Working Report 2008-91

Herpetofauna and Small Mammals on the Island of Olkiluoto in 2008

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December 2008

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ABSTRACT

Herpetofaunal (amphibians and reptiles) survey of the Olkiluoto island in western Finland was conducted in 2008. Two species of reptiles, the common lizard and the adder, and two species of amphibians, the common frog and the smooth newt, were found during the survey. All four species breed in Olkiluoto.

Small mammals were trapped on 18 sites with 216 traps (144 mouse traps and 72 rat traps) in a monitoring in 2008. Totally 146 individuals of six species were captured. The most abundant species was bank vole. A hay field and several forest types harboured high numbers of individuals.
Monitoring should be continued at least every second year to obtain a reliable picture of changes in population sizes.

Keywords: Amphibians, monitoring, Olkiluoto, reptiles, small mammals.

Olkiluodon sammakkoeläimet, matelijat ja pikkunisäkkäät vuonna 2008

TIIVISTELMÄ

Sammakkoeläin- ja matelijalajiston kartoitus tehtiin Olkiluodossa vuonna 2008. Selvityksessä havaittiin kaksi matelijalajia (kyy ja sisilisko) ja kaksi sammakkoeläinlajia (sammakko ja vesilisko). Kaikki havaitut lajit lisääntyvät alueella.

Pikkunisäkässeurannassa loukutettiin 18 koealalla yhteensä 216 pyydyksellä (144 hiirenloukkua ja 72 rotanloukkua) vuonna 2008. Yhteensä pyydystettiin 146 yksilöä kuudesta lajista. Runsain laji oli metsämyyrä. Suurimmat yksilömäärät olivat heinäpellolla ja useilla metsätyypeillä. Seurantaa tulisi jatkaa ainakin joka toinen vuosi, jotta saataisiin luotettava kuva kannanvaihteluista.

Avainsanat: Matelijat, Olkiluoto, pikkunisäkkäät, sammakkoeläimet, seuranta.

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1. INTRODUCTION AND STUDY AREA

The island of Olkiluoto (ca. 12 km²) is situated off the Finnish coast in the Bothnian Sea. The coast is characterised by shallow bays surrounded by small islands and skerries. The soil of this relatively flat island consists mainly of gravel, sand and fine-textured till. There are also some sedge and sphagnum peat soils, and exposed bedrock. The landscape at Olkiluoto is characterised by forests: pine, spruce, mixed coniferous, mixed deciduous/coniferous forests and deciduous forests. There are some small mires and near shore also meadows and shore scrubs. Two man-made water reservoirs are situated at the centre of the island, and transmission lines run through the northern part of the island. There is also a nature reserve (Liiklankari) at the southern coast of the island. The whole local hydrogeochemical and biological system is affected by the postglacial land up-lift (6 mm/y) typical to the Finnish western coast.

There are two nuclear power plant units situated in Olkiluoto and a third one is under construction. Olkiluoto has also been selected as a location for final repository of spent nuclear fuel, and currently a test repository cave is under construction. These projects have taken over a large land area and traffic has increased a lot on the island.

This study includes the following parts:

- Survey of amphibian species of Olkiluoto
- Survey of reptile species of Olkiluoto
- Trapping of small mammals (especially rodents) in various habitat types.

The study was ordered by Posiva Oy and commissioned to Faunatica Oy, where it was coordinated by Marko Nieminen.

2. MATERIAL AND METHODS

A list of scientific names of species mentioned in the report is presented in Appendix 1 with English and Finnish common names. The average weights of each species are shown in Appendix 2.

2.1. Herpetofauna (amphibians and reptiles)

As a part of the various nature inventories in Olkiluoto, reptiles and amphibians of the island were surveyed in spring 2008. The aim of the inventory was to confirm the presence of various species and to estimate their abundances at the region. A further purpose of the survey was to develop a reliable and easy method for monitoring the regional herpetofauna at regular intervals.

The herpetofaunal survey of the Olkiluoto was started with a literature survey of the recorded observations and historical data of various reptile and amphibian species found on the island. Potentially valuable herpetofaunal areas were determined from the maps, and the following local biologists and birdwatchers were interviewed: Hannu Klemola, Janne Lampolahti, Markku Lappalainen, Päivi Sirkiä & Ville Vasko. Their comments about the potential areas were taken into account. Also, observations in the Finnish Museum of Natural History's Hatikka database were used (observations checked by Mikko Heikkinen). The study area was monitored by regular visits at the area in the spring 2008. The visits were scheduled to be done on favourable weather and to cover the spring emergence times of the reptiles and spawning periods of the amphibians. Monitoring was focused on the areas that were considered most potential. The animals were tracked in the field by the experienced herpetologists and potential small water bodies were searched with a net to catch frogs and newts. The abundance of the frogs at spawning sites was estimated by counting the egg clutches. A collection permit was applied and received from the local environmental authorities (number: LOS-2008-L-259-254).

Species

The Finnish herpetofauna is poor in species: it includes great crested newt (*Triturus cristatus*), smooth newt (*T. vulgaris*), common toad (*Bufo bufo*), common frog (*Rana temporaria*), moor frog (*R. arvalis*), common lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), grass snake (*Natrix natrix*), smooth snake (*Coronella austriaca*) and adder (*Vipera berus*). The marsh frog (*Rana ridibunda*) was introduced in some areas in southern Finland in the 1930's, but became evidently extinct in the early 1960's (Terhivuo 1981). Some records of that species (or some other species of the green frog complex) are known from this year from the SW part of Finland, in the area of Turku. In Finland all these species live at northern margins of their European range and are therefore of special interest (Arnold & Burton 1981, Gasc et al. 1997, Terhivuo 1993, Terhivuo 1981; Appendix I).

In Olkiluoto, four species of amphibians and four species of reptiles could be found. Smooth snake and great crested newt are found only at Åland archipelago in SW Finland and great crested newt also at some localities in eastern Finland.

All amphibian and reptile species, except adder, are protected under the national conservation degree in Finland (Ympäristöministeriö 2008a). Four species are listed in annexes of the EU's habitats directive: the smooth snake, the moor frog and the great crested newt in Annex IV, the common frog in Annex V and the great crested newt also in Annex II (Ympäristöministeriö 2008b). Three species are listed threatened according to the IUCN threat categories: smooth snake, grass snake and great crested newt as vulnerable (VU) and slow worm as a near threatened (NT) species. (Rassi ym. 2001)

2.2. Small mammals

The aim of the small mammal study was to inventory species composition and abundances of small mammals in various habitat types in Olkiluoto. The methods used followed those in earlier inventories (Ranta et al. 2005, Roivainen 2006), but our study was noticeably more comprehensive.

We placed traps on 18 trapping sites (including eight pairs of habitat types, and two habitat types with one trapping site only; see Table 1 & Figure 1). Trapping sites included as many as possible of those in Ranta et al. (2005), but sites FET914262 and FET917276 had to be removed from the study due to changes in land use. There were four groups of traps (FT1-4) in each trapping site, each group consisted of three individual traps (two mouse traps [codes: *a* & *b*] and one rat trap [code: *c*]). Totally 216 traps (144 mouse traps and 72 rat traps) were used. Traps groups were marked in the field for GPS-positioning by Posiva Oy. Figure 2 shows the trapping design and trap coding.

Trap coding was derived from the forest monitoring grid of Olkiluoto (FET = Forest Extensive Monitoring plot). That grid consists of a permanent research frame which was established as a grid network in the autumn of 2003 by selecting 560 plots around the main island from a regular 100x100-metre grid that covered the whole Olkiluoto and its surroundings. By using the existing network and coding, the results from e.g. fauna studies can be compared with various descriptions made on the plots. The easting and northing coordinates of the Finnish KKJ1 system in 100 m act as the identification code of a sampling plot. They are abbreviated to three numbers and rounded, if necessary (e.g. plot at 6 790 898 m N, 1 526 500 m E is marked as FET909265).

Individual traps were positioned in places as good (sheltered) as available, i.e. not with fixed distances and directions from each other. The traps were baited as follows: in group FT1 mouse traps *a* & *b* with bread (Reilu vehnäleipä) and rat trap *c* with cat food (Rainbow Lihamureke [sis. kanaa]), in groups FT2-4 mouse trap *a* & rat trap *c* with bread and mouse trap *b* with cat food. Locations of traps groups and individual traps were photographed.

Trapping took place for four days both in spring (May 21-26) and in fall (September 1-5), totalling 1728 trap days. Even though the working period was longer in spring, each trap

group was in the field for four days only. Anniina Lindroos and Marko Nieminen placed the traps to the field. All traps were kept unloaded in the field between study periods except on the three field sites. Anniina Lindroos checked and reloaded traps daily, she also identified, photographed and measured the sampled individuals. Individuals were stored as frozen and handed over to Posiva Oy. Photographs and other data are archived by Posiva Oy and Faunatica Oy.

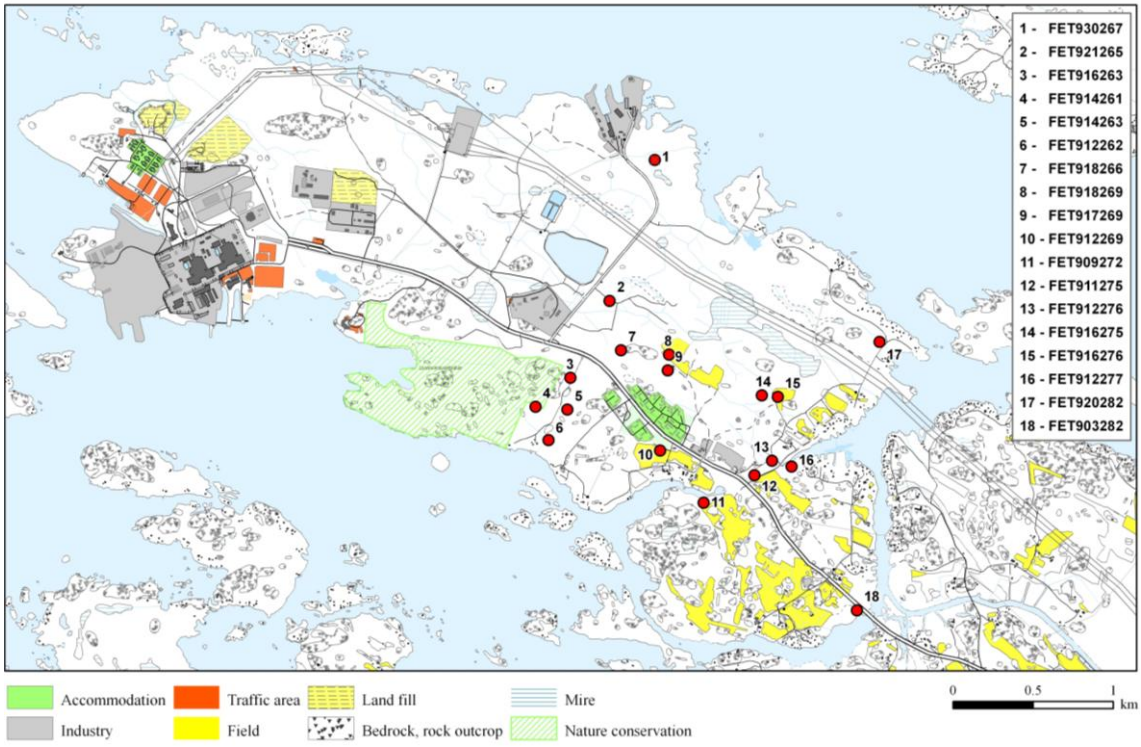

Figure 1. *Locations of trapping sites. Layout Posiva 2008. © Maanmittauslaitos 41/MYY/08.*

Table 1. *Trapping site information.*

Code of trapping site	Code on Fig. 1	Habitat	Coordinates (YKJ) of trapping site centre	
FET903282 *	18	Shore meadow	6802531	3206044
FET909272	11	Shore meadow	6803201	3205087
FET911275	12	Black alder-dominated forest	6803373	3205405
FET912262	6	Spruce-dominated forest	6803592	3204118
FET912269	10	Hay field	6803528	3204816
FET912276	13	Birch-dominated forest	6803464	3205513
FET912277	16	Black alder-dominated forest	6803427	3205636
FET914261	4	Spruce-dominated forest	6803801	3204036
FET914263	5	Mixed forest	6803782	3204236
FET916263	3	Spruce-dominated forest	6803981	3204254
FET916275	14	Clear-cut	6803872	3205450
FET916276	15	Fallow field	6803862	3205550
FET917269	9	Pine-dominated forest	6804027	3204862
FET918266	7	Pine-dominated forest	6804154	3204571
FET918269	8	Fallow field	6804126	3204871
FET920282	17	Birch-dominated forest	6804206	3206185
FET921265	2	Mixed forest	6804462	3204499
FET930267	1	Spruce-dominated forest	6805341	3204781

* = centre of trapping site was moved (ca. 20 m to north & ca. 16 m to east) to place traps out of water; new centre is a readily observable rock.

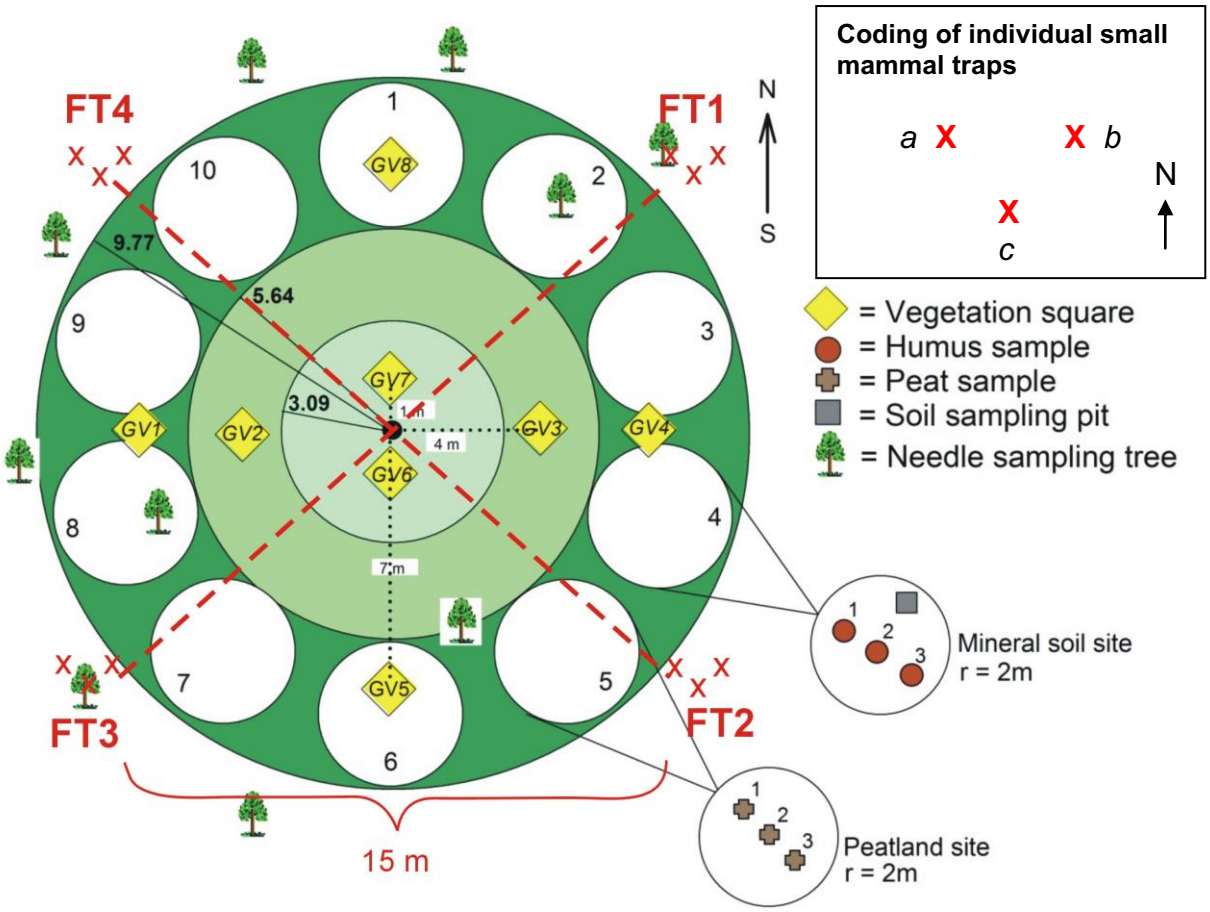

Figure 2. *Study design (**FT1-4** = trap groups; **x** = individual small mammal trap; a & b = mouse traps; c = rat trap). Other coding on the figure is from Finnish Forest Research Institute's sampling on the same plots. © Posiva Oy*

3. RESULTS

3.1. Herpetofauna

Historical data on the herpetofauna in Olkiluoto is scarce. There are no records of individuals from the island in museum collections or in any other scientific collections, nor in the nature observation diary (Hatikka) of the Finnish Museum of Natural History.

Based on the discussions with local biologists and birdwatchers, it became evident that Olkiluoto is generally unlikely to be potentially rich in herp species. There is a limited amount of suitable habitats and the high intensity of human activity at the area makes it unfavourable for these animals that typically thrive in undisturbed habitats and exhibit (breeding) philopatry and site fidelity.

There are very few potentially suitable breeding ponds for amphibians on the island. The lake Olkiluodonjärvi is almost dry because of the draining most likely done for forestry purposes. Also, many other forested areas on the island are drained or ditched and the vegetation under the transmission lines is regularly cut to keep the area open. Local naturalists mentioned that the moor frog is found nearby at the mouth of Eurajoki river and some dead-on-the-road adders have been seen on Olkiluodontie, the main road running through the island.

Posiva Oy provided us maps of their recorded observations of snakes at Olkiluoto island (Appendix 3). The observations were collected from the company workers and local residents and consist of three recorded observations of the grass snake and 13 recorded observations of the adder.

The fieldwork was done in April-June in 2008 and consisted of visits to the potential sites in April 16-17 (one fieldworker), April 24 (two fieldworkers) and June 7 (three fieldworkers). All recorded observations of various species are shown on maps in Appendix 3, and listed in Appendices 4 & 5.

The most abundant reptile species found during the study was the common lizard (Appendix 9: Picture 1). Several individuals were found at various locations. Common lizard seems to be widespread and abundant at the forested (eastern) areas of the island. Adults and juveniles were encountered basking at the forest edges and clearings. Rocky hills, shoreline willows and a few meadows also make suitable microhabitats for this species.

The other reptile species found was the adder. Three individuals (males) were found at the same location on April 16, thus indicating a likely hibernation site found (Appendix 9: Picture 2). Two males found at the site were having a combat fight, typical for the male adders at spring time (see cover picture). One adder of unknown sex was seen crossing a road at the centre of the island on the same day and one more (a young male) a short distance from the possible hibernation site on April 24.

No slow worms nor grass snakes were found during the fieldwork.

The common frog was the most common amphibian species found during the survey. The common frog was abundant in some ditches, but not very numerous in several potential sites. Spawn was found in 13 locations, four of these having more than 10 egg clutches. The total number of common frog egg clutches found was 136. The abundance of the common frogs at the spawning sites varied from only a couple of clutches in some ditches to 39 clutches in one location. Typically one female frog lays a single clutch of eggs. The highest number of eggs clutches (39) was found from a ditch by a field in the eastern part of the island (Appendix 9: Pictures 3 and 4).

The other amphibian species found during the survey was the smooth newt that was found in the ditches and in the willows. The individuals found were fully grown and ready to mate (Appendix 9: Picture 5), thus indicating spawning sites being at the location where the individuals were found.

No moor frogs nor toads were found during the study.

3.2. Small mammals

Totally six species of small mammals were captured, the most abundant species being bank vole with 100 individuals trapped (Table 2). The numbers of small mammals varied from 0 to 16 (Table 3). A detailed list of trapped individuals with species, site, trap and bait type is presented in Appendix 6. Hay field and most forest types harboured high numbers of individuals, whereas most open habitat types had the lowest numbers (Table 4).

4. DISCUSSION

4.1. Herpetofauna

The limited number of observations of the various amphibian and reptile species suggests that Olkiluoto is not very favourable for most herps. Nevertheless, half of the potential eight species were found, thus indicating that some suitable habitats occur on the island. Most individuals were observed at the eastern parts of the island during the survey.

The frogs were most numerous in the agricultural areas, and since the larger ponds and man-made lakes at the centre of the island are used for fish and crayfish farming, frogs and newts use ditches and ponds in shoreline willows as sites for spawning (to avoid fish). Therefore, no large gatherings of spawning amphibians could be found on the island at springtime. This lack of suitable breeding ponds is probably the main factor in restricting the abundance of amphibians on the island. It may also be the reason for the likely absence of the common toad in the area. The common toad needs larger water-bodies for reproduction and is therefore probably absent, whereas common frog and smooth newt still thrive in small ditches and ponds. Common frogs and smooth newts also tolerate some salinity and can therefore survive at the coastal willows of the region. The moor frog prefers swampy habitats in Finland and since there are no habitats suitable for that species in Olkiluoto, the species is obviously not present there.

Table 2. *Numbers of small mammals trapped during each trapping period.*

Species		No. of individuals		
		Spring	Fall	Total
Yellow-necked mouse	*Apodemus flavicollis*	-	2	2
Bank vole	*Myodes glareolus*	22	78	100
East European vole	*Microtus levis*	6	9	15
Field vole	*Microtus agrestis*	1	18	19
Water vole	*Arvicola amphibius*	-	2	2
Common shrew	*Sorex araneus*	4	4	8
	Total:	**33**	**113**	**146**

Table 3. *Abundances of small mammal species at each trapping site.*

Code of trapping site	Code on Fig. 1	Yellow-necked mouse	Bank vole	East European vole	Field vole	Water vole	Common shrew	Total no. of inds.	species
FET903282	18							0	0
FET909272	11			3	1			4	2
FET911275	12	2	11		1			14	3
FET912262	6		6		1			7	2
FET912269	10			8	4		1	13	3
FET912276	13		11	1	2	2		16	4
FET912277	16		1					1	1
FET914261	4		8				1	9	2
FET914263	5		5		2			7	2
FET916263	3		12				1	13	2
FET916275	14		5					5	1
FET916276	15				3			3	1
FET917269	9		4				3	7	2
FET918266	7		6					6	1
FET918269	8		1		1			2	2
FET920282	17		8	1	2		1	12	4
FET921265	2		9	1	2			12	3
FET930267	1		13	1			1	15	3

Table 4. *Mean numbers of individuals in each habitat type.*

Habitat type	No. of sites	No. of individuals/site
Birch-dominated forest	2	14
Hay field	1	13
Spruce-dominated forest	4	11
Mixed forest	2	9.5
Black alder-dominated forest	2	7.5
Pine-dominated forest	2	6.5
Clear-cut	1	5
Fallow field	2	2.5
Shore meadow	2	2

The common lizards were quite numerous in the forested parts of the island, especially at forest clearings and on meadows. Individuals encountered early in the spring are found near their hibernation sites. Therefore, it seems that the lizards hibernate in numerous localities on the island, so only a few individuals use a single hibernation site. Also, the dry and sunny shoreline habitats were favoured by this species. The adder individuals were found at a rocky forest edge in early spring, and it's likely that their hibernation site is near that place since the ground was still mostly covered with snow at the time when they were found.

It is possible that also the grass snake and the slow worm inhabit the island, although no individuals were encountered during this study. The few observations on grass snakes provided by Posiva Oy are not doubtful, since one hibernation site is known on a nearby island. This species is a good swimmer and may therefore be encountered in Olkiluoto during the summer months. Preferred habitats for the grass snake are the shoreline willows and ditches where they prey on small fish and frogs. The slow worm is a burrowing and secretive species that is seldom encountered in the field. Thus, also slow worms may inhabit the island, but this cannot be confirmed since there are no records of the species from the area.

4.2. Small mammals

The current monitoring study increased the numbers of both trapping sites and trap days considerably compared with the previous study by Ranta et al. (2005). Besides this larger trapping effort in the current study, the population densities of small mammals were probably considerably larger in 2008. Indeed, the vole populations were at a very high level in southern Finland in the autumn 2008 (METLA 2008). Bank vole was the most abundant species in both studies. This was not unexpected, since bank vole is usually the most numerous small mammal species in most of Finland.

Bank voles were widely distributed and numerous in all forested habitats types except pine-dominated forests (tables 3 & 4). They were still more numerous even in pine-dominated forests than species of open habitats were in fallow fields and shore meadows. Bank vole was the only species inhabiting a previous clear-cut which is currently a semi-open habitat with 3-4 m tall young trees.

A hay field was the only open habitat where there was a high number of small mammals captured. That was mainly due to an apparently strong population of East European vole. This species is probably widespread (single individuals from four trapping sites) but has a scattered distribution (two sites with several individuals) in Olkiluoto.

Field vole seems also a widespread species occupying even deciduous and mixed forests in low numbers, but being however almost absent in coniferous forests. Those individuals in forested habitats may be moving around in a search for new suitable habitats.

Trapping effort was intensive enough for catching a couple of individuals of two species apparently quite rare in Olkiluoto: yellow-necked mouse and water vole. Common shrews are not captured very efficiently with the method used, therefore it is not reasonable to

interpret their distribution or other factors. If the monitoring continues in the future, some further species will probably be caught in low numbers, as Olkiluoto belongs to the potential range of at least pygmy shrew (*Sorex minutus*), water shrew (*Neomys fodiens*), harvest mouse (*Micromys minutus*), brown rat (*Rattus norvegicus*) and house mouse (*Mus musculus*).

We recommend that monitoring will be continued at least every second year to obtain a reliable picture of changes in population sizes. The population sizes vary in a more or less cyclic manner in southern Finland, depending on the species as well as on various biotic and abiotic factors. However, the causes of this variability are not well-understood. Therefore, this kind of monitoring would generate information from different stages of population “cycles”.

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More information on the reptiles and amphibians in Finland:

www.sammakkolampi.fi
www.herpetomania.fi
www.fmnh.helsinki.fi/elainmuseo/selkarankaiset/tietoa/herp/
www.ymparisto.fi

APPENDIX 1. List of scientific and common names of different species.

English name(s)	Finnish name(s)	Scientific name(s)
Amphibians		
Smooth newt, common newt	Vesilisko	*Triturus* (*Lissotriton*) *vulgaris*
Common frog, European common frog, European common brown frog	(Tavallinen) sammakko	*Rana temporaria*
Reptiles		
Common lizard, viviparous lizard	Sisilisko	*Zootoca* (*Lacerta*) *vivipara*
Grass snake, European grass snake, ringed snake, water snake	Rantakäärme, tarhakäärme	*Natrix natrix*
Adder, viper, common European adder, common European viper	Kyy, kyykäärme	*Vipera berus*
Small mammals		
Yellow-necked (field) mouse	Metsähiiri	*Apodemus flavicollis*
Bank vole	Metsämyyrä	*Myodes* (*Clethrionomys*) *glareolus*
East European vole, southern vole	Idänkenttämyyrä	*Microtus levis* (*M. epiroticus, M. rossiaemeridionalis, M. subarvalis*)
Field vole, short-tailed vole	Peltomyyrä	*Microtus agrestis*
(European) Water vole, northern water vole, water rat	Vesimyyrä, vesirotta	*Arvicola amphibius* (*A. terrestris*)
Common shrew, Eurasian shrew	Metsäpäästäinen	*Sorex araneus*

APPENDIX 2. Weights of mature individuals.

Species	Average weight
Amphibians	
Smooth newt (*Triturus vulgaris*)	1.7-3.7 g
Common frog (*Rana temporaria*)	30-50 g
Reptiles	
Common lizard (*Zootoca vivipara*)	4-5 g
Grass snake (*Natrix natrix*)	40-200 g
Adder (*Vipera berus*)	50-150 g
Small mammals	
Yellow-necked mouse (*Apodemus flavicollis*)	10-50 g
Bank vole (*Myodes glareolus*)	14-40 g
East European vole (*Microtus levis*)	?-45 g
Field vole (*Microtus agrestis*)	14-90 g
Water vole (*Arvicola amphibius*)	65-320 g
Common shrew (*Sorex araneus*)	3.5-16 g

Sources

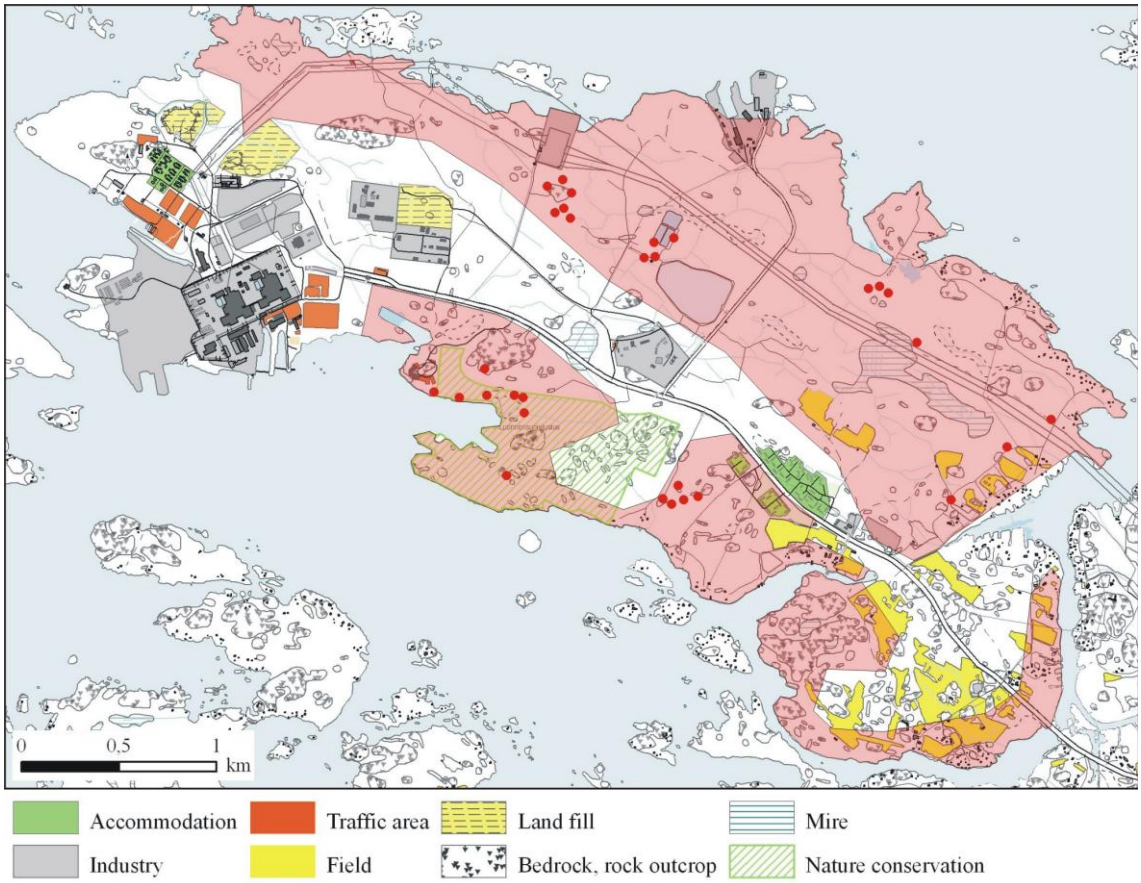
Herpetofauna:

Herczeg et al..2004, 2008,
Leigh 1997,
Forsman & Ås 1987,
Olsson et al.. 1997,
Callan & Taylor 1968,
Anton et al. 1998,
Alonso-Bedate et al. 1990,
Polenov & Chetverukhin 1993

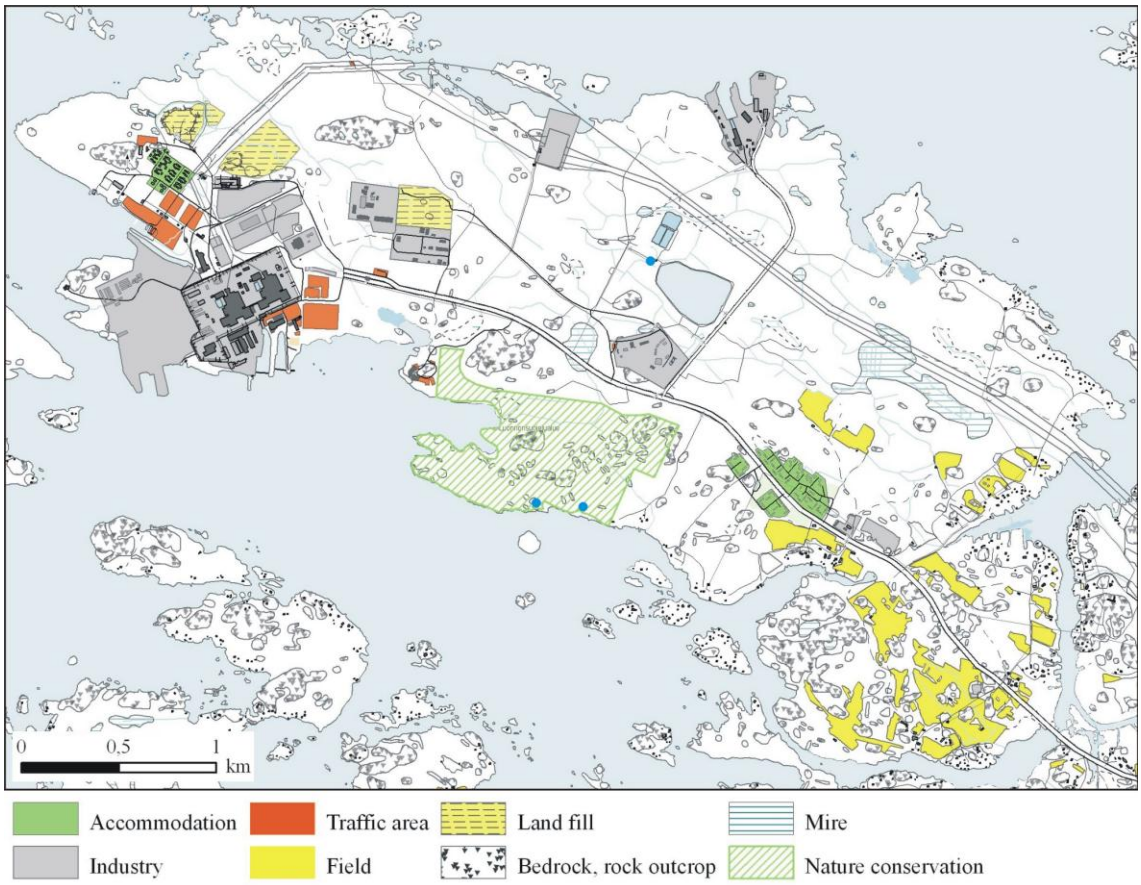
Small mammals:

Arnold & Burton (1981),
Bjärvall & Ullström (1996).

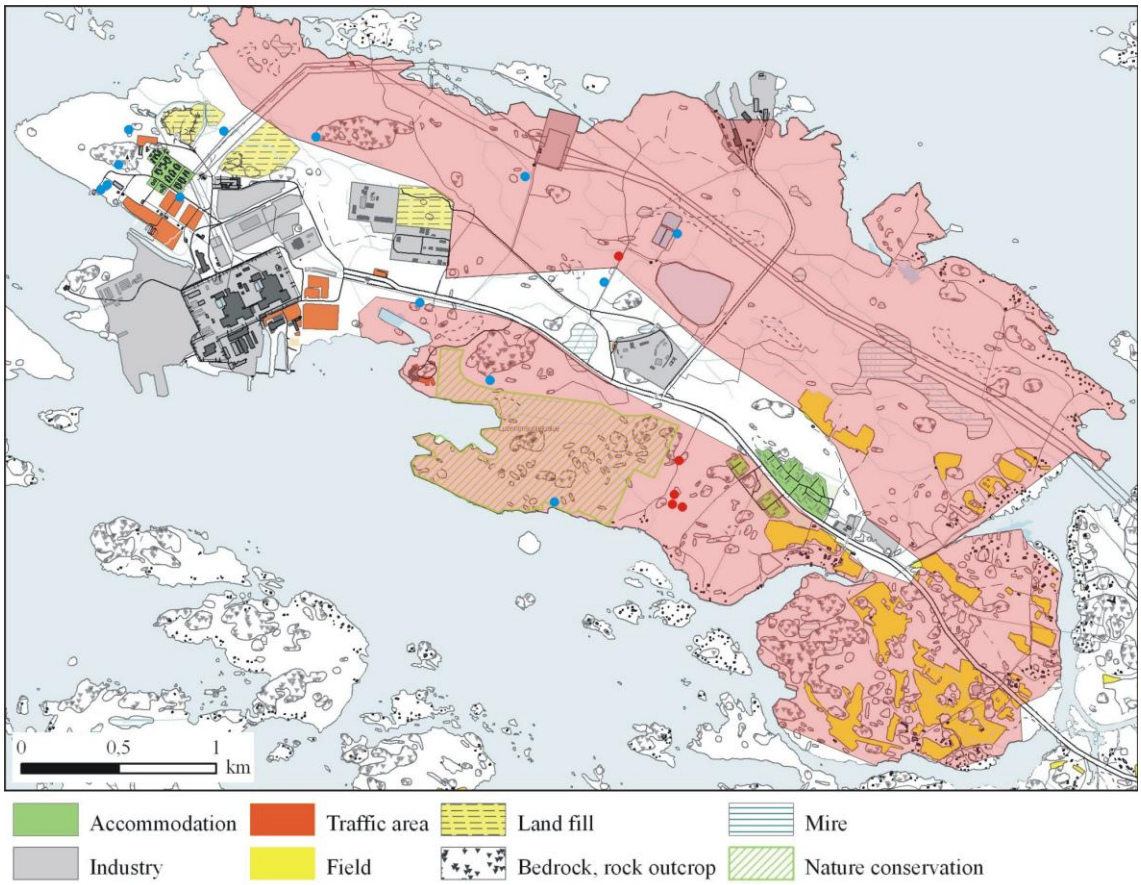
Appendix 3. Field observations of herpetofauna in Olkiluoto.



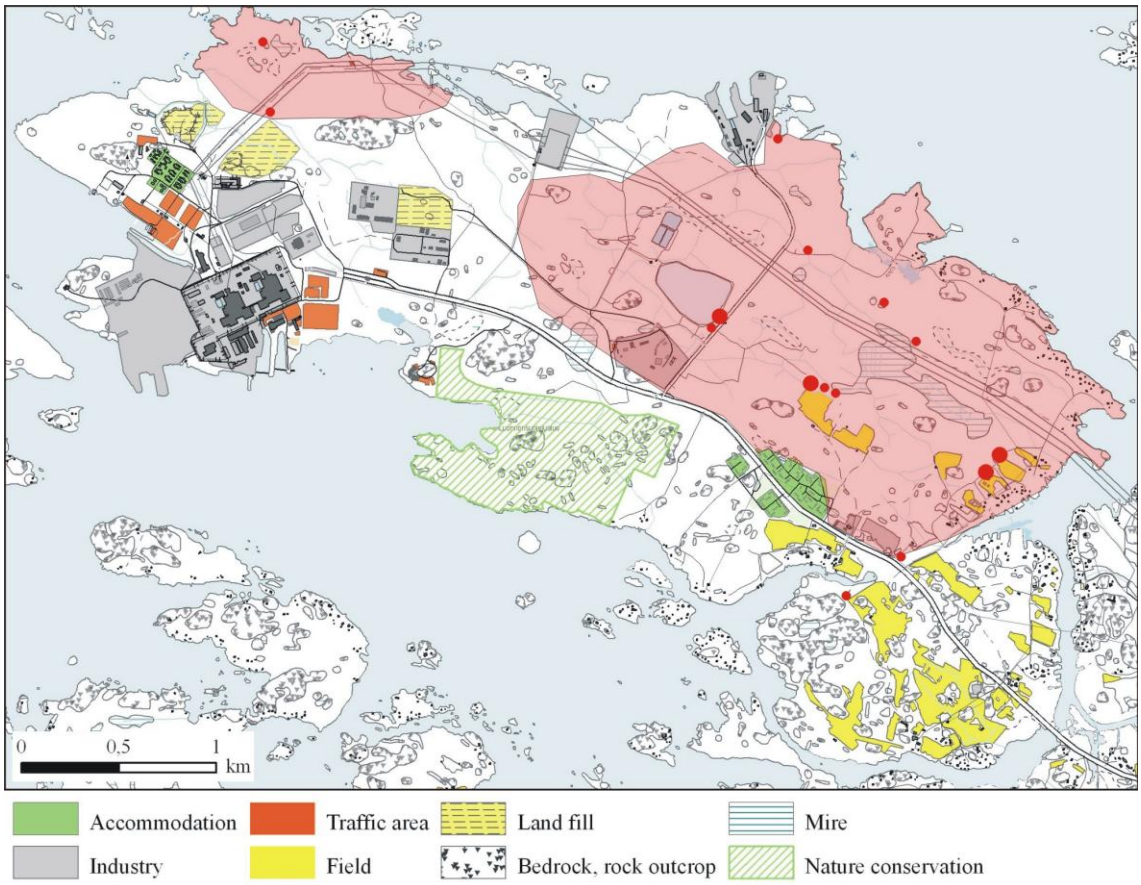
Common lizard (*Zootoca vivipara*) observation sites in 2008 (30; red dots) and area most suitable for the species (red shading). (Design Faunatica Oy. Layout Posiva 2008. Base map © Maanmittauslaitos 41/MYY/08)



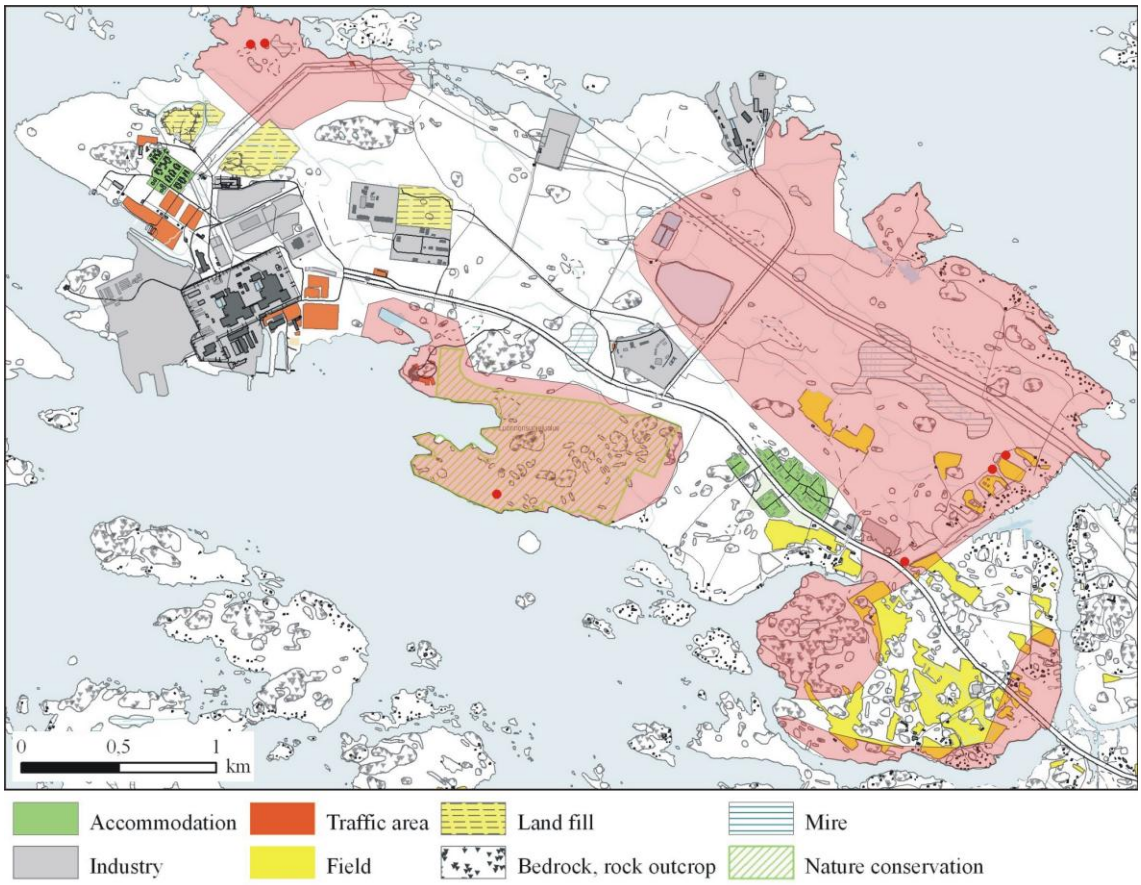
Grass snake (*Natrix natrix*) observation sites by Posiva Oy (3; blue dots). (Design Faunatica Oy. Layout Posiva 2008. Base map © Maanmittauslaitos 41/MYY/08)



Adder (*Vipera berus*) observation sites by Posiva Oy (13; blue dots), observation sites in 2008 (5; red dots) and area most suitable for the species (red shading). (Design Faunatica Oy. Layout Posiva 2008. Base map © Maanmittauslaitos 41/MYY/08)



Common frog (*Rana temporaria*) spawning sites in 2008 (small red dots: <10 egg clutches [9]; large red dots: >10 egg clutches [4]) and area most suitable for the species (red shading). (Design Faunatica Oy. Layout Posiva 2008. Base map © Maanmittauslaitos 41/MYY/08)



Smooth newt (*Triturus vulgaris*) observation sites in 2008 (6; red dots [most likely these are also spawning sites]) and area most suitable for the species (red shading). (Design Faunatica Oy. Layout Posiva 2008. Base map © Maanmittauslaitos 41/MYY/08)

Appendix 4. Amphibian observations in Olkiluoto in 2008.

Species	Observation date	No. of egg clutches	Coordinates (YKJ)		Notes
Common frog	16.4.2008	39	6803946	3205941	Field edge
Common frog	16.4.2008	21	6803887	3205858	Field edge
Common frog	16.4.2008	1	6803325	3205381	In ditch
Common frog	17.4.2008	10	6804584	3204450	In ditch
Common frog	17.4.2008	1	6804538	3204376	In ditch
Common frog	17.4.2008	12	6804285	3204863	New heaping area
Common frog	17.4.2008	3	6804267	3204907	New heaping area
Common frog	17.4.2008	5	6804257	3204946	New heaping area
Common frog	17.4.2008	4	6804420	3205428	In pond
Common frog	17.4.2008	5	6805510	3204714	In pond
Common frog	17.4.2008	2	6804003	3206093	In ditch, under transmission line
Common frog	24.4.2008	8	6806106	3202018	In pond
Common frog	24.4.2008	7	6805638	3202118	In ditch
Common frog	24.4.2008	21	6804965	3204845	In ditch
Common frog	24.4.2008	8	6804719	3205220	In pond
Common frog	24.4.2008	1	6803183	3205107	Field edge
Smooth newt	17.4.2008		6803946	3205941	Field edge
Smooth newt	17.4.2008		6803887	3205858	Field edge
Smooth newt	17.4.2008		6803325	3205381	In ditch
Smooth newt	24.4.2008		6803750	3203174	In reeds
Smooth newt	24.4.2008		6805998	3202077	In pond
Smooth newt	24.4.2008		6806098	3201987	In pond

Appendix 5. Reptile observations in Olkiluoto in 2008.

Species	Observation date	Coordinates (YKJ)		Notes
Adder	16.4.2008	6803715	3204224	Possible overwintering site
Adder	17.4.2008	6804929	3203916	Crossed a road
Adder	24.4.2008	6803801	3204181	Young male
Common lizard	16.4.2008	6805260	3203634	On open rock at forest edge
Common lizard	16.4.2008	6805262	3203565	
Common lizard	16.4.2008	6805240	3203620	
Common lizard	16.4.2008	6805213	3203621	
Common lizard	16.4.2008	6805203	3203587	
Common lizard	16.4.2008	6805203	3203575	
Common lizard	16.4.2008	6803692	3204172	Near adder site
Common lizard	16.4.2008	6803710	3204222	
Common lizard	16.4.2008	6803723	3204193	
Common lizard	16.4.2008	6803708	3204200	
Common lizard	17.4.2008	6804288	3202841	Several on reedbed
Common lizard	17.4.2008	6804236	3202902	
Common lizard	17.4.2008	6804216	3203057	
Common lizard	17.4.2008	6804195	3203216	
Common lizard	17.4.2008	6804176	3203313	Several on meadow
Common lizard	17.4.2008	6804098	3203310	
Common lizard	17.4.2008	6804186	3203332	
Common lizard	17.4.2008	6804130	3203339	
Common lizard	17.4.2008	6803754	3203361	At the edge of reeds
Common lizard	17.4.2008	6804777	3205208	Several on clearcut
Common lizard	17.4.2008	6804757	3205238	
Common lizard	17.4.2008	6804714	3205205	
Common lizard	17.4.2008	6804744	3205172	
Common lizard	17.4.2008	6803906	3205850	On meadow
Common lizard	24.4.2008	6804990	3204172	Along a road
Common lizard	24.4.2008	6804433	3205452	At the end of road, under transmission line
Common lizard	24.4.2008	6804073	3206121	At forest edge
Common lizard	24.4.2008	6803521	3205492	At forest edge
Common lizard	7.6.2008	6804901	3204048	
Common lizard	7.6.2008	6804902	3204114	
Common lizard	7.6.2008	6804909	3204089	

Appendix 6. Small mammal observations in Olkiluoto in 2008.

Sample code	Trap-ping site (FET)	Site code on Fig. 1	Trap (FT)	Trap type	Bait	Species	Fresh weight (g)
Spring							
TMA50-DF02	914261	4	2c	Rat trap	Bread	Bank vole	25.5
TMA50-DF03	914261	4	4a	Mouse trap	Bread	Bank vole	29.6
TMA50-DF04	914263	5	2b	Mouse trap	Cat food	Bank vole	8.8
TMA50-DF05	916263	3	3a	Mouse trap	Bread	Bank vole	23.0
TMA50-DF06	930267	1	3c	Rat trap	Bread	Common shrew	9.3
TMA50-DF07	930267	1	4c	Rat trap	Bread	Bank vole	38.0
TMA50-DF08	930267	1	4a	Mouse trap	Bread	Bank vole	29.5
TMA50-DF09	921265	2	4a	Mouse trap	Bread	East European vole	40.0
TMA50-DF10	921265	2	4b	Mouse trap	Cat food	Field vole	19.2
TMA50-DF11	912269	10	4a	Mouse trap	Bread	East European vole	48.5
TMA50-DF12	917269	9	2a	Mouse trap	Bread	Bank vole	27.5
TMA50-DF13	917269	9	2c	Rat trap	Bread	Common shrew	11.0
TMA50-DF14	918266	7	2c	Rat trap	Bread	Bank vole	23.7
TMA50-DF15	918266	7	2a	Mouse trap	Bread	Bank vole	25.5
TMA50-DF16	911275	12	3c	Rat trap	Bread	Bank vole	36.4
TMA50-DF17	916263	3	3c	Rat trap	Bread	Bank vole	28.0
TMA50-DF18	912269	10	4a	Mouse trap	Bread	East European vole	51.8
TMA50-DF19	911275	12	3c	Rat trap	Bread	Bank vole	32.4
TMA50-DF20	920282	17	3b	Mouse trap	Cat food	Bank vole	25.6
TMA50-DF21	920282	17	2c	Rat trap	Bread	Common shrew	11.1
TMA50-DF22	930267	1	4c	Rat trap	Bread	Bank vole	29.4
TMA50-DF23	930267	1	3a	Mouse trap	Bread	Bank vole	28.0
TMA50-DF24	930267	1	3b	Mouse trap	Cat food	Bank vole	29.5
TMA50-DF25	914263	5	3a	Mouse trap	Bread	Bank vole	31.6
TMA50-DF26	912269	10	1a	Mouse trap	Bread	East European vole	54.4
TMA50-DF27	912269	10	4b	Mouse trap	Cat food	East European vole	20.2
TMA50-DF28	912269	10	2b	Mouse trap	Cat food	East European vole	47.3
TMA50-DF29	930267	1	4a	Mouse trap	Bread	Bank vole	26.0
TMA50-DF30	930267	1	3c	Rat trap	Bread	Bank vole	26.8
TMA50-DF31	930267	1	3a	Mouse trap	Bread	Bank vole	24.0
TMA50-DF32	917269	9	2a	Mouse trap	Bread	Common shrew	12.2

TMA50-DF33	917269	9	4b	Mouse trap	Cat food	Robin (*Erithacus rubecula*)	17.9
TMA50-DF34	912276	13	3a	Mouse trap	Bread	Bank vole	26.4
TMA50-DF35	912276	13	2c	Rat trap	Bread	Song thrush (*Turdus philomelos*)	78.5
TMA50-DF36	912276	23	2c	Rat trap	Bread	Bank vole	31.0
Fall							
TMA50-DF37	912262	6	1a	Mouse trap	Bread	Bank vole	18.8
TMA50-DF38	912262	6	1c	Rat trap	Cat food	Bank vole	23.2
TMA50-DF39	912262	6	4c	Rat trap	Bread	Bank vole	16.1
TMA50-DF40	914261	4	2c	Rat trap	Bread	Bank vole	24.8
TMA50-DF41	914261	4	3a	Mouse trap	Bread	Common shrew	7.0
TMA50-DF42	914261	4	4c	Rat trap	Bread	Bank vole	15.6
TMA50-DF43	914261	4	1a	Mouse trap	Bread	Bank vole	17.1
TMA50-DF44	914261	4	1b	Mouse trap	Bread	Bank vole	16.6
TMA50-DF45	914263	5	3a	Mouse trap	Bread	Field vole	28.8
TMA50-DF46	914263	5	1b	Mouse trap	Bread	Bank vole	18.9
TMA50-DF47	916263	3	3a	Mouse trap	Bread	Bank vole	22.4
TMA50-DF48	916263	3	3b	Mouse trap	Cat food	Bank vole	26.6
TMA50-DF49	916263	3	1b	Mouse trap	Bread	Bank vole	22.1
TMA50-DF50	912269	10	1a	Mouse trap	Bread	Field vole	39.1
TMA50-DF51	912269	10	1c	Rat trap	Cat food	Field vole	57.4
TMA50-DF52	912269	10	2c	Rat trap	Bread	Common shrew	13.1
TMA50-DF53	930267	1	3a	Mouse trap	Bread	Bank vole	25.0
TMA50-DF54	918269	8	2a	Mouse trap	Bread	Bank vole	28.1
TMA50-DF55	917269	9	1a	Mouse trap	Bread	Bank vole	18.5
TMA50-DF56	918266	7	4a	Mouse trap	Bread	Bank vole	18.2
TMA50-DF57	918266	7	1a	Mouse trap	Bread	Bank vole	18.9
TMA50-DF58	918266	7	3b	Mouse trap	Cat food	Bank vole	18.2
TMA50-DF59	921265	2	3a	Mouse trap	Bread	Bank vole	18.2
TMA50-DF60	921265	2	3b	Mouse trap	Cat food	Bank vole	21.6
TMA50-DF61	921265	2	1a	Mouse trap	Bread	Bank vole	17.4
TMA50-DF62	921265	2	4a	Mouse trap	Bread	Bank vole	20.2
TMA50-DF63	921265	2	4b	Mouse trap	Cat food	Field vole	58.1
TMA50-DF64	920282	17	2a	Mouse trap	Bread	Field vole	43.6
TMA50-DF65	920282	17	3a	Mouse trap	Bread	Field vole	46.2
TMA50-DF66	920282	17	4a	Mouse trap	Bread	Bank vole	17.7
TMA50-DF67	920282	17	1a	Mouse trap	Bread	Bank vole	23.3
TMA50-DF68	916275	14	3b	Mouse trap	Cat food	Bank vole	15.6

TMA50-DF69	911275	12	4a	Mouse trap	Bread	Bank vole	18.6
TMA50-DF70	911275	12	4c	Rat trap	Bread	Field vole	55.1
TMA50-DF71	912276	13	3c	Rat trap	Bread	Song thrush (*Turdus philomelos*)	71.5
TMA50-DF72	912262	6	3a	Mouse trap	Bread	Field vole	22.6
TMA50-DF73	912262	6	2a	Mouse trap	Bread	Bank vole	19.8
TMA50-DF74	914261	4	4a	Mouse trap	Bread	Bank vole	17.7
TMA50-DF75	914263	5	3a	Mouse trap	Bread	Field vole	31.9
TMA50-DF76	916263	3	1b	Mouse trap	Bread	Bank vole	21.4
TMA50-DF77	916263	3	2a	Mouse trap	Bread	Bank vole	20.8
TMA50-DF78	930267	1	4b	Mouse trap	Cat food	Bank vole	18.6
TMA50-DF79	917269	9	4a	Mouse trap	Bread	Common shrew	7.9
TMA50-DF80	918269	8	2c	Rat trap	Bread	Field vole	42.7
TMA50-DF81	921265	2	4a	Mouse trap	Bread	Bank vole	21.7
TMA50-DF82	912269	10	4c	Rat trap	Bread	Field vole	41.1
TMA50-DF83	912269	10	2a	Mouse trap	Bread	East European vole	24.1
TMA50-DF84	912269	10	4a	Mouse trap	Bread	East European vole	23.4
TMA50-DF85	920282	17	3b	Mouse trap	Cat food	Bank vole	18.1
TMA50-DF86	920282	17	4a	Mouse trap	Bread	Bank vole	17.2
TMA50-DF87	920282	17	1b	Mouse trap	Bread	Bank vole	18.8
TMA50-DF88	916276	15	3b	Mouse trap	Cat food	Field vole	51.5
TMA50-DF89	916275	14	2a	Mouse trap	Bread	Bank vole	16.3
TMA50-DF90	916275	14	2c	Rat trap	Bread	Bank vole	35.1
TMA50-DF91	909272	11	4a	Mouse trap	Bread	East European vole	26.9
TMA50-DF92	909272	11	4c	Rat trap	Bread	Field vole	68.0
TMA50-DF93	911275	12	2c	Rat trap	Bread	Bank vole	19.0
TMA50-DF94	911275	12	2a	Mouse trap	Bread	Bank vole	19.9
TMA50-DF95	911275	12	1a	Mouse trap	Bread	Bank vole	32.0
TMA50-DF96	911275	12	4a	Mouse trap	Bread	Bank vole	18.0
TMA50-DF97	912276	13	3b	Mouse trap	Cat food	Bank vole	29.6
TMA50-DF98	912276	13	3a	Mouse trap	Bread	Field vole	28.3
TMA50-DF99	912276	13	4a	Mouse trap	Bread	Water vole	32.9
TMA50-DF100	912276	13	4c	Rat trap	Bread	Water vole	93.5
TMA50-DF101	912276	13	1a	Mouse trap	Bread	East European vole	24.7
TMA50-DF102	912276	13	2a	Mouse trap	Bread	Bank vole	22.0
TMA50-DF103	914263	5	3c	Rat trap	Bread	Bank vole	16.5
TMA50-DF104	914263	5	2a	Mouse trap	Bread	Bank vole	21.3
TMA50-DF105	916263	3	1a	Mouse trap	Bread	Bank vole	16.3

TMA50-DF106	916263	3	1b	Mouse trap	Bread	Bank vole	25.8
TMA50-DF107	912269	10	3a	Mouse trap	Bread	Field vole	23.3
TMA50-DF108	911275	12	2a	Mouse trap	Bread	Bank vole	17.2
TMA50-DF109	911275	12	3c	Rat trap	Bread	Bank vole	15.0
TMA50-DF110	911275	12	1a	Mouse trap	Bread	Bank vole	19.2
TMA50-DF111	911275	12	4a	Mouse trap	Bread	Yellow-necked mouse	21.2
TMA50-DF112	911275	12	4c	Rat trap	Bread	Yellow-necked mouse	49.9
TMA50-DF113	912276	13	3a	Mouse trap	Bread	Bank vole	15.1
TMA50-DF114	912276	13	3b	Mouse trap	Cat food	Bank vole	20.6
TMA50-DF115	912276	13	1a	Mouse trap	Bread	Bank vole	22.8
TMA50-DF116	912276	13	2a	Mouse trap	Bread	Bank vole	15.1
TMA50-DF117	912262	6	2c	Rat trap	Bread	Bank vole	16.8
TMA50-DF118	912262	6	1c	Rat trap	Cat food	Bank vole	29.2
TMA50-DF119	930267	1	3a	Mouse trap	Bread	Bank vole	23.7
TMA50-DF120	917269	9	4b	Mouse trap	Cat food	Bank vole	18.5
TMA50-DF121	918266	7	4a	Mouse trap	Bread	Bank vole	15.9
TMA50-DF122	921265	2	1b	Mouse trap	Bread	Bank vole	17.4
TMA50-DF123	920282	17	4a	Mouse trap	Bread	Bank vole	17.7
TMA50-DF124	920282	17	3b	Mouse trap	Cat food	East European vole	23.1
TMA50-DF125	916276	15	3b	Mouse trap	Cat food	Field vole	15.2
TMA50-DF126	916275	14	2c	Rat trap	Bread	Bank vole	21.5
TMA50-DF127	914261	4	3a	Mouse trap	Bread	Bank vole	17.5
TMA50-DF128	916263	3	3a	Mouse trap	Bread	Bank vole	20.1
TMA50-DF129	916263	3	1a	Mouse trap	Bread	Bank vole	17.1
TMA50-DF130	916263	3	1b	Mouse trap	Bread	Common shrew	8.0
TMA50-DF131	916263	3	2a	Mouse trap	Bread	Bank vole	18.6
TMA50-DF132	912269	10	3a	Mouse trap	Bread	East European vole	13.9
TMA50-DF133	920282	17	4c	Rat trap	Bread	Bank vole	16.5
TMA50-DF134	916276	15	2a	Mouse trap	Bread	Field vole	38.9
TMA50-DF135	916275	14	2a	Mouse trap	Bread	Bank vole	25.7
TMA50-DF136	911275	12	2a	Mouse trap	Bread	Bank vole	19.4
TMA50-DF137	912277	16	4a	Mouse trap	Bread	Bank vole	17.6
TMA50-DF138	912276	13	3a	Mouse trap	Bread	Bank vole	18.6
TMA50-DF139	912276	13	3b	Mouse trap	Cat food	Bank vole	18.5
TMA50-DF140	912276	13	3a	Mouse trap	Bread	Field vole	43.5
TMA50-DF141	912276	13	1a	Mouse trap	Bread	Bank vole	18.2
TMA50-DF142	909272	11	3a	Mouse trap	Bread	East European vole	25.7

TMA50-DF143	909272	11	3b	Mouse trap	Cat food	East European vole	22.0
TMA50-DF144	917269	9	4b	Mouse trap	Cat food	Bank vole	16.1
TMA50-DF145	921265	2	3a	Mouse trap	Bread	Bank vole	17.7
TMA50-DF146	921265	2	4a	Mouse trap	Bread	Bank vole	16.7
TMA50-DF147	921265	2	4b	Mouse trap	Cat food	Bank vole	14.3
TMA50-DF148	930267	1	4a	Mouse trap	Bread	Bank vole	18.8
TMA50-DF149	930267	1	3c	Rat trap	Bread	East European vole	22.8
TMA50-DF150	930267	1	3a	Mouse trap	Bread	Bank vole	20.2

Notes

Spring:

Trapping sites FET916263, FET914261, FET914263 & FET912262 harboured masses of ants, which quickly removed cat food from traps.

Fall:

The following traps had disappeared from the field, and replaced with traps which were somewhat bigger than other mouse traps but considerably smaller than rat traps:

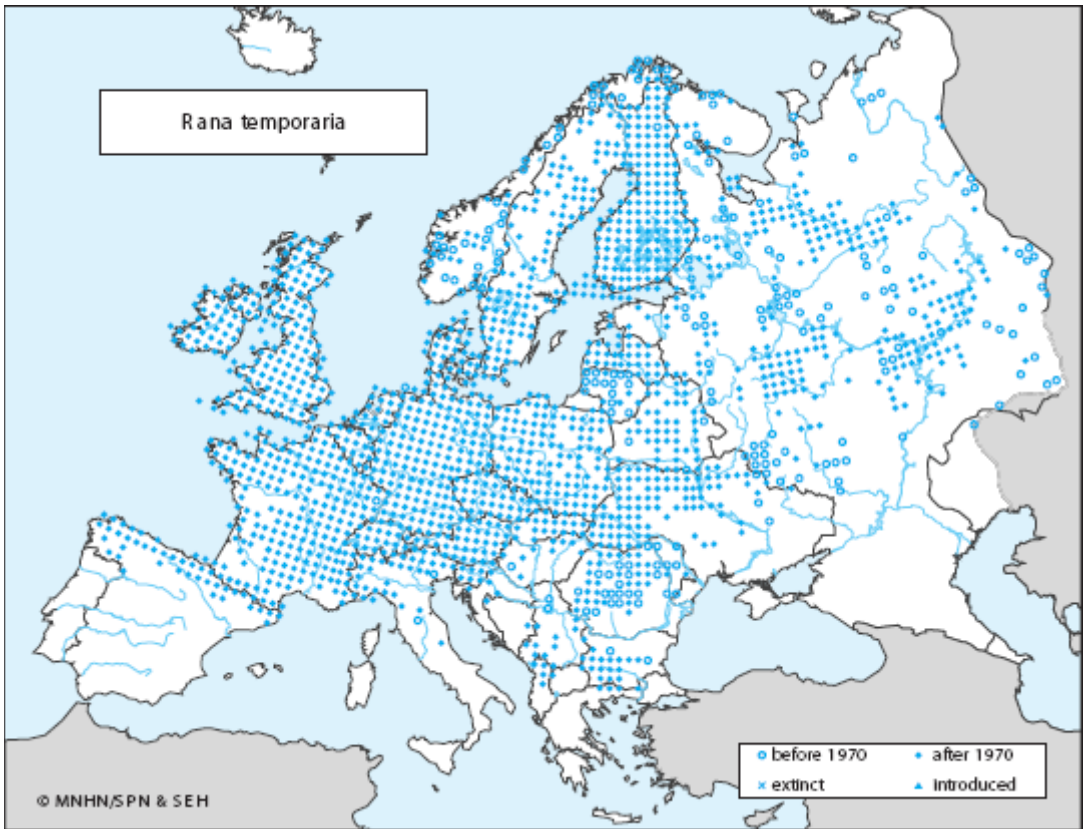
FET916276: 1a, 1b, 4a, 4b
FET917269: 1a-c, 2c, 3c
FET 903282: 1c, 2b
FET921265: 2a-c.

In September 5 the entire trap group FT4 in trapping site FET903282 was found disappeared. It was not replaced, as the trapping period ended that day.

Appendix 7. Descriptions of herpetofaunal species.

Common frog (*Rana temporaria*)

The common frog is a widely distributed species throughout Europe (Map 1). It is found from the Mediterranean coasts well into the arctic circle, even at the coasts of the Arctic Ocean (Gasc et al. 1997).



Map 1. *Common frog distribution in Europe after Gasc et al. 1997.*

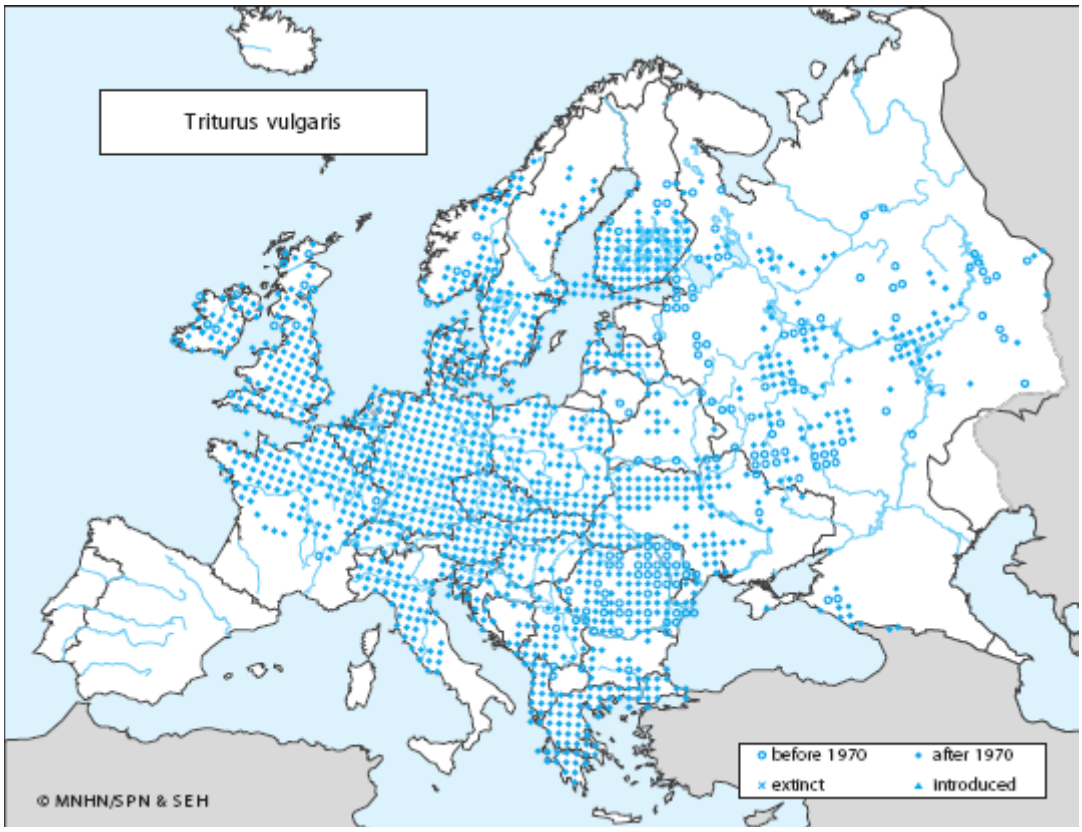
The common frog inhabits a wide variety of habitats. Many terrestrial (associated with woodland) and aquatic habitat types are used. The species is present in coniferous, mixed and deciduous forests, forested tundra and steppe, bush and shrublands, glades, grasslands, dry and wet meadows, marshes, fields, rural gardens, parks, and urban areas. Aquatic habitats include both temporary and permanent ponds, lakes and rivers; spawning and larval development occurs in these water-bodies. The species does well in many modified habitats such as rural gardens (Kuzmin et al. 2004).

The common frog tadpoles start their life as herbivores feeding on algae, detritus and some plant material. They turn to carnivores already at the tadpole stage feeding on aquatic invertebrates and even display cannibalistic behaviour during periods of food shortages.

After metamorphosis, the frogs will feed on any invertebrate of suitable size. Favourites include insects (especially flies), snails and worms.

Smooth newt (*Triturus vulgaris*)

The smooth newt is also widely distributed throughout Europe (Map 2), but its range does not exceed as far north as in the case of the common frog, the adder or the common lizard (Gasc et al. 1997).



Map 2. *Smooth newt distribution in Europe after Gasc et al. 1997.*

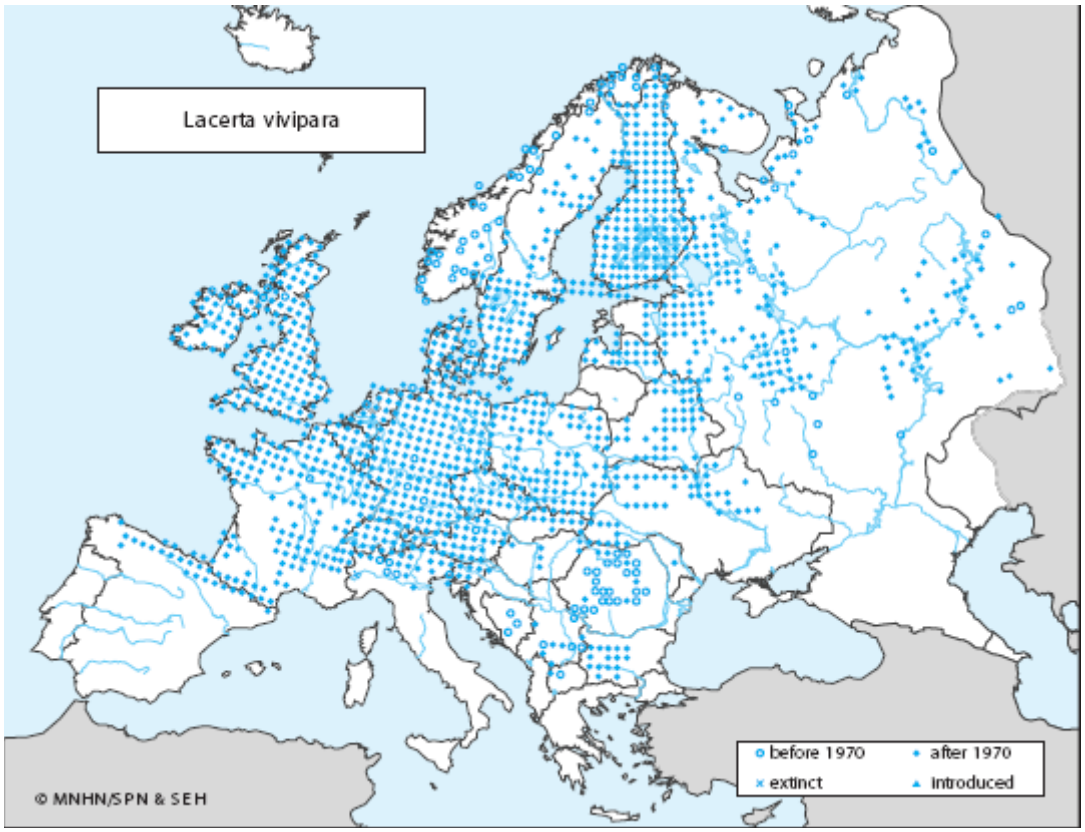
The species is generally associated with woodland habitats, including deciduous, coniferous, mixed and dry forests and woodlands. This is an adaptable species also present in meadows, bushlands, parks, fruit gardens, many damp habitats and rural and urban areas. The species breeds in still and slow moving shallow waters and irrigation ditches; females lay 200-300 eggs. The species is often recorded from modified habitats (Arntzen et al. 2006).

Unlike common frogs, the newts are carnivorous throughout their lives. After hatching, the larvae (tadpoles) start feeding on plankton, insect larvae and molluscs. As the newts grow, metamorphose and start terrestrial life, their diet includes a wider variety of invertebrates.

The preferred prey for larger individuals are also tadpoles of other amphibian species, like the common frog tadpoles.

Common lizard (*Zootoca vivipara*)

The common lizard is found further north than any other reptile species (Map 3) (Gasc et al. 1997). It has a very wide range: through Europe and across Asia, reaching Pacific coast and Japan (Beebee & Griffiths 2000).



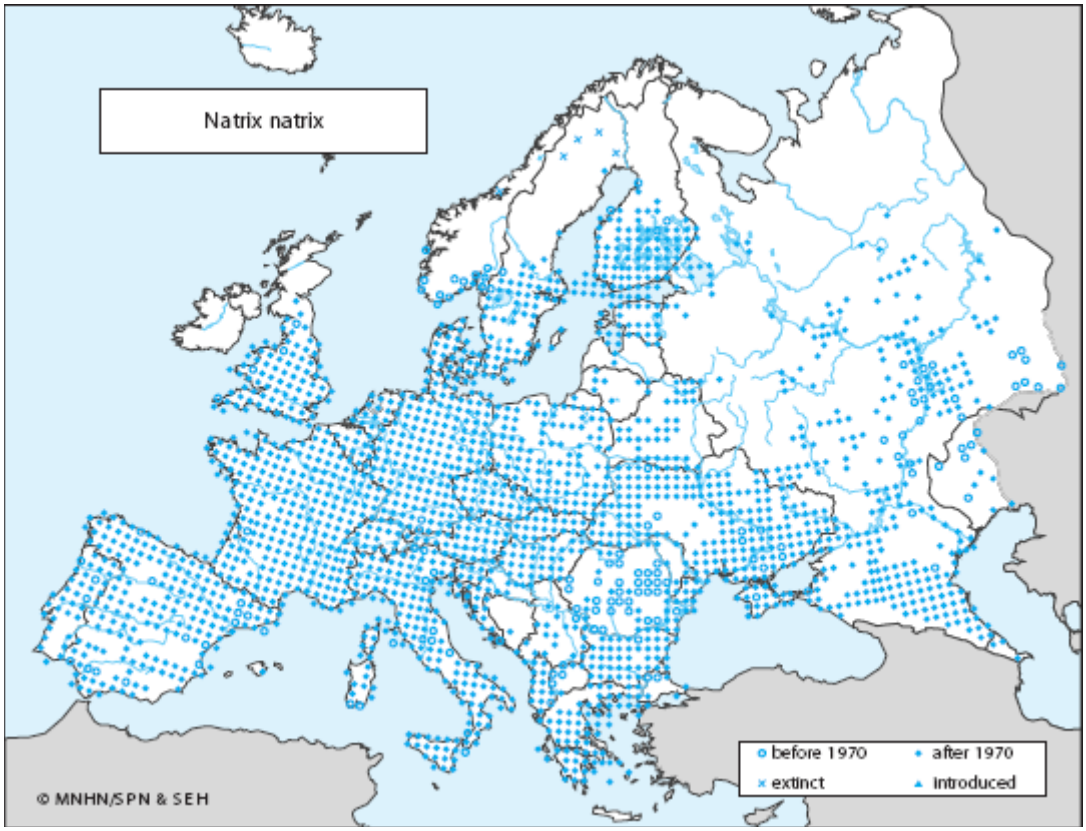
Map 3. *Common lizard distribution in Europe after Gasc et al. 1997.*

The common lizard is found in a variety of habitats, but it prefers open sunny areas. It tends to occur in dry areas, but also frequents wet heaths and swamps. Main habitats include meadows, moorland, heaths, sea cliffs, dry stone walls and embankments.

Common lizards hunt insects, spiders, snails and earthworms. They stun their prey by shaking it, and then swallow it whole. The diet can be highly variable and often includes a variety of insect and other invertebrate species.

Grass snake (*Natrix natrix*)

The grass snake is found throughout Europe, except the northernmost areas (Map 4) (Gasc et al. 1997). The species is an egg-layer and needs higher temperatures for reproduction than species like the adder or the common lizard, which give birth to live young.



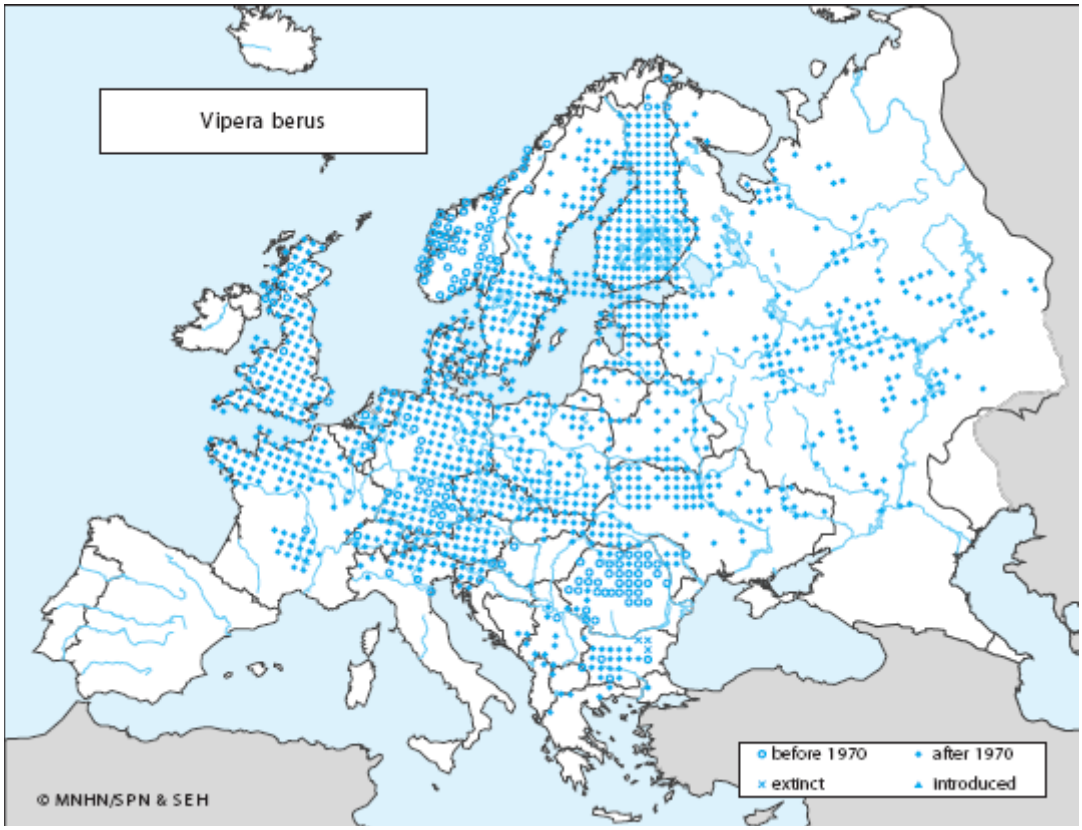
Map 4. *Grass snake distribution in Europe after Gasc et al. 1997.*

The grass snake is an aquatic species that lives close to water-bodies, like coastal areas, lakes, river banks and swamps. Also other damp habitats like ponds and ditches are often included to grass snake habitats. The species inhabits meadows, hedgerows, woodland margins and farmland as long as suitable water-bodies exist within a region.

Amphibians and fish dominate the diet of the grass snake. Most hunting is done underwater, but the snake may occasionally take small mammals and birds.

Adder (*Vipera berus*)

The adder is found throughout Europe and Asia, all the way to the Pacific, making it the most widely distributed terrestrial snake in the world (Map 5) (Gasc et al. 1997).



Map 5. *The adder distribution in Europe after Gasc et al. 1997.*

The adder can be found in sunny habitats: rocky hillsides, meadows, forest edges and clearings, bushy slopes, coastal dunes and stone quarries. It may also inhabit damp areas like swamps and it may be encountered on the banks of streams, lakes and ponds.

The main prey animals of adder are small mammals and other reptiles, which are killed by the snakes' potent venom. The newborn juveniles also eat insects, like grasshoppers, but turn into a vertebrate diet as they mature.

Appendix 8. Descriptions of small mammal species.

Information on habitat use and main food sources are based on Arnold & Burton (1981) and Bjärvall & Ullström (1996).

Yellow-necked mouse (*Apodemus flavicollis*)

Habitat use: Mainly in various types of forest and bush areas, but also in cultural habitats. It avoids open areas. Comes to buildings in winter. Home range size varies between ca. 0.3-5 ha. Population density is usually 1-10 individuals/ha, but even 50 inds./ha at the highest.

Main food source(s): Mainly plant material: seeds, nuts, berries, fruits, and shoots and buds of herbs, grasses, bushes and even trees. About 1/10 of diet consists of small invertebrates (e.g. insect larvae and snails), reptiles and carcasses.

Bank vole (*Myodes glareolus*)

Habitat use: Different forest types, also coniferous forests, and bush-dominated areas including semi-open pastures, field edges and parks. It prefers dense vegetation and therefore often younger forests. Home ranges are 500-7000 m^2, depending on e.g. population density and habitat type. Population density is usually 10-80 inds./ha in habitats suitable for breeding.

Main food source(s): Almost only plant material: e.g. herbs, grasses, seeds, fruits, berries, nuts, moss, roots, mushrooms, and leaves and bark of trees. Occasionally eats insects and other small invertebrates.

East European vole (*Microtus levis*)

Habitat use: Relatively dry grasslands, including also road and railroad verges, gardens and parks (lives in drier habitat and shorter vegetation than field vole).

Main food source(s): Supposedly mainly plant material.

Field vole (*Microtus agrestis*)

Habitat use: Open grasslands on skerries in the Baltic Sea, shore and other meadows, fallows, edges of cultivated fields, forests and ditches, clear-cuts, sparse forests (like mountain birch forests) and fjeld meadows. It requires dense vegetation near ground. Home ranges vary from 200 to 1000 m^2, depending on e.g. population density and amount of food.

Home ranges of males are often twice as large as females' home ranges. Population density may reach several hundreds per hectare.

Main food source(s): Mainly grasses, but around midsummer they prefer herbs. In wintertime they often eat bark of trees. An adult field vole may eat up to 30 g of grass per day.

Water vole (*Arvicola amphibius*)

Habitat use: Often close to water bodies (e.g. ponds, ditches, marshlands), but also meadows, fields and gardens. Changes habitat during the season: in summer it prefers moister habitats and uses tunnels burrowed into drier soils in winter.

Main food source(s): Various plant material. Stores potatoes and other root crops for winter. Damages roots and bark of (fruit-)trees, as well as spruce seedlings. Very occasionally insects, gastropods and clams.

Common shrew (*Sorex araneus*)

Habitat use: It lives in almost all habitat types from the Baltic archipelagos to fjeld areas. Home ranges are typically small (from some hundreds to over a thousand square meters), as they usually move within some hundreds of meters, but sometimes they migrate even several kilometres.

Main food source(s): Various small invertebrates: worms, insects, myriapods, spiders, snails and isopods. Also carcasses. They sometimes also eat plant material, especially seed. The daily amount of food is equal to ¾ of their own body weight on average.

Appendix 9. Pictures.

Picture 1. *Common lizard with a regenerated tail basking in a forest clearing.*

Picture 2. *A possible hibernation site of adders.*

Picture 3. *This ditch by a field harboured 39 common frog egg clutches.*

Picture 4. *Egg clutches of common frog floating in the ditch in picture 3.*

Picture 5. *This smooth newt male was found at the ditch in pictures 3 and 4.*

Picture 6. *Regular cutting of vegetation under the transmission lines creates a dry and warm habitat.*