



THE EFFECTS OF ANTHROPOGENIC STRUCTURES ON THE ECOHYDRAULIC CHARACTERISTICS FOR MORTONAGRION HIROSEI HABITATING IN ESTUARINE WETLAND

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Objectives

The aim of this study is to explore the characteristics of flow and salinity affected by tidal gates for *Mortonagrion hirosei* habitating. The population of *Mortonagrion hirosei*, one species of *Odonata* emerging in brackish water area, living in the reeds of the tidal wetland. In 2005, it is the first time to find *Mortonagrion hirosei* which is near threatened species in the International Union for Conservation of Nature (IUCN) Red List in Wu-ku wetland of Tanshui River (Fig. 1), Taiwan. The Society of Wilderness incessantly monitor the species and then detect that the number of *Mortonagrion hirosei* rapidly decreased from 2006 to 2014. Flow condition and salinity are considered the crucial factor of the habitat destruction and responsible for the loss of species. Therefore, this study uses the method of on-site investigation to understand the characteristics of water flow and salinity changes outside the gates of the Erchung floodway and in Swamp Canal during the full tide survey. In the future, the simulation reference of hydraulic model and salinity model can be provided to facilitate the research and simulation of ladder rods. The gate operation mode is adopted to maintain the environmental quality of the habitat of the *Mortonagrion hirosei*.

Methods

the Acoustic Doppler Current Profile (ADCP) was used for the flow measurement of the full tide survey. Carry out full tide surveys according to the following specifications: (1) Select 4 sections for simultaneous total tide observation (including 1 outside the exit weir gate, and 3 upstream at Swamp Canal, as shown in stations 1, 2, 3, and 4 in Fig. 1. (2) Measurement content: Measurement items include cross-sectional area, cross-sectional stratified velocity, water level, flow, and salinity. (3) Measurement frequency: 1 measurement per hour, at least 13 hours during the full tide survey.

Results and Discussion

Fig. 2 shows the water level changes at each station during the full tide survey of the Erchung Floodway. On January 4, 2022, the full-tide survey day was from 7:00 to 19:00 (including 7:00 and 19:00). The salinity changes of each station are arranged as shown in Fig 3. The tidal hydrology and salinity characteristics of the outside of the weir gate and swamp canal can be known from the results of this full tide survey, which can be used as the basic data for subsequent hydraulic and salinity simulations.

It is necessary to conduct a hydrological environment and ecological survey, and establish the basic background information of hydrology and ecology before the renovation of the gate. Including evaluation of the changes in the habitat characteristics of Wu-ku wetland after the renovation of the planned outlet weir gate, and the zoning of the future habitat characteristics of Wu-ku wetland and the development of management strategies.

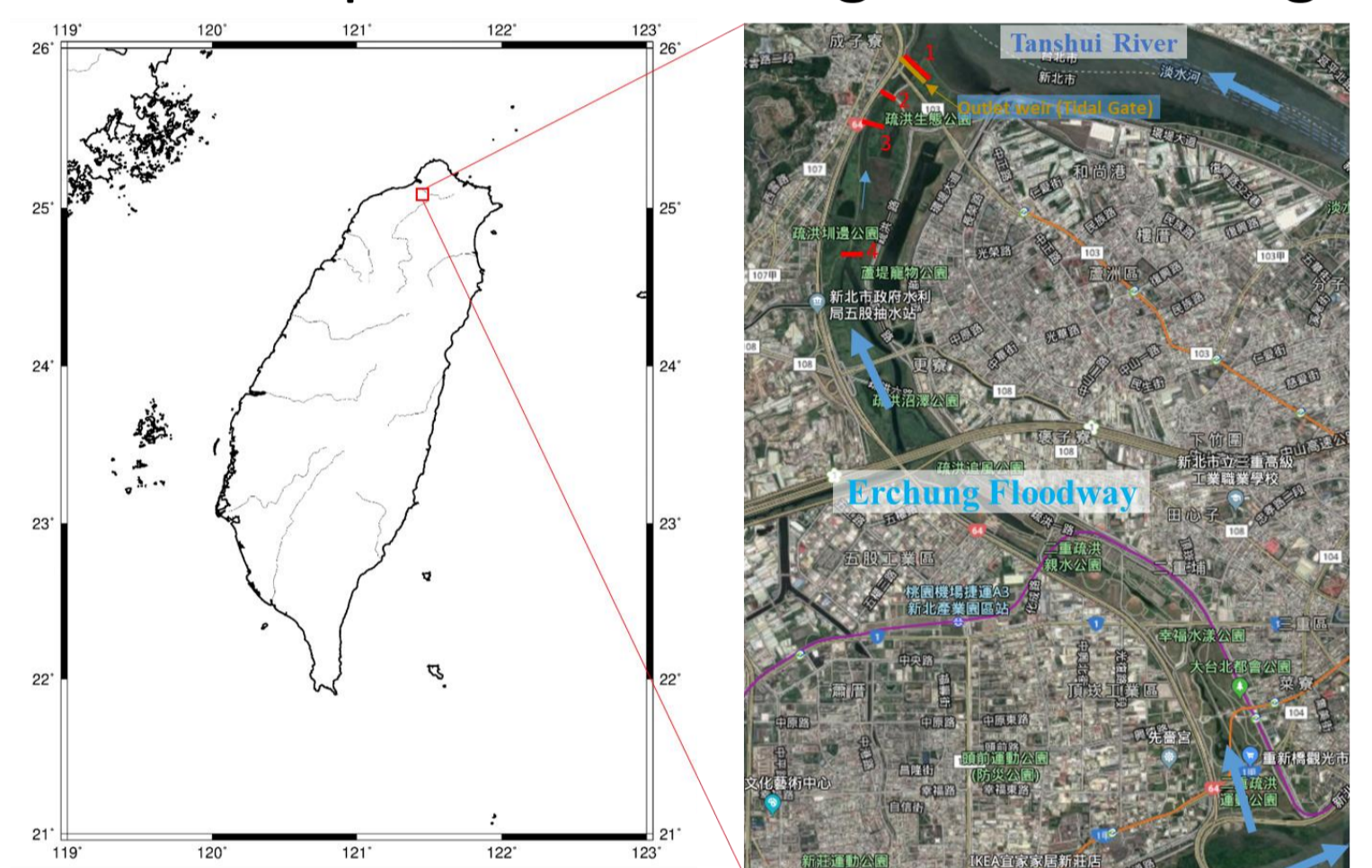


Fig. 1 The map of the Erchung Floodway and the position of tidal current investigation

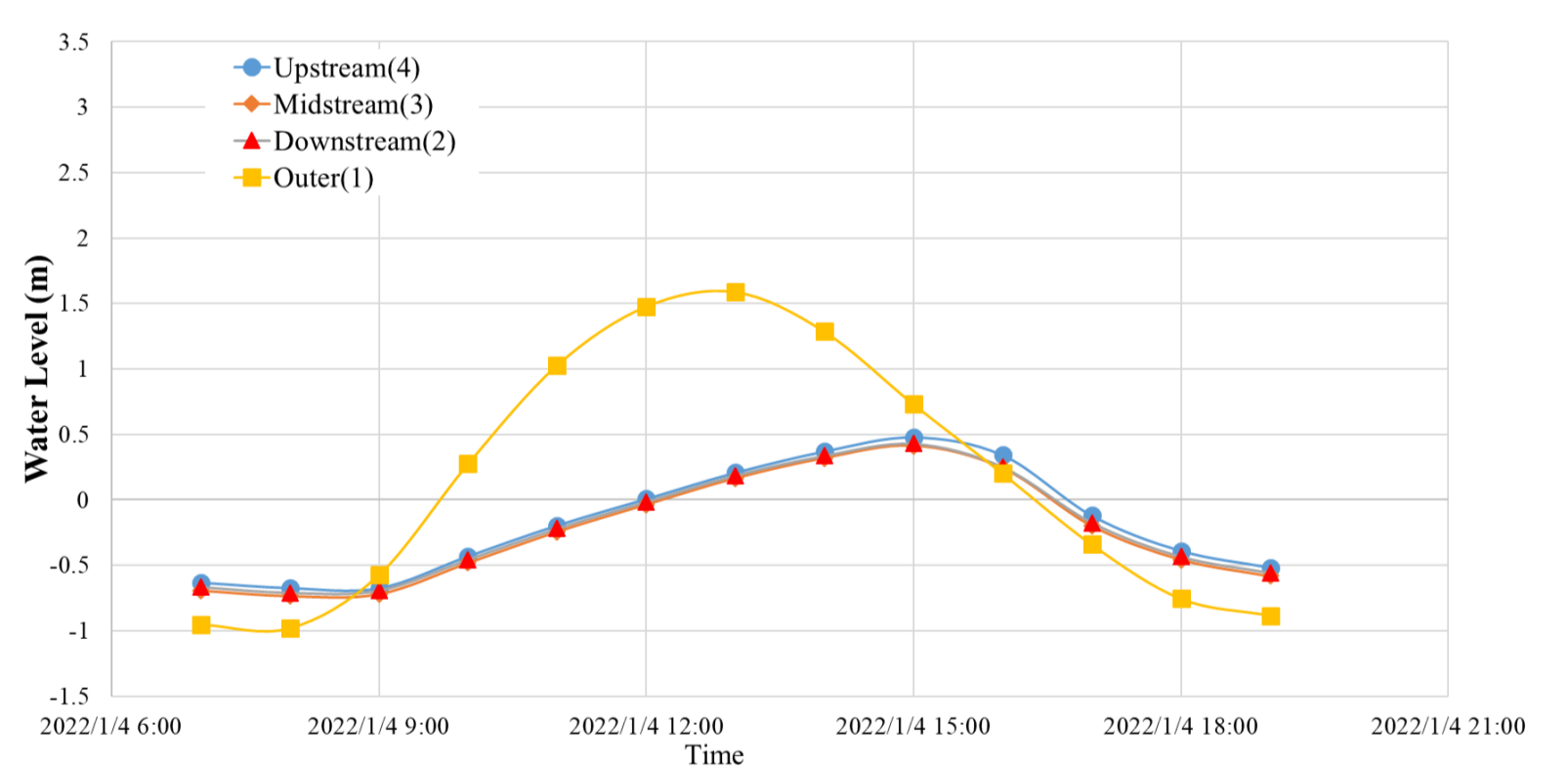


Fig. 2 The measurement results of water level in the full tide survey

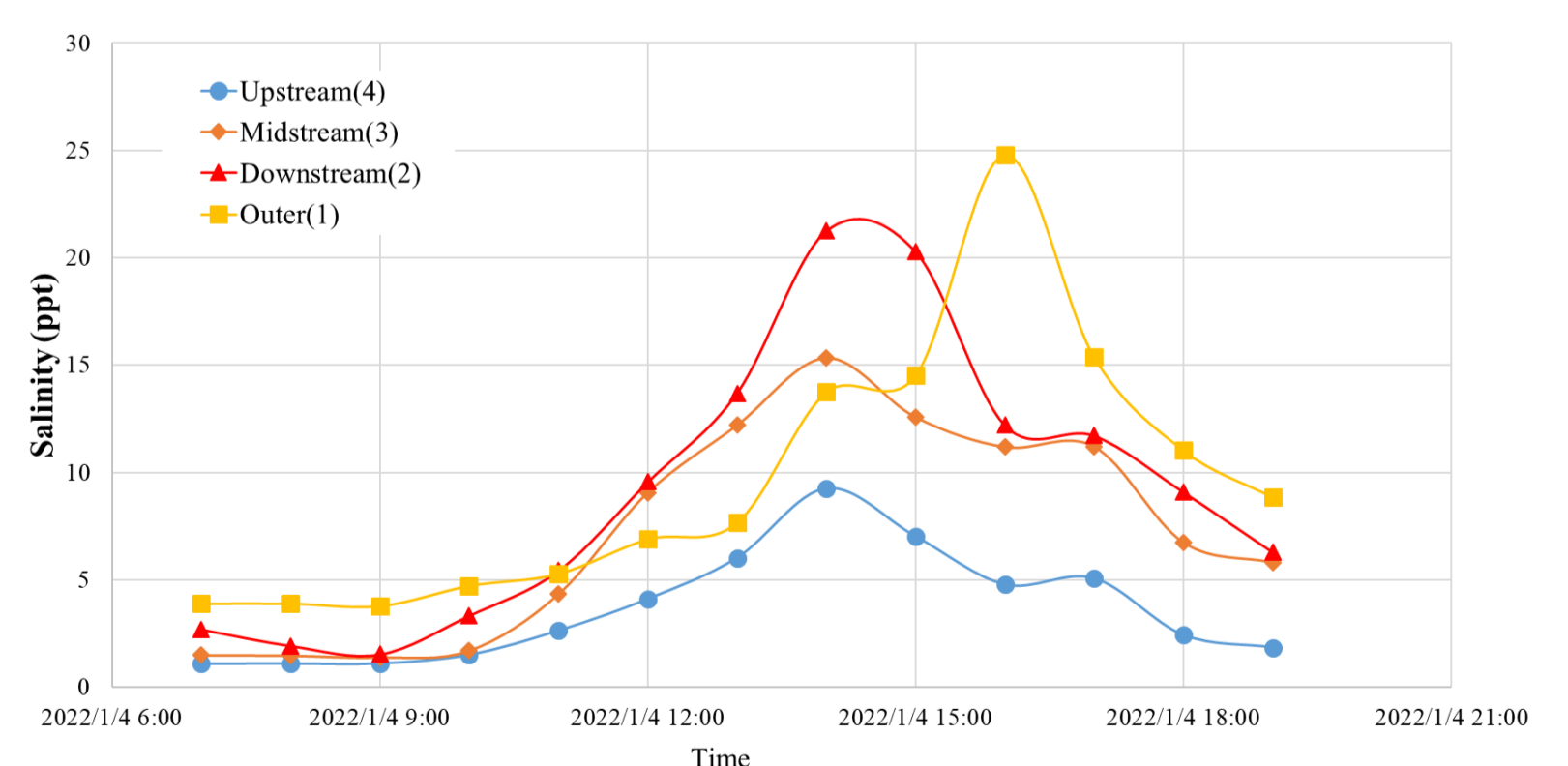


Fig. 3 The measurement results of salinity in the full tide survey

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