UNIVERSITE JOSEPH FOURIER
SCIENCES. TECHNOLOGIE. MEDICINE.
GRENOBLE - ALPES

NLH

"Genetics of the Scandinavian brown bear (*Ursus arctos*): implications for biology and conservation"

Eva Bellemain

PhD thesis 2004

Joint agreement

- Agricultural University of Norway
  Department of Ecology and Natural Resource Management
  Pb 5003, NO-1432 Ås, Norway.
- Université Joseph Fourier
  Laboratoire d'Ecologie Alpine, Génomique des Populations et Biodiversité
  CNRS UMR 5553, BP 53, F-38041 Grenoble Cedex 9, France.

CONTENTS

LIST OF PAPERS

The thesis includes the following papers, which are later referred by their Roman numerals in the text

Paper I: Piggott, M.P., **Bellemain, E.**, Taberlet, P. & Taylor, A.C. 2004. A multiplex pre-amplification method that significantly improves microsatellite amplification and error rates for faecal DNA in limiting conditions. *Conservation Genetics* **5**(2): 417-420.

Paper II: **Bellemain, E.** & Taberlet, P. 2004. Improved non invasive genotyping method: application to brown bear (*Ursus arctos*) feces. *Molecular Ecology Notes* **4**: 519-522.

Paper IV: Bonin, A., **Bellemain, E.**, Bronken Eidesen, P., Pompanon, F., Brochmann, C. & Taberlet, P. 2004. How to track and deal with genotyping errors in population genetics studies. Invited review *Molecular Ecology* In press.

Paper III : Cercueil, A., **Bellemain, E.** & Manel, S. 2002. PARENTE: A software package for parentage analysis. *Journal of Heredity* **93**: 458-459.

Paper V: **Bellemain, E.**, Swenson, J.E., Tallmon, D.A., Brunberg, S. & Taberlet, P. 2004. Estimating population size of elusive animals using DNA from hunter-collected feces: comparing four methods for brown bears. *Conservation Biology* In press.

Paper VI: Solberg, K.H., **Bellemain, E.**, Dragaset, O.M., Taberlet, P. & Swenson, J.E. An evaluation of field and genetic methods to estimate brown bear (*Ursus arctos*) population size Manuscript.

Paper VII: **Bellemain, E.**, Swenson, J.E. & Taberlet, P. Mating strategies in relation to sexually selected infanticide in a nonsocial carnivore: the brown bear. Manuscript.

Paper VIII: **Bellemain, E.**, Zedrosser, A., Manel, S., Taberlet, P. & Swenson, J.E. The dilemma of female mate selection in the brown bear, a species with sexually selected infanticide. Manuscript.

ABSTRACT

This thesis deals with the application of molecular tools, combined with field data, in wildlife management, in conservation and in understanding species' biology and behavior. We used the brown bear (*Ursus arctos*) as a model species and the Scandinavian bear population as a case study. The first part of this thesis is a methodological part, in which we developed or reviewed technical aspects in molecular biology and parentage analysis; the second part is devoted to the application of molecular genetics to estimate population sizes and to understand mating systems.

Noninvasive methods are gaining widespread use in genetic studies as they do not require the handling or disturbance of the study animal. However, DNA recovered from noninvasive samples, such as hairs or feces, is usually degraded and/or in small quantities, leading to genotyping errors and resulting in the identification of incorrect genotypes. This is a major concern, especially for small or endangered populations, as it can lead to biases in population size estimates. With the aim of increasing the quality and quantity of the desired DNA template, and to avoid the need for numerous replicates, we devised a two-step polymerase chain reaction (PCR) method. This "multiplex pre-amplification method" was tested on different species and compared with a conventional PCR approach. It significantly improved microsatellite amplification and decreased error rates for fecal DNA in limiting conditions. To more specifically amplify DNA from noninvasive samples of brown bears, we also redesigned microsatellite primers and one sex-specific primer and combined a semi-nested PCR with the multiplex pre-amplification method. These new approaches could be transposed to other species where conventional PCR methods experience low success due to limiting DNA concentration and/or quality.

Genotyping errors remain a taboo subject in population genetics studies, in spite of their occurrence in most datasets and the negative consequences they may cause in the interpretation of the results. We considered four case studies representing a large variety of population genetics investigations, to track genotyping errors and identify their causes. In these datasets the estimated genotyping error rate ranged from 0.8% to 2.6%, depending on the study organism and the marker used. Main sources of errors were allelic dropouts for microsatellites and differences in peak intensities for AFLPs (Amplified Fragment Length Polymorphism), but in both cases, human factors were non-negligible error generators. We present suggestions to limit and quantify genotyping errors at each step of the genotyping process and recommend the systematic reporting of the error rate in population genetics studies.

Parentage analyses using multilocus genotypes are widely used to assess reproductive success, mating patterns, kinship and fitness in natural populations. Several approaches, based on maximum likelihood estimations and /or Bayesian inference, have been recently developed, but they often remain theoretical and difficult for biologists to apply. However, there is a clear lack of parentage assignment softwares that are able to consider several generations of individuals and that allow the determination of both parents without any prior assumptions. We developed the software PARENTE to conduct parentage inference using molecular data from diploid codominant markers. Based on the principle of genetic compatibility, PARENTE looks for maternity, paternity or simultaneously for both potential parents, using multilocus genotypes and birth and death dates of individuals (if available). It also calculates the probability of successfully allocating an individual offspring to its parents.

Estimates of population size and population density are essential for successful management and conservation of species. However, few attempts have been made to evaluate the accuracy of the estimates obtained. Using the protocols developed for amplifying fecal DNA, we first compared four census methods based on noninvasive genetic methods. Two methods used rarefaction indices and two were based on capture-mark-recapture (CMR) estimators. A total of 1904 fecal samples were collected over 2 consecutive years in a 49,000-km² study area in south-central Sweden. Population size estimates ranged from 378 to 572 bears in 2001 and 273 to 433 bears in 2002, depending on the method used. Based on a calculated minimum population size from radio-telemetry data, we concluded that the estimate from the best model in program MARK, a CMR estimator, was the most accurate. This model included heterogeneity and temporal variation in detection probabilities, which appeared to be present in our samples. Second, we evaluated the reliability of three traditional field methods in comparison with the best performing noninvasive genetic method in a smaller study area (7,328 km²). All three field methods tended to underestimate population size; the genetic method using the MARK estimator seemed to perform the best. We concluded that approximately 550 (482-648) bears were present in the 49,000-km² study area and 223 (188-282) bears were present in the 7,328-km² study area during 2001 and 2002. We suggest that the brown bear has reached a threshold density in the core area and currently expands on the edge of this area. A cost/benefit analysis showed that the noninvasive genetic method was less expensive than the most reliable field method and it is preferable from an ethical point of view. In conclusion, we recommend the use of noninvasive genetic methods, using the MARK estimator, to estimate population size over large areas. We also point out the importance of an adequate and well-distributed sampling effort and advise calibration with independent estimates in case of biased sampling. Future studies should aim at collecting 2.5 to 3 times the

5

number of fecal samples as the "assumed" number of animals. These studies also confirmed that the present management of the Scandinavian bears has been successful and that this population is in a good conservation status.

The knowledge of mating systems is important for understanding the evolution of sexual selection. We studied two major aspects of the brown bear mating system, namely the mating strategies employed by both sexes in relation to sexually selected infanticide (SSI) and female mate selection. Infanticide, the killing of dependent young, can be considered as sexually selected and adaptive for males, if the following three requirements are fulfilled: i) infanticide shortens the time to the mother's next estrus, ii) the perpetrator is not the father of the killed infants, and iii) perpetrators sire the female's next litter. However, this is not of benefit for females and they may have evolved counterstrategies in order to defend their infants against infanticidal males. We documented eight cases of infanticide in the field. From genetic samples collected at the sites and from observations, we verified that all requirements for SSI were fulfilled, suggesting that SSI may be an adaptive male mating strategy in this nonsocial carnivore. Contrary to social species, where mostly immigrant males kill young, mainly resident adult males were infanticidal in Scandinavian brown bears. This implies that they are able to differentiate their own progeny from unrelated cubs, perhaps by recognizing the females they mated with. Moreover, we genetically documented a minimum of 14.5% multiple paternities (28% for litters with 3 young or more). Female promiscuity to confuse paternity may therefore be an adaptive counterstrategy to avoid SSI. Further, we assessed on which criteria female brown bears chose their reproductive partner(s). We hypothesized that females may be faced with a dilemma: either select a high quality partner based on morphological or genetic criteria, as suggested by theories of mate choice, or rather mate with future potentially infanticidal males, i.e. the geographically closest males. We tested whether different male traits influenced paternity determination and found that females significantly selected the geographically closest males, but also the more heterozygous, largest and oldest males. We suggest that female brown bears might mate with the closest males as a counter-strategy to infanticide and exercise a post-copulatory cryptic choice, based on morphological traits such as body size or dominance, reflecting male genetic quality.

SYNOPSIS

I. The use of molecular markers in conservation and management

We live in a time of rapid environmental changes resulting from anthropogenic activities and leading to habitat loss and species extinction. As a consequence, biodiversity, the variability of life on earth, is threatened. However, it is of fundamental importance to our future, as adequate biological diversity limits the effects of particular environmental risks, such as climate change and parasite invasions. Biodiversity can be considered from the level of genes to the level of ecosystems. One of the factors threatening the survival of many species is the loss of genetic diversity due to genetic drift and the increase in inbreeding, because of population bottlenecks and decreased gene flow (Wright 1977). Conservation genetics is an emerging field, which can be defined as "the application of genetics to preserve species as dynamic entities capable of coping with environmental change and minimize their risk of extinction" (Frankham *et al.* 2002). It represents a crucial scientific tool that assists scientists and managers in making decisions related to managing and conserving populations of plants and animals.

Intraspecific genetic surveys can provide insight into how a species should be managed, i.e. whether an effective management plan needs to include all individuals of a species simultaneously or whether a species should be better managed as distinct segments. The level of connectivity among (sub)populations can vary greatly from panmixis (extensive gene flow and random mating) to complete genetic isolation among (sub)populations (Hartl & Clark 1989). These different scenarios have divergent implications for the effective and sustainable management of a species. Consequently, knowledge about levels of genetic diversity for both nuclear and mitochondrial DNA (mt DNA) is important for the proper management and conservation of any species. More specifically, due to its maternal mode of inheritance, mtDNA reveals female-mediated gene flow, whereas nuclear DNA, which is biparentally inherited, allows individual identification and assessment of the degree of genetic differentiation among (sub)populations.

Once the genetic status and structure of a population have been assessed, it is possible to further use molecular genetics in the understanding of species biology, in the estimation of biological parameters such as population size, in the resolution of taxonomic uncertainties or in forensics (Frankham *et al.* 2002). These aspects have additional important implications for species conservation. In this thesis, I develop two main applications of molecular genetics for

conservation and wildlife management, namely the estimation of population size and the understanding of mating systems.

I. 1. Estimating population size

Knowledge about population size is an essential aspect in the management and conservation of any population. However, it is difficult to directly estimate population sizes, especially for elusive, nocturnal or rare animals. It is very important to test and develop reliable census methods. Molecular methods have recently been developed to estimate population size from noninvasive sources, such as hairs, feces or feathers (Taberlet & Luikart 1999). These new approaches have received much interest, as they do not require handling or even observation of the animals under study. Consequently they present, from an ethical consideration, a huge advantage, especially for endangered or elusive species. Specific markers allow distinguishing feces from different species and minimum estimates of population sizes can be derived from the number of unique genotypes found among the samples. However, due to the novelty of these methods, a few problems persist. First, at the molecular level, technical difficulties arising from low quantity/quality samples need to be overcome. Technical protocols have only recently been proposed and require more development and assessment before they can be used reliably. Second, at the statistical level, different methods have been proposed to estimate the true population size (Seber 1982; Kohn *et al.* 1999; White & Burnham 1999; Eggert *et al.* 2003) but there have been few assessments of the reliability of these methods, for instance by comparing several independent estimates. Another important question for management is what is the best method to census a population, i.e. how do the genetic methods perform in comparison with traditional field methods, considering different aspects such as time, money, and ethics?

I. 2. Understanding a species biology and behavior

Molecular genetics can also provide tools to improve our knowledge and understanding about the biology and behavior of a species. Assuming that individual behavior is adaptive and predictable in different environmental conditions and has implications at the population level, this aspect can be integrated into the management and conservation of populations or species (Festa-Bianchet & Apollonio 2003). It can provide guidelines about the appropriate scale of habitat protection and restoration. The mating system is one of the fundamental descriptors of the natural history of a species, considering mating behavior, number of breeding partners, timing, and location of reproduction (Clutton-Brock 1989; Emlen & Oring 1977). Consequently, assessing the mechanisms influencing mating systems, including mate selection,

contributes to an improved understanding of population persistence and connectivity (Hogg 2000). Our understanding of mating systems over the past decade has been revolutionized by the incorporation of molecular genetic methods, which allow the analysis of paternity (e.g. Amos *et al.* 1993; 1995; Brotherton *et al.* 1997; Clapham & Palsbøll 1997; Coltman 1999; for a review see Hugues 1998). For example, many species formerly considered to be monogamous have been revealed to be polygynous or promiscuous, as molecular techniques have demonstrated that the social partner may not always be the reproductive partner (Clapham & Palsbøll 1997; Goossens *et al.* 1998). Actually, it is often impossible to confidently attribute paternities without the use of molecular tools. I focus here on two mechanisms influencing mating systems that can be investigated through the use of molecular markers.

First, the occurrence of infanticide, the killing of dependent young, influences animal mating systems to a certain extent. This phenomenon is widespread among some groups of animals, e.g. primates and cats (Van Schaik & Janson 2000). Among the several categories of infanticide, sexually selected infanticide (SSI) refers to competition for breeding opportunities. In species where SSI occurs, males kill dependent offspring, because the female cannot breed while raising her offspring, but can become sexually receptive sooner if all her young die. As a consequence, the infanticidal male can gain mating access to the female. It is widely recognized to be an adaptive behavioral strategy to increase the fitness of the perpetrator (Hrdy 1979; Hrdy & Hausfater 1984). Three prerequisites are necessary to consider infanticide as sexually selected: (1) the perpetrator is not the father of the infants he kills, (2) he has a high probability of siring the female's next litter, and (3) the mother of the killed offspring will come into estrus more quickly than if she had not lost her young (Hrdy 1979). However, cases of infanticide are difficult to document in the wild, and most tests of SSI have been laboratory experiments with small mammals, for which paternity was manipulated (for a review see Agrell *et al.* 1998). Molecular techniques now offer the possibility to acquire knowledge about paternity and consequently to test the first two prerequisites.

Second, identifying mechanisms of mate selection, including the genetic component, provides basic knowledge about the variance in reproductive success, and allows the assessment of the genetic dynamics of the population under study (Hogg 2000). In mammals, females invest more energy in each gamete than males (Bateman 1948), consequently, they tend to be more selective than males when selecting a reproductive partner (Clutton-Brock 1989). Female choice has been widely debated during the past decades and it is extremely difficult to study this subject, especially in long-living species, mainly because it necessitates long-term and individual-based field and genetic data, which are difficult to gather.

II. The framework: the Scandinavian Brown Bear Research Project

The theme of this thesis is conservation genetics, with the brown bear (*Ursus arctos*) as a model species and the Scandinavian bear population as a case study. This study is part of the Scandinavian Brown Bear Research Project (SBBRP), which is a management-orientated project, existing since 1984, based on individually radio-marked bears that ideally are followed from birth to death. It is an integrated Swedish-Norwegian cooperation, with researchers, MSc and PhD students, and funding from both countries. The overall goal of the project is to document the general ecology of the Scandinavian brown bear, but there are many specific goals and subprojects dealing with population ecology, social organisation, life history traits, behavior, dispersal, activity, genetics, physiology, diseases, reproduction, etc.
To date, 425 bears have been radio-marked, making it one of the largest projects for wild large carnivores in the world. In addition, data are obtained from all legally killed bears in Sweden and Norway.

The SBBRP has made a major contribution to the management of brown bears both in Scandinavia and at the European level, with cooperations with several European and North American bear research projects. Up to August 2004, it has produced 181 publications, varying from papers in top scientific journals to popular articles for the public and 41 student theses.

One of the major results obtained by the SBBRP is that the Scandinavian brown bear has gone through a population bottleneck and subsequent population recovery and expansion (Swenson et al. 1994; see paragraph "Study population" for more details). The SBBRP also provided evidence that the killing of established adult males may have population consequences through SSI (Swenson *et al.* 1997; 2001; Swenson 2003). It documented the shape of the expansion front of an increasing bear population and found evidence of presaturation dispersal in a bear population (Swenson *et al.* 1998a). It has shown, for the first time in a solitary carnivore, that estrous females increase their home range size, presumably searching for males (Dahle & Swenson 2003a) and for the first time in bears, that home range size is inversely density dependent (Dahle & Swenson 2003b).

Genetics is an important part of this project, and the present work is partly based on the earlier genetic studies of the SBBRP. Studies of mtDNA diversity among European brown bears (Taberlet & Bouvet 1994) revealed two geographically distributed haplotypes (eastern and western haplotypes). Taberlet *et al.* (1995) found little genetic diversity in mtDNA, which suggested two separate brown bear colonizations of Scandinavia and proposed two distinct conservation units for this population, one from the north by representatives of the eastern lineage and one from the south by representatives of the western lineage. However, no

evidence of female-mediated gene flow was apparent between subpopulations. A later study (Waits *et al.* 2000) further characterized the genetic status of this population with the analysis of nuclear DNA, and suprisingly revealed a high genetic diversity, equivalent to that found in several nonbottlenecked populations, and low to moderate gene flow levels between subpopulations. These results suggested that it might have been better for genetic diversity that several small populations survived and later gained genetic contact than if only a single isolated population had survived. The authors proposed one evolutionary significant unit and four management units, i.e. units with significant divergence in allele frequencies at nuclear or mitochondrial loci, regardless of phylogenetic distinctiveness of alleles (Moritz 1994). Manel *et al.* (2004) used two independent methods to reanalyze the spatial structure of the Scandinavian brown bear population, based on multilocus genotypes and without any prior assignment of bears to a subpopulation. The genetic pattern deduced from these analyses was three geographical clusters. Consequently, the authors recommended considering this Scandinavian population as three distinct subpopulations instead of four. To conclude, earlier genetic studies of Scandinavian brown bears allowed the assessment of the genetic structure of the population, mitochondrial and nuclear genetic diversity, and gene flow and were essential from a management perspective.

As stated earlier, it is possible to further use molecular genetics in the understanding of species biology or the estimation of biological parameters (Frankham *et al.* 2002), notably for bears (Waits 1999). Our genetic database includes both radio-marked bears and hunter-killed bears, and we have ecological and radio telemetry data from a large proportion of the genetically identified individuals, which allows us to make ecological interpretations of the genetic results. Consequently, there is a tremendous potential for cooperation between the field of genetics and the fields of life history traits, behavior, dispersal and social organization. A part of this thesis relates molecular genetics to behavioral and life history aspects.

III. Objectives of the thesis

In this thesis we use molecular tools in management and in understanding biology of the Scandinavian brown bear.

First, the following methodological aspects were developed or reviewed:

a) we developed a reliable protocol for DNA amplification from fecal samples (**Papers I and II**)

b) we reviewed methods for tracking and assessing genotyping errors in population genetic studies (**Paper III**).

c) we developed a parentage analysis software to establish pedigrees from genetic data (**Paper VI**)

Using those methodological aspects, the two main objectives of this study were:

a) to test and develop reliable census methods to obtain estimates of population size over large areas by using noninvasive samples (fecal samples). This included evaluating the performance of the noninvasive genetic method in comparison with traditional field methods and making a cost/benefit analysis in order to give guidelines to managers (**Papers V** and **VI**).

b) to investigate the brown bear mating system, from field and genetic data (tissue samples) of radio-collared animals. This included the evaluation of mating strategies in relation to sexually selcted infanticide and the study of factors influencing female mate selection (**Papers VII, VIII**).

IV. Material and methods

IV. 1. The study species

The brown bear, first described by Linneus in 1758, is one of the largest and the most widely distributed of the eight bear species (Schwartz *et al.* 2003). It occupies habitats ranging from dense forests, subalpine and alpine mountain areas, to deserts and tundra (Servheen 1990). These solitary carnivores are found across Europe, Asia and western North America (Curry-Lindahl 1972; Servheen 1990). Nowadays, large viable populations are only found in eastern and northern Europe, whereas the populations in south-central and southwestern Europe are small, isolated, and probably not viable (Zedrosser *et al.* 2001).

Brown bears are distributed in overlapping home ranges and male home ranges are larger than those occupied by females (Sandel 1989; McLoughlin 1999; Dahle & Swenson 2003b). They mainly eat vegetation, such as berries, forbs and graminoids. In some areas they are significant predators of large mammals, such as moose (*Alces alces*), caribou (*Rangifer tarandus caribou*), elk (*Cervus elaphus*) or free-ranging domestic sheep (*Ovis aries*) and may eat fish, small mammals or insects, such as ants (Dahle *et al.* 1998; Swenson *et al.* 1999).

Brown bears are promiscuous, i.e. males and females mate with several partners each (Craighead *et al.* 1995a; Hensel *et al.* 1969). The age of sexual maturity varies from 2 to 10 years old depending on the population (Swenson *et al.* 1995; McLellan 1994; Hilderbrand *et al.* 1999; Zedrosser *et al.* 2004). The breeding season takes place from early May to the middle of July (Curry-Lindahl 1972; Dahle & Swenson 2003a), but implantation does not occur until about October or November (Renfree & Calaby 1981; Tsubota *et al.* 1989). Young are born from about January to March, after 6-8 weeks of effective gestation (Pasitschniak-Arts 1993). The litter size ranges from 1 to 4, most commonly 2 or 3. Cubs remain with their mothers for at least 1.5 years and in some areas up to 3.5 years (McLellan 1994), so the most frequently a female can breed is every two years. There is no paternal care. Longevity in the wild is 25 to 30 years, and reproductive senescence in females occurs around 25-27 years (Schwartz *et al.* 2004).

IV. 2. The study population

The brown bear originally occurred in most of the Scandinavian Peninsula, but, due to rigorous extermination programs, the population was greatly reduced (Swenson *et al.* 1995; 1998b). Around 1930, the Scandinavian population was close to extinction, with only about 130 individuals in four isolated populations in Sweden (Swenson *et al.* 1998a). After this population bottleneck in Sweden, killed brown bears became Crown property in Sweden,

removing the economical incentive to kill them, they received increased protection, and the population responded with a dramatic increase in both number and distribution (Swenson *et al.* 1995). In Norway, the bear did not receive full protection until 1972 and it was the last bear population in the world to become extinct. The Swedish brown bear population size was estimated to be about 300 individuals in 1942 (Selander & Fries 1943), about 1000 bears in 1996 (Sandegren & Swenson 1997) and over 2000 bears in 2004 (Kindberg *et al.* 2004). The population is still expanding and colonization events have been observed in Sweden and in Norway by Swedish, Russian and Finnish bears (unpublished data). To summarize, the history of this population includes a population bottleneck, successful management, and subsequent population recovery and expansion.

IV. 3. The study areas

The Scandinavian brown bear population has been studied in the field for over 20 years (Swenson *et al.* 1998b). The study areas (**Annex 1**) differed depending on the goal of the study and the type of samples used for the genetic analyses (tissues or feces).

For the mating system study, we used tissue samples from marked and killed brown bears. The study areas (Bjärvall & Sandegren 1987; Swenson *et al.* 1998a) were in female brown bear concentration areas, in northern Sweden (67°N, 18°E; 8,000 km^2) and central Sweden-southeastern Norway (61°N, 18°E; 13,000 km^2). In the southern study area, which covers the southern part of the southernmost brown bear subpopulation in Scandinavia, the elevation ranges from about 200 m a.s.l in the southeastern part to about 1,000 m a.s.l in the western part at the Norwegian border, but only a minor part of the area is above timberline, which is at about 750 m. Lakes and bogs are common, but most of the hilly landscape is covered with intensively managed coniferous forest, dominated by Scots pine *(Pinus sylvestri*s) and Norway spruce *(Picea abie*s). The northern study area is dominated by mountains that rise to over 2,000 m in the west and elevations are below 300 m in the east. Northern boreal coniferous forest dominates, but there are extensive subalpine birch *(Betula pubescen*s) forests. Both areas are sparsely populated by humans. For a detailed description of the study areas see Grundsten (1997), Lundqvist (2002) and Dahle & Swenson (2003a).

For the population size estimate study, we used fecal samples, collected by hunters and volunteers, and the study area covered 48 hunting areas (49,000 km^2) in two counties (Dalarna and Gävleborg) in south-central Sweden. This area encompasses the southern study area described above (**Annex 1**).

IV. 4. Field methods

Brown bears are active from April to November, mostly during the snow-free period, which is about a month shorter in the northern study area (Friebe *et al.* 2001; Manchi & Swenson, in press). In spring, bears, including yearlings accompanying radio-collared females, were captured by immobilizing them from helicopters. Bears were anaesthetized using 2.5 mg tiletamine, 2.5 mg zolazepam and 0.02 mg medetomidine per kg of body mass (Kreeger *et al.* 2002). Physiological parameters (i.e. rectal temperature, respiratory rate, blood oxygenation, pulse rate, and depth of anaesthesia) were monitored to detect drug-induced side effects. During capture, a skin biopsy was taken from the inner part of an ear for genetic analyses using a 4-6 mm sterile biopsy punch. In addition, standard zoological data, i.e. weight and body measurements, were recorded and a first premolar tooth was removed to for age determination (to year) (Matson *et al.* 1999). Most bears were fitted with a collar mounted with a transmitter (Telonics®) or implanted into the peritoneal cavity (Telonics®). Radio-collars of subadult bears were fitted with cotton spacers designed to break away after about 20 months. Collars of adult fully grown bears were replaced every second or third year. Over the study period, we never registered any adverse effect of radio-collars on any individual and only 0.3% of the immobilized bears have died (J. Arnemo, pers. comm.). Capture and handling of bears was approved by the appropriate animal ethical committees in both Sweden and Norway and permission was obtained from the national wildlife management authorities in both countries.

Radio-marked bears were located from an airplane or helicopter using receivers and antennas mounted on the aircraft or from the ground using receivers and hand-held antennas. All bears were located weekly or biweekly, but many were located more frequently, in order to achieve better documentation of movements for specific studies.

IV. 5. Genetic methods

Highly variable DNA markers are an informative tool for identifying individuals and determining their pedigrees. These markers have been widely applied to investigate the genetic structure, mating systems, reproductive success, relatedness and other behavioral parameters of many species and can provide useful information about different aspects of their ecology. In the past few years, laboratory genetic techniques have greatly improved and now allow DNA typing using a noninvasive sampling approach (Höss *et al.* 1992; Taberlet & Bouvet 1992; Morin & Woodruff 1996; Taberlet *et al.* 1996; 1999). Microsatellites, consisting of tandem repeats of a short core sequence of 2 to 5 nucleotides, have become the marker of choice for many conservation and behavioral ecology studies (Bruford & Wayne 1993; Beaumont & Bruford 1998), because of: (i) their expected neutrality (they are representative of genome-

wide polymorphism), (ii) their abundance and broad distribution in the genome, and (iii) their relatively high polymorphism.

The number of microsatellite markers needed to be amplified differed depending on the type of sample used and on the study goal (tissue or fecal samples; see paragraph "Objectives of the thesis"). For studies using tissue samples, the aim was to conduct population genetics analyses and more precisely to construct pedigrees from parentage analyses. As a consequence, 18 microsatellites were used for genotyping individuals. The amplification of DNA from fecal samples was intended for individual identification, thus, we selected the 6 most informative loci (see **Paper II** for more details).

All samples were preserved in 95% alcohol until extraction. The extraction, amplification and analysis of microsatellites were carried out following the protocol described in Waits *et al.* (2000). The study using fecal DNA was first implemented in this thesis, consequently, we developed the amplification protocol (**Papers I and II**). At the time this thesis began (2001), 386 individual Scandinavian bears had been genotyped from tissue samples using 19 microsatellites markers. The following markers: G1A, G1D, G10B, G10C, G10L, G10M, G10P, G10X, G10H, G10O, G10J (Paetkau *et al.* 1995; Paetkau & Strobeck 1994) were cloned from an American brown bear DNA library and Mu05, Mu10, Mu15, Mu23, Mu50, Mu51, Mu59, Mu61 (Taberlet *et al.* 1997), were cloned from a European brown bear DNA library. During this thesis, we genotyped 591 more individual bears for 18 microsatellite markers (one of them: G10M could not be amplified reliably). Totally, our genetic database from bear tissues now includes 977 genotypes (**Annex 2**). The Probabilities of identity, i.e. the probability to obtain two identical genotypes by chance, (PI; Paetkau & Strobeck (1994); PIsib, for siblings; Waits *et al.* (2001)) were low: PI=3.1 10^{-17} and PIsib=2.4 10^{-7}.

For both types of samples, one primer of each pair was synthesized with a fluorescent dye group (6-FAM, TET or HEX) on the 5' end to allow detection and sizing of fragments on an automatic sequencer. From 2001 to January 2003, the sequencer was an ABI Prism 377 (automatic sequencer with polyacrylamide gel plates). From January 2003, we used an ABI Prism 3100 (automatic sequencer with 16 capillaries operating in parallel).

The gels were analyzed with GeneScan version 2 and GenoTyper version 1.1 software packages, when using the ABI Prism 377 and with GeneMapper version 3.0 when using the ABI Prism 3100.

V. Main results and discussion

V. 1. METHODOLOGICAL ADVANCES (Papers I-IV)

The first part of this thesis focuses on the methodological advances I have developed with my colleagues for studying biology and conservation of brown bears. Of course these methods are applicable to other species as well.

V. 1. 1. DNA amplification methods from fecal samples

We proposed a new method (**Paper I**) and redesigned specific bear primers (**Paper II**) to amplify DNA from fecal samples. DNA extracted from noninvasive samples is often the only source of genetic material available for many wild animals. However, it is typically of low quality and quantity and is therefore prone to poor amplification success, allelic dropout, false alleles and contaminations. Dealing with these problems is a challenge for researchers.

The "multiplex pre-amplification method" (**Paper I**) proposes two distinct steps in the amplification of DNA products. The first step simultaneously amplifies all microsatellite loci to be subsequently genotyped. The second step uses post-amplification aliquots as template in locus-specific PCRs to genotype individuals. Compared to conventional PCR approaches, this method allows to increase amplification rates, reduce genotyping error rates (false alleles and allelic dropouts) and improve the readability of the microsatellite profiles, particularly in species for which DNA is in limiting conditions or degraded. Moreover, the amount of DNA template required is reduced, which is particularly useful in studies with low-quantity DNA samples. The multiplex pre-amplification PCR method worked well in two different laboratories and for four different species, both carnivores and herbivores, although the results for bears were not shown in **Paper I**. This new approach can be considered as a major advance in the field of noninvasive genotyping.

This multiplex pre-amplification method employed together with a nested PCR approach and re-designed microsatellite primers (**Paper II**) allowed us to optimize the amplification of DNA from bear feces. Most of the original microsatellite primers (Paetkau & Strobeck 1994; Taberlet *et al.* 1997) were redesigned in order to obtain smaller amplicons and more similar annealing temperatures among primers. We also designed new sex-identification primers, amplifying a short fragment more specific to carnivores, in order to avoid amplifications from most of the prey DNA coextracted from a bear feces. The strategy of combining the multiplex pre-amplification method and a semi-nested PCR could be transposed

to other species where conventional PCR approaches yield low success due to limiting DNA concentration and/or quality.

V. 1. 2. Genotyping errors in population genetics

We reviewed methods for tracking and assessing genotyping errors in population genetics (**Paper III**). In spite of their widespread occurrence, genotyping errors usually remain ignored in population genetics studies, except when analyzing samples suspected to be problematic (e.g. Paetkau 2003). Using four different datasets differing in their sampling strategies (noninvasive or traditional), in the type of organism studied (plant or animal) and the molecular markers used (microsatellites or AFLPs), we showed how prevalent genotyping errors are, in a wide population genetics context, and identified their main causes. This study points out for the first time the necessity of estimating and reporting genotyping error rates in population genetics studies. Tracking genotyping errors and identifying their causes are necessary to clean up the datasets and validate the final results according to the precision required. We proposed guidelines for practioners, at each step of the experimental process (from sampling to analysis) to limit and estimate the genotyping error rate.

V. 1. 3. Parentage analysis software: PARENTE

We developed a software to analyze parentage from genetic data (**Paper VI**). Reliable parentage assignment is a first important step in the study of mating systems and social organization. Accurate parentage assignment allows one to determine the genetic "payoff" for behavioral strategies, and lifetime reproductive success (Hugues 1998). In many species, including bears, field data can only provide information on the mother (due to the absence of paternal care), and the only way to identify the father is from genetic information, i.e. from multilocus genotypes. However, there is a clear lack of parentage assignment softwares that are able to consider several generations of individuals and that allow the determination of both parents without any prior assumptions. The software we developed has several advantages over previously available softwares. First, it enables one to find fathers, mothers, as well as both parents simultaneously for an individual, based on multilocus genotypes, without any prior assumptions. It is possible to consider a defined number of genetic incompatibilities between the offspring and parent(s) in order to take into account the error rate in the genetic dataset (e.g. genotyping errors, mutations). Second, it considers dates of birth and death of individuals to restrict the analysis to possible parents only. In this way the input file is able to consider all genotyped individuals, even with overlapping generations and there is no need to define

different files for parents and offspring. Third, this software is able to handle large datasets (more than 1000 genotypes). Finally, parentage probabilities are calculated using a Bayesian approach, considering the error rate in the genetic dataset and the sampling rate of the population, which are important factors in parentage assignment. Simulated data showed that this software was reliable (Cercueil 2004; **Annex 3**). Effectively, PARENTE was able to find 97% and 83% of correct parentage relationships with a probability $P \geq 0.95$ and $0.8 < P < 0.95$ respectively. Those performances were compared with the results obtained from another commonly used parentage analysis software, CERVUS (Marshall *et al.* 1998), using the same simulated dataset, and 87% and 55% of correct parentage relationships were found, for the same probabilities respectively. Using the Scandinavian brown bear dataset, we also verified that known relationships from field data were identified by PARENTE (without any prior assumption). In 65% and 77% of the cases, the relationships mother-offspring were identified with a probability $P > 0.99$ and $P > 0.95$ respectively. This software permitted the construction of pedigree data (**Annex 4**) from individual multilocus genotypes (**Annex 2**).

V. 2. APPLICATIONS FOR MANAGEMENT, CONSERVATION AND UNDERSTANDING BIOLOGY

V. 2. 1. Population size estimates (Papers V-VI)

The first genetic studies of the Scandinavian brown bear (Taberlet & Bouvet 1994; Taberlet *et al.* 1995; Waits 2000; Manel *et al.* 2004) constituted an important step in the management of this population. However, there was a great need to determine the size of the present population (Naturvårdsverket 2003). It is difficult to census populations of bears, due to the behavior of this solitary carnivore that occurs at low densities, but it is necessary for proper management and conservation, allowing, for instance, managers to set hunting quotas. Previous population size estimates were based on conventional field methods, such as helicopter surveys or observations in the field (Bjärvall & Sandegren 1987; Sandegren & Swenson 1997; Selander & Fries 1943; Swenson *et al.* 1994; 1995). However, the reliability of those estimates has never been evaluated.

V. 2. 1. 1. Estimates using genetic methods

The noninvasive genetic approach developed in this thesis to estimate population sizes, includes three phases: the collection of fecal samples in the field, the laboratory phase, and the analytical phase, i.e. population size estimates derived from fecal genotypes. The laboratory

phase has been described earlier in **Papers I** and **II**. The two other phases (sampling and analysis) were tested in **Paper V**.

We compared four methods for estimating population sizes based on genotyping of fecal samples. Two methods used rarefaction indices (Kohn *et al.* 1999; Eggert *et al.* 2003), one was based on a closed population capture-mark-recapture (CMR) method (MARK; White & Burnham 1999), and the last one used a Lincoln Peterson CMR method (Seber 1982), combining genetic and field data. We evaluated the accuracy and precision of the estimates based on a known minimum number of radiomarked bears in a subsection of our sampling area. We concluded that the MARK method, based on a principle of capture-mark-recapture of individuals within the fecal sampling, performed the best. We obtained a population size estimate of 550 (482-648 95% confidence intervals) brown bears in Dalarna and Gävleborg counties. In addition, we give recommendations concerning the collection of fecal samples in the field and the use of the best performing population size estimate method. We also suggest how to avoid some important biases in the estimates.

V. 2. 1. 2. Comparing the performance of genetic and field methods

In **Paper VI** we compared the performance of the genetic method recommended in **Paper V** (MARK method) with three other methods based on conventional field data, to estimate population sizes. The field methods were based on (1) observations of females with cubs; (2) data from hunter killed bears; and (3) a capture-mark-recapture principle, considering the proportion of marked estrous females with adult males during the mating season, using helicopters. We found that the three field methods tended to underestimate the true population size and that the noninvasive genetic method seemed to perform the best. In addition, a cost/benefit analysis, in terms of time and money, showed that the genetic method was 4 to 5 times cheaper than the best performing field method, i.e. the mark recapture census using helicopters.

Based on these two studies, and considering hunting statistics in other parts of Sweden and a net population growth rate of about 4.7% annually, it was possible to extrapolate the population size estimate to the entire Sweden; approximately 2200 bears (1600-2800 95% CI) in 2004 (Kindberg *et al.* 2004). We conclude that the present management of the population has been successful and bears in Sweden can be considered as being in a good conservation status.

These results are important for the human-dimension perspective of wildlife management. In the long-term, the survival of bears depends on how they are accepted by humans. Much of the human-bear conflict arises from the fact that local people and

managers/researchers have different answers to common questions such as "how many bears?". The involvement of the local human population in the project (e.g. collection of fecal samples) helped to increase the acceptance of the results. It was also very important that those volunteer helpers, and other people interested, obtain feedback from the research project. In cooperation with Jonas Kindberg, we made the results from the fecal analysis available on the following website of the Swedish Association for "Hunting and Wildlife Management" (http://www.jagareforbundet.se/forsk/bjornspillningsinventering/default.asp). On this website, it is possible to see maps of the different hunting areas with the geographical localization of fecal samples corresponding to male and female bears or without amplifiable DNA, and a number is assigned to each genetically identified individual. This allows people to perceive the utility and importance of the collection of fecal samples and to see the results from the analysis, e.g. what is the minimum number of bears that has been in their region before or during the sampling period.

V. 2. 2. The brown bear mating system (Papers VII-VIII)

In general, the mating system of bears is poorly known. Only a few studies have addressed this question with a limited amount of field and genetic data (Craighead *et al.* 1995b; Craighead *et al.* 1998; Kovach & Powell 2003; Schenk & Kovacs 1995). We studied the mating system of the brown bear with the help of molecular markers. From parentage analysis and pedigrees (**Annex 4**), we examined mating strategies employed by both sexes in relation to SSI and approached the subject of mate selection by females.

V. 2. 2. 1. Sexually selected infanticide

SSI is probably a major factor influencing mating systems in several species (Hrdy 1979; Hrdy & Hausfater 1984) and has been found to be an important factor affecting cub survival in the Scandinavian brown bear population (Swenson *et al.* 1997; 2001). In **paper VII**, we examined the presence of the three requirements for SSI in our brown bear population, based on documented cases of infanticide and genetic data collected in the field. We found that mothers that lost all cubs had their next litter more than one year earlier than those with surviving cubs. From genetic analyses of samples found at the sites of infanticide, we determined that the infanticidal males were not the fathers of the killed cubs and that they had a high probability of fathering the female's next litter. Interestingly, most of those males were residents, suggesting that they probably recognize the female they mated with the year before and do not attempt to

kill cubs that are potentially their own. We concluded that all three prerequisites of SSI were met and that SSI might be an adaptive male mating strategy in brown bears. Multiple paternities were genetically demonstrated and suggested that females may mate with several males in order to confuse paternities, i.e. as a counterstrategy to SSI. This study was the first to genetically document mating strategies in relation to SSI in a nonsocial species. We predict those findings may also be applicable to other social and nonsocial species with SSI and we encourage future studies to obtain paternity estimates in order to assess the reproductive benefits to infanticidal males and to evaluate the counterstrategies employed by females.

V. 2. 2. 2. Female mate selection

In **paper VIII**, we investigated different factors possibly influencing female mate selection in the brown bear. We compared different characteristics of the males "chosen" to be fathers, as determined by paternity tests using microsatellite polymorphism, to those known to be available in the vicinity of the female. We assumed that SSI might influence female mate selection in this species, as females may seek mating counterstrategies to SSI. Consequently, we tested the following predictions: (1) females would select high quality males based on their age, body size, heterozygosity, or relatedness, in order to maximize their reproductive output and avoid inbreeding; (2) females would adopt a strategy to minimize the risk of SSI, and rather mate with potentially infanticidal males, i.e. the geographically closest males. We found evidence that both geographical distance and male morphological, genetic and age criteria significantly influenced female choice. Female brown bears might mate with the closest males as a counter-strategy to infanticide and exercise a post-copulatory cryptic choice, using morphological traits or dominance status as indicators of male genetic quality ("good gene" hypothesis, Brown 1997). Mate selection was apparently not a mechanism to avoid inbreeding or outbreeding, as our results supported a random mating scheme in relation to genetic relatedness. Instead, inbreeding avoidance may be a natural consequence of sex-biased dispersal (McLellan & Hovey 2001).

VI. Conclusions

Genetic studies of the Scandinavian brown bear population have been useful for the management and conservation of this population and have improved the understanding of important aspects of the species' biology. Earlier genetic studies of Scandinavian brown bears allowed the assessment the genetic structure of the population, mitochondrial and nuclear genetic diversity and gene flow (Taberlet *et al.* 1994; 1995; Waits *et al.* 2000; see Material & Methods section for more details), and this population is now considered as three distinct subpopulations from a conservation perspective (Manel *et al.* 2004).

In the present thesis, we developed techniques to amplify DNA from noninvasive samples and assess parentage and applied those techniques to management and conservation of the Scandinavian brown bear. Overall, our results allowed an accurate estimation of the brown bear population size in Sweden and helped in the understanding of the brown bear mating system. The results also have a wider general ecological and genetical interest and some can be applied to other bear populations or even to other species. The importance of this study lies in three different aspects: methodological developments, management implications, and understanding of bear biology.

Methodological developments

Papers I, III and **IV** are of general interest. The multiplex pre-amplification method (**Paper I**) is applicable for a range of species where conventional PCR approaches experience low success and facilitates the genotyping of samples formerly considered as "difficult" because of their low DNA quality/quantity. This approach is now being implemented for other species such as wolves (*Canis lupus*; P. Taberlet, pers. comm.). We hope the discussion about genotyping errors (**Paper III**) will encourage population geneticists to estimate and systematically report genotyping error rates in their datasets. The development of statistical aspects to evaluate genotyping errors was recommended in this paper and has recently been implemented (S. Kalinowski, pers. comm.). The parentage analysis software PARENTE (**Paper IV**) assists studies that analyze parentage in different species and is now used more and more (positive feedback has been received from different users). It was also described and compared favorably with other softwares in a review about methods of parentage analysis in natural populations (Jones & Ardren 2003).

Paper II describes a method specifically developed for amplifying brown bear fecal DNA, with newly designed primers, and will help brown bear studies in other parts of the world. This is especially relevant in studies where bears are endangered or difficult to capture. The use of this protocol is already implemented or planned to census bears in other counties in

Sweden (e.g. Västernorrland) and also in other parts of Europe (Croatia, Slovenia, Estonia). One advantage of using the same method across different bear studies is that the results from different bear populations will be comparable. This protocol will probably be applicable to other bear species, with adjustments depending on the allelic polymorphism.

Management implications

Based on our results on the reliability and costs of different population size estimators from genetic and field data (**Papers V** and **VI**), managers are able to decide which method they might use to census brown bears or other elusive animals. If the noninvasive genetic method is chosen, recommendations given in **Paper V** allow the implementation of this approach from the sampling phase to the analytical phase, in a routine way. In this study, using the genetic approach, we estimated a population size of Scandinavian brown bears that was larger than expected (J. Swenson pers. comm.), and proved that this population is now in a favorable conservation status. This gives managers more flexibility in their decisions, including the setting of hunting quotas and the removal of problem bears.

Understanding bear biology

Our findings concerning the mating system of the brown bear allowed a better understanding of reproductive parameters and factors influencing reproduction in this species. We found evidence that SSI is not restricted to social mammals and not only immigrant males kill dependent offspring, suggesting that our results on SSI might be applicable to other social or nonsocial species (**Paper VII**). Moreover female mate selection is probably influenced by SSI in this species (**Paper VIII**). This is important from an evolutionary perspective, because it corroborates the fact that intersexual conflict has the potential to shape mating systems. Another major factor influencing mating system is the female selection for individual genetic heterozygosity among males, which may be more important than previously recognized.

VII. Perspectives

There is potential to further invest in the genetics of the Scandinavian brown bear and increase our understanding of population and species biology and conservation. A few aspects of potential future work are briefly described here.

Further investigations of the brown bear mating system

The future development of techniques both in the field and in the laboratory will help to better understand mating systems in Scandinavian bears as well as in other animals. Advances in telemetry technology will allow a more precise monitoring of individual bears. For instance, collars with GPS (Global Positioning System) capabilities could give simultaneous positions of males and females during the entire mating season and would allow documentation of how they interact, giving insight on both mate selection and infanticidal behavior. By documenting male encounters with a particular female during the mating season (which males, how many males, and in which order), and corroborating these data with paternity analyses, we will be able to draw more precise predictions about female choice or male-male competition.

From a genetic perspective, several aspects related to mating systems could be further investigated. Cub survival is an important factor determining individual reproductive success. It has been documented that cub mortality averages 35% annually in the south core study area and 4% in the north core study area, the main cause of death being social factors (Swenson *et al.* 2001). Due to ethical reasons we do not handle young until they are one year old, which means that genetic samples have not been obtained from individuals that had died earlier. It is possible to obtain data of the dead individuals by the collection of feces from the young at the dens. By comparing the genotypes of dead cubs with surviving cubs, it would be possible to investigate whether there is a genetic component in cub survival. In accordance with the importance of immunocompetence in some theories of sexual selection, the genetic compatibility between the mother and father, including MHC (Major Histocompatibility Complex) genes, could be assessed as a factor influencing mate choice (Jordan & Bruford 1998, Penn & Potts 1999) and possibly cub survival (Tregenza & Wedell 2000). It has been shown that sexual selection of condition-dependent traits during mate choice could be used to select successful MHC alleles, thereby providing offspring with a higher relative immunity in their pathogenic environment (Groba *et al.* 1998). MHC similarity might serve as an indicator of genome-wide relatedness and detection of MHC differences between individuals could be related to olfactory cues, primarily in urine (Groba *et al.* 1998). Finally, it would be interesting to evaluate the benefits of choice for females by assessing the correlation between choice of the

reproductive partner and offspring fitness (Gibson & Langen 1996). For instance, will the number of descendants of a female depend on whom she mated with?

The promise of population genomics

With the development of new molecular techniques, we will be able to work on a larger portion of the bear genome and identify adaptive molecular variation, among other applications. This relatively new field, called "population genomics", can be defined as "the simultaneous study of numerous loci or genome regions to better understand the role of evolutionary processes … that influence variation across genomes and populations" (Luikart *et al.* 2003). The basic population genomics approach consists of genotyping many individuals at many loci and conducting statistical tests for outlier loci, i.e. loci showing patterns of variation that are divergent from the rest of the genome (potentially under selection). Outlier loci should be removed to improve estimation of population parameters (e.g. effective population size, levels of population structure, phylogeny). Then, the adaptive information can be used for biodiversity conservation or evolutionary inferences (Luikart *et al.* 2003).

The development of markers covering a large part of the genome, such as SNPs (Single Nucleotide Polymorphisms), has recently become feasible in mammals. Among carnivores, the sequence of the entire dog genome is near completion. Consequently, candidate genes will be identified and it will soon be possible to define SNP markers for bears as well as other organisms that are genetically close to the dog. The markers under selection can then be related to quantitative or environmental traits, which will give insights into adaptive molecular variation.

ACKNOWLEDGEMENTS

REFERENCES

Agrell, J., J. O. Wolff, & H. Ylönen. 1998. Counter-strategies to infanticide in mammals: costs and consequences *Oikos* **83**:507-517.

Amos, B., S. Twiss, P. Pomeroy, & S. Anderson. 1993. Male mating success and paternity in the gray seal *Halichoerus grupus* : a study using DNA fingerprinting. *Proceedings of the Royal Society of London Series B* **252**:199-207.

Amos, B., S. Twiss, P. Pomeroy, & S. Anderson. 1995. Evidence for male fidelity in the gray seal. *Science* **268**:1897-1899.

Bateman, A. J. 1948. Intra-sexual selection in *Drosophila*. *Heredity* **2**:349-368.

Beaumont, M. A., & M. W. Bruford. 1998. Microsatellites in conservation genetics. Pages 165-182 in *Microsatellites: Evolution and applications*. D. B. Goldstein, and C. Schlötterer, editors. Oxford University Press, New York.

Bjärvall, A., & F. Sandegren. 1987. Early experiences with the first radio-marked brown bears in Sweden. *International Conference on Bear Research and Management* **7**: 9-12.

Brotherton, P. N. M., J. Pemberton, P. Komers, & G. Malarky. 1997. Genetic and behavioural evidence of monogamy in a mammal, Kirk's dik-dik. *Proceedings of the Royal Society of London* **264**:675-681.

Brown, J. L. 1997 A theory of mate choice based on heterozygosity. *Behavioral Ecology* **8**:60-65.

Bruford, M. W., & R. K. Wayne. 1993. Microsatellites and their application to population genetic studies. *Genomes and Evolution* **3**:939-942.

Cercueil, A. 2004. Contributions statistiques en génétique des populations. Thesis (in French). 118 pp. Laboratoire des Techniques de l'Imagerie, de la Modelisation et de la Cognition; Laboratoire d'Ecologie Alpine. Université Joseph Fourier, Grenoble.

Clapham, P. J., & P. J. Palsbøll. 1997. Molecular analysis of paternity shows promiscuous mating in female humpback whales (*Megaptera novaeangliae* Borowski). *Proceedings of the Royal Society of London* **264**:95-98.

Clutton-Brock, T. H. 1989. Mammalian mating systems. *Proceedings of the Royal Society of London Series B.* **236**:339-372.

Coltman, D. W. 1999. Male reproductive success in a promiscuous mammal: behavioural estimates compared with genetic paternity. *Molecular Ecology* **8**:1199-1209.

Craighead, J. J., J. S. Sumner, & J. A. Mitchell. 1995a. *The grizzly bears of Yellowstone: their ecology in the Yellowstone Ecosystem.* Island Press, Washington DC.

Craighead, L., D. Paetkau, H. V. Reynolds, E. R. Vyse, & C. Strobeck. 1995b. Microsatellite analysis of paternity and reproduction in arctic grizzly bears. *Journal of Heredity* **86**:225-261.

Craighead, L., H. V. Reynolds, C. Strobeck, & E. R. Vyse. 1998. Use of microsatellite DNA analyses to infer breeding behavior and demographic processes in an arctic grizzly bear population. *Ursus* **10**:323-327.

Curry-Lindahl, K. 1972. The brown bear (*Ursus arctos*) in Europe: decline present distribution biology and ecology. *International Conference on Bear Research and Management* **2**: 74-80.

Dahle, B., O. J. Sørensen, E. H. Wedul, J. E. Swenson, & F. Sandegren. 1998. The diet of brown bears *Ursus arctos* in central Scandinavia: effects of access to free-ranging domestic sheeps *Ovis aries*. *Wildlife Biology* **4**:147-158.

Dahle, B., & J. E. Swenson. 2003a. Seasonal range size in relation to reproductive strategies in brown bears *Ursus arctos*. *Journal of Animal Ecology* **72**:660-667.

Dahle, B., & J. E. Swenson. 2003b. Home ranges in adult Scandinavian brown bears *Ursus arctos*: effect of mass, sex, reproductive status, population density and habitat type. *Journal of Zoology* **260**:329-335.

Eggert, L. S., J. A. Eggert, & D. S. Woodruff. 2003. Estimating population sizes for elusive animals: the forest elephants of Kalum National Park Guana. *Molecular Ecology* **12**:1389-1402.

Emlen, S. T., & L. W. Oring. 1977. Ecology sexual selection and the evolution of mating systems. *Science* **197**:215-233.

Festa-Bianchet, M., & M. Apollonio. 2003. *Animal Behaviour and Wildlife Conservation* Island Press, Washington DC.

Frankham, R., J. D. Ballou, & J. E. Briscoe. 2002. *Introduction to conservation genetics* University of Cambridge, Cambridge.

Friebe, A., J. E. Swenson, & F. Sandegren. 2001. Denning chronology of female brown bears (*Ursus arctos*) in central Sweden. *Ursus* **12**: 37-46.

Gibson, R. M., & T. A. Langen. 1996. How do animals choose their mate ? *Trends in Ecology and Evolution* **11**:468-470.

Goossens, B., L. Graziani, & L. P. Waits. 1998. Extra-pair paternity in the monogamous Alpine marmot revealed by nuclear DNA microsatellite analysis. *Behavioural Ecology and Sociobiology* **43**:281-288.

Groba, B., L. A. Knappb, R. D. Martina, & G. Anzenbergera. 1998. The major histocompatibility complex and mate choice: inbreeding avoidance and selection of good genes. *Experimental and Clinical Immunogenetics* **15**:119-129.

Grundsten, C. 1997. The Laponian area, a Swedish world heritage site. *Naturvårdsverket*, Stockholm Sweden.

Hartl, D. L., & A. G. Clark 1989. *Principles of population genetics* Sunderland.

Hensel, R. J., W. H. Troyer, & A. W. Erickson. 1969. Reproduction in the female brown bear. *Journal of Wildlife Management* **33**:357-365.

Höss, M., M. Kohn, S. Pääbo, F. Knauer, & W. Schröder. 1992. Excremental analysis by PCR. *Nature* **359**:199.

Hilderbrand, G. V., S. G. Jenkins, C. C. Schwartz, T. A. Hanley, & C. T. Robbins. 1999. Effects of seasonal differences in dietary meat intake on changes in body mass and composition in wild and captive brown bears. *Canadian Journal of Zoology* **77**:1623-1630.

Hogg, J. T. 2000. Mating systems and conservation at large spatial scales. Pages 214-252 in *Vertebrate mating systems* M. Apollonio, et al., editors. World Scientific, Singapore.

Hrdy, S. B. 1979. Infanticide among animals: a review classification and examination of the implications for the reproductive strategies of females. *Ethology and Sociobiology* **1**:13-40.

Hrdy, S. B., & G. Hausfater 1984. *Infanticide: Comparative and evolutionary perspectives*. Adline, New York.

Hugues, C. 1998. Integrating molecular techniques with field methods in studies of social behaviour: a revolution results. *Ecology* **79**:383-399.

Jones, A. G., & W. R. Ardren. 2003. Methods of parentage analysis in natural populations. *Molecular Ecology* **12**:2511-2523.

Jordan, W. C., & M. W. Bruford. 1998. New perspectives on mate choice and the MHC. *Heredity* **81**:239-245.

Kindberg, J., J. E. Swenson, S. Brunberg, & G. Ericsson. 2004. Preliminär rapport on populations utveckling och storlek av brunbjörn i Sverige, 2004. 10pp. *Report from The Scandinavian Brown Bear Research Project to the Swedish Environmental Protection Agency* (In Swedish). Stockholm, Sweden.

Kohn, M. H., E. C. York, D. A. Kamradt, G. Haught, R. M. Sauvajot, & R. K. Wayne. 1999. Estimating population size by genotyping faeces. *Proceedings of the Royal Society of London* **266**:657-663.

Kovach, A. I., & R. A. Powell. 2003. Effects of body size on male mating tactics and paternity in black bears *Ursus americanus*. *Canadian Journal of Zoology* **81**:1257-1268.

Kreeger, T. J., J. M. Arnemo, & J. P. Raath 2002. *Handbook of wildlife chemical immobilization* Wildlife Pharmaceuticals Inc, Colorado USA.

Luikart, G., P. R. England, D. Tallmon, S. Jordan, & P. Taberlet. 2003. The power and promise of population genomics: from genotyping to genome typing. *Nature Reviews Genetics* **4**:981-994.

Lundqvist, R. 2002. Fulufjället Nationalpark i Dalafjällen. *Naturvårdsverket*. Stockholm Sweden.

Manchi, S., & J. E. Swenson. Denning behaviour of Scandinavian brown bears (*Ursus arctos*). *Wildlife Biology* In press.

Manel, S., E. Bellemain, J. E. Swenson, & O. Francois. 2004. Assumed and inferred structure of populations: the Scandinavian brown bears revisited. *Molecular Ecology* **13**:1327-1331.

Marshall, T. C., J. Slate, L. E. B. Kruuk, & J. M. Pemberton. 1998. Statistical confidence for likelihood-based paternity inference in natural populations. *Molecular Ecology* **7**:639-655.

Matson, G. M., H. E. Casquilho-Gray, J. D. Paynich, H. V. Reynolds, & J. E. Swenson. 1999. Cementum annuli are unreliable reproductive indicators in female brown bears. *Ursus* **11**:275-280.

McLellan, B. N. 1994. Density dependent population regulation of brown bears. In *Density-dependent population regulation of black, brown, and polar bears*. M Taylor editor. *Ninth International Conference on Bear Research and Management, Monograph Series* **3**:15-24.

McLoughlin, P. D. 1999. Annual and seasonal movement patterns of barren-ground grizzly bears in the central Northwest Territories. *Ursus* **11**:79-86.

Morin, P. A., & D. S. Woodruff. 1996. Non-invasive sampling for vertebrate conservation. Pages 298-313 in *Molecular approaches in conservation*. R. Wayne, & T. Smith, editors. Oxford University Press, Oxford.

Moritz, C. 1994. Defining "evolutionary significant units" for conservation. *Trends in Ecology and Evolution* **9**:373-375.

Naturårdsverket. 2003. Åtgärdsprogram för bevarande av björn (*Ursus artos*). Åtgärdsprogram No 20 Swedish Environmental Protection Agency, Stockholm (In Swedish).

Paetkau, D., & C. Strobeck. 1994. Microsatellite analysis of genetic variation in black bear populations. *Molecular Ecology* **3**:489-495.

Paetkau, D., W. Calvert, I. Stirling, & C. Strobeck. 1995. Microsatellite analysis structure of population structure in Canadian polar bears. *Molecular Ecology* **4**:347-354.

Paetkau, D. 2003. An empirical exploration of data quality in DNA-based population inventories. *Molecular Ecology* **12**:1375-1387.

Pasitschniak-Arts, M. 1993. *Ursus arctos*. *Mammalian Species* **439**:1-10

Penn, D. J., & W. K. Potts. 1999. The evolution of mating preferences and major histocompatibility complex genes. *American Naturalist* **153**:145-164.

Renfree, M. B., & J. H. Calaby. 1981. Background to delayed implantation and embryonic diapause. *Journal of Reproduction and Fertility* (Suppl.) **29**:1-9.

Sandegren, F. & J.E. Swenson, J.E. 1997. *Björnen—viltet, ekologin och människan.* Svenska Jägareförbundet, Stockholm, Sweden. (The brown bear—the animal, ecology, and man; in Swedish). 70 pp.

Sandel, M. 1989. The mating tactics and spacing patterns of solitary carnivores. Pages 164-182 in *Carnivore behavior, ecology and evolution* J. L. Gittleman, editor. Cornwell University Press, New York.

Schenk, A., & K. M. Kovacs. 1995. Multiple mating between black bears revealed by DNA fingerprinting. *Animal Behavior* **50**:1483-1490.

Schwartz, C. C., S. D. Miller, & M. A. Haroldson. 2003. Grizzly bear. Pages 556-586 in *Wild mammals of north America: biology, management, and conservation* G. A. Feldhamer, et al. editors. The Johns Hopkins University Press, Baltimore, Maryland.

Schwartz, C. C., K. A. Keating, H. V. Reynolds et al. 2004. Reproductive senescence in the brown/grizzly bear. *Ursus* **14**:109-119.

Seber, G. A. F. 1982. *The estimation of animal abundance and related parameters* 2nd edition. G A F Seber, London.

Selander, S., & C. Fries. 1943. års björnutredning. *Sveriges Natur* **1**:1-10.

Servheen, C. 1990. The status and conservation of the bears of the world. *International Conference on Bear Research and Managment* **8**: 1-29

Swenson, J. E., F. Sandegren, A. Bjärvall, A. Söderberg, P. Wabakken, & R. Franzèn. 1994. Size, trend, distribution and conservation of the brown bear *Ursus arctos* population in Sweden. *Biological conservation* **70**:9-17.

Swenson, J. E., P. Wabakken, F. Sandegren, A. Bjärvall, R. Franzèn, & A. Söderberg. 1995. The near extinction and recovery of brown bears in Scandinavia in relation to the bear management policies of Norway and Sweden. *Wildlife Biology* **1**:11-25.

Swenson, J. E., F. Sandegren, A. Söderberg, A. Bjärvall, R. Franzén, & P. Wabakken. 1997. Infanticide caused by the hunting of male bears. *Nature* **386**:450-451.

Swenson, J. E., F. Sandegren, & A. Söderberg. 1998a. Geographic expansion of an increasing brown bear population: evidence for presaturation dispersal. *Journal of Animal Ecology* **67**:819-826.

Swenson, J. E., F. Sandegren, A. Bjärvall, & P. Wabakken. 1998b. Living with success: research needs for an expanding brown bear population. *Ursus* **10**:17-23.

Swenson, J. E., A. Jansson, R. Riig, & F. Sandegren. 1999. Bears and ants: myrmecophagy by brown bears in central Scandinavia. C*anadian Journal of Zoology* **77**:551-561.

Swenson, J. E., B. Dahle, & F. Sandegren. 2001. Intraspecific predation in Scandinavian bears older than cubs of the year. *Ursus* **12**:81-92.

Swenson, J. 2003. Implication of sexually selected infanticide for the hunting of large carnivores. Pages 171-189 in *Animal behaviour and wildlife management*, M. F. Bianchet, &. M. Apollonio, editors. Insland press Washington DC.

Taberlet, P., & J. Bouvet. 1992. Bear conservation genetics. *Nature* **358**:197.

Taberlet, P., & J. Bouvet. 1994. Mitochondrial DNA polymorphism phylogeography and conservation genetics of the brown bear *Ursus arctos* in Europe. *Proceedings of the Royal Society of London* **255**:195-200.

Taberlet, P., J. E. Swenson, F. Sandegren, & A. Bjärnvall. 1995. Localisation of a contact zone between two highly divergent mitochondrial lineages of the brown bear Ursus arctos in Scandinavia. *Conservation Biology* **9**:1255-1261.

Taberlet, P., S. Griffin, B. Goossens, S. Questiau, V. Manceau, N. Escaravage, L. P. Waits, & J. Bouvet. 1996. Reliable genotyping of samples with very low DNA quantities using PCR. *Nucleic Acids research* **24**:3189-3194.

Taberlet, P., J. J. Camarra, S. Griffin, O. Hanotte, L. P. Waits, C. Dubois-Paganon, T. Burke, & J. Bouvet. 1997. Nonivasive genetic tracking of the endangered Pyrenean brown bear population. *Molecular Ecology* **6**:869-876.

Taberlet, P., & G. Luikart. 1999. Non-invasive genetic sampling and individual identification. *Biological journal of the linnean society* **68**:41-55.

Taberlet, P., L. P. Waits, & G. Luikart. 1999. Nonivasive genetic sampling: look before you leap. *Trends in Ecology and Evolution* **14**:323-327.

Tregenza, T., & N. Wedell. 2000. Genetic compatibility, mate choice and patterns of parentage: Invited Review. *Molecular Ecology* **9**:1013-1027.

Tsubota, T., H. Kanagawa, T. Mano, & T. Aoi. 1989. Corpora albicantia and placental scars in the Hokkaido brown bear. *International Conference on Bear Research and Management* **8**:125-128

Van-Schaik, C. P., & C. H. Janson 2000. *Infanticide by males and its implications* C. P. Van Schaik, & C. R. Janson, editors. Cambridge Univ Press.

Waits, L. P. 1999. Molecular genetic applications for bear research. *Ursus* **11**:253-260.

Waits, L. P., P. Taberlet, J. E. Swenson, & F. Sandegren. 2000. Nuclear DNA microsatellite analysis of genetic diversity and gene flow in the Scandinavian brown bear (*Ursus arctos*). *Molecular Ecology* **9**:421-431.

Waits, L. P., G. Luikart, & P. Taberlet. 2001. Estimating the probability of identity among genotypes in natural populations: cautions and guidelines. *Molecular Ecology* **10**:249-256.

White, G. C., & K. P. Burnham. 1999. Program MARK: survival estimation from populations of marked individuals. *Bird Study Supplement* **46**:120-138.

Wright, S. 1977. *Evolution and the genetics of populations.* Vol 3 *Experimental results and evolutionary deductions* Univ. Chicago Press, Chicago.

Zedrosser, A., B. Dahle, J. E. Swenson, & N. Gerstl. 2001. Status and management of the brown bear in europe. *Ursus* **12**:9-20.

Zedrosser, A., G. Rauer, & L. Kruckenhauser. 2004. Early primiparity in brown bears. *Acta Theoriologica* In press.

ANNEX 1: Map of bear distribution in Scandinavia

The primary distribution of female brown bears (dark shading areas) and all bears (light shading) in Scandinavia. The black dashed line indicates the location of the contact zone between the two mitochondrial lineages. The tissue samples from marked bears were collected in areas NN and S, and the tissue samples from killed bears were collected from throughout the range (adapted from Swenson *et al*. 1998). Fecal samples were collected in the area delimited by the bold red dotted line.
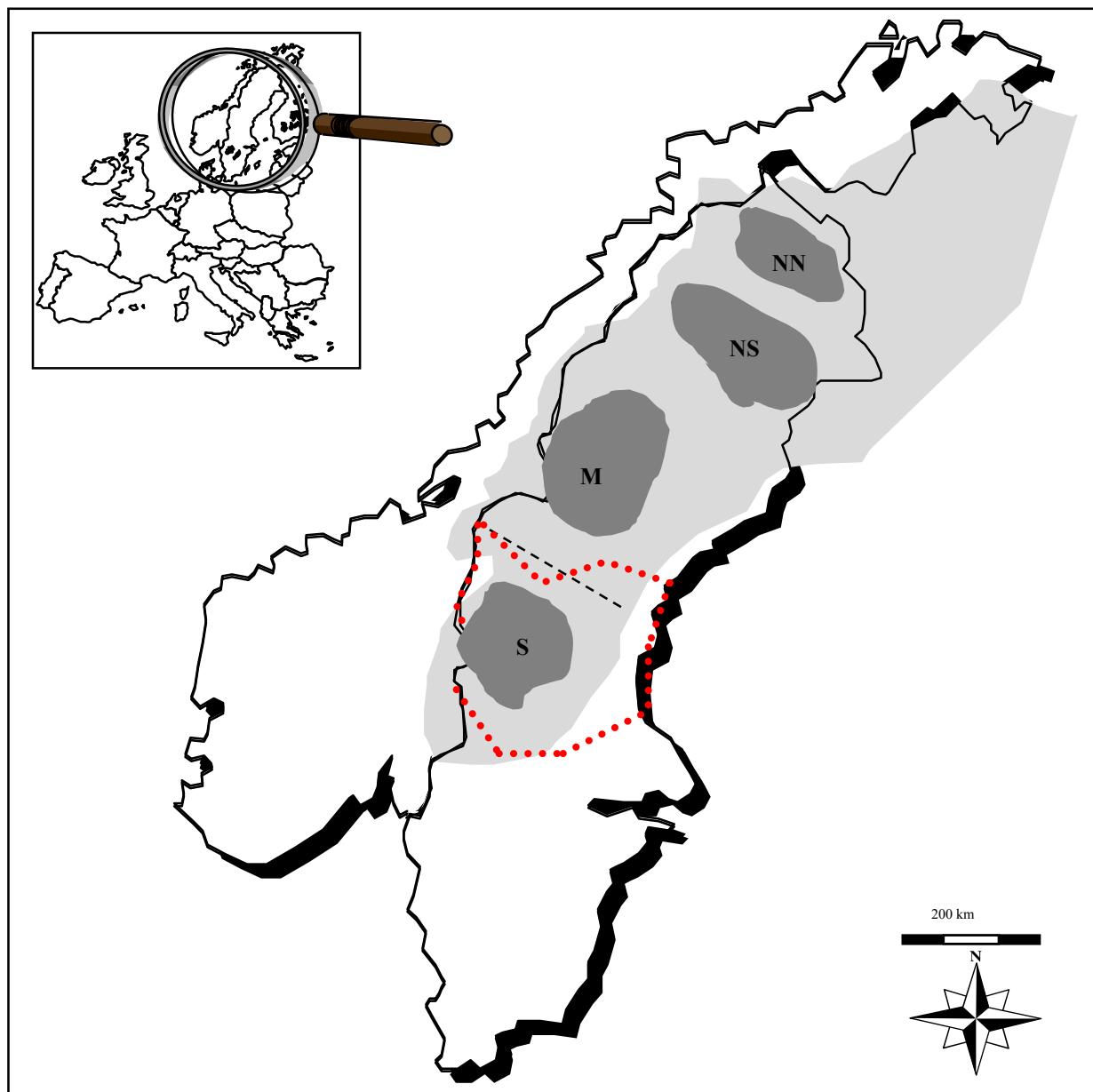
ANNEX 2: Multilocus genotypes from all sampled Scandinavian brown bears

<u>Legend</u>: The coordinates ("X-coord" and "Y-coord") correspond to the Swedish coordinate system

"Subpop" indicates the subpopulation where the bear was sampled (see **Annex 1**)

"?" indicates missing data

Bear ID	Year	X-coord	Y-coord	Sex	Year of birth	Year of death	Subpop	G1A	G1A	G1D	G1D	G10B	G10B	G10C	G10C	G10L	G10L	G10P	G10P	G10O	G10O
00BD01	2000	7461682	1654343	M	1999	2000	N	189	189	169	173	136	136	108	108	153	157	159	163	195	195
00BD02	2000	7494181	1811000	M	1998	2000	N	183	189	169	173	136	136	104	104	145	153	159	163	195	195
00BD04	2000	7253500	1719500	M	1996	2000	N	191	191	179	181	136	148	102	102	143	145	147	159	195	195
00BD05	2000	7437900	1580700	M	1992	2000	NS	189	189	173	179	148	154	102	108	143	149	159	163	195	195
00BD07	2000	7319000	1744000	M	1998	2000	N	191	191	?	?	138	148	102	104	?	?	157	159	?	?
00BD08	2000	7342300	1677800	M	1998	2000	NS	181	189	175	181	148	156	?	?	143	149	159	163	195	195
00BD09	2000	7461706	1770558	F	1995	2000	N	187	189	169	181	150	152	102	104	143	153	157	163	195	195
00BD10	2000	7361690	1698000	F	1999	2000	N	187	191	181	181	136	148	102	112	149	149	141	163	195	197
00BD11	2000	7353246	1559484	M	1998	2000	N	181	187	173	181	138	154	108	108	149	157	147	159	195	195
00BD92	2000	7353246	1559484	M	2000	2000	N	189	189	179	179	144	154	102	102	143	149	159	163	195	195
00BD93	?	?	?	M	2000	2000	N	189	189	179	179	144	154	102	102	143	149	159	163	195	195
00BD94	?	?	?	M	?	2000	N	189	189	169	179	138	150	104	108	149	153	159	163	195	195
00BD96	?	?	?	?	?	2000	N	?	?	169	181	148	150	102	102	153	?	147	153	195	195
00BD97	?	?	?	F	?	2000	N	187	191	179	181	148	150	102	108	149	153	147	163	195	195
00BD98	?	?	?	?	?	2000	N	?	?	173	181	138	148	102	104	153	153	163	163	195	195
00W01	2000	6767216	1424587	M	1992	2000	SS	181	191	173	181	148	156	102	108	143	153	147	157	195	195
00W02	2000	6800200	1401550	F	1999	2000	S	181	193	179	181	136	148	102	102	149	153	155	155	195	195
00W03	2000	6760100	1489200	M	1997	2000	S	181	193	179	181	136	148	102	102	149	153	155	155	195	195
00W05	2000	6766000	1471200	F	1999	2000	S	189	191	173	181	136	156	102	106	143	155	147	147	195	195
00W06	2000	6748000	1500600	F	1996	2000	S	181	191	181	181	136	156	102	108	153	155	147	155	195	195
00W07	2000	6794400	1429300	M	1992	2000	S	181	181	179	181	136	148	108	112	153	155	155	155	185	195
00W08	2000	6798900	1400200	F	1999	2000	S	189	193	179	179	138	148	102	112	153	159	155	163	195	195
00W09	2000	6801400	1439300	F	1998	2000	S	181	181	179	181	148	156	104	108	155	159	147	153	185	195
00W10	2000	6758000	1483500	M	1997	2000	S	181	191	179	181	136	156	108	108	153	155	155	157	185	195
00W15	2000	6790400	1420500	F	1993	2000	S	181	191	?	?	136	136	102	104	149	159	155	155	195	195
00W16	2000	6822000	1402400	M	?	2000	S	181	193	179	179	136	148	104	112	159	159	155	157	195	195
00W94	2000	6819400	1442900	F	2000	2000	S	191	191	179	181	136	138	102	112	143	153	147	155	195	195
00W95	2000	6821700	1389600	F	1995	2000	S	181	181	181	181	136	136	102	104	159	159	147	159	195	195

ID	Year	X	Y	Sex	Birth	Year2	Status															
00W98	2000	6781900	1435600	M	1999	2000	S	181	193	179	181	136	148	102	102	?	?	155	155	195	195
00W99	2000	6781900	1435600	F	1991	2000	SS	181	181	181	181	136	148	102	102	153	153	155	155	195	195
00X01A	2000	6851800	1497500	F	1999	2000	S	181	191	179	181	148	148	102	108	153	159	147	159	195	195
00X01B	2000	6851800	1497500	F	1999	2000	SS	181	181	181	181	136	148	102	108	153	155	147	159	195	195
00X02	2000	6819070	1498060	F	1991	2000	SS	181	191	179	181	136	156	104	112	153	153	147	157	185	195
00X03	2000	6762050	1530220	M	1992	2000	S	181	181	173	173	136	136	102	104	153	153	155	155	195	195
00X04	2000	6821600	1516900	M	1995	2000	S	181	181	173	179	136	148	102	108	153	155	147	157	195	195
00X05	2000	6832300	1470500	M	1998	2000	S	181	187	173	181	136	148	102	102	143	157	157	159	185	195
00X06	2000	6838800	1475200	M	1988	2000	S	181	191	179	181	136	148	102	102	153	155	157	159	195	195
00X98	2000	6825800	1482300	F	1994	2000	S	181	181	173	181	136	148	102	108	153	153	159	159	185	195
00Z01	2000	7121400	1510700	M	1985	2000	S	181	181	181	181	156	156	106	108	155	155	147	147	195	195
00Z07	2000	7104400	1468400	M	1984	2000	M	181	189	173	179	136	148	104	112	159	159	157	157	185	185
01AC01	2001	7135877	1661109	M	1998	2001	M	187	191	173	181	136	148	102	108	149	153	147	163	195	195
01AC02	2001	7269000	1552800	M	1998	2001	M	187	187	173	173	136	154	108	108	149	153	159	159	195	195
01AC03	2001	7093000	1637000	F	2000	2001	M	189	191	173	179	136	144	102	108	149	153	155	159	195	195
01AC05	2001	7288200	1536000	M	1998	2001	M	181	189	173	181	136	154	104	108	149	157	159	163	195	195
01AC06	2001	7198300	1513500	F	1998	2001	M	191	191	179	179	136	136	108	108	153	153	?	?	195	197
01AC07	2001	7139800	1633600	M	1996	2001	M	189	191	179	181	148	152	102	108	153	155	159	163	195	195
01BD01	2001	7422064	1657310	M	1997	2001	NS	187	189	173	181	136	144	102	102	149	157	159	163	195	195
01BD02	2001	7422822	1654167	M	1995	2001	NS	189	189	177	181	136	136	104	108	143	149	147	155	195	195
01BD06	2001	7448405	1780442	M	2000	2001	NN	187	191	169	173	136	138	102	104	143	143	163	163	195	195
01BD07	2001	7352400	1593000	F	1996	2001	NS	187	189	179	181	136	152	104	108	?	?	155	163	195	195
01BD08	2001	7378052	1585388	M	1996	2001	NS	189	189	179	179	150	150	104	104	149	159	155	163	195	195
01BD09	2001	7422700	1511900	F	1992	2001	NS	189	189	177	179	138	154	104	104	157	157	163	163	195	195
01BD10	2001	7374000	1714000	M	2000	2001	NS	187	189	179	181	136	152	108	108	143	153	155	159	195	195
01BD11	2001	7352288	1598770	M	2000	2001	NS	189	189	173	177	136	136	102	104	143	149	147	163	195	195
01BD13	2001	7369763	1719417	F	2000	2001	NS	189	189	179	181	136	136	102	104	?	?	155	159	195	195
01S01	2001	6751870	1332877	M	1997	2001	SS	181	189	173	181	136	156	102	108	153	155	147	147	195	195
01W05	2001	6731400	1525000	M	1991	2001	SS	181	191	181	181	156	156	108	112	155	155	147	159	185	195
01W07	2001	6798900	1422900	M	1992	2001	SS	193	193	179	179	136	136	102	102	149	149	155	155	195	195
01W08	2001	6789300	1462300	F	1999	2001	SS	181	191	179	181	136	156	104	108	153	159	147	147	195	195
01W09	2001	6815800	1436700	F	1989	2001	SS	181	181	173	179	136	148	102	104	149	159	153	155	195	195
01W11	2001	6753900	1453900	M	1989	2001	SS	181	189	181	181	136	156	102	108	155	155	147	155	195	195
01W12	2001	6818000	1387000	F	2000	2001	SS	181	191	173	173	136	136	102	108	153	159	147	155	195	195
01W14	2001	6720255	1451760	M	1999	2001	SS	181	191	179	181	136	156	102	108	153	155	147	147	195	195
01W98	2001	6906400	1321900	F	?	2001	SS	181	189	181	181	136	148	104	112	153	155	157	159	195	195
01X01	2001	6815465	1484135	F	1997	2001	SS	181	193	181	181	136	136	108	108	149	155	147	159	195	195

01X02	2001	6839800	1507800	M	1999	2001	SS	181	191	173	173	136	156	104	104	149	149	155	157	195	195
01X03	2001	6862300	1487200	F	1999	2001	SS	189	191	179	181	136	148	102	108	155	159	159	159	195	195
01X05	2001	6757500	1565300	M	1997	2001	SS	181	181	173	179	148	156	106	112	143	153	147	155	195	195
01X06	2001	6867000	1478400	M	1998	2001	SS	181	191	173	179	136	156	102	108	155	155	157	159	185	195
01Y02	2001	7060600	1569500	F	2000	2001	M	189	191	173	179	136	148	108	112	153	159	157	163	195	195
01Y03	2001	7033200	1520400	F	1994	2001	M	189	191	173	179	136	136	102	104	153	153	157	163	195	195
01Z04	2001	7097600	1477500	F	1991	2001	M	189	189	173	179	148	148	102	102	153	155	155	155	195	195
01Z05	2001	7167500	1461700	F	1998	2001	M	189	189	179	179	148	148	102	102	153	153	163	163	195	195
01Z06	2001	6899900	1466900	M	2000	2001	SN	189	191	173	173	136	136	112	112	149	153	157	159	195	195
01Z07	2001	7109112	1536333	F	1997	2001	M	189	191	179	181	138	144	104	108	143	153	155	155	195	197
01Z09	2001	7114100	1495900	F	2000	2001	M	189	193	179	179	148	148	102	106	153	153	155	155	185	185
01Z10	2001	7165363	1473230	M	1986	2001	M	189	189	179	179	136	148	102	102	153	153	155	163	195	195
01Z12	2001	7094400	1510400	M	2000	2001	M	187	191	179	179	148	148	104	108	153	153	157	163	195	195
01Z13	2001	6966035	1401350	M	1995	2001	SN	187	189	179	183	136	136	102	104	149	149	155	157	195	195
01Z98	2001	6868600	1435300	F	1997	2001	SN	181	189	179	181	136	148	102	102	143	159	155	157	185	195
01Z99	2001	6868600	1374600	?	2000	2001	SN	181	?	179	181	136	148	102	102	143	159	147	157	185	195
01ZZ01	2001	6942420	1489300	M	1993	2001	M	189	189	173	173	136	136	102	108	153	159	163	163	185	195
01ZZ03	2001	7033200	1520400	F	1997	2001	M	189	189	179	181	136	136	102	104	153	157	155	157	195	195
02AC01	2002	7110000	1737500	M	2000	2002	M	189	191	173	179	136	138	102	104	149	149	157	157	195	197
02AC02	2002	7160601	1691854	M	2000	2002	M	181	189	181	181	136	148	102	108	143	153	147	157	195	197
02AC03	2002	7160822	1540013	F	2000	2002	M	189	191	173	181	148	148	102	104	153	153	159	163	195	197
02AC04	2002	7280306	1559575	M	1999	2002	M	181	181	179	179	138	148	102	112	149	153	157	163	185	195
02AC05	2002	7199246	1498664	M	2000	2002	M	181	189	173	179	136	148	102	112	153	159	157	163	185	195
02AC06	2002	7283100	1582900	M	1999	2002	M	187	189	173	181	148	148	102	112	?	?	157	163	195	195
02AC07	2002	7125200	1625300	M	1997	2002	M	189	191	173	179	136	148	106	112	153	153	155	163	185	195
02AC08	2002	7231300	1539500	F	1988	2002	M	189	191	179	183	148	148	104	104	153	155	157	163	195	195
02AC09	2002	7184584	1588755	M	2002	2002	M	191	191	179	183	136	136	102	108	143	153	163	163	195	197
02BD01	2002	7348945	1655869	M	1995	2002	N	181	181	173	181	136	148	106	108	?	?	147	147	195	195
02BD02	2002	7332900	1615400	F	1991	2002	N	187	187	173	179	136	152	104	108	149	155	163	163	195	195
02BD03	2002	7303070	1639010	M	1996	2002	N	187	187	173	179	148	152	102	102	149	155	147	163	195	195
02BD05	2002	7265060	1700030	F	1989	2002	N	187	191	179	181	136	150	104	108	?	?	155	157	195	195
02BD06	2002	7391700	1781800	F	2000	2002	N	187	191	173	181	136	136	102	102	?	?	157	163	195	195
02BD07	2002	7326792	1688166	M	2000	2002	N	181	191	181	181	136	154	108	112	143	145	155	163	185	195
02BD08	2002	7367400	1628400	F	1999	2002	N	187	189	173	181	136	136	102	102	143	149	147	163	195	195
02BD09	2002	7378600	1659800	F	1996	2002	N	187	189	181	181	136	136	102	104	143	159	159	159	195	197
02BD10	2002	7322570	1785970	F	1988	2002	N	189	191	173	181	136	138	102	104	149	153	157	157	195	197
02BD97	2002	7357580	1758520	F	2001	2002	N	187	189	173	179	136	138	?	104	153	153	157	163	195	197

02BD98	2002	7467000	1709000	?	?	2002	NN	189	191	173	181	148	150	102	108	149	155	155	157	195	195
02BD99	2002	7373300	1614100	M	1999	2002	N	189	189	173	177	138	138	104	108	149	157	159	163	195	195
02SS01	2002	6753926	1335872	M	1984	2002	S	181	191	173	179	136	136	102	102	149	155	155	157	195	195
02WW03	2002	6805730	1415807	F	1994	2002	S	181	181	179	181	136	156	108	112	149	153	147	157	185	195
02WW06	2002	6775263	1458849	M	1995	2002	S	181	181	173	181	136	148	102	112	143	153	147	155	195	195
02WW08	2002	6846079	1351192	M	2001	2002	S	181	181	173	181	148	156	102	102	153	153	147	159	185	195
02WW14	2002	6791966	1418652	M	2000	2002	S	181	189	179	181	136	156	108	108	149	155	147	157	195	195
02WW15	2002	6799037	1435946	M	2002	2002	S	181	189	179	179	136	148	104	108	159	159	147	155	185	195
02WW94	2002	6790800	1424600	?	2001	2002	S	191	191	179	179	136	136	?	?	?	?	155	155	185	185
02WW95	2002	6820600	1446000	F	2000	2002	S	181	191	181	181	136	156	108	112	155	155	155	159	185	195
02WW96	2002	6748705	1496310	M	1993	2002	S	189	191	179	181	136	136	102	112	153	153	147	155	?	?
02WW97	2002	6718765	1515830	M	2001	2002	S	181	189	181	181	136	156	108	108	143	155	147	155	185	185
02WW98	2002	6718765	1515830	F	2001	2002	S	181	181	179	181	156	156	108	108	153	155	147	157	185	195
02X99	2002	6831920	1526080	M	2000	2002	S	181	191	181	181	136	136	104	112	145	155	147	157	195	195
02XX01	2002	6741400	1533400	F	1998	2002	S	181	189	181	181	156	156	108	112	155	159	147	155	185	195
02XX02	2002	6730750	1530000	M	1996	2002	S	181	191	181	181	156	156	102	112	153	153	147	147	195	195
02XX03	2002	6777498	1506202	F	2001	2002	S	191	193	179	181	136	156	108	112	143	155	147	155	185	195
02XX04	2002	6796563	1486562	F	1993	2002	S	181	189	181	181	136	156	102	102	153	155	147	155	?	?
02XX06	2002	6885000	1494200	F	1999	2002	S	189	193	173	179	136	148	112	112	159	159	157	157	185	195
02XX94	2002	6845310	1466830	M	2000	2002	S	181	189	173	179	136	148	102	102	153	159	153	155	185	185
02XX95	2002	6718800	1530660	M	2000	2002	S	191	191	173	179	136	148	102	112	153	155	157	157	185	185
02XX96	2002	6846930	1467180	F	1997	2002	S	181	191	173	179	148	148	102	104	153	153	157	157	195	195
02XX97	2002	6843480	1443840	M	2001	2002	S	181	191	173	181	156	156	112	112	153	153	155	157	195	195
02XX98	2002	6718800	1530660	M	?	2002	S	181	181	181	181	148	156	102	108	149	155	155	159	185	195
02XX99	2002	6831920	1526080	M	2000	2002	S	181	191	173	173	136	156	102	104	149	149	155	157	?	?
02YY01	2002	7056600	1505000	M	1992	2002	M	181	181	173	181	136	136	102	104	143	153	147	155	185	195
02YY02	2002	7067500	1630100	F	2000	2002	M	187	191	173	179	136	136	104	104	?	?	147	155	185	195
02ZZ01	2002	6894500	1368300	M	2001	2002	S	189	191	179	181	136	148	102	102	?	?	159	163	185	185
02ZZ02	2002	7137300	1478200	F	1998	2002	M	189	191	?	?	136	148	102	102	153	?	155	157	195	197
02ZZ03	2002	7125200	1467100	F	2001	2002	M	181	191	179	179	136	136	104	112	143	159	155	155	185	197
02ZZ04	2002	6889300	1370500	F	2001	2002	S	181	191	179	181	148	148	102	102	153	153	147	163	185	195
02ZZ05	2002	7108900	1504600	F	2001	2002	M	189	191	173	173	136	148	102	102	153	153	163	163	185	?
02ZZ06	2002	6921500	1405500	F	1994	2002	S	181	191	173	173	136	138	102	112	155	159	153	157	185	185
02ZZ08	2002	7043111	1394108	M	1995	2002	M	189	191	179	179	136	148	102	104	143	153	155	163	195	195
02ZZ09	2002	7140800	1482700	F	1999	2002	M	189	191	179	179	136	148	102	102	153	153	155	159	195	195
02ZZ10	2002	6872900	1386500	F	2000	2002	S	181	189	173	179	148	148	102	102	155	159	155	157	185	195
02ZZ11	2002	7171100	1409400	F	1999	2002	M	191	191	179	181	136	148	104	104	153	157	157	163	195	195

02ZZ12	2002	6884000	1382500	F	2000	2002	S	181	189	179	181	148	156	102	108	153	155	155	159	185	195
02ZZ13	2002	7085500	1535900	M	1993	2002	M	191	191	179	179	148	148	102	104	143	153	155	157	195	195
02ZZ14	2002	7094300	1471200	F	2000	2002	M	189	189	173	179	136	148	102	102	153	153	155	163	195	195
02ZZ15	2002	6923000	1307000	F	1997	2002	S	189	191	173	?	136	136	104	112	153	155	153	163	185	195
02ZZ16	2002	6886500	1393500	F	1990	2002	S	189	191	173	181	136	148	102	112	153	159	147	147	195	195
02ZZ17	2002	6902250	1410810	F	2001	2002	S	181	189	173	?	136	148	102	104	153	155	155	163	185	195
02ZZ98	2002	6926100	1355908	F	1997	2002	S	181	191	179	181	136	136	102	112	153	159	147	159	195	195
02ZZ99	2002	6926887	1400316	F	1999	2002	S	181	189	173	181	136	148	102	112	155	155	147	157	185	195
03AC01	2003	7123588	1674253	M	2000	2003	M	181	191	173	181	136	148	102	108	149	149	147	157	195	195
03AC02	2003	7305386	1527345	F	2000	2003	?	189	191	?	?	136	144	104	104	?	?	155	163	195	195
03AC03	2003	7265940	1573100	M	?	2003	?	187	191	179	181	136	136	104	108	143	153	147	163	?	?
03AC04	2003	7171388	1597163	M	2000	2003	M	181	189	179	179	136	148	102	104	145	153	157	163	195	195
03AC06	2003	7277500	1518500	F	1991	2003	M	189	191	179	181	148	156	102	104	143	153	163	163	195	195
03AC07	2003	7206340	1658760	F	?	2003	?	187	191	181	181	136	148	102	108	153	153	147	163	?	?
03AC08	2003	7176700	1495000	F	1993	2003	M	187	?	173	173	136	136	102	108	153	?	157	163	195	?
03AC09	2003	7119103	1535732	M	2002	2003	M	191	191	179	183	138	148	104	104	153	?	157	163	195	195
03AC11	2003	7276900	1559800	M	1995	2003	M	187	187	181	181	136	?	102	112	149	?	147	163	195	195
03AC96	2003	7202100	1721900	M	2001	2003	M	187	189	173	181	136	138	102	104	143	153	163	163	195	195
03AC97	2003	7138692	1543145	F	2001	2003	M	189	191	179	179	136	136	102	102	145	153	157	163	185	195
03AC98	2003	7155200	1557100	?	2004	2003	M	?	?	173	181	138	138	102	102	149	?	147	155	195	195
03AC99	2003	7247567	1704153	M	2002	2003	?	189	189	179	181	136	138	103	108	153	153	163	163	195	195
03BD02	2003	7308030	1575060	M	2001	2003	?	187	189	179	181	136	136	104	108	?	?	147	147	195	195
03BD03	2003	7326406	1699106	F	1995	2003	?	187	189	179	181	138	148	104	104	?	153	147	157	195	195
03BD04	2003	7497821	1810841	F	1996	2003	NN	183	189	173	179	136	148	108	108	155	157	159	163	195	195
03BD05	2003	7441871	1637143	M	2000	2003	?	187	189	173	181	136	154	104	108	153	159	159	163	195	195
03BD06	2003	7456315	1728471	F	1985	2003	?	189	189	173	175	136	148	?	?	153	?	159	163	195	195
03BD07	2003	7484790	1824745	M	2001	2003	NN	185	185	171	179	138	156	108	110	153	153	149	157	195	197
03BD09	2003	7542274	1707190	F	2001	2003	NN	183	189	173	179	136	148	104	104	153	157	159	163	195	195
03BD10	2003	7507950	1676274	F	2002	2003	NN	187	189	169	173	136	150	104	110	153	153	147	159	195	195
03BD12	2003	7404769	1667015	M	2003	2003	NN	189	189	173	173	136	136	102	102	143	149	147	163	195	195
03BD13	2003	7560560	1648693	M	1999	2003	NN	189	189	179	181	138	150	108	108	145	149	163	163	195	197
03BD14	2003	7412590	1657620	M	2002	2003	NS	187	191	173	181	136	144	102	102	?	?	147	163	195	195
03BD15	2003	7309500	1577000	M	2000	2003	NS	189	191	173	179	136	136	104	104	145	?	155	163	195	195
03BD95	2003	7423710	1764160	?	?	2003	?	187	189	173	173	136	148	104	108	145	155	159	163	195	195
03BD96	2003	7566970	1665270	M	2003	2003	?	187	189	173	179	136	152	104	104	143	149	159	163	195	195
03BD98	2003	7295520	1765960	M	2003	2003	NS	187	189	173	181	148	154	102	104	149	157	147	163	195	195
03BD99	2003	7298800	1782500	M	2002	2003	NS	189	189	173	179	136	136	102	108	149	153	163	163	195	195

03WW02	2003	6794604	1457281	F	2002	2003	SS	181	189	179	181	136	148	102	104	153	153	147	157	195	195
03WW03	2003	6770504	1399351	M	1999	2003	SS	181	193	173	181	156	156	102	108	?	?	147	159	185	185
03WW06	2003	6791700	1425200	F	2003	2003	SS	181	181	173	181	148	148	102	104	153	155	155	155	195	195
03WW09	2003	6771100	1472300	M	2001	2003	SS	181	189	181	181	136	156	102	102	143	157	147	155	195	195
03WW12	2003	6751790	1484122	F	2000	2003	SS	181	181	173	179	136	148	106	112	143	153	147	155	195	195
03WW13	2003	6751000	1503500	F	1996	2003	SS	181	181	179	181	136	156	102	108	155	155	147	163	195	195
03WW14	2003	6761200	1482200	M	1991	2003	SS	181	189	173	181	148	156	102	106	143	155	147	147	195	195
03WW16	2003	6768108	1470253	F	2002	2003	SS	181	191	173	181	136	148	102	102	145	153	147	155	195	195
03WW98	2003	6807870	1429560	M	2002	2003	?	189	189	179	183	136	150	102	104	145	155	157	163	185	195
03XX02	2003	6822100	1517100	F	2002	2003	SS	181	189	173	181	136	136	104	108	145	149	155	157	185	195
03XX04	2003	6821547	1497731	F	2000	2003	SS	181	181	173	179	136	156	102	104	153	155	147	157	195	195
03XX05	2003	6877400	1542200	M	1998	2003	SS	181	191	?	?	136	148	102	102	149	155	?	?	?	?
03XX06	2003	6838800	1480800	M	2002	2003	SS	181	187	173	181	148	156	102	108	149	153	157	159	195	195
03XX07	2003	6880942	1476655	F	1994	2003	SS	181	187	173	179	136	136	102	104	143	153	155	157	195	195
03YY01	2003	6983564	1593490	M	2000	2003	M	191	191	173	179	148	148	102	108	155	155	157	157	195	195
03YY02	2003	7056059	1569182	F	1999	2003	M	189	191	173	179	148	148	104	104	153	155	157	157	195	195
03YY03	2003	7032000	1568000	M	1999	2003	M	189	189	179	181	136	136	104	104	145	153	155	163	195	195
03YY04	2003	7080800	1591500	M	2002	2003	M	189	191	173	179	148	148	104	104	153	155	157	157	195	195
03ZZ01	2003	6875046	1383043	M	2002	2003	SN	181	189	179	179	136	148	102	112	155	159	155	157	195	195
03ZZ03	2003	6897181	1384206	M	1999	2003	SN	187	189	179	183	148	148	102	108	153	153	147	157	195	197
03ZZ04	2003	7096300	1459200	M	?	2003	M	191	191	?	?	138	148	102	102	?	153	157	163	195	197
03ZZ05	2003	7134166	1506636	M	1998	2003	?	181	193	179	181	136	136	102	102	149	159	155	155	195	195
03ZZ06	2003	7109013	1504370	F	2002	2003	M	189	193	173	179	144	148	102	104	153	153	155	163	195	197
03ZZ07	2003	6865200	1390050	M	1998	2003	SN	181	189	179	181	136	156	102	102	155	159	155	159	195	195
03ZZ08	2003	6921900	1417500	M	1996	2003	?	181	191	?	?	156	156	108	108	145	159	159	159	185	195
03ZZ09	?	?	?	M	2002	2003	?	181	189	179	179	148	148	102	102	153	155	153	163	195	195
03ZZ10	2003	6867500	1388500	F	2002	2003	SN	189	193	179	179	148	148	102	102	145	159	155	163	185	195
03ZZ11	2003	7165744	1415935	M	2002	2003	M	189	191	179	181	136	148	102	104	153	159	147	157	195	195
03ZZ12	2003	6886610	1388890	F	2002	2003	SN	181	189	179	181	148	148	102	102	153	159	147	163	195	195
03ZZ13	2003	7172594	1448888	F	1999	2003	?	189	189	173	179	136	148	102	102	?	?	155	159	195	195
03ZZ14	2003	7120036	1509062	M	2000	2003	?	191	191	173	173	?	?	102	104	153	?	157	163	185	195
03ZZ16	2003	7094281	1500492	F	1997	2003	?	191	191	173	179	136	136	102	104	149	153	157	163	185	195
03ZZ17	2003	6903600	1406700	M	2002	2003	SN	189	189	179	179	148	148	102	104	153	155	155	157	185	195
03ZZ18	2003	7093049	1520602	M	2000	2003	?	181	181	173	179	136	156	104	104	153	?	159	159	185	185
03ZZ19	2003	6919917	1392472	M	1995	2003	?	181	189	181	181	148	156	102	102	?	?	155	155	195	195
03ZZ94	2003	6923700	1388300	M		2003	?	189	189	173	179	148	148	102	104	153	159	147	163	195	195
03ZZ95	2003	6926219	1402575	?	2003	2003	SN	187	187	?	?	136	136	102	112	?	?	153	157	185	195

03ZZ97	2003	6935371	1430026	M	2002	2003	SN	181	181	179	181	136	148	102	112	155	155	155	159	195	195
03ZZ98	2003	7129530	1499060	M	2003	2003	M	181	187	173	179	136	138	104	104	153	153	155	155	185	195
03ZZ99	2003	6892206	1410196	M	2001	2003	SN	181	189	173	179	136	148	102	104	155	159	147	155	185	195
81BD90	1981	7339700	1689200	F	1978	1981	NS	187	187	181	181	136	148	102	108	149	157	147	159	195	195
85WW90	1985	6796200	1413600	F	?	1985	S	181	181	173	181	148	156	102	108	155	159	155	157	185	195
86BD01	1986	7320800	1559500	M	1981	1986	NS	187	189	173	173	136	148	102	108	153	153	155	157	195	195
86BD90	1986	7534800	1755200	F	1980	1986	NN	187	189	173	181	136	136	108	108	143	149	159	163	195	195
86BD91	1986	7463300	1817400	F	1989	1986	NN	181	187	173	181	150	150	102	108	149	153	157	163	195	195
86ZZ11	1986	6832800	1422100	M	?	1986	SN	181	187	173	181	148	152	102	108	149	155	147	157	185	195
86ZZ12	1986	6875200	1395800	F	1979	1986	SN	181	181	173	181	148	156	102	106	155	159	147	155	185	195
86ZZ13	1986	6871500	1433900	M	?	1986	SN	181	191	173	181	148	148	102	108	149	159	147	147	195	195
86ZZ14	1986	6915500	1395700	M	?	1986	SN	181	181	179	181	136	156	108	108	153	155	147	155	185	195
86ZZ16	1986	6924500	1369600	F	?	1986	SN	181	191	173	181	136	148	102	104	153	157	157	157	195	195
87BD11	1987	7538300	1701500	M	1984	1987	NN	187	187	169	173	136	152	104	104	151	153	147	159	195	195
87BD13	1987	7303300	1745200	M	1985	1987	NS	183	?	181	181	136	?	102	104	153	153	147	159	195	195
88BD08	1988	7506200	1716400	M	1984	1987	NN	189	189	169	173	136	148	104	104	145	155	163	163	195	195
88BD10	1988	7471300	1643200	M	?	1988	NN	181	181	173	181	148	156	102	108	155	155	147	155	195	195
88BD11	1988	7383300	1757200	M	1982	1988	NN	189	189	173	179	136	138	102	108	149	153	157	157	195	195
88BD12	1988	7325300	1667700	M	1987	1988	NS	187	189	179	181	144	148	102	104	143	143	159	159	195	197
88BD13	1988	7362100	1757700	F	?	1988	NS	189	191	173	179	136	136	104	104	143	153	155	157	195	197
88BD14	1988	7304300	1747500	F	1981	1988	NS	187	187	179	181	148	150	104	108	153	153	147	159	195	195
88XX90	1988	6842900	1478600	F	1988	1988	S	181	181	173	173	148	156	102	104	153	155	147	159	195	195
88ZZ07	1988	6905200	1386800	M	1987	1988	S	193	193	181	181	148	148	106	108	149	159	155	159	195	195
88ZZ11	1988	7086400	1457200	M	?	1988	M	181	191	179	179	136	148	104	108	145	153	155	163	185	195
88ZZ12	1988	7083500	1439000	F	1987	1988	M	181	191	173	179	136	138	104	108	145	153	159	163	195	195
89AC03	1989	7193800	1500500	F	1983	1989	M	191	191	179	183	136	148	104	104	145	149	163	163	195	197
89BD03	1989	7390400	1714600	F	1983	1989	NS	193	193	173	179	136	148	102	112	143	153	157	163	195	197
89BD04	1989	7410600	1683600	F	1986	1989	NS	183	189	169	173	136	148	104	108	143	153	157	163	195	195
89BD05	1989	7393800	1694400	M	1986	1989	NS	181	189	173	181	136	150	104	108	149	149	157	163	195	195
89BD09	1989	7527600	1733200	F	1984	1989	NN	183	187	169	173	136	138	104	108	153	157	159	163	195	195
89BD10	1989	7498700	1744300	F	1984	1989	NN	187	187	169	179	136	150	104	108	153	153	159	163	195	195
89BD11	1989	7477100	1735700	M	1978	1989	NN	189	189	173	175	136	148	102	108	143	155	157	163	195	195
89BD14	1989	7472300	1803800	F	1988	1989	NN	189	189	169	179	136	148	108	108	153	153	163	163	195	195
89BD16	1989	7275300	1712500	M	1988	1989	NS	183	187	169	173	136	138	104	108	153	155	159	163	195	195
89YY01	1989	7046000	1527000	M	1988	1989	M	189	189	179	183	136	148	102	102	153	153	157	163	195	195
89ZZ04	1989	6867300	1426200	F	1988	1989	SN	181	181	173	181	148	148	106	108	155	159	147	155	195	195
89ZZ16	1989	7121700	1475900	F	1988	1989	M	189	191	179	181	136	148	102	108	157	157	157	157	195	195

89ZZ19	1989	7130600	1458500	F	1984	1989	M	181	191	173	179	148	148	108	108	153	155	147	157	195	195
89ZZ20	1989	7115600	1479500	M	1988	1989	M	189	191	179	181	138	138	102	104	149	153	163	163	195	195
90AC01	1990	7190000	1588500	M	1988	1990	M	189	191	179	179	136	136	102	102	143	145	155	157	195	195
90AC05	1990	7182160	1474610	F	1980	1990	M	191	191	179	183	136	148	102	104	143	153	157	163	195	195
90ZZ11	1990	7152500	1434500	F	1987	1990	M	191	191	179	179	136	148	102	108	153	153	155	163	195	197
90ZZ13	1990	6916200	1385600	F	1987	1990	S	181	181	181	181	136	156	102	108	155	159	147	157	185	195
90ZZ21	1990	7154500	1428300	M	?	1990	M	189	191	173	179	136	148	102	108	153	153	163	163	195	195
91AC01	1991	7182500	1701000	M	1984	1991	M	187	189	175	179	136	136	104	108	143	143	157	157	195	197
91AC02	1991	7302200	1530400	M	1989	1991	M	187	191	181	181	136	150	102	104	153	153	147	155	195	195
91AC05	1991	7158100	1548700	M	1990	1991	M	189	191	179	179	136	136	102	102	145	153	147	157	195	197
91BD01	1991	7519000	1702000	F	1990	1991	NN	189	189	169	179	136	148	108	108	153	153	163	163	195	195
91BD02	1991	7326800	1674600	M	1988	1991	NS	189	189	179	179	136	138	102	104	143	153	157	157	195	197
91BD03	1991	7407000	1717000	F	1984	1991	NS	189	191	173	175	136	148	102	108	149	153	155	163	195	195
91BD04	1991	7412000	1674000	F	1989	1991	NS	187	189	173	181	136	148	104	104	143	153	157	163	195	195
91BD05	1991	7361000	1698000	M	1987	1991	NS	189	189	173	179	136	136	102	104	149	153	155	163	195	195
91BD06	1991	7479000	1792000	F	1990	1991	NN	189	189	173	181	136	138	102	104	149	153	157	163	195	197
91BD07	1991	7389000	1753000	M	1989	1991	NN	189	193	173	183	136	148	104	112	143	143	157	163	195	195
91BD09	1991	7410000	1664000	F	1987	1991	NS	189	189	173	179	136	150	104	108	143	153	155	159	195	195
91BD10	1991	7270000	1690000	F	?	1991	NS	187	191	179	181	150	150	104	108	153	153	157	163	195	195
91BD98	1991	7482300	1774500	M	1977	1991	NN	189	191	181	181	136	136	102	104	149	153	157	163	195	197
91WW02	1991	6781800	1481800	M	?	1991	S	189	193	173	179	136	136	106	112	153	159	155	157	185	195
91WW03	1991	6820900	1428800	M	?	1991	S	187	191	179	179	136	152	102	108	149	153	155	157	195	195
91XX01	1991	6822800	1501700	M	1991	1991	S	181	191	179	179	148	156	102	104	145	155	157	159	195	195
91ZZ01	1991	6949600	1365800	M	1990	1991	S	181	193	179	181	136	156	102	112	149	155	155	159	195	195
91ZZ03	1991	7062000	1438500	F	1989	1991	M	181	191	173	179	148	148	104	112	153	153	153	155	195	195
91ZZ04	1991	6900500	1386600	M	1969	1991	S	191	193	173	179	136	136	102	112	149	153	155	157	195	195
91ZZ05	1991	6865800	1440500	F	1989	1991	S	181	187	181	181	148	148	102	108	155	159	157	159	195	195
91ZZ07	1991	7075100	1455400	F	1989	1991	M	189	191	179	181	136	148	104	108	149	155	157	159	195	195
91ZZ09	1991	6973300	1360900	M	1987	1991	S	189	191	173	179	138	148	102	104	153	159	155	157	195	195
91ZZ10	1991	6898000	1406000	M	1989	1991	S	181	187	179	181	136	148	102	108	153	153	147	159	195	197
91ZZ11	1991	6848300	1386800	F	1989	1991	S	181	181	179	181	136	148	102	102	143	153	159	163	195	195
91ZZ13	1991	7112800	1496500	F	1990	1991	M	181	189	173	181	136	136	102	106	153	153	147	163	185	185
91ZZ16	1991	6886800	1450700	M	1985	1991	S	187	191	173	181	148	148	106	108	155	159	147	155	195	195
91ZZ96	1991	7108200	1490550	F	1986	1991	M	189	191	173	179	136	148	108	112	153	153	157	163	195	197
92AC01	1992	7227000	1511000	M	1986	1992	M	187	191	173	179	136	148	104	108	153	157	155	155	195	195
92AC02	1992	7180000	1510000	M	1990	1992	M	189	189	173	179	136	148	102	108	153	157	155	155	195	195
92AC03	1992	7177400	1502400	M	1987	1992	M	189	189	179	183	144	148	102	102	153	153	157	163	195	195

92AC05	1992	7221900	1616700	M	1990	1992	M	191	191	179	179	136	148	102	108	143	143	147	163	195	197
92AC06	1992	7214400	1651800	M	1987	1992	M	187	191	173	181	148	150	104	108	153	153	147	159	195	195
92BD01	1992	7481500	1768800	M	1990	1992	NN	189	193	169	173	136	148	102	104	151	153	157	159	195	195
92BD02	1992	7335200	1743500	F	1991	1992	NS	189	191	179	181	136	136	104	104	143	153	157	163	195	195
92BD03	1992	7491500	1758500	M	1991	1992	NN	187	189	169	169	138	150	104	108	149	153	163	163	195	195
92BD05	1992	7431000	1734000	M	1991	1992	NN	187	187	169	181	136	148	102	108	149	155	159	163	195	195
92BD06	1992	7505600	1696900	M	1991	1992	NN	189	189	169	179	138	150	104	108	149	153	157	163	195	195
92BD07	1992	7533700	1765200	M	1981	1992	NN	187	191	169	179	148	148	102	104	153	153	159	163	195	195
92BD08	1992	7529500	1817600	M	1977	1992	NN	187	189	173	179	136	150	104	108	149	155	155	159	195	195
92BD09	1992	7308100	1608700	F	1990	1992	NS	187	189	179	181	136	136	102	108	149	153	159	163	195	195
92BD10	1992	7415000	1639000	F	1990	1992	NS	187	189	173	181	136	138	102	108	149	157	159	163	195	195
92W04	1992	6827900	1383300	F	1990	1992	S	181	181	173	173	136	136	102	104	153	159	147	147	195	195
92W05	1992	6792400	1417200	M	1991	1992	S	189	189	181	181	138	148	102	102	153	159	147	159	185	195
92X02	1992	6842000	1455700	M	1991	1992	S	181	191	173	179	148	156	102	104	153	155	157	159	185	195
92XX01	1992	6842000	1455700	M	1991	1992	S	181	189	181	181	148	148	102	106	153	155	147	147	185	195
92Z02	1992	6900500	1386600	M	1982	1992	M	181	189	181	181	156	156	102	108	155	159	147	155	195	195
92ZZ01	1992	6843200	1417000	M	1988	1992	S	181	189	179	179	136	136	104	104	159	159	157	157	195	195
92ZZ03	1992	6890500	1381800	M	1991	1992	S	189	193	179	179	136	148	102	102	143	153	157	163	185	195
92ZZ05	1992	6870200	1444600	M	1991	1992	S	181	193	179	181	136	148	102	104	149	159	155	157	195	195
92ZZ06	1992	7102000	1508500	M	1971	1992	M	189	191	173	179	136	136	102	102	153	159	157	163	185	195
92ZZ07	1992	7143000	1486000	M	1983	1992	M	187	187	179	181	136	144	102	104	143	149	155	163	195	197
92ZZ08	1992	7117800	1515200	F	1987	1992	M	181	189	179	181	138	148	102	108	143	153	147	159	195	197
92ZZ09	1992	6894500	1441200	M	1988	1992	S	181	191	173	179	136	138	102	104	153	153	155	157	195	195
92ZZ10	1992	7099900	1465900	M	1991	1992	M	189	191	173	183	136	138	102	104	149	153	157	159	195	195
92ZZ11	1992	7176800	1446800	F	1989	1992	M	189	191	173	179	136	148	102	104	143	153	155	157	195	195
92ZZ12	1992	7116400	1480200	M	1991	1992	M	189	191	179	179	136	148	102	104	153	153	163	163	195	197
92ZZ13	1992	7119400	1474200	F	1990	1992	M	181	191	179	179	148	148	102	108	153	153	147	163	195	195
93M03	1993	7095800	1474000	F	1987	1993	M	187	189	173	173	148	148	102	102	145	155	155	159	195	195
93M04	1993	7126600	1464800	F	1991	1993	M	189	191	179	179	136	148	102	104	149	153	157	163	195	195
93M05	1993	7154600	1467500	F	1992	1993	M	187	191	181	183	136	144	102	102	149	159	155	157	185	197
93M06	1993	7207000	1559200	M	1989	1993	M	187	187	179	179	148	150	104	104	143	153	147	155	195	195
93M08	1993	7195700	1515600	M	1989	1993	M	187	191	179	179	136	148	102	102	149	153	155	163	195	195
93M09	1993	7096200	1494500	F	1991	1993	M	189	191	179	181	136	148	102	102	?	153	159	163	185	195
93M10	1993	7093800	1488200	M	1991	1993	M	181	191	179	181	136	148	102	102	153	153	159	163	185	195
93M11	1993	7198200	1553800	M	1985	1993	M	187	189	173	179	136	148	104	108	145	157	155	155	195	195
93M12	1993	7006000	1532900	M	1993	1993	M	187	189	173	183	136	138	102	104	145	153	157	163	195	195
93M13	1993	7214400	1652700	F	1985	1993	M	187	193	179	181	136	136	102	108	143	153	157	163	195	195

93M14	1993	7141000	1455500	F	1991	1993	M	189	191	179	179	136	148	102	102	153	153	155	163	195	195
93M15	1993	7104800	1517800	F	1992	1993	M	189	191	173	173	136	136	102	108	159	159	157	163	195	195
93NN01	1993	7545700	1685600	F	1981	1993	NN	187	189	169	173	136	148	104	108	143	149	159	163	195	195
93NS01	1993	7403200	1629600	M	1992	1993	NS	189	191	173	179	136	136	104	108	143	143	155	155	195	195
93Ns02	1993	7319700	1723100	M	1992	1993	NS	187	189	181	181	136	150	102	108	143	143	147	147	195	195
93NS04	1993	7385000	1657500	F	1991	1993	NS	189	191	173	179	136	136	102	104	143	149	163	163	195	195
93Ns06	1993	7424000	1602000	M	1992	1993	NS	181	187	173	177	138	144	102	108	143	159	159	163	195	195
93NS07	1993	7467000	1635500	M	1990	1993	NS	181	189	173	177	136	136	102	108	149	149	159	163	195	195
93Ns08	1993	7348500	1761500	F	1993	1993	NS	189	189	179	181	138	148	102	102	149	157	155	157	195	195
93Ns09	1993	7326000	1766500	F	1981	1993	NS	189	191	179	181	136	136	104	104	143	149	157	157	197	197
93NS99	1993	?	?	M	1991	1993	NS	189	191	173	179	136	136	102	104	149	153	163	163	195	195
93S01	1993	6784200	1428800	F	1990	1993	S	189	191	179	179	136	136	102	102	145	153	147	157	195	195
93S01b	1993	6784200	1428800	F	1990	1993	S	181	181	173	173	136	148	102	102	153	159	155	155	195	195
93S02	1993	6895900	1381800	F	1973	1993	S	181	189	179	181	136	148	102	104	153	159	155	157	185	195
93S03	1993	6896700	1381300	M	1988	1993	S	181	189	179	179	136	136	102	112	143	155	147	155	185	195
93S04	1993	6780800	1481000	M	?	1993	S	189	191	179	181	136	148	102	102	153	153	155	159	185	195
93S05	1993	6825300	1470300	F	1992	1993	S	181	189	181	181	156	156	102	108	155	155	155	159	195	195
93S06	1993	6888500	1470700	M	1989	1993	S	181	189	181	181	136	156	102	102	155	159	155	159	185	195
93S07	1993	6870200	1389900	M	1991	1993	S	189	191	179	179	136	148	102	104	157	159	155	157	195	195
93S08	1993	6893800	1417500	F	1991	1993	S	181	181	181	181	136	156	104	108	153	155	147	155	195	195
93S98	1993	6676000	1372000	M	1990	1993	S	181	189	181	181	148	148	102	108	153	155	147	155	195	195
93S99	1993	6893100	1382500	M	1993	1993	S	181	193	173	179	148	148	102	112	143	159	157	163	195	195
94M02	1994	7173000	1490200	F	1993	1994	M	181	191	179	181	136	138	102	102	145	153	157	163	195	195
94M03	1994	7154400	1470400	M	1990	1994	M	189	189	179	179	136	148	102	104	145	153	155	155	195	195
94M05	1994	7048900	1432900	M	1990	1994	M	189	191	173	179	136	148	102	102	153	159	163	163	185	197
94M06	1994	7084030	1507040	F	1991	1994	M	181	191	179	181	136	148	102	104	153	155	159	163	185	195
94M07	1994	7138200	1428000	F	1993	1994	M	187	191	179	181	138	148	102	102	153	157	155	157	195	195
94M08	1994	7103000	1496900	F	1993	1994	M	181	193	179	179	136	148	104	112	149	153	155	163	195	195
94M09	1994	7119900	1490100	F	1992	1994	M	191	193	179	179	148	148	112	112	153	153	155	157	195	195
94M11	1994	7093600	1488100	F	1990	1994	M	181	189	179	181	136	148	102	102	153	153	157	159	185	195
94M12	1994	7158300	1751700	M	1992	1994	M	187	187	179	181	136	136	104	108	153	153	147	163	195	195
94M13	1994	7194600	1666500	M	1990	1994	M	189	191	173	179	136	148	102	108	157	157	155	157	195	195
94M90	1994	7173600	1481300	F	1993	1994	M	191	191	173	179	136	148	102	108	145	149	163	163	195	195
94M91	1994	6936150	1495010	M	1988	1994	M	189	191	179	179	136	148	102	104	153	153	155	163	195	197
94Nn01	1994	7542500	1703800	M	1993	1994	NN	189	191	169	181	136	136	102	108	153	153	163	163	195	195
94NN02	1994	7527000	1798000	F	1987	1994	NN	187	189	169	173	136	148	104	108	143	153	159	163	195	195
94Nn03	1994	7527000	1798000	F	1994	1994	NN	189	191	169	179	136	148	102	104	143	153	163	163	195	195

94Ns01	1994	7248000	1683200	F	1991	1994	NS	191	191	173	181	136	136	102	104	143	153	147	163	195	195
94NS02	1994	7401800	1651800	M	1992	1994	NS	189	191	179	181	136	148	102	108	153	153	157	163	195	195
94Ns03	1994	7349900	1774100	M	1993	1994	NS	189	197	181	181	138	138	102	104	143	155	163	163	195	197
94NS05	1994	7338400	1626200	M	1990	1994	NS	187	193	173	181	136	136	102	104	143	143	159	163	195	195
94Ns06	1994	7344000	1755800	F	1976	1994	NS	187	191	181	181	148	150	102	108	143	153	147	157	195	195
94Ns07	1994	7284000	1696600	M	1990	1994	NS	189	191	173	179	136	138	104	104	153	153	155	157	195	195
94NS08	1994	7320500	1723900	M	1988	1994	NS	187	187	173	173	148	152	102	104	149	153	147	163	195	195
94NS90	1994	7443400	1698400	F	1986	1994	NS	187	187	181	181	136	136	102	102	155	157	147	159	195	195
94S01	1994	6897900	1382100	F	1991	1994	S	181	189	179	181	148	148	102	112	153	159	157	163	195	195
94S02	1994	6881000	1457900	F	1988	1994	S	181	187	181	181	136	148	102	108	149	155	147	153	185	195
94S03	1994	6897200	1419800	F	1991	1994	S	189	191	181	181	138	156	102	108	155	155	147	153	195	195
94S04	1994	6982000	1420000	F	1989	1994	S	191	191	179	181	136	136	104	112	153	155	159	163	195	195
94S92	1994	6879100	1456400	M	1990	1994	S	181	181	181	181	136	156	102	108	145	153	147	155	185	195
94S93R	1994	6842000	1410500	M	1988	1994	S	181	181	179	181	136	156	102	112	153	153	155	155	195	195
94S95	1994	6772200	1412500	F	1989	1994	S	189	191	181	181	136	148	102	102	149	153	155	163	195	195
94S97	1994	6924800	1393500	F	1992	1994	S	181	191	179	181	136	148	106	112	149	153	147	155	195	195
95M01	1995	7179000	1493000	M	1991	1995	M	191	191	179	183	136	148	102	102	143	149	157	163	195	195
95M02	1995	7106400	1469300	F	1993	1995	M	187	187	179	179	148	150	102	102	145	145	155	157	195	195
95M03	1995	7119000	1552500	M	1985	1995	M	189	189	173	179	136	148	104	108	153	159	157	163	185	195
95M04	1995	7009800	1502400	M	1993	1995	M	191	193	179	179	136	136	106	112	153	153	159	163	185	195
95M05	1995	7185700	1544100	M	1989	1995	M	181	191	179	181	136	148	102	108	143	143	159	163	195	195
95M06	1995	7125800	1453200	F	1990	1995	M	191	191	179	179	136	136	104	104	143	153	155	157	195	195
95M07	1995	7067000	1500500	M	1994	1995	M	189	191	173	173	138	148	102	104	145	145	155	163	195	195
95M08	1995	7140500	1508200	M	1981	1995	M	189	189	179	179	136	136	102	104	145	159	157	157	195	195
95M09	1995	7142500	1547800	M	1992	1995	M	181	191	179	179	136	136	102	108	153	153	157	157	195	197
95M10	1995	7096500	1497500	F	1991	1995	M	191	191	179	183	136	136	102	104	153	155	155	163	185	195
95M11	1995	7125400	1446000	F	1991	1995	M	189	191	179	181	136	148	102	104	153	155	155	157	195	195
95M12	1995	7077700	1513800	M	1994	1995	M	189	191	173	173	144	148	104	104	145	145	163	163	195	195
95M13	1995	7093000	1513800	F	?	1995	M	187	191	179	183	136	138	104	108	153	153	163	163	185	195
95M14	1995	7124800	1463800	F	1994	1995	M	181	189	173	179	136	136	104	112	159	159	155	157	185	195
95M15	1995	7075400	1521500	F	1994	1995	M	189	191	173	179	136	138	102	102	143	153	163	163	185	195
95M16	1995	7146200	1432000	M	1994	1995	M	181	191	179	181	136	148	102	104	143	149	157	163	195	195
95NN02	1995	7436000	1752000	F	1990	1995	NN	189	189	173	175	136	148	102	104	145	155	163	163	195	195
95NN03	1995	7484000	1738800	M	1993	1995	NN	189	197	173	173	136	138	102	104	143	153	155	163	195	197
95NN04	1995	7555000	1759000	F	1993	1995	NN	183	187	169	181	136	148	104	104	153	155	159	163	195	195
95NN05	1995	7560000	1674000	M	1994	1995	NN	187	187	173	173	136	136	104	108	149	153	155	159	195	195
95NS01	1995	7414600	1701600	F	1993	1995	NS	189	189	179	181	148	148	102	104	143	157	147	147	195	195

95NS02	1995	7331000	1720000	M	1994	1995	NS	187	191	173	181	150	152	102	108	153	153	147	163	195	195
95NS03	1995	7335500	1603500	M	1993	1995	NS	189	189	179	181	148	152	102	104	143	143	147	147	195	195
95NS04	1995	7414000	1707400	F	1975	1995	NS	189	189	169	173	148	150	104	108	153	155	155	163	195	195
95NS05	1995	7335500	1542400	M	1988	1995	NS	191	193	173	179	136	136	104	112	153	153	153	157	195	195
95NS06	1995	7302400	1647600	M	1990	1995	NS	189	191	181	181	148	148	102	102	153	153	159	159	195	195
95NS07	1995	7327700	1698800	M	1994	1995	NS	189	191	173	181	136	154	102	104	153	159	157	159	195	195
95S90	1995	6792000	1413800	M	1995	1995	S	191	191	173	179	136	156	102	112	153	155	153	155	185	195
95SN01	1995	6900100	1386800	M	1984	1995	S	181	189	179	181	148	148	102	102	143	159	159	163	185	195
95SN02	1995	6892000	1396000	F	1995	1995	S	181	189	173	179	148	148	102	104	143	153	153	163	185	195
95SN03	1995	6876500	1428500	F	1991	1995	S	187	191	181	181	136	148	102	108	143	155	147	147	185	195
95SN04	1995	7414000	1707400	F	1993	1995	S	181	189	173	179	138	148	102	104	153	159	153	155	185	197
95SN05	1995	6861600	1410400	M	1992	1995	S	181	189	179	181	136	136	102	108	153	155	155	163	195	195
95SN91	1995	6890200	1433200	F	1987	1995	S	191	191	173	181	136	156	106	112	153	155	157	159	195	195
95SS01	1995	6821800	1503000	F	1994	1995	S	191	191	179	181	136	136	102	112	145	149	155	157	195	195
95SS02	1995	6854200	1473800	M	1994	1995	S	181	181	179	181	138	148	102	104	155	155	155	155	195	195
95SS03	1995	6765900	1462500	F	1993	1995	S	181	191	181	181	136	148	102	104	159	159	147	155	185	195
95SS92	1995	6835800	1493700	F	1987	1995	S	181	191	173	179	136	156	104	112	145	155	155	159	195	195
95SS93	1995	6785500	1456800	F	1988	1995	S	181	191	173	181	136	148	104	104	149	159	155	157	195	195
96M01	1996	7104800	1469800	F	1991	1996	M	187	189	173	173	148	148	102	104	155	155	155	157	195	195
96M02	1996	7294400	1537000	M	1992	1996	M	189	191	173	179	136	148	102	108	153	153	155	163	195	195
96M04	1997	7223000	1554000	M	1986	1996	M	181	181	179	181	136	148	102	104	153	155	157	163	185	195
96M05	1996	7061200	1518800	F	1994	1996	M	189	189	173	173	136	148	102	102	145	153	155	159	185	195
96M06	1996	7190100	1677700	M	1988	1996	M	187	189	181	181	136	148	102	108	149	153	147	163	195	195
96M07	1996	7071200	1447500	F	1993	1996	M	191	191	179	179	138	148	102	104	149	153	155	159	195	195
96M08	1996	7080200	1495500	F	1994	1996	M	181	193	179	179	136	148	102	106	153	153	155	157	185	195
96M09	1996	7079900	1630800	M	1987	1996	M	191	191	179	183	138	148	102	104	143	153	155	157	195	195
96M10	1996	7126000	1508200	F	1995	1996	M	187	191	179	179	136	138	102	102	145	153	163	163	195	197
96M11	1996	7098100	1492000	F	1994	1996	M	181	189	173	181	148	148	104	106	153	153	147	163	195	195
96M12	1996	7188200	1543500	F	1988	1996	M	189	191	173	179	148	156	102	104	143	153	163	163	195	195
96M91	1996	7184400	1701600	M	1993	1996	M	189	191	173	179	136	148	102	102	153	159	147	155	195	195
96NN01	1996	7532000	1759000	F	1985	1996	NN	187	187	179	181	136	136	104	108	143	155	159	159	195	NN
96NS05	1996	7418600	1687200	F	1989	1996	NS	187	189	173	179	148	150	104	104	143	153	147	157	195	195
96SN01	1996	6874000	1391000	M	1986	1996	S	189	193	173	181	136	148	104	112	153	159	147	157	195	195
96SN03	1996	6933500	1364000	F	1995	1996	S	181	189	173	179	136	136	102	102	153	159	153	155	195	195
96SN92	1996	6758100	1511200	M	1992	1996	S	181	191	179	181	136	148	108	108	149	153	155	157	195	195
96SS02	1996	6758100	1511200	F	1992	1996	S	181	191	179	179	136	136	102	108	155	155	155	155	195	195
96SS03	1996	6728400	1437300	M	1993	1996	S	181	191	181	181	136	138	102	102	149	153	155	159	195	195

96SS04	1996	6814000	1485100	M	1994	1996	S	181	181	179	181	136	138	102	104	155	155	147	155	195	195
96SS05	1996	6791800	1425200	F	1995	1996	S	181	181	173	173	136	148	102	102	149	159	155	155	195	195
96SS06	1996	6788200	1418200	M	1991	1996	S	181	193	179	181	136	148	102	104	149	153	155	157	195	195
96SS07	1996	6817400	1402400	F	1992	1996	S	181	181	173	181	136	138	102	102	153	153	147	155	185	195
96SS08	1996	6798600	1412300	F	1989	1996	S	181	191	173	181	136	148	102	102	149	159	153	155	185	195
96SS92	1996	6769900	1430600	M	1993	1996	S	181	191	179	181	136	136	108	112	155	159	147	155	195	195
97M01	1997	7148100	1455800	F	?	1997	M	181	189	173	181	136	148	102	112	149	159	157	159	185	195
97M02	1997	7105400	1468600	F	1986	1997	M	189	191	179	179	136	136	102	104	149	153	157	159	195	195
97M03	1997	7212000	1515300	M	1993	1997	M	189	189	181	181	136	148	102	108	153	155	157	163	195	195
97M04	1997	7001000	1550000	M	1996	1997	M	181	189	179	179	136	138	102	102	149	153	157	163	195	195
97M05	1997	7090700	1601000	M	1989	1997	M	189	189	179	183	138	148	102	102	143	153	155	163	195	195
97M06	1997	7078200	1655800	M	?	1997	M	181	189	181	181	136	148	102	108	153	155	147	155	185	195
97M07	1997	7173000	1677200	F	1994	1997	M	187	187	181	181	136	148	102	108	143	149	147	157	195	195
97M08	1997	7093400	1489800	M	1996	1997	M	181	189	173	179	136	136	104	106	153	153	155	157	185	195
97M09	1997	7096300	1625000	M	1995	1997	M	181	181	173	181	136	148	102	108	143	153	155	159	195	195
97M11	1997	7102000	1474000	F	1994	1997	M	189	189	179	179	136	148	102	104	153	153	155	155	185	195
97M12	1997	7211500	1652800	F	1996	1997	M	187	187	175	181	136	148	108	108	149	153	147	157	195	195
97M14	1997	7140100	1448100	F	1990	1997	M	189	191	179	179	136	148	102	104	153	153	155	163	195	197
97M15	1997	7105500	1495500	F	1995	1997	M	189	189	179	179	136	148	102	102	153	153	163	163	195	195
97M92	1997	7035000	1532100	F	1984	1997	M	181	189	173	179	136	148	102	104	153	153	157	163	195	195
97NN01	1997	7545000	1759000	F	1988	1997	NN	187	189	173	181	136	136	108	108	149	149	155	163	195	195
97NN02	1997	7508300	1737400	F	1991	1997	NN	191	191	173	181	136	150	104	104	149	153	157	163	195	195
97NN03	1997	7529500	1761500	M	1996	1997	NN	189	191	173	181	136	152	102	104	143	153	157	163	195	195
97NS01	1997	7406000	1681500	F	1990	1997	NS	187	191	179	181	136	148	102	104	153	157	147	155	195	195
97NS05	1997	7324800	1701800	M	1995	1997	NS	181	181	173	179	136	148	102	102	153	153	147	155	195	195
97NS06	1997	7293400	1685400	M	1990	1997	NS	187	191	173	181	136	150	102	112	153	153	157	157	195	197
97NS07	1997	7366300	1710200	F	1997	1997	NS	189	191	173	181	138	148	102	112	143	149	147	163	195	195
97NS08	1997	7246700	1641000	F	1994	1997	NS	187	189	179	179	136	144	102	104	149	157	155	159	195	197
97NS09	1997	7378000	1670000	F	1994	1997	NS	191	193	173	179	136	136	104	104	149	153	141	155	195	197
97NS90	1997	7443800	1573800	M	1996	1997	NS	181	189	181	181	136	150	102	104	149	159	155	163	195	195
97SN01	1997	6890000	1363000	F	1995	1997	S	181	191	179	181	148	148	102	112	153	155	147	163	185	195
97SN02	1997	6888000	1385000	M	1990	1997	S	181	189	181	181	148	148	102	104	153	155	147	163	185	195
97SN03	1997	6900500	1386500	F	1973	1997	S	181	189	179	181	136	148	104	106	153	159	147	155	185	195
97SN05	1997	6917000	1431500	M	?	1997	S	189	189	169	175	136	136	102	104	153	153	163	163	195	195
97SN06	1997	6900500	1386500	F	1996	1997	S	181	187	179	181	136	148	108	108	153	157	157	157	185	195
97SN08	1997	6866000	1403000	M	1996	1997	S	181	181	173	181	148	152	102	102	143	155	147	159	185	185
97SN09	1997	6868500	1459000	F	1994	1997	S	181	193	175	181	136	136	102	108	143	155	155	157	195	195

97SN90	1997	6925200	1457200	M	1994	1997	S	181	189	?	?	148	156	102	104	153	159	155	163	185	195
97SN91	1997	6939600	1411700	F	1980	1997	S	181	191	173	181	136	148	102	104	149	159	147	157	195	195
97SS03	1997	6833500	1457200	M	1995	1997	S	181	191	181	181	136	156	102	108	155	159	147	147	195	195
97SS04	1997	6767800	1442000	F	1988	1997	S	181	191	181	181	136	156	108	112	153	159	147	159	185	195
97SS07	1997	6866800	1355800	M	1996	1997	S	181	193	173	181	148	148	102	108	149	153	147	155	185	185
97SS08	1997	6818000	1523200	F	1993	1997	S	189	191	173	181	136	156	102	102	153	153	157	157	195	197
97SS10	1997	6852200	1484200	M	1991	1997	S	189	195	181	181	148	148	102	102	153	155	147	159	195	195
97SS11	1997	6784700	1415500	F	1995	1997	S	181	191	181	181	136	156	102	102	155	155	147	155	195	195
97SS12	1997	6784700	1415500	F	?	1997	S	181	191	177	181	136	138	102	104	143	153	155	159	195	195
98M02	1998	7244400	1553300	F	1983	1998	M	189	189	179	181	148	152	102	104	145	153	157	159	195	195
98M03	1998	7250300	1639200	M	1996	1998	M	187	189	173	181	136	150	104	108	149	155	155	163	195	195
98M05	1998	7207000	1616700	M	1996	1998	M	189	191	181	181	136	144	102	104	149	155	157	163	195	197
98M07	1998	7154400	1426300	F	?	1998	M	189	191	181	183	136	136	102	104	149	153	157	157	195	195
98M08	1998	7143500	1547800	F	1996	1998	M	181	189	173	179	136	136	102	104	145	153	157	159	195	195
98M09	1998	7142300	1561500	F	1996	1998	M	189	189	179	183	138	148	102	102	145	149	155	155	195	195
98M11	1998	7105800	1535100	F	1997	1998	M	189	189	179	181	136	148	102	104	145	153	163	163	195	197
98M12	1998	7192900	1671600	F	1996	1998	M	187	187	175	181	136	136	102	108	143	153	147	163	195	195
98M91	1998	7139800	1436200	F	1996	1998	M	187	191	173	179	136	148	102	104	153	153	163	163	195	195
98M92	1998	7108000	1496000	M	1997	1998	M	191	191	179	179	136	148	104	104	143	153	155	163	185	195
98M93	1998	7141900	1460500	F	1979	1998	M	189	191	173	179	136	136	102	102	153	153	155	163	195	195
98M94	1998	7191080	1461830	M	1997	1998	M	181	189	173	179	136	148	102	106	153	153	155	163	185	195
98M95	1998	7092600	1499600	F	1988	1998	M	181	191	179	179	136	136	104	108	149	155	147	163	185	195
98M96	1998	7092800	1499700	M	?	1998	M	189	191	179	181	136	148	104	112	153	155	147	155	185	195
98M99	1998	7129400	1508500	F	1986	1998	M	189	191	179	179	136	138	102	102	145	153	147	163	195	197
98N01	1998	7396000	1847500	M	1996	1998	NN	187	187	181	181	148	148	108	108	143	153	163	163	195	195
98N02	1998	7552400	1757500	F	1997	1998	NN	187	187	169	181	136	148	102	108	153	153	147	163	195	195
98N04	1998	7463200	1689400	F	1986	1998	NN	187	189	179	181	136	136	104	108	149	157	163	163	195	195
98N05	1998	7315000	1575000	F	1997	1998	NN	189	189	181	181	136	144	102	102	153	153	147	163	195	195
98N06	1998	7342000	1690000	F	1997	1998	NN	181	187	173	173	138	154	102	108	149	149	157	159	195	195
98N07	1998	7408400	1763200	M	1991	1998	NN	181	187	177	181	148	154	108	108	149	153	147	159	195	195
98SN03	1998	6894000	1408600	F	1996	1998	SN	181	191	179	181	138	148	102	102	143	159	147	163	185	195
98SN04	1998	6895500	1364500	F	1997	1998	SN	187	191	179	181	136	148	102	102	145	153	155	157	195	195
98SN05	1998	6927000	1429000	F	1997	1998	SN	181	191	173	181	138	148	102	108	155	155	155	159	195	195
98SN90	1998	6970000	1338600	M	1996	1998	SN	181	181	181	181	148	156	102	108	143	149	147	159	185	195
98SS01	1998	6814100	1537000	M	1997	1998	S	187	191	173	181	136	148	102	106	153	155	147	157	185	195
98SS02	1998	6759200	1486300	M	1993	1998	S	181	191	181	181	148	156	102	108	153	155	147	159	185	195
98SS04	1998	6775800	1457100	M	1996	1998	S	181	181	179	181	156	156	102	108	145	155	159	159	185	195

98SS05	1998	6858000	1349200	F	1984	1998	S	181	193	173	181	148	156	102	108	149	155	147	155	185	195
98SS08	1998	6827100	1471000	M	1996	1998	S	181	189	181	181	136	156	102	108	153	155	147	159	195	195
98SS10	1998	6822000	1522000	M	1997	1998	S	181	189	173	181	136	136	102	102	149	155	147	155	195	195
98SS11	1998	6776800	1454200	F	1995	1998	S	181	191	179	181	136	136	102	108	153	159	147	163	195	195
98SS12	1998	6736700	1543800	M	1994	1998	S	181	191	181	181	136	136	104	108	145	153	155	155	185	195
98SS13	1998	6811200	1407300	M	1995	1998	S	181	191	173	181	136	148	102	102	143	155	155	159	185	185
98SS14	1998	6852400	1447200	M	1992	1998	S	181	191	173	181	136	148	102	102	149	159	147	157	185	195
98SS15	1998	6806300	1406900	F	1984	1998	S	189	191	181	181	138	148	102	102	143	153	159	163	195	195
98SS16	1998	6795000	1405000	M	1990	1998	S	181	189	181	181	136	136	102	108	153	153	147	147	195	195
98SS17	1998	6797800	1428600	F	1990	1998	S	181	191	179	181	136	148	102	104	149	159	155	157	185	195
98SS18	1998	6769700	1408600	F	1995	1998	S	189	191	173	181	136	138	102	102	153	153	155	159	195	195
98SS19	1998	6821800	1501800	F	1993	1998	S	181	181	173	181	136	156	108	108	155	155	147	155	195	195
98SS20	1998	6823200	1465100	M	1995	1998	S	181	189	179	181	156	156	102	102	149	155	155	157	195	195
98SS90	1998	6771500	1492500	M	1995	1998	S	181	181	173	179	136	156	102	108	153	155	147	147	185	195
98SS91	1998	6740400	1548100	M	1996	1998	S	181	191	181	181	156	156	102	108	155	159	155	155	185	195
98SS93	1998	6718900	1493800	?	1998	1998	S	181	181	179	181	136	156	102	104	153	155	157	159	185	195
99AC02	1999	7144000	1626100	M	?	1999	M	181	189	173	181	136	148	108	112	153	153	147	157	185	195
99AC03	1999	7249300	1583400	M	1998	1999	M	189	189	173	173	136	150	104	112	153	157	157	159	195	195
99AC04	1999	7192800	1463000	F	1997	1999	M	189	191	173	179	136	148	102	104	143	153	155	163	195	195
99AC90	1999	7226100	1483500	M	1998	1999	M	189	191	179	181	148	148	102	102	153	155	159	163	195	197
99AC91	1999	7226100	1483500	M	1998	1999	M	187	191	179	181	136	156	102	102	153	153	147	163	195	197
99AC92	1999	7226100	1483500	F	?	1999	M	187	189	179	181	148	156	102	104	153	155	163	163	195	195
99BD02	1999	7414000	1654700	M	1997	1999	NS	181	189	181	181	136	148	104	108	149	149	141	163	195	195
99BD03	1999	7327600	1715800	M	1991	1999	NS	189	191	173	181	136	136	102	102	149	153	159	163	195	195
99BD04	1999	7424900	1594300	M	1998	1999	NS	187	189	173	181	136	136	102	104	149	157	159	163	195	197
99BD05	1999	7334500	1724000	F	1989	1999	NS	189	191	173	173	136	138	102	108	149	153	141	157	195	195
99BD06	1999	7342300	1677800	F	1993	1999	NS	189	191	173	181	136	144	102	102	149	155	159	163	195	197
99BD07	1999	7478900	1787300	F	1993	1999	NN	189	189	173	173	136	136	102	104	153	153	157	163	195	195
99BD09	1999	7541900	1727900	F	1997	1999	NN	183	189	169	173	136	138	104	104	153	157	159	163	195	195
99BD90	1999	7571600	1702900	F	?	1999	NN	183	189	169	173	136	150	104	106	153	155	147	157	195	195
99BD91	1999	7571600	1702900	M	1998	1999	NN	189	189	173	173	136	136	104	108	145	155	157	159	195	195
99BD92	1999	7571600	1702900	M	1998	1999	NN	189	189	173	179	136	136	104	108	145	155	157	163	195	195
99BD94	1999	7525500	1809000	F	1981	1999	NN	183	189	173	179	136	136	108	108	157	157	163	163	195	195
99M06	?	?	?	M	?	1999	M	181	181	179	181	148	156	102	102	155	155	?	?	195	195
99NG01	?	?	?	F	?	1999	M	189	189	179	179	148	150	102	104	145	153	155	159	195	195
99W02	1999	6756300	1477400	M	1998	1999	S	181	191	179	179	136	136	112	112	153	155	147	155	185	195
99W04	1999	6889200	1337300	F	1998	1999	S	181	193	173	181	148	148	104	112	153	155	157	157	195	195

ID	Yr	X	Y	Sex	Yr1	Yr2	St															
99W12	1999	6784200	1473200	M	1998	1999	S	181	181	179	181	136	156	108	108	149	155	155	157	185	195
99W13	1999	6803700	1430400	F	1998	1999	S	181	191	179	181	136	136	102	104	149	159	155	157	185	195
99W16	1999	6864800	1326000	F	1996	1999	S	181	181	181	181	136	136	102	102	143	143	147	159	185	185
99W80	?	?	?	?	?	1999	S	181	191	179	181	136	136	104	108	153	153	155	155	185	195
99X01	1999	6813500	1506400	F	1998	1999	S	181	191	179	181	?	?	?	?	?	?	147	159	185	185
99X02	1999	6896100	1493000	M	1992	1999	S	181	191	173	181	136	136	102	104	149	153	155	155	195	195
99X03	1999	6823000	1483200	F	1998	1999	S	181	181	173	179	136	148	102	108	153	155	147	157	185	195
99X04	1999	6890700	1490500	M	1989	1999	S	181	189	173	181	136	148	108	112	153	159	147	157	185	195
99X05	1999	6823600	1495900	M	1992	1999	S	181	191	173	173	148	152	102	106	155	155	157	157	185	185
99X07	1999	6819100	1522000	M	1994	1999	S	189	193	179	181	138	148	104	108	145	153	155	157	195	195
99Z01	1999	7152800	1428300	F	1999	1999	M	181	189	173	179	136	148	104	108	149	155	157	157	195	195
99Z02	1999	6894100	1380600	F	1997	1999	S	181	191	173	179	148	148	102	104	155	155	157	157	185	195
99Z03	1999	6887500	1360000	F	1990	1999	S	181	189	173	179	136	148	102	102	143	155	157	163	195	195
99Z04	1999	7050700	1511900	M	1983	1999	M	191	191	173	181	136	138	104	104	145	149	163	163	195	195
99Z05	1999	7070200	1496700	M	1996	1999	M	187	189	173	181	136	148	104	104	153	153	163	163	195	195
99Z06	1999	6886100	1383600	M	1994	1999	S	181	181	179	179	136	156	104	108	153	155	155	159	195	195
99Z07	1999	6886000	1383600	M	1995	1999	S	181	189	181	181	136	148	102	102	143	153	147	163	185	195
99Z08	1999	7158300	1482300	F	1993	1999	M	187	189	179	183	144	144	102	104	143	143	155	157	185	197
99Z09	1999	6904500	1471300	M	1996	1999	S	181	181	181	181	148	156	102	102	155	155	147	163	185	195
99Z10	1999	7023400	1368800	M	1997	1999	S	181	191	179	181	148	148	102	108	155	159	155	159	195	195
99Z11	1999	7159600	1481000	M	1999	1999	M	189	191	179	183	144	148	102	104	143	153	155	155	185	195
99Z12	1999	7154200	1479100	F	1997	1999	M	181	191	179	183	136	144	102	104	145	153	155	163	195	195
99Z13	1999	6882600	1394600	F	1998	1999	S	189	191	181	181	136	152	102	112	149	153	147	157	185	185
99Z14	1999	6889400	1396900	M	1998	1999	S	189	189	173	181	136	136	102	106	159	159	147	155	195	195
99Z15	1999	7147500	1486000	M	1985	1999	M	187	191	179	181	148	148	102	108	143	153	159	163	195	195
99Z16	1999	7116200	1480200	M	1992	1999	M	181	191	179	179	148	148	102	106	149	153	155	163	185	185
99Z90	1999	7090500	1521500	F	1987	1999	M	?	?	173	173	136	148	102	108	153	153	157	163	195	197
99Z91	1999	7098600	1418400	M	1991	1999	M	187	189	179	183	136	148	102	108	149	153	157	163	195	195
99Z92	1999	6932800	1485200	M	1997	1999	S	187	189	179	181	136	148	102	104	149	153	163	163	195	195
BD01	2001	7464400	1573800	F	1983	?	NS	187	189	173	173	136	138	104	108	153	155	155	157	195	195
BD03	1985	7415000	1649000	F	1983	?	M	189	191	179	179	136	136	102	102	145	153	147	157	195	197
BD06	1997	7437000	1581100	M	1975	?	NS	181	189	177	181	138	154	104	108	157	159	159	163	195	195
BD07	2000	7428400	1573700	F	1980	2000	NS	187	189	173	179	138	144	102	104	143	157	159	163	195	197
BD12	1992	7424800	1629400	F	1986	?	NS	189	189	173	181	136	136	102	108	143	143	147	155	195	195
BD15	1989	7412200	1647800	M	1985	1989	NS	187	189	169	173	136	136	104	108	153	155	147	159	195	195
BD16	1990	7409500	1676500	F	1982	1990	NS	189	189	179	181	136	150	104	108	143	153	159	163	195	195
BD17	1988	7411300	1681800	M	1983	1988	NS	187	189	173	179	148	150	104	104	153	153	155	157	195	195

BD18	1996	7444200	1633200	F	1982	?	NS	187	189	169	173	136	136	102	108	143	157	147	163	195	195
BD22	1989	7437500	1635800	M	1977	1989	NS	189	189	173	173	136	136	108	108	143	153	155	157	195	195
BD23	2001	7409600	1613200	F	1984	?	NS	181	189	173	181	136	138	104	108	149	157	159	163	195	195
BD24	1994	7467300	1603100	F	1988	?	NS	189	189	173	173	136	138	104	108	153	155	155	157	195	195
BD25	2000	7494500	1589700	F	1988	?	NS	189	189	173	173	136	138	104	108	143	153	157	157	195	195
BD26	1993	7376000	1649100	M	1989	1995	NS	189	189	179	179	136	148	104	108	143	153	147	155	195	195
BD27	1991	7452200	1571000	F	1977	?	NS	?	187	173	?	136	?	104	108	149	153	155	159	195	?
BD28	1993	7546900	1622500	M	1988	?	NS	187	189	173	177	136	136	108	108	149	159	159	159	195	195
BD29	1991	7533200	1624700	M	1988	?	NS	187	189	173	181	136	138	104	104	149	159	155	163	195	195
BD31	1991	7450000	1621000	M	1989	1991	NS	187	187	169	173	136	136	102	108	143	153	147	155	195	195
BD32	1991	7440000	1630000	M	1988	1991	NS	189	191	173	173	136	148	104	108	143	143	157	157	195	195
BD33	1995	7408500	1600300	F	1974	?	NS	189	189	173	181	136	136	104	108	149	149	155	159	195	195
BD34	1992	7451300	1612900	M	1986	?	NS	187	187	173	181	136	136	104	108	149	149	159	163	195	195
BD35	1998	7435000	1590000	M	1990	1998	NS	189	189	177	181	138	154	104	108	157	157	159	159	195	195
BD36	2001	7421900	1616400	M	1991	2003	NS	189	189	179	181	136	150	102	104	149	153	155	163	195	195
BD37	1997	7432600	1571100	F	1991	?	NS	181	187	173	181	136	154	104	108	149	159	155	163	195	195
BD38	2000	7439100	1667800	M	1991	?	NS	181	189	173	177	136	138	104	104	153	157	159	159	195	195
BD39	1992	7442900	1571900	M	1991	1992	NS	187	189	173	181	136	138	104	108	149	159	155	163	195	195
BD40	1992	7501500	1576000	M	1988	?	NS	183	187	179	179	136	150	104	108	149	153	155	155	195	195
BD41	1994	7302400	1505000	M	1991	?	NS	189	189	173	181	136	154	108	108	149	157	155	163	195	195
BD42	1996	7201800	1513200	M	1991	1996	NS	189	189	173	181	136	138	104	108	149	159	159	163	195	195
BD43	1994	7338400	1626200	M	1990	1994	NS	187	193	173	181	136	136	102	104	143	143	159	163	195	195
BD44	1993	7436000	1577700	F	1992	1993	NS	181	189	177	181	138	154	104	104	149	157	159	159	195	195
BD45	1994	7417800	1588300	M	1992	1994	NS	181	181	173	181	136	138	104	108	149	159	159	163	195	195
BD46	1999	7433200	1624500	F	1992	?	NS	189	191	169	173	136	136	102	104	143	143	147	155	195	195
BD47	2001	7442300	1590000	F	1992	?	NS	181	189	173	181	138	154	108	108	155	159	155	163	195	195
BD48	1997	7505600	1608600	M	1992	?	NS	187	189	173	177	136	154	108	108	155	159	157	159	195	195
BD49	2001	7417500	1500800	F	1990	?	NS	187	189	173	177	138	138	104	104	157	157	159	163	195	195
BD50	1994	7440000	1610000	F	1990	1994	NS	187	189	173	177	138	138	104	104	157	157	159	163	185	195
BD51	2001	7383300	1604900	F	1989	2003	NS	181	189	173	181	136	154	106	108	149	157	159	163	195	195
BD52	2001	7405000	1588900	F	1993	?	NS	189	189	173	177	136	136	104	108	149	159	159	159	195	195
BD53	1997	7396000	1606000	M	1993	1997	NS	189	189	177	181	136	136	104	104	149	159	155	159	195	195
BD54	1996	7395700	1599700	F	1993	?	NS	189	189	181	181	136	136	104	108	149	159	155	159	195	195
BD55	1997	7347400	1663400	M	1993	1997	NS	189	189	173	177	136	136	104	104	149	149	159	159	195	195
BD56	1994	7467300	1603100	F	1993	?	NS	187	189	173	181	136	136	104	104	149	155	155	163	195	195
BD57	1995	7463900	1579000	F	1993	1995	NS	181	189	173	181	138	154	104	108	155	159	157	159	195	195
BD58	1994	7467300	1603100	M	1993	?	NS	189	189	173	181	138	154	104	108	155	159	155	163	195	195

BD59	1999	7468300	1605300	M	1991	?	NS	187	189	173	179	136	138	102	108	153	153	155	163	195	195
BD60	1996	7442900	1634700	M	1987	1996	NS	187	191	173	179	136	136	104	104	143	153	155	163	195	195
BD61	2001	7405500	1602500	M	1991	?	NS	187	187	173	181	148	154	108	108	149	153	147	159	195	195
BD62	2000	7406900	1588900	F	1981	?	NS	189	189	173	181	136	154	104	104	149	159	155	163	195	195
BD63	?	?	?	F	1994	?	NS	181	189	181	181	136	154	104	108	149	157	163	163	195	195
BD64	2001	7417500	1500800	F	1994	?	NS	181	189	173	181	154	154	104	108	159	159	155	163	195	195
BD65	2001	7430400	1594600	F	1994	?	NS	187	193	173	181	136	138	102	102	143	157	159	159	195	197
BD66	1996	7431000	1571600	F	1994	1996	NS	189	193	173	173	136	138	102	102	143	157	159	163	195	197
BD67	2001	7435900	1583800	F	1994	?	NS	187	193	173	179	136	138	102	104	143	157	159	163	195	197
BD68	1997	7361900	1571100	M	1994	1997	NS	189	193	173	173	136	136	102	108	143	157	159	163	195	195
BD69	2001	7378900	1576500	F	1994	?	NS	189	193	173	181	136	154	102	108	143	157	159	159	195	195
BD70	2001	7369400	1592600	F	1994	?	NS	181	187	173	173	136	136	102	108	143	157	159	159	195	195
BD71	2001	7447500	1565400	F	1992	?	NS	181	189	173	181	138	144	102	104	143	157	159	163	195	195
BD72	1997	7498000	1587000	F	1994	?	NS	181	189	173	177	138	154	104	108	153	159	157	159	195	195
BD73	2001	7465100	1638900	M	1995	?	NS	187	189	177	179	138	150	104	104	153	157	155	159	195	195
BD74	1998	7421000	1575800	M	1995	?	NS	189	189	177	181	136	138	102	104	149	157	163	163	195	195
BD75	2001	7423000	1578900	F	1995	?	NS	187	189	177	179	138	150	102	104	149	157	155	163	195	195
BD76	1997	7437800	1625900	F	1995	?	NS	187	187	169	179	136	136	102	104	143	153	147	155	195	195
BD77	2000	7481400	1596300	F	1995	?	NS	187	187	169	179	136	136	102	104	143	153	147	155	195	195
BD78	2000	7454200	1602700	F	1995	?	NS	187	189	173	179	136	138	102	104	149	153	155	155	195	195
BD79	1998	7526400	1570600	M	1995	?	NS	189	189	173	181	136	150	102	104	149	153	157	163	195	195
BD80	1997	7443800	1573800	M	1996	?	NN	181	189	181	181	136	150	102	104	149	159	155	163	195	195
BD81	1997	7444200	1573700	M	1996	1997	NN	187	189	173	179	136	150	102	104	149	159	155	163	195	195
BD82	1997	7432000	1571500	M	1996	?	NN	181	189	179	181	136	150	104	104	149	153	155	163	195	195
BD83	1999	7410000	1485000	M	1996	1999	NN	189	189	179	181	138	138	102	108	143	157	159	159	195	195
BD84	1997	7427600	1582800	M	1996	1997	NN	187	189	177	179	138	138	102	104	143	157	159	159	195	195
BD85	1998	7431000	1573400	F	1996	1998	NN	189	189	177	179	138	144	104	108	143	157	159	163	195	197
BD86	2000	7404800	1588700	F	1997	?	NN	189	191	173	179	148	154	102	104	145	159	155	157	195	195
BD87	1999	7380000	1537000	M	1997	1999	NN	189	189	173	179	136	152	102	104	149	153	157	163	195	195
BD88	2000	7437900	1580700	M	1992	2000	NN	189	189	173	179	148	154	102	108	143	149	159	163	195	195
BD89	2001	7415200	1593600	F	1997	?	NN	189	191	179	181	138	156	104	108	143	157	157	159	195	195
BD90	1999	7378200	1594200	M	1997	?	NN	187	189	173	181	136	154	108	108	149	149	147	159	195	195
BD91	2001	7411300	1561700	M	1997	?	NN	181	187	173	173	148	154	108	108	149	157	159	159	195	195
BD92	2000	7500400	1584500	M	1997	?	NN	189	189	173	179	136	138	104	108	153	153	155	157	195	195
BD93	2001	7504700	1567100	M	1997	2001	NN	187	189	173	173	136	138	104	108	143	153	157	163	195	195
BD94	2001	7456400	1594500	M	1997	?	NN	189	189	173	181	138	154	108	108	155	157	155	159	195	195
BD95	2001	7395900	1585700	F	1990	?	NN	189	189	173	179	136	150	102	104	149	153	163	163	195	195

BD96	2001	7394400	1587800	M	1994	?	NN	189	191	179	181	144	150	102	102	153	157	155	157	195	195
BD97	2001	7413800	1626200	M	1992	?	NN	187	191	173	179	136	156	102	108	143	157	155	157	195	197
BD98	1999	7428300	1574500	M	1998	?	NN	189	189	173	179	138	154	102	108	143	149	159	163	195	197
BD99	2000	7342300	1677800	M	1998	2000	NN	187	189	179	179	144	148	104	108	143	143	163	163	195	195
BD100	2001	7420700	1587100	F	1998	?	NN	181	187	177	177	138	154	104	104	157	157	159	159	195	195
BD101	1999	7422800	1582100	F	1998	1999	NN	189	189	173	181	138	138	104	108	157	159	163	163	195	195
BD102	1999	7418700	1598000	M	1998	?	NN	189	189	177	177	138	138	104	104	157	157	159	159	195	195
BD103	1999	7431700	1620000	M	1998	?	NN	189	191	173	179	136	150	102	104	143	149	155	155	195	195
BD104	2001	7457800	1641700	F	1991	2003	NN	187	191	179	181	136	136	104	108	143	143	147	155	195	195
BD105	2001	7452100	1600000	M	1996	?	NN	189	193	173	181	136	150	102	102	143	159	159	163	195	195
BD106	2001	7470900	1601600	M	1998	?	NN	189	189	173	179	136	138	108	108	153	155	155	157	195	195
BD107	1999	7457800	1596400	M	1998	2000	NN	187	187	173	179	136	138	102	104	153	153	157	163	195	195
BD108	2001	7446000	1578100	F	1998	?	NN	189	189	173	179	136	138	108	108	153	155	155	155	195	195
BD109	2001	7398300	1575300	F	1999	?	N	189	189	179	179	150	150	102	102	153	153	155	163	195	195
BD110	2001	7398300	1575300	F	1999	?	N	189	189	173	181	150	150	102	104	?	?	157	163	195	195
BD111	2000	7404500	1574000	M	1999	?	N	189	191	173	181	?	?	?	?	145	145	157	163	195	195
BD112	2001	7385400	1617000	F	?	?	N	189	189	179	181	136	150	102	104	145	159	163	163	195	195
BD113	2002	7373300	1614100	M	1999	2002	N	189	189	173	177	138	138	104	108	149	157	159	163	195	195
BD114	2002	7380500	1687300	M	1999	2002	N	189	189	173	177	138	154	104	104	157	157	159	163	195	195
BD115	2001	7396300	1588900	F	1999	?	N	189	189	173	179	136	150	102	108	157	157	155	159	195	195
BD116	2000	7378000	1594900	F	1999	2000	N	181	187	181	181	154	154	108	108	149	157	147	159	195	195
BD117	2001	7391400	1585400	F	1999	?	N	181	189	181	181	144	154	102	108	157	157	157	163	195	195
BD118	2001	7409100	1574200	F	1999	?	N	189	189	173	179	148	154	102	108	143	159	155	163	195	195
BD120	2001	7430800	1562700	F	2000	?	N	187	189	173	177	138	156	104	108	143	157	155	159	195	197
BD121	2001	7430800	1562700	M	2000	?	N	189	191	173	179	138	156	104	108	143	157	157	159	195	195
BD122	2001	7431800	1571900	F	2000	?	N	189	193	179	179	138	148	102	108	143	157	163	163	195	197
BD123	2001	7465000	1639400	F	1998	?	NS	189	191	173	181	136	136	102	102	153	157	155	163	195	195
BD124	2002	7450800	1599400	F	2001	?	N	189	189	179	181	136	150	102	108	149	153	155	163	195	195
BD125	2002	7482500	1596900	M	2001	?	N	181	191	173	181	136	144	102	108	149	157	157	159	195	195
BD126	?	7407300	1569100	M	2001	?	N	181	191	179	181	144	154	102	108	149	153	155	163	195	195
BD127	?	7379800	1570400	M	2001	?	N	187	191	181	181	136	150	102	108	?	?	157	159	195	195
BD128	2002	7443500	1591500	F	2001	?	N	187	189	173	181	136	144	102	108	143	157	157	159	195	195
BD129	2003	7423012	1653260	M	2001	2003	N	181	191	179	181	136	150	102	102	143	153	157	159	195	195
BD130	2002	7432400	1655100	F	2001	?	N	189	193	173	181	136	154	104	108	143	149	155	159	195	195
BD131	2002	7415300	1588000	F	2001	?	N	187	189	173	181	136	138	104	108	143	157	147	159	195	195
BD132	2002	7379800	1570400	F	2001	?	N	187	189	179	181	136	136	104	108	143	143	147	155	195	195
BD133	2002	7389000	1625500	F	2001	?	N	189	189	169	179	138	148	104	108	149	153	155	163	195	195

BD134	2002	7425300	1520200	M	2001	?	N	181	189	173	181	144	148	104	108	149	157	159	163	195	195
BD135	2002	7440700	1559900	F	2001	?	N	181	189	179	181	144	148	102	108	143	143	163	163	195	195
BD136	2002	7409700	1608500	F	2001	?	N	181	189	173	173	138	150	102	108	149	155	155	163	195	195
BD137	2002	7446400	1573300	F	2001	?	N	189	193	181	181	136	154	102	108	143	159	163	163	195	195
BD138	2002	7405600	1589100	M	2001	?	N	189	193	173	181	150	154	102	108	149	155	155	163	195	195
BD139	2002	7401000	1571600	F	2001	?	N	187	187	169	173	138	148	104	108	153	155	155	163	195	195
BD140	2002	7458400	1592500	M	2001	?	N	187	189	173	179	136	136	108	108	149	155	155	155	195	195
BD141	2002	7420100	1602600	M	2001	?	N	187	189	169	173	136	148	108	108	153	153	155	163	195	195
BD142	?	?	?	M	2001	?	N	187	189	173	181	136	154	104	108	149	?	147	159	195	195
BD143	?	?	?	F	2001	?	N	187	189	173	181	136	148	108	108	153	157	159	159	195	195
BD144	?	7414600	1590800	M	2002	?	N	181	191	173	181	136	156	102	104	143	157	155	163	195	197
BD145	?	7414600	1590800	M	2002	?	N	181	191	179	181	136	136	102	104	143	149	155	163	195	195
BD146	?	7416600	1602900	M	2002	?	N	181	189	179	181	138	150	102	108	149	149	155	159	195	195
BD147	?	7416600	1602900	F	2002	?	N	181	189	179	181	136	136	102	108	153	157	155	159	195	195
BD148	?	7416600	1602900	M	2002	?	N	189	189	181	181	136	138	104	104	149	157	163	163	195	195
BD149	?	7414800	1590000	M	2002	?	N	189	191	173	181	154	156	102	108	157	157	155	163	195	197
BD150	?	7424700	1543900	F	1996	?	N	189	193	173	173	136	150	102	102	143	153	159	163	195	195
BD151	?	7424700	1543900	F	2001	?	N	189	189	173	179	136	148	102	102	143	149	163	163	195	195
BD152	?	7424700	1543900	F	2001	?	N	189	193	173	173	136	154	102	108	143	143	159	163	?	?
BD153	?	7432400	1615200	F	1990	?	N	189	189	179	181	136	144	102	104	149	153	155	163	195	195
BD154	?	7391000	1595700	M	?	?	N	189	189	179	181	144	148	102	104	153	153	157	163	195	195
BD155	?	7381600	1595200	F	1998	?	N	187	189	173	179	148	150	104	108	145	149	159	163	195	195
BD156	?	7433000	1565900	M	1998	?	N	187	191	179	179	136	136	104	104	153	153	147	155	195	195
NT99-01	?	?	?	F	1993	?	M	189	191	173	179	136	148	102	104	153	153	155	163	195	195
T97-69	1997	7119200	1415100	M	1993	?	M	181	191	179	181	136	156	102	112	153	155	159	163	185	195
T97-70	1997	7140000	1414000	M	1993	?	M	187	189	173	179	136	136	102	104	149	153	159	163	?	?
T97-71	1995	7150400	1413800	F	?	?	M	181	191	179	181	136	136	104	108	143	155	155	157	195	195
W0001	2001	6850400	1456900	M	1997	?	S	181	189	179	181	148	156	106	108	143	153	147	155	195	195
W0002	2001	6779300	1484900	M	1994	?	S	181	181	179	179	136	156	104	108	145	159	155	157	195	195
W0003	2000	6828700	1456900	M	1997	2003	S	181	191	181	181	136	156	102	102	155	159	157	159	185	195
W0004	2001	6797400	1442700	F	1994	?	S	181	189	179	179	148	148	102	104	153	159	155	157	195	195
W0005	2000	6795200	1444800	M	1999	?	S	181	181	173	179	148	156	102	104	149	159	157	157	195	195
W0006	2000	6784600	1378700	M	1999	?	S	191	191	173	181	136	156	102	108	153	159	147	157	195	195
W0007	2002	6663600	1306300	M	1999	2002	S	181	181	173	181	136	136	106	108	155	159	157	159	195	195
W0008	2001	6785400	1378200	F	1999	2001	S	181	191	173	181	136	136	102	102	153	159	147	157	195	195
W0009	2000	6816200	1389200	M	1999	?	S	181	181	173	181	136	156	102	104	143	159	147	155	185	195
W0010	2001	6805100	1455400	F	1999	?	S	181	181	181	181	136	136	108	112	153	155	155	157	185	195

W0011	2000	6813800	1459200	M	1999	?	S	181	191	181	181	136	156	108	112	145	145	147	155	195	195
W0012	2001	6814600	1461300	M	1991	?	S	181	181	173	181	148	152	102	102	143	155	147	155	185	195
W0013	2001	6858700	1356700	M	1995	?	S	181	191	179	181	136	156	102	108	153	153	147	163	195	195
W0014	2001	6730322	1483959	M	1999	2001	S	181	181	173	181	148	156	102	108	153	155	147	155	185	195
W0015	2001	6797200	1411500	F	1999	?	S	?	?	179	181	148	156	102	112	153	153	153	155	185	195
W0016	2000	6823200	1465300	M	1994	2000	S	181	193	179	181	136	136	102	102	153	155	147	157	195	197
W0017	2000	6829100	1458500	M	1999	2003	S	191	191	179	181	136	136	104	108	153	153	155	155	195	195
W0018	2001	6808400	1406700	F	1999	?	S	181	181	173	179	136	148	102	102	143	159	155	155	195	195
W0019	2001	6814900	1412100	F	1999	?	S	181	189	181	181	136	148	102	102	153	159	147	155	195	195
W0020	2001	6813000	1404500	F	1999	?	S	181	189	179	181	136	156	102	102	143	159	155	155	185	195
W0021	2001	6819600	1335700	F	1999	?	S	181	189	173	181	148	148	102	104	159	159	147	147	195	195
W0022	2000	6823000	1349800	M	1999	?	S	181	189	181	181	148	148	102	104	159	159	147	147	195	195
W0023	2000	6823000	1349800	M	1999	?	S	181	189	181	181	148	148	102	104	155	159	147	147	185	195
W0024	2000	6811400	1398500	M	1999	2000	S	189	191	181	181	148	148	102	102	153	153	147	159	195	195
W0025	2000	6800200	1401550	F	1999	2000	S	181	191	179	181	148	156	102	102	143	153	147	155	185	195
W0101	2001	6836800	1417200	M	1998	?	S	181	191	173	179	136	138	102	112	153	159	155	163	195	195
W0102	2001	6798100	1378400	M	1997	?	S	181	191	173	179	136	156	102	102	153	153	155	157	195	195
W0103	2001	6808700	1364000	M	1999	?	S	181	191	181	181	148	156	102	108	153	159	147	159	195	195
W0104	2001	6810100	1491700	F	2000	?	S	181	193	179	181	136	148	104	104	145	153	157	159	195	195
W0105	2001	6807000	1493300	F	2000	2001	S	181	189	179	181	136	148	108	112	153	153	157	159	195	195
W0106	2001	6810200	1486500	M	2000	?	S	181	181	173	181	156	156	102	104	155	155	155	159	195	195
W0107	2001	6816100	1398400	F	2000	?	S	189	191	179	181	136	138	102	102	153	159	147	163	195	195
W0108	2001	6794400	1324900	M	1990	2001	S	181	191	173	181	136	156	102	108	153	155	147	157	195	195
W0109	2001	6817300	1464400	F	1994	?	S	181	189	179	181	148	156	104	112	153	155	155	159	185	195
W0110	2001	6795500	1462000	M	1998	?	S	181	191	181	181	136	156	102	108	155	155	147	155	195	195
W0111	2001	6769600	1469000	M	1994	2003	S	181	191	181	181	148	148	102	108	153	155	159	159	195	195
W0112	2001	6829500	1443900	M	2000	?	S	181	191	181	181	156	156	108	108	145	155	155	159	185	195
W0113	2001	6829500	1443900	M	2000	?	S	181	191	181	181	136	156	102	108	155	155	155	155	185	185
W0114	2001	6829300	1443900	M	2000	?	S	181	191	181	181	156	156	102	108	145	153	147	159	185	185
W0115	2001	6811600	1448800	M	2000	2003	S	181	191	179	181	136	136	108	112	153	155	155	155	185	195
W0116	2001	6811600	1448800	M	2000	?	S	181	189	179	181	136	156	104	108	153	155	155	155	185	185
W0117	2001	6812500	1453900	F	2000	?	S	181	191	179	181	136	156	102	104	153	153	155	155	185	185
W0118	2001	6809000	1442000	M	2000	?	S	181	189	179	179	136	136	104	104	?	?	155	157	195	195
W0119	2001	6809000	1442000	M	2000	?	S	181	191	179	179	136	136	102	104	?	?	155	155	195	195
W0120	2001	6798100	1378400	F	1999	2003	S	181	191	173	181	148	156	102	108	153	155	157	159	195	195
W0121	2001	6829900	1451500	F	1986	?	S	181	191	179	181	136	156	102	112	153	155	155	159	185	195
W0122	2001	6801300	1453000	F	1994	2003	S	181	191	179	181	136	156	108	112	153	159	147	155	195	195

W0124	2001	6831900	1417400	F	1991	2002	S	181	187	179	181	152	156	104	108	149	159	157	157	195	195
W0201	2002	6822900	1364800	M	1998	?	S	189	189	173	179	148	148	102	102	153	159	155	159	185	195
W0202	2002	6803700	1349900	M	1996	?	S	181	181	173	181	136	152	102	102	143	155	155	159	185	195
W0203	2002	6804800	1375900	M	2001	?	S	181	181	181	181	?	?	?	?	143	155	159	159	185	195
W0204	2002	6804800	1375900	M	2001	?	S	181	193	181	181	148	156	102	108	155	155	147	159	185	195
W0205	2002	6786300	1402000	F	2001	2002	S	181	191	173	173	156	156	102	108	155	159	155	157	195	195
W0206	2002	6793500	1383500	M	2001	2002	S	181	191	173	173	136	136	104	108	155	159	155	157	195	195
W0207	2002	6792800	1388200	M	2001	2002	S	181	181	173	173	136	156	102	102	153	159	155	157	195	195
W0208	?	6818600	1473100	F	2001	?	S	181	181	179	181	136	148	104	108	145	155	155	155	185	195
W0209	?	6820000	1468100	F	2001	?	S	189	191	181	181	148	156	108	112	155	155	159	159	185	195
W0210	?	6835700	1456800	M	2001	?	S	181	191	181	181	136	156	108	108	153	155	147	155	195	195
W0211	?	6835700	1456800	M	2001	?	S	181	191	181	181	136	156	108	108	145	153	155	159	195	195
W0212	?	6842000	1458000	F	2001	?	S	181	191	181	181	136	156	108	108	145	153	147	159	195	195
W0213	?	6792800	1442000	M	2001	?	S	181	181	179	181	136	148	104	104	153	159	147	157	185	195
W0214	?	6791900	1443600	F	2001	2002	S	181	181	179	181	136	148	102	104	159	159	147	155	195	195
W0215	?	6818200	1449600	M	2001	?	S	181	189	179	181	136	136	112	112	145	153	155	157	185	195
W0216	?	6818200	1449600	M	2001	?	S	181	191	179	181	136	136	102	112	145	159	157	157	185	195
W0217	?	6818200	1449600	F	2001	?	S	181	189	179	181	136	156	112	112	153	153	155	157	185	195
W0218	?	6818200	1449600	M	2001	?	S	181	191	179	181	136	136	102	112	153	159	147	157	185	195
W0219	?	6818100	1339300	F	2001	?	S	181	181	179	181	152	156	102	102	155	159	147	159	185	195
W0220	?	6818700	1348000	M	2001	?	S	181	181	179	181	152	156	102	102	155	155	147	159	195	195
W0221	?	6806100	1345500	F	2001	?	S	181	191	181	181	148	156	102	112	155	159	147	163	195	195
W0222	?	6815500	1349400	M	2001	?	S	181	189	173	181	136	156	102	104	155	159	147	157	195	195
W0223	?	6810600	1351200	F	2001	?	S	181	191	181	181	136	156	102	104	159	159	147	147	195	195
W0224	?	6909000	1326500	M	1999	?	S	181	189	181	181	136	156	102	112	149	153	155	159	195	195
W0225	?	6817600	1351800	M	1997	?	S	189	191	179	181	136	156	102	102	153	155	155	159	195	195
W0226	?	6773800	1390100	M	1991	2003	S	181	191	181	181	136	136	108	112	145	153	147	147	185	195
W0227	?	6804100	1419700	F	1995	2003	S	181	191	181	181	136	136	102	102	153	159	155	155	195	195
W0228	?	6801200	1412500	M	1998	?	S	181	181	181	181	148	156	102	108	145	155	147	159	185	195
W0229	?	6803700	1434800	F	1998	?	S	181	181	173	181	148	156	102	104	149	155	147	155	185	195
W0230	?	6810100	1462800	M	1998	?	S	181	181	181	181	136	156	104	108	153	155	147	163	185	195
W0231	?	6833500	1465800	F	1992	?	S	191	191	181	181	?	?	?	?	?	?	147	159	185	195
W0232	?	6814700	1438700	M	1995	2002	S	189	191	173	179	136	136	102	102	159	159	155	157	185	195
W0233	?	6831900	1442300	M	1995	?	S	189	191	173	181	148	148	102	102	149	155	155	159	185	185
W0234	?	6810600	1457800	F	1999	?	S	181	181	181	181	?	?	?	?	145	153	155	155	195	195
W0235	?	6802000	1458400	M	1998	?	S	181	?	173	179	136	148	102	108	153	155	157	159	195	195
W0236	?	6857200	1326200	F	1999	?	S	181	?	181	181	148	148	104	106	149	155	155	159	195	195

W0237	?	6839000	1431100	F	1997	?	S	189	191	179	179	136	156	104	108	153	155	155	157	185	195
W0238	?	6793300	1457200	F	1991	2002	S	181	189	181	181	136	148	102	108	153	159	147	155	195	195
W0301	?	6813900	1454300	M	2002	?	S	181	181	181	181	152	156	102	102	143	153	155	155	185	195
W0302	?	6814300	1454000	M	2002	?	S	181	181	173	181	136	152	102	108	153	155	155	155	185	185
W0303	?	6814100	1454300	F	2002	?	S	181	181	181	181	136	152	102	102	143	155	147	155	195	195
W0304	?	6809500	1490300	F	2002	?	S	181	181	179	179	136	138	102	112	153	155	155	155	185	195
W0305	?	6809500	1490300	F	2002	?	S	?	?	173	179	136	136	112	112	153	155	155	159	185	195
W0306	?	6809800	1489900	F	2002	?	S	181	181	173	179	136	156	112	112	153	155	159	163	185	195
W0307	?	6841700	1354700	M	2001	?	S	181	189	179	181	148	156	102	108	155	155	155	159	185	195
W0308	?	6832700	1355900	M	2002	?	S	189	191	173	179	?	?	?	?	155	159	147	157	195	195
W0309	2003	6842300	1351400	F	2002	2003	S	181	189	181	181	136	156	102	112	155	159	147	157	195	195
W0310	?	6828900	1453700	M	2002	?	S	181	181	173	181	156	156	104	112	155	155	155	155	195	195
W0311	?	6780600	1395700	F	2002	?	S	181	191	173	181	136	148	102	102	153	159	147	159	195	195
W0312	?	6780600	1395700	M	2002	?	S	181	181	181	181	136	138	102	108	153	159	147	147	195	195
W0313	?	6786100	1413700	M	2002	?	S	181	189	173	173	148	156	102	104	149	153	147	155	195	195
W0314	2003	6792373	1412386	F	2002	2003	S	181	191	179	179	138	148	102	104	149	155	153	155	195	195
W0315	?	6822300	1447600	M	2002	?	S	191	191	181	181	138	156	108	108	153	155	147	147	185	195
W0316	?	6822300	1447600	M	2002	?	S	181	181	181	181	136	138	102	108	153	155	147	147	185	185
W0317	2003	6819478	1442777	F	2002	2003	S	189	191	173	181	138	148	102	102	149	159	147	155	185	195
W0318	?	6826438	1389852	F	2002	?	S	181	191	173	181	136	148	102	104	149	149	147	159	195	195
W0319	?	6826274	1389985	M	2002	?	S	181	181	181	181	136	136	102	112	149	159	147	159	195	195
W0320	?	6816700	1447900	M	2002	?	S	181	191	179	181	156	156	102	104	153	155	147	157	195	195
W0321	?	6816700	1447900	M	2002	?	S	181	191	181	181	138	156	104	108	153	155	147	155	195	195
W0322	?	6816700	1447900	M	2002	?	S	181	181	179	181	136	138	102	102	153	155	147	155	185	195
W0323	?	6811500	1438300	F	2000	?	S	181	181	179	181	136	156	102	104	155	159	157	163	195	195
W0324	?	6794900	1415600	M	1998	?	S	181	181	181	181	148	148	102	102	149	155	155	159	195	195
W0325	2003	6812700	1461400	F	1994	2003	S	181	189	179	179	148	156	104	112	153	155	147	155	195	195
W0326	?	6831900	1429000	F	1993	?	S	181	191	181	181	136	148	102	102	153	155	147	155	185	185
W0327	?	6830900	1411800	M	1998	?	S	181	181	173	181	152	156	106	108	153	155	157	159	185	195
W0328	2003	6823336	1465121	F	1996	2003	S	189	191	181	181	136	148	102	112	153	153	159	159	185	195
W8503	1991	6808300	1449700	M	1978	1991	S	181	191	173	181	136	156	108	112	153	159	147	157	185	195
W8601	1986	6845800	1480300	M	1982	1999	S	181	191	173	179	136	156	102	108	149	153	157	157	195	195
W8606	1991	6823400	1450300	M	1982	1991	S	189	191	181	181	148	148	102	102	143	153	147	159	185	195
W8607	2001	6795300	1437700	M	1971	2001	S	181	191	179	181	136	136	108	112	145	153	147	155	185	195
W8701	1989	6840200	1425700	M	1982	1989	SN	191	191	179	183	136	136	102	102	145	149	157	157	195	195
W8705	1998	6806300	1406900	F	1984	1998	S	189	191	181	181	138	148	102	102	143	153	159	163	195	195
W8707	1999	6758100	1486800	F	1977	1999	S	181	181	181	181	148	156	104	108	155	159	147	147	195	195

W8802	1991	6807500	1395600	F	1983	1991	S	189	191	179	179	138	148	102	102	143	153	147	163	195	195
W8804	1991	6837700	1403300	M	1974	1991	S	181	191	179	181	138	148	102	102	143	155	147	163	185	195
W8805	1995	6828900	1352900	M	1983	?	S	181	181	173	179	136	156	102	102	155	155	153	155	185	195
W8807	2001	6815100	1415900	M	1984	?	S	181	189	181	181	136	156	102	108	155	159	147	155	195	195
W8808	2001	6810100	1439100	F	1981	2003	S	181	181	179	181	136	156	102	104	153	155	155	157	195	195
W8809	1992	6827900	1383300	M	1974	1992	S	181	191	181	181	148	148	102	108	155	159	147	147	195	195
W8811	2000	6813400	1400300	F	1978	2000	S	181	189	179	181	148	148	102	102	153	159	147	159	185	195
W8904	2001	6789400	1412300	F	1987	?	S	181	191	173	179	138	156	102	102	153	155	147	153	195	195
W8905	1999	6813800	1435900	F	1987	1999	S	181	191	179	181	138	148	102	108	143	155	147	163	185	195
W8906	2001	6809600	1447800	F	1981	?	S	181	181	181	181	136	156	102	108	153	155	155	155	185	195
W8908	1991	6822800	1402400	M	1985	1991	S	181	191	173	179	136	148	102	112	149	159	153	155	195	195
W8909	1994	6777600	1452100	F	1983	1995	S	181	191	181	181	136	148	102	108	145	159	147	155	185	195
W8910	1996	6764000	1494200	M	1986	1996	S	181	181	179	179	136	138	102	102	153	155	155	163	195	195
W8913	1989	6797600	1377200	M	1986	1989	S	181	181	173	179	148	156	102	102	153	155	147	153	185	195
W9001	1994	6813700	1405300	F	1984	?	S	181	191	181	181	148	156	102	102	153	159	147	159	185	195
W9002	1996	6807900	1450200	M	1989	1996	S	189	189	179	179	148	148	102	104	153	153	147	155	195	195
W9003	2001	6811100	1398800	F	1989	2001	S	189	189	179	179	138	148	102	102	143	153	155	163	195	195
W9004	1992	6906800	1226000	M	1989	1992	S	181	191	173	181	136	136	102	108	155	159	157	157	185	195
W9005	1996	6913000	1346000	M	1989	1996	S	181	191	181	181	136	156	102	112	155	159	147	157	195	195
W9006	2001	6780800	1525700	M	1989	?	S	181	191	181	181	156	156	102	112	153	159	147	155	185	195
W9007	1994	6814700	1382700	F	1986	?	S	181	181	181	181	148	148	102	102	155	159	147	159	195	195
W9008	2002	6823104	1351185	F	1986	2002	S	181	189	179	181	148	156	102	102	155	159	147	147	195	195
W9009	1992	6908700	1360200	M	1986	1992	S	181	181	179	181	148	156	102	102	143	153	159	163	195	195
W9010	1991	6900500	1386600	M	1985	1991	S	181	189	173	179	148	156	108	108	155	155	147	147	185	195
W9011	1999	6864300	1259900	M	1984	?	S	181	191	173	181	136	156	104	108	149	155	155	155	195	195
W9101	2001	6831200	1445000	F	1990	?	S	181	191	181	181	136	156	102	108	153	155	147	155	185	185
W9102	1995	6786400	1461800	F	1990	1995	S	181	181	179	181	136	136	108	108	145	153	155	155	195	195
W9201	1997	6868200	1462000	M	1991	1997	SS	181	189	181	181	148	156	102	108	?	?	147	147	185	195
W9202	1998	6791500	1445700	M	1991	1998	S	181	189	181	181	148	156	102	108	153	155	147	159	195	195
W9203	1992	6814100	1408100	F	1991	1992	S	191	191	173	181	136	156	102	104	149	159	155	159	185	195
W9204	1992	6816600	1409700	F	1991	1992	S	191	191	181	181	136	148	102	104	153	159	147	155	185	195
W9205	1993	6819100	1383600	M	1991	1993	S	181	181	181	181	136	148	102	102	159	159	155	159	195	195
W9206	1997	6767800	1442000	M	1991	1997	S	181	191	181	181	136	136	102	108	153	159	147	155	195	195
W9207	1997	6774000	1450500	F	1991	?	S	181	181	173	179	136	156	104	108	153	159	157	157	195	195
W9208	2000	6819070	1498060	F	1991	2000	S	181	191	179	181	136	156	104	112	153	153	147	157	185	195
W9301	2001	6823900	1440500	M	1989	?	S	189	191	179	179	136	136	104	104	153	159	157	157	185	195
W9302	1993	6906500	1361500	M	1982	?	S	189	193	173	181	136	148	104	112	153	153	157	157	195	195

W9303	1995	6771300	1408800	M	1989	?	S	181	191	179	181	138	148	102	108	143	155	147	163	185	195
W9304	1994	6841700	1244700	M	1991	1994	S	181	193	173	181	148	148	104	104	153	155	157	159	185	195
W9305	1995	6797700	1456600	M	1992	1995	S	181	181	173	181	156	156	102	108	155	159	155	157	195	195
W9306	1999	6807300	1459000	F	1992	1999	S	181	191	181	181	136	156	102	108	155	159	147	155	185	195
W9307	2001	6836500	1455800	F	1992	?	S	181	191	181	181	136	136	108	108	153	153	147	155	195	195
W9308	2001	6835600	1400100	F	1988	?	S	181	191	173	181	136	148	102	104	149	159	155	159	195	195
W9309	1995	6925700	1338200	M	1992	1995	S	181	189	173	181	136	156	102	108	149	159	147	155	195	195
W9310	2001	6777000	1395100	F	1992	2003	S	181	191	173	181	136	136	102	108	159	159	147	159	195	195
W9311	2001	6834100	1346800	M	1992	?	S	181	191	181	181	148	156	108	112	143	159	147	163	195	195
W9401	2001	6795900	1453300	M	1993	?	S	191	191	173	179	136	156	102	104	153	155	147	155	195	195
W9402	2002	6767300	1470100	F	1993	2002	S	181	191	181	181	136	136	102	112	145	155	147	155	195	195
W9403	2001	6817400	1449000	F	1993	?	S	181	181	181	181	136	156	102	112	145	153	147	157	195	195
W9404	2001	6817800	1349100	F	1993	?	S	189	191	181	181	136	156	102	112	155	159	147	147	195	195
W9405	1994	6802100	1341800	M	1993	1994	S	181	189	179	181	136	156	102	104	155	159	147	147	195	195
W9406	1994	6806400	1386500	F	1993	1994	S	181	181	181	181	136	148	102	104	155	155	147	157	195	197
W9407	1996	6971800	1204200	M	1993	1996	S	181	181	181	181	136	148	102	112	145	159	147	157	195	195
W9408	1994	6806600	1376900	F	1993	1994	S	181	181	181	181	136	148	102	112	145	159	147	147	195	195
W9409	1994	6861000	1430000	M	1988	?	S	181	189	181	181	138	156	102	108	159	159	147	153	195	195
W9501	1996	6754800	1114700	M	1991	?	S	193	193	173	179	136	136	102	102	149	149	155	157	195	195
W9502	2001	6813200	1395300	F	1994	?	S	181	181	173	181	136	156	102	104	155	159	147	155	195	195
W9503	2000	6812100	1387900	F	1994	2000	S	181	191	173	181	136	136	102	108	159	159	155	155	195	195
W9504	2002	6814601	1402972	F	1994	2002	S	181	189	173	181	136	136	102	102	159	159	155	155	195	195
W9505	1998	6799900	1361200	M	1988	?	S	181	181	173	181	136	148	104	104	159	159	147	157	185	195
W9506	1999	6778800	1260100	M	1994	1999	S	181	181	179	181	136	136	108	108	145	153	147	155	185	185
W9507	2000	6805300	1443000	F	1994	2000	S	181	181	179	181	136	156	108	108	145	155	155	155	185	195
W9508	1998	6529500	1085700	M	1994	1998	S	181	181	179	181	136	136	102	112	153	155	155	155	195	195
W9509	1996	6900500	1386500	M	1994	1996	S	181	191	179	181	136	156	108	108	145	155	155	159	185	195
W9510	1997	6820200	1241600	M	1994	1997	S	181	181	181	181	156	156	112	112	145	155	155	159	185	185
W9511	1997	6806500	1453800	F	1985	1997	S	181	181	179	181	136	156	108	112	145	155	155	155	185	195
W9601	1999	6719300	1398200	F	1995	1999	S	181	189	179	179	136	138	102	102	153	155	157	163	195	195
W9602	2000	6798800	1396300	F	1995	2000	S	189	191	179	181	138	148	102	102	153	155	157	163	195	195
W9603	1996	6815900	1393900	M	1995	?	S	181	189	179	181	148	148	102	102	155	159	159	163	185	195
W9604	1996	6806600	1402400	M	1995	1996	S	181	181	179	181	136	148	102	102	155	159	147	163	195	195
W9605	1999	6818300	1402200	F	1995	1999	S	181	191	181	181	136	148	102	102	153	155	157	159	195	195
W9606	1996	6788000	1442800	F	1995	?	S	181	189	173	179	148	156	104	104	153	153	155	157	195	195
W9607	1998	6782800	1452500	F	1995	1998	S	181	189	179	179	136	?	104	104	153	153	147	157	195	195
W9608	2000	6345500	1387480	M	1995	2000	S	181	181	173	181	136	156	102	104	155	159	147	157	185	195

ID				Sex																	
W9609	1998	6777300	1349500	M	1995	?	S	181	181	179	181	136	156	102	104	155	159	147	147	185	195
W9610	1998	6686500	1440500	M	1995	?	S	181	181	179	181	136	156	102	104	155	159	147	157	195	195
W9611	1999	6790000	1421500	M	1995	1999	S	181	181	173	181	136	136	102	104	149	153	155	155	195	195
W9612	2002	6739950	1320830	M	1995	2002	S	181	191	173	179	136	156	102	104	149	153	155	157	195	195
W9613	1996	6814200	1446200	F	1995	1996	S	181	191	173	181	136	136	102	104	153	155	155	155	195	195
W9614	1998	6806300	1456400	M	1995	1998	S	181	189	181	181	148	156	108	108	143	159	147	147	185	195
W9615	2001	6820100	1437300	F	1995	?	S	189	191	181	181	138	148	102	102	143	159	147	153	195	195
W9701	1998	6766500	1414800	M	1996	?	S	181	191	181	181	136	156	108	108	145	155	155	159	185	195
W9702	1999	6805200	1478900	M	1996	?	S	181	191	181	181	136	156	108	108	153	155	155	155	185	195
W9703	1997	6788300	1410500	F	1996	1997	S	181	191	173	179	136	156	102	102	149	155	147	155	195	195
W9704	2001	6733400	1526200	M	1996	2001	S	181	181	179	181	136	156	108	112	143	153	147	157	?	?
W9705	1997	6808700	1502900	M	1996	1997	S	181	193	173	181	156	156	102	104	149	153	147	157	185	195
W9801	1999	6823700	1447000	M	1997	?	S	181	189	179	181	136	156	102	104	153	155	147	155	185	195
W9802	1999	6779100	1467100	M	1983	1999	S	181	181	181	181	148	156	108	108	145	155	147	147	185	195
W9803	2000	6771500	1404000	F	1997	?	S	181	181	173	181	136	136	102	104	153	159	147	159	195	195
W9804	2001	6829500	1361800	F	1997	?	S	181	189	179	181	136	148	102	112	155	159	147	157	195	195
W9805	1998	6813400	1351400	F	1997	1998	S	181	191	181	181	136	156	102	104	155	159	147	147	195	195
W9806	2001	6834300	1454000	F	1996	?	S	181	191	173	181	136	156	108	112	153	155	155	159	185	195
W9807	2000	6819200	1309300	M	1988	2000	S	181	191	179	181	136	136	104	112	153	159	147	157	195	195
W9808	1999	6804700	1461100	F	1997	1999	S	181	181	?	?	136	156	102	102	?	?	155	157	195	195
W9809	2000	6713300	1298500	M	1997	2000	S	181	191	173	181	136	156	102	102	149	155	155	157	195	195
W9810	1998	6821800	1452500	M	1988	?	S	181	191	181	181	136	156	108	108	145	155	155	159	185	195
W9811	1999	6795100	1362900	M	1985	2002	S	181	191	181	181	136	136	104	112	145	155	147	157	195	195
W9812	2000	6818100	1402000	F	1997	2000	S	189	191	181	181	148	156	104	108	149	155	155	155	195	195
W9813	1999	6825100	1400800	M	1997	1999	S	181	189	173	181	136	136	102	104	149	155	155	155	195	195
W9814	2001	6826300	1389000	F	1997	?	S	181	191	173	181	148	156	102	108	155	155	155	159	195	195
W9901	1999	6792000	1332300	M	1993	?	S	189	191	181	181	136	148	102	108	153	155	147	155	185	195
W9902	1999	6813500	1506400	F	1998	1999	S	181	191	179	181	136	136	102	104	153	155	147	159	185	185
W9903	2001	6826500	1367100	F	1997	?	S	181	181	173	181	136	148	102	104	145	155	147	157	195	195
W9904	1999	6733600	1437900	F	1994	1999	S	181	189	181	181	136	148	102	102	149	155	155	155	195	195
W9905	1999	6738200	1437000	F	1998	1999	S	181	191	181	181	136	136	102	108	149	159	155	155	195	195
W9906	1999	6728200	1436900	M	1998	1999	S	181	181	181	181	136	152	102	102	149	153	155	157	195	195
W9907	2000	6802600	1390500	M	1998	?	S	189	191	179	181	136	138	102	102	143	155	155	163	195	195
W9908	2000	6804000	1403200	F	1998	?	S	181	189	179	179	136	148	102	102	143	155	157	163	195	195
W9909	2001	6809700	1485900	F	1989	?	S	181	181	173	179	136	156	104	112	153	155	155	159	185	195
W9910	1999	6819100	1449200	F	1998	1999	S	181	189	179	179	136	156	104	104	153	155	155	157	185	195
W9911	2000	6816500	1447100	F	1998	2000	S	181	189	179	179	136	156	104	104	153	155	155	157	185	195

W9912	1999	6814700	1443200	F	1998	1999	S	181	189	179	181	136	156	104	104	153	153	155	155	195	195
W9913	2001	6806900	1342200	F	1998	?	S	181	191	181	181	156	156	102	108	143	155	?	?	195	195
W9914	2001	6802100	1362100	F	1998	?	S	181	191	181	181	136	148	108	112	155	159	147	163	195	195
W9915	1999	6815200	1344700	M	1998	?	S	181	189	181	181	136	148	108	112	143	159	147	163	195	195
W9916	2001	6828400	1403800	M	1994	?	S	181	193	181	181	136	156	102	108	143	155	147	159	185	185
W9917	1999	6811800	1441800	M	1996	1999	S	189	189	179	181	148	148	102	108	143	159	155	159	185	195
W9918	2001	6795500	1492800	M	1998	?	S	181	191	181	181	136	136	102	112	153	155	155	157	195	195
W9919	1999	6813600	1452200	F	1998	1999	S	181	191	181	181	136	156	102	112	155	159	147	155	185	195
W9920	2000	6814200	1450900	M	1998	2003	S	181	191	179	181	136	136	104	108	153	159	155	157	185	195
W9921	2001	6839200	1426000	M	1991	2003	S	181	191	181	181	138	156	102	108	155	155	147	147	185	195
W9922	1999	6813500	1435700	M	1999	1999	S	181	181	181	181	136	148	108	112	145	155	147	147	185	195
W9923	1999	6813500	1435700	M	1999	1999	S	181	181	179	179	136	138	108	112	143	153	147	155	185	195
Z9512	1995	7144600	1420800	F	?	?	M	191	191	179	181	136	156	102	104	153	153	147	163	185	195
Z9513	1995	7128000	1442000	M	1975	?	M	187	189	173	181	136	148	102	108	155	157	155	157	195	195
Z9514	1995	7151400	1444000	M	1988	?	M	189	191	179	183	136	148	102	108	143	153	157	163	195	195
Z9515	1995	7139500	1451100	F	1971	?	M	189	191	173	179	136	136	102	102	153	153	155	163	195	195
Z9815	1998	7134200	1431200	M	1993	?	M	181	191	179	181	136	156	102	112	153	155	159	163	195	195
Z9816	1998	7066300	1370200	M	1992	?	M	191	191	173	179	136	156	102	112	153	153	155	157	195	197
Z9922	?	?	?	M	1998	?	M	181	187	181	181	136	156	102	104	155	155	155	159	195	195
Z9923	2000	7156000	1412000	F	1998	?	M	181	191	?	?	136	156	102	108	143	153	155	159	195	195

File Name	G10J	G10J	G10X	G10X	Mu15	Mu15	Mu51	Mu51	Mu61	Mu61	G10H	G10H	Mu05	Mu05	Mu59	Mu59	Mu10	Mu10	Mu23	Mu23	Mu50	Mu50
00BD01	106	108	140	140	135	135	102	118	205	207	?	?	135	139	114	114	146	146	151	153	?	?
00BD02	104	106	140	140	141	141	102	118	205	207	?	?	139	139	100	114	146	146	151	153	?	?
00BD04	094	108	134	140	139	141	110	120	205	207	?	?	131	141	120	120	140	150	145	155	?	?
00BD05	104	108	134	134	137	141	110	110	205	207	?	?	137	141	122	124	148	150	149	151	?	?
00BD07	094	108	?	?	141	141	110	110	?	?	?	?	141	141	?	?	?	?	151	151	?	?
00BD08	094	104	134	142	135	141	110	110	?	?	?	?	137	139	?	?	?	?	151	155	?	?
00BD09	102	102	134	142	141	141	110	118	?	?	?	?	131	139	106	120	140	146	145	153	?	?
00BD10	094	108	134	150	137	137	102	118	207	207	?	?	139	141	104	122	146	150	145	153	?	?
00BD11	094	108	134	140	135	135	112	118	205	205	?	?	131	131	122	124	146	150	151	151	?	?
00BD92	094	104	134	150	141	141	110	110	205	207	?	?	137	139	120	124	132	150	149	151	?	?
00BD93	094	104	134	150	141	141	110	110	205	207	?	?	137	139	120	124	132	150	149	151	?	?
00BD94	094	106	134	140	139	141	102	118	205	207	?	?	135	141	120	126	140	146	149	153	?	?
00BD96	094	094	140	140	131	135	118	120	?	?	?	?	129	135	116	124	146	150	151	153	?	?
00BD97	094	102	140	142	139	141	102	112	205	205	?	?	131	139	106	114	140	146	145	149	?	?
00BD98	108	108	134	134	139	141	102	112	?	?	?	?	139	139	102	126	146	148	149	151	?	?
00W01	092	094	140	142	137	141	112	118	211	211	?	?	137	141	114	122	146	150	151	155	212	216
00W02	092	094	134	142	135	137	110	122	211	211	?	?	137	139	124	126	146	150	153	155	212	214
00W03	094	094	134	142	135	137	122	122	207	211	?	?	123	139	124	126	150	150	153	155	216	216
00W05	092	094	134	142	141	141	112	112	211	211	?	?	141	141	122	122	146	146	145	153	?	?
00W06	094	094	142	142	135	141	112	112	211	211	?	?	137	141	?	?	142	150	151	153	212	212
00W07	092	108	142	142	135	135	120	122	211	211	?	?	137	139	120	120	140	146	153	155	210	212
00W08	094	108	142	142	141	141	110	120	207	211	?	?	137	141	?	?	144	150	145	149	206	216
00W09	092	094	142	142	135	135	118	122	211	211	?	?	137	141	?	?	142	150	155	155	206	212
00W10	094	094	142	142	135	141	118	120	?	?	?	?	137	141	?	?	146	150	147	151	210	210
00W15	092	094	134	142	137	137	120	122	207	211	?	?	137	139	114	122	150	150	153	155	212	212
00W16	094	094	134	142	141	141	110	122	207	207	?	?	131	137	118	118	140	144	145	153	210	216
00W94	108	108	142	142	141	141	122	122	211	211	?	?	137	141	120	122	140	150	149	151	206	212
00W95	092	094	134	142	137	141	110	112	207	211	?	?	139	141	118	122	140	144	145	155	210	214
00W98	092	094	134	142	135	137	?	?	211	211	?	?	137	139	124	126	146	150	153	155	212	214
00W99	092	094	142	142	135	135	110	122	207	211	?	?	139	141	114	124	146	150	153	155	212	216
00X01A	094	108	134	142	137	141	112	122	211	211	?	?	137	139	114	120	144	144	151	155	212	214
00X01B	092	094	134	142	141	141	112	118	205	211	?	?	137	137	120	120	144	144	151	155	?	?
00X02	094	108	134	142	141	141	112	120	205	211	?	?	137	141	118	122	146	150	151	155	?	?
00X03	094	094	142	142	135	137	?	?	207	211	?	?	139	141	114	124	142	146	155	155	212	216
00X04	092	094	134	142	137	141	112	112	205	211	?	?	137	137	120	120	144	150	151	155	206	212

00X05	094	094	140	140	137	141	102	120	207	211	?	?	137	139	120	124	140	146	151	155	214	214
00X06	092	094	134	134	137	141	112	118	205	211	?	?	137	137	114	120	144	150	151	155	210	212
00X98	092	092	134	142	141	141	112	112	205	211	?	?	137	137	120	120	144	146	151	155	206	212
00Z01	092	094	134	142	135	135	110	112	205	205	?	?	137	137	120	120	132	132	145	145	206	212
00Z07	094	108	142	142	135	141	112	118	211	211	?	?	137	141	114	120	144	150	153	155	?	?
01AC01	108	108	134	140	141	141	120	120	207	207	244	274	139	141	102	120	148	150	145	145	212	214
01AC02	104	108	134	134	135	135	110	118	205	205	?	?	131	137	106	126	140	140	151	151	?	?
01AC03	108	108	134	140	141	141	110	112	205	207	244	244	141	141	124	124	140	150	149	149	192	206
01AC05	094	104	134	134	135	141	110	118	207	207	?	?	137	141	104	124	132	148	149	151	?	?
01AC06	094	094	134	140	135	141	112	112	?	?	?	?	135	139	106	124	150	150	153	153	?	?
01AC07	108	108	134	134	137	137	118	120	205	207	244	276	139	141	120	122	140	146	145	151	214	214
01BD01	102	108	140	140	141	141	118	118	207	207	?	?	139	139	100	122	140	150	145	153	?	?
01BD02	102	110	134	134	135	141	118	118	205	207	?	?	139	141	100	124	146	148	145	145	?	?
01BD06	108	108	134	142	141	141	110	112	205	211	?	?	131	139	122	122	146	150	149	151	?	?
01BD07	102	108	134	134	137	141	118	118	207	207	?	?	131	139	104	126	132	140	145	151	?	?
01BD08	102	108	134	134	141	141	110	110	207	207	?	?	123	137	122	126	150	150	149	149	?	?
01BD09	094	102	134	150	135	141	110	118	205	207	?	?	137	141	100	124	132	150	151	153	?	?
01BD10	094	108	134	140	137	141	110	118	205	207	?	?	135	139	114	122	140	146	145	149	?	?
01BD11	102	104	?	?	135	141	112	118	207	207	?	?	139	139	100	114	132	150	145	151	?	?
01BD13	094	108	134	150	137	141	?	?	205	207	?	?	131	139	114	122	140	146	145	149	?	?
01S01	092	094	142	142	135	141	112	118	205	205	?	?	137	137	114	122	144	150	145	151	212	212
01W05	092	108	142	142	137	141	122	122	211	211	?	?	141	141	120	122	140	146	155	155	210	210
01W07	094	094	134	142	137	141	118	122	211	211	?	?	123	137	122	126	150	150	151	153	214	216
01W08	094	108	134	142	135	137	120	122	205	211	?	?	137	141	122	122	142	142	147	155	210	216
01W09	094	094	?	?	135	137	118	120	211	211	?	?	137	141	114	120	142	146	153	155	206	212
01W11	108	108	134	142	135	141	120	122	211	211	?	?	139	141	120	122	146	150	155	155	206	214
01W12	094	108	134	142	141	141	120	122	207	211	?	?	137	141	120	122	146	146	151	155	212	214
01W14	094	094	134	142	137	141	112	122	205	211	?	?	137	141	114	122	140	146	155	155	206	210
01W98	094	094	134	134	137	141	112	120	207	207	?	?	137	137	118	120	144	144	145	155	206	216
01X01	092	094	134	142	135	141	118	120	211	211	?	?	139	141	120	122	140	146	145	155	210	212
01X02	092	108	142	142	135	137	118	120	211	211	?	?	137	139	114	114	144	144	155	155	212	212
01X03	094	094	134	142	141	141	112	112	211	211	?	?	139	141	120	120	142	150	153	155	210	214
01X05	094	108	142	142	141	141	112	112	205	211	?	?	141	141	120	122	146	146	145	147	210	212
01X06	092	092	134	142	135	141	112	118	211	211	?	?	137	137	120	120	144	144	151	155	206	210
01Y02	094	108	140	142	137	141	110	120	205	211	?	?	141	141	122	124	142	150	149	155	?	?
01Y03	094	104	134	140	141	141	110	110	205	211	?	?	141	141	124	126	132	140	145	149	?	?
01Z04	094	104	134	134	141	141	102	112	207	211	?	?	139	141	122	126	140	150	145	151	?	?
01Z05	108	108	134	140	141	141	112	112	205	207	?	?	141	141	114	124	140	150	149	151	?	?

ID																						
01Z06	094	094	134	142	135	141	118	120	205	205	?	?	131	141	120	122	140	144	145	155	206	216
01Z07	108	108	134	140	139	139	120	120	205	205	?	?	135	139	104	120	132	132	145	145	?	?
01Z09	094	102	142	142	139	141	110	122	207	211	?	?	141	141	120	122	142	150	153	155	?	?
01Z10	094	108	134	134	141	141	112	120	205	207	?	?	139	141	122	124	150	150	149	153	?	?
01Z12	094	108	140	142	139	141	114	118	?	?	?	?	141	141	106	122	142	150	143	155	?	?
01Z13	094	108	134	140	141	141	112	120	205	205	?	?	139	141	126	126	142	150	149	151	194	212
01Z98	094	094	134	142	135	135	112	122	211	211	?	?	137	139	120	122	140	144	149	155	206	212
01Z99	094	108	134	142	137	141	110	118	?	?	?	?	139	141	122	122	146	150	153	155	206	212
01ZZ01	094	108	142	142	137	141	110	122	211	211	244	244	141	141	120	122	140	150	155	155	210	214
01ZZ03	094	108	134	140	141	141	112	120	205	207	244	276	139	139	114	122	140	150	151	153	210	214
02AC01	108	108	134	140	141	141	118	118	205	207	244	246	135	141	102	122	146	146	149	151	210	214
02AC02	094	094	140	140	135	141	120	122	205	211	244	244	139	141	126	126	142	150	149	155	206	216
02AC03	094	108	140	140	141	141	118	120	207	211	244	244	141	141	104	104	132	140	143	145	206	210
02AC04	094	108	142	142	135	137	120	120	207	211	244	246	137	141	122	126	140	144	151	155	212	216
02AC05	094	094	140	142	141	141	112	118	207	211	244	257	141	141	120	126	140	144	153	153	210	212
02AC06	094	102	134	142	135	141	?	?	205	207	244	276	141	141	122	126	140	140	145	151	206	214
02AC07	094	094	142	142	139	141	120	120	207	211	244	244	141	141	120	126	142	142	149	151	206	216
02AC08	104	104	134	140	141	141	112	118	205	211	244	244	141	141	124	126	140	150	145	149	214	218
02AC09	104	108	140	140	141	141	110	112	205	211	244	274	139	141	104	122	140	146	145	155	212	218
02BD01	092	094	132	142	135	141	110	112	207	211	244	244	135	139	118	120	146	146	149	155	?	?
02BD02	108	108	132	132	137	141	118	118	205	207	244	276	131	139	122	126	140	146	149	151	?	?
02BD03	094	108	132	150	137	139	102	118	205	207	253	?	134	141	122	124	146	150	151	151	?	?
02BD05	094	108	132	140	141	141	110	120	207	207	244	244	134	139	102	124	146	148	149	151	?	?
02BD06	094	108	134	142	137	141	110	118	205	207	244	244	131	131	122	122	146	146	149	151	?	?
02BD07	094	094	134	142	137	141	110	112	205	205	246	276	135	139	122	122	140	148	151	153	?	?
02BD08	102	108	134	140	135	141	118	120	207	211	253	257	131	139	114	120	150	150	145	145	?	?
02BD09	102	108	134	150	135	141	118	118	207	211	244	244	134	141	120	124	148	150	145	145	?	?
02BD10	094	108	134	140	141	141	110	112	205	207	246	257	141	141	114	126	146	150	145	151	?	?
02BD97	094	108	138	140	137	141	?	?	?	?	?	?	141	141	104	124	146	148	151	151	?	?
02BD98	094	102	134	140	135	137	110	118	207	207	246	259	127	135	120	124	146	148	149	153	192	214
02BD99	108	108	134	134	141	141	112	118	205	207	244	244	141	141	122	122	132	132	151	151	?	?
02SS01	094	094	132	142	141	141	110	118	205	211	244	246	134	141	118	126	132	142	145	151	?	?
02WW03	094	094	142	142	137	141	120	122	205	211	244	276	137	141	102	114	142	144	155	155	?	?
02WW06	092	108	134	134	141	141	118	120	211	211	244	244	141	141	120	122	140	140	145	155	?	?
02WW08	094	094	134	142	141	141	110	110	211	211	244	244	137	141	100	114	146	146	145	155	?	?
02WW14	094	108	142	142	141	141	112	120	211	211	244	?	137	141	100	120	144	146	145	155	?	?
02WW15	092	094	142	142	135	137	120	122	205	211	244	259	141	141	120	126	142	150	149	155	?	?
02WW94	092	092	134	142	135	135	118	118	?	?	?	?	137	137	120	122	?	?	153	153	?	?

02WW95	092	094	132	142	135	141	110	120	205	205	244	244	137	141	120	122	140	140	155	155	?	?
02WW96	092	094	142	142	137	141	118	122	205	205	244	259	137	141	114	122	140	144	153	155	?	?
02WW97	094	094	142	142	135	141	110	112	207	211	244	259	137	137	118	122	146	146	155	155	?	?
02WW98	094	108	142	142	135	141	110	112	205	207	244	259	134	141	120	122	144	146	155	155	?	?
02X99	094	094	134	134	137	141	112	122	205	205	244	244	137	141	114	122	140	146	155	155	?	?
02XX01	094	094	142	142	137	141	112	122	211	211	244	259	141	141	122	126	142	144	155	155	?	?
02XX02	094	094	134	142	137	141	112	118	211	211	259	259	137	141	122	126	140	142	153	155	?	?
02XX03	094	108	142	142	135	137	110	118	211	211	244	259	137	141	120	122	140	146	145	153	?	?
02XX04	092	108	142	142	137	141	112	122	211	211	244	244	137	141	120	122	140	146	147	155	?	?
02XX06	094	094	142	142	137	141	110	112	211	211	244	244	131	141	120	122	140	142	145	155	?	?
02XX94	094	094	142	142	137	137	110	118	211	211	244	259	141	141	122	122	140	146	155	155	?	?
02XX95	108	?	132	142	141	141	112	112	205	211	246	?	137	141	118	120	142	150	151	155	?	?
02XX96	092	094	134	142	137	141	112	118	205	211	244	246	137	141	114	120	144	150	151	155	?	?
02XX97	094	094	134	142	137	141	110	120	211	211	244	244	137	141	114	122	140	142	153	155	?	?
02XX98	092	094	132	140	135	137	122	122	205	211	244	259	135	141	120	120	140	144	145	153	?	?
02XX99	092	094	132	142	135	137	110	118	211	211	244	246	137	141	114	114	140	142	153	155	?	?
02YY01	092	094	142	142	135	141	110	112	207	211	244	259	137	141	120	122	142	144	153	155	206	212
02YY02	094	094	140	142	135	141	110	122	211	211	244	244	139	141	124	126	142	150	145	155	214	214
02ZZ01	094	094	134	142	135	141	112	120	211	211	246	259	141	141	114	120	146	150	151	155	?	?
02ZZ02	094	102	134	140	137	141	112	112	205	205	244	244	139	141	120	124	140	150	153	155	?	?
02ZZ03	094	108	134	142	141	141	112	120	207	207	244	244	137	139	114	122	132	146	143	153	206	210
02ZZ04	092	108	142	142	135	141	120	122	211	211	244	244	137	141	114	126	146	150	149	155	?	?
02ZZ05	108	108	140	142	137	141	110	120	?	211	244	244	141	141	120	122	150	150	149	155	?	?
02ZZ06	094	094	142	142	135	137	110	120	207	211	244	246	131	141	120	122	146	150	155	155	?	?
02ZZ08	094	104	134	134	141	141	110	120	205	207	244	246	141	141	122	126	140	150	149	153	192	218
02ZZ09	094	108	134	140	139	141	110	110	211	211	244	244	131	141	120	122	150	150	149	153	210	214
02ZZ10	094	108	132	142	137	141	118	120	211	211	244	?	141	141	118	126	144	146	149	155	?	?
02ZZ11	094	094	140	140	137	141	110	120	207	211	246	274	139	139	122	126	150	150	143	153	192	192
02ZZ12	094	094	134	140	137	141	?	120	211	211	244	259	137	141	114	118	142	144	153	155	?	?
02ZZ13	104	108	140	140	141	141	110	110	205	211	244	259	139	141	124	124	150	150	145	145	192	214
02ZZ14	094	104	134	134	139	141	112	112	207	211	246	257	139	141	122	122	150	150	145	153	212	216
02ZZ15	094	108	134	142	135	137	112	120	207	207	244	246	131	139	114	120	132	150	149	155	?	?
02ZZ16	094	108	134	134	137	141	110	122	207	211	244	244	137	137	120	120	150	150	151	155	?	?
02ZZ17	094	108	134	142	137	137	110	112	205	207	244	246	134	141	114	126	140	150	155	155	?	?
02ZZ98	094	108	134	134	137	141	120	122	207	207	244	244	137	141	114	126	146	150	155	155	?	?
02ZZ99	094	094	134	134	135	137	112	120	207	211	244	244	137	141	120	120	132	146	145	153	?	?
03AC01	094	110	134	142	135	135	112	118	205	207	259	259	135	141	100	120	140	146	155	155	212	216
03AC02	?	108	?	?	?	141	?	?	?	?	?	?	?	?	?	?	?	?	153	153	?	?

03AC03	094	102	134	134	131	135	112	112	207	207	244	244	131	131	106	114	142	146	149	151	206	214
03AC04	094	094	140	142	135	139	110	110	207	211	244	244	141	141	122	126	132	150	145	153	206	206
03AC06	094	108	134	?	?	141	112	112	205	211	244	244	139	141	122	124	140	150	149	153	?	?
03AC07	094	102	134	140	135	141	110	122	207	211	244	274	141	141	122	126	142	150	151	155	206	214
03AC08	094	094	140	142	135	141	120	120	211	211	244	244	137	141	104	120	146	150	153	155	206	?
03AC09	094	104	140	140	137	139	110	120	205	207	244	244	139	141	122	124	140	150	149	153	210	212
03AC11	094	102	140	140	139	141	112	118	?	?	244	276	131	141	102	126	148	150	149	151	?	?
03AC96	102	108	134	134	137	141	110	118	207	207	244	244	131	131	114	122	146	150	151	151	206	214
03AC97	094	104	134	142	137	137	110	120	207	207	244	274	131	141	122	126	140	150	145	155	206	212
03AC98	?	?	?	?	135	141	?	?	?	?	244	247	131	131	?	?	144	144	?	155	?	?
03AC99	108	108	134	138	141	141	110	112	205	205	244	279	135	141	122	122	146	148	145	151	210	210
03BD02	094	102	134	140	131	141	?	?	205	207	244	244	135	141	122	124	142	148	145	149	206	212
03BD03	108	108	134	140	137	141	112	120	205	207	246	276	141	141	126	126	140	150	149	151	?	?
03BD04	094	108	134	140	135	137	112	?	205	207	246	257	139	139	114	114	146	150	145	149	206	210
03BD05	102	108	134	140	135	141	110	112	205	207	244	246	131	137	122	124	140	148	145	149	210	212
03BD06	108	108	134	140	131	137	118	?	205	207	244	244	131	135	114	122	132	146	149	151	214	214
03BD07	104	110	140	142	135	141	114	116	205	207	273	276	127	131	102	116	144	152	151	151	204	214
03BD09	102	108	134	134	141	141	118	118	205	207	246	259	135	139	100	114	146	146	149	153	210	210
03BD10	094	102	134	142	141	141	110	118	205	207	244	246	131	139	100	114	132	140	151	151	206	210
03BD12	094	102	134	140	141	141	118	118	207	207	244	257	139	141	100	120	146	150	149	153	212	212
03BD13	094	094	134	140	135	141	112	118	205	207	259	273	135	139	100	122	142	146	145	153	206	214
03BD14	094	108	140	140	139	141	118	118	207	207	257	279	139	141	122	122	146	150	145	149	?	?
03BD15	104	104	134	140	141	141	110	120	205	207	244	244	131	141	122	122	150	150	149	155	?	?
03BD95	102	108	134	140	137	141	110	116	205	205	244	244	131	131	114	122	140	146	143	149	206	214
03BD96	102	104	134	134	135	141	112	112	205	207	273	279	139	141	122	126	146	146	145	151	210	214
03BD98	094	094	134	134	135	135	112	112	207	207	244	244	131	131	120	122	132	132	149	151	210	210
03BD99	108	108	134	140	141	141	112	112	205	205	244	246	135	141	102	122	146	148	145	151	210	214
03WW02	094	094	134	142	137	141	118	120	205	211	259	259	137	139	122	126	144	144	153	155	212	212
03WW03	094	108	142	142	135	135	?	?	211	211	244	259	137	141	120	120	146	146	145	145	210	212
03WW06	094	094	142	142	135	135	120	120	211	211	246	259	141	141	120	122	144	150	145	153	212	212
03WW09	094	108	134	142	141	141	112	120	?	?	244	259	139	141	?	?	146	146	145	145	?	?
03WW12	092	094	140	142	135	141	112	112	211	211	244	244	141	141	120	122	144	146	149	155	206	212
03WW13	094	108	142	142	141	141	112	120	205	211	244	244	141	?	118	122	140	146	145	149	206	214
03WW14	092	094	140	142	135	141	112	112	205	211	244	244	137	141	120	122	144	146	145	149	206	212
03WW16	092	094	134	134	141	141	112	120	211	211	244	244	141	141	122	122	140	146	153	155	206	212
03WW98	102	104	134	140	141	141	118	120	205	211	244	244	137	141	120	124	150	150	145	149	?	?
03XX02	094	094	134	142	135	141	112	122	205	211	244	259	137	141	114	122	140	150	147	153	212	212
03XX04	092	094	134	142	141	141	118	122	211	211	244	244	141	141	120	120	140	144	155	155	212	214

ID																								
03XX05	094	108	?	?	?	?	112	112	205	211	257	259	137	141	100	114	140	150	151	153	210	212
03XX06	092	094	134	134	135	141	112	118	205	211	244	259	137	137	120	120	142	144	155	155	214	216
03XX07	094	108	134	142	135	141	112	112	205	205	244	244	131	137	122	122	140	146	151	153	206	214
03YY01	094	094	134	142	137	141	112	118	205	211	244	246	137	137	114	120	150	150	151	155	210	210
03YY02	104	108	134	140	139	141	112	118	207	211	?	?	?	?	124	124	146	150	143	145	?	?
03YY03	094	108	134	140	135	141	110	118	205	207	244	244	139	141	122	124	132	142	145	149	206	214
03YY04	?	?	134	140	139	141	112	118	207	211	244	244	?	?	124	124	146	150	143	145	210	214
03ZZ01	108	108	134	140	135	141	110	118	205	211	259	259	139	141	102	122	146	150	151	153	214	216
03ZZ03	094	108	140	142	139	141	112	118	207	211	244	244	137	141	104	124	140	142	143	149	192	210
03ZZ04	094	094	134	140	141	141	110	120	211	211	244	274	141	141	122	126	?	?	143	145	?	?
03ZZ05	092	094	134	134	135	137	118	120	211	211	246	246	137	137	122	122	146	150	153	155	?	?
03ZZ06	094	108	134	140	135	141	120	120	205	207	244	244	141	141	118	120	142	150	145	151	206	216
03ZZ07	092	094	140	142	141	141	110	118	211	211	244	259	137	141	118	122	144	150	155	155	210	214
03ZZ08	094	094	134	142	?	?	120	?	205	205	244	244	137	141	120	122	140	140	155	155	?	?
03ZZ09	094	104	142	142	137	141	?	122	205	211	244	244	137	137	120	122	146	150	153	155	?	?
03ZZ10	094	108	134	140	141	141	110	118	205	211	244	259	137	139	102	118	146	150	145	151	206	214
03ZZ11	094	094	134	140	137	137	110	120	211	211	244	246	139	141	118	120	144	146	149	153	210	214
03ZZ12	092	094	134	142	137	137	118	122	211	211	244	244	141	141	114	120	140	150	153	155	206	206
03ZZ13	108	108	134	142	141	141	112	?	205	205	244	244	139	141	124	126	140	150	149	153	?	?
03ZZ14	104	108	142	142	141	141	120	?	205	205	244	244	141	141	122	126	150	150	145	153	206	214
03ZZ16	094	102	140	142	139	141	112	120	205	211	?	?	139	141	120	122	?	?	153	155	206	206
03ZZ17	092	102	134	142	135	141	120	120	207	211	244	244	137	141	120	122	146	150	149	149	192	212
03ZZ18	094	094	142	142	135	137	?	?	205	211	244	246	137	141	?	?	140	144	155	155	?	?
03ZZ19	094	094	134	142	135	137	118	120	205	211	?	?	135	139	102	122	?	?	145	147	212	214
03ZZ94	094	094	140	142	135	137	110	120	211	211	244	244	137	141	120	122	140	146	149	155	212	214
03ZZ95	094	094	134	134	135	141	?	?	?	?	244	244	131	139	?	?	?	?	149	155	?	?
03ZZ97	094	094	134	142	137	141	118	120	211	211	259	259	137	141	114	122	144	144	147	155	206	214
03ZZ98	094	094	134	142	135	137	110	120	205	207	244	253	137	141	122	122	132	140	145	149	206	214
03ZZ99	094	094	134	142	135	141	120	120	211	211	244	244	123	131	118	120	142	146	155	155	214	216
81BD90	102	110	134	140	141	141	118	118	205	205	244	246	139	141	102	114	148	150	149	151	214	214
85WW90	094	094	142	142	135	141	112	122	211	211	244	257	137	139	120	124	146	146	155	155	212	212
86BD01	094	102	134	142	135	135	118	120	205	207	246	257	135	139	120	122	140	140	151	151	212	214
86BD90	102	102	134	134	135	141	110	110	205	207	259	276	139	141	122	122	132	146	145	145	210	214
86BD91	102	108	134	134	131	135	116	118	205	207	257	276	139	141	122	122	132	146	145	151	212	214
86ZZ11	094	110	134	142	135	141	118	122	207	211	259	276	131	135	102	120	140	150	145	155	212	212
86ZZ12	094	094	134	142	135	141	110	112	205	211	244	259	137	137	118	120	132	140	147	155	212	212
86ZZ13	094	094	134	134	135	141	112	122	205	207	259	259	135	137	102	120	146	150	145	155	212	212
86ZZ14	092	094	142	142	135	141	122	122	205	205	244	244	137	141	114	120	142	146	155	155	206	210

86ZZ16	094	094	134	134	141	141	110	120	205	207	244	259	137	137	120	126	132	150	145	151	210	212
87BD11	102	108	134	140	141	141	112	116	207	207	244	257	131	139	114	114	132	132	145	149	210	210
87BD13	094	102	134	142	141	141	112	120	205	207	244	244	139	139	114	114	146	146	149	149	210	210
88BD08	094	102	134	140	137	141	112	118	205	207	244	259	137	137	114	126	150	152	149	151	210	210
88BD10	092	094	142	142	135	135	110	112	205	205	259	259	139	141	120	120	132	146	145	155	206	212
88BD11	108	108	134	140	139	141	110	120	205	205	244	246	139	139	122	126	140	150	145	149	210	210
88BD12	108	108	140	140	141	141	118	118	207	211	244	244	135	141	100	122	132	150	153	153	206	206
88BD13	094	094	140	140	135	137	112	118	207	207	246	257	139	141	114	114	146	150	151	153	206	210
88BD14	094	108	134	140	141	141	110	112	205	207	244	246	137	141	106	120	140	140	149	151	210	214
88XX90	094	094	142	142	135	141	112	118	211	211	244	259	137	137	120	122	144	144	155	155	206	212
88ZZ07	094	094	134	134	137	139	110	122	205	207	244	244	137	141	114	114	144	150	153	155	206	210
88ZZ11	094	108	140	142	141	141	110	110	205	211	257	259	137	141	122	126	132	140	145	151	206	218
88ZZ12	108	108	134	140	141	141	112	120	205	205	244	244	139	141	122	126	140	142	145	155	206	212
89AC03	104	108	140	140	141	141	112	120	205	211	253	274	135	139	124	124	148	150	145	153	214	214
89BD03	108	108	140	140	131	141	112	118	207	207	244	244	141	141	102	114	146	148	151	151	210	214
89BD04	094	108	134	134	137	141	112	112	205	207	257	276	135	139	100	114	146	150	145	145	210	210
89BD05	102	108	134	142	141	141	110	116	205	207	244	257	131	141	102	122	132	140	151	151	210	214
89BD09	094	102	134	134	141	141	112	112	205	205	246	276	139	139	114	114	132	146	145	145	206	210
89BD10	106	108	134	134	141	141	102	110	207	207	244	257	131	139	114	114	140	146	145	153	210	214
89BD11	108	108	134	134	131	141	110	116	205	207	244	272	135	141	122	122	132	150	143	151	210	214
89BD14	108	110	134	134	141	141	110	110	207	207	244	257	139	141	104	106	140	146	151	151	214	216
89BD16	094	102	134	134	141	141	112	112	205	205	246	276	139	139	114	114	132	146	145	145	206	210
89YY01	094	108	134	134	141	141	112	112	207	207	244	244	139	141	124	126	146	150	149	149	192	210
89ZZ04	092	094	134	142	135	141	110	112	205	205	257	259	137	141	118	120	144	146	145	155	206	212
89ZZ16	094	108	140	140	139	141	000	000	207	207	244	246	139	141	122	126	142	146	145	151	210	214
89ZZ19	094	108	134	140	135	135	102	122	205	207	244	274	135	137	106	120	142	150	143	155	206	206
89ZZ20	104	104	140	140	141	141	118	120	205	205	244	257	139	139	122	124	140	150	153	155	210	218
90AC01	094	108	140	140	135	135	118	120	205	207	244	274	141	141	106	122	146	150	143	149	206	214
90AC05	094	094	134	140	141	141	110	112	207	211	244	259	139	141	124	126	150	150	149	153	206	210
90ZZ11	094	108	134	140	141	141	110	120	207	211	244	244	123	135	106	114	150	150	143	153	210	214
90ZZ13	092	092	142	142	135	141	110	122	205	211	244	259	137	141	114	120	146	150	145	155	206	212
90ZZ21	102	108	134	140	139	141	118	120	207	207	244	244	141	141	106	114	142	150	145	153	210	214
91AC01	094	102	134	140	137	141	112	118	205	207	276	276	141	141	114	122	142	146	149	151	210	214
91AC02	094	094	134	140	141	141	110	110	205	207	244	246	139	139	102	122	146	148	149	151	210	214
91AC05	094	108	134	140	137	141	110	120	205	211	244	274	139	141	106	122	140	150	145	149	206	214
91BD01	102	106	140	140	135	141	112	118	205	207	246	257	135	139	114	114	146	150	151	151	206	210
91BD02	094	108	140	140	137	141	112	120	205	205	246	276	139	141	102	126	142	150	145	151	210	210
91BD03	094	094	134	134	131	135	110	116	207	207	259	272	135	135	124	124	142	146	143	151	206	210

91BD04	108	108	134	140	135	141	110	116	205	207	244	276	135	141	114	114	140	146	149	149	210	214
91BD05	094	104	134	134	141	141	112	118	205	207	244	257	131	139	124	126	132	150	145	149	210	218
91BD06	094	108	134	140	141	141	112	118	207	207	244	259	131	141	106	126	146	146	149	151	210	212
91BD07	102	108	140	140	141	141	118	118	205	207	244	259	131	141	114	122	146	148	151	151	206	214
91BD09	108	110	134	134	141	141	110	116	205	207	246	246	139	141	114	122	140	150	149	151	210	214
91BD10	108	108	134	134	141	141	110	112	205	207	244	244	141	141	106	120	146	148	149	151	214	214
91BD98	102	108	140	142	137	141	110	112	207	207	244	244	131	141	102	106	146	150	145	151	210	214
91WW02	094	094	134	142	137	141	120	122	211	211	244	244	123	141	120	126	142	150	153	155	206	216
91WW03	094	094	134	142	139	141	120	122	205	211	244	276	123	137	114	122	140	150	155	155	206	212
91XX01	094	094	134	142	135	141	112	118	211	211	244	257	137	137	114	120	144	150	155	155	212	214
91ZZ01	094	094	134	142	137	141	110	118	205	211	244	246	137	137	114	126	146	150	153	155	210	216
91ZZ03	094	102	134	134	137	141	102	120	205	211	244	257	139	139	120	124	140	144	149	151	210	218
91ZZ04	094	094	134	142	137	141	118	120	207	211	244	246	137	141	114	126	142	150	151	153	210	216
91ZZ05	094	094	134	142	135	141	110	112	211	211	244	276	135	137	120	120	140	144	145	155	206	212
91ZZ07	108	108	134	140	141	?	112	120	205	205	246	257	139	141	122	126	142	146	151	151	214	218
91ZZ09	092	094	134	142	141	141	120	122	205	211	244	246	137	141	118	122	140	150	145	155	210	210
91ZZ10	094	104	140	142	135	139	102	110	205	205	244	274	141	141	106	120	142	150	153	155	212	214
91ZZ11	092	094	142	142	135	141	110	120	211	211	244	244	137	141	120	122	140	144	155	155	206	212
91ZZ13	094	102	140	142	139	141	110	120	205	207	244	244	141	141	124	126	140	150	153	155	206	216
91ZZ16	094	110	134	134	135	141	112	122	205	211	259	259	135	137	120	120	140	146	155	155	212	212
91ZZ96	094	094	140	142	135	141	102	122	205	207	244	244	135	141	106	120	140	142	153	155	206	206
92AC01	094	104	134	140	137	141	110	120	205	207	246	257	139	141	114	122	132	140	145	151	214	218
92AC02	104	108	134	140	137	141	102	120	205	205	244	246	139	141	122	126	140	140	145	151	212	214
92AC03	104	108	134	140	141	141	110	112	205	207	244	244	139	141	114	124	132	140	145	153	206	218
92AC05	094	108	140	140	137	141	110	118	205	211	244	244	131	139	120	122	140	150	143	155	206	214
92AC06	108	108	134	134	141	141	110	112	205	207	244	246	139	141	106	120	140	140	149	151	210	214
92BD01	106	108	134	140	131	141	112	118	205	207	244	276	139	141	100	114	146	146	145	151	206	214
92BD02	094	108	134	134	135	141	110	120	205	207	244	257	131	139	106	114	146	150	149	149	210	210
92BD03	094	094	134	134	141	141	118	118	205	207	244	257	131	139	122	126	146	146	145	151	206	210
92BD05	104	108	134	140	135	141	118	120	205	207	253	257	139	141	100	126	132	150	145	153	210	212
92BD06	094	094	134	140	141	141	118	118	207	207	244	259	139	139	126	126	146	152	145	151	206	210
92BD07	094	110	134	134	139	141	110	112	205	207	244	279	131	131	122	126	146	150	145	153	214	214
92BD08	094	094	134	140	135	139	116	118	205	207	244	272	135	141	114	120	140	150	149	151	206	212
92BD09	102	108	134	140	137	141	110	118	207	207	253	257	139	139	114	122	140	148	145	151	206	212
92BD10	102	104	140	140	135	141	110	118	205	207	246	257	131	139	122	126	146	150	145	151	210	212
92W04	092	094	134	142	135	135	120	122	207	211	246	246	139	141	122	124	142	150	153	155	212	212
92W05	108	108	140	142	141	141	112	112	211	211	244	259	141	141	120	120	140	146	149	155	206	214
92X02	092	094	134	134	135	141	112	112	205	211	244	246	137	137	114	120	144	146	151	155	206	212

92XX01	094	110	134	134	135	135	112	118	207	211	259	259	135	137	102	122	140	144	145	149	206	212
92Z02	092	108	142	142	135	141	120	122	211	211	259	259	139	139	118	120	146	150	155	155	206	214
92ZZ01	092	108	134	142	137	141	112	118	211	211	257	259	137	141	118	124	150	150	155	155	210	212
92ZZ03	094	108	142	142	141	141	110	120	211	211	244	246	137	141	118	122	144	146	149	155	210	214
92ZZ05	094	094	142	142	141	141	110	118	205	211	246	259	137	141	114	120	140	150	145	155	210	210
92ZZ06	094	108	140	142	137	141	110	120	205	211	244	244	137	141	120	122	150	150	155	155	206	214
92ZZ07	108	108	140	140	141	141	118	120	205	207	253	274	135	139	104	120	132	140	145	153	214	216
92ZZ08	094	108	134	140	135	141	110	120	205	207	244	246	131	139	120	122	140	150	145	155	206	206
92ZZ09	094	104	134	140	141	141	110	120	205	211	244	246	137	141	120	122	132	146	151	155	206	210
92ZZ10	094	108	134	140	141	141	110	120	205	211	244	244	137	141	124	126	142	150	153	155	206	218
92ZZ11	094	104	140	140	141	141	120	120	205	211	244	244	137	141	114	122	130	150	149	155	206	206
92ZZ12	094	108	134	140	139	141	118	120	205	207	244	244	135	139	124	126	142	146	145	149	210	214
92ZZ13	094	108	140	142	139	139	110	118	207	207	274	274	141	141	106	120	142	150	145	155	210	212
93M03	108	108	134	134	137	141	102	112	205	211	244	276	139	141	114	122	146	150	145	151	192	214
93M04	108	108	140	140	141	141	110	110	207	207	274	276	139	141	106	126	140	150	143	145	210	210
93M05	104	108	140	142	141	141	120	120	205	211	244	244	139	141	114	120	140	150	149	153	212	214
93M06	104	108	134	134	141	141	110	116	205	207	244	244	135	139	114	120	140	146	145	153	212	214
93M08	108	108	140	140	141	141	110	118	205	205	253	257	139	141	114	124	132	150	151	153	214	214
93M09	094	108	140	142	135	141	120	120	205	205	244	244	141	141	122	122	150	150	149	153	206	212
93M10	094	104	134	142	135	137	120	122	205	205	244	244	141	141	122	122	150	150	149	153	206	212
93M11	108	108	134	134	141	141	102	110	207	211	244	276	139	141	122	124	146	150	149	151	214	218
93M12	108	108	134	140	141	141	110	118	205	211	244	253	137	139	104	126	140	148	149	151	192	214
93M13	094	108	134	134	141	141	110	112	207	207	244	244	131	139	106	120	132	140	145	149	214	214
93M14	108	108	140	140	141	141	120	120	205	211	244	244	141	141	114	124	140	150	149	153	210	214
93M15	108	108	140	142	137	141	120	122	205	205	244	244	137	141	122	122	140	150	155	155	210	214
93NN01	094	108	134	140	141	141	112	116	205	207	244	279	131	131	100	114	146	146	149	151	210	210
93NS01	094	094	134	140	135	141	112	118	207	207	244	279	131	135	114	120	146	146	149	151	210	214
93Ns02	094	108	134	134	141	141	110	110	207	207	244	244	131	141	114	120	140	148	143	149	214	214
93NS04	094	108	134	134	141	141	112	118	205	207	244	276	139	139	114	122	146	150	149	151	206	214
93Ns06	094	094	134	150	135	141	110	110	207	211	244	253	137	141	100	124	132	150	151	153	210	210
93NS07	094	102	140	140	141	141	118	118	205	207	244	257	137	139	122	126	146	150	145	151	212	214
93Ns08	094	104	134	134	141	141	112	120	205	207	257	257	141	141	114	122	146	150	145	151	212	214
93Ns09	094	108	140	140	137	141	102	112	205	207	257	276	141	141	102	114	142	146	151	151	210	214
93NS99	094	094	134	134	135	135	110	116	207	207	259	276	135	139	114	124	146	146	145	151	206	214
93S01	094	108	134	140	137	141	110	120	205	211	244	274	139	141	106	122	140	150	145	149	206	214
93S01b	092	094	142	142	137	137	120	120	211	211	?	?	137	139	114	122	146	150	155	155	?	?
93S02	092	108	134	142	135	141	110	112	211	211	244	259	137	139	118	122	144	150	145	155	210	212
93S03	094	108	134	140	135	141	110	118	211	211	244	246	137	141	120	122	132	140	145	155	206	210

93S04	094	094	140	142	137	137	110	112	205	211	244	244	137	137	120	120	140	144	147	155	206	206
93S05	092	094	142	142	137	141	112	122	205	211	244	244	133	141	120	120	132	140	155	155	212	214
93S06	092	094	134	142	137	137	120	122	205	211	244	259	137	139	114	120	146	146	147	155	206	212
93S07	094	108	134	142	135	141	120	122	211	211	244	244	135	141	120	126	144	150	151	153	210	214
93S08	094	094	134	142	135	141	112	118	205	211	244	259	137	141	120	122	146	150	145	153	206	206
93S98	094	094	134	140	135	137	112	118	207	211	259	259	141	141	118	120	144	146	149	155	206	212
93S99	094	094	134	142	137	141	120	120	207	211	244	244	141	141	114	122	146	150	153	155	206	212
94M02	094	104	134	134	141	141	110	110	207	211	244	244	137	139	114	122	150	150	145	155	192	212
94M03	104	108	134	140	141	141	120	120	205	207	244	244	139	141	124	124	146	150	145	149	206	214
94M05	094	094	140	142	135	137	102	110	205	207	244	244	137	141	106	122	142	150	149	155	206	206
94M06	104	104	134	140	135	141	102	120	205	207	244	244	135	141	122	124	150	150	149	153	212	214
94M07	094	102	134	140	141	141	102	120	205	207	244	276	139	141	122	124	140	150	145	151	192	214
94M08	094	102	140	142	135	139	120	122	205	207	244	244	141	141	120	122	142	150	149	151	206	206
94M09	094	108	134	142	141	141	110	120	207	211	244	244	141	141	124	126	140	150	149	155	206	214
94M11	104	108	140	140	141	141	114	120	205	205	244	244	137	141	114	122	150	150	153	153	212	212
94M12	108	110	134	140	141	141	110	110	205	205	244	244	139	141	106	114	140	148	149	149	214	214
94M13	108	108	140	140	141	141	110	120	207	207	244	246	139	139	122	122	140	146	151	151	214	214
94M90	094	094	140	140	141	141	110	120	211	211	244	259	141	141	124	126	140	150	145	155	206	214
94M91	102	108	140	140	139	141	118	120	207	207	244	244	135	141	106	114	150	150	143	149	206	210
94Nn01	102	102	140	142	135	141	112	118	205	207	244	246	135	141	100	102	142	150	151	151	210	214
94NN02	094	108	134	134	141	141	116	118	207	207	244	257	131	131	114	114	132	146	149	151	210	210
94Nn03	094	094	134	134	141	141	112	112	205	205	244	279	131	135	114	122	140	146	145	145	214	214
94Ns01	094	108	134	140	137	141	112	118	205	207	276	279	139	139	114	122	140	146	149	151	206	214
94NS02	102	106	140	142	135	141	110	118	205	207	244	259	131	135	102	114	146	150	151	151	210	210
94Ns03	094	108	140	140	137	141	118	118	205	207	244	272	135	141	106	122	146	146	145	151	192	206
94NS05	094	108	134	140	131	141	110	112	205	207	244	259	141	141	114	114	146	150	151	151	210	214
94Ns06	094	108	134	140	141	141	110	120	205	207	244	244	139	141	102	120	140	148	149	149	214	214
94Ns07	094	108	134	134	135	141	112	112	205	207	257	272	135	141	104	124	142	146	143	151	192	214
94NS08	108	110	134	134	141	141	110	118	207	207	244	257	135	141	104	106	146	146	151	151	214	214
94NS90	108	108	134	140	141	141	118	120	207	211	244	253	139	141	100	120	132	140	153	153	212	212
94S01	094	108	142	142	137	141	120	120	211	211	244	244	137	141	118	122	144	146	155	155	210	214
94S02	092	094	134	142	137	141	118	122	211	211	246	276	123	135	120	120	140	146	153	155	210	212
94S03	092	092	140	142	135	141	120	122	205	211	244	259	139	141	118	122	140	146	149	155	206	214
94S04	094	108	142	142	141	141	118	120	207	211	244	246	137	141	114	122	144	150	149	155	212	216
94S92	094	108	134	142	137	141	112	122	205	211	244	244	131	135	114	114	140	140	153	155	206	214
94S93R	092	094	134	142	135	137	112	120	205	205	?	?	137	141	118	122	142	146	147	155	212	212
94S95	092	092	134	140	135	141	110	112	211	211	246	259	137	141	114	120	146	150	149	153	206	212
94S97	094	094	134	142	137	137	118	122	207	211	244	244	123	141	114	120	150	150	151	155	206	206

95M01	094	094	140	140	141	141	110	112	211	211	244	259	139	141	124	124	140	150	145	153	214	214
95M02	102	108	134	140	141	141	120	120	205	207	244	244	123	139	122	124	142	150	145	155	212	214
95M03	094	108	140	142	137	141	120	122	205	207	244	244	137	137	114	122	150	150	153	153	212	212
95M04	094	108	142	142	139	141	110	120	205	211	244	244	141	141	106	120	140	150	143	151	206	206
95M05	094	108	134	140	137	141	110	120	207	211	244	246	141	141	120	120	132	150	145	149	206	206
95M06	094	104	134	140	141	141	120	120	205	211	244	244	141	141	122	124	140	146	149	155	206	218
95M07	104	108	134	138	141	141	118	120	205	205	253	257	139	141	104	122	150	150	145	153	214	214
95M08	094	108	140	140	141	141	110	120	205	205	244	244	141	141	122	122	150	150	149	155	212	214
95M09	094	108	140	140	135	141	102	120	205	207	244	244	137	137	120	120	140	150	153	155	214	214
95M10	104	104	134	142	139	141	102	122	205	205	244	274	135	141	106	122	142	150	143	153	206	206
95M11	104	108	134	140	137	141	120	120	205	207	244	276	139	141	122	122	140	146	151	155	206	214
95M12	104	108	134	140	137	141	120	120	205	205	244	244	137	141	114	120	150	150	149	155	206	212
95M13	094	108	140	142	141	141	110	118	205	205	259	259	139	141	104	120	150	150	153	155	210	214
95M14	108	108	140	142	135	135	118	120	207	211	244	257	137	141	114	114	132	144	145	155	210	216
95M15	104	108	134	140	137	141	110	120	205	205	244	244	139	141	114	120	140	150	149	155	206	206
95M16	094	094	134	140	141	141	112	120	207	211	244	246	141	141	122	126	146	150	153	155	210	210
95NN02	094	108	134	140	137	141	118	118	205	207	244	259	135	139	114	126	146	150	149	149	206	210
95NN03	094	102	134	142	131	141	118	118	205	207	272	276	135	141	106	124	142	146	149	151	210	214
95NN04	094	094	134	140	141	141	110	118	205	207	272	272	131	141	122	122	132	150	145	145	214	214
95NN05	094	108	134	140	141	141	112	118	205	207	244	257	139	139	114	126	132	150	145	149	210	210
95NS01	104	108	134	134	141	141	102	116	205	207	246	246	131	139	114	120	140	140	145	153	206	214
95NS02	108	110	134	134	141	141	110	120	205	207	244	257	141	141	106	120	140	146	149	151	214	214
95NS03	102	108	134	134	141	141	102	116	205	211	259	274	139	139	114	120	140	146	149	149	206	214
95NS04	094	102	134	140	135	137	102	112	205	205	246	279	135	139	114	126	146	150	151	153	206	214
95NS05	094	104	134	140	137	141	110	120	205	211	244	244	139	141	118	126	140	150	145	145	206	218
95NS06	108	108	134	140	137	141	118	120	205	207	244	259	141	141	120	120	146	150	153	153	206	214
95NS07	094	108	134	134	139	141	112	120	205	207	244	244	135	141	122	126	146	148	149	151	210	216
95S90	094	094	142	142	139	141	110	120	207	211	244	244	141	141	120	120	142	146	149	155	210	212
95SN01	092	094	140	142	137	141	120	120	211	211	244	244	141	141	120	122	144	146	149	155	206	214
95SN02	094	094	140	142	139	141	120	120	211	211	244	244	137	141	120	120	140	146	149	155	212	214
95SN03	092	092	140	142	137	137	112	118	211	211	246	259	135	137	120	120	140	146	155	155	212	212
95SN04	094	108	140	142	135	141	110	118	207	211	244	246	131	135	114	122	150	150	143	155	206	214
95SN05	094	108	140	142	137	141	120	122	211	211	244	244	137	141	120	122	144	150	149	155	206	212
95SN91	094	094	142	142	137	141	110	118	205	207	246	259	131	141	114	120	144	150	155	155	206	210
95SS01	094	094	140	142	137	141	110	120	205	211	244	244	137	141	102	122	140	144	151	155	210	214
95SS02	094	108	142	142	141	141	112	120	211	211	244	244	139	141	120	122	146	150	149	155	206	212
95SS03	092	094	142	142	135	137	112	120	211	211	259	259	137	141	114	122	144	144	153	155	212	216
95SS92	094	094	134	142	135	137	118	120	211	211	244	244	137	137	120	122	140	144	153	155	210	214

95SS93	104	108	142	142	135	135	112	120	211	211	257	259	137	141	114	120	142	146	153	155	212	212
96M01	108	108	134	134	137	137	102	120	211	211	244	244	137	141	120	122	142	146	145	145	192	210
96M02	094	108	134	140	141	141	118	120	207	211	244	274	123	141	114	126	150	150	145	153	206	214
96M04	094	108	142	142	135	141	118	120	?	?	?	?	131	137	120	122	?	?	155	155	?	?
96M05	094	108	134	134	135	141	112	120	211	211	244	257	137	141	114	120	140	142	145	149	192	210
96M06	094	108	134	134	135	141	112	120	207	207	244	246	135	139	102	102	146	150	145	151	206	210
96M07	094	108	134	140	141	141	110	120	205	211	244	244	141	141	124	126	132	140	153	155	210	218
96M08	094	094	140	142	135	141	120	122	205	207	244	244	141	141	124	126	142	150	151	155	212	216
96M09	094	108	140	140	141	141	110	120	205	211	244	259	139	141	124	124	140	150	145	145	192	214
96M10	108	108	140	142	135	141	102	118	205	205	244	244	139	141	106	124	142	150	143	153	206	210
96M11	094	108	134	142	141	141	120	122	205	207	244	244	141	141	122	126	142	150	155	155	206	212
96M12	104	108	134	140	141	141	112	118	205	211	244	257	135	141	124	126	132	150	145	153	210	214
96M91	094	102	134	140	141	141	118	120	205	207	244	244	137	141	114	114	144	150	143	151	206	210
96NN01	094	102	134	140	135	141	110	118	205	207	259	272	141	141	114	122	132	150	145	151	206	214
96NS05	104	108	134	134	135	141	102	116	205	205	246	257	131	139	114	114	140	146	145	149	206	210
96SN01	094	108	134	142	137	137	120	122	207	211	?	?	137	141	114	120	150	150	153	155	?	?
96SN03	092	094	134	142	141	141	118	122	211	211	?	?	137	141	114	122	142	144	153	155	?	?
96SN92	094	094	142	142	135	137	112	122	211	211	?	?	137	141	122	122	142	150	153	153	?	?
96SS02	094	108	140	142	141	141	112	122	211	211	244	244	137	141	122	122	140	146	149	155	206	210
96SS03	094	108	140	142	137	141	120	120	207	211	246	259	141	141	114	120	142	144	153	155	212	214
96SS04	108	108	142	142	141	141	112	120	211	211	244	244	137	141	120	122	140	140	147	155	206	210
96SS05	092	094	134	142	135	137	120	122	207	207	257	259	141	141	114	122	146	150	153	155	212	216
96SS06	092	092	134	142	137	141	118	120	205	211	246	259	137	139	120	122	150	150	145	155	210	212
96SS07	094	094	142	142	135	141	110	118	207	211	244	259	137	141	114	120	144	150	153	155	212	214
96SS08	094	108	142	142	137	141	112	120	211	211	246	259	137	141	114	124	150	150	155	155	212	216
96SS92	094	108	142	142	135	141	112	122	205	211	244	244	141	141	114	114	146	146	155	155	212	212
97M01	108	108	140	142	141	141	110	112	205	211	244	244	137	141	114	126	150	150	153	153	212	218
97M02	104	108	134	140	141	141	110	110	205	205	244	244	141	141	114	126	140	150	145	153	210	218
97M03	094	108	134	140	141	141	112	120	205	207	246	257	139	141	114	122	140	146	151	153	210	214
97M04	094	094	134	142	137	141	120	120	207	211	244	244	137	137	118	126	140	140	145	155	210	218
97M05	108	108	134	140	141	141	118	120	205	207	244	244	137	139	124	126	132	150	149	153	192	210
97M06	094	094	134	142	137	141	112	120	205	211	259	259	139	141	118	122	142	144	151	155	206	212
97M07	102	108	134	134	141	141	118	120	207	207	246	276	135	141	102	122	142	150	145	145	210	210
97M08	094	094	140	142	135	141	120	120	205	211	244	244	141	141	124	126	142	150	149	155	206	206
97M09	094	094	134	140	137	141	110	120	207	211	244	259	137	141	120	122	150	150	151	153	206	210
97M11	094	108	134	142	137	141	120	120	207	211	244	257	139	141	114	118	140	142	145	149	210	212
97M12	094	102	134	134	135	141	112	118	207	207	244	246	139	141	102	122	142	150	145	151	206	214
97M14	094	104	134	140	139	141	118	120	207	211	?	?	141	141	106	114	142	150	145	149	192	214

97M15	094	108	134	140	141	141	110	110	205	211	244	244	139	141	124	126	140	146	149	149	210	214
97M92	094	108	134	140	135	141	120	120	205	205	244	244	141	141	122	124	150	150	149	155	206	212
97NN01	102	108	134	134	141	141	110	118	205	205	244	276	131	139	114	122	132	146	145	145	210	210
97NN02	108	108	134	142	135	137	110	118	207	207	?	?	131	141	102	114	146	146	145	151	210	212
97NN03	102	108	134	134	135	141	110	118	207	207	244	274	131	139	114	120	140	146	149	151	210	214
97NS01	094	108	134	142	141	141	112	116	207	207	244	246	135	141	114	120	140	146	149	149	192	206
97NS05	094	094	134	140	137	141	110	110	205	207	244	244	141	141	120	122	132	150	151	155	206	210
97NS06	094	108	?	?	135	141	118	122	207	207	244	257	135	141	120	126	142	146	149	155	206	214
97NS07	094	102	134	140	139	139	112	118	205	205	244	244	141	141	106	122	146	150	145	151	206	214
97NS08	108	108	134	150	141	141	110	118	207	207	244	244	139	141	122	122	150	150	149	153	210	214
97NS09	094	108	134	140	135	137	110	110	207	207	244	244	?	?	114	122	146	148	149	151	206	214
97NS90	104	108	134	140	141	141	110	118	207	207	244	244	123	137	124	126	146	150	149	149	210	212
97SN01	094	108	140	142	135	141	112	120	211	211	244	246	137	137	114	122	146	146	151	155	206	210
97SN02	094	108	140	142	141	141	118	120	211	211	244	259	137	141	120	122	140	146	149	155	206	214
97SN03	094	108	134	142	137	139	110	122	211	211	244	244	123	141	120	122	140	150	155	155	206	214
97SN05	094	108	134	134	135	137	112	116	207	207	?	?	135	139	114	114	132	132	145	149	206	214
97SN06	094	108	134	140	141	141	110	120	205	211	246	259	137	139	118	124	132	140	145	155	212	214
97SN08	108	110	134	142	135	141	110	112	211	211	259	259	137	141	102	122	140	144	145	155	206	212
97SN09	094	102	134	142	137	141	112	118	207	211	259	276	137	141	122	122	146	150	151	153	210	216
97SN90	092	094	142	142	135	141	112	120	211	211	244	259	139	141	120	122	146	150	155	155	214	214
97SN91	094	094	134	142	137	141	110	120	205	207	246	259	137	137	114	118	144	150	145	151	210	210
97SS03	094	094	134	142	135	135	112	122	205	211	?	?	141	141	114	118	144	150	145	153	212	214
97SS04	094	094	142	142	135	141	112	120	205	211	244	259	141	141	114	118	146	146	155	155	210	212
97SS07	094	108	142	142	135	141	110	118	207	211	244	244	137	141	120	122	?	?	155	155	212	212
97SS08	094	094	140	142	135	141	110	118	205	211	244	244	141	141	102	120	140	140	145	153	212	214
97SS10	108	108	142	142	137	141	112	112	211	211	?	?	141	141	120	122	144	144	149	155	206	212
97SS11	094	108	134	142	135	137	112	122	211	211	244	244	139	141	122	122	146	146	153	155	212	214
97SS12	094	108	142	142	135	137	112	120	207	211	?	?	137	141	120	122	142	146	155	155	?	?
98M02	108	108	?	?	141	141	112	120	205	207	244	257	139	141	104	124	146	150	151	153	192	214
98M03	?	?	134	142	135	141	110	118	207	207	244	276	131	139	114	122	146	150	151	151	206	216
98M05	108	108	140	150	135	141	110	118	205	207	257	257	139	139	122	124	140	150	145	153	212	214
98M07	094	094	134	140	137	141	112	120	211	211	244	246	137	141	122	124	146	150	153	155	210	210
98M08	094	104	?	?	137	137	110	120	211	211	244	259	141	141	120	122	132	140	149	155	210	212
98M09	094	104	?	?	141	141	110	112	207	211	244	244	139	141	120	126	140	150	145	149	206	206
98M11	108	108	140	140	137	141	110	110	205	205	244	244	139	141	120	124	150	150	149	155	210	214
98M12	094	102	134	134	141	141	110	110	207	207	?	?	?	?	104	122	146	146	145	151	210	210
98M91	094	108	134	134	141	141	118	118	205	205	244	257	139	139	114	126	148	150	151	153	210	210
98M92	094	104	140	142	139	141	110	112	205	205	244	244	139	141	104	122	150	150	149	155	206	206

98M93	094	102	134	134	141	141	114	120	211	211	244	244	123	123	114	122	150	150	149	153	192	206
98M94	094	104	142	142	141	141	120	120	207	211	244	244	141	141	120	122	132	150	149	151	206	210
98M95	094	104	134	142	135	139	102	110	205	207	244	274	135	141	106	124	142	150	143	149	206	214
98M96	094	094	142	142	139	139	110	120	207	207	244	244	141	141	120	124	142	150	149	155	206	206
98M99	094	094	134	134	137	141	118	120	207	207	244	244	139	141	120	122	132	140	145	153	206	206
98N01	094	102	134	134	135	141	110	120	207	207	244	246	139	141	102	106	142	150	145	151	210	210
98N02	106	108	134	134	135	141	110	112	205	207	244	246	139	139	106	114	146	150	145	145	210	210
98N04	108	108	134	140	141	141	102	110	205	207	244	276	131	139	114	122	132	146	145	153	210	210
98N05	102	108	134	134	141	141	118	120	207	211	244	253	131	141	114	124	132	140	149	153	206	206
98N06	094	094	134	134	135	137	102	112	205	207	244	253	131	141	122	122	148	150	149	151	210	210
98N07	094	106	134	134	135	141	110	112	205	205	246	246	139	141	114	122	140	150	145	149	210	212
98SN03	094	094	142	142	135	137	120	120	211	211	244	244	141	141	120	122	140	144	155	155	212	214
98SN04	092	104	140	142	141	141	112	120	205	211	244	246	137	139	120	122	140	146	151	155	210	214
98SN05	094	094	134	142	135	137	118	120	205	205	244	244	137	141	118	122	144	144	155	155	210	210
98SN90	094	094	142	142	135	141	110	112	205	211	244	259	137	141	120	120	144	146	155	155	210	212
98SS01	094	110	142	142	135	141	112	122	205	211	244	246	135	137	120	120	142	146	147	153	206	206
98SS02	092	094	134	134	135	137	118	122	205	211	244	246	137	141	120	120	146	150	145	155	210	210
98SS04	092	094	134	134	135	137	122	122	205	205	244	244	137	141	114	120	140	146	147	153	206	212
98SS05	094	094	142	142	135	139	110	118	205	207	244	259	137	137	120	124	140	146	145	155	210	212
98SS08	094	094	142	142	137	141	120	122	205	211	244	259	137	141	114	122	142	144	153	153	210	212
98SS10	092	094	142	142	135	135	118	122	211	211	244	244	137	141	114	120	142	150	147	155	206	206
98SS11	094	094	142	142	135	141	112	120	205	211	244	259	141	141	114	122	146	150	147	155	206	210
98SS12	092	108	142	142	135	135	112	120	211	211	244	259	137	141	114	114	144	144	147	155	212	214
98SS13	092	108	134	134	137	137	112	112	211	211	244	259	137	141	114	120	132	142	149	155	212	216
98SS14	094	094	142	142	135	141	118	122	211	211	244	244	139	141	114	120	140	150	149	153	212	212
98SS15	108	108	140	142	137	141	112	120	211	211	244	259	141	141	120	120	144	146	149	155	206	214
98SS16	094	094	134	142	137	137	120	122	205	211	244	244	137	141	114	122	142	142	153	155	210	212
98SS17	092	108	142	142	135	135	110	118	207	211	246	257	139	141	122	124	142	146	155	155	212	216
98SS18	092	108	134	140	135	141	110	120	207	211	259	259	137	141	120	122	146	150	155	155	206	216
98SS19	094	094	142	142	137	141	118	122	205	211	244	244	137	137	114	120	146	150	151	155	210	212
98SS20	094	108	134	142	135	141	112	120	211	211	244	259	137	141	120	122	146	150	145	153	206	212
98SS90	094	094	142	142	135	135	110	112	211	211	?	?	137	137	114	122	142	150	145	153	?	?
98SS91	094	094	142	142	137	141	112	122	211	211	244	259	141	141	122	126	144	146	155	155	210	216
98SS93	094	108	134	142	137	141	112	112	205	205	?	?	?	?	114	118	?	146	155	155	212	212
99AC02	094	094	140	142	135	141	120	122	205	211	244	244	141	141	122	126	140	150	151	155	206	206
99AC03	094	104	134	134	135	137	110	120	205	207	244	244	137	141	114	124	146	148	145	149	206	210
99AC04	094	108	140	140	141	141	112	122	211	211	257	259	141	141	122	126	150	150	151	153	192	206
99AC90	104	108	140	150	137	141	110	118	205	211	244	244	139	141	120	122	140	150	153	155	206	212

99AC91	104	108	134	140	141	141	118	118	205	211	244	244	139	141	120	122	140	140	145	145	206	206
99AC92	104	108	134	150	141	141	110	118	211	211	244	244	135	139	122	124	140	150	145	153	206	212
99BD02	104	108	134	134	137	141	102	110	?	?	?	?	131	137	104	126	?	?	145	145	210	212
99BD03	102	108	134	140	135	141	110	120	205	207	?	?	131	139	114	120	140	150	145	145	206	212
99BD04	094	102	134	134	141	141	110	110	205	207	257	273	123	141	114	122	148	150	151	153	210	214
99BD05	094	108	134	140	135	139	102	110	205	207	244	273	135	141	114	126	140	150	149	153	192	210
99BD06	102	108	140	150	135	141	110	120	205	207	?	?	131	139	100	122	140	150	145	153	212	214
99BD07	?	?	140	140	137	139	112	112	?	?	?	?	?	?	106	126	?	?	151	151	212	214
99BD09	104	106	134	140	135	141	102	118	207	207	244	259	139	139	100	114	132	146	151	153	210	210
99BD90	102	108	134	134	141	141	110	116	205	207	257	276	139	139	104	114	140	146	143	145	210	218
99BD91	108	108	134	134	135	141	102	116	205	207	246	257	139	139	104	114	140	146	145	149	210	210
99BD92	104	108	134	134	135	141	102	116	207	207	244	257	139	139	114	114	140	146	143	153	214	218
99BD94	094	102	134	134	135	141	110	112	205	207	246	276	139	139	114	122	132	150	145	145	206	214
99M06	092	094	134	142	141	141	112	118	211	213	246	259	137	139	114	120	144	144	155	155	206	212
99NG01	108	108	134	140	141	141	120	120	207	207	244	244	141	141	114	124	140	150	149	151	192	206
99W02	094	094	142	142	135	141	112	118	205	211	244	244	139	141	120	122	140	140	153	155	212	212
99W04	094	108	134	134	137	141	120	120	207	207	244	244	137	137	118	118	144	144	145	153	216	216
99W12	092	094	134	142	135	141	118	122	205	211	244	259	137	141	114	120	146	150	147	149	212	212
99W13	092	094	142	142	135	135	118	120	207	211	246	259	139	141	122	122	146	150	155	155	216	216
99W16	092	094	142	142	141	141	118	118	211	211	244	259	137	139	120	122	140	146	155	155	212	214
99W80	094	108	142	142	141	141	120	122	211	211	?	?	123	141	118	120	142	142	151	155	?	?
99X01	094	094	142	142	137	141	?	?	205	211	?	?	137	141	114	122	144	150	151	155	?	?
99X02	092	094	142	142	137	137	110	120	207	211	246	257	137	139	114	122	142	146	153	155	212	216
99X03	094	094	134	134	135	141	112	112	205	211	244	244	137	141	114	120	144	150	155	155	206	210
99X04	094	094	142	142	141	141	112	120	205	211	244	259	139	141	118	122	142	144	145	151	206	212
99X05	094	110	134	142	137	141	112	118	205	211	246	276	141	141	114	114	140	142	155	155	206	216
99X07	094	108	134	140	141	141	102	110	205	211	244	244	139	141	114	122	140	150	151	155	210	214
99Z01	094	108	140	140	137	141	118	120	205	211	244	246	139	141	122	122	140	146	151	155	214	218
99Z02	092	108	134	140	135	135	120	122	207	211	?	?	?	?	118	120	?	?	145	155	212	212
99Z03	094	108	134	142	137	141	112	120	205	211	244	259	137	137	120	122	144	146	145	149	206	212
99Z04	104	108	140	140	141	141	112	118	?	?	?	?	?	?	104	124	?	?	151	153	214	214
99Z05	094	108	134	142	141	141	112	118	205	207	246	257	139	141	102	126	148	150	151	151	210	212
99Z06	094	094	134	134	135	137	120	122	?	?	?	?	137	137	114	114	?	?	153	153	206	214
99Z07	092	094	142	142	137	141	118	120	211	211	244	244	141	141	122	122	146	146	147	155	212	212
99Z08	104	108	140	142	139	141	120	120	205	211	244	253	135	141	114	120	132	150	149	153	206	214
99Z09	092	094	142	142	135	141	118	120	211	211	244	259	139	141	120	122	146	150	149	155	206	214
99Z10	092	094	134	142	137	141	120	122	205	211	244	244	137	137	118	122	132	150	145	151	210	210
99Z11	108	108	134	142	141	141	112	120	205	205	244	244	137	137	120	122	146	150	145	155	206	210

99Z12	108	110	134	140	137	137	120	120	207	211	244	259	139	141	104	122	140	140	155	155	212	216
99Z13	094	108	134	142	141	141	110	112	207	211	244	244	131	135	102	120	140	140	145	155	212	216
99Z14	094	104	134	134	137	137	110	120	207	211	244	244	139	141	120	120	150	150	149	153	206	214
99Z15	104	108	140	140	139	141	110	110	?	?	244	276	139	141	120	126	140	140	151	155	206	214
99Z16	104	108	140	140	137	141	120	122	?	?	244	244	131	139	120	122	150	150	149	151	206	206
99Z90	104	108	?	?	141	141	118	118	?	?	?	?	?	?	?	?	?	?	153	155	?	?
99Z91	094	108	140	142	135	141	102	112	?	?	244	244	137	141	106	124	?	?	143	149	210	214
99Z92	094	108	140	140	141	141	110	112	205	205	244	253	139	141	104	124	146	148	149	151	214	214
BD01	102	108	134	140	141	141	110	118	207	207	273	279	139	141	100	120	132	146	143	149	210	210
BD03	094	094	134	140	137	141	110	120	205	211	244	274	139	141	106	122	140	150	145	149	206	214
BD06	094	104	131	134	135	141	110	118	207	207	244	244	137	141	122	124	132	146	151	151	210	212
BD07	094	102	134	150	135	141	110	110	205	211	253	273	139	141	100	120	132	150	149	153	206	210
BD12	094	094	134	140	135	139	110	118	207	207	244	246	135	139	120	122	140	146	151	151	212	214
BD15	104	108	134	140	141	141	110	118	205	205	257	257	139	139	114	114	146	146	143	145	210	210
BD16	102	108	134	140	135	141	112	116	205	207	246	276	131	141	114	122	140	150	149	149	210	214
BD17	104	108	134	134	135	141	102	110	205	205	244	257	131	135	114	114	146	146	145	149	206	214
BD18	102	108	134	140	141	141	118	118	207	207	259	276	141	141	122	126	132	146	149	151	210	210
BD22	094	110	134	134	135	141	110	118	207	207	246	276	139	139	120	122	140	146	151	151	214	214
BD23	104	108	134	140	141	141	110	112	205	207	244	273	141	141	120	122	132	150	149	151	210	212
BD24	094	102	134	140	141	141	110	118	207	207	276	279	139	139	120	120	132	146	149	151	210	214
BD25	094	108	134	140	135	141	110	110	207	207	246	279	139	141	120	122	140	146	143	151	210	214
BD26	094	108	134	140	135	139	102	118	205	207	244	244	131	135	114	122	140	146	149	151	206	214
BD27	108	?	134	?	141	?	112	118	205	207	257	273	131	141	120	122	132	146	149	?	210	212
BD28	104	108	134	134	141	141	118	118	207	207	244	273	141	141	122	122	146	146	149	151	210	212
BD29	094	108	134	134	135	141	118	118	205	207	244	257	131	137	122	124	146	146	149	151	210	210
BD31	108	108	134	140	141	141	102	118	205	207	259	279	139	141	114	126	146	150	151	151	206	210
BD32	094	102	134	134	139	141	110	110	205	205	244	274	139	141	100	122	140	150	149	151	210	?
BD33	094	102	134	140	141	141	112	118	207	207	244	257	131	141	104	122	132	148	145	149	210	210
BD34	102	108	134	140	135	141	110	118	205	207	257	276	139	141	114	122	146	146	145	145	210	210
BD35	104	108	134	140	135	141	110	118	205	207	244	244	141	141	122	122	132	132	151	151	210	212
BD36	102	104	134	140	141	141	110	120	207	207	244	257	123	137	122	126	148	150	149	151	210	212
BD37	104	108	134	134	141	141	118	118	205	207	244	257	137	141	120	124	132	146	149	151	212	212
BD38	094	108	134	134	135	141	112	118	207	207	244	273	141	141	120	124	132	132	149	151	210	212
BD39	094	108	134	134	141	141	112	118	205	207	244	257	137	141	122	122	132	146	149	151	212	212
BD40	094	108	134	134	141	141	102	112	205	207	257	257	139	139	114	126	146	146	149	151	210	210
BD41	094	102	134	134	141	141	118	118	207	207	244	244	137	141	122	124	132	146	149	151	210	210
BD42	094	104	134	140	135	141	118	118	207	207	244	244	131	141	104	122	132	132	149	151	210	212
BD43	094	108	134	140	131	141	110	112	205	207	244	259	141	141	114	114	146	150	151	151	210	214

BD44	094	104	134	140	141	141	110	112	205	207	244	273	141	141	122	122	132	132	149	151	210	212
BD45	104	108	134	134	141	141	110	118	205	207	244	273	141	141	120	124	132	132	149	151	210	210
BD46	094	102	134	140	141	141	110	118	207	207	244	276	131	141	114	122	132	146	149	151	206	210
BD47	094	102	134	134	135	141	110	118	207	207	244	273	141	141	100	124	132	146	149	151	210	210
BD48	102	104	134	134	141	141	110	118	207	207	244	273	141	141	120	122	132	132	143	151	210	210
BD49	094	102	134	134	135	135	110	118	205	207	244	273	141	141	120	122	132	146	151	153	206	210
BD50	094	102	134	134	141	141	110	110	207	211	244	253	137	141	120	124	146	150	149	151	210	212
BD51	102	104	134	140	135	141	110	118	207	207	244	257	131	141	104	124	146	148	149	151	210	210
BD52	094	102	134	140	141	141	118	118	207	207	244	257	131	141	104	124	132	148	149	151	210	210
BD53	102	104	134	134	135	141	118	118	207	207	244	244	131	131	104	124	132	132	145	145	210	212
BD54	102	104	134	140	135	141	118	118	207	207	244	244	131	141	122	124	148	148	145	145	210	210
BD55	102	104	134	140	141	141	118	118	207	207	244	244	131	141	104	124	132	148	145	151	210	212
BD56	094	102	134	140	135	141	110	118	205	207	276	279	139	141	120	122	146	146	145	149	210	214
BD57	094	102	134	134	135	141	110	118	207	207	244	276	137	139	120	124	132	146	149	151	210	210
BD58	094	102	134	134	135	141	110	118	207	207	244	276	137	139	120	124	146	146	151	151	212	214
BD59	094	094	134	140	141	141	110	116	207	207	246	257	135	139	122	126	132	142	151	151	210	214
BD60	094	094	134	134	135	141	110	112	207	207	244	279	131	135	114	122	146	146	149	149	206	210
BD61	094	108	134	134	135	141	110	112	205	207	244	246	131	139	106	122	140	150	145	151	210	212
BD62	102	104	134	140	141	141	110	112	207	207	244	257	137	141	122	124	132	148	149	151	210	210
BD63	102	104	134	140	135	141	110	112	207	207	244	244	141	141	122	124	148	148	149	151	210	210
BD64	094	102	134	140	135	141	112	118	207	207	244	244	137	141	122	124	146	148	149	151	210	210
BD65	094	094	134	150	131	141	110	110	205	205	244	273	139	141	100	114	150	150	151	153	206	214
BD66	094	108	140	150	131	135	110	112	207	211	244	273	139	141	114	120	132	150	151	153	206	214
BD67	094	108	134	150	135	141	110	110	205	207	244	273	141	141	114	120	132	146	151	153	206	214
BD68	104	108	134	138	141	141	118	120	207	207	257	259	141	141	114	124	146	146	151	151	210	210
BD69	104	108	134	140	131	141	110	112	205	207	244	257	131	141	104	114	146	148	151	151	210	210
BD70	094	104	134	140	131	141	112	118	207	207	244	257	131	141	104	114	146	150	149	151	210	214
BD71	094	104	134	134	141	141	110	118	205	207	244	253	137	139	100	122	132	132	149	151	206	210
BD72	094	094	134	140	135	135	110	110	207	207	244	246	137	141	122	124	140	146	151	151	210	212
BD73	102	108	134	134	135	141	118	120	207	207	244	244	137	141	120	122	146	150	149	153	210	212
BD74	102	108	134	134	135	141	110	120	207	207	244	273	141	141	120	122	132	150	149	151	210	210
BD75	102	102	134	134	135	141	110	110	207	207	244	244	141	141	120	122	146	148	149	153	206	210
BD76	094	102	134	140	135	141	110	118	207	207	244	276	131	141	114	126	132	146	149	149	206	210
BD77	094	102	134	134	135	141	110	118	207	207	276	279	135	141	114	122	146	146	149	151	210	210
BD78	104	108	134	140	141	141	110	120	207	207	244	279	137	141	100	126	146	148	143	149	210	212
BD79	104	108	134	140	141	141	118	120	207	207	244	273	137	139	100	126	132	150	143	149	210	212
BD80	104	108	134	140	141	141	110	118	207	207	244	257	123	137	124	126	146	150	149	149	208	212
BD81	104	108	134	140	141	141	118	120	205	207	257	257	123	141	124	126	132	150	149	151	210	212

BD82	104	104	134	134	141	141	110	118	?	?	244	244	137	141	122	124	132	150	149	149	212	212
BD83	102	108	134	140	135	141	110	118	205	211	244	253	139	141	120	122	132	132	149	151	206	212
BD84	102	104	134	134	135	135	110	118	205	205	244	273	141	141	100	122	132	132	151	153	206	212
BD85	102	104	134	150	135	141	110	118	205	207	244	253	141	141	100	122	132	150	149	151	210	212
BD86	104	108	134	140	141	141	112	120	205	207	244	244	141	141	120	124	148	150	151	151	210	214
BD87	104	108	140	140	141	141	110	118	205	207	244	244	137	141	122	124	148	150	149	151	210	214
BD88	104	108	134	134	141	141	110	110	205	207	244	244	137	141	122	124	148	150	149	151	210	214
BD89	104	104	140	140	141	141	110	120	207	207	244	273	141	141	114	122	150	150	149	151	210	218
BD90	094	104	134	134	141	141	110	110	207	207	244	257	139	141	106	124	140	148	151	151	210	212
BD91	094	102	134	134	135	141	110	112	207	207	?	?	131	139	104	122	140	148	149	151	210	212
BD92	094	094	134	140	141	141	110	116	207	207	244	246	135	139	120	126	132	140	151	151	210	210
BD93	094	094	140	140	141	141	110	116	207	207	244	279	135	141	120	126	132	146	143	151	210	214
BD94	094	102	134	134	135	141	118	120	207	207	244	?	137	141	100	124	132	132	151	151	210	210
BD95	102	102	134	140	141	141	110	120	207	207	244	?	141	141	122	122	148	150	149	149	206	210
BD96	102	108	134	140	141	141	120	122	207	207	244	244	139	141	100	122	150	150	149	153	210	214
BD97	104	108	140	150	141	141	120	122	205	207	244	?	137	141	114	122	140	150	145	149	206	216
BD98	094	104	134	134	135	141	110	110	205	211	?	?	139	141	120	122	148	150	149	151	206	214
BD99	094	104	134	134	135	141	110	110	205	207	244	253	137	139	100	124	132	148	151	153	206	210
BD100	094	102	134	134	135	141	110	118	207	207	244	273	137	141	120	122	132	132	151	153	210	210
BD101	094	094	134	134	135	141	118	120	205	207	244	273	141	141	120	122	132	146	151	151	210	212
BD102	094	102	134	134	135	135	110	118	205	207	244	273	141	141	120	122	132	132	151	153	206	212
BD103	094	102	140	140	141	141	110	110	207	207	244	276	123	131	122	122	132	150	151	151	210	212
BD104	094	094	134	134	135	139	110	118	207	207	244	244	135	135	114	120	140	146	149	149	206	212
BD105	094	102	140	140	131	141	112	120	205	207	244	259	141	141	114	122	146	150	149	151	210	210
BD106	094	108	134	140	141	141	110	110	207	207	244	279	135	139	120	122	132	146	143	151	210	214
BD107	094	102	134	140	141	141	110	118	207	207	257	257	139	141	100	126	132	132	149	151	210	214
BD108	094	108	134	140	141	141	110	116	207	207	257	273	139	139	120	122	132	142	149	151	210	210
BD109	102	102	134	134	141	141	110	120	207	207	?	?	139	141	100	122	150	150	149	149	206	210
BD110	102	102	140	140	141	141	120	120	207	207	?	?	139	141	122	122	148	150	149	153	206	214
BD111	102	102	134	140	141	141	120	120	207	207	?	?	141	141	122	122	148	150	149	153	206	210
BD112	102	102	134	134	141	141	110	120	207	207	?	?	123	137	122	126	132	150	149	151	?	?
BD113	108	108	134	134	141	141	112	118	205	207	?	?	141	141	122	122	132	132	151	151	212	212
BD114	104	104	134	140	141	141	110	112	205	207	?	?	141	141	120	122	132	132	149	151	210	212
BD115	102	108	140	140	135	141	110	120	207	207	?	?	139	141	122	124	146	150	151	153	210	214
BD116	094	104	134	140	135	141	110	118	207	207	?	?	131	131	104	122	140	148	151	151	210	210
BD117	104	108	134	140	135	141	110	120	207	207	?	?	141	141	104	122	148	150	149	153	210	214
BD118	094	108	134	140	135	141	110	112	205	207	?	?	137	141	122	122	146	150	149	151	?	?
BD120	094	104	134	150	135	141	110	120	205	207	?	?	137	141	114	122	140	146	145	153	206	210

BD121	094	108	134	140	135	141	110	120	207	207	?	?	137	141	114	120	132	150	149	151	?	?
BD122	094	108	134	150	141	141	110	110	205	207	?	?	141	141	114	124	132	150	151	153	?	?
BD123	104	108	140	150	141	141	120	120	205	207	?	?	123	141	122	126	140	150	149	149	?	?
BD124	102	102	134	140	141	141	118	120	207	207	244	244	131	139	122	124	146	150	149	151	?	?
BD125	102	102	134	134	141	141	118	120	207	207	244	257	131	139	122	124	148	150	149	149	?	?
BD126	104	108	134	140	135	141	118	120	207	207	244	244	139	141	100	104	146	150	151	153	?	?
BD127	102	104	134	140	131	141	112	120	207	207	244	257	139	141	104	122	146	150	149	151	?	?
BD128	102	104	134	140	131	141	112	120	207	207	244	244	131	139	114	122	150	150	149	149	?	?
BD129	094	102	134	140	131	141	112	120	207	207	244	244	139	141	114	122	150	150	151	153	?	?
BD130	104	104	134	134	135	141	112	118	207	207	244	257	131	131	104	114	132	148	151	151	?	?
BD131	094	094	134	134	135	139	112	118	207	207	244	273	135	141	120	120	132	140	149	151	212	212
BD132	094	102	134	134	135	135	110	118	205	207	244	244	135	141	114	124	140	146	145	149	212	212
BD133	102	104	134	134	135	141	110	118	205	207	244	246	139	141	120	126	146	146	145	153	?	?
BD134	094	108	134	134	141	141	110	110	205	205	244	?	137	137	122	124	132	148	151	151	?	?
BD135	094	108	134	134	141	141	110	118	205	207	244	?	137	141	100	124	132	148	149	151	?	?
BD136	094	094	134	140	131	141	112	118	205	207	244	259	141	141	114	124	146	146	149	149	?	?
BD137	094	094	134	140	131	141	110	112	207	207	244	259	141	141	100	122	146	146	149	151	?	?
BD138	094	094	134	140	141	141	112	118	207	207	259	273	141	141	122	124	146	146	149	151	210	210
BD139	104	108	134	140	135	141	118	118	205	207	?	273	139	139	120	126	146	146	143	145	?	?
BD140	102	106	134	140	141	141	110	118	207	207	257	273	134	139	114	120	146	146	143	145	?	?
BD141	102	106	134	134	141	141	110	118	207	207	257	273	134	141	100	126	132	146	143	145	?	?
BD142	094	102	134	134	135	141	110	118	205	207	244	246	131	139	104	122	140	?	145	149	210	212
BD143	094	094	134	134	135	141	112	118	205	207	244	257	139	141	104	122	148	150	145	149	210	212
BD144	102	108	140	140	135	141	112	120	205	207	244	246	141	141	122	124	132	140	145	149	206	210
BD145	104	104	140	140	141	141	112	120	205	207	244	246	137	141	114	122	140	148	145	149	206	210
BD146	104	104	134	140	141	141	110	112	205	207	244	244	123	141	120	126	150	150	149	151	212	212
BD147	102	108	140	140	141	141	110	110	207	207	244	244	123	141	120	122	132	148	149	151	210	212
BD148	104	108	134	140	141	141	110	112	205	207	244	244	123	141	120	126	132	148	151	151	210	212
BD149	102	108	140	140	135	141	112	120	205	207	244	246	141	141	114	124	148	150	149	149	210	218
BD150	102	108	140	140	141	141	110	120	205	207	244	259	141	141	114	122	146	148	149	151	206	210
BD151	108	108	134	140	141	141	110	110	205	207	244	244	141	141	114	122	148	148	149	149	206	214
BD152	102	108	134	140	141	141	110	110	205	207	244	244	141	141	114	122	146	148	149	151	206	214
BD153	102	104	134	140	141	141	110	120	207	207	244	244	123	137	124	126	132	150	149	149	206	210
BD154	102	108	134	134	141	141	110	118	205	207	244	244	137	141	120	126	150	150	149	155	206	214
BD155	094	102	134	134	135	141	112	120	205	207	244	244	131	137	122	122	132	150	145	151	206	210
BD156	094	094	134	134	135	141	112	112	207	207	244	279	131	141	114	122	146	146	149	151	206	210
NT99-01	094	108	?	?	137	141	102	110	205	207	244	244	139	141	106	124	146	150	143	151	206	214
T97-69	094	108	142	142	135	141	110	120	207	211	246	259	137	141	114	120	140	144	149	155	206	212

T97-70	094	104	140	140	139	141	110	120	205	207	?	?	131	139	122	124	?	?	149	151	192	206
T97-71	094	108	134	140	141	141	120	120	207	211	244	244	131	141	122	122	150	150	149	155	214	218
W0001	094	108	140	142	141	141	112	112	205	211	244	244	137	141	120	122	144	146	147	149	206	210
W0002	094	094	134	134	137	141	120	122	205	205	244	259	135	137	114	122	140	140	153	155	206	210
W0003	094	094	134	142	135	141	112	118	205	211	244	244	137	139	120	120	140	140	145	149	206	212
W0004	094	108	142	142	135	141	120	122	211	211	244	259	137	141	114	122	142	150	153	155	210	212
W0005	094	108	142	142	135	135	118	120	211	211	244	259	137	141	114	114	150	150	151	155	210	210
W0006	094	108	134	142	135	137	112	122	211	211	244	259	141	141	120	120	146	150	145	155	206	206
W0007	094	108	134	142	137	141	112	112	205	211	244	259	141	141	120	122	150	150	145	151	206	212
W0008	094	108	134	142	137	141	112	122	205	211	244	244	137	141	120	122	146	150	151	155	206	206
W0009	094	108	134	142	137	141	112	118	207	211	?	?	137	141	122	124	146	146	155	155	210	216
W0010	094	094	134	134	141	141	120	122	205	205	244	244	137	141	118	120	142	146	155	155	212	212
W0011	092	094	142	142	135	137	120	122	205	205	244	244	137	137	122	122	140	146	153	153	212	212
W0012	094	108	134	142	141	141	112	118	211	211	244	259	137	141	120	120	?	?	145	155	206	212
W0013	094	094	140	142	141	141	112	120	205	211	?	?	137	141	114	122	146	150	149	155	206	212
W0014	108	108	142	142	135	141	120	122	211	211	244	244	137	141	120	120	146	146	153	155	210	212
W0015	092	108	142	142	135	135	122	122	205	211	?	?	137	137	120	120	146	146	155	155	210	212
W0016	094	102	134	142	135	141	112	118	205	211	?	?	131	137	122	122	140	150	151	155	210	216
W0017	094	094	134	142	137	137	120	122	205	211	?	?	123	137	114	118	142	142	147	151	212	216
W0018	092	108	134	142	135	137	112	112	205	207	?	?	137	141	120	122	144	144	153	155	206	216
W0019	092	108	142	142	135	137	112	112	205	211	?	?	137	141	122	122	144	146	145	155	206	206
W0020	092	094	134	142	137	137	112	112	205	211	?	?	137	141	120	122	142	146	145	155	206	210
W0021	094	108	142	142	135	137	118	122	207	211	?	?	137	137	118	124	140	150	153	155	206	206
W0022	094	108	142	142	135	137	118	122	205	211	?	?	137	141	118	124	140	150	153	155	214	214
W0023	094	108	142	142	135	135	118	122	211	211	?	?	137	141	118	124	144	150	153	155	214	214
W0024	092	108	142	142	135	135	112	112	205	211	?	?	137	141	120	122	142	144	155	155	210	212
W0025	094	094	134	142	137	137	112	120	205	211	?	?	141	141	120	122	144	144	153	155	210	214
W0101	094	108	140	142	141	141	110	122	207	211	?	?	141	141	118	122	142	155	153	153	210	216
W0102	092	094	142	142	135	141	112	122	211	211	?	?	137	141	114	114	140	142	147	155	206	212
W0103	094	094	142	142	135	141	120	122	205	211	?	?	137	137	118	120	146	146	151	155	206	212
W0104	094	108	134	142	135	141	102	120	205	211	?	?	137	139	114	114	144	150	153	155	210	210
W0105	094	108	134	140	137	141	102	118	205	211	?	?	137	139	120	122	142	150	153	155	210	210
W0106	092	094	134	142	137	141	118	122	211	211	?	?	137	137	114	114	142	144	153	155	206	210
W0107	094	108	134	142	141	141	110	112	211	211	?	?	123	141	118	122	150	150	145	155	212	212
W0108	094	094	142	142	135	141	112	122	211	211	244	?	137	141	120	122	146	150	151	155	206	212
W0109	094	108	142	142	137	141	122	122	205	211	?	?	137	141	120	122	146	150	155	155	206	212
W0110	094	094	134	142	135	135	112	112	211	211	?	?	137	137	114	114	146	150	145	147	206	212
W0111	094	094	134	134	137	141	110	118	205	211	?	?	137	141	120	120	132	150	155	155	210	212

W0112	092	094	142	142	135	137	120	122	205	205	?	?	141	141	120	122	142	146	155	155	212	212
W0113	094	094	134	142	137	137	120	122	205	205	?	?	141	141	122	122	142	146	153	153	212	212
W0114	094	094	134	142	137	137	120	122	205	211	?	?	137	137	122	122	142	146	153	153	212	212
W0115	094	108	134	142	141	141	118	122	205	211	?	?	137	141	114	122	142	142	151	155	206	212
W0116	094	108	142	142	137	137	118	120	205	211	?	?	137	137	114	120	142	142	147	155	212	216
W0117	094	108	134	142	137	141	118	122	205	211	?	?	123	137	120	120	142	146	147	151	212	216
W0118	094	094	142	142	141	141	112	122	205	211	?	?	123	137	114	122	140	146	147	151	206	216
W0119	094	094	134	142	141	141	120	122	211	211	?	?	137	137	114	122	140	150	151	155	206	206
W0120	094	108	142	142	135	137	120	122	205	211	?	?	137	137	118	122	144	146	151	155	206	212
W0121	094	094	134	142	135	137	110	122	205	205	?	?	137	137	114	120	140	146	147	155	206	212
W0122	094	094	142	142	137	141	118	122	205	211	244	244	137	141	114	122	144	146	153	155	210	212
W0124	094	094	134	142	141	141	122	122	205	211	259	276	135	137	100	122	140	144	155	155	206	212
W0201	094	094	134	142	141	141	110	112	205	211	244	246	137	141	114	118	142	150	153	155	?	?
W0202	094	094	132	142	141	141	118	118	207	211	259	259	137	139	120	120	140	140	155	155	?	?
W0203	094	094	134	142	137	139	118	120	205	211	244	259	137	137	120	124	144	144	155	155	?	?
W0204	094	094	134	142	137	139	118	120	205	205	244	259	137	137	118	124	144	144	145	155	?	?
W0205	094	108	132	142	137	141	112	122	205	211	244	259	137	141	120	120	146	150	151	155	?	?
W0206	092	094	132	142	135	137	112	112	205	211	244	244	141	141	122	122	146	146	145	151	?	?
W0207	092	094	132	142	137	141	112	112	205	211	244	244	141	141	120	120	150	150	155	155	?	?
W0208	092	094	142	142	137	141	122	122	205	205	244	244	137	141	122	122	140	146	155	155	?	?
W0209	092	094	142	142	137	141	122	122	205	211	244	244	141	141	120	120	140	146	153	155	?	?
W0210	094	094	142	142	137	141	120	122	205	205	244	259	137	137	122	122	140	142	147	155	?	?
W0211	094	094	134	134	137	141	120	122	205	211	244	259	137	141	120	122	146	146	147	153	?	?
W0212	094	094	142	142	141	141	120	122	205	205	244	259	137	141	120	122	140	142	147	153	?	?
W0213	094	108	142	142	135	141	120	122	211	211	244	259	137	141	118	122	150	150	155	155	?	?
W0214	094	108	134	142	141	141	122	122	205	211	259	259	134	141	118	122	142	144	153	155	?	?
W0215	094	108	142	142	141	141	118	122	205	211	244	244	137	141	120	122	140	146	153	155	?	?
W0216	094	108	134	142	141	141	120	120	205	211	244	244	137	139	122	122	142	150	153	155	?	?
W0217	094	094	134	142	?	141	122	122	205	211	244	246	137	137	114	118	140	142	155	155	?	?
W0218	094	108	142	142	135	137	120	122	205	211	244	244	137	141	122	122	142	146	153	153	?	?
W0219	094	094	132	142	135	141	118	122	211	211	257	259	137	137	120	122	140	144	155	155	?	?
W0220	094	108	132	142	135	141	118	120	205	207	257	259	137	139	118	120	140	144	155	155	?	?
W0221	094	108	134	140	137	141	120	122	205	207	244	244	137	141	122	126	142	146	155	155	?	?
W0222	094	108	132	142	135	141	118	122	211	211	244	244	137	141	114	122	144	150	155	155	?	?
W0223	108	108	142	142	137	141	110	122	205	207	244	257	137	137	114	114	146	150	153	155	?	?
W0224	094	094	134	134	135	141	112	120	207	211	244	259	135	137	118	122	144	144	145	145	?	?
W0225	092	108	140	142	135	141	110	110	211	211	244	244	141	141	118	122	140	144	155	155	?	?
W0226	094	094	142	142	137	141	118	120	205	205	244	244	137	141	114	122	140	142	153	153	?	?

W0227	092	092	132	142	135	137	110	118	207	211	246	259	137	139	122	122	146	150	153	155	?	?
W0228	092	094	132	142	135	137	112	118	205	211	244	244	137	141	118	120	140	150	151	155	?	?
W0229	094	108	142	142	135	137	118	120	205	211	244	259	137	141	114	122	140	146	149	155	?	?
W0230	092	094	142	142	135	141	110	112	205	211	244	259	137	137	120	122	132	150	145	155	?	?
W0231	094	094	132	142	135	135	?	?	205	211	244	244	137	137	120	120	146	146	147	155	?	?
W0232	108	108	142	142	137	141	110	120	205	211	244	259	137	139	120	122	142	150	145	153	?	?
W0233	092	094	132	134	135	135	112	112	211	211	244	246	137	141	120	122	132	142	153	155	?	?
W0234	092	094	132	142	135	141	110	120	205	205	244	244	137	141	114	120	140	146	153	155	?	?
W0235	092	092	134	142	141	141	118	118	211	211	244	257	137	141	120	120	144	150	151	155	212	214
W0236	094	094	134	142	137	141	112	118	205	207	244	259	135	137	120	122	140	144	145	145	?	?
W0237	094	094	142	142	135	141	120	122	205	205	244	259	134	141	114	118	142	144	145	155	206	212
W0238	094	094	142	142	137	141	118	122	205	211	244	259	137	137	122	122	142	144	147	153	210	212
W0301	094	094	134	134	137	141	118	122	205	211	244	259	?	141	120	122	132	?	147	155	206	212
W0302	094	094	142	142	137	141	118	122	205	211	244	259	141	141	120	122	132	146	145	155	212	212
W0303	094	094	134	142	141	141	118	122	205	211	244	259	137	137	120	122	140	142	147	155	206	212
W0304	092	094	142	142	135	135	120	120	211	211	244	244	137	139	120	120	140	144	147	153	210	212
W0305	?	?	142	142	135	137	112	120	211	211	?	?	?	?	114	120	?	?	?	?	206	214
W0306	?	?	142	142	135	135	118	120	211	211	244	244	?	?	114	120	140	144	153	155	206	210
W0307	094	094	134	142	135	135	120	122	211	211	244	259	137	141	114	122	144	146	149	153	206	214
W0308	094	094	134	142	135	135	112	112	205	211	244	244	137	141	120	122	140	150	155	155	206	212
W0309	094	094	142	142	135	141	112	120	211	211	244	244	137	137	118	122	140	150	151	155	206	212
W0310	094	094	142	142	137	137	110	122	205	205	244	259	137	137	114	114	142	146	155	155	212	216
W0311	108	108	134	142	137	141	112	118	205	211	244	259	141	141	120	122	144	150	145	155	212	214
W0312	108	108	134	142	137	141	110	112	205	211	244	259	137	141	120	122	146	150	145	155	206	214
W0313	094	094	134	142	135	141	120	122	211	211	257	259	137	141	114	120	142	146	153	155	212	212
W0314	094	108	134	142	137	141	120	122	205	211	257	259	137	141	114	120	142	146	155	155	212	212
W0315	094	108	142	142	135	137	120	122	205	211	244	259	141	141	122	122	140	150	149	155	212	212
W0316	092	094	142	142	135	135	120	120	211	211	244	259	141	141	122	122	140	150	153	155	206	212
W0317	092	094	134	142	135	141	112	122	211	211	244	246	137	141	118	122	142	150	149	155	212	216
W0318	094	108	134	134	137	141	112	120	211	211	259	259	139	141	118	122	150	150	145	155	212	216
W0319	094	108	142	142	135	137	110	112	211	211	244	259	139	141	118	122	140	150	155	155	210	214
W0320	094	108	134	142	135	141	120	122	205	211	259	259	137	141	122	122	140	146	155	155	206	212
W0321	094	108	134	142	135	141	112	120	211	211	244	259	139	141	118	120	146	150	147	149	206	206
W0322	092	094	142	142	141	141	120	120	211	211	244	244	137	139	118	120	140	146	147	149	206	212
W0323	094	094	134	142	135	141	120	122	205	211	259	259	135	137	100	122	140	150	155	155	206	206
W0324	092	110	134	142	135	137	112	112	207	211	246	259	137	141	100	114	142	144	145	151	212	212
W0325	092	094	134	142	135	135	110	122	205	211	244	259	137	141	120	122	146	146	155	155	206	212
W0326	094	094	134	142	137	141	112	120	205	211	244	244	137	141	122	122	142	146	149	155	206	210

W0327	092	094	142	142	135	141	110	118	211	211	244	259	141	141	118	120	140	150	145	151	206	210
W0328	092	094	134	142	135	135	112	122	205	211	244	259	137	137	114	120	144	146	147	155	206	212
W8503	094	108	134	142	141	141	112	120	207	211	244	244	137	141	118	126	142	150	151	155	212	216
W8601	094	094	142	142	135	141	112	118	211	211	244	244	141	141	114	122	150	150	151	153	210	212
W8606	092	094	134	140	135	137	112	112	211	211	244	259	137	137	120	122	144	146	149	155	206	212
W8607	094	094	134	142	135	137	120	122	205	211	244	244	137	141	114	122	140	142	153	155	210	212
W8701	094	108	140	142	139	141	110	120	207	211	244	244	141	141	122	126	142	150	145	153	206	210
W8705	108	108	140	142	137	141	112	120	211	211	244	259	141	141	120	120	144	146	149	155	206	214
W8707	094	108	142	142	135	141	120	122	205	211	244	259	139	141	118	122	146	150	145	155	212	214
W8802	108	108	140	142	135	141	120	122	211	211	244	259	137	141	120	122	144	146	149	155	212	212
W8804	092	108	140	142	135	141	112	120	211	211	244	259	137	141	120	122	140	146	149	155	206	212
W8805	094	094	142	142	135	141	118	122	205	211	244	257	137	139	118	122	140	140	147	155	206	210
W8807	094	108	134	142	137	141	112	120	205	211	244	259	137	141	120	120	146	146	145	145	206	206
W8808	094	094	134	142	141	141	112	120	205	211	244	259	137	141	118	122	146	150	147	155	206	206
W8809	094	094	134	142	135	135	112	122	205	211	244	259	137	141	118	118	140	146	145	145	206	212
W8811	094	108	134	142	135	137	112	120	211	211	244	244	137	141	120	122	144	144	155	155	212	214
W8904	094	108	134	142	135	141	120	122	205	211	244	257	137	141	118	120	146	146	149	155	212	212
W8905	094	108	140	142	141	141	120	122	211	211	244	244	139	141	118	122	140	144	145	149	212	212
W8906	094	094	134	142	137	141	120	122	205	205	244	259	137	141	120	122	142	146	147	155	212	212
W8908	094	094	142	142	141	141	118	122	205	207	246	257	137	141	118	126	140	142	153	155	206	216
W8909	094	108	134	142	135	137	112	122	211	211	244	259	135	139	114	122	140	144	147	153	206	214
W8910	092	094	140	142	141	141	112	120	211	211	244	244	137	141	120	122	140	150	147	149	206	206
W8913	094	094	134	142	135	137	110	120	205	211	244	257	137	137	118	120	144	146	145	155	212	214
W9001	092	108	142	142	135	141	110	112	205	211	244	259	137	137	118	120	140	144	145	155	212	212
W9002	092	108	142	142	135	141	120	122	211	211	244	259	141	141	122	122	146	150	149	155	210	212
W9003	108	108	142	142	135	141	112	120	211	211	244	259	141	141	122	122	144	150	149	155	206	212
W9004	094	108	134	134	141	141	120	120	205	207	244	244	137	141	118	126	142	146	147	151	206	216
W9005	094	108	134	142	141	141	120	120	207	211	244	244	141	141	122	126	142	146	147	155	206	216
W9006	094	094	134	142	141	141	112	120	211	211	244	259	137	141	122	126	142	146	151	155	206	216
W9007	094	108	134	142	137	141	110	120	205	211	244	244	137	137	118	120	144	146	145	155	206	212
W9008	094	108	142	142	135	137	122	122	205	211	244	257	137	137	118	122	140	144	155	155	206	214
W9009	094	108	140	142	135	141	110	112	211	211	244	259	137	137	120	120	140	144	149	155	206	212
W9010	094	110	142	142	135	137	120	122	207	211	259	259	131	137	120	122	140	146	155	155	212	212
W9011	094	094	134	142	135	141	120	122	207	207	257	259	137	137	114	124	142	146	155	155	212	216
W9101	094	094	142	142	135	137	120	120	205	211	244	259	137	141	122	122	140	142	153	155	212	212
W9102	094	094	140	142	137	141	120	122	205	205	244	259	141	141	114	122	142	146	153	155	210	212
W9201	092	094	134	142	135	137	110	112	?	?	?	?	137	141	120	122	132	144	145	155	?	?
W9202	092	108	134	134	135	137	112	120	205	211	244	259	137	141	120	120	132	144	145	155	212	212

W9203	094	094	134	142	137	141	110	110	211	211	244	259	137	137	114	118	140	150	145	155	212	214
W9204	092	094	142	142	135	137	110	110	207	211	259	259	139	141	120	122	140	142	145	153	212	216
W9205	094	094	134	134	141	141	110	120	205	205	244	259	137	137	118	120	146	146	145	155	206	212
W9206	094	094	134	134	141	141	120	120	205	211	244	244	137	141	122	126	146	150	147	151	206	216
W9207	094	094	134	134	141	141	112	112	211	211	244	244	137	141	118	126	150	150	147	151	206	212
W9208	094	108	134	142	141	141	112	120	205	211	244	259	137	141	118	122	146	150	151	155	206	212
W9301	094	108	142	142	137	141	118	122	211	211	244	246	123	137	114	120	140	142	149	151	206	216
W9302	094	108	134	134	137	141	112	120	207	211	244	244	137	137	114	118	142	144	153	155	210	216
W9303	094	108	140	142	141	141	120	122	211	211	244	244	139	141	114	118	140	144	145	149	212	212
W9304	094	094	134	142	137	141	120	120	207	207	244	244	137	137	114	120	132	142	145	155	210	216
W9305	094	108	134	142	141	141	112	120	205	207	244	259	141	141	118	120	142	150	155	155	212	216
W9306	094	108	134	134	141	141	112	122	205	207	244	259	137	141	120	126	142	150	151	155	212	216
W9307	094	108	134	142	137	141	120	120	205	211	244	259	137	141	118	122	142	146	147	151	212	216
W9308	092	108	134	142	137	137	112	120	207	211	244	259	141	141	122	122	144	150	155	155	214	216
W9309	092	094	134	142	137	137	112	112	211	211	244	259	137	141	120	122	146	150	145	155	206	214
W9310	108	108	134	134	137	137	112	112	205	211	244	259	141	141	120	122	146	150	145	155	206	214
W9311	094	094	140	142	141	141	120	122	207	211	244	244	141	141	122	126	142	144	149	155	212	216
W9401	094	108	134	134	135	135	120	120	211	211	257	259	141	141	120	122	142	146	155	155	212	216
W9402	094	094	134	134	137	141	112	120	205	211	244	244	141	141	122	122	140	146	153	155	206	210
W9403	094	094	134	142	135	141	120	122	205	205	244	244	137	141	118	122	142	146	153	155	206	212
W9404	094	108	134	142	137	141	122	122	205	211	244	244	137	137	114	122	144	146	155	155	212	214
W9405	094	094	134	142	137	141	120	122	205	205	244	244	137	141	114	118	140	140	155	155	206	214
W9406	094	094	134	134	141	141	120	122	205	205	244	244	137	137	114	118	146	146	145	155	212	212
W9407	094	108	134	142	137	141	110	122	205	211	244	244	137	137	118	122	140	146	155	155	206	212
W9408	094	108	134	134	137	141	120	122	205	211	244	244	137	141	114	120	144	146	145	155	206	212
W9409	092	092	140	142	135	141	120	122	211	211	244	259	139	141	118	122	140	150	149	155	214	214
W9501	094	094	134	142	141	141	120	122	211	211	244	244	123	137	114	126	142	150	151	151	210	214
W9502	092	108	134	142	137	137	112	112	205	207	244	259	141	141	120	122	146	150	145	155	206	216
W9503	108	108	134	134	137	141	112	120	207	211	244	259	137	141	120	122	146	150	145	155	206	214
W9504	092	108	142	142	137	141	112	112	207	211	244	259	141	141	120	122	144	146	145	155	206	216
W9505	094	108	142	142	135	137	110	118	207	211	244	257	137	141	114	124	150	150	153	155	206	214
W9506	094	094	134	142	137	137	120	122	205	211	244	244	137	141	114	122	142	146	147	153	212	212
W9507	094	094	134	142	135	137	120	122	205	205	244	259	137	141	114	120	140	146	147	153	210	212
W9508	094	094	134	142	135	141	120	122	205	211	244	259	137	141	120	122	140	142	147	155	212	212
W9509	094	094	142	142	135	141	112	120	211	211	244	244	141	141	114	120	146	146	155	155	212	212
W9510	094	094	142	142	135	141	122	122	205	211	244	244	137	141	118	120	140	140	155	155	210	212
W9511	094	094	142	142	135	141	120	122	205	211	244	244	137	141	114	118	140	146	147	155	210	212
W9601	094	108	142	142	135	141	112	120	211	211	244	244	141	141	122	122	146	150	149	149	206	212

W9602	094	108	142	142	141	141	112	120	211	211	244	259	141	141	122	122	150	150	149	155	206	212
W9603	094	094	134	142	135	135	112	120	211	211	244	259	141	141	120	122	144	146	155	155	206	212
W9604	094	108	142	142	135	141	120	120	211	211	244	259	137	141	122	122	144	150	155	155	206	212
W9605	092	108	134	142	135	135	112	120	211	211	244	259	137	139	120	122	144	150	149	155	206	212
W9606	092	094	134	142	141	141	112	120	211	211	?	?	137	141	118	122	146	150	147	155	206	210
W9607	094	108	134	142	135	141	112	122	211	211	244	259	137	141	118	122	146	150	149	151	212	212
W9608	108	108	142	142	135	137	118	120	211	211	244	257	137	141	114	122	140	150	155	155	206	206
W9609	108	108	142	142	135	137	110	122	207	211	257	257	137	141	118	124	144	150	155	155	206	214
W9610	094	108	142	142	137	137	110	122	205	211	244	257	137	137	118	124	140	150	155	155	206	206
W9611	092	094	134	142	137	141	110	112	207	211	246	259	137	137	122	122	142	150	147	153	206	216
W9612	094	094	134	142	137	141	120	120	205	211	259	259	137	137	118	122	142	150	147	155	206	212
W9613	092	094	134	134	135	141	112	120	207	211	244	259	137	141	114	122	146	150	147	155	206	212
W9614	092	108	140	142	135	141	120	122	211	211	244	244	141	141	118	118	140	144	149	149	212	212
W9615	092	108	140	142	141	141	120	122	211	211	244	259	139	141	118	122	140	150	145	149	212	214
W9701	092	094	134	142	137	141	122	122	205	205	244	259	137	141	120	122	140	146	147	153	212	212
W9702	092	094	?	?	141	141	120	122	205	205	244	244	141	141	122	122	146	146	147	153	212	212
W9703	094	108	?	?	135	141	120	120	205	207	257	257	137	137	118	122	142	146	155	155	212	216
W9704	094	108	142	142	135	141	110	112	205	207	259	259	137	139	118	120	144	146	155	155	212	212
W9705	094	108	142	142	141	141	112	118	211	211	244	259	137	137	118	120	146	146	155	155	212	212
W9801	094	094	142	142	137	141	120	122	211	211	246	259	137	141	120	122	140	142	151	153	212	216
W9802	094	108	134	142	141	141	118	122	205	211	244	244	137	139	120	120	144	144	155	155	206	206
W9803	094	108	134	134	137	141	112	122	205	211	259	259	139	141	118	122	150	150	155	155	206	212
W9804	094	094	134	142	135	137	112	120	205	211	244	244	137	137	118	122	140	140	155	155	206	206
W9805	094	094	134	142	137	137	122	122	205	211	244	257	137	137	114	118	140	146	155	155	212	214
W9806	094	094	134	142	137	137	110	120	205	205	244	244	137	137	114	120	140	146	147	155	206	212
W9807	094	108	142	142	137	141	110	112	211	211	246	257	137	141	120	122	150	150	153	155	212	214
W9808	094	094	134	142	141	141	?	?	?	?	?	?	141	141	114	126	?	?	153	155	?	?
W9809	094	108	134	142	135	141	112	122	207	211	244	259	?	?	114	120	150	150	151	155	212	212
W9810	092	094	134	142	137	141	118	120	205	205	?	?	141	141	120	122	140	146	155	155	212	212
W9811	094	094	134	134	137	141	112	122	205	205	244	244	137	141	114	122	140	146	155	155	206	212
W9812	092	094	134	142	137	141	120	120	211	211	244	244	137	141	120	122	144	146	145	155	206	216
W9813	108	108	142	142	135	137	120	120	205	207	244	244	137	141	120	122	146	150	145	155	206	216
W9814	108	108	134	142	137	141	112	112	205	211	244	259	137	141	120	122	144	146	145	155	206	216
W9901	094	108	134	142	141	141	112	112	211	211	244	259	137	139	118	120	150	150	145	151	206	212
W9902	094	094	142	142	137	141	110	120	205	211	246	259	137	141	114	122	144	150	151	155	212	212
W9903	094	108	134	142	135	137	120	122	205	211	244	244	137	141	114	118	144	150	145	155	206	206
W9904	092	092	134	134	137	141	112	122	211	211	246	259	141	141	114	122	146	150	149	153	206	216
W9905	092	092	134	134	141	141	110	112	211	211	246	259	141	141	114	122	142	146	153	153	216	216

W9906	092	092	134	142	141	141	110	112	211	211	259	259	135	141	114	122	140	146	153	153	206	216
W9907	094	108	142	142	141	141	112	120	211	211	244	259	137	141	122	122	144	146	149	155	206	206
W9908	092	108	142	142	141	141	120	120	211	211	244	259	141	141	122	122	144	146	155	155	206	212
W9909	092	094	134	142	135	137	118	120	211	211	244	244	137	137	114	120	142	144	153	155	210	214
W9910	094	094	134	142	137	141	118	120	205	211	244	244	123	137	118	120	142	150	151	155	206	206
W9911	094	094	134	142	137	141	118	120	205	211	244	244	123	137	118	120	142	150	151	155	206	206
W9912	094	108	134	142	137	141	112	118	205	211	244	259	137	137	118	120	142	150	147	155	206	216
W9913	094	108	134	142	141	141	122	122	211	211	244	244	137	141	114	126	142	146	149	155	212	214
W9914	094	094	140	142	141	141	120	122	205	211	244	244	137	141	122	122	144	146	155	155	212	216
W9915	094	094	134	142	137	141	120	122	211	211	244	244	137	141	122	126	144	146	149	155	212	212
W9916	094	094	?	?	139	141	118	118	205	211	244	259	137	139	122	124	144	146	155	155	210	212
W9917	092	108	?	?	137	141	110	120	211	211	244	246	137	141	120	126	144	146	149	153	206	216
W9918	094	108	142	142	137	141	112	122	205	211	244	246	137	141	120	122	146	150	147	153	212	214
W9919	094	108	134	142	137	137	112	122	205	211	244	246	137	141	122	122	146	150	153	155	212	212
W9920	094	094	142	142	137	141	112	120	205	211	246	259	137	141	120	120	142	150	147	155	212	212
W9921	092	108	?	?	135	141	120	122	205	211	244	259	139	141	120	122	140	150	149	155	206	212
W9922	094	108	140	142	137	141	120	122	211	211	244	244	137	139	118	122	140	142	149	155	212	212
W9923	094	108	134	142	137	141	120	122	205	211	244	244	139	141	118	122	142	144	149	153	212	212
Z9512	094	104	140	142	137	141	112	120	207	211	244	246	131	141	120	122	150	150	147	155	192	206
Z9513	094	108	134	140	137	141	102	120	205	207	246	276	139	139	122	122	140	146	151	151	214	214
Z9514	094	094	134	140	141	141	110	112	207	211	246	259	139	141	124	126	150	150	153	153	192	210
Z9515	094	102	134	140	141	141	120	120	207	211	244	244	123	141	114	124	150	150	149	153	206	210
Z9815	094	108	142	142	135	141	110	120	207	211	246	259	137	141	114	120	140	144	149	155	206	212
Z9816	094	094	134	142	137	141	110	120	205	207	244	246	131	141	114	114	140	144	155	155	206	206
Z9922	?	?	140	142	135	141	120	122	207	211	259	276	141	141	114	122	140	144	155	155	206	214
Z9923	104	108	134	142	141	141	120	122	211	211	244	276	137	139	120	122	140	144	149	155	212	214

ANNEX 3: Results from parentage analysis simulations.

Comparison of the results obtained with the softwares CERVUS (Marshall *et al.* 1998) and PARENTE (Cercueil *et al.* 2003) from simulated data (table modified from Cercueil (2004)). Parentage analysis results obtained from CERVUS are categorized depending on the α value for the significativity test Δ, and results obtained from PARENTE are categorized depending on the probability P that the parentage relationship is correct.

p-value α	$0.8 < \alpha$	$0.8 \leq \alpha < 0.95$	$\alpha \geq 0.95$
Parentage relationships found with CERVUS	449	200	158
including true parentage	53	109	138
in percentages	12%	55%	87%
Probability P	$0.8 < P$	$0.8 \leq P < 0.95$	$P \geq 0.95$
Parentage relationships found with PARENTE	578	81	148
including true parentage	89	67	144
in percentages	15%	83%	97%

ANNEX 4: Pedigrees of the sampled Scandinavian brown bears

Legend: Blue colors represent mothers known from field data and genetically confirmed.

Red colors represent mothers that were only genetically determined.

Offspring from the same litter are represented by green or orange colors.

A) Southern study area

Bear ID	Name	Sex	Year of birth	Year of death	litter	Probable parents		Parentage probability	Possible mothers (probability)	Possible fathers (probability)
						Mother	Father			
W0001	KORSU	M	1997							03WW14 (0,99)
W0002	NOTE	M	1994			W0124	W8607	0.99		
W0003	Hammraberget	M	1997	2003						98SS14 (0,96)
W0004	ÖDA	F	1994			95SS93	W9002	0.59		
W0005	ÖDAU2	M	1999			W0004	W8601	0.99		
W0006	SARIU1	M	1999			W9310	W0108	0.99		
W0007	SARIU2	M	1999			W9310	W0108	0.96		
W0008	VANA	F	1999	2001		W9310	W0108	0.93		
W0009	BINNAU1	M	1999			W9502	W9916	0.92		
W0010	HIRVA	F	1999			W9403	W9810	0.91		
W0011	GRIVLAU2	M	1999			W9403	W8607	0.99		
W0012	RUODIN	M	1991							
W0013	SUROLA	M	1995			97SS04	W8910	0.99		
W0014	TÄXÅSU2	M	1999	2001		W8904	00W07	0.27		
W0015	TÄLLA	F	1999			W8904	00W07	0.68		
W0016	JOKA	M	1994	2000						
W0017	KATAJA	M	1999	2003		W9307	W9301	0.99		
W0018	TUVA	F	1999			W9504				

ID	Name	Sex	Year1	Year2		Code1	Code2	Value	Col10	Col11
W0019	LETA	F	1999		■	W9504	03WW14	0.63		
W0020	SPANA	F	1999		■	W9504				
W0021	TANGÅ	F	1999		■	W9008	W9505	0.99		
W0022	RENSJÖU2	M	1999		■	W9008	W9505	0.99		
W0023	RENSJÖU3	M	1999		■	W9008	W9505	0.99		
W0024	MOSSIU4	M	1999	2000	■	W8811				
W0025	BRINDA	F	1999	2000	■	W8811				
W0101	*Sexaån*	M	1998							
W0102	RAN	M	1997							
W0103	*Ärnäs*	M	1999			W9007	W0108	0.99		
W0104	ABBORROGINA	F	2000	2001	■	W9909	99X07	0.99		
W0105	ABBORA	F	2000		■	W9909	99X07	0.99		
W0106	STUBBAU3	M	2000		■	W9909				
W0107	AKITA	F	2000			W9003				
W0108	NÄCKEN	M	1990	2001						W8601 (0,9)
W0109	LOMA	F	1994			W0121	W9002	0.99		
W0110	*Ärteråsen*	M	1998							
W0111	*Ockran*	M	1995	2003		W9007				
W0112	GRIFFELU1	M	2000		■	W9101	W9701	0.99		
W0113	GRIFFELU2	M	2000		■	W9101	W9701	0.98		
W0114	GRIFFELU3	M	2000		■	W9101	W9701	0.99		
W0115	TUNTURIU1	M	2000	2003	■	W8906	W9301	0.16		
W0116	TUNTURIU2	M	2000		■	W8906	W9301	0.96		
W0117	DELÅSA	F	2000		■	W8906	W9301	0.99		
W0118	NOPPIU1	M	2000		■	W8808	W9301	0.99		
W0119	NOPPIU2	M	2000		■	W8808	W9301	0.60		
W0120	RÅDLÖSA	F	1999	2003		W9007	W0108	0.99		
W0121	KOIVIKA	F	1986			W8906	Z9815	0.96		
W0122	TELNA	F	1994	2003						
W0123	JÄRVAU1	F	2001	2001		W9308				
W0124	EMÅA	F	1991	2002						91WW03 (0,99)
W0201	*Vinvallen*	M	1998							
W0202	GRUNDE	M	1996						99W16 (0.96)	W0202 (0,97)

ID	Name	Sex	Born	Died		Father	Mother	Value		
W0203	RASSAKU k4:1	M	2001			W9007	W9916	0.99		
W0204	RASSAKU k4:2	M	2001			W9007	W9916	0.97		
W0205	BLECKA	F	2001	2002		W9502	W0108	0.95		
W0206	BINNA k2:2	M	2001	2002		W9502	W0108	0.98		
W0207	BINNA k2:3	M	2001	2002		W9502	W0108	0.94		
W0208	SNOTTA	F	2001			W0109	W9701	0.12		
W0209	LANNA	F	2001			W0109	W9701	0.84		
W0210	TIPPA k5:2	M	2001			W9307	W9701	0.99		
W0211	TIPPA k5:3	M	2001			W9307	W9701	0.97		
W0212	SALMA	F	2001			W9307	W9701	0.98		
W0213	ÖDA k2:2	M	2001			W0004	W9608/W9609	0.35/0.52		
W0214	JÄSKA	F	2001	2002		W0004				
W0215	GRIVLA k2:1	M	2001			W9403				
W0216	GRIVLA k2:2	M	2001			W9403	W0232	0.96		
W0217	SILINA	F	2001			W9403				
W0218	GRIVLA k2:4	M	2001			W9403	W0232	0.86		
W0219	LJÖRA	F	2001			W9008	W0202	1		
W0220	RENSJÖ k6:2	M	2001			W9008	W0202	0.91		
W0221	FASKA	F	2001			W9404	W9311	0.98		
W0222	BÖRRINE k4:2	M	2001			W9404	W9505	0.92		
W0223	HÖLJA	F	2001			W9404	W9505	0.99		
W0224	*Slagufjället*	M	1999						01W98 (0.99)	
W0225	*Jämthedsbacken*	M	1997			W9001	93S03	0.88		
W0226	BLÄCKE	M	1991	2003						W8607 (0,99)
W0227	TORRLIDA	F	1995	2003						W9611 (0,80)
W0228	*Torrlid*	M	1998							
W0229	UNNA	F	1998							
W0230	BLOME	M	1998							00Z01 (0.99)
W0231	KLÖVA	F	1992							W8606 (0,92)
W0232	*Tvåsktjärnsberget*	M	1995	2002						
W0233	BARKE	M	1995							
W0234	HÅLLA	F	1999							
W0235	*Hålldammsjön*	M	1998							

W0236	TOXA	F	1999						01W98 (0.75)	91ZZ16 (0,86)
W0237	LONAHOA	F	1997							86ZZ14 (0,77)
W0238	SÄLJA	F	1991	2002						
W0301	*Tunturi k7:1*	M	2002			W8906	W0012	0.92		
W0302	*Tunturi k7:2*	M	2002			W8906	W0012	0.93		
W0303	Näcka	F	2002			W8906	W0012	0.88		
W0304	Gruva	F	2002			W9909				
W0305	Snåla	F	2002			W9909				
W0306	Kringla	F	2002			W9909				
W0307	*Slättberget*	M								
W0308	*Borregaard k2:1*	M	2002			W9804	W0108	0.98		
W0309	Bornå	F	2002	2003		W9804	W0108	0.91		
W0310	*Femma k2:1*	M	2002			W9806				
W0311	Rita	F	2002			W9310				
W0312	*Sari k4:2*	M	2002			W9310				
W0313	*Täxås k9:1*	M	2002			W8904				
W0314	*Täxås k9:2*	F	2002	2003		W8904				
W0315	*Griffel k5:1*	M	2002			W9101	W9921	0.89		
W0316	*Griffel k5:2*	M	2002			W9101	W9921	0.95		
W0317	Vasta	F	2002	2003		W9615	W0233	0.99		
W0318	Tana	F	2002			W9308	W9901	0.88		
W0319	*Järva k7:2*	M	2002			W9308				
W0320	*Noppi k9:1*	M	2002			W8808	W9921	0.97		
W0321	*Noppi k9:2*	M	2002			W8808	W9921	0.87		
W0322	*Noppi k9:3*	M	2002			W8808	W9921	0.90		
W0323	Löva	F	2000						W0124 (0.99)	
W0324	Nabben	M	1998							W9202 (0,99)
W0325	Rissla	F	1994	2003		W0121	W9002	0.99		
W0326	Gälla	F	1993							
W0327	*Dödåsen*	M	1998							
W0328	Kallio	F	1996	2003		W0121	W9202	0.99		
W8503	SVARTNÄS	M	1977	1991						91ZZ04 (0,89)
W8601	LILLSKOGARN	M	1982	1999						91ZZ04 (0,93)

ID	Name	Sex								
W8603	GEBBAREN	M	1972							
W8604	SKRÄLLDALSHONAN	F	1983							
W8606	LOSBJÖRN	M	1982	1991		W8811	W8804	0.99		
W8607	UNTORPAREN	M	1971	2001		95SS92	86ZZ14	0.99		
W8701	RISOMÄGGSBJÖRN	M	1982	1989						89ZZ09 (0,99)
W8705	ÄLVDALSHONAN	F	1984	1998		W8811	W8804	0.99		
W8707	BINGSJÖHONAN	F	1978	1999						
W8801	OKBOBSBJÖRN	M								
W8802	BRUNNSBERGSHONAN	F	1982	1991		W8811	W8804	0.98		
W8804	STORVARDSBJÖRN	M	1973	1991						
W8805	FULUFJÄLL	M	1983							
W8806	LJOTRISKLITT	M	1980							
W8807	TIPPINGEN	M	1984							
W8808	NOPPIHONAN	F	1982	2003						
W8809	TRÄNGSLETBJÖRN	M	1974	1992						
W8811	MOSSIHONAN	F	1978	2000		93S02				
W8903	GRÅTBÄCKSBJÖRN	M	1985							
W8904	TÄXÅSHONAN	F	1987			W8802				
W8905	BJÖRNBERGSHONAN	F	1987	1999		W8707	W8804	0.96		
W8906	TUNTURIHONAN	F	1981			85WW90	97M06	0.79		
W8908	MAGNETEN	M	1985	1991						91ZZ04 (0,99)
W8909	TENNINGHONAN	F	1982	1994						
W8910	OXPUSSBJÖRN	M	1987	1996		W8808	W8804	0.99		
W8911	MOSSATJ.Hane	M	1988			W8811				
W8912	MOSSATJ.Hona	M	1988	1998		W8811				
W9001	KRÄCKELBÄCK	F	1984							
W9002	RISBERGSHANEN	M	1989	1996		W8802				
W9003	JÖLLMYRSHONAN	F	1989	2001		W8802				
W9004	NUPPI	M	1989	1992		W8808	W8503	0.99		
W9005	KESKI	M	1989	1996		W8808	W8503	0.99		
W9006	KOTI	M	1989			W8808	W8503	0.99		
W9007	RASSAKUHONAN	F	1986			W8811				
W9008	RENSJÖHONAN	F	1986	2002		W8811		0.99		

W9009	HÄRJÅBJÖRN	M	1986	1992		W8811				
W9101	GRIFFEL	F	1990			W8906	W8607	0.99		
W9102	MAJGROP	F	1990	1995		W8906	W8607	0.94		
W9201	SVISKEN	M	1991	1997		W8811	00Z01	0.99		
W9202	RIVSJÖ	M	1991	1998		W8811	00Z01	0.99		
W9203	TROLLBÄCK	F	1991	1992		W9001				
W9204	LÖVÅS	F	1991	1992		W9001				
W9205	KULLBODS	M	1991	1993		W9007	W8807	0.99		
W9206	KERO	M	1991	1997		W8808	W8503	0.99		
W9207	KOSKA	F	1991	1997		W8808	W8503	0.99		
W9208	BARKA	F	1991	2000		W8808	W8503	0.99		
W9301	HEROS	M	1989	2000						91ZZ04 (0,99)
W9302	ZAKRIS	M	1982			93S02	91ZZ04	0.99		
W9303	AKSI	M	1989			W8707	W8804	0.84		
W9305	JUSSIN	M	1992	1995		W8906	W8503	0.99		
W9306	AVA	F	1992	1999		W8906	W8503	0.99		
W9307	TIPPA	F	1992			W8906	W8503	0.99		
W9308	JÄRVA	F	1988			W8811				
W9309	MILO	M	1992	1995		W9308	W8807	0.99		
W9310	SARI	F	1992	2003		W9308	W8807	0.99		
W9311	JAN-KAMPI	M	1992			W8905	W8503	0.99		
W9401	LOKE	M	1993			W8904				
W9402	KANGA	F	1993	2002		W8808	W8607	0.88		
W9403	GRIVLA	F	1993			W8808	W8607	0.99		
W9404	BÖRRINE	F	1993			W9008	W9811	0.99		
W9405	NAEVRA	M	1993	1994		W9008	W9811	0.95		
W9406	RASKA	F	1993	1994		W9007	W9811	0.99		
W9407	RASKEN	M	1993	1996		W9007	W9811	0.94		
W9408	RAJSA	F	1993	1994		W9007	W9811	0.99		
W9409	KORPI	M	1988			W8707				
W9501	DEJSJOBJORN	M	1991							91ZZ04 (0,99)
W9502	BINNA	F	1994			W9308	W8807	0.99		
W9503	MIRA	F	1994	2000		W9308	W8807	0.99		

W9504	DONNA	F	1994	2002		W9308	W8807	0.99		
W9505	VRANG-OLA	M	1988							
W9506	KANIS	M	1994	1999		W8906	W8607	0.98		
W9507	RIGA	F	1994	2000		W8906	W8607	0.99		
W9508	LÄFTO	M	1994	1998		W8906	W8607	0.99		
W9509	PURO	M	1994	1996		W9511	W0108	0.78		
W9510	PALO	M	1994	1997		W9511				
W9511	RIITA	F	1985	1997		W8906	W8607	0.99		
W9601	JÖLLA	F	1995	1999		W9003				
W9602	MYRA	F	1995	2000		W9003	W0108	0.66		
W9603	MOSSIU2	M	1995			W8811	97SN02	0.91		
W9604	MOSSIU3	M	1995	1996		W8811				
W9605	PILA	F	1995	1999		W8811				
W9606	KOSKAU2	F	1995			W9207	W9002	0.99		
W9607	KOSKAU3	F	1995	1998		W9207	W9002	0.98		
W9608	GRANFJÄLLSBJÖRN	M	1995	2000		W9008	W9505	0.97		
W9609	SYNDALSBJÖRN	M	1995			W9008	W9505	1		
W9610	ÖJSKOGSBJÖRN	M	1995			W9008	W9505	0.99		
W9611	MÄNNIKU	M	1995	1999		W8808				
W9612	HAUKU	M	1995			W8808				
W9613	TIKKA	F	1995	1996		W8808				
W9614	VÄSSIN	M	1995	1998		W8905	W9409	0.99		
W9615	KEIKO	F	1995			W8905	W9409	0.99		
W9701	BJOKE	M	1996			W8906				
W9702	GRANE	M	1996			W8906				
W9703	TEKLA	F	1996	1997		W8904	99X02	0.8		
W9704	BAMSE	M	1996	2001		W9208				
W9705	BJÖRE	M	1996	1997		W9208				
W9801	LOHOS	M	1997			W9101	W9301	0.99		
W9802	BLINDE	M	1983	1999						
W9803	NITA	F	1997			W9310				
W9804	BORREGAARDSBINNA	F	1997			W9008	W9811	0.97		
W9805	RE-2	F	1997	1998		W9008	W9811	0.99		

W9806	FEMMA	F	1996			W0121	W8607	0.99		
W9807	SILIAS	M	1988	2000						
W9808	EJA	F	1997	1998		W9306	W8601			
W9809	ÅMYN	M	1997	2000		W9306	W8601	0.99		
W9810	NURMI	M	1988						W8906 (0.81)	
W9811	LIAS	M	1986			W8808	W8607	0.99		
W9812	MOA	F	1997	2000		W9308	W8807	0.99		
W9813	AMOS	M	1997	1999		W9308	W8807	0.98		
W9814	BELLA	F	1997			W9308	W8807	0.98		
W9901		M	1993						93S02 (0.85)	
W9902	TORPA	F	1998	1999		W9208	T97-69	0.92		
W9903	KULLA	F	1997						W9007 (0.7)	
W9904	FLENA	F	1994	1999					94S95 (0.99)	
W9905	VÅNA	F	1998	1999		W9904				
W9906	FLENAU2	M	1998	1999		W9904				
W9907	JÖLLMYRU2	M	1998			W9003				
W9908	SUSSI	F	1998			W9003				
W9909	STUBBA	F	1989			95SS92	W8607	0.98		
W9910	HINSA	F	1998	1999		W8808	W9301	0.99		
W9911	SIKA	F	1998	2000		W8808	W9301	0.99		
W9912	NOPPI-U3	F	1998	1999		W8808	W9301	0.28		
W9913	STRANDLI	F	1998			W9404	W9311	0.99		
W9914	GIRA	F	1998			W9404	W9311	0.95		
W9915	BÖRRINE-U3	M	1998	1999		W9404	W9311	0.99		
W9916	OLINGEN	M	1994						98SS05 (0.99)	
W9917		M	1995	1999						95SN01 (0,96)
W9918	AJTO	M	1998			W8906	W9807	0.99		
W9919	MILLA	F	1998	1999		W8906	W9807	0.99		
W9920	ALAN	M	1998	2003		W8906	W9807	0.99		
W9921	LUSEN	M	1991	2003		W8707	W8804	0.99		
W9922	BJÖRNBERGU4	M	1999	1999		W8905	W8607	0.99		
W9923	BJÖRNBERGU5	M	1999	1999		W8905	W8607	0.99		

B) Northern study area

Offspring	Name	Sex	Birth year	Death year	litter	Probable couple		Parentage probability	Possible mothers (probability)	Possible fathers (probability)
						Mother	Father			
BD01	RAPA	F	1983			BD27				
BD03	KNOLL	M	1983							
BD04	TOTT	M	1983							
BD06	SVARTE	M	1975							02BD99 (0,94)
BD07	TARRA	F	1980	2000						
BD10	RITA	F	1981							
BD11	RULLE	M	1986			BD10				
BD12	RISSA	F	1986			BD10				
BD13	RASK	M	1986	1988		BD10				
BD15	BROR	M	1985	1989						
BD16	STINA	F	1982	1990						
BD17	FINN	M	1983	1988						
BD18	GRETA	F	1982							
BD22	PORJUSI	M	1977	1989						
BD23	TINA	F	1984			BD27	BD06	0,99		
BD24	PIA	F	1988			BD01	BD22	1		
BD25	MIA	F	1988			BD01	BD22	1		
BD26	ILO	M	1989	1993						BD17 (0,99)
BD27	STANTA	F	1977							
BD28	ÄNOK	M	1988			BD27	BD06	1		
BD29	VARTO	M	1988			BD27	BD06	1		
BD30	KIBLO	M	1989			BD18				
BD31	TJUOLAK	M	1989	1991		BD18				
BD32	PORJUS	M	1988	1990						
BD33	LINN	F	1974							

BD34	NÅITE	M	1986						
BD35	STURE	M	1990	1998		BD23	BD06	1	
BD36	PETER	M	1991	2003		BD62			
BD37	TJUOLTA	F	1991		▦	BD27	BD06	0,99	
BD38	VALLATJ	M	1991		▦	BD27	BD06	0,99	
BD39	TJÅROK	M	1991	1992	▦	BD27	BD06	0,15	
BD40	STIG	M	1988						
BD41	JENS	M	1991		▦	BD33	BD06	1	
BD42	ROBBAN	M	1991	1996	▦	BD33	BD06	1	
BD43	SÖREN	M	1990	1994					
BD44	NJANNJA	F	1992	1993	▦	BD23	BD06	1	
BD45	TJAPPIS	M	1992	1994	▦	BD23	BD06	0,99	
BD46	AIME	F	1992			BD18	BD60	1	
BD47	TIELMA	F	1992		▦	BD01	BD06	1	
BD48	SKÅRKI	M	1992		▦	BD01	BD06	1	
BD49	NAMMATJ	F	1990		▦	BD07	BD06	1	
BD50	NJUNJES	F	1990	1994	▦	BD07	BD06	1	
BD51	MAJSVEN	F	1989	2003		BD33	BD06	1	
BD52	GARDA	F	1993		▦	BD33	BD06	0,96	
BD53	TJÅKKÅ	M	1993	1997	▦	BD33			
BD54	ARVAS	F	1993		▦	BD33			
BD55	MUNKA	M	1993	1997	▦	BD33			
BD56	LULLI	F	1993		▦	BD24	BD34	1	
BD57	KASKA	F	1993	1995	▦	BD24	BD06	0,99	
BD58	PIELLO	M	1993		▦	BD24	BD06	1	
BD59	IVAR	M	1991						
BD60	TEUNE	M	1987	1996					
BD61	ASTOR	M	1991						
BD62	SKAITE	F	1981			BD33	BD06	1	
BD63	TSAPEK	F	1994		▦	BD62	BD06	1	
BD64	TARFEK	F	1994		▦	BD62	BD06	0,99	
BD65	AKALM	F	1994		▦	BD07	BD43	1	
BD66	KURRA	F	1994	1996	▦	BD07	BD43	1	
BD67	SÅMMA	F	1994		▦	BD07	BD43	1	

BD68	HAUKA	M	1994	1997		BD51	BD43	1	
BD69	BLÄCKA	F	1994			BD51	BD43	1	
BD70	SADDJA	F	1994			BD51	BD43	1	
BD71	ELISE	F	1992			BD07	BD06	0,99	
BD72	AKKA	F	1994			BD25	BD06	1	
BD73	RAKAS	M	1995			BD49	BD36	0,99	
BD74	RAUKA	M	1995			BD49	BD36	0,22	
BD75	KUOSSA	F	1995			BD49	BD36	0,99	
BD76	GRETAk3:1	F	1995			BD18	BD60	1	
BD77	GRETAk3:2	F	1995			BD18	BD60	1	
BD78	PIELA	F	1995			BD01	BD36	1	
BD79	LÅDDE	M	1995			BD01	BD36	1	
BD80	KÅBREK	M	1996			BD37	BD36	0,99	
BD81	SÄKOK	M	1996	1997		BD37	BD36	1	
BD82	MATER	M	1996			BD37	BD36	0,99	
BD83	GRUMME	M	1996	1999		BD07	BD35	1	
BD84	SIGGE	M	1996	1997		BD07	BD35	0,99	
BD85	AIVO	F	1996	1997		BD07	BD35/BD06	0,93/0,06	
BD86	PARKA	F	1997			BD62			
BD87	TSIELEK	M	1997	1999		BD62			
BD88	EGIL	M	1992	2000		BD62			
BD89	LUOVVA	F	1997			BD23	BD97	0,99	
BD90	LIGAS	M	1997			BD51	BD61	1	
BD91	SILES	M	1997			BD51	BD61	0,99	
BD92	LENNART	M	1997			BD25	BD59	0,99	
BD93	TJAPA	M	1997	2000		BD25	BD59	1	
BD94	AKTSE	M	1997			BD47	BD06	0,99	
BD95	LINOK	F	1990						BD62 (0,99)
BD96	TJEGGEL	M	1994						BD95 (0,88)
BD97	LUOKKA	M	1992						
BD98	TARRAk6:1	M	1998			BD07	BD88	0,99	
BD99	TARRAk6:2	M	1998	2000		BD07	BD88	1	
BD100	SOLLAN	F	1998			BD49	BD06	1	
BD101	BEA	F	1998	1999		BD49	BD06	0,93	

BD102	NAMMATJk2:3	M	1998			BD49	BD38/BD06	0,88/0,12		
BD103	AIMEk1:2	M	1998			BD46	BD36	1		
BD104	SUSANNE	F	1991	2003		BD12	BD60	0,99		
BD105	INGVAR	M	1996			BD95				
BD106	KÅTOK	M	1998			BD01	BD59	0,98		
BD107	STUOLLO	M	1998	1999		BD01	BD59	0,99		
BD108	JEKNA	F	1998			BD01	BD59	1		
BD109	NISSUA	F	1999			BD95	BD96	0,99		
BD110	NEITA	F	1999			BD95	BD96	1		
BD111	LINOKk1:3	M	1999			BD95	BD96	0,53		
BD112	LORIDANA	F	?			BD62	BD36	0,99		
BD113	TINAk5:1	M	1999	2002		BD23	BD35	0,99		
BD114	TINAk5:2	M	1999	2002		BD23	BD35	1		
BD115	VUOTSA	F	1999			BD51	BD96	0,99		
BD116	REIPI	F	1999	2000		BD51	BD61	1		
BD117	TJUOIVA	F	1999			BD51	BD96	1		
BD118	LOTTA	F	1999			BD64	BD88	0,99		
BD119	TARFEKk1:2	M	1999			BD64	(BD119 not typed)			
BD120	ELIZA	F	2000			BD49	BD97	1		
BD121	MAMMATJk3:2	M	2000			BD49	BD97	0,99		
BD122	EVA	F	2000			BD67	BD88	0,99		
BD123	ELENA	M	1998			BD153	BD97			
BD124	PATRICIA	F	2001			BD 51	BD96	0,97		
BD125	MAJSVEN k4:2	M	2001			BD 51	BD96	0,83		
BD126	MAJSVEN k4:3	M	2001			BD 51	BD96	0,99		
BD127	SADDJA k2:1	M	2001			BD 70	BD96			
BD128	ELIN	F	2001			BD 70	BD96	1		
BD129	SADDJA k2:3	M	2001	2003		BD 70	BD96	0,99		
BD130	HEIKA	F	2001			BD 69				
BD131	MAJA	F	2001			BD 104	BD38	0,99		
BD132	LINA	F	2001			BD 104	01BD02	0,99		
BD133	LIUKA	F	2001			BD 75				
BD134	ELISE k3:1	M	2001			BD 71	BD88			
BD135	WIEBKE	F	2001			BD 71	BD88			

BD136	LOMMA	F	2001			BD 47	BD105	0,99	
BD137	ANKI	F	2001			BD 47	BD105	0,97	
BD138	TIELMA k2:3	M	2001			BD 47	BD105		
BD139	HANNA	F	2001			BD 01			
BD140	RAPA k5:2	M	2001			BD 01			
BD141	RAPA k5:3	M	2001			BD 01			
BD142	KARJEL	M	2001			BD 52	BD61	0,99	
BD143	MARIA	F	2001			BD 52	BD61	0,99	
BD144	Tsapek k 3:1	M	2002			BD 63	BD97	0,93	
BD145	Tsapek k 3:2	M	2002			BD 63	BD97	0,98	
BD146	Tina k 6:1	M	2002			BD 23	BD36	0,97	
BD147	Deeva	F	2002			BD 23	BD36	0,99	
BD148	Tina k 6:3	M	2002			BD 23	BD36	0,99	
BD149	Tsapek k 3:3	M	2002			BD 63	BD97	0,99	
BD150	Mieka	F	1996			BD95			
BD151	Vuoja	F	2001			BD 150	BD88	0,99	
BD152	Savon	F	2001			BD 150	BD88	0,99	
BD153	Madonna	F	1990			BD62	BD154	0,97	
BD154	Even	M							
BD155	Gina	F	1998			BD112	BD61	0,98	
BD156	Lars	M	1998						

PAPER I

PARENTE: computer program for parentage analysis.

By

Alain CERCUEIL , Eva BELLEMAIN and Stéphanie MANEL

Correspondance :

Alain Cercueil

Laboratoire de modélisation et Calcul. IMAG, BP 53, 38041 Grenoble cedex 09, France.

Tel: (33) 4 76 63 58 29; Fax : (33) 4 76 63 12 63.

E-mail : alain.cercueil@imag.fr

PAPER II

A multiplex pre-amplification method that significantly improves microsatellite amplification and

error rates for faecal DNA in limiting conditions

By

Piggott, M.P., Bellemain, E., Taberlet, P. & Taylor, A.C.

Correspondance:

Maxine, P. Piggott

School of Biological Sciences, Monash University, Clayton Victoria 3800, Australia.

Tel: +61 399055661, Fax: +61 399055613.

E-mail: Maxine.Piggott@sci.monash.edu.au)

PAPER III

Improved non invasive genotyping method: application to brown bear (*Ursus arctos*) feces.

By

Eva BELLEMAIN & Pierre TABERLET

Correspondance :

Eva Bellemain

Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier BP53, 38041 Grenoble

Cedex09, France. Tel: +33(0)4 76 63 54 37 ; Fax : +33(0)4 76 51 42 79.

Agricultural University of Norway, Department of Ecology and Natural Resource Management, Postbox

5003, No-1432 Ås, Norway.

E-mail : eva.bellemain@ujf-grenoble.fr

PAPER IV

How to track and deal with genotyping errors in population genetics studies

By

Aurélie BONIN, Eva BELLEMAIN, Pernille BRONKEN EIDESEN, François POMPANON, Christian

BROCHMANN & Pierre TABERLET

Correspondance :

Aurélie Bonin

Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier BP53, 38041 Grenoble

Cedex09, France. Tel**:** +33(0)4 76 63 54 37 ; Fax : +33(0)4 76 51 42 79

E-mail : aurelie.bonin@ujf-grenoble.fr

PAPER V

Estimating population size of elusive animals using DNA from hunter-collected feces: comparing four methods for brown bears.

By

Eva BELLEMAIN, Jon E. SWENSON, David, A. TALLMON, Sven BRUNBERG & Pierre TABERLET.

Correspondance :

 Eva Bellemain

Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier BP53, 38041 Grenoble

Cedex09, France. Tel: +33(0)4 76 63 54 37 ; Fax : +33(0)4 76 51 42 79.

Agricultural University of Norway, Department of Ecology and Natural Resource Management, Postbox

5003, No-1432 Ås, Norway.

E-mail : eva.bellemain@ujf-grenoble.fr

PAPER VI

Manuscript

An evaluation of field and genetic methods to estimate brown bear (*Ursus arctos*) population size

By

Knut Håkon SOLBERG, Eva BELLEMAIN, Ola-Mattis DRAGESET, Pierre TABERLET, Jon E.

SWENSON

Correspondance :

Eva Bellemain

Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier BP53, 38041 Grenoble

Cedex09, France. Tel: +33(0)4 76 63 54 37 ; Fax : +33(0)4 76 51 42 79.

Agricultural University of Norway, Department of Ecology and Natural Resource Management, Postbox

5003, No-1432 Ås, Norway.

E-mail : eva.bellemain@ujf-grenoble.fr

PAPER VII

Manuscript

Mating strategies in relation to sexually selected infanticide in a nonsocial carnivore: the brown bear

By

Eva BELLEMAIN, Jon E. SWENSON & Pierre TABERLET

Correspondance :

Eva Bellemain

Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier BP53, 38041 Grenoble Cedex09, France. Tel: +33(0)4 76 63 54 37 ; Fax : +33(0)4 76 51 42 79.

Agricultural University of Norway, Department of Ecology and Natural Resource Management, Postbox 5003, No-1432 Ås, Norway.

E-mail : eva.bellemain@ujf-grenoble.fr

PAPER VIII

Manuscript

The dilemma of female mate selection in the brown bear, a species with sexually selected infanticide.

By

Eva BELLEMAIN, Andreas ZEDROSSER, Stephanie MANEL, Pierre TABERLET & Jon E. SWENSON

Correspondance :

Eva Bellemain

Laboratoire d'Ecologie Alpine, UMR CNRS 5553, Université Joseph Fourier BP53, 38041 Grenoble Cedex09, France. Tel: +33(0)4 76 63 54 37 ; Fax : +33(0)4 76 51 42 79.

Agricultural University of Norway, Department of Ecology and Natural Resource Management, Postbox 5003, No-1432 Ås, Norway.

E-mail : eva.bellemain@ujf-grenoble.fr