

Revised SEIC River Crossings Report: Preliminary comments – Rev 02

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Preamble

These are brief, preliminary comments prepared for the teleconference with AEAT and potential lenders for Monday 28.11.05.

Revisions from 28.11.08 are in blue. These include emailed text from Sandy.

Sandy was unable to email me his comments from New Zealand because of technical difficulties with email, but we spoke several times and he has given me some verbal feedback.

This has been written at great speed, as very little time was available. I focused on 25 November version; Sandy on the 23 November version as his Friday 25 copy arrived too late in New Zealand, and without warning (again).

A number of improvements are evident, and these can be discussed tomorrow.

However, we have the following concerns. The very concerning Sakhalin Environment Watch photos act as a backdrop to the discussion.

It is important not to allow further construction to go ahead on any Group II or II rivers, or any Group 1 rivers which flow into Group II or II rivers, until proper (a) mitigation and (b) monitoring measures and (c) contractor-control policies, (d) enforcement and (e) independent inspection processes are in place. Facilities for snap inspection, not simply planned inspections, are preferable.

We gave extra attention to the issues raised by AEAT and the lenders in emails of 25 November.

1. Burden of proof lies with the company in cases like this

At many points we are still left to take a leap of faith, and this point is expanded below. Information on approaches, specific techniques or governing equations used to derive the results is often missing, and these components must be included before derived results can be independently verified. are vital.

2. Impact underestimation

At almost all turns of the argument, impacts tend to be downplayed throughout.

At many points, therefore, there is also a tendency for extra mitigation measures not to be given the consideration they deserve.

3. Sediment transport modelling: Chapter 5

Given the importance of the project, the potential impacts and the sensitivity of the ecosystems, before we can recommend acceptance of any part of the report, we have to apply similar Peer Review criteria as that used in published scientific work.

We cannot accept this ECMOS modelling work as it stands because of several limitations:

- **Information on generic approaches, specific techniques or governing equations used to derive the results is completely absent.** On this basis alone, it is impossible to accept the findings (the model outputs, curves), as these absolutely crucial foundations to the argument are missing.

Moreover, although the text is very thin here and sometime confusingly presented, it appears, there are several flaws, *which act to underestimate the impacts significantly*

- (a) **Only silt (<0.1 mm) has been included apparently** (Table 5-2). The graph we gave in our earlier October report clearly showed the importance of coarser sediment too < 0.88mm (coarse sand) in controlling the strong relationship between sedimentation and redd permeability and survival etc. (Lawler and Milner, 2005a). Effects have thus been significantly underestimated therefore.
- (b) **If they are focusing on this very fine sediment, then the plume distances (impact zones) will almost certainly be much greater than the 100m they envisage** (see earlier evidence we present, and the literature)
- (c) **Input data have also been excluded**, e.g. the crucial channel boundary particle size distributions, from which they appear to derive the silt percentages
- (d) **The target variable is not justified (*sedimentation depth*)**. The crucial variable is the *percentage of sand/silt* that ingresses the redds, **specifically the proportion <0.88mm** (coarse sand) as shown in the graphics supplied with our earlier report (Lawler and Milner, 2005a). However, the modelling focuses **only on depth, with no comment on its significance**.
- (e) **In any event, no justification is offered for the 5mm sediment figure used**. It looks like an arbitrary number to ensure the impact zone is presented as <100m downstream of the crossing. What is the ecosystem significance?
- (f) **Note that the curves are asymptotic too, on the downstream diagrams** confirming that significant sedimentation will occur downstream of the 100m 'limit' they propose.

(g) **Eroded vs deposited sediment volume differences.** It appears that no allowance has been made for the fact that deposited sediment occupies larger volume than the host sediment body delivering the sediment, because of unconsolidation processes. **This again understates the effects, and will especially apply to sediment derived from river banks and the ROW/floodplain surface.**

A fully worked example is needed, with full declaration of all the above.

Where has the SHI study gone to? Did its finding concur with ECMOS? We need to see this (4th request)

The precautionary principle would suggest that caution is exercised before accepting modelling results which appear not to have been validated against field data or verified.

Clearly, Sakhalin sites have the potential to generate and deliver considerable quantities of fine sediment (e.g. Figs 1-2).

With 500 watercourse crossings already completed, there surely must be some field checking or photographic evidence available to test the model predictions. Have the contractors or SEIC personnel in Sakhalin ant photographs SEIC can use for objective, representative and independent testing?

Is there a photographic library for the Sakhalin II project that we can explore?

4. Suspended sediment loads analysis (chapter 4)

This is admitted as 'broad brush', but analytical routes not shown. **There are many methods of calculating suspended sediment loads and this has been shown many years ago (see Walling and Webb work; Ferguson 1987 etc.). Methods give wildly different results in accuracy and precision (including for Pacific environments of New Zealand rivers (e.g. Griffiths, 1979; Adams, 1980) so results are difficult to accept. See also Bobrovitskaya study of Russia and FSU river suspended sediment loads, including Sakhalin.**

The sediment analysis in this chapter also confuses volumes and weights of sediment, and fails to declare the suspended sediment concentration values used to estimate annual loads.

Yes, high suspended sediment concentrations will naturally common in summer meltwater peaks, **but** the key thing here is that high suspended sediment concentrations will occur in winter when some organisms will be at more sensitive stages (e.g. when young)

Need to know magnitude, peak, timing and duration of turbidity and suspended sediment concentration increases during crossing, not just averages: these characteristics determine *impact*.

5. Sediment plumes

This links to the recurrent sediment plume issue. They continue throughout to maintain that 100m downstream is the maximum, despite all the evidence to the contrary.

R. Amur ([Russian mainland](#)) sediments have been found in the seas around Sakhalin also. It is well known that fine sediments travel long distances, even in small streams (e.g. the Spain example presented 29 September). [See Figures 1-2](#).

Even the Reid & Anderson studies point to 180-290m sediment impact zones, and 30cm sediment depths.

[SEIC](#) must provide sediment plume evidence from Sakhalin (e.g. from current crossings, in advance of the monitoring plan being established.). In October, we called for monitoring to begin. Models mean very little without (a) calibration and (b) field testing, especially when all the supportive material is absent.

To what extent are the results of the modelling consistent with photographic evidence (e.g. Sakhalin Environment Watch photos. These show very high suspended sediment concentrations (e.g. Figures 1-2), with a long length of an indeterminate channel carrying high suspended sediment concentrations. The plume in and how do the plumes compare?

Repeat request for satellite imagery of plumes. This is essential

6. Classification

This still does not offer adequate protection to the sensitive rivers, through a robust categorisation.

[The new classification is still a major problem and after clarification it is clear that the Type 3 high sensitive streams is based entirely on Sakhalin Taimen spawning habitat being present. This is still not clear if it is in the vicinity of the crossing area or how far downstream.](#)

[While it is important that taimen spawning areas are protected this negates the possibility of impact to spawning of the other species \(e.g. silver or cherry salmon\) and to other aspects of life cycle spawning \(e.g. rearing habitat\). This is particularly the case for as the report acknowledges taimen information is not complete and further information may be available from new surveys.](#)

[In addition it appears that the spawning criteria is based on width, flow and velocity. However this is dependent on when the survey was done and optimum depths and flow could be found at other times than the survey. We feel this new classification system does not offer adequate protection to a number of critical rivers and the criteria for Type 3 "high sensitivity" rivers should be reviewed.](#)

[In Figure 5-1 it states that "potential spawning Grounds" where in the text it would imply KNOWN spawning grounds. It is also not clear how the hydromorphological links to the sensitivity criteria to provide a cumulative effect change to ensure greater](#)

protection - in other words if ecological sensitivity was type 2 medium and medium susceptibility to disturbance would this combine to signal greater protection for the crossing point?

This recognises a 500m impact zone, not 100m? This lacks consistency.

In view of the concerning Sakhalin Environment Watch photographs (Fig 1), and in the repeated absence of a full justification of the new classification it is recommended that all 153 rivers in Type 2 and 3 are given the maximum protection measures, and that no attempt is made to limit these to c.20 rivers. All 153 have 'recorded salmon spawning grounds and/or potential for presence of Sakhalin Taimen' (p.83; Fig. 5-1): this is reason enough, without any other species taken into account.

Good quality spawning grounds have still not been defined, despite 3 requests: it is not sufficient to refer to 1 1997 report, The results and definitions must be integrated here, or placed in an Annexe.

How has 15,000m² been calculated?

This is the precautionary principle at work, which SEIC stated they wished to follow. This recommendation assists them to follow that policy.

7. Group 1 rivers

Those that flow into Group III rivers should be cut in winter, not just outside the spawning season, to reflect the longer impact zone and sediment plumes.

8. Life cycle diagram is *still* inaccurate, and internally inconsistent. This is crucial to get it right, as it will be used to schedule crossing activity. Details on Monday, but see text. When correct it will limit crossing window to December to late March/very early April.

9. Minnow and Sturgeons: show map to confirm not affected, as data are admitted a spoor.

10. River crossing timings

Winter is too broad a term. We need to focus on mid-December to end of March, and exclude April (too close to meltwater season). Sakhyrbvod prefer a specific month, apparently: to discuss.

11. Monitoring is far stronger now, but should be 4 years for all variables, fish and sediment. We can discuss gaps and strengths at the telecom more meaningfully.

12. Annexe material: I have had time for a cursory scan of these. But they seem to be a useful, basis for discussion, and many useful variables are included. We can discuss at the telecom more meaningfully.

13. Creation of new spawning grounds. This is problematic. Artificial gravels often lack the binding, finer **interstitial** material, and are not imbricated (**e.g. they are unstructured because not deposited naturally**), and so are highly vulnerable to disturbance. This is especially so for those emplaced just before the meltwater season, when little time for consolidation has been available. Washout is a distinct risk.

14. The wetlands approach also requires further attention. The fact that fish move into them before the winter season and therefore will not be impacted by the winter is a flawed approach. Wetlands can still be damaged during the winter and may impact important overwintering habitat and some measures to protect wetlands should be incorporated in this report, evn if another report exists

List of Figures

NB. Both photographs (Figs 1 and 2) are contained in a separate file to ease emailing)

Figure 1 Highly turbid waters with significant plume, even at low flow conditions with small depths (source: Sakhalin Environment Watch photo file)

Figure 2. Highly turbid waters with significant plume, even under apparently quasi-static flow conditions with small depths (source: Pacific Environment Press Release 23 November 2005: <http://www.pacificenvironment.org/article.php?id=452>)

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Figures



Figure 1 Highly turbid waters with significant plume, even at low flow conditions with small depths (source: Sakhalin Environment Watch photo file, November 2005)



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