

Chapter 16 Environment—Sustainable Fish Population Management

1.0 MAIN POINTS

By July 2022, of the nine recommendations we made in 2019 in regards to managing freshwater fish populations in a sustainable manner, the Ministry of Environment implemented seven recommendations, partially implemented one recommendation, and we determined one recommendation was no longer relevant.

There are over 50,000 water bodies in Saskatchewan with fish populations.¹ The Ministry uses water body assessments to collect information on the health and population of fish. These assessments entail collecting information about fish populations (e.g., size, weight, maturity) to make decisions (e.g., adjusting catch limits, adding fish) to ensure healthy fish populations are available for a long time.

In line with good practice, the Ministry now expects to assess water bodies determined to be highest priority (based on risk) every 8–10 years. It determines the assessment frequency for the remaining water bodies using a risk-based approach. By July 2022, the Ministry assigned priority scores to 325 water bodies. It determined nine water bodies as highest priority.

Ministry staff followed improved guidance for completing water body assessments. Improved guidance provides staff with written, standardized, science-based protocols for field data collection as well as for reporting on fish populations and their health. A new assessment template also ensures proper documentation of water body assessments. The new guidance contributed to the Ministry improving timeliness of water body assessment reports to allow fish catch limits to be changed (where required) before it publishes its annual Anglers Guide.

The Ministry also created specific plans for managing fish populations for three of the nine highest priority water bodies. However, the plans do not include sustainability targets for fish populations the Ministry strives to maintain in the highest priority water bodies; without clear fish population sustainability targets, it is difficult to determine whether a healthy fish population exists in Saskatchewan water bodies.

Effective fish population management is critical to sustainable fisheries today, and for future generations.

2.0 INTRODUCTION

2.1 Background

The Ministry of Environment is responsible for managing freshwater fish populations in a sustainable manner. It monitors fish populations to detect changes resulting from harvest, environmental conditions, and stocking.²

¹ Ministry of Environment, *Fisheries Management Plan* (2010), p. 2, (14 October 2022).

² Ministry of Environment, *Fish Population Monitoring*. (14 October 2022).



In Saskatchewan, an estimated 50,000 water bodies contain fish with the majority in the northern half of the province. These waters contain 69 fish species with 58 species native to Saskatchewan and 11 introduced or invasive species. Most fishing and harvesting in the province focuses on five primary species: Northern Pike, Walleye, Yellow Perch, Lake Trout, and Lake Whitefish.³

In 2021–22, the Ministry spent about \$13.9 million on conserving fish and wildlife populations and maintaining biodiversity, including approximately \$4.3 million for the Fish and Wildlife Development Fund.⁴ The purpose of the Ministry-administered Fund is to maintain natural habitats including maintaining and growing sustainable fish populations and their habitats, as well as maintaining game populations and accessible hunting.⁵

Fish, although a renewable resource, are at risk without proper management. Each fish caught or harvested should benefit the angler while minimizing the impact to the ecosystem. In addition, sustainable fishing allows the remaining fish to populate.

2.2 Focus of Follow-Up Audit

This chapter describes our first follow-up audit of management's actions on the nine recommendations we made in 2019.⁶

In 2019, we assessed the Ministry of Environment's processes to manage fish populations in a sustainable manner. Our *2019 Report – Volume 2*, Chapter 21, concluded that for the 12-month period ended July 31, 2019, the Ministry had, except for the nine areas where we made recommendations, effective processes to manage freshwater fish populations in a sustainable manner.

To conduct this audit engagement, we followed the standards for assurance engagements published in the *CPA Canada Handbook—Assurance* (CSAE 3001). To evaluate the Ministry of Environment's progress toward meeting our recommendations, we used the relevant criteria from the original audit. The Ministry's management agreed with the criteria in the original audit.

To complete this follow-up audit, we discussed actions taken with management. We reviewed assessments completed on water bodies, priority rankings of water bodies, and policies and procedure manuals for monitoring fish populations. We consulted with an independent consultant with subject matter expertise in the area of fish management.

3.0 STATUS OF RECOMMENDATIONS

This section sets out each recommendation including the date on which the Standing Committee on Public Accounts agreed to the recommendation, the status of the recommendation at July 31, 2022, and the Ministry of Environment's actions up to that date.

³ Ministry of Environment, *Fisheries Management Plan* (2010), p. 2, (14 October 2022).

⁴ *Ministry of Environment Annual Report for 2021–22*, p. 13.

⁵ www.saskatchewan.ca/residents/parks-culture-heritage-and-sport/hunting-trapping-and-angling/fish-and-wildlife-development-fund (20 October 2022).

⁶ *2019 Report – Volume 2, Chapter 21*, pp. 135–154.

3.1 Collection and Reporting Protocols for Water Body Assessments Established

We recommended the Ministry of Environment give staff written, standardized, science-based protocols for field data collection and reporting on fish populations and their health. (2019 Report – Volume 2, p. 143, Recommendation 2; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

The Ministry of Environment drafted a procedures manual for staff to provide guidance on standardizing field data collection and reporting on fish populations and their health.

The Ministry uses water body assessments to collect information on the health and population of fisheries. A critical component of a water body assessment is sampling methodology, including the number and placement of nets (i.e., gill and trap nets), and the minimum number of fish required (i.e., sample size) to estimate the health of the population in the lake.⁷

At July 31, 2022, the Ministry drafted a procedures manual for all significant processes in field data collection and reporting using good practice and science-based protocols. The procedures manual will be formally approved in fall 2022. We reviewed the draft procedures manual and found it contained reasonable guidance to staff on all significant processes (e.g., field data collection, sample collection and extrapolations) to monitor the health of fish populations.

We observed the Ministry using its draft procedures manual in summer 2022. For example, we reviewed draft water body assessment reports from 2021 and they aligned with new protocols and reporting standards in the draft procedures manual.

Using consistent, appropriate approaches to sample fish from one water body to the next, and to analyze results, helps ensure comparability of results and consistent analysis.

3.2 Water Bodies and Fish Populations Assessed Based on Risk

We recommended the Ministry of Environment keep its listing of lakes, and associated priority categories used to determine the frequency of assessing fish populations of water bodies up to date and accurate. (2019 Report – Volume 2, p. 144, Recommendation 3; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

⁷ A gill net is a type of net used to catch fish for sampling; this type of sampling is lethal. Varying sizes of mesh squares make up the length of the net, which is designed for fish to swim into. However, trap nets catch fish for sampling and house them within the net until sampling is complete; this type of net is not lethal.



We recommended the Ministry of Environment assess fish populations including their health using intervals determined through a scientific, risk-based approach. (2019 Report – Volume 2, p. 146, Recommendation 4; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

The Ministry of Environment developed a new matrix to determine high-risk water bodies to prioritize them for water body assessments. Priority level 1 water bodies (e.g., lakes) are assessed every 8–10 years in line with good practice and priority level 2 to priority level 4 water bodies are assessed using a risk-based approach. Overall, priority level 1 water body assessments are completed consistent with set frequency.

The Ministry developed a new ranking system that prioritizes lakes based on the type of fish in the lake, the usage of the lake (e.g., commercial, sustenance fishing), and environmental factors. The Ministry uses its ranking system to rank water bodies from priority level 1 to priority level 4. The priority score assigned to a water body determines how frequently the Ministry assesses the health of the fish population in that water body. The risk-based approach to prioritizing water bodies aligns with good practice.

As shown in **Figure 1**, the Ministry plans to assess, through water body assessments, priority level 1 water bodies every 8–10 years. It based this interval on the lifecycle of Walleye (the most sought after fish in Saskatchewan) and the interval is in line with good practice. It identified nine priority level 1 water bodies.⁸

Figure 1—Water Body Priority Categories and Monitoring Frequency

Priority Category	Monitoring Frequency 2019	Monitoring Frequency 2022
Priority 1	3–5 years	8–10 years
Priority 2	5–7 years	Risk-based
Priority 3	7–9 years	
Priority 4	10+ years	

Source: Adapted from Ministry of Environment information.

The Ministry plans to assess priority level 2 to priority level 4 water bodies based on risk. The Ministry sets annual work plans each spring outlining the water bodies planned for assessment. Management indicated the Ministry’s Fisheries Unit discusses the proposed work plan and rationale for selecting water bodies before it finalizes the work plan. It considers:

- Unexpected events (e.g., potential population decline due to identified winterkill)⁹
- Environmental changes (e.g., change in water levels)
- Angling pressures (e.g., increased fishing due to a campground expansion)
- Proximity to other planned water bodies to be assessed

⁸ The nine priority level 1 water bodies are Candle Lake, Tobin Lake, Last Mountain Lake, Diefenbaker Lake, Lac la Ronge, Chitek Lake, Dore Lake, Otter Lake, Blackstrap Reservoir.

⁹ Winterkill is the most common fish mortality event generally caused by a depletion of dissolved oxygen, especially in smaller bodies of water. Although the fish typically die during the winter months, dead fish are observed floating at the surface when the ice starts to break up in the spring.

We assessed the Fisheries Unit meeting minutes for 2020 and 2022, and found the minutes provide limited documented rationale for selected priority level 2 to priority level 4 water bodies.¹⁰ The minutes indicated discussion of priorities occurred, but did not document specific rationale. We suggest that the Ministry fully document rationale for water bodies chosen in its finalized annual work plan and/or meeting minutes. As shown in **Figure 2**, the Ministry conducted 10 water body assessments in 2021 of priority level 2 – 4 water bodies.

By July 2022, the Ministry assigned new priority scores to 325 out of about 50,000 water bodies that contain fish using its new priority matrix.¹¹ We tested 27 updated water body priority scores and found the Ministry calculated them consistent with the new priority matrix requirements.

As shown in **Figure 2**, the Ministry completed 38 water body assessments between 2019 and 2021, including three priority 1 water bodies assessed in 2021.

Figure 2—Water Body Assessments Completed From 2019 to 2021

Priority Category	2019	2020	2021
Priority 1	0	0	3
Priority 2	2	1	3
Priority 3	4	5	4
Priority 4	11	2	3
Total	17	8	13

Source: Adapted from Ministry of Environment records.

We assessed whether the Ministry completed priority 1 water body assessments in line with expected intervals. For the nine priority 1 water bodies, the Ministry assessed water bodies in line with intervals in eight instances. For the one remaining priority 1 water body, it plans to complete the assessment three years later than expected (e.g., 13 years after the last assessment).¹²

Completing water body assessments consistent with risk-based frequencies helps ensure the Ministry collects sufficient information to detect changes in fish population or fish health within a water body, particularly those assessed as high-risk water bodies. This enables it to take timely action to avoid potentially irreversible declines in overall fish population and health of key fish species.

3.3 Water Body Assessment Reports Improved

We recommended the Ministry of Environment document, in its reports of fish populations and health of assessed water bodies, key decisions (e.g., key assumptions, sampling methods and sizes). (2019 Report – Volume 2, p. 149, Recommendation 7; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

¹⁰ The Fisheries Unit was unable to have in-person-meetings in 2021 due to the COVID-19 pandemic. The Fisheries Unit met virtually, however, no meeting minutes were kept for 2021.

¹¹ The Ministry applies its risk-based approach (i.e., priority matrix) only to water bodies with reasonable road, trail or boat access. It examines remote waters only if the lake hosts multiple fishery uses, and identified issues justify the expense required to study them.

¹² The Ministry planned to complete a water body assessment at Last Mountain Lake in 2021 (planned one year late; 11 years after the last assessment). Due to the pandemic this was delayed by two years.



The Ministry of Environment implemented a new report template that requires staff completing water body assessments to document key assumptions and decisions made as well as sampling methods used, including number of nets, placements and sizes.

We assessed five water body assessment reports from 2020 and 2021 and found each report contained sufficient detail and followed the Ministry's template as expected. The reports sufficiently documented sampling decisions and appropriately referenced good practice used in determining key assumptions.

The implemented template allows for standardization in water body assessment sampling and increased documentation for assumptions made, increasing reliability of results from water body assessments.

3.4 Specific Fish Population Management Plans for High-Usage Water Bodies In Progress

We recommended the Ministry of Environment create specific management plans for key high-risk fish species and/or high-usage water bodies.

(2019 Report – Volume 2, p. 147, Recommendation 6; Public Accounts Committee agreement February 9, 2021)

Status—Partially Implemented

The Ministry of Environment only created management plans for three of the nine key high-usage water bodies as part of its water body assessment process. The plans created do not include sustainability targets for fish in the water body (e.g., fish size and weight, population sizes). Setting clear sustainability targets for fish in water bodies is important to define what the Ministry considers a healthy fish population, and to determine when to change management activities (e.g., restrictions).

A fish management plan is a plan, using fish population data from water body assessments, of specific actions to manage fish populations in a water body. It would compare fish population data to set sustainability targets (e.g., fish population by age group) and, where the population is less than needed, would plan specific actions or interventions to increase the population over time.

The Ministry implemented a new water body assessment template that requires management to consider impacts of changes observed in the fish population from the last water body assessment. Management considers interventions (e.g., restrictions on size of fish caught that can be kept, catch and release) where necessary to protect the fish population which align with good practice. For example, for one report we assessed, management determined no interventions to the fish populations were required and that the population should be assessed again in 7–10 years. Additionally, management recommended reiterating best practices for catch and release fishing in certain areas to decrease the mortality rate of fish caught above size limits.

The Ministry had only completed management plans for three of its nine water bodies determined to be high risk (i.e., priority level 1). It expected to complete the remaining

six management plans when it finalizes the next scheduled water body assessments (i.e., 8–10 years from last assessment per its assessment frequency in **Figure 1**).

The three management plans we assessed did not set sustainability targets for fish. The new template did not require staff to establish fish population sustainability targets (e.g., acceptable population ranges used during trend analysis that it considers to allow the fish population to remain sustainable).

The management plans we assessed did compare the fish population information from the last water body assessment to previous water body assessments (e.g., to identify trends in number of fish caught, number of fish by species caught, and changes in relative weight, size [e.g., fish length], and maturity). However, because the plans included no sustainability targets for fish populations, there was no indication of when the Ministry would take corrective action (e.g., how big of a decline in fish population would trigger new actions such as adding fishing restrictions for a specific species of fish).

Not having clear fish population sustainability targets increase the risk that the Ministry does not take actions appropriate to maintain the fish populations in high-usage water bodies.

3.5 Timeliness of Water Body Assessment Reports Improving

We recommended the Ministry of Environment finalize analysis of fish data collected from water body assessments in a reasonable timeframe to allow for consideration before the next assessment season. (2019 Report – Volume 2, p. 149, Recommendation 8; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

The Ministry of Environment improved timeliness of water body assessments by setting a target for water body assessment reports to be drafted by the end of the fiscal year the assessment occurred, with completion of the final report by the end of the following fiscal year. In 2019, the Ministry did not have set timelines for completing reports.

We reviewed five water body assessment reports from 2020 and 2021 and found that the Ministry prepared four reports within target timelines. One report had a target timeline for completion of March 31, 2022, however, it is still in draft as of October 2022.

In 2019, we identified 62% of water body assessment reports completed timely. In 2022, the Ministry improved to 80% completed timely.

The Ministry now requires the water body assessment report to include analysis for data collected during fieldwork before the end of the fiscal year the assessment occurred. In addition to fish-aging information, the Ministry analyzes the fish size, weight, and maturity for each species caught during the water body assessment.¹³ The improved timeliness of

¹³ The Ministry contracts out the analysis of the fish-aging process, which involves analyzing fish bone. It usually receives the results in March, following the summer assessment period.



analysis for fish size, weight, and maturity gives management critical information required to make changes to the Anglers Guide, if required, published each April.¹⁴

Completing timely water body assessments enables the Ministry to appropriately respond to significant changes in the health of fish populations (e.g., restricting sizes of fish anglers can keep).

3.6 Assistance from Commercial Fishers in Assessing Fish Population Health Considered

We recommended the Ministry of Environment consider adopting the emerging practice of asking commercial fishers to submit additional key information about the health of fish populations in water bodies they use.

(2019 Report – Volume 2, p. 147, Recommendation 5; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

The Ministry of Environment considered receiving additional information on fish caught (e.g., size, length, maturity) from commercial fishers; however, it determined the practice is not practicable.

The Ministry monitors the health of fish populations in water bodies subject to commercial fishing. It receives weight information on commercial catches from commercial fishers for about 200 water bodies annually.

The Ministry considered receiving additional information from commercial fishers but determined the additional information would be burdensome on commercial fishers and not practical. We found other jurisdictions are not currently using this practice either.

3.7 Fisheries Management Plan Action Items Completed

We recommended the Ministry of Environment formally determine resources needed to meet timeframes outlined in its Fisheries Management Plan. *(2019 Report – Volume 2, p. 142, Recommendation 1; Public Accounts Committee agreement February 9, 2021)*

(2019 Report – Volume 2, p. 142, Recommendation 1; Public Accounts Committee agreement February 9, 2021)

Status—Implemented

We recommended the Ministry of Environment develop a detailed strategy to assess the effectiveness of the Fisheries Management Plan including determining its success. *(2019 Report – Volume 2, p. 152, Recommendation 9; Public Accounts Committee agreement February 9, 2021)*

(2019 Report – Volume 2, p. 152, Recommendation 9; Public Accounts Committee agreement February 9, 2021)

Status—No Longer Relevant

¹⁴ The Ministry publishes its Anglers Guide online in April, which includes detailed rules that guide fishing (e.g., specific catch limits for each water body). For example, it published its [2022–23 Anglers Guide](#) on April 4, 2022 (17 October 2022).

By July 2022, the Ministry of Environment completed the actions in its 2010 Fisheries Management Plan and expects to have a new plan in 2023–24.

The Ministry's 2010 Fisheries Management Plan set 51 action items. The Plan included strategies to monitor and manage freshwater fish populations and changes affecting populations. The Ministry conducted a review of the status of action items in 2015. Our 2019 audit found the Ministry was implementing action items slower than the Plan's timelines.

The Ministry completed a review of its 2010 Plan in 2022 and determined all action items were completed, as well as completed the action items without needing to formally determine resources required to do so. For four action items completed since our original audit, we found the Ministry had sufficient evidence to support the complete status. Completing key identified activities assists with maintaining sustainable freshwater fish populations.

As the 2010 Fisheries Management Plan is complete, the Ministry no longer needs to develop a strategy to assess effectiveness of the Plan. Rather, setting sustainability targets for fish in water bodies to determine whether fish populations remain sustainable (see **Section 3.4**) is still important.

The Ministry indicated it plans to complete a new fisheries management plan in 2023–24 that aligns with its other management plans (e.g., wildlife, habitat) and considers resources available to manage all of these activities. We suggest the Ministry determine how it will assess the success of the new plan.

