

**PREDICTION OF SPAWNING SUITABILITY FOR AYU,  
PLECOGLOSSUS ALTIVELIS, WITH HORIZONTAL 2-D  
NUMERICAL SIMULATION**

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Hydraulic structures such as a dam, weir and water gate affect on the flow depth, velocity, bed topology, water quality and so on, so that the hydraulic structures may affect on the water environment for plants and aquatic lives in and around rivers. Therefore, before construction of such hydraulic structures, it is necessary to conduct the environmental assessment.

In this study, a numerical simulation in and around spawn bed of ayu was carried out using a horizontal 2-D numerical model. Further, the suitability of spawning for ayu is predicted with the preference curve of the flow depth and velocity obtained by Onitsuka et al.(2005). The predicted results of the suitability of spawning for ayu and field data are compared.

Therefore, the suitability of spawning for ayu is calculated by the following equation.

$$CSI(\textit{suitability of spawning for ayu}) = SI(h) \times SI(v) \times SI(s) \quad (1)$$

Nagaya et al.(2004) and Onitsuka et al.(2005) pointed out that the effects of the flow depth  $SI(h)$  and cover  $SI(c)$  on the suitability of spawning for ayu are quite small in compared with that of the velocity. Unfortunately, the effect of the substrate  $SI(s)$  is not cleared. In contrast, the velocity strongly affects on the suitability of spawning for ayu. The preference curve of the velocity for spawning of ayu is suggested by Onitsuka et al.(2005). The suitability of spawning for ayu may be predicted from Eq.(1) under the assumption that  $SI(s)$  is always 1.0.

Fig. 1 shows the contour lines of  $CSI$  of spawning of ayu. Almost the value of  $CSI$  in the regions except for a little upstream from the Ose Bridge is zero. In contrast, a large value of  $CSI$  is seen where is a little upstream from the Ose Bridge. This area slightly deviates downstream from the spawn bed observed in 16th Dec., 2003. This is because the spawn bed was moved a little upstream by the shovel roader after the survey day of

leveling (9th Sep., 2003). Therefore, it can be said that the prediction accuracy of the *CSI* of spawning for ayu is high.

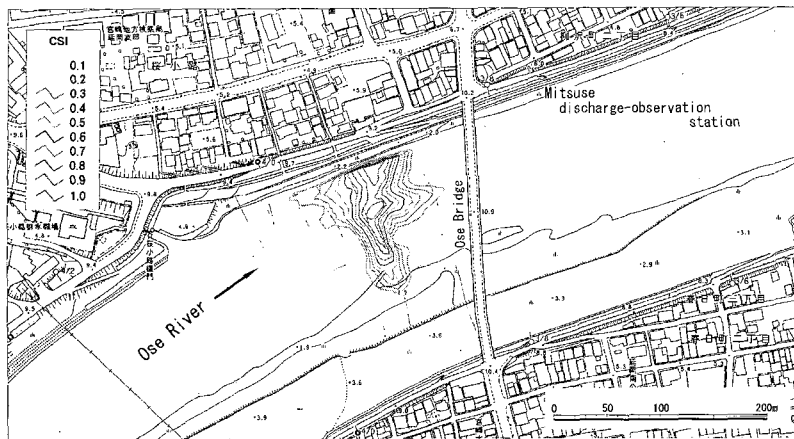


Fig. 1 Contour lines of *CSI* of spawning for ayu

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