrology and sediment transport, • Surface water quality, • Groundwater quality and quantity, • Vegetation, • Terrain and soils, • Wildlife and biodiversity, and • Air quality easily accessible to the public, subject to the satisfaction of Alberta Environment and Parks.

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

Regulations, Approvals and Guidelines
December 2021

Table 2.1 Summary of Approval Conditions for Fish Rescue and Fish Health

Project Phase	Reference	Approval Condition
Flood and Post-Flood Operation	IAAC Decision Statement Condition 3.16	<p>The Proponent shall develop and implement, in consultation with Indigenous groups, Fisheries and Oceans Canada and other relevant authorities, a protocol to rescue juvenile and adult fish during post-flood operation. The Proponent shall develop the protocol prior to operation. As part of the development of the protocol, the Proponent shall determine the rescue methods, the environmental conditions under which fish rescue can occur, including the ambient air temperature and the rate of receding water level, and the frequency at which fish rescue must be undertaken. The protocol shall include having a qualified individual:</p> <ul style="list-style-type: none"> • 3.16.1 determine the earliest possible timing for fish rescue during draw down for each flood event; • 3.16.2 prior to relocating fish in accordance with condition 3.16.4, record through visual observation and photographs, external physical damage on stranded fish that show signs of injury; • 3.16.3 locate stranded fish in any isolated pool in the reservoir area, the low-level outlet canal and the intake channel during each post-flood operation phase; and • 3.16.4 relocate stranded fish identified as per condition 3.16.3 in suitable habitat in the Elbow River.
Post-Flood Operation	IAAC Decision Statement Condition 3.18	<p>3.18 The Proponent shall develop and implement, in consultation with Indigenous groups and Fisheries and Oceans Canada, a follow-up program to verify the accuracy of the environmental assessment and the effectiveness of the mitigation measures as it pertains to fish rescue. As part of the follow-up program, the Proponent shall:</p> <ul style="list-style-type: none"> • 3.18.1 monitor fish strandings and safe passage from the reservoir after flood operation; and • 3.18.2 if the results of the monitoring conducted in accordance with condition 3.18.1 demonstrate fish failure to exit the reservoir, or fish harm or mortality when exiting, the Proponent shall develop and implement modified or additional mitigation measures to allow for safe and feasible fish passage through the reservoir outlet.
<p>NOTE: Approval conditions listed are provided in the NRCB Board Decisions (June 22, 2021) and SR1 Decision Statement ISSUED under Section 54 of the <i>Canadian Environmental Assessment Act, 2012</i> (July 8, 2021)</p>		

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Regulations, Approvals and Guidelines
December 2021

2.1 RESPONSIBILITIES AND REPORTING REQUIREMENTS

AEP will be responsible for implementation of the Fish Rescue and Fish Health Monitoring and Mitigation Programs during flood and post-flood operation phases of the Project.

In compliance with IAAC approval condition 2.11, AEP will prepare an annual report summarizing the monitoring results, which will be provided to IAAC and the First Nation Land Use Advisory Committee by October 31 of the reporting year to which the annual report applies. IAAC has defined the reporting year as July 1 of the calendar year to June 30 of the subsequent calendar year (definition 1.32). The annual report, including a plain language executive summary in both official languages, will be made publicly available to Indigenous groups and public stakeholders no later than October 31 following the reporting year to which the annual report applies (IAAC approval condition 2.13). Indigenous groups, the First Nation Land Use Advisory Committee and the Agency will be notified of the annual reports within 48 hours of their publication (IAAC approval condition 2.14). The annual reports will be available for 15 years following their publication (IAAC approval condition 2.14).

In compliance with NRCB approval condition 10 and IAAC approval condition 3.16, the results of the Fish Rescue and Fish Health Monitoring and Mitigation Programs will be made easily accessible to the public, subject to privacy protection requirements and to the satisfaction of AEP.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Indigenous and Public Stakeholder Input
December 2021

3.0 INDIGENOUS AND PUBLIC STAKEHOLDER INPUT

Since completion of the EIA, additional feedback on fish health and fish rescue was received from Indigenous groups, stakeholders and the public, and through supplemental regulatory information requests and the Project approval hearing.

Alberta Transportation developed a draft fish rescue and fish health monitoring and mitigation programs which outlined key mitigations and monitoring commitments during construction and dry, and flood operations and was shared with Piikani Nation, Ermineskin Cree Nation, Foothills Ojibway Society, Ktunaxa Nation Council, Métis Nation of Alberta Region 3, Montana First Nation, Samson Cree Nation, Blood Tribe/Kainai, Siksika Nation, Stoney Nakoda Nations, and Louis Bull Tribe on July 22, 2020 for review and feedback. This draft fish rescue and health monitoring and mitigation programs was also shared Tsuut'ina Nation on July 23, 2020. Alberta Transportation also offered funding to Indigenous groups to provide written feedback and offered multiple opportunities to provide oral feedback, including group meetings in the fall of September 2020 and individual meetings to discuss.

At the NRCB hearing, the Stoney Nakoda Nations expressed concern regarding the practice of electrofishing and recommended that fish rescues incorporate traditional fishing methods. These traditional practices can be considered through the fish rescue program where possible. AEP is committed to Indigenous participation in the Project, including opportunities to hire Indigenous Environmental Monitors who are properly trained and experienced in monitoring techniques and safety protocols for working in and around water to participate in fish rescue activities. The Fish Rescue and Fish Health Monitoring and Mitigation Programs will be finalized in consultation with Indigenous groups prior to Project operation.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Fish Rescue Program
December 2021

4.0 FISH RESCUE PROGRAM

This fish rescue program design is based on fish rescue programs conducted at several mines in northern Canada and General Fish-out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut (Tyson et al. 2011). Mine development often results in disturbance or destruction of fish habitat due to the dewatering of lakes and subsequent mine activities (Tyson et al. 2011). Fish rescues must be undertaken as the lakes are dewatered as part of DFO approvals under Section 35(2) of the *Fisheries Act*.

The key components of the fish rescue program are:

- rescue of stranded fish
- temporary handling and holding of stranded fish
- redistribution of the rescued fish to a suitable release point in the river
- collection of biological data from rescued fish

4.1 METHODS TO RESCUE STRANDED FISH

Flood operation will limit the opportunity to rescue and monitor fish within the diversion channel upon activation of the Project (i.e., while water is entering the channel); therefore, rescue and monitoring efforts are timed to coincide with reservoir water drawdown and release. The reservoir, diversion channel, and unnamed creek will be monitored, and fish rescues will be undertaken when water levels are appropriate for access. Fish rescues will only be undertaken once it has been determined that the reservoir and surrounding area is safe for crews and equipment to operate onsite. The following will be undertaken to rescue stranded fish:

- Preparations for crew and equipment deployment will be initiated as soon as water begins to be diverted from Elbow River into the diversion channel such that crews can be prepared to begin fish rescue efforts when reservoir drawdown commences at a later time. Environmental conditions for fish rescue will be considered, including access, ambient air temperature and rate of receding water level. This measure aligns with IAAC approval condition 3.16.1, in which the Proponent needs to determine the earliest possible timing for fish rescue for each flood event.
- All equipment will be mobilized to a pre-designated staging area adjacent to the reservoir prior to any water being released back into Elbow River.
- Fish rescues will include surveys along the perimeter of the reservoir as water levels recede, such that potential strandings in isolated pools are identified (IAAC approval condition 3.16.3)

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Fish Rescue Program
December 2021

- Crew size will be scaled to reflect the volume of water that is diverted to the reservoir and anticipated scale of fish rescue operation.
- Fish capture methods may include the use of seine nets, standard Gee-style minnow traps, backpack electrofishing, tote electrofishing, or hand capture. Equipment type will be determined by the QAES and will reflect the volume of water that is diverted to the reservoir and anticipated scale of fish rescue efforts. Electrofishing efforts will follow the *Alberta Fisheries Management Division Electrofishing Policy Respecting Injuries to Fish (GOA 2012)*.
- It is anticipated that some sections of the reservoir will have substantial sediment deposition and will be unwadeable. Additional effort or specialized techniques may be required to access low areas where pooled water and stranded fish are present due to the amount of sedimentation that may be present in reservoir. Additional effort may also be required based on access, timing, and physical characteristics of areas where fish become stranded.
- Fish rescue will be considered complete when the reservoir has been drained and stranded fish have been captured and relocated into Elbow River.

4.2 TEMPORARY HANDLING AND HOLDING OF RESCUED FISH

The procedures for handling and holding of rescued fish are as follows:

- Rescued fish will be temporarily held in a bucket or tote with fresh river water and aerated with a battery-operated air pump or compressed oxygen.
- Handling of fish will be kept to a minimum to reduce stress.
- Retention time in the buckets or totes will be kept to a minimum before transferring to a large capacity, aerated live well. For relatively large magnitude flood events, large capacity holding systems (e.g., trailer mounted 1,500 L tanks with high-capacity aerators) may be required to temporarily handle fish. Designated personnel from the field crews will be responsible for transporting fish between the buckets and totes to the larger capacity holding systems (if required) to reduce stress to fish during transfer.
- Water in buckets and totes will be replaced as often as possible to maintain water temperature and dissolved oxygen concentrations suitable for rescued fish.
- Water temperature and dissolved oxygen will be monitored regularly in the holding tank.
- Fish health and stress will be monitored in the holding tanks.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Fish Rescue Program
December 2021

4.3 RELEASE OF RESCUED FISH INTO THE ELBOW RIVER

The following steps will be undertaken to relocate and release rescued fish back into Elbow River:

- Fish will be released to the Elbow River in suitable habitat identified in advance of operation of the reservoir, as per IAAC approval condition 3.16.4. Fish will be released into Elbow River when:
 - the large-capacity trailer mounted holding tank(s) has reached its capacity to hold fish
 - water temperature in the large-capacity trailer mounted holding tank(s) begins to rise to an unacceptable level
 - retention of fish in holding tank is resulting in stress to the fish
 - fishing efforts are deemed complete and multiple passes with electrofishing equipment and netting efforts result in no additional fish captures
- Criteria to determine a suitable release location will include:
 - adequate access for a truck towing a trailer with a large capacity holding tank (if required)
 - suitable water depth, flow and fish habitat are present and abundant
 - safe location for staff to work
- Where fish are held in a large-capacity trailer mounted holding tank, they will be observed to evaluate their condition prior to their release into the Elbow River.
- Visual observations of fish health and behaviour will be conducted and recorded immediately upon release into the river upstream of the diversion inlet (further monitoring efforts are proposed for the downstream reach, after the confluence of the unnamed creek with Elbow River, as discussed in Section 5.0).
- The water in the large-capacity trailer mounted holding tank will be flushed and replaced with fresh water from Elbow River before returning it to the reservoir to continue fish rescue efforts (if required). Specifically, a water pump with a fish exclusion screen will be used to refill the holding tank. The fish exclusion screen will meet the criteria outlined in the Interim code of practice: end-of-pipe fish protection screens for small water intakes in freshwater (DFO 2020).

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

Fish Rescue Program
December 2021

4.4 COLLECTION OF BIOLOGICAL DATA

In order to reduce stress and the potential for harm to rescued fish, it is recommended that fish handling be kept to a minimum. As such, rescued fish will be identified to species, life stage and observations of deformities, erosion, lesions or tumours recorded (IAAC approval condition 3.16.2). Additional data, such as length and weight measurements will be undertaken only if requested to do so by Alberta Environment and Parks (AEP) or DFO.

If fish mortalities are observed, fish will be identified to species and life stage, measured for length and weight and observations of external condition conducted.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Downstream Fish Health Monitoring and Mitigation Program
December 2021

5.0 DOWNSTREAM FISH HEALTH MONITORING AND MITIGATION PROGRAM

Upon completion of fish rescues in the reservoir and release of rescued fish into Elbow River, fish health monitoring will be undertaken in the downstream reach of Elbow River (from the confluence of the unnamed creek with Elbow River to Glenmore Reservoir). Monitoring efforts downstream of the Project will also account for effects on fish that are exposed to water from the reservoir that has re-entered the Elbow River, which may have reduced quality (i.e., increased water temperature, reduced dissolved oxygen, increased suspended sediment concentrations).

5.1 FISH HEALTH INDICATORS

The Fish Health Monitoring component of flood operation is intended to provide information on fish survival following rescue from the reservoir and relocation efforts to the Elbow River. Monitoring efforts will be focused on immediate observations following the release of fish to the Elbow River. Rather than relying on physiological indicators that are derived through laboratory analyses, the scope of the fish health monitoring program will use in-situ behavioural indicators, such as oxygen uptake (breathing rate), swim performance and avoidance behaviour. These are suitable indicators of fish health and stress that can be utilized in natural rivers and lakes. They do not require the capture of fish where undue stress could lead to a further deterioration of health.

It is possible that fish in the Elbow River are affected by sedimentation as a result of reservoir water release after a flood. This monitoring task is not intended to characterize the extent of effects on fish in the Elbow River following flood operation and focuses on observing the condition of fish that are captured and released from the reservoir. While not intended to characterize the extent of effects on fish in the Elbow River from the release of water from the reservoir or natural floodwaters, information from the Fish Health Monitoring scope could be used to inform ongoing fisheries management in the Elbow River.

Table 5.1 outlines the fish stress and health indicators, and corresponding ranking systems that will be utilized in the section of Elbow River downstream of the Project site to Glenmore Reservoir during release of water and fish from the reservoir.

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

Downstream Fish Health Monitoring and Mitigation Program
December 2021

Table 5.1 Fish Health Indicators and Ranking System

Rank	Health Indicator			Follow-Up Action by Monitoring Crew (if applicable)
	Swim Performance	Breathing Rate	Avoidance Behaviour	
0	<ul style="list-style-type: none"> no deterioration active and maintain expected swim speed and agility 	<ul style="list-style-type: none"> no deterioration unaffected 	<ul style="list-style-type: none"> exhibits strong avoidance maintains avoidance and not observed again 	No action required; fish is unaffected by reservoir water release and/or fish rescue, and further capture and handling for monitoring purposes would result in undue stress.
1	<ul style="list-style-type: none"> mild deterioration appears mildly sluggish but regains swimming ability 	<ul style="list-style-type: none"> mild deterioration generally unaffected and still able to function as expected 	<ul style="list-style-type: none"> exhibits moderate to strong avoidance 	No action required; fish is generally only mildly affected and will recover. Capture and handling for monitoring purposes would result in undue stress.
2	<ul style="list-style-type: none"> moderate deterioration very sluggish, struggling to maintain body form in water periods of time spent floating 	<ul style="list-style-type: none"> moderate deterioration labored breathing affecting fish's ability to function as expected 	<ul style="list-style-type: none"> exhibits only moderate avoidance struggles to gain body function and exhibits moderate avoidance behaviour 	Fish will be captured and held in holding tank that contains fresh water that is well oxygenated to recover. When fish has recovered, it is to be released in a section of river with suitable habitat
3	<ul style="list-style-type: none"> high deterioration unable to maintain body form in water floating, with no active swimming ability 	<ul style="list-style-type: none"> highly labored and low rate of breathing no longer able to function in any capacity 	<ul style="list-style-type: none"> no longer capable of avoidance 	Fish will be captured and held to recover in a holding tank that contains fresh water that is well oxygenated. When fish has recovered it is to be released in a section of river with suitable habitat. If an extended recovery time is required, fish will be relocated to large capacity holding tank to increase chance of recovery.
4	<ul style="list-style-type: none"> mortality 	<ul style="list-style-type: none"> mortality 	<ul style="list-style-type: none"> mortality 	Remove fish from river as per directions indicated in the AEP fish rescue license for the Project.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Downstream Fish Health Monitoring and Mitigation Program
December 2021

5.2 MONITORING OF FISH HEALTH AND MITIGATION

Monitoring of fish health in the downstream extent of the Elbow River will be carried out immediately following fish relocation, or at the soonest time that it is safe to enter the river upon reservoir water release. Monitoring is expected to continue for the duration that fish are being relocated to the Elbow River, and will focus on observations of fish that are being relocated. The number of crews will be scaled according to the size of the fish rescue program.

The following steps will be conducted by the crews to monitor for fish potentially impacted by the flood operations at the reservoir:

- Each crew will observe fish as they are being relocated to the Elbow River. It is expected that mortalities and fish that are experiencing stress will be visible at the surface; underwater cameras will also be employed, if possible.
- When fish are observed, each will be ranked according to criteria outlined in Table 5.1 and follow-up action will be taken to improve survival of fish that are exhibiting signs of behavioural stress.
- Fish that are Rank 0 or Rank 1 will not be captured because this could result in undue stress that could impact health. Each fish observed will be identified to species and life stage and the data recorded.
- Fish that are Rank 2 or Rank 3 will be captured and held in a well oxygenated live well on the boat until they have recovered. Each fish will be identified to species and life stage and observations of deformities, erosion, lesions or tumours recorded. Once they have recovered, they will then be released into Elbow River in a location with suitable water depth, velocity and habitat. Fish that do not recover will be removed as per directions indicated in the AEP fish rescue license for the Project.
- Any fish mortalities observed (Rank 4) will be retrieved from the river to record physical condition. They will be identified to species and life stage and measured for length and weight and observations of deformities, erosion, lesions or tumours recorded. A digital hand-held reader will be used to scan fish for a passive integrated transducer (PIT) tag and, if present, the PIT tag number will be recorded.
- The monitoring of fish health and mitigation will continue for the duration of fish rescue relocations from the reservoir.

The above-described observations are expected to also apply to fish that are impacted by the flood event and are located downstream of the Project but were not diverted from the river into the reservoir.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

Cleaning and Decontamination
December 2021

6.0 CLEANING AND DECONTAMINATION

Whirling disease has been detected in many watersheds in southern Alberta. Therefore, equipment will be cleaned and disinfected to limit the spread of *Myxobolus cerebralis*, the parasite that causes the disease. The Government of Alberta has developed standard decontamination protocols for watercraft and equipment (GOA 2017; <https://open.alberta.ca/publications/9781460134986>). These will be implemented and adhered to prior to, and following, completion of the fish rescue and fish health monitoring and mitigation programs. These standards for reducing the spread of invasive species may be updated as required in the future.

SPRINGBANK OFF-STREAM RESERVOIR PROJECT FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION

References
December 2021

7.0 REFERENCES

- Fisheries and Oceans Canada (DFO). 2020. Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater. <https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html>
- Fletcher D. 1984. Plasma glucose and plasma fatty acid levels of *Limanda* (L.) in relation to season, stress, glucose loads and nutritional state. *J Fish Biol* 25:629–648.
- Fromm, P. 1980. A review of some physiological and toxicological responses of freshwater fish to acid stress. *Environ Biol Fishes* 5:79–93
- GOA (Government of Alberta). 2012. Alberta Fisheries Management Division Electrofishing Policy Respecting Injuries to Fish. Fisheries Management Division, Environment and Sustainable Resource Development Branch. Available at: <https://open.alberta.ca/dataset/cc744351-2fc0-426c-ae9c-ea2ff671aaa6/resource/7fee715d-1704-4e5f-944d-816ee6990674/download/electrofishingpolicy-injuriestofish-nov2012a.pdf>
- GOA. 2017. Decontamination Protocol for Watercraft & Equipment. Alberta Environment and Parks, 28p + appendices <https://open.alberta.ca/publications/9781460134986>
- Maita M., Aoki H., Yamagata Y., Satoh S., Okamoto N., Watanabe T. 1998. Plasma biochemistry and disease resistance in yellowtail fed a non-fish meal diet. *Fish Pathol* 33:59–63.
- Pickering A. and Pottinger T. 1989a. Stress responses and disease resistance in salmonid fish: effects of chronic elevation of plasma cortisol. *Fish Physiol Biochem* 7:253–258.
- Pickering A. and Pottinger T. 1989b. Stress responses and disease resistance in salmonid fish: effects of chronic elevation of plasma cortisol. *Fish Physiol Biochem* 7:253–258.
- Tyson, J.D., Tonn, W.M., Boss, S., and B.W. Hanna. 2011. General Fish-out Protocol for Lakes and Impoundments in the Northwest Territories and Nunavut. Canadian Technical Report of Fisheries and Aquatic Sciences 2935.
- Wells R. and Pankhurst N. 1999. Evaluation of simple instruments for the measurement of blood glucose and lactate, and plasma protein as stress indicators in fish. *J World Aquac Soc* 30:276–284.

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
FISH RESCUE AND FISH HEALTH MONITORING AND MITIGATION**

References
December 2021