Abstract.

The European sturgeon, *Acipenser sturio* Linnaeus, 1758, is a critically endangered species according to UICN. The last viable population lives in the Gironde-Garonne-Dordogne watershed. Few things are known about its estuarine ecophasis except that juveniles stay 4 to 7 years in this environment while migrating downstream before reaching the ocean. When considering the European sturgeon abitats, very few things are known, whatever the environment (river, estuary or ocean) considered.

The aim of this work is to identify as well to characterize the zones of essential habitats for juveniles of *A. sturio* in the Gironde estuary. The purpose of this work is also to try to explain why sturgeons preferentially use some habitats rather than others. The results obtained will be used to build a habitat suitability index (HIS) usable to characterize the whole Gironde estuary (and potentially others in Europe) from the point of view of European sturgeon juvenile's requirements in term of habitats.

In order to fullfill these objectives, this work is based on the analysis of the monthly survey campaign of juveniles *A. sturio* in the Gironde estuary between 1995 and 2000 and on the results obtained by telemetric survey for 16 sturgeons during several months in 1999. The results highlight three preferential zones of concentration for European sturgeon juveniles distributed according to an upstream-downstream salinity gradient, each one laying in a different haline sector (oligo; meso and polyhaline). These three zones are successively used in time as sturgeons migrate downstream before leaving definitively the estuary for the ocean.

The comparison of these concentration zones with the environment variables (use of a multiple correspondance analysis) shows that these three habitat zones have a similar profile and that they are characterized by a muddy or sandy sediment, a localization preferentially close to the median part (in term of section) of the estuary, a high current and the presence of important feeding grounds rich in tube dwelling polychetes (*Polydora sp*. and *Heteromastus filiformis*) which are the two main preys of European sturgeon juveniles. The use of these results for the development of a Habitat Suitability Index for European sturgeon juveniles, and its application to the whole Gironde estuary gives good results in term of prediction for the localization of the most favorable habitats zones for sturgeons. This is confirmed for the downstream part of the estuary with confrontation between these results and that obtained with an independent data set (telemetry) of those used for the development of the HSI.

The results obtained during this work are interesting as regards to the conservation and restoration of the European sturgeon in the Gironde watershed but also elsewhere in Europe. These results give elements allowing a better management and protection of the essential estuarine habitats for this species by allowing their identification and fast delimitation. These results remain to be validated with new cohorts of *A. sturio* before being able to affirm that they are a reliable tool for the characterization of estuarine habitats of European sturgeon juveniles.

Key words:

Habitats; *Acipenser sturio*; feeding behaviour; substratum ; polychetes , HSI.