Physical Habitat Modeling of Dalcheon Stream using CASiMiR

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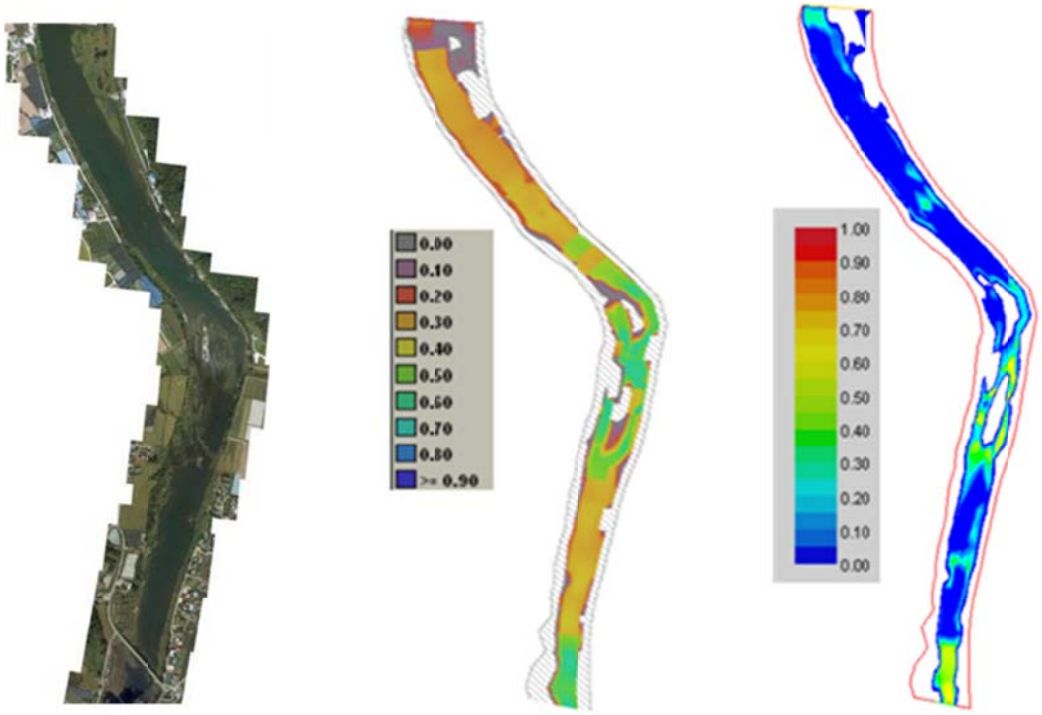
CASiMiR is a computer model for physical habitat modeling proposed by Jorde and Schneider in 1990s. CASiMiR uses the membership function from the fuzzy logic in estimating the habitat suitability index. The fuzzy logic was first proposed by Zadeh (1965) for the mathematical analysis of uncertain and imprecise knowledge. The strength of the fuzzy logic in physical habitat modelings is that it can predict size and quality of habitat quantitatively and can consider interaction between each factors (Schneider et al., 2010). This study presents physical habitat modeling of a downstream reach of Goesan Dam in Dalcheon Stream, Korea, using CASiMiR.

The study reach is located downstream of Goesan Dam, about 2.5 km long from Soojun Bridge to Daesu Weir (see Figure 1(a)). The basin area of Goesan Dam is 675.2 m^3 and designed flood discharge is 1,750 m^3/s. The minimum flow is 1.82 m^3/s. The substrate of the study reach consists mostly of gravels, pebbles, and boulders and bed-slope is 1/650. The reach shows a general feature of the gravel-bed river. In the study reach, dominant species is Zacco platypus, and the next dominant fishes were Zacco temminckii and Coreoleuciscus splendidus (MLTM, 2010). So, habitat modeling about Zacco platypus is performed in this study.

The distributions of habitat suitability simulated by CASiMiR and RIVER2D are given in Figure 1(b) and (c), respectively. It can be seen that two distributions of habitat

suitability are similar. In general, HSI (habitat suitability index) in the pool is lower than that in the riffle around the channel bend. Therein, the depth-averaged velocity ranges between 0.3 and 0.4 m/s. Specifically, CASiMiR tends to overestimate habitat suitability than RIVER2D. This seems to be resulted from the additional consideration of types of cover and substrate in CASiMiR.



(a) Study reach (b) HSI by CASiMiR (c) HSI by River2D

Figure. 1 Physical Habitat Modeling using CASiMiR and River2D