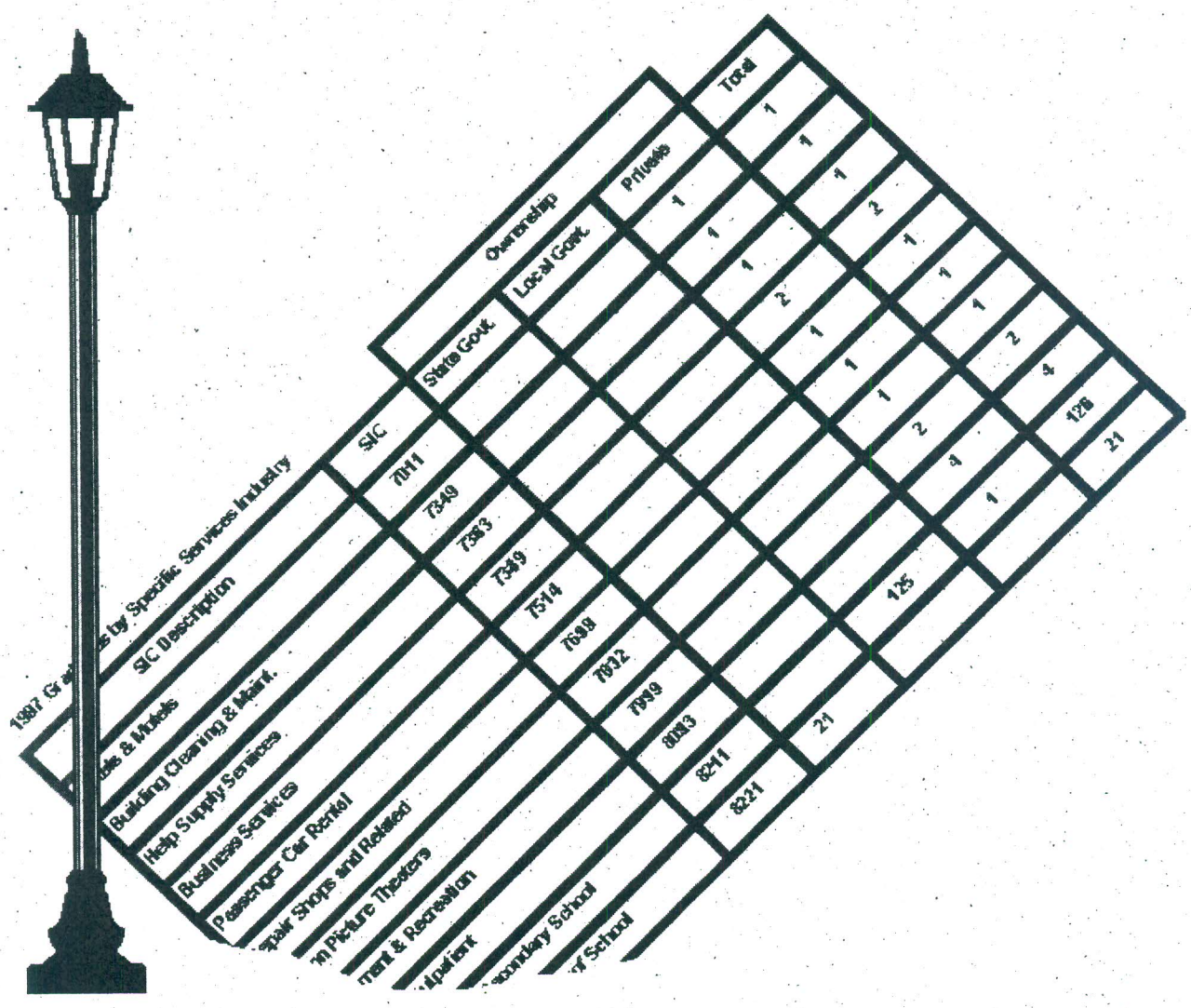
Under the Lamppost:

Report to the Workforce Development Council on Wyoming Institutions of Higher Education Program Completers.



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Overview

This report summarizes program completer information from all of Wyoming's higher education institutions. It compares program completer information to projected employment demand, and develops the first examination of job holding following graduation since the report *Tracking University of Wyoming Graduates Into the Wyoming Work-force* was published in 1995.

Employment projections by occupation from *Wyoming Industry & Occupational Projections 1996-2006,* and projections for the country as a whole, are presented to compare the current supply of labor with projected demand. Information on the number of graduates and the types of awards earned is only available for one time period while occupational projections at both the state and national level are presented in their more traditional multi-year trend format. Thus, while the average number of persons required to meet the 2006 projected level for the occupation of Emergency Medical Technicians (Table 11) is 9 per year, considerable variation from this average number is likely to exist from year to year. At the same time, the combined output of individuals with certificates, Associates, Bachelors and Masters degrees in the broad area of Health Professions and Related Sciences was 615 persons, a volume which may be considered far too large given the demand. Clearly, however, one year of completer data is insufficient to understand the complex of relationships mediating supply and demand functions. The balance of this report explores some of those issues in detail and describes the potential of exhausting the use of administrative data already collected by the Community Colleges, the University, and the Department of Employment before developing an approach to collecting more information by costly survey techniques.

Part A of the report presents tabular data indicating that only 13 of Wyoming's top fifty growing occupations are likely to require post high school education. In contrast, half of the top growth occupations in the national labor market require some education beyond high school. Given the comparatively simple structure of Wyoming's economy and labor market relative to the nation as a whole, it is evident that many program completers may have to leave Wyoming to apply their certificates and degrees in the labor market. Precisely how many individuals meet with job search success in Wyoming, and do so in an industry likely to require skills obtained through certification from institutions of higher education, is explored in the conclusion of Part A.

Most individuals (68.0%) completing a course of study at UW in 1997 worked at least some time during the year in an industry covered by Unemployment Insurance wage record tax reporting requirements. Based on analysis in Wyoming and other states, an estimated 92 percent of all work opportunities are covered by Unemployment Insurance and require that employers submit tax records covering employees earnings. (In 1997, another 3.3 percent of all employment was covered by federal insurance and not required to submit wage records to the Employment Resources Division.) However, wage record data are only available for the first two quarters of 1998, and as we track UW 1997 completers into Wyoming's 1998 labor market, the proportion of completers appearing on wage records declined to 50.2 percent. Discounting the significant minority of UW completers who are nonresidents, and expected to return to their home states, we

expect more UW completers to appear on the wage record file in the third quarter which is the period of peak seasonal employment. More complete analysis can discern what happens to UW graduates as their experience in the labor market matures.

The analysis focuses in detail on UW completers awarded Teaching degrees to explore the relationship between the projections of occupational demand and the incidence of individuals with degrees recording employment at the very detailed industry level (e.g. were employed in Elementary and Secondary Schools). This process illustrates how wage record employment information can be used as an efficient mechanism to provide feed-back to the institution(s) supplying labor to the market. The analysis explores variables other than the projections of demand, that compete in explaining the employment level during the first two quarters of 1998 in Wyoming of Teachers who obtained a degree in 1997 from UW. Discussion of this additional information illustrates the role of professional insider knowledge in interpreting wage record data. It appears, for example, that some individuals who obtained their masters degrees were either simultaneously employed, or job attached, to existing employers in both 1997 and 1998. Since these MA completers already appear to be employed at the point of graduation, they cannot be treated as part of labor supply without simultaneously considering them to be part of demand. Our point in this analysis is that not only can administrative data be used to answer the question of whether or not completer segments find work in an industry associated with their degree,but that the use of administrative data in conjunction with other information can add much greater dimension to what we know about outcomes for particular training programs.

This report was compiled in the eight working days that followed the November 13, 1998 meeting of the Workforce Development Council Labor Shortage Subcommittee and represents an attempt to respond to some of the key issues raised by members of that committee. Given the scope of the topic, this report is intended to raise the level of discussion regarding the types of reports that may interest the Workforce Development Council. Omitted from the current report is documentation relating to the amount of wages paid to individuals and the steadiness of their attachment to work either with a single employer or in a particular industry. A great deal is knowable without the collection of additional information beyond what Colleges and UW already retain in their files. Moreover, should additional information be required, e.g. an identification through survey technique of the occupation completers are working in within, for example Elementary and Secondary Schools, the analysis of existing data can position such collections to be far more efficient.

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Under the Lamppost: Report to Workforce Development Council on Wyoming Institutions of Higher Education Program Completers

To supply the state's labor market information database with current information about recent program graduates, the Wyoming Department of Employment (DOE), Research and Planning Section has secured data-sharing agreements with the University of Wyoming and the state's several community colleges. These agreements require the institutions of higher education to supply minimal student data with regard to residency, instructional program enrollment and degrees or certificates earned for those students completing programs each term. Combined with similar data from other educational, training and apprenticeship programs in Wyoming such those offered through the Job Training Partnership Act (JTPA) and Vocational Rehabilitation, this cooperative effort yields valuable information regarding Wyoming's labor supply. From this raw data, DOE researchers can annually report to the Workforce Development Council the total number of program completers in each academic or vocational field.

This report is based on data reported to Research and Planning by college institutional research personnel on the following dates:

Casper College	8 October 1998
Central Wyoming College	30 October 1998
Eastern Wyoming College	9 November 1998
Laramie County Community College	26 October 1998
Northern Wyoming Community College District	2 November 1998
Northwest College	10 November 1998
University of Wyoming	7 July 1998
Western Wyoming Community College	5 November 1998

Appendix 1 is a technical appendix describing our research methods. Among our methods, the report uses the Classification of Instructional Programs (CIP) code system to track and compare instructional programs and student completion rates of Wyoming's institutions of higher education.

> The Classification of Instructional Programs (CIP) . . . is a [coding] system used by secondary, postsecondary, and adult education institutions to categorize education programs and courses. The CIP code system is intended to be comprehensive and provide a logically consistent guide to courses and programs. The CIP codes [used in this report] are the 1990 revision of the [U.S.] Department of Education's standard educational program classification system.[1]

CIP categorizes instructional programs according to a six-digit hierarchical coding system. The first two digits of any code refer to one of 53 general divisions of academic and vocational training. For example, a CIP code of 01 refers to Agricultural Business & Production. CIP 13 represents instructional programs within the general category of Education. The last four digits of a code subdivide these general divisions into specialized fields of study. Thus, with reference to the above examples, CIP 010605 refers to Landscaping Operations & Management; CIP 131331 represents Speech Teacher Education. Appendix 2 contains a listing and brief narrative description of all two-digit CIP codes.

University of Wyoming data contained in this report reflects program graduates during the three academic terms of the 1997 calendar year. The community colleges' program data differs in time period; it uniformly reflects the1997-98 academic year, beginning with the Fall term of 1997 and ending with the Summer term of 1998. As Research and Planning receives future installments of completer data from the community colleges and UW, subsequent studies will reflect a time period common to all Wyoming's institutions of higher education.

In some cases, college registrars may find a small difference between the completer counts they reported to Research & Planning electronically and table totals in this report. This is because labor supply is a count of people and not degrees. Where the research analysts determined that institutions awarded more than one degree or certificate to an individual, individuals were only counted according to the "higher" degree earned. Research & Planning's intention is to avoid inflating labor supply by counting completers more than once. The greatest number of duplicate credentials belonged to joint associate's degree and certificate earners within the community colleges. With few exceptions, students earned their associates and certificates in closely related programs. Indeed, these complementary programs usually share the same two-digit CIP (e.g., an A.S. in automotive mechanics and a Certificate in diesel mechanics share CIP 47). Thus, a completer earning both an associate's degree and a certificate in the same year was counted only as the recipient of an associate's degree. Similarly, a UW student who earned both a bachelor's and master's degree in 1997 was counted only as having earned the higher credential.

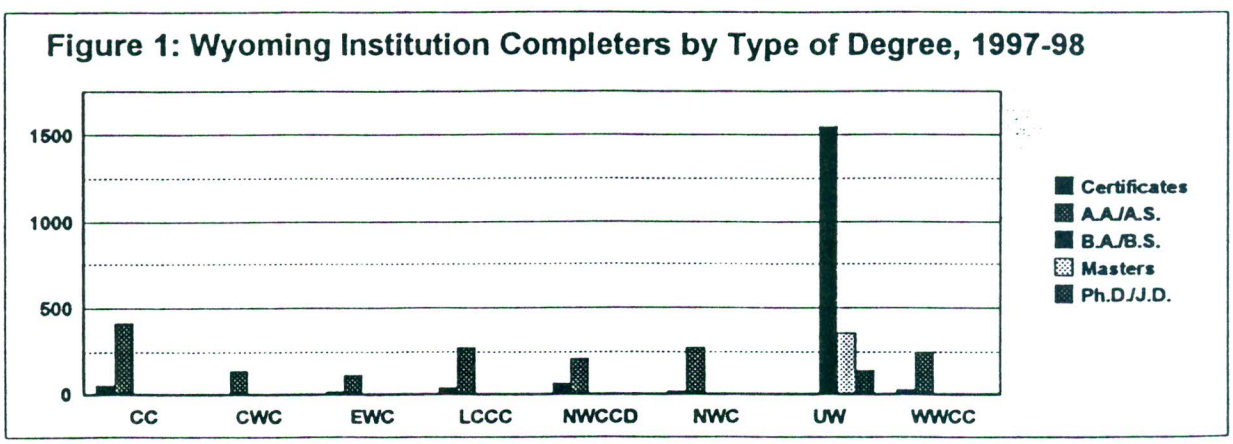
Completer Analysis, Statewide

Table 1 shows the number of completers of each degree type by institution. Of the 3,928 completers within the one-year period we studied, 48.1 percent or 1,888 completers attended one of the seven community colleges and received either an associate degree or certificate. The remaining 51.9 percent of Wyoming completers reflect UW program enrollment. Figure 1 shows a comparison of the proportion of degree types issued by each college and university in the state.

Table 1: Percentage of Wyoming Completers* by Institution of Higher Education by Type of Degree, 1997-98, Crosstabulation**

Institution	Type of Degree					Total
	Certificate	A.A./A.S.	B.A./B.S.	Masters	Ph.D./J.D.	
Casper College	23.9% (54)	25.3% (420)				12.1% (474)
Central Wyoming College	2.2% (5)	8.0% (133)				3.5% (138)
Eastern Wyoming College	6.6% (15)	6.8% (113)				3.3% (128)
Laramie County Community College	19.9% (45)	16.0% (266)				7.9% (311)
Northwest College	7.5% (17)	16.5% (275)				7.4% (292)
Northern Wyoming Community College District	28.8% (65)	12.5% (207)				6.9% (272)
University of Wyoming			100.0% (1553)	100.0% (354)	100.0% (133)	51.9% (2040)
Western Wyoming College	11.1% (25)	14.9% (248)				7.0% (273)
TOTAL	100.0% (266)	100.0% (1662)	100.0% (1553)	100.0% (354)	100.0% (133)	100.0% (3928)

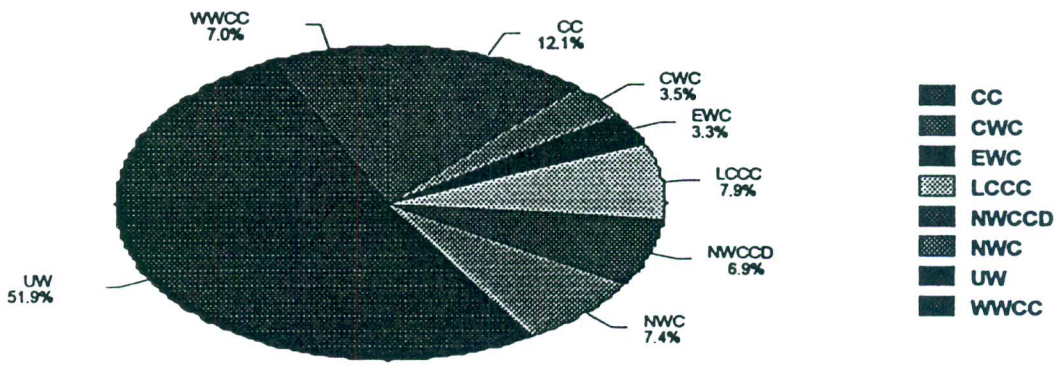
*The actual completer count follows the percentages in parentheses.
**The table uses UW completer data for the 1997 Calendar Year; Community College completer data refers to 1997-98 Academic Year.



The figure uses UW completer data for the 1997 Calendar Year; Community College completer data refers to 1997-98 Academic Year.

Table 2 lists all of the instructional programs (two digit CIP) completed by Wyoming graduates and shows the percentage of degrees awarded for each program category. Statewide, 57.5 percent of all degree-type completers at UW and the community colleges fell into six primary CIP categories. Health Professions & Related Sciences (CIP 51) had the largest number of completers, 615 (15.7%). Education (CIP 13; 12.6%) and Business Management & Administrative Services (CIP 52; 12.3%) followed with 493 and 484 completers respectively. Three other significant categories were Social Sciences & History (CIP 45; 239 completers; 6.1%), Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 228 completers; 5.8%), and Engineering (CIP 14; 195 completers; 5.0%). Of these primary categories, the Liberal Arts code (CIP 24) was used exclusively by the community colleges; it represents no bachelors or advanced degrees.

Figure 2: Percentage of Degrees/Certificates Granted by Institution, 1997



***UW data represents Calendar Year 1997; Community Colleges' data is for 1997-98 Academic Year.**

Table 2: Percentage of Wyoming Completers* by Institutional Program (two digit CIP) and Type of Degree 1997-98, Crosstabulation**

Institution Program (two digit CIP)	Type of Degree					Total
	Certificate	A.A./A.S.	B.A./B.S.	Masters	Ph.D./J.D.	
Agricultural Business & Production (01)	.9% (2)	3.5% (59)	2.3% (36)	1.4% (5)		2.6% (102)
Agricultural Sciences (02)	.4% (1)	2.6% (44)	2.8% (43)	2.3% (8)	1.5% (2)	2.5% (98)
Conservation & Renewable Natural Resources (03)		.4% (7)	2.6% (40)			1.2% (47)
Area, Ethnic & Cultural Studies (05)		.1% (1)	.2% (3)	1.7% (6)		.3% (10)
Communications (09)		1.7% (28)	3.5% (54)	.8% (3)		2.2% (85)
Computer & Information Sciences (11)		1.1% (18)	1.5% (23)	2.3% (8)	.8% (1)	1.3% (50)
Personal & Miscellaneous Services (12)	1.8% (4)	.4% (7)				.3% (11)
Education (13)	2.2% (5)	9.6% (160)	15.8% (245)	21.8% (77)	4.5% (6)	12.6% (493)
Engineering (14)		1.0% (17)	9.5% (147)	8.2% (29)	1.5% (2)	5.0% (195)
Engineering-related Technologies (15)		1.7% (29)				.7% (29)
Foreign Languages & Literatures (16)		.7% (11)	.5% (8)	1.7% (6)		.6% (25)
Home Economics, General (19)		.2% (4)	2.1% (32)	1.1% (4)		1.0% (40)
Law & Legal Studies (22)	.4% (1)	2.3% (38)			50.4% (67)	2.7% (106)
English Language & Literature/Letters (23)		1.6% (26)	2.0% (31)	2.5% (9)		1.7% (66)
Liberal Arts & Sciences, General Studies & Humanities (24)	1.3% (3)	13.5% (225)				5.8% (228)
Biological Sciences/Life Sciences (26)		2.8% (46)	6.2% (97)	4.8% (17)	8.3% (11)	4.4% (171)
Mathematics (27)		.7% (12)	1.7% (27)	10.2% (36)	4.5% (6)	2.1% (81)
Multi/Interdisciplinary Studies (30)		.2% (3)	.1% (1)	.3% (1)		.1% (5)
Parks, Recreation, Leisure & Fitness Studies (31)		.2% (3)	3.3% (51)	.3% (1)		1.4% (55)
Leisure & Recreational Activities (36)		.1% (2)				.1% (2)
Philosophy & Religion (38)			.1% (2)	1.7% (6)		.2% (8)
Physical Sciences (40)		.7% (11)	2.1% (33)	3.4% (12)	19.5% (26)	2.1% (82)
Psychology (42)	.4% (1)	1.9% (32)	4.3% (67)	2.3% (8)	6.0% (8)	3.0% (116)
Protective Services (43)	.4% (1)	4.0% (67)	2.6% (41)			2.8% (109)
Public Administration & Services (44)	.9% (2)	.3% (5)	4.6% (72)	6.8% (24)		2.6% (103)
Social Sciences & History (45)	.4% (1)	3.9% (64)	9.3% (144)	8.2% (29)	.8% (1)	6.1% (239)
Construction Trades (46)	.9% (2)	.1% (2)				.1% (4)

Mechanics & Repairers (47)	28.3% (64)	1.5% (25)				2.3% (89)
Precision Production Trades (48)	12.4% (28)	2.4% (40)				1.7% (68)
Visual & Performing Arts (50)	.9% (2)	4.7% (78)	1.9% (29)	.3% (1)		2.8% (110)
Health Professions & Related Sciences (51)	30.5% (69)	22.4% (372)	8.8% (137)	10.5% (37)		15.7% (615)
Business Management & Administrative Services (52)	17.7% (40)	13.6% (226)	12.2% (190)	7.3% (26)	1.5% (2)	12.3% (484)
Unknown				.3% (1)	.8% (1)	.1% (2)
TOTAL	100.0% (226)	100.0% (1662)	100.0% (1553)	100.0% (354)	100.0% (133)	100.0% (3928)

*The actual completer count follows the percentages in parentheses.
**Certificates and Associates data is for the 1997-98 Academic Year; Bachelors, Masters, and Doctorates is for 1997 Calendar Year.

Figure 3: Percentage of Statewide Certificate Completers
by Wyoming Institution, 1997-98 Academic Year

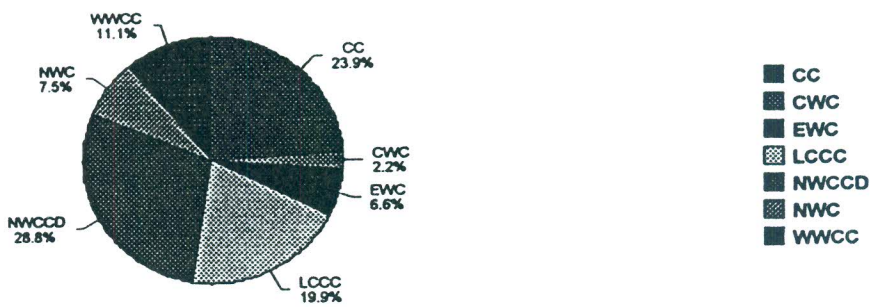
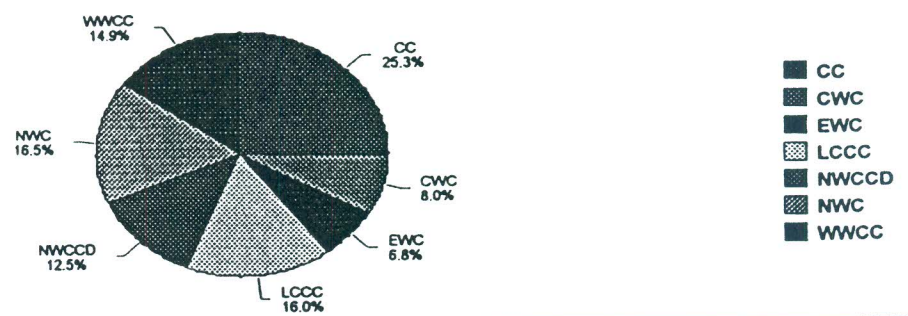


Figure 4: Percentage of Statewide Associate Degree Completers
by Wyoming Institution, 1997-98 Academic Year



Completer Analysis by Institution

During the 1997 calendar year, 2,040 students earned degrees from the University of Wyoming (UW). (See Table 3.) This count includes those who earned degrees through UW/Casper College. UW awarded 1,553 bachelors, 354 masters, and 133 doctorates. UW is the only Wyoming public institution awarding each of these degree types. When UW is grouped with Wyoming's other public institutions of higher education, it accounted for 51.9 percent of the total number of all degrees and certificates awarded in the state. Of 25 CIP codes represented by UW completers, six general categories accounted for 58.7 percent of all undergraduate and graduate degrees issued. Education (CIP 13) accounted for 16.1 percent (328 completers). Other major categories were Business Management & Administrative Services (CIP 52; 218 completers; 10.7%); Engineering (CIP 14; 178 completers; 8.7%); Social Sciences & History (CIP 45; 174 completers; 8.5%); Health Professions & Related Sciences (CIP 51; 174 completers; 8.5%); and Biological Sciences/Life Sciences (CIP 26; 125 completers; 6.1%).

Table 3: University of Wyoming Completers by Institutional Program (two digit CIP) and Type of Degree, 1997 Calendar Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree			Total
	B.A./B.S.	Masters	Ph.D./J.D.	
Agricultural Business & Production (01)	36	5		41
Agricultural Sciences (02)	43	8	2	53
Conservation & Renewable Natural Resources (03)	40			40
Area, Ethnic & Cultural Studies (05)	3	6		9
Communications (09)	54	3		57
Computer & Information Sciences (11)	23	8	1	32
Education (13)	245	77	6	328
Engineering (14)	147	29	2	178
Foreign Languages & Literatures (16)	8	6		14
Home Economics, General (19)	32	4		36
Law & Legal Studies (22)			67	67
English Language & Literature/Letters (23)	31	9		40
Biological Sciences/Life Sciences (26)	97	17	11	125
Mathematics (27)	27	36	6	69
Multi/Interdisciplinary Studies (30)	1	1		2
Parks, Recreation, Leisure & Fitness Studies (31)	51	1		52
Philosophy & Religion (38)	2	6		8
Physical Sciences (40)	33	12	26	71
Psychology (42)	67	8	8	83
Protective Services (43)	41			41
Public Administration & Services (44)	72	24		96
Social Sciences & History (45)	144	29	1	174
Visual & Performing Arts (50)	29	1		30
Health Professions & Related Sciences (51)	137	37		174
Business Management & Administrative Services (52)	190	26	2	218
Unknown		1	1	2
TOTAL	1553	364	133	2040

Within a comparable one-year time frame, during the 1997-98 academic year, the seven community colleges awarded 1,888 associates and program certificates. A unique institutional program profile emerges from the completer data reported by each of the community colleges. Following each institutional narrative is the aggregated data for the respective college in tabular form (See Table 4 through Table 10).

Casper College (CC), the largest of the state's community colleges, had 474 program completers during the 1997-98 academic year. Without regard to degree type, Casper College students represented 12.1 percent of all Wyoming program completers. Of its graduates, 420 earned associates (representing 25.3% of statewide associates) and 54 earned certificates. Of the 25 CIPs represented by Casper College completers, four program categories were responsible for 54.8 percent of associates: Health Professions & Related Sciences (CIP 51; 93 graduates); Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 51 graduates); Education (CIP 13; 43 graduates); and Business Management & Administrative Services (CIP 52; 43 graduates). Two Casper College program classifications accounted for 68.5 percent of the college's 54 certificate earners: Mechanics & Repairers (CIP 47; 24 completers) and Precision Production Trades (CIP 48; 13 completers).

Table 4: Casper College Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Agricultural Business & Production (01)		7	7
Agricultural Sciences (02)		17	17
Conservation & Renewable Natural Resources (03)		3	3
Area, Ethnic & Cultural Studies (05)		1	1
Communications (09)		2	2
Computer & Information Sciences (11)		4	4
Education (13)	2	43	45
Engineering (14)		9	9
Engineering-related Technologies (15)		17	17
Foreign Languages & Literatures (16)		6	6
Law & Legal Studies (22)	1	14	15
English Language & Literature/Letters (23)		19	19
Liberal Arts & Sciences, General Studies & Humanities (24)		51	51
Biological Sciences/Life Sciences (26)		15	15
Mathematics (27)		2	2
Physical Sciences (40)		3	3
Psychology (42)		10	10
Protective Services (43)	1	19	20
Public Administration & Services (44)		3	3
Social Sciences & History (45)		3	3
Mechanics & Repairers (47)	24	3	27
Precision Production Trades (48)	13	15	28
Visual & Performing Arts (50)		18	18
Health Professions & Related Sciences (51)	7	93	100
Business Management & Administrative Services (52)	6	43	49
TOTAL	54	420	474

Central Wyoming College (CWC) students earned 133 associates (8% of statewide totals for this degree type) and five certificates during 1997-98. CWC was responsible for 3.5 percent of Wyoming's total number of program completers. CWC's associate's degree earners reflect a program completion pattern similar to Casper College's in that 68.4 percent (91 graduates) earned credentials in the same top four CIP categories: Health Professions & Related Sciences (CIP 51; 40 graduates); Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 24 graduates); Business Management & Administrative Services (CIP 52; 14 graduates); and Education (CIP 13; 13 graduates). Another 10 CWC students earned degrees in Protective Services (CIP 43).

Table 5: Central Wyoming College Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Agricultural Business & Production (01)	1	5	6
Agricultural Sciences (02)		3	3
Communications (09)		5	5
Computer & Information Sciences (11)		2	2
Education (13)		13	13
English Language & Literature/Letters (23)		1	1
Liberal Arts & Sciences, General Studies & Humanities (24)		24	24
Biological Sciences/Life Sciences (26)		3	3
Physical Sciences (40)		1	1
Psychology (42)		2	2
Protective Services (43)		10	10
Social Sciences & History (45)		1	1
Mechanics & Repairers (47)		1	1
Precision Production Trades (48)	1	2	3
Visual & Performing Arts (50)		6	6
Health Professions & Related Sciences (51)	1	40	41
Business Management & Administrative Services (52)	2	14	16
TOTAL	5	133	138

Eastern Wyoming College (EWC) reported 128 program completers. EWC students represent 6.8 percent of associate's degrees and 6.6 percent of certificates awarded statewide in 1997-98. Of EWC's associates, 76.1 percent were awarded in four program areas: Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 44 graduates); Business Management & Administrative Services (CIP 52; 17 graduates); Health Professions & Related Sciences (CIP 51; 16 graduates); and Protective Services (CIP 43; 9 graduates). Of 15 certificates awarded in 1997-98, 77.3 percent were earned in two program categories, Mechanics & Repairers (CIP 47; 7

completers) and Precision Production Trades (CIP 48; 4 completers). EWC's and Central Wyoming College's completer profiles are very similar in both numbers and program representation.

Table 6: Eastern Wyoming College Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Agricultural Business & Production (01)		2	2
Agricultural Sciences (02)		1	1
Personal & Miscellaneous Services (12)	3	4	7
Education (13)		5	5
Liberal Arts & Sciences, General Studies & Humanities (24)		44	44
Biological Sciences/Life Sciences (26)		5	5
Mathematics (27)		4	4
Psychology (42)		2	2
Protective Services (43)		9	9
Social Sciences & History (45)		1	1
Mechanics & Repairers (47)	7	1	8
Precision Production Trades (48)	4	2	6
Health Professions & Related Sciences (51)		16	16
Business Management & Administrative Services (52)	1	17	18
TOTAL	15	113	128

In the 1997-98 academic year, **Laramie County Community College (LCCC)** granted both the third largest number of associate's degrees (16.0%) and certificates (19.9%) in the state. Of LCCC's graduates, 27.8 percent (74 students) earned degrees in Health Professions & Related Sciences (CIP 51). Another 45.5 percent of associates were earned in five fields of study: Business Management & Administrative Services (CIP 52; 30 graduates); Agricultural Business & Production (CIP 01; 27 graduates); Education (CIP 13; 23 graduates); Law & Legal Studies (CIP

22; 22 graduates); and Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 19 graduates). Principal among LCCC's certificate programs were those in Health Professions & Related Sciences (CIP 51; 23 completers) which accounted for 51.1 percent of certificates earned.

Table 7: Laramie County College Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Agricultural Business & Production (01)		27	27
Communications (09)		8	8
Computer & Information Sciences (11)		10	10
Education (13)		23	23
Engineering (14)		1	1
Engineering-related Technologies (15)		3	3
Law & Legal Studies (22)		22	22
English Language & Literature/Letters (23)		1	1
Liberal Arts & Sciences, General Studies & Humanities (24)		19	19
Biological Sciences/Life Sciences (26)		10	10
Mathematics (27)		5	5
Psychology (42)	1	5	6
Protective Services (43)		10	10
Public Administration & Services (44)	2	1	3
Social Sciences & History (45)		6	6
Construction Trades (46)	2	2	4
Mechanics & Repairers (47)	11	6	17
Precision Production Trades (48)		2	2
Visual & Performing Arts (50)		1	1
Health Professions & Related Sciences (51)	23	74	97
Business Management & Administrative Services (52)	6	30	36
TOTAL	45	266	311

Northern Wyoming Community College District students earned 207 associate's degrees and 65 certificates during the 1997-98 academic year. These numbers include those completers from both the Sheridan and Gillette campuses. Fifty-seven percent of associates were earned in three CIP categories: Health Professions & Related Sciences (CIP 51; 51 graduates); Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 36 graduates); and Social Sciences & History (CIP 45; 31 graduates). Interestingly, Northern Wyoming Community College District granted only 12.5 percent of the total number of Wyoming's associate's degrees in 1997-98, but the school issued 28.5 percent of the state's program certificates. Each of three CIP categories accounted for 19 certificate completions (29.2%): Business Management & Administrative Services (CIP 52); Health Professions & Related Services (CIP 51); and Mechanics & Repairers (CIP 47).

Table 9: Northern Wyoming Community College District Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Agricultural Sciences (02)		5	5
Computer & Information Sciences (11)		2	2
Personal & Miscellaneous Services (12)	1	3	4
Education (13)	1	13	14
Engineering-related Technologies (15)		4	4
Foreign Languages & Literatures (16)		2	2
English Language & Literature/Letters (23)		1	1
Liberal Arts & Sciences, General Studies & Humanities (24)		36	36
Biological Sciences/Life Sciences (26)		3	3
Multi/Interdisciplinary Studies (30)		3	3
Leisure & Recreational Activities (36)		2	2
Protective Services (43)		17	17
Social Sciences & History (45)		31	31
Mechanics & Repairers (47)	19	4	23
Precision Production Trades (48)	6	4	10
Visual & Performing Arts (50)		4	4
Health Professions & Related Sciences (51)	19	51	70
Business Management & Administrative Services (52)	19	22	41
TOTAL	65	207	272

Among Wyoming's community colleges, **Northwest College (NWC)** granted the second largest number of associates in the 1997-98 academic year. NWC's 275 associates represented 16.5 percent of the state's total. Of completers, 77.5 percent graduated with associate's degrees in seven primary CIP categories: Health Professions & Related Sciences (CIP 51; 44 graduates); Business Management & Administrative Services (CIP 52; 43 graduates); Visual & Performing Arts (CIP 50; 36 graduates); Education (CIP 13; 28 graduates); Liberal Arts & Sciences, General

Studies & Humanities (CIP 24; 26 graduates); and Agricultural Business & Production (CIP 01) and Agricultural Sciences (CIP 02), each with 18 graduates. Additionally, NWC granted 17 certificates in eight CIP categories.

Table 8: Northwest College Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Agricultural Business & Production (01)	1	18	19
Agricultural Sciences (02)	1	18	19
Conservation & Renewable Natural Resources (03)		4	4
Communications (09)		7	7
Education (13)	2	28	30
Engineering (14)		1	1
Engineering-related Technologies (15)		5	5
Foreign Languages & Literatures (16)		2	2
Home Economics, General (19)		4	4
Law & Legal Studies (22)		2	2
English Language & Literature/Letters (23)		2	2
Liberal Arts & Sciences, General Studies & Humanities (24)		26	26
Biological Sciences/Life Sciences (26)		4	4
Parks, Recreation Leisure & Fitness Studies (31)		3	3
Physical Sciences (40)		1	1
Psychology (42)		4	4
Public Administration & Services (44)		1	1
Social Sciences & History (45)	1	7	8
Precision Production Trades (48)	3	15	18
Visual & Performing Arts (50)	2	36	38
Health Professions & Related Sciences (51)	3	44	47
Business Management & Administrative Services (52)	4	43	47
TOTAL	17	275	292

During the 1997-98 academic year, **Western Wyoming Community College (WWCC)** granted 248 associate's degrees (14.9% of statewide associates) and 25 certificates (11.1%). Seventy percent of WWCC's associates were awarded among four CIPs: Business Management & Administrative Services (CIP 52; 57 completers); Health Professions & Related Sciences (CIP 51; 54 completers); Education (CIP 13; 35 completers); and Liberal Arts & Sciences, General Studies & Humanities (CIP 24; 25 completers). Sixty-four percent of WWCC's certificates were awarded in Health Professions & Related Sciences (CIP 51; 16 completers).

Table 10: Western Wyoming Community College Completers by Institutional Program (two digit CIP) by Type of Degree, 1997-98 Academic Year, Crosstabulation

Institution Program (two digit CIP)	Type of Degree		Total
	Certificate	A.A./A.S.	
Communications (09)		6	6
Education (13)		35	35
Engineering (14)		6	6
Foreign Languages & Literatures (16)		1	1
English Language & Literature/Letters (23)		2	2
Liberal Arts & Sciences, General Studies & Humanities (24)	3	25	28
Biological Sciences/Life Sciences (26)		6	6
Mathematics (27)		1	1
Physical Sciences (40)		6	6
Psychology (42)		9	9
Protective Services (43)		2	2
Social Sciences & History (45)		15	15
Mechanics & Repairers (47)	3	10	13
Precision Production Trades (48)	1		1
Visual & Performing Arts (50)		13	13
Health Professions & Related Sciences (51)	16	54	70
Business Management & Administrative Services (52)	2	57	59
TOTAL	25	248	273

The next chapter shows how institutional data about instructional programs can be compared to information regarding occupational trends in Wyoming and the nation.

Wyoming Occupations Compared to Institutional Programs

A Brief Analysis Using Wyoming's Occupational Growth projections and CIP Data Provided by the University of Wyoming and Wyoming's Community Colleges.

Some of the concepts introduced earlier in this paper will be re-introduced in this section relative to the current analysis. This analysis will attempt to address the concept of supply and demand of labor for a part of Wyoming's labor market that requires post high school education. It is not intended to explain all the complex interactions that occur within the labor market due to numerous outside influences. Rather, it is to offer a brief introduction of Supply (University of Wyoming & Community College graduates) and Demand (projected occupation growth) of labor utilizing data supplied to Research and Planning by UW and the Community Colleges.

General tables containing Wyoming's and the Nation's 50 fastest growing occupations and Wyoming's 50 fastest declining occupations, minimum education requirement of the occupation, and the number of qualified persons graduating from the institutions under consideration (Table 11-13) will be discussed. Tables 11-13, were created using only the first two digit Classification of Instructional Programs (CIP) codes, this creates several limitations to interpretation and this will also be discussed.

A specific examples using 6 digit CIP codes will be introduced for teachers K-12 in Tables 14 &15. This is an attempt to narrow the general view that is introduced in Tables 11-13. Further, the graduates will be crossed with wage records data to explore the major industries in which the

graduates were working in 1997 and the first two quarters of 1998. As an example of the potential of future research in this area focus will then be narrowed to the specific industries, in which graduates of teacher K-12 programs are found and whether the graduates (Supply) are actually being utilized within the specific industries (areas of Demand) most likely to use their acquired abilities.

Concluding remarks will suggest limitations of the current analysis and future research in this area.

Wyoming's and the Nation's 50 Fastest Growing Occupations and Wyoming's 50 Declining Occupations and Two Digit CIP Code

The first three tables were created by crossing an Occupational Employment Statistic (OES) code with a 2 digit CIP code. The OES code, a unique 5 digit number, is assigned to an occupational title and description (Occupational Employment Statistics). For the purpose of the current analysis only occupations ranked in the top 50 growing or declining occupations in Wyoming (Wyoming's Industry & Occupational Projections 1996-2006) and the top 50 growing occupations in the nation (America's Career Infonet) were used. The CIP codes are hierarchical in nature with the first two digits giving the general area in which the educational curriculum is encompassed. For example, the first two digit CIP of 13 (Education) contains everyone from Education Related Administrators to Educational Researchers and School Teachers K-12 which will be the focus group in the next section. This is an important limitation to keep in mind when reviewing Tables 11-13.

The following is a list of the columns contained in Tables 11-13 and in most cases, Table 15:

Occupational Title & Minimum Educational Requirements

OES Code- As discussed previously, a 5 digit number that relates to a specific occupation.

Matching CIP Code- A two digit number that represents a general area of educational training that is related to the OES code using a crosswalk (table linking the OES to the CIP Codes) table created by National Occupational Coordinating Information Committee (NOICC).

Occupation Title- The title of the occupation that corresponds to the 5 digit OES code.

Education Required- The level of education usually necessary to obtain employment within the given occupation relative to the area under consideration (America's Career Infonet).

1997 Wyoming College Graduates
(Supply)

Certificate, AA/AS, BA/BS, MA/MS and PhD/JD- Type and number of degrees awarded.

1997 Supply Min. Qualifications- The number of 1997 college graduates that meet the minimum educational requirements for the occupation under consideration.

Projected Growth
(Demand)

Annual Projected Demand- Annual projected growth of the occupation based on Wyoming Industry and Occupational Projections 1996-2006. Annual Projected Growth is calculated by dividing the decade projected growth by 10.

Annual Supply Vs. Demand

Undersupply (-) Oversupply (+)- Calculated by subtracting the Demand (projected growth) from the Supply (graduates meeting minimum education requirements for occupation).

Other Table Components

Shaded Area- The shaded area represents the college graduates that meet the minimum educational requirements of the occupation under consideration.

Bold Horizontal Line- Occupations that are above the bold line are ones that require education beyond a High School Diploma.

Table 11: Top 50 projected growing occupations in Wyoming crossed with 2 digit CIP.

Occupational Description & Minimum Educational Requirements				1997 Wyoming College Graduates (Supply)						Projected Growth (Demand)	Annual Supply Vs. Demand
OES Code	Matching CIP Code (3)	Occupational Title	Education Required (2)	Certificate	AA/AS	BA/BS	MA/MS	PhD/JD	1997 Supply Min. Qualifications	Annual Projected Demand (1) APD=(Growth 1996-2006 / 10)	Undersupply (-) Oversupply (+)
32508	51	Emergency Medical Technicians	Certificate	69	372	137	37	0	615	12	+ 603
31521	13	Teacher Aides, Paraprof	AA/AS	5	160	245	77	6	488	15	+ 473
32502	51	Registered Nurses	AA/AS	69	372	137	37	0	546	30	+ 516
25102	11, 52	Systems Analysts	BA/BS	40	244	213	34	3	250	12	+ 238
32308	51	Physical Therapists	BA/BS	69	372	137	57	0	174	12	+ 162
13017	14	Engineer, Math, Nat Sci Mgrs	BA/BS	0	17	147	29	2	178	13	+ 165
15017	*46	Construction Managers	BA/BS	2	2	0	0	0	0	21	- 21
27307	20	Residential Counselors	BA/BS	0	0	0	0	0	0	18	- 18
31311	13	Teachers, Special Education	BA/BS	5	160	245	77	6	328	21	+ 307
13002	52	Financial Managers	BA/BS	40	226	190	26	2	218	29	+ 189
41002	8	Marketing/Sales Supervisors	BA/BS	0	0	0	0	0	0	50	- 50
19005	44, 50, 52	General Mgrs & Top Execs	BA/BS	44	309	291	51	2	344	78	+ 266
32102	51	Physicians	PhD	69	372	137	37	0	0	12	- 12
68035	20	Personal/Home Care Aides	N/A	0	0	0	0	0	0	12	- 12
66011	51	Home Health Aides	N/A	69	372	137	37	0	615	30	+ 585
27308	51	Human Services Workers	N/A	69	372	137	37	0	615	20	+ 595
92935	41	Chem Eqp Controllers/Oprs	N/A	0	0	0	0	0	0	17	- 17
87402	46	Painters & Paperhangers	N/A	2	2	0	0	0	4	14	- 10
98312	*46	Carpenters & Related Helpers	N/A	2	2	0	0	0	4	22	- 18
58023	8	Stock Clerks:Stockrm/Warehouse	N/A	0	0	0	0	0	0	32	- 32
79041	N/A	Laborers, Landscp/Groundskeep	N/A	0	0	0	0	0	0	13	- 13
66014	12	Amusement & Recreation Attends	N/A	4	7	0	0	0	11	19	- 8
87311	46	Concrete & Terrazzo Finishers	N/A	2	2	0	0	0	4	15	- 8
31321	13, 31	Instructors & Coaches, Sports	N/A	5	63	296	78	6	548	19	+ 529
68038	20	Child Care Workers	N/A	0	0	0	0	0	0	20	- 20
53806	8	Hotel Desk Clerks	N/A	0	0	0	0	0	0	17	- 17
49011	1, 8, 20	Salespersons, Retail	N/A	2	59	36	5	0	102	151	- 49
87202	46, 49	Electricians	N/A	2	2	0	0	0	4	31	- 27
55305	8, 51, 52	Reception/Information Clks	N/A	109	696	327	63	2	1099	32	+ 1067
15026	8, 12, 19, 20, 52	Food Service & Lodging Mgrs	N/A	44	237	222	30	2	535	21	+ 514
87102	46, 49	Carpenters	N/A	2	2	0	0	0	4	42	- 38
49023	8	Cashiers	N/A	0	0	0	0	0	0	112	- 112
59999	52	Clerical/Admin Wkrs, NEC	N/A	40	226	190	26	2	484	17	+ 467
87917	N/A	Service Unit Operators	N/A	0	0	0	0	0	0	20	- 20
65032	12	Cooks, Fast Food	N/A	4	7	0	0	0	11	22	- 11
85132	10, 46, 47	Maintenance Repairers, Gen Util	N/A	66	27	0	0	0	93	55	+ 38
49999	1, 8	Sales & Related Workrs	N/A	2	59	36	5	0	102	19	+ 83
98902	N/A	Hand Packers & Packagers	N/A	0	0	0	0	0	0	13	- 13
66006	51	Nursing Aides & Orderlies	N/A	69	372	137	37	0	615	35	+ 580
97105	1, 49	Truck Drivers, Light	N/A	2	59	36	5	0	102	29	+ 73
65036	12, 20	Food Preparation Workers	N/A	4	7	0	0	0	11	45	- 34
49006	1, 8, 20	Sales Representatives, NEC	N/A	2	59	36	5	0	102	14	+ 88
51002	52	Clerical Supervisors	N/A	40	226	190	26	2	484	22	+ 462
98999	N/A	Helpers & Laborers, NEC	N/A	0	0	0	0	0	0	28	- 28
81005	N/A	First Line Superv: Const,Extrac	N/A	0	0	0	0	0	0	15	- 15
61099	8, 20, 31	Service Supervisors, NEC	N/A	0	3	31	1	0	55	14	+ 41
53905	13	Teacher Aides/Education Assts	N/A	5	160	245	77	6	493	15	+ 478
65026	12	Cooks, Restaurant	N/A	4	7	0	0	0	11	17	- 6
65041	8	Comb Food Prep/Serv Wkrs	N/A	0	0	0	0	0	0	19	- 19
65006	12	Waiters & Waitresses	N/A	4	7	0	0	0	11	35	- 24

Shaded areas are students graduating that meet the minimum requirements of the occupation

The bold line represents the deviding point with occupations above requiring education beyond high school.

References:

(1) Projected Occupation Growth - Research & Planning Section, Wyoming Department of Employment. Wyoming's Industry & Occupational Projections 1996-2006.

(2) Educational Requirement - America's Career InfoNet. http://www.acinet.com (16 November 1998).

(3) OES X CIP Crosswalk - National Occupational Coordinating Information Committee. http://www.state.ia.us/government/wd/ncdc/ (16 November 1998).

Table 12: Top 50 projected declining occupations in Wyoming crossed with 2 digit CIP.

Occupational Description & Minimum Educational Requirements				1997 Wyoming College Graduates (Supply)						Projected Growth (Demand)	Annual Supply Vs. Demand
OES Code	Matching CIP Code (3)	Occupational Title	Education Required (2)	Certificate	AA/AS	BA/BS	MA/MS	PhD/JD	1997 Supply Min. Qualifications	Annual Projected Demand (1) APD=(Growth 1996-2006 / 10)	Undersupply (-) Oversupply (+)
85726	47	Station Intlrs/Reprs, Telephone	Certificate	64	25	0	0	0	89	-4	+ 93
22521	15, 45	Surveying/Mapping Techns	Certificate	1	93	144	29	1	268	-2	+ 270
22599	10, 15	Engin Technicn/Technolog, NEC	AA/AS	0	29	0	0	0	29	-2	+ 31
15005	13	Education Administrators	BA/BS	5	160	245	77	6	328	-13	+ 341
31323	1, 2, 20	Farm, Home Mgmt Advisors	BA/BS	3	107	111	17	2	130	-2	+ 132
19002	44	Govt Chief Exec & Legislators	BA/BS	2	5	72	24	0	96	-5	+ 101
31305	13	Teachers, Elementary	BA/BS	5	160	245	77	6	328	-48	+ 376
31304	13	Teachers, Knder, Educ Serv	BA/BS	5	160	245	77	6	328	-3	+ 331
31306	13	Teachers, Secondary School	BA/BS	5	160	245	77	6	328	-18	+ 346
31502	25	Librarians, Professional	MA/MS	0	0	0	0	0	0	-6	+ 6
31299	13, 19, 38, 39, 43, 52	Postsecondary Teachers, NEC	PhD	46	457	510	113	8	8	-15	+ 23
53102	8, 52	Bank Tellers	N/A	40	226	190	26	2	484	-6	+ 490
65005	12	Bartenders	N/A	4	7	0	0	0	11	-5	+ 16
55338	52	Bookkpng, Accntng, Audit Clks	N/A	40	226	190	26	2	484	-28	+512
97111	49	Bus Drivers, School	N/A	0	0	0	0	0	0	-11	+ 11
85311	47	Bus, Truck, Diesel Eng Mechs	N/A	64	25	0	0	0	89	-2	+ 91
65023	12	Butchers & Meatcutters, Retail	N/A	4	7	0	0	0	11	-3	+ 41
67099	20	Cleaning/Bldg Serv Wrks, NEC	N/A	0	0	0	0	0	0	-11	+ 11
59011	11, 52	Computer Operators, Exc Periphrl	N/A	40	244	213	34	3	534	-14	+ 548
65028	12, 20	Cooks, Institution/Cafe	N/A	4	7	0	0	0	11	-14	+ 25
53702	52	Court Clerks	N/A	40	226	190	26	2	484	-2	+ 486
53117	52	Credit Checkers	N/A	40	226	190	26	2	484	-4	+ 488
63044	N/A	Crossing Guards	N/A	0	0	0	0	0	0	-2	+ 2
58002	N/A	Dispatchers: Police/Fire/Ambu	N/A	0	0	0	0	0	0	-5	+ 5
85911	47	Elect Meter Installers/Rprs	N/A	64	25	0	0	0	89	-2	+ 91
85723	46	Elect Powerline Intlrs/Rprs	N/A	2	2	0	0	0	4	-6	+ 10
83008	43	Fire Fighters	N/A	1	67	41	0	0	109	-4	+ 113
61002	43	Fire Fightng/Prevent Supervrs	N/A	1	67	41	0	0	109	-3	+ 112
81002	52	First Line Superv: Mech.&Repair	N/A	40	226	190	26	2	484	-4	+ 488
81011	N/A	First Line Superv: Transport	N/A	0	0	0	0	0	0	-2	+ 2
79002	3	Forest & Conservation Wkrs	N/A	0	7	40	0	0	47	-3	+ 50
87711	1	Highway Maintenance Workers	N/A	2	59	36	5	0	102	-10	+ 112
67005	20	Janitors & Cleaners	N/A	0	0	0	0	0	0	-36	+ 36
53902	25	Library Assists/Bookmobile	N/A	0	0	0	0	0	0	-5	+ 5
53121	52	Loan & Credit Clerks	N/A	40	226	190	26	2	484	-2	+ 486
58014	N/A	Meter Readers, Utilities	N/A	0	0	0	0	0	0	-3	+ 3
55341	52	Payroll/Timekeeping Clerks	N/A	40	226	190	26	2	484	-3	+ 487
63014	43	Police Patrol Officers	N/A	1	67	41	0	0	109	-3	+ 112
61005	43	Police/Detective Supervrs	N/A	1	67	41	0	0	109	-3	+ 113
98705	N/A	Refuse Collectors	N/A	0	0	0	0	0	0	-3	+ 3
97317	47	RR Brake, Signal, Switch Oprs	N/A	64	25	0	0	0	89	-6	+ 95
92308	48	Sewing Machine Opers/Tenders	N/A	28	40	0	0	0	68	-2	+ 70
55108	52	Secretaries, Ex Legal or Med	N/A	40	226	190	26	2	484	-56	+ 540
97805	8, 48	Service Station Attendants	N/A	28	40	0	0	0	68	-4	+ 72
63032	43	Sheriffs & Deputy Sheriffs	N/A	1	67	41	0	0	109	-7	+ 116
49021	8	Stock Clerks, Sales Floor	N/A	0	0	0	0	0	0	-29	+ 29
97102	1, 49	Truck Drivers, Heavy	N/A	2	59	36	5	0	102	-12	+ 114
55307	52	Typists, Incl Word Processing	N/A	40	226	190	26	2	484	-7	+ 491
53502	44	Welfare Eligibility Workers	N/A	2	5	72	24	0	103	-17	+ 120
92311	48	Woodworking Machine Setters	N/A	28	40	0	0	0	68	-3	+ 71

Shaded areas are students graduating that meet the minimum requirements of the occupation.

The bold line represents the deviding point with occupations above requiring education beyond high school.

References:

(1) Projected Occupation Growth - Research & Planning Section, Wyoming Department of Employment. Wyoming's Industry & Occupational Projections 1996-2006.

(2) Educational Requirement - America's Career InfoNet. http://www.acinet.com (16 November 1998).

(3) OES X CIP Crosswalk - National Occupational Coordinating Information Committee. http://www.state.ia.us/government/wd/ncdc/ (16 November 1998).

Table 13: Top 50 projected growing occupations in Nation crossed with 2 digit CIP.

Occupational Description & Minimum Educational Requirements				1997 Wyoming College Graduates (Supply)						Projected Growth (Demand)
OES Code	Matching CIP Code (3)	Occupational Title	Education Required (2)	Certificate	AA/AS	BA/BS	MA/MS	PhD/JD	1997 Supply Min. Qualifications	Annual Projected Demand (1)
32508	51	Emergency medical technicians	Certificate	69	372	137	37	0	615	4473
85705	15, 47	Data processing equipment repairers	Certificate	64	54	0	0	0	118	2609
68008	12	Manicurists	Certificate	4	7	0	0	0	11	2368
28305	22	Paralegal personnel	AS/AA	1	38	0	0	67	105	5850
32302	51	Respiratory therapists	AS/AA	69	372	137	37	0	546	2400
32505	51	Licensed practical nurses	AS/AA	69	372	137	37	0	546	17868
32908	51	Dental hygienists	AS/AA	69	372	137	37	0	546	4845
32911	51	Medical records technicians	AS/AA	69	372	137	37	0	546	4109
32928	51	Surgical technologists and technicians	AS/AA	69	372	137	37	0	546	1764
15017	46	Construction managers	BA/BS	2	2	0	0	0	0	5100
21508	52	Employment interviewers, private or public employment service	BA/BS	40	226	190	26	2	218	2482
21905	52	Management analysts	BA/BS	40	226	190	26	2	218	7423
22127	11, 14	Computer engineers	BA/BS	0	35	170	37	3	210	16050
24311	26, 51	Medical scientists	BA/BS	69	418	234	54	11	299	1009
25102	11, 52	Systems analysts, electronic data processing	BA/BS	40	244	213	34	3	250	40455
25302	27, 52	Operations and systems researchers and analysts, except computer	BA/BS	40	238	217	62	8	287	2023
27307	20	Residential counselors	BA/BS	0	0	0	0	0	0	11441
31308	13	Teachers, secondary school	BA/BS	5	160	245	77	6	328	35077
31311	13	Teachers, special education	BA/BS	5	160	245	77	6	328	18700
31514	13, 42, 51	Vocational and educational counselors	BA/BS	75	564	449	122	14	585	4582
32113	51	Chiropractors	BA/BS	69	372	137	37	0	174	1105
32305	51	Occupational therapists	BA/BS	69	372	137	37	0	174	3527
32308	51	Physical therapists	BA/BS	69	372	137	37	0	174	7405
32314	51	Speech-language pathologists and audiologists	BA/BS	69	372	137	37	0	174	3568
34038	8, 20, 50	Designers, except interior designers	BA/BS	2	78	29	1	0	30	6905
15026	8, 12, 19, 20, 52	Food service and lodging managers	N/A	44	237	222	30	2	535	17468
15031	1, 2	Nursery and greenhouse managers	N/A	3	103	79	13	2	200	645
15032	1	Lawn service managers	N/A	2	59	36	5	0	102	1064
27308	51	Human services workers	N/A	69	372	137	37	0	615	11391
31321	13, 31	Instructors and coaches, sports and physical training	N/A	5	163	298	78	6	548	8932
43014	8, 52	Sales agents, securities, commodities, and financial services	N/A	40	226	190	26	2	484	8168
53123	8, 52	Adjustment clerks	N/A	40	226	190	26	2	484	13441
53508	52	Bill and account collectors	N/A	40	226	190	26	2	484	8295
62035	N/A	Detectives and investigators, except public	N/A	0	0	0	0	0	0	2200
63017	43	Correction officers and jailers	N/A	1	67	41	0	0	109	14368
63047	43	Guards and watch guards	N/A	1	67	41	0	0	109	37714
65021	12	Bakers, bread and pastry	N/A	4	7	0	0	0	11	5445
66002	51	Dental assistants	N/A	69	372	137	37	0	615	7227
66005	51	Medical assistants	N/A	69	372	137	37	0	615	11027
66011	51	Home health aides	N/A	69	372	137	37	0	615	38927
66017	51	Physical and corrective therapy assistants and aides	N/A	69	372	137	37	0	615	5855
66021	51	Occupational therapy assistants and aides	N/A	69	372	137	37	0	615	1173
67008	1	Pest controllers and assistants	N/A	2	59	36	5	0	102	1823
68014	12	Amusement and recreation attendants	N/A	4	7	0	0	0	11	12605
68035	20	Personal and home care aides	N/A	0	0	0	0	0	0	19277
68038	20	Child care workers	N/A	0	0	0	0	0	0	22577
79033	1	Pruners	N/A	2	59	36	5	0	102	755
79036	1	Sprayers/applicators	N/A	2	59	36	5	0	102	441
79038	1	Lawn maintenance workers	N/A	2	59	36	5	0	102	2800
89707	48	Electronic pagination system operators	N/A	28	40	0	0	0	68	1359

Shaded areas are students graduating that meet the minimum requirements of the occupation
The bold line represents the deviding point with occupations above requiring education beyond high school

References

(1) Projected Occupation Growth - America's Career InfoNet. http://www.acinet.com (16 November 1998) Annual Projected Growth=(Growth 1994-2005/11)

(2) Educational Requirement - America's Career InfoNet. http://www.acinet.com (16 November 1998)

(3) OES X CIP Crosswalk - National Occupational Coordinating Information Committee. http://www.state.ia.us/government/wd/ncdc/ (16 November 1998)

A review of Tables 11-13 using the two digit CIP reveals several limitations that will be addressed by taking the analysis a step further to include the six digit CIP in the next section. For example OES Code 32502 is defined as a Registered Nurse. The Matching two digit CIP code for a Registered Nurse is 51, which relates to "Health Professions and Related Science." Looking at the "Education Required" reveals that only persons who have obtained at least a AA/AS degree within the two digit CIP code area would be qualified to pursue an occupation as a Registered Nurse. In Tables 11-13 only graduates in the shaded areas have the minimum educational requirements to work in the listed occupations. The Supply meeting the minimum qualifications to become RNs in this example is 546 graduates. It is doubtful that all 546 persons graduating with a two digit CIP of 51 are qualified to work as RNs.

However, the analysis is useful when you contrast the 50 growing versus the 50 declining occupations in Wyoming and the nation. The CIP code 51 corresponds with 16 percent of Wyoming's and 36 percent of the Nation's 50 fastest growing occupations and none of Wyoming's 50 declining occupations.

In contrast to the above example, CIP 13 Education appears on both the 50 growing and the 50 declining occupations of Wyoming. In Table 11 (growing) it appears as "Special Education Teachers, Teachers Aides and Sports Instructors & Coaches" and in Table 12 (declining) as "Teachers for Kindergarten, Elementary and Secondary Schools." The next section will separate the broad two digit CIP into its specific six digit codes for teachers K-12.

An Analysis of UW Graduates with CIP Codes Related to Teaching K-12

The University of Wyoming had 328 graduates in 1997 that met the minimum educational requirements to become teachers K-12. To take the current analysis a step further, the previously discussed occupational projections, a detailed 6 digit CIP code and wage records will be mined to assess the interactions between supply and demand in the labor market, illustrating the potential of this type of analysis.

Table 14 lists in detail the 328 Graduates by 6 Digit CIP and degree awarded. In reviewing Tables 11 and 12 you will note that Special Education Teachers (OES 31311) appear as one of the fastest growing occupations in Wyoming while Kindergarten, Elementary and Secondary Teachers (OES 31304, 31305 & 31308) are among the fastest declining. Table 14 combines all OES codes that represent Teachers K-12, all University of Wyoming graduates with 6 digit CIP codes in K-12 education programs and a combined annual Wyoming occupational projection for Teachers K-12.

Table 14: 1997 University of Wyoming graduates by 6 digit CIP (K-12 education degree) and degree awarded.

Matching CIP Code	CIP Description	BA/BS	MA/MS	PhD	Total
131202	Elementary Teacher Education	135	0	0	135
130101	Education, General	0	64	6	70
131205	Secondary Teacher Education	60	4	0	64
131314	Physical Education Teaching and Coaching	10	7	0	17
131099	Special Education, Other	14	0	0	14
131312	Music Teacher Education	12	0	0	12
131301	Agricultural Teacher Education	5	0	0	5
131303	Business Teacher Education	4	0	0	4
131309	Technology Teacher Education/Industrial Arts	4	0	0	4
131001	Special Education, General	1	2	0	1
	Total	245	77	6	328

Wyoming's Industry and Occupational Projections 1996-2006 , which uses a statistical model projects a net change of 506 fewer teachers K-12 will be employed over the next ten years. Table 15 shows the annual projected growth (Demand) of -51. As stated above UW produced 328 graduates (Supply) in 1997 that meet the minimum educational requirements to become teachers K-12 which appears to have created an oversupply of 379 teachers K-12 in 1997. Analysis of future wage record data may reveal whether an oversupply indeed exists and to what extent. To illustrate the analysis of future wage records data, 1997 and the first two quarters of 1998 wage record data are used in Tables 16 and 17 to show where the 1997 UW graduates (teachers K-12) were working.

All graduates of UW, excluding those who received Doctorates , were crossed by 2 digit CIP code, degree type and major industry using wage records for 1997 (Appendix 3) and 1998 (Appendix 4). Analysis of wage records reveals that of the remaining 322 (excluding PhDs) graduates, with teacher K-12 qualifications, 78 percent were found in wage records in 1997 and

Table 15: 1997 Supply (Education K-12 Graduates) versus 1997 Projected Growth (Demand).

Occupational Description	1997 Wyoming College Graduates (Supply)				Projected Growth (Demand)	Annual Supply Vs. Demand
Occupational Title (OES Code)	BA/BS	MA/MS	PhD	Wyoming's 1997 Supply	Annual Growth	Undersupply (-) Oversupply (+)
Teachers K-12 (31304, 31305, 31308, 31311)	245	77	6	328	-51	379

64 percent were found in 1998. The majority of the 251(78%) found in the 1997 Wage Records (Appendix 3, page 8) could be found in the two following major industries, 42(16.7%) Retail Trade (SIC 52-59), 186(74.1%) Services (SIC 70-89) and of the 205(64%) found in the first two quarters of 1998 (Appendix 4, page 6) 13(6.3%) Retail Trade (SIC 52-59), 175(85.4%) Services (SIC 70-89).

The specific four digit SICs and wage records are explored in greater detail in Table 16 for 1997 and Table 17 for 1998. Of the original 322 graduates in 1997, 150(47%) in 1997, and 154(48%) using the first two quarters of 1998 wage records, are found working in specific industries that would be most likely to utilize their educational skills. These industries include "Elementary and Secondary Schools (SIC 8211)," "Colleges and Universities (SIC 8221)," "Junior Colleges and Technical Institutes (SIC 8222)" and "Schools and Educational Services (SIC 8299)."

Combining college completers, wage records and projected occupational growth leads to some interesting questions and a point where future analyses should begin. Statistical occupational projections do not and can not mathematically take into consideration several of the following issues that affect the supply and demand of teachers K-12 on a transitory basis. A brief introduction to each of these issues will offer paths for future research .

Projections of occupational growth (demand) imply a closed rigid system and do not address issues such as teachers entering and exiting (replacements and separations) due to factors such as, relocation and retirement. The September 1998 issue of Trends contained an article entitled "Selected Determinants of Elementary and Secondary Teachers Wages" which showed that Wyoming ranked 23rd for Elementary Teachers and 30th for Secondary Teachers in hourly wages[2]. With surrounding states paying higher wages for teachers, it is quite likely that persons with a large investment in their education are relocating out of state.

Another factor expected to influence separations from the educational system is the mean age of its current employees, being closer to retirement than in other industries. As stated in the October 1997 issue of Trends in reference to Wyoming's Education Industry with respect to the

Table 16: University of Wyoming Graduates* in Education (CIP13) Found in 1997 Wage Records (Four Quarters) by Degree Type by Standard Industrial Code (four digit SIC) by Ownership, Crosstabulation

Degree Type	SIC Description	SIC Code	Ownership				Total
			No Ownership	State Govt.	Local Govt.	Private	
Bachelors			1				1
	Crop Planting, Cultivating, and Protecting	0721			3		3
	General Contractors–Nonresidential Buildings	1542				1	1
	Highway and Street Construction, Except Elevated Highways	1611				1	1
	Water, Sewer, Pipeline, and Communications and Power Line Construction	1623				1	1
	Plumbing, Heating, and Air-Conditioning	1711				1	1
	Painting and Paper Hanging	1721				1	1
	Carpentry Work	1751				1	1
	Bottled & Canned Soft Drinks & Carbonated Waters	2086				1	1
	Newspapers: Publishing, or Publishing & Printing	2711				1	1
	Department Stores	5311				5	5
	Miscellaneous General Merchandising Stores	5399				1	1
	Grocery Stores	5411				1	1
	Gasoline Service Stations	5541				2	2
	Women's Clothing Stores	5621				1	1
	Family Clothing Stores	5651				1	1
	Misc. Apparel and Accessory Stores	5699				3	3
	Eating Places	5812				18	18
	Drinking Places (Alcoholic Beverages)	5813				2	2
	Liquor Stores	5921				2	2
	Sporting Goods Stores & Bicycle Shops	5941				1	1

Table 16 (cont.)

	Gift, Novelty, and Souvenir Shops	5947				2	2
	Catalog and Mail-Order Houses	5961				2	2
	National Commercial Banks	6021				1	1
	Real Estate Agents and Managers	6531				1	1
	Hotels and Motels	7011				1	1
	Building Cleaning and Maintenance Services	7349				1	1
	Help Supply Services	7363				1	1
	Business Services, Not Elsewhere Classified	7389				2	2
	Passenger Car Rental	7514				1	1
	Repair Shops and Related Services, Not Elsewhere Classified	7699				1	1
	Motion Picture Theaters, Except Drive-In	7832				1	1
	Amusement & Recreation Services, Not Elsewhere Classified	7999				2	2
	Specialty Outpatient Facilities, Not Elsewhere Classified	8093				1	1
	Elementary & Secondary Schools	8211			84	1	85
	Colleges, Universities, & Professional Schools	8221		10			10
	Child Day Care Services	8351				9	9
	Residential Care	8361				2	2
	Museums and Art Galleries	8412				1	1
	Business Associations	8611				1	1
	Civic, Social, and Fraternal Associations	8641				4	4
	Business Consulting Services, Not Elsewhere Classified	8748				1	1
	Executive and Legislative Offices Combined	9131			6		6
	Courts	9211		1			1
		Sub Total	1	11	93	81	186

Masters	Paint, Glass and Wallpaper Stores	5231				1	1
	Specialty Outpatient Facilities, Not Elsewhere Classified	8093				3	3
	Elementary and Secondary Schools	8211			41		41
	Colleges, Universities, and Professional Schools	8221		11			11
	Junior Colleges and Technical Institutes	8222			2		2
	Schools and Educational Services, Not Elsewhere Classified	8299				1	1
	Individual and Family Social Services	8322				1	1
	Child Day Care Services	8351				1	1
	Residential Care	8361				1	1
	Private Households	8811				1	1
	Executive & Legislative Offices Combined	9131			1		1
	Administration of Educational Programs	9411			1		1
		Sub Total	1	11	45	9	66
		Total	1		22	90	251

* Bachelor and Master Degree Completers Only.

Table 17: University of Wyoming Graduates* in Education (CIP13) Found in 1998 Wage Records (First Two Quarters) by Degree Type by Standard Industrial Code (four digit SIC) by Ownership, Crosstabulation

Degree Type	SIC Description	SIC Code	Ownership				Total
			No Ownership	State Govt.	Local Govt.	Private	
Bachelors			2				2
	Crop Planting, Cultivating, and Protecting	0721			2		2
	General Contractors – Single Family Houses	1521				1	1
	Highway and Street Construction, Except Elevated Highways	1611				1	1
	Water, Sewer, Pipeline, and Communications and Power Line Construction	1623				1	1
	Plumbing, Heating, and Air-Conditioning	1711				1	1
	Painting and Paper Hanging	1721				2	2
	Farm Supplies	5191				1	1
	Department Stores	5311				1	1
	Grocery Stores	5411				1	1
	Motor Vehicle Dealers	5511				1	1
	Misc. Apparel and Accessory Stores	5699				2	2
	Eating Places	5812				6	6
	Liquor Stores	5921				1	1
	Catalog and Mail-Order Houses	5961				1	1
	Hotels and Motels	7011				1	1
	Business Services, Not Elsewhere Classified	7389				1	1
	Amusement & Recreation Services, Not Elsewhere Classified	7999				1	1
	Specialty Outpatient Facilities, Not Elsewhere Classified	8093				1	1
	Elementary & Secondary Schools	8211			101	1	102

	Colleges, Universities, & Professional Schools	8221		3			3
	Junior Colleges and Technical Institutes	8222			1		1
	Job Training and Vocational Rehabilitation Services	8331				1	1
	Child Day Care Services	8351				6	6
	Residential Care	8361				1	1
	Social Services, Not Elsewhere Classified	8399				1	1
	Civic, Social, and Fraternal Associations	8641				2	2
	Engineering Services	8711				1	1
	Executive and Legislative Offices Combined	9131			1		1
	Administration of Educational Programs	9411			1		1
	Administration of Public Health Programs	9431			1		1
		Sub Total	2	3	107	37	149
Masters			1				1
	Specialty Outpatient Facilities, Not Elsewhere Classified	8093				2	2
	Elementary and Secondary Schools	8211			41		41
	Colleges, Universities, and Professional Schools	8221		6			6
	Junior Colleges and Technical Institutes	8222			1		1
	Individual and Family Social Services	8322				1	1
	Child Day Care Services	8351				1	1
	Residential Care	8361				1	1
	Executive & Legislative Offices Combined	9131			1		1
	Administration of Educational Programs	9411			1		1
		Sub Total	1	6	44	5	56
		Total	1	6	151	42	205

* Bachelor and Master Degree Completers Only.

expected large outflow due to retirement, "This retirement process will mean numerous additional job openings compared to the current level."[3] Both examples above suggest that teachers K-12 are leaving the educational system. It is important to keep in mind that as people leave creating positions for teachers K-12 others (possibly teachers with less experience) will enter the system to fill the void. The influences of separations and replacements offer another area for future analysis.

Student driven demand for teachers is also declining within Wyoming as suggested in a recent Trends (March, 1998) article.[4] The population of Wyoming residents aged 5-19 is projected to decline 13.7 percent over the next ten years. A smaller school-age population base would be indicative of less positions for teachers in the state and would support the ten year decline in total positions suggested by the current research. The above analysis can not incorporate the social mechanisms that would drive the population to create a demographic change, but the impact of these changes would be of interest for future research.

Policy issues such as teachers salaries and increased budgetary allowances (Casper Star-Tribune, July 3, 1998)[5] and reductions in class size (Casper Star-Tribune, May 12, 1998)[6] are likely to influence the supply and demand issues in ways not yet explored. An increase in a school district budget, similar to the $10,000,000 that Natrona County will receive, is likely to increase the desirability of teaching positions on a local and regional level. For example the Natrona County School District intends to up the starting wages for teachers by $2,000/year. Further with the national trend toward a smaller classroom size, teaching positions will be created in response to calls for a smaller student to teacher ratio. How these and other policy issues influence the supply and demand issues will be of interest for future analysis.

It is also important to keep in mind that the current analysis taps into a fraction of the potential for this type of research. The data used provides only a snapshot in time, as only one year of college completer data was available. There are several other issues that could be addressed using a continuum of data. It is not known if the change of graduates found in wage records from 1997 (78%) to the first two quarters of 1998 (64%), is due to an outflow of teachers K-12 to other states or a seasonal variation that can be accounted for with future data. Are individuals who receive degrees, beyond a BA/BS already employed by the educational system, and therefore not part of the available supply? What happens to the graduate in the time span between graduation and successfully obtaining a job that utilizes their abilities? There is an endless list of questions, such as these, that future research could investigate about teachers K-12 and any other occupation we wish to focus on.

PART B.

University of Wyoming 1997 Graduates Compared to 1997 Wage Records (Four Quarters)

Tables B1 and B4 are crosstabulations of UW graduates (1997 Academic Year) found or not found in wage records by degree type. Table B1 uses 1997 Wage Records (Four Quarters) and B4 uses 1998 Wage Records (Two Quarters). These two tables tell us that of the 1,553 UW graduates who earned bachelors, 1095 (70.5%) were found in 1997 Wage Records and 805 (51.8%) were found in 1998 Wage Records. Of the 354 UW graduates with masters, 202 (57.1%) were found in the 1997 Wage Records and 153 (43.2%) were found in the 1998 Wage Records.

Tables B2 and B5 are crosstabulations of UW graduates' Instructional Programs (two digit CIP) by Found or Not Found in Wage Records. Once again, Table B2 uses 1997 Wage Record data and Table B5 uses 1998 Wage Record data. Of the 1,297 graduates found in 1997 Wage Records, 251 (19.4%) were in the Education Program, 139 (10.7%) were in the Business Management & Administrative Services Program, and 122 (9.4%) were in the Social Sciences & History Program. Of the 610 not found in the 1997 Wage Records the most represented program was Engineering at 88 (14.4%). Of the 958 graduates found in the 1998 Wage Records, the most represented program was Education at 205 (21.4%). Of the 949 not found in 1998 Wage Records, the most represented program is Engineering at 124 (13.1%).

Tables B3 and B6 use subsets of the data files for the preceding tables. Only those found in the 1997 & 1998 Wage Records files are considered in these two tables respectively. Each table contains two crosstabulations because the data are first broken out by a level variable, Degree Type, which contains two categories bachelors and masters. These tables also contain

both row and column percentages. Of the UW graduates found in 1997 Wage Records receiving a bachelor's degree, 265 were working in the Services Industry for a company that was privately owned. This represents 47.7 percent of the Services Industry and 37.8 percent of the privately owned companies for which graduates of UW receiving a bachelor's and being found in the 1997 Wage Records were working. Of the UW graduates found in 1998 Wage Records receiving bachelors, 195 were working in the Services Industry for a company that was privately owned. This represents 43.2 percent of the Services Industry and 42.7 percent of the privately owned companies for which graduates of UW receiving their bachelor's degrees and being found in the 1998 Wage Records were working.

Appendix 3 (using 1997 Wage Records) and Appendix 4 (which uses 1998 Wage Records), contain tables describing 1997 University of Wyoming Completers Found in Wage Records by Major Industry by Ownership. These large tables are similar to Tables B3 and B6 in that they contain more than one crosstabulation. The difference is that these tables contain three, level variables [, i.e., wage records status, instructional program (two digit CIP), and degree type] that act as a key. This key represents a unique combination of these three variables. A different Major Industry by Ownership crosstabulation is produced for each of these key variable combinations. Seven individuals fit the following description: a 1997 UW graduate found on 1997 Wage Records, from the Agricultural Sciences program with a bachelors degree working in the Services Industry for a Branch of State Government (See bottom of page 3 in Appendix 3).

Table B1: Percentage of University of Wyoming 1997 Completers* Found or Not Found in 1997 Wage Records (Four Quarters) by Degree Type, Crosstabulation

Found in Wage Records?	Degree Type		Total
	Bachelors	Masters	
No	29.5% (458)	42.9% (152)	32.0% (610)
Yes	70.5% (1095)	57.1% (202)	68.0% (1297)
TOTAL	100.0% (1553)	100.0% (354)	100.0% (1907)

*Completers include only students earning Bachelor and Master Degrees during Calendar Year 1997.

Table B2: Percentage of Completers* of University of Wyoming Instructional Programs (two digit CIP) Found or Not Found in 1997 Wage Records (Four Quarters), Crosstabulation

Institution Program (two digit CIP)	Found in Wage Records?		
	No	Yes	Total
Agricultural Business & Production (01)	2.5% (15)	2.0% (26)	2.1% (41)
Agricultural Sciences (02)	3.3% (20	2.4% (31)	2.7% (51)
Conservation & Renewable Natural Resources (03)	2.5% (15)	1.9% (25)	2.1% (40)
Area, Ethnic & Cultural Studies (05)	.7% (4)	.4% (5)	.5% (9)
Communications (09)	2.1% (13)	3.4% (44)	3.0% (57)
Computer & Information Sciences (11)	2.0% (12)	1.5% (19)	1.6% (31)
Education (13)	11.6% (71)	19.4% (251)	16.9% (322)
Engineering (14)	14.4% (88)	6.8% (88)	9.2% (176)
Foreign Languages & Literatures (16)	.7% (4)	.8% (10)	.7% (14)
Home Economics, General (19)	1.5% (9)	2.1% (27)	1.9% (36)
English Language & Literature/Letters (23)	2.5% (15)	1.9% (25)	2.1% (40)
Biological Sciences/Life Sciences (26)	5.6% (34)	6.2% (80)	6.0% (114)
Mathematics (27)	4.6% (28)	2.7% (35)	3.3% (63)
Multi/Interdisciplinary Studies (30)	.3% (2)		.1% (2)
Parks, Recreation, Leisure & Fitness Studies (31)	2.5% (15)	2.9% (37)	2.7% (52)
Philosophy & Religion (38)	.7% (4)	.3% (4)	.4% (8)
Physical Sciences (40)	4.1% (25)	1.5% (20)	2.4% (45)
Psychology (42)	2.3% (14)	4.7% (61)	3.9% (75)
Protective Services (43)	.8% (5)	2.8% (36)	2.1% (41)
Public Administration & Services (44)	3.6% (22)	5.7% (74)	5.0% (96)
Social Sciences & History (45)	8.4% (51)	9.4% (122)	9.1% (173)
Visual & Performing Arts (50)	1.0% (6)	1.9% (24)	1.6% (30)
Health Professions & Related Sciences (51)	9.8% (60)	8.8% (114)	9.1% (174)
Business Management & Administrative Services (52)	12.6% (77)	10.7% (139)	11.3% (216)
Unknown	.2% (1)		.1% (1)
TOTAL	100.0% (610)	100.0% (1297)	100.0% (1907)

* Completers include only Bachelor and Master Degrees Earned in Calendar Year 1997.

Table B3: University of Wyoming Completers Found in 1997 Wage Records (Four Quarters) by Degree Type by Major Industry by Ownership, Crosstabulation

Degree Type	Major Industrial Divisions (SIC)	Ownership				Total
		No Ownership	State Govt.	Local Govt.	Private	
Bachelors	No assigned Standard Industrial Code	14 (100.0%) (100.0%)				14 (100.0%) (1.3%)
	Agriculture, Forestry, Fishing			4 (23.5%) (1.9%)	13 (76.5%) (1.9%)	17 (100.0%) (1.6%)
	Mining				15 (100.0%) (2.1%)	15 (100.0%) (1.4%)
	Construction		9 (17.0%) (5.2%)		44 (83.0%) (6.3%)	53 (100.0%) (4.8%)
	Manufacturing				34 (100.0%) (4.9%)	34 (100.0%) (3.1%)
	Transportation and Public Utilities			1 (3.1%) (.5%)	31 (96.9%) (4.4%)	32 (100.0%) (2.9%)
	Wholesale Trade				13 (100.0%) (1.9%)	13 (100.0%) (1.2%)
	Retail Trade				254 (100.0%) (36.2%)	254 (100.0%) (23.2%)
	Finance, Insurance, and Real Estate				32 (100.0%) (4.6%)	32 (100.0%) (2.9%)
	Services		130 (23.4%) (74.7%)	161 (29.0%) (78.2%)	265 (47.7%) (37.8%)	556 (100.0%) (50.8%)
	Public Administration		35 (46.7%) (20.1%)	40 (53.3%) (19.4%)		75 (100.0%) (6.8%)
	TOTAL	14 (1.3%) (100.0%)	174 (15.9%) (100.0%)	206 (18.8%) (100.0%)	701 (64.0%) (100.0%)	1095 (100.0%) (100.0%)

Table B3 (cont.)

Masters	No assigned Standard Industrial Code	2 (100.0% (100.0%)				2 (100.0%) (1.0%)
	Mining				1 (100.0%) (1.7%)	1 (100.0%) (.5%)
	Construction		2 (100.0%) (3.0%)			2 (100.0%) (1.0%)
	Manufacturing				2 (100.0%) (3.4%)	2 (100.0%) (1.0%)
	Wholesale Trade				1 (100.0%) (1.7%)	1 (100.0%) (.5%)
	Retail Trade				11 (100.0%) (19.0%)	11 (100.0%) (5.4%)
	Finance, Insurance, and Real Estate				2 (100.0%) (3.4%)	2 (100.0%) (1.0%)
	Services		58 (33.9%) (87.9%)	72 (42.1%) (94.7%)	41 (24.0%) (70.7%)	171 (100.0%) (84.7%)
	Public Administration		6 (60.0%) (9.1%)	4 (40.0%) (5.3%)		10 (100.0%) (5.0%)
	TOTAL	2 (1.0%) (100.0%)	66 (32.7%) (100.0%)	76 (37.6%) (100.0%)	58 (28.7%) (100.0%)	202 (100.0%) (100.0%)

University of Wyoming 1997 Graduates Compared to 1998 Wage Records (First Two Quarters)

Table B4: Percentage of University of Wyoming 1997 Completers Found or Not Found in 1998 Wage Records (First Two Quarters) by Degree Type, Crosstabulation

Found in Wage Records?	Degree Type		Total
	Bachelors	Masters	
No	48.2% (748)	56.8% (201)	49.8% (949)
Yes	51.8% (805)	43.2% (153)	50.2% (958)
TOTAL	100.0% (1553)	100.0% (354)	100.0% (1907)

*Completers include only students earning Bachelor and Master Degrees during Calendar Year 1997.

Table B5: Percentage of Completers* of University of Wyoming Instructional Programs (two digit CIP) Found or Not Found in 1998 Wage Records (First Two Quarters), Crosstabulation[7]

Institution Program (two digit CIP)	Found in Wage Records?		Total
	No	Yes	
Agricultural Business & Production (01)	2.4% (23)	1.9% (18)	2.1% (41)
Agricultural Sciences (02)	3.9% (37)	1.5% (14)	2.7% (51)
Conservation & Renewable Natural Resources (03)	2.2% (21)	2.0% (19)	2.1% (40)
Area, Ethnic & Cultural Studies (05)	.8% (8)	.1% (1)	.5% (9)
Communications (09)	3.1% (29)	2.9% (28)	3.0% (57)
Computer & Information Sciences (11)	2.3% (22)	.9% (9)	1.6% (31)
Education (13)	12.3% (117)	21.4% (205)	16.9% (322)
Engineering (14)	13.1% (124)	5.4% (52)	9.2% (176)
Foreign Languages & Literatures (16)	.6% (6)	.8% (8)	.7% (14)
Home Economics, General (19)	1.6% (15)	2.2% (21)	1.9% (36)
English Language & Literature/Letters (23)	1.6% (15)	2.6% (25)	2.1% (40)
Biological Sciences/Life Sciences (26)	6.0% (57)	5.9% (57)	6.0% (114)
Mathematics (27)	3.5% (33)	3.1% (30)	3.3% (63)
Multi/Interdisciplinary Studies (30)	.2% (2)		.1% (2)
Parks, Recreation, Leisure & Fitness Studies (31)	3.2% (30)	2.3% (22)	2.7% (52)
Philosophy & Religion (38)	.4% (4)	.4% (4)	.4% (8)
Physical Sciences (40)	3.2% (30)	1.6% (15)	2.4% (45)
Psychology (42)	3.4% (32)	4.5% (43)	3.9% (75)
Protective Services (43)	1.6% (15)	2.7% (26)	2.1% (41)
Public Administration & Services (44)	3.6% (34)	6.5% (62)	5.0% (96)
Social Sciences & History (45)	9.3% (88)	8.9% (85(	9.1% 173
Visual & Performing Arts (50)	1.3% (12)	1.9% (18)	1.6% (30)
Health Professions & Related Sciences (51)	10.2% (97)	8.0% (77)	9.1% (174)
Business Management & Administrative Services (52)	10.2% (97)	12.4% (119)	11.3% (216)
Unknown	.1% (1)		.1% (1)
TOTAL	100.0% (949)	100.0% (958)	100.0% (1907)

* Completers include only Bachelor and Master Degrees Earned in Calendar Year 1997.

Table B6: University of Wyoming Completers Found in 1998 Wage Records (First Two Quarters) by Degree Type by Major Industry by Ownership, Crosstabulation

Degree Type	Major Industrial Divisions (SIC)	Ownership				Total
		No Ownership	State Govt.	Local Govt.	Private	
Bachelors	No assigned Standard Industrial Code	22 (100.0%) (100.0%)				22 (100.0%) (2.7%)
	Agriculture, Forestry, Fishing			2 (25.0) (1.0%)	6 (75.0%) (1.3%)	8 (100.0%) (1.0%)
	Mining				11 (100.0%) (2.4%)	11 (100.0%) (1.4%)
	Construction		7 (22.6%) (6.0%)		24 (77.4%) (5.3%)	31 (100.0%) (3.9%)
	Manufacturing				20 (100.0%) (4.4%)	20 (100.0%) (2.5%)
	Transportation and Public Utilities				24 (100.0%) (5.3%)	24 (100.0%) (3.0%)
	Wholesale Trade				12 (100.0%) (2.6%)	12 (100.0%) (1.5%)
	Retail Trade				124 (100.0%) (27.1%)	124 (100.0%) (15.4%)
	Finance, Insurance, and Real Estate				41 (100.0%) (9.0%)	41 (100.0%) (5.1%)
	Services		73 (16.2%) (62.4%)	183 (40.6%) (87.6%)	195 (43.2%) (42.7%)	451 (100.0%) (56.0%)
	Public Administration		37 (60.7%) (31.6%)	24 (39.3%) (11.5%)		61 (100.0%) (7.6%)
	TOTAL	22 (2.7%) (100.0%)	117 (14.5%) (100.0%)	209 (26.0%) (100.0%)	457 (56.80%) (100.0%)	805 (100.0%) (100.0%)

Masters	No assigned Standard Industrial Code	1 (100.0% (100.0%)				1 (100.0%) (.7%)
	Mining				2 (100.0%) (4.5%)	2 (100.0%) (1.3%)
	Construction		2 (100.0%) (5.3%)			2 (100.0%) (1.3%)
	Manufacturing				1 (100.0%) (2.3%)	2 (100.0%) (.7%)
	Wholesale Trade				1 (100.0%) (2.3%)	1 (100.0%) (.7%)
	Retail Trade				5 (100.0%) (11.40%)	5 (100.0%) (3.3%)
	Finance, Insurance, and Real Estate				3 (100.0%) (6.8%)	3 (100.0%) (2.0%)
	Services		32 (24.6%) (84.2%)	66 (50.8%) (94.3%)	32 (24.6%) (72.7%)	130 (100.0%) (85.0%)
	Public Administration		4 (50.0%) (10.5%)	4 (50.0%) (5.7%)		8 (100.0%) (5.2%)
	TOTAL	1 (.7%) (100.0%)	38 (24.8%) (100.0%)	70 (45.86%) (100.0%)	44 (28.7%) (100.0%)	153 (100.0%) (100.0%)

End Notes

1 Connecticut. Department of Higher Education. "Classification of Instructional Programs (CIP), 1990 Edition." http://ctdhe.commnet.edu/cip/ (16 Nov. 1998), p. 1.

2 Gayle C. Edlin, "Selected Determinants of Elementary and Secondary Teacher's Wages," Trends, September 1998, p.1.

3 Lee Saathoff, "Wyoming Public Education Industry (K-12): Aging Employment in the Wyoming Education System," Trends, October 1997, p. 8.

4 Wenlin Liu, "Wyoming Population Projections," Trends, March 1998, p. 7.

5 Sonja Lee, "School District Working with $10 Million Increase," [photocopied article], Casper Star-Tribune, July 3, 1998.

6 Janet Picknally, "Tentative School Budget Accepted," [photocopied article], Casper Star-Tribune, May 12, 1998.

7 On the first draft of this table, titled "Instructional Program (two digit cip)*Degree Type*FOUND ON WAGE RECORDS? Crosstabulation,"distributed at the Wyoming Workforce Development Council Meeting, Labor Demand and Supply Subcommittee on 13 November 1998, the analysts failed to use enough variables to secure a direct one-to-one match between the University of Wyoming data table and the 1997 wage records data. This table represents a correction of that error.

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Appendix 1

A. DATA SOURCES

The following four basic files were used to construct the two working files used to produce the tables in Part B of this report:

1. 1997 University of Wyoming Graduates---This file is a combination of the three 1997 semester enrollment files received from the university. These three files were then combined into one file (28,461 records). Then those listed as having graduated where selected and put into a new file (2,040 records). Then those receiving doctorates were removed. The reason for doing so is that J.D.s are most likely to be self employed and Ph.D.s are inclined to seek employment in the national market place. The final file used contained 1907 records.
2. Wage Records for 1997---This file is a combination of four quarters of Wage Record data (880,081 records). This file was then reduced to one record for each SSN (person) by selecting the primary employer for the year for each SSN. The primary employer is the employer that paid the individual the highest quarterly wage for that year. The final wage file used contained 286,827 records.
3. Wage Records for 1998---The 1998 Wage Records file was produce in the same manner as the 1997 file with one exception. The 1998 Wage Records file was produced with only the first two quarters of data due to availability.
4. Fourth Quarter 1997 ES-202 file---This file is a record of all employers (master records only as of fourth quarter 1997) in the state that are subject to unemployment insurance (18,109 records). The time constraint on this project did not permit all four quarters of the ES-202 data to combined. So the fourth quarter of 1997 was chosen because it offered the best probability of a good match. Only 16 out of a possible 1,297 records (1.2%) in 1997 and 23 out of a possible 958 records (2.4%) in 1998 did not match (See tables B3 and B6).

B. FIELDS FROM EACH DATA FILE USED IN THE NEW FILES

The UW file contains the following information:

SSN--Social Security Number (Used to Match with Wage Record file)
CIP code--Classification of Instructional program
Type of Degree--B.S./B.A./Masters

Both 1997 & 1998 Wage Record files contain the following information:

SSN--Social Security Number
UI #--Unemployment Insurance number (employer, Used to Match with ES-202 file)
year--Year of Wage Record in witch highest wage was received
QTR--Quarter of Wage Records in witch highest wage was received

The ES-202 file contains the following information:

UI #--Unemployment Insurance number (employer)
SIC--Standard Industrial Classification (industry)
Ownership--Whether the business is owned by Government (local, state) or Private entities

When a match is found between the UW file and Wage Records, this allows us to link an individual with an employer. Also, when a match is found between the Wage Records file and the ES-202 file, we can then assign the employer, industry (SIC) and ownership code. This allows us to link the individual with the industry in which they work.
(Individual--employer--industry)

C. PROCEDURE FOR COMBINING THE FILES

In order to obtain the two final data files used to produce the tables in Part B of this report, information from the four files explained above must be combined. In order to produce the first of the two files, a program was written that added the information from the UW, 1997 Wage Records, and ES-202 files together utilizing the following steps for each record in the UW file:

1. Add information from UW file to a new file
2. Search the Wage Record file for the SSN in the UW file
3. If a match was found information from the Wage Record file was added
4. If a match was not found Skip to next record
5. If a match was found for Wage Records it then searched the ES-202 file by UI#
6. If a match was found in the ES-202 file its information was added

This process was used again with the 1998 Wage Records file in place of the 1997 Wage Records to obtain the second file. After the files were combined the new files was transferred from FoxPro to SPSS. SPSS was used to produce the tables.

Appendix 2

Classification of Instructional Programs (CIP), 1990 Edition

01. AGRICULTURAL BUSINESS AND PRODUCTION. A summary of groups of instructional programs that prepare individuals to apply scientific knowledge and methods, and techniques to agricultural business and production.

02. AGRICULTURAL SCIENCES. A summary of groups of instructional programs that describe the study of animals and plants as related to agricultural production, the organization of agricultural work, and the processing and distribution of food and fiber products.

03. CONSERVATION AND RENEWABLE NATURAL RESOURCES. A summary of groups of instructional programs that prepare individuals for activities involving the conservation and/or improvement of natural resources.

04. ARCHITECTURE AND RELATED PROGRAMS. A summary of groups of instructional programs that describe the principles and methods used to create, adapt, alter, preserve, and control human physical and social surroundings and habitations.

05. AREA, ETHNIC AND CULTURAL STUDIES. A summary of groups of instructional programs that describe the history, society, politics, culture, and economics of a particular geographic region, or a particular subset of the population sharing common characteristics, traits and customs.

08. MARKETING OPERATIONS/MARKETING AND DISTRIBUTION. A summary of groups of instructional programs that prepare individuals to plan and execute, at the operational or direct sales level, the promotion and distribution of ideas, goods and services in order to create exchanges that satisfy individual and organizational objectives.

09. COMMUNICATIONS. A summary of groups of instructional programs that describe the creation, transmission and evaluation of messages.

10. COMMUNICATIONS TECHNOLOGIES. A group of instructional programs that prepare individuals to support and assist communications professionals and skilled communications workers.

11. COMPUTER AND INFORMATION SCIENCES. A summary of groups of instructional programs that describe the design, development and operation of electronic data storage and processing systems, including hardware and software.

12. PERSONAL AND MISCELLANEOUS SERVICES. A summary of instructional programs that prepare individuals to provide a variety of services to individual consumers as well as to organizations such as businesses and industries.

13. EDUCATION. A summary of groups of instructional programs that describe the theory and practice of learning and teaching, and related research, administrative and support services.

14. ENGINEERING. A summary of groups of instructional programs that prepares individuals to apply mathematical and scientific principles to the solution of practical problems for the benefit of society.

15. ENGINEERING RELATED TECHNOLOGIES. A summary of groups of instructional programs that prepare individuals to apply basic engineering principles and technical skills in support of engineering and related projects.

16. FOREIGN LANGUAGES AND LITERATURES. A summary of groups of instructional programs that describe the study of languages other than English, and the study of related aspects of foreign literatures and cultures.

19. HOME ECONOMICS, GENERAL. A summary of groups of instructional programs that describe the relationship of the physical, social, emotional, and intellectual environments to the development of individuals, homes and families, and the effects of these factors on society and the workplace.

20. VOCATIONAL HOME ECONOMICS. A summary of groups of instructional programs that describe competencies in home economics which prepare individuals for the occupation of homemaking, for paid employment, and for organizing and managing business undertakings and services.

21. TECHNOLOGY EDUCATION/INDUSTRIAL ARTS. A summary of groups of instructional programs that provide individuals with knowledge and competencies pertaining to aspects of industry and technology, including a variety of learning experiences, and that assist individuals in making informed and meaningful occupational choices as well as preparation for entry into occupational training or education programs.

22. LAW AND LEGAL STUDIES. A summary of groups of instructional programs that describe the theory, history and application of the rules of conduct by which societal relations are formally structured and adjudicated.

23. ENGLISH LANGUAGE AND LITERATURE/LETTERS. A summary of groups of instructional programs that describe the structure and use of the English language and dialects, speech, writing, and various aspects of the literatures and cultures of the English-speaking peoples.

24. LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES. A summary of groups of instructional programs that describe general programs and independent or individualized studies in the liberal arts subjects, the humanities disciplines and the general curriculum.

25. LIBRARY SCIENCE. A summary of groups of instructional programs that describe the knowledge and skills required to manage and/or maintain libraries and related information and record systems, collections and facilities for research and general use.

26. BIOLOGICAL SCIENCES/LIFE SCIENCES. A summary of groups of instructional programs that describe the scientific study of living organisms and their systems.

27. MATHEMATICS. A summary of groups of instructional programs that describe the systematic study of logical symbolic language and its applications.

29. MILITARY TECHNOLOGIES. A summary of groups of instructional programs that prepare individuals in specialized and advanced subject matter for the armed services and related national security organizations.

30. MULTI/INTERDISCIPLINARY STUDIES. A summary of groups of instructional programs, the components of which derive from two or more separate instructional programs.

31. PARKS, RECREATION, LEISURE AND FITNESS STUDIES. A summary of groups of instructional programs that describe the principles and practices of managing parks and other recreational and fitness facilities; providing recreational, leisure and fitness services; and the study of human fitness.

The programs in the 32., 33., 34., 35., 36. and 37. Series describe areas of educational competence that equip individuals with knowledge and/or skills related to personal growth and leisuretime pursuits. Most of these instructional programs are designed for adult learners and are not formal academic or occupationally specific programs, nor do they result in transferable credit. Awards and completions in these programs are usually informal. These codes and Series are located in Chapter IV to avoid potential confusion with codes and Series in Chapter I, since data for these programs are not routinely collected or analyzed by the United States Department of Education.

32. Basic Skills. A summary of groups of instructional programs that describe fundamental knowledge and skills that individuals need in order to function productively in society.

33. Citizenship Activities. A summary of groups of instructional programs that prepare individuals for citizenship, and describe how citizens may engage in civic activities.

34. Health Related Knowledge and Skills. A summary of groups of instructional programs that describe the promotion of personal and family health..

35. Interpersonal and Social Skills. A summary of groups of instructional programs that describe how to effectively interact with others in private, social and business settings.

36. LEISURE & RECREATIONAL ACTIVITIES. A summary of groups of instructional programs that describe the development of an appreciation for and competency in recreational and leisure related activities.

37. Personal Awareness and Self Improvement. A summary of groups of instructional programs that describe how to develop improved self awareness, avoid stressful behavior and improve decision making skills.

38. PHILOSOPHY AND RELIGION. A summary of groups of instructional programs that describe the study of modes, methods and types of logical inquiry; and the study of organized systems of belief and related practices.

39. THEOLOGICAL STUDIES AND RELIGIOUS VOCATIONS. A summary of groups of instructional programs that describe the study of religious beliefs, doctrines, and practices from the intramural standpoint of a particular faith; and that prepare individuals for the professional practice of religious vocations.

40. PHYSICAL SCIENCES. A summary of groups of instructional programs that describe the scientific study of inanimate objects, processes of matter and energy, and associated phenomena.

41. SCIENCE TECHNOLOGIES. A summary of groups of instructional programs that prepare individuals to apply scientific principles and technical skills in support of scientific research and development.

42. PSYCHOLOGY. A summary of groups of instructional programs that describe the scientific study of the behavior of individuals, independently or collectively, and the physical and environmental bases of mental, emotional and neurological activity.

43. PROTECTIVE SERVICES. A summary of groups of instructional programs that describe the principles and procedures for providing police, fire, and other safety services, and for managing penal institutions.

44. PUBLIC ADMINISTRATION AND SERVICES. A summary of groups of instructional programs that prepare individuals to analyze, manage, and deliver public programs and services.

45. SOCIAL SCIENCES AND HISTORY. A summary of groups of instructional programs that describe the systematic study of social systems, social institutions, and social behavior, as well as the study of the human past.

46. CONSTRUCTION TRADES. A summary of groups of instructional programs that prepare individuals to apply technical knowledge and skills in the building, inspecting, and maintaining of structures and related properties.

47. MECHANICS AND REPAIRERS. A summary of groups of instructional programs that prepare individuals to apply technical knowledge and skills in the adjustment, maintenance, part replacement, and repair of tools, equipment, and machines.

48. PRECISION PRODUCTION TRADES. A summary of groups of instructional programs that prepare individuals to apply technical knowledge and skills to create products using techniques of precision craftsmanship or technical illustration.

49. TRANSPORTATION AND MATERIALS MOVING WORKERS. A summary of groups of instructional programs that prepare individuals to apply technical knowledge and skills to perform tasks and services that facilitate the movement of people or materials.

50. VISUAL AND PERFORMING ARTS. A summary of groups of instructional programs that describe the creation and interpretation of works and performances that use auditory, kinesthetic, and visual phenomena to express ideas and emotions in various forms, subject to aesthetic criteria.

51. HEALTH PROFESSIONS AND RELATED SCIENCES. A summary of groups of instructional programs that prepare individuals to provide health care, or related research and support services, to individuals or groups.

52. BUSINESS MANAGEMENT AND ADMINISTRATIVE SERVICES. A summary of groups of instructional programs that prepare individuals to perform managerial, research, and technical support functions related to the commercial and/or non-profit production, buying, and selling of goods and services.

53. HIGH SCHOOL/SECONDARY DIPLOMAS AND CERTIFICATES. A summary of groups of instructional programs that describe the requirements for high school/secondary graduation.

Source: Connecticut. Department of Higher Education. "Classification of Instructional Programs (CIP), 1990 Edition." http://ctdhe.commnet.edu/cip/ (16 Nov. 1998), pp. 1-4.

Appendix 3

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY	OWNERSHIP				Total
				NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
NO	Unknown	Masters	NO SIC	1				1
			Total	1				1
	Agricultural Business & Production	Masters	NO SIC	2				2
			Total	2				2
		Bachelors	NO SIC	13				13
			Total	13				13
	Agricultural Sciences	Masters	NO SIC	4				4
			Total	4				4
		Bachelors	NO SIC	16				16
			Total	16				16
	Conservation & Renewable Natural Resources	Bachelors	NO SIC	15				15
			Total	15				15
	Area, Ethnic & Cultural Studies	Masters	NO SIC	3				3
			Total	3				3
		Bachelors	NO SIC	1				1
			Total	1				1
	Communications	Masters	NO SIC	2				2
			Total	2				2
		Bachelors	NO SIC	11				11
			Total	11				11
	Computer & Information Sciences	Masters	NO SIC	5				5
			Total	5				5
		Bachelors	NO SIC	7				7
			Total	7				7
	Education	Masters	NO SIC	12				12
			Total	12				12
		Bachelors	NO SIC	59				59
			Total	59				59
	Engineering	Masters	NO SIC	20				20
			Total	20				20
		Bachelors	NO SIC	68				68
			Total	68				68
	Foreign Languages & Literatures	Masters	NO SIC	1				1
			Total	1				1
		Bachelors	NO SIC	3				3
			Total	3				3
	Home Economics, General	Masters	NO SIC	1				1
			Total	1				1
		Bachelors	NO SIC	8				8

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	Total
NO	Home Economics, General	Bachelors	Total		8				8
	English Language & Literature/Letters	Masters		NO SIC	5				5
			Total		5				5
		Bachelors		NO SIC	10				10
			Total		10				10
	Biological Sciences/Life Sciences	Masters		NO SIC	7				7
			Total		7				7
		Bachelors		NO SIC	27				27
			Total		27				27
	Mathematics	Masters		NO SIC	21				21
			Total		21				21
		Bachelors		NO SIC	7				7
			Total		7				7
	Multi/Interdisciplinary Studies	Masters		NO SIC	1				1
			Total		1				1
		Bachelors		NO SIC	1				1
			Total		1				1
	Parks, Recreation, Leisure & Fitness Studies	Bachelors		NO SIC	15				15
			Total		15				15
	Philosophy & Religion	Masters		NO SIC	4				4
			Total		4				4
	Physical Sciences	Masters		NO SIC	8				8
			Total		8				8
		Bachelors		NO SIC	17				17
			Total		17				17
	Psychology	Masters		NO SIC	3				3
			Total		3				3
		Bachelors		NO SIC	11				11
			Total		11				11
	Protective Services	Bachelors		NO SIC	5				5
			Total		5				5
	Public Administration & Services	Masters		NO SIC	4				4
			Total		4				4
		Bachelors		NO SIC	18				18
			Total		18				18
	Social Sciences & History	Masters		NO SIC	13				13
			Total		13				13
		Bachelors		NO SIC	38				38
			Total		38				38
	Visual & Performing Arts	Bachelors		NO SIC	6				6

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
NO	Visual & Performing Arts	Bachelors	Total		6				6
	Health Professions & Related Sciences	Masters		NO SIC	20				20
			Total		20				20
		Bachelors		NO SIC	40				40
			Total		40				40
	Business Management & Administrative Services	Masters		NO SIC	15				15
			Total		15				15
		Bachelors		NO SIC	62				62
			Total		62				62
YES	Agricultural Business & Production	Masters		SERVICES		2		1	3
			Total			2		1	3
		Bachelors		NO SIC	1				1
				AGRICULTURE, FORESTRY, FISHING				5	5
				CONSTRUCTION				2	2
				TCPU				1	1
				WHOLESALE TRADE				5	5
				RETAIL TRADE				6	6
				FIRE				1	1
				SERVICES		2			2
			Total		1	2		20	23
	Agricultural Sciences	Masters		NO SIC	1				1
				SERVICES		1		2	3
			Total		1	1		2	4
		Bachelors		AGRICULTURE, FORESTRY, FISHING				2	2
				MINING				1	1
				CONSTRUCTION				2	2
				MANUFACTURING				2	2
				TCPU				2	2
				WHOLESALE TRADE				1	1
				RETAIL TRADE				4	4
				FIRE				1	1
				SERVICES		7		2	9
				PUBLIC ADMINISTRATION		2	1		3

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Agricultural Sciences	Bachelors	Total			9	1	17	27
	Conservation & Renewable Natural Resources	Bachelors		NO SIC	2				2
				MINING				1	1
				MANUFACTURING				1	1
				RETAIL TRADE				6	6
				FIRE				1	1
				SERVICES		8		3	11
				PUBLIC ADMINISTRATION		3			3
			Total		2	11		12	25
	Area, Ethnic & Cultural Studies	Masters		RETAIL TRADE				1	1
				SERVICES				2	2
			Total					3	3
		Bachelors		RETAIL TRADE				2	2
			Total					2	2
	Communications	Masters		RETAIL TRADE				1	1
			Total					1	1
		Bachelors		CONSTRUCTION				1	1
				MANUFACTURING				4	4
				TCPU				5	5
				RETAIL TRADE				14	14
				FIRE				1	1
				SERVICES		7	1	9	17
				PUBLIC ADMINISTRATION		1			1
			Total			8	1	34	43
	Computer & Information Sciences	Masters		SERVICES		3			3
			Total			3			3
		Bachelors		TCPU				2	2
				RETAIL TRADE				3	3
				SERVICES		5	1	4	10
				PUBLIC ADMINISTRATION		1			1
			Total			6	1	9	16

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Education	Masters		RETAIL TRADE				1	1
				SERVICES		11	43	8	62
				PUBLIC ADMINISTRATION			2		2
			Total			11	45	9	65
		Bachelors		NO SIC	1				1
				AGRICULTURE, FORESTRY, FISHING			3		3
				CONSTRUCTION				6	6
				MANUFACTURING				2	2
				RETAIL TRADE				41	41
				FIRE				2	2
				SERVICES		10	84	30	124
				PUBLIC ADMINISTRATION		1	6		7
			Total		1	11	93	81	186
	Engineering	Masters		CONSTRUCTION		1			1
				RETAIL TRADE				1	1
				SERVICES		5		2	7
			Total			6		3	9
		Bachelors		NO SIC	1				1
				MINING				5	5
				CONSTRUCTION		7		13	20
				MANUFACTURING				9	9
				RETAIL TRADE				11	11
				SERVICES		8	1	21	30
				PUBLIC ADMINISTRATION			3		3
			Total		1	15	4	59	79
	Foreign Languages & Literatures	Masters		RETAIL TRADE				1	1
				SERVICES		2		2	4
			Total			2		3	5
		Bachelors		MANUFACTURING				1	1
				TCPU				1	1
				RETAIL TRADE				1	1
				SERVICES			1	1	2

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Foreign Languages & Literatures	Bachelors	Total				1	4	5
	Home Economics, General	Masters		SERVICES		1	1	1	3
			Total			1	1	1	3
		Bachelors		TCPU				1	1
				RETAIL TRADE				6	6
				FIRE				1	1
				SERVICES		2	7	6	15
				PUBLIC ADMINISTRATION		1			1
			Total			3	7	14	24
	English Language & Literature/Letters	Masters		SERVICES		2		2	4
			Total			2		2	4
		Bachelors		AGRICULTURE, FORESTRY, FISHING				1	1
				CONSTRUCTION				1	1
				MANUFACTURING				2	2
				RETAIL TRADE				7	7
				SERVICES		3	2	3	8
				PUBLIC ADMINISTRATION			2		2
			Total			3	4	14	21
	Biological Sciences/Life Sciences	Masters		SERVICES		8		2	10
			Total			8		2	10
		Bachelors		AGRICULTURE, FORESTRY, FISHING				2	2
				MINING				2	2
				CONSTRUCTION		1		6	7
				MANUFACTURING				1	1
				TCPU				3	3
				WHOLESALE TRADE				1	1
				RETAIL TRADE				19	19
				SERVICES		9	3	17	29
				PUBLIC ADMINISTRATION		1	5		6
			Total			11	8	51	70
	Mathematics	Masters		SERVICES		1	14		15
			Total			1	14		15

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Mathematics	Bachelors		MANUFACTURING				1	1
				TCPU				1	1
				RETAIL TRADE				5	5
				SERVICES		6	3	4	13
			Total			6	3	11	20
	Parks, Recreation, Leisure & Fitness Studies	Masters		PUBLIC ADMINISTRATION		1			1
			Total			1			1
		Bachelors		NO SIC	1				1
				AGRICULTURE, FORESTRY, FISHING				1	1
				CONSTRUCTION				1	1
				MANUFACTURING				2	2
				WHOLESALE TRADE				1	1
				RETAIL TRADE				12	12
				FIRE				1	1
				SERVICES		2	5	8	15
				PUBLIC ADMINISTRATION		1	1		2
			Total		1	3	6	26	36
	Philosophy & Religion	Masters		SERVICES		1	1		2
			Total			1	1		2
		Bachelors		RETAIL TRADE				1	1
				SERVICES				1	1
			Total					2	2
	Physical Sciences	Masters		SERVICES		3		1	4
			Total			3		1	4
		Bachelors		NO SIC	1				1
				MINING				1	1
				RETAIL TRADE				1	1
				SERVICES		7	2	2	11
				PUBLIC ADMINISTRATION			2		2
			Total		1	7	4	4	16

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Psychology	Masters		SERVICES		2		3	5
			Total			2		3	5
		Bachelors		NO SIC	1				1
				MINING				1	1
				MANUFACTURING				1	1
				TCPU				1	1
				RETAIL TRADE				19	19
				FIRE				1	1
				SERVICES		6	3	20	29
				PUBLIC ADMINISTRATION		1	2		3
			Total		1	7	5	43	56
	Protective Services	Bachelors		CONSTRUCTION		1		3	4
				TCPU			1	2	3
				RETAIL TRADE				10	10
				FIRE				1	1
				SERVICES		2	1	8	11
				PUBLIC ADMINISTRATION		4	3		7
			Total			7	5	24	36
	Public Administration & Services	Masters		CONSTRUCTION		1			1
				RETAIL TRADE				2	2
				FIRE				1	1
				SERVICES		2	6	4	12
				PUBLIC ADMINISTRATION		3	1		4
			Total			6	7	7	20
		Bachelors		RETAIL TRADE				4	4
				SERVICES		1	9	28	38
				PUBLIC ADMINISTRATION		11	1		12
			Total			12	10	32	54

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Social Sciences & History	Masters		WHOLESALE TRADE				1	1
				RETAIL TRADE				1	1
				SERVICES		10	1	2	13
				PUBLIC ADMINISTRATION		1			1
			Total			11	1	4	16
		Bachelors		NO SIC	4				4
				AGRICULTURE, FORESTRY, FISHING			1		1
				CONSTRUCTION				2	2
				MANUFACTURING				6	6
				TCPU				6	6
				WHOLESALE TRADE				2	2
				RETAIL TRADE				23	23
				FIRE				1	1
				SERVICES		20	3	28	51
				PUBLIC ADMINISTRATION		3	7		10
			Total		4	23	11	68	106
	Visual & Performing Arts	Masters		SERVICES		1			1
			Total			1			1
		Bachelors		AGRICULTURE, FORESTRY, FISHING				1	1
				CONSTRUCTION				2	2
				RETAIL TRADE				8	8
				SERVICES		3	2	6	11
				PUBLIC ADMINISTRATION			1		1
			Total			3	3	17	23
	Health Professions & Related Sciences	Masters		NO SIC	1				1
				SERVICES		1	6	8	15
				PUBLIC ADMINISTRATION			1		1
			Total		1	1	7	8	17

FOUND IN 1997 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Health Professions & Related Sciences	Bachelors		NO SIC	1				1
				CONSTRUCTION				3	3
				MANUFACTURING				2	2
				RETAIL TRADE				24	24
				SERVICES		6	31	29	66
				PUBLIC ADMINISTRATION			1		1
			Total		1	6	32	58	97
	Business Management & Administrative Services	Masters		MINING				1	1
				MANUFACTURING				2	2
				RETAIL TRADE				3	3
				FIRE				1	1
				SERVICES		2		1	3
				PUBLIC ADMINISTRATION		1			1
			Total			3		8	11
		Bachelors		NO SIC	1				1
				AGRICULTURE, FORESTRY, FISHING				1	1
				MINING				4	4
				CONSTRUCTION				2	2
				TCPU				6	6
				WHOLESALE TRADE				3	3
				RETAIL TRADE				27	27
				FIRE				21	21
				SERVICES		16	2	35	53
				PUBLIC ADMINISTRATION		5	5		10
			Total		1	21	7	99	128

Table Caption

Appendix 4

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
NO	Unknown	Masters		NO SIC	1				1
			Total		1				1
	Agricultural Business & Production	Masters		NO SIC	2				2
			Total		2				2
		Bachelors		NO SIC	21				21
			Total		21				21
	Agricultural Sciences	Masters		NO SIC	7				7
			Total		7				7
		Bachelors		NO SIC	30				30
			Total		30				30
	Conservation & Renewable Natural Resources	Bachelors		NO SIC	21				21
			Total		21				21
	Area, Ethnic & Cultural Studies	Masters		NO SIC	6				6
			Total		6				6
		Bachelors		NO SIC	2				2
			Total		2				2
	Communications	Masters		NO SIC	3				3
			Total		3				3
		Bachelors		NO SIC	26				26
			Total		26				26
	Computer & Information Sciences	Masters		NO SIC	6				6
			Total		6				6
		Bachelors		NO SIC	16				16
			Total		16				16
	Education	Masters		NO SIC	21				21
			Total		21				21
		Bachelors		NO SIC	96				96
			Total		96				96
	Engineering	Masters		NO SIC	22				22
			Total		22				22
		Bachelors		NO SIC	102				102
			Total		102				102
	Foreign Languages & Literatures	Masters		NO SIC	3				3
			Total		3				3
		Bachelors		NO SIC	3				3
			Total		3				3
	Home Economics, General	Masters		NO SIC	1				1
			Total		1				1

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY	OWNERSHIP				Total
				NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
NO	Home Economics, General	Bachelors	NO SIC	14				14
			Total	14				14
	English Language & Literature/Letters	Masters	NO SIC	8				8
			Total	8				8
		Bachelors	NO SIC	7				7
			Total	7				7
	Biological Sciences/Life Sciences	Masters	NO SIC	12				12
			Total	12				12
		Bachelors	NO SIC	45				45
			Total	45				45
	Mathematics	Masters	NO SIC	20				20
			Total	20				20
		Bachelors	NO SIC	13				13
			Total	13				13
	Multi/Interdisciplinary Studies	Masters	NO SIC	1				1
			Total	1				1
		Bachelors	NO SIC	1				1
			Total	1				1
	Parks, Recreation, Leisure & Fitness Studies	Bachelors	NO SIC	30				30
			Total	30				30
	Philosophy & Religion	Masters	NO SIC	4				4
			Total	4				4
	Physical Sciences	Masters	NO SIC	10				10
			Total	10				10
		Bachelors	NO SIC	20				20
			Total	20				20
	Psychology	Masters	NO SIC	5				5
			Total	5				5
		Bachelors	NO SIC	27				27
			Total	27				27
	Protective Services	Bachelors	NO SIC	15				15
			Total	15				15
	Public Administration & Services	Masters	NO SIC	10				10
			Total	10				10
		Bachelors	NO SIC	24				24
			Total	24				24
	Social Sciences & History	Masters	NO SIC	17				17
			Total	17				17
		Bachelors	NO SIC	71				71
			Total	71				71

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
NO	Visual & Performing Arts	Bachelors		NO SIC	12				12
			Total		12				12
	Health Professions & Related Sciences	Masters		NO SIC	23				23
			Total		23				23
		Bachelors		NO SIC	74				74
			Total		74				74
	Business Management & Administrative Services	Masters		NO SIC	19				19
			Total		19				19
		Bachelors		NO SIC	78				78
			Total		78				78
YES	Agricultural Business & Production	Masters		FIRE				1	1
				SERVICES		1		1	2
			Total			1		2	3
		Bachelors		AGRICULTURE, FORESTRY, FISHING				3	3
				TCPU				1	1
				WHOLESALE TRADE				4	4
				RETAIL TRADE				3	3
				FIRE				3	3
				SERVICES			1		1
			Total				1	14	15
	Agricultural Sciences	Masters		SERVICES				1	1
			Total					1	1
		Bachelors		AGRICULTURE, FORESTRY, FISHING				1	1
				MINING				1	1
				CONSTRUCTION				1	1
				TCPU				1	1
				WHOLESALE TRADE				2	2
				RETAIL TRADE				3	3
				FIRE				1	1
				SERVICES				1	1
				PUBLIC ADMINISTRATION		1	1		2
			Total			1	1	11	13

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY	OWNERSHIP				Total
				NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Conservation & Renewable Natural Resources	Bachelors	NO SIC	1				1
			CONSTRUCTION				1	1
			TCPU				1	1
			RETAIL TRADE				1	1
			FIRE				1	1
			SERVICES		8	1	3	12
			PUBLIC ADMINISTRATION		2			2
			Total	1	10	1	7	19
	Area, Ethnic & Cultural Studies	Bachelors	RETAIL TRADE				1	1
			Total				1	1
	Communications	Bachelors	CONSTRUCTION				1	1
			MANUFACTURING				2	2
			TCPU				6	6
			RETAIL TRADE				4	4
			FIRE				1	1
			SERVICES		5	1	6	12
			PUBLIC ADMINISTRATION		2			2
			Total		7	1	20	28
	Computer & Information Sciences	Masters	SERVICES		2			2
			Total		2			2
		Bachelors	SERVICES		3	1	3	7
			Total		3	1	3	7
	Education	Masters	NO SIC	1				1
			SERVICES		6	42	5	53
			PUBLIC ADMINISTRATION			2		2
			Total	1	6	44	5	56
		Bachelors	NO SIC	2				2
			AGRICULTURE, FORESTRY, FISHING			2		2
			CONSTRUCTION				6	6
			WHOLESALE TRADE				1	1
			RETAIL TRADE				13	13
			SERVICES		3	102	17	122
			PUBLIC ADMINISTRATION			3		3
			Total	2	3	107	37	149
	Engineering	Masters	CONSTRUCTION		1			1
			SERVICES		3		3	6

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Engineering	Masters	Total			4		3	7
		Bachelors		NO SIC	1				1
				MINING				2	2
				CONSTRUCTION		6		4	10
				MANUFACTURING				8	8
				RETAIL TRADE				1	1
				SERVICES		3		19	22
				PUBLIC ADMINISTRATION		1			1
			Total		1	10		34	45
	Foreign Languages & Literatures	Masters		SERVICES		2		1	3
			Total			2		1	3
		Bachelors		MANUFACTURING				1	1
				TCPU				1	1
				RETAIL TRADE				1	1
				SERVICES			1	1	2
			Total				1	4	5
	Home Economics, General	Masters		SERVICES		2		1	3
			Total			2		1	3
		Bachelors		RETAIL TRADE				4	4
				FIRE				1	1
				SERVICES		3	5	4	12
				PUBLIC ADMINISTRATION		1			1
			Total			4	5	9	18
	English Language & Literature/Letters	Masters		SERVICES				1	1
			Total					1	1
		Bachelors		NO SIC	1				1
				MANUFACTURING				2	2
				RETAIL TRADE				7	7
				SERVICES		3	4	6	13
				PUBLIC ADMINISTRATION			1		1
			Total		1	3	5	15	24
	Biological Sciences/Life Sciences	Masters		SERVICES		4		1	5
			Total			4		1	5

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY	OWNERSHIP				Total
				NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Biological Sciences/Life Sciences	Bachelors	NO SIC	4				4
			AGRICULTURE, FORESTRY, FISHING				1	1
			MINING				2	2
			CONSTRUCTION				3	3
			TCPU				3	3
			WHOLESALE TRADE				2	2
			RETAIL TRADE				10	10
			FIRE				1	1
			SERVICES		5	4	12	21
			PUBLIC ADMINISTRATION		2	3		5
			Total	4	7	7	34	52
	Mathematics	Masters	MINING				1	1
			SERVICES			14	1	15
			Total			14	2	16
		Bachelors	MANUFACTURING				1	1
			TCPU				1	1
			RETAIL TRADE				3	3
			SERVICES		3	3	3	9
			Total		3	3	8	14
	Parks, Recreation, Leisure & Fitness Studies	Masters	PUBLIC ADMINISTRATION		1			1
			Total		1			1
		Bachelors	NO SIC	1				1
			MANUFACTURING				1	1
			RETAIL TRADE				1	1
			FIRE				1	1
			SERVICES		2	7	7	16
			PUBLIC ADMINISTRATION		1			1
			Total	1	3	7	10	21
	Philosophy & Religion	Masters	SERVICES		1		1	2
			Total		1		1	2
		Bachelors	SERVICES			1	1	2
			Total			1	1	2
	Physical Sciences	Masters	SERVICES		2			2
			Total		2			2

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY	OWNERSHIP				Total
				NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Physical Sciences	Bachelors	NO SIC	1				1
			MINING				2	2
			CONSTRUCTION				1	1
			RETAIL TRADE				3	3
			SERVICES		4		2	6
			Total	1	4		8	13
	Psychology	Masters	SERVICES				3	3
			Total				3	3
		Bachelors	NO SIC	1				1
			MINING				1	1
			CONSTRUCTION				1	1
			RETAIL TRADE				11	11
			FIRE				2	2
			SERVICES		4	3	13	20
			PUBLIC ADMINISTRATION		3	1		4
			Total	1	7	4	28	40
	Protective Services	Bachelors	CONSTRUCTION		1		1	2
			TCPU				1	1
			RETAIL TRADE				5	5
			SERVICES		1	2	5	8
			PUBLIC ADMINISTRATION		6	4		10
			Total		8	6	12	26
	Public Administration & Services	Masters	CONSTRUCTION		1			1
			RETAIL TRADE				1	1
			FIRE				1	1
			SERVICES		1	3	4	8
			PUBLIC ADMINISTRATION		2	1		3
			Total		4	4	6	14
		Bachelors	RETAIL TRADE				3	3
			SERVICES		1	8	24	33
			PUBLIC ADMINISTRATION		10	2		12
			Total		11	10	27	48
	Social Sciences & History	Masters	WHOLESALE TRADE				1	1
			RETAIL TRADE				1	1
			SERVICES		5	1	3	9
			PUBLIC ADMINISTRATION		1			1

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY		OWNERSHIP				Total
					NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Social Sciences & History	Masters	Total			6	1	5	12
		Bachelors		NO SIC	5				5
				CONSTRUCTION				2	2
				MANUFACTURING				2	2
				TCPU				4	4
				RETAIL TRADE				13	13
				FIRE				2	2
				SERVICES		13	5	18	36
				PUBLIC ADMINISTRATION		2	7		9
			Total		5	15	12	41	73
	Visual & Performing Arts	Masters		SERVICES		1			1
			Total			1			1
		Bachelors		CONSTRUCTION				1	1
				RETAIL TRADE				8	8
				SERVICES		2	4	1	7
				PUBLIC ADMINISTRATION			1		1
			Total			2	5	10	17
	Health Professions & Related Sciences	Masters		SERVICES		1	6	6	13
				PUBLIC ADMINISTRATION			1		1
			Total			1	7	6	14
		Bachelors		NO SIC	3				3
				RETAIL TRADE				12	12
				SERVICES			27	21	48
			Total		3		27	33	63
	Business Management & Administrative Services	Masters		MINING				1	1
				MANUFACTURING				1	1
				RETAIL TRADE				3	3
				FIRE				1	1
				SERVICES		1			1
			Total			1		6	7

FOUND IN 1998 WAGE RECORDS? by Instructional Program (two digit cip) by Degree Type by MAJOR INDUSTRY by OWNERSHIP, Crosstabulation

FOUND IN WAGE RECORDS?	Instructional Program (two digit cip)	Degree Type	MAJOR INDUSTRY	OWNERSHIP				Total
				NO OWNERSHIP	STATE GOV.	LOCAL GOV.	PRIVATE	
YES	Business Management & Administrative Services	Bachelors	NO SIC	2				2
			AGRICULTURE, FORESTRY, FISHING				1	1
			MINING				3	3
			CONSTRUCTION				2	2
			MANUFACTURING				3	3
			TCPU				5	5
			WHOLESALE TRADE				3	3
			RETAIL TRADE				17	17
			FIRE				28	28
			SERVICES		10	3	28	41
			PUBLIC ADMINISTRATION		6	1		7
			Total	2	16	4	90	112

Appendix 5

Major Group 82. – Educational Services
The Major Group as a Whole

This major group includes establishments providing academic or technical instruction. Also included are establishments providing educational services such as libraries, student exchange programs, and curriculum development. Schools for the instruction of beauticians and cosmetologists are classified in Industry 7231, and barber colleges are classified in Industry 7241. Establishments primarily engaged in providing job training for the unemployed, the underemployed, the handicapped, and to persons who have a job market disadvantage because of lack of education, job skill or experience are classified in Industry 8331.

Industry Group No.	Industry No.	
821		ELEMENTARY AND SECONDARY SCHOOLS
	8211	Elementary and Secondary Schools

Elementary and secondary schools furnishing academic courses, ordinarily for kindergarten through grade 12. Included in this industry are parochial schools and military academies furnishing academic courses for kindergarten through grade 12, and secondary schools which furnish both academic and technical courses.

Academies, elementary and secondary schools
Boarding schools
Finishing schools, secondary
High schools
Kindergartens
Military academies, elementary and secondary level
Parochial schools, elementary and secondary
Preparatory schools
Schools for the physically handicapped elementary and secondary
Schools for the retarded
Schools, elementary and secondary
Seminaries, below university grade
Vocational high schools

822		COLLEGES, UNIVERSITIES, PROFESSIONAL SCHOOLS, AND JUNIOR COLLEGES
	8221	Colleges, Universities, and Professional Schools

Colleges, universities, and professional schools furnishing academic courses and granting academic degrees. The requirement for admission is at least a high school diploma or equivalent general academic training.

Colleges, except junior
Professional schools: e.g., dental, engineering, law, medical
Seminaries, theological
Service academies (college)
Theological seminaries
Universities

8221 Junior Colleges and Technical Institutes

Junior colleges and technical institutes furnishing academic, or academic and technical, courses and granting associate academic degrees, certificates, or diplomas. The requirement for admission is at least a high school diploma or equivalent general academic training. Schools having junior college grades in conjunction with secondary grades are classified in Industry 8211.

Community colleges (junior)
Junior Colleges
Technical institutes

Source: **Executive Office of the President, Office of Management and Budget. Standard Industrial Classification Manual, 1987, p. 391.**

Appendix 6

These pages look best viewed in **Netscape**!

Population Projections and Labor Force Participation 1997-2006: Something Has to Give

by: **Tom Gallagher**

According to recently released population projections, nearly one quarter of Wyoming's total population, the boom generation, will mature into the near retirement age bracket of 45-59 years of age between 1997 and 2006. At the same time, a large share of that generation's progeny, the boom's echo, will come of an age characterized by increasing labor market participation and a high probability of migration. On average, 9,203 people will turn 20 years of age each year over the projection period, as 17.1 percent of Wyoming's population aged 10-19 moves in to the 20-29 age bracket. Will there be enough jobs for the new pool of labor market participants? If there are not, who will replace the large number of boom generation workers who begin to retire later (after the year 2006) and fill the 15-20 year gap between the boom and the echo generation?

Labor force participation (the proportion of the population in the labor force either working or seeking work) is relatively modest among the young, peaks during middle age and tapers off as we reach traditional retirement age. Among those aged 16-19, according to the Current Population Survey (CPS), 62.6 percent of Wyoming's youth were in the labor market in 1995. From there, participation rises steeply to 87.9 percent for those 35-44 years of age, but then declines to 65.9 percent for those aged 55-64. Unemployment rates tend to be high for youth (14.9% for ages 16-19 and 6.6% for ages 20-24) but taper off with age to less than three quarters of the statewide average for ages 45-54 years (3.1%) and falls to less than half the state average for those aged 55-64 (2.1%).

High participation rates and low unemployment rates are also complemented by relatively high earnings levels for middle-aged individuals. In 1996, for those individuals covered by Unemployment Insurance (see "The Wyoming Wage Record Classification System) nearly half of all males aged 35-44, and 55.8 percent of males and 21.8 percent of females aged 45-54, had earnings in the top 20 percent ($27,212 or more) when compared to all Wyoming workers. This suggests that so long as the existing jobs remain stable and available for these incumbents, there will be little reason for the boom generation to abandon them over the projections period and make them available to the growing number of young adults.

Using age-adjusted participation and unemployment rates to estimate the number of jobs needed in Wyoming for the 9,203 persons reaching age 20 each year, the state will need to create employment opportunities at the rate of 6,945 per year over the projections horizon of 2006. Some of those opportunities will come from separation from the labor force by people reaching the traditional retirement age of 65. Using the age adjusted participation and unemployment rates to estimate the number of vacancies created by people reaching the traditional retirement age over the projections horizon, these vacancies should create opportunities for 42.3 percent of Wyoming's youth who are coming of age in the labor market. This still leaves a gap of 3,981 jobs, annually. From 1996 to 1997, the annual average number of persons working in Wyoming declined by 5,478 persons. (See "The Local Area Unemployment

Statistics (LAUS) Benchmark: What Does it Tell Us?") It is not particularly clear that Wyoming in the near term can recover from the job deficit of 1997, let alone add sufficient job opportunities for the children of the boom generation.

According to estimates from the Bureau of the Census[1], individuals aged 20-24 and 25-29 are the most likely to change residences (technically, this means to move to a different county) than are any other age groups. Given this historic propensity to migrate, it appears that the projections period in question, because of the large number of youth involved (an estimated 82,824 persons were 10-19 years of age in 1997), could be one in which a larger share (17.1%) of Wyoming's total population is lost due to out-migration than occurred through mid-decade. While creating job opportunities during the first half of the decade was problematic, the period was marked by at least some growth. Since that time, however, the number of persons employed first flattened and then declined. If Wyoming is unable to retain a substantial share of the children of the boom generation over the population projection period, then it seems quite likely that the job openings created by the retirement of the boom generation after 2006 will become even more difficult to fill. Given the demographics of labor supply at work, and the economics of labor demand about which we are currently aware, it appears that something has to give, and in a fairly dramatic way.

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1 Hansen, Kristin A., Geographical Mobility: March 1993 to March 1994, U.S. Bureau of the Census, Current Population Reports, P20-485, U.S. Government Printing Office, Washington, DC, 1995.

Tom Gallagher is the Manager of Research and Planning.

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Last modified on March 16, 1998 by Valerie A. Davis.

Appendix 7

Wyoming Population Projections

by: **Wenlin Liu**

The Division of Economic Analysis recently released a new report which presents estimates and projections of the resident population of Wyoming and its counties by age and gender from 1990 to 2006. It also includes estimates and projections of city and town population totals for the same period. This article will discuss how these estimates and projections were made; data excerpted is shown in the Table and the Figure (see page 8).

Since actual future population trends are unknown, the projections in this report should not be considered a prediction of the future. These projections, mathematically calculated under a specific set of assumptions, indicate the population that would result given our assumptions if each population component persisted throughout the projection period. In other words, the projection procedures are only as accurate as the assumptions on which they are based. Therefore, they should be used as only one tool in the process of planning and decision making.

Methodology

The most commonly used projection technique, a cohort-component (sometimes called cohort-survival) model was applied to develop age and gender details. It involves the direct simulation of the demographic processes of fertility, mortality, and migration that produce changes in population size. This method employs the following basic demographic equation:

$$P_1 = P_0 + B - D + M$$

P_1 = Population at the end of the period,
P_0 = Population at the beginning of the period,
B = Births during the period,
D = Deaths during the period and
M = Net migration during the period.

For every projection period, the base population--disaggregated by

(Continued on page 8)

Table: Population Projections of Wyoming by Age by Sex: 1997 - 2006

	Total Population									
Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
0-4	31,358	31,886	32,725	33,858	35,163	35,936	36,690	37,390	37,992	38,561
5-9	33,780	33,427	32,686	31,750	31,103	31,217	31,726	32,538	33,645	35,024
10-14	39,825	37,953	36,817	35,731	34,622	33,753	33,391	32,632	31,676	31,086
15-19	42,998	43,317	42,627	41,843	40,951	39,742	37,860	36,707	35,607	34,575
20-24	36,735	38,380	40,280	41,654	42,559	42,799	43,094	42,378	41,572	40,805
25-29	27,965	29,782	31,424	33,150	34,629	36,510	38,120	39,972	41,301	42,327
30-34	27,665	26,023	25,229	25,433	26,529	27,797	29,584	31,182	32,862	34,428
35-39	37,620	36,076	33,991	31,801	29,510	27,506	25,857	25,041	25,216	26,389
40-44	42,897	42,241	41,631	40,705	39,335	37,352	35,809	33,719	31,524	29,305
45-49	37,336	38,853	40,082	41,138	41,983	42,402	41,741	41,122	40,190	38,881
50-54	29,280	30,294	31,947	33,777	35,996	36,631	38,113	39,307	40,328	41,178
55-59	22,468	23,797	24,538	25,215	25,864	28,470	29,453	31,053	32,821	34,994
60-64	19,007	19,271	19,975	20,506	20,911	21,471	22,741	23,444	24,081	24,707
65-69	17,071	17,190	17,106	17,171	17,412	17,641	17,885	18,537	19,028	19,420
70-74	14,051	14,331	14,493	14,699	14,850	15,133	15,228	15,149	15,202	15,420
75-79	10,746	10,822	11,192	11,410	11,455	11,573	11,794	11,929	12,103	12,240
80-84	7,101	7,289	7,418	7,598	7,809	7,991	8,045	8,315	8,473	8,504
85 & up	6,107	6,276	6,447	6,641	6,869	7,057	7,248	7,375	7,558	7,796
Total	**484,010**	**487,210**	**490,610**	**494,080**	**497,550**	**500,980**	**504,380**	**507,790**	**511,180**	**515,640**

Prepared by Wyoming Department of A & I, Division of Economic Analysis (2/9/98)

single year age by gender, is survived to the next year period by applying the appropriate survival rates for each age and gender group. Next, net migrants by age and gender are added to the survived population, as is the population under age one. The populations under one year of age were created by applying age specific birth rates to the females of childbearing age. The entire process is then repeated for each year of the projections.

State Total Population Projections

The state total was produced from the economic forecast model which was developed by the Division of Economic Analysis and aided by the contractual services of the Wharton Econometric Forecast Associates (WEFA) Group. This econometric model uses historical data to identify relationships between economic variables. The state population tends to mirror employment in the economy, but with a slight lag. Therefore, the projections of state population follow the trends of employment forecasts to a great extent.

County Total Population Projections

A combination of extrapolative techniques and symptomatic techniques are used to produce county level projections. Trends of population variables were derived from data for the recent years since 1990, and used in a modified form to extend a population value to the future date. The arithmetic growth rates of population estimates, K-12 enrollments, employment estimates, and sales tax collections in the Retail Trade sector were applied for the patterns of population change. The projected county totals obtained from the model were adjusted to achieve the consistency with state projections.

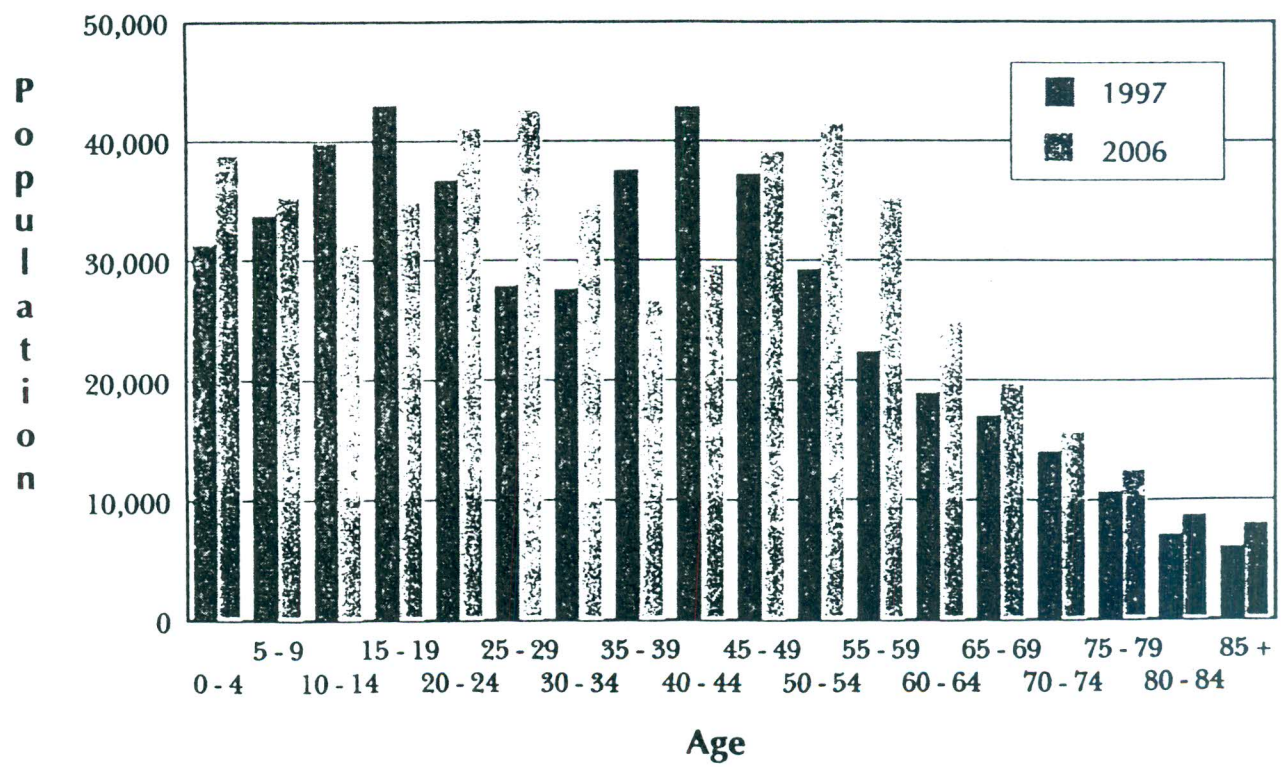
City and Town Level Projections

To determine population projections for incorporated places, a "share of growth" was utilized. It simply applies the average place/county ratios of the 1990 Census and 1996 estimates to

(Continued on page 9)

Figure: Wyoming's Changing Population

1997 v.s. 2006 Estimates for Wyoming



the appropriate county projections to produce projections for municipalities.

Baseline Population

The April 1, 1990 county MARS (modified census counts by age, gender, and race/Hispanic origin) are used as the starting point. A review of 1990 data by the Census Bureau revealed that people tended to report their age as of the date when they completed the census questionnaire, not as of April 1, 1990. Some of them may have also rounded their age up if they were close to their next birthday. The problem is more pronounced at age zero because there may have been more rounding from age zero to age one. Therefore, the Census Bureau modified the original 1990 data and made them more useful, particularly for the purpose of age estimates and projections.

Special Populations

Special populations (also called group quarters) display very different demographic patterns and characteristics than the population as a whole. In counties where special populations represented a significant proportion, an adjustment was made. The primary sources of special populations are prisons, colleges and military base populations. Because of the difficulty in predicting growth rates in special populations, one common procedure assumed that a fixed number of persons with a fixed set of age/gender structures will hold through the next 10 years.

Birth Projections

The number of births projected to occur in each county was derived from age-specific fertility rates for females aged 14 to 48. These rates were calculated by dividing the average of the number of births in each age cohort of mother for the years 1989, 1990 and 1991 by the 1990 appropriate female population. The three year average was used to control for year to year variation.

In the model, these rates are applied to the projected number of females of child bearing age at the beginning of the period to obtain the number of births in a future period. The gender of the births was determined by applying the usual assumption of 105 male births for every 100 female births. Again, these rates were county specific, and it was assumed to be constant throughout the projection period.

Death Projections

Because of the small death data cells for many counties, it was decided to use statewide death rates to develop the standard life table. Again, the three-year average of age- and gender-specific mortality controlled for year to year fluctuations in the number of deaths. The evaluation of the survival rates calculated from the life table revealed the similarity with the Census Bureau's 1990 life tables for Wyoming. Therefore, the statewide age- and gender-specific survival rates adopted in the model were directly derived from the Census Bureau's life table by race for 1990. For the reason of their extreme stability over time, the 1990 survival rates are assumed to remain constant during the projection period.

Migration Projections

Net migration procedures involve determining migration using residual methods which are equivalent to solving the population equation for the migration component. Thus, after the amount of total population change attributable to natural increases (births - deaths) is accounted for, the remaining difference between the total change and that due to births and deaths--the residual--is assumed to be the number of net migration.

In the model, the difference between the total population projected for a future period and the expected population obtained by surviving from the earlier period is the estimate of residual net migration. The migration pattern (distribution rates by age and gender) is statewide specific, and was derived from the Census Bureau's "1985-90 county migration file" and the "1993-94 geographical mobility file among different states." Because these patterns are quite stable over time, they were fixed to the same level over the projection period.

More Information

This report may also be obtained electronically via the Division of Economic Analysis' home page on the Internet: **http://eadiv.state.wy.us/** For more information regarding Wyoming Population Projections, please contact Wenlin Liu at: Division of Economic Analysis, 327 East Emerson Building, Cheyenne, WY 82002. Telephone: (307) 777-7504 Fax: (307) 777-5852 Email: ead@missc.state.wy.us

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