

Proceedings of the RAP Meeting on Mackenzie River Inconnu

Chairperson: Susan E. Cosens

Department of Fisheries and Oceans
Freshwater Institute
501 University Crescent
Winnipeg, Manitoba
R3T 2N6

28 July, 1998

Introduction

The Chair of the meeting outlined the Regional Advisory Process (RAP). A draft Stock Status Report (SSR) was prepared by the Department of Fisheries and Oceans (DFO) and distributed for review, along with background documents, to the Fisheries Joint Management Committee, Gwich'in Renewable Resource Board and Sahtu Renewable Resource Board prior to the meeting. The intent of the meeting was to discuss reviewers' comments and further discuss background material to revise the SSR. The SSR would then be sent to the Boards for final review. Final changes would then be made to the SSR before it is submitted to the Central and Arctic Regional Director of Science (RDS) for approval. Once signed off by the Regional Director of Science, the SSR would be sent to the Canadian Stock Assessment Secretariat (CSAS) in Ottawa and posted on its web site.

The agenda of the meeting is outlined in Annex 1. Participants (Annex 2) included representatives of the Department of Fisheries and Oceans (DFO), Fisheries Joint Management Committee (FJMC) and Gwich'in Renewable Resource Board (GRRB). Two representatives of the GRRB also participated in the meeting by telephone from Inuvik, NT. The Sahtu Renewable Resource Board (SRRB) reviewed the first draft of the SSR and provided comments prior to the RAP meeting.

Stock delineation, migration, life history

The species description in the 'Background' section was discussed. In addition to an error in citation being pointed out, it was suggested that the description should include the Eurasian as well as the North American distribution.

The point was raised that the Gwich'in Traditional Knowledge (TK) report was not referenced. There was general discussion about the use of TK and general agreement that it should be integrated as much as possible into the SSR. There was agreement to include the aboriginal names for inconnu in the Background species description.

A section called 'Views of the Fishers' and its relationship to TK was discussed. Delegates agreed that a section on views of the fishers should be included but that TK refers to general biological rather than catch-related information. TK should be integrated into the main body of the SSR.

Patrice Simon and Ian MacDonald of the GRRB joined the meeting by telephone for the remainder of the morning session.

The question of how many stocks of inconnu occur in the lower Mackenzie was then discussed. Anadromous lower Mackenzie stocks were thought to include the Peel River and the Arctic Red River. After some discussion, it was concluded that inconnu in the Ramparts area probably consisted of one stock containing two different life history strategies: one riverine and the other anadromous, with the number of riverine fish increasing as one goes further upstream. It was noted that energetic costs of migration increase further inland so anadromy would be expected

to decline as a life history strategy. A fourth stock probably occurs around Ft. Simpson and is likely riverine.

The definition of anadromy in relation to the Mackenzie Delta was discussed. Fish migrating to coastal areas would not necessarily be in highly saline waters because the freshwater plume of the Mackenzie River extends into the Beaufort Sea. Strontium analysis looks for strontium peaks associated with time spent in marine areas. A fish migrating to the Delta would not necessarily show strong strontium peaks but would nevertheless be considered anadromous. Strong strontium peaks imply anadromy but the water around the Delta tends to be brackish. Small but identifiable peaks of strontium are generally found in fish sampled there. Males tend to occur in the inner Delta and perhaps need less energy than females.

Tagging information on fish movements in relation to land claims boundaries was discussed. Radio-tagging showed that Arctic Red River inconnu are anadromous. Floy-tagging of inconnu around Ft. Simpson showed local movements. Inconnu floy-tagged in the Delta have been caught in Ft. Good Hope and Norman Wells. These fish would constitute the Ramparts stock. Spawning locations of inconnu found around the Ramparts should be located.

With respect to stock identification, there is nothing known about spawning site fidelity. It is known that spawning areas are used year after year but the degree of fidelity of individuals is not known. Frequency of spawning is also not known.

There is evidence that resting (non-spawning adult) fish may remain along the coast over 2 summers. Individuals may show a mix of spawning strategies, some spawning more frequently than others or spawning at irregular intervals.

There was discussion about Campbell Lake inconnu. This stock was not the focus of the RAP and is not included in the SSR but is of interest to both the FJMC and GRRB. Strontium levels suggest they may be non-anadromous but some participants thought there might be migration to the Delta. The GRRB is funding a Campbell Lake study to see what fish are there and describe their distribution and movements in the lake. Inconnu have been floy-tagged to estimate stock size and study movements. Dead sampling could provide samples for additional strontium analysis.

One participant indicated that floy-tagging studies should report the life stage of the fish tagged, a young fish that is not anadromous could still be part of an anadromous population. It was also suggested that if a stock is anadromous, young fish would not likely be caught upstream because they would already be in the Delta. Juveniles have been found in the Delta (unpublished work by Hecky, DFO). In the Inuvialuit Settlement Region (ISR), fishing would harvest juveniles living along the coast thus much of the coastal harvest could be on immature fish.

Arctic Red River: Fish migrating to the Arctic Red River to spawn would be harvested during their migration in the Inuvialuit and Gwich'in settlement areas but not in the Sahtu. Floy-tagging data show that fish from this river migrate to and from the east side and middle of the Delta, towards Tuktoyaktuk. Results from radio-tagging studies were confusing because half the fish that were radio-tagged in the Arctic Red River moved from the mouth of the Arctic Red to the mainstream Mackenzie in the Sahtu area. This would suggest that the Arctic Red is not a

discrete stock. There was discussion about whether this movement was passive drift (a result of post-tagging recovery) or active movement. The latter was considered likely because the fish were moving upstream and had to be actively swimming.

Although participants thought it was possible that some Arctic Red fish might migrate to Ft. Good Hope, other hypotheses were put forward. One proposal was that inconnu are schooling fish and that tagging removes a fish from its school. When it is returned to the water, it may simply join any nearby school. Tagging was done near the mouth of the Arctic Red and fish destined to travel to Ft. Good Hope pass nearby. Tagged fish may be as likely to join up with an Arctic Red school as a Ft. Good Hope school. It is also possible that schools of inconnu heading for Ft. Good Hope may travel up the Arctic Red for some distance but ultimately continue their migration upstream in the Mackenzie. Thus, fish on their way to Ft. Good Hope could be tagged in the Arctic Red.

Peel River: Resting and juvenile inconnu from this river are found in the west part of the Delta and along the coast to Shingle Point. They are caught at Shingle Point as non-spawners, at Aklavik and Ft. MacPherson as upstream migrating spawners and as downstream migrating post-spawners. Both the Inuvialuit and Gwich'in fish this stock. There are no data to suggest that these inconnu migrate to the Sahtu claims area. It was noted that there is fishing of both pre- and post-spawners during migrations upstream and downstream. Participants indicated that 'Management Considerations' should include a note that Peel River inconnu could be considered a single-stock fishery whereas fishing along the east side of the Delta looks like a mixed-stock fishery.

Mainstem/Ft. Good Hope: These fish, designated as the Ramparts stock, are caught in all three settlement areas: as resting fish in the Delta toward the Tuktoyaktuk Peninsula, and as migrants to and from their spawning areas by the Inuvialuit, Gwich'in and Sahtu. The harvest data suggest that both upstream and downstream migrants are harvested. Catches peak in both July (upstream pre-spawning migration) and in October (downstream post-spawning migration).

Stock relationships are still difficult to confirm. Spawning areas define the stocks but we still do not know where spawning areas are for the mainstem fish. It was suggested that, although the fishery is likely not a threat, the use, by inconnu, of small isolated spawning areas could make these fish vulnerable to other impacts, such as logging.

The Gwich'in propose to look for spawning areas on the Peel River. It was suggested that timber will probably not be developed to a great extent in this area and that spawning areas are far from the communities. It was pointed out that two out of three stocks may spawn in the Gwich'in Settlement Area (GSA) so a study to identify critical habitats for spawning in the GSA would be useful.

There was further discussion about spawning areas. Inconnu spawn around freezeup and the water clears up once the ice forms so little siltation occurs during the incubation period. Inconnu and charr seem to pick different types of spawning rivers. Young inconnu may be flushed downstream to feeding areas rather than arriving there by active migration. Not much research has been done, even on Yukon River, on early life stages of inconnu.

The meeting then heard comments from the Gwich'in participants who were calling in by telephone. First, they indicated that the documents should have been distributed sooner. This would have given them more time before the meeting to review the material. Nevertheless, they like the process and believe it will help summarize what is known about the stocks and encourage the analysis of information that was collected in the past. For example, there was a Campbell Creek study in 1983 but only a data report was published from that. If we can use the process to encourage staff to look at previously collected data and publish them, it will be helpful.

The point was raised that inconnu are caught in mixed-species fisheries and the proportion of inconnu in these fisheries could be analyzed. Howland et al. (unpublished (b) is fully referenced in the SSR) contains data on mixed-species fisheries where inconnu are harvested.

The goals of the Peel River study were outlined. They are to 1) locate spawning areas and 2) monitor the catch by local fishermen, including the collection of data on maturity and timing of migration.

Gwich'in participants asked whether the questionnaire that was used as a background document was a useful tool for collecting information from fishers. There was general agreement that it was a useful way of incorporating Traditional Knowledge into the SSR and its use confirmed DFO's interest in using Traditional Knowledge.

The question was raised as to whether anything is known about the vulnerability of inconnu to changes in water levels, temperature or climate. One participant indicated that water temperature was probably important for egg development and changes could affect hatchability and survival. It was pointed out that development time of eggs is cued to the river freeze-up period so there is variation from river to river. Rivers further inland have shorter freeze-up periods and eggs develop more quickly.

The Gwich'in participants indicated that some elders think that break-up is occurring earlier and the ice is thinner than in the past. What are the implications for inconnu? There was discussion about whether to include these observations in the SSR but there was general agreement that there should be documentation and confirmation of such observations before they are included in an SSR. It was suggested that stocks may not be interchangeable if egg development is adapted to river freeze-up patterns. Freeze-up patterns do vary from river to river, eg. the Arctic Red pattern differs from that of the mainstream Mackenzie. A TK workshop is now being summarized and that report may refer to these observations. Disruption of temperature regimes could have a big impact on inconnu egg development but it is too soon to say whether temperature regimes have changed significantly.

The Gwich'in participants indicated that the Peel River study will gather information that can be used in future assessments.

There was agreement that pollution should be identified in the SSR document as a possible impact.

The need to include TK was reiterated. It was stated that elders have reported 2 types of inconnu (small and large) and there was general agreement that local fishers probably would not make a mistake in species identification. One

participant asked if these types might not be different life history stages because a young fish could look very different from an old fish. The Gwich'in participants indicated that this question could be followed up during their study. The FJMC participant suggested the observation should be recorded in the SSR, indicating that different forms have been reported but have not been confirmed. That the Peel River study will look at this question should also be indicated. (Note: The Gwich'in participants have, since the meeting, determined that *sruh tsal* or small coney refers to cisco and *sruh choo* or large coney refers to inconnu).

There was a question about the management areas used by the commercial fishery. Treble (DFO) looked at these areas and concluded that they were not very useful for management of inconnu. The history of these management areas was outlined by a Gwich'in participant. The areas were used for administrative purposes and kept the commercial fisheries away from subsistence fisheries when commercial fishing first started. The management areas have nothing to do with the biology of the fish. This point should be included in the SSR.

There was discussion about how the commercial catches should be reported. It was decided to report only the total commercial catch because the management areas do not relate to stock boundaries and reporting catch by area would not be useful for assessing the impact of commercial fishing on stock status.

Various points were then discussed such as the use of aboriginal names in the SSR, wording in the SSR that describes sexual maturity and the meaning of anadromy. It was reported that anadromous and freshwater inconnu show different abilities to acclimate to salt water and that anadromous inconnu may tolerate higher salinities than non-anadromous inconnu. It was agreed that the SSR should discuss the implication of the temporal and spatial overlap of commercial and food fisheries with inconnu migrations to and from the Delta.

DFO participants had some questions about how the subsistence catch data were collected. The Boards may have more detail in their archived data bases than what was presented for the SSR. Matching place names with water bodies, for example, can sometimes be done. It was suggested that more detail on where catches take place would be helpful. For example, moving a fishing location 100 metres downstream near the mouth of the Arctic Red could change the harvest from a single-stock to a mixed-stock fishery. It was recognized that this level of detail probably cannot be provided now but it was recommended that perhaps adjustments could be made to future data collection, especially in the Arctic Red where mixed stocks may occur near the mouth.

It was pointed out that several communities use the Arctic Red when the fish are 'running'. The question was raised about whether subsistence catches are reported by fishing area or by community. The Gwich'in participants indicated that they can probably report catches by fishing area. Another participant suggested that there may be resistance to refining the area data because confidentiality of fishers can be lost if resolution is too fine. One suggestion made was that, in the future, interviewers could clarify the meaning of 'Arctic Red' versus 'Mackenzie' as fishing locations. This would help clarify whether fishers are located at the mouth of the Arctic Red and whether they may be fishing a single or mixed stock.

A question was raised about how catch data from Inuvik and Aklavik are reported. Both communities are made up of both Inuvialuit and Gwich'in beneficiaries. Clarification was requested on whether the catch data of beneficiaries was reported by the appropriate claims study or simply by community. It was pointed out that the Gwich'in began reporting catch data in 1995. Since then, data for beneficiaries have been recorded separately by the appropriate Board. Wherever Gwich'in fish, location and catch are recorded. Data for some non-beneficiaries who are not Inuvialuit are included but can be separated. Since 1995, subsistence catches for the two land claims are additive. This point is important because the Inuvialuit catch appears to have dropped in recent years; this is, in fact, a reporting artifact.

The question was raised as to whether the Sahtu, for example from Ft. MacPherson, fish in another claims areas. The Gwich'in participants indicated this was the case and that relating the harvest to fish life stage and migration might be difficult.

There were comments made by the Gwich'in participants about the fishery and catch statistics. There was discussion about the size at which inconnu are recruited into the fishery and the vulnerability of females to recruitment overfishing. Females mature later and at a larger size than males. It was pointed out that some fisheries take spawners and others take immatures so generalizations are difficult to make.

Rewording of the section on spawning was suggested. Inconnu along the coast are not spawners and the likelihood of catching current year spawners increases as one goes upstream. For example, Tuktoyaktuk Harbour samples are made up of immature and resting adult fish. The Gwich'in TK report should be referenced.

Catch statistics

Tables were not included in the draft SSR so discussion initially focused on how food fish catch statistics should be reported. It was decided to use the GSA data as they were submitted, keeping the detail on catches by month and community. It was agreed to present the ISR data as a table of yearly catches by community and a figure of monthly catches for the ISR. (During preparation of the SSR, it was determined that the ISR data required significant reorganization to present a table of monthly catches. General trends are stated instead.) Commercial catches will be reported as a regional total because management areas don't have any relationship to stock boundaries.

DFO has some catch data for the Sahtu Settlement Area, nothing for Deh Cho area. The FJMC delegate asked for a total weight of the commercial harvest. It was decided that a mean weight of fish caught at Arctic Red River could serve as a multiplier of the total number. Total weight can then be multiplied by price per pound to estimate the economic value of the fishery.

Resource status

Some comments were made on the growth information and it was noted that Arctic Red River females grow faster than males. The strontium analyses were discussed and the conclusion was that all inconnu caught at Tuktoyaktuk Harbour were anadromous. Those from Shingle Point and the Arctic Red and Peel Rivers also showed signs of anadromy.

Catch curves are not available for most stocks nor are estimates of mortality. Data are available for the Arctic Red but these are not worked up. For Horseshoe Bend, data suggest low fishing mortality .22 to .30 (relatively low for fish). There was discussion about whether to report Z (instantaneous) or A (annual mortality) and it was decided to use both. Fishers would probably understand A but scientists would use Z.

It was suggested that a single stock could be subject to harvest several times during the course of its annual migration. This statement should be in management considerations.

There was some discussion about wording in the SSR. It was suggested that we have, in fact, made progress toward stock-based management. We have data on stock structure so we can propose that inconnu from the east and west sides of the Delta are discrete stocks or stock complexes so management should reflect this structure. It was also suggested that the Arctic Red River could be managed as a terminal for migrant inconnu. Inconnu using the east side of the Delta appear to be made up of 2 stocks but fish spawning in the Arctic Red could be managed as one stock.

The point was raised that Campbell Lake could be a separate stock, managers should talk to local fishers to identify possible locations of lacustrine stocks. Critical habitats (spawning, rearing and overwintering) should be identified.

Outlook

A Campbell Lake study is being developed by the GRRB; it will look at spawning areas, habitat use and stock discreteness. Kim Howland is working on physiological (salinity tolerance, egg development) and biochemical genetic differences among anadromous and non-anadromous (freshwater) stocks.

It was agreed that the Background section should include a statement that the SSR is being used as input to the Integrated Management Plan being done by DFO, the FJMC, GRRB, and SRRB.

The schedule for review and sign-off is as follows. The completed SSR and the Proceedings are to be sent to the Boards for review by the end of July. Reviewers are to have returned their comments by mid-August. Final documents are to be signed off by the Regional Director of Science by the end of August, then immediately forwarded to the Canadian Stock Assessment Secretariat at DFO Ottawa.

Annex 1. Agenda for RAP meeting on Mackenzie River Inconnu

June 18, 1998

North Board Room, Freshwater Institute, Winnipeg, MB.

09:00 – 09:30 Introductory remarks including an outline of the Regional Advisory Process

09:30-12:00 Discuss background information on stock delineation, migration, life history

13:00-15:00 Discuss the fishery and catch statistics

15:15-17:00 Discuss resource status, outlook and management considerations

Annex 2. Participants at RAP meeting on Mackenzie River Inconnu

- B. Ayles – Fisheries Joint Management Committee, Inuvialuit Settlement Region
- S. Cosens (Chair) – Department of Fisheries and Oceans, Central and Arctic Region
- C. Day – Department of Fisheries and Oceans, Central and Arctic Region
- K. Howland – University of Alberta
- I. MacDonald – Gwich'in Renewable Resource Board, Gwich'in Settlement Area
- R. Peet – Gwich'in Renewable Resource Board, Gwich'in Settlement Area
- P. Simone – Gwich'in Renewable Resource Board, Gwich'in Settlement Area
- R. Tallman – Department of Fisheries and Oceans, Central and Arctic Region