factors, are considered suitable for bison re-introduction. The need to support *at least* 50-150 individuals is a major consideration when selecting release sites.

Each release site must must be equipped with an enclosure (2-3 ha per animal) in which the animals are kept for 4-5 months. This is to enable the bison to acclimatize to the environment. Following release, the bison tend to spend more and more time away from the enclosure, until the winter months when they often return to the enclosure. This is useful, as it enables the project to carry out preventative treatment for helminthoses on the bison.

Bison conservation is both complex and problematical, and includes the three following interconnected aspects: biological (preservation of genetic polymorphism), ecological (the need to create a large population, including an effective breeding population of 500 individuals), economical (considerable cost of bison keeping). With respect to these, a strategy and action plan on bison re-introduction in Belarus has been developed.

A strategy for the metapopulation management of the bison was developed, which included the translocation of individuals between sub-populations to help improve the genetic viability of the various sub-populations.

Contributed by Pietr Kozlo, Institute of Zoology BAS, Minsk, Belarus.

Release of red deer in Belarus

In the 17th Century, the indigenous red deer, *Cervus elaphus elaphus,* population was extirpated from the greater part of Belarus, and by the end of the 18th Century, it was extinct from the entire country.

Red deer were released in 1865 into the hunting estates of Polish Kings and Russian Tzars - Belovezhskaya Pushcha. Subsequently, between 1892 to 1900, more than 500 individuals from different regions of Central Europe were released: 18 from Germany (estate 'Pless'); 400 from Polan (estate 'Spala'), 51 from Silezia, 18 from Bohemia (Chechia); 30 from Austria (Prince Lichtenshtain's hunting estate). Unfortunately, therefore, the modern Belkovezhskaya population of red deer has a complicated hybrid origin. It is unfortunate, therefore, that this population has provided founder stock for other release projects in Belarus, Ukrain, Latvia and the Russian Federation.

The deer's re-introduction into the whole territory of Belarus was carried out between 1968-1985. Nearly 1500 individuals were settled in 25 regions. By 1990 the deer's numbers had increased to between 5300-5500 individuals. The deer from Belovezhskaya Pushcha were used for re-introduction.

In most cases,between 60-80 deer were released within one region, but sometimes between 100-150 or more. There are now sufficiently large populations of red deer: 750-850 in Osipovichskaya; 300-350 in Jurovskaya; 200-250 in Volozhinskaya.

The ultimate aim of the project is for red deer to number 15000-18000 in Belarus.

Contributed by Pietr Kozlo, Institute of Zoology BAS, Minsk, Belarus.

SAUDI ARABIA- AN UPDATE

Arabian oryx: Recent developments in Saudi Arabia

The basis of the Saudi Arabian conservation programme for the Arabian oryx, *Oryx leucoryx*, is the National Commission for Wildlife Conservation and Development's (NCWCD) Protected Area System Plan. The ultimate goal of the Saudi Arabian oryx programme is to re-establish self-sustaining, free-ranging populations within the framework of protected areas throughout the historically documented range of the species in the Kingdom. Initial re-introductions of the species in Saudi Arabia in the Mahazat as-Sayd fenced Protected Area have proved to be very successful. With the release of oryx in to the 'Uruq Bani Ma'arid Protected Area, restoration to the deserts of Saudi Arabia became a reality (RE-INTRODUCTION NEWS 10). This communication summarizes recent developments of the Saudi Arabian oryx programme.

Captive breeding of the Arabian oryx began in the Kingdom of Saudi Arabia in 1986 when 57 animals were transported from the late King Khalid's collection to the National Wildlife Research Center (NWRC)[1] in Taif. After an outbreak of tuberculosis was brought under control, efforts were directed towards promoting both rapid growth of the herd and improving the genetic representation through the addition of blood lineages from Qatar, Abu Dhabi and Bahrein; these are not represented in the World Herd. On 1 January 1997, the NWRC herd numbered 245 (126 males and 119 females) animals, and in the near future will stabilise at around 260 animals. Captive breeding is now focusing on the production of animals of optimal health and genetic status for re-introduction into the wild. To date, 93 oryx (42 males and 51 females) born at the NWRC have been already re-introduced into two protected areas; Mahazat as-Sayd and 'Uruq Bani Ma'arid.

The initial re-introduction site for Arabian oryx in Saudi Arabia was Mahazat as-Sayd, a 2,200km² area of desert steppe habitat near Taif, east of the Asir mountains. The area has been fenced to protect oryx from hunting and to allow the vegetation to recover. Since March 1990, 72 (32 males and 40 females) animals have been released: thirty-four came from the NWRC captive breeding unit and 38 from other private collections (mainly from the Zoological Society of San Diego in the USA and from Shaumari in Jordan). The animals are followed daily by NCWCD ranger staff and monitoring of population dynamics as well as studies on the behavioural ecology and reproductive physiology of the animals are carried out by NWRC scientists. The Mahazat as-Sayd population has increased rapidly (15-20% per year) and was estimated at the beginning of January 1997 to number 270 individuals. No supplementary food or water has been made available to the wild animals, as recovery of vegetation within the reserve has been remarkable, providing considerable optimism for the successful re-establishment of this wild population. A simulation model based on observed rates of productivity and survival indicates that the population will continue to grow at an increasing rate for the next few years, reaching 400 individuals by the year 2000.

The second site of re-introduction is the 'Uruz Bani Ma'arid Protected Area, a 12,500 km² reserve at the western edge of the Rub'al Khali, or Empty Quarter (RE-INTRODUCTION NEWS 10). In February 1997, 17 Arabian oryx, ten males and seven females aged between three months and two and a half years, were transported from the NWRC and released in March and April. These animals will supplement the already established population (RE-INTRODUCTION NEWS 11 and 13). In total, 77 captive-born animals (NWRC) and six wild born oryx from Mahazat as-Sayd have been released in 'Uruq Bani Ma'arid since January 1995. It brings the total of released Arabian oryx in 'Uruq Bani Ma'arid to 83 (40 males and 43 females) individuals. It is remarkable that no deaths related to translocation stress have occurred, although the species is known to be difficult to transport. Fifty-six animals have been fitted with radio-collars and their movements recorded regularly by Mr. Martin Stausse, postgraduate student from the University of Pretoria, RSA.

By the end of 1996, 23 calves, 11 males, nine females and three of unknown sex, had been born to females released during 1995 and 1996. Of the 16 females released in March-April 1995 (first re-introduction) nine had given birth once by the end of 1996 and six twice during the same period. The mean inter-birth interval calculated from seven females was 300 days (SD+/-30.6 days). The mean age at first calving was 895 days (SD+/-107.6 days), and the minimum age at first calving was 726 days old. Despite the likelihood that these data on reproduction are influenced by the stress of adaptation to a new environment, figures are very consistent with data collected from Mahazat as-Sayd and Taif herds.

Seven of the calves are of unknown sire. Six of the 13 males released at the same time reproduced at least once, and four died. Three of these are believed to have died as a result of injuries sustained in a fight with another male. The cause of death of one female was unknown: her calf was rescued by the ranger staff and released the following year. Of the 19 females released in March-April-May 1996 (second re-introduction), seven had already given birth by the end of March 1997. One male released in 1996 died three months after its release, but we were unable to determine the cause of death. Two animals released in 1996 a male and a female, disappeared in the autumn of the same year while heading south-east into the desert. Despite intensive searches by light aircraft and NCWCD ground patrols, they have not been found.

By March 1997 the two wild Arabian oryx herds re-introduced into the Kingdom of Saudi Arabia were estimated to number 380 individuals (270 in Mahazat as-Sayd and 110 in 'Uruq Bani Ma'arid), while the captive herd at the NWRC, Taif, comprised 245 oryx.

[1]The NWRC is responsible for the captive breeding and re-introduction of Arabian oryx and houbara bustards in the Kingdom of Saudi Arabia, on behalf of the National Commission for Wildlife Conservation and Development (NCWCD).

Contributed by Stéphane Ostrowski and Eric Bedin, National Wildlife Research Center, Taif, Saudi Arabia.

Ostrich Update, Saudi Arabia

Wild Ostriches breed in the Arabian Peninsula for the first time in over 40 years:

In February and March of this year, ostrich chicks hatched within the Acacia savannah of the 2,200km² Mahazat as-Sayd Protected Area in central Saudi Arabia. These chicks represent the first breeding by free-ranging ostriches in Arabian Peninsula since the last Arabian ostrich *Struthio camelus syriacus* was shot in northern Saudi Arabia in the 1950s. They also herald a new phase in Saudi Arabia's ostrich restoration project.

The death of the last Arabian ostrich marked the extinction of the subspecies. Unlike other Arabian endemics, such as the Arabian oryx, *Oryx leucoryx*, the Arabian ostrich was not represented in any captive