

2522 Sichel

*Pelecus cultratus* (Linnaeus, 1758)



Photo. 1. Sichel (photo by T. Kuczyński)

## I. INFORMATION OF SPECIES

### 1. Systematic affiliation

Order: Cypriniformes

Family: Cyprinidae

### 2. Legal status and threat to the species

#### International law

Habitats Directive - Annexes II and V

Bern Convention - Annex III

#### National law

Species protection - is subject to species protection (partial protection), individuals from outside the Vistula Lagoon population

#### Category of threat IUCN

IUCN Red list – LC (Least Concern ver. 3.1), (Freyhof and Kottelat, 2008)

Red list of lamprey and fish - CR E (Critically Threatened), (Witkowski et al. 2009)

Polish Red Book of Animals. Vertebrates - NT (lower risk, but close to be threatened), (Głowaciński 2002)

### 3. Species description

The sichel is an anadromous fish, the Cyprinidae family, reaching a maximum length of 50 cm and a body mass of 1 kg, the most common are individuals approx. 35 cm long and weighing up to 400 g. The body is laterally flattened, elongated, not too high with a horizontal back line. The abdomen's edge is arched and squeezed into a distinct "sharp" scale-free keel. The characteristic are irregular collateral line and the mouth in the upper position. The coloration of the back is dark, the sides of the body and the abdomen is silver, fins are grey (Terlecki 2004).

#### 4. Biology of the species

The sichel is considered to be a river species, reophyllous characteristic of the lower estuaries of large rivers. It also occurs in bays and sea lagoons with salinity up to 5. During the breeding period, when the temperature varies between 15-20°C, it forms large spawning concentrations. The spawning itself takes place mainly in rivers. When water reaches 19°C, the embryo develops around 3.5 days. Fry and adult individuals, whose body length reaches up to 20 cm, feed on small crustaceans, insect larvae and small fish, become optional predators (Terlecki 2004).

#### 5. Habitat conditions

The sichel prefers the estuaries of large river systems, however, it is also found in the very riverbed of large rivers. In the open waters of coastal lagoons, it inhabits the pelagic zone (Terlecki 2004). Habitat requirements related to reproduction are poorly recognized. Due to the pelagic spawn, the spawning substrate requirements are irrelevant. Significant water pollution and transverse watercourse construction can prevent migration to spawning grounds and reproduction.

#### 6. Species distribution

The area of occurrence of sichel is the catchment areas of the Caspian Sea, the Black Sea and the Eastern Baltic Sea, which is the western limit of its range. In the Polish waters, this species forms a strong and stable population in the Vistula Lagoon, where it is caught by both Polish and Russian fishermen (Psuty and Wilkońska 2009, Psuty 2010, 2012). In addition, sporadically is recorded in the coastal lakes and Szczecin Lagoon. Historical sources (Demel 1925 after Seligo 1902) indicate the occurrence of a sichel at the mouth of the Vistula River. Probably, however, Seligo (1902) referred to the state before the change in water regime in the whole Vistula delta at the turn of the 19th century. Recent studies in the area of the Vistula estuary did not confirm the occurrence of the sichel in Wisła Śmiała, Martwa Wisła and Wisła Przekop (PROEKO 2011, Kuczyński and others 2013, Grochowski et al. 2012).

## II. METHODS

#### 1. Concept of species monitoring

Monitoring of the sichel, due to the concentration of the population of this species in Poland in the area of the Vistula Lagoon, bases on the characteristics of this site. It should be conducted using relatively simple methods as least invasive to fish and their habitat. Due to the specificity of the reservoir and fish stocks, research fishing should be performed by specially designed net for fishing spawners. In addition, for the purpose of assessing the condition of the species, the data of the State Environmental Monitoring performed in the transitional water body of the Vistula Lagoon (PLTW I WB 1) should be used to assess the ecological status of the water body for the purpose of the Water Framework Directive (WFD).

#### 2. Indicators and assessment of the conservation status of the species

##### Population status indices

The table (Table 1) presents indicators for the assessment of the status of the sichel 'Population' parameter, while the table (Table 2) presents the method of valorisation of these indicators.

*Table 1. Indicators for assessing the status of the sichel 'Population' parameter*

Indicator	Unit	Indicator description
Number of individuals migrating	NPUE	number of individuals determined on the basis of net catch

Indicator	Unit	Indicator description
for spawning		
Age structure	size classes [cm]	index based on the presence of 3 age classes of adults (ADULT, > 25 cm), juvenile, before puberty (JUV, 25-10 cm) and young in the first year of life (YOY, <10 cm), based on total length measurements
Share in fish community	%	sichel share in the total number of caught fish

Table 2. Valorisation of indicators for assessing the status of the sichel 'Population' parameter

Indicator	Assessment		
	FV favourable status	U1 unfavourable inadequate status	U2 unfavourable bad status
Number of individuals migrating for spawning	if the value is >20	if the value is in the range 20-10	if the value is <10
Age structure	ADULT, JUV individuals are present	ADULT individuals are present	JUV individuals are present or missing
Share in fish community	share >3%	share within range 3–1%	share <1%

### Habitat status indicators

The table (Table 3) presents the indicators for the assessment of the status of the parameter 'Habitat', whereas the table (Table 4) presents the method of valorisation of these indicators.

Table 3. Indicators for the assessment of the status of the sichel 'Habitat' parameter

Indicator	Unit	Indicator description
SI	-	currently applicable indices of ecological status / potential of transitional and coastal waters based on ichthyofauna research for JCWP PLTW I WB 1
Patency of migratory routes	-	indicator based on the inventory of migration barriers, such as: clogged / non-functional fish passes, bridges / anthropogenic development of banks causing intensive vibration, noise and light, fishing gear, poaching

Table 4. Valorisation of indicators for the assessment of the status of the sichel 'Habitat' parameter

Indicator	Assessment		
	FV favourable status	U1 unfavourable inadequate status	U2 unfavourable bad status
SI	status Good or Very Good (after WFD)	status moderate (after WFD)	status poor or bad (after WFD)
Patency of migratory routes	no migration barriers to the spawning grounds	periodically migration barriers to the spawning grounds	durable migration barriers to the spawning grounds

### **Conservation prospects**

Evaluation of the prospects for protection of the species in the site is a forecast of the population status of the species and the condition of its habitat in the next 10-15 years. It is an expert judgement taking into account the current population status (if assessed) and species habitat as well as all current impacts and anticipated threats that may affect the future status of the population and habitat in the surveyed site. The parameter should be evaluated in the context of the condition of the population and the habitat for as long as possible for which data or observations exist. When assessing the prospects for protection of sichel, it is necessary to analyse the pressures from commercial fishery operating on the Vistula Lagoon based on fishing statistics. However, the basic element of the assessment should be the analysis of potential predicted changes in the habitat that may have a negative impact on the population of the sichel, in particular referring to the possibility of effective spawning. The increase of salinity and suspended matter in water that prevent the development of pelagic spawn and barriers to spawning migration should be considered as elements negatively influencing the assessment of protection prospects.

Conservation prospects can be assessed as good (FV), when we predict that in the perspective of 10–15 years the currently observed condition of the species will improve. The unsatisfactory perspective for species (U1) can be assessed when we predict that the currently assessed condition will not change. Perspectives of preserving can be assessed as bad (U2) if we predict that the currently observed bad state (U2) will not improve, or that as a result of negative impacts or planned projects it will continue to deteriorate.

### **Overall assessment**

The overall assessment of the conservation status of a species is synonymous with the lowest rating from among the three assessed parameters: 'Population', 'Habitat' and 'Conservation prospects'. The diagram of aggregation of indicators and parameters to assess the state of protection of the sichel is presented in the figure (Fig. 1).

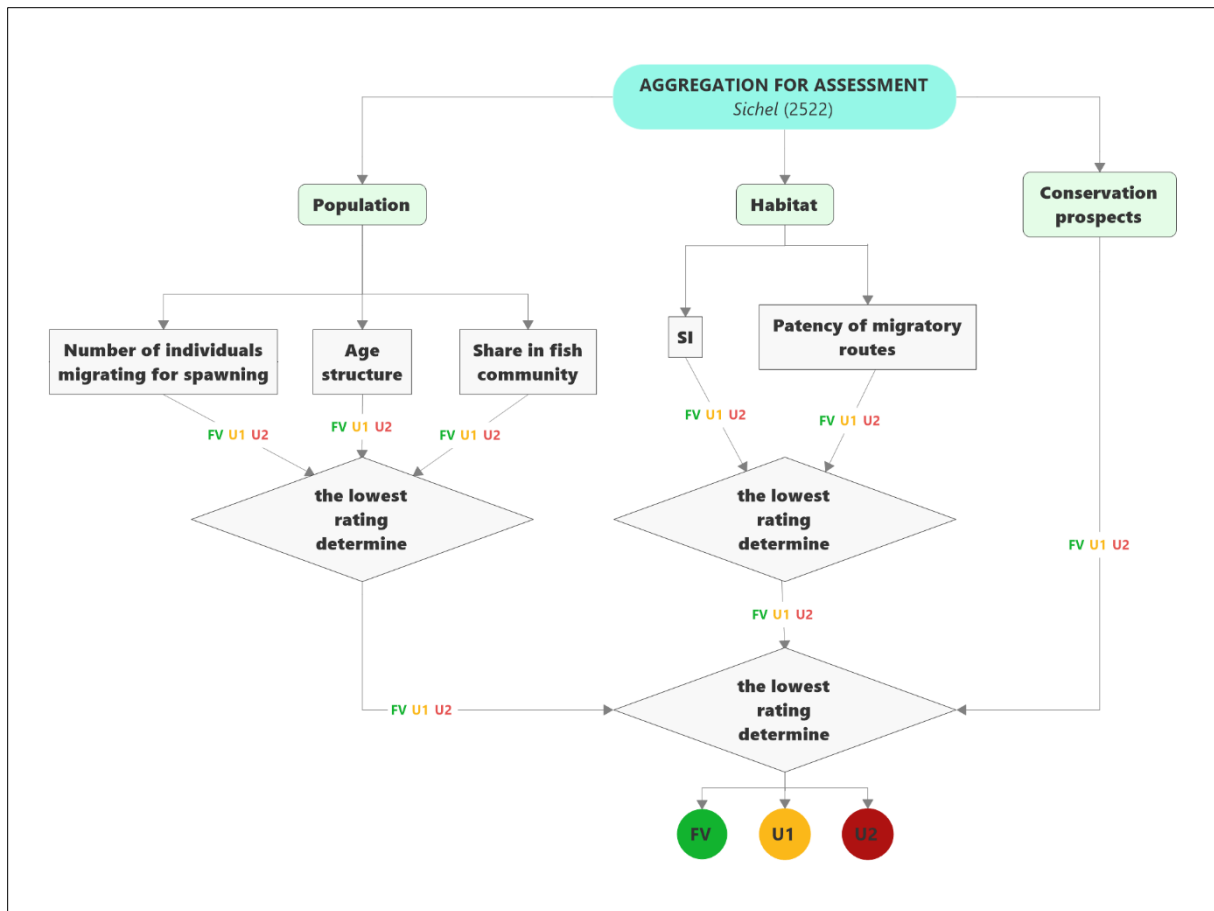


Fig. 1. Diagram of aggregation of indicators and parameters to assess the state of protection of the sichel

### 3. Description of monitoring

#### Selection of monitoring stations

Monitoring of the sichel regarding the spawner fishing should be carried out on within the site covering the Vistula Lagoon (one station) and the Elbląg River (two stations), (Figure 2). The population of the sichel is also assessed on the basis of data the State Environmental Monitoring according to WFD stations located in the area of the Vistula Lagoon.

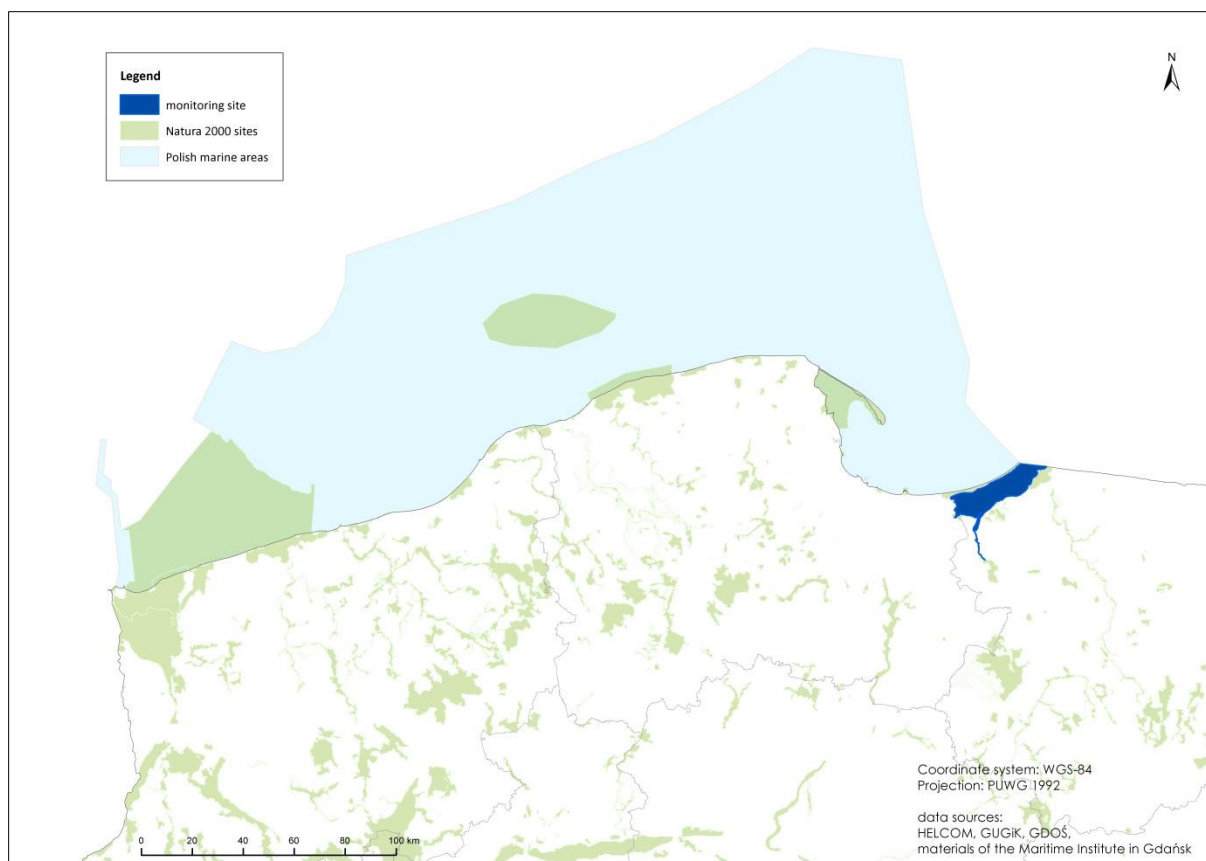


Fig. 2. Sites for the sibel monitoring

## 4. The method of investigation

### Determination of population status indicators

#### Presence of individuals migrating for spawning

Catches to determine the number of individuals in the spawning run should be performed in the places where the shoal is formed on entering the Elbląg River, i.e. in the Elbląg Bay and the Elbląg River. Fishing of spawners should be done with specially designed gillnet. It is a surface net consisting of panels of various mesh sizes. It catches the adult sibel and limits by-catch of other fish species that may significantly disturb the spawner catch. A set of these pelagic panel nets should be exposed at night for 12 hours. After collecting nets, species composition and catch size should be determined. The length measurements should be made to the nearest 0.5 cm.

The index assessment is based on the number expressed in the unit specifying the number of individuals per fishing effort (NPU). The highest fishing result for a single net, which was recorded during one of the research campaigns, is taken into account.

#### Age structure

The age structure is calculated based on two types of data. The first of these is data obtained from the monitoring of spawners in which the age structure is determined based on the body length of the fish caught, divided into three categories: YOY (<10 cm), JUV (25-10 cm) and ADULT (> 25 cm). The second type of data regarding fish length measurements is obtained from the State Environmental Monitoring (SEM) according to WFD.

## **Share in fish community**

To determine the share of the sichel in the fish community, the SEM data on species structure should be used, acquired as part of research fisheries using the standard Nordic type net method.

## **Determination of the habitat status indicators**

### **Status/ecological potential of coastal and transitional waters based on ichthyologic studies**

The assessment is based on the assessment of the current index being a component of the assessment for PLTW I WB 1 as part of the SEM. The assessment of the water body is carried out in accordance with the current Regulation of the Minister of Environment *on the method of classification of the surface water bodies and environmental quality standards for priority substances*.

### **Patency of migratory routes**

During the research of spawners, it is necessary to assess the migration barriers, such as: clogged / non-functional fish passes, bridges / anthropogenic development of banks causing intense vibrations, noise and light, fishing gear, poaching.

## **5. The date and frequency of investigations**

Research aimed at the migrating population (research on spawners) should be carried out once every 3 years, five times during the intensive spawning migrations period of the sichel, i.e. at the turn of March and April.

## **6. Equipment and materials for investigations**

Panel pelagic nets of the total length of 45.6 m and a height of 0.5 m - for fishing of migrant individuals. Panels of 5.7 m lengths should have a differentiated mesh size: 30 mm, 42 mm, 15 mm, 35 mm, 10 mm, 20 mm, 50 mm and 25 mm.

## **7. Examples of sichel research forms**

Fishing form		
Name of site: <i>Zalew Wiślany z rzeką Elbląg</i>		
Way of fishing (mark X):	<input checked="" type="checkbox"/> X from boat	<input type="checkbox"/> wading
type of device):	<i>sichel gillnet</i>	

No.	Station	Depth [m] <sup>1</sup>		Start date	Hour	Initial position		Final position <sup>2</sup>		Date of completion	Hour	Threats/remarks
		P	K			Latitude	Longitude	Latitude	Longitude			
1.	<i>Rzeka Elbląg 3</i>	<i>1,3</i>		<i>2016-03-22</i>	<i>18:20</i>	<i>53,7777</i>	<i>19,2222</i>			<i>2016-03-24</i>	<i>7:15</i>	
2.	<i>Rzeka Elbląg 4</i>	<i>1,0</i>		<i>2016-03-22</i>	<i>18:50</i>	<i>53,7633</i>	<i>19,2111</i>			<i>2016-03-24</i>	<i>8:00</i>	

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<sup>1</sup> P – initial depth, K – final depth in case of electrofishing, for other devices only for P

<sup>2</sup> For trap devices do not fill!



Observation and measurement form	
Name of site: <i>Zalew Wiślany z rzeką Elbląg</i>	

No.	Station	Date	Hour	Weather conditions		Water parameters			
				Temp [°C]	Clouds [8/8]	Temp [°C]	O <sub>2</sub> [mg/l]	O <sub>2</sub> [%]	Salinity[PSU]
1.	<i>Rzeka Elbląg 3</i>	<i>2016-03-23</i>	<i>18:20</i>	<i>7,3</i>	<i>7</i>	<i>5,2</i>	<i>7,6</i>	<i>87,6</i>	<i>2,2</i>
2.	<i>Rzeka Elbląg 4</i>	<i>2016-03-23</i>	<i>18:50</i>	<i>7,1</i>	<i>7</i>	<i>5,2</i>	<i>7,7</i>	<i>95,9</i>	<i>2,5</i>

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Analysis form											
Station		Rzeka Elbląg 3				Date 2016-03-24					
Species				Species				Species			
Lt [cm]				Lt [cm]				Lt [cm]			
0,5				18,0	I			35,5			
1,0				18,5				36,0			
1,5				19,0				36,5			
2,0				19,5				37,0			
2,5				20,0				37,5			
3,0				20,5				38,0			
3,5				21,0				38,5			
4,0				21,5				39,0			
4,5				22,0				39,5			
5,0				22,5				40,0			
5,5				23,0				40,5			
6,0				23,5				41,0			
6,5				24,0				41,5			
7,0				24,5				42,0			
7,5				25,0				42,5			
8,0				25,5				43,0			
8,5				26,0				43,5			
9,0				26,5				44,0			
9,5				27,0				44,5			
10,0				27,5				45,0			
10,5				28,0				45,5			
11,0				28,5				46,0			
11,5				29,0				46,5			
12,0				29,5				47,0			
12,5				30,0				47,5			
13,0				30,5				48,0			
13,5				31,0				48,5			
14,0				31,5				49,0			
14,5	II			32,0				49,5			
15,0				32,5				50,0			
15,5	II			33,0				50,5			
16,0				33,5				51,0			
16,5				34,0				51,5			
17,0	III			34,5				52,0			
17,5				35,0				52,5			
<b>Uwagi:</b>  Leszcz: 5											

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## 8. Species protection

The sichel (excluding the population from the Vistula Lagoon) is a species covered by partial species protection, according to the regulation of the Minister of the Environment of 16 December 2016 on species protection of animals (OJ 2016 item 2183) and is an important species for the EU, whose protection requires the designation of special protection areas listed in Annex II of the Habitats Directive (Council Directive 92/43 / EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora).

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