YSSC
YUKON SALMON
SUB-COMMITTEE

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June 4th, 2025
Honourable Joanne Thompson, M.P., P.C.
Minister of Fisheries
Government of Canada
200 Kent Street, Station 15N100 Ottawa, ON
K1A 0E6
min@dfo-mpo.gc.ca

Dear Minister Thompson:

As you are likely are already aware, Yukon Energy operates the Mayo Generating Station (MGS) which is a hydroelectric generation plant located on the Mayo River, which drains into the Stewart River which itself drains in the Yukon River. All three of those rivers provide invaluable Chinook and chum salmon habitat year-round.

Yukon Energy has applied for a licence to enable the continued operation of the MGS, the construction of a new Mayo Lake Control Structure (MLSC) and associated fish ladder, and the removal of coffer dam materials. Yukon Energy has proposed no adjustments or changes to the current operating conditions of the MGS. Presently, the MGS does not allow or enable any fish passage upstream; yet, Chinook salmon previously spawned in both the Mayo River and Mayo Lake. The MGS, upon its construction and operation, has effectively severed all access for migrating salmon (and all freshwater fish) from Mayo River to Mayo Lake and once critical habitat has become devoid of all salmon.

To be sure, this project and its application for continued operation was a focal point of discussion for the YSSC on May 13, 2025. After careful consideration, much deliberation, deep review of relevant documents and materials, and consideration of Traditional Knowledge provided by the First Nation of Na-Cho Nyak Dun, the YSSC considers the impacts of the MGS to be ongoing impacts under DFO's Position Statement: The *Management of Existing Facilities and Structures under the Fisheries ACT and Species at Risk Act*. The on going impact is from the lack of fish passage that results in the exclusion of Chinook from their spawning dunes which are critical spawning habitats. Under the authority of Section 16.7.17.11 of the Yukon First Nation Final Agreements we issue the following recommendations:

We recommend that the Minister of Fisheries, pursuant to her authority under the *Fisheries Act*, require Yukon Energy, as part of the 2025 relicensing of the operations of the Mayo Generating Station to:

- **Ensure that timely, proper and appropriate measures are enacted, to allow Chinook to migrate from Mayo River to Mayo Lake and from Mayo Lake to Mayo River throughout the year for both adult and juvenile life stages.**
- **Include the requirement to ensure sufficient water flows and ramping protocols to all section of the Mayo River to support salmon through their entire freshwater life cycle.**

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- **Include the requirement for consultation with the First Nation of Na-Cho Nyäk Dun on all the above**

State of Salmon in Yukon

In order to properly contextualize our recommendation, it is important to highlight two important initiatives occurring at both the national and international levels focused on Yukon River Chinook conservation and stewardship. These are:

1. The development of domestic and international Yukon River Chinook Rebuilding Plans, and
2. the April 1, 2024 signing of a seven-year agreement between Fisheries and Oceans Canada and the Alaskan Department of Fish and Game, calling for a cessation of directed fishing for Canadian-origin Chinook for seven years from 2024 through 2030.

It is important to note that both these initiatives specifically identify hydroelectric dam impacts as a "very high" limiting factor (relative to other stressors) for Canadian-origin Yukon River Chinook. The seven-year agreement is explicit in its reference to "hydro-electric development" as a major focus among both Canadian and American members of the Yukon River Panel. This highlights the commitment, priority and requirements both in Canada and in the United States of America to address the negative impacts from the Mayo Generating Station. For a copy of the seven-year agreement, please visit: https://www.pac.dfo-mpo.gc.ca/fm-gp/salmon-saumon/yukon-chinook-agreement-quinnat-accord/index-eng.html.

In addition, the development of the domestic Chinook rebuilding plan is going to become a requirement when Yukon River Chinook are listed as a major stock under the *Fisheries Act*. Section 6.2 will also require the implementation of the plan for stocks below their lower reference point. It is very likely that the Stewart Conservation Unit (which includes the Mayo River) will be below the limit reference point and will identify actions related to the MGS. It is therefore prudent to consider this relicensing an opportunity to start the implementation of the rebuilding plan.

Yukon salmon are in a long-term period of decline and everything possible must be done to protect and conserve these stocks and their habitat. Fisheries and Oceans Canada department officials themselves have recognized this as a priority and have initiated measures to maintain fish stocks pursuant to Section 6.1 and 6.2 of the *Fisheries Act*, identifying Yukon River Chinook Salmon of Canadian-origin as a major fish stock that has fallen below its limit reference point. Re-establishing passage to historical areas that are known to have support Yukon River salmon is consistent with – and central to – both the above noted initiatives.

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Effects of the MGS Salmon

The construction of the Mayo dam and associated structures started in 1951. Mayo B was added in 2011. No fish ladder or other structure was ever installed to enable fish passage since these structures were placed in the river. This has effectively severed Chinook from some of their most productive habitat: lake headed rivers. Across the Canadian section of the Yukon River drainage the rivers immediately below lakes, are a hot spot for Chinook spawning. Over thousands of years of spawning activity, these areas are formed and they are referred to as Chinook spawning dunes. Spawning dunes are highly productive salmon habitat that increase water flow through the gravels to support egg development. The lake provides a steady supply of warm water for egg development and often oxygen, as many lake outlets remain open during the winter. Below is a spawning dune from Takhini River, which shows Chinook salmon spawning. Fine sediments are streaking downstream as the water washes the sediments away as females dig the redds. This leaves clean gravel that is ideal for incubating eggs.

Photo of Chinook salmon on a spawning dune in Takhini River.

Photo of several spawning dunes on the Takhini River with Chinook salmon spawning.

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These dunes exist in the Mayo River but Chinook can no longer access them due to the Mayo Generating Station (MGS). Instead, Chinook are forced to spawn downstream of all the structures, in areas that are less productive. Every year that Chinook are prevented from accessing the highly productive spawning dunes results directly in a lower egg survival rate.

In addition to being displaced from the spawning dunes below Mayo Lake, Chinook are also being displaced from previous spawning rivers above Mayo Lake. Many of these rivers are also lake headed and may contain spawning dunes. Since the construction of the MGS, these populations of Chinook have been extirpated. These Chinook were specifically adapted to spawn and rear in these areas, and we will never get those exact populations back. However, if access to the habitat is restored, Chinook will recolonize these areas and will, over time, adapt to these specific habitats again.

As stated earlier, Chinook are in crisis on the Yukon River. The populations are a fraction of past populations. This is the perfect time to provide them with access to better spawning habitat to increase their survival. This would support the long-term restoration of Chinook through re-establishing access to viable spawning grounds.

Additional Recommendations

To mitigate the effects on the damn on Chinook, we recommend the following to the Minister of Fisheries:

1. **Fish passage at the Mayo Lake Control Structure (MLCS) fishway must be carefully designed to enable migration of both adult and juvenile Chinook salmon.**

Chinook salmon are much larger than what is indicated in the project proposal (fork length of 400mm). Chinook average measurements (mid-eye fork length) for males is over 700mm and females are over 800mm at Eagle sonar. Adding to the need to revise the design is that fork length measurements are longer than mid-eye fork lengths. This is incredibly important to ensure the larger females can access the spawning areas. As such, the plans need to be updated to ensure the fishway can accommodate much larger fish.

Juvenile Chinook are considerably smaller than adult salmon. The smallest target species considered in the fishway is 125mm (fork length). Newly hatched Chinook are considerably smaller than this. As such, the plans need to be updated to ensure the fishway can likewise accommodate much smaller fish.

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2. **Fish passage at Wareham dam should be carefully designed to enable migration of both adult and juvenile Chinook salmon.**

Fish passage at Wareham dam is essential to getting Chinook back onto the highly productive spawning dunes that they can no longer access. Every year Chinook are excluded from this section of the river which is likely resulting in lower egg survival and an ongoing impact. Reopening this section of the river to Chinook is absolutely crucial.

3. **Determine water levels needed to ensure Chinook juveniles can rear and eggs can incubate in Mayo River, particularly at the spawning dunes below the MLCS. Once these levels are determined, they must be maintained throughout the year and sufficient ramping protocols be established to avoid all stranding.**

Once Chinook can access their spawning dunes, we need to ensure there is adequate water flow all winter to allow them to develop. Without continued water flow, the eggs will not survive. In addition to the eggs, we need to ensure that the river can support rearing juveniles throughout the year. This will maintain valuable rearing habitats but also the migration corridor for juveniles to migrate both upstream and downstream as they seek out rearing areas. Current ramping protocols allow for instantaneous changes from one flow regime to another. This very rapid change strands rearing and migrating juvenile salmon in isolated pools where they are vulnerable to predation and desiccation. Fish salvage crews are a poor substitute for gentle ramping that allows fish to find their way into deeper water. The river flows also need to be maintained to ensure the survival of eggs and ramping protocols should avoid the rapid switch of flows.

4. **Determine if there are spawning dunes located in other areas of the Mayo River drainage, particularly in the tributaries upstream of Mayo Lake.**

Identifying all areas that have spawning dunes is crucial to ensuring Chinook continue to have access to these highly valuable spawning areas. Surveys should be conducted to find these areas. In addition, historical aerial photos should be used to ensure areas that once had dunes are not lost.

5. **Develop a Chinook restoration plan with the First Nation of Na-Cho Nyäk Dun**

To ensure Chinook salmon are able to recolonize the habitat that the MGS has displaced them from, a restoration plan must be developed. The plan should be co-developed with the First Nation of Na-Cho Nyäk Dun. The plan should include methods to rebuild Chinook to their previous population distribution and should include habitat restoration as well. As an example, spawning dunes have not been turned over by Chinook in over 70 years. It is likely many of these dunes are filled with fine sediments. If so, the dunes may be hard, like concrete. The dunes may need to be turned over prior to Chinook being able to use

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them. In some areas, dunes may have been lost due to raising water levels or from lack of use. Nevertheless, these dunes could be rebuilt.

There have also been other impacts to the Chinook habitat above the MGS, such as placer mining. As such, the plan should also involve involvement from placer miners, Yukon Government and Fisheries and Oceans Canada.

If you have any questions, please contact our Executive Director, Taylor Bradley, by email at ex.dir@yssc.ca or by phone at 867-393-6725.

Sincerely,

EB MacDonald

Elizabeth MacDonald
Vice-Chair, Yukon Salmon Sub-Committee

CC: Jeska Gagnon, Section Head FFHPP; DFO