

# 10 Years of Amphibian Monitoring in the Netherlands: Preliminary Results

**Introduction** Of the 16 Dutch amphibian species, nine are listed on the national Red List of Threatened Species. Various reasons have caused the decline of amphibian populations in the last century. In 1997, a National Amphibian Monitoring Program was started by the organisation RAVON (Reptile, Amphibian & Fish Conservation the Netherlands) and Statistics Netherlands.

**Methods** Well-instructed volunteers have monitored 320 areas, representing 2,700 breeding sites, four times a year. Not all areas have been monitored annually. In each area a representative selection of appropriate as well as marginal breeding sites was surveyed. The surveys aim to observe all species during their maximum presence. Adult abundance for each species was estimated with an index value:

0 = not present;  
 1 = rare, only some individuals are present;  
 2 = common, several dozens of individuals are present;  
 3 = very common, more than hundred are present.  
 Estimating adult abundance was also based on a combination of egg, larvae or juvenile observations. The main techniques used in the field include visual and call surveys and net dipping. In some cases single populations were monitored using a slightly different approach.

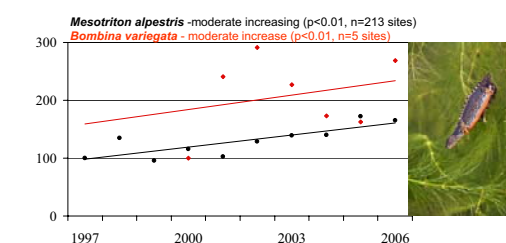
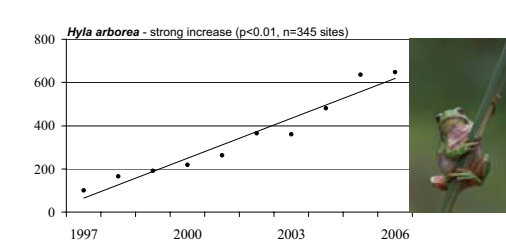
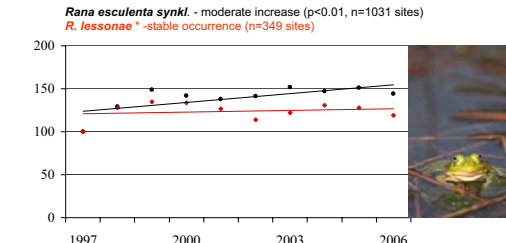
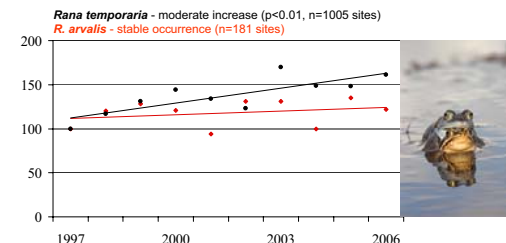
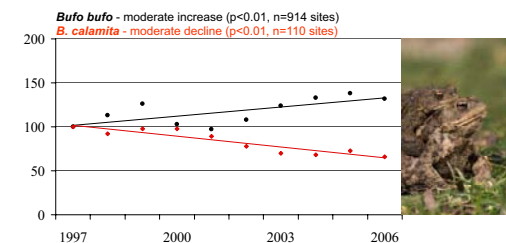
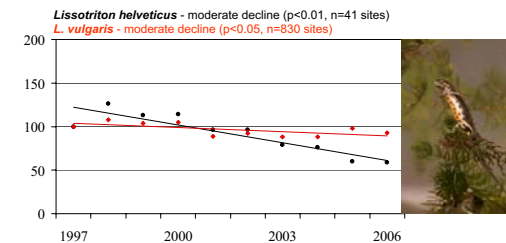
**Results & Discussion** Ten years of monitoring resulted in a significant assessment of the status of 11 of the 16 species, which are presented in the graphs.

*Lissotriton helveticus* and *L. vulgaris* show a moderate decline. In both cases the sample size is representative for the natural distribution. *Mesotriton alpestris* shows a significant, moderate increase. The distributions of *L. helveticus* and *M. alpestris* show a large overlap but we can give no clear environment-related factors to explain the different trends.

*Bufo bufo*, *Rana temporaria* and *R. esculenta* synkl. show a moderate increase. They have a very wide distribution and the overall sample size is large. Changes in environmental conditions have caused this increase. Over the last decade(s) rainwater and water quality of breeding sites have improved, and many new ponds have been created. It is unclear why the common *L. vulgaris* has not benefit from this.

Species	Name	National Red List	Habitats Directive	Occurrence	Monitoring effort
<i>Salamandra salamandra</i>	Fire salamander	Endangered		few localities	counting individuals*
<i>Triturus cristatus</i>	Northern crested newt	Vulnerable	Annex II, IV	nationally	random sampling
<i>Lissotriton helveticus</i>	Palmate newt	Vulnerable		regionally	random sampling
<i>L. vulgaris</i>	Common newt			nationally	random sampling
<i>Mesotriton alpestris</i>	Alpine newt			regionally	random sampling
<i>Alytes obstetricans</i>	Common midwife toad	Vulnerable	Annex IV	regionally	all populations*
<i>Bombina variegata</i>	Yellow-bellied toad	Critically endangered	Annex II, IV	few localities	counting individuals*
<i>Pelobates fuscus</i>	Common spadefoot	Endangered	Annex IV	nationally	all populations
<i>Bufo calamita</i>	Natterjack		Annex IV	nationally	random sampling
<i>B. bufo</i>	Common toad			nationally	random sampling
<i>Hyla arborea</i>	Common tree frog	Endangered	Annex IV	regionally	all populations*
<i>Rana arvalis</i>	Moor frog	Vulnerable	Annex IV	nationally	random sampling
<i>R. temporaria</i>	Common frog		Annex V	nationally	random sampling
<i>R. lessonae</i>	Pool frog	Vulnerable	Annex IV	nationally	random sampling
<i>R. kl. esculenta</i>	Edible frog		Annex V	nationally	random sampling
<i>R. ridibunda</i>	Marsh frog		Annex V	nationally	random sampling

Indices and trends for the species are calculated using the data analysis package TRIM (Trends and Indices for Monitoring data), a statistical program based on Poisson regression designed for fauna monitoring data with missing values. Indices for each individual year represent the annual numbers as a percentage of the numbers in the starting year.



Until the nineties, the distribution of *Hyla arborea* declined by more than 80%. To stop this process a Species Protection Plan started in 2000. Between 1997-2006 the species increased by almost 60%, this reflects the biggest success of amphibian conservation in the Netherlands so far.

Identifying *Rana esculenta* synkl. at the species level is difficult for most volunteers. We have therefore chosen to calculate indices for the entire complex. The index for *R. lessonae* is based on sample sites of *R. esculenta* synkl. for areas where *R. lessonae* is present.

*R. arvalis* and *R. lessonae* have a significantly stable occurrence. The characteristic habitats of these species (heathlands and moors) are nowadays protected and carefully managed. *R. arvalis* and *R. lessonae* will be removed from the national Red List.

*Bombina variegata* shows a moderate increase, but the species is still critically endangered. In 1964 the species occurred in 45 areas and in 1980, this was reduced to five sites. In 2000 a Species Protection Plan was initiated to save it from national extinction. It seems that the species reacts insufficiently to conservation measures.

*Bufo calamita* is observed less frequently every year. Since 2000, the species shows a decline. In 2006 the species was observed 44% less frequently as compared to 1997. This, combined with the overall decrease of its distribution area, is the reason for listing the species on the next national Red List.

*Salamandra salamandra* and *Alytes obstetricans* – index calculation started in 2001, too short for trend detection. *Pelobates fuscus* - it proved not possible to find enough volunteers to monitor its populations. Maybe in the future it will be possible to present a population trend by using presence/absence data. *Triturus cristatus* - over the period 1997-2005 the species had a stable presence. In 2006, the species was observed more frequently and the presence could not be considered as stable anymore. *Rana ridibunda* and *R. kl. esculenta* have not been evaluated yet.

## Acknowledgements

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