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New perspectives for fish in the Scheldt Estuary

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Abstract

The integration of a 600ha floodplain to the stream corridor of the tidal freshwater Scheldt Estuary will increase populations of eurytopic and rheophylic b species.

Keywords: Estuarine fish community; Controlled floodplain; Habitat restoration.

Introduction

After severe flooding in 1976, a flood prevention plan was developed to protect the tidal Scheldt catchment from new calamities. The plan comprised the construction of 512km dikes, 1133ha controlled floodplains and a storm surge barrier. The largest floodplain (578ha) is now under construction on the west bank of the river at Kruibeke, Bazel and Rupelmonde. The integration of the floodplain to the stream corridor is expected to significantly alter the structure and abundance of different fish populations in the river. Using different life history characteristics of estuarine fish species, we attempt to make a qualitative assessment of future changes to the species composition.

Reference condition

The fish community of Western European lowland rivers under tidal influence consists of about 20 rheophylic species, showing a particular preference for slow running, warmer water (Table I). Rheophylic A (RA) species use only the channel and the riparian zone. Examples include anadromous lampreys, salmonids, shads and sturgeon. RA cyprinids are mainly restricted to headwaters and are uncommon in lowland rivers. Apart from the river lamprey *Lampetra fluviatilis*, most species are absent in the tidal freshwater reach of River Scheldt due to population extinctions, migration barriers, spawning habitat reduction and overall pollution. Rheophylic B species (RB) include burbot, loaches and some cyprinid species. The species make essential use of backwaters along the river during their life history. Only *Leuciscus idus* is a typical member of a lowland river fish community but it occurs only sporadically in the Scheldt Estuary.

Rheophylic C species (RC) are confined to slow running brackish waters. These species are frequently caught in the river. Eurytopic species (E) do not have particular habitat demands. In dry periods, marine fishes may penetrate this zone while also typical limnophylic fish preferring lentic waters can be found. Both groups are not considered here.

Table I. Reference fish fauna for a tidal fresh water estuary with respective life cycle category and spawning habitat [for abbreviations, see text; relative abundance based on average daily fyke net catches in the Scheldt at Antwerp (4: >1 fish day^{-1}; 3: >1 fish week^{-1}; 2: >1 fish month^{-1}; 1: >1 fish year^{-1}; 0: not present); expected change in the population size after integration of the floodplain to the river corridor (+: increase; 0: no change)]

Species name	Abundance	Life cycle	Spawning habitat	Expectation
Abramis brama	3	E	plant or substrate	+
Acipenser sturio	0	RA	gravel	0
Alosa alosa	0	RA	gravel	0
Alosa fallax	0	RA	midwater	0
Anguilla anguilla	4	E	ocean	0
Coregonus oxyrinchus	0	RA	midwater	0
Esox lucius	0	E	plant	+
Gasterosteus aculeatus	4	E	nest	+
Gymnocephalus cernuus	2	E	gravel	+
Lampetra fluviatilis	1	RA	gravel	0
Leuciscus idus	1	RB	plant or substrate	+
Liza ramada	1	RC	ocean	0
Osmerus eperlanus	3	RC	sand	0
Perca fluviatilis	3	E	plant or substrate	+
Petromyzon marinus	0	RA	gravel	0
Platichthys flesus	4	RC	ocean	+
Pungitius pungitius	1	E	nest	0
Rutilus rutilus	3	E	plant or substrate	+
Salmo salar	0	RA	gravel	0
Salmo trutta	0	RA	gravel	0
Silurus glanis	0	E	soft bottom	0
Stizostedion lucioperca	2	E	nest	0

Future development of the fish community

We expect that the floodplain will autonomously develop into a fish nursery as long as permanent aquatic habitats are provided: small ponds and creeks are refugia to which juvenile fishes withdraw once the flood water is drained to the main river channel. The increased availability of spawning and nursery habitat is predicted to result in a notable increase of the total fish density in the oligohaline and freshwater parts of the estuary. The addition of inundated areas to the stream corridor particularly favours RB species such as ide (*Leuciscus idus*), which is now virtually absent in the Scheldt Estuary. Measures that support the recovery of the ide population may therefore be successful.

However, not all species are likely to increase in abundance. Anadromous fish such as *Lampetra fluviatilis* and salmonid species will not benefit from increased habitat diversity since their distribution is limited to the main river channel.