

Effects of Modifications to River Constructions

1. Background

The River Construction Working Group of the Shiretoko World Natural Heritage Site Scientific Council found that 13 river constructions on five rivers within the Shiretoko World Natural Heritage Site required modification, and these structures were modified starting in 2006 (Fig. 1), with the status of salmonid species upstream run and number of spawning beds monitored three years after modification.

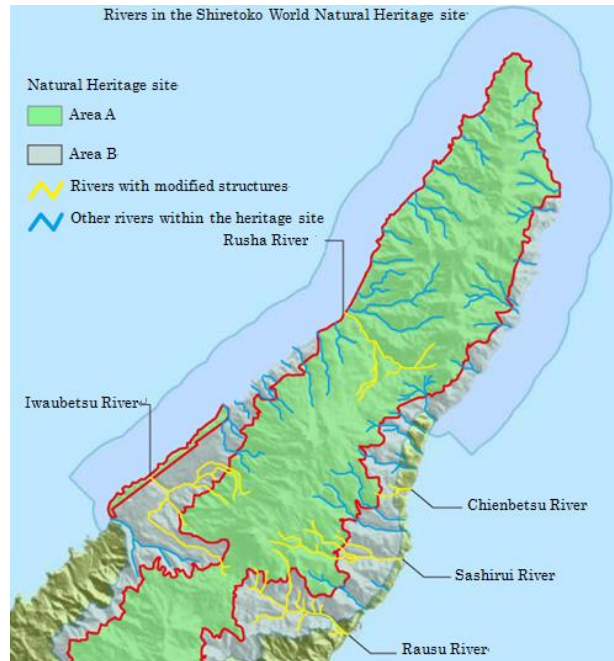


Fig. 1 Rivers in the Shiretoko World Natural Heritage Site

2. Effects of modifications to river constructions The following is a description of the modifications to river constructions on four rivers that were completed by 2010, and their effects.

1) Sashirui River

Year of modification	No. of structures modified	Modification method
2007	2	Modification of existing fishways

There were two existing fishways on the Sashirui River, but their structure was not conducive to fish run. The structures were modified so as to be suitable for upstream run (Fig. 2).

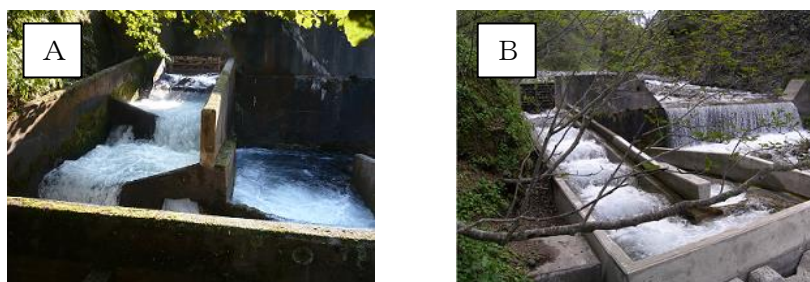


Fig. 2 Before and after dam modification (modifications to existing fishways)
A: Before modification, B: After modification

◆ Effects of modification

The beneficial effects of the modification of the fishways were verified through observation of the number of salmonid species spawning beds upstream from the modified river constructions. The number of salmonid species spawning beds upstream from the constructions had increased (Fig. 3).

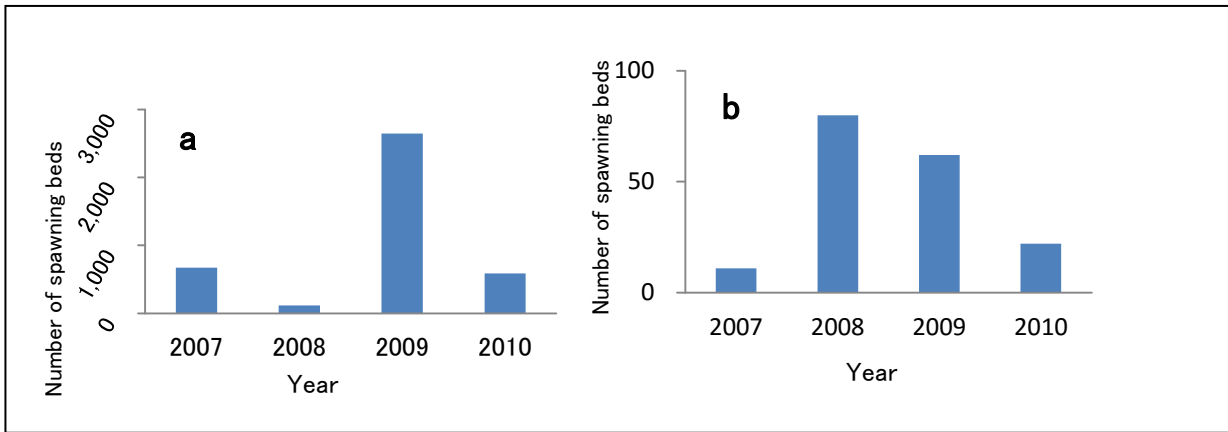


Fig. 3 Change in number of salmonid species spawning beds on the Sashirui River after modification of river constructions

(2007 data indicates the number of spawning beds before fishways were modified)

a: Pink salmon (*Oncorhynchus gorbuscha*) b: Chum salmon (*Oncorhynchus keta*) Fishways modified in 2007.

2) Chienbetsu River

Year of modification	No. of structures modified	Modification method
2008, 2009	2	New fishways installed

There were two erosion-control dams built on the Chienbetsu River, but no fishways were installed, rendering salmonid species upstream migration difficult. For this reason, new fishways were installed (Fig. 4).



Fig. 4 Before and after dam modification (installation of new fishways)

A: Before modification, B: After modification

◆Effects of modification

The beneficial effects of the modification of the fishways were verified through observation of the number of salmonid species spawning beds upstream from the modified river constructions. The number of salmonid species spawning beds upstream from the constructions had increased (Fig. 5).

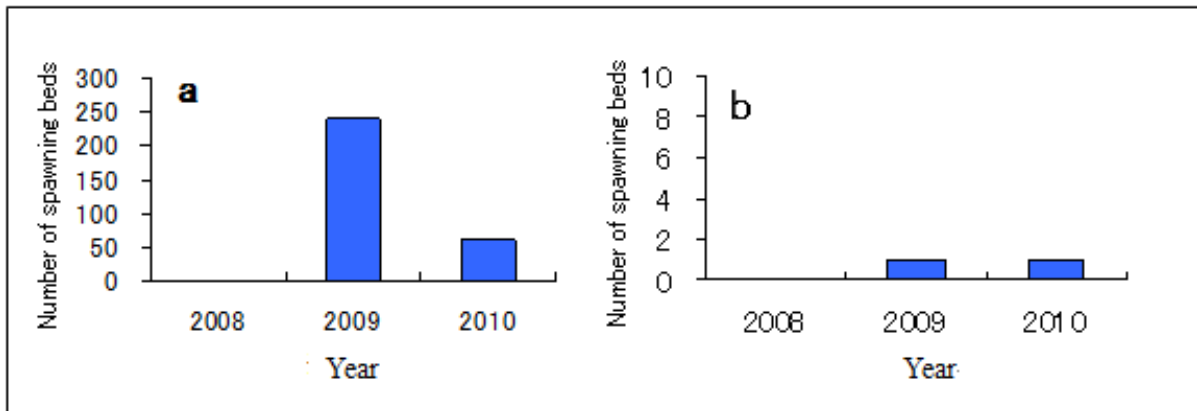


Fig. 5 Change in number of salmonid species spawning beds on the Chienbetsu River after modification of river constructions
 (2008 data indicates the number of spawning beds before fishways were modified)
 a: Pink salmon b: Chum salmon Fishways modified in 2008 and 2009.

3) Iwubetsu River

Year of modification	No. of structures modified	Modification Method
2006 – 2010	6	Opening slits and cutting down height

Five erosion-control dams and one water channel were built on the tributaries of the Iwubetsu River, rendering salmonid species upstream run impossible. For this reason modifications to these six structures were performed, consisting of opening slits and cutting down height of dams (Fig. 6).

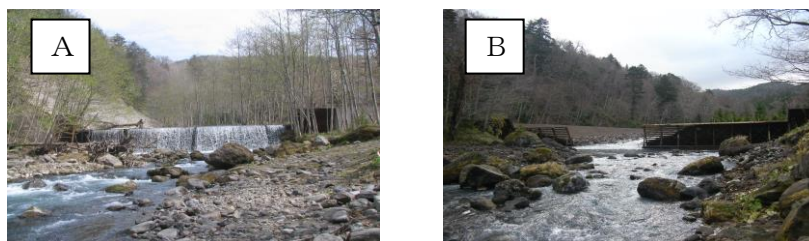


Fig.6 Before and after dam modification (opening slits)

A: Before modification, B: After modification

◆Effects of modification

The beneficial effects of opening slits and cutting down height were verified through observation of the number of salmonid species spawning beds upstream from the modified river constructions. The number of salmonid species spawning beds upstream from the constructions had increased (Fig. 7).

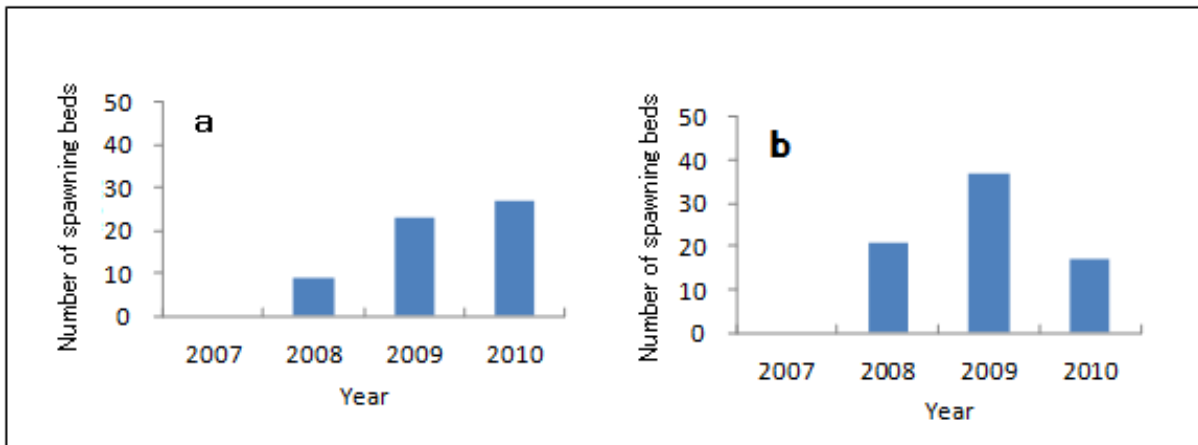


Fig. 7 Change in number of salmonid species spawning beds on the Iwaubetsu River after modification of river constructions

(No data on the number of spawning beds in 2007)

a: Pink salmon b: Chum salmon Fishways modified from 2006 to 2010.

4) Rusha River

Year of modification	No. of structures modified	Modification method
2006	2	Opening slits

There were three dams built on the Rusha River, and the two upstream dams were cut down and/or had openings cut in them to enable freer migration for salmonid species which run upstream (Fig. 8).

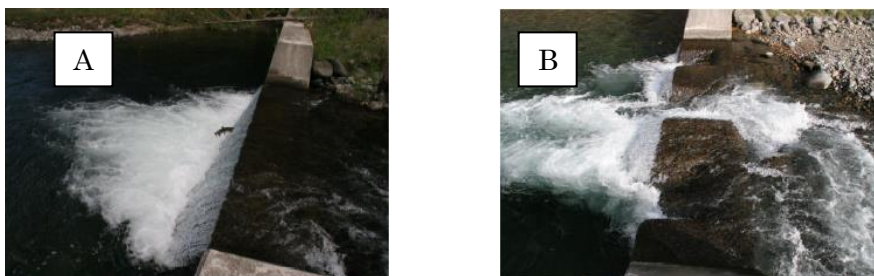


Fig. 8 Before and after dam modification (cutting down height and creating opening)
A: Before modification, B: After modification

◆ Effects of modification

The beneficial effects of cutting down height and creating openings were verified through observation of the number of salmonid species spawning beds upstream from the modified river constructions. The number of salmonid species spawning beds upstream from the constructions had increased (Fig. 9).

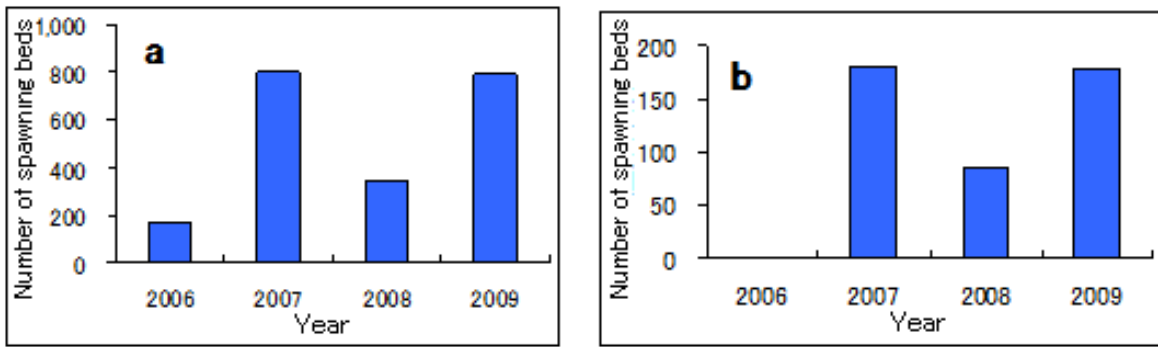


Fig. 9 Change in number of salmonid species spawning beds on the Rusha River after modification of river constructions

a: Pink salmon, b: Chum salmon Fishways modified in 2006.