

## 1149 Spined loach

*Cobitis taenia* (Linnaeus, 1758)



Photo 1. Spined loach (photo by T. Kuczyński)

The following methodology for studies of the spined loach in brackish water is supplementation of the spined loach methodology described in the Methodological guide (Mazurkiewicz 2012) for individuals found in inland freshwater.

### 1. Species distribution

The spined loach is a common species in the Polish waters. The range of its occurrence covers the whole region of the country, excluding the southern mountainous and foothill areas. It inhabits stagnant and flowing waters with a small water flow up to 0.15 m/s. The spined loach is characterized by high tolerance to salinity, hence it is also found in brackish water. In the northern part of Poland, it is observed along the whole coastline, in most coastal lakes, the Szczecin Lagoon and the Vistula Lagoon.

## I. METHODS

### 1. Concept of species monitoring

Currently, the monitoring methodology for the spined loach is based on the general method of fishing according to the Water Framework Directive based on electrofishing (Makomaska-Juchiewicz and Baran 2012). This methodology is used in rivers or canals, however, the possibility of using it in stagnant waters such as lakes or reservoirs is practically limited. Electrofishing should be excluded from this monitoring, because area of the research in coastal waters is characterized by significant fluctuations in salinity. Monitoring in these waters should coincide with the monitoring proposed for streams including the assessment of population and habitat status. At the same time, the research methods should be relatively simple and possibly no invasive for fish and their habitat. So far, general concept of monitoring for fish species living in the stagnant water has not been developed. These requirements of the monitoring are only accomplished for the lake minnow, because it is based on catches with minnow traps. Therefore, it is proposed to replace electrofishing method by minnow traps. Monitoring should be carried out during the period of the greatest fish activity that will allow for their potential catch in traps.

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

### Population status indicators

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

Table 1. Indicators for assessing the status of the spined loach 'Population' parameter

Indicator	Unit	Indicator description
Abundance	mean NPUE	number of individuals determined based on catches with the minnow traps
Age structure	length class [cm]	indicator based on the occurrence 3 age classes of adults (ADULT, >6 cm), immature juveniles (JUV, 6-4 cm) and young-of-the-year (YOY, <4 cm), based on the total length of caught fish

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

Indicator	Assessment		
	FV favourable conservation status	U1 unfavourable inadequate status	U2 unfavourable bad status
Abundance	if the value is >20	if the value is in the range 20–1	lack of individuals
Age structure	3 age stages are observed	2 age stages are observed	1 age stages is observed

### Habitat status indicators

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

Table 3. Indicators for assessing the status of the spined loach 'Habitat' parameter

Indicator	Unit	Indicator description
Sediment structure in the coastal zone	%	psammolittoral contribution in the coastal zone up to 1.5 m in depth

Table 4. Valorization of indicators for assessing the status of the spined loach 'Habitat' parameter

Indicator	Assessment		
	FV favourable conservation status	U1 unfavourable inadequate status	U2 unfavourable bad status
Sediment structure in the coastal zone	sand contribution >50%	sand contribution within a range of 50–30%	sand contribution <30%

### Conservation prospects

Assessment of the conservation prospects of the species on the site is a prediction of the population and habitat status in the perspective of the next 10–15 years. This is an expert method that takes into consideration the current population (if it has been assessed) and habitat status of the species as well as all current impacts and anticipated threats that may affect the future status of the population and the habitat on the surveyed site. The parameter should be assessed in the context of the population and habitat status for the longest possible period for which data and observation data are

available. Important fact for assessing of the conservation status for the spined loach is that population indicators may change significantly. Therefore, the downward trend observed between follow-up monitoring studies assessed as U1 or even U2 will not be determination of the conservation prospects.

Conservation prospects can be assessed as favourable (FV) if in the perspective of 10–15 years the currently observed species status FV will persist or if the unfavourable inadequate status (U1) will improve. The unfavourable inadequate status (U1) of the species' behaviour can be assessed when we predict that due to negative impacts or planned projects, the currently assessed favourable status may deteriorate or the unfavourable inadequate status will not change. Conservation prospects can be assessed as unfavourable bad (U2) if we predict that the currently observed status will not improve and the unfavourable inadequate status of the species (U1) will deteriorate or the current favourable status will significantly deteriorate.

### Overall assessment

Overall assessment of conservation status of species is determined according to lowest assessment from among the three parameters: 'Population', 'Habitat' and 'Conservation prospects'. Scheme of assessment aggregation of indicators and parameters of the conservation status for the spined loach is presented in the figure (Fig. 1).

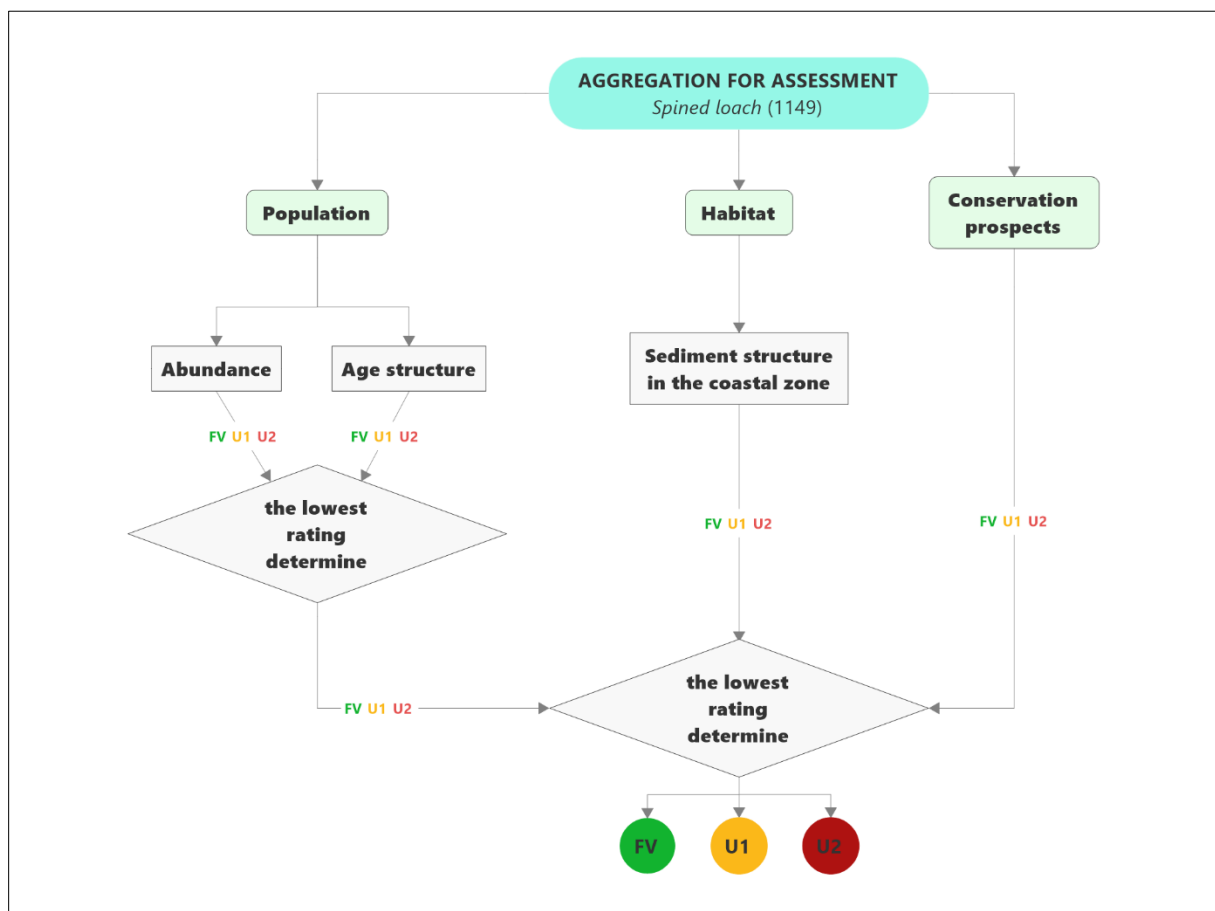


Fig. 1. Diagram of aggregation of indicators and parameters to assess the state of protection of the spined loach

### 3. Description of monitoring studies

#### Selection of monitored stations

In the 'Monitoring of marine species and habitats' the research sites for the spine loach are: Szczecin Lagoon (Stepnicka Bay), Vistula Lagoon (Nogat mouth) and Gardno Lake (Fig. 2). Research catches should be carried out at 3 to 5 selected stations located in the littoral zone due to the large surface of water area designated as a monitoring sites for the spined loach.

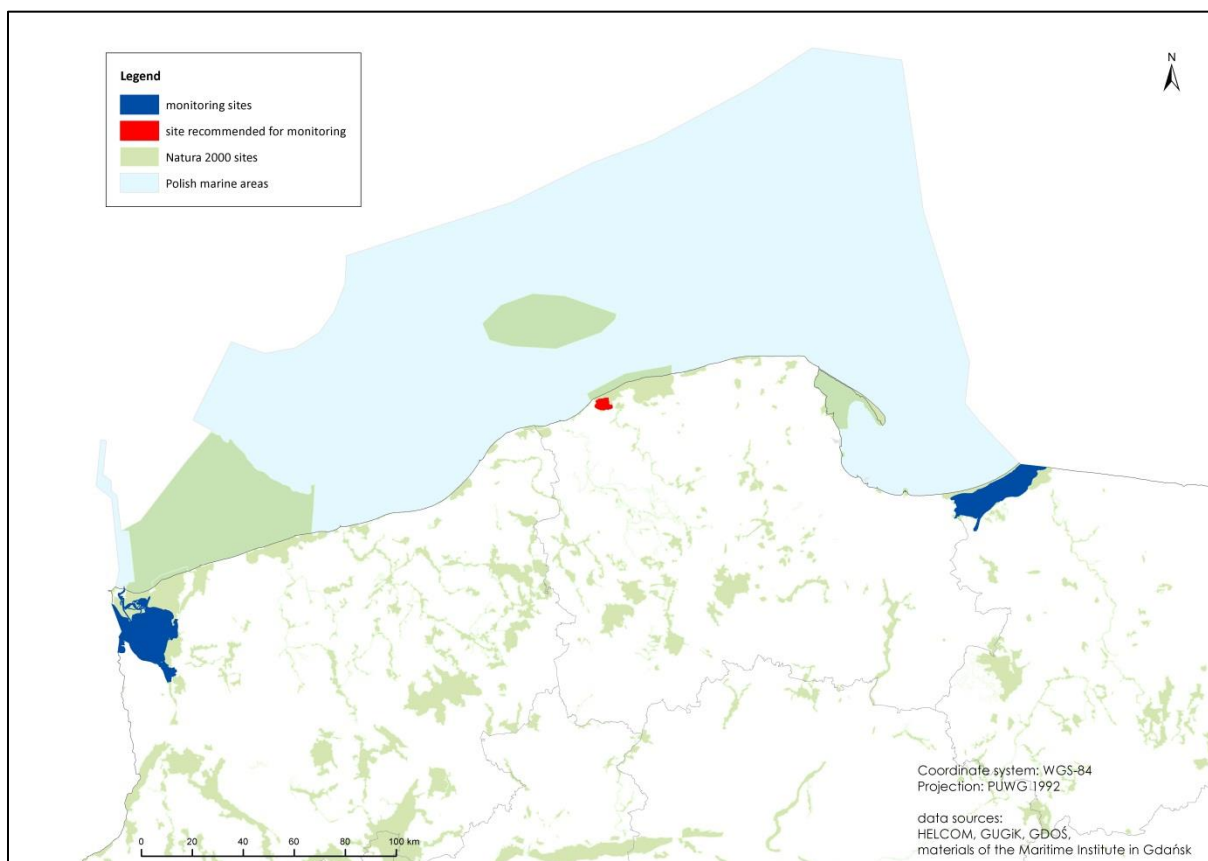


Fig. 2. Sites for the spined loach monitoring

### 4. The method of investigation

#### Determination of population status indicators

The basis for determining the population status of the studied species are results of abundance (averaged for the station) and body length of fish obtained from research catches at selected stations using a set consists of 10 minnow traps exposed for 12 hours at night. After removal of the traps, the species composition and number of individuals in the catch should be determined. It is necessary to conduct vital length measurements of the fish with an accuracy of 0.5 cm, rounded down. After measurement, the fish should be released into the water. The age structure is determined based on the body length of the caught fish classified into three categories: YOY (<40mm), JUV (40-60mm) and ADULT (> 60mm).

#### Determination of the habitat status indicators

There is no a specific research methodology for lakes, e.g. hydromorphological quality in contrast to flowing waters. The classification of lakes in view of abiotic factors is not relevant for the spined loach. One indicator, i.e. type of the bottom substrate in the littoral zone, was selected for assessing of the spined loach. This factor may determine the occurrence of the spined loach at the selected

station because of behaviour of this species. It often submerges in the substrate and rests. The value of the indicator is estimated using the expert method, during direct observation from the boat or wading at the station. If it is not possible to determine the type of sediment by visual observation then a sample of the sediment should be taken using the bottom sediment grab to assess its type.

## 5. The date and frequency of investigations

Monitoring should be carried out once in a three-year period from May to June.

## 6. Equipment and materials for investigations

The minnow traps should be used for monitoring catches. The body size of a single trap is 0,5x0,5x1 m. The trap is made of knotless net with mesh sizes smaller than 5mm. The trap has two inlets of 15 cm in diameter placed in opposite sides. One set consists of 10 traps connected by means of a rope with floats. The distance between the traps should be 5 m.

## 7. Examples of spined loach research forms

Fishing form		
Name of a site: <i>Zalew Wiślany</i>		
Setting method (mark X):	<input checked="" type="checkbox"/> from the boat	<input type="checkbox"/> wading
Type of gear:	<i>minnow traps</i>	

No.	Station	Depth [m] <sup>1</sup>		Date of setting / starting	Time	Starting position		Final position <sup>2</sup>		Date of removal/ end	Time	Threats/Remarks
		P	K			Latitude	Longitude	Latitude	Longitude			
1.	<i>Ujście Nogatu 1</i>	<i>0,7</i>	-	<i>2017-06-17</i>	<i>18:45</i>	<i>54,6666</i>	<i>19,0222</i>	-	-	<i>2017-06-18</i>	<i>7:30</i>	-
2.	<i>Ujście Nogatu 1</i>	<i>0,8</i>	-	<i>2017-06-17</i>	<i>18:55</i>	<i>54,6664</i>	<i>19,0233</i>	-	-	<i>2017-06-18</i>	<i>7:50</i>	-

<b>Compiled by:</b>	<b>Checked by:</b>	<b>Approved by:</b>
Date:	Date:	Date:
Signature – full name:	Signature – full name:	Signature – full name:

<sup>1</sup> P – starting depth, K – final depth in case of the electrofishing, for other gears write only for P

<sup>2</sup> For fish traps – Do not fill out!

Analysis form											
Station		Ujście Nogatu 1				Date 2017-06-18					
Species				Species				Species			
Lt [cm]	<i>spined loach</i>	<i>bitterling</i>		Lt [cm]				Lt [cm]			
0,5				18,0				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		II		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				32,0				49,5			
15,0				32,5				50,0			
15,5				33,0				50,5			
16,0				33,5				51,0			
16,5				34,0				51,5			
17,0	III III II			34,5				52,0			
17,5				35,0				52,5			
<b>Remarks:</b>  <i>Round goby: 4</i>											

<b>Compiled by:</b>	<b>Checked by:</b>	<b>Approved by:</b>
Date:	Date:	Date:
Signature – full name:	Signature – full name:	Signature – full name:



Observation and measurement form																							
[1] Name of a site				Zalew Wiślany				Date		2017-06-18				Time									
[2] Station				Ujście Nogatu 1																			
[3] Geographical coordinates						54,6666						19,0222											
[4] Depth				0,6 m				[5] Number of bivalves 1				-				[5] ] Number of bivalves 2				-			
[6] Submerged vegetation				1	x	3	4	[7] Rush and floating vegetation				x	2	3	4	[8] Filamentous algae				0	x	2	
[9] Mud		1	x	3	4	[10] Sand		1	2	x	4	[11] Gravel		x	2	3	4	[12] Stones		x	2	3	4
[13] Threats																							
Remarks																							

<b>Prepared by:</b>				<b>Verify by:</b>				<b>Approved by:</b>			
Date:				Date:				Date:			
Signature – full name:				Signature – full name:				Signature – full name:			

**Necessary measuring instruments:** GPS, measuring staff (2 m), weight with line, camera, frame or Bernatowicz grab, buoy with an anchor;

**Instruction for filling out the form:**

[1] name of a site, example: *Jamno*,

[2] station, example: *Jamno2*

[3] geographical coordinates in WGS 84 form

[4] depth near the buoy measures by measuring staff or weight with line

[5] mark only at the stations for the bitterling

[6] bottom coverage estimated as a percentage [1] up to 25%, [2] 26%-50%, [3] 51%-75%, [4] 76%-100% (circle the number)

[7] water surface coverage estimated as in point [6]

[8] 0- none, 1 – up to 20% of coverage of a bottom substrate, 2 – more than 20% of coverage of a bottom substrate (circle the number)

[9] [10] [11] [12] ] bottom coverage estimated as a percentage as in point [6] determined by the expert method

[13] write codes of the observed threats from the list of the threats

## 8. Other species for which the methodology can be applied

This catch methodology can be used also for the bitterling and the weatherfish in the coastal lakes. However, the methodology of the assessment of the habitat status is characteristic only for one selected species.

## 9. References

Makomaska-Juchiewicz M., Baran P. (red.). 2012. Monitoring gatunków zwierząt. Przewodnik metodyczny. Część III. GIOŚ, Warszawa.

Mazurkiewicz J. 2012. Koza *Cobitis taenia*. W: Makomaska-Juchiewicz M., Baran P. (red.). Monitoring gatunków zwierząt. Przewodnik metodyczny. Część III. GIOŚ, Warszawa, s. 210-222.

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