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Historical and ecological determinants of genetic structure in arctic canids

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Abstract

Wolves (*Canis lupus*) and arctic foxes (*Alopex lagopus*) are the only canid species found throughout the mainland tundra and arctic islands of North America. Contrasting evolutionary histories, and the contemporary ecology of each species, have combined to produce their divergent population genetic characteristics. Arctic foxes are more variable than wolves, and both island and mainland fox populations possess similarly high microsatellite variation. These differences result from larger effective population sizes in arctic foxes, and the fact that, unlike wolves, foxes were not isolated in discrete refugia during the Pleistocene. Despite the large physical distances and distinct ecotypes represented, a single, panmictic population of arctic foxes was found which spans the Svalbard Archipelago and the North American range of the species. This pattern likely reflects both the absence of historical population bottlenecks and current, high levels of gene flow following frequent long-distance foraging movements. In contrast, genetic structure in wolves correlates strongly to transitions in habitat type, and is probably determined by natal habitat-biased dispersal. Nonrandom dispersal may be cued by relative levels of vegetation cover between tundra and forest habitats, but especially by wolf prey specialization on ungulate species of familiar type and behaviour (sedentary or migratory). Results presented here suggest that, through its influence on sea ice, vegetation, prey dynamics and distribution, continued arctic climate change may have effects as dramatic as those of the Pleistocene on the genetic structure of arctic canid species.

Keywords: *Alopex lagopus*, arctic fox, *Canis lupus*, dispersal, genetic structure, grey wolf, microsatellite, prey specialization

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Introduction

Canid species inhabit forests and jungles, prairies and savannas, mountains, deserts and coastlines; they are able to thrive in undisturbed habitats and in human cities (Wandeler *et al*. 2003; IUCN/SSC 2004). However, only two species, the arctic fox (*Alopex lagopus*) and the grey wolf (*Canis lupus*), occupy the mainland tundra and arctic archipelago of North America (Angerbjörn *et al*. 2004a; Mech & Boitani 2004). Commonalities and contrasts in the history and behaviour of these arctic canid species could make a comparison of their population genetics particularly interesting.

Fossil evidence suggests modern wolves and arctic foxes reached the New World during later phases of the Pleistocene (Kurtén & Anderson 1980), but their post-arrival histories show few similarities. Grey wolf morphology supports persistence in multiple glacial refugia (Brewster

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& Fritts 1995), followed by expansion throughout North America at the onset of the current interglacial (Nowak 2003); the present reduced range of this species is a consequence of recent persecution (Leonard *et al*. 2005). Unlike wolves, arctic foxes were widely distributed during the last glaciation, their current North American range reflecting progressive contraction of suitable habitat towards the pole (Kurtén & Anderson 1980; Dalén *et al*. 2004, 2005) and northward expansion of their primary competitor, the red fox (*Vulpes vulpes*, Hersteinsson & Macdonald 1992; Tannerfeldt *et al*. 2002). Contemporary variation and genetic structure in arctic canids could therefore be very different.

On the other hand, analogous ecologies and life histories may be expected to produce analogous population genetic characteristics. For example, northern wolves and arctic foxes have developed similar strategies for dealing with the variation in type and density of available prey that is typical of arctic ecosystems. Two arctic fox ecotypes are generally recognized: 'coastal' foxes, feeding on birds, eggs, and carrion from the marine ecosystem (e.g. polar bear kills); and 'lemming' foxes, which subsist primarily on small mammals of cyclical abundance (Braestrup 1941). The stable resource base available to coastal foxes results in smaller home ranges (Eide *et al*. 2004) which may be occupied and defended year round (Anthony 1997; Audet *et al*. 2002). However, lemming foxes are territorial primarily during the breeding season, and in winter, many arctic foxes travel distances up to 2300 km in search of food (Eberhardt *et al*. 1983). Long-range foraging movements have also been documented through regions which do not support breeding populations, such as sea ice (640 km) and the southern boreal forest (1000 km, Wrigley & Hatch 1976). The high vagility of these small canids is thought to be an adaptation to regional synchrony of lemming population dynamics (Pulliainen 1965; Audet *et al*. 2002; Dalén *et al*. 2006), and would be expected to reduce genetic differentiation among populations. We might even predict lower differentiation among North American lemming foxes, relative to coastal foxes living, for example, in the Svalbard archipelago.

Like arctic foxes, northern grey wolves can be divided into two prey-defined ecotypes with divergent behaviours. Forest wolves feed primarily on resident ungulates like moose, elk, and deer, and inhabit and defend their territories in all seasons (e.g. Huggard 1993; Hayes *et al*. 2000; Mech & Boitani 2003). Mainland tundra wolves rely on migratory barren ground caribou and are territorial only while denning; during the fall and winter, wolves follow the movements of the caribou from their calving areas on the tundra to wintering grounds below the tree line, which may be thousands of kilometres away (Kuyt 1972; Heard & Williams 1992; Walton *et al*. 2001; Musiani 2003). Dispersal distances of forest wolves vary with availability of vacant territories, and can be as great as 886 km (Fritts 1983; Mech & Boitani 2003). Studies distinguishing dispersal distances from migratory movements of tundra wolves have not been conducted, but dispersal during migration was recently documented (Walton *et al*. 2001). Gene flow of tundra wolves could therefore be much greater than that of wolves in the boreal forest or on arctic islands without migratory caribou populations, even as gene flow among lemming foxes could be higher than that of coastal foxes. In both species, prey specialization could reduce gene flow between populations of different ecotypes (Carmichael *et al*. 2001; Geffen *et al*. 2004; Pilot *et al*. 2006).

Despite their similar responses to common climatic and foraging challenges, the social behaviour of wolves and arctic foxes is quite different, and could have opposing effects on variation and genetic differentiation. Wolves form packs which generally centre around a dominant breeding pair (Mech & Boitani 2003). Groups average six to eight individuals, and may include offspring of the breeders and additional nonbreeding helpers. By comparison, arctic foxes form smaller groups — most often consisting of a mated pair and their offspring (Audet *et al*. 2002) — that may not persist after the denning season. Grey wolves also have smaller litter sizes relative to arctic foxes, which may wean as many as 19 cubs in a peak lemming year (Geffen *et al*. 1996; Angerbjörn *et al*. 2004a). Lower current effective population sizes should produce lower genetic variation in grey wolves relative to arctic foxes, perhaps maintaining patterns originally produced by the species' divergent Pleistocene histories.

Of the various genetic studies that have been conducted on wolves (e.g. Roy *et al*. 1994; Vilà *et al*. 1999; Flagstad *et al*. 2003; Blanco *et al*. 2005; Kyle *et al*. 2006), only one focused specifically on New World arctic populations, and it was unfortunately restricted to a small portion of the Canadian Northwest (Carmichael *et al*. 2001). The single genetic study of North American arctic foxes included few sampling locations and focused on phylogeography using mitochondrial DNA (mtDNA, Dalén *et al*. 2005); recent or finer-scale differentiation may therefore have gone undetected. Here, we compare population-level genetics of both canid species, using microsatellite markers and populations distributed throughout the North American Arctic. Wolves are expected to display lower genetic variation and greater genetic structuring than arctic foxes. Differentiation among territorial forest wolves should be higher than that among migratory barren ground populations; in arctic foxes, coastal populations might display greater differentiation than inland 'lemming' fox populations. In both wolves and arctic foxes, gene flow between ecotypes could be inhibited by prey specialization. Identification of the historical, physical, and/or ecological factors with greatest influence on the contemporary genetics of these canid species may be particularly useful for their conservation in a changing arctic environment.

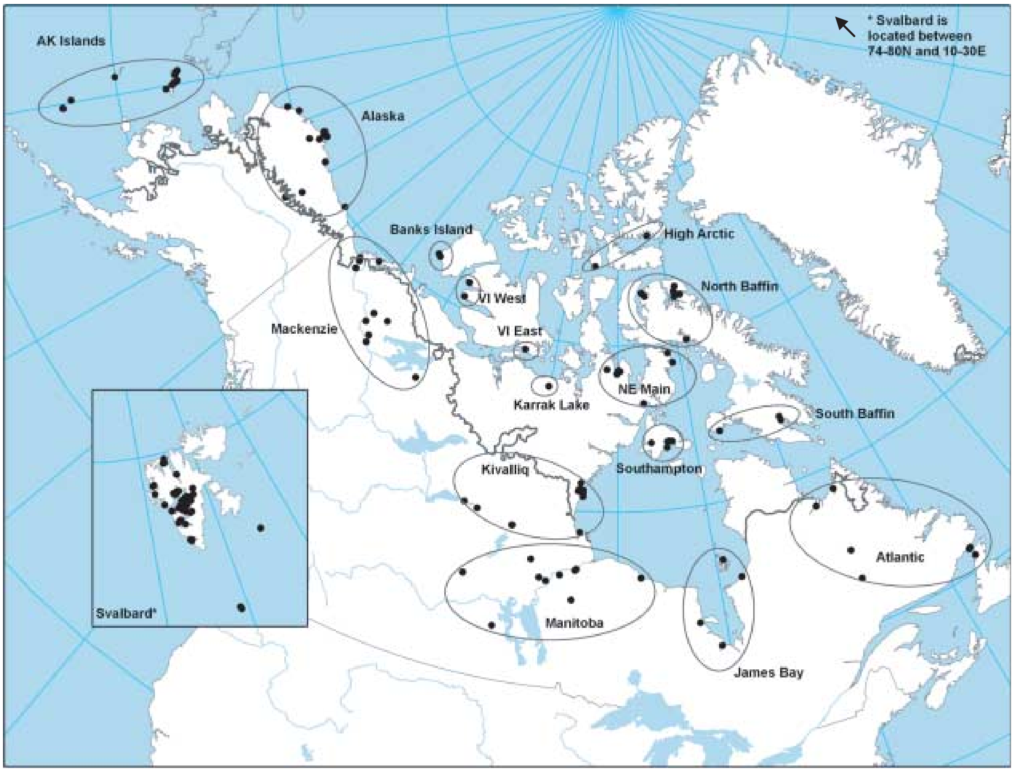

Fig. 1 Arctic fox samples grouped into geographical regions (some sites represent multiple samples). Svalbard foxes are considered coastal foxes, with all other populations belonging to the lemming ecotype. Tree line is indicated with a grey line.

Materials and methods

Sample collection, laboratory analysis and data set validation

We collected contemporary samples of 1063 lemming arctic foxes distributed throughout their North American range (Fig. 1). Foxes from the Svalbard archipelago (n = 637) were included for comparison due to their physical separation from contiguous New World populations and their membership in the coastal ecotype. Sampling area for wolves extended across the North American Arctic and included territorial boreal forest wolves for comparison to migratory tundra populations (Fig. 2). We genotyped 2025 wolves, including 491 individuals previously examined by Carmichael *et al*. (2001). Samples obtained from the University of Alaska tissue collections are listed in Table S1, Supplementary material.

Tissue and blood samples were stored frozen while dry material such as pelt or hair was kept at room temperature. We used DNeasy tissue kits (QIAGEN) to extract genomic DNA from all samples. Microsatellite loci were amplified through polymerase chain reaction (PCR) using fluorescently labelled primers from domestic dogs. Fifteen loci were amplified in wolves: CPH5 and CPH16 (Fredholm & Wintero 1995); CXX110, CXX140, CXX173, CXX250, CXX251, and CXX377 (Ostrander *et al*. 1993); CXX618, CXX671, CXX733, CXX745, CXX758, CXX781, and CXX2079 (Mellersh *et al*. 1997). We used 13 loci for arctic foxes: CPH5, CPH8, CPH9, and CPH15 (Fredholm & Wintero 1995); CXX140, CXX147, CXX173, and CXX250 (Ostrander *et al*. 1993); CXX671, CXX733, CXX745, CXX758, and CXX771 (Mellersh *et al*. 1997). Eight loci were common between the species; six of the wolf markers were also used by Carmichael *et al*. (2001).

For arctic foxes, single-locus amplifications of CPH5, CPH8, CPH9, CXX140, CXX147, CXX250, or CXX745 contained 0.16 μmol each primer, 0.12 mmol dNTP, 2.5 mmol $MgCl_2$, 1 × PCR buffer (50 mmol KCl, 10 mmol Tris-HCl, pH 8.8, 0.1% Triton X100), 1 U *Taq* polymerase, and approximately 40 ng template in 15 μL total. For multiplex reactions of CXX173/CXX671, CPH15/CXX758, or CXX733/CXX771, we increased dNTP concentration to 0.16 mmol and $MgCl_2$ to 2.7 mmol. Wolf loci were amplified in the following multiplexes: CPH5/CXX2079; CXX671/CXX173/CXX377; CXX745/CPH16; CXX140/CXX250/CXX251; CXX618/CXX758/CXX110; and CXX733/CXX781. Reactions contained 0.16 mmol dNTP, 1.7–2.5 mmol $MgCl_2$, and

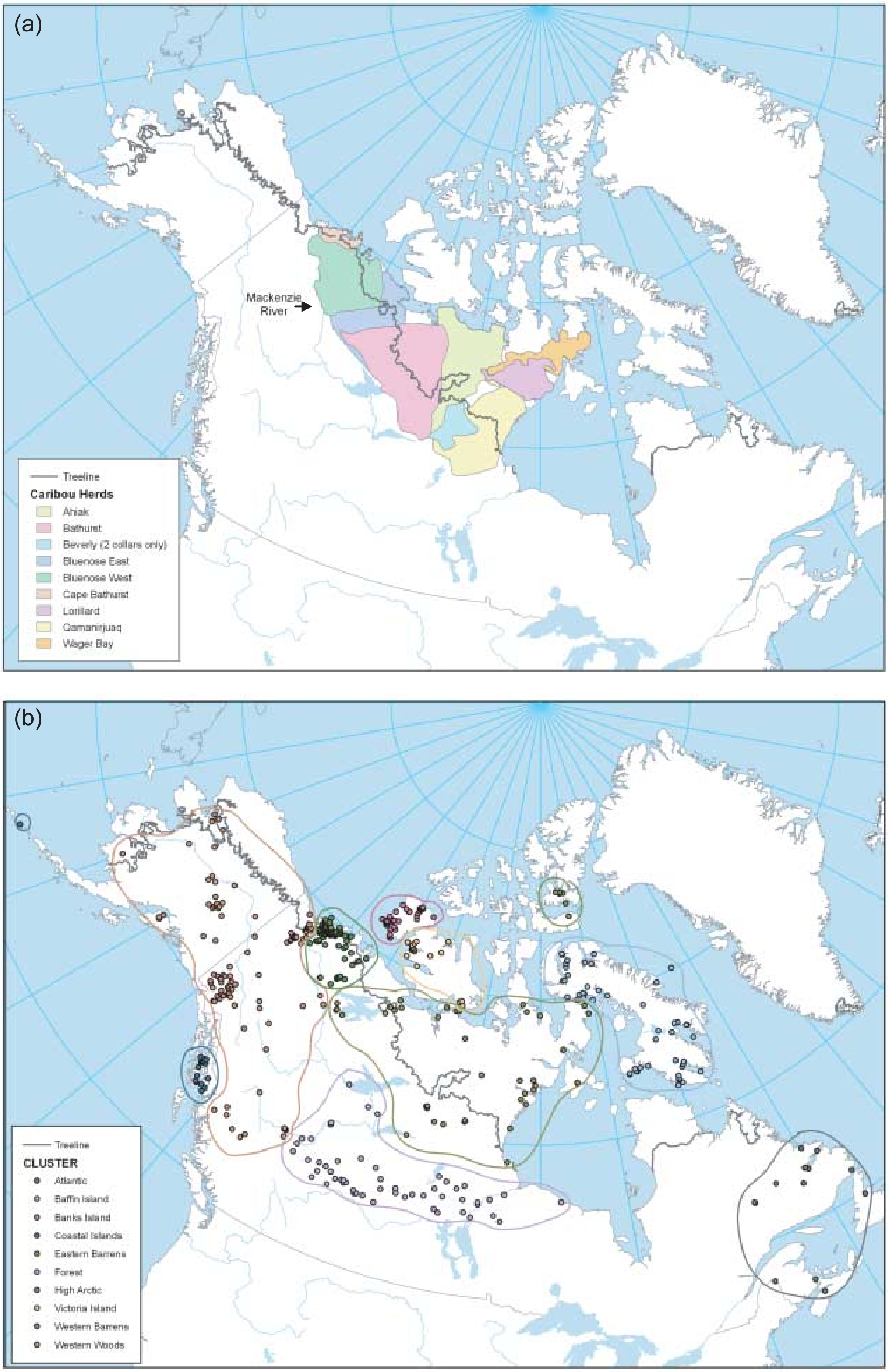

Fig. 2 (a) Annual ranges of migratory barren-ground caribou herds found on the mainland. Caribou calve on the tundra and winter below tree line. (b) Grey wolf samples grouped into genetic clusters, based on STRUCTURE and GENELAND analyses. Western Barrens and Eastern Barrens represent migratory wolves, with all other populations belonging to the territorial ecotype.

0.5–2.5 U *Taq*, with primer concentrations in each reaction scaled for optimal product balance.

All PCR amplifications were conducted in Eppendorf Mastercycler ep thermocyclers (Eppendorf AG) with: 2 min at 94 °C; 3 cycles of 45 s at 94 °C, 30 s at 50 °C, 10 s at 72 °C; 30 cycles of 35 s at 94 °C, 35 s at 50 °C, 5 s at 72 °C; and 30 min at 72 °C. Reaction products were separated on an ABI 377 Sequencer (Applied Biosystems) and genotypes assigned using GENESCAN 3.1 and GENOTYPER 2.0 software (Applied Biosystems). All genotypes were checked twice by eye and all ambiguous results repeated.

We used the MICROSATELLITE TOOLKIT version 3.1 for PC Microsoft Excel (Park 2001) to check the data set for typographical errors and for samples with identical genotypes. Most matching pairs consisted of a fur house sample and one collected directly from the hunter; the sample with the least reliable biological data was excluded. One pair of identical wolves appeared to represent monozygotic twins (L.E. Carmichael, A. Nagy, C. Strobeck, in preparation), and therefore both individuals were retained. After elimination of matching individuals, 1924 wolves and 1514 arctic foxes remained for analysis.

Preliminary analysis

Capture locations of all samples were mapped using ARCGIS 9.1 (Environmental Systems Research Institute 1999–2004). Arctic fox samples were grouped based on gaps in the sampling distribution (Fig. 1). Wolves were divided into geographical regions (Fig. S1, Supplementary material) based on these three hierarchical criteria: (i) gaps in the sampling distribution, (ii) ranges of associated barren ground caribou herds (Fig. 2a, Hall 1989; Carmichael *et al*. 2001; Zittlau 2004), and (iii) political boundaries of Canadian provinces. The geographical regions thus defined for each species were tested for genic differentiation, linkage disequilibrium, and Hardy–Weinberg equilibrium using the Markov chain method of GENEPOP 3.4 (Raymond & Rousset 1995) with 10 000 dememorizations of 1000 batches, and 10 000 iterations per batch. Genic differentiation results were combined across loci using Fisher's method (Sokal & Rohlf 1995), and Bonferroni corrections used to obtain *P* values of 0.05 for all tests.

Genetic clustering of each species

We used STRUCTURE 2.1 to perform Bayesian clustering of genotypes, including all loci and without any prior spatial information (Pritchard *et al*. 2000). Initial runs for arctic foxes consisted of 100 000 burn-in cycles followed by 1 million iterations of the Markov chain. We estimated a unique level of admixture (α) for each cluster; λ, describing the allele frequency distribution of each locus, was also inferred. Setting the number of clusters, K, to vary between 1 and 4, indicated that an appropriate value for λ was 0.5 and that α was unequal between clusters and often small; we therefore set ALPHAPROPSD to 0.1. These final parameters were used to conduct two replicates each of K = 1–7. A similar exploration indicated that λ = 0.4 was most appropriate for wolves; all other parameters were identical to those for arctic foxes. As we observed greater variation between wolf runs, three replicates each of K = 1–13 were performed to examine convergence of the Markov chain. The number of clusters in each species was determined based on peaking of lnProb(D) (Pritchard *et al*. 2000; Faubet *et al*. 2007), level of admixture in each cluster, and the partitioning of individuals between clusters.

STRUCTURE results for wolves were confirmed using GENELAND, a Bayesian clustering program that incorporates spatial coordinates of individuals into the analysis via Voronoi tessellation; GENELAND therefore assigns greater probability to genetic clusters that are continuous within the spatial landscape (Guillot *et al*. 2005). STRUCTURE results suggested that K = 7 was most appropriate for wolves (Fig. S2a, b, Supplementary material), and we thus employed the following settings in GENELAND: delta.coord 0.15 (to 'de-noise' the spatial coordinates); 1 million iterations; burn-in 100 000 iterations; thinning 1000; the Dirichlet allele frequency model (Guillot *et al*. 2005); and seven populations. Arctic foxes were not analysed in the GENELAND framework as STRUCTURE suggested K was most likely at 1 (see Results).

Outputs from STRUCTURE and GENELAND were combined to devise wolf genetic clusters which were used for all further analysis (Table S2); since foxes formed a single cluster, parallel analyses were conducted on fox geographical regions (Fig. 1). Figure 2b shows wolf genetic clusters and their ecotype (migratory barren ground or territorial forest). Throughout the study, 'region' refers to a geographically defined group of samples, 'cluster' refers to a genetically defined group of samples, and 'population' is used inclusively.

Genetic variation within species

Average expected heterozygosity (H_E, Nei & Roychoudhury 1974) in each population was calculated in the MICROSATELLITE TOOLKIT version 3.1 for PC Microsoft Excel (Park 2001). To identify significant differences in H_E, we performed two-tailed Wilcoxon's signed-ranks tests (Sokal & Rohlf 1995) between pairs of populations within each species, using critical values for $P = 0.05$ and 11 or 13 degrees of freedom (number of loci minus 1). The rarefaction method implemented in CONTRIB 1.01 (Petit *et al*. 1998) was used to calculate allelic richness after correction for variation in sample size, with a rarefaction size of 20 allele copies in foxes and 22 copies in wolves (Table 1).

Table 1 Genetic variation in arctic foxes and grey wolves

Arctic foxes					Grey wolves				
Region*	N†	H_E‡	H_E SD	A^R (20)§	Cluster*	N†	H_E‡	H_E SD	A^R (22)§
Alaska	50	0.78	0.04	6.84	Western Woods	322	0.73	0.02	5.67
Mackenzie	20	0.76	0.03	6.49	Forest	258	0.74	0.03	5.92
Karrak	50	0.77	0.03	6.52	Western Barrens	237	0.74	0.02	5.92
Kivalliq	304	0.79	0.03	6.80	Eastern Barrens	704	0.74	0.03	6.04
NE Main	99	0.81	0.04	7.05	Atlantic	25	0.75	0.03	6.06
Manitoba	46	0.78	0.03	6.50					
James Bay	16	0.77	0.05	6.67					
Atlantic	25	0.81	0.04	7.14					
Mainland		**0.78**		**6.65**	**Mainland**		**0.74**		**5.92**
AK Islands	30	0.78	0.05	7.90	Coastal Islands	36	0.61	0.05	4.19
Banks Island	10	0.80	0.03	7.00	Banks Island	163	0.63	0.03	3.65
Victoria West	71	0.79	0.03	6.64	Victoria Island	52	0.65	0.03	4.30
Victoria East	24	0.78	0.04	6.80	High Arctic	11	0.49	0.06	3.07
High Arctic	19	0.76	0.05	6.52	Baffin Island	116	0.60	0.04	4.20
Southampton	19	0.77	0.05	6.63					
North Baffin	68	0.78	0.03	6.69					
South Baffin	27	0.78	0.03	6.56					
Svalbard	636	0.78	0.03	6.48					
Island		**0.78**		**6.80**	**Island**		**0.60**		**3.88**

*Arctic fox regions are shown in Fig. 1 and wolf clusters in Fig. 2b. Averages for population type are given in bold.
†number of individuals sampled in each region.
‡expected heterozygosity, with standard deviation indicated by SD.
§allelic richness, with rarefaction size (in alleles) given in brackets.

Genetic distance and assignment

We used PHYLIP 3.65 (Felsenstein 1995) to generate 1000 bootstrap pseudoreplicates of wolf clusters and fox regions. Nei's D_S (Nei 1972) was calculated for each replicate, and neighbour-joining majority-rule consensus trees constructed (Felsenstein 1985; Saitou & Nei 1987). Euclidean distance was calculated among populations within species using average latitude and longitude and the 'Geographic Distances' subroutine of MANTEL 4.0 (Casgrain & Legendre 2001). We then performed a Mantel test (Mantel 1967) of D_S and log-transformed geographical distances, with 9999 permutations, to assess isolation by distance in each species.

Paetkau *et al*.'s (1995) assignment test was conducted with allele frequencies adjusted to avoid zeros (Titterington *et al*. 1981). To identify levels of cross-assignment greater than those expected due to correlation of allele frequencies between clusters, 10 000 replicates were performed, creating new individuals and assuming Hardy–Weinberg equilibrium (Carmichael *et al*. 2001). In addition to providing estimates of the relative number of migrants between two populations, assignment indices can be used as an indicator of relative differentiation, and were employed to explore contrasts between wolves in different habitat types.

Correlates of genetic structure in wolves

Carmichael *et al*. (2001) used partial Mantel tests to estimate correlations between physical barriers and genetic distance between populations while controlling for the influence of physical distance (Smouse *et al*. 1986). The inability to simultaneously assess more than two predictor variables, and recent concerns regarding the validity of associated significance estimates (Raufaste & Rousset 2001), are limitations of this technique. An alternative recently applied to population genetic data in wolves is distance-based redundancy analysis (dbRDA, McArdle & Anderson 2001; Geffen *et al*. 2004; Pilot *et al*. 2006). The dbRDA allows the user to test up to $N - 1$ predictor variables (N = number of populations) either individually, or fitted in sequence to produce a combined model. Significance estimates in dbRDA have also been proven adequate (McArdle & Anderson 2001). We used this approach to test correlations between Nei's D_S among our wolf clusters and a suite of 22 potential determinants of genetic structure. The eight factors most related to D_S in preliminary tests were retained for full analysis and are described below.

Carmichael *et al*. (2001) and Pilot *et al*. (2006) suggested wolf genetic structure may result from specialization on particular prey types. We therefore designed a categorical predictor indicating the dominant prey species within the range of each wolf cluster, based upon distribution of large ungulate species (moose, elk, deer, muskoxen, or barren-ground caribou) and available wolf diet studies (Larter *et al*. 1994; Hayes *et al*. 1997, 2000; Kohira & Rexstad 1997; Olsen *et al*. 2001; Mahoney & Virgl 2003; Stenhouse *et al*. 1995; Spaulding *et al*. 1998; Schaefer *et al*. 1999; Urton & Hobson 2005; R. Popko, personal communication). However, wolf diet is complex and variable over space and time, and we were forced to make a number of assumptions while constructing this predictor. To simplify and to focus on an aspect of prey behaviour that influences movement patterns of associated wolves (Ballard *et al*. 1997; Walton *et al*. 2001), we constructed a second indicator denoting the behaviour, sedentary or migratory, of each dominant prey species (migratory barren-ground caribou = 0, all others = 1). These predictors were tested singly and as a set called 'prey'.

Isolation by a water barrier — the Mackenzie River, channels of the Arctic ocean and the straits between the Coastal Islands and the mainland (Fig. 2a) — was coded with a 1, with absence of a barrier represented by 0. Annual minimum temperature and annual rainfall in each area were obtained from Environment Canada (2000) and the National Climatic Data Center's (2000) online databases, and represented as continuous variables. Vegetation complex in each cluster was coded as a categorical variable based on the World Wildlife Fund's Terrestrial Ecosystems (ESRI). Temperature, rainfall, and vegetation were tested separately and as a set called 'habitat.' Finally, average latitude and longitude for each cluster were tested individually, as a set called 'spatial', and in combination with other variable sets.

We used the program PCO to perform principle coordinate analysis (PCA) on our genetic distance matrix (Anderson 2003b), then conducted dbRDA on all variables using DISTLM *forward* (Anderson 2003a). Marginal tests of each predictor or set of predictors were made, followed by sequential tests using a forward selection procedure to produce a combined model of genetic differentiation in wolves (Pilot *et al*. 2006).

Results

Equilibrium and differentiation in each species

Allele frequencies in arctic fox regions were generally homogeneous; the Svalbard population was one consistent exception. Ten locus pairs deviated from linkage equilibrium in the Svalbard fox population alone, suggesting hidden population structure rather than nonindependence of loci.

CPH5 and CXX110 showed significant association in eight out of 21 wolf regions, indicating potential physical linkage (all other Bonferroni-corrected significant results occurred in a single population). Since CXX110 was less variable and more difficult to type, it was excluded from further analysis. In arctic foxes, CPH8 suffered a significant deficiency of heterozygotes in 12 of 17 regions. CPH8 also accounted for over 50% of the missing data in our fox samples, and was excluded for likely possession of null alleles. We therefore proceeded with 14 microsatellite loci in wolves and 12 loci in arctic foxes.

Genetic clustering of each species

As K was increased, lnProb(D) for arctic foxes increased slightly (Fig. S2a). However, for K = 2, an average of 97% of the individuals in each geographical region assigned to a single cluster, and this trend persisted as K was increased. While linkage disequilibrium results suggested substructuring within the Svalbard group, the vast majority of these samples consistently assigned to the single cluster also containing the vast majority of North American arctic foxes. We therefore concluded that the increase in probability with larger K resulted from over-parameterization of the model, and that STRUCTURE was segregating rare alleles, rather than partitioning individuals according to true genetic discontinuities. A single panmictic unit including North America and Svalbard seemed most likely for this species.

In contrast, given the plateau in lnProb(D) and cohesion of the clusters (Fig. S2a, b), K = 7 was the most appropriate choice for wolves. In general, STRUCTURE recovered an Atlantic group, a western and eastern boreal forest group (Western Woods and Forest), and a western and eastern barren ground group (Western Barrens and Eastern Barrens), shown in Fig. 2b. Assignment of mainland clusters was nearly identical in GENELAND as in STRUCTURE (Table S2); however, the methods differed with regards to island populations. GENELAND separated Coastal Island wolves and grouped all arctic island wolves into a single cluster; STRUCTURE divided the arctic islands into a western grouping (Banks and Victoria Island) and an eastern grouping (North and South Baffin Island), and did not delineate Coastal Island wolves until K = 9 (data not shown). We suspect this difference is due to spatial concentration of the Coastal samples, which would receive high weighting in the GENELAND framework.

We combined results from STRUCTURE and GENELAND to devise genetic clusters of wolves in all regions (Fig. 2b; Table S2). North and South Baffin Island were pooled, but all other island populations remained distinct for these three reasons: (i) the conflict between the clustering methods; (ii) the obvious physical boundaries of islands in the landscape; and (iii) to retain the ability to perform detailed examinations of island wolf genetics (Carmichael *et al*., submitted). Ten clusters of wolves were therefore used

Table 2 Nei's standard genetic distance (D_S) between arctic fox regions and wolf clusters (extreme values are indicated in bold)

Arctic foxes	AK	MA	KA	KI	NE	MB	JB	AT	AI	BI	VW	VE	HA	SH	NB	SB	SV
Alaska (AK)	0.00																
Mackenzie (MA)	0.09	0.00															
Karrak (KA)	0.06	0.08	0.00														
Kivalliq (KI)	0.03	0.07	0.03	0.00													
NE Mainland (NE)	**0.02**	0.08	0.04	**0.02**	0.00												
Manitoba (MB)	0.04	0.09	0.03	**0.02**	0.03	0.00											
James Bay (JB)	0.08	0.13	0.09	0.06	0.06	0.08	0.00										
Atlantic (AT)	0.07	0.12	0.08	0.07	0.08	0.08	0.15	0.00									
AK Islands (AI)	0.08	0.11	0.08	0.06	0.09	0.07	0.12	0.09	0.00								
Banks (BI)	0.11	0.11	0.11	0.09	0.08	0.10	**0.18**	0.13	0.14	0.00							
Victoria West (VW)	0.04	0.07	0.04	**0.02**	0.03	0.03	0.07	0.08	0.07	0.09	0.00						
Victoria East (VE)	0.07	0.10	0.05	0.04	0.06	0.06	0.09	0.12	0.10	0.13	0.06	0.00					
High Arctic (HA)	0.06	0.14	0.08	0.06	0.07	0.08	0.11	0.14	0.12	0.13	0.08	0.09	0.00				
Southampton (SH)	0.07	0.07	0.06	0.05	0.06	0.07	0.10	0.08	0.09	0.12	0.06	0.08	0.11	0.00			
North Baffin (NB)	0.04	0.06	0.04	**0.02**	**0.02**	0.03	0.08	0.07	0.08	0.09	0.04	0.06	0.09	0.06	0.00		
South Baffin (SB)	0.04	0.08	0.05	0.03	0.04	0.04	0.07	0.08	0.09	0.12	0.05	0.07	0.08	0.06	0.04	0.00	
Svalbard (SV)	0.03	0.09	0.05	**0.02**	0.03	0.04	0.09	0.07	0.06	0.09	0.04	0.06	0.07	0.07	0.03	0.05	0.00

Wolves	WW	FO	WB	EB	AT	CI	BI	VI	HA	BAF
Western Woods (WW)	0.00									
Forest (FO)	0.11	0.00								
Western Barrens (WB)	0.10	0.05	0.00							
Eastern Barrens (EB)	0.16	**0.04**	**0.04**	0.00						
Atlantic (AT)	0.35	0.26	0.27	0.22	0.00					
Coastal Islands (CI)	0.36	0.44	0.45	0.51	0.66	0.00				
Banks Island (BI)	0.30	0.27	0.24	0.23	0.38	0.89	0.00			
Victoria Island (BI)	0.33	0.22	0.19	0.16	0.42	0.87	0.09	0.00		
High Arctic (HA)	0.49	0.44	0.35	0.33	0.50	**1.23**	0.26	0.25	0.00	
Baffin Island (BAF)	0.36	0.26	0.22	0.16	0.34	0.73	0.42	0.34	0.34	0.00

for all analysis detailed below. Since arctic foxes formed a single cluster, we performed parallel analyses on arctic fox regions (Fig. 1).

Genetic variation

Average H_E for mainland wolves was 74%, with island populations significantly less variable (Wilcoxon's signed-rank test, $P = 0.05$). In arctic foxes, H_E averaged 78% in all types of populations. Allelic richness for both species duplicated these trends (Table 1).

Relationships among canid populations

D_S among wolf clusters is shown in Table 2. Moderate to high levels of support (48–93%) were observed for all nodes in the bootstrap consensus tree except that for the Atlantic population (Fig. 3a). As the placement of the Atlantic cluster is not well supported, we are reluctant to speculate on its basis, but in general, clusters were grouped in approximate reflection of their physical locations (Fig. 2). Despite this visual correspondence between tree topology and geography, we obtained only a moderate correlation between log-transformed physical distance and D_S (Mantel test, $r = 0.44$, $P = 0.04$). In contrast to results for wolf clusters, there was no association, visual or statistical, between geography and D_S in arctic foxes (Mantel test, $r = 0.16$, $P = 0.19$). Indeed, subpopulations located on the same island appear on opposite sides of the tree (Figs 1 and 3b), and genetic distances between regions were generally small (Table 2). These observations confirm that arctic foxes form a single genetic unit.

We next performed classical assignment tests for wolf clusters and fox regions (Paetkau *et al*. 1995). Unsurprisingly, island wolves were most distinct in both genetic distance (Table 2) and assignment analyses (Table 3). We were interested to note, however, that divergence in assignment indices for wolves suggested higher differentiation among territorial boreal forest populations than migratory barren ground ones (Fig. 4). Assignment across habitat types was more complex. Differentiation between the Western Woods and the Western Barrens was similar to

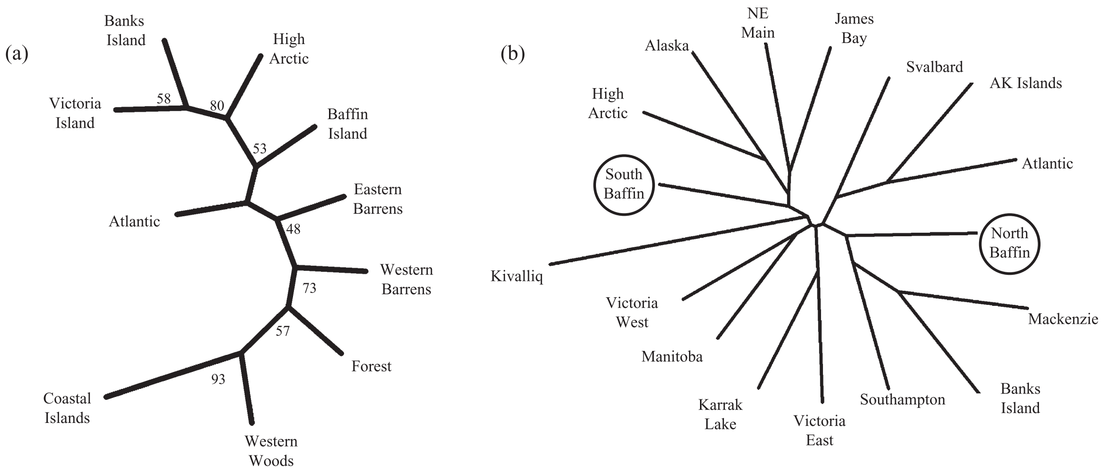

Fig. 3 (a) Majority-rule consensus tree of wolf clusters based on Nei's D_S. Bootstrap support values for each node are indicated. Tree topology is roughly congruent with geography. (b) Majority rule consensus tree of arctic fox regions, based on Nei's D_S. Bootstrap support is not indicated, as no grouping occurred in more than 50% of trees. We observed no correlation between topology and geography (e.g. the positions of the Baffin Island populations).

Table 3 Assignment among wolf clusters. The proportion of individuals sampled in each cluster, which assign to each cluster, is indicated by each row. Self-assignment proportions are italicized, and bold values represent significantly more cross-assignment than predicted given each sample's allele frequencies. Cluster abbreviations follow Table 2

	Assigned cluster									
Sampling cluster	WW	FO	WB	EB	AT	CI	BI	VI	HA	BAF
Western Woods	*0.904*	**0.047**	0.037	0.012	0.000	0.000	0.000	0.000	0.000	0.000
Forest	0.050	*0.589*	0.074	**0.275**	0.000	0.000	0.000	0.004	0.000	**0.008**
Western Barrens	**0.084**	**0.110**	*0.679*	0.089	0.004	0.000	**0.008**	**0.025**	0.000	0.000
Eastern Barrens	**0.024**	**0.192**	0.080	*0.635*	**0.036**	0.000	0.001	0.013	0.000	**0.020**
Atlantic	0.000	0.040	0.000	0.000	*0.960*	0.000	0.000	0.000	0.000	0.000
Coastal Islands	**0.056**	0.000	**0.028**	0.000	0.000	*0.917*	0.000	0.000	0.000	0.000
Banks Island	0.000	0.000	0.000	0.000	0.000	0.000	*0.939*	**0.061**	0.000	0.000
Victoria Island	0.000	0.000	**0.038**	0.038	0.000	0.000	**0.231**	*0.692*	0.000	0.000
High Arctic	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	*1.000*	0.000
Baffin Island	0.000	0.000	0.000	0.060	0.000	0.000	0.000	**0.009**	0.000	0.931

that among forest populations (Figs 4a and 5a), while differentiation between the Eastern Barrens and the Forest was similar to that observed within the tundra (Figs 4b and 5b), despite comparable average physical separation in these cases (Fig. 2). In contrast, arctic foxes show overlapping assignment indices (data not shown) and self-assignment rates below 14% in North America.

Correlates of genetic structure in wolves

We did not pursue model testing for arctic foxes as the level of structure seemed too low to provide any useful signal. However, despite the small number of clusters, structure in wolves was strong enough to produce several significant results.

We began by assessing complexity in our genetic distance matrix using PCA. Several vectors with large and negative eigenvalues were obtained, indicating wolf D_S was nonmetric (Laub & Muller 2004; Table 4a). Studies of pattern-recognition have demonstrated correspondences between negative eigenvalues and hidden aspects of data variation: for example, specificity vs. frequency of words in different texts, or shape vs. stroke weight of numerals (Laub & Muller 2004). The complex aspect of D_S quantified by our negative eigenvectors is not clear, and its origins difficult to conceptualize relative to the 'real' world. However, it is perhaps unsurprising that distance measures which summarize complex information are themselves complex, and furthermore, exclusion of negative vectors biases significance calculations in dbRDA (McArdle &

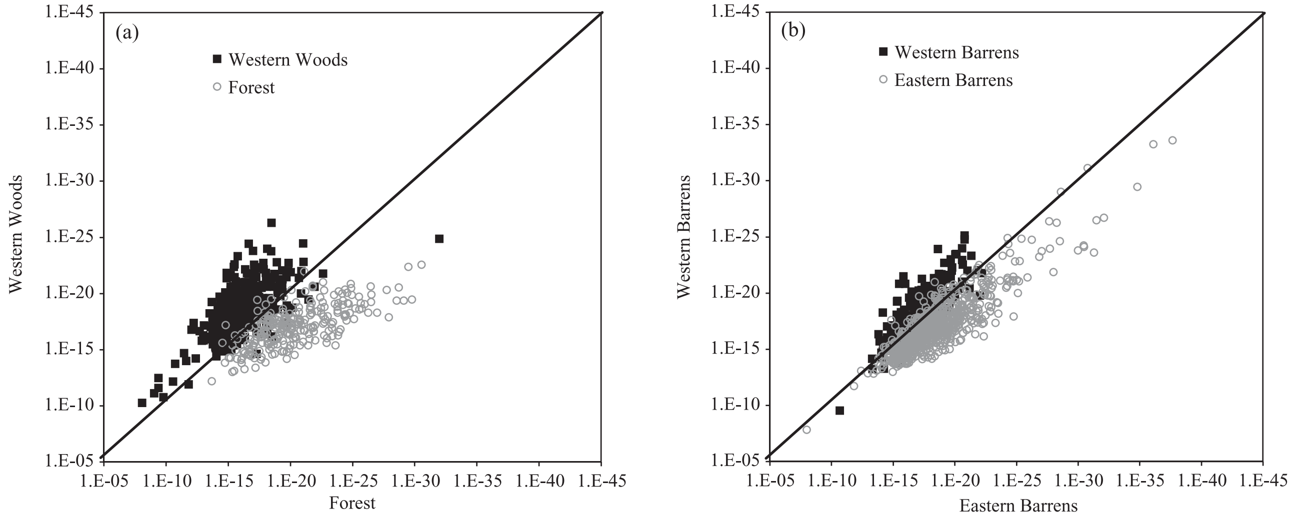

Fig. 4 Assignment among wolf clusters. Symbols indicate the sampling cluster of each wolf. Individuals are plotted according to the probability that their genotype would arise in each cluster; the diagonal line represents genotypes equally likely in both. (a) Assignment among wolves within the boreal forest habitat (territorial ecotype). The Western Woods and Forest clusters are 1816 km apart. The low level of overlap in assignment indices is suggestive of moderate genetic differentiation. (b) Assignment among wolves within the barren ground habitat (migratory ecotype). Western Barrens and Eastern Barrens are separated by 1462 km. Increased overlap in assignment indices relative to the boreal forest may be due to decreased geographical distance, but likely also signifies lower genetic differentiation within the barren ground habitat type.

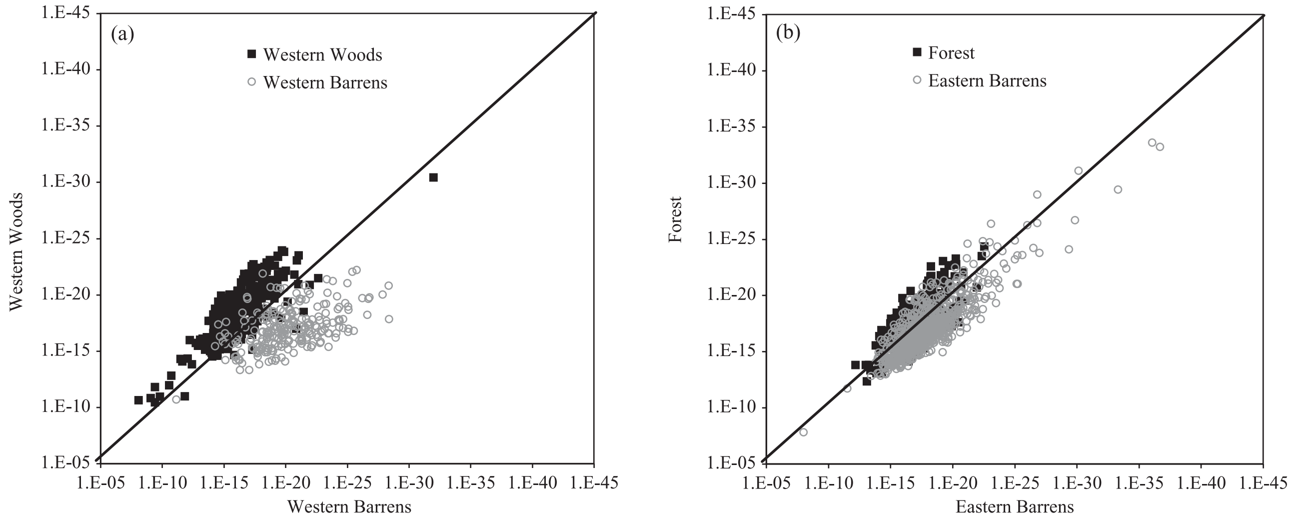

Fig. 5 (a) Assignment among wolves occupying different habitat types. Despite a physical separation approximately half that represented in Fig. 4a (766 km), differentiation is equivalent to that within the boreal forest habitat type. (b) In this case, genetic differentiation appears equivalent to that observed within the barren-ground habitat type (Fig. 4b) despite separation by only 746 km.

Anderson 2001). These vectors were therefore included despite resultant mathematical oddities such as sequential tests that explained more than 100% of the variation in D_S, and negative F statistics, with associated, significant P values above 0.95 for some predictor variables (Table 5). It is important to note that this complexity does not invalidate the dbRDA procedure (M.J. Anderson, personal communication).

Our suite of predictor variables included minimum annual temperature, rainfall, vegetation, isolation by a water barrier, behaviour and species of primary prey for each cluster, and average longitude and latitude. Consistent with Geffen *et al.* (2004) minimum temperature explained 98% of the variation in D_S ($P = 0.0001$) when the eight predictors were tested individually; addition of longitude to temperature in a sequential test explained 113% of the variation in D_S. Significant positive associations were also obtained between latitude or rainfall and D_S, while behaviour of prey (migratory or nonmigratory) was significantly negatively associated with genetic distance (Table 5). This negative association represents correlation to the imaginary (complex) dimensions of D_S identified by negative eigenvalues in the PCA (M.J. Anderson, personal communication).

When we grouped variables into sets, the spatial coordinates displayed the strongest relationship to D_S, explaining 98.14% of the genetic distance ($P = 0.0005$, Table 5). However, tests for associations between predictors indicated that each spatial variable was strongly correlated, positively or negatively, to most of the other predictors in our matrix (Table 4b), implying that the high explanatory power of the spatial variables is more complex than a simple causal increase in D_S with geographical distance. The relatively low correlation between log distance and D_S in Mantel tests supports this conclusion.

Table 4a Principle coordinate analysis of Nei's D_S among wolf clusters. The large negative eigenvalue of axis 10 indicates nonmetricity and implies complexity within the genetic distance

	Variation explained (%)	
Axis	Individual	Cumulative
1	112.99	112.99
2	14.18	127.18
3	9.21	136.39
4	2.35	138.74
5	0.01	138.75
6	0.00	138.75
7	–0.29	138.45
8	–1.43	137.02
9	–2.42	134.60
10	–34.60	100.00

Discussion

Methodology of cluster identification

Two technical aspects of our STRUCTURE analysis merit comment. Default settings for the admixture model assume a uniform allele frequency distribution ($\lambda = 1.0$) and that all clusters are equally admixed (Pritchard & Wen 2004). Under these assumptions, K = 18 was most probable for our wolves (data not shown). Fixing λ equal to the inferred value 0.4 (skewed allele frequencies), while allowing a unique level of admixture in each cluster, produced the far more spatially coherent result (K = 7) discussed above. STRUCTURE's default settings may therefore be inappropriate for other microsatellite data sets, and for other systems including dispersal barriers of unequal permeability.

The program's behaviour in the absence of genetic discontinuity is also of interest. Increasing K for arctic foxes produced small increases in probability and clusters without any real content: improvement through sequestering of rare alleles, rather than divergent groups of individuals. Taken together, our results recommend cautious choice of STRUCTURE parameters and careful assessment of outputs. Confirmation of results using GENELAND (Guillot *et al*. 2005), BAPS (Corander & Marttinen 2006), or STRUCTURAMA (Huelsenbeck & Andolfatto submitted) may also be prudent.

Genetic variation of arctic canid species

Since all markers used in this study were originally developed for domestic dogs (*Canis lupus familiaris*), ascertainment bias might be predicted to inflate variation observed in wolves, relative to more distantly related arctic foxes (Ellegren *et al*. 1997; Bardeleben *et al*. 2005). However, larger allele sizes (data not shown) and greater variation (Table 1) were observed in foxes, suggesting trends reported here result from divergent species and life-history characteristics, rather than from any significant methodological constraints.

Table 4b Correlation among predictor variables used in distance-based redundancy analysis of Nei's D_S among wolf clusters. Variable sets are indicated in bold

		Spatial		**Prey**		**Habitat**		
	Barrier	Latitude	Longitude	Behaviour	Species	Temperature	Rain	Vegetation
Barrier	1							
Latitude	0.5156	1						
Longitude	–0.2068	–0.097	1					
Behaviour	0.6124	–0.0544	0.2056	1				
Species	0.5278	0.7424	–0.1747	0.068	1			
Temperature	–0.2059	–0.8524	–0.2934	0.1393	–0.4712	1		
Rain	0.1137	–0.5771	–0.2625	0.214	–0.0516	0.8482	1	
Vegetation	0.7013	0.531	0.2656	0.6247	0.7332	–0.3735	–0.0262	1

Table 5 Distance-based redundancy analysis of Nei's D_S among wolf clusters. We analysed individual variables (single predictors) alone, then sequentially to obtain a combined model. Analysis was then repeated, treating variables as predictor sets (Table 4b). Significant P values can occur both below 0.05 and above 0.95, and are shown in bold. The column headed '% variation' indicates the amount of variation in D_S explained by a particular variable, with the 'Cumulative' column indicating the total variation explained by all fitted variables in sequential tests. Explanatory power of greater than 100% results from nonmetricity in the D_S matrix

	Single predictors				
	Variable	F	P	% Variation	Cumulative
Marginal test	Barrier	−0.65	0.9273	−8.80	
	Latitude	11.42	**0.0115**	58.80	
	Longitude	3.83	0.1188	32.37	
	Prey behaviour	−0.56	**0.9779**	−7.49	
	Prey species	0.24	0.6685	2.97	
	Temperature	392.34	**0.0001**	98.00	
	Rain	23.09	**0.0017**	74.27	
	Vegetation	0.21	0.6477	2.54	
Sequential test	Temperature	392.34	**0.0001**	98.00	98.00
	Longitude	−8.06	0.7760	15.17	113.18
	Predictor sets				
	Variable	F	P	% Variation	Cumulative
Marginal test	Barrier	−0.65	0.9287	−8.80	
	Spatial	185.06	**0.0005**	98.14	
	Prey	−0.12	0.8796	−3.46	
	Habitat	5.15	0.0623	72.03	
Sequential test	Spatial	185.06	**0.0005**	98.14	98.14

During the last glaciation, while wolves persisted in small populations in a number of distinct refugia (Brewster & Fritts 1995), arctic foxes were widely distributed, and would not have shared the bottlenecks experienced by wolves (Kurtén & Anderson 1980; Dalén *et al.* 2005). In addition, arctic foxes occur at higher density than wolves (Angerbjörn *et al.* 2004a; Mech & Boitani 2004), and likely possess a higher effective population size. Whereas only two wolves normally breed in a pack of six to eight individuals (but see Mech & Boitani 2003), foxes form smaller social groups, with a higher proportion of adults thus breeding each generation (Macpherson 1969). Litter sizes in foxes are also greater (Moehlman 1989; Geffen *et al.* 1996). Given their respective species and life histories, it is unsurprising that arctic foxes in general possess more genetic variation than wolves (Table 1).

Since arctic foxes can travel long distances over sea ice, it is also unsurprising that island and mainland fox populations are equally variable (Table 1). More interesting is the fact that foxes surveyed here appear more variable than populations in Scandinavia (H_E = 0.58–0.63, Dalén *et al.* 2006) and Greenland (H_E = 0.54−0.73, Meinke *et al.* 2001). Scandinavian foxes have endured recent, severe, and prolonged bottlenecks (Dalén *et al.* 2006; Nyström *et al.* 2006). Lower variation in Greenland foxes is more difficult to explain, but portions of the island's coast are ice-free year round, perhaps impeding gene flow and accelerating drift-in-isolation (Dalén *et al.* 2005). Variation in North American and Svalbard foxes seems similar to that in the large Russian population (H_E = 0.77, Dalén *et al.* 2006), suggesting high density, and higher gene flow, have been maintained in each area since the Pleistocene.

Wolves can also travel over sea ice, and it seems strange that island wolf populations would have less variation than island arctic foxes (Table 1). However, due to differences in energetics and thus home range sizes, island wolf populations are likely to be smaller than those of foxes, resulting in elevated genetic drift. While both species are harvested, wolves, with longer generation times and smaller litter sizes, may also be more sensitive to harvesting bottlenecks (Macpherson 1969; Mech & Boitani 2003).

Homogeneity of arctic fox populations

Mitochondrial DNA (mtDNA) haplotypes in arctic foxes display little geographical partitioning, a pattern attributed to the inverse response of polar-adapted species to climatic cycles: expanding during ice ages and contracting into a single circumpolar population during interglacials (Dalén *et al.* 2005). With the exception of foxes in alpine habitats and on sea ice-free islands like Iceland, worldwide arctic fox populations were therefore assumed to have been physically continuous since the Pleistocene. Microsatellite data presented here support contemporary maintenance of high levels of gene flow throughout a large portion of this contiguous range.

While geographical partitioning of mtDNA was not observed, Dalén *et al*. (2005) detected some differentiation between worldwide fox populations of the coastal and lemming ecotypes. As our study area included only one coastal population, Svalbard, we could not confirm this finding directly; however, the genetic affinity of Svalbard with North America, and ear-tagging studies conducted in the Svalbard archipelago (Fuglei & Oritsland 2003), suggest gene flow between these spatially and ecologically distinct groups may still take place. Furthermore, while foxes inhabiting the coastlines of North America use marine food resources, particularly when lemmings are at low abundance (Roth 2002, 2003), no significant genetic differentiation was detected within the North American range of this species. It is therefore likely that, despite the large distances and varying feeding ecologies represented here, no population sampled has experienced significant genetic isolation since initial colonization.

Demographic and historical factors may contribute to genetic homogeneity of contemporary arctic foxes, but their long-distance movements are likely also key. These movements may occur: in response to lemming population declines (Audet *et al*. 2002; Dalén 2005); in coastal-dwelling foxes that may follow polar bears long distances in search of carrion; or in inland areas, among foxes scavenging on wolf-killed migratory caribou (J. Akat, personal communication). In North America, these movements have been documented during both low and peak lemming years, and thus may be prompted by breeding as well as by foraging imperatives (Eberhardt & Hanson 1978). Regardless of their timing or motivation, they appear to result in gene flow over very large geographical areas.

Most of our fox samples were obtained from winter trapping. If foxes were a truly migratory species, roaming over long distances during winter but returning each year to breed in their natal areas, a study based on spring and summer sampling might be expected to reveal greater genetic structuring than found here. However, to our knowledge, such behaviour has not been documented in arctic foxes. Furthermore, juveniles and adults tagged in natal and breeding areas have been recaptured, the following breeding season, hundreds or thousands of kilometres away (Eberhardt & Hanson 1978; Eberhardt *et al*. 1983). We are therefore confident that the lack of structure observed in our study is not a product of our sampling scheme, but a true absence of differentiation. This is particularly supported by the fact that the Karrak Lake population, which was sampled entirely during denning season, showed no greater genetic differentiation than any other population included here (Table 2).

No fox populations were separated by F_{ST} above 0.02, and our pairwise values averaged 0.002 (data not shown). In contrast, pairwise F_{ST} ranged from 0.06 to 0.2 in Scandinavian foxes (Dalén *et al*. 2006), while Meinke *et al*. (2001) observed values from 0.07 to 0.262 among coastal Greenland populations. Higher differentiation, like low variation, is expected among isolated Scandinavian populations. Greenland foxes are restricted to coastal regions (Meinke *et al*. 2001), and if movement occurs only around the island's circumference, gene flow between populations may be restricted. Greater resource stability may also reduce the number of long distance movements made by Greenland foxes relative to North American ones.

The low level of genetic structure in our arctic fox populations appears to be unique among canids studied to date. D_S between wolf populations was higher than that among foxes in almost all cases (Table 2). Coyotes (*Canis latrans*) were once considered genetically homogeneous (Roy *et al*. 1994), but recent work suggests the existence of previously undetected genetic subdivisions (Sacks *et al*. 2004). The smallest pairwise F_{ST} observed in red foxes was 0.009 (Lade *et al*. 1996; Wandeler *et al*. 2003): low, but higher than our average value of 0.002. A global value of 0.043 was found in kit foxes (*Vulpes macrotis*, Schwartz *et al*. 2005), and F_{ST} was 0.11 between Channel Island foxes (*Urocyon littoralis*) separated by only 13 km (Roemer *et al*. 2001). The Channel Island fox population has also diverged into a unique species after a time since founding (by *Urocyon cinereoargenteus*) equivalent to that of Svalbard arctic foxes, which remain largely indistinguishable from those in North America. While extreme, our results are however, consistent with the minimal social structure and larger litter sizes observed in arctic foxes relative to other canid species (Moehlman 1989; Geffen *et al*. 1996).

Ecologically defined genetic structure of grey wolves

Since the Pleistocene distribution of arctic foxes is one likely contributor to their contemporary structure, it is reasonable to expect the same for wolves. The five morphologically defined subspecies of North American wolves are thought to have resulted from populations previously isolated in distinct glacial refugia (Nowak 1995, 2003), but their ranges do not correspond to the population boundaries detected here (Nowak 1995). Our microsatellite signal thus appears to reflect predominantly contemporary influences.

Dalén *et al*. (2005) found that the degree of genetic differentiation among arctic fox populations varied between ecotypes; we observed similar patterns in wolves. Differentiation was lower among barren ground populations than territorial forest populations (Fig. 4a, b), consistent with the extensive annual migrations that facilitate long-distance dispersal of tundra wolves (Walton *et al*. 2001), and with the high potential for gene flow when wolves follow distinct caribou herds into common wintering grounds. In addition, despite separation by half the distance, differentiation between wolves in the Western Barrens (migratory tundra) and Western Woods (territorial forest) was equivalent to that among forest clusters, suggesting the differences between wooded and tundra habitats, and between territorial and migratory life histories, discourage gene flow between wolf populations (Fig. 5a). Of these potential isolating factors, wolf life history seems to dominate: boundaries of Bayesian-derived genetic clusters correspond to habitat transitions as defined by migratory caribou ranges (Fig. 2).

We used dbRDA to identify aspects of habitat statistically correlated to the genetic discontinuities observed. The greatest single predictor of wolf genetic differentiation was climate (minimum annual temperature, Table 5). However, it is not clear if this result represents a causal link between climate and gene flow (Geffen *et al*. 2004); indeed, it is difficult to imagine how temperature could directly influence the amount or direction of genetic exchange between wolf populations. However, two correlates of temperature, vegetation type (0.7332) and prey species (–0.4712, Table 4b) could direct the dispersal choices of individual wolves. Pilot *et al*. (2006) recently established a correlation between frequency of red deer in wolf diet and structure of European wolf populations; in our study, the behaviour of the dominant prey species in each area (resident or migratory) was significantly correlated to the complex vectors within wolf *Ds* ($P = 0.9779$, Table 5).

When we treated our predictor variables as sets, the spatial descriptors — latitude and longitude — explained more variation in D_S than minimum temperature alone (Table 5). These coordinates have been used to signify geographical distance between groups (Geffen *et al*. 2004; Pilot *et al*. 2006), but we are uncertain if they describe a parameter as directly relevant to the dispersal of wolves as the distance in kilometres between regions, especially as latitude and longitude seem to possess unequal predictive value (Table 5, Geffen *et al*. 2004; Pilot *et al*. 2006). As with climate, we suggest that the high explanatory power of these spatial descriptors reflects a more complex, underlying causal process. This idea is supported by the observation that latitude and longitude are correlated, positively or negatively, to all variables describing the habitat and ecology of wolves in our sampling regions (Table 4b).

Considered together, the outcomes of our Bayesian clustering, classical assignment, and dbRDA analysis support the hypothesis that natal habitat-biased dispersal drives genetic differentiation in wolves (Davis & Stamps 2004; Geffen *et al*. 2004; Sacks *et al*. 2004; Pilot *et al*. 2006). For northern wolves, a familiar level of vegetation cover — forest or tundra — could signify a suitable habitat, encouraging dispersing wolves to remain within their natal habitat type. Dispersers that settle in familiar areas may also increase their reproductive success via cultural mechanisms, as hunting strategies specific to local prey would be learned during tenure with their natal pack (Sacks *et al*. 2005; Pilot *et al*. 2006). Here, learned behaviour is most likely to isolate forest from tundra wolves, which have adapted their denning and territorial behaviour to cope with the large-scale seasonal movements of barren ground caribou (Heard & Williams 1992; Walton *et al*. 2001). Prey specialization as a barrier to gene flow has been suggested by other authors (Carmichael *et al*. 2001; Musiani 2003; Geffen *et al*. 2004; Pilot *et al*. 2006), and has been used to explain differences in skull morphology between wolf populations in other regions (Brewster & Fritts 1995).

In our study area, two additional processes may help reinforce population boundaries established through biased dispersal. In the Western Arctic, wolves which cross habitat types must also cross the human-populated Mackenzie Delta region, and increased mortality of these dispersers, overlaid upon the change in habitat type, could create a barrier more intractable to wolves than either influence alone (Carmichael *et al*. 2001; Blanco *et al*. 2005). It is possible that the marginally significant correlation between the barrier predictor and complex aspects of genetic distance between populations reflects this process (Table 5). In the Central Arctic, wolves from the Eastern Barrens follow the southern winter migration of caribou into the spatial range of the forest population. Since their period of range overlap includes the wolf breeding season (Mech 2002), a high potential for admixture exists. Significant cross-assignment between these clusters (Table 3, Fig. 5b) suggests some level of gene flow does occur, although it is likely overestimated in our data due to winter sampling of wolves in this area. Regardless of its precise degree, gene flow is not sufficient to prevent differentiation between these forest and tundra wolves (Fig. 2b). Since pale pelage occurs at much higher frequency in tundra than in forest wolves (Musiani 2003), assortative mating is one possible isolating mechanism. Finer-scaled genetic or ecological studies of wolves in this region should be most informative (M. Musiani, J.A. Leonard, H.D. Cluff, C.C. Gates, S. Mariani, P.C. Paquet, C. Vila & R. Wayne, in preparation).

Conclusions

Arctic fox populations in North America and Svalbard appear to be genetically homogeneous, a uniformity likely maintained through long-distance movements occurring in response to spatiotemporal changes in availability of prey. Wolves exhibit biased dispersal, resulting in part from specialization on prey with divergent behaviours, and producing differentiated populations restricted to particular habitats. While the contemporary genetic structures we observe are dramatically different, both arise from the response of arctic carnivores to a shared ecological challenge — the problem of acquiring adequate prey.

Differential responses to historical climate change are also potential contributors to the genetic characteristics of northern wolves and arctic foxes. While wolves are thought to have been isolated in multiple Pleistocene refugia, arctic foxes enjoyed an extensive range expansion. During the current interglacial, wolf populations have expanded and merged, while foxes have retreated, following arctic ecosystems toward the pole and avoiding intraguild competition with more temperate-adapted red foxes (Tannerfeldt *et al*. 2002; Dalén *et al*. 2004). As the arctic climate continues to warm and sea ice becomes scarcer, arctic foxes may persist only in those isolated high arctic islands red foxes cannot reach. The fox populations surveyed here may then begin to resemble currently isolated populations (e.g. Iceland), with higher differentiation and lower genetic variation (Dalen *et al*. 2005, 2006). Winter thaw–freeze cycles associated with climatic warming may also negatively impact winter survival of lemmings, and therefore breeding success of arctic foxes (Ims & Fuglei 2005; Killengreen *et al*. 2007); reduced sea ice could hamper foxes' ability to escape crashes in lemming population density. However, as long as migratory birds nest on the arctic islands (Samelius & Alisauskas 2000; Bêty *et al*. 2001), and carrion from the marine ecosystem is available (Angerbjörn *et al*. 2004b; Goltsman *et al*. 2005), arctic foxes are likely to persist.

Predictions for wolves are more difficult to make, but as climate change provokes a northward shift in the tree line (Grace *et al*. 2002), wolves may begin to den at higher latitudes (Heard & Williams 1992), increasing their access to caribou calves during breeding season (Frame *et al*. 2004), and thus increasing pup survival (Fuller *et al*. 2003). However, shifts in the distribution of vegetation and associated prey species (Brotton & Wall 1997; Mech 2005) may also result in further intermingling of wolf types and an eventual loss of regional differentiation, at least in mainland regions. It is likely that the forthcoming climatic changes will have influences as dramatic as those of the Pleistocene on the distribution and genetics of arctic canids, and indeed, of all arctic species.

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This work forms part of L.E. Carmichael's PhD thesis on ecological genetics of wolves and arctic foxes, conducted under the supervision of C. Strobeck. J. Krizan, J.A. Nagy, E. Fuglei, M. Dumond, D. Johnson, A. Veitch, and D. Berteaux are biologists pursuing a variety of polar research programs in Svalbard and the Canadian North.

Supplementary material

The following supplementary material is available for this article:

Figure S1 Grey wolf samples grouped into geographical regions.

Figure S2 Summary of STRUCTURE analysis in arctic foxes and grey wolves

Table S1 Samples obtained from the University of Alaska Museum tissue collection.

Table S2 Individual, sampling location, geographical region, final genetic cluster, and Bayesian cluster assignments are shown for all wolf samples included in this study.

This material is available as part of the online article from: http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-294X.2007.03381.x
(This link will take you to the article abstract).

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Figure S1 Grey wolf samples grouped into geographic regions. These populations were used for tests of linkage disequilibrium and Hardy-Weinberg equilibrium only.

Figure S1

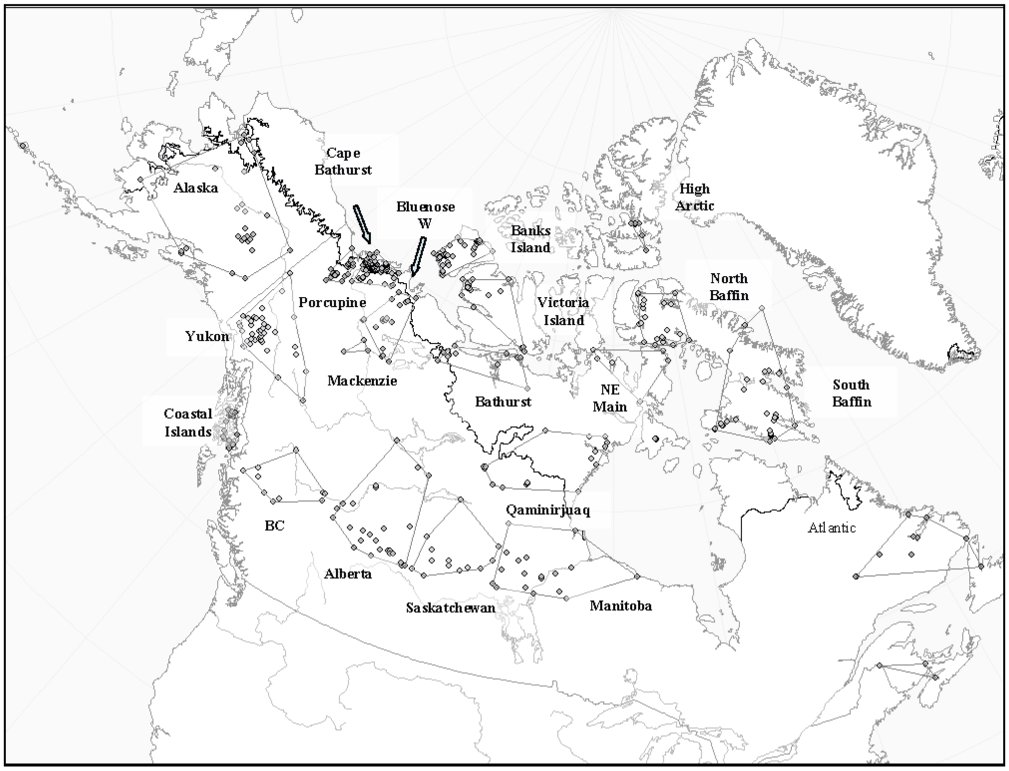

Figure S2 Summary of STRUCTURE analysis in arctic foxes and grey wolves. **A)** Average lnProb(D) as number of clusters is increased. Probability of wolf data began to peak around K=7. All values of K were similarly likely for arctic foxes. **B)** Average admixture of each wolf cluster as K is increased. Data from equivalent clusters at each value of K was pooled across three replicates. Lowest levels of admixture were obtained with K=7, suggesting highest group cohesion under this model.

Figure S2A

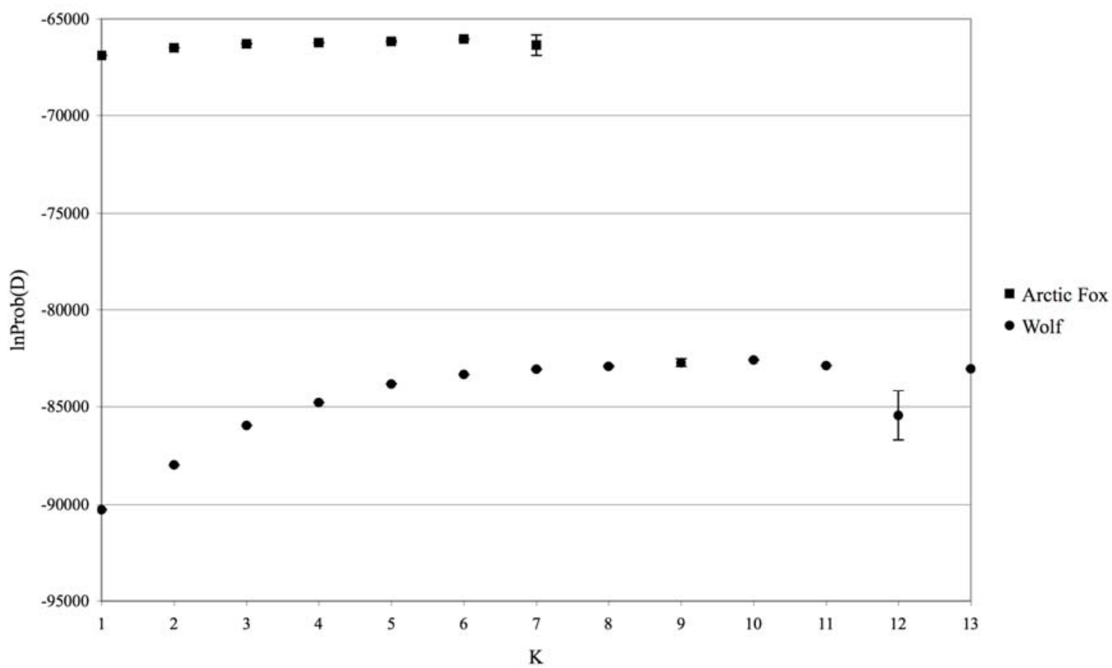

Figure S2B

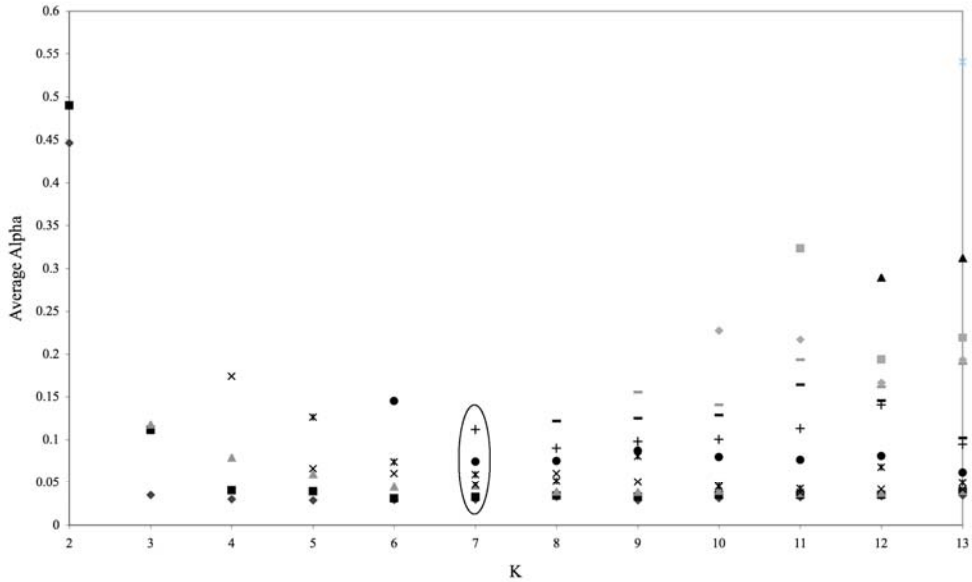
Average Alpha
K
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
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Table S1 Samples obtained from the University of Alaska Museum tissue collection.

Arctic Fox	Arctic Fox	Wolf	Wolf
AF#371	UAM12671	AF#33503	UAM46949
AF#372	UAM12672	AF#33504	UAM46953
AF#373	UAM12674	AF#33505	UAM46959
AF#374	UAM18715	AF#33508	UAM46969
AF#375	UAM18717	UAM10336	UAM46979
AF#376	UAM37046	UAM10338	UAM47431
AF#377	UAM42434	UAM15610	UAM63628
AF#379	UAM64000	UAM15611	UAM63629
AF#4012		UAM15613	UAM63747
AF#4013		UAM17134	UAM63756
AF#4014		UAM17136	
AF#21094		UAM17137	
AF#4039		UAM17279	
AF#48892		UAM17282	
UAM9377		UAM17933	
UAM9469		UAM18012	
UAM9525		UAM18015	
UAM9531		UAM18016	
UAM9672		UAM18152	
UAM12106		UAM18175	
UAM12107		UAM18178	
UAM12112		UAM18181	
UAM12148		UAM18184	
UAM12156		UAM18186	
UAM12161		UAM18188	
UAM12162		UAM18418	
UAM12188		UAM18419	
UAM12199		UAM18420	
UAM12200		UAM18421	
UAM12229		UAM18422	
UAM12235		UAM18424	
UAM12272		UAM18425	
UAM12275		UAM18426	
UAM12300		UAM18427	
UAM12313		UAM18430	
UAM12631		UAM18432	
UAM12632		UAM18434	
UAM12637		UAM18435	
UAM12641		UAM18436	
UAM12651		UAM18438	
UAM12653		UAM18439	
UAM12655		UAM18440	
UAM12656		UAM24105	
UAM12657		UAM28891	
UAM12670		UAM44525	

Supplementary Material 2

Wolf samples were divided into genetic clusters using results of STRUCTURE and GENELAND analysis, and according to the following protocol:

1) Geographic regions formerly designated Banks Island, Victoria Island, and the High Arctic (supplementary Fig. S1) were treated as distinct clusters for three reasons:

a) conflict between clustering methods
b) inherent physical boundaries
c) to allow fine-scale analysis of island wolf genetics

2) Geographic regions North and South Baffin were pooled into a single cluster based on agreement between clustering methods and physical position on the same island (Fig. S1).

3) The Coastal Islands region was designated a cluster due to partitioning in GENELAND at K = 7, identical partitioning in STRUCTURE at K = 9 (data not shown), and physical coherence of the sampling locations (Fig. S1). A single additional sample was added to this group based on clustering results (Pacific region, below).

4) Mainland clusters were established in the following manner:

a) Samples were sorted according to GENELAND class, then STRUCTURE cluster. As STRUCTURE analysis is aspatial, it is more sensitive to admixture; as GENELAND analysis is inherently spatial, it is most sensitive to population substructure. Division of samples into units of analysis requires emphasis on differentiation, rather than admixture, and GENELAND results therefore took precedence when clustering outcomes conflicted.
b) Spatial sorting, with longitude or latitude dominant, was used to assess distribution of samples within each cluster.
c) When multiple wolves were sampled at a single location, and >1 class/cluster was inferred, all wolves were assigned to the dominant cluster for that location.
d) Gaps in the distribution of spatial coordinates for wolf samples were used to fine-tune boundaries between genetic clusters. To be used as a demarcation, these gaps were required to correspond to shifts in the dominance of class/cluster category. This rule was employed most often in establishing the Forest cluster, where sampling location data for some individuals may have been compromised by wolf migration (see Discussion).

Data used to perform cluster partitioning is shown in Table S2 below.

Table S2 Individual, sampling location, geographic region, final genetic cluster, and Bayesian cluster assignments are shown for all wolf samples included in this study. Cluster order and abbreviations follow **Table 2**. Regional abbreviations are as follows: Alaska (AK), Alberta (AB), Atlantic (AT), Banks Island (BI), Bathurst (BA), Bluenose W (BW), British Columbia (BC), Cape Bathurst (CB), Coastal Island (CI), High Arctic (HA), Mackenzie (MA), Manitoba (MB), Maritime (MR), NE Main (NE), North Baffin (NB), Pacific (PA), Porcupine (PO), Qamanirjuaq (QA), Saskatchewan (SK), South Baffin (SB), Southampton (SH), Victoria Island (VI), Yukon (YK). Maritime, Pacific, and Southampton samples were not included in regional analysis (for Hardy-Weinberg and linkage equilibrium) due to extremely low sample size, but were pooled into genetic clusters following Bayesian analysis.

Individual	Latitude	Longitude	Region	Cluster	Structure	Geneland
CFX-456	54.070	-124.550	BC	WW	B	Class 2
CXG-169	54.230	-125.750	BC	WW	B	Class 2
CXI-971	54.230	-125.750	BC	WW	B	Class 2
CXI-972	54.230	-125.750	BC	WW	A	Class 2
CXI-973	54.230	-125.750	BC	WW	B	Class 2
CXI-974	54.230	-125.750	BC	WW	B	Class 2
QAE-863	54.230	-125.750	BC	WW	F	Class 2
CXF-782	54.430	-124.250	BC	WW	B	Class 2
CXI-336	54.430	-124.250	BC	WW	B	Class 2
CXI-337	54.430	-124.250	BC	WW	B	Class 2
CXI-338	54.430	-124.250	BC	WW	B	Class 2
CXI-339	54.430	-124.250	BC	WW	B	Class 2
CXI-340	54.430	-124.250	BC	WW	A	Class 2
CXK-566	54.520	-128.600	BC	WW	B	Class 1
CYH-729	54.770	-127.170	BC	WW	B	Class 2
CXD-826	55.250	-127.670	BC	WW	B	Class 2
CXH-480	55.750	-120.530	BC	WW	A	Class 2
CXH-481	55.760	-120.530	BC	WW	B	Class 2
CXL-488	56.200	-120.680	BC	WW	B	Class 2
Y30	56.230	-120.920	BC	WW	B	Class 2
Y31	56.230	-120.920	BC	WW	A	Class 2
Y32	56.230	-120.920	BC	WW	B	Class 2
Y33	56.230	-120.920	BC	WW	B	Class 2
Y34	56.230	-120.920	BC	WW	B	Class 2
Y35	56.230	-120.920	BC	WW	B	Class 2
Y36	56.230	-120.920	BC	WW	B	Class 2
Y37	56.230	-120.920	BC	WW	B	Class 2
Y38	56.230	-120.920	BC	WW	B	Class 2
Y39	56.230	-120.920	BC	WW	A	Class 2
Y40	56.230	-120.920	BC	WW	B	Class 2
Y41	56.230	-120.920	BC	WW	B	Class 2
Y42	56.230	-120.920	BC	WW	B	Class 2

Y43	56.230	-120.920	BC	WW	B	Class 2
Y44	56.230	-120.920	BC	WW	B	Class 2
Y45	56.230	-120.920	BC	WW	A	Class 2
Y46	56.230	-120.920	BC	WW	B	Class 2
Y47	56.230	-120.920	BC	WW	B	Class 2
Y48	56.230	-120.920	BC	WW	B	Class 2
Y49	56.230	-120.920	BC	WW	B	Class 2
Y50	56.230	-120.920	BC	WW	B	Class 2
Y51	56.230	-120.920	BC	WW	B	Class 2
Y52	56.230	-120.920	BC	WW	B	Class 2
Y53	56.230	-120.920	BC	WW	B	Class 2
Y54	56.230	-120.920	BC	WW	B	Class 2
Y55	56.230	-120.920	BC	WW	B	Class 2
Y56	56.230	-120.920	BC	WW	B	Class 2
Y57	56.230	-120.920	BC	WW	B	Class 2
Y58	56.230	-120.920	BC	WW	B	Class 2
Y59	56.230	-120.920	BC	WW	B	Class 2
Y60	56.230	-120.920	BC	WW	B	Class 2
Y61	56.230	-120.920	BC	WW	B	Class 2
Y62	56.230	-120.920	BC	WW	B	Class 2
Y63	56.230	-120.920	BC	WW	B	Class 2
Y64	56.230	-120.920	BC	WW	B	Class 2
Y65	56.230	-120.920	BC	WW	B	Class 2
Y66	56.230	-120.920	BC	WW	B	Class 2
Y67	56.230	-120.920	BC	WW	B	Class 2
Y68	56.230	-120.920	BC	WW	B	Class 2
Y69	56.230	-120.920	BC	WW	B	Class 2
Y70	56.230	-120.920	BC	WW	B	Class 2
CXL-670	56.250	-120.850	BC	WW	B	Class 2
CWC-233	56.280	-120.950	BC	WW	A	Class 2
CXI-955	56.280	-120.950	BC	WW	A	Class 2
SDU-697	57.430	-125.630	BC	WW	B	Class 2
UAM10338	60.000	-160.000	AK	WW	B	Class 2
KNP12	60.050	-137.500	YK	WW	B	Class 2
KNP17	60.050	-137.500	YK	WW	B	Class 2
PMY09	60.080	-128.220	YK	WW	B	Class 2
27607	60.100	-137.380	YK	WW	B	Class 2
41778	60.100	-137.380	YK	WW	B	Class 2
PMY41140	60.100	-137.380	YK	WW	B	Class 2
PMY41141	60.100	-137.380	YK	WW	B	Class 2
PMY41142	60.100	-137.380	YK	WW	B	Class 2
PMY41143	60.100	-137.380	YK	WW	B	Class 2
PMY41208	60.100	-137.380	YK	WW	B	Class 2
YT04	60.100	-137.380	YK	WW	B	Class 2
PMY41155	60.220	-132.130	YK	WW	B	Class 2
UAM15611	60.400	-150.330	AK	WW	B	Class 2
UAM15610	60.450	-150.530	AK	WW	B	Class 2
KNP09	60.480	-137.170	YK	WW	B	Class 2
KNP11	60.480	-137.170	YK	WW	B	Class 2
KNP18	60.480	-137.170	YK	WW	B	Class 2
KNP01	60.500	-137.620	YK	WW	B	Class 2

KNP02	60.500	-137.620	YK	WW	B	Class 2
KNP10	60.500	-137.620	YK	WW	B	Class 2
KNP15	60.500	-137.620	YK	WW	B	Class 2
KNP16	60.500	-137.620	YK	WW	B	Class 2
KNP23	60.650	-138.870	YK	WW	B	Class 2
KNP24	60.750	-139.500	YK	WW	B	Class 2
KNP25	60.750	-139.500	YK	WW	B	Class 2
KNP26	60.750	-139.500	YK	WW	B	Class 2
KNP41007	60.750	-139.500	YK	WW	B	Class 2
KNP41008	60.750	-139.500	YK	WW	B	Class 2
KNP41009	60.750	-139.500	YK	WW	B	Class 2
KNP41015	60.750	-139.500	YK	WW	B	Class 2
KNP41023	60.750	-139.500	YK	WW	B	Class 2
KNP41024	60.750	-139.500	YK	WW	B	Class 2
KNP41034	60.750	-139.500	YK	WW	B	Class 2
KNP41035	60.750	-139.500	YK	WW	B	Class 2
KNP41036	60.750	-139.500	YK	WW	B	Class 2
KNP41050	60.750	-139.500	YK	WW	B	Class 2
KNP41055	60.750	-139.500	YK	WW	B	Class 2
KNP41056	60.750	-139.500	YK	WW	E	Class 2
KNP41054	60.750	-137.500	YK	WW	B	Class 2
KNP41060	60.750	-137.500	YK	WW	B	Class 2
KNP41070	60.750	-137.500	YK	WW	B	Class 2
KNP41071	60.750	-137.500	YK	WW	B	Class 2
UAM15613	60.770	-150.500	AK	WW	B	Class 2
PMY41207	60.820	-137.430	YK	WW	B	Class 2
PMY41209	60.820	-137.430	YK	WW	B	Class 2
KNP19	60.830	-139.750	YK	WW	B	Class 2
KNP20	60.830	-139.750	YK	WW	B	Class 2
PMY41200	60.830	-139.750	YK	WW	B	Class 2
PMY41201	60.830	-139.750	YK	WW	B	Class 2
PMY41202	60.830	-139.750	YK	WW	B	Class 2
PMY41206	60.830	-139.750	YK	WW	B	Class 2
KNP41025	60.830	-137.080	YK	WW	B	Class 2
KNP41026	60.830	-137.080	YK	WW	B	Class 2
KNP41027	60.830	-137.080	YK	WW	B	Class 2
KNP41057	60.830	-137.080	YK	WW	B	Class 2
KNP41058	60.830	-137.080	YK	WW	B	Class 2
KNP41059	60.830	-137.080	YK	WW	B	Class 2
KNP41061	60.830	-137.080	YK	WW	B	Class 2
KNP41069	60.830	-137.080	YK	WW	B	Class 2
KNP41072	60.830	-137.080	YK	WW	B	Class 2
YT41100	60.830	-137.080	YK	WW	A	Class 2
YT41101	60.830	-137.080	YK	WW	B	Class 2
YT41102	60.830	-137.080	YK	WW	B	Class 2
YT41103	60.830	-137.080	YK	WW	B	Class 2
YT41105	60.830	-137.080	YK	WW	B	Class 2
YT41106	60.830	-137.080	YK	WW	B	Class 2
YT41107	60.830	-137.080	YK	WW	B	Class 2
PMY04	60.900	-135.200	YK	WW	B	Class 2
KNP07	60.950	-137.850	YK	WW	B	Class 2

KNP08	60.950	-137.850	YK	WW	B	Class 2
KNP41033	60.950	-137.850	YK	WW	B	Class 2
KNP41045	60.950	-137.850	YK	WW	B	Class 2
KNP41046	60.950	-137.850	YK	WW	B	Class 2
KNP41068	60.950	-137.850	YK	WW	B	Class 2
AF33503	61.067	-136.833	YK	WW	B	Class 2
AF33504	61.067	-136.833	YK	WW	B	Class 2
AF33505	61.067	-136.833	YK	WW	B	Class 2
AF33508	61.067	-136.833	YK	WW	B	Class 2
PMY41203	61.120	-136.580	YK	WW	B	Class 2
PMY41205	61.120	-136.580	YK	WW	B	Class 2
PMY41210	61.120	-136.580	YK	WW	B	Class 2
PMY41211	61.120	-136.580	YK	WW	B	Class 2
PMY41212	61.120	-136.580	YK	WW	B	Class 2
KNP41001	61.120	-136.370	YK	WW	B	Class 2
KNP41002	61.120	-136.370	YK	WW	B	Class 2
PMY41145	61.220	-136.950	YK	WW	B	Class 2
PMY41151	61.220	-136.950	YK	WW	B	Class 2
YT01	61.270	-136.930	YK	WW	B	Class 2
YT02	61.270	-136.930	YK	WW	B	Class 2
KNP41013	61.300	-140.100	YK	WW	B	Class 2
KNP41014	61.300	-140.100	YK	WW	B	Class 2
KNP41062	61.320	-138.670	YK	WW	B	Class 2
KNP41063	61.320	-138.670	YK	WW	B	Class 2
KNP21	61.420	-139.570	YK	WW	B	Class 2
KNP22	61.420	-139.570	YK	WW	B	Class 2
KNP03	61.430	-139.100	YK	WW	B	Class 2
PMY41153	61.430	-137.550	YK	WW	B	Class 2
PMY41154	61.430	-137.550	YK	WW	B	Class 2
KNP41003	61.450	-137.180	YK	WW	B	Class 2
KNP41004	61.450	-137.180	YK	WW	B	Class 2
KNP41005	61.450	-137.180	YK	WW	B	Class 2
KNP41006	61.450	-137.180	YK	WW	B	Class 2
KNP41064	61.470	-139.020	YK	WW	B	Class 2
KNP41065	61.470	-139.020	YK	WW	B	Class 2
KNP41028	61.550	-137.530	YK	WW	A	Class 2
KNP41040	61.550	-137.530	YK	WW	B	Class 2
KNP41041	61.550	-137.530	YK	WW	B	Class 2
KNP41016	61.570	-136.970	YK	WW	B	Class 2
KNP41017	61.570	-136.970	YK	WW	B	Class 2
PMY02	61.580	-130.120	YK	WW	B	Class 2
PMY41150	61.720	-137.500	YK	WW	B	Class 2
KNP41010	61.770	-139.230	YK	WW	B	Class 2
KNP41011	61.770	-139.230	YK	WW	B	Class 2
KNP41012	61.770	-139.230	YK	WW	B	Class 2
KNP41051	61.780	-138.930	YK	WW	B	Class 2
KNP41052	61.780	-138.930	YK	WW	B	Class 2
KNP41053	61.780	-138.930	YK	WW	B	Class 2
KNP41018	61.900	-137.780	YK	WW	B	Class 2
KNP41019	61.900	-137.780	YK	WW	B	Class 2
KNP41020	61.900	-137.780	YK	WW	B	Class 2

KNP41021	61.900	-137.780	YK	WW	B	Class 2
KNP41022	61.900	-137.780	YK	WW	B	Class 2
KNP41037	61.970	-137.180	YK	WW	B	Class 2
KNP41038	61.970	-137.180	YK	WW	B	Class 2
KNP41039	61.970	-137.180	YK	WW	B	Class 2
PMY01	61.970	-132.420	YK	WW	B	Class 2
KNP41067	62.080	-138.480	YK	WW	B	Class 2
PMY05	62.080	-136.150	YK	WW	B	Class 2
PMY06	62.080	-136.150	YK	WW	B	Class 2
PMY07	62.080	-136.150	YK	WW	B	Class 2
PMY08	62.080	-136.150	YK	WW	B	Class 2
PMY13	62.080	-136.150	YK	WW	B	Class 2
PMY10	62.300	-133.100	YK	WW	B	Class 2
PMY12	62.300	-133.100	YK	WW	B	Class 2
UAM10336	62.330	-145.150	AK	WW	B	Class 2
KNP41066	62.480	-139.470	YK	WW	B	Class 2
ARF01	62.830	-143.670	AK	WW	B	Class 2
ARF02	62.830	-143.670	AK	WW	B	Class 2
ARF03	62.830	-143.670	AK	WW	B	Class 2
PMY03	63.580	-135.830	YK	WW	B	Class 2
UAM28891	63.844	-148.580	AK	WW	B	Class 2
UAM46953	63.924	-147.829	AK	WW	B	Class 2
NW21	64.000	-128.000	MA	WW	B	Class 2
NW22	64.000	-128.000	MA	WW	B	Class 2
NW24	64.000	-128.000	MA	WW	B	Class 2
NW25	64.000	-128.000	MA	WW	B	Class 2
NW26	64.000	-128.000	MA	WW	B	Class 2
NW33	64.000	-128.000	MA	WW	B	Class 2
NW34	64.000	-128.000	MA	WW	B	Class 2
GQQ-362	64.050	-139.420	YK	WW	B	Class 2
UAM46959	64.115	-147.894	AK	WW	B	Class 2
UAM46949	64.132	-146.113	AK	WW	B	Class 2
UAM46979	64.221	-147.678	AK	WW	B	Class 2
UAM63629	64.250	-147.350	AK	WW	B	Class 2
UAM63747	64.250	-147.350	AK	WW	E	Class 2
UAM47431	64.333	-147.983	AK	WW	B	Class 2
UAM46969	64.371	-147.445	AK	WW	B	Class 2
ARF11	64.500	-158.000	AK	WW	B	Class 2
ARF12	64.500	-158.000	AK	WW	B	Class 2
ARF13	64.500	-158.000	AK	WW	E	Class 2
UAM63756	64.500	-149.000	AK	WW	B	Class 2
ARF10	64.670	-151.830	AK	WW	B	Class 2
UAM63628	64.700	-147.700	AK	WW	B	Class 2
NW01	64.900	-125.570	MA	WW	B	Class 2
NW09	64.900	-125.570	MA	WW	B	Class 2
ARF17	65.000	-152.000	AK	WW	B	Class 2
ARF09	65.000	-151.000	AK	WW	B	Class 2
KNP04	65.120	-140.520	YK	WW	A	Class 2
NW03	65.270	-126.820	MA	WW	B	Class 2
NW04	65.270	-126.820	MA	WW	B	Class 2
NW05	65.270	-126.820	MA	WW	B	Class 2

NW06	65.270	-126.820	MA	WW	B	Class 2
NW10	65.270	-126.820	MA	WW	B	Class 2
NW16	65.270	-126.820	MA	WW	D	Class 2
NW18	65.270	-126.820	MA	WW	B	Class 2
NW19	65.270	-126.820	MA	WW	D	Class 2
NW32	65.270	-126.820	MA	WW	D	Class 2
ARF19	66.000	-156.000	AK	WW	B	Class 2
ARF14	66.000	-149.000	AK	WW	B	Class 2
ARF15	66.000	-149.000	AK	WW	B	Class 2
ARF04	66.000	-143.000	AK	WW	B	Class 2
ARF05	66.500	-160.000	AK	WW	B	Class 2
ARF06	66.500	-160.000	AK	WW	A	Class 2
MP9214	66.500	-136.500	PO	WW	B	Class 2
MP9213	66.733	-136.283	PO	WW	B	Class 2
ARF08	66.830	-161.000	AK	WW	B	Class 2
MP9221	66.833	-136.300	PO	WW	B	Class 2
ARF16	67.000	-160.000	AK	WW	B	Class 2
ARF07	67.000	-158.000	AK	WW	B	Class 2
IN9202	67.050	-136.500	PO	WW	B	Class 2
MP9218	67.050	-136.267	PO	WW	B	Class 2
MP9219	67.050	-136.267	PO	WW	B	Class 2
MP9216	67.050	-136.250	PO	WW	E	Class 2
MP9217	67.050	-136.250	PO	WW	B	Class 2
MP9220	67.050	-136.250	PO	WW	B	Class 2
MP9224	67.050	-136.250	PO	WW	B	Class 2
MP9211	67.067	-136.150	PO	WW	B	Class 2
MP9207	67.083	-136.133	PO	WW	B	Class 2
MP9215	67.100	-136.117	PO	WW	B	Class 2
MP9201	67.117	-136.117	PO	WW	B	Class 2
MP9202	67.117	-136.117	PO	WW	B	Class 2
MP9222	67.117	-136.000	PO	WW	B	Class 2
MP9223	67.117	-134.750	PO	WW	B	Class 2
MP9204	67.133	-136.100	PO	WW	A	Class 2
MP9203	67.133	-136.083	PO	WW	B	Class 2
MP9206	67.150	-137.117	PO	WW	B	Class 2
MP9208	67.150	-136.333	PO	WW	B	Class 2
MP9205	67.150	-136.117	PO	WW	B	Class 2
MP9209	67.200	-136.050	PO	WW	B	Class 2
MP9210	67.217	-136.050	PO	WW	B	Class 2
MP9212	67.450	-134.917	PO	WW	E	Class 2
MP9301	67.667	-134.833	PO	WW	A	Class 3
AK9230	67.950	-135.750	PO	WW	B	Class 2
AK9232	67.950	-135.750	PO	WW	B	Class 2
AK9233	67.950	-135.750	PO	WW	B	Class 2
AK8909	67.950	-135.533	PO	WW	B	Class 2
AK9305	67.950	-135.533	PO	WW	B	Class 2
AK9306	67.950	-135.533	PO	WW	B	Class 2
AK8902	68.133	-135.883	PO	WW	B	Class 2
AK8904	68.133	-135.883	PO	WW	B	Class 2
AK9202	68.133	-135.883	PO	WW	B	Class 2
AK9210	68.133	-135.883	PO	WW	B	Class 2

AK9211	68.133	-135.883	PO	WW	B	Class 2
AK9221	68.133	-135.883	PO	WW	B	Class 2
AK9222	68.133	-135.883	PO	WW	B	Class 2
AK9223	68.133	-135.883	PO	WW	B	Class 2
AK9224	68.133	-135.883	PO	WW	B	Class 2
AK9228	68.133	-135.883	PO	WW	A	Class 2
AK9302	68.133	-135.883	PO	WW	B	Class 2
AK9304	68.167	-135.883	PO	WW	B	Class 2
AK8905	68.200	-135.167	PO	WW	B	Class 2
AK8901	68.217	-135.883	PO	WW	B	Class 2
AK8906	68.217	-135.883	PO	WW	B	Class 2
AK9201	68.217	-135.883	PO	WW	B	Class 2
AK9207	68.217	-135.883	PO	WW	B	Class 2
AK9208	68.217	-135.883	PO	WW	B	Class 2
AK9209	68.217	-135.883	PO	WW	B	Class 2
AK9218	68.217	-135.883	PO	WW	B	Class 2
AK9219	68.217	-135.883	PO	WW	B	Class 2
AK9220	68.217	-135.883	PO	WW	B	Class 2
AK9229	68.217	-135.883	PO	WW	B	Class 2
AK9235	68.217	-135.883	PO	WW	B	Class 2
AK93JM	68.217	-135.883	PO	WW	B	Class 2
AK8903	68.300	-135.800	PO	WW	B	Class 2
AK9212	68.300	-135.800	PO	WW	B	Class 2
AK9213	68.300	-135.800	PO	WW	B	Class 2
AK9214	68.300	-135.800	PO	WW	B	Class 2
AK9215	68.300	-135.800	PO	WW	B	Class 2
AK9225	68.300	-135.800	PO	WW	B	Class 2
AK9231	68.300	-135.800	PO	WW	B	Class 2
AK9301	68.350	-135.367	PO	WW	B	Class 2
AK9303	68.417	-136.000	PO	WW	B	Class 2
AK9203	68.917	-137.333	PO	WW	E	Class 2
AK9204	68.917	-137.333	PO	WW	B	Class 2
AK9205	68.917	-137.333	PO	WW	E	Class 2
AK9206	68.917	-137.333	PO	WW	B	Class 2
AK9217	68.917	-137.333	PO	WW	B	Class 2
PBQ-943	54.130	-108.430	SK	FO	A	Class 1
CVV-658	54.150	-115.680	AB	FO	A	Class 1
CWE-317	54.150	-115.680	AB	FO	A	Class 1
CWE-348	54.150	-115.680	AB	FO	A	Class 1
CVZ-118	54.150	-113.870	AB	FO	A	Class 1
CWF-159	54.150	-113.870	AB	FO	B	Class 1
CVU-850	54.270	-110.730	AB	FO	A	Class 1
CVU-851	54.270	-110.730	AB	FO	A	Class 1
CVV-208	54.270	-110.730	AB	FO	A	Class 1
CVX-108	54.270	-110.730	AB	FO	A	Class 1
CVX-109	54.270	-110.730	AB	FO	A	Class 1
CVZ-098	54.270	-110.730	AB	FO	A	Class 1
GJS-017	54.270	-110.730	AB	FO	A	Class 1
CUX-352	54.330	-110.480	AB	FO	A	Class 1
CVX-351	54.330	-110.480	AB	FO	A	Class 1
CVX-353	54.330	-110.480	AB	FO	A	Class 1

GJT-330	54.330	-110.480	AB	FO	E	Class 1
BSM-158	54.330	-109.770	SK	FO	A	Class 1
BSM-159	54.330	-109.770	SK	FO	A	Class 1
GQT-672	54.330	-109.770	SK	FO	A	Class 1
GWK-247	54.330	-109.770	SK	FO	A	Class 1
PBQ-864	54.330	-109.770	SK	FO	A	Class 1
PBT-197	54.330	-109.770	SK	FO	A	Class 1
RGH-655	54.330	-109.770	SK	FO	A	Class 1
CWC-082	54.450	-110.920	AB	FO	A	Class 1
GPX-042	54.550	-94.470	MB	FO	A	Class 1
GQQ-553	54.580	-101.370	MB	FO	E	Class 1
PBO-563	54.580	-101.370	MB	FO	A	Class 1
PBO-564	54.580	-101.370	MB	FO	A	Class 1
PBO-778	54.580	-101.370	MB	FO	A	Class 1
BMT-927	54.620	-97.770	MB	FO	D	Class 1
BMT-928	54.620	-97.770	MB	FO	A	Class 1
CWA-676	54.680	-112.220	AB	FO	A	Class 1
CWF-200	54.720	-115.400	AB	FO	A	Class 1
CWF-201	54.720	-115.400	AB	FO	A	Class 1
CWF-202	54.720	-115.400	AB	FO	A	Class 1
CWF-203	54.720	-115.400	AB	FO	A	Class 1
CVV-813	54.720	-113.280	AB	FO	B	Class 1
CVV-814	54.720	-113.280	AB	FO	A	Class 1
CVZ-588	54.720	-113.280	AB	FO	A	Class 1
CWD-016	54.720	-113.280	AB	FO	A	Class 1
CVY-194	54.770	-111.970	AB	FO	A	Class 1
BMD-395	54.770	-101.850	MB	FO	A	Class 1
BMO-688	54.770	-101.850	MB	FO	D	Class 1
BMP-291	54.770	-101.850	MB	FO	A	Class 1
PBC-794	54.770	-101.850	MB	FO	A	Class 1
PBC-795	54.770	-101.850	MB	FO	A	Class 1
CVZ-649	54.820	-112.550	AB	FO	A	Class 1
CWB-560	54.850	-112.320	AB	FO	A	Class 1
GJX-713	54.850	-112.320	AB	FO	A	Class 1
GJZ-078	54.850	-112.320	AB	FO	A	Class 1
BM8-008	54.900	-98.620	MB	FO	A	Class 1
PSI-792	54.900	-98.620	MB	FO	F	Class 1
WMB03-23	54.930	-95.250	MB	FO	A	Class 1
WMB03-25	54.930	-95.250	MB	FO	E	Class 1
WMB03-26	54.930	-95.250	MB	FO	A	Class 1
CWB-685	55.070	-114.030	AB	FO	A	Class 1
CWB-717	55.070	-114.030	AB	FO	A	Class 1
BRZ-850	55.100	-105.280	SK	FO	E	Class 6
BRZ-851	55.100	-105.280	SK	FO	A	Class 6
BRZ-852	55.100	-105.280	SK	FO	A	Class 6
BRZ-853	55.100	-105.280	SK	FO	E	Class 6
BSB-933	55.100	-105.280	SK	FO	D	Class 6
BSE-448	55.100	-105.280	SK	FO	A	Class 6
BSK-931	55.100	-105.280	SK	FO	A	Class 6
BSK-932	55.100	-105.280	SK	FO	D	Class 6
BSK-933	55.100	-105.280	SK	FO	A	Class 6

BSK-935	55.100	-105.280	SK	FO	B	Class 6
BSK-936	55.100	-105.280	SK	FO	F	Class 6
BSK-937	55.100	-105.280	SK	FO	A	Class 6
BSK-938	55.100	-105.280	SK	FO	A	Class 6
BSK-939	55.100	-105.280	SK	FO	A	Class 6
BSK-940	55.100	-105.280	SK	FO	E	Class 6
DGW-688	55.100	-105.280	SK	FO	E	Class 6
DGW-692	55.100	-105.280	SK	FO	D	Class 6
DGW-694	55.100	-105.280	SK	FO	E	Class 6
DGW-699	55.100	-105.280	SK	FO	D	Class 6
DGW-700	55.100	-105.280	SK	FO	A	Class 6
DGW-701	55.100	-105.280	SK	FO	E	Class 6
DGW-739	55.100	-105.280	SK	FO	A	Class 6
DGW-786	55.100	-105.280	SK	FO	E	Class 6
DGW-787	55.100	-105.280	SK	FO	E	Class 6
DGW-802	55.100	-105.280	SK	FO	A	Class 6
DGW-835	55.100	-105.280	SK	FO	E	Class 6
DGW-837	55.100	-105.280	SK	FO	E	Class 6
DGW-883	55.100	-105.280	SK	FO	E	Class 6
DGW-887	55.100	-105.280	SK	FO	A	Class 6
GWC-780	55.100	-105.280	SK	FO	E	Class 6
GWC-785	55.100	-105.280	SK	FO	E	Class 6
GWC-787	55.100	-105.280	SK	FO	E	Class 6
GWC-788	55.100	-105.280	SK	FO	E	Class 6
GWC-790	55.100	-105.280	SK	FO	E	Class 6
GWC-791	55.100	-105.280	SK	FO	E	Class 6
GWC-796	55.100	-105.280	SK	FO	E	Class 6
GWC-797	55.100	-105.280	SK	FO	E	Class 6
GWC-799	55.100	-105.280	SK	FO	D	Class 6
GWC-802	55.100	-105.280	SK	FO	E	Class 6
GWC-803	55.100	-105.280	SK	FO	B	Class 6
GWC-805	55.100	-105.280	SK	FO	E	Class 6
GWC-809	55.100	-105.280	SK	FO	A	Class 6
GWC-810	55.100	-105.280	SK	FO	E	Class 6
GWC-814	55.100	-105.280	SK	FO	A	Class 6
GWC-818	55.100	-105.280	SK	FO	E	Class 6
GWC-821	55.100	-105.280	SK	FO	E	Class 6
GWC-833	55.100	-105.280	SK	FO	A	Class 6
GWC-836	55.100	-105.280	SK	FO	A	Class 6
GWC-843	55.100	-105.280	SK	FO	E	Class 6
GWC-845	55.100	-105.280	SK	FO	E	Class 6
GWC-848	55.100	-105.280	SK	FO	E	Class 6
GWC-852	55.100	-105.280	SK	FO	D	Class 6
GWC-857	55.100	-105.280	SK	FO	E	Class 6
GWC-861	55.100	-105.280	SK	FO	D	Class 6
GWC-862	55.100	-105.280	SK	FO	E	Class 6
GWD-057	55.100	-105.280	SK	FO	E	Class 6
GWD-059	55.100	-105.280	SK	FO	E	Class 6
GWD-066	55.100	-105.280	SK	FO	E	Class 6
GWD-068	55.100	-105.280	SK	FO	E	Class 6
GWD-073	55.100	-105.280	SK	FO	E	Class 6

GWD-074	55.100	-105.280	SK	FO	E	Class 6
GWK-478	55.100	-105.280	SK	FO	E	Class 6
GWK-708	55.100	-105.280	SK	FO	D	Class 6
GWK-710	55.100	-105.280	SK	FO	E	Class 6
GWK-711	55.100	-105.280	SK	FO	E	Class 6
GWK-715	55.100	-105.280	SK	FO	E	Class 6
GWK-716	55.100	-105.280	SK	FO	E	Class 6
GWK-719	55.100	-105.280	SK	FO	E	Class 6
GWK-720	55.100	-105.280	SK	FO	E	Class 6
GWK-721	55.100	-105.280	SK	FO	E	Class 6
GWK-723	55.100	-105.280	SK	FO	E	Class 6
GWK-724	55.100	-105.280	SK	FO	E	Class 6
GWK-728	55.100	-105.280	SK	FO	E	Class 6
GWK-735	55.100	-105.280	SK	FO	E	Class 6
GWK-736	55.100	-105.280	SK	FO	E	Class 6
GWK-737	55.100	-105.280	SK	FO	E	Class 6
GWK-743	55.100	-105.280	SK	FO	E	Class 6
GWK-745	55.100	-105.280	SK	FO	E	Class 6
GWM-778	55.100	-105.280	SK	FO	E	Class 6
GWM-781	55.100	-105.280	SK	FO	E	Class 6
GWM-783	55.100	-105.280	SK	FO	E	Class 6
GWM-784	55.100	-105.280	SK	FO	E	Class 6
GWM-785	55.100	-105.280	SK	FO	E	Class 6
GWM-800	55.100	-105.280	SK	FO	E	Class 6
GWM-805	55.100	-105.280	SK	FO	E	Class 6
GWM-806	55.100	-105.280	SK	FO	E	Class 6
GWM-807	55.100	-105.280	SK	FO	D	Class 6
GWM-811	55.100	-105.280	SK	FO	D	Class 6
GWM-813	55.100	-105.280	SK	FO	E	Class 6
GWM-824	55.100	-105.280	SK	FO	E	Class 6
GWM-826	55.100	-105.280	SK	FO	E	Class 6
GWX-929	55.100	-105.280	SK	FO	A	Class 6
RDX-895	55.100	-105.280	SK	FO	D	Class 6
RDX-896	55.100	-105.280	SK	FO	E	Class 6
RDX-897	55.100	-105.280	SK	FO	E	Class 6
RGD-855	55.100	-105.280	SK	FO	E	Class 6
AXZ-514	55.120	-116.870	AB	FO	A	Class 1
AXZ-515	55.120	-116.870	AB	FO	A	Class 1
AXZ-516	55.120	-116.870	AB	FO	B	Class 1
GJV-259	55.120	-116.870	AB	FO	B	Class 1
SDU-275	55.120	-116.870	AB	FO	A	Class 1
SDR-504	55.170	-118.800	AB	FO	A	Class 1
SDS-277	55.170	-118.800	AB	FO	A	Class 1
GOP-360	55.170	-108.150	SK	FO	E	Class 1
GWI-032	55.220	-106.400	SK	FO	A	Class 1
CWE-303	55.280	-114.770	AB	FO	A	Class 1
CVV-574	55.320	-115.630	AB	FO	A	Class 1
CWE-093	55.320	-115.630	AB	FO	B	Class 1
CWF-004	55.320	-115.630	AB	FO	A	Class 1
BRW-382	55.420	-104.550	SK	FO	A	Class 1
BRW-383	55.420	-104.550	SK	FO	A	Class 1

BSE-168	55.420	-104.550	SK	FO	A	Class 1
BSM-305	55.420	-104.550	SK	FO	A	Class 1
BMA-405	55.520	-106.570	SK	FO	A	Class 1
WMB03-17	55.530	-103.280	SK	FO	A	Class 1
BMK-397	55.580	-97.150	MB	FO	D	Class 1
BMK-398	55.580	-97.150	MB	FO	F	Class 1
BMK-399	55.580	-97.150	MB	FO	A	Class 1
BMK-400	55.580	-97.150	MB	FO	A	Class 1
BMP-505	55.580	-97.150	MB	FO	A	Class 1
BMP-506	55.580	-97.150	MB	FO	A	Class 1
GPN-107	55.580	-97.150	MB	FO	A	Class 1
PAZ-024	55.580	-97.150	MB	FO	F	Class 1
GQM-277	55.730	-97.150	MB	FO	A	Class 1
GRR-734	55.730	-97.150	MB	FO	G	Class 1
PBL-756	55.730	-97.150	MB	FO	A	Class 1
PBL-757	55.730	-97.150	MB	FO	F	Class 1
PBL-758	55.730	-97.150	MB	FO	A	Class 1
PBL-759	55.730	-97.150	MB	FO	A	Class 1
PBL-760	55.730	-97.150	MB	FO	F	Class 1
PBL-761	55.730	-97.150	MB	FO	A	Class 1
PBL-762	55.730	-97.150	MB	FO	A	Class 1
PBL-763	55.730	-97.150	MB	FO	A	Class 1
PBO-254	55.730	-97.150	MB	FO	A	Class 1
PBQ-456	55.730	-97.150	MB	FO	F	Class 1
WMB03-08	55.750	-101.180	MB	FO	A	Class 1
SDT-680	55.780	-118.830	AB	FO	A	Class 1
WMB03-05	55.780	-98.880	MB	FO	A	Class 1
WMB03-10	55.780	-98.880	MB	FO	A	Class 1
WMB03-14	55.780	-98.880	MB	FO	A	Class 1
WMB03-15	55.780	-98.880	MB	FO	A	Class 1
WMB03-22	55.780	-98.880	MB	FO	A	Class 1
BSJ-430	55.850	-108.480	SK	FO	A	Class 1
GQV-446	55.850	-108.480	SK	FO	A	Class 1
PBR-282	55.850	-108.480	SK	FO	B	Class 1
PBS-483	55.850	-108.480	SK	FO	A	Class 1
PBS-484	55.850	-108.480	SK	FO	A	Class 1
PBS-485	55.850	-108.480	SK	FO	A	Class 1
PBS-487	55.850	-108.480	SK	FO	A	Class 1
PBS-488	55.850	-108.480	SK	FO	A	Class 1
PBS-489	55.850	-108.480	SK	FO	A	Class 1
CWE-920	55.950	-113.770	AB	FO	A	Class 1
GJG-214	55.950	-113.770	AB	FO	A	Class 1
K34997	55.950	-113.770	AB	FO	A	Class 1
AXI-897	55.980	-87.630	MB	FO	A	Class 1
AXI-898	55.980	-87.630	MB	FO	A	Class 1
WMB03-09	56.010	-95.820	MB	FO	A	Class 1
WMB03-07	56.020	-95.820	MB	FO	A	Class 1
WMB03-12	56.020	-95.820	MB	FO	A	Class 1
WMB03-18	56.020	-95.820	MB	FO	A	Class 1
WMB03-20	56.170	-102.250	SK	FO	A	Class 1
WMB03-21	56.170	-102.250	SK	FO	A	Class 1

SDR-652	56.250	-118.600	AB	FO	A	Class 1
SDR-653	56.250	-118.600	AB	FO	A	Class 1
SDR-654	56.250	-118.600	AB	FO	A	Class 1
SDR-655	56.250	-118.600	AB	FO	A	Class 1
SDR-656	56.250	-118.600	AB	FO	A	Class 1
SDR-657	56.250	-118.600	AB	FO	A	Class 1
SDR-658	56.250	-118.600	AB	FO	A	Class 1
SDR-659	56.250	-118.600	AB	FO	A	Class 1
PBG-651	56.450	-94.200	MB	FO	F	Class 1
PBG-652	56.450	-94.200	MB	FO	A	Class 1
WMB03-19	56.450	-94.200	MB	FO	A	Class 1
BMH-590	56.470	-99.750	MB	FO	A	Class 1
BMH-591	56.470	-99.750	MB	FO	A	Class 1
BMH-592	56.470	-99.750	MB	FO	A	Class 1
BMJ-461	56.470	-99.750	MB	FO	E	Class 1
BMJ-462	56.470	-99.750	MB	FO	A	Class 1
BMJ-463	56.470	-99.750	MB	FO	A	Class 1
PBN-658	56.470	-99.750	MB	FO	A	Class 1
PBQ-285	56.480	-109.430	SK	FO	A	Class 1
PBQ-286	56.480	-109.430	SK	FO	A	Class 1
AXS-674	56.530	-117.670	AB	FO	B	Class 1
SDV-409	56.730	-111.380	AB	FO	A	Class 1
BLH-495	56.770	-98.920	MB	FO	A	Class 1
BLH-496	56.770	-98.920	MB	FO	A	Class 1
PSM-580	56.770	-98.920	MB	FO	A	Class 1
GDE-773	56.820	-101.070	MB	FO	E	Class 1
PBD-195	56.820	-101.070	MB	FO	A	Class 1
PBN-869	56.820	-101.070	MB	FO	A	Class 1
PBN-870	56.820	-101.070	MB	FO	A	Class 1
PBN-871	56.820	-101.070	MB	FO	A	Class 1
PBN-872	56.820	-101.070	MB	FO	A	Class 1
WMB03-13	57.080	-102.020	SK	FO	E	Class 6
SDU-369	58.050	-116.350	AB	FO	A	Class 1
SDU-370	58.050	-116.350	AB	FO	B	Class 1
UYQ-264G	58.180	-116.400	AB	FO	B	Class 1
W98	60.020	-111.540	AB	FO	A	Class 1
W99	60.250	-113.000	AB	FO	A	Class 1
W97	61.104	-116.498	AB	FO	A	Class 1
NW27	66.250	-128.630	BW	WB	D	Class 3
NW28	66.250	-128.630	BW	WB	D	Class 3
NW29	66.250	-128.630	BW	WB	B	Class 3
NW30	66.250	-128.630	BW	WB	B	Class 3
NW31	66.250	-128.630	BW	WB	D	Class 3
FG8905	66.250	-128.617	BW	WB	A	Class 3
FG8904	66.283	-128.617	BW	WB	D	Class 3
FG8902	66.283	-128.533	BW	WB	D	Class 3
FG9301	66.350	-126.583	BW	WB	A	Class 3
CO9204	66.883	-126.250	BW	WB	A	Class 3
CO9205	66.883	-126.250	BW	WB	D	Class 3
CO9206	66.883	-126.250	BW	WB	D	Class 3
FG8901	66.983	-126.400	BW	WB	B	Class 3

NW07	67.030	-126.120	BW	WB	D	Class 3
NW08	67.030	-126.120	BW	WB	A	Class 3
NW23	67.030	-126.120	BW	WB	E	Class 3
CO9301	67.050	-126.033	BW	WB	D	Class 3
CO9302	67.050	-126.033	BW	WB	D	Class 3
CO9303	67.050	-126.033	BW	WB	D	Class 3
CO9304	67.050	-126.033	BW	WB	A	Class 3
CO9305	67.050	-126.033	BW	WB	D	Class 3
FG9201	67.167	-126.000	BW	WB	D	Class 3
FG9202	67.167	-126.000	BW	WB	D	Class 3
CO9201	67.167	-125.167	BW	WB	B	Class 3
CO9202	67.167	-125.167	BW	WB	E	Class 3
CO9203	67.167	-125.167	BW	WB	E	Class 3
IN9315	67.567	-133.667	CB	WB	A	Class 3
IN9308	67.967	-133.167	CB	WB	D	Class 3
IN9313	68.000	-132.917	CB	WB	F	Class 3
IN9314	68.000	-132.917	CB	WB	A	Class 3
IN9316	68.000	-132.917	CB	WB	D	Class 3
IN9317	68.000	-132.917	CB	WB	B	Class 3
IN9319	68.000	-132.917	CB	WB	D	Class 3
IN9312	68.117	-132.667	CB	WB	D	Class 3
IN9201	68.167	-132.833	CB	WB	B	Class 3
IN8903	68.200	-131.500	CB	WB	D	Class 3
IN8904	68.200	-131.500	CB	WB	D	Class 3
PA9201	68.267	-125.500	BW	WB	E	Class 3
PA9202	68.267	-125.500	BW	WB	E	Class 3
PA9203	68.267	-125.500	BW	WB	E	Class 3
PA9204	68.267	-125.500	BW	WB	E	Class 3
PA9301	68.267	-125.500	BW	WB	D	Class 3
PA9302	68.267	-125.500	BW	WB	D	Class 3
PA9303	68.267	-125.500	BW	WB	D	Class 3
PA9304	68.267	-125.500	BW	WB	D	Class 3
PA9305	68.267	-125.500	BW	WB	E	Class 3
PA9306	68.267	-125.500	BW	WB	D	Class 3
IN9213	68.283	-127.250	BW	WB	D	Class 3
IN9214	68.283	-127.250	BW	WB	D	Class 3
IN9215	68.283	-127.250	BW	WB	D	Class 3
IN9216	68.283	-127.250	BW	WB	E	Class 3
IN9217	68.283	-127.250	BW	WB	D	Class 3
IN9218	68.283	-127.250	BW	WB	D	Class 3
IN9219	68.283	-127.250	BW	WB	D	Class 3
IN9220	68.283	-127.250	BW	WB	D	Class 3
IN9221	68.283	-127.250	BW	WB	E	Class 3
IN9222	68.283	-127.250	BW	WB	D	Class 3
IN9305	68.500	-132.667	CB	WB	D	Class 3
IN9318	68.517	-133.633	CB	WB	D	Class 3
IN8906	68.583	-133.583	CB	WB	E	Class 3
IN9303	68.583	-133.167	CB	WB	B	Class 3
IN9304	68.583	-133.167	CB	WB	D	Class 3
PA0189	68.633	-125.167	BW	WB	A	Class 3
PA0289	68.633	-125.167	BW	WB	D	Class 3

PA0389	68.633	-125.167	BW	WB	A	Class 3
PA0489	68.633	-125.167	BW	WB	D	Class 3
PA0589	68.633	-125.167	BW	WB	E	Class 3
PA0789	68.633	-125.167	BW	WB	E	Class 3
PA0889	68.633	-125.167	BW	WB	D	Class 3
PA0989	68.633	-125.167	BW	WB	E	Class 3
PA1189	68.633	-125.167	BW	WB	E	Class 3
IN9301	68.667	-133.783	CB	WB	D	Class 3
TU9372	68.667	-132.833	CB	WB	E	Class 3
IN9306	68.700	-134.167	CB	WB	A	Class 3
CHA35	68.717	-134.117	CB	WB	D	Class 3
TU9331	68.717	-133.250	CB	WB	D	Class 3
TU9366	68.717	-132.833	CB	WB	B	Class 3
TU9367	68.717	-132.833	CB	WB	D	Class 3
TU9368	68.717	-132.833	CB	WB	B	Class 3
TU8901	68.733	-129.550	CB	WB	D	Class 3
TU9230	68.733	-129.550	CB	WB	D	Class 3
TU9228	68.733	-129.533	CB	WB	A	Class 3
IN9307	68.750	-133.333	CB	WB	B	Class 3
PA1389	68.750	-124.917	BW	WB	D	Class 3
PA1489	68.750	-124.917	BW	WB	D	Class 3
PA1589	68.750	-124.917	BW	WB	D	Class 3
PA1689	68.750	-124.917	BW	WB	D	Class 3
PA1789	68.750	-124.917	BW	WB	D	Class 3
PA1989	68.750	-124.917	BW	WB	E	Class 3
PA2189	68.750	-124.917	BW	WB	D	Class 3
PA2289	68.750	-124.917	BW	WB	D	Class 3
PA2389	68.750	-124.917	BW	WB	E	Class 3
PA2489	68.750	-124.917	BW	WB	D	Class 3
TU9231	68.817	-132.500	CB	WB	A	Class 3
TU9289	68.833	-133.000	CB	WB	D	Class 3
TU9290	68.833	-133.000	CB	WB	A	Class 3
TU9291	68.833	-133.000	CB	WB	C	Class 3
TU9348	68.833	-133.000	CB	WB	D	Class 3
IN9309	68.833	-128.500	CB	WB	D	Class 3
TU9370	68.867	-133.467	CB	WB	D	Class 3
TU9282	68.867	-133.450	CB	WB	A	Class 3
TU9359	68.867	-133.000	CB	WB	D	Class 3
TU9240	68.867	-127.000	BW	WB	D	Class 3
BJ-004	68.880	-126.950	BW	WB	C	Class 3
BJ-005	68.880	-126.950	BW	WB	E	Class 3
BJ-006	68.880	-126.950	BW	WB	E	Class 3
IN9302	68.883	-134.167	CB	WB	A	Class 3
TU9360	68.883	-132.583	CB	WB	D	Class 3
TU9324	68.900	-133.417	CB	WB	D	Class 3
TU9326	68.900	-133.417	CB	WB	D	Class 3
TU9273	68.900	-132.417	CB	WB	D	Class 3
TU9274	68.900	-132.417	CB	WB	D	Class 3
TU9275	68.900	-132.333	CB	WB	D	Class 3
TU9271	68.917	-132.667	CB	WB	F	Class 3
TU9288	68.917	-132.667	CB	WB	B	Class 3

TU9285	68.917	-131.967	CB	WB	D	Class 3
TU9213	68.933	-132.750	CB	WB	D	Class 3
TU9214	68.933	-132.750	CB	WB	D	Class 3
TU9209	68.933	-132.083	CB	WB	D	Class 3
TU9210	68.933	-132.083	CB	WB	D	Class 3
TU9320	68.950	-134.133	CB	WB	B	Class 3
TU9321	68.950	-134.133	CB	WB	A	Class 3
TU9322	68.950	-134.133	CB	WB	A	Class 3
TU9266	68.950	-133.667	CB	WB	D	Class 3
TU9242	68.950	-132.167	CB	WB	D	Class 3
TU9243	68.950	-132.167	CB	WB	D	Class 3
TU9276	68.950	-132.167	CB	WB	D	Class 3
TU9277	68.950	-132.167	CB	WB	D	Class 3
TU9283	68.950	-132.167	CB	WB	D	Class 3
TU9284	68.950	-132.167	CB	WB	D	Class 3
TU9262	68.950	-132.117	CB	WB	D	Class 3
TU9344	68.967	-132.533	CB	WB	D	Class 3
TU9345	68.967	-132.533	CB	WB	D	Class 3
TU9369	68.967	-132.533	CB	WB	F	Class 3
TU9212	69.000	-134.000	CB	WB	D	Class 3
TU9330	69.000	-133.617	CB	WB	D	Class 3
TU9340	69.000	-133.383	CB	WB	E	Class 3
TU9341	69.000	-133.383	CB	WB	D	Class 3
TU9347	69.000	-132.500	CB	WB	D	Class 3
TU9272	69.000	-132.417	CB	WB	D	Class 3
TU9225	69.000	-128.417	CB	WB	D	Class 3
TU9226	69.000	-128.417	CB	WB	D	Class 3
TU9227	69.000	-128.417	CB	WB	B	Class 3
TU9280	69.033	-132.250	CB	WB	D	Class 3
TU9281	69.033	-132.250	CB	WB	D	Class 3
TU9278	69.033	-131.950	CB	WB	B	Class 3
TU9224	69.067	-132.000	CB	WB	A	Class 3
TU9333	69.083	-133.167	CB	WB	A	Class 3
TU9334	69.083	-133.167	CB	WB	A	Class 3
TU9335	69.083	-133.167	CB	WB	D	Class 3
TU9319	69.083	-133.150	CB	WB	B	Class 3
TU9223	69.083	-132.583	CB	WB	D	Class 3
TU9346	69.100	-133.533	CB	WB	E	Class 3
TU9286	69.100	-132.000	CB	WB	D	Class 3
TU9287	69.100	-132.000	CB	WB	A	Class 3
TU9361	69.100	-131.250	CB	WB	D	Class 3
TU9362	69.100	-131.250	CB	WB	D	Class 3
TU9343	69.133	-134.333	CB	WB	A	Class 3
TU9342	69.133	-133.800	CB	WB	D	Class 3
TU9302	69.133	-133.350	CB	WB	E	Class 3
TU9303	69.133	-133.350	CB	WB	D	Class 3
TU9311	69.133	-133.350	CB	WB	D	Class 3
TU9312	69.133	-133.350	CB	WB	D	Class 3
TU9327	69.133	-131.250	CB	WB	B	Class 3
TU9329	69.133	-131.250	CB	WB	D	Class 3
TU9304	69.150	-133.650	CB	WB	D	Class 3

TU9305	69.150	-133.650	CB	WB	D	Class 3
TU9306	69.150	-133.650	CB	WB	D	Class 3
TU9307	69.150	-133.650	CB	WB	B	Class 3
TU9308	69.150	-133.650	CB	WB	D	Class 3
TU9309	69.150	-133.650	CB	WB	B	Class 3
TU9310	69.150	-133.650	CB	WB	B	Class 3
TU9313	69.150	-133.650	CB	WB	D	Class 3
TU9314	69.150	-133.650	CB	WB	B	Class 3
TU9315	69.150	-133.650	CB	WB	D	Class 3
TU9316	69.150	-133.650	CB	WB	E	Class 3
TU9317	69.150	-133.650	CB	WB	E	Class 3
TU9318	69.150	-133.650	CB	WB	D	Class 3
PA9206	69.150	-124.100	BW	WB	A	Class 3
PA9207	69.150	-124.100	BW	WB	E	Class 3
PA9208	69.150	-124.100	BW	WB	D	Class 3
TU9265	69.167	-132.500	CB	WB	D	Class 3
PA9205	69.167	-124.150	BW	WB	D	Class 3
TU9323	69.200	-132.000	CB	WB	D	Class 3
TU9336	69.217	-132.500	CB	WB	D	Class 3
TU9263	69.217	-131.333	CB	WB	D	Class 3
TU9264	69.217	-131.333	CB	WB	D	Class 3
TU9207	69.250	-131.333	CB	WB	D	Class 3
TU9208	69.250	-131.333	CB	WB	D	Class 3
TU9353	69.267	-132.700	CB	WB	D	Class 3
TU9354	69.267	-132.700	CB	WB	D	Class 3
TU9355	69.267	-132.700	CB	WB	E	Class 3
TU9332	69.283	-132.583	CB	WB	D	Class 3
TU9349	69.300	-134.283	CB	WB	F	Class 2
TU9268	69.300	-133.583	CB	WB	A	Class 3
TU9269	69.300	-133.583	CB	WB	A	Class 3
TU9270	69.300	-133.583	CB	WB	D	Class 3
IN9310	69.333	-133.167	CB	WB	A	Class 3
TU9220	69.333	-133.000	CB	WB	B	Class 3
TU9221	69.333	-133.000	CB	WB	E	Class 3
TU9337	69.333	-132.800	CB	WB	D	Class 3
TU9338	69.333	-132.800	CB	WB	E	Class 3
TU9339	69.333	-132.800	CB	WB	D	Class 3
TU9239	69.333	-131.500	CB	WB	B	Class 3
TU9371	69.333	-129.000	CB	WB	E	Class 3
TU9301	69.367	-134.167	CB	WB	B	Class 2
TU9211	69.367	-130.850	CB	WB	B	Class 3
TU9350	69.450	-134.550	CB	WB	B	Class 2
TU9201	69.500	-133.667	CB	WB	B	Class 2
TU9203	69.500	-133.667	CB	WB	B	Class 2
TU9204	69.500	-133.667	CB	WB	B	Class 2
TU9205	69.500	-133.667	CB	WB	B	Class 2
TU9206	69.500	-133.667	CB	WB	B	Class 2
TU9236	69.500	-130.800	CB	WB	D	Class 3
TU9237	69.500	-130.800	CB	WB	D	Class 3
TU9356	69.533	-129.750	CB	WB	A	Class 3
TU9217	69.550	-131.000	CB	WB	A	Class 3

TU9215	69.633	-131.417	CB	WB	D	Class 3
TU9216	69.633	-131.417	CB	WB	D	Class 3
TU9218	69.633	-131.417	CB	WB	D	Class 3
TU9219	69.633	-131.417	CB	WB	D	Class 3
TU9232	69.633	-131.250	CB	WB	D	Class 3
TU9233	69.633	-131.250	CB	WB	D	Class 3
TU9234	69.633	-131.250	CB	WB	D	Class 3
TU9235	69.633	-131.250	CB	WB	D	Class 3
TU9351	69.700	-131.500	CB	WB	B	Class 2
TU9352	69.700	-131.500	CB	WB	F	Class 2
TU8908	69.700	-129.000	CB	WB	D	Class 3
BJ-001	69.700	-128.970	CB	WB	C	Class 3
BJ-002	69.700	-128.970	CB	WB	C	Class 3
BJ-003	69.700	-128.970	CB	WB	B	Class 3
BJ-007	69.700	-128.970	CB	WB	C	Class 3
TU9222	69.717	-131.583	CB	WB	B	Class 2
TU9357	69.750	-128.833	CB	WB	D	Class 5
TU9358	69.767	-128.833	CB	WB	D	Class 5
IN9211	69.833	-134.000	CB	WB	B	Class 2
IN9212	69.833	-134.000	CB	WB	D	Class 2
BMF-001	58.620	-101.480	MB	EB	E	Class 6
PBD-885	58.620	-101.480	MB	EB	A	Class 6
PBD-886	58.620	-101.480	MB	EB	E	Class 6
PBD-889	58.620	-101.480	MB	EB	B	Class 6
PBO-887	58.620	-101.480	MB	EB	A	Class 6
PBO-888	58.620	-101.480	MB	EB	F	Class 6
WMB03-01	58.620	-101.480	MB	EB	A	Class 6
WMB03-02	58.620	-101.480	MB	EB	F	Class 6
WMB03-03	58.620	-101.480	MB	EB	E	Class 6
WMB03-06	58.620	-101.480	MB	EB	E	Class 6
WMB03-16	58.620	-101.480	MB	EB	E	Class 6
BMR-614	58.720	-94.120	MB	EB	E	Class 6
PBJ-980	58.720	-94.120	MB	EB	F	Class 6
PBJ-981	58.720	-94.120	MB	EB	A	Class 6
PBJ-982	58.720	-94.120	MB	EB	E	Class 6
PBK-539	58.720	-94.120	MB	EB	A	Class 6
BSB-325	59.320	-107.200	SK	EB	A	Class 6
BSB-326	59.320	-107.200	SK	EB	E	Class 6
BSJ-003	59.320	-107.200	SK	EB	B	Class 6
BSJ-004	59.320	-107.200	SK	EB	E	Class 6
BSJ-005	59.320	-107.200	SK	EB	B	Class 6
BSJ-006	59.320	-107.200	SK	EB	A	Class 6
BSJ-007	59.320	-107.200	SK	EB	F	Class 6
BSJ-008	59.320	-107.200	SK	EB	E	Class 6
BSJ-009	59.320	-107.200	SK	EB	E	Class 6
BSJ-010	59.320	-107.200	SK	EB	E	Class 6
BSJ-011	59.320	-107.200	SK	EB	E	Class 6
BSM-447	59.320	-107.200	SK	EB	E	Class 6
BSM-448	59.320	-107.200	SK	EB	A	Class 6
BSM-449	59.320	-107.200	SK	EB	F	Class 6
BSM-450	59.320	-107.200	SK	EB	E	Class 6

BSM-451	59.320	-107.200	SK	EB	E	Class 6
BSM-452	59.320	-107.200	SK	EB	E	Class 6
BSM-453	59.320	-107.200	SK	EB	D	Class 6
W1	60.680	-102.930	QA	EB	A	Class 1
W2	60.680	-102.930	QA	EB	A	Class 1
W3	60.680	-102.930	QA	EB	A	Class 1
W4	60.680	-102.930	QA	EB	A	Class 1
W5	60.680	-102.930	QA	EB	A	Class 1
W6	60.680	-102.930	QA	EB	A	Class 1
W14	60.720	-104.170	QA	EB	F	Class 6
W15	60.720	-104.170	QA	EB	E	Class 6
W16	60.720	-104.170	QA	EB	A	Class 6
W17	60.720	-104.170	QA	EB	E	Class 6
W18	60.720	-104.170	QA	EB	A	Class 6
W19	60.720	-104.170	QA	EB	E	Class 6
W20	60.720	-104.170	QA	EB	E	Class 6
W21	60.720	-104.170	QA	EB	E	Class 6
W22	60.720	-104.170	QA	EB	E	Class 6
W23	60.720	-104.170	QA	EB	A	Class 6
W24	60.720	-104.170	QA	EB	E	Class 6
W25	60.720	-104.170	QA	EB	D	Class 6
W26	60.720	-104.170	QA	EB	B	Class 6
W27	60.720	-104.170	QA	EB	A	Class 6
W28	60.720	-104.170	QA	EB	E	Class 6
W29	60.720	-104.170	QA	EB	E	Class 6
W30	60.720	-104.170	QA	EB	E	Class 6
W31	60.720	-104.170	QA	EB	A	Class 6
W32	60.720	-104.170	QA	EB	A	Class 6
W33	60.720	-104.170	QA	EB	E	Class 6
W34	60.720	-104.170	QA	EB	E	Class 6
W35	60.720	-104.170	QA	EB	E	Class 6
W36	60.720	-104.170	QA	EB	A	Class 6
W37	60.720	-104.170	QA	EB	E	Class 6
W38	60.720	-104.170	QA	EB	A	Class 6
W39	60.720	-104.170	QA	EB	E	Class 6
W40	60.720	-104.170	QA	EB	A	Class 6
W42	60.720	-104.170	QA	EB	E	Class 6
W43	60.720	-104.170	QA	EB	E	Class 6
W44	60.720	-104.170	QA	EB	A	Class 6
W46	60.720	-104.170	QA	EB	D	Class 6
W47	60.720	-104.170	QA	EB	E	Class 6
W48	60.720	-104.170	QA	EB	E	Class 6
W49	60.720	-104.170	QA	EB	A	Class 6
W50	60.720	-104.170	QA	EB	B	Class 6
W51	60.720	-104.170	QA	EB	E	Class 6
W52	60.720	-104.170	QA	EB	D	Class 6
W53	60.720	-104.170	QA	EB	A	Class 6
W54	60.720	-104.170	QA	EB	A	Class 6
W55	60.720	-104.170	QA	EB	E	Class 6
W56	60.720	-104.170	QA	EB	E	Class 6
W57	60.720	-104.170	QA	EB	E	Class 6

W58	60.720	-104.170	QA	EB	E	Class 6
W59	60.720	-104.170	QA	EB	E	Class 6
W60	60.720	-104.170	QA	EB	A	Class 6
W61	60.720	-104.170	QA	EB	D	Class 6
W62	60.720	-104.170	QA	EB	E	Class 6
W63	60.720	-104.170	QA	EB	A	Class 6
W64	60.720	-104.170	QA	EB	E	Class 6
W65	60.720	-104.170	QA	EB	A	Class 6
W66	60.720	-104.170	QA	EB	A	Class 6
W67	60.720	-104.170	QA	EB	D	Class 6
W68	60.720	-104.170	QA	EB	A	Class 6
W69	60.720	-104.170	QA	EB	A	Class 6
W70	60.720	-104.170	QA	EB	E	Class 6
W71	60.720	-104.170	QA	EB	A	Class 6
W72	60.720	-104.170	QA	EB	A	Class 6
W73	60.720	-104.170	QA	EB	E	Class 6
W74	60.720	-104.170	QA	EB	A	Class 6
W75	60.720	-104.170	QA	EB	A	Class 6
W76	60.720	-104.170	QA	EB	E	Class 6
W77	60.720	-104.170	QA	EB	E	Class 6
W78	60.720	-104.170	QA	EB	E	Class 6
W79	60.720	-104.170	QA	EB	F	Class 6
W80	60.720	-104.170	QA	EB	E	Class 6
W81	60.720	-104.170	QA	EB	C	Class 6
W82	60.720	-104.170	QA	EB	E	Class 6
W83	60.720	-104.170	QA	EB	E	Class 6
W84	60.720	-104.170	QA	EB	A	Class 6
W85	60.720	-104.170	QA	EB	A	Class 6
W86	60.720	-104.170	QA	EB	F	Class 6
W87	60.720	-104.170	QA	EB	E	Class 6
W88	60.720	-104.170	QA	EB	F	Class 6
W89	60.720	-104.170	QA	EB	E	Class 6
W90	60.720	-104.170	QA	EB	D	Class 6
W91	60.720	-104.170	QA	EB	E	Class 6
W92	60.720	-104.170	QA	EB	D	Class 6
W93	60.720	-104.170	QA	EB	A	Class 6
W94	60.720	-104.170	QA	EB	A	Class 6
W95	60.720	-104.170	QA	EB	E	Class 6
W96	60.720	-104.170	QA	EB	E	Class 6
AR166	61.100	-94.050	QA	EB	E	Class 6
AR167	61.100	-94.050	QA	EB	E	Class 6
AR168	61.100	-94.050	QA	EB	E	Class 6
AR169	61.100	-94.050	QA	EB	E	Class 6
AR170	61.100	-94.050	QA	EB	E	Class 6
AR171	61.100	-94.050	QA	EB	E	Class 6
AR172	61.100	-94.050	QA	EB	D	Class 6
AR181	61.100	-94.050	QA	EB	E	Class 6
AR182	61.100	-94.050	QA	EB	E	Class 6
AR183	61.100	-94.050	QA	EB	E	Class 6
AR184	61.100	-94.050	QA	EB	E	Class 6
AR185	61.100	-94.050	QA	EB	A	Class 6

AR186	61.100	-94.050	QA	EB	F	Class 6
AR187	61.100	-94.050	QA	EB	D	Class 6
AR188	61.100	-94.050	QA	EB	E	Class 6
AR189	61.100	-94.050	QA	EB	E	Class 6
AR190	61.100	-94.050	QA	EB	E	Class 6
BKW-364	61.100	-94.050	QA	EB	E	Class 6
BKW-365	61.100	-94.050	QA	EB	A	Class 6
BKW-366	61.100	-94.050	QA	EB	A	Class 6
BKW-367	61.100	-94.050	QA	EB	D	Class 6
BKW-368	61.100	-94.050	QA	EB	E	Class 6
BKW-369	61.100	-94.050	QA	EB	A	Class 6
BKW-371	61.100	-94.050	QA	EB	E	Class 6
BKW-372	61.100	-94.050	QA	EB	E	Class 6
BKW-373	61.100	-94.050	QA	EB	E	Class 6
BKW-374	61.100	-94.050	QA	EB	E	Class 6
BKW-375	61.100	-94.050	QA	EB	A	Class 6
BKW-376	61.100	-94.050	QA	EB	A	Class 6
BKW-377	61.100	-94.050	QA	EB	E	Class 6
BKW-378	61.100	-94.050	QA	EB	E	Class 6
BKW-379	61.100	-94.050	QA	EB	D	Class 6
BKW-380	61.100	-94.050	QA	EB	E	Class 6
BKW-381	61.100	-94.050	QA	EB	A	Class 6
BKW-382	61.100	-94.050	QA	EB	A	Class 6
BKW-383	61.100	-94.050	QA	EB	A	Class 6
BKW-384	61.100	-94.050	QA	EB	E	Class 6
BKW-385	61.100	-94.050	QA	EB	E	Class 6
BKW-386	61.100	-94.050	QA	EB	E	Class 6
BKW-387	61.100	-94.050	QA	EB	E	Class 6
BKW-388	61.100	-94.050	QA	EB	E	Class 6
BKW-389	61.100	-94.050	QA	EB	D	Class 6
BKW-390	61.100	-94.050	QA	EB	E	Class 6
BKW-391	61.100	-94.050	QA	EB	E	Class 6
BKW-392	61.100	-94.050	QA	EB	E	Class 6
BKW-393	61.100	-94.050	QA	EB	E	Class 6
BKW-394	61.100	-94.050	QA	EB	E	Class 6
BKW-395	61.100	-94.050	QA	EB	E	Class 6
BLB-191	61.100	-94.050	QA	EB	C	Class 6
BLB-192	61.100	-94.050	QA	EB	E	Class 6
BLB-193	61.100	-94.050	QA	EB	E	Class 6
BLB-194	61.100	-94.050	QA	EB	E	Class 6
BLB-195	61.100	-94.050	QA	EB	A	Class 6
BLB-196	61.100	-94.050	QA	EB	E	Class 6
BLB-198	61.100	-94.050	QA	EB	E	Class 6
BLB-199	61.100	-94.050	QA	EB	A	Class 6
BLB-201	61.100	-94.050	QA	EB	C	Class 6
BLB-202	61.100	-94.050	QA	EB	E	Class 6
BLB-203	61.100	-94.050	QA	EB	E	Class 6
BLB-204	61.100	-94.050	QA	EB	D	Class 6
BLB-205	61.100	-94.050	QA	EB	B	Class 6
BLB-206	61.100	-94.050	QA	EB	E	Class 6
BLB-207	61.100	-94.050	QA	EB	E	Class 6

BLB-208	61.100	-94.050	QA	EB	E	Class 6
BLB-209	61.100	-94.050	QA	EB	E	Class 6
BLB-210	61.100	-94.050	QA	EB	A	Class 6
BLB-211	61.100	-94.050	QA	EB	B	Class 6
BLB-212	61.100	-94.050	QA	EB	E	Class 6
BLB-213	61.100	-94.050	QA	EB	E	Class 6
BLB-214	61.100	-94.050	QA	EB	A	Class 6
BLB-215	61.100	-94.050	QA	EB	E	Class 6
BLB-216	61.100	-94.050	QA	EB	E	Class 6
BLB-217	61.100	-94.050	QA	EB	E	Class 6
BLB-218	61.100	-94.050	QA	EB	E	Class 6
BLB-219	61.100	-94.050	QA	EB	E	Class 6
BLB-221	61.100	-94.050	QA	EB	E	Class 6
BLB-222	61.100	-94.050	QA	EB	A	Class 6
BLB-223	61.100	-94.050	QA	EB	E	Class 6
BLB-224	61.100	-94.050	QA	EB	E	Class 6
BLB-225	61.100	-94.050	QA	EB	E	Class 6
BLB-226	61.100	-94.050	QA	EB	E	Class 6
BLB-227	61.100	-94.050	QA	EB	E	Class 6
BLB-229	61.100	-94.050	QA	EB	E	Class 6
BLB-230	61.100	-94.050	QA	EB	A	Class 6
BLB-231	61.100	-94.050	QA	EB	E	Class 6
BUB-197	61.100	-94.050	QA	EB	E	Class 6
BUB-220	61.100	-94.050	QA	EB	A	Class 6
K34843	61.100	-94.050	QA	EB	A	Class 6
PKW-370	61.100	-94.050	QA	EB	E	Class 6
PSI-641	61.100	-94.050	QA	EB	E	Class 6
PSI-642	61.100	-94.050	QA	EB	E	Class 6
AR05	61.170	-100.260	QA	EB	B	Class 6
AR06	61.170	-100.260	QA	EB	E	Class 6
AR01	61.200	-100.190	QA	EB	D	Class 6
AR02	61.240	-100.240	QA	EB	E	Class 6
AR03	61.240	-100.240	QA	EB	E	Class 6
AR04	61.240	-100.240	QA	EB	E	Class 6
AR07	61.240	-100.240	QA	EB	E	Class 6
AR08	61.240	-100.240	QA	EB	E	Class 6
3360	61.530	-105.580	QA	EB	E	Class 6
3371	61.530	-105.580	QA	EB	D	Class 6
3372	61.530	-105.580	QA	EB	E	Class 6
3377	61.530	-105.580	QA	EB	E	Class 6
3378	61.530	-105.580	QA	EB	E	Class 6
3396	61.530	-105.580	QA	EB	A	Class 6
3402	61.530	-105.580	QA	EB	D	Class 6
3403	61.530	-105.580	QA	EB	E	Class 6
3410	61.530	-105.580	QA	EB	E	Class 6
3411	61.530	-105.580	QA	EB	E	Class 6
3413	61.530	-105.580	QA	EB	E	Class 6
3414	61.530	-105.580	QA	EB	A	Class 6
3417	61.530	-105.580	QA	EB	E	Class 6
3418	61.530	-105.580	QA	EB	E	Class 6
3419	61.530	-105.580	QA	EB	E	Class 6

3421	61.530	-105.580	QA	EB	E	Class 6
3422	61.530	-105.580	QA	EB	G	Class 6
3423	61.530	-105.580	QA	EB	E	Class 6
3424	61.530	-105.580	QA	EB	E	Class 6
3425	61.530	-105.580	QA	EB	E	Class 6
3426	61.530	-105.580	QA	EB	E	Class 6
3427	61.530	-105.580	QA	EB	E	Class 6
3429	61.530	-105.580	QA	EB	E	Class 6
3430	61.530	-105.580	QA	EB	F	Class 6
3432	61.530	-105.580	QA	EB	E	Class 6
3433	61.530	-105.580	QA	EB	E	Class 6
3361a	61.530	-105.580	QA	EB	E	Class 6
3361b	61.530	-105.580	QA	EB	E	Class 6
3362a	61.530	-105.580	QA	EB	E	Class 6
3362b	61.530	-105.580	QA	EB	D	Class 6
3362c	61.530	-105.580	QA	EB	E	Class 6
3363a	61.530	-105.580	QA	EB	E	Class 6
3363b	61.530	-105.580	QA	EB	E	Class 6
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3364b	61.530	-105.580	QA	EB	D	Class 6
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3373b	61.530	-105.580	QA	EB	E	Class 6
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3374b	61.530	-105.580	QA	EB	D	Class 6
3374c	61.530	-105.580	QA	EB	E	Class 6
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3375b	61.530	-105.580	QA	EB	E	Class 6
3376a	61.530	-105.580	QA	EB	E	Class 6
3376b	61.530	-105.580	QA	EB	D	Class 6
3376c	61.530	-105.580	QA	EB	E	Class 6
3379a	61.530	-105.580	QA	EB	E	Class 6
3379b	61.530	-105.580	QA	EB	E	Class 6
3379c	61.530	-105.580	QA	EB	E	Class 6
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3380b	61.530	-105.580	QA	EB	E	Class 6
3380c	61.530	-105.580	QA	EB	E	Class 6
3380d	61.530	-105.580	QA	EB	E	Class 6
3381a	61.530	-105.580	QA	EB	E	Class 6
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3382a	61.530	-105.580	QA	EB	E	Class 6
3382b	61.530	-105.580	QA	EB	E	Class 6
3383a	61.530	-105.580	QA	EB	E	Class 6

3383b	61.530	-105.580	QA	EB	A	Class 6
3383c	61.530	-105.580	QA	EB	E	Class 6
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3384b	61.530	-105.580	QA	EB	E	Class 6
3385a	61.530	-105.580	QA	EB	E	Class 6
3385b	61.530	-105.580	QA	EB	E	Class 6
3385c	61.530	-105.580	QA	EB	E	Class 6
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3387a	61.530	-105.580	QA	EB	E	Class 6
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3389b	61.530	-105.580	QA	EB	E	Class 6
3389c	61.530	-105.580	QA	EB	E	Class 6
3389d	61.530	-105.580	QA	EB	E	Class 6
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3393c	61.530	-105.580	QA	EB	E	Class 6
3393d	61.530	-105.580	QA	EB	E	Class 6
3394a	61.530	-105.580	QA	EB	F	Class 6
3394b	61.530	-105.580	QA	EB	E	Class 6
3394c	61.530	-105.580	QA	EB	E	Class 6
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3398b	61.530	-105.580	QA	EB	E	Class 6
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3398d	61.530	-105.580	QA	EB	E	Class 6
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3400c	61.530	-105.580	QA	EB	E	Class 6
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3404a	61.530	-105.580	QA	EB	E	Class 6
3405a	61.530	-105.580	QA	EB	E	Class 6
3405b	61.530	-105.580	QA	EB	E	Class 6

3406a	61.530	-105.580	QA	EB	E	Class 6
3406b	61.530	-105.580	QA	EB	E	Class 6
3406c	61.530	-105.580	QA	EB	E	Class 6
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3412a	61.530	-105.580	QA	EB	D	Class 6
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3416b	61.530	-105.580	QA	EB	E	Class 6
3416c	61.530	-105.580	QA	EB	E	Class 6
3420a	61.530	-105.580	QA	EB	E	Class 6
3420b	61.530	-105.580	QA	EB	E	Class 6
3428a	61.530	-105.580	QA	EB	E	Class 6
3434a	61.530	-105.580	QA	EB	E	Class 6
3434b	61.530	-105.580	QA	EB	E	Class 6
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W108	61.530	-105.580	QA	EB	F	Class 6
W109	61.530	-105.580	QA	EB	D	Class 6
W110	61.530	-105.580	QA	EB	A	Class 6
W111	61.530	-105.580	QA	EB	A	Class 6
W112	61.530	-105.580	QA	EB	B	Class 6
W114	61.530	-105.580	QA	EB	E	Class 6
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W116	61.530	-105.580	QA	EB	F	Class 6
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W125	61.530	-105.580	QA	EB	E	Class 6
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W128	61.530	-105.580	QA	EB	F	Class 6
W129	61.530	-105.580	QA	EB	A	Class 6

W130	61.530	-105.580	QA	EB	E	Class 6
W131	61.530	-105.580	QA	EB	E	Class 6
W132	61.530	-105.580	QA	EB	A	Class 6
W133	61.530	-105.580	QA	EB	A	Class 6
W135	61.530	-105.580	QA	EB	A	Class 6
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W137	61.530	-105.580	QA	EB	E	Class 6
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W144	61.530	-105.580	QA	EB	F	Class 6
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W146	61.530	-105.580	QA	EB	E	Class 6
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W182	61.530	-105.580	QA	EB	F	Class 6
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W185	61.530	-105.580	QA	EB	F	Class 6
W186	61.530	-105.580	QA	EB	E	Class 6
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W190	61.530	-105.580	QA	EB	D	Class 6
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W214	61.530	-105.580	QA	EB	E	Class 6
W215	61.530	-105.580	QA	EB	E	Class 6
W216	61.530	-105.580	QA	EB	D	Class 6
W217	61.530	-105.580	QA	EB	F	Class 6
W218	61.530	-105.580	QA	EB	A	Class 6
W219	61.530	-105.580	QA	EB	A	Class 6
W220	61.530	-105.580	QA	EB	F	Class 6
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W223	61.530	-105.580	QA	EB	F	Class 6
W224	61.530	-105.580	QA	EB	F	Class 6
W225	61.530	-105.580	QA	EB	A	Class 6
W226	61.530	-105.580	QA	EB	A	Class 6
3305	61.620	-105.750	QA	EB	E	Class 6
3312	61.620	-105.750	QA	EB	E	Class 6
3320	61.620	-105.750	QA	EB	E	Class 6
3326	61.620	-105.750	QA	EB	E	Class 6
3330	61.620	-105.750	QA	EB	A	Class 6
3331	61.620	-105.750	QA	EB	E	Class 6
3332	61.620	-105.750	QA	EB	E	Class 6
3343	61.620	-105.750	QA	EB	A	Class 6
3344	61.620	-105.750	QA	EB	E	Class 6
3348	61.620	-105.750	QA	EB	D	Class 6
3349	61.620	-105.750	QA	EB	A	Class 6
3350	61.620	-105.750	QA	EB	E	Class 6
3351	61.620	-105.750	QA	EB	D	Class 6

3352	61.620	-105.750	QA	EB	E	Class 6
3355	61.620	-105.750	QA	EB	E	Class 6
3356	61.620	-105.750	QA	EB	E	Class 6
3357	61.620	-105.750	QA	EB	D	Class 6
3300a	61.620	-105.750	QA	EB	E	Class 6
3301a	61.620	-105.750	QA	EB	E	Class 6
3301b	61.620	-105.750	QA	EB	E	Class 6
3301c	61.620	-105.750	QA	EB	E	Class 6
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3302b	61.620	-105.750	QA	EB	E	Class 6
3303b	61.620	-105.750	QA	EB	A	Class 6
3303c	61.620	-105.750	QA	EB	E	Class 6
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3304c	61.620	-105.750	QA	EB	E	Class 6
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3306a	61.620	-105.750	QA	EB	E	Class 6
3306b	61.620	-105.750	QA	EB	E	Class 6
3306c	61.620	-105.750	QA	EB	E	Class 6
3307a	61.620	-105.750	QA	EB	E	Class 6
3307b	61.620	-105.750	QA	EB	E	Class 6
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3308b	61.620	-105.750	QA	EB	E	Class 6
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3310b	61.620	-105.750	QA	EB	E	Class 6
3310c	61.620	-105.750	QA	EB	E	Class 6
3310d	61.620	-105.750	QA	EB	E	Class 6
3311a	61.620	-105.750	QA	EB	E	Class 6
3311b	61.620	-105.750	QA	EB	E	Class 6
3311c	61.620	-105.750	QA	EB	E	Class 6
3313a	61.620	-105.750	QA	EB	E	Class 6
3313b	61.620	-105.750	QA	EB	E	Class 6
3313c	61.620	-105.750	QA	EB	E	Class 6
3313d	61.620	-105.750	QA	EB	E	Class 6
3314a	61.620	-105.750	QA	EB	E	Class 6
3314b	61.620	-105.750	QA	EB	E	Class 6
3314c	61.620	-105.750	QA	EB	E	Class 6
3314d	61.620	-105.750	QA	EB	E	Class 6
3315a	61.620	-105.750	QA	EB	E	Class 6
3315b	61.620	-105.750	QA	EB	D	Class 6
3316a	61.620	-105.750	QA	EB	E	Class 6
3316b	61.620	-105.750	QA	EB	E	Class 6
3317b	61.620	-105.750	QA	EB	E	Class 6
3318a	61.620	-105.750	QA	EB	D	Class 6
3318b	61.620	-105.750	QA	EB	E	Class 6
3318c	61.620	-105.750	QA	EB	D	Class 6

3318d	61.620	-105.750	QA	EB	B	Class 6
3319a	61.620	-105.750	QA	EB	A	Class 6
3319b	61.620	-105.750	QA	EB	E	Class 6
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3321b	61.620	-105.750	QA	EB	E	Class 6
3321c	61.620	-105.750	QA	EB	E	Class 6
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3323b	61.620	-105.750	QA	EB	E	Class 6
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3325a	61.620	-105.750	QA	EB	E	Class 6
3325b	61.620	-105.750	QA	EB	D	Class 6
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3329b	61.620	-105.750	QA	EB	B	Class 6
3333a	61.620	-105.750	QA	EB	E	Class 6
3333b	61.620	-105.750	QA	EB	F	Class 6
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3334b	61.620	-105.750	QA	EB	E	Class 6
3334c	61.620	-105.750	QA	EB	E	Class 6
3335a	61.620	-105.750	QA	EB	E	Class 6
3335b	61.620	-105.750	QA	EB	E	Class 6
3336a	61.620	-105.750	QA	EB	B	Class 6
3336b	61.620	-105.750	QA	EB	E	Class 6
3337a	61.620	-105.750	QA	EB	E	Class 6
3337b	61.620	-105.750	QA	EB	E	Class 6
3337c	61.620	-105.750	QA	EB	E	Class 6
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3338b	61.620	-105.750	QA	EB	E	Class 6
3338c	61.620	-105.750	QA	EB	E	Class 6
3338d	61.620	-105.750	QA	EB	E	Class 6
3339a	61.620	-105.750	QA	EB	E	Class 6
3339b	61.620	-105.750	QA	EB	E	Class 6
3339c	61.620	-105.750	QA	EB	D	Class 6
3339d	61.620	-105.750	QA	EB	E	Class 6
3339e	61.620	-105.750	QA	EB	E	Class 6
3340a	61.620	-105.750	QA	EB	E	Class 6
3340b	61.620	-105.750	QA	EB	E	Class 6
3340c	61.620	-105.750	QA	EB	E	Class 6
3341a	61.620	-105.750	QA	EB	E	Class 6
3341b	61.620	-105.750	QA	EB	E	Class 6
3341c	61.620	-105.750	QA	EB	E	Class 6
3342a	61.620	-105.750	QA	EB	E	Class 6
3342b	61.620	-105.750	QA	EB	A	Class 6
3345a	61.620	-105.750	QA	EB	D	Class 6
3345b	61.620	-105.750	QA	EB	E	Class 6

3346a	61.620	-105.750	QA	EB	E	Class 6
3346b	61.620	-105.750	QA	EB	E	Class 6
3347a	61.620	-105.750	QA	EB	E	Class 6
3347b	61.620	-105.750	QA	EB	E	Class 6
3347c	61.620	-105.750	QA	EB	E	Class 6
3353a	61.620	-105.750	QA	EB	E	Class 6
3353b	61.620	-105.750	QA	EB	E	Class 6
3354a	61.620	-105.750	QA	EB	A	Class 6
3354b	61.620	-105.750	QA	EB	D	Class 6
3359a	61.620	-105.750	QA	EB	E	Class 6
3359b	61.620	-105.750	QA	EB	E	Class 6
W10	61.650	-105.580	QA	EB	E	Class 6
W11	61.650	-105.580	QA	EB	E	Class 6
W12	61.650	-105.580	QA	EB	E	Class 6
W13	61.650	-105.580	QA	EB	D	Class 6
W7	61.650	-105.580	QA	EB	E	Class 6
W8	61.650	-105.580	QA	EB	E	Class 6
W9	61.650	-105.580	QA	EB	E	Class 6
RI87	62.820	-92.080	QA	EB	E	Class 6
RI89	63.130	-92.800	QA	EB	E	Class 6
CI193	63.580	-92.250	QA	EB	E	Class 6
CI195	63.580	-92.250	QA	EB	E	Class 6
RI88	63.580	-92.250	QA	EB	C	Class 6
CI194	63.830	-91.000	QA	EB	E	Class 6
CI192	64.120	-90.750	QA	EB	E	Class 6
CH24	64.150	-84.450	SH	EB	B	Class 6
CH20	64.160	-84.460	SH	EB	E	Class 6
CH23	64.180	-84.460	SH	EB	E	Class 6
CH22	64.200	-84.500	SH	EB	E	Class 6
CH21	64.200	-84.450	SH	EB	E	Class 6
RI75	64.430	-93.100	QA	EB	E	Class 6
RI76	64.430	-93.100	QA	EB	E	Class 6
RI77	64.430	-93.100	QA	EB	E	Class 6
RI78	64.430	-93.100	QA	EB	E	Class 6
RI79	64.430	-93.100	QA	EB	E	Class 6
RI80	64.430	-93.100	QA	EB	E	Class 6
RI81	64.430	-93.100	QA	EB	E	Class 6
RI82	64.430	-93.100	QA	EB	G	Class 6
RI83	64.430	-93.100	QA	EB	E	Class 6
RI84	64.430	-93.100	QA	EB	E	Class 6
RI85	64.430	-93.100	QA	EB	E	Class 6
RI86	64.430	-93.100	QA	EB	E	Class 6
CI191	64.480	-91.070	QA	EB	E	Class 6
BL40	64.500	-99.000	QA	EB	E	Class 6
BL41	64.500	-99.000	QA	EB	E	Class 6
FF9203	65.033	-122.267	BW	EB	A	Class 6
FF9201	65.083	-123.500	BW	EB	A	Class 6
FF9202	65.083	-123.500	BW	EB	A	Class 6
NW02	65.180	-123.420	BW	EB	E	Class 6
NW11	65.180	-123.420	BW	EB	D	Class 6
NW12	65.180	-123.420	BW	EB	D	Class 6

NW13	65.180	-123.420	BW	EB	F	Class 6
NW14	65.180	-123.420	BW	EB	G	Class 6
NW15	65.180	-123.420	BW	EB	A	Class 6
NW17	65.180	-123.420	BW	EB	E	Class 6
NW20	65.180	-123.420	BW	EB	D	Class 6
FF9394	65.517	-123.950	BW	EB	B	Class 6
BLK-490	66.530	-86.250	NE	EB	E	Class 6
BLK-491	66.530	-86.250	NE	EB	E	Class 6
BLK-492	66.530	-86.250	NE	EB	E	Class 6
BLK-493	66.530	-86.250	NE	EB	E	Class 6
GOS-886	66.530	-86.250	NE	EB	E	Class 6
HB19	66.530	-86.250	NE	EB	E	Class 6
KU146	66.570	-116.430	BA	EB	E	Class 6
KU151	66.570	-116.430	BA	EB	A	Class 6
CB173	66.770	-102.600	BA	EB	E	Class 6
CB174	66.770	-102.600	BA	EB	E	Class 6
CB175	66.770	-102.600	BA	EB	E	Class 6
CB176	66.770	-102.600	BA	EB	E	Class 6
CB177	66.770	-102.600	BA	EB	E	Class 6
CB178	66.770	-102.600	BA	EB	E	Class 6
CB179	66.770	-102.600	BA	EB	E	Class 6
CB180	66.770	-102.600	BA	EB	E	Class 6
KU157	67.030	-115.280	BA	EB	E	Class 6
KU159	67.120	-116.120	BA	EB	E	Class 6
KU145	67.390	-114.380	BA	EB	E	Class 6
KU147	67.390	-114.380	BA	EB	E	Class 6
KU148	67.390	-114.380	BA	EB	E	Class 6
KU149	67.390	-114.380	BA	EB	F	Class 6
KU150	67.390	-114.380	BA	EB	E	Class 6
KIT198	67.680	-107.930	BA	EB	E	Class 6
KIT201	67.680	-107.930	BA	EB	E	Class 6
KIT202	67.680	-107.930	BA	EB	E	Class 6
KIT199	67.820	-115.080	BA	EB	E	Class 6
KIT203	67.820	-115.080	BA	EB	D	Class 6
KIT204	67.820	-115.080	BA	EB	E	Class 6
KU158	67.820	-115.080	BA	EB	A	Class 6
CB220	68.450	-105.200	BA	EB	E	Class 6
CB206	68.500	-107.000	BA	EB	C	Class 5
CB213	68.500	-107.000	BA	EB	C	Class 5
KIT200	68.500	-107.000	BA	EB	E	Class 5
CB205	68.500	-104.750	BA	EB	D	Class 6
CB218	68.500	-104.750	BA	EB	D	Class 6
HB104	68.780	-81.230	NE	EB	E	Class 6
HB16	68.780	-81.230	NE	EB	G	Class 6
PB34	68.880	-90.080	NE	EB	E	Class 6
PB35	68.880	-90.080	NE	EB	E	Class 6
PB36	68.880	-90.080	NE	EB	E	Class 6
PB37	68.880	-90.080	NE	EB	E	Class 6
PB38	68.880	-90.080	NE	EB	D	Class 6
PB39	68.880	-90.080	NE	EB	E	Class 6
TA154	69.130	-92.500	NE	EB	A	Class 6

TA156	69.130	-92.500	NE	EB	D	Class 6
CVR-188	69.380	-81.800	NE	EB	E	Class 5
CVR-189	69.380	-81.800	NE	EB	G	Class 5
CVR-190	69.380	-81.800	NE	EB	G	Class 5
CVR-191	69.380	-81.800	NE	EB	G	Class 5
CVR-193	69.380	-81.800	NE	EB	G	Class 5
CVR-194	69.380	-81.800	NE	EB	E	Class 5
CYH-002	69.380	-81.800	NE	EB	G	Class 5
TA153	69.620	-93.300	NE	EB	E	Class 6
TA155	69.620	-93.300	NE	EB	E	Class 6
BGK-072	45.100	-64.300	MR	AT	F	Class 7
BGR-524	46.170	-64.570	MR	AT	F	Class 7
BTR-035	47.220	-67.980	MR	AT	F	Class 7
BTR-036	47.220	-67.980	MR	AT	F	Class 7
BTR-037	47.220	-67.980	MR	AT	F	Class 7
RFI-955	49.780	-56.630	AT	AT	F	Class 7
BAO-873	51.730	-56.420	AT	AT	F	Class 7
2003004	52.680	-61.400	AT	AT	F	Class 7
CYE-405	52.900	-66.890	AT	AT	F	Class 7
BAI-329	52.950	-66.920	AT	AT	F	Class 7
FCN-987	52.950	-66.920	AT	AT	F	Class 7
VQ2-276	52.950	-66.920	AT	AT	F	Class 7
K26514	53.400	-60.170	AT	AT	F	Class 7
PXY-414	53.550	-64.020	AT	AT	F	Class 7
PXY-787	53.550	-64.020	AT	AT	F	Class 7
PXY-788	53.550	-64.020	AT	AT	F	Class 7
QAP-504	53.550	-64.020	AT	AT	F	Class 7
QAP-505	53.550	-64.020	AT	AT	F	Class 7
2003002	53.580	-60.470	AT	AT	F	Class 7
2003001	53.580	-60.450	AT	AT	F	Class 7
CVK-168	54.180	-58.430	AT	AT	F	Class 7
BAF-117	54.900	-59.780	AT	AT	F	Class 7
BAF-118	54.900	-59.780	AT	AT	F	Class 7
BAF-122	54.900	-59.780	AT	AT	F	Class 7
BAI-443	54.900	-59.780	AT	AT	F	Class 7
UAM18418	53.720	-166.770	PA	CI	B	Class 4
ARF18	55.000	-131.000	CI	CI	B	Class 4
UAM18015	55.220	-132.080	CI	CI	F	Class 4
UAM18016	55.252	-132.255	CI	CI	B	Class 4
UAM17282	55.317	-131.000	CI	CI	F	Class 4
UAM24105	55.333	-131.500	CI	CI	B	Class 4
UAM17134	55.570	-132.530	CI	CI	B	Class 4
UAM17136	55.570	-132.530	CI	CI	B	Class 4
UAM17137	55.570	-132.530	CI	CI	B	Class 4
UAM17279	55.933	-131.383	CI	CI	F	Class 4
UAM18012	56.069	-133.080	CI	CI	B	Class 4
UAM17933	56.070	-133.070	CI	CI	B	Class 4
UAM18152	56.070	-133.070	CI	CI	B	Class 4
UAM18440	56.450	-133.200	CI	CI	B	Class 4
UAM18421	56.500	-133.100	CI	CI	B	Class 4
UAM18422	56.500	-133.100	CI	CI	B	Class 4

UAM18427	56.500	-133.100	CI	CI	B	Class 4
UAM18432	56.550	-133.000	CI	CI	B	Class 4
UAM18438	56.550	-133.000	CI	CI	B	Class 4
UAM18436	56.580	-132.800	CI	CI	B	Class 4
UAM18435	56.600	-133.130	CI	CI	B	Class 4
UAM18419	56.630	-133.250	CI	CI	B	Class 4
UAM18420	56.630	-133.250	CI	CI	B	Class 4
UAM44525	56.630	-133.100	CI	CI	B	Class 4
UAM18175	56.700	-133.670	CI	CI	B	Class 4
UAM18178	56.700	-133.670	CI	CI	B	Class 4
UAM18181	56.700	-133.670	CI	CI	B	Class 4
UAM18184	56.700	-133.670	CI	CI	B	Class 4
UAM18186	56.700	-133.670	CI	CI	B	Class 4
UAM18188	56.700	-133.670	CI	CI	B	Class 4
UAM18424	56.700	-133.670	CI	CI	B	Class 4
UAM18430	56.700	-133.670	CI	CI	B	Class 4
UAM18439	56.700	-133.670	CI	CI	B	Class 4
UAM18425	56.770	-133.200	CI	CI	B	Class 4
UAM18426	56.770	-133.200	CI	CI	B	Class 4
UAM18434	56.830	-132.970	CI	CI	B	Class 4
S07	71.220	-122.470	BI	BI	C	Class 5
S08	71.220	-122.470	BI	BI	C	Class 5
SW35	71.220	-122.470	BI	BI	C	Class 5
SW37	71.220	-122.470	BI	BI	C	Class 5
SW38	71.220	-122.470	BI	BI	C	Class 5
SHS423	71.350	-122.750	BI	BI	C	Class 5
SHS424	71.350	-122.750	BI	BI	C	Class 5
SHS425	71.350	-122.750	BI	BI	C	Class 5
SHS421	71.400	-122.800	BI	BI	C	Class 5
SHS9329	71.717	-123.367	BI	BI	C	Class 5
SHS9330	71.717	-123.367	BI	BI	C	Class 5
SHS9331	71.717	-123.367	BI	BI	C	Class 5
SHS9332	71.717	-123.367	BI	BI	C	Class 5
SHS9333	71.717	-123.367	BI	BI	C	Class 5
SHS9334	71.717	-123.367	BI	BI	C	Class 5
SHS9335	71.717	-123.367	BI	BI	C	Class 5
SHS9336	71.717	-123.367	BI	BI	C	Class 5
SHS9337	71.717	-123.367	BI	BI	C	Class 5
HW41	71.820	-124.550	BI	BI	E	Class 5
SHS442	71.833	-124.533	BI	BI	C	Class 5
SHS9302	71.875	-122.500	BI	BI	C	Class 5
SHS9303	71.875	-122.500	BI	BI	C	Class 5
SHS9304	71.875	-122.500	BI	BI	C	Class 5
SHS9305	71.875	-122.500	BI	BI	C	Class 5
SHS9306	71.875	-122.500	BI	BI	C	Class 5
SHS9105	71.900	-124.867	BI	BI	C	Class 5
SHS978-05	71.958	-124.750	BI	BI	C	Class 5
SH023	71.970	-126.000	BI	BI	C	Class 5
SHS9201	71.978	-125.049	BI	BI	C	Class 5
SHS9204	71.978	-125.049	BI	BI	C	Class 5
SHS9301	71.978	-125.049	BI	BI	C	Class 5

SHS9340	71.978	-125.049	BI	BI	C	Class 5
SHS9203	71.980	-125.000	BI	BI	C	Class 5
SHS426	71.980	-124.833	BI	BI	C	Class 5
SHS9106	71.983	-125.250	BI	BI	C	Class 5
SHS978-07	71.983	-125.250	BI	BI	C	Class 5
SHS978-14	71.983	-125.250	BI	BI	C	Class 5
SHS978-33	71.983	-125.250	BI	BI	E	Class 5
SHS978-36	71.983	-125.250	BI	BI	C	Class 5
SHS9202	71.992	-124.867	BI	BI	C	Class 5
SHS978-08	72.000	-125.100	BI	BI	C	Class 5
SHS978-09	72.000	-124.600	BI	BI	C	Class 5
SHS978-10	72.000	-124.600	BI	BI	C	Class 5
SHS416	72.000	-124.530	BI	BI	C	Class 5
SHS417	72.000	-124.530	BI	BI	C	Class 5
SHS978-35	72.000	-123.000	BI	BI	C	Class 5
SHS431	72.033	-125.217	BI	BI	C	Class 5
SHS9103	72.033	-124.583	BI	BI	C	Class 5
SHS9108	72.033	-124.583	BI	BI	C	Class 5
SHS978-03	72.033	-124.583	BI	BI	C	Class 5
SHS427	72.050	-124.867	BI	BI	C	Class 5
SHS428	72.050	-124.867	BI	BI	C	Class 5
SHS429	72.050	-124.867	BI	BI	C	Class 5
SHS430	72.050	-124.867	BI	BI	C	Class 5
SHS978-04	72.248	-124.000	BI	BI	C	Class 5
SHS978-12	72.263	-123.985	BI	BI	C	Class 5
SH038	72.270	-123.980	BI	BI	C	Class 5
S04	72.280	-124.480	BI	BI	C	Class 5
S05	72.280	-124.480	BI	BI	C	Class 5
S06	72.280	-124.480	BI	BI	C	Class 5
SW13	72.280	-124.480	BI	BI	C	Class 5
SW14	72.280	-124.480	BI	BI	C	Class 5
SW15	72.280	-124.480	BI	BI	C	Class 5
SW16	72.280	-124.480	BI	BI	C	Class 5
SW17	72.280	-124.480	BI	BI	C	Class 5
SW18	72.280	-124.480	BI	BI	C	Class 5
SW19	72.280	-124.480	BI	BI	C	Class 5
SW36	72.280	-124.480	BI	BI	C	Class 5
SHS9339	72.333	-124.167	BI	BI	C	Class 5
SHS456	72.359	-123.719	BI	BI	C	Class 5
SHS457	72.359	-123.719	BI	BI	C	Class 5
SHS432	72.433	-125.033	BI	BI	C	Class 5
SHS433	72.433	-125.033	BI	BI	C	Class 5
SHS434	72.433	-125.033	BI	BI	C	Class 5
SHS418	72.483	-122.833	BI	BI	C	Class 5
SHS419	72.483	-122.833	BI	BI	C	Class 5
SHS420	72.483	-122.833	BI	BI	C	Class 5
SHS422	72.483	-122.833	BI	BI	C	Class 5
SW30	72.930	-124.480	BI	BI	C	Class 5
SW31	72.930	-124.480	BI	BI	C	Class 5
SW32	72.930	-124.480	BI	BI	C	Class 5
SHN455	73.229	-119.556	BI	BI	C	Class 5

SHN978-15	73.400	-122.000	BI	BI	C	Class 5
SHN9311	73.417	-121.950	BI	BI	C	Class 5
SHN9312	73.417	-121.950	BI	BI	C	Class 5
SHN9313	73.417	-121.950	BI	BI	C	Class 5
SHN9314	73.417	-121.950	BI	BI	C	Class 5
SHN9315	73.417	-121.950	BI	BI	C	Class 5
SHN9316	73.417	-121.950	BI	BI	C	Class 5
SHN9317	73.417	-121.950	BI	BI	C	Class 5
SHN9318	73.417	-121.950	BI	BI	C	Class 5
SHN9319	73.417	-121.950	BI	BI	C	Class 5
SHN9320	73.417	-121.950	BI	BI	C	Class 5
SHN9321	73.417	-121.950	BI	BI	C	Class 5
SHN9322	73.417	-121.950	BI	BI	C	Class 5
SHN9323	73.417	-121.950	BI	BI	C	Class 5
SHN9324	73.417	-121.950	BI	BI	C	Class 5
SHN9325	73.417	-121.950	BI	BI	C	Class 5
SHN978-16	73.425	-121.980	BI	BI	C	Class 5
SHN978-17	73.440	-121.925	BI	BI	C	Class 5
SHN453	73.444	-119.950	BI	BI	C	Class 5
SHN454	73.444	-119.950	BI	BI	C	Class 5
SH027	73.470	-122.950	BI	BI	C	Class 5
SH028	73.470	-122.950	BI	BI	C	Class 5
SH029	73.470	-122.950	BI	BI	C	Class 5
SH030	73.470	-122.950	BI	BI	C	Class 5
SH031	73.470	-122.950	BI	BI	C	Class 5
SH033	73.470	-122.950	BI	BI	C	Class 5
SH036	73.470	-122.950	BI	BI	C	Class 5
SW20	73.470	-122.950	BI	BI	C	Class 5
SW21	73.470	-122.950	BI	BI	C	Class 5
SW22	73.470	-122.950	BI	BI	C	Class 5
SW53	73.470	-122.950	BI	BI	C	Class 5
SW54	73.470	-122.950	BI	BI	C	Class 5
SW55	73.470	-122.950	BI	BI	C	Class 5
SW56	73.470	-122.950	BI	BI	C	Class 5
S01	73.570	-124.080	BI	BI	C	Class 5
S02	73.570	-124.080	BI	BI	C	Class 5
S03	73.570	-124.080	BI	BI	C	Class 5
SH051	73.570	-124.080	BI	BI	C	Class 5
SH052	73.570	-124.080	BI	BI	C	Class 5
SW10	73.570	-124.080	BI	BI	C	Class 5
SW11	73.570	-124.080	BI	BI	C	Class 5
SW12	73.570	-124.080	BI	BI	C	Class 5
SW25	73.570	-124.080	BI	BI	C	Class 5
SW27	73.570	-124.080	BI	BI	C	Class 5
SW28	73.570	-124.080	BI	BI	C	Class 5
SW29	73.570	-124.080	BI	BI	C	Class 5
SW33	73.570	-124.080	BI	BI	C	Class 5
SHN452	73.622	-119.988	BI	BI	C	Class 5
HW57	73.820	-119.920	BI	BI	C	Class 5
SH024	73.820	-119.920	BI	BI	C	Class 5
SH025	73.880	-116.330	BI	BI	C	Class 5

SH026	73.880	-116.330	BI	BI	C	Class 5
SH035	73.880	-116.330	BI	BI	C	Class 5
SW23	73.880	-116.330	BI	BI	C	Class 5
SHN9328	73.967	-119.750	BI	BI	C	Class 5
SHN978-18	73.971	-120.150	BI	BI	C	Class 5
SHN978-19	73.971	-120.150	BI	BI	C	Class 5
SHN978-20	73.971	-120.150	BI	BI	C	Class 5
SHN978-21	73.971	-120.150	BI	BI	C	Class 5
SHN978-22	73.971	-120.150	BI	BI	C	Class 5
SHN978-23	73.971	-120.150	BI	BI	C	Class 5
SHN9326	74.000	-119.833	BI	BI	C	Class 5
SHN449	74.016	-120.068	BI	BI	C	Class 5
SHN450	74.016	-120.068	BI	BI	C	Class 5
SHN451	74.016	-120.068	BI	BI	C	Class 5
SHN9327	74.025	-119.867	BI	BI	C	Class 5
SHN978-24	74.050	-119.570	BI	BI	C	Class 5
SHN978-25	74.050	-119.570	BI	BI	C	Class 5
SHN978-26	74.050	-119.570	BI	BI	C	Class 5
SHN978-27	74.050	-119.570	BI	BI	C	Class 5
SHN978-28	74.050	-119.570	BI	BI	C	Class 5
SHN978-29	74.050	-119.570	BI	BI	C	Class 5
SHN978-30	74.050	-119.570	BI	BI	C	Class 5
SHN978-31	74.050	-119.570	BI	BI	C	Class 5
SHN444	74.128	-119.825	BI	BI	C	Class 5
SHN445	74.128	-119.825	BI	BI	C	Class 5
SHN446	74.128	-119.825	BI	BI	C	Class 5
SHN447	74.128	-119.825	BI	BI	C	Class 5
SHN448	74.128	-119.825	BI	BI	C	Class 5
SW24	74.130	-119.750	BI	BI	C	Class 5
SW26	74.130	-119.750	BI	BI	C	Class 5
CB215	68.920	-104.370	VI	VI	E	Class 6
CB219	68.920	-104.370	VI	VI	E	Class 6
CB209	69.100	-105.050	VI	VI	C	Class 5
CB207	69.180	-104.700	VI	VI	C	Class 5
HW44	70.420	-115.000	VI	VI	E	Class 5
HW45	70.420	-115.000	VI	VI	E	Class 5
HW46	70.420	-115.000	VI	VI	E	Class 5
HW47	70.420	-115.000	VI	VI	C	Class 5
HW58	70.420	-115.000	VI	VI	D	Class 5
HW59	70.420	-115.000	VI	VI	C	Class 5
HW61	70.420	-115.000	VI	VI	C	Class 5
HW62	70.420	-115.000	VI	VI	C	Class 5
HW72	70.420	-115.000	VI	VI	C	Class 5
HW73	70.420	-115.000	VI	VI	E	Class 5
HW74	70.420	-115.000	VI	VI	C	Class 5
HW76	70.420	-115.000	VI	VI	C	Class 5
HW82	70.730	-117.750	VI	VI	C	Class 5
HW89	71.250	-117.420	VI	VI	C	Class 3
HW77	71.250	-116.800	VI	VI	C	Class 5
HW78	71.250	-116.800	VI	VI	C	Class 5
HW79	71.250	-116.800	VI	VI	C	Class 5

HW80	71.250	-116.800	VI	VI	C	Class 5
HW81	71.250	-116.800	VI	VI	E	Class 5
HW83	71.250	-116.800	VI	VI	C	Class 5
HW48	71.330	-117.000	VI	VI	C	Class 5
HW49	71.330	-117.000	VI	VI	E	Class 5
HW52	71.330	-117.000	VI	VI	C	Class 5
HW60	71.330	-117.000	VI	VI	C	Class 5
HW63	71.330	-117.000	VI	VI	C	Class 5
HW64	71.330	-117.000	VI	VI	C	Class 5
HW87	71.350	-117.420	VI	VI	E	Class 3
HW90	71.360	-117.430	VI	VI	E	Class 5
HW91	71.360	-117.430	VI	VI	E	Class 5
HW84	71.420	-113.420	VI	VI	C	Class 5
HW85	71.420	-113.420	VI	VI	C	Class 5
HW67	71.430	-117.470	VI	VI	C	Class 5
HW68	71.430	-117.470	VI	VI	E	Class 5
HW06	71.533	-117.767	VI	VI	C	Class 5
HW69	71.580	-118.870	VI	VI	C	Class 5
HW03	71.720	-117.490	VI	VI	C	Class 5
HW04	71.720	-117.490	VI	VI	C	Class 5
HW05	71.720	-117.490	VI	VI	C	Class 5
HW07	71.720	-117.490	VI	VI	C	Class 5
HW08	71.720	-117.490	VI	VI	C	Class 5
HW09	71.720	-117.490	VI	VI	C	Class 5
HW01	71.900	-117.300	VI	VI	C	Class 5
HW86	71.900	-111.580	VI	VI	C	Class 5
HW65	72.770	-111.020	VI	VI	C	Class 5
HW66	72.770	-111.020	VI	VI	C	Class 5
HW70	72.770	-111.020	VI	VI	C	Class 5
HW71	72.770	-111.020	VI	VI	C	Class 5
HW75	72.770	-111.020	VI	VI	E	Class 5
GF210	75.530	-82.500	HA	HA	C	Class 5
GF217	76.420	-82.880	HA	HA	E	Class 5
GF214	77.100	-84.320	HA	HA	C	Class 5
GF135	77.120	-83.330	HA	HA	C	Class 5
GF136	77.190	-84.260	HA	HA	C	Class 5
GF44	77.190	-84.260	HA	HA	G	Class 5
GF45	77.190	-84.260	HA	HA	G	Class 5
GF208	77.220	-85.420	HA	HA	G	Class 5
GF211	77.220	-85.420	HA	HA	C	Class 5
GF212	77.220	-85.420	HA	HA	E	Class 5
GF216	77.220	-85.420	HA	HA	G	Class 5
KI107	62.500	-70.250	SB	BAF	G	Class 5
KI108	62.500	-70.250	SB	BAF	G	Class 5
KI109	62.500	-70.250	SB	BAF	G	Class 5
KI110	62.500	-70.250	SB	BAF	G	Class 5
KI111	62.500	-70.250	SB	BAF	G	Class 5
KI112	62.500	-70.250	SB	BAF	E	Class 5
KI113	62.500	-70.250	SB	BAF	G	Class 5
KI115	62.500	-70.250	SB	BAF	G	Class 5
KI116	62.500	-70.250	SB	BAF	G	Class 5

KI09	62.600	-69.500	SB	BAF	G	Class 5
KI106	62.830	-69.870	SB	BAF	G	Class 5
KI114	62.830	-69.870	SB	BAF	G	Class 5
KI47	62.830	-69.870	SB	BAF	G	Class 5
IQ43	62.830	-66.580	SB	BAF	G	Class 5
KI53	62.900	-69.850	SB	BAF	G	Class 5
KI52	62.930	-69.800	SB	BAF	G	Class 5
KI51	63.120	-69.730	SB	BAF	G	Class 5
IQ98	63.600	-68.820	SB	BAF	G	Class 5
IQ101	63.730	-68.570	SB	BAF	G	Class 5
IQ91	63.730	-68.570	SB	BAF	G	Class 5
IQ92	63.730	-68.570	SB	BAF	G	Class 5
IQ93	63.730	-68.570	SB	BAF	G	Class 5
IQ97	63.730	-68.570	SB	BAF	G	Class 5
IQ100	63.750	-68.520	SB	BAF	G	Class 5
IQ102	63.750	-68.520	SB	BAF	G	Class 5
IQ103	63.750	-68.520	SB	BAF	G	Class 5
IQ99	63.750	-68.520	SB	BAF	G	Class 5
KI105	63.750	-68.520	SB	BAF	G	Class 5
IQ33	63.900	-68.320	SB	BAF	G	Class 5
CD127	64.160	-76.580	SB	BAF	G	Class 6
CD130	64.160	-76.580	SB	BAF	E	Class 6
IQ61	64.170	-69.420	SB	BAF	G	Class 5
IQ62	64.170	-69.420	SB	BAF	G	Class 5
CD94	64.230	-76.530	SB	BAF	G	Class 5
CD95	64.230	-76.530	SB	BAF	G	Class 5
CD129	64.250	-75.350	SB	BAF	G	Class 5
CD138	64.280	-75.490	SB	BAF	G	Class 5
CD137	64.400	-73.580	SB	BAF	E	Class 6
CD139	64.400	-73.580	SB	BAF	E	Class 6
CD96	64.430	-74.800	SB	BAF	G	Class 5
CD128	64.450	-75.600	SB	BAF	G	Class 5
CD131	64.450	-75.600	SB	BAF	E	Class 5
CD140	64.450	-75.600	SB	BAF	G	Class 5
PG63	65.170	-65.500	SB	BAF	G	Class 5
PG64	65.170	-65.500	SB	BAF	G	Class 5
PG65	65.170	-65.500	SB	BAF	G	Class 5
PG67	65.980	-71.200	SB	BAF	G	Class 5
PG69	66.050	-68.330	SB	BAF	G	Class 5
PG70	66.050	-68.330	SB	BAF	G	Class 5
PG90	66.050	-68.330	SB	BAF	G	Class 5
PG66	66.120	-65.620	SB	BAF	G	Class 5
PG08	66.130	-65.720	SB	BAF	G	Class 5
PG72	66.130	-65.720	SB	BAF	G	Class 5
PG73	66.130	-65.720	SB	BAF	G	Class 5
PG74	66.130	-65.720	SB	BAF	G	Class 5
PG01	66.480	-70.330	SB	BAF	G	Class 5
PG02	66.480	-70.330	SB	BAF	G	Class 5
PG05	66.480	-70.330	SB	BAF	G	Class 5
PG06	66.480	-70.330	SB	BAF	G	Class 5
PG07	66.480	-70.330	SB	BAF	G	Class 5

ANP01	66.550	-66.920	SB	BAF	G	Class 5
PG68	66.550	-66.920	SB	BAF	G	Class 5
PG03	66.570	-67.450	SB	BAF	G	Class 5
PG04	66.570	-67.450	SB	BAF	G	Class 5
CR26	68.500	-71.330	SB	BAF	G	Class 5
CR27	68.500	-71.330	SB	BAF	G	Class 5
CR28	68.500	-71.330	SB	BAF	G	Class 5
CR29	68.500	-71.330	SB	BAF	G	Class 5
CR30	69.620	-67.550	SB	BAF	G	Class 5
II14	69.650	-80.070	NB	BAF	G	Class 5
HB25	69.780	-77.250	NB	BAF	G	Class 5
II12	69.830	-83.000	NB	BAF	G	Class 6
II160	69.930	-81.720	NB	BAF	E	Class 5
II15	70.080	-84.830	NB	BAF	E	Class 6
KI48	70.100	-63.800	SB	BAF	G	Class 5
KI49	70.100	-63.800	SB	BAF	G	Class 5
KI50	70.100	-63.800	SB	BAF	G	Class 5
KI54	70.100	-63.800	SB	BAF	G	Class 5
HB17	70.170	-82.500	NB	BAF	G	Class 5
HB18	70.170	-82.500	NB	BAF	G	Class 5
II162	70.170	-82.500	NB	BAF	G	Class 5
II10	70.200	-81.480	NB	BAF	G	Class 5
II11	70.200	-81.480	NB	BAF	G	Class 5
II13	70.250	-81.700	NB	BAF	G	Class 5
PI31	70.250	-81.700	NB	BAF	G	Class 5
PI32	70.250	-81.700	NB	BAF	E	Class 5
II161	70.250	-78.580	NB	BAF	G	Class 5
II164	70.250	-78.580	NB	BAF	G	Class 5
PI144	70.620	-80.680	NB	BAF	G	Class 5
AB121	71.190	-85.510	NB	BAF	G	Class 6
AB122	71.190	-85.510	NB	BAF	G	Class 6
AB124	71.190	-85.510	NB	BAF	D	Class 6
AB125	71.190	-85.510	NB	BAF	G	Class 6
AB126	71.190	-85.510	NB	BAF	E	Class 6
AB120	71.230	-85.100	NB	BAF	E	Class 6
AB123	71.230	-85.100	NB	BAF	E	Class 6
AB118	71.560	-84.270	NB	BAF	E	Class 6
AB196	72.100	-84.500	NB	BAF	G	Class 6
AB197	72.100	-84.500	NB	BAF	G	Class 6
PI141	72.100	-79.000	NB	BAF	G	Class 5
PI60	72.100	-79.000	NB	BAF	G	Class 5
AB117	72.250	-80.340	NB	BAF	G	Class 6
AB119	72.250	-80.340	NB	BAF	G	Class 6
AB132	72.350	-84.430	NB	BAF	D	Class 6
AB133	72.550	-84.170	NB	BAF	E	Class 6
AB134	72.560	-84.100	NB	BAF	C	Class 6
PI142	72.700	-77.980	NB	BAF	G	Class 5
PI143	72.700	-77.980	NB	BAF	F	Class 5
PI56	72.700	-77.980	NB	BAF	G	Class 5
PI57	72.700	-77.980	NB	BAF	G	Class 5
PI58	72.700	-77.980	NB	BAF	G	Class 5

PI59	72.700	-77.980	NB	BAF	G	Class 5
AB152	72.980	-85.100	NB	BAF	G	Class 5
CVK-163	73.030	-85.170	NB	BAF	G	Class 5
II163	73.030	-85.170	NB	BAF	G	Class 5
II165	73.030	-85.170	NB	BAF	G	Class 5