Species at Risk Act
Action Plan Series

Action Plan for the Speckled Dace (*Rhinichthys osculus*) in Canada

Speckled Dace

2020

Canada

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For copies of the action plan, or for additional information on species at risk, including Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports, residence descriptions, recovery strategies, and other related recovery documents, please visit the SAR Public Registry.

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Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996) agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of action plans for species listed as extirpated, endangered, or threatened for which recovery has been deemed feasible. They are also required to report on progress five years after the publication of the final document on the Species at Risk Public Registry.

The Minister of Fisheries and Oceans is the competent minister under SARA for the Speckled Dace and has prepared this action plan to implement the recovery strategy, as per section 47 of SARA. In preparing this action plan, the competent minister has considered, as per section 38 of SARA, the commitment of the Government of Canada to conserving biological diversity and to the principle that, if there are threats of serious or irreversible damage to the listed species, cost-effective measures to prevent the reduction or loss of the species should not be postponed for a lack of full scientific certainty. To the extent possible, this action plan has been prepared in cooperation with environmental non-government organizations, industry and species experts, Indigenous organizations, and the Province of British Columbia as detailed in appendix B and as per section 48(1) of SARA.

As stated in the preamble to SARA, success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this action plan and will not be achieved by Fisheries and Oceans Canada or any other jurisdiction alone. The cost of conserving species at risk is shared amongst different constituencies. All Canadians are invited to join in supporting and implementing this action plan for the benefit of the Speckled Dace and Canadian society as a whole.

Under SARA, an action plan provides the detailed recovery planning that supports the strategic direction set out in the recovery strategy for the species. The plan outlines recovery measures to be taken by Fisheries and Oceans Canada and other jurisdictions and/or organizations to help achieve the population and distribution objectives identified in the recovery strategy. Implementation of this action plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Acknowledgments

This action plan was prepared by Erin Gertzen (Fisheries and Oceans Canada (DFO)), with contributions from Tara White (British Columbia Ministry of Forest, Lands and Natural Resource Operations), Sean MacConnachie (DFO), Andrew Baylis (DFO) and Martin Nantel (DFO). Participants of the Action Planning Workshop (appendix B) contributed valuable information and ideas towards the development of this action plan.

Executive summary

The Speckled Dace (*Rhinichthys osculus*) was listed as Endangered under the *Species at Risk Act* (SARA) in 2009. This action plan is part of a series of documents regarding Speckled Dace, including the COSEWIC Status Report (COSEWIC 2006), Recovery Potential Assessment (RPA) (DFO 2008a), critical habitat identification report (Brown et al. 2012), and recovery strategy (DFO 2018) that should be taken into consideration together.

Speckled Dace is a small freshwater minnow that resides in the West Kettle, Kettle and Granby rivers within British Columbia, Canada. The small (51 to 94 millimetres (mm)) fish is characterized by an elongated body, prominent snout and sucker-like mouth. Speckled Dace is grey or brownish-grey with dark speckles and a light coloured belly. Its habitat consists of riffles, runs, pools and river margins with gravel, cobble and boulder substrates.

This action plan identifies recovery measures to implement the broad approaches to recovery identified in the recovery strategy for the Speckled Dace in Canada (DFO 2018). These measures are intended to support the progress towards the population and distribution objective for the species identified in the recovery strategy:

- maintain current distribution and abundance within natural fluctuations

Section 1.2 outlines the measures to be taken under the following broad strategies:

1. increase understanding of population and distribution trends, natural variability, and any linkages to threats
2. clarify threats associated with water use in the West Kettle, Kettle and Granby watersheds
3. study the relationship between discharge and Speckled Dace productivity to help replace assumptions with direct observations
4. support local stewardship groups to advance Speckled Dace recovery.
5. work towards preventing entry of aquatic invasive species into Speckled Dace range above Cascade Falls
6. research diet of juveniles less than 18 mm
7. research importance of embeddedness and relate to threats that create embeddedness
8. research spawning, night-time, overwintering and migratory behaviour
9. clarify impacts of rangeland operations, including nutrient loading

For the Speckled Dace, critical habitat was identified to the extent possible, using the best available information, in section 7 of the recovery strategy. Under SARA, critical habitat must be legally protected from destruction within 180 days of being identified in a final recovery strategy or action plan and included in the Species at Risk Public Registry. For the Speckled Dace's critical habitats identified in the 2008 recovery strategy (DFO 2018), legal protection was accomplished on November 14, 2018 through two SARA Critical Habitat Orders made under subsections 58(4) and (5), which invoked the prohibition in subsection 58(1) against the destruction of the identified critical habitat.

An evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation is provided in section 3.

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1. Recovery actions

1.1 Context and scope of the action plan

The Speckled Dace (*Rhinichthys osculus*) was listed as Endangered under the *Species at Risk Act* (SARA) in 2009. This action plan is part of a series of documents regarding Speckled Dace, including the COSEWIC Status Report (COSEWIC 2006), Recovery Potential Assessment (RPA) (DFO 2008a), critical habitat identification report (Brown et al. 2012), and recovery strategy (DFO 2018) that should be taken into consideration together. Under SARA, an action plan provides the detailed recovery planning that supports the strategic direction set out in a recovery strategy for the species. A recovery strategy also provides background information on the species and its threats and critical habitat information.

Speckled Dace is a small minnow found in riverine habitats. It inhabits slow-moving shallow habitats as well as riffles and runs with gravel, cobble or boulder substrate and low to moderate embeddedness.[1] Immature fish have been found associated with river margins, while adults typically inhabit deeper channel habitat. Speckled Dace spawns in the summer and uses its sucker-like mouth to feed on filamentous algae and aquatic insects on the substrate (COSEWIC 2006; Batty 2010).

In Canada, Speckled Dace is found in the West Kettle, Kettle and Granby rivers in the Kootenay Boundary Region of British Columbia. Its population of approximately one million mature individuals is distributed over 300 kilometres of river, with abundance being highest in the West Kettle River and lowest in the Granby River. No trends in population are available but populations appear to be robust (Batty 2010; DFO 2018).

Key anthropogenic threats identified in the recovery strategy include: habitat loss or degradation from reduced flows in the summer and autumn due to water extraction for consumptive uses; inundation and loss of habitat through potential hydro development;[2] water pollution from increased siltation and substrate embeddedness from agriculture activities, forestry activities and mining activities; harmful substance and sediment releases from mining activities; increased predation by invasive piscivorous fish; and, changes in hydrograph, temperature, cover and stream morphology due to climate change.[3]

The recovery strategy defined the population and distribution objective for Speckled Dace as:

- maintain current distribution and abundance within natural fluctuations

Under section 47 of SARA, the competent minister must prepare one or more action plans based on the recovery strategy. Therefore, action planning for species at risk recovery is an iterative process. The implementation schedule in this action plan may be modified in the future depending on the progress made towards recovery.

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[1] Embeddedness is the degree to which a coarse substrate surface is covered by fine sediment.
[2] This threat is not addressed in the action plan as the Environmental Assessment Certificate for the proposed Cascade Falls hydro development expired in August 2016 (B.C. Environmental Assessment Office 2017).
[3] Addressing this threat is beyond the scope of the recovery strategy and action plan.

1.2 Measures to be taken and implementation schedule

Success in the recovery of this species is dependent on the actions of many different jurisdictions; it requires the commitment and cooperation of the constituencies that will be involved in implementing the directions and measures set out in this action plan.

This action plan identifies recovery measures to implement the broad approaches to recovery identified in the recovery strategy for the Speckled Dace in Canada (DFO 2018). These measures are intended to support the progress towards the population and distribution objective for the species, including measures to address threats to the species and monitor its recovery, to guide not only activities to be undertaken by Fisheries and Oceans Canada (DFO), but those for which other jurisdictions, organizations and individuals have a role to play. As new information becomes available, these measures and the priority of these measures may change. DFO strongly encourages all Canadians to participate in the conservation of the Speckled Dace by undertaking measures outlined in this action plan.

Section 1.2 outlines the measures to be taken under the following broad strategies identified in the species' recovery strategy (DFO 2018):

1. increase understanding of population and distribution trends, natural variability, and any linkages to threats
2. clarify threats associated with water use in the West Kettle, Kettle and Granby watersheds
3. study the relationship between discharge and Speckled Dace productivity to help replace assumptions with direct observations
4. support local stewardship groups to advance Speckled Dace recovery
5. work towards preventing entry of aquatic invasive species into Speckled Dace range above Cascade Falls
6. research diet of juveniles less than 18 mm
7. research importance of embeddedness and relate to threats that create embeddedness
8. research spawning, night-time, overwintering and migratory behaviour
9. clarify impacts of rangeland operations, including nutrient loading

Table 1 identifies the measures to be undertaken by DFO to support the recovery of the Speckled Dace.

Table 2 identifies the measures to be undertaken collaboratively between DFO and its partners, other agencies, organizations or individuals. Implementation of these measures will be dependent on a collaborative approach, in which DFO is a partner in recovery efforts, but cannot implement the measures alone. As all Canadians are invited to join in supporting and implementing this action plan, table 3 identifies the remaining measures that represent opportunities for other jurisdictions, organizations or individuals to lead for the recovery of the species. If your organization is interested in participating in one of these measures, please contact the Species at Risk Pacific Region office at sara@pac.dfo-mpo.gc.ca.

Implementation of this action plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Table 1. Measures to be undertaken by Fisheries and Oceans Canada

#	Recovery measures	Broad strategy (ies)[4]	Priority[5]	Threats addressed	Timeline
1	Develop a monitoring plan to assess Speckled Dace population and distribution trends, variability and response to threats. Monitoring efforts may also include: • abundance and distribution estimates • Speckled Dace density • water quantity and quality parameters • presence of aquatic invasive species (AIS)	1	Medium	All	2023
2	Develop allowable harm estimates and collection guidelines for Speckled Dace.	1	Low	All	2023
3	Refine, prioritize and address a list of knowledge gaps on the basic biology of Speckled Dace. Research on knowledge gaps may include: • habitat use by life stage, including possible night-time and winter downstream migration and overwintering habitat	8	Medium	All	2027

[4] Numbering for Broad Strategies based on the Recovery Strategy for the Speckled Dace (*Rhinichthys osculus*) in Canada (DFO 2018).
[5] "Priority" reflects the degree to which the measure contributes directly to the recovery of the species or is an essential precursor to a measure that contributes to the recovery of the species:

- "high" priority measures are considered likely to have an immediate and/or direct influence on the recovery of the species.
- "medium" priority measures are important but considered to have an indirect or less immediate influence on the recovery of the species.
- "low" priority measures are considered important contributions to the knowledge base about the species and mitigation of threats.

Table 2. Measures to be undertaken collaboratively between Fisheries and Oceans Canada and its partners

#	Recovery measures	Broad strategy (ies)	Priority	Threats addressed	Timeline[6]	Partner(s)
4	Implement the monitoring plan for Speckled Dace.	1	Medium	All	Long-term	DFO, stewardship groups, local, provincial, or regional governments
5	Compare salmonid and Speckled Dace's biological needs for temperature and water flows to ensure that actions identified in existing drought response, fish protection and water management plans[7] to protect salmonids would also meet the needs of Speckled Dace.	2 and 3	High	Reduced flows in summer and autumn due to water extraction for consumptive uses; changes in hydrograph, temperature, cover and stream morphology from climate change	Short-term	DFO, local, provincial or regional government, industry, stewardship groups
6	Continue to update, coordinate and implement existing drought response, fish protection and water management plans[8] to support the needs of Speckled Dace. This may include modifying plans to specifically acknowledge the needs of Speckled Dace.	2 and 3	High	Reduced flows in summer and autumn due to water extraction for consumptive uses; changes in hydrograph, temperature, cover and stream morphology from climate change	Medium-term	DFO, local, provincial or regional government, industry, stewardship groups

[6] Short-term = 2019 to 2023, medium-term = 2024 to 2028, long-term = beyond 2028.
[7] Existing provincial, regional and operational plans include: British Columbia Drought Response Plan (B.C. Ministry of Environment 2016); Provincial Fisheries Drought Response Plan (Andrusak et al. 2016); Thompson Okanagan Region Drought Response Implementation Plan (Thompson Okanagan Drought Response Team 2016); West Kettle River Fish Protection Recommendations (Epp 2013a); Granby River Fish Protection Recommendations (Epp 2013b); Kettle River Fish Protection Recommendations (Epp 2013c); Results of 2012 West Kettle River, Kettle River and Granby River Flow, Temperature and Useable Fish Habitat Monitoring for Kettle River Fish Protection Planning (Epp 2013d); and, Kettle River Watershed Management Plan: Phase 1 Technical Assessment (S.E.C. Inc. 2012).
[8] Ibid.

#	Recovery measures	Broad strategy (ies)	Priority	Threats addressed	Timeline[6]	Partner(s)
7	Building on the Kettle River Riparian Threat Assessment (Coleshill and Watt 2015), support recommendations that could improve Speckled Dace habitat by: (a) reducing sediment inputs into the West Kettle, Kettle and Granby rivers (b) prioritizing areas for riparian area restoration and preventative bank stabilization within the watershed (c) improving function of riparian areas through habitat restoration and bank stabilization projects	7 and 9[9]	High	Increased siltation and substrate embeddedness from agriculture activities; increased siltation and substrate embeddedness from forestry activities; harmful substances and sediment released and substrate embeddedness from mining activities	Medium-term	DFO, academia, local, provincial or regional government, industry, stewardship groups
8	Refine, prioritize and address a list of knowledge gaps on the basic biology of Speckled Dace. Research on knowledge gaps may include: • reproductive strategies (for example, nest building vs. broadcast, guarding), location and timing of spawning • diets of juveniles less than 18 mm • temperature tolerances of Speckled Dace	6 and 8	Medium	All	Long-term	DFO, academia, local, provincial or regional government, industry, stewardship groups

[9] Rangeland operations refer primarily to livestock grazing.

Table 3. Measures that represent opportunities for other jurisdictions, organizations or individuals to lead

#	Recovery measures	Broad strategy (ies)	Priority	Threats addressed	Suggested other jurisdictions or organizations
9	Increase understanding of surface-groundwater coupling and its relationship to discharge and Speckled Dace productivity.	2 and 3	Medium	Reduced flows in summer and autumn due to water extraction for consumptive uses; changes in hydrograph, temperature, cover and stream morphology from climate change	Academia, provincial and regional government
10	Increase understanding of: (a) the historic contribution of placer mining and (b) the potential contribution of future mineral mining to sedimentation, embeddedness and contamination in the mainstems of the West Kettle, Kettle and Granby rivers.	7 and 9	Low	Harmful substances and sediment released and substrate embeddedness from mining activities	Academia, local, provincial or regional government, industry, stewardship groups
11	As opportunities arise, update rangeland management plans where they apply, including best management practices, to encourage compliance promotion and voluntary stewardship.	7 and 9	Low	Increased siltation and substrate embeddedness from agriculture activities	Local, provincial or regional government, industry, stewardship groups, consultants
12	Participate in a group that supports the conservation and protection of Speckled Dace. This group may undertake watershed-based stewardship initiatives that increase understanding, awareness and conservation of the species (for example, promotion of best management practices, development and implementation of community-based drought response plans that are complementary to provincial, regional and operational plans).	4 and 5	Low	All	Stewardship groups, Indigenous groups, local, provincial or regional governments, industry, landowners

#	Recovery measures	Broad strategy (ies)	Priority	Threats addressed	Suggested other jurisdictions or organizations
13	Develop educational materials and host educational events with an emphasis on: • public awareness about AIS (for example, Smallmouth Bass (*Micropterus dolomieu*), Largemouth Bass (*M. salmoides*), Walleye (*Sander vitreus*), Pumpkinseed (*Lepomis gibbosus*), Northern Pike (*Esox lucius*), Zebra Mussel (*Dreissena polymorpha*), Quagga Mussel (*Dreissena bugensis*)) with a focus on preventing entry of AIS from Christina Lake and other areas into the West Kettle, Kettle and Granby rivers (for example, through signage at boat launches) • the importance of maintaining the integrity of riparian habitats and vegetation, including applying best management practices for restoration and bank stabilization (that is, to avoid doing more harm than good when conducting these activities) • enhancing management of grazing animals through the promotion and adoption of best management practices and mitigation measures (for example, offstream watering, fencing, and livestock crossings) to reduce sediment inputs and nutrient loading The target audience should include the general public, landowners, and land use operators.	4 and 5	Medium	All	Stewardship groups, Indigenous organizations, local, provincial or regional governments, industry, landowners

2. Critical habitat

2.1 Identification of the species' critical habitat

2.1.1 General description of the species' critical habitat

Critical habitat is defined in SARA as "…*the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in a Recovery Strategy or in an Action Plan for the species*." [s. 2(1)]

Also, SARA defines habitat for aquatic species as "… *spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced*." [s. 2(1)]

Critical habitat for Speckled Dace is identified to the extent possible in section 7.1 of the recovery strategy (DFO 2018). The recovery strategy also contains details about the identified critical habitat including geographic location and biophysical functions, features and attributes. The recovery strategy contains a schedule of studies outlining the research required to identify additional critical habitat if necessary, and to acquire more detail about the critical habitat identified, in order to achieve the species' population and distribution objectives.

2.2 Activities likely to result in the destruction of critical habitat

Examples of activities likely to result in destruction of critical habitat may be found in section 7.3 of the recovery strategy.

2.3 Measures to protect critical habitat

Under SARA, critical habitat must be legally protected from destruction within 180 days of being identified in a final recovery strategy or action plan and included in the Species at Risk Public Registry. For the Speckled Dace's critical habitats identified in the 2008 recovery strategy (DFO 2018), legal protection was accomplished on November 14, 2018 through two SARA Critical Habitat Orders made under subsections 58(4) and (5), which invoked the prohibition in subsection 58(1) against the destruction of the identified critical habitat.

3. Evaluation of socio-economic costs and of benefits

The *Species at Risk Act* requires that an action plan include an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation (SARA 49(1)(e), 2003). This evaluation addresses only the incremental socio-economic costs of implementing this action plan from a national perspective as well as the social and environmental benefits that would occur if the action plan were implemented in its entirety, recognizing that organizations or agents other than the federal government may be better placed for implementation of certain aspects of the plan. It does not address cumulative costs of species recovery in general nor does it attempt a cost-benefit analysis. The intent of this evaluation is to inform the public and to guide decision making on implementation of the action plan by partners.

The protection and recovery of species at risk can result in both benefits and costs. The Act recognizes that "*wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological and scientific reasons*" (SARA 2003). Self-sustaining and healthy ecosystems with their various elements in place, including species at risk, contribute positively to the livelihoods and the quality of life of all Canadians. A review of the literature confirms that Canadians value the preservation and conservation of species in and of themselves. Actions taken to preserve a species, such as habitat protection and restoration, are also valued. In addition, the more an action contributes to the recovery of a species, the higher the value the public places on such actions (Loomis and White 1996; DFO 2008b). Furthermore, the conservation of species at risk is an important component of the Government of Canada's commitment to conserving biological diversity under the *International Convention on Biological Diversity*. The Government of Canada has also made a commitment to protect and recover species at risk through the *Accord for the Protection of Species at Risk*. The specific costs and benefits associated with this action plan are described below.

3.1 Benefits of implementing this action plan

The impacts on Speckled Dace of the recovery measures in this plan are unknown but likely positive. As indicated above, Canadians value species for a number of reasons, including non-market benefits (that is existence, bequest and option values)[10]. Activities that positively affect the recovery of species, for which there are non-market benefits, may result in positive benefits to Canadians.

The recovery measures may also provide broader benefits to other species. For example, monitoring and research activities to address research gaps for Speckled Dace may provide information on other species or habitat conditions that would be useful in their management. Also, implementation of water management plans and compliance on best management practices to reduce sediment inputs is meant to provide ecosystem wide benefits and protect other fish stocks, such as salmonids, that also depend on those habitats.

3.2 Socio-economic costs of implementing this action plan

The implementation schedule separates recovery measures into three tables. Table 1 includes measures to be undertaken by DFO with the full costs borne by the Government of Canada. Table 2 includes measures to be undertaken collaboratively between DFO and partners; the costs of these measures would be borne jointly by government and partners. The measures in table 3 provide opportunities for other jurisdictions, organizations and individuals to support the recovery of Speckled Dace; these costs would be borne primarily by parties other than the Government of Canada. The costs incurred by the Government of Canada would come from existing allocations.

The majority of the measures in table 1 and 2 of the action plan are research and monitoring activities. Research is focused on gathering information on habitat use by life stage, downstream migration patterns and overwintering habitat, and impacts on Speckled Dace of

[10] Non-market benefits include bequest values (the value placed on conservation for future generations), existence values (the value people place on the existence of a species) and option values (the amount someone is willing to pay to keep open the option of future use of the species).

water use, sedimentation and AIS. Monitoring actions will indicate progress towards meeting population and distribution objectives and are to be undertaken on an ongoing basis. The majority of the actions are one-time, very low cost activities, scheduled to be conducted in the short- to medium-term (that is, over the next 10 years).

The costs associated with the actions in table 3 are unknown but are likely very low based on similar actions for other species. Table 3 activities focus on compliance promotion, stewardship, and education. Additionally, research measures are identified to increase understanding and awareness of the species and promote best practices which could be undertaken on a voluntary basis by groups as opportunities arise. These measures are anticipated for the duration of the action plan, including over the long-term. Most of the direct and in-kind costs, while likely low, would be borne by parties other than the Government of Canada.

Overall, the direct annual costs of all the measures in the action plan (tables 1, 2 and 3) are likely low (that is, <$50,000/year), with some additional in-kind costs likely for partners, organizations and individuals for measures in tables 2 and 3. Indirect costs are not anticipated. The costs will be distributed across the short, medium and long-term.

4. Measuring progress

The performance indicators presented in the associated recovery strategy provide a way to define and measure progress toward achieving the population and distribution objectives.

Reporting on *implementation* of the action plan (under section 55 of SARA) will be done by assessing progress towards implementing the broad strategies.

Reporting on the ecological and socio-economic impacts of the action plan (under s. 55 of SARA) will be done by assessing the results of monitoring the recovery of the species and its long term viability, and by assessing the implementation of the action plan.

5. References

Andrusak, G.F., H. Ward, and R. Ptolemy. 2016. Provincial Fisheries Management: Drought Response Plan - 2016. Prepared for the Ministry of Forests, Lands and Natural Resource Operations, Victoria, B.C. July 2016. 16 pp.

Batty, A. 2010. Examination of Speckled Dace abundance, biology and habitat in the Canadian range. M.Sc. thesis, Simon Fraser University, Burnaby, B.C., Canada. vii + 87 pp.

British Columbia (B.C.) Environmental Assessment Office. 2017. Project Information Centre: Cascade Heritage Power Project. Accessed February 20, 2017. https://projects.eao.gov.bc.ca/p/cascade-heritage-power/detail

British Columbia (B.C.) Ministry of Environment. 2016. British Columbia Drought Response Plan (Updated July 2016). Prepared by the Ministry of Environment on behalf of the Inter-Agency Drought Working Group. 38 pp.

Brown, T., B. Harvey, and M.J. Bradford. 2012. Information in support of the identification of critical habitat for speckled dace (*Rhinichtys osculus*). DFO Can. Sci. Advis. Sec. Res. Doc. 2012/065. iv + 29p.
Coleshill, J., and G. Watt. 2015. Kettle River Riparian Threat Assessment (Final Draft). Grand Forks, B.C., Granby Wilderness Association.

COSEWIC. 2006. COSEWIC assessment and update status report on the speckled dace *Rhinichthys osculus* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa. vi + 27 pp.

DFO (Fisheries and Oceans Canada). 2008a. Recovery potential for the speckled dace (*Rhinichthys osculus*). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2008/030. 8 pp.

DFO (Fisheries and Oceans Canada). 2008b. Estimation of the Economic Benefits of Marine Mammal Recovery in the St. Lawrence Estuary. Policy and Economics Regional Branch, Quebec 2008.

DFO (Fisheries and Oceans Canada). 2018. Recovery Strategy for the Speckled Dace (*Rhinichthys osculus*) in Canada. *Species at Risk Act* Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. v + 31 pp.

Epp, P. 2013a. West Kettle River fish protection recommendations. Internal Report. Prepared for the British Columbia Ministry of Forests, Lands and Natural Resource Operations, Penticton, British Columbia.

Epp, P. 2013b. Granby River fish protection recommendations. Internal Report. Prepared for the British Columbia Ministry of Forests, Lands and Natural Resource Operations, Penticton, British Columbia.

Epp, P. 2013c. Kettle River fish protection recommendations. Internal Report. Prepared for the British Columbia Ministry of Forests, Lands and Natural Resource Operations, Penticton, British Columbia.

Epp, P. 2013d. Results of 2012 West Kettle River, Kettle River and Granby River Flow, Temperature and Useable Fish Habitat Monitoring for Kettle River Fish Protection Planning. Internal Report. Prepared for the British Columbia Ministry of Forests, Lands and Natural Resource Operations, Penticton, British Columbia.

Loomis, J.B., and D.S. White. 1996. Economic Benefits of Rare and Endangered Species: Summary and Meta-analysis. Ecological Economics, 18: 197-206.

S.E.C. Inc. (Summit Environmental Consultants Inc). 2012. Kettle River watershed management plan: phase 1 technical assessment. Prepared for the Regional District of Kootenay Boundary, Trail, British Columbia. xvii + 186 pp.

Thompson Okanagan Drought Response Team. 2016. Thompson Okanagan Region Drought Response Implementation Plan (July 2016 Draft). British Columbia Ministry of Forest, Lands and Natural Resource Operations. 32 pp.

Appendix A: effects on the environment and other species

In accordance with the Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals (2010), SARA recovery planning documents incorporate Strategic Environmental Assessment (SEA) considerations throughout the document. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or achievement of any of the goals and targets of the Federal Sustainable Development Strategy (FSDS).

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the action plan itself, but are also summarized below in this statement.

By promoting the recovery of Speckled Dace, this action plan will benefit the environment, thereby contributing to FSDS Goal 4 (Conserving and Restoring Ecosystems, Wildlife and Habitat, and Protecting Canadians). Specifically, it will help to attain the associated Target 4.1 which is to have populations of federally listed species at risk exhibit trends that are consistent with recovery strategies and management plans. In addition, it could help to meet the target associated with 4.6, whereby pathways of AIS introductions are identified, and risk-based intervention or management plans are in place for priority pathways and species.

The actions identified in this Plan address threats such as: habitat loss from reduced flows in the summer and autumn due to water extraction for consumptive uses; inundation and habitat loss through potential hydro development; increased siltation and substrate embeddedness from agriculture activities, forestry activities and mining activities; harmful substance and sediment releases from mining activities; increased predation by invasive piscivorous fish; and, changes in hydrograph, temperature, cover and stream morphology due to climate change. By addressing these threats, the actions will contribute to overall ecosystem health, which may provide benefits to other species that coexist in the West Kettle, Kettle and Granby watersheds, including Rainbow Trout (*Oncorhynchus mykiss*), Mountain Whitefish (*Prosopium williamsoni*), Umatilla Dace (*Rhinichthys umatilla*), and other Cyprinid and Cottidae species, as well as ecological services to Canadians living in the area. No adverse effects on other species are anticipated as the result of the implementation of this action plan.

More specifically, within the distribution of the Speckled Dace, it is unlikely that the recovery measures recommended within this document will negatively impact other fish or wildlife species. The recovery measures will help to address threats to the Speckled Dace and their habitat, such as improving water quality by limiting sediment inputs, which will also benefit other native species. Furthermore, recovery efforts may benefit species downstream of the distribution of Speckled Dace as improvements in water quality could be conveyed to these areas.

Given the considerations outlined above, the benefits of this action plan to the environment and other species are expected to outweigh any adverse effects that may occur.

Appendix B: record of cooperation and consultation

Action Plans are to be prepared in cooperation and consultation with other jurisdictions, organizations, affected parties and others as outlined in SARA section 48. DFO hosted an action planning workshop in Penticton, British Columbia the afternoon of December 12, 2016 to seek input to the development of this action plan. WebEx and a teleconference line were made available to those unable to attend in person. Information on participation is included below.

Organizations represented
1. B.C. Cattlemen's Association (Farmland-Riparian Interface Stewardship Program)
2. Bobtail Ranch
3. British Columbia Ministry of Agriculture
4. British Columbia Ministry of Environment
5. British Columbia Ministry of Forest, Lands, and Natural Resource Operations
6. City of Grand Forks
7. Fisheries and Oceans Canada
8. Granby Wilderness Association
9. Interfor
10. Okanagan Nation Alliance

Workshop participants identified knowledge gaps and provided input on potential recovery measures to address key threats. Discussions focused on the importance of: coordinating water management plans in the Kootenay-Boundary watersheds to help address the water use threat for Speckled Dace; confirming that water use measures developed for salmonids apply to Speckled Dace; and, identifying and prioritizing sources of sediment inputs into the West Kettle River, Kettle River and Granby River.

In May 2017, the draft action plan was circulated to Indigenous organizations, local, regional and provincial governments, academia, environmental non-government organizations, and industry for a 30-day external review. Comments resulted in minor revisions to recovery measures.

Additional Indigenous organizations, stakeholder, and public input was sought through the publication of the proposed document on the Species at Risk Public Registry for a 60-day public comment period. No feedback was received.