

Sequence variation in bowhead whales; a response to BRG29 and a reexamination of the analyses

LeDuc, R.G., Martien, K.K., Morin, P.A., Hedrick, N., Robertson, K.M., Taylor, B.L.
SWFSC 8604 La Jolla Shores Dr. La Jolla, CA 92037 USA rick.leduc@noaa.gov

Mugue, N.S., Borodin, R.G., Zelenina, D.A.
Russian Federal Research Institute of Fisheries & Oceanography (VNIRO),
17 V. Krasnoselskaya, Moscow 107140, Russia.

and George, J.C.
North Slope Borough Dept. of Wildlife Management, PO Box 69, Barrow, AK 99723, USA

ABSTRACT

We reanalyze comparisons made in LeDuc et al. 2007 (SC/59/BRG9) with small corrections to samples included and find no substantive differences in our conclusions. We also provide new analyses for comparisons involving Saint Lawrence Island data, where uncertainty remains regarding linking bone and baleen samples to individual whales. The new analyses bracket the uncertainty by in one case using all sequences and in another decreasing the sample size by excluding sequences of questionable origin. We find that sample choice does not affect the statistical conclusion of significance between fall and spring at Saint Lawrence Island using *F_{st}*, significance between age cohorts, and negative results for all other comparisons.

Pastene et al. (2007) present analyses of mitochondrial sequence data to examine the Bering/Chukchi/Beaufort Seas (BCB) population of bowhead whales for the possible existence of multiple stocks. Although their analyses and results are similar to LeDuc et al. (2007) using the same available data, there are a number of items that deserve mention and brief discussion.

Pastene et al. (2007), in discussing earlier research on BCB bowheads, cited their own previous paper (Pastene et al. 2004) regarding differences between fall and spring whales taken in Barrow. They cite a nearly significant p-value of 0.053 from a chi-square analysis. However, as pointed out in Taylor et al. (2004), this result, which differed from the value of 0.082 found in LeDuc and Taylor (2004), stemmed in part from some errors in sample selection and haplotype frequencies. A summary of those differences is excerpted from Appendix 1 in Taylor et al. (2004b) below:

“Differences in the data sets used are:

- 1) we found only 6 (versus 7 in BRG32) whales killed in the fall with haplotype 21: 00B11, 02B15, 02B18, 90B9, 96B10, 96B14,
- 2) we included 99B6F (which has a fetus with no sample from the mother),
- 3) we included 02B17, which was completely omitted and should be added at haplotype 59 to Figure 3 with the following variable sites using their notation:
..... AG.. ..C.T.. ..C..... ..
- 4) haplotype 35 should only have one sample (96B15) instead of 2 (BRG 32)”

(Note that the haplotype number designations are not the same as those currently in use.)

These differences in p-values are not great, but given their proximity to the significance value it is important to keep the record straight with regards to previous results. This also highlights the effect on results and conclusions that can arise from the addition and removal of just a few samples in a sample set of almost 200.

Pastene et al. (2007) also point out a number of differences between their current dataset and ours (LeDuc et al. 2007). Some of these reflect real errors in the dataset used in our paper, specifically samples inadvertently left out or samples whose genotypes revealed them to be duplicates subsequent to our analyses. These have been incorporated into a reanalysis of our data in the present paper. However, we did not incorporate some of their changes. The comments from Pastene et al. (2007) (in italics) and our responses are given below:

- i) In Barrow, we decided to delete data from a stranded animal (1BC97B) in August 1997 and a sample (05B12) from May 2005, which showed a ‘Y’ in the mtDNA sequence.*
- ii) In Nuiqsut, we decided to delete data from a stranded animal (92N-BC-1) in September 1992.*

Rather than delete the stranding samples completely, we included them in the large-scale spatial strata of Alaska and NS. Although uncertainties about the date and location of their deaths precluded them from being used for temporal and small-scale spatial comparisons, we felt it reasonable to assume that they could both be assigned to these strata. We also retained sample 05B12, which had a “Y” in its sequence. This ambiguity (“C” or “T” base call) was not the result of weak sequence or an uncertain base call, but rather reflected a double “peak” in the sequence, one that arose at that site in every sequence of both DNA strands over several replications. This double peak was clear even though the sequences were otherwise very “clean”, and the replications were conducted through multiple DNA extractions. As a result, although Pastene et al.’s decision to remove it was reasonable, we feel there is reason to think that this was a real heteroplasmic base, and warrants its own haplotype designation.

iii) In Pt. Hope two samples were deleted in May 2005 because of two duplicates (05H3_5 and 05H4_7) found in the latest data set.

This has been corrected in our dataset as well.

iv) In Gambell we deleted a sample in April 2003 (sample 03G1 was duplicated in BRG9). Also two samples were deleted in December 2002 because G-BAL-5 was not included in the latest data set and was represented twice in BRG9. We added two samples in ‘UK’ (G-BAL1_2 and GSK14) after examination of the latest data set.

We have removed duplicate samples. In addition, we have tried to address some of the links that have been proposed between skull and baleen samples and harvested whales. This involved using a different approach regarding the treatment of bone and baleen samples from St. Lawrence Island (SLI). To date, there have been two efforts to associate samples of bone and baleen with particular harvested whales. In one, interviews with local hunters and measurements of the specimens were used to infer associations, some of which were rated as “fairly certain”. These results are available through the data availability agreement. In the second analysis, presented in Morin et al. (2007), single nucleotide polymorphisms (SNPs) were used to genotype samples and look for genetic matches. Although neither method is foolproof, they do provide some basis for inferring putative duplicates. Because the sample size of SLI is so limited, the potential effect of duplication of samples on the results is large. All analyses involving SLI were therefore conducted twice: first with all samples treated as separate and independent, and second incorporating SNP-based and “fairly certain” matches from the aforementioned studies. These included matches within sample types (e.g., baleen – baleen) and between sample types (e.g., baleen – bone or bone – skin). The effect of incorporating these matches was to reduce the sample size for most comparisons involving SLI. However, since some of the matches were of skulls to previously unsampled whales, this meant that some of the skull samples now had collection dates associated with them. This allowed the seasonal comparison of SLI to have a greater sample size. The putative matches have been added to the table in a separate column, and the putative collection information (for whales not already represented by other samples) has been included in parentheses.

v) In Chukotka we added one sample in ‘UK’ (RUS-BW000824.19) after examination of the latest data set.

We are not sure of the rationale behind this change. RUS-BW000824.19 is a sample that was collected from the Sea of Okhotsk and therefore should not be added to the Chukotka stratum.

Our results are provided in Table 1 and the strata used for the revised analyses are presented in the appendix. Both of these are to supersede those presented in LeDuc et al. (2007). Qualitatively, there are no noteworthy differences between the results of the two papers.

Table 1. Results of the analyses of mitochondrial sequence data. Comparisons labeled with a “I” are analyses in which all samples from SLI, including bone and baleen, were treated as separate. Those labeled with “II” have incorporated putative matches among samples and harvested whales. See text and appendix for explanation.

Strata (sample size)	F_{st}	p	χ^2	p	Φ_{st}	p
Spatial						
Barrow (258) v SLI (63) I	-0.0006	0.469	0.995	0.493	0.006	0.122
Barrow (258) v SLI (52) II	-0.003	0.820	0.865	0.772	0.0003	0.357
Barrow (258) v Savoonga (21) I	-0.002	0.495	0.856	0.688	-0.002	0.464
Barrow (258) v Savoonga (20) II	-0.004	0.587	0.857	0.687	-0.003	0.494
Barrow (258) v Gambell (42) I	0.002	0.218	1.133	0.243	0.012	0.069
Barrow (258) v Gambell (32) II	-0.004	0.731	0.935	0.597	0.001	0.342
Barrow (258) v Chukotka (22)	-0.009	0.919	0.707	0.877	-0.009	0.764
AK (360) v Chukotka (22) I	-0.008	0.856	0.752	0.792	-0.006	0.605
AK (348) v Chukotka (22) II	-0.008	0.879	0.750	0.799	-0.007	0.631
NS (297) v SLI (63) I	0.0004	0.359	1.026	0.429	0.005	0.147
NS (297) v SLI (52) II	-0.003	0.728	0.895	0.709	-0.0001	0.390
NS (297) v Savoonga (21) I	0.00003	0.394	0.883	0.643	-0.0009	0.409
NS (297) v Savoonga (20) II	-0.002	0.506	0.880	0.637	-0.002	0.436
NS (297) v Gambell (42) I	0.003	0.211	1.150	0.226	0.011	0.082
NS (297) v Gambell (32) II	-0.004	0.714	0.955	0.563	-0.0001	0.382
NS (297) v Chukotka (22)	-0.009	0.913	0.711	0.860	-0.008	0.695
Temporal						
Barrow F (133) v S (125)	0.0003	0.357	0.984	0.546	0.002	0.210
NS F (154) v S (141)	-0.001	0.640	1.026	0.421	0.0003	0.346
SLI F (13) v S (11) I	0.054	0.070	1.180	0.176	-0.013	0.481
SLI F (14) v S (17) II	0.056	0.024	1.193	0.154	0.011	0.268
Age cohort						
Birth-year <1918 (8) v 1918-1949 (13)	-0.010	0.513	1.102	0.320	-0.035	0.714
Birth-year <1918 (8) v 1950-1979 (25)	-0.013	0.680	1.001	0.686	-0.027	0.698
Birth-year <1918 (8) v >1979 (34)	0.003	0.357	1.519	0.030	0.005	0.361
Birth-year 1918-1949 (13) v 1950-1979 (25)	-0.010	0.652	0.745	0.981	0.006	0.315
Birth-year 1918-1949 (13) v >1979 (34)	0.010	0.230	1.390	0.050	0.007	0.294
Birth-year 1950-1979 (25) v >1979 (34)	0.008	0.182	1.194	0.088	-0.009	0.566
Birth-year <1950 (21) v 1950-1979 (25)	-0.007	0.652	0.910	0.829	0.004	0.322
Birth-year <1950 (21) v >1979 (34)	0.009	0.204	1.386	0.009	0.010	0.236

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APPENDIX 1. Sample information and stratifications used in sequence analysis. Collection info in parentheses applies to putative matches (see text).

SampleID	Haplotype	skull/baleen possible match	Year	Month	Day	Sex	Village	Barrow v SLI I	Barrow v SLI II	NS v SLI I	NS v SLI II	Barrow v village/Chukotka I
81WW2	BH42		1981	5	19	P	Wainwright			1	1	
81WW3	BH68		1981	5	28	F	Wainwright			1	1	
83B1	BH41		1983	5	5	F	Barrow	1	1	1	1	1
84B1	BH42		1984	5	19	M	Barrow	1	1	1	1	1
84B3	BH3		1984	5	20	M	Barrow	1	1	1	1	1
84B4	BH18		1984	5	21	F	Barrow	1	1	1	1	1
84S1	BH32		1984	4	19	F	Savoonga	2	2	2	2	3
84WW1_2	BH6		1984	5	18	M	Wainwright			1	1	
86B1	BH46		1986	4	27	M	Barrow	1	1	1	1	1
86B2	BH42		1986	4	27	M	Barrow	1	1	1	1	1
86B5	BH23		1986	5	4	M	Barrow	1	1	1	1	1
86B6	BH23		1986	5	5	F	Barrow	1	1	1	1	1
86B7	BH5		1986	5	6	M	Barrow	1	1	1	1	1
86KK2	BH7		1986	9	17	F	Kaktovik			1	1	
86KK3	BH40		1986	9	26	M	Kaktovik			1	1	
87B4	BH4		1987	5	19	F	Barrow	1	1	1	1	1
88B9	BH55		1988	9	15	M	Barrow	1	1	1	1	1
89B2	BH25		1989	5	15	F	Barrow	1	1	1	1	1
89B3	BH13		1989	5	28	F	Barrow	1	1	1	1	1
89B4	BH42		1989	10	2	M	Barrow	1	1	1	1	1
89B5	BH8		1989	10	2	M	Barrow	1	1	1	1	1
89B6	BH20		1989	10	2	M	Barrow	1	1	1	1	1
89S1	BH43		1989	5	25	F	Savoonga	2	2	2	2	3
90B1	BH39		1990	5	9	M	Barrow	1	1	1	1	1
90B2	BH26		1990	5	10	M	Barrow	1	1	1	1	1
90B7	BH31		1990	10	1	F	Barrow	1	1	1	1	1
90B8	BH53		1990	10	2	M	Barrow	1	1	1	1	1
90B9	BH1		1990	10	11	F	Barrow	1	1	1	1	1
90KK1	BH39		1990	9	11	F	Kaktovik			1	1	
92B1	BH7		1992	5	28	F	Barrow	1	1	1	1	1
92B11	BH51		1992	9	17	M	Barrow	1	1	1	1	1
92B12	BH15		1992	9	19	F	Barrow	1	1	1	1	1
92B18	BH42		1992	10	9	M	Barrow	1	1	1	1	1
92B2	BH64		1992	5	29	F	Barrow	1	1	1	1	1
92B3	BH42		1992	8	31	F	Barrow	1	1	1	1	1
92B4	BH5		1992	9	1	F	Barrow	1	1	1	1	1
92B5	BH44		1992	9	2	M	Barrow	1	1	1	1	1
92B6	BH53		1992	9	2	M	Barrow	1	1	1	1	1

92B7	BH2	1992	9	2	F	Barrow	1	1	1	1	1
92B8	BH27	1992	9	3	F	Barrow	1	1	1	1	1
92B9	BH51	1992	9	4	F	Barrow	1	1	1	1	1
92N-BC-1	BH67	1992	9	1		Nuiqsut			1	1	
93B10	BH46	1993	5	3	F	Barrow	1	1	1	1	1
93B11	BH61	1993	5	3	M	Barrow	1	1	1	1	1
93B12	BH42	1993	5	4	M	Barrow	1	1	1	1	1
93B13	BH26	1993	5	7	F	Barrow	1	1	1	1	1
93B15	BH54	1993	5	7	F	Barrow	1	1	1	1	1
93B16	BH42	1993	5	11	F	Barrow	1	1	1	1	1
93B2	BH1	1993	4	21	F	Barrow	1	1	1	1	1
93B3	BH5	1993	4	21	M	Barrow	1	1	1	1	1
93B4	BH3	1993	4	25	F	Barrow	1	1	1	1	1
93B5	BH9	1993	4	25	F	Barrow	1	1	1	1	1
93B6	BH42	1993	4	30	F	Barrow	1	1	1	1	1
93B7	BH42	1993	4	30	F	Barrow	1	1	1	1	1
93B9	BH42	1993	5	2	F	Barrow	1	1	1	1	1
95B1	BH20	1995	5	6	M	Barrow	1	1	1	1	1
95B13	BH47	1995	9	16	F	Barrow	1	1	1	1	1
95B17	BH42	1995	10	16	F	Barrow	1	1	1	1	1
95B18	BH17	1995	10	17	F	Barrow	1	1	1	1	1
95B4	BH27	1995	5	9	F	Barrow	1	1	1	1	1
95B7	BH37	1995	5	25	M	Barrow	1	1	1	1	1
95B8	BH42	1995	6	1	F	Barrow	1	1	1	1	1
95B9	BH42	1995	9	5	M	Barrow	1	1	1	1	1
SAK-19	BH64	1995	8	22		Okhotsk					
SAK-20	BH42	1995	8	22		Okhotsk					
SAK-21	BH42	1995	8	22		Okhotsk					
SAK-22	BH43	1995	8	22		Okhotsk					
SAK-23	BH43	1995	8	22		Okhotsk					
SAK-24	BH43	1995	8	24		Okhotsk					
SAK-25	BH50	1995	8	24		Okhotsk					
SAK-26	BH42	1995	8	24		Okhotsk					
SAK-27	BH42	1995	8	24		Okhotsk					
SAK-28	BH43	1995	8	24		Okhotsk					
SAK-29	BH43	1995	8	24		Okhotsk					
SAK-30	BH42	1995	8	24		Okhotsk					
SAK-31	BH42	1995	8	24		Okhotsk					
96B1	BH42	1996	4	25	F	Barrow	1	1	1	1	1
96B10	BH1	1996	9	12	M	Barrow	1	1	1	1	1
96B11	BH23	1996	9	14	F	Barrow	1	1	1	1	1
96B12	BH45	1996	9	14	F	Barrow	1	1	1	1	1
96B14	BH1	1996	9	16	F	Barrow	1	1	1	1	1
96B15	BH35	1996	9	16	M	Barrow	1	1	1	1	1

96B16	BH28	1996	9	17	M	Barrow	1	1	1	1	1
96B17	BH29	1996	9	19	M	Barrow	1	1	1	1	1
96B18	BH46	1996	9	19	F	Barrow	1	1	1	1	1
96B19	BH38	1996	9	19	M	Barrow	1	1	1	1	1
96B2	BH4	1996	5	3	F	Barrow	1	1	1	1	1
96B20	BH20	1996	9	19	M	Barrow	1	1	1	1	1
96B21	BH42	1996	9	19	M	Barrow	1	1	1	1	1
96B22	BH61	1996	9	24	M	Barrow	1	1	1	1	1
96B23	BH42	1996	9	26	M	Barrow	1	1	1	1	1
96B24	BH2	1996	9	26	F	Barrow	1	1	1	1	1
96B3	BH16	1996	5	5	F	Barrow	1	1	1	1	1
96B4	BH19	1996	5	24	F	Barrow	1	1	1	1	1
96B5	BH61	1996	5	29	F	Barrow	1	1	1	1	1
96B6	BH58	1996	9	10	F	Barrow	1	1	1	1	1
96B7	BH42	1996	9	12	M	Barrow	1	1	1	1	1
96B8	BH23	1996	9	12	M	Barrow	1	1	1	1	1
96B9	BH51	1996	9	12	F	Barrow	1	1	1	1	1
96G1_2	BH22	1996	4	1	M	Gambell	2	2	2	2	2
96G3	BH51	1996	5	3	M	Gambell	2	2	2	2	2
96S1	BH1	1996	4	7	M	Savoonga	2	2	2	2	3
96S2	BH34	1996	4	29	F	Savoonga	2	2	2	2	3
RUS96-1	BH42	1996	9	4		Okhotsk					
RUS96-10	BH42	1996	9	7		Okhotsk					
RUS96-11	BH42	1996	9	7		Okhotsk					
RUS96-2	BH42	1996	9	4		Okhotsk					
RUS96-3	BH42	1996	9	4		Okhotsk					
RUS96-4	BH43	1996	9	4		Okhotsk					
RUS96-5	BH43	1996	9	5		Okhotsk					
RUS96-6	BH42	1996	9	6		Okhotsk					
RUS96-7	BH42	1996	9	6		Okhotsk					
RUS96-8	BH64	1996	9	6		Okhotsk					
RUS96-9	BH64	1996	9	7		Okhotsk					
1BC97B	BH35	1997	8	16	F	Barrow			1	1	
97B1	BH5	1997	5	4	M	Barrow	1	1	1	1	1
97B10	BH42	1997	6	4	F	Barrow	1	1	1	1	1
97B11	BH3	1997	9	11	M	Barrow	1	1	1	1	1
97B12	BH4	1997	9	12	M	Barrow	1	1	1	1	1
97B13	BH55	1997	9	14	M	Barrow	1	1	1	1	1
97B15_16	BH32	1997	9	20	F	Barrow	1	1	1	1	1
97B17	BH46	1997	9	22	M	Barrow	1	1	1	1	1
97B18	BH39	1997	9	22	M	Barrow	1	1	1	1	1
97B19	BH2	1997	9	22	F	Barrow	1	1	1	1	1
97B2	BH42	1997	5	7	F	Barrow	1	1	1	1	1
97B20	BH23	1997	9	26	M	Barrow	1	1	1	1	1

97B21	BH64	1997	9	27	F	Barrow	1	1	1	1	1
97B22	BH10	1997	9	27	F	Barrow	1	1	1	1	1
97B23	BH64	1997	9	27	M	Barrow	1	1	1	1	1
97B24	BH21	1997	9	28	F	Barrow	1	1	1	1	1
97B25	BH5	1997	9	28	M	Barrow	1	1	1	1	1
97B26	BH23	1997	9	29	M	Barrow	1	1	1	1	1
97B27	BH5	1997	10	2	M	Barrow	1	1	1	1	1
97B28	BH42	1997	10	2	M	Barrow	1	1	1	1	1
97B29	BH2	1997	10	17	M	Barrow	1	1	1	1	1
97B3	BH18	1997	5	7	F	Barrow	1	1	1	1	1
97B30	BH4	1997	10	18	F	Barrow	1	1	1	1	1
97B31	BH42	1997	10	21	F	Barrow	1	1	1	1	1
97B4	BH32	1997	5	8	F	Barrow	1	1	1	1	1
97B5	BH1	1997	5	10	F	Barrow	1	1	1	1	1
97B6	BH8	1997	5	12	F	Barrow	1	1	1	1	1
97B7	BH32	1997	5	12	F	Barrow	1	1	1	1	1
97B8	BH31	1997	5	15	F	Barrow	1	1	1	1	1
98B1	BH18	1998	5	8	F	Barrow	1	1	1	1	1
98B17	BH20	1998	9	24	M	Barrow	1	1	1	1	1
98B2	BH61	1998	5	9	M	Barrow	1	1	1	1	1
98B24	BH42	1998	10	7	F	Barrow	1	1	1	1	1
98B3	BH28	1998	5	10	M	Barrow	1	1	1	1	1
98B4	BH61	1998	5	17	F	Barrow	1	1	1	1	1
98B5	BH17	1998	5	17	M	Barrow	1	1	1	1	1
98B6	BH1	1998	5	23	F	Barrow	1	1	1	1	1
98B7	BH42	1998	5	24	F	Barrow	1	1	1	1	1
98B8	BH5	1998	5	25	M	Barrow	1	1	1	1	1
98B9	BH31	1998	5	27	F	Barrow	1	1	1	1	1
BWCH5	BH42	1998	5	27	M	Chukotka					4
RUSO21998	BH9	1998	5	27		Chukotka					4
99B1	BH10	1999	4	28	F	Barrow	1	1	1	1	1
99B14	BH61	1999	5	17	M	Barrow	1	1	1	1	1
99B15	BH5	1999	5	17	M	Barrow	1	1	1	1	1
99B17	BH42	1999	5	22	M	Barrow	1	1	1	1	1
99B18	BH41	1999	5	23	F	Barrow	1	1	1	1	1
99B19	BH15	1999	10	9	F	Barrow	1	1	1	1	1
99B2	BH14	1999	5	2	F	Barrow	1	1	1	1	1
99B20	BH23	1999	10	10	F	Barrow	1	1	1	1	1
99B21	BH23	1999	10	10	M	Barrow	1	1	1	1	1
99B22	BH28	1999	10	12	F	Barrow	1	1	1	1	1
99B23	BH50	1999	10	13	M	Barrow	1	1	1	1	1
99B24	BH28	1999	10	13	M	Barrow	1	1	1	1	1
99B3	BH23	1999	5	2	F	Barrow	1	1	1	1	1
99B6F	BH15	1999	5	6		Barrow	1	1	1	1	1

99B7	BH43	1999	5	8	F	Barrow	1	1	1	1	1
RUS-BM991105.01	BH56	1999	11	5		Chukotka					4
00B1	BH42	2000	4	24	M	Barrow	1	1	1	1	1
00B10	BH23	2000	9	30	F	Barrow	1	1	1	1	1
00B11	BH1	2000	10	1	M	Barrow	1	1	1	1	1
00B12	BH47	2000	10	3	M	Barrow	1	1	1	1	1
00B2	BH42	2000	5	25	F	Barrow	1	1	1	1	1
00B3	BH42	2000	5	25	F	Barrow	1	1	1	1	1
00B4	BH5	2000	5	25	F	Barrow	1	1	1	1	1
00B5	BH42	2000	5	30	F	Barrow	1	1	1	1	1
00B6	BH42	2000	9	26	M	Barrow	1	1	1	1	1
00B7	BH42	2000	9	29	M	Barrow	1	1	1	1	1
00B8	BH23	2000	9	29		Barrow	1	1	1	1	1
00KK1	BH46	2000	9	2	F	Kaktovik			1	1	
00KK2	BH42	2000	9	3	M	Kaktovik			1	1	
00KK3	BH36	2000	9	8	F	Kaktovik			1	1	
RUS#5-000623	BH42	2000	6	23		Commander Is					
RUS#6-000622	BH5	2000	6	22	F	Commander Is					
RUS#7-000623	BH61	2000	6	23		Commander Is					
RUS#8-000627	BH42	2000	6	27		Commander Is					
RUS-BM000909.01	BH46	2000	9	9		Chukotka					4
RUS-BW000824.19	BH43	2000	8	24		Okhotsk					
01B1	BH58	2001	4	28	F	Barrow	1	1	1	1	1
01B10	BH4	2001	5	10	M	Barrow	1	1	1	1	1
01B11	BH54	2001	5	11	M	Barrow	1	1	1	1	1
01B12	BH42	2001	5	11	M	Barrow	1	1	1	1	1
01B13	BH42	2001	5	12	F	Barrow	1	1	1	1	1
01B14	BH64	2001	5	13	M	Barrow	1	1	1	1	1
01B15	BH42	2001	5	13	M	Barrow	1	1	1	1	1
01B16	BH42	2001	5	14	M	Barrow	1	1	1	1	1
01B17	BH5	2001	5	15	F	Barrow	1	1	1	1	1
01B19	BH42	2001	5	18	M	Barrow	1	1	1	1	1
01B2	BH42	2001	5	1	M	Barrow	1	1	1	1	1
01B24	BH28	2001	10	8	F	Barrow	1	1	1	1	1
01B25	BH23	2001	10	8	M	Barrow	1	1	1	1	1
01B26	BH65	2001	10	8	F	Barrow	1	1	1	1	1
01B27	BH57	2001	10	9	M	Barrow	1	1	1	1	1
01B3	BH46	2001	5	1	F	Barrow	1	1	1	1	1
01B4	BH15	2001	5	1	M	Barrow	1	1	1	1	1
01B6	BH31	2001	5	2	M	Barrow	1	1	1	1	1
01B7	BH62	2001	5	3	M	Barrow	1	1	1	1	1
01B8	BH5	2001	5	7	M	Barrow	1	1	1	1	1
01B9	BH61	2001	5	8	M	Barrow	1	1	1	1	1
01S3	BH57	2001	11	27	M	Savoonga	2	2	2	2	3

BWCH2	BH42	2001	10	19	F	Chukotka					4
02B1	BH45	2002	5	3	F	Barrow	1	1	1	1	1
02B10	BH39	2002	10	10	M	Barrow	1	1	1	1	1
02B11	BH50	2002	10	15	F	Barrow	1	1	1	1	1
02B12	BH42	2002	10	15	M	Barrow	1	1	1	1	1
02B13	BH42	2002	10	15	M	Barrow	1	1	1	1	1
02B14	BH42	2002	10	18	F	Barrow	1	1	1	1	1
02B15	BH1	2002	10	18	M	Barrow	1	1	1	1	1
02B16	BH15	2002	10	19	M	Barrow	1	1	1	1	1
02B17	BH34	2002	10	19	F	Barrow	1	1	1	1	1
02B18	BH1	2002	10	19	F	Barrow	1	1	1	1	1
02B19	BH42	2002	10	19	M	Barrow	1	1	1	1	1
02B2	BH42	2002	5	10	F	Barrow	1	1	1	1	1
02B20	BH48	2002	10	19	M	Barrow	1	1	1	1	1
02B21	BH31	2002	10	22	F	Barrow	1	1	1	1	1
02B22	BH58	2002	10	25	F	Barrow	1	1	1	1	1
02B3	BH24	2002	5	30	F	Barrow	1	1	1	1	1
02B4	BH20	2002	9	30	F	Barrow	1	1	1	1	1
02B5	BH42	2002	10	1	F	Barrow	1	1	1	1	1
02B6	BH42	2002	10	3	M	Barrow	1	1	1	1	1
02B7	BH18	2002	10	3	M	Barrow	1	1	1	1	1
02B8	BH5	2002	10	3	F	Barrow	1	1	1	1	1
02B9	BH23	2002	10	10	F	Barrow	1	1	1	1	1
02G2	BH31	2002	12	5	F	Gambell	2	2	2	2	2
02KK1	BH23	2002	9	8	F	Kaktovik			1	1	
02KK2	BH15	2002	9	11	M	Kaktovik			1	1	
02KK3	BH42	2002	9	13	F	Kaktovik			1	1	
02S2_4	BH42	2002	12	7	F	Savoonga	2	2	2	2	3
02S3	BH64	2002	12	11	F	Savoonga	2	2	2	2	3
02S5	BH42	2002	12	14	F	Savoonga	2	2	2	2	3
BWCH7	BH23	2002	11	15	F	Chukotka					4
03B1	BH28	2003	4	19	F	Barrow	1	1	1	1	1
03B10	BH63	2003	6	1	F	Barrow	1	1	1	1	1
03B11	BH46	2003	10	8	F	Barrow	1	1	1	1	1
03B12	BH19	2003	10	9	F	Barrow	1	1	1	1	1
03B13	BH46	2003	10	9	M	Barrow	1	1	1	1	1
03B14	BH5	2003	10	9	M	Barrow	1	1	1	1	1
03B16	BH42	2003	10	14	F	Barrow	1	1	1	1	1
03B2	BH42	2003	5	3	M	Barrow	1	1	1	1	1
03B3	BH42	2003	5	7	F	Barrow	1	1	1	1	1
03B4	BH7	2003	5	8	M	Barrow	1	1	1	1	1
03B5	BH60	2003	5	8	M	Barrow	1	1	1	1	1
03B6	BH42	2003	5	9	F	Barrow	1	1	1	1	1
03B7	BH9	2003	5	12	M	Barrow	1	1	1	1	1

03B8	BH42	2003	5	24	M	Barrow	1	1	1	1	1
03B9	BH23	2003	5	25	F	Barrow	1	1	1	1	1
03G1	BH42	2003	4	6	M	Gambell	2	2	2	2	2
03H1	BH9	2003	4	20	F	Point Hope			1	1	
03H2	BH31	2003	4	22	M	Point Hope			1	1	
03H3_4	BH23	2003	4	22	F	Point Hope			1	1	
03KK1	BH42	2003	9	5	M	Kaktovik			1	1	
03KK2	BH42	2003	9	7	M	Kaktovik			1	1	
03S1	BH34	2003	12	6		Savoonga	2	2	2	2	3
03S2	BH42	2003	12	11	F	Savoonga	2	2	2	2	3
03WW1	BH58	2003	4	18	F	Wainwright			1	1	
BWCH6	BH42	2003	10	14	M	Chukotka					4
04B1	BH23	2004	4	23	M	Barrow	1	1	1	1	1
04B10	BH23	2004	9	22	M	Barrow	1	1	1	1	1
04B11	BH55	2004	9	22	F	Barrow	1	1	1	1	1
04B12	BH31	2004	9	22	M	Barrow	1	1	1	1	1
04B13	BH25	2004	9	26	M	Barrow	1	1	1	1	1
04B14	BH66	2004	9	26	F	Barrow	1	1	1	1	1
04B15	BH42	2004	9	26	F	Barrow	1	1	1	1	1
04B16	BH10	2004	10	21	M	Barrow	1	1	1	1	1
04B17	BH42	2004	10	21	M	Barrow	1	1	1	1	1
04B18	BH13	2004	10	22	F	Barrow	1	1	1	1	1
04B19	BH42	2004	10	22	F	Barrow	1	1	1	1	1
04B2	BH45	2004	4	26	M	Barrow	1	1	1	1	1
04B20	BH17	2004	10	22	M	Barrow	1	1	1	1	1
04B21	BH42	2004	10	23	F	Barrow	1	1	1	1	1
04B3	BH5	2004	5	9	F	Barrow	1	1	1	1	1
04B4	BH61	2004	5	12	F	Barrow	1	1	1	1	1
04B5	BH32	2004	5	20	F	Barrow	1	1	1	1	1
04B6	BH43	2004	6	4	U	Barrow	1	1	1	1	1
04B7	BH7	2004	9	18	F	Barrow	1	1	1	1	1
04B8	BH42	2004	9	18	F	Barrow	1	1	1	1	1
04B9	BH2	2004	9	18	F	Barrow	1	1	1	1	1
04G3	BH28	2004	12	31	F	Gambell	2	2	2	2	2
04KK1	BH46	2004	9	6	M	Kaktovik			1	1	
04KK2	BH42	2004	9	14	M	Kaktovik			1	1	
04KK3	BH33	2004	9	14	F	Kaktovik			1	1	
04N1	BH51	2004	9	5	F	Nuiqsut			1	1	
04N2	BH20	2004	9	6	M	Nuiqsut			1	1	
04N3	BH20	2004	9	14	M	Nuiqsut			1	1	
BWCH1	BH4	2004	11	11	M	Chukotka					4
05B1	BH61	2005	4	28	M	Barrow	1	1	1	1	1
05B10	BH42	2005	5	9	M	Barrow	1	1	1	1	1
05B11	BH43	2005	5	9	F	Barrow	1	1	1	1	1

05B12	BH59	2005	5	10	F	Barrow	1	1	1	1	1
05B13	BH23	2005	5	10	M	Barrow	1	1	1	1	1
05B15	BH28	2005	5	19	M	Barrow	1	1	1	1	1
05B16	BH53	2005	5	23	M	Barrow	1	1	1	1	1
05B17	BH61	2005	10	1	M	Barrow	1	1	1	1	1
05B18	BH24	2005	10	1	F	Barrow	1	1	1	1	1
05B19	BH42	2005	10	2	M	Barrow	1	1	1	1	1
05B2	BH20	2005	4	28	F	Barrow	1	1	1	1	1
05B20	BH42	2005	10	2	M	Barrow	1	1	1	1	1
05B21	BH46	2005	10	3	F	Barrow	1	1	1	1	1
05B22	BH36	2005	10	3	M	Barrow	1	1	1	1	1
05B23	BH11	2005	10	3	F	Barrow	1	1	1	1	1
05B24	BH29	2005	10	4	M	Barrow	1	1	1	1	1
05B25	BH7	2005	10	4	F	Barrow	1	1	1	1	1
05B26	BH64	2005	10	4	M	Barrow	1	1	1	1	1
05B27	BH41	2005	10	5	M	Barrow	1	1	1	1	1
05B28	BH49	2005	10	5	F	Barrow	1	1	1	1	1
05B29	BH42	2005	10	5	F	Barrow	1	1	1	1	1
05B3	BH7	2005	5	4	F	Barrow	1	1	1	1	1
05B4	BH42	2005	5	5	M	Barrow	1	1	1	1	1
05B5	BH36	2005	5	6	M	Barrow	1	1	1	1	1
05B6	BH42	2005	5	6	F	Barrow	1	1	1	1	1
05B7	BH64	2005	5	7	F	Barrow	1	1	1	1	1
05B8	BH42	2005	5	8	M	Barrow	1	1	1	1	1
05B9	BH23	2005	5	8	M	Barrow	1	1	1	1	1
05BpB1	BH9	2005	9	14		Barrow	1	1	1	1	1
05BpB12	BH19	2005	10	6		Barrow	1	1	1	1	1
05BpB13	BH12	2005	10	6		Barrow	1	1	1	1	1
05BpB2	BH24	2005	9	14		Barrow	1	1	1	1	1
05BpB8	BH42	2005	10	6		Barrow	1	1	1	1	1
05D1	BH5	2005	4	20	M	Little Diomedede					
05G1	BH42	2005	1	4	M	Gambell	2	2	2	2	2
05G2	BH5	2005	4	27	M	Gambell	2	2	2	2	2
05H1	BH23	2005	4	30	F	Point Hope			1	1	
05H3_5	BH20	2005	5		F	Point Hope			1	1	
05H4_7	BH47	2005	5		M	Point Hope			1	1	
05H6	BH63	2005	5	21	F	Point Hope			1	1	
05KK1	BH42	2005	9	3	M	Kaktovik			1	1	
05KK2	BH42	2005	9	5	F	Kaktovik			1	1	
05KK3	BH27	2005	9	14	F	Kaktovik			1	1	
05N1	BH9	2005	9	14	F	Nuiqsut			1	1	
05S1	BH47	2005	1	4	F	Savoonga	2	2	2	2	3
05S2	BH23	2005	4	11	?	Savoonga	2	2	2	2	3
05S3	BH5	2005	4	22	M	Savoonga	2	2	2	2	3

05S4	BH7		2005	4	22	M	Savoonga	2	2	2	2	3
05S5	BH42		2005	11	29	F	Savoonga	2	2	2	2	3
05S6	BH43		2005	11	29	F	Savoonga	2	2	2	2	3
05S7	BH42		2005	11	29	F	Savoonga	2	2	2	2	3
05WW1	BH41		2005	4	28	M	Wainwright			1	1	
05WW2	BH20		2005	4	28	F	Wainwright			1	1	
05WW3	BH32		2005	5	10	F	Wainwright			1	1	
05WW4	BH23		2005	5	19	F	Wainwright			1	1	
BWCH11	BH23		2005	10	24		Chukotka					4
BWCH12	BH42		2005	10	24		Chukotka					4
BWCH13	BH5		2005	10	25		Chukotka					4
BWCH14	BH24		2005	10	28		Chukotka					4
BWCH16	BH61		2005	10	30		Chukotka					4
BWCH18	BH36		2005	11	5		Chukotka					4
BWCH19	BH3		2005	10	5		Chukotka					4
BWCH20	BH5		2005	10	28		Chukotka					4
BWCH21	BH13		2005	10	29		Chukotka					4
BWCH8	BH2		2005	10	21		Chukotka					4
06B1	BH42		2006	5	11	M	Barrow	1	1	1	1	1
06B2	BH3		2006	5	12	M	Barrow	1	1	1	1	1
06B3	BH42		2006	5	18	M	Barrow	1	1	1	1	1
06BpB60010	BH49		2006	5	12	M	Barrow	1	1	1	1	1
06WW1_2	BH28		2006	5	10	F	Wainwright			1	1	
CH1	BH50		2006	4	28		Chukotka					4
CH2	BH3		2006	4	28		Chukotka					4
CH3	BH23		2006	4	30		Chukotka					4
GSK1	BH15	88G1	(1988)	(4)	(16)	(F)	Gambell	2	2	2	2	2
GSK28	BH58	92G1	(1992)	(2)	(12)	(F)	Gambell	2	2	2	2	2
GSK20	BH2	93G3	(1993)	(4)	(24)	(M)	Gambell	2	2	2	2	2
GSK8	BH29	93G4	(1993)	(4)	(24)	(M)	Gambell	2	2	2	2	2
G-BAL-1	BH50	G-BAL-2, GSK14, 95G4	(1995)	(5)	(4)		Gambell	2	2	2	2	2
GSK6	BH7	95G3	(1995)	(5)	(2)	(M)	Gambell	2	2	2	2	2
GSK29	BH28	97G3	(1997)	(5)	(1)	(F)	Gambell	2	2	2	2	2
GSK25	BH23	04G2	(2004)	(4)	(11)	(F)	Gambell	2	2	2	2	2
BWCH4	BH42						Chukotka					4
G-BAL-2	BH50	G-BAL-1, GSK14, 95G4					Gambell	2		2		2
G-BAL-3	BH42	GSK22					Gambell	2	2	2	2	2
G-BAL-4	BH42	G-BAL-5, GSK17, 02G2					Gambell	2		2		2
G-BAL-5	BH31	G-BAL-4, GSK17, 02G2					Gambell	2		2		2
G-BAL-6	BH52						Gambell	2	2	2	2	2
G-BAL-7	BH45						Gambell	2	2	2	2	2
G-BAL-8	BH42						Gambell	2	2	2	2	2
GSK10	BH32						Gambell	2	2	2	2	2
GSK11	BH45						Gambell	2	2	2	2	2

GSK12	BH3		Gambell	2	2	2	2	2
GSK13	BH31		Gambell	2	2	2	2	2
GSK14	BH50	G-BAL-1, G-BAL-2, 95G4	Gambell	2		2		2
GSK15	BH30		Gambell	2	2	2	2	2
GSK16	BH42		Gambell	2	2	2	2	2
GSK17	BH42	G-BAL-4, G-BAL-5, 02G2	Gambell	2		2		2
GSK18	BH42		Gambell	2	2	2	2	2
GSK19	BH45		Gambell	2	2	2	2	2
GSK2	BH42	03G1	Gambell	2		2		2
GSK21	BH42		Gambell	2	2	2	2	2
GSK22	BH42	G-BAL-3	Gambell	2		2		2
GSK23	BH22	96G1_2	Gambell	2		2		2
GSK24	BH23		Gambell	2	2	2	2	2
GSK26	BH42		Gambell	2	2	2	2	2
GSK27	BH28	04G3	Gambell	2		2		2
GSK5	BH51	96G3	Gambell	2		2		2
GSK7	BH42		Gambell	2	2	2	2	2
GSK9	BH23		Gambell	2	2	2	2	2
SAV-BAL-1	BH5	SAV-BAL-4	Savoonga	2	2	2	2	3
SAV-BAL-2	BH64		Savoonga	2	2	2	2	3
SAV-BAL-3	BH42		Savoonga	2	2	2	2	3
SAV-BAL-4	BH5	SAV-BAL-1	Savoonga	2		2		3

APPENDIX 1. Additional stratifications used in sequence analysis.

SampleID	Barrow v village/Chukotka II	NS v village/Chukotka I	NS v village/Chukotka II	Barrow F v S	NS F v S	AK v Chukotka I	AK v Chukotka II	Age I	Age II	season sli I	season sli II
81WW2		1	1		1	1	1				
81WW3		1	1		1	1	1	1	1		
83B1	1	1	1	1	1	1	1				
84B1	1	1	1	1	1	1	1				
84B3	1	1	1	1	1	1	1				
84B4	1	1	1	1	1	1	1				
84S1	3	3	3			1	1			2	2
84WW1_2		1	1		1	1	1				
86B1	1	1	1	1	1	1	1	4	3		
86B2	1	1	1	1	1	1	1	4	3		
86B5	1	1	1	1	1	1	1	4	3		
86B6	1	1	1	1	1	1	1	3	2		
86B7	1	1	1	1	1	1	1	3	2		
86KK2		1	1		2	1	1	2	1		
86KK3		1	1		2	1	1	3	2		
87B4	1	1	1	1	1	1	1				
88B9	1	1	1	2	2	1	1				
89B2	1	1	1	1	1	1	1	3	2		
89B3	1	1	1	1	1	1	1	1	1		
89B4	1	1	1	2	2	1	1				
89B5	1	1	1	2	2	1	1				
89B6	1	1	1	2	2	1	1				
89S1	3	3	3			1	1			2	2
90B1	1	1	1	1	1	1	1				
90B2	1	1	1	1	1	1	1				
90B7	1	1	1	2	2	1	1	4	3		
90B8	1	1	1	2	2	1	1	3	2		
90B9	1	1	1	2	2	1	1				
90KK1		1	1		2	1	1				
92B1	1	1	1	1	1	1	1				
92B11	1	1	1	2	2	1	1				
92B12	1	1	1	2	2	1	1				
92B18	1	1	1	2	2	1	1				
92B2	1	1	1	1	1	1	1	1	1		
92B3	1	1	1	2	2	1	1	2	1		
92B4	1	1	1	2	2	1	1	2	1		
92B5	1	1	1	2	2	1	1				
92B6	1	1	1	2	2	1	1				

92B7	1	1	1	2	2	1	1	3	2
92B8	1	1	1	2	2	1	1		
92B9	1	1	1	2	2	1	1	2	1
92N-BC-1		1	1			1	1		
93B10	1	1	1	1	1	1	1		
93B11	1	1	1	1	1	1	1		
93B12	1	1	1	1	1	1	1		
93B13	1	1	1	1	1	1	1		
93B15	1	1	1	1	1	1	1		
93B16	1	1	1	1	1	1	1		
93B2	1	1	1	1	1	1	1		
93B3	1	1	1	1	1	1	1		
93B4	1	1	1	1	1	1	1		
93B5	1	1	1	1	1	1	1		
93B6	1	1	1	1	1	1	1		
93B7	1	1	1	1	1	1	1		
93B9	1	1	1	1	1	1	1		
95B1	1	1	1	1	1	1	1		
95B13	1	1	1	2	2	1	1		
95B17	1	1	1	2	2	1	1		
95B18	1	1	1	2	2	1	1		
95B4	1	1	1	1	1	1	1	4	3
95B7	1	1	1	1	1	1	1	1	1
95B8	1	1	1	1	1	1	1	3	2
95B9	1	1	1	2	2	1	1	1	1
SAK-19									
SAK-20									
SAK-21									
SAK-22									
SAK-23									
SAK-24									
SAK-25									
SAK-26									
SAK-27									
SAK-28									
SAK-29									
SAK-30									
SAK-31									
96B1	1	1	1	1	1	1	1	4	3
96B10	1	1	1	2	2	1	1	3	2
96B11	1	1	1	2	2	1	1		
96B12	1	1	1	2	2	1	1		
96B14	1	1	1	2	2	1	1		
96B15	1	1	1	2	2	1	1	4	3

96B16	1	1	1	2	2	1	1	3	2		
96B17	1	1	1	2	2	1	1	3	2		
96B18	1	1	1	2	2	1	1	3	2		
96B19	1	1	1	2	2	1	1	3	2		
96B2	1	1	1	1	1	1	1	4	3		
96B20	1	1	1	2	2	1	1				
96B21	1	1	1	2	2	1	1				
96B22	1	1	1	2	2	1	1	3	2		
96B23	1	1	1	2	2	1	1				
96B24	1	1	1	2	2	1	1	3	2		
96B3	1	1	1	1	1	1	1				
96B4	1	1	1	1	1	1	1	3	2		
96B5	1	1	1	1	1	1	1	1	1		
96B6	1	1	1	2	2	1	1	3	2		
96B7	1	1	1	2	2	1	1				
96B8	1	1	1	2	2	1	1				
96B9	1	1	1	2	2	1	1	3	2		
96G1_2	2	2	2			1	1			2	2
96G3	2	2	2			1	1			2	2
96S1	3	3	3			1	1			2	2
96S2	3	3	3			1	1			2	2
RUS96-1											
RUS96-10											
RUS96-11											
RUS96-2											
RUS96-3											
RUS96-4											
RUS96-5											
RUS96-6											
RUS96-7											
RUS96-8											
RUS96-9											
1BC97B		1	1			1	1				
97B1	1	1	1	1	1	1	1				
97B10	1	1	1	1	1	1	1	2	1		
97B11	1	1	1	2	2	1	1				
97B12	1	1	1	2	2	1	1				
97B13	1	1	1	2	2	1	1				
97B15_16	1	1	1	2	2	1	1				
97B17	1	1	1	2	2	1	1				
97B18	1	1	1	2	2	1	1				
97B19	1	1	1	2	2	1	1				
97B2	1	1	1	1	1	1	1				
97B20	1	1	1	2	2	1	1				

99B7	1	1	1	1	1	1	1	3	2
RUS-BM991105.01	4	4	4			2	2		
00B1	1	1	1	1	1	1	1	4	3
00B10	1	1	1	2	2	1	1	4	3
00B11	1	1	1	2	2	1	1	2	1
00B12	1	1	1	2	2	1	1	4	3
00B2	1	1	1	1	1	1	1	3	2
00B3	1	1	1	1	1	1	1	3	2
00B4	1	1	1	1	1	1	1	2	1
00B5	1	1	1	1	1	1	1	2	1
00B6	1	1	1	2	2	1	1	4	3
00B7	1	1	1	2	2	1	1		
00B8	1	1	1	2	2	1	1	4	3
00KK1		1	1		2	1	1	4	3
00KK2		1	1		2	1	1	3	2
00KK3		1	1		2	1	1	4	3
RUS#5-000623									
RUS#6-000622									
RUS#7-000623									
RUS#8-000627									
RUS-BM000909.01	4	4	4			2	2		
RUS-BW000824.19									
01B1	1	1	1	1	1	1	1		
01B10	1	1	1	1	1	1	1	4	3
01B11	1	1	1	1	1	1	1		
01B12	1	1	1	1	1	1	1	4	3
01B13	1	1	1	1	1	1	1	4	3
01B14	1	1	1	1	1	1	1		
01B15	1	1	1	1	1	1	1		
01B16	1	1	1	1	1	1	1	4	3
01B17	1	1	1	1	1	1	1	3	2
01B19	1	1	1	1	1	1	1		
01B2	1	1	1	1	1	1	1		
01B24	1	1	1	2	2	1	1		
01B25	1	1	1	2	2	1	1		
01B26	1	1	1	2	2	1	1		
01B27	1	1	1	2	2	1	1		
01B3	1	1	1	1	1	1	1		
01B4	1	1	1	1	1	1	1		
01B6	1	1	1	1	1	1	1		
01B7	1	1	1	1	1	1	1		
01B8	1	1	1	1	1	1	1		
01B9	1	1	1	1	1	1	1		
01S3	3	3	3			1	1		

03B8	1	1	1	1	1	1	1				
03B9	1	1	1	1	1	1	1	2	1		
03G1	2	2	2			1	1			2	2
03H1		1	1		1	1	1				
03H2		1	1		1	1	1				
03H3_4		1	1		1	1	1				
03KK1		1	1		2	1	1				
03KK2		1	1		2	1	1				
03S1	3	3	3			1	1			1	1
03S2	3	3	3			1	1			1	1
03WW1		1	1		1	1	1				
BWCH6	4	4	4			2	2				
04B1	1	1	1	1	1	1	1				
04B10	1	1	1	2	2	1	1				
04B11	1	1	1	2	2	1	1				
04B12	1	1	1	2	2	1	1				
04B13	1	1	1	2	2	1	1				
04B14	1	1	1	2	2	1	1				
04B15	1	1	1	2	2	1	1				
04B16	1	1	1	2	2	1	1				
04B17	1	1	1	2	2	1	1				
04B18	1	1	1	2	2	1	1				
04B19	1	1	1	2	2	1	1				
04B2	1	1	1	1	1	1	1				
04B20	1	1	1	2	2	1	1				
04B21	1	1	1	2	2	1	1				
04B3	1	1	1	1	1	1	1				
04B4	1	1	1	1	1	1	1				
04B5	1	1	1	1	1	1	1				
04B6	1	1	1	1	1	1	1				
04B7	1	1	1	2	2	1	1				
04B8	1	1	1	2	2	1	1				
04B9	1	1	1	2	2	1	1				
04G3	2	2	2			1	1			1	1
04KK1		1	1		2	1	1				
04KK2		1	1		2	1	1				
04KK3		1	1		2	1	1				
04N1		1	1		2	1	1				
04N2		1	1		2	1	1				
04N3		1	1		2	1	1				
BWCH1	4	4	4			2	2				
05B1	1	1	1	1	1	1	1				
05B10	1	1	1	1	1	1	1				
05B11	1	1	1	1	1	1	1				

05B12	1	1	1	1	1	1	1				
05B13	1	1	1	1	1	1	1				
05B15	1	1	1	1	1	1	1				
05B16	1	1	1	1	1	1	1				
05B17	1	1	1	1	2	2	1				
05B18	1	1	1	1	2	2	1				
05B19	1	1	1	1	2	2	1				
05B2	1	1	1	1	1	1	1				
05B20	1	1	1	1	2	2	1				
05B21	1	1	1	1	2	2	1				
05B22	1	1	1	1	2	2	1				
05B23	1	1	1	1	2	2	1				
05B24	1	1	1	1	2	2	1				
05B25	1	1	1	1	2	2	1				
05B26	1	1	1	1	2	2	1				
05B27	1	1	1	1	2	2	1				
05B28	1	1	1	1	2	2	1				
05B29	1	1	1	1	2	2	1				
05B3	1	1	1	1	1	1	1				
05B4	1	1	1	1	1	1	1				
05B5	1	1	1	1	1	1	1				
05B6	1	1	1	1	1	1	1				
05B7	1	1	1	1	1	1	1				
05B8	1	1	1	1	1	1	1				
05B9	1	1	1	1	1	1	1				
05BpB1	1	1	1	1	2	2	1				
05BpB12	1	1	1	1	2	2	1				
05BpB13	1	1	1	1	2	2	1				
05BpB2	1	1	1	1	2	2	1				
05BpB8	1	1	1	1	2	2	1				
05D1											
05G1	2	2	2				1			1	
05G2	2	2	2				1			1	
05H1		1	1			1	1			1	
05H3_5		1	1			1	1			1	
05H4_7		1	1			1	1			1	
05H6		1	1			1	1			1	
05KK1		1	1			2	1			1	
05KK2		1	1			2	1			1	
05KK3		1	1			2	1			1	
05N1		1	1			2	1			1	
05S1	3	3	3				1		4	3	1
05S2	3	3	3				1				2
05S3	3	3	3				1				2

05S4	3	3	3			1	1	2	2
05S5	3	3	3			1	1	1	1
05S6	3	3	3			1	1	1	1
05S7	3	3	3			1	1	1	1
05WW1		1	1		1	1	1		
05WW2		1	1		1	1	1		
05WW3		1	1		1	1	1		
05WW4		1	1		1	1	1		
BWCH11	4	4	4			2	2		
BWCH12	4	4	4			2	2		
BWCH13	4	4	4			2	2		
BWCH14	4	4	4			2	2		
BWCH16	4	4	4			2	2		
BWCH18	4	4	4			2	2		
BWCH19	4	4	4			2	2		
BWCH20	4	4	4			2	2		
BWCH21	4	4	4			2	2		
BWCH8	4	4	4			2	2		
06B1	1	1	1	1	1	1	1		
06B2	1	1	1	1	1	1	1		
06B3	1	1	1	1	1	1	1		
06BpB60010	1	1	1	1	1	1	1		
06WW1_2		1	1		1	1	1		
CH1	4	4	4			2	2		
CH2	4	4	4			2	2		
CH3	4	4	4			2	2		
GSK1	2	2	2			1	1		2
GSK28	2	2	2			1	1		1
GSK20	2	2	2			1	1		2
GSK8	2	2	2			1	1		2
G-BAL-1	2	2	2			1	1		
GSK6	2	2	2			1	1		2
GSK29	2	2	2			1	1		2
GSK25	2	2	2			1	1		2
BWCH4	4	4	4			2	2		
G-BAL-2		2				1			
G-BAL-3	2	2	2			1	1		
G-BAL-4		2				1			
G-BAL-5		2				1			
G-BAL-6	2	2	2			1	1		
G-BAL-7	2	2	2			1	1		
G-BAL-8	2	2	2			1	1		
GSK10	2	2	2			1	1		
GSK11	2	2	2			1	1		

GSK12	2	2	2	1	1
GSK13	2	2	2	1	1
GSK14		2		1	
GSK15	2	2	2	1	1
GSK16	2	2	2	1	1
GSK17		2		1	
GSK18	2	2	2	1	1
GSK19	2	2	2	1	1
GSK2		2		1	
GSK21	2	2	2	1	1
GSK22		2		1	
GSK23		2		1	
GSK24	2	2	2	1	1
GSK26	2	2	2	1	1
GSK27		2		1	
GSK5		2		1	
GSK7	2	2	2	1	1
GSK9	2	2	2	1	1
SAV-BAL-1	3	3	3	1	1
SAV-BAL-2	3	3	3	1	1
SAV-BAL-3	3	3	3	1	1
SAV-BAL-4		3		1	