

Comments by Otto Langer

Carol - I have looked at the agenda RE **putting chum salmon into Terra Nova Slough**. I have also commented on this idea some years ago. It keeps coming up like the moon over the past 3 decades! I will therefore provide a complete response and hopefully end the myths and wishful thinking surrounding this project.

All 5 species of our salmon do not spawn in mud ie clay silt and sand that is 100 percent of the material that makes up at least the upper few hundred feet of Lulu Island ie Richmond. Salmon need cold and clean water and a gravel bed to spawn in - that is a certainty. None of this exists in the Fraser River Sloughs and Terra Nova Slough is especially bad in that it is designed as a pond and if called a slough it is largely cut off from the river. The river does not have free access to the Terra Nova Slough other than when a relatively small pipe is opened up.

However sloughs are good to excellent habitat for chum and Chinook fry to rear in. If you put chum fry into the TN Slough they would be trapped and largely be blue heron food. If you put chum salmon into the slough and if a few did get out they will want to come back here to spawn and there is no way they can get back into the slough and if they could get into the slough where do they spawn - there is only mud and not gravel with good water flow. If the slough has been radically rebuilt in the past year to allow free water movement into the slough from the river, I am totally unaware of that

When salmon spawn they wash the gravel out with their tails ie create a redd / nest. They then deposit their eggs in that redd and cover them up with their washed / cleaned gravel. Here the eggs will sit buried about 30cm deep for 4-5 months depending on water temperature. During this period the eggs must have water circulating over them ie from a river flow or a well oxygenated spring below the redd. In the Terra Nova area the springs are indeed probably toxic due to natural gases in them making them toxic and anaerobic (no oxygen in the water). If the eggs do not get a free flow of water around them they cannot get the oxygen they need and will suffocate. Also the water flow is needed to remove metabolic wastes ie ammonia and carbon dioxide. If the ammonia builds up due to lack of water flow, the eggs die. The worst possible location therefore for eggs would be in fine sediments ie mud! The mud blocks all water flow around the incubating eggs. Most salmon-trout-char type fish would not be silly enough to spawn in such a habitat.

You can trust my opinion on this matter in that I have been an expert witness on this issue in courts all across Canada about 60 times ie on the deleteriousness of

sediment on salmonids and their habitat. However, in that I know Harold is talking about chum -- chum salmon in BC do spawn in the lower reaches of most of our rivers (like in the Fraser in the Chilliwack area) and they do spawn in gravel that is often more 'dirty' (more fines or sediments in the gravel) than sockeye would spawn in such as on the Adams River. As a result, chum salmon egg survivals in nature is often lower and it is the species of salmon that most often does have the lowest level of production ie adults produced for the amount of eggs spawned. In Squamish the chum do spawn in gravel that looks muddy but those spawning areas which some will call a slough does have a good supply of spring water from below the gravel bed. When I did research in Jones Creek near Hope, gravels that were filled with sediment (looked muddy) had survival so as little as 5%. When the same gravel was cleaned and washed, the survival was over 80%.

If you want chum in TN slough you would have to rebuild the intake of the Terra Nova Slough so water can freely flow into it with each outgoing tide. The upper part of the slough would have to be built with a gradient into it (an not just a pond as it now it) and that new channel would have to be filled with gravel. Then some fry could be put into the slough and hope for the adults to return in about 4 years. The adults (big fish - 10 pounds) would need to get into that gravel channel so would need good access - will Richmond allow a good flow through their dyke ie flood risk issue? Also the fry from any eggs spawned there would have to get out of that channel the next spring ie they have to move downstream. The channel is now largely dead ended. You would have to redesign the bottom end so it could empty onto Sturgeon Bank with a good ongoing flow of water.

To make the channel work you may have to put pumps into the river to get water into the channel for a positive stream flow - big cost. The eggs could not be allowed to go dry. Bill Gates did this in his home in Seattle and got sockeye to spawn in it. Does Richmond Parks have the money Bill Gates -Microsoft has for such a project? I would say its not a good use of tax payer money. If you spent that money at a Harrison River chum salmon enhancement project, you could produce 1000+X more chum fry than for each dollar spent at TN Slough.

Meanwhile we have the Province and DFO allowing gravel mining on chum and sturgeon spawning habitat at Chilliwack etc. where we have a million fold more habitat that costs nothing to build or to maintain. Why are we destroying what nature has built for us then we try and recreate it at great expense where it probably will not work?? Any such project at TN Slough would be at a significant cost and at a high level of possible failure. It is a bit of a wild idea. Some will say that they remember chum spawning in the sloughs of Richmond. I entirely doubt that - it goes against all principles of successful salmonid natural reproductive

biology. If they did spawn in the mud of a Richmond Slough none of the eggs would have survived.

Finally if you want the TN Slough to be more natural and less stagnant, allow a positive flow from the river into it at least with each high tide and allow the water to exit on a significant and ongoing basis out onto Sturgeons Bank into a slough / ditch. This way some chum fry will get into the slough from natural sources (ie the river) and can rear there for a few weeks each spring and get out by following the current downstream ie out of the slough and into a good ditch-channel on Sturgeon Bank. This way the fry will not get trapped and be blue heron food. Also the Chinook salmon fry -smolts would use the slough even more than the chum fry.

When we (while in DFO) examined the old farm ditches on Annacis Island 30 years ago when the downstream part of the island was developed we found Chinook fry in the ditches. They got into the old farm ditches by getting around the leaky flap valves in the old dyke system. Something like this could be expected in TN Slough with a bit of ingenuity and some positive flow of water into the slough and out of it. It can be a rearing area for Fraser River fish but the slough should not be made into an attempted chum spawning area. If you put hatchery chum fry into the slough, where will the adults home to or return to? Open up the slough to more positive flow and it will be a more natural area for rearing chum and Chinook fry. Now TN slough is too much like a duck / ornamental pond. DFO does have Community Advisors (if Harper has not laid all of them off) that can also comment on this item.

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