



Definition of favourable conservation status for Annex IV amphibian & reptile species in Southern Lithuania

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1. *Bufo viridis* – *Bufotes variabilis*

Green toads, commonly known as *Bufo viridis*, have recently been referred to a special genus, *Bufotes*. What was formerly known as the species *viridis* should probably be considered as two species with similar external morphology, *B. viridis* and *B. variabilis*. The one that occurs in the Baltic region, presumably including Lithuania, is *B. variabilis*. It is defined only by mitochondrial DNA. Its main distribution is from western Siberia and Iran to the Middle East and the countries around the Black Sea, with the occurrence in the Baltic region as a more or less separate area.

Within Europe, the species is rare and rapidly declining. Together with *B. viridis*, it is included in the Annex IV of the EU Habitats Directive (92/43/EEC). Such status demands conservation efforts and explicit understanding of the species' habitat requirements to achieve favourable conservation status. The determination of the criteria for assessing the favourable conservation status of *B. variabilis* for Lithuania has been one of the targets of the ECONAT project.

In Lithuania *B. variabilis* breeds in two types of habitats, natural water bodies and human made ponds. The breeding sites must have the following characteristics: full sun exposition, no or little / low vegetation, no fish. Preferably, there should be larger areas with sun exposed shallow water. The natural breeding habitats consist of floodzones along meandering rivers and other places where soil material is rearranged by natural forces from year to year. The anthropogenic habitats often consist of artificial lakes, regularly dredged ditches, and ponds such as gravel pits, former fish ponds, cattle ponds within villages. The species can also be found breeding in temporary waters at construction areas and landfill sites and in field floodings. Crucial is absence of higher vegetation. The terrestrial habitat in the neighboring areas of the breeding site has to be open. The species does not tolerate dense forest in the vicinities of the breeding site.

The criteria for the favourable conservation status are as follows:

Bufotes variabilis			
Criteria	"favourable"	"good"	"unfavourable"
Population	Excellent	good	average - bad
Size	> 100 callers / egg strings	20-100 callers / egg strings	<20 callers / egg strings
Structure	reproductional success		no reproduction
Habitat	Excellent	good	average - bad
aquatic			
Number and size of waterbodies	>10 small waterbodies with total surface > 5.000 m ² or 1 big waterbody with total surface >10.000	>5 small waterbodies with total surface >2.500 m ² or 1 big waterbody with total surface >5.000m ²	<5 small waterbodies with total surface <2.500 m ² or 1 big waterbody with total surface <5.000m ²
% of shallow areas (<50cm depth)	>80%	40%-80%	<40%
sun exposition in %	100 %	90-100 %	<90%
% cover emergent vegetation	0 - 5 %	5%-20%	>20%
% cover submerge vegetation	0-10 %	10-90 %	> 90%
Drying out of pond	Semi-permanent, dries out in late summer in some years	1) permanent 2) Dries out before mid July in some years	1) permanent 2) Dries out before mid July in most years
terrestrial			
presence of hiding places (crevices, holes, stone heaps etc.)	Many hiding places at buildings, between stones, in heaps of dung or rubbish, or by digging holes in south facing slopes	Few such hiding places	No obvious hiding places. Areas around buildings are tidy and clean.
Presence of area with bare / scattered vegetation / ruderal areas / traditional village structures within 1 km radius around pond	>50% cover of area within 200 m radius	Several places within 1 km radius	Few or no places within 1 km radius
connectivity			
distance to the next population	<1.500 m	1.500m to 3.000m	>3.000 m
Threats	None	average	strong
aquatic			
presence of fish	None	Few small fish (sticklebacks)	yes
Growing in	No swamp / reed vegetation, due to grazing or newness	Scattered or low swamp /reed vegetation	Extensive reed vegetation
terrestrial			
Growing in	Many patches without vegetation	Few bare patches, most of the area grown in with grass or herbs	Much of the area grown in with grass or herbs, the rest shaded by bushes and trees
Roads or car traffic within 50 m of terrestrial habitat	None	Roads with a little local traffic < 30 cars per night	> 30 cars per night
connectivity			
isolation due to landuse in the assumed direction of migration ¹⁾	0% to 10% blocked	10% to 50% blocked	>50% blocked

¹⁾ isolation caused by dense forest, city areas, larger roads, dense shrubs etc.

2. Bufo calamita - Epidaleia calamita

The natterjack toad is found in southern, western and northern Europe, ranging from Portugal and Spain, north to Denmark, southern Sweden, and as far east as western Ukraine, Belarus, Latvia and Estonia. The species is locally abundant across much of its range, especially in southern Europe. In the northern parts of its range, it is much more rare and the local populations are declining. This has led to an inclusion of the species on the Annex IV of the EU Habitats Directive (92/43/EEC).

The species is related to open landscapes. In Lithuania *B. calamita* inhabits two types of habitats, natural water bodies and human made ponds. In general the species prefers very shallow water bodies that dry out after the start of July. The yearly desiccation provides water with few predators and competitors. It does not tolerate that the water contains fish or is partly shaded by woody vegetation. The natural breeding habitats consist of floodzones along meandering rivers, seasonally flooded meadows, coastal meadows and shallow shore zones along larger lakes. The anthropogenic habitats mostly consist of ditches and gravel pits. But the species can also be found breeding in temporary waters at construction areas and landfill sites and in field floodings. The terrestrial habitat in the neighboring areas of the breeding site has to be open and often consist of short grazed dry meadows. The species does not tolerate dense forest in the vicinities of the breeding site.

The criteria for the favourable conservation status are as follows:

Epidalea calamita			
Criteria	"favourable"	"good"	"unfavourable"
Population	Excellent	good	average - bad
Size	> 100 callers / egg strings	20-100 callers / egg strings	<20 callers / egg strings
Structure	reproductional success		no reproduction
Habitat	Excellent	good	average - bad
aquatic			
Number and size of waterbodies	>10 small waterbodies with total surface > 5.000 m ² or 1 big waterbody with total surface >10.000	>5 small waterbodies with total surface >2.500 m ² or 1 big waterbody with total surface >5.000m ²	<5 small waterbodies with total surface <2.500 m ² or 1 big waterbody with total surface <5.000m ²
% of shallow areas (<25cm depth)	>80%	40%-80%	<40%
sun exposition in %	100 %	90-100 %	<90%
% cover emergent vegetation	0 - 20 %	20%-50%	>50%
Drying out of pond	Temporary, dries out in mid or late summer	1) semi-permanent, dries out in late summer in some years 2) Dries out before mid June in some years	1) permanent 2) Dries out before mid June in most years
terrestrial			
Presence of wood / forest within 1 km radius around breeding site	No wood or forest	No wood or forest within 300 m radius	No wood or forest within 30 m radius
Presence of area with bare / scattered vegetation / ruderal areas / short grass within 1 km radius around breeding site	>50% cover of area within 200 m radius	Several places within 1 km radius	Few or no places within 1 km radius
connectivity			
distance to the next population	<1.500 m	1.500m to 3.000m	>3.000 m
Threats	None	average	strong
aquatic			
presence of fish	None	Few small fish (sticklebacks)	yes
Growing in	No swamp /reed vegetation, but flooded grass	Scattered or low swamp /reed vegetation	Extensive / dense reed vegetation
terrestrial			
Growing in	Short grass vegetation with patches without vegetation	Not very short grassy vegetation with few bare patches	Much of the area grown in with grass or herbs, the rest shaded by bushes and trees
Roads or car traffic within 50 m of terrestrial habitat	None	Roads with a little local traffic < 30 cars per night	> 30 cars per night
connectivity			
isolation due to landuse in the assumed direction of migration ¹⁾	0% to 10% blocked	10% to 50% blocked	>50% blocked

¹⁾ isolation caused by dense forest, city areas, larger roads, dense shrubs etc.

3. *Hyla orientalis*

The European treefrogs are divided into several species. In Lithuania occurs the Eastern Treefrog, *Hyla orientalis*. It is distributed from northwestern Poland to the south bank of the Caspian Sea. In Lithuania it occurs naturally only in the very south, where it may have immigrated recently from Belorussia. In addition, the species has been introduced to southwestern Latvia, from where it seems to have spread into northwestern Lithuania.

Together with *Hyla arborea* and other European *Hyla* species, it is listed in the Annex IV of the EU Habitats Directive (92/43/EEC). Such status demands conservation efforts and explicit understanding of the species' habitat requirements to achieve favourable conservation status. The determination of the criteria for assessing the favourable conservation status of *H. arborea* for Lithuania has been one of the targets of the Econat-project.

The species is generally associated with open landscapes, either open broad-leaved forests and shrublands or anthropogenic habitats such as meadows, gardens and orchards. It avoids dense forest and conifer forest. It breeds in small or large water bodies of many different types. The common feature is that they fulfill the following criteria: rather shallow, good sun exposition, good water quality, no fish. Lithuanian breeding sites are often shallow floodings, in fields, meadows or flooded deciduous forest, usually partially grown in with *Carex* or similar plants. If large fish free areas are present a single water body can have a population of more than 100 calling males, and these habitats might act as source populations that supply the neighboring landscape with emigrating tree frogs.

The criteria for the favourable conservation status are as follows:

Hyla orientalis			
Criteria	"favourable"	"good"	"unfavourable"
Population	excellent	Good	average - bad
Size	> 100 callers	20-100 callers	<20 callers
Breeding success: number of tadpoles caught in 30 minutes	> 20	1-20	0
Habitat	excellent	Good	average - bad
Aquatic			
Number and size of waterbodies	>10 waterbodies with total surface > 5.000 m²	>5 waterbodies with total surface >2.500 m²	<5 waterbodies with total surface <2.500 m²
% of shallow areas (<50cm depth)	>50%	25%-50%	<25%
sun exposition in %	>95%	80%-95%	<80%
% cover submerge vegetation	50-90%	90-100 % or 30-50%	<30%
Terrestrial			
% of shrubs, tall flowering vegetation or light forest within 500m around the waterbodies	>50%	20% to 50%	<20%
Connectivity			
distance to the next population	<1.000 m	1.000m to 2.000m	>2.000 m
Part of a metapopulation ?	Yes, clearly part of a metapopulation with a total of > 5000 calling males	Some contact to a larger metapopulation	Isolated
Threats	none	Average	strong
Aquatic			
presence of fish	none	None	yes
other (e.g. pollution, threat of filling in etc.)	on site expertise from herpetologist		
Terrestrial			
Anticipated changes in tree cover	Mixed structure of open land and tree/bush stands will remain	Trees are gradually growing up, shading gradually more	Large open areas will be planted with trees
other (e.g. roads, pollution etc)	on site expertise from herpetologist		
connectivity			
isolation due to landuse in the direction of migration ¹⁾	0% to 25% blocked	25% to 99% blocked	100% blocked

¹⁾ isolation caused by dense forest or city areas

4. *Pelobates fuscus*

The spadefoot toad *Pelobates fuscus* is distributed in the plains and hills of Central, Eastern and Southeastern Europe. The northern margin of the range is in south Sweden and in the Baltic states and Russia, where the distribution is unclear in its eastern part but known to occur as far north as Rakvere in Estonia and Sct Petersburg in Russia. The species is listed in the Annex IV of the EU Habitats Directive (92/43/EEC). Such status demands conservation efforts and explicit understanding of the species' habitat requirements to achieve favourable conservation status across the EU. The determination of the criteria for assessing the favourable conservation status of *P. fuscus* for Lithuania has been one of the targets of the Econat-project.

Pelobates fuscus inhabits a wide spectrum of habitats; these include different coniferous, deciduous and mixed forests and parks, but in forests only the relatively open parts and their edges. More typically, it lives in open land, in cultivated fields, dry grassland meadows, and vegetable gardens. The daytime is spent buried in the ground, and if only the soil is not very hard to dig, it needs no further hiding places.

The breeding sites are various types of water bodies. The common feature is that they fulfill the following criteria: good sun exposition, good water quality, no fish. They can be deep (several meters) or very shallow (20 cm). Shallow parts with flooded grass is often favourable. The tadpoles grow to a large size and do not metamorphose before the end of July. Therefore, the water must not dry out before that.

It is usually not possible to estimate the population size, because the calling is so weak that smaller males, or males in deep parts of the pond, cannot be heard at all by the human ear. Only by the use of underwater microphones can they be recorded. Probably males stop calling once they have mated. Egg strings are often difficult to find and therefore unsuited for monitoring. Small-medium size tadpoles may be caught rather easily, but large tadpoles (from mid June onwards) are fast and shy and difficult to find.

The criteria for the favourable conservation status are as follows:

Pelobates fuscus			
Criteria	"favourable"	"good"	"unfavourable"
Population	Excellent	good	average - bad
Size	No easy method of recording		
Structure	Tadpoles can be caught in the water		no reproduction
Habitat	Excellent	good	average - bad
aquatic			
Number and size of waterbodies	>10 waterbodies with total surface > 5.000 m ²	>5 waterbodies with total surface >2.500 m ²	<5 waterbodies with total surface <2.500 m ²
sun exposition in %	>95%	80%-95%	<80%
% cover submerge vegetation	50-90%	30-50% or 90%-95%	<30% or >95%
terrestrial			
Soil type	Easy to dig in, e.g. sandy loam, garden mull	Less easy to dig in, e.g. clayey loam, or top soil covered with dense network of grass roots	Difficult to dig in, e.g. dense clay or heavily grazed soil with a hard crust dried in the sun
connectivity			
distance to the next population	<300 m	300 m to 600 m	>600 m
Threats	None	average	strong
aquatic			
presence of fish	None	none	yes
Eutrophication	Good water quality	Plant and animals species requiring very good water quality are absent	Plant and animal species requiring fair water quality are absent
terrestrial			
Roads	< 10 cars per night	10 to 30 cars per night	> 30 cars per night
connectivity			
isolation due to landuse in the direction of migration ¹⁾	0% to 10% blocked	10% to 25% blocked	>25% blocked

¹⁾ isolation caused by dense forest or city areas

5. *Rana arvalis*

The moor frog is found throughout most of the northern, central, and eastern parts of Europe, eastwards far into Siberia east of 120° E. In Europe it is typically a lowland species found at altitudes below 1,000m asl. Except near the border of distribution, the species is generally common and abundant. However in highly intensified agricultural areas the species populations are declining and the remaining populations are left fragmented in the landscape. The species is listed in the Annex IV of the EU Habitats Directive (92/43/EEC). Such status demands conservation efforts and explicit understanding of the species' habitat requirements to achieve favourable conservation status. The determination of the criteria for assessing the favourable conservation status of *R. arvalis* for Lithuania has been one of the targets of the Econat-project.

R. arvalis occurs in a wide variety of habitats including forest, dry grasslands landscapes, forest edges and fens, swamps, peatlands, moorlands, meadows, fields, bush lands, and gardens. It breeds in a wide variety of water bodies, including ponds, swamps, puddles, and ditches. The species can be found in agricultural landscapes, however it is essential that proper foraging areas are found close to the breeding habitats. In larger waters the species aggregate and sometimes establish a choir of calling males with up to 10000 individuals.

The crucial feature for the moor frog seems to be a high connectivity in the landscape – breeding sites should be close to each other and make out a suitable migration corridor, e.g. along river valleys.

The criteria for the favourable conservation status are as follows:

Rana arvalis			
Criteria	"favourable"	"good"	"unfavourable"
Population	excellent	good	average - bad
Size	>500 clutches	100 - 500 clutches	< 100 clutches
Structure	reproductional success		no reproduction
Habitat	excellent	good	average - bad
aquatic			
Number and size of waterbodies	>10 small waterbodies with total surface > 5.000 m²	>5 small waterbodies with total surface >2.500 m²	<5 small waterbodies with total surface <2.500 m²
% of shallow areas (<40cm depth)	>70%	40%-70%	<40%
sun exposition in %	>70%	40%-70%	<40%
% cover submerge vegetation	>60%	30% - 60%	>30%
terrestrial			
distance to suitable terrestrial habitats (wet meadows, wet forest >1ha)	0 m	1-200 m	> 200m
Microhabitats / hiding places	Good conditions for hiding in holes, under grass tufts etc., or the soil is peaty or sandy and thereby easy to dig in	Not as good conditions as in previous case	Barren landscape with few hiding places, and the soil not easy to dig in
connectivity			
distance to the next population	<200 m	200 m to 600m	>600 m
Intact corridors of suitable fouraging habitat	Extensive corridor network with contact to all breeding sites	Not all breeding sites in contact with corridors; corridors interrupted over distances of up to 200 m.	Breeding sites not connected via corridors, corridors interrupted over distances of more than 200 m.
Threats	none	average	strong
aquatic			
presence of fish	none	Few fish, but tadpoles may avoid predation by living in dense submerge vegetation	Many fish, and/or few possibilities for tadpoles to hide
Eutrophication	Good water quality	Plant and animals species requiring especially good water quality are absent	direct inflow of eutrophication visible
terrestrial			
loss of good fouraging habitats	no loss of habitats anticipated within the next 5 years	loss of <30% of habitats anticipapted within the next 5 years, corridors will be more broken	loss of >30% of habitats anticipapted within the next 5 years, corridors will be massively broken
other (e.g. roads, pollution etc)	on site expertise from herpetologist		
connectivity			
isolation due to roads in the direction of migration	< 10 cars per night	10 to 30 cars per night	> 30 cars per night
isolation due to landuse in the direction of migration ¹⁾	0% to 10% blocked	10% to 25% blocked	>25% blocked

¹⁾ isolation caused by dry forest, city areas, intensive agriculture etc.

6. *Rana lessonae* / *Pelophylax lessonae*

The pool frog *Pelophylax lessonae* is widely distributed in central Europe, from western France to central Russia.

It rarely occurs in pure populations, but usually together with the hybrid 'species' *Pelophylax esculentus*, which contains chromosomes from *P. lessonae* and from the marsh frog, *Pelophylax ridibundus*. In Lithuania, *P. esculentus* lives as a 'klepton', that is, a systematic unit which cannot exist alone, but only by mating with one of its parent species. For instance, in some mixed populations, if a *P. lessonae* male mates with an *P. esculentus* female, the offspring will be *P. esculentus*; whereas if it mates with a *P. lessonae* female, the offspring will be *P. lessonae*. If a male and a female *P. esculentus* mate, the offspring will die, that is, they can only be reproduced by mating with *lessonae*. This affects the selection pressure in *lessonae*, favouring those genes which function well in an *esculentus* individual. In pure *lessonae* populations, the selection pressure will be somewhat different, and they will therefore genetically be slightly different.

Pelophylax lessonae is listed in the Annex IV of the EU Habitats Directive (92/43/EEC). For the above reasons, this may cause some problems of definition. Mixed populations of *lessonae/esculentus* are very common. However, pure populations of *lessonae* are very rare and threatened, and where they exist, much should be done to preserve them as such. They are threatened by any landscape changes that favour the immigration of *esculentus* from elsewhere.

Pure populations of *lessonae* live and breed in very oligotrophic localities, typically in ponds in large bogs. The ponds are typically small. The species hibernates on land, where it digs into sandy soil. Eutrophication of the surroundings and the presence of ditches and canals with eutrophic water will increase the risk that *esculentus* migrates towards the pond.

The criteria for the favourable conservation status are as follows:

Rana lessonae, pure populations			
Criteria	"favourable"	"good"	"unfavourable"
Population	excellent	good	average - bad
Size	>200 callers	50 - 200 callers	< 50 callers
Structure	reproductional success		no reproduction
Habitat	excellent	good	average - bad
aquatic			
Number and size of waterbodies	>10 small waterbodies with total surface > 5.000 m ²	>5 small waterbodies with total surface >2.500 m ²	<5 small waterbodies with total surface <2.500 m ²
sun exposition in %	> 95 %	80%-95%	<80%
% cover submersed vegetation	>80%	20% - 80%	<20%
terrestrial			
Landscape around the reproduction ponds, extent of oligotrophic habitats (bogs and conifer forest)	All oligotrophic within 5 km radius	All oligotrophic within 2 km radius	All oligotrophic within 500 m radius or less
distance to hibernation sites (dry, sandy soil, preferably in forest)	<100m	100 m – 500 m	> 500m
connectivity			
distance to the nearest esculentus population	> 5 km	> 2 km	> 500 m
Threats	none	average	strong
aquatic			
presence of fish	none	none	yes
Eutrophication	none visible	eutrophication indicators visible	direct inflow of eutrophication visible
Shade from tree growth	Tree stands do not increase	Some young trees near the pond may survive and grow up	Much growth of young trees which will increasingly shade the pond and lower the water table
surroundings			
Water level	Water level constant	Water level may rise, whereby fish enter the pond, or decrease, whereby the pond may dry out in dry summers	Water level in the bog is reduced markedly, whereby it becomes more dry, resulting in tree growth and some eutrophication
connectivity			
Artificial ditches and canals	No ditches or canals	Small ditches which are not very suitable for migrating frogs	Long, coherent system of waterfilled ditches that allow individuals of esculentus to immigrate

7. *Lacerta agilis*

The sand lizard, *Lacerta agilis*, is distributed throughout most of Europe, eastwards to central Asia and northwards it includes southern Scandinavia and southern England. Because of massive loss of its habitats *L. agilis* is declining in Europe, which explains the species being listed in the Annex IV of the EU Habitats Directive (92/43/EEC). Such status demands conservation efforts and explicit understanding of the species' habitat requirements to achieve favourable conservation status across the EU. The determination of the criteria for assessing the favourable conservation status of *L. agilis* for Lithuania has been one of the targets of the Econat-project

In Lithuania the sand lizard occurs in sunny, dry places: open pine forests, sandy slopes and stone heaps. Open sunny places are needed for sun basking of this ectothermic animal. Additionally, the eggs are buried in warm sand or earth, where the summer sun provides the heat necessary for hatching the eggs. Therefore bare patches of soil or sand, with no or extremely short vegetation cover, is a key factor for this lizard.

The lizard lives in small colonies. There must be contact to other colonies to allow gene exchange. Such contact is interrupted if there are landscape barriers that the lizards will not cross. Such barriers are especially shady wood or forest vegetation.

The criteria for the favourable conservation status are as follows:

Lacerta agilis			
Criteria	"favourable"	"good"	"unfavourable"
Population	excellent	good	average - bad
activity rate	> 15 adults & subadults recorded per h	5 to 15 adults & subadults per h	< 5 adults & subadults per h
Reproduction	> 10 juveniles seen in late summer	1-10 juveniles seen in late summer	no reproduction
Habitat	excellent	good	average - bad
Habitat			
structure	well-developed mosaic pattern of different structures	mosaic pattern with more monotonous areas	monotonous areas
number of sun basking places / ha	>20	10 to 20	<10
number of stone piles, hedges, dead trees etc / ha	>20	10 to 20	<10
sun exposition of total habitat in %	>80%	60%-80%	<60%
egg laying sites per ha	>50m ²	20 to 50 m ²	<20m ²
connectivity*			
distance to the next population / colony	<700 m	700m to 1500m	>1500 m
Habitat between populations	easy to pass for L .agilis	L. agilis can pass	impossible to pass for L .agilis
Threats	none	average	strong
Anticipated changes in tree cover	Open land or mixed structure of open land and tree/bush stands will remain	Trees are gradually growing up, shading gradually more	Large open areas will be planted with trees
Cultivation	No cultivation anticipated	< 30 % of the habitat may be turned into arable fields	> 30 % of the habitat may be turned into arable fields
predation *	no presence of predators detected	predators present, but no immediate impact observed	predators frequent, high level of predation anticipated

* predators are e.g. domestic cats, and some species of birds of prey