

**P-04-36**

## **Oskarshamn site investigation**

### **Amphibians and reptiles in SKB special area of investigation at Simpevarp**

Claes Andrén, Nature

March 2004

**Svensk Kärnbränslehantering AB**

Swedish Nuclear Fuel  
and Waste Management Co  
Box 5864

SE-102 40 Stockholm Sweden

Tel 08-459 84 00  
+46 8 459 84 00

Fax 08-661 57 19  
+46 8 661 57 19



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This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the author and do not necessarily coincide with those of the client.

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## Summary

Amphibian and reptile species likely to occur in the Simpevarp SKB special area of investigation are listed with comments on their distribution, status, biology and environmental demands. The species are *Triturus vulgaris* (Smooth newt), *T cristatus* (Great crested newt), *Bufo bufo* (Common toad), *Rana arvalis* (Moor frog), *R temporaria* (Common frog), *Lacerta agilis* (Sand lizard), *L vivipara* (Common lizard), *Anguis fragilis* (Slow-worm), *Coronella austriaca* (Smooth snake), *Natrix natrix* (Grass snake) and *Vipera berus* (Adder). A short field study was performed mainly to verify the presence of suitable habitats for the species listed. Findings of amphibians and reptiles as well as their potential habitats are noted by geographical codes and additional remarks are given to interesting findings. Altogether 38 findings of five different species of amphibians and reptiles were done in 18 localities. Of special interest is the record of sand lizard, which probably indicate a colony in the vicinity even though this could not be confirmed.

# Sammanfattning

Grod- och kräldjur som enligt litteraturen kan finnas inom SKB:s särskilda undersökningsområde vid Simpevarp har beskrivits med avseende på utbredning, hotstatus, biologi och miljökrav. De aktuella arterna är mindre vattensalamander, större vattensalamander, vanlig padda, åkergroda, vanlig groda, sandödla, skogsödla, kopparödla, hasselsnok, vanlig snok och huggorm. En kortare fältstudie har genomförts med syfte att verifiera förekomsten av lämpliga miljöer för nämnda arter. Fynd av grod- och kräldjur och deras potentiella miljöer har angetts med geografiska koder. Under studien noterades 38 grodor, paddor, ödlor och ormar av fem arter på 18 olika lokaler. Särskilt bör noteras fyndet av sandödla, vilket sannolikt indikerar en koloni inom området, även om detta inte kunde bekräftas.

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# **1 Introduction with description of mission and methods**

The aim of this inventory has been to confirm which amphibian and reptile species that do occur in the special area of investigation in Simpevarp. As important has been to identify important habitats especially for species regarded to be rare or threatened, e.g. listed on the national red list or placed in the EU habitat directive. The report should also include some basic information on the species that are likely to occur in the area, even though they were not found during this short field investigation. The methods used was firstly to study the variation in biotopes and vegetation structure and compare this with the habitat requirements known from literature, and combine this with own experience, for each species. A short field investigation was carried out mainly following all smaller roads in the area and checking areas of special interest. It must be kept in mind that the outcome of such a study tour on one hand depends on the time of year and day, but also on unpredicted events such as weather conditions. Dry weather reduces the findings of amphibians and rainy or cold weather make it less likely to see reptiles out. When an interesting habitat was spotted from car (and maps) a short walk was done looking for possible amphibians and reptiles and making notes from the environment.

## **2 Species likely to occur in the area, habitat and biology**

### **2.1 Smooth newt (Mindre vattensalamander) *Triturus vulgaris***

The distribution includes most of southern and central Sweden up to Ångermanland and further north up to altitudes of 500–700 m. Adult size is normally 6–10 cm. Adult specimens are recognized from the smooth and moist skin, dark dots on body sides, a dark stripe on side of head and an orange band on belly with dark dots. The male has a typical continuous, wavy and relatively low crest during the reproduction period.

The eggs are deposited one by one on water plants and difficult to detect, the larvae metamorphose and leave the water in mid summer and spend 2 years on land before returning to the water for breeding the first time. Breeding normally takes place in rather small waters (less than 100 m<sup>2</sup>), often with much vegetation, but the species seems to be very flexible and can use many kinds of breeding pools. At least half of the water surface should be sun exposed. Increasing amount of fertilizers or pollutions in the water reduces the density of smooth newts in the water. Both adults and larvae are sensitive to predation by birds, fish and many water insects.

During the terrestrial phase most animals are found less than 400 m from the breeding pond. During daytime they hide in burrows or under logs or stones and being active in night at a temperature of more than 7°C (especially after rain) hunting small evertbrate prey such as insects and their larvae. Normally the species is connected to forest habitats, grazed areas and other non-cultivated land, but it has a wide range of habitats including also e.g. gardens and farms. It is still a very common species in most of its Swedish range and do not need special conservation measures for its future survival. A most interesting and unique population of neotenic smooth newts in northern Sweden has been lost by introduction of predatory fish. There are many records of the smooth newt along the Swedish southeast coast including the vicinity of Oskarshamn. It is likely to occur also in the Simpevarp investigated area.

### **2.2 Great crested newt (Större vattensalamander) *Triturus cristatus***

The more continuous distribution is restricted to the southern part of Sweden up to the lake Vänern in northwest and Uppland in the northeast. Scattered localities are found along the Baltic coast up to the vicinity of Gävle. The species is largely connected to old forest areas in the culture landscape and mostly along the coasts. It is missing on the Baltic island Gotland. The adult size is about twice of that of the smooth newt, which means 10–16 cm including the tail. The skin is more dry and warty, the colour is dark brown or black with small white dots on the body sides. The belly is orange with scattered dark patches distributed in a specific pattern typical for each individual. During the aquatic reproductive phase the male develop a high crest divided in two separate parts and with a spiny upper edge. The reproductive behaviour is mainly

chemical and tactile and most interesting. Eggs are deposited one by one on water plants and the larva is a predator on small invertebrates of suitable size. The larvae metamorphose and leave the water in July or August. After 2–3 years they reach maturity and return as adults for breeding often in the same water they were born in. Breeding normally takes place in waters with much vegetation, but they are more sensitive to pollution compared to the smooth newt. They also to some extent feed on their smaller relative.

After leaving the breeding pond the great crested newt normally are found in old forests, mostly deciduous ones, with much dead wood on the forest floor. Dead wood is important as day shelter and sometimes also as winter dens. The decomposing wood is often wet (especially if the bark remains) and produces some heat during this process. The adults have small feeding territories including suitable hiding logs and the terrestrial habitats normally are found within a distance of 800 m from the breeding ponds. The great crested newt is an annex II species in the EU habitat directive and placed on the Swedish Red list under the category NT (Near Threatened). The Swedish population is estimated to be larger than 100,000 reproductive animals, but even if the population trend is not known it is likely that many local populations are lost due to exploitation, fish introductions and deteriorating water quality of many breeding ponds. The species is known to occur in the vicinity of Oskarshamn, and it is likely to occur also in the Simpevarp investigated area.

### **2.3 Common toad (Vanlig padda) *Bufo bufo***

The common toad is probably the most common amphibian species in Sweden regarding both population size and area of distribution. It is distributed through almost all of southern and central parts and at lower altitudes it follows the Baltic Sea to Finland. The northernmost record is in Nikkalukta near Kebnekaise at almost 68° N. The common toad is a robust species with large size difference between the sexes, the female being up to 12 cm and the adult male rarely exceeding 7 cm. The skin is relatively dry and covered with glands for secretion of mucus for keeping the skin moist and poison for protection from predators. Especially behind the neck (parotid glands) and on the hind legs glands for production of poison are aggregated. The hind legs are short as in all toads and they are therefore walking or taking short jumps compared to frogs normally moving with big jumps. The common toad is normally brown or sometimes grey, but as in many amphibians the body colour can quickly change to be darker or lighter or with more pattern being seen as an adaptation to external environmental and internal physiological factors.

The species has an explosive reproductive strategy, which means that almost all individuals breed during a short period in early spring. Hundreds of amplexus pairs can be seen together and a lot of fighting between males, which are always outnumbering the females, as they start to breed at an earlier age. The eggs are laid as long strings wrapped around water plants and often egg strings from many females form large balls of eggs. The larvae are black and often seen moving in the open water mass in large shoals, and this is possible as also the larvae have skin poison and therefore a good protection against many aquatic predators. Normally the common toad breed in larger and permanent waters. The species seems to do quite well also in many disturbed and



exploited areas and is less sensitive towards eutrophication. The species is known to occur in the Oskarshamn area and is likely to be common also in the Simpevarp investigated area.

## **2.4 Moor frog (Åkergroda) *Rana arvalis***

The moor frog is widely distributed in large parts of Sweden including Öland and Gotland. It is found up to about 400 m above sea level and therefore lacking in westernmost and northern parts of the country. Adults are 4–7 cm, rather similar to the other “common” brown frog *Rana temporaria*, but the moor frog is recognized by a more pointing snout and a typical large tubercle beside the smallest toe on the hind leg. During the reproductive period, the male can be grey or completely blue. True frogs (*Rana*) including this species deposit their eggs in round clumps. As many females lay their eggs at the same place large clusters are formed, and this is an adaptation to be able to reproduce in a cold climate. The moor frog is found along the coast including smaller islands and the breeding ponds can be very small and shallow. All brown frog larvae are vulnerable to predation by birds, fish and many aquatic invertebrates.

The moor frog followed the melting ice towards north after the last ice period and the species has a long history in Sweden, probably more than 10,000 years. There are many local adaptations or unique evolutionary lines. This can be seen in morphological characters as length of hind legs, size of tubercle on hind foot, a number of colour pattern morphs and differences in the mating calls. The species was described by Sven Nilsson 1842 from animals on a locality not far from Oskarshamn (Tveta socken) and these all belong to the striped morph, which is rare in other parts of the country. Normally the moor frog in Sweden is unicoloured yellowish brown with a white belly. The species has a general negative population trend in Europe and is placed on many national Red lists in northern Europe. In Sweden the species is still common and in general it is doing well. However, it is dependant on wet grazed areas surrounding the breeding ponds, and changes in the natural water regime therefore can be a problem. The species has been recorded in the vicinity of the investigated Simpevarp area, and is likely to occur there.

## **2.5 Common frog (Vanlig groda) *Rana temporaria***

The common frog has a wide distribution throughout most of Europe. The northern border extends in Scandinavia to the coast of the Atlantic and Arctic Ocean and continuous in Russia to the southern border of the tundra. In Sweden the species has a peculiar distribution. It is common in Scania, but absent from the Baltic islands Öland and Gotland. It is regarded to be lacking in Blekinge east of Karlshamn and in Kalmar län as well as in great *Sphagnum* bogs in Småland and parts of Halland. However, new localities are continuously found filling these gaps slowly. Up to now no findings are done in Kalmar län and in the area surrounding Simpevarp. It is a most interesting distribution, which may reflect an ongoing colonization which has been stopped by a strong competition with the moor frog. These brown frogs are probably strong competitors and in areas where the common frog is lacking (e.g. on Gotland) the moor frog is morphologically sharing the characters of both species.

The common frog is slightly larger than the moor frog and often reaches 7–9 cm and sometimes even more than 10 cm. It has a very variable colour pattern and a number of morphs can be seen in same population. It can be distinguished from the moor frog by the small and soft tubercle on the hind foot, the blunt snout, the dark spots covering the belly and a larger adult size. The call is also a very good species character being very different from the moor frog. In many localities the two brown frog species are reproducing side by side, the common frog starting a week earlier. They share the vulnerability to predation during the early development in the water up to metamorphosis. A well developed submerged vegetation around the shore line therefore is important offering larval protection. The common frog often move away from the breeding pond and is found in a wide variety of terrestrial habitats, mainly in the cultivated farm land. It is less well adapted to low pH habitats as Sphagnum bogs and pine tree forests. Acidification therefore is a more severe problem for the common frog compared to the moor frog. Up to now no findings of the common frog has been done in the Simpevarp area, but the species known distribution is not far away from the investigated area in Simpevarp.

## **2.6 Sand lizard (Sandödla) *Lacerta agilis***

The sand lizard is distributed over major parts of central Europe and the western parts of central Asia. The Swedish range is restricted to a more or less continuous distribution in south and south eastern parts of the country. Additionally, many small isolated patches of distribution are found further north up to Dalarna, which is thought to reflect a former more wide continuous range in Sweden. The sand lizard lays eggs and is therefore dependant on a suitable microclimate offering good possibilities for embryonic development. The scattered northern relict populations probably reflect this climatological limitation. These distribution patches normally includes e.g. deserted sand or gravel pits with a favourable microclimate, and the locality is shared by a number of high temperature demanding insects and plants. The sand lizard is heavy built, reaching a length in Sweden of about 22 cm including the tail (unbroken). A typical colour pattern includes a brown band along the back or sometimes a row of blotches, but with a narrow vertebral continuous or interrupted white line. Along the body sides a number “eye blotches” are distributed, that is dark brown blotches with a white central spot. There are also several additional unique scale characters. During reproduction in May-June the male develop a beautiful green colour along the body sides.

Sand lizards are living in small colonies and their habitats normally include exposed areas of sand where they dig wholes for hiding and egg development. Some of the Swedish localities differ from this pattern and the sand can be replaced by gravel or rocks, probably offering a similar climatic condition. In many places bare rocks with patches of heather are typical localities for the species. Quarries or roadsides with slopes exposed towards south and with stones or blocks also offer good places. The sand lizard needs open exposed ground, and changes in the landscape with increased vegetation cover e.g. depending on less grazing by cattle has been negative to the population development. There are some few localities in Sweden still doing well, but most local populations are small and slowly vanishing. The sand lizard has been recorded in the vicinity of Oskarshamn and the species is placed on our national Red list under the category VU (Vulnerable).

## 2.7 Common lizard (Skogsödla) *Lacerta vivipara*

The common lizard has a very broad distribution throughout most of Europe and far eastwards in Asia. This lizard has been regarded common almost everywhere in Sweden, but I think the density of lizards now is much less, even if it still has a very large distribution. It also occupies the two Baltic islands Öland and Gotland and it has been recorded towards north through Norrland up to the latitude 68° 30' (Karesuando). It is found in many different habitats, but highest densities may be in open and exposed *Sphagnum* bogs and exposed hillsides with stones and sparse grass vegetation. It is a more slender and flat bodied lizard compared to the sand lizard. The total length is up to 18 cm, with tail and body approximately of the same length. The body is grey, green or brown and along the body several white lines or rows of white dots occur. "Eye-blotches" are lacking or only weakly developed. It is not so easy to distinguish the two sexes. The male normally has a more swollen and pointing cloacae, a yellow belly with many dark spots and often more strong red or bluish colours on the throat, while the female has different colours on the body and only few darker dots or lacking these completely.

It is a day active alert lizard, hunting insects, spiders and other invertebrates. It can be seen in dry and wet habitats, but it should be an exposed ground for good thermoregulation. Often it is found on vegetation edges between colder places and warmer. When disturbed it quickly find shelter and can at the same time lower body temperature and reduce energy consumption. Sometimes it jumps into water and stay submerged for long time when scared away. Being a viviparous lizard it can exploit more cold areas compared to the sand lizard, and the female can select optimal microclimate and speed up embryonic development in a way not possible for the sand lizard, where the eggs have a fixed place. It has been recorded in the vicinity of the Simpevarp investigation area.

## 2.8 Slow-worm (Kopparödla) *Anguis fragilis*

The slow-worm is a legless lizard looking almost like a snake, but the movable eye lid and the long tail are typical morphological characters for lizards. The skin is armed by bone plates giving the species a hard and rigid outer "shell", but the slow-worm moves surprisingly fast in spite of its stiff body. The tail easily breaks but can be replaced through a regeneration process (autotomy). This species also has a wide distribution in Europe from the British isles, France and Spain in the west to Russia, Asia Minor and northern Iran towards east. In Sweden it occurs in southern and central parts following the Baltic coast towards north up to southern Lappland. The slow-worm also give birth to live young, which may explain the distribution towards north. Most important habitat seems to be open forest areas with exposed ground patches. The old culture landscape is normally an optimal habitat. It feeds on snails and worms and therefore is favoured by a relatively moist ground where these prey items occur frequently.

The slow-worm is not usually seen basking out in the open, but instead thermo regulates by staying under flat warm stones taking advantage of conducting heat. In this way predation pressure is also reduced as the time of exposure towards visually guided predators is reduced. They are normally exposed in the open a short period in the morning and in the afternoon. A good way of searching for slow-worms is to turn logs

and flat stones on the ground but along stone walls and ditches. Best time to do this in late afternoon. The slow-worm including tail can reach a length of almost half a meter. The new born specimens are gold or silver in ground colour, with a longitudinal dark band along the body side and a dark vertebral line. The adult female is brown in ground colour and keep the dark body side while the male turn unicoloured copper brown. In some populations males have blue spots scattered over the body, and this form becomes more common in the eastern parts of the range.

## **2.9 Smooth snake (Hasselsnok) *Coronella austriaca***

The smooth snake is confined mainly to biotopes including sand or bare rocks partly covered by bushes and shrub leaving a mosaic of open patches where the sun reaches the ground. In Sweden this kind of areas dominate along the west coast and north through Bohuslän and includes also the Norwegian SE coastal landscapes. On the eastcoast similar biotopes are found from Blekinge along the coast towards north up to Uppland and around the lakes Mälaren, Vänern and Vättern. It has a wide occurrence in major parts of Europe. The species is rarely seen and the main reason for this is its secret behaviour, spending most time under warm stones or coiled up around the stem of small bushes and almost invisible from above. The shadow from leaves and small branches completely conceal the snake. Being a top predator, feeding mainly on slow-worms, and occasionally on snakes or rodents, it has naturally a low density. When taking a prey it quickly bite the victim in the head and put a number of coils around its body and act as a *Boa constrictor*. It is a non poisonous snake, but often aggressive and attacking an enemy with vigorous bites.

Adult size including tail is normally 60–70 cm, but can rarely be up to 90 cm. The skin is smooth (lacking keels) and gives a bright impression. The colour pattern is similar in the two sexes with brown or grey ground colour with a dark brown or black pattern of two rows of blotches along the back and a stripe on side of head through the eye. The male is recognized (as in most snakes) by having a longer tail being more wide at the base. The smooth snake is giving birth to live young, and the litter size is normally around 10 juveniles. The winter dens can be a sloop with stones or rocks, partly overgrown by bushes. At the time of emerge in spring there are no leaves and the sun can reach the ground. This is an important factor as basking this time of the year is necessary for achieving optimal temperature allowing reproductive activity. The preferred daily temperature is about 30°C, which is also necessary for digestion, but the snake can move at much lower temperatures. The smooth snake has been recorded near Oskarshamn and there is likely to occur in the investigated Simpevarp area.

## **2.10 Grass snake (Vanlig snok) *Natrix natrix***

The grass snake has a wide distribution including most of Europe and lacking only on high altitudes and in northern parts of Scandinavia. Being an egg laying snake it is dependant on habitats including warm places where the eggs can develop up to hatching during summer. This can be heaps of leaf litter or other natural detoriating material, but in most places the grass snake put its eggs in dung or compost. This makes it strongly connected to the culture landscape (also including gardens). The northern distribution in Sweden along the Baltic coast far north in Norrland can probably be explained by this

culture dependence. As the farming practise has changed and free laying dung heaps no longer is allowed, the northern range of the species has been lost or strongly diminished. The grass snake is also connected to wetland areas as the main food is amphibians and fish.

The most typical species characters are the two yellow or white eye blotches in the neck, clearly brought out by the surrounding black colouration. The body is usually grey, black or sometimes greenish or brownish. The neck pattern can serve different functions. It may mimic big eyes on a larger animal and look frightening when the snake lift the head, hiss and strike like a cobra. The grass snake has poisonous saliva but no special fangs to transfer poison. I have never heard of a grass snake biting a human even though it can be aggressive. The neck pattern may also be an effective passive defence by acting as camouflage in some habitats. On the mainland completely black, melanistic, specimens do occur but are very rare. On the Baltic island Gotland on the other hand a special subspecies of grass snakes occur, where almost half of the population is melanistic. "Normal coloured" specimens often has a yellow or orange band in the neck and large dark spots or stripes along the body sides. The mainland grass snake has had a continuous population decrease and is classified as NT (Near Threatened) on the national Swedish red list. The grass snake is known from reports in the literature to occur near Oskarshamn and is therefore likely to be found in the Simpevarp investigated area.

## **2.11 Adder (Huggorm) *Vipera berus***

The adder is the only venomous snake in Sweden. It has special fangs for transferring venom in to the body of a prey or an enemy. The venom is comparatively powerful and a human being bitten may have a strong reaction and need medical care. However, a new excellent anti venom is available in most hospitals and almost no fatal cases of adder bites of humans are known. The adder is still a common snake in Sweden with a large range covering most of the country except small alpine areas. It is regarded to be the species with widest range of all terrestrial snakes. As for most snakes at our latitudes suitable habitats must include a mosaic of open patches where the sun reaches the ground. The culture landscape with a combination of grazed and cultivated areas, ditches, stone walls, bushes and bare rocks offer this optimal conditions. Farming also normally increases the density of rodents, which is the main food for the adder. After a farm has closed down there is a period during early succession when meadows produce high numbers of rodents, which also may result in extreme densities of adders (up to 4 per hectare). When bushes and trees start to cover the ground the adder population again decreases as a result of lower prey density.

The adder is one of very few snakes with pronounced colour pattern differences between the sexes. Males are grey or even white with a black zigzag pattern, while females are brown, reddish or yellowish, with dark brown pattern. When laying still on the ground the zigzag pattern makes it difficult for a predator to detect the snake. Melanism (being completely or partly black) is common in many adder populations. The black colour effects heat uptake from sun radiation, which in turn effect the time period when digestion of food is possible. The black colour can on the contrary be a disadvantage as visually hunting predators as birds of prey may easier detect a black snake. The adder gives birth to live young and the litter size is about ten juveniles.

All newborn adders are reddish brown and adult colour morph as well as melanism develops when they grow older and is fully developed after two to three years. Adult size including tail is normally up to 70 cm in males and 80 cm in females.

### 3 Field studies

A field study was carried out in the Simpevarp area during the 28<sup>th</sup> to 30<sup>th</sup> of May, 2003, with the aim to identify interesting herpetological sites and habitats. In Figure 1 sites where amphibians and reptiles were found or potential habitats are presented. They sites are briefly described further below.

The descriptions and coordinates are reported to the SKB GIS database (FN 252).



**Figure 3-1.** Potential habitats for amphibians and reptiles, or sites where amphibians and reptiles were found during the field study.

**Below a list of amphibians and reptiles and potential habitats are given**

**01. Äspö N57°26.180', E016°40.137'**

Bare rocks, scattered trees and bushes, close to the coastline  
Grass snake, 1 ad, killed on road  
Adder, 1 ad, killed on road  
Common toad, 1 ad, killed on road

**02. Äspö N57°24.898', E016°38.385'**

Mixed habitats, open bare patches, small deciduous forests and meadows  
Slow-worm, 1 ad, live on road

**03. Utlångö N57°25.190', E016°41.452'**

Mixed habitats, open patches, dens birch forest  
Adder, 1 ad, near road  
Slow-worm, 1 ad, live on road

**04. Utlångö N57°26.446', E016°41.697'**

Mixed open habitats, dens birch forest  
Slow-worm, 3 ad, killed on road

**05. Utlångö N57°26.725', E016°42.318'**

Deciduous old forest with moist ground, stony exposed slope  
Slow-worm, 1 ad, live near road  
Potential habitat for smooth snake including hibernation slope  
Potential habitat for Great crested newt, terrestrial habitat for hunting

**06. Utlångö N57°26.670', E016°42.549'**

Mixed habitats, bare rocks, meadows, grows of trees  
Slow-worm, 2 ad, near road

**07. Utlångö N57°26.628', E016°723'**

Mixed habitats, bare rocks, meadows, grows of trees  
Slow-worm, 1 ad, on road

**08. Utlångö N57°26.658', E016°42.888'**

Mixed habitats, open bare rocks, bushes, small meadows  
Slow-worm, 2 ad, near road  
Adder, 1ad, near road

**09. Utlångö N57°26.678', E016°42.089'**

Mixed habitats, open patches, dens forest grows  
Slow-worm, 1 ad, killed on road,  
Adder, 1 ad, on road live

**10. Figeholm camping N57°22.805', E016°35.336'**

Grass snake, 1 ad, live in sandy area with bushes  
Sandy open pine forest with bushes and grass meadows  
Adder, 1 ad, live on small path in open forest  
Slow-worm, 3 ad, live on small path in open forest



**11. Uthammar N57°23.217', E016°36.316'**

Mixed culture landscape, open patches forest grows

Grass snake, 1 ad, killed on road

Slow-worm, 1 ad, near road

**12. Uthammar N57°22.679', E016°36.363'**

Mixed culture landscape, open patches forest grows

Slow-worm, 1 ad, near road

**13. Uvö N57°23.755', E016°37.112'**

Mixed open culture landscape

Slow-worm, 3 ad, 2 killed on road, one live near road

**14. Gammal Näs N57°23.621', E016°37.884'**

Mixed open culture landscape

Slow-worm, 2 ad, live on road

**15. Gammal Näs N57°23.681', E016°37.375'**

Near farm, old culture landscape

Slow-worm, 1 ad, killed on road

**16. Basteböla N57°23.894', E016°36.503'**

Open forest, meadows, stonewalls

Slow-worm, 2 ad, live on and near road

**17. Riket N57°24.579', E016°35.266'**

Potential very good habitat for smooth snake including hibernation slope, should be checked early spring or early autumn

**18. Älmhult-Laxamar N57°24.411', E016°37.131'**

Forest with open patches

Slow-worm, 1 ad, live on road

**19. Arnhult (inside toward land) N57°25.969', E016°38.307'**

Small scale culture landscape

Slow-worm, 1 ad, near road

Potential very good habitat for smooth snake including hibernation slope, should be checked early spring and early autumn

**20. Near Figeholm camping N57°23.018', E016°33.598'**

Roadside with stony slope, 1.9 km east sign with text "Figeholm" and 1.4 km west of sign with text "Camping".

Sand lizard, 1 ad female killed on road

**21. St. Laxemar N57°24.371', E016°36.827'**

Small scale culture landscape, open forest

Adder, 1 ad, live on road

Grass snake, 1 juv, live near road

Slow-worm, 1 ad, near road

**22. Ekerum N57°25.249', E016°38.651'**

Slope with deciduous trees and blocks in open forest

Potential very good habitat for smooth snake including hibernation place, should be checked early spring and early autumn

**23. Simpevarp drilling point near the coast**

Right on the coast on bare rocks with small water pools

No conflicts with herpetological interests

**24. Ävrö drilling point**

Open forest with bushes and patches of bare ground, similar habitat is widely distributed in the surrounding area.

No conflicts with herpetological interests

## **4 Special consideration of rare or threatened species with suggestions on the management of their habitats**

Normally habitat management imply specific knowledge of the species concerned. However, for amphibians and reptiles some general aspects of their biology make it possible to describe composition and structure of suitable vegetation as well as management.

Amphibians have a thin and moist skin and use it for supplementary oxygen uptake. It means that they are more or less dependent upon a moist or wet surrounding. All amphibians in Sweden lay their eggs in water, where also larval development up to metamorphosis takes place. In most cases amphibians spent or relatively short period in spring in water for breeding and the rest of the active season they are terrestrial, but avoid dry places. Because of this most species are night active, they produce a special skin secret to keep the skin moist and reduce the risk of drying. If active in daytime they prefer soils covered with vegetation, which keeps the ground humid. If the weather is dry amphibians hide in burrows or dig down in the soil. Among the species concerned in this study the pool frog differ from the “normal” behaviour by being almost completely aquatic during the entire active period. It is often seen basking, but sitting in shallow water.

Reptiles were the first animals to conquer the terrestrial environment. They are in fact extremely well adapted to survive in dry and hot areas, and it is the dominating animal group in most steppe and desert communities. As they cannot produce necessary body heat for normal activity they are dependent upon either radiant heat or heat from the ground to reach optimal temperature. Therefore open exposed patches in their environment is necessary for regulating the body temperature by exposing different parts of the body to the sun. Often a mosaic of closed and open microhabitats are very good, preferably also including edge zones with open areas for basking on one side and dense vegetation for hiding on the other side. The old culture landscape usually includes this variation in biotope structure and is a preferred environment.

The great crested newt is favoured by breeding ponds with clean water (no pollutants or acidification), much vegetation (for egg depositing on submerged leaves) and at least exposed to the sun from south (to keep water temperature high). The terrestrial habitat (within 500 m from the breeding water) should be old forest, preferably deciduous but pine will do also, with much decomposing wood. This decomposing material on the ground is often wet and is used as day shelter. In the night they are out hunting various invertebrates. In the old forest they also find their hibernation places. It is important that fallen logs and other old wood remain on the ground.

The sand lizard lives in small colonies and the habitat normally includes climatically favourable slopes towards south. These can be of sand, gravel, stone or flat rocks partly covered with scrub. The habitat must be open and exposed to the sun and the slope itself increases the ground temperature. As the sand lizard lays eggs, suitable egg depositing places must also be available, which can be sand or sometimes decomposing material.

As a female sand lizard was found killed on road near the Figeholm camping, the colony may be on the road slope or at least near the road. In spite of careful search no colony was seen. However, the observation makes it probable that more sand lizard colonies are to be found in the area and it could well be more close to the Simpevarp power station. If colonies are located, a careful management program should be made to ensure that the habitat remains optimal. It may include removal of trees, bushes or shrub to increase sun exposure.

The smooth snake has a very secret behaviour and is therefore a difficult species to investigate. Even in an area where the species is known to occur it may be very difficult to verify this. The population density is normally low as it is a top predator. Often the smooth snake bask flat stones coiled up around the stem of small bushes or shrub and being almost invisible from above. It may also use the heat from warm stones instead of basking in the open as most reptiles do. However, in early spring and early autumn the smooth snakes can be found in the hibernation area and as the temperature this time of the year is lower, the snake usually needs to bask in the open. This can also be true after rain or in early mornings in the summer. Several suitable habitats with possible overwintering dens was located in the investigated area, and these places should be checked at the best time of year and at right time of day to confirm if the species do occur in the area. The areas of special interest are slopes with stones towards south with scattered bushes of hazel and nearby open deciduous forest with many open patches. A high density of slow-worms (the main prey of smooth snakes) in the area also supports the possible occurrence of the snake. Important management includes keeping the hibernation slope partly open and an open forest with bare ground patches nearby.

The grass snake is feeding on amphibians and fish and therefore largely dependent on habitats where these prey items occur, e.g. marshland, bogs or along the shore of lakes. As most amphibians are terrestrial during summer and can spread far away from open water the grass snake can also be connected to terrestrial habitats with moist ground. However, to be able to thermo regulate these areas must include open sun exposed patches or better edge zones along low and higher vegetation. The species is highly dependent on the old culture landscape for finding suitable egg depositing places. Some more "natural" places with decomposing material are available, but dung heaps and compost heaps is excellent places for egg deposition. As these elements become more and more rare due to new regulations and reconstruction of farming practice the grass snake can no longer find suitable places for egg laying. Management for this species include keeping the ground water regime natural and leave leaf litter or dung in heaps outside.

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Photos and habitats



*Figure 1. Coastal habitat for many reptiles and amphibians.*



*Figure 2. Grass snake on road.*



*Figure 3. Exposed rocky roadside with good basking sites for reptiles.*



*Figure 4. Roadkilled adder.*





*Figure 5. Wet forest habitat suitable for newts and toads*



*Figure 6. Roadkilled common toad.*



*Figure 7. Optimal habitat in old culture landscape for reptiles*



*Figure 8. Roadkilled slow-worm.*



*Figure 9. Exposed roadside near finding of sandlizard.*



*Figure 10. Roadkilled female sandlizard.*



*Figure 11. Optimal habitat for smooth snakes with potential hibernation site.*