

UBC Year 2002 Transportation Survey

1 Introduction

This study is a component part of a trilogy of questionnaire surveys conducted electronically in 1998, 2000, and 2002. Each survey provides a wealth of potentially useful data on travel patterns, trip making and addressed likely markets for a number of planning options being considered at the time each study was conducted.

It continues with the objective of 1998 to provide profiles of the university community in terms of their transportation usage and to gauge responses to proposed initiatives by Trek to reduce the proportion of commuters relying on single occupancy vehicles, a commitment made in UBC Official Community Plan and a GVRD Memorandum of Understanding. The 1998 study collected a set of data in coordination with a 1997 ground count of person trips into and out of the campus that established a benchmark to assess the effectiveness of UBC in meeting it's commitment. In 2,000 and again in 2,002 similar information was collected and coordinated with ground counts to establish overall travel patterns and provide information on issues of immediate concern to the university. This report covers the issues emerging in 2,002. Two issues requiring immediate consideration:

1. With the change in class start times in September 2,000, to begin on the hour at 8:00 a.m. rather than on the half hour beginning at 8:30 a.m. the 2,002 survey asked the effect of the change in scheduling on participants commuting patterns and timing. Initiative for the change had commenced with a survey question posed in the 2,000 survey to determine if there was a preference for earlier start times or barring preference would there be sufficient acceptance to support the change. Addressed here is the post adoption evaluation from the perspective of university participant observers.
2. The survey asked what would improve the attractiveness of higher occupant vehicles (HOV). Despite ground counts clearly showing overall increases in transit rider volumes current patterns of mode choice indicate that the proportion of commuters in carpools and van pools is declining. Increases in transit use appeared to come from higher occupant vehicles. The 2,000 survey reported that not only did single occupant vehicles (SOV) continue to account for the largest share of commuters but that during the critical peak morning hour 30% of commuters only drove. This trend continues and in 2,002 recording travel on a 24hour period , 36% of trips by vehicle into and out of campus are by individuals who drive only.

Mode	Peak Period Commute 2,000	Mode Share 2,000	24 Hr. Total for 2,002	Mode Share 2,002
SOV	128,741	40.08%	153,015	41.36%
HOV	71,459	22.25%	80,659	21.80%
Transit	98,159	30.56%	114,812	31.03%
Bicycle	12,017	3.74%	13,542	3.66%
Walk	4,454	1.39%	5,586	1.51%
Motorcycle	706	.22%	1,174	0.32%
Other			1,210	0.33%
Other and campus	5,707	1.77%		
Total	321,243		369,998	

Mode	Faculty	Staff	Student	Grad	Total	%
Drive only	2056	1567	8128	2404	14155	36.0%
Carpool only	158	701	3031	255	4145	10.5%
Transit only	468	851	6030	1493	8842	22.5%
Drive and Carpool	450	281	3099	174	4004	10.2%
Drive and Transit	317	240	2180	763	3500	8.9%
Carpool and Transit	176	251	2754	213	3394	8.6%
Drive, Carpool and Transit	36	42	1101	73	1252	3.2%
Total	3661	3933	26323	5375	39292	100.0%
Percentages	9.3%	10.0%	67.0%	13.7%	100.0%	

University Population	3806	4076	30196	6069	44147
Percentage (in vehicles)	96.2%	96.5%	87.2%	88.6%	89.0%

Any form of Driving	22,911	58.3%
Any form of transit	16,988	43.2%



2. Methodology

2.1 Data Collection

The approach was similar to that initiated in 1998 and used in 2,000. A request for participation via a website address was sent to all students, staff and faculty with UBC-based email accounts in February 2,002., The website was also publicized for those without a UBC email account (primarily students) although the efficacy of this is uncertain.

Responses from participants were received by a ColdFusion-based web interface hosted by Communicopea, and stored in a Microsoft Access database. A serious technical glitch in the way certain servers record responses resulted in error in transmission to Access databases and delay to investigate and reinterpret the capture process. Fortunately a part of the answer was correctly recorded and redundancy in the questionnaire permitted reconstructing the response, albeit through considerable and tedious effort. Analysis of results was conducted using a statistical package (Statistical Package for Social Sciences, Version 11) and a geographic information system (ArcView, version 3.2).

In effect weighting is used to accommodate inherent biases in electronic surveys and behavioural transportation surveys:

- 1. Those arising from using the medium of the Internet that reasonably result in different response rates.**
- 2. Differences in responses associated with mode use sufficiently large not to be associated with the survey being conducted on the Internet.**

2.2 Responses and Weighting

Survey responses were verified to provide suitable data for processing. This included consistency checks and excluded responses that were clearly dubious. The methodology pioneered for large electronic surveys in the 1998 UBC Transportation Survey approaches responses rather different than traditional surveys. Seldom do transportation researchers and market analysts have the luxury of very large samples and hence highly statistically reliable results for even small segments of the sample. Furthermore, traditional market surveys work off of population profiles which are sampled to discern travel patterns with the statistical significance of the travel pattern established strictly in terms of likelihood that sample captured the population profile. Yet travel behaviour may vary more by mode selected than group participant happens to be categorized with. Such was certainly the case in 1998 and 2000 and expected in 2002. In each of these surveys a large number of respondents, sufficiently motivated to participate in web based surveys is compared with population profile after the responses are collected and each weighted to reflect overall population. The approach is robust since number of responses are in the order of ten times what would be collected by a traditional survey. Travel patterns are handled in a similar way with information from ground counts used in the weighting of aggregate use of mode. The result is a combined weighting that closely reflects ground counts and population profiles in order to discern broader patterns and travel behaviour as specified by individual respondents.

What follows is an assessment of the strategic implications of responses rather than just a statistical summary.

The number of responses with sufficient information to be used to establish the population profile at UBC were 5,629. In addition several thousand responses had partial information, reasons for which include giving up, losing connection, or refusing to answer critical questions. These critical questions were used to weight the sample to match key attributes of the university population: faculty/ staff/ student ratios, faculty, part/full-time status, gender, off/on-campus ratio. The responses were compared to known university profiles and given an individual weight to increase or decrease influence on the total sample. Each of these individual weights was cross-multiplied to determine a final weight that is a close approximation to the overall university profile. The number of responses were further abridged to 5,025 for the estimation of travel patterns as respondents who did not make trips off campus during the survey week tended not to answer the question on what mode they used to reach campus presumably because they typically walk which they perceived as extraneous to the intent of the survey. Mode split of survey responses was standardised (person trips were matched to a detailed on-the-ground set of cross-screen counts, Characteristics of Travel To/From the University of British Columbia, The off/on-campus variable was used as a key analysis variable, splitting the dataset into "commuters" (those who do live off-campus) and "on-campus". For most results it is commuters who are targeted, otherwise it is all respondents being considered. Examples of this process are reproduced below for faculty/staff/student ratios.

Ideally the final weight would be produced on an as-needed basis. Thus if the question called for simulating the typical level of activity on campus during the day, participation by individuals not commuting daily to campus would need to be adjusted for in the final weight.

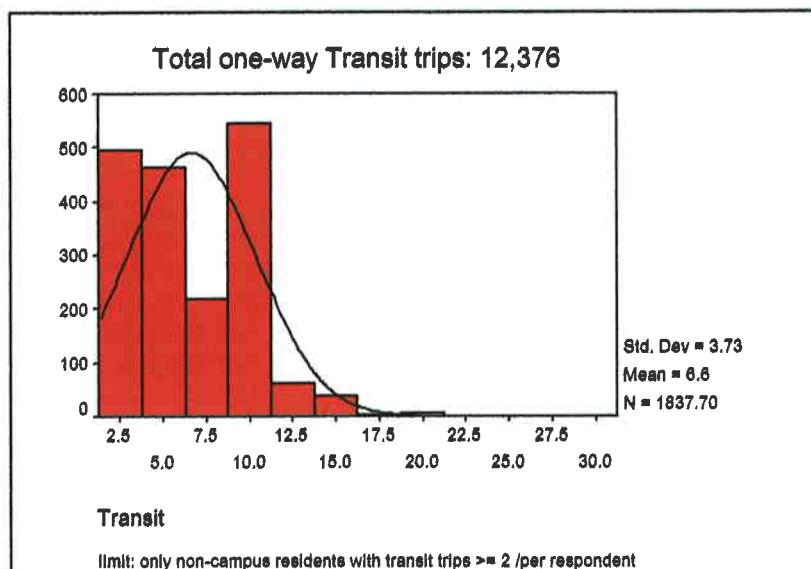
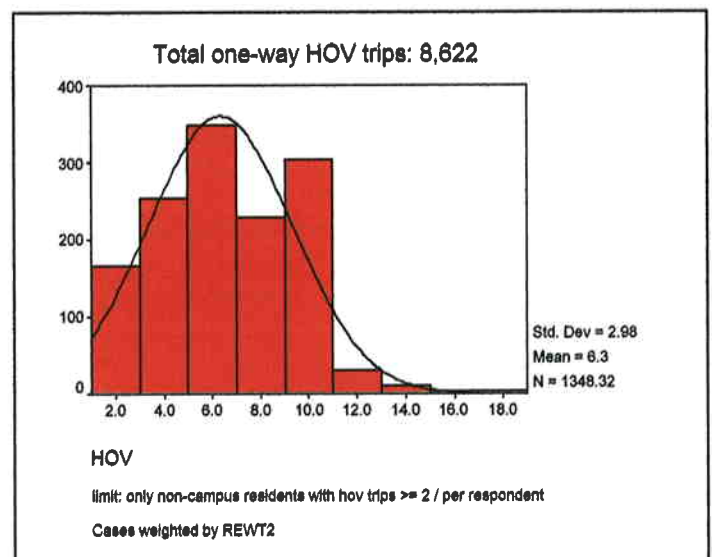
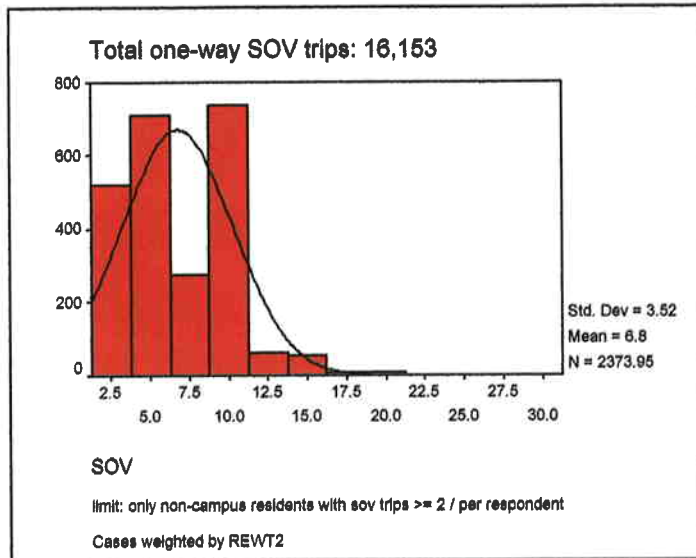
Primary Reason for being at UBC

	Unweighted Frequency	Unweighted Percent	Weighted Frequency	Weighted Percent
Undergraduate	3229	64.3	30196	68.4
Faculty	251	5.0	3806	8.6
Staff	881	17.5	4076	9.2
Graduate	664	13.2	6069	13.7
Total	5025	100.0	44147	100.0

Did you attend UBC prior to Sept 2001

	Unweighted Frequency	Unweighted Percent	Weighted Frequency	Weighted Percent
Yes	3869	77.0	35196	79.7
No	1156	23.0	8951	20.3
Total	5025	100.0	44147	100.0

Mode	Total for 2,002	Survey 2,002	Screenline Peaks and Mid-day	% Difference Screenline - Survey
SOV	153,015	41.36%	43.14%	-1.78%
HOV	80,659	21.80%	24.65%	-2.85%
Transit	114,812	31.03%	27.48%	3.55%
Bicycle	13,542	3.66%	2.25%	1.41%
Walk	5,586	1.51%	1.39%	0.12%
Motorcycle	1,174	0.32%	0.38%	-0.06%
Other	1,210	0.33%	0.71%	-0.38%
Other and campus				
Total	369,998			



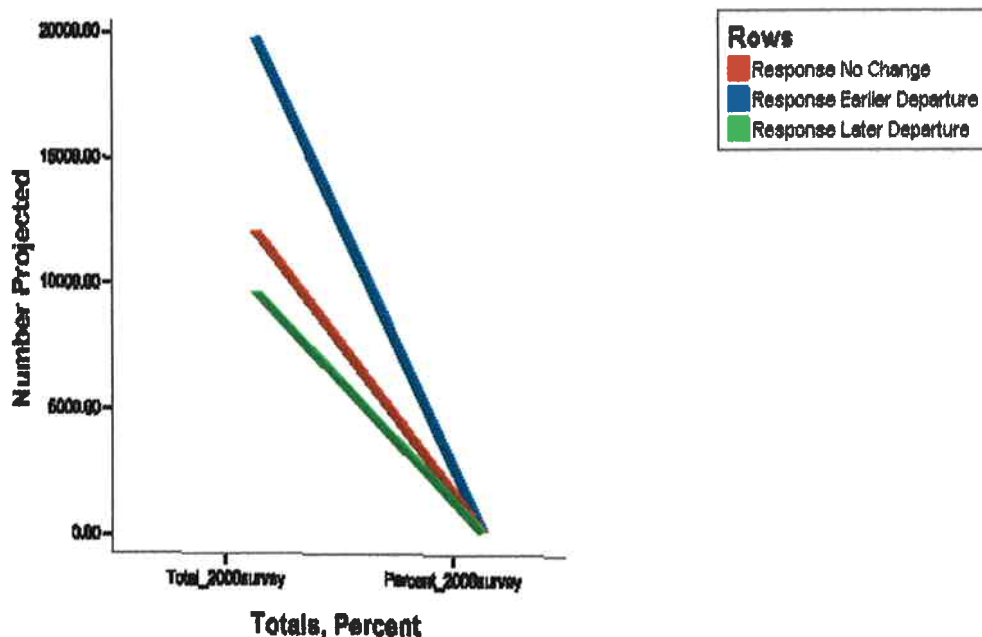
3 Start Time

Prior to September 2,001, TransLink transit planners found it challenging to service UBC operating on the half-hour starting at 8:30 a.m. UBC is the second largest attractor/generator of traffic in the region so partly defines the service requirements for the greater transit system. This scheduling of first classes coincided with peak demand in the central business district, a half hour road trip away, and hence was a competing demand on transit vehicles. A change in start times to the hour, it was surmised by TransLink, would result in better harmony throughout the system and thereby make a more efficient allocation of transit vehicles at peak times, a saving to TransLink of \$1 million.

UBC Trek recognized the public interest would be served in adjusting class schedules and perhaps more directly the advantages to the university if improved services could be directed to maximum inflow periods. But before changing start times some gauging of acceptance by those most directly impacted was necessary to determine if infrastructure changes were warranted and avoid the exercise of scheduling empty classrooms at 8:00 a.m. Two questions were included on the UBC Year 2,000 Transportation Survey to determine if there was an appetite amongst faculty, staff, students for changing start times, either to the 8:00 a.m. or later 9:00 a.m. The first question addressed preference. About 30% of faculty indicated they would prefer an earlier start but students were less supportive of such a change and only 20% would voluntarily choose this option. A second question asked whether a change in start times, if instituted, would actually shift arrival times. Again about 30% of faculty would arrive earlier but few of the remaining expected to have to alter behaviour. In contrast, an increased portion of students (over 30%) indicated they would arrive earlier. Interpretation based on E-Mail responses and a subsequent student survey clearly identified the change in response was interpreted as both a recognition by students typically late risers, if class schedules shifted, they would necessarily comply, but gave a somewhat less than enthusiastic endorsement for an earlier schedule. Staff neither supported change in schedules nor expected a change would alter their arrival times with most already arriving before 8:30.

		Total	Percent
Response in 2000 to proposed shift shift	No Change	11946	29.04
	Earlier Departure	19664	47.81
	Later Departure	9520	23.15

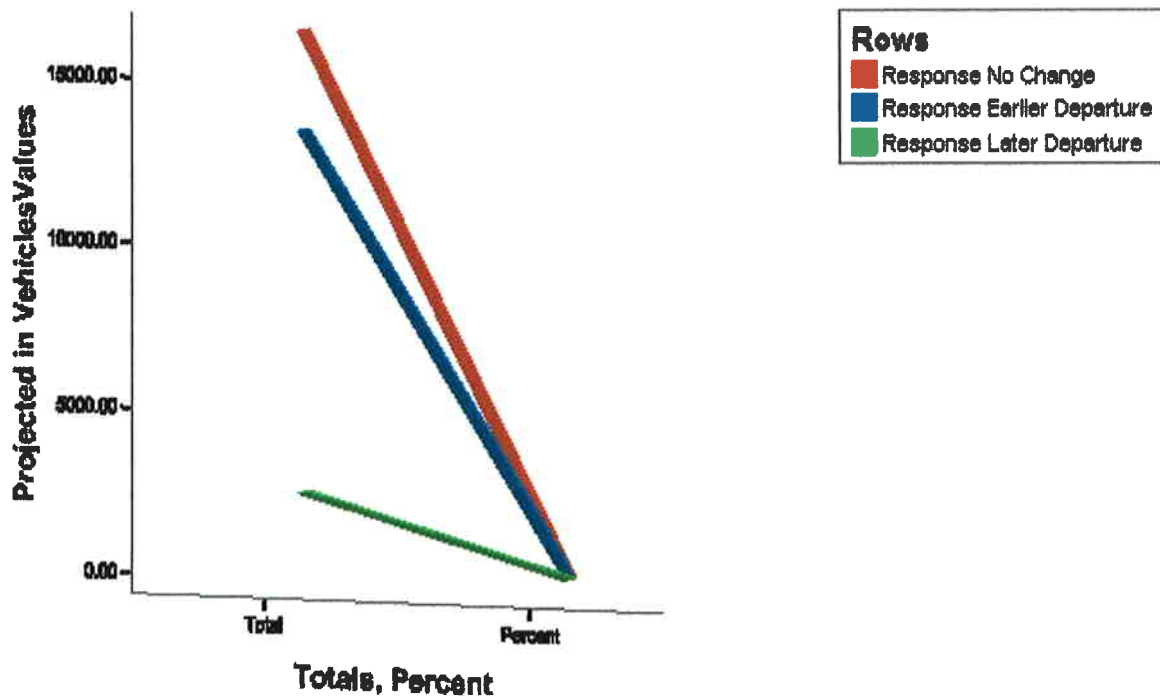
From a transit perspective the likely impact on mode use of shifting class start, even if reluctantly accepted, was promising. From under 20% of transit only users who indicated preference, a shift in start times would influence 40% to respond by coming earlier. This was interpreted by researchers that people would use earlier start time classes and that efficiencies for TransLink could be realized without undo disruption. There was one serious caveat: those who carpooled at least some of the time, excluding staff, expressed a strong preference for start times to remain at 8:30.



Survey results by Trek prompted the senior management at UBC to explore the possibility of an 8:00 a.m. start time to solve a pressing logistical issue, the bottleneck of limited classrooms. Classroom planners calculated a modified and expanded scheduling day should add considerable capacity if there was sufficient acceptance by faculties. Planners indicated a threshold of 30% participation in 8:00 a.m. classes was required. Although this level would not be achieved by preference it did coincide with survey results if times were shifted. A proposal to Senate to modify class starts was endorsed for September 2001; perhaps the quickest operational adjustment in the history of the institution.

Adoption of modified class starts had an immediate impact on life at UBC. To explore the size of the effect all respondents who worked at or attended UBC prior to September 2, 2001 were asked if and how the change had altered timing, mode, convenience and use of transit. An estimated 35,672 had been on campus prior to the change. The first year cohort group is not represented in what follows. An indication of the effect on faculty, staff and students is conveyed in responses to question 6 regarding change in leaving to UBC in the morning depicted here. Fully 41.13% of all participants have adjusted to the scheduling with an earlier departure and only 7.13% with a later departure.

		Total_pre 2001	Percent_ pre2001
Response	No Change	18459	51.74
	Earlier Departure	14671	41.13
	Later Departure	2543	7.13



Most noticeable in the 2,002 responses, with the change to modified class start times, only 7.13 % indicated arriving later. This was an unexpected change in behaviour by a large segment of campus population. In 2,000, fully 23.15 % of respondents expected to arrive later no doubt assuming others would teach, support or attend classes open in the earlier start. In market situations when the degree of change over time contrasts original expectations and experiences, perception of associated products are influenced. In this scenario, transportation market researchers surmise perception of travel conditions are influenced.

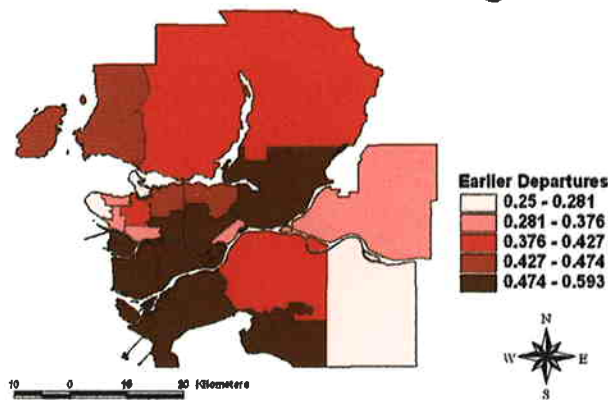
To consider the change in behaviour reflected in traffic patterns the population was abridged slightly to respondents who had experienced the change and arrived/departed by vehicle in 2,002. This adjustment leaves out a small group of campus residents who did not make trips by vehicle during the school week of the survey and permits a finer delineation in terms of size of effect on traffic patterns. Given the size of the sample from which the projection was made, statistical significance testing of perception of change by participants is not eroded.

Q6: How has the class start-time change affected WHEN you travel to UBC?

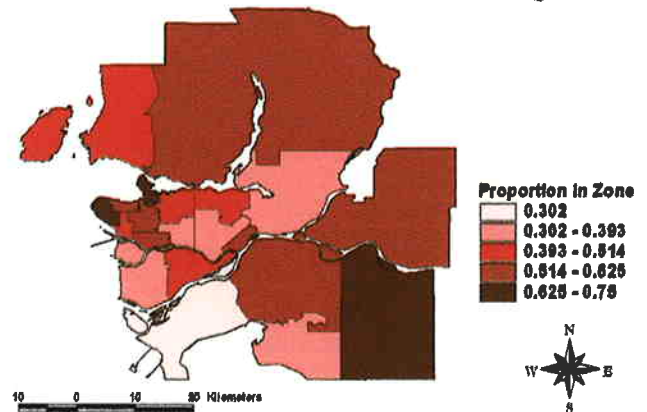
Mode	Responses	Undergrad	Faculty	Staff	Grad	Total
Drive only	No Change	3087	1457	1036	1794	7374
	Earlier Departure	3236	394	277	272	4179
	Later Departure	608	127	85	73	893
Carpool only	No Change	954	121	479	187	1741
	Earlier Departure	1140	0	147	40	1327
	Later Departure	321	0	26	23	370
Transit only	No Change	1465	224	495	854	3038
	Earlier Departure	2239	148	198	256	2841
	Later Departure	354	18	33	40	445
Drive & Carpool	No Change	833	246	232	50	1361
	Earlier Departure	1543	139	43	94	1819
	Later Departure	205	0	2	0	207
Drive & Transit	No Change	639	264	128	528	1559
	Earlier Departure	1100	14	82	91	1287
	Later Departure	113	10	0	12	135
Carpool & Transit	No Change	418	130	136	163	847
	Earlier Departure	1172	12	104	28	1316
	Later Departure	210	0	0	15	225
Drive, Carpool & Transit	No Change	264	22	37	57	380
	Earlier Departure	482	14	3	16	515
	Later Departure	59	0	0	0	59
All Vehicle Modes	Responses	Undergrad	Faculty	Staff	Grad	Total
	No Change	7660	2464	2543	3633	16300
	Earlier Departure	10912	721	854	797	13284
	Later Departure	1870	155	146	163	2334
Total		20442	3340	3543	4593	31918

Impact differed by mode. Undergraduate transit only users were affected. Students classified in categories of combined mode or transit only, tend to be differentially impacted by the change. An association between earlier departure and the use of transit either as sole mode or in combination with other modes can be drawn. For graduate students impact is associated with dependence on others for travel. There an apparent lack of equity in the effect both with respect to faculty, staff, students and also mode used.

Penetration of Change

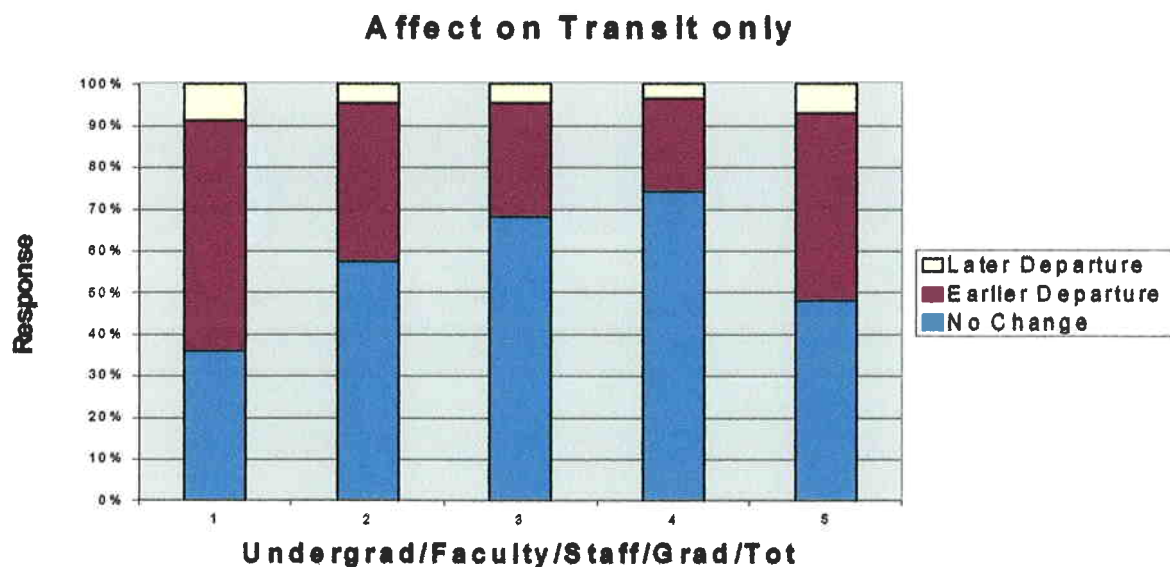


Status Quo: No Change



There are several observations to note. The size of the effect was greater than anticipated, and impacted differentially on participants specifically staff and students. Twenty four percent of staff responded they were now departing earlier. In 2000 expectation was that travel schedules would not be interrupted. The reason given in numerous E-Mails comments from staff was that due to their typically earlier arrival time a half-hour adjustment would not upset their schedules. Fully 53% of students indicated earlier departures in contrast to the 29% responding in 2,000 that if classes were shifted to start earlier they would attend. Faculty responses are in keeping with the general expectations expressed in 2000 save for fewer experiencing later departures.

It was suggested in the UBC Year 2,000 Report that since only 18% expressed a preference to start classes earlier, the 29% figure indicated less than enthusiastic support: "This may reflect a resignation on students' part to earlier times being a "done deal". This raises a clear warning sign. What may have been a sentiment of the 11% who reluctantly agreed they would participate if schedules shifted could become a high degree of resentment and animosity amongst a sizable portion of the 53% affected by the reality of change in 2002. Implications of this are explored in discussions following each set of responses to questions on change in mode, convenience of commute, and transit.



Q7: How has the class start-time change affected HOW you get to/from UBC?

Mode	Question 7 Responses	Undergrad	Faculty	Staff	Graduate	Total
Drive Only	No change	5975	1886	1332	2053	11246
	Change to SOV	927	108	42	79	1156
Carpool Only	No change	2154	121	605	222	3102
	Change to SOV	57	0	12	29	98
	Change to HOV	204	0	12	0	216
Transit only	No change	3567	369	701	1099	5736
	Change to SOV	61			10	71
	Change to Transit	359	20	11	33	423
Drive & Carpool	No change	2073	307	229	117	2726
	Change to SOV	236	39			275
	Change to HOV	208	39	26		273
Drive & Transit	No change	1453	280	163	592	2488
	Change to SOV	272	8	40	31	351
	Change to Transit	65	0	3	0	68
Carpool & Transit	No change	1179	142	179	181	1681
	Change to SOV	258	0	0	0	258
	Change to HOV	216	0	48	24	288
	Change to Transit	126	0	21	0	147
Drive, Carpool & Transit	No change	556	22	37	73	688
	Change to SOV	166	0	0	0	166
	Change to HOV	57	0	3	0	60
	Change to Transit	19	14	0	0	33
All Modes	Question 7 Responses	Undergrad	Faculty	Staff	Graduate	Total
	No change	16957	3127	3246	4337	27667
	Change to SOV	1977	155	94	149	2375
	Change to HOV	685	39	89	24	837
	Change to Transit	569	34	35	33	671
Total		20188	3355	3464	4543	31550

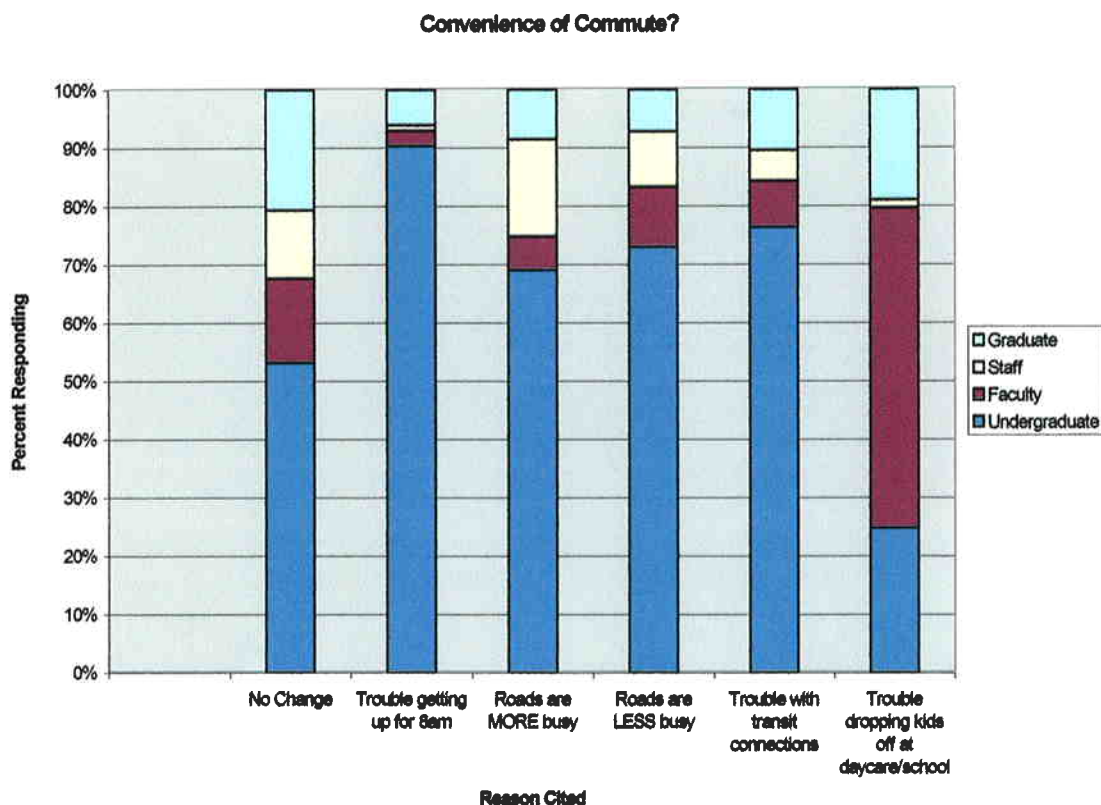
At first glance magnitude of change at twelve percent appears marginal. However direction of change in travel behaviour is not promising for transportation demand management. Switchers were statistically significant with change to SOV ranked highest at about ten percent of undergraduates, followed by change to HOV, with change to transit ranking third but worthy of bare mention.

Q8: How has the class start-time change affected the CONVENIENCE of your commute to/from UBC?

Mode	(Major) Responses	Undergrad	Faculty	Staff	Grad	Total
Drive only	No Change	3183	1346	759	1595	6883
	Roads are LESS busy	1478	335	236	212	2261
	Roads are MORE busy	1473	302	389	283	2447
Carpool only	No Change	981	81	334	196	1592
	Roads are LESS busy	565	40	113	31	749
	Roads are MORE busy	597	0	208	23	828
Transit only	No Change	1775	278	457	761	3271
	Roads are LESS busy	422	45	70	67	604
	Roads are MORE busy	995	63	175	169	1402
Drive & Carpool	No Change	899	214	111	64	1288
	Roads are LESS busy	572	78	29	18	697
	Roads are MORE busy	640	19	133	19	811
Drive & Transit	No Change	622	270	88	461	1441
	Roads are LESS busy	403	0	25	43	471
	Roads are MORE busy	334	0	85	41	460
Carpool & Transit	No Change	721	113	100	160	1094
	Roads are LESS busy	253	17	18	3	291
	Roads are MORE busy	365	0	126	37	528
Drive, Carpool & Transit	No Change	371	21	33	73	498
	Roads are LESS busy	101	15	4	0	120
	Roads are MORE busy	231	0	0	0	231
All Modes						
	Question 8 (All) Responses	Undergrad	Faculty	Staff	Grad	Total
	No Change	8552	2323	1882	3310	16067
	Trouble getting up for 8am	7526	218	78	506	8328
	Roads are MORE busy	4635	384	1116	572	6707
	Roads are LESS busy	3794	530	495	374	5193
	Trouble with transit connections	1373	141	95	188	1797
	Trouble dropping kids off at daycare/school	72	159	4	55	290
Totals		25952	3755	3076	4388	31102

More than half of respondents indicated no change in convenience of commute. But those who did, other than faculty, see roads as more busy. For undergraduates noting change the most significant factor cited is the difficulty they have with early rising. An age factor is evident with twenty-nine percent of undergraduates had trouble getting up for 8:00 a.m. compared with eleven percent of graduate students. Staff, were most likely to respond (36.21%) that they perceived an increase in traffic whereas the small subset of faculty noting change (14.12%) indicated roads are less busy.

What is interesting about the responses is how they contrast with changing travel conditions as recorded by official ground counts of traffic. Between 1997 when the baseline figures were established and 2002 the number of person trips during morning peak hours has decreased. Automobile traffic counts are also down due largely to the decline in carpooling. But rather than perceiving peak hour traffic lower in 2002, commuters noting change suggested otherwise.



It is not surprising that in terms of size effect of modified class start times, undergraduates dominate the counts of responses save for one item: trouble dropping kids off at daycare/school. Faculty cited the earlier start as a serious inconvenience, most likely due to requiring a lengthened period of supervision/care of children between class start time and daycare/school openings.



Q9: Indicate the effect the class start-time has had on transit.

Mode	Question 9 Responses	Undergrad	Faculty	Staff	Grad	Total
Transit only	No change	1339	174	218	423	2154
	Buses MORE crowded	2093	141	402	503	3139
	Buses LESS crowded	417	63	95	127	702
Drive & Transit	No change	614	53	73	361	1101
	Buses MORE crowded	693	138	92	153	1076
	Buses LESS crowded	261	49	36	52	398
Carpool & Transit	No change	504	76	35	38	653
	Buses MORE crowded	808	12	155	94	1069
	Buses LESS crowded	191	17	47	60	315
Drive, Carpool & Transit	No change	303	7	22	60	392
	Buses MORE crowded	300	14	9	0	323
	Buses LESS crowded	78	15	9	0	102
All Modes	Question 9 Responses	Undergrad	Faculty	Staff	Grad	Total
	No change	2760	310	348	882	4300
	Buses MORE crowded	3894	305	658	750	5607
	Buses LESS crowded	947	144	187	239	1517
Total		7601	759	1193	1871	11424

The question was for transit users. Over fifty percent of undergraduates, faculty, staff and graduate students registered that the effect of the modified start times was a change (7,124) and the impact was more crowded buses (5607). There is a loose association between criticism of transit service and degree of reliance on transit. Aside from faculty, those responding they used transit only observed increased crowding. Only respondents who use multiple modes (drive, carpool and transit) indicated the combination of no change and buses less crowded (494) over more crowded buses (323).

Perception that buses are more crowded is made against a backdrop of increasing seat capacity. TransLink reports a thirty percent improvement in transit infrastructure. Respondents to the transportation surveys in 1998 and 2000 noted first the initiation of the 99B express bus just prior to the 1998 survey, then increase in frequency in the 2000 survey. Responses in 2002, extending from the detailed interview section of the survey, reflect difficulty boarding on stops close to campus and being by-passed by full vehicles. Either service is not keeping up with demand, or experience with modified class start times may be influencing behaviour and in turn perception of quality of service across constituencies.

4. Carpool

Reality on the ground is that carpool and vanpool use remain significant. Yet between 1997 and 2002, ground counts recorded a decline of 8,700 person trips over a typical twenty four-hour period. This decline was against a backdrop of 9,300 more transit trips, 1,600 more single occupant vehicle trips giving rise to the observation that increase in transit person trips has come at the expense of carpool/vanpool use. With planned transit improvements and the adoption of U-Pass by undergraduates in September 2003 further erosion in high occupancy vehicle mode choice is anticipated. The struggle is to determine incentives to individuals driving alone to join carpools.

Q12: Do you carpool to/from UBC?

Question 12 Responses	Undergrad	Faculty	Staff	Grad	Total	%
No	15494	2456	2473	4293	24716	56
Yes	9904	813	1267	760	12745	28.9
Live at UBC or Missing	4798	537	336	1016	6687	15.1
Total	30196	3806	4076	6069	44147	100

Some insights were achieved in both the 1998 and 2000 surveys and incentives crafted by Trek to intervene in the downward spiral but for the most part the questions addressed the general issue of mode shift from transit or single occupant vehicle alike. Questions were asked to determine the reasons individuals choose to carpool or not and obtain responses to incentives to interest individuals in switching thus increase use or stop further decline. The 1998 survey participants were asked "how much consideration would you give to carpooling more often to campus given acceptable conditions?" About thirty percent of students and twenty percent of staff indicated they would consider carpooling for most trips whereas faculty were noticeably disinterested. A follow up question on vanpooling got a weaker response from each group. For the most part respondents favourable to increasing use of vanpools indicated they were favourable to carpools. Most expressing interest in carpooling were regular transit users implying a mode shift to carpool would result in a net loss to transit.

Respondents to the 2,000 survey were asked to rate various incentives for carpooling. Responses were somewhat neutral to the set of incentives included with two exceptions. Faculty, staff and students indicated flexible departure times as a strong incentive. Sharing a vehicle with children or children with carpoolers was overwhelmingly rejected. A selective question asked carpoolers if they dropped others off en route, were dropped off with driver continuing to a further destination, or all were destined for UBC. Interestingly 2171 more answered this question for carpoolers than the 9,919 who indicated they carpooled and arrived/departed during peak periods. Typically carpoolers are students with students destined for UBC. In contrast, staff tended to be more likely to share with non UBC bound individuals and either drop off someone en route (12.7%), or were dropped off by a driver with a destination other than UBC (17.9%). Arising from the strong response to flexible arrival/departure times Trek conducted an initial exploration of feasibility of dynamic carpool matching.

Dropped Out of Carpools and Reasons Given

The decline in carpools has been attributed to a number of factors, most prominently the rigidity of carpools and vanpools notably lack of flexibility to deviate from fixed departure time. Rides home in case of emergencies and difficulty in joining up with convenient and like minded participants are also often cited. In 2002 two questions were posed to establish those who had carpooled but no longer did and why they discontinued. In terms of projected numbers 7061 had previously carpooled. Twelve factors were suggested to respondents who had dropped out of carpools/vanpools. Multiple responses to the question (Q14) support results of earlier surveys with escaping rigidity emphasized and the effect of improvements in transit evident as most switching to other modes chose transit. More respondents in this survey (8.1%) checked "*feel it would be a hassle*" than had mentioned frustrations of carpooling in earlier surveys. As in past surveys more individuals responded to this question than acknowledged they actually carpooled.

Q13: Did you previously carpool to/from UBC?

Question 13 Responses	Undergrad	Faculty	Staff	Grad	Total	%
No	12508	2462	2119	3639	20728	47.0
Live at UBC or Missing	12455	1045	1249	1609	16358	37.1
Yes	5233	299	708	821	7061	16.0

Q14: Please indicate why you choose NOT to carpool now?

Question 14 Responses	Undergrad	Faculty	Staff	Grad	Total	%
Live at UBC or Missing	13882	1321	1570	1768	18541	18.8
Schedule varies day-to-day	11660	1867	1255	3029	17811	18.0
Don,t know anyone to carpool with	7463	589	632	1420	10104	10.2
Like to come into school/work early/late	6168	1035	1085	1715	10003	10.1
Take alternate mode	5295	780	799	1804	8678	8.8
Carpooling leaves no spontaneity	5834	584	957	1274	8649	8.8
Feel it would be a hassle	5583	620	756	1009	7968	8.1
Don,t like sharing car with stranger	3410	252	390	539	4591	4.7
Need car for emergencies	2836	456	496	451	4239	4.3
Can afford NOT to carpool	2498	281	255	639	3673	3.7
Don't know about carpool parking	2495	191	154	493	3297	3.3
Have to drop kids at school/daycare	193	480	284	192	1149	1.2
Total	67281	8456	8633	14333	98703	100.0

Incentives to Carpool or Vanpool

Respondents were asked to review separately twelve incentives indicating for each one the effect the measure would have on encouraging carpooling. Entries of responses are tabulated and analyzed to rank them as incentives.

Q15: Please indicate the effect the following measures would have on encouraging you to carpool.

Statistical Significance Testing

The objective of the analysis is to determine rank order of incentives for individuals who typically use transit and for those who typically singly occupy vehicles and then compare rank ordering to discern if differences in preferences can be associated with mode used. Questions were structured in a specific way. Each respondent, who did not carpool, was asked to indicate the effect a set of incentives would have on encouraging him or her to carpool. For each incentive there were possible actions: encourage 3+ days/week; 1 day/week; not encourage; or, if none of these satisfied, missing. The structure of responses dictates a specific statistical approach. A non-parametric analysis is appropriate due to the restricted and discrete nature of responses allowed. Further, because the same respondents rated each incentive, the samples are not independent thus a related samples test is called for. A Friedman test of statistical significance is used here. The test is to validate the reliability of ranking choice of incentives against a template of no difference in preferences.

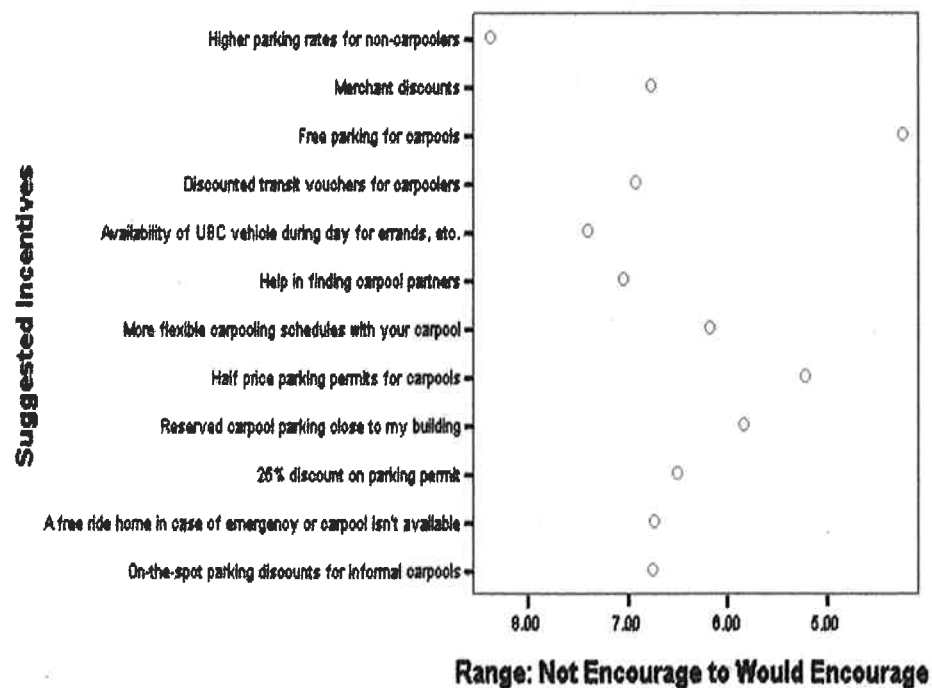
Responses of non-carpoolers/vanpoolers all other modes.

Responses to incentives are ranked for those identifying themselves as non-carpoolers, including individuals specifying using multiple modes during the week. Ranking of responses generally support results from earlier surveys. Providing free parking for carpools is first, half price parking is second, followed by reserved carpool parking close to commuter's destination third with more flexible carpool schedules with carpool just behind at fourth. The first two likely reflect parking costs at UBC being significant. Student permits at UBC vary from \$50.00 per month for surface space to \$75.00 per month in Health Sciences Parkade. Convenient space ranks third perhaps due to general perception that availability of parking at UBC is not a critical constraint on choice of mode but not having to trudge across campus once parked would be desirable. The prominent rank for the incentive of more flexible carpool schedules by respondents echoes earlier surveys. Of note is the lowest rank conferred on the disincentive of higher parking rates for non-carpoolers.

Ranks indicate order of preferences	
	Mean Rank
On-the-spot parking discounts for informal carpools	6.75
A free ride home in case of emergency or carpool isn't available	6.74
25% discount on parking permit	6.50
Reserved carpool parking close to my building	5.84
Half price parking permits for carpools	5.22
More flexible carpooling schedules with your carpool	6.18
Help in finding carpool partners	7.05
Availability of UBC vehicle during day for errands, etc.	7.41
Discounted transit vouchers for carpools	6.93
Free parking for carpools	4.25
Merchant discounts	6.77
Higher parking rates for non-carpoolers	8.38

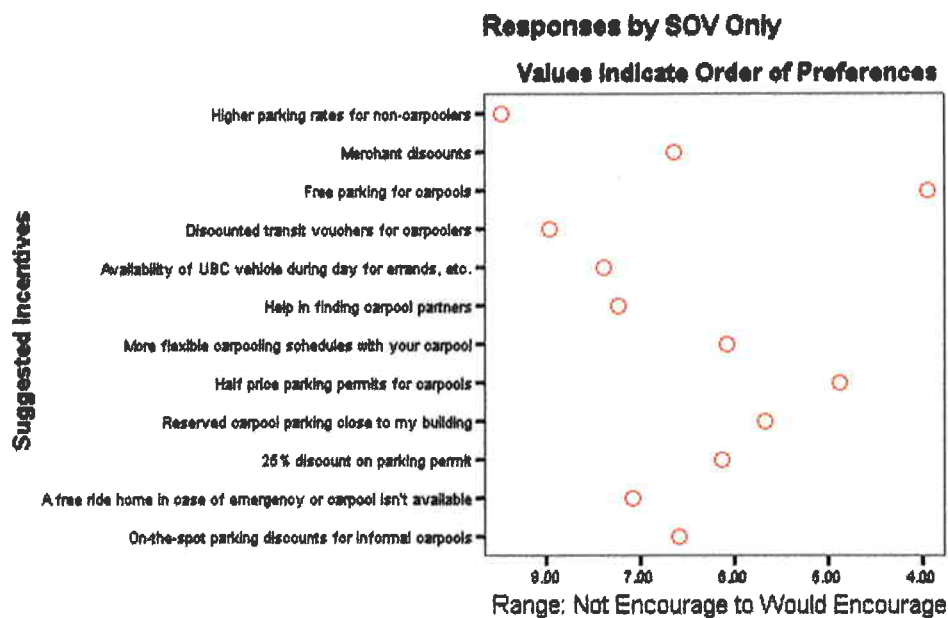
Responses by non carpoolers - All modes

Values Indicate Order of Preferences



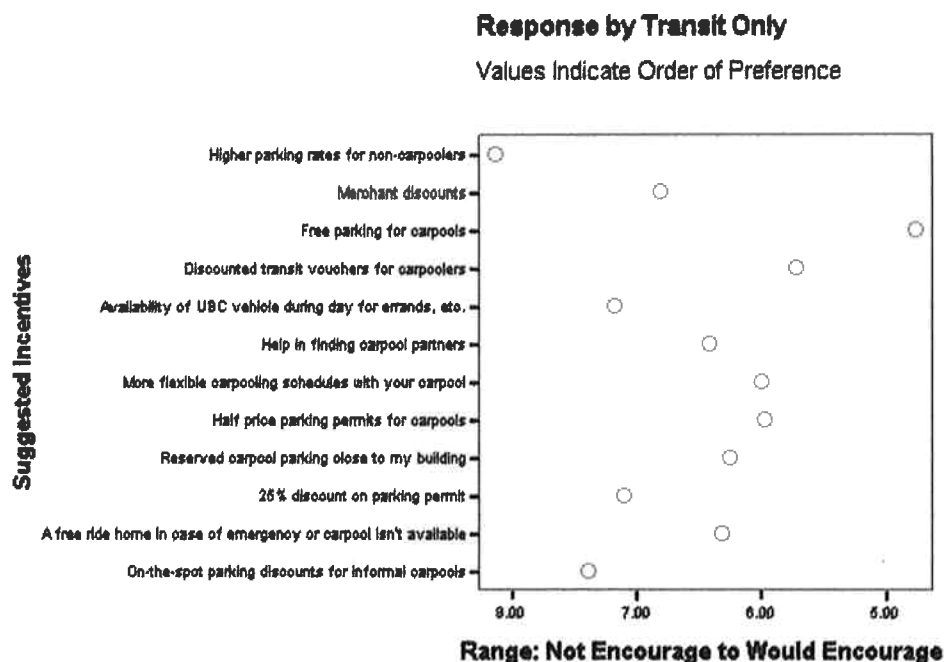
Responses by Single Occupants of Vehicles

Greatest benefit to sustainability of roads would be by a switch in behaviour from SOV to to carpool/vanpool. Yet, preferences reflected in responses by individuals who typically drive alone is similar to all non-carpoolers. This is partially due to the large component of SOV trips to and from campus. Free parking for carpoolers and half price parking permits rank one, two, with reserved carpool parking close to building third. There are a few notable differences though: a drop of a full value in rank for the incentive of discounted transit vouchers for carpoolers; and, reduction in rank of the safety feature of a free ride home in case of emergency or carpool isn't available. Higher parking rates for non-carpoolers is ranked last.



Responses by Transit Riders

Free parking for carpools is top ranked by transit riders. Second is discounted transit vouchers for carpools raising the specter of multi-mode switchers. Half price parking permits for carpools ranks third, almost tied with more flexible carpool schedules with carpool. The safety issue of a free ride home in case of emergency or carpool isn't available appeals. A 25% discount on parking permits hardly registered.



Comparison of Rankings by SOVers and Transit Riders

A comparison of rankings of incentives to carpool illustrates different preferences by lone drivers and transit riders. Discounted travel vouchers, already to be in place in September 2003 for all undergraduates appeal to transit riders but not to lone drivers and would not likely sway them to switch mode of travel. Price of parking is given prominence in responses in each sample with greater preference registered by lone drivers for half price parking permits. Convenience of parking appeals more to lone drivers than transit riders as an incentive perhaps reflecting higher income and generally greater discretion associated with access to vehicles. If so, the availability of convenient spots at reduced costs appeals more to lone drivers than transit users.

Interpretation of Factors to Encourage SOVers to Switch to Carpool/Vanpool

From a marketing perspective a number of incentives appealing to transit riders should be avoided if policy direction is to promote lone drivers to switch to carpools. Discounted transit vouchers and free parking might increase carpools but participants are likely to come from transit riders. Aside from price of permits the prominence of convenience of spots distinguishes lone drivers from transit riders. Limiting and directing parking capacity is likely to cause drivers to consider carpooling. Linking higher parking rates with carpooling appears to have received ambivalent responses and could be interpreted as a warning. Parking permits may necessarily increase but if increase is seen to be linked to encouraging carpooling, a reverse effect is likely.

Perceived Difficulty to Carpool

Entries in the table below record responses indicating reasons it would be difficult to switch to carpool. Respondents appear to have interpreted the question as switch to carpool as sole mode for commuting and those who use alternate modes in their commute did not check of the "already carpool" option. Consequently the sample projected to totals likely overstates the potential market of those who could "*with only minor problems*" (7744) or if they "*chose to do so*" (5899).

Q16: Indicate how difficult you feel it is to carpool to/from UBC.

(Difficulty may be due to schedules, time constraints, ability to find carpooling partners, etc.).

Question 16 Responses	Undergrad	Faculty	Staff	Grad	Total	%
Carpooling would be somewhat difficult	7285	696	918	1252	10151	25.8
Carpooling would be very difficult	6106	1073	722	1504	9405	23.9
Could carpool with only minor problems	5874	299	678	893	7744	19.7
No problem carpooling if I chose to do so	3664	732	914	588	5899	15.0
Carpooling would be impossible	1847	577	411	723	3558	9.1
Already carpool	1767	218	349	208	2542	6.5
Total	26544	3595	3991	5169	39299	100.0

5. Parking

Parking is a service issue that most who parked or parked with someone felt sufficiently motivated to have their responses recorded. With the projected distribution of those parking including passengers or occasional drivers accounting for 65.1 percent of the overall population parking is clearly embedded in travel patterns of most at UBC. Students comprise the largest block of projected population with use, directly or indirectly, amounting to 19,485 of the projected 28,728 who park. Based on responses graduate students are the least likely to park (60.5%) while faculty are most likely to park (75.3%).

Q17: Do you currently park at UBC?

Responses	Undergrad	Faculty	Staff	Grad	Total	%
Yes	19485	2866	2689	3688	28728	65.1
No	10254	940	1355	2315	14864	33.7
Missing	457	0	32	66	555	1.3
Total	30196	3806	4076	6069	44147	100.0

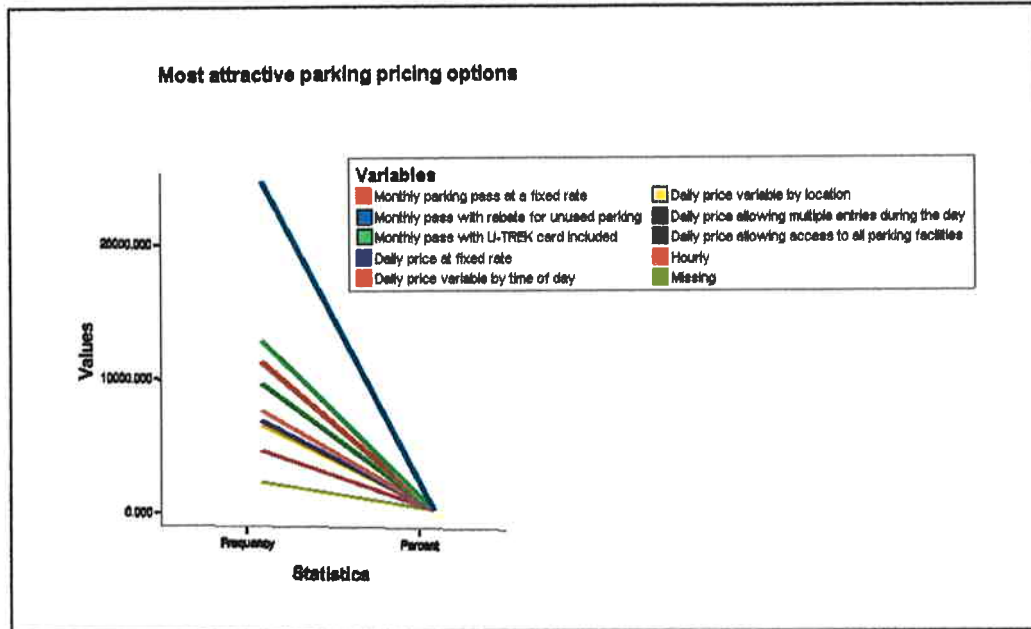
Purchasing a parking permit is the most common means of paying for parking (51.4%), followed by paying daily in B-Lot (35.3%). All other parking constitutes only 13.3 percent of those parking. This includes 'parking off campus', the practice for 3.8 percent who appropriate spaces on 16th, North-West Marine Drive, and Chancellor.

Q18: How do you currently pay for your parking?

Responses	Undergrad	Faculty	Staff	Grad	Total	%
Purchase parking permit	9744	1850	1848	1407	14849	51.4
Daily (B-Lot)	7433	419	567	1771	10190	35.3
Park off campus	712	61	113	200	1087	3.8
Hourly (parkade)	741	57	25	130	953	3.3
Daily (parkade)	429	180	68	73	750	2.6
Hourly (meters)	462	49	17	137	666	2.3
Department/Faculty pays	111	186	64	14	375	1.3
Total	19633	2803	2703	3732	28870	100.0

Pricing Options.

Projected responses based on the overall sample are useful as an indicator of sentiment on campus towards parking. The clear favorite at 26 percent is 'monthly pass with a rebate for unused parking'. Other options are less attractive with the next 'monthly pass which includes a U-Pass' accounting for a little more than half the support of the favorite.

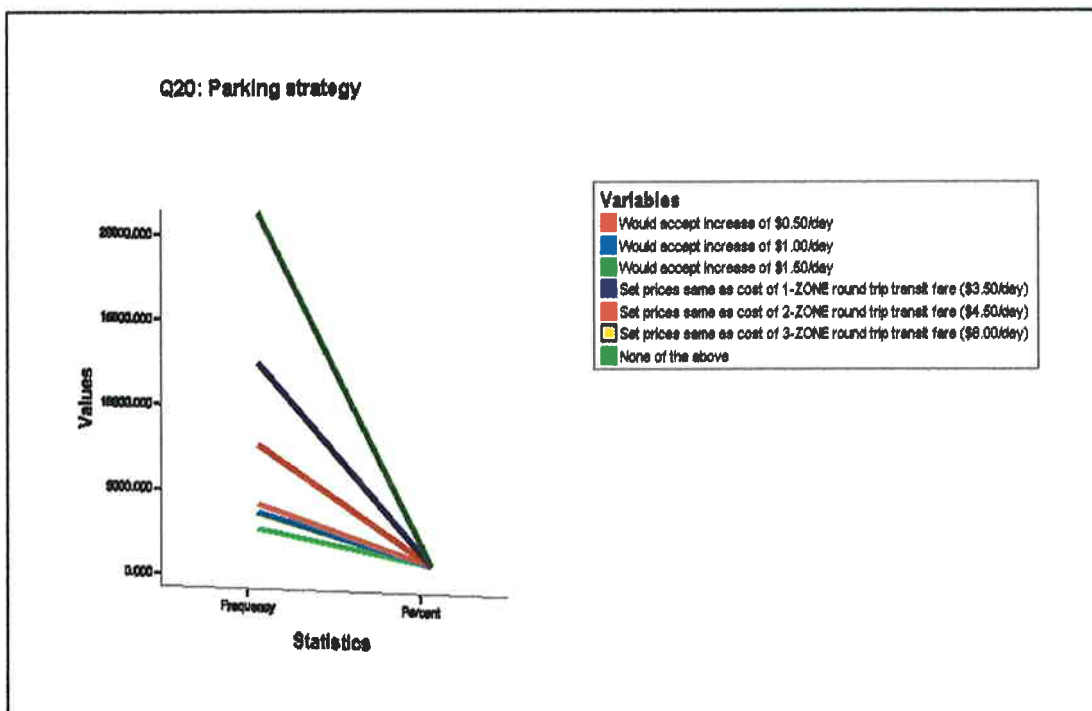


Q19: Which option for parking pricing would be most attractive to you? (Check all that apply).

Responses	Undergraduate	Faculty	Staff	Graduate	Total	%
Monthly pass with rebate for unused parking	17703	1809	2192	2693	24397	26.0
Monthly pass which includes a U-TREK card	8953	806	1118	1594	12471	13.3
Monthly parking pass at fixed rate	7984	754	983	1191	10912	11.6
Daily price allowing access to all facilities	8750	257	629	1163	10799	11.5
Daily price allowing multi-entries during day	7232	385	505	1173	9295	9.9
Daily price variable by time of day	5352	348	267	1287	7254	7.7
Daily price at fixed rate	4817	462	358	898	6535	7.0
Daily price variable by location	4545	305	301	989	6140	6.5
Hourly	3039	258	189	798	4284	4.6
Missing Information	1190	203	266	263	1922	2.0
Total	69565	5587	6808	12049	94009	100.0

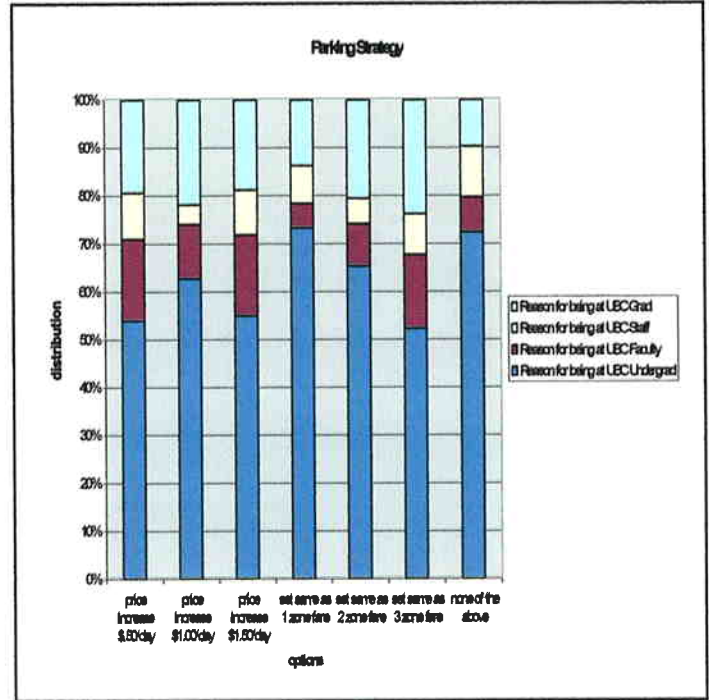
Parking Strategy.

Respondents reject the strategies outlined for approaching UBC's environmental objectives through the peripheral mechanism of parking as evidenced by overwhelming support for 'none of the above' by a projected 20,638 persons. Next in priority is 'set parking prices the same as the cost of a 1-ZONE round-trip transit fare (currently \$3.50 per day)' by a projected 10,602 likely connoting support for equity of treatment for parkers and transit users. This may have implications for response to parking charges with the institutionalizing of the mandatory twenty dollar a month U-Pass. The strategy ranking third 'I would accept a parking price increase of \$.50 / day' received less than ten percent support across campus with faculty being most engaged (18.7% support) and provides the only glimmer of acceptance for parking as one component of environmental policy and appropriate as a lever for other objectives.



parking strategy by group Crosstabulation

strategies towards UBC's environmental objectives	Reason for being at UBC				Total
	Undergrad	Faculty	Staff	Grad	
price increase \$.50/day	2176	683	389	782	4030
price increase \$1.00/day	832	150	54	290	1326
price increase \$1.50/day	441	135	75	151	802
set same as 1 zone fare	7772	530	838	1462	10602
set same as 2 zone fare	1739	233	141	548	2661
set same as 3 zone fare	1472	433	239	671	2815
none of the above	14946	1497	2179	2016	20638
Total	29378	3661	3915	5920	42874



Detailed Statistical Analysis of Responses

Presumably a respondent who does not have access and isn't driving will consider options quite differently than a person who actually parks. In order to indicate the possibility of effect of having access an analysis of variance test is conducted on sample data. Responses by those with access are compared to those lacking access. If responses follow a similar pattern there would be an insignificant likelihood of finding distinct variations.

ANOVA: options (q19), parking strategies (q20), according to availability of automobile (q11)

		Sum of Squares	df	Mean Square	F	Sig.
parking strategy	Between Groups	183.555	2	91.777	23.028	0
	Within Groups	19433.28	4876	3.985		
	Total	19616.835	4878			
parking options	Between Groups	376.015	2	188.007	24.16	0
	Within Groups	37064.252	4763	7.782		
	Total	37440.266	4765			

For both parking options (Q19) and strategies (Q20), level of significance of zero was obtained (to four decimal places) indicating responses vary according to availability of automobile. Respondents not having access to an automobile choose differently than those that do. Access is responsible for the distinct patterns in responses.

A further delineation is made to determine whether responses are conditioned by whether individual parks. Responses by those who park are compared to those who don't. For this exercise the sample was divided into subgroups and an analysis of variance test conducted.

ANOVA: options (q19), parking strategies (q20), according to parking/not parking at UBC

		Sum of Squares	df	Mean Square	F	Sig.
parking strategy	Between Groups	488.952	2	244.476	62.321	0
	Within Groups	19127.883	4876	3.923		
	Total	19616.835	4878			
parking options	Between Groups	56.095	2	28.047	3.573	0.028
	Within Groups	37384.172	4763	7.849		
	Total	37440.266	4765			

For parking strategies (Q20), significance tabulated as zero was obtained (to four decimal places) indicating responses vary according to the exercise of parking With respect to parking options (Q19) results are not quite as overwhelming with a small chance (level of significance tabulated at .028) that responses don't vary according to experience with parking. From a statistical perspective, less than three chances in a hundred that there is not an evident difference, rather small odds. Consequently for the objective of addressing those actively engaged in the exercise of parking, rather than exploring general attitudes on campus towards parking, estimates of only the active group are considered below.

Parking strategy by member group conditioned by parking and access to automobile

			member group (DISTAC)				Total
			Undergraduate	Faculty	Staff	Graduate	
parking strategy	price increase \$.50/day	Count	83	71	26	53	233
		% within DISTAC	6.7%	23.1%	9.2%	15.3%	10.7%
	price increase \$1.00/day	Count	17	9	3	17	46
		% within DISTAC	1.4%	2.9%	1.1%	4.9%	2.1%
	price increase \$1.50/day	Count	11	7	3	7	28
		% within DISTAC	.9%	2.3%	1.1%	2.0%	1.3%
	set 1 zone	Count	294	38	51	75	458
		% within DISTAC	23.9%	12.3%	18.1%	21.7%	21.1%
	set 2 zone	Count	41	18	3	18	80
		% within DISTAC	3.3%	5.8%	1.1%	5.2%	3.7%
	set 3 zone	Count	20	28	5	25	78
		% within DISTAC	1.6%	9.1%	1.8%	7.2%	3.6%
	none of	Count	766	137	191	151	1245
		% within DISTAC	62.2%	44.5%	67.7%	43.6%	57.4%
Total		Count	1232	308	282	346	2168
		% within DISTAC	100.0%	100.0%	100.0%	100.0%	100.0%

Results reflect general responses by campus community. Individuals parking do not accept intrusion of environmental objectives into parking as reflected by 57% support of 'None of the above'. Staff are most adamant (67.7% of group), followed by undergraduate students (62.2% of group). Support for 'set parking prices the same as the cost of a 1-ZONE round-trip transit fare (currently \$3.50 per day)' dropped from 24.7% of projected campus population to 21.1% of those potentially impacted by adoption of a strategy. Albeit, 23.1 % of faculty and 15.3 % of graduate students chose 'I would accept a parking price increase of \$.50 / day'.

Factor Analysis

There are differences in responses traced to availability of access to an automobile and parking experience. So it is conceivable that other factors account for variations in pattern in preferences for options and strategies and that cohorts with similar characteristics respond in similar ways. A factor analysis of selected variables is conducted to discern key dimensions of response patterns. Principle components analysis is used to reduce complexity by extracting several manageable dimensions of associations. Results are then highlighted through rotation to simplify interpretation.

Component	Initial Eigenvalues			Loadings			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.390	19.855	19.855	1.390	19.855	19.855	1.322	18.880	18.880
2	1.113	15.902	35.756	1.113	15.902	35.756	1.122	16.035	34.915
3	1.022	14.606	50.362	1.022	14.606	50.362	1.081	15.447	50.362
4	.986	14.085	64.447						
5	.941	13.438	77.885						
6	.838	11.968	89.853						
7	.710	10.147	100.000						

Extraction Method: Principal Component Analysis.

Component Score Coefficient Matrix			
	Component		
	1	2	3
parking strategy	.145	-.179	-.561
parking options	.157	.516	.068
Full or Part time {1,full}	.114	-.140	.744
Male or Female {1,male}	-.298	.649	-.172
Access to car {1,own}	.489	.154	.010
DISTAC	-.581	.126	.074
CAMPUS	.206	.348	.148

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

A number of associations are highlighted by the procedure. Component 1 is quite general and relates access to automobile to member group and distinctions in response accordingly. This is evidenced in difference in faculty response to options and strategy. Component 2 is noteworthy. Gender influences response to parking options and is worth further enquiry. Component 3 indicates that response to parking strategy varies according to full or part time. Part timers prefer 'daily price allowing access to all facilities', full timers don't.

Parking options * Male or Female {1,male} respondents with access to automobile and parking

			Male or Female {1,male}		Total
			Male	Female	
parking options	pass with rebate	Count	141	114	255
		% within parking options	55.3%	44.7%	100.0%
	pass include U-Trek	Count	324	295	619
		% within parking options	52.3%	47.7%	100.0%
	pass fixed rate	Count	113	179	292
		% within parking options	38.7%	61.3%	100.0%
	daily price - access	Count	71	54	125
		% within parking options	56.8%	43.2%	100.0%
	daily price - multi entry	Count	40	39	79
		% within parking options	50.6%	49.4%	100.0%
	daily price by tod	Count	80	70	150
		% within parking options	53.3%	46.7%	100.0%
	daily price by location	Count	186	262	448
		% within parking options	41.5%	58.5%	100.0%
	hourly	Count	98	86	184
		% within parking options	53.3%	46.7%	100.0%
Total		Count	1053	1099	2152
		% within parking options	48.9%	51.1%	100.0%

Parking strategy by member group conditioned by parking and access to automobile

			member group (DISTAC)				Total	
			Undergraduate	Faculty	Staff	Graduate		
parking strategy	price increase \$.50/day	Count	83	71	26	53	233	
		% within DISTAC	6.7%	23.1%	9.2%	15.3%	10.7%	
	price increase \$1.00/day	Count	17	9	3	17	46	
		% within DISTAC	1.4%	2.9%	1.1%	4.9%	2.1%	
	price increase \$1.50/day	Count	11	7	3	7	28	
		% within DISTAC	.9%	2.3%	1.1%	2.0%	1.3%	
	set 1 zone	Count	294	38	51	75	458	
		% within DISTAC	23.9%	12.3%	18.1%	21.7%	21.1%	
	set 2 zone	Count	41	18	3	18	80	
		% within DISTAC	3.3%	5.8%	1.1%	5.2%	3.7%	
	set 3 zone	Count	20	28	5	25	78	
		% within DISTAC	1.6%	9.1%	1.8%	7.2%	3.6%	
	none of	Count	766	137	191	151	1245	
		% within DISTAC	62.2%	44.5%	67.7%	43.6%	57.4%	
	Total		Count	1232	308	282	346	2168
			% within DISTAC	100.0%	100.0%	100.0%	100.0%	100.0%

Projected market: Parking strategy by member group conditioned by parking and access to automobile

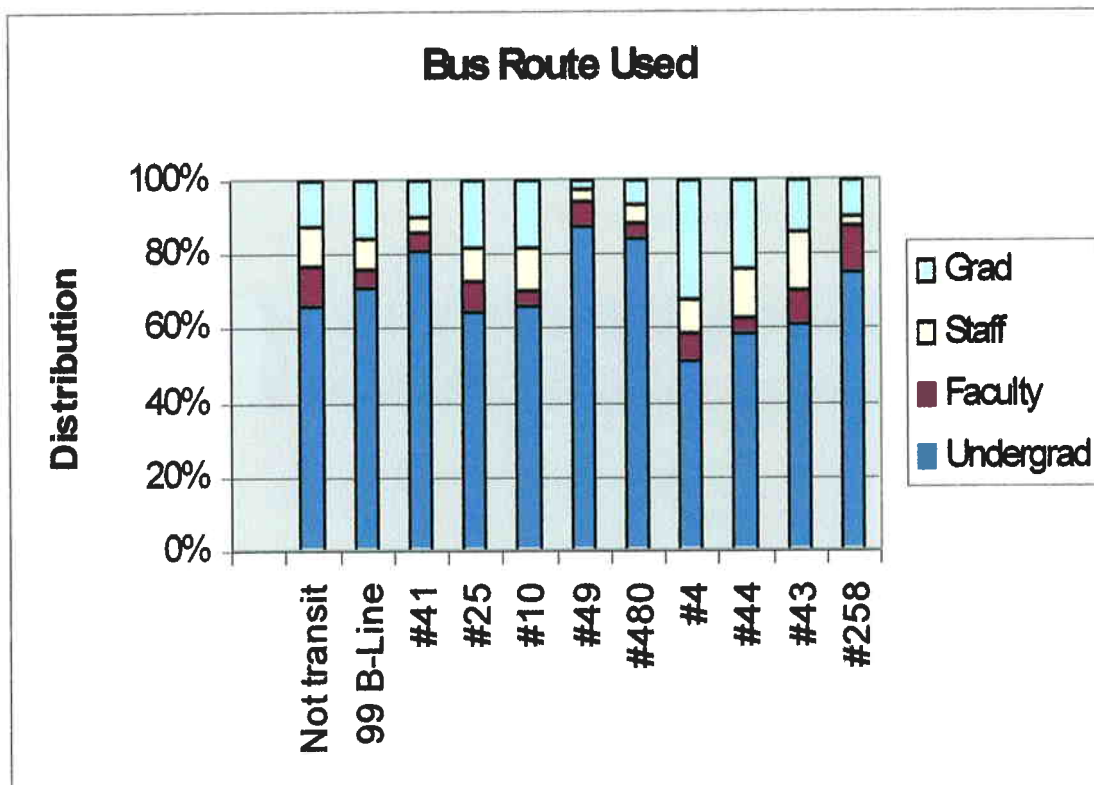
			member group (DISTAC)				Total
			Undergraduate	Faculty	Staff	Graduate	
parking strategy	price increase \$.50/day	Count	725	622	227	462	2036
		% within DISTAC	6.7%	23.1%	9.2%	15.1%	10.7%
	price increase \$1.00/day	Count	146	75	22	149	392
		% within DISTAC	1.3%	2.8%	.9%	4.9%	2.1%
	price increase \$1.50/day	Count	97	65	24	60	246
		% within DISTAC	.9%	2.4%	1.0%	2.0%	1.3%
	set 1 zone	Count	2584	330	446	663	4023
		% within DISTAC	23.9%	12.2%	18.1%	21.7%	21.1%
	set 2 zone	Count	361	156	27	162	706
		% within DISTAC	3.3%	5.8%	1.1%	5.3%	3.7%
	set 3 zone	Count	176	242	43	223	684
		% within DISTAC	1.6%	9.0%	1.7%	7.3%	3.6%
	none of	Count	6726	1206	1676	1331	10939
		% within DISTAC	62.2%	44.7%	68.0%	43.6%	57.5%
Total		Count	10815	2696	2465	3050	19026
		% within DISTAC	100.0%	100.0%	100.0%	100.0%	100.0%

6. Transit

Residence pattern, income, availability of automobile and attitude are factors influencing mode choice. In the 1998 survey respondents indicated proximity to transit service, convenient connections, available seating and frequent service influence route choice. As expected, these factors and the number of undergraduates result in undergraduates accounting for more than 50 percent of users on all routes. The 2002 survey registered 31 percent of trips by transit an increase in transit use of over 45 percent since the benchmark 1998 survey. Fully 42.2 percent of respondents indicate they arrive on-campus by transit at least once during the week. The routes taken by transit users are summarized in the following table. The 99 B-Line (Broadway Station to UBC Loop) is most popular accounting for 16.7 percent of all respondents and 39.6 percent of those indicating use of transit. Of considerable interest is the increasing attraction of the 99 B-Line since its inception. The 1998 survey, taken the year after inception of the express 99 B-Line, asked a similar question and noted 29.5 percent of transit riders using the route (then described as Broadway/Lougheed Mall/Brentwood Mall). In conjunction with the second most popular route, #41 (Joyce Station/UBC) with 12.3 percent of transit users, these routes attract more than half the transit mode users. Incidentally, #41 appears to have retained the same proportion of transit users as in 1998 but moved ahead of #10 (Hastings/UBC) which was then second. The #10 dropped to fourth with 8.5 percent of transit users, no doubt due to transfers to 99 B-Line as riders became cognizant of the improved level of service with express operation and new equipment.

Q10a: Indicate which bus you arrive on-campus in.

Bus #	Undergrad	Faculty	Staff	Grad	Total	%
Do not take transit	16925	2734	2597	3261	25516	57.8
99 B-Line	5246	372	587	1156	7362	16.7
#41	1857	121	100	221	2300	5.2
#25	1245	162	173	351	1931	4.4
#10	1054	71	175	296	1595	3.6
#49	1101	90	40	30	1261	2.9
#480	1057	51	71	80	1260	2.9
#4	549	78	94	347	1069	2.4
#44	503	33	117	201	854	1.9
#43	455	64	115	105	739	1.7
#258	162	25	6	21	215	0.5
#9	41	5	1		46	0.1
Total	30196	3806	4076	6069	44147	100.0



Route Patronage

On route #480 serving Richmond, the residential origin of undergraduates, second only to UBC, account for 75 percent of patrons. An even higher proportion of undergraduates is evident on routes serving Vancouver, East of Cambie (#99 B-Line, #41, #49). Graduate student's residences, in order of frequency, Point Grey (#25), UBC, East Kitsilano (#10, #4), North East sector (#10), and Burrard Peninsula (#44). Staff are most evident on routes through East Kitsilano (#44, #4, #10) which is their most commonly mentioned origin. Staff presence on #43 (Joyce Station to UBC Loop) and #44 (Waterfront Station to UBC Loop) is linked to residences downtown, East of Cambie in Vancouver, and neighbouring municipalities. Other staff tend to live some distance from campus and in areas where transit is not convenient due to route alignment or scheduling. In contrast, faculty reside in close proximity to campus (Point Grey, UBC, East Kitsilano, Dunbar, Richmond) but, of all the sample, are least likely to use transit. When they do, routes serving Dunbar area of Point Grey (#25), East Kitsilano (#4), are selected. One exception is the #258 bus reflecting an increase since 1998 in faculty living in West Vancouver and some evidence of mode switch to transit likely as result of improvement in service.

Trips per week per respondent

Frequency of use varies greatly according to reason for being at UBC and route. Note that Route #9 is excluded from the following comparisons due to small number of responses and questionable statistical basis for inference. Undergraduates most consistently at 7.29 trips per week ride #25 (North Burnaby - Brentwood Station to UBC Loop) and at 5.07 trips per week least consistently #480 (Richmond to UBC Loop). Graduate students at 8.85 trips per week most consistently used #258 (West Vancouver to UBC Loop) and least at 4.19 trips per week, #49 (49th, Avenue to UBC Loop). There was less variance between routes by staff than other groups : trips per week varied for staff from most frequent on #480 from Richmond 8.05 trips per week and least on #4 the regular bus on 4th, avenue through Kitsilano with 6.30 trips per week. Faculty, least likely to use transit, were the most frequent riders on a person per week basis with 9.58 on #44 which provides convenient connections with West Coast Express train and West Vancouver buses. Albeit, faculty displayed the greatest variance in frequency usage with #41 (Joyce Station to UBC) at 3.49 trips per week being the least frequently patronized per person in the sample.

		Undergrad	Faculty	Staff	Graduate
		trips/week	trips/week	trips/week	trips/week
Bus # (If taken)	99 B-Line	6.15	4.73	7.06	5.61
	#4	6.40	6.98	6.30	5.14
	#9	4.57	2.00	5.00	.
	#10	5.67	7.49	7.23	4.45
	#25	7.29	4.79	6.38	5.56
	#41	6.06	3.49	7.14	5.77
	#43	6.65	3.98	7.58	6.58
	#44	7.60	9.58	7.49	4.90
	#49	5.26	3.51	7.27	4.19
	#258	5.21	6.81	7.80	8.85
	#480	5.07	7.70	8.05	6.81

Method of payment by all transit users

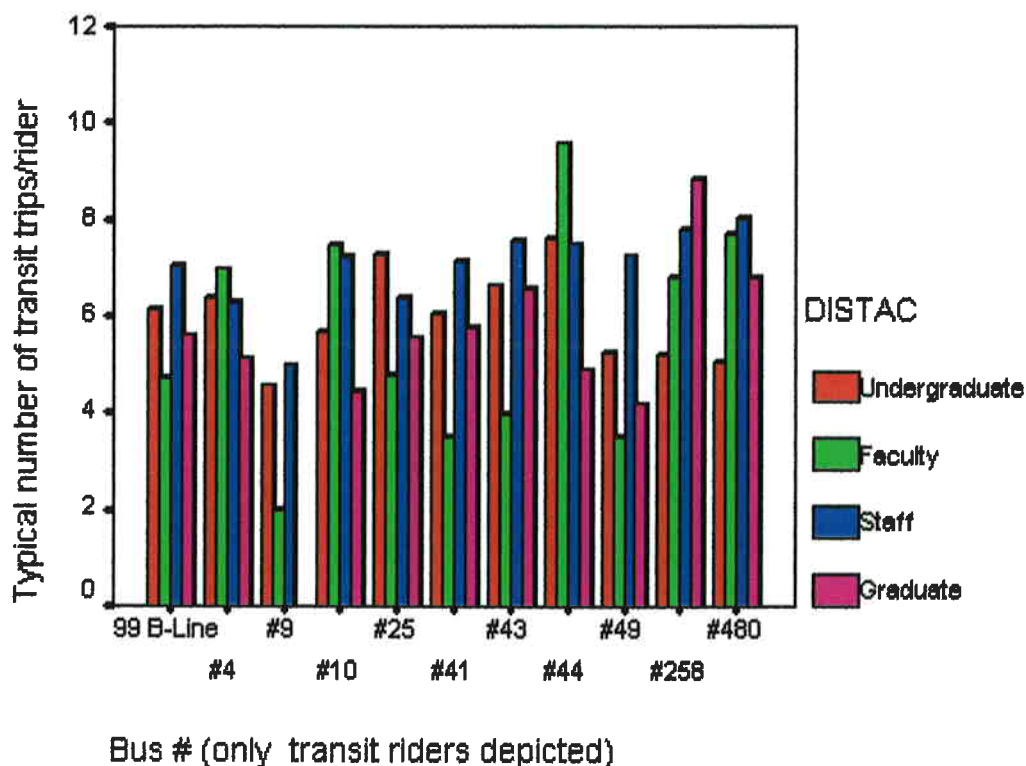
In terms of a single payment method the preferred choice for 42.2 percent of all transit users are tickets. Yet, in combination monthly passes (Adult Monthly Pass and Fastrax Monthly Pass) account for 46.7 percent of transit users. The polarization in payment methods appears closely tied to frequency of use with the large number of occasional transit users selecting tickets and more regular riders monthly passes.

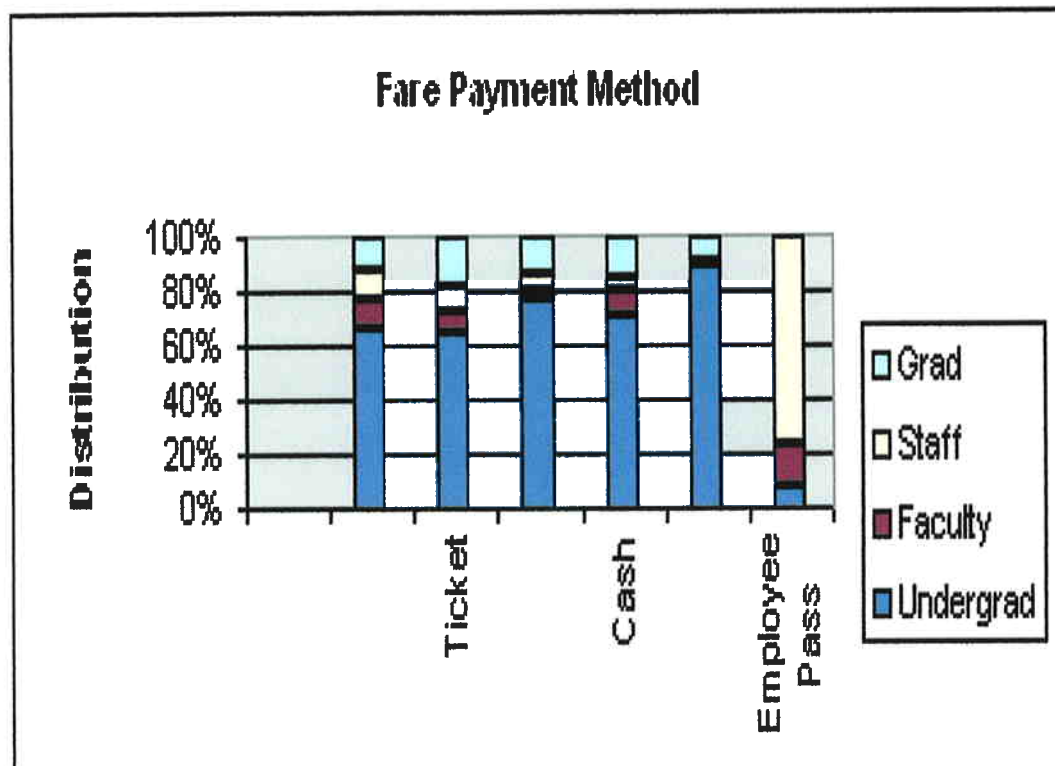
Q10b: Indicate how you pay for travel on the bus.

(All respondents).

Fare Payment Method	Undergraduate	Faculty	Staff	Graduate	Total	%
Do not take transit	16771	2734	2800	3244	25349	57.4
Ticket	5089	581	691	1433	7794	17.7
Adult Monthly Pass	4583	180	361	793	5917	13.4
Cash	2045	226	159	436	2867	6.5
Fastrax Monthly Pass	1683	36	21	163	1902	4.3
Employee Pass (payroll deduction)	26	49	244		319	0.7
Total	30196	3806	4076	6069	44147	100.0

Transit trips per week per respondent



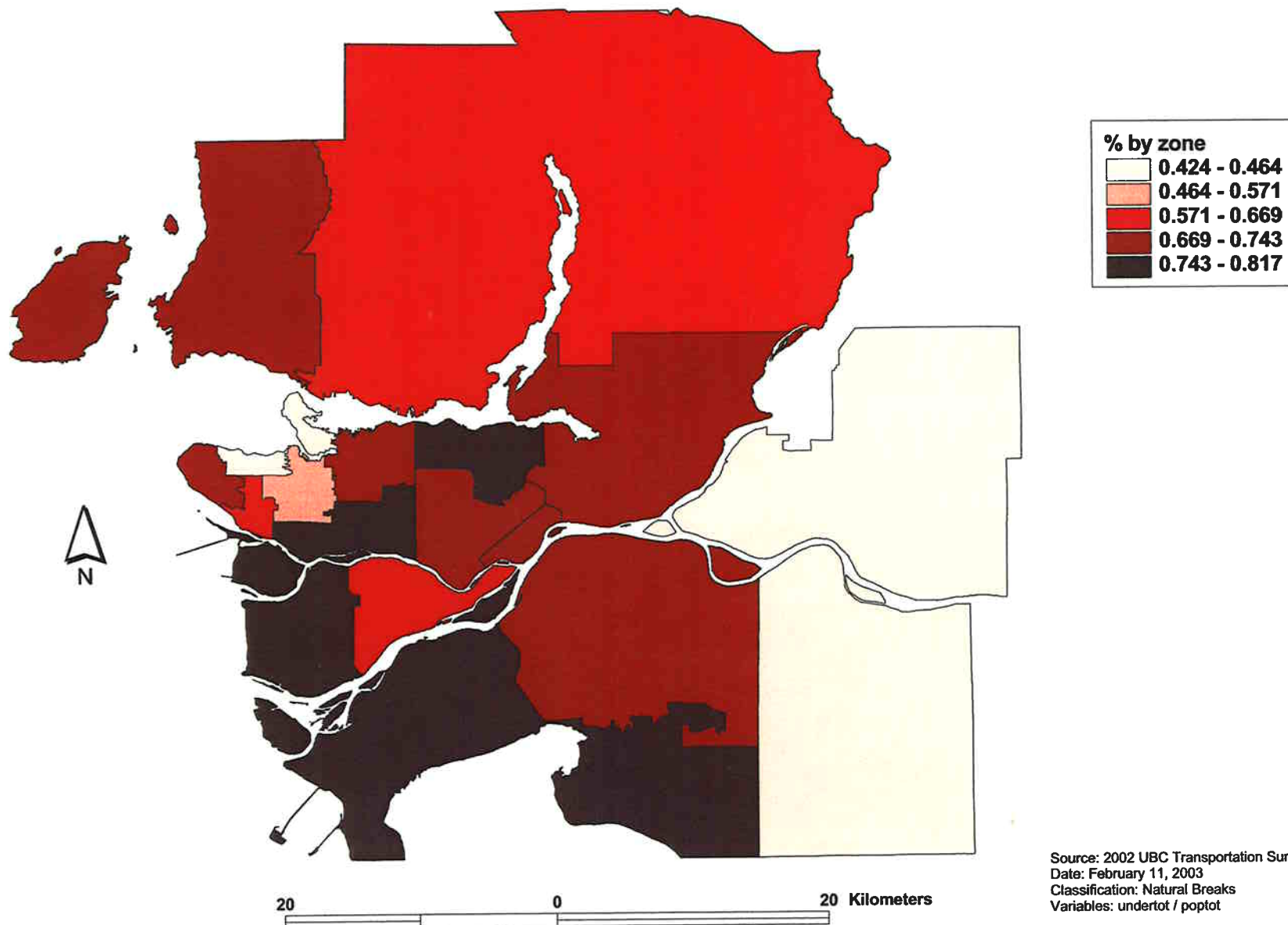


Method of payment by regular transit users

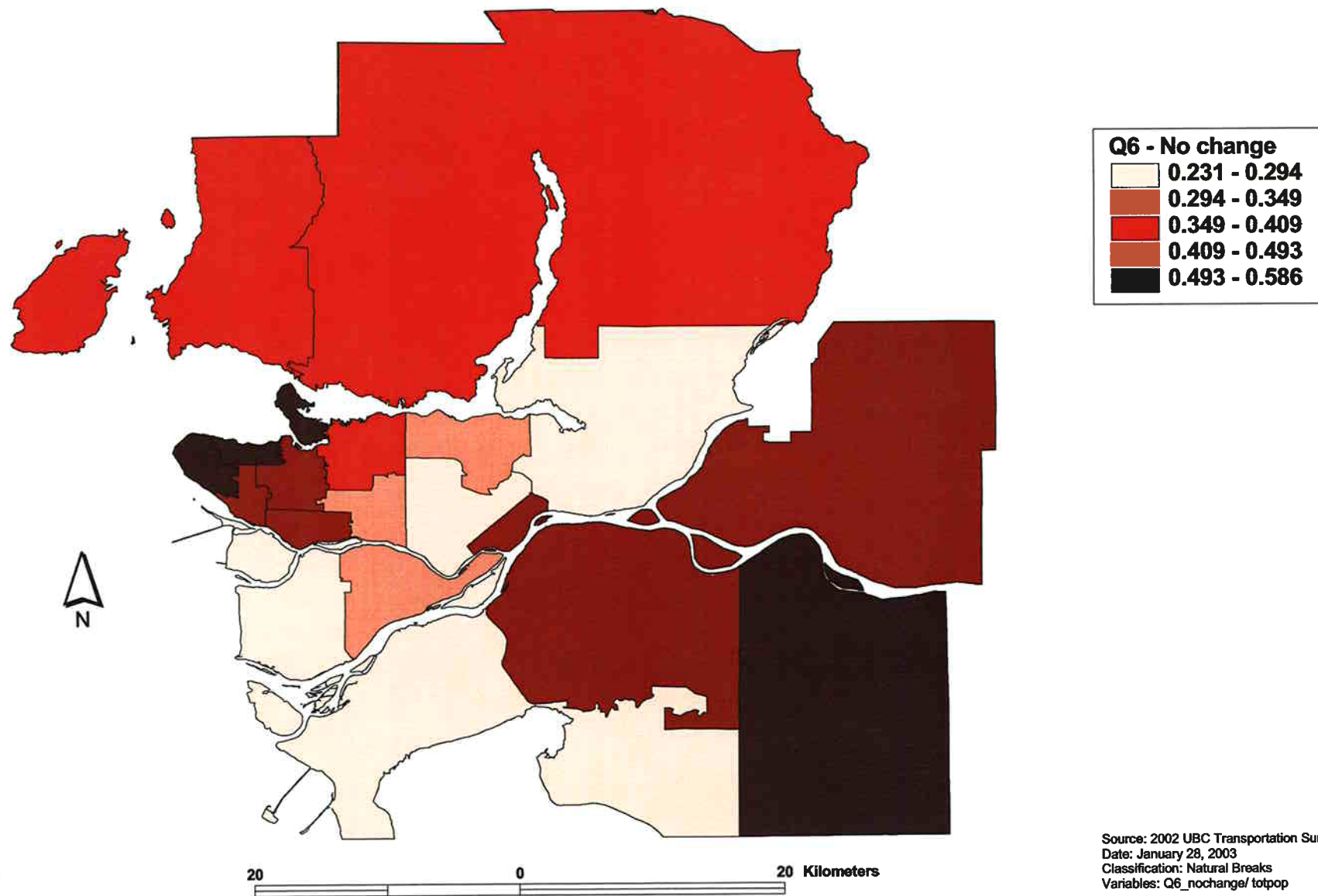
Most regular transit users purchase some form of monthly pass. Respondents (62.2 percent) purchased monthly passes: Adult Monthly Pass (46.9 percent); or Fastrax Monthly Pass (15.3 percent). Only faculty (198), prefer Ticket or cash (26) to Adult Monthly Pass (152). Undergraduate, graduate students and staff who rely solely on transit service purchase monthly passes.

Fare Payment Method		Undergrad	Faculty	Staff	Grad	Total	
		Count	Count	Count	Count	Count	%
	Cash	564	26	52	128	770	8.9
	Ticket	1172	198	249	531	2150	24.8
	Adult Monthly Pass	3025	152	327	643	4146	47.8
	Fastrax Monthly Pass	1139	36	18	137	1330	15.3
	Employee Pass (payroll deduction)	26	49	202		276	3.2
Total		5926	461	848	1439	8672	100

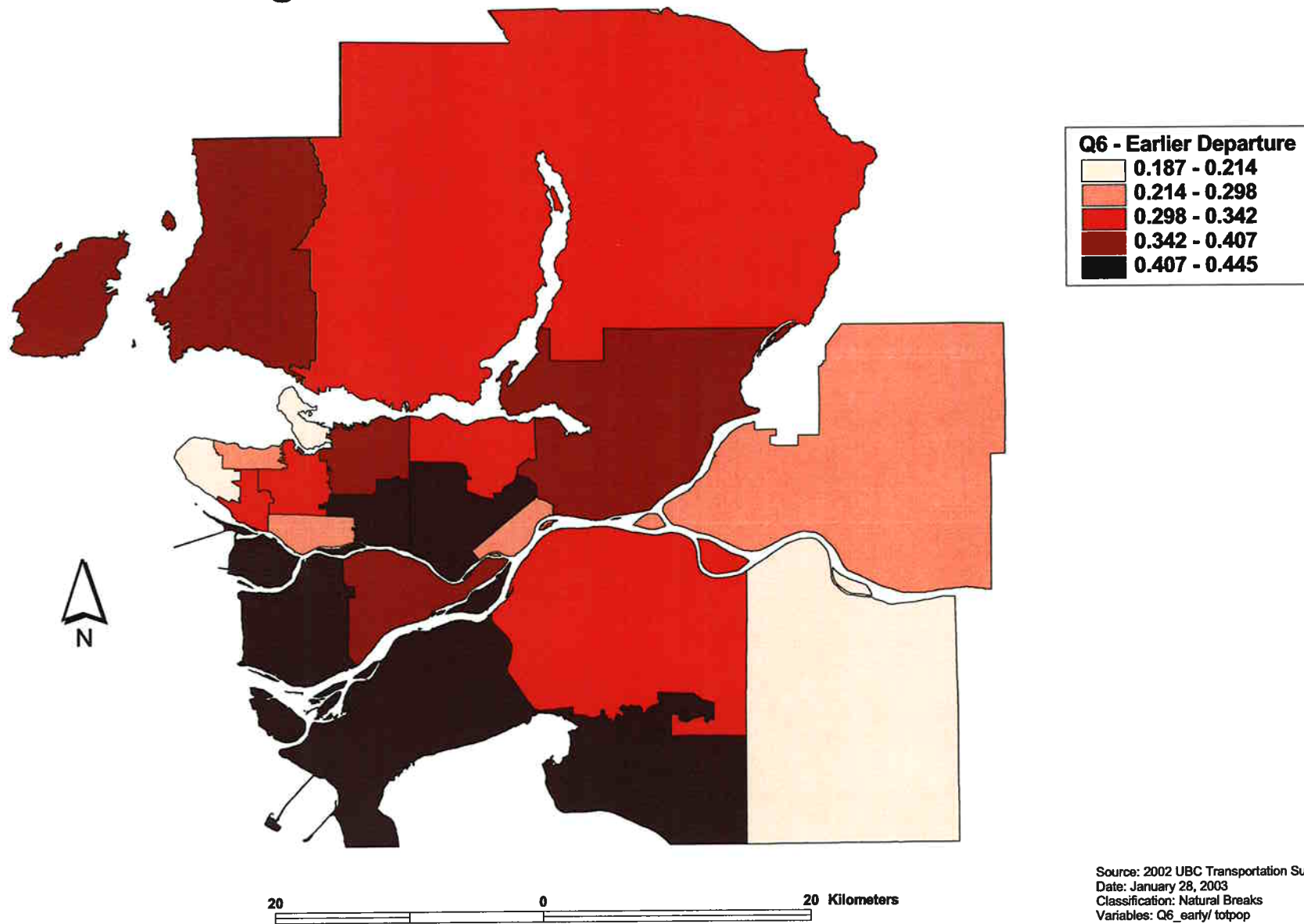
Percentage of Undergraduates by Zone



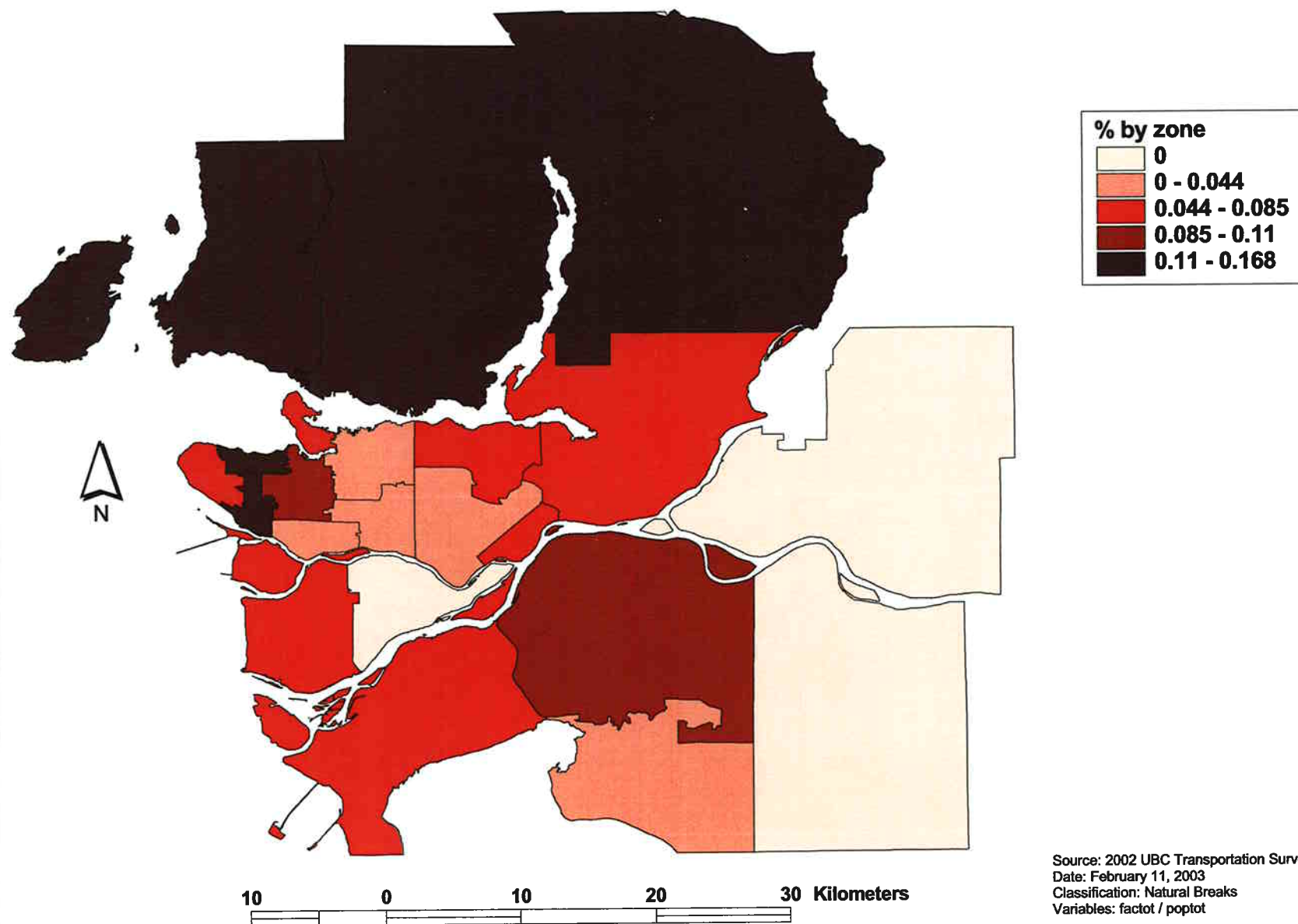
Percentage of those who feel the class start-time change has NOT affected WHEN they travel to UBC



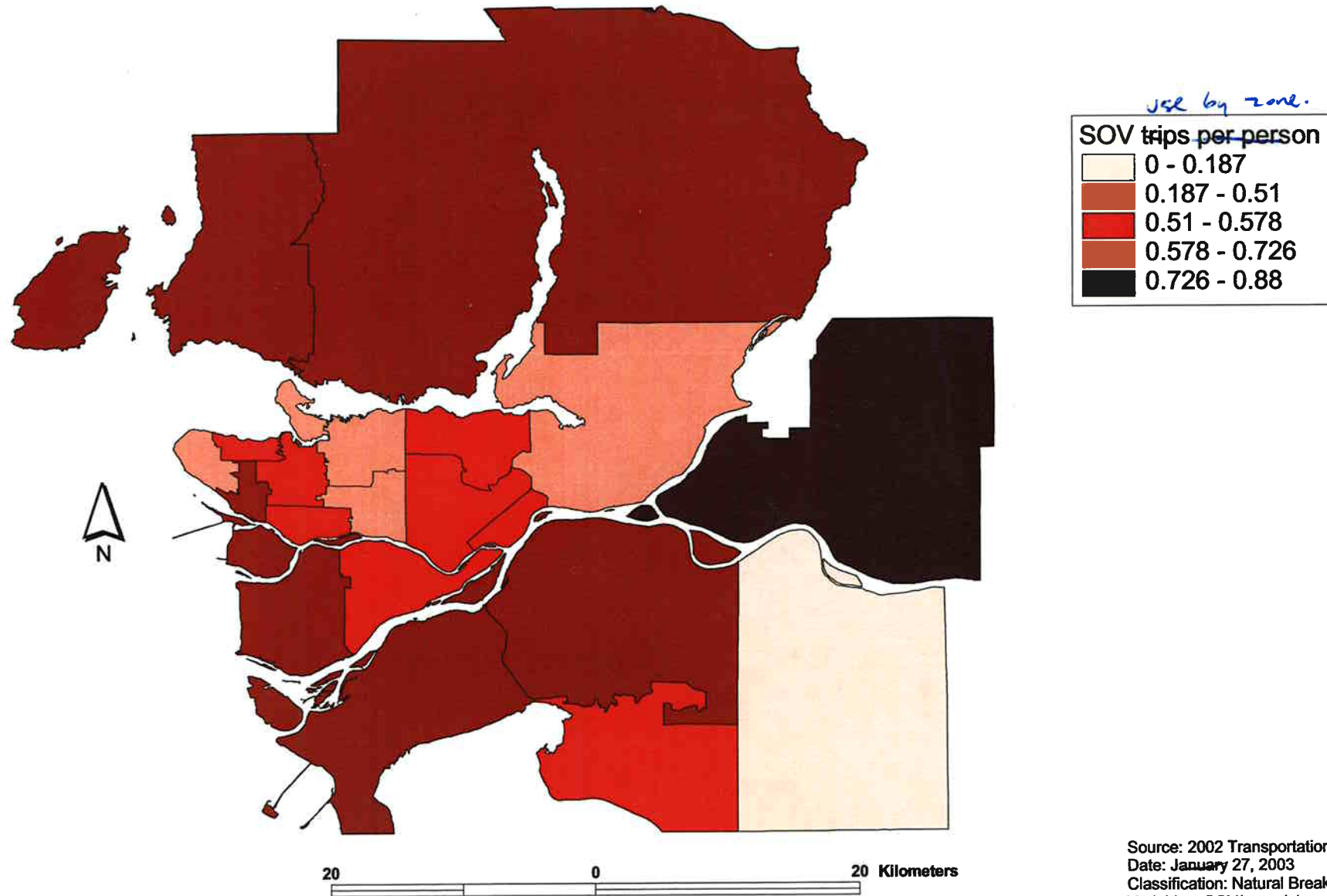
Percentage of those who feel the class start-time change has made their departure for UBC Earlier



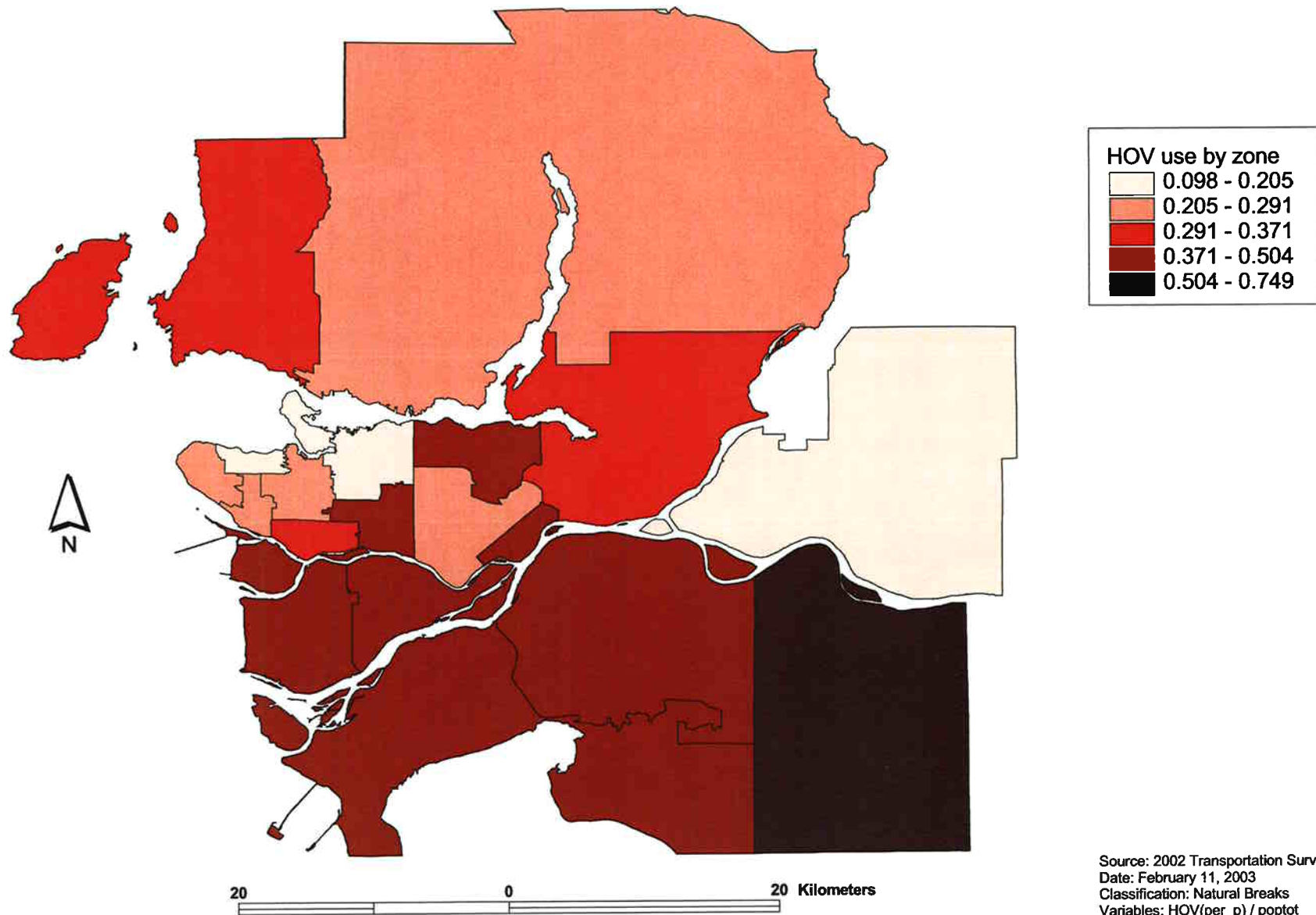
Percentage of Faculty by Zone



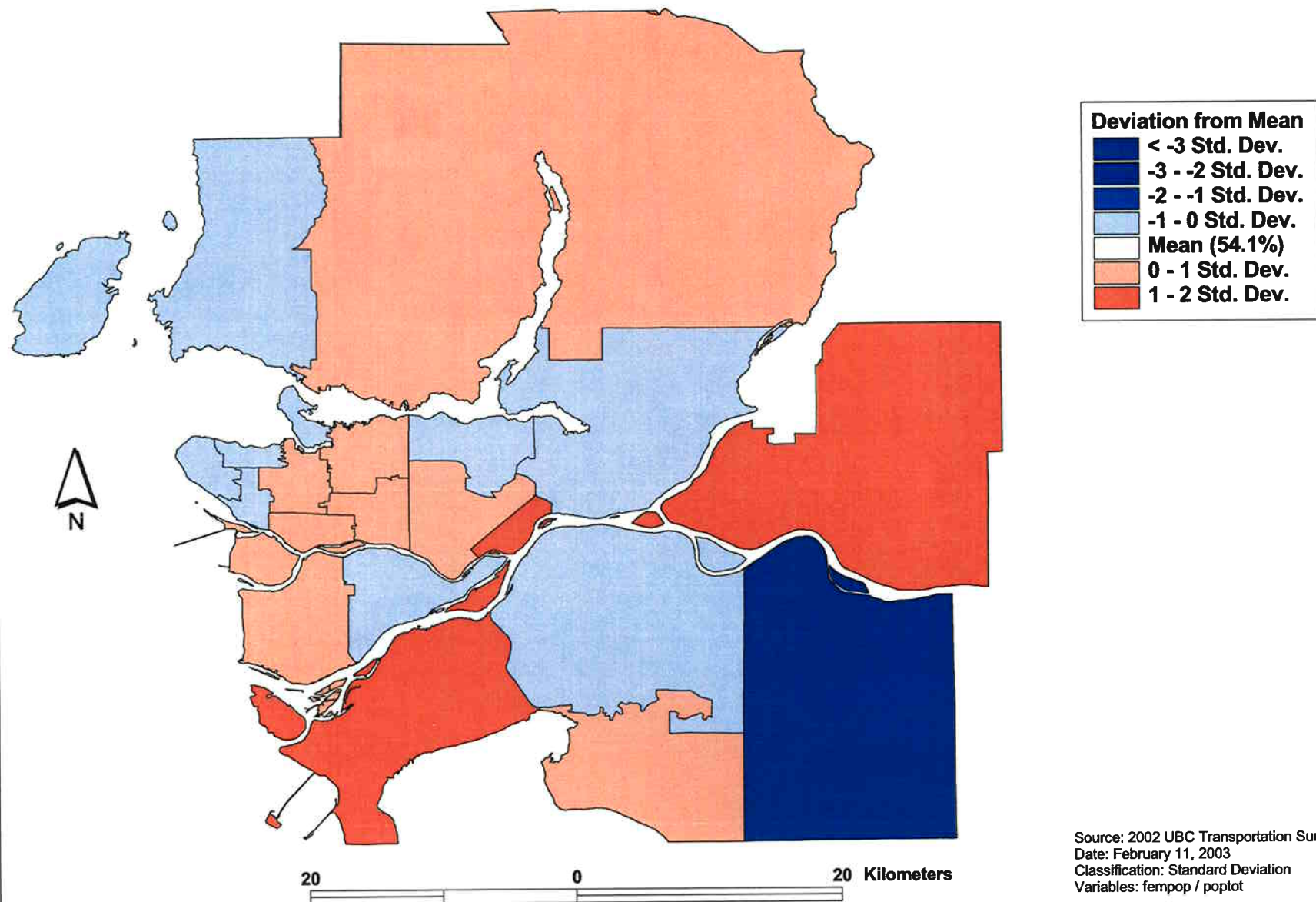
Percentage of Drivers in Zone



Percentage of Carpoolers in Zone

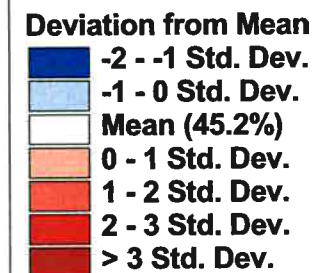
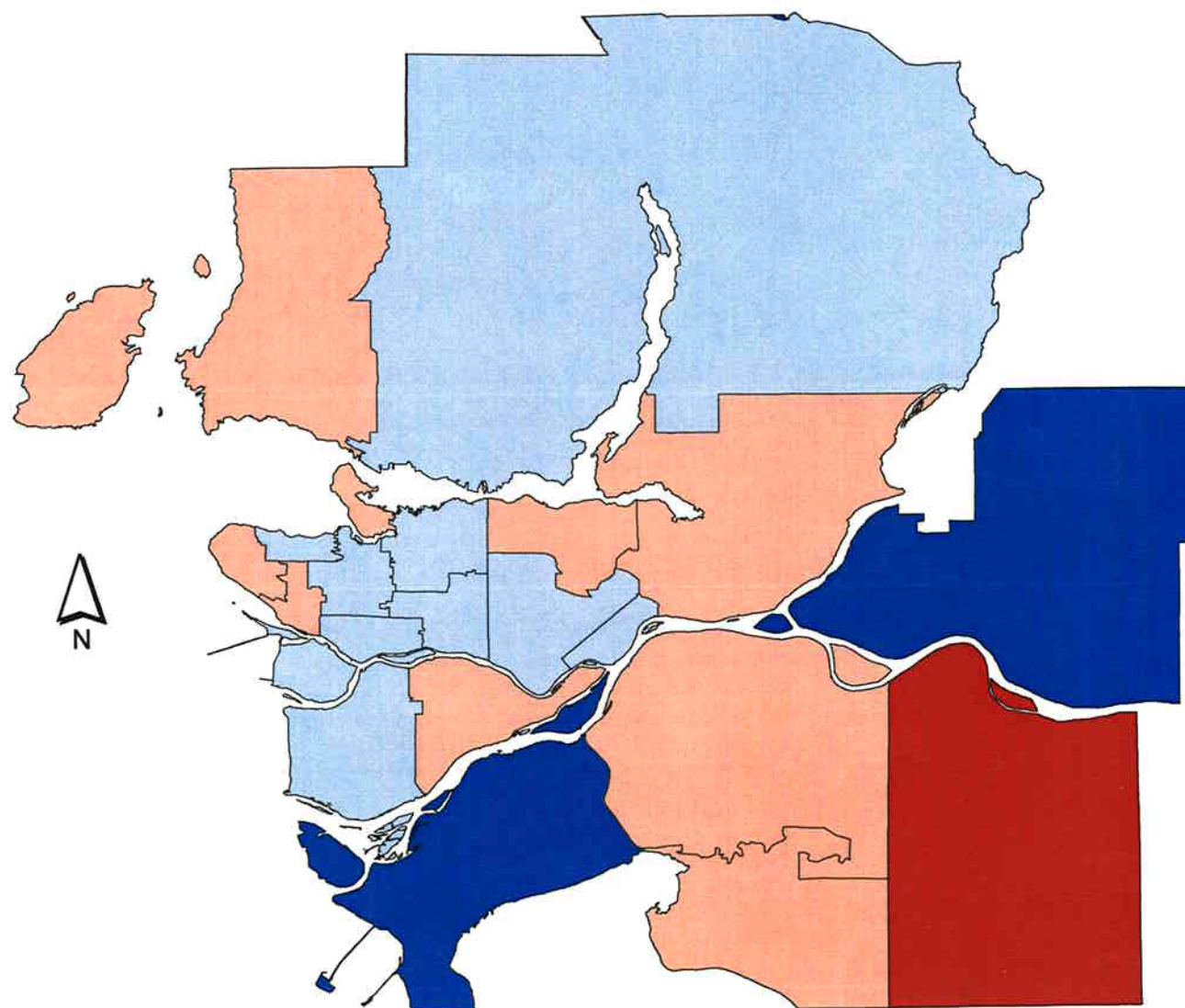


Female Population by Zone



Source: 2002 UBC Transportation Survey
Date: February 11, 2003
Classification: Standard Deviation
Variables: fempop / poptot

Male Population by Zone



20 0 20 Kilometers

Source: 2002 UBC Transportation Survey
Date: February 11, 2003
Classification: Standard Deviation
Variables: malepop / poptot

Percentage of Staff by Zone

