

# Monitoring the reintroduction of species: establishing a fruitful marriage between ecology and molecular genetics

## Problem

In many western European countries the habitats of many species are under continuous threat because of changes in land use, road management, pollution, recreation and urbanization. In the Netherlands, this has led in 1988 to the extinction of one of the foremost aquatic mammals, the otter (*Lutra lutra*). In the 1990's extensive measures have been undertaken to facilitate the reintroduction of the otter in a peat bog wetland composed of national park De Weerribben, De Wieden and several other water-rich sites: water quality was increased, roads were closed, connectivity among sites was improved by tunnels and other fauna passages, and agreements with local fishermen were established. All to ensure a successful return of the otter to the Netherlands. In 2002 the first otters were released, and to guide their return an extensive monitoring programme was started, not only based on traditional ecological methods, but also incorporating recently developed molecular genetic and hormonal methods.

## Objectives

What ecological, social and economic measures are necessary to ensure the establishment and maintenance of a viable otter population in the Netherlands?

## Approach (ecology)

Released individuals were tagged with radio transmitters to gain insight in their behavior, home range and dispersal. Transmitters function, however, only for about 1-2 years. Therefore, also a DNA fingerprint was determined from all individuals. Because otters mark their territory with spraints (faeces), which contain DNA of the gut cells, individuals could also be recognized based on their DNA profile. Moreover, spraints contain concentrations of hormones and possible

pollutants. Thus, by assessing concentrations of hormones the status of female otters (pregnant or not) could be established. Concentrations of pollutants will provide information about the quality of the habitat.

## Results

Initially, the fate of the released otters was traced by radio-telemetry. Later on, DNA fingerprints and assessment of hormone concentrations in spraints confirmed the presence of the initially released individuals. It also revealed that several females were pregnant and the presence of at least two newborn otters. The molecular and hormonal methods proved to be valuable tools for assessing the population status. Moreover, because the genetic fingerprint of newborns is known, their fate can be traced without any further human involvement.

## Follow-up

Continuous monitoring is envisaged to follow individual and population fate. Landscape reconstructions, local road changes and closures, might be necessary to ensure the survival of the population. Release of otters in neighbouring habitats is considered.



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