Title of Paper: Eel River Dam Removal Project EA and Follow-up Program: A Benefit to those affected by the Project.

Authors: Province of New Brunswick (Mike Pauley), Eel River Bar First Nation (Keshia Moffat, Sacha Labillois), Stantec Consulting (Darek Moreau, Jenny Reid, Chris Blair)

This Project consisted of the removal of an earthen dam constructed in 1963 that was no longer serving the purpose for which it was designed and was demonstrably hurting the ecology of the River within which it was installed. The purpose of this paper is to provide a lesson's learned perspective on the follow-up program that was developed from the EA for the removal of the dam. As originally scoped, most of the Follow-up Programs were to be completed by technical specialists, but as the program evolved it became apparent that the right thing to do was to have as many programs as possible be implemented by members of the community immediately adjacent to and most affected by the Project – Eel River Bar First Nation (ERBFN). Further, the proponent and their consultant worked with the Chief and Council of ERBFN to seek opportunities for training and professional mentorship for members of the Community.

Background

The Eel River dam is located in eastern Canada, on the northeastern coast of the Province of New Brunswick, near the town of Dalhousie, adjacent to the ERBFN community. The dam and gateway were in the lower tidal estuary of the river about 600 m from its mouth in the Eel Bay. The Eel River watershed is approximately 220 km^2 and 24 km long. Mean annual stream flow is 5 m^3/s. The dam was built in 1963 to provide an industrial water source (non-potable) to attract industry to the region. Following construction, there was no longer upstream tidal exchange and all but the lower 600 m of the estuary was lost. Fish passage was incorporated into the dam's construction, however it never functioned properly. Changes in flow, increased water elevation above the dam, and lack of tidal influences caused the impoundment to be more "lake-like" than a river. This had detrimental environmental and social impacts on the river, particularly the traditional uses of the river by the ERBFN.

Members of the ERBFN, Fisheries and Oceans Canada (DFO), and local anglers, reported that Atlantic salmon were once relatively plentiful in Eel River. Monitoring conducted by DFO and the Province of New Brunswick documented few adult salmon above the dam even though upstream spawning habitat is still suitable.

Reports from DFO and observations by members of ERBFN, indicate that clam populations declined in the remaining estuary below the dam partially due to sedimentation associated with the reduced tidal flushing and destruction of clam beds, and there were no clams upstream of the dam due to the change to a freshwater environment. Adding injury to insult, the presence of sewage-related bacteria, made worse by the reduced tidal exchange, resulted in closures of the remaining clam fishery in the Eel River estuary and Eel Bay.

Environmental Assessment

In 2002, the Government of Canada, Province of New Brunswick and ERBFN entered into an agreement to conduct an environmental assessment for the removal of the dam with the following Project Objectives to address the challenges related to fish passage, loss of salt marsh, and loss of habitat for soft-shelled clams.

The proponent was the Province of New Brunswick, the owner of the dam, and the EA was completed and the project, the removal of the dam, was approved by 2007.

Project Implementation

Prior to the implementation of the 3-stage removal, a Steering Committee was formed to oversee the work being undertaken and provide overall direction in relation to the decommissioning. Decisions of the Steering Committee are based on consensus. The Steering Committee is made up of various Departments of the Province of New Brunswick (and their consultant, Stantec), ERBFN, and Indian and Northern Affairs Canada, among others.

The dam was removed in three stages: 1 – project planning (2009); 2 - create 150 m opening in the dam to reestablish the pre-dam flow patterns in the river (2010); and 3 - remove the remainder of the Eel River dam (2011).

Several ceremonies in the ERBFN Community were initiated around the opening of the gates and removal of the dam. The project implementation was interesting for many in the community (those under 50 years of age) as they had only ever known the river to have a dam.

Follow-up Program

The EA recommended Follow-up Programs to verify the predictions of the environmental assessment of a Project and determine the effectiveness of mitigation. The following components of the environment were subject to Follow-up Plans:

- Clams
- Finfish
- Public Health and Safety
- Vegetation and Wetlands
- Migratory Birds, and
- Archaeological Resources.

Soft shell clam (*Mya arenaria*) habitat quality was assessed through monitoring of sediment quality (grain size) upstream and downstream of the dam as well as clam population density. Surveys and monitoring programs for finfish were undertaken to monitor TSS, freshwater fish species and their distribution (electrofishing and redd surveys), and fish passage (adult Atlantic salmon counts). Training was provided for both of these components which are being conducted by trained teams from ERBFN.

Of the remaining Follow-up Plans, for the purposes of this paper, only those elements that were found to be "problematic" are discussed further. Those not discussed were carried out as described in the EA.

The Problem of Positive Impacts

As the removal of the dam resulted in largely positive impacts for the majority of the Value Components assessed in the EA, the follow-up program was based on verifying those positive effects. But to what end?

The changes observed in the first two years of the follow-up program for terrestrial and wetlands, and migratory birds, called into question whether further years of observations would be of value to the Project. In addition, what would be done if the anticipated rate of change was slower or faster than predicted--Implement further mitigation? Plant salt marsh species? Import estuarine birds? The environmental and ecology was going to change, it was just a matter of when, so the purpose of these elements of the follow-up program was questioned retrospectively. The program surveys were done by consulting professionals with only little participation by the Indigenous Community members living on the river – yes, the removal of the dam would hopefully be a benefit, but what other more tangible benefit opportunities could be realized?

In some cases, such as those predicted from the wetland and bird VCs, one year of follow-up was considered by those professional undertaking the surveys to be sufficient for the requirements of the EA. So what could we learn from a situation such as this? As an example, the wording surrounding the follow-up program could have read, "The follow-up program was meant to document the shift in bird species using the estuary through breeding bird and migratory surveys (Years 1 and 3)," however if the shift from freshwater to estuarine species is observed after one year, the follow-up program is considered complete."

In Projects where there is a change to pre-Project conditions (e.g., decommissioning) mitigation should focus on impacts from construction, and follow-up programs should focus on recommendations that may require further mitigation and adaptive management (i.e., things we can do something about), not simply to document whether something worked or not.

Further, and perhaps more importantly particularly in the case of this Project where all funding from the Project was coming from government sources, additional consideration could have been given to the human factor – are there additional tangible benefit opportunities that could be made available to the Indigenous partners in this Project? As you will see this was eventually what was done.

Indigenous Involvement

For the members of the ERBFN Community, the restoration of Atlantic salmon was a top priority as this species is an integral part of their culture and diet. Monitoring indicated that juvenile Atlantic salmon were present within three years of the dam removal, however there were no salmon populations in the upper reaches of Eel River because of numerous stream blockages (some natural (beaver dams), others anthropogenic (wood debris from clear cutting, etc., hung

culverts) that were noted during the salmon redd counts. During the 2014 Steering Committee meeting, it was decided to divert funds from the scheduled wetland and migratory bird surveys to the development of an obstruction removal plan for fish passage and to continue with the redd surveys to monitor the effects of the fish obstruction removal. Further, this Obstruction Removal program would be staffed entirely from individuals from ERBFN.

The removal of the dam signified a huge victory for the small Migmaq community of Eel River Bar. Historically, the river had been a vital to the survival of the community through salmon fishing and clam harvesting – the dam dramatically and adversely affected those sources of food and revenue for individuals within the Community.

After the dam was removed, the Project Follow-up activities which included clam surveys, water quality analysis, river surveys, fish counts, and the obstruction removal brought an exciting transformation to how the river is viewed by members of the Community; although still no longer a source of food, it was now a source of income for some.

As the project grew over the years and the team became more educated on why they were doing the work, they understood what their work would accomplish. The crew was able see the results in their obstruction removals and the other studies and were knowledgeable and aware of its importance to the successful return of fin fish to the river. A Community information session on the Project was held in 2012 and it instilled a sense of pride and accomplishment in the crew members. The team understood the importance of how the Follow-up Plan for the river could eventually lead to the revitalization of the river and the return of its natural state – maybe not to its former natural state, but certainly much better than it was when the dam was in place. Those participating in the various studies on the River could relate to the importance of this end goal with community and cultural values in mind.

Today the crew has come to realize that their work is valuable and meaningful. As Aboriginal people, traditionally and in modern day, the members of the ERBFN have a strong bond with Mother-Earth. To be a steward to the environment is an important role for ERBFN and they always look forward for the next seven generations. The follow up to the dam removal has allowed for the people to act as stewards of the Eel River by embracing adaptive management and community involvement in a manner that respected the true purpose of the project.

Leadership was exemplified in this project and was the key component for the hard work completed on the river. The authors believe that after the Follow-up plan has been completed, ERBFN will continue to have a presence on the river and will identify and implement activities that reflect their careful stewardship of traditional values. ERBFN now clearly see themselves as a capable organization that could take the lead on managing this watershed.

Closure

The work on Eel River continues – some arising from commitments made in the environmental assessment process, others as a result of the strong relationships and collaborative efforts that have developed between the Province of New Brunswick and the ERBFN Community through this project. EA practitioners should look for opportunities to have the Follow-up programs

developed with a purpose that is not simply to data gathering to fulfill process requirements. Importantly, they should seek additional value for those most affected by Projects – the people of the local community.

References.

Jacques Whitford. 2006 Final Report. Environmental Impact Assessment for the Removal of the Eel River Dam. Report prepared for New Brunswick Department of Supply and Services.

[i] * Stantec Consulting Ltd
** New Brunswick Department of Transportation and Infrastructure
*** Eel River Bar Firs Nation