

Research and Graduate Education Task Force Report

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Task Force Members:

Kathy Cruz-Uribe, Chair

Cynthia Childrey

Susan Fitzmaurice

Carl Fox

Mason Gerety

Laura Huenneke

Fred Hurst

Dan Kain

Sandra Lubarsky

Nick Lund

Barry Lutz,

Tom McPoil

Jim Mead

David R. Patton

Karen Appleby, staff support

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Preface

In the fall of 2004, the President and Provost created the “Research and Graduate Education Task Force.” Membership on the task force includes the college Deans, the Vice Provost for Research and Graduate Studies, and representatives from the University Graduate Committee, the Faculty Senate, the Academic Chairs Council, and the Regents’ Professors. The RGE Task Force was charged to discuss, evaluate, and recommend policies and programs related to the following questions (abbreviated here):

- 1) What is the role of research at NAU now and in the future?
- 2) How do we evaluate the economic development/technology transfer potential of basic and applied research?
- 3) What is NAU’s role in graduate education now and in the future?

We began our work by trying to gain a broad understanding of the full picture of the current state of graduate education and scholarly activity at NAU. Each of us knows best our own programs, and we felt it was critical to expand our understanding beyond our own units. Moreover, we all hear a lot of statements on campus about research and graduate education, and they often appear to be based on perceptions rather than actual data. In essence, we conducted a “self-study” of research and graduate education at NAU, and looked at data from NAU as well as comparative data from our peer institutions.

Part I and Part II of this report present our data findings for graduate education (Part I) and research (Part II). Much of this data collection and comparative work was done during 2004-05 academic year, and the numbers reflect the data available at the time.

By the end of the 2005 academic year, the Task Force had completed the draft of the “Graduate Education Data” part of the report, which was discussed with our various academic units, as well as the University Graduate Committee. We have incorporated suggestions from this group as well as the academic units in this revised version of our report.

In June 2005, consultant Dennis Jones from NCHEMS visited campus, and part of his time was spent meeting with the RGE Task Force. The ideas generated in our meeting with Dr. Jones helped us as we finished Part II of the report (research data). These discussions also informed our thinking as we prepared Part III of the report—our recommendations and ideas for future directions. We are now taking these ideas out to campus for further discussion and deliberation.

Acknowledgements

We owe a special debt of thanks to Dr. Patricia Baron, Associate Dean of the Graduate School. Although she did not participate as a formal member of the Task Force, she and her office staff provided invaluable help in gathering data for this report. Pat was kind enough to review much of this material in draft form, particularly for the Graduate Education part of the report, and was very generous in sharing her time and insights with the chair of the Task Force.

We also thank the many groups and individuals who offered input on the early drafts of this report, including the University Graduate Committee, the Faculty Senate, and various departments and individual faculty. In addition, Dennis Jones (President, National Center for Higher Education Management Systems) provided valuable input during a discussion with our task force in June 2005.

Part I: Graduate Education

Current Picture of NAU Graduate Programs

General Information

The second goal of NAU's 2006-2010 Strategic Plan is to "strengthen graduate and professional education, economic development, and research," and there is no question that graduate education and research are vitally important parts of NAU's mission as a Doctoral Research Intensive university. We live in a knowledge-based economy where advances in technology have given the United States a competitive advantage. To maintain that advantage we must provide appropriate training and education at the post-baccalaureate level. Nationally, it is clear that there will be a general increasing demand for graduate education, especially for Master's degrees and select doctoral degrees. In the state of Arizona, projections suggest that over the next 10 years, Arizona's economy will need over 74,000 Master's, 16,000 Ph.D., and 23,000 professional degrees (source: "Needs Assessment Subcommittee" report to ABOR Feasibility Task Force, 1/26/05).

Currently, NAU's graduate programs may be described as follows:

- 1) We draw students regionally, nationally, and internationally.
- 2) We have strong enrollments in graduate and professional programs across Arizona.
- 3) We have a strong mission to serve professional educators.
- 4) We offer a number of Master's programs and selected doctoral programs. These programs may be characterized as:
 - a) professional and applied programs, many of which are tied directly to work opportunities, and;
 - b) traditional, research-intensive programs

NAU offers 49 Master's degrees, 9 doctoral degrees, and 17 graduate certificates. Table GRADTOTALS shows the distribution of our students over the last 5 years in these different types of programs; it is obvious that the vast majority of NAU graduate students are in Master's degree programs (e.g., 4686 out of 5814 in Fall 04, or 80.6%). This fits with national trends, with 90% of all graduate degrees awarded in 2003-04 being Master's degrees (CGS 2005).

Table GRADTOTALS. Graduate student enrollment (headcount) for fall semesters, 2000 – 2004. Data from the Graduate College website.

	Fall 2000	Fall 2001	Fall 2002	Fall 2003	Fall 2004
Master's	4162	4062	4374	4240	4686
Doctoral	350	358	345	315	324
First Professional (DPT)	9	131	132	132	132
Total Degree Seeking	4521	4551	4851	4687	5142
Graduate Certificates				34	52
Nondegree	1538	1437	1479	1088	620
GRAND TOTAL	6059	5988	6330	5809	5814

Of the 5814 graduate students enrolled in fall 04, 2087 (36%) are full-time, and 3727 (64%) are part-time. 30% are men, and 70% are women. These figures are comparable to national data (CGS 2005), where 60% of students are part-time, and 60% are women. Ethnic minority enrollment represents 23.7% of total graduate enrollment, and international students represent 5.5% of the total. The breakdown by ethnicity at NAU is as follows:

Table ETHNIC. Graduate student enrollment (headcount) for fall 2004, by ethnicity (from NAU Graduate College website)

	Full-time	Part-time	Total	percent
International	79	14	93	1.6%
Black	75	92	168	2.9%
American Indian	106	200	306	5.3%
Asian	76	60	136	2.3%
Hispanic	227	541	768	13.2%
White	1533	2766	4299	73.9%
Unknown	13	31	44	0.8%
TOTAL:	2109	3705	5814	100%

Table GRADENROLL shows the distribution of our graduate programs among NAU's six academic units and the Graduate College. The majority of graduate students at NAU (63%) are in the College of Education; with the next highest number in the Graduate College (16%). The Graduate College students are primarily non-degree, with the exception of the Master of Administration starting in Fall 04 (137 out of 970 students). Other academic colleges range from about 1% to 5% of the total enrollment.

Since a significant portion of the students are non-degree students in the Graduate College, we can also look at the enrollment picture without these non-degree students (table GRADENROLL, right columns). The overall picture remains much the same, with the percentages in each of the colleges thus somewhat higher.

Table GRADENROLL. Fall semester 2004 Graduate Student Enrollment (headcount), Flagstaff and statewide sites included. Source: NAU Graduate College website.

College	All Students (Degree and non-degree)		Degree-Seeking students only	
	2004 Grad Enrollment	Percent Enrollment	2004 Grad Enrollment	Percent Enrollment
CAL	281	4.7%	281	5.5%
CBA	74	1.2%	74	1.4%
CPS	324	5.4%	324	6.3%
COE	3720	62.6%	3720	72.7%
CENS	258	4.3%	258	5.0%
SBS	320	5.4%	320	6.3%
Grad College	970	16.3%	137	2.7%
TOTAL:	5947	100.0%	5114	100.0%

One striking difference among colleges is in the Off-Campus/On-Campus mix (Table OFFONENROLL). The College of Education and the Grad College each have much higher numbers of off-campus students than any of the other units, with 89% of the College of Education students attending off campus. Since the COE and Grad College together make up more than 79% of our graduate enrollment, the net effect is that 71% of our total graduate students are off-campus.

Table OFFONENROLL. 2004 Off Campus/On Campus Enrollment. Data from Karen Appleby. Note that the enrollment numbers differ slightly from those in the Grad College data (total difference = 124 fewer students in Karen's data).

College	2004 total grad enrollment	Off Campus	On Campus	% Off	% On
CAL	274	37	237	13.5%	86.5%
CBA	71	31	40	43.7%	56.3%
CPS	314	17	297	5.4%	94.6%
COE	3726	3316	410	89.0%	11.0%
CENS	257	12	245	4.7%	95.3%
SBS	313	11	302	3.5%	96.5%
Grad Coll	868	691	177	79.6%	20.4%
TOTAL By COLLEGE:	5823	4115	1708	70.7%	29.3%

Looking at the Off-campus students, almost 75% are part-time students (Table OFF_FTPT). This contrasts markedly with the On-campus students, with only 38% being part-time (Table ON_FTPT).

Table OFF_FTPT. 2004 full-time/part-time mix for Off-campus students (Appleby data). Note that "full-time" is defined as 9 hours for graduate students.

	FT	PT	%FT	%PT	Total
CAL	9	28	24.3%	75.7%	37
CBA	4	27	12.9%	87.1%	31
Consort	10	7	58.8%	41.2%	17
COE	938	2378	28.3%	71.7%	3316
CENS	3	9	25.0%	75.0%	12
SBS	1	10	9.1%	90.9%	11
Grad Coll	74	617	10.7%	89.3%	691
TOTAL By COLLEGE:	1039	3076	25.2%	74.8%	4115

Table ON_FTPT. 2004 full-time/part-time mix for On-campus students (Appleby data).

	FT	PT	%FT	%PT	total
CAL	168	69	70.9%	29.1%	237
CBA	28	12	70.0%	30.0%	40
Consort	241	56	81.1%	18.9%	297
COE	246	164	60.0%	40.0%	410
CENS	178	67	72.7%	27.3%	245
SBS	172	130	57.0%	43.0%	302
Grad Coll	24	153	13.6%	86.4%	177
TOTAL By COLLEGE:	1057	651	61.9%	38.1%	1708

Master's Programs

NAU offers 49 Master's degrees, housed in all the academic units including the Graduate College. The departments, degree names, and fall semester enrollment are listed in the table below. Master's enrollments have risen from a headcount of 4170 in Fall 2000 to 4587 in Fall 2005.

TABLE MASTERS_PROGRAMS. (Data from Business Objects, via Pat Baron)

Administrative Unit	Degree	2000	2001	2002	2003	2004
College of Arts & Letters:						
English	MA	76	81	86	92	88
English	MA-TESL	33	36	41	45	40
History	MA	19	26	29	32	28
Liberal Studies	MLS	42	56	56	50	50
Music	MM	22	25	24	29	21
Spanish	MAT					7
Arts & Letters TOTAL:		192	224	236	248	234
College of Business Administration:						
	MBA	74	55	49	40	32
	MSM	6	36	46	42	42
Business TOTAL:		80	91	95	82	74
Consortium of Professional Schools:						
Exercise and Health Sciences	MS	10	9	9	4	3
Nursing	MS	21	24	25	27	34
Physical Therapy	MPT (d)	117	115	1	0	
Public Health (tri-university)	MPH	8	12	12	4	3
Speech Pathology, Clinical	MS	79	67	69	73	86
Forestry	MF					6
Forestry	MS	52	45	50	44	37

Consortium TOTAL:		287	272	166	152	169
College of Education:						
Early Childhood Education	MEd	95	111	134	158	150
Elementary Education--Cont Prof	MEd	705	585	563	565	684
Elementary Education--Certification	MEd					68
Secondary Education--Cont Prof	MEd	243	205	191	176	213
Secondary Education--Certification	MEd					44
Educational Leadership	MEd	1027	1007	1108	1067	1060
Counseling	MA	61	54	63	66	76
Counseling--Human Relations	MEd	469	534	591	547	428
Counseling--School Counseling	MEd	100	109	98	44	107
Counseling--Student Affairs	MEd	14	16	11	4	12
School Psychology	MA	21	25	23	20	22
Bilingual/Multicultural Education	MEd	302	318	329	285	249
Career and Technology Education	MEd	15	11	12	23	31
Educational Technology	MEd	29	79	177	205	192
Reading/Learning Disabilities	MEd (d)	13	5	2	2	1
Special Education	MEd	128	138	162	158	179
Education TOTAL:		3222	3197	3464	3320	3516
College of Engineering and Natural Sciences:						
Biology	MS	63	56	48	54	61
Biology	MAT	1	5	6	8	3
Chemistry	MS	15	16	14	15	17
Environmental Sciences & Policy	MS	4	14	15	17	19
Geology	MS	42	46	47	42	36
Earth Science	MAT	2	0	3	5	4
Mathematics	MS	15	8	8	11	12
Mathematics	MAT	3	4	6	5	13
Statistics	MS		1	7	7	4
Physical Science	MAT	4	3	2	1	4
Physics, Applied	MS		1	7	11	13
Quaternary Sciences	MS	19	14	14	14	6
Engineering	M.Eng	10	16	24	29	27
CENS TOTAL:		178	184	201	219	219
Graduate College:						
Administration	MAdmin					137

College of Social and Behavioral Sciences:						
Anthropology	MA	73	64	72	69	67
Communication, Applied	MA					19
Criminal Justice	MS	22	28	21	17	28
Geography	MA	26	26	37	32	30
Political Science	MA	14	12	9	14	15
Public Administration	MPA	20	18	23	21	14
Psychology	MA	34	31	30	35	33
Sociology, Applied	MA	22	24	27	30	32
SBS TOTAL:		211	203	219	218	238
Master's Degree Total:		4170	4171	4381	4239	4587

Doctoral Programs

Doctoral programs are (and should be) qualitatively different from Master's programs. They should be highly selective and rigorous. NAU has a total of nine doctoral programs: six that offer the Ph.D. degree, two that offer the Ed.D. degree, and one DPT. This section of the report provides some summary data about our doctoral programs, followed by a brief description of each program.

Overall, the enrollment (headcount) in NAU doctoral programs has been relatively stable over the last five years, as Table DOC_ENROLL shows. When one compares Fall 2004 enrollment with that of 2001, there is an overall increase of 129%, but that can largely be accounted for by the DPT, which is a new program that had zero students in 2000, and 132 in 2004. When the DPT students are excluded, doctoral enrollment in 2004 is actually slightly lower in 2004 when compared to 2001 (92%).

Table DOC_ENROLL. Doctoral enrollment (headcount) over last five years. Source: Graduate College website.

		2000	2001	2002	2003	2004	2004 as % of 2001
Applied Linguistics	PhD	16	23	23	18	20	125.0%
Biological Sciences	PhD	33	35	38	34	32	97.0%
Curriculum & Instruction	EdD	47	49	47	46	57	121.3%
Educational Leadership	EdD	127	112	100	92	80	63.0%
Educational Psychology	PhD	51	61	62	55	60	117.6%
Forest Science	PhD	22	20	20	23	21	95.5%
History	PhD	15	15	13	11	13	86.7%
Physical Therapy	DPT		9	131	132	132	
Political Science	PhD	41	43	39	40	41	100.0%
Total:		352	367	473	451	456	129.5%
Total Excluding DPT:		352	358	342	319	324	92.0%

Degrees awarded in Doctoral Programs: Currently, only one program (History) falls below the ABOR guidelines of 7 graduates over 3 years. (Note: Educational Psychology has recently changed their Ed.D. to a Ph.D., degrees offered in the years below were Ed.D.)

		Degrees	Degrees	Degrees	Degrees	degrees 01-02 through 03-04
		2000-01	2001-02	2002-03	2003-04	
DEGREES ONLY:						
Applied Linguistics	PhD	3	2	3	7	12
Biological Sciences	PhD	6	3	6	6	15
Curriculum & Instruction	EdD	9	1	7	3	11
Educational Leadership	EdD	13	15	9	8	32
Educational Psychology	EdD	0	7	7	2	16
History	PhD	1	2	1	2	5
Forest Science	PhD	6	3	3	5	11
Physical Therapy	DPT	2	77	44	40	161
Political Science	PhD	2	6	1	2	9

Ph.D. in Applied Linguistics (English Department):

The Ph.D. program in applied linguistics prepares researchers, scholars, and teacher trainers who will be able to work independently and in leadership positions with the learning and teaching of second languages, the analysis of language, and the design of language-related research. The program is open to qualified students with appropriate M.A.-level preparation in linguistics, applied linguistics, TESL, or related fields.

Completion of the Ph.D. requires (a) advanced course work; (b) excellent performance on a variety of assessment measures and evidence of ability to carry out independent dissertation research. Areas of specialization include bilingualism, computational and corpus linguistics, computer-assisted language learning (CALL), discourse analysis, historical linguistics/language change, language planning and policy, language testing and program evaluation, linguistic and cognitive approaches to second language acquisition, literacy, register analysis, second language teaching and learning, sociolinguistics, stylistics, and teacher education and program administration. Students are expected to combine elective course sequences with advanced seminars to create a flexible and specialized program of study. Most of the 33 Ph.D. graduates have tenure or tenure-track positions in well-established universities.

Ph. D. in Biological Sciences:

Biological Sciences was the first department at NAU to offer a Ph.D. Originally doctoral degrees were granted in Botany and in Zoology; a shift to a general Biology Ph.D. in the 1990's has increased the participation of faculty in training doctoral students and has been accompanied by a growth in the number of doctoral students. The department has developed (and is able to offer) a large number of 500- and 600-level courses. Doctoral students are provided with courses in grant proposal preparation and in college teaching, as well as advanced courses in their disciplinary or taxonomic areas of interest.

The majority of Ph.D. students in Biology are full time students; many are from out-of-

state (that is, the program attracts applicants from across the nation). The majority are supported on graduate assistantships; most of these are supported by extramural research funding brought in by faculty members, though there are some teaching assistantships (associated with the need to cover large numbers of undergraduate laboratory sections). The presence of doctoral students in the research teams of faculty members provides a strong positive feedback to the ability of faculty to gain external funding and to involve undergraduate students in collaborative modern research. The large size and competitive nature of the Ph.D. program also is positively associated with the quality of instruction in undergraduate laboratory course sections.

Ph. D. in Educational Psychology:

There are three different tracks for this degree: Counseling Psychology, Learning and Instruction, and School Psychology. In each case, the program is a full-time, Flagstaff program with a residency requirement of two full-time, consecutive semesters on campus. Students must complete 109 hours beyond the bachelor degree, complete an intensive and rigorous curriculum content emphasis in quantitative and research methodologies (21 credit hours), and successfully complete a dissertation that involves empirical research. While the Learning and Instruction focus does not require an internship (though students must complete practicum and supervised experiences in teaching and fieldwork experiences), the other foci require students to complete internships lasting between 9 and 12 months. The program follows the criteria, guiding principles and standards of the American Psychological Association, and operates with a “science practitioner” philosophy. Graduates typically work in higher education, school settings, public mental health settings, and private practice. This program was an Ed.D. program until Fall of 2004, when it was changed to a Ph.D. program.

Ph.D. in Forest Science:

The Doctor of Philosophy is the terminal degree in the profession of forestry. Its goal is to prepare individuals for a career in research and/or education. The Ph.D. program has three emphasis areas: ecosystem science, forest management science and economics, and forest social science. Students are expected to demonstrate their skill in generating original ideas, a considerable command of the scientific literature, and skill at designing, analyzing, and interpreting research results. Students must also have skill in scientific writing, including publication of research results in major professional journals and to have basic skills in teaching. Candidates are expected to be self-motivated and to largely direct their own research program with the advice and counsel of the major professor and dissertation committee. The goal of the dissertation is the generation of new knowledge. The program includes both comprehensive written and oral examinations designed to establish and individual’s breadth and depth of subjects within the larger field of forestry. Students must also demonstrate reading competency in a foreign language or competency in the design and analysis of experiments. In the past five years 21 students have been awarded a Ph.D. in Forest Science.

Ph.D. in History:

The Ph.D. program in History is designed to prepare students for college-level teaching, research, secondary education teaching, public history, and archives management. This is a 54-credit program beyond the M.A. degree that admits only the most competitive students. About half the students are Arizona residents, the other half come from out of state. The program is small and individualized. In every case, the program encourages students to approach the subject

matter from broad multidisciplinary (e.g. anthropology, economic, literary) and comparative perspectives, while at the same time engaging in in-depth and innovative research of a particular historical subject, as embodied in the student's doctoral dissertation work. Students choose courses from geographical and thematic areas in history, and from cognate disciplinary areas that address their career needs. Doctoral students are trained in cutting edge, interdisciplinary, theoretical concepts (environmental, new cultural, feminist, postcolonial, subaltern, critical race, transnational) and the connections between the local and the global that makes them very competitive in the academic marketplace. Graduates of the Ph.D. program and ABDs during the last decade have obtained academic/professional historical jobs at research universities, community colleges, and historical centers and associations.

Ph.D. in Political Science:

This doctoral program prepares students for careers in higher education, research, or public service. The fields offered are American politics and public administration, comparative politics and international relations, and public policy. All Ph.D. students take a 9-hour graduate political science core, which includes Approaches to Political Inquiry, Research Methods and Analysis, and Philosophical Perspectives. There also are core requirements in each of the fields. Students complete 21 hours of course work in their first field, 18-21 hours in their second field, and 12-15 hours in a cognate or policy concentration area that is usually interdisciplinary. The degree requires 63 credit hours of coursework, 15-18 hours of dissertation credits, and 6 hours of research and language skills development. In addition, students take Ph.D. comprehensive examinations in three areas (first field, second field, and their cognate or policy concentration), and must successfully defend both a dissertation prospectus and the completed dissertation before their dissertation committee. Advanced Ph.D. students who want to teach courses in the department are required to take the department's Professional Development seminar, POS 691, which introduces them to the profession and covers topics such as the strategies, techniques, and issues of teaching, professional ethics, and issues related to research and publishing.

Ed. D. in Curriculum and Instruction:

This program was originally designed for practitioners (e.g., district curriculum directors), but has gradually become a route into higher education (i.e., faculty positions in universities and colleges). The program (90 semester hours beyond a bachelor degree) requires a one-year residency, but this can be fulfilled through 2 consecutive summers of full-time on-campus work. A 135-hour internship is recommended and a 21 hour focus study may be chosen among four areas (higher education, research, distance education, or content concentration). Students must complete a research dissertation. Graduates are split evenly between those who work in the K-12 system and higher education.

Ed. D. in Educational Leadership:

This program is designed for education practitioners, primarily serving as administrators (superintendents, assistant superintendents, principals, and so on). The focus is to prepare leaders for educational and public service organizations. The program (90 semester hours beyond a bachelor degree) is primarily delivered as a statewide program, and utilizes a cohort model, with a new cohort group beginning each summer. Students complete residency requirements through two summers (including a web-based follow up), and they write a research dissertation. Most graduates return to positions in K-12 or community colleges.

Doctor of Physical Therapy (DPT):

The Physical Therapy (PT) program at NAU has been in existence since 1978. In 2000 with ABOR approval, the program transitioned to the doctor of physical therapy (DPT) degree, which was becoming the standard professional degree in that field. The PT degree is fully accredited by the Commission on Accreditation of Physical Therapy Education (CAPTE).

The PT program currently receives approximately 120 applications for the 40 openings each year. Students applying to the program must complete pre-requisite courses in Chemistry, Physics, Human Anatomy & Physiology, Statistics and Psychology. Admission is determined using information regarding each applicant's GPA, letters of recommendation, performance on the GRE, and a formal interview process. Those who are accepted into the program have an average GPA of 3.4. The PT curriculum is 33 months, with significant weight being applied to the medical sciences such as anatomy and physiology, but also includes significant emphasis on the safe and effective delivery of clinical services. The first 2 years of the program are primarily didactic in nature and the final year being full-time clinical rotations at hospitals and clinics throughout Arizona and the Western United States. At the conclusion of the program, student performance is evaluated using a number of different methods including survey of students, employers and clinical instructors and performance on the national physical therapy examination.

Certificate Programs

Graduate certificates offer students the opportunity to take a coherent suite of courses that provide training in a specific area. At NAU, such programs typically require 12-18 hours of coursework. Certificates are designed to be flexible and to meet relatively short term needs. They do not require ABOR approval, so the curriculum can be developed and implemented quickly. They are reviewed formally by the Review Committee of the University Graduate Committee in the fourth year after approval.

Two kinds of students are served by graduate certificates. First are those for whom the certificate is their only (or first) plan. In the table below, these students are listed in the "primary" column. The second column represents those certificate students who are also in a degree program. These students are counted with the degree program for the official university counts, and thus don't show up in standard headcount reports. For these students, the certificate provides an opportunity for extra, focused training in a particular specialization that may be in their degree field, or may expand their expertise beyond, often in an interdisciplinary fashion.

In Fall 2005, NAU has 312 students registered for certificate programs. Most of the programs are relatively small—with the exception of the "Principal" certificate, all have fewer than 20 students registered. Seventy-nine percent of the students enrolled in certificate programs list the certificate as their primary plan. Some certificates are clearly aimed at serving this need, while others serve students who are looking to complement their degree programs.

Certificate programs also provide an efficient way to "test" new curriculum ideas and market demand, and may potentially develop into full-blown degree programs over time. One example of that is the certificate in Geographic Information Systems, which

Table GRAD_CERTS. Fall 2005 Graduate Certificate Enrollments (data from Pat Baron).

	Enrollment (primary)	Enrollment (not primary)	Total	Percent Primary
Applied Statistics	2	3	5	40.0%
Assistive Technology	3	2	5	60.0%
Case Management (Nursing)	0	0	0	
Conservation Ecology	3	2	5	60.0%
Criminal Justice	0	0	0	
Disability Policy & Practice	3	14	17	17.6%
Early Intervention (new)	0	0	0	
Educational Technology	5	4	9	55.6%
ESL/TESL	3	2	5	60.0%
Geographic Info Systems	14	4	18	77.8%
Professional Writing	12	3	15	80.0%
Principal	170	15	185	91.9%
Public Management	12	4	16	75.0%
Substance Abuse Ed & Preven	4	2	6	66.7%
Superintendent	3	0	3	100.0%
Supervisor (EDL)	9	0	9	100.0%
Women's Studies	4	10	14	28.6%
Total	247	65	312	79.2%

Size of NAU Graduate Programs

We assume that there is some critical mass that is necessary for a quality graduate program. Conversely, one should also look at very large graduate programs with the same quality issue in mind. NAU's graduate programs vary tremendously in size, with by far the largest programs in Education. We can look at enrollment by looking at headcount (Table MASTERS_HEADCOUNT) as well as degrees awarded (Table MASTERS_DEGREES). The very large programs are in the College of Education, including two programs with more than 500 students enrolled.

Table MASTERS_HEADCOUNT Headcount (Master's programs only).

2004 Headcount	Number of programs	Notes
>1000	1	COE
500-999	1	COE
100-499	7	COE
75-99	3	Various colleges
50-74	3	Various colleges
25-49	13	Various colleges
0-24	22	Various colleges

Table MASTERS_DEGREES. Master's Degrees Awarded.

2003-04 Degrees Awarded	Number of programs	Notes
>500	1	COE
100-499	3	COE
75-99	3	COE
50-74	1	COE
25-49	7	Various colleges
0-24	31	Various colleges
Further Breakdown of 0 – 24:		
20-24	1	
15-19	1	
10-14	6	
5-9	10	
0-4	12	

It is worth taking a closer look at the smaller Master's programs in order to understand possible reasons for their size. Small size may be very appropriate in some cases. Table SMALLMASTERS lists all degree programs with 20 or fewer students enrolled in Fall 04, and also those programs that awarded 5 or fewer degrees in 03-04. In addition, the table lists the total degrees awarded over the last three academic years (01-02, 02-03, 03-04). This number is included because ABOR defines a "low productivity" Master's program as one that produces fewer than 9 degrees over a three-year period. However, we are not making the assumption that the programs listed in this table are "low productivity"—we recognize that there may be good pedagogical reasons for some smaller program sizes. In addition, including the 3-year total is also helpful in case the 03-04 number is simply an anomaly for any single year.

The table is divided into different sections, based on different potential reasons for small program size. Generally, low enrollment programs also awarded few degrees, although that is not always the case. There are a total of 21 programs listed in this table; 17 with low enrollment based on Fall 04 headcount, and 18 with a small number of degrees awarded in 03-04. Two of these programs are formally discontinued, three more are phasing out (MAT degrees in the sciences), and one is being restructured. Three programs were started only in AY 04-05, and two more are relatively new. These leaves 12 programs that are probably worth a closer look.

Table SMALLMASTERS. (Data from Graduate College). Programs with \leq 20 Fall 04 headcount, and/or \leq 5 degrees awarded in 2003-04. Note that some programs meet only one of these criteria, although numbers are presented for both (italicized and in parentheses if they exceed the criteria). The table also shows the total number of degrees awarded over a three-year period (AY 01-02 through AY 03-04). (Note that the MPH and MSW are both excluded, since they are not awarded by NAU.)

Program Name and Degree		Fall 04 Headct	2003-04 Degrees Awarded	Degrees over 3 years (01-02 to 03-4)	Comments
Discontinued Programs:					
Reading/Lrning Disabil.	MEd (d)	1	0	1	discontinued
Phasing Out:					
Biology	MAT	3	2	8	phasing out
Earth Science	MAT	4	1	5	phasing out
Physical Science	MAT	4	1	5	phasing out
New:					
Communication, Applied	MA	19	0	N/A	new (04-05)
Forestry	MF	6	0	N/A	new (04-05)
Spanish	MAT	7	0	N/A	new (04-05)
Env. Sciences & Policy	MS	19	(6)	(12)	new (1 st degree in 01-02)
Physics, Applied	MS	13	1	N/A	New (1 st degree in 03-04)
Other factors:					
Ex. and Health Sciences	MS	1	3	5	being restructured
Quaternary Sciences	MS	6	1	8	looking to possibly combine
Counseling-Stud. Affairs	MEd	12	(6)	(19)	lost a faculty member; can grow
Mathematics	MAT	13	5	7	being reworked for a distance audience
Chemistry	MS	17	(9)	(15)	
Criminal Justice	MS	(28)	1	(14)	
Engineering	M.Eng.	(27)	2	6	
Geography	MA	(30)	5	(12)	
Mathematics	MS	12	3	6	
Political Science	MA	15	3	(16)	
Public Administration	MPA	14	(11)	(24)	
Statistics	MS	6	3	4	

Selectivity and Yield of NAU Graduate Programs

Prospective graduate students at NAU apply to the Graduate College, which works closely with departments to make admissions decisions and offers. With so many graduate students at NAU, it is no surprise that the Graduate College and departments receive numerous inquiries every year, leading to more than 2000 applications. In 2004, for example, the Graduate College alone received about 3600 inquiries, and this number does not include the students who

went directly to departments or websites rather than write or call as they typically did in the past. Table NUMBER_APPS shows the number of applications and admission offers made in 2001 and 2002.

Table NUMBER_APPS. Number of applications, admission offers, and enrolled students processed by the Graduate College in 2001 and 2002. (Data from the Graduate College.)

	2001		2002	
	Master's and Certificate Programs	Doctoral Programs	Master's and Certificate Programs	Doctoral Programs
Applications	2139	190	2240	248
Admissions offers	1428	101	1527	107
Enrolled	1129	80	1221	85

One indicator of program health that can be used is the selectivity of the programs, although we recognize that this measures input rather than outcomes. We have analyzed Graduate College data pertaining to admissions for two years—2001, and 2002. (Data for 03 and 04 are not available in the same form due to the PeopleSoft conversion.) We looked at the following items:

- 1) number of applications
- 2) number of students admitted
- 3) number of students enrolled (yield)

We then calculated two indices, based on these data:

- 1) “Selectivity” (#Admitted/#Applications). What percentage of those who applied were admitted? A lower number indicates greater selectivity—e.g., a program may have 100 applications, but only admit 25 of those as students.
- 2) “Yield” (#Enrolled/#Admitted). What percent of those who were admitted actually enrolled in the program? Here, a higher number is better—e.g., if all 25 of those admitted students choose to attend, then that is a 100% yield rate.

We realize that this type of calculation is rather imprecise and does not address many of the subtle nuances of graduate admissions. For example, this does not take into account student self-selection. If only eight people apply to a very specialized program, and the program accepts five, this is selectivity index of 62%, a rather high and perhaps undesirable rate if considered in isolation. For such programs, the ‘yield’ may be a better index than ‘selectivity.’ But it is important to remember that we cannot tell from numbers alone whether low numbers of applications mean that students are self-selecting, or if the program is not recruiting or does not have a strong reputation.

Selectivity: We would expect Doctoral programs to be more selective than Master’s programs, and that is in fact the case. Doctoral programs had an average “Selectivity Index” of 50.7% in 2001, and 46.5% in 2002. The selectivity index for Master’s programs is higher (less selective), with an average of 59.5% in 2001 and 62.4% in 2002.

Yield: Yield rates in the Doctoral programs averaged 76.0% in 2001 and 75.3% in 2002. Yield rates in the Master's programs averaged 73.4% in 2001 and 71.5% in 2002. Thus, the yield rates in the Master's programs were only slightly lower than those in the Doctoral programs.

These averages mask a lot of variability, so Tables SELECTIVITY and YIELD show these indices by quartiles:

Table SELECTIVITY. Selectivity Index (lower is more selective):

	Number of programs in each:			
	Master's 01	Master's O2	Doctoral 01	Doctoral 02
76% - 100%	8	13	1	0
51% - 75%	19	14	3	4
26% - 50%	11	10	4	3
0% - 25%	2	2	1	2

Table YIELD. Yield Index (higher indicates greater yield):

	Number of programs in each:			
	Master's 01	Master's O2	Doctoral 01	Doctoral 02
76% - 100%	20	18	5	5
51% - 75%	11	16	3	2
26% - 50%	8	5	1	2
0% - 25%	1	1	0	0

NAU Graduate Student Support

Graduate students receive support from NAU in several different ways, including Graduate Assistantships as well as out-of-state and in-state tuition waivers.

Graduate Assistantships

A graduate assistantship is a form of apprenticeship and contributes to the student's professional development. A graduate assistant receives a stipend for services rendered. A twenty-hour per week graduate assistantship is a full-time position. Only full-time graduate students (those taking 9 hours) qualify for graduate assistantships. Graduate assistants are part-time employees of the university, and are eligible for some benefits (as described in the tables below) if they meet the following requirements:

- 1) the graduate assistantship must be for the entire semester
- 2) the graduate assistantship must be for at least 10 hours/week

The following sections summarize the three types of graduate assistants recognized by NAU, along with the benefits associated with the different types of appointments (source: Graduate College homepage, "Graduate Assistant Benefits").

a) Graduate Teaching Assistants (GTA) have a primary responsibility in an instructional capacity. Services provided by a graduate teaching assistant may include lecturing, leading discussion groups, serving as an assistant to laboratory classes, counseling students, proctoring

examinations, grading tests and papers, and providing general assistance in the instructional process.

Assistantship	Funding	Hours	Benefits
Teaching	All (state, grant, and/or local)	10-19	Tuition waiver \$300 per semester
Teaching	All	20	Tuition waiver \$600 per semester; health insurance subsidy paid by NAU through Graduate College.*

b) Graduate Research Assistants (GRA) are selected for excellence in scholarship and promise as researchers. They do part-time research as a portion of their training under the direct supervision of regular faculty members or support the research initiatives of the institution.

Assistantship	Funding	Hours	Benefits
Research	State	10-19	Tuition remission \$300 per semester, paid by NAU through Graduate College
Research	State	20	Tuition remission \$600 per semester, health insurance subsidy.* Both paid by NAU through Graduate College.
Research	Grant or local	10-19	Tuition remission \$300 per semester, paid by sponsor.
Research	Grant or local	20	Tuition remission \$600 per semester, health insurance subsidy.* Both paid by sponsor.

c) Graduate Service Assistants (GSA) assist in a service unit whose mission is closely related to the student's area of academic study and interest. The GSA is responsible to a professional member of the service unit who supervises and trains the student in the service role. The main purpose of the assignment is to assist in the service role of the unit.

Assistantship	Funding	Hours	Benefits
Service	State	10-19	Tuition remission \$300 per semester, paid by NAU through Graduate College.
Service	State	20	Tuition remission \$600 per semester, health insurance subsidy.* Both paid by NAU through Graduate College.
Service	Grant or local	10-19	Tuition remission \$300 per semester, paid by sponsor.
Service	Grant or local	20	Tuition remission \$600 per semester, health insurance subsidy.* Both paid by sponsor.

* Health insurance premium is \$1171 for 2004-05 (fall = \$488, spring/summer=\$683).

* Tuition "waivers" are for GTAs only; GRAs and GSAs, the tuition remission must be paid for by some source (e.g., a grant, state or local account, etc.)

Table GA_TYPE shows the current distribution of the different types of graduate assistants, along with their funding source. Funding sources include auxiliary accounts, grants/contracts, local accounts and state accounts, with grants/contracts and state accounts contributing the most funds (25.51% and 63.79% respectively). Out of 474 graduate assistants, almost 60% (277) are Teaching Assistants, and the vast majority of these (92%) are supported on state accounts. In contrast, Research Assistants comprise 123 out of 474, or 26% of the assistants, most of who (79%) are supported by grants and contracts.

Table GA_TYPE. Current distribution of different types of graduate assistants, along with their funding source. The table lists both FTE and Headcount. It is important to note that a “full-time” GA is defined as 20 hours/week, which is 0.5 FTE. Also note that the table lists a generic category of “Graduate Assistant” as well as the three specific types. This is because the tripartite classification of GAs is relatively new, and a few students (21) were not classified in their submitted paperwork. Source: payroll data.

Job Title	Data	Source				Grand Total
		Auxiliary	Grants	Local	State	
Graduate Assistant	FTE this fund	1.00	4.88	0.50	2.12	8.50
	% this fund	11.76%	57.41%	5.88%	24.94%	100.00%
	Headcount	2	12	2	5	21
Graduate Research Assistant	FTE this fund		43.11	1.25	10.30	54.66
	% this fund	0.00%	78.86%	2.29%	18.85%	100.00%
	Headcount		95	3	25	123
Graduate Service Assistant	FTE this fund	7.50	3.50	4.07	10.56	25.63
	% this fund	29.26%	13.66%	15.88%	41.20%	100.00%
	Headcount	15	7	9	22	53
Graduate Teaching Assistant	FTE this fund	0.75	3.74	5.13	109.89	119.51
	% this fund	0.63%	3.13%	4.29%	91.95%	100.00%
	Headcount	2	9	13	253	277
GRD FTE this fund		9.25	55.23	10.95	132.87	208.30
GRD % this fund		4.44%	26.51%	5.26%	63.79%	100.00%
GRD Count of ID		19	123	27	305	474
Total FTE this fund		9.25	55.23	10.95	132.87	208.30
Total % this fund		4.44%	26.51%	5.26%	63.79%	100.00%
Total Count of ID		19	123	27	305	474

Most graduate assistants are located on the Flagstaff campus. In the fall of 2004, of the 1708 Flagstaff campus students, only 1057 were full-time, and thus eligible for a graduate assistantship. Table GA_by_COLLEGE shows the distribution of these assistantships among the colleges. (NOTE: there were 24 full-time students in the Graduate College, none of whom are in programs and thus eligible for assistantships; these 24 are NOT included in the table.) Overall, less than half (43%) of the eligible Flagstaff students have assistantships. The percentages vary

by college, from a high of almost 75% of the full-time students in CENS with assistantships (probably reflecting grant funding) to a low of 23.2% in the Consortium of Professional Schools and Colleges.

Table GA_by_COLLEGE. Assistantship distribution for full-time, Flagstaff campus graduate students, by college. (Data from Karen Appleby)

	No Assist	Yes Assist	TOTAL	% No	%Yes
CAL	80	88	168	47.6%	52.4%
CBA	15	13	28	53.6%	46.4%
CPSC	185	56	241	76.8%	23.2%
COE	177	69	246	72.0%	28.0%
CENS	45	133	178	25.3%	74.7%
SBS	87	85	172	50.6%	49.4%
Colleges Total:	589	444	1033	57.0%	43.0%

We would expect that doctoral programs would have more students with assistantships. Table DOCASSIST looks only at the doctoral programs. Contrary to expectations, when we look at all doctoral programs, a LOWER percentage of students have assistantships (33% versus 42% for all Mountain Campus full-time students). This is probably due to the professional doctorates (e.g., DPT) where there are few assistantships. Thus, Table PhDASSIST looks only at the Ph.D. programs (excludes DPT and EdD degrees). In this case, a relatively high percentage of students have assistantships (65% versus 42% for all full-time graduate students on the mountain campus).

Table DOCASSIST. Assistantship status of full-time, Mountain campus doctoral students. Karen Appleby data.

		No Assist	Yes Assist	Total	% No	%Yes
CAL	Applied Linguistics (PhD)	3	14	17	17.6%	82.4%
	History (PhD)	1	4	5	20.0%	80.0%
Consort	Forest Science (PhD)	3	12	15	20.0%	80.0%
	Physical Therapy (DPT)	122	4	126	96.8%	3.2%
COE	Curriculum & Instruction (EdD)	5	5	10	50.0%	50.0%
	Educational Psychology (PhD)	16	13	29	55.2%	44.8%
	Educational Leadership (EdD)	1	0	1	100.0%	0.0%
CENS	Biology (PhD)	6	20	26	23.1%	76.9%
SBS	Political Science (PhD)	11	12	23	47.8%	52.2%
TOTAL:		168	84	252	66.7%	33.3%

Table PhDASSIST. Assistantship status of full-time, Mountain campus Ph.D. students. Karen Appleby data.

		No Assist	Yes Assist	Total	% No	% Yes
CAL	Applied Linguistics (PhD)	3	14	17	17.6%	82.4%
	History (PhD)	1	4	5	20.0%	80.0%
Consort	Forest Science (PhD)	3	12	15	20.0%	80.0%
CENS	Biology (PhD)	6	20	26	23.1%	76.9%
COE	Educ Psy-Counseling Psy (PhD)	10	3	13	76.9%	23.1%
	Educ Psy-Learn&Instruct (PhD)	2	1	3	66.7%	33.3%
	Educ Psy-School Psy (PhD)	4	9	13	30.8%	69.2%
SBS	Political Science (PhD)	11	12	23	47.8%	52.2%
TOTAL:		40	75	115	34.8%	65.2%

Graduate Assistantship Pay

Graduate programs at Northern Arizona University have plenty of anecdotal evidence that they lose potential graduate students who are lured away by more lucrative offers elsewhere. One source of comparative data for graduate assistantships is the University of North Dakota 2003-04 Graduate Teaching Assistant stipend survey (Table UND_Survey). The survey includes 32 named research universities (Doctoral Research Intensive and Doctoral Research Extensive), as well as 13 institutions that wished to remain anonymous. Note that the survey was specifically focused on teaching assistants, and that only some limited fields are included. Nonetheless, the comparisons show that NAU's stipends for comparable fields are all lower than the mean survey stipend, with the exception of Mathematics.

Table UND_Survey. University of North Dakota graduate assistantship stipend survey comparisons.

	2003-2004 Mean Stipend	2003-2004 NAU stipend	NAU difference from Mean
English	\$10,516	\$10,258	(-\$258)
Chemistry	\$11,921	\$10,668	(-\$1,253)
Education	\$10,185	\$7,925	(-\$2,260)
Accounting	\$9,125		
Music	\$10,185	\$8,225	(-\$1,960)
Economics	\$9,125		
Civil Eng	\$10,125		
Biochemistry	\$13,750	\$10,668	(-\$3,082)
Counseling	\$10,000	\$8,225	(-\$1,775)
Mathematics	\$11,216	\$12,725	\$1,509
Average	\$10,615	\$9,813	(-\$1,297)

Other available data from the sciences also suggest that NAU stipend levels are low. Two of the major support programs from the NSF (IGERT and GK-12 Fellowship programs) have stipends of \$30,000 for a 12-month appointment, plus \$10,500 for educational allowance

(to be used for tuition, fees, health insurance, etc.). For NIH, the current (2005) stipend levels are \$20,772 for pre-doctoral students (meaning PhD students). This is the level to be used for any NIH program, whether it is a specific training program (meant to provide training for large numbers of students at an institution) or the stipend for an individual student supported on an individual investigator's grant.

Graduate Teaching Assistants (GTAs) play a very important role at NAU, as they do at all research universities. They may teach both regular organized class sections as well as lab or recitation sections. They are particularly important for some of our large, required Freshmen liberal studies classes, especially in English and Math. These departments have well-established programs for training these teachers, and the work of these students is important for their educational experience as well as for helping NAU meet our teaching needs. As an example, graduate teaching assistants deliver between 43 and 47 four-credit hour sections of English 105 per semester. These classes are capped at 23 per section. Each GTA is responsible for teaching one section of ENG 105, and either one section of a two-credit hour sophomore writing class (ENG 205) or two credit hours of English writing tuition in the Writing Center (ENG 100). These GTAs are required to enroll in ENG 601 (English Composition teaching practicum).

Graduate Tuition Waivers

Most graduate tuition waivers are awarded to students who do not have assistantships. Tuition waivers are allocated from the Graduate College to academic departments, who in turn allocate them to their students. Thus, some are used for statewide students as well as mountain campus students. For the 2004-05 academic year, the budget for resident graduate tuition waivers is \$497,896. This is equivalent to waivers for 119 full-time graduate students. For non-resident students, the budget is \$511,200. This is equivalent to 60 graduate students enrolling for 12 hours each semester. However, since most graduate students enroll in 9 hours, we can help about 90 non-resident graduate students with these waivers. These amounts are allocated to the Graduate College from the Financial Aid office each year, and have changed very little over the past 5 years or so.

Is Graduate Student Support Adequate?

A university typically engages in thoughtful deliberations when new programs or course offerings are initiated. One of the questions posed for every proposal for a new course or new program at NAU addresses the need for new resources to enable a department to staff the change. For example, the new Spanish MAT program, which is in its first year, has no Graduate Teaching Assistantships that are funded by the Graduate College. The College of Arts and Letters is supporting seven Graduate Assistantships in Spanish in the current year (FY 05). The new M.A. in Applied Communication has four GTAs that are funded for three years from Prop 301 money, but no plan for how these will be funded after three years.

It is important to understand that there are both internal and external reasons and pressures to add new graduate programs. One reason is the potential availability of graduate students to assist with offering very large numbers of relatively small sections (e.g., English composition, math classes, lab classes in the sciences, some types of communication classes). Another pressure faculty desire to have graduate students, who by their very nature are committed to their subject area and are generally a joy to teach! In addition, especially in the sciences, graduate students offer the major mechanism for increasing faculty scholarly productivity (and therefore building and maintaining research credentials); thus faculty members

in certain disciplines see their own professional development as tied to the opportunity to advise and mentor graduate students.

In light of this recognition that program offerings require adequate resources, it is appropriate to question whether or not NAU is supporting graduate programs at sufficient levels. At the student level, are sufficient assistantships allotted to allow for effective recruitment of high quality graduate students? At the faculty level, are sufficient numbers of full-time faculty members engaged to offer the doctoral and master’s programs? Is there an ideal or standard ratio for faculty to students in graduate programs?

Graduate Student “Revenue” to NAU

Although some of our graduate students are supported by assistantships and thus receive partial or full tuition waivers, as noted previously, many students are off-campus, part-time students who receive no assistantships or tuition waivers. (Note: Institutional policy is a waiver of the \$1,200 tuition increase from two years ago. There may be local supplements as well.). Overall, in fact, graduate students have a higher net tuition return to the university than undergraduate students. (NOTE: This calculation does not take into account the fact that 488 G.A.’s are treated as residents for tuition purposes although they are non-residents.) The figures for Fall 04 collections are as follows (data from Karen Appleby):

	Grand Total Collected	Net Collection	% Net
Graduate Students	\$8,804,390	\$7,408,046	84.1%
Undergraduate Students	\$32,234,590	\$25,060,814	77.7%

Note that 60% of the SCH and 65% of the revenue is from statewide, 36% of the SCH and 30% of the revenue from on-campus and 4% of SCH and 5% of revenue from Yuma.

The issue of “Regents’ Set-Aside”(RSA) is also relevant to this discussion. ABOR policy requires that a portion of tuition collections be set aside for financial aid to students (“Regents’ Set-Aside”). The focus of distribution of this set-aside is need-based aid for Arizona undergraduates. In AY2005, the amount of tuition set aside is 14% of the undergraduate resident tuition rate (\$3,983, for a set-aside amount of approximately \$558) times the number of full-pay equivalent (FPE) students for the entire university. For resident students, a full-pay equivalent is \$3,983 (\$4,183 for graduate students) and for non-residents it is \$12,503 (\$12,703 for graduate students). So, for every \$3,983/\$4,183 in resident tuition collected and for every \$12,503/\$12,703 in non-resident tuition collected, we must set aside \$558 for financial aid.

In Fall, 2004, Graduate students paid a total of approximately \$770,000 (net of waivers) in non-resident tuition and \$6,300,000 (net of waivers) in resident tuition. If we assume that Spring registration for graduate students is much the same as Fall, then the number of full-pay equivalents for resident graduate students would be about 798 (\$12,600,000/\$4,183), and for non-residents 123 (\$1,540,000/\$12,507). Graduate students account for approximately 921 Full-Pay-equivalents and so about \$502,000 (921 * \$3,983 * 14%) of graduate tuition payments are set aside for financial aid. This financial aid is directed primarily to needy undergraduate Arizona residents.

The bottom line is that the set-aside comes from both graduate and undergraduate students, but that it benefits primarily undergraduates. In AY 04-05, approximately \$500,000 of graduate tuition payments contributed to financial aid for undergraduate students through the set-aside.

Peer Institution Comparisons and National Trends

We have compared the number of our graduate programs with our 17 peer institutions. We realize that these are our official institutional peers; we do not imply that our graduate programs necessarily compete with these institutions for students. However, we wanted to make this comparison in order to see if our peer institutions, presumably with similar missions, have a similar number of graduate programs.

Table PEERPROGRAMS shows total enrollment and graduate enrollment, along with the number of Master's Doctoral, graduate Certificate, and Specialist degrees offered. The enrollment figures are from the NAU PAIR website, and represent Fall 03 enrollment. The number of degree programs comes from each university's website—in some cases they list their total number of programs, in other cases we had to count the number of programs from catalogs or individual school listings. Thus, there may be some counting inconsistencies, but on the whole these figures are reasonably accurate.

Interestingly enough, in this comparison NAU is the fourth largest institution in terms of graduate enrollment, and yet we do not look "heavy" with respect to the number of graduate programs (see table PEERPROGRAMS). In fact, we have many fewer Master's programs than many of our peers with fewer graduate students. A crude measure of this is provided in the last two columns, which list the number of degree programs (certificates excluded) then the graduate enrollment divided by the number of programs. Using this measure, NAU has 102 students per graduate program, the second highest ratio among our peers, and far above most of them. Thus, the question to ask should be whether we have "enough" graduate programs, or the right mix of programs. The data and comparisons imply that we do not have "too many."

Table PEERPROGRAMS: Comparison of number of graduate programs (Masters's, Doctoral, Certificates, Specialist degrees) at NAU and our peer institutions. Table is sorted by graduate enrollment. Data from NAU PAIR website; accessed Fall 04.

School	Total Headct	Grad Headct	Master's	Doctoral	Certs	Specialist	# Degree pgms	Grad Enroll/# pgms
MN-Duluth	10003	695	17	2			19	37
Miami Ohio	16863	1713	54	10	5		64	27
U. of Vermont	10967	1733	72	20	9		92	19
U. of Montana	12253	1874	97	31	7	3	131	14
U. of North Dakota	12857	2146	54	23	11	1	78	28
Ball State	20533	2892	70	16	3	3	89	32
Bowling Green	18534	3053	66	14	3	2	82	37
Ohio U.	20452	3252	82	33	14		115	28
U. Delaware	20501	3301	97	40	17		137	24
Nevada-Reno	15459	3,341	63	37			100	33
U. of Wyoming	12880	3495	62	28	8	3	93	38
Oakland U.	16575	3617	42	11	30	1	54	67
Cal St-Fresno	21305	3,967	42	1	7		43	92
UNLV	25749	5069	60	28	2	4	92	55
NAU	18824	5809	48	9	17		57	102
Old Dominion	20802	6593	57	23	8		80	82
U. Central FL	41102	6932	62	24	69	3	89	78
George Mason	28246	11144	76	17	66		93	120

Notes about the comparison:

- 1) UVM—does not include the medical school
- 2) Doctoral programs include: Ph.D., Ed.D., D.A., DMA, JD, DPT, DO, D.Au.

Given the very large number of graduate students in Education at NAU, it is also important to look at how we compare with our peers in this respect. As Table EDUCATIONPEER shows, NAU has very large numbers in Education compared to our peers, and this may skew our comparison of the total number of grad programs.

TABLE EDUCATIONPEER. NAU and Peers: % Graduate enrollment in Education programs (data collected by Karen Appleby, Fall 04).

Institution	Year	Tot Grad	Education	% Ed	College Name
NAU	2004	5814	4043	69.5%	Education
Oakland U.	2003	3787	1928	50.9%	
CSU Fresno	2003	3634	1393	38.3%	Education and Human Development
U. of Vermont	2004	1344	469	34.9%	Education and Social Science
UNLV	2003	3746	1288	34.4%	Education (total does not include "not admitted")

Nevada Reno	2003	3204	891	27.8%	Education
Central Florida	2004	7409	1939	26.2%	Education
George Mason	2003	10870	2238	20.6%	Graduate School of Education
Ball State	2003	3102	638	20.6%	Education
Ohio University	2003	2742	559	20.4%	Education
Old Dominion	2003	6849	1366	19.9%	Education
Delaware	2003	3301	650	19.7%	College of Human Services, Education and Public Policy
U. of Montana	2003	1519	288	19.0%	Education -- master's/doc only no non-degree/post-bacc
U. of North Dakota	2004	2045	345	16.9%	??Education
U. of Wyoming	2003	3078	375	12.2%	Education
Miami Ohio	2004				contact department
Bowling Green	2004	3148			not broken out
Minn.-Duluth					reports not available

Table PeerNon-ED compares the non-education enrollment at NAU versus our peer institutions. (Note that not all peer institutions are included because we could not get comparable data for all.) When Education enrollment is removed, NAU with 1771 students actually has relatively low numbers of graduate students compared to our peers. Nonetheless, we have only 34 non-Education Master's graduate programs, and this is also not excessive in comparison to our peers with comparable non-Education headcount. NAU has a total of 40 non-Education graduate degree programs; as the table shows, this translates to 44 students per non-Education program, the third-highest ratio among our peers for which we have comparable data. Thus, the data do not suggest that NAU has "too many" graduate programs compared to our peer institutions.

Table: PeerNon-ED. Comparison of non-education enrollments and number of non-education graduate programs at peer institutions. (The table is sorted by non-education enrollment).

Institution	Year	Tot Grad	Non-Ed	# Non-Ed Master's	# Non-Ed Doc	# Non-Ed Degree Pgms	Non-Ed Grad Enroll/ # non-Ed pgms
George Mason	2003	10870	8632	60	16	76	114
Old Dominion	2003	6849	5483	47	22	69	79
Wyoming	2003	3078	2703	51	17	68	40
Delaware	2003	3301	2651	89	38	127	21
UNLV	2003	3746	2458	50	19	69	36
Ohio University	2003	2742	2183	50	19	69	32
Oakland	2003	3787	1859	40	10	50	37
Northern Arizona U	2004	5814	1771	34	6	40	44
U. of North Dakota	2004	2045	1700	44	19	63	27
U. of Montana	2003	1519	1231	88	27	115	11
U. of Vermont	2004	1344	875	65	19	84	10

It is also instructive to compare NAU with our “rural peers”—although these are not officially approved ABOR peers, they are listed on the PAIR website as “potential peers,” because they tend to be institutions very much like NAU—generally Doctoral Research Intensive institutions located in rural areas. As Table RURAL_PEER_PROGRAMS shows, the comparison shows similar results as reported for our “official peers”—NAU has relatively few graduate programs relative to the number of graduate students. NAU and Central Michigan both stand out in this regard as institutions with a very high ratio of graduate headcount to the number of degree programs.

Table RURAL_PEER_PROGRAMS: Comparison of number of graduate programs (Masters’s, Doctoral, Certificates, Specialist degrees) at NAU and our “potential rural peer” institutions. Table is sorted by graduate enrollment. Data from NAU PAIR website; accessed Fall 04.

School	Total Headct	Grad Headct	Master's	Doctoral	Certs	Specialist	#Grad Degree pgms	Enroll/ pgms
Indiana U. of Pennsylvania	13956	1837	42	8	6	0	50	37
U. of Northern Colorado	13204	2540	31	20	??	2	51	50
U. of Southern Mississippi	14996	2679	62	25	??	2	87	31
Illinois State	20860	2763	63	9	16	1	72	38
SUNY Binghamton	13385	2822	53	25	13	0	78	36
U. of North Carolina--Greensboro	14328	3222	62	21	32	1	83	39
U. of Alabama--Tuscaloosa	20290	4402	69	53	??	6	122	36
East Carolina	21756	4821	72	16	25	0	88	55
Northern Arizona U.	18824	5809	48	9	17	0	57	102
Western Michigan U.	29178	5869	70	29	9	2	99	59
U. of Texas--Arlington	24979	6109	71	37	48	0	108	57
Central Michigan University	27758	8116	47	10	1	11	57	142

Part II: Research: Sponsored Projects and Scholarly Activity

Current Picture of NAU Sponsored Projects

We often use the word “research” to describe the various types of scholarly activity that our faculty engage in, often with students. This terminology, however, can be misleading, especially when we are talking about an institution like NAU, which has a broad mission, and where scholarship is often very applied. A recent Kellogg report, for example, talks about the “discovery function” of public universities, particularly emphasizing the importance of applying research to community, state, national and international problems (Kellogg report 2000: 21).

Another way in which the term “research” is too narrow for NAU refers simply to the way in which we count our research dollars. Faculty and staff at the university win awards for a variety of activities that are considered to be part of the “research” mission, but should be more accurately referred to as scholarly activity. These sponsored projects are classified into three broad areas:

- 1) Research (projects whose purpose is to increase knowledge and understanding of the subject studied)
- 2) Instruction (activities that are part of the instructional program)
- 3) Public Service (projects established primarily to provide non-instructional services beneficial to individuals and groups external to the university)

These are the types of grants and contracts that are often thought of as “research,” although in fact, they comprise a variety of scholarly activities. In FY 04, the research, instruction, and public service dollars comprised 94.8% of the sponsored projects at NAU (Source: Vice Provost for Research and Graduate Studies FY 2004 Annual Report, p. 14), (Note: the other 5.2% of sponsored projects came from projects classified as: a) fellowships & scholarships, b) academic support, c) institutional support, d) student services, and e) capital.)

NAU, as a Doctoral Research-Intensive university, has a different mission than UA or ASU, both of which are classified as Doctoral Research-Extensive institutions. These differences are reflected in the proportions of the different types of sponsored projects at the three institutions (see figure Types_of_Projects); NAU’s sponsored programs are relatively balanced among the three categories of research, instruction, and public service, whereas our sister institutions are much more heavily weighted towards research.

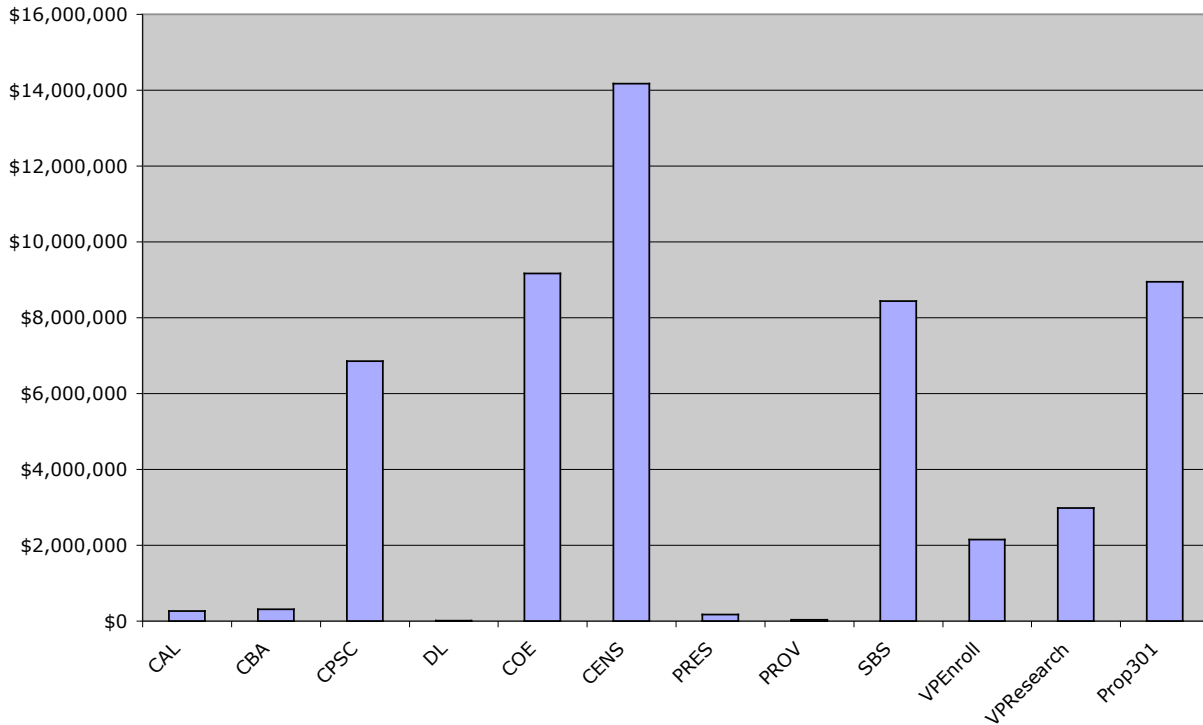
Figure Types_of_Projects. Ratio of different types of sponsored projects at NAU, ASU, and UA. Source: Vice Provost FY 2004 Annual Report.



NAU’s colleges also vary amongst themselves with respect to their ratios of types of projects, and also with respect to the total dollars. (Vice Provost report, table 5, p. 13; see also chart below). This variety reflects the different emphases of each college. For example, in FY04, the College of Education received the majority of its dollars in the area of “Public Service” grants (\$6.69 million), a significant amount in “Instruction” grants (\$2.32 million), and a much smaller amount in of research dollars (\$72K). In contrast, the College of Arts and Sciences received \$5.60 million in research grants, out of a total of \$7.23 million. The School of Forestry had roughly comparable numbers in research (\$1.17 million) and public service (\$1.00 million).

Figure Awards_by_Units. FY 04 awards by administrative units. Note that although the data in this figure are for FY04, they are cast in terms of the current college structures. Source: Vice Provost FY 2004 Annual Report.

FY04 Sponsored Project Awards by Current Units



Sponsored program support at NAU has increased more than 300 % in the past decade, from \$12.6 million received in awards in FY94 to \$53.6 million in FY04. The pattern has been one of steady increase over this time period, with a particularly large jump between FY 2000 (\$28.7 million) and FY 2001 (\$43.4 M). Although the dollar value of awards has increased significantly, the number of proposals submitted and the number of awards has been roughly stable since FY2000. While this suggests increasing effectiveness of proposals (or at least increasing mean size of awards), the plateau in number of proposals and number of awards may reflect some limit or constraint being approached.

Over the past three years, federal agencies have been the source of 55 – 60 % of the sponsored project support at NAU. Major sponsors have been the US Department of Education (30 % of the total federal funding in FY2004), NSF, EPA, Department of Commerce, and Health & Human Services. NIH funding has grown substantially over the past decade, but NIH comprises only a small portion of NAU’s external support. State and local government sources (including Proposition 301) have provided another 25 – 28 %. Other sources of support are diverse but small contributors to the total. Particularly notable is the very small proportion of support coming from industry (0.4 % of the total, or \$200,000 in FY2004); this is an obvious area of potential growth.

There are other sources of funding for scholarly activities on campus, although they are not as readily “countable” as sponsored projects funding. Many of our units provide service to the state of Arizona though fee for service agreements that are designed to recover the cost of the

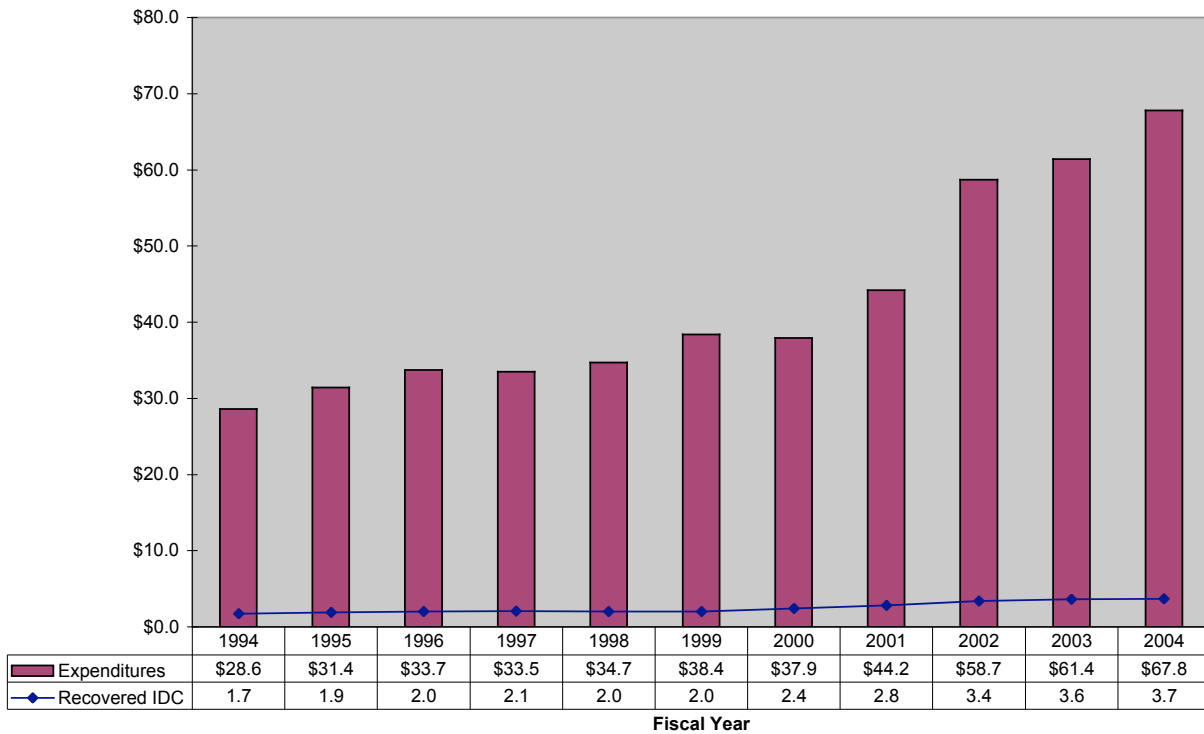
activity. For example, the Center for Business Outreach in the College of Business Administration provides services to over 7,000 clients annually with an investment of less than \$150,000 per year of state funding. While this is not counted in our public service totals, it does represent significant outreach to the state.

Indirect Costs

Indirect costs are also called “overhead” and “facilities and administration costs.” While sponsored project expenditures have risen steadily at NAU, recovered indirect costs do not appear to have risen proportionally (Figure Expenditures /IDC). This is particularly noticeable when one compares expenditures for FY 2001 and FY 2002. FY 2002 is the first year of Prop 301 expenditures, and that is largely responsible for the large increase in expenditures (from \$44.2 M in FY2001 to \$58.7 M in FY 2002). Prop 301 funding does not provide any indirect return back to the university.

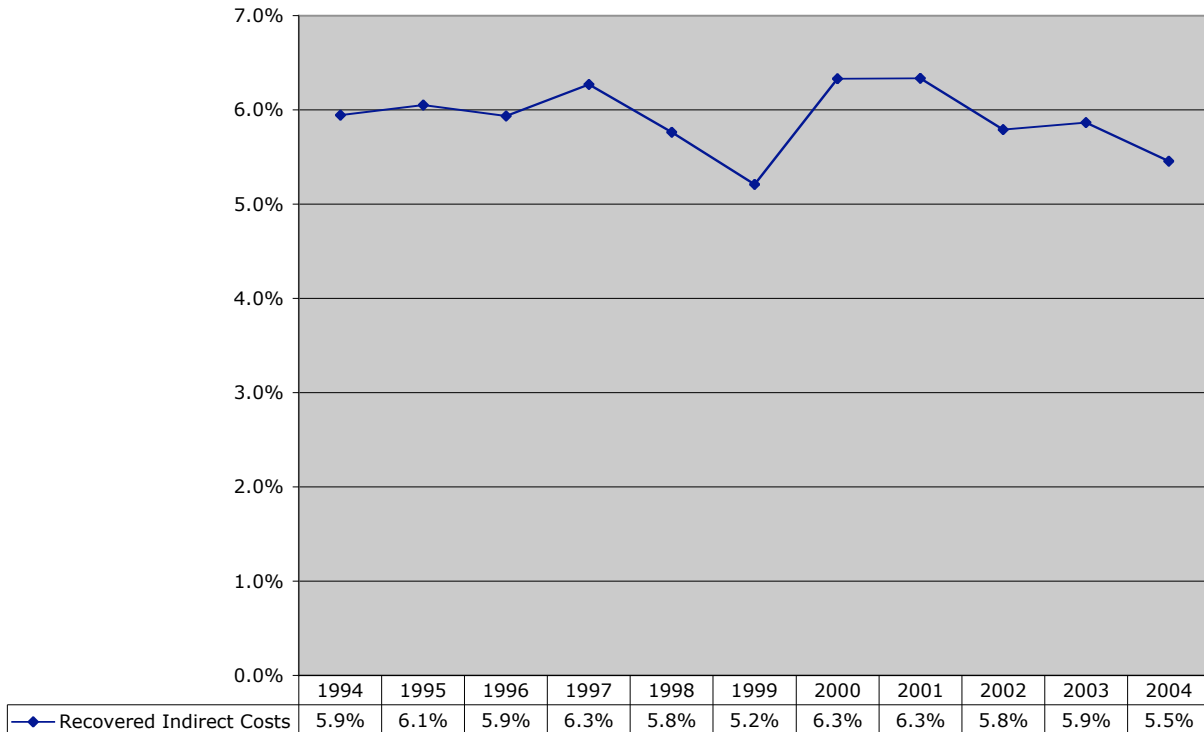
Figure Expenditures/IDC. Sponsored program expenditures over from FY 1994 – FY 2004. Note that these figures DO include financial aid.

Sponsored Program Expenditures, FY94-FY04



It is also helpful to look at recovered indirect costs as a percentage of the total expenditures. Over the last 10 fiscal years, the percentage has remained relatively constant, ranging from 5.2% to 6.3%, with a 10-year average of 5.9%. The drop seen in the last three fiscal years can be attributed to Proposition 301 funding, which provides additional dollars, but no indirect costs.

Recovered Indirect Costs as % of Total Expenditures



Some of our key agencies carry relatively low indirect cost rates (e.g., Dept. of Education at 8%). Another concern has been the formula that NAU uses to calculate its indirect costs—we have been using 48.7% of salaries and wages, whereas an institution with our level of sponsored project funding should be using a percentage of Modified Total Direct Costs. We recently engaged the accounting firm of KPMG to prepare the data to enable us to renegotiate our federal rate. This study has now been completed, and the new rates are in effect for proposals that are being submitted as of January 2006. This should increase the recovered indirect costs.

Recovered indirect costs received by NAU are distributed annually, normally in August for the previous fiscal year’s grants and contracts. Table IDC_DISTRIB shows the distribution of costs from FY 02 – FY 04, as well as the FY05 projection.

Table IDC_DISTRIB. Rough estimates of the uses of recovered Indirect Costs.

Indirect Account -- FY02-FY04	FY02	FY03	FY04	FY05 (proj)
Bal Fwd (not actual amount available due to August payout of previous FY's indirects)	\$1,468,553	\$1,582,062	\$1,826,747	\$2,322,000
Revenue	\$3,239,850	\$3,407,871	\$3,473,500	\$3,586,700
Distributions to generating units	\$981,816	\$884,192	\$1,040,900	\$1,042,000
Other distributions (Fin Aid, etc.)	\$200,000	\$200,000	\$200,000	\$200,000
Total Distributions	\$1,181,816	\$1,084,192	\$1,240,900	\$1,242,000
Percent Revenue distributed:				
% Distributed to College	30.3%	25.9%	30.0%	29.1%
% Other Distributions	6.2%	5.9%	5.8%	5.6%
% Support Research Infrastructure	21.9%	23.4%	23.0%	26.0%
% Institutional Support/Carryfwd	41.6%	44.8%	41.3%	39.3%
Provost Grant Matches	\$40,000	\$64,840	\$127,655	\$168,900
% of Total Indirects	1.2%	1.9%	3.7%	4.7%

Approximately 30% of the recovered IDC is distributed back to the generating units (colleges, centers). Approximately 5-6% is distributed to Financial Aid and other needs. The percent devoted to direct support of research infrastructure has ranged from about 22% in FY 02 to an estimate of 26% in FY 05. (These expenses include support of the Hooper Undergraduate Research Program, grant development, and research staff support, including the campus Bio-Safety Officer.) The rest of the dollars are used for general institutional support and carryforward. Over the last two fiscal years, this general support includes support for the Institute for Native Americans, AZ Board of Regents planning efforts, auditing (including the IDC study), and various “reserve” projects.

Prior to the internal reorganization of NAU, the Centers and Institutes received their 30% distribution directly, and that is still in fact the case. These dollars are important in keeping their units functioning. However, now that the Centers and Institutes are placed within colleges, who provide administrative oversight, we recommend that the colleges receive some IDC in return. In order not to hurt the Centers and Institutes, we would recommend that the amount come not from the 30% that is already distributed, but from the approximately 40% that is used for general institutional support/carry forward. We recommend an additional 10% distribution to the colleges. Recognizing that other sources will need to be identified to fund the “institutional support” projects, we recommend that this be phased in over a 5-year time period (2% per year).

Benefits of NAU’s Scholarly Activities

Research (whether basic or applied) and creative activities represent different versions of a faculty member’s work as a scholar. Some of this scholarly work may be supported by

external funding (sponsored projects). What benefits, financial and otherwise, are brought to the campus by this array of scholarly activities?

Achievement of essential elements of the university's mission

Much of the research and outreach performed by faculty members and by centers is directly related to key components of the university's mission and strategic goals. Some of these components are not adequately funded through legislative appropriations and tuition revenues, yet are core commitments of Northern Arizona University. Research, particularly sponsored projects, is how the university makes good on these commitments to areas such as outreach and service to K-12 education in the state, services to tribal governments and Native Americans more generally, and partnerships with Colorado Plateau communities and agencies. Basic and applied research, and technology transfer or outreach, enable the university to carry out its mission of creating and disseminating knowledge – including knowledge aimed at solving societal problems.

The research mission of the university also contributes to University – city relationships, as well as relationships with various institutions housed in Flagstaff. The scientific contributions are obvious benefits for the city and generate financial returns. However, the fine arts, humanities, and the social sciences contribute to the quality of life of city residents and create cultural and intellectual benefits for the city that need to be recognized. Without NAU, the city would not have these assets. The value of these benefits is borne out in the city's support of the university at particularly critical times.

Our faculty and staff members serve in state, national, and even international efforts. The university's high level of effort in these areas results in our sponsored projects portfolio resembling that of a land grant institution – a vital role, given the dearth of such institutions in our region and our commitment to regional economic and social development.

Enhanced quality of faculty members

Faculty members who are active scholars in their professional disciplines are by definition well-informed and up-to-date. This is important in maintaining the university's credibility as a quality institution, and absolutely essential in rapidly evolving fields and disciplines (such as the sciences, professional programs, and technical fields). Furthermore, faculty members who are actively engaged as scholars are able to convey passion and excitement about their disciplines – an excitement that is apparent to students and our community partners. Faculty are also able to improve their effectiveness as teachers by pursuing the “scholarship of pedagogy,” in Boyer's term; the critical analytical approach of an active scholar predisposes faculty members to pursue assessment and continuous improvement of teaching activities. Finally, the strong reputations of faculty and staff at the national and international level enhance the university's ability to recruit talented, committed students who complete their degree programs. In particular, faculty members with such reputations contribute to the recruitment of students from outside the immediate region – contributing to the diversity of our student population and the number of out-of-state students on campus. It also significantly enhances NAU's abilities to recruit new top-level faculty in all areas of the university.

Enhanced quality of the educational experience

Faculty members who are active scholars within their disciplines are able to provide higher quality educational experiences to their students. Critical thinking and scholarly

approaches to the content matter of a discipline contribute to the development of the key analytical and communication skills our liberal education program strives to provide our students. More specifically, faculty scholars provide their students with the opportunity for research and design experiences outside the classroom, an opportunity to apply and practice the knowledge and skills gained from a textbook. Both graduate students and undergraduate students benefit from participation in research, attendance and presentations at regional or national meetings of professional societies, and involvement with professional publication of results. Graduate and undergraduate students benefit from collaboration with expert faculty in scholarly and creative activities designed to produce results that can be tested and applied in the field with important implications for practices in the disciplines. Further, in some areas faculty members have been able to incorporate research and design (problem-solving) into the curriculum itself. This commitment to active engagement of students is representative of the best pedagogical practices for student-driven inquiry, and also viewed by prospective students (and their parents) as a key marketing point for student recruitment.

An important aspect of student engagement is the personal contact with faculty members and others who can serve as mentors or networks of support – components of a student’s experience documented to correlate with retention and success. Participation in a research group provides a real team experience and a supportive network of others in the group (from the faculty supervisor to graduate students to peers). The team experience is both important for student retention and a major element of student preparation for the realities of the work world in many professions.

Faculty research also contributes to the quality of our academic programs in more tangible financial ways. In the sciences and technical disciplines, external funding for research purchases equipment that is also used for teaching – hence providing more up-to-date experiences and training for students than our instructional budget alone could support. The strong reputations and credentials of research-active faculty members increase the success of NSF and other curriculum improvement grants, equipment/instrumentation grants, awards for Research Experiences for Undergraduates, and so on. These grants in turn provide direct enhancement and expansion of the experiences we offer students. Finally, the excellence of research and graduate programs attracts stronger applicant pools for graduate assistantships, directly enhancing the quality of instruction in laboratory courses for large numbers of undergraduates.

In the arts and humanities, external funding for scholarly work takes many forms. Fields such as Applied Linguistics are supported by NSF funding, which provides many of the same benefits mentioned above for the sciences and technical disciplines. Mostly, however, faculty in the arts and humanities are supported by NEH, NEA, Lannan, Guggenheim Foundation, and other private foundation-funded fellowships. These fellowships enhance the reputations of the faculty and their programs, making them attractive to graduate students as well as providing a spur to further funding of scholarly and creative work, including publication. These humanities and arts faculty also interact with the wider community through readings, arts shows, performances, school programs, and lectures, all of which provide indirect benefits back to the university.

Financial benefits of sponsored projects

Finally, there are obvious benefits of increasing the revenue stream represented by indirect cost recovery on sponsored projects. Indirect cost returns are a primary source of the

'start-up' purchases of equipment and other support for new tenure-track faculty in the sciences, for example. In many units, generated overhead is used to provide seed monies or support for pilot projects, professional travel, faculty development, and other activities no longer covered by state dollars. Indirect costs contribute to or cover the maintenance and replacement of large pieces of equipment, instrumentation, and other infrastructure used for both research and teaching. The dollars returned to academic units based on generated overhead are relatively flexible budgetary resources that have become increasingly important as programs have lost most of their operations budgets; of course, the portions retained by the central administration provide the direct support of infrastructure for managing grants and contracts, centralized services such as life safety, regulatory compliance, and so on.

Undergraduate Research at NAU

Given NAU's strong emphasis on undergraduate education, it is no surprise that we have numerous programs aimed specifically at undergraduate research experiences. These are enumerated here. In addition to pedagogical benefits discussed above, many undergraduates are supported on various sponsored project grants and contracts. In 2004, for example, 203 student positions were supported, totaling almost 1 million dollars of direct student employment support (\$998,222), in FY 2005, 208 undergraduates received \$989,084 from research funding (data source: NAU Payroll).

Some of our key undergraduate research programs are listed below; further information about these programs is available in the Appendix.

- NSF Research Experiences for Undergraduates (REU) (Biology, Psychology, Astronomy & Physics)
- NASA Space Grant
- Beckman Scholars Program (biology, chemistry, biochemistry)
- NIH Minority Student Development Program (MSD) (biomedical sciences)
- Henry O. Hooper Undergraduate Research Awards (HURA) (all fields eligible)
- Native American Undergraduate Research Awards (John and Sophie Ottens Foundation) (health or health related fields)
- Undergraduate Student Training in Academic Research (U*STAR) (NIH Minority Access to Research Careers)
- NAU Student Travel Awards (all fields; funded by Vice Provost for Research as well as individual colleges)
- Ecological Restoration Institute (ERI)
- Health Careers Opportunity Program (HCOP) (student service functions as well as pre-health professional research and education programs)
- Navajo Nation Archaeology Department at NAU (NNAD) (Anthropology)
- NSF Undergraduate Mentoring in Environmental Biology (UMEB)
- National Undergraduate Research Observatory (NURO)

Many of the programs listed above are funded externally. In addition to these opportunities, many undergraduate students engage in research through their coursework, including independent study, research methods courses, and capstone courses.

State Funding for NAU’s Scholarly Activities

There are several ways in which state funds contribute directly to our scholarly activity or “discovery and application” mission. Some are more easily and directly counted than others. It is appropriate that state dollars contribute to scholarly activity, as we are a university, where the discovery and application of knowledge are absolutely critical parts of our mission (Kellogg report).

Faculty Time

One very obvious investment is of course, faculty time. Data from the 2004-05 academic year workload study are summarized below. The workload data are based on the ABOR-defined workload of five courses per semester, with everyone receiving a one-course “release” (assignment) for advising. As is evident in the tables below, tenured/tenure-track faculty spend more than 50% of their time in teaching activities, including formal class sections as well as supervising independent study and individual student research. Non tenure-track faculty spend about 70% of their time in teaching activities.

Tenured/Tenure-Track Faculty:					
	Assistant	Associate	Full	Regents	TOTAL
Total Teaching	53.18%	53.41%	51.80%	43.78%	52.40%
Other Activities	46.82%	46.59%	48.20%	56.22%	47.60%

Non-Tenure-Track Faculty:							
	Assistant	Associate	Full	Instructor	Lecturer	Sr. Lecturer	TOTAL
Total Teaching	65.71	57.98	82.48	70.93	69.84	67.36	69.21
Other Activities	34.29	42.02	17.52	29.07	30.16	32.64	30.79

The “Other Activities” in the tables above include primarily student advising, service, and research/scholarly activity. These activities are broken down in the following tables. Note that “research” was reported as either “Funded” or “Unfunded.” For the purposes of this report, it is those measures of scholarly activity that are of interest. The total percent of time devoted to funded and unfunded research for tenured/tenure-track faculty, is 20.78%. This equates to about one course per semester (two courses per year). This figure is quite low, particularly considering the faculty productivity (discussed below). For non-tenure-track faculty, most of the “Other Activities” time is spent in advising and service, with only about 5% devoted to research/scholarly activities.

Percentage Breakdown of “Other Activities”:

Tenured/Tenure-Track Faculty:					
	Assistant	Associate	Full	Regents	TOTAL
Administration	3.42	4.81	4.69	10.91	4.68
Advising and Service	19.07	18.9	18.65	15.86	18.73
Family Leave	0	0.26	0	0	0.1
Other	0.74	1.89	2.67	3.74	1.98
Research (funded)	6.56	5.33	5.37	13.84	5.97
Research (unfunded)	17.03	13.84	14.69	11.88	14.81
Sabbatical	0	1.56	4.12	0	1.34
TOTAL:	46.82	46.59	50.19	56.23	47.61
Research Total:	23.59	19.17	20.06	25.72	20.78

Non-Tenure-Track Faculty:							
	Assistant	Associate	Professor	Instructor	Lecturer	Sr. Lecturer	TOTAL
Administration	9.34	5.04	4.38	4.92	3.29	4.73	5.81
Advising and Service	17.42	20.17	8.76	18.16	19.37	19.33	17.98
Course Development	0	6.72	0	0	0	0	0.1
Other	1.12	0	0	2.29	0.73	2.67	1.72
Research (funded)	0.98	0	4.38	0.16	0	0.62	0.54
Research (unfunded)	5.44	10.08	0	3.54	6.76	5.29	4.64
TOTAL:	34.30	42.01	17.52	29.07	30.15	32.64	30.79
Research Total:	6.42	10.08	4.38	3.7	6.76	5.91	5.18

It is clear that the time that faculty devote to scholarship has resulted in a highly productive group of faculty and academic professionals who are active in scholarly publications and presentations. The scholarly productivity for academic year 03-04, as summarized from Annual Review documents for all six colleges as well as Cline Library, is presented below. Over 1300 publications were reported, including books, chapters in books, refereed journal articles, reports, and other types of “standard” publications. In addition, the “Exhibits, Performances and Other” category includes much of the scholarly activity that takes place in the arts and music, as well as items like videos, book reviews, and working papers that are not counted under the more “traditional” categories of journal articles and books. Finally, faculty and academic professionals made presentations at more than 1100 regional, national, and international conferences. Note also that these numbers are underestimates, since not all Annual Review documents were equally thorough in documenting scholarly publications.

2003-04 Scholarly Activity at NAU:

Type of Publication/Activity:	Number:
Books & Monographs	49
Articles & Book Chapters	742
Reports	71
Exhibits & Performances & Other Scholarly Activities	474
Subtotal "Publications"	1336
Presentations	1104
Total Publications and Presentations	2440

Intramural Grants Program

A second, very obvious and easily "counted" investment in research is through the Intramural Grant Program (known previously as "Organized Research"). For many years, this fund has supported faculty scholarly activities, including "start-up" support for new faculty as well as "seed money" for established faculty who are attempting to modify or enhance their existing area of scholarship. Intramural research funding is extremely critical for research intensive institutions, such as Northern Arizona University, who have a wide variety of research initiatives and scholarship to support their undergraduate and graduate programs but do not generate large amounts of indirect income.

Historically, since NAU has only generated a significant amount of external funding within the last decade, "state dollars" were used to develop and maintain the University's intramural grant program. Since most of the University's colleges and schools had limited "capital equipment" budgets, the NAU Intramural Grant Program (IGP) became an important recruiting tool. New faculty hires who had requested "start-up" funds for their research initiatives during the interview process, especially those being hired in the science and technology areas, were often instructed by Deans and Department Chairs to submit a proposal to the NAU IGP in order to secure necessary research funding.

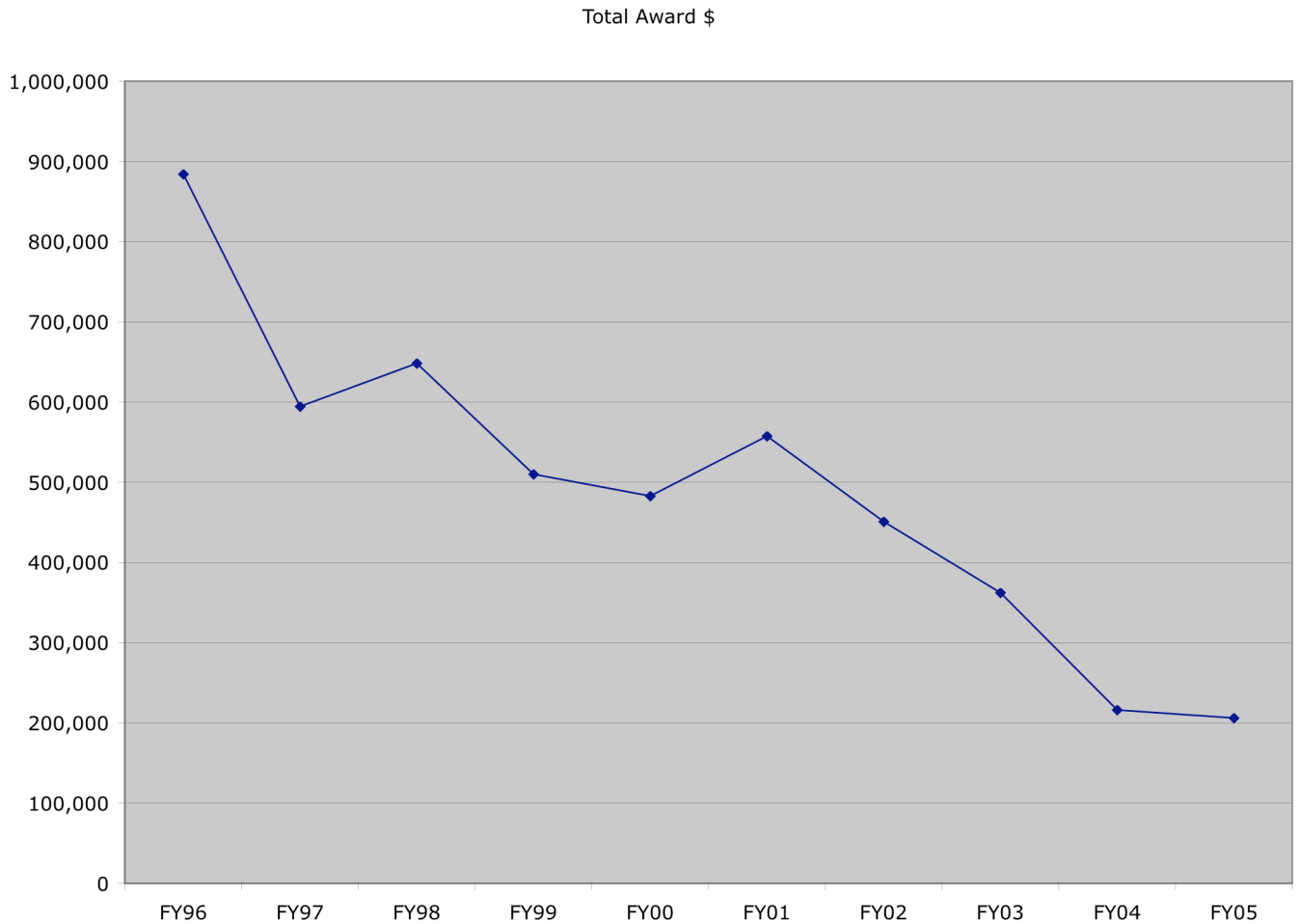
It is also important to note, that the IGP was a mechanism used by Deans and Department Chairs to enhance newly-hired faculty salaries, which at notoriously low at NAU. In many cases IGP funding included a summer stipend for the faculty member of approximately \$6,000.

The number of external grants that are awarded to faculty as a result of research and scholarship activities that were initially funded through the IGP can serve as a measure the overall success of the IGP program. The past recipients of NAU IGP awards have been and continue to be highly successful in obtaining extramural grants and contracts.

With the initiation of the academic sector budget cuts that were initiated in the late 1990's, the first budget component of many colleges and schools to disappear was "capital equipment" funds. Thus, the importance of the IGP became even more critical to stimulate research and scholarship endeavors on campus. Figure IGP_FUNDING illustrates the total

funding awarded for the IGP program over the past decade. In 1996, the IGP provided more than \$800,000 of research and scholarship funding. In light of continuous budget cuts over the past 5 years, the state appropriation for IGP funding has dramatically eroded. For fiscal year 2005, only \$206,000 was available to fund IGP proposals. This represents a 75% reduction in funding that the University provides to promote scholarly activities through this program.

Figure IGP_FUNDING. Total dollar amounts of IGP funding at NAU from FY96 through FY05.



Building and Infrastructure Investments

Over the last several years, the state has invested in all three universities for research infrastructure and support. Prop 301/TRIF support is discussed below. In addition, the state has made funding available for a 1.5 million addition to the engineering building for research and the construction of an Applied Research facility (ARD Building). Moreover, the new \$35 million science facility is partially funded by the Research Bill. These investments in research also contribute significantly to our teaching mission.

President/Provost/College support

Various units, including individual departments, schools, and colleges as well as the Provost and the President, contribute matching funds and other research support. This may take the form of summer stipends, travel support, equipment matches, start-up funds, etc. There are two important notes about these investments: 1) in many cases, it is difficult to separate “research” support from “teaching” support, as we have argued that the two are closely intertwined, particularly at NAU; 2) much of the support comes from the Indirect Costs that are returned back to the generating units. These funds are supposed to be used to support research-related activities. Thus, they are not available to be invested otherwise—they must be expended appropriately.

Sabbaticals

For the most part, sabbatical leaves tend to be for research projects, although many also include a component that clearly will inform teaching in the unit. In fact, the NAU Conditions of Faculty Service (pp. 186-187) provides for a variety of criteria of merit for sabbaticals, including both teaching and service, as follows:

- a. Enhancing the teaching or scholarly work of the academic unit;
- b. Enhancing the applicant's effectiveness as a faculty member;
- c. Adding to the reputation of the institution;
- d. Contributing to knowledge in the subject field;
- e. Providing outstanding public or professional service at a local or national level

Thus, while sabbaticals are often for research, they may also be approved for other activities.

Prop 301/TRIF

A major source of sponsored funding for NAU in recent years is “Proposition 301” or “TRIF” (Technology and Research Initiative Fund) funding from the state of Arizona. TRIF funds are quite restricted, with their uses defined by Proposition 301 legislation and identified in *Arizona at Risk: an Urgent Call to Action* and *Arizona Partnership for a New Economy* and more recently by roadmaps developed by Battelle for the Flinn Foundation and the Arizona Department of Commerce. While each university has been able to design their own TRIF initiatives, these must fit within the guidelines defined in the legislation and reports mentioned above.

During the first five years of TRIF funding, NAU is supporting five initiatives with an emphasis on research, access and workforce development, and infrastructure. These initiatives were selected to build on areas of excellence at NAU and meet the economic development requirements of TRIF through strategic partnerships with business, industry, and federal/state agencies. The two research initiatives, Growing Biotechnology (GBI) and Environmental Research, Development, and Education (ERDENE), expand in an interdisciplinary manner NAU’s research capabilities in the biological, ecological, and environmental sciences and engineering. Access and Workforce Development (AWD) and E-Learning initiatives enhance preparation of Arizona citizens for the New Economy by expanding access to baccalaureate and post-baccalaureate education for time and/or place bound students and meeting the employment needs of Arizona companies. The Infrastructure (Capital) initiative is enhancing NAU research and development capacity in the biological and environmental sciences (new Applied Research & Development Building) and planning is underway to renovate nursing and other health professions facilities.

The TRIF actual revenue to Northern Arizona University was \$7,850,834 in FY 2002, \$8,143,654 in FY 2003, and \$9,100,242 in FY 2004, for a total dollar amount of \$25,094,730 over the three fiscal years (source: NAU TRIF FY02-04 Evaluation report, February 25, 2005). It is clear that TRIF is an important source of research funding for NAU, and we anticipate that this will continue to be the case for the near future. The dollars are important in and of themselves, but equally important is an understanding of the areas of emphasis that can be funded through TRIF, given that these will continue to be areas of strength for NAU as we move into the future.

Centers and Institutes

The campus hosts numerous Centers and Institutes. Many times these are referred to as “research centers,” but in fact, they have varied missions that focus may on research, teaching, service, and/or any combination of all three areas. Many of the centers and institutes are also interdisciplinary, and that is in fact one of their strengths. During the academic restructuring process at NAU (implemented during the 2004-05 academic year), most centers and institutes were moved administratively into the six academic colleges. However, despite the fact that they now have administrative “homes,” it is important to recognize that they retain their interdisciplinarity, and continue their cross-college activities.

Table CENTER_SUMMARY summarizes the number of centers/institutes and dollar investments as well as external revenues by category. Out of 34 units, 12 may be classified as primarily research units, with an equal number of public service centers. Over a 3-year period (FY 02-04), the centers and institutes brought in more than \$51 million in direct costs, and an additional \$5.4 million in indirect costs. Four units are devoted primarily to research support: the Academic Shops (Developmental Machine Shop), the Animal Care Facility, the Bilby Research Center, and the Greenhouse.

Table CENTER_SUMMARY.

Primary Function	Number of Centers	State Dollars (FY 05)	Prop 301 (2002-04)	# Awards, 2002-2004	3 Year Directs (02-04)	3 Year Indirects (02-04)
Academic Support	2	\$160,001	\$3,900,000	0	\$0	\$0
Misc	1	\$0	\$0	7	\$119,325	\$0
Education	3	\$50,000	\$0	0	\$0	\$0
Public Svc	12	\$1,812,902	\$0	247	\$28,817,924	\$2,338,279
Research	12	\$797,662	\$3,854,200	219	\$20,936,205	\$2,856,055
Research Support	4	\$319,416	\$0	49	\$1,452,557	\$213,243
TOTAL	34	\$3,139,981	\$7,754,200	522	\$51,326,011	\$5,407,577

Public Service Projects

NAU is heavily engaged in public service to the state of Arizona and beyond. In some ways, our mission is very much a “land-grant” mission, as we tend to be applied and service-

oriented. As noted above, twelve of our institutes and centers have missions that focus on service. We also have a variety of clinics that serve clientele beyond NAU, including the Health Psychology Clinic, the Dental Hygiene Clinic, and the IHD Interdisciplinary Training Clinic. These clinics serve the public, train students, and may include research components also.

As examples of the way in which we serve the state, we can look at the grant funding in the College of Education in FY04. Faculty and staff in the college had numerous grant-funded projects, most of which were focused on the state of Arizona, including counties outside of northern Arizona.

College of Education FY04 Grant projects:

Number of Projects:	Area(s) Served:
3	Statewide
6	Arizona: multiple counties (including Coconino, Maricopa, Pima, Graham, Gila, Pinal, Chochise, Greenlee, Yuma, Yavapai, Apache, Navajo, Mohave, Santa Cruz, La Paz)
5	Maricopa County
1	Chochise County
1	Maricopa County & Navajo Nation
2	Multiple Counties & Navajo Nation
2	Yuma County

Another example is provided by the 2005-06 projects in the Institute for Human Development, which focuses on serving individuals with disabilities. They have some national projects, but the majority of their work serves the state of Arizona, either in its entirety, or various combinations of different counties. In addition, they have projects that serve the Hopi, Navajo, and Southern Paiute nations.

IHD 2005-06 projects:

Number of Projects:	Area(s) Served:
2	National
16	Statewide
9	Arizona: multiple counties (including Coconino, Yavapai, Apache, Navajo and Mohave)
2	Coconino County
1	Coconino County & Navajo & Hopi Nations
1	Hopi, Navajo, and Southern Paiute Nations

In the College of Engineering and Natural Sciences, the Department of Geology and the Center for Environmental Sciences and Education are examples of academic units that have a strong presence in the state of Arizona and the greater Southwest. These two units (which share several faculty through joint appointments), have projects throughout the southwest, many of which are focused on national parks and monuments. The list of new projects from FY 2004 includes:

- Middle schools throughout several northern Arizona counties
- Tuzigoot National Monument
- Verde Valley
- Camp Navajo
- Coconino and Yavapai counties, grasslands
- Petrified Forest National Park
- Grand Canyon National Park
- Glen Canyon National Recreational Area
- Grand Staircase-Escalante Nat Monument
- Flagstaff area national monuments
- San Francisco Peaks, topographic gradient
- Navajo Nation
- Mesa Verde National Park
- Jemez Mountains, New Mexico

The Institute for Tribal Environmental Professionals (ITEP), on the other hand, is an example of a unit that has primarily a national focus. It has served more than 230 recognized tribes (from Alaska to the east coast), providing tribal governments with the technical expertise to set up environmental and resource monitoring systems and to train/support the staff to maintain those programs.

These examples are not meant to be exhaustive, but simply illustrative of the work that our faculty and staff do, much of which is focused very strongly on serving the state, but which of course includes national and international work as well.

Peer Institution Comparisons

Expenditures

Comparison of research expenditures with our peer institutions is not quite as straightforward as comparison of graduate enrollment figures. NAU’s PAIR website provides two comparative figures on research expenditures: “IPEDS Research Expenditures”, and “Research NSF Awards.” These are provided for both our official peer institutions, as well as our “rural peers.” It is clear from the figures that IPEDS Research Expenditures are counted using more restrictive criteria than we normally use when calculated total Sponsored Projects support. For example, the IPEDS Research Expenditures in the table for NAU are about \$18.8 million, whereas our sponsored project figures reported for FY04 were far higher--\$67.8 million.

Nevertheless, these figures are available for our peer institutions, and are thus presented here for comparison. For the IPEDS data, NAU ranks 10th out of 17 reporting “official” peer institutions. In comparison to our “rural peers,” NAU fares much better, ranking 8th out of 20 on IPEDS expenditures.

Peer Institutions: Research Expenditures and Research NSF awards (sorted by expenditures). Data from PAIR website (May 05). Note that “research” is defined narrowly—as “research,” not all sponsored project activity. Sorted by “Research Expenditures.”

	IPEDS Research Expenditures	Research NSF Awards
Cal State University-Fresno	0	189
Old Dominion University	2,380,967	4,657
Bowling Green State University	5,835,246	1,621
Oakland University	6,587,015	1,200
Miami University (OH)	7,873,532	3,408
University of Minnesota - Duluth	11,531,060	1,360
Ball State University	16,494,242	861
Northern Arizona University	18,824,650	8,056
Ohio University	29,073,506	2,445
University of North Dakota	31,542,768	925
University of Nevada – Las Vegas	32,877,000	1,665
University of Montana	36,849,442	7,598
University of Wyoming	37,626,318	9,547
George Mason University	43,455,368	3,328
University of Nevada - Reno	59,232,412	5,435
University of Central Florida	81,640,665	5,708
University of Vermont	82,045,000	6,406
University of Delaware	not reported	16,981

^ NOTE: NSF Research awards are in \$K

“Rural Peer” Comparisons: Research Expenditures and Research NSF awards (sorted by expenditures). Data from PAIR website (May 05).

	IPEDS Research Expenditures	Research NSF Awards	Carnegie Classification
Indiana U. of Pennsylvania	1,920,655	1,000	DRI
Old Dominion	2,380,967	4,657	DRE
U. of Northern Colorado	2,720,769	410	DRI
Bowling Green State University	5,835,246	1,621	DRI
Central Michigan University	5,971,842	988	DRI
Oakland University	6,587,015	1,200	DRI
Miami University (OH)	7,873,532	3,408	DRI
East Carolina	11,902,185	2,294	DRI
U. of North Carolina-Greensboro	13,738,781	1,114	DRI
Ball State	16,494,242	861	DRI
University of Texas-Arlington	16,860,274	2,179	DRE
SUNY Binghamton	17,126,235	2,372	DRE
Northern Arizona University	18,824,650	8,056	DRI
Illinois State	19,937,345	2,727	DRI
Western Michigan University	20,950,536	6,180	DRE
U. of Alabama-Tuscaloosa	28,122,701	7,507	DRE
Ohio University	29,073,506	2,445	DRE
U. of North Dakota	31,572,768	925	DRI
U. of Montana	36,849,442	7,598	DRI
U. of Southern Mississippi	40,830,073	5,660	DRE
Not Peers, But For Comparison Purposes:			
Arizona State U, Tempe Campus	97,537,000	44,128	DRE
U. of Arizona	326,369,000	48,262	DRE

Administrative Infrastructure

The basic organizational structure of Research and Graduate Studies at NAU has been in place since the early 1980s, when graduate enrollment was much lower and sponsored activity was much less than today. In fall 1981, total grad enrollment was 1791 - 1067 in Flagstaff and 724 distance. In fall 2004, total was 5814, 1699 in Flagstaff and 4115 distance. In light of current levels of activity, a review to see if the structure is appropriate is in order.

Currently, NAU has one individual who serves as Vice Provost for Research and Graduate Studies and Graduate Dean. There are no other senior, Ph.D.-level administrators on the research side of the house, despite the fact that our research funding has grown tremendously. In the Graduate School, NAU has an Associate Dean. In the past, faculty served in various support roles in both research and graduate studies. These were not permanent re-assignments, but rather temporary assignments for the duration of one or more academic years, with specific projects to be completed. It has been at least seven years since anyone has served in those roles.

A recent report from the Council for Graduate Schools (CGS 2004: 14-15) notes that there are two common models for research administration at universities: 1) a model in which one individual is responsible for both research and graduate studies; and 2) a model in which a senior official has sole responsibility for research administration, with a second, parallel individual responsible for the graduate school. Each model has advantages and disadvantages, but the report points out that in the first model (that used by NAU), “pressures of day-to-day research administration have required full-time attention by the administrator involved, resulting in little or no time available for graduate school matters” (CGS 2004: 15).

A rough comparison with the organizational structure of our peer institutions is possible using information from their websites, although universities vary in how much detail is provided. One “official” peer was left out of the comparison—the University of Minnesota-Duluth is part of a larger system, and thus the structure is not comparable. This leaves 16 universities in the comparison, in addition to NAU.

Of those 16, 11 have a structure that is like CGS Model 2, with two different senior administrators—one for research (typically a Vice Provost or Vice President), and one for graduate studies (typically, a Graduate Dean). Five universities have a structure similar to NAU’s, in that they have one person who serves in the role of the “research VP” as well as Graduate Dean. However, in all cases, these peer institutions have significantly more “middle management” in the form of Associate Deans, Associate VP’s, Associate Provosts and other such titles.

UNLV, for example, has about the same number of graduate students as NAU (5069 at UNLV vs. 5809 at NAU). Their top administrator in this area is a Vice President For Research and Graduate Studies. They also have a Dean of the Graduate College, and an Associate Dean for Graduate Programs and Research. NAU has no separate Dean of the Graduate College, nor do we have an Associate Dean for Graduate Programs and Research.

NAU’s Graduate College has some unique challenges. It performs all the graduate admissions processing, including that for our many distance-learning students. At many other institutions, this processing is not done by the Graduate College, but by a separate Admissions Office. Moreover, many of NAU’s distance programs have year-round admissions. Thus, there is a constant flow of work in the office, rather than the more traditional “admissions season” with some downtime between seasons.

With respect research dollars, NAU may be compared with the University of Montana and the University of Wyoming, which “bracket” NAU in terms of NSF research dollars (see Table above—NAU at \$8 M, U. of Montana at \$7.5M, U. of Wyoming at \$9.5M). The U. of Wyoming has a Vice President for Research, and Associate Vice President for Research, as well as a separate Dean of the Graduate School. The U. of Montana has a similar structure, with a Graduate School Dean as well as a separate Vice President for Research and Development as well as an Associate Vice President for Research and an Assistant Vice President for Research and Economic Development and Technology Transfer. Both schools have significantly fewer graduate students than NAU (3078 for Montana and 1519 for Wyoming), and yet both have separate Graduate Deans.

Given the size of NAU’s graduate programs as well as our research dollars, it appears that we are under-staffed with respect to similar institutions. Either model of research and graduate education administration can work, but NAU should add at least one administrator to the current structure in Research and Graduate Studies - either a full-time Graduate Dean or an Associate Vice President for Research

Links between Research and Economic Development

There is a strong and empirically demonstrable link between the research (and service) activities of a major university and the economic development of the surrounding area. The economic impact of research activities at Northern Arizona University was estimated at \$84 million in 2003 (Northern Arizona University Economic Impact Study, Bank One Center for Business Outreach, College of Business Administration). While many of these benefits accrue to parties other than Northern Arizona University, the activity associated with research are an integral part of economic development in the state of Arizona.

It is the case that at many universities there is also a direct and quantifiable benefit back to the university. Through patenting and licensing, or through direct equity positions in private sector firms begun as a result of university research breakthroughs, there can be considerable cash flow returned to help support both research and non-research missions of universities. The most obvious of these examples are well known (SUN Microsystems is Stanford University Networks, Google is a Stanford invention, and Gatorade is the University of Florida). There are many other universities that have invested in the research capability with the express intention of creating long term diversified cash flows. Given the highly applied nature of much of the research at Northern Arizona University, this opportunity seems to fit our mission.

David Mowery (2005), in his recent work examining technology transfer and the Bayh-Dole Act finds that “academic entrepreneurship (defined in this case as the involvement of university faculty and researchers in commercial development of their inventions) has been a unique characteristic of the U.S. higher education system for most of the past 100 years.” Successful technology transfer programs that benefit inventor, university, and region are not created accidentally. Instead, they need careful attention and investment. Seigal and Phan (2005) find that “university technology transfer should be considered from a strategic perspective. Institutions that choose to stress the entrepreneurial dimension of technology transfer need to address skill deficiencies in technology transfer offices, reward systems that are inconsistent with enhanced entrepreneurial activity, and education/training for faculty members, post-docs, and graduate students relating to interactions with entrepreneurs”. If Northern Arizona University is to participate to a greater degree in technology transfer activities, investment will need to be made in the skill set of the personnel in the central administration and probably most importantly in the faculty with potential entrepreneurial opportunities.

Economic development also is directly impacted by the significant activities that are broadly categorized as service. Organizations such as the Center for American Indian Economic Development, the Institute for Human Development and the Institute for Tribal Environmental Professionals have direct impact on the economic health of our surrounding communities. (add other stuff here) While this provides resources to the university only through indirect costs charged to individual projects, activities such as these are a critical part of the service that a state university should perform.

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Part III: Recommendations: Future Directions for Research and Graduate Education at Northern Arizona University

Please see separate document.

Part III: Recommendations: Future Directions for Research and Graduate Education at Northern Arizona University

Strengths, Weaknesses, Opportunities and Threats

One of the natural outcomes of our Task Force discussions, both among ourselves, and with various groups on campus, is an assessment of the strengths, weaknesses, opportunities and threats that we perceive to be facing NAU with respect to research and graduate studies. We list these here; the recommendations that follow reflect our thoughts on how to capitalize on our strengths, address some of our weaknesses, and build upon both opportunities and perceived threats (which are sometimes one and the same).

Strengths:

- The diversity and quality of intellectual capital in NAU faculty.
- NAU's geographic and cultural location.
- Current strategic partnerships with agencies, tribes, communities, and other existing scientific and cultural institutions in the region.
- An extensive and supported distance delivery program.
- Library that supports access, and also extensive and unique special collections pertinent to the Colorado Plateau.
- Areas of strength: biohealth, environment, education.
- Current investments in our physical plant, both in Flagstaff and beyond.
- Applied research and public service that is relevant to community needs.
- Cooperative integration of faculty across areas of campus; small enough community that people know each other and are open to cross-disciplinary collaboration.

Weaknesses:

- Perceived lack of agreement on the importance of developing/sustaining a research profile for NAU.
- An inadequate infrastructure in some areas, some of which relates to physical plant, other of which relates to administrative/staff support.
- Assistantships are not competitive, in some academic units, with other NAU peer institutions; lack of fellowships.
- Dwindling internal monies to support IGP program, provide seed money for new research, support areas with limited external funding opportunities, and new faculty.
- Lack of diversity in our research portfolio (e.g., very little industry funding); also, our mix of funded projects includes many that don't return large indirect costs to the university.
- Our collective hesitancy to critically evaluate our graduate programs and phase out those that are deemed to be inadequate; this limits our ability to implement planned, strategic growth.

Opportunities:

- NAU's involvement in the biotech corridor (Bioscience Roadmap)

- Potential to create stronger partnerships with businesses
- Favorable climate for our priorities with the current Governor (e.g., Education, water, Battelle Reports priorities)
- NAU's emphasis on internationalizing the campus opens up opportunities for research and diversifying graduate enrollment.
- Interdisciplinary research and graduate programs.
- We can "leverage place" by building on our location in a place of unique cultural diversity and a natural outdoor laboratory.
- New alliances of Centers and Institutes with colleges.
- Enlivened undergraduate education as research base increases.
- Seeking NCATE accreditation might provide a timely opportunity to strengthen graduate programs that tie in specifically with our strong teacher preparation mission.
- National demand for Master's degrees and post-baccalaureate training continues to increase: demand for professional education is particularly strong; this is an opportunity for both on-campus and distance programs.

Threats:

- Community Colleges' desire to offer four-year programs, and the potential negative effect on overall NAU enrollment and thus funding. (NOTE: this is also an opportunity for research and graduate education, as they are key elements of promoting our distinctiveness from Community Colleges; this may also provide opportunities for increased enrollment in post-baccalaureate programs at NAU).
- Continued struggle to build Mountain Campus undergraduate enrollment, which is critical to our overall funding base.
- Uncertainties resulting from the Arizona Redesign and a lingering perception outside of Flagstaff that NAU is a second tier in the university system. (NOTE: the Redesign is also an opportunity, depending on how we respond, and how the differential tuition requirement is implemented.)
- A potential loss of students because of the increasing cost of living in Flagstaff, and non-competitive GA salaries in certain areas.
- The move towards increased Federal oversight with respect to Sponsored Projects leave us vulnerable to compliance issues.
- The move towards new Federal accountability rules for undergraduate graduation rates may force us to redirect resources and energies in ways that do not necessarily benefit our students.
- Much of our current graduate enrollment is in distance education; there are many new competitors in this market, both public and private.

Recommendations

We see Northern Arizona University's areas of strength in research and graduate studies as being situated within the context of our geographic region and social issues of the "New American West." Economic development, natural resource management, rural-urban interface, community development, and tribal concerns and needs, are among the relevant topics taken up in the classroom and in research. Attention to important regional themes, however, is enriched by faculty research and teaching on parallel issues found on a global level and the larger global context is an important aspect of all that we do. Critical topics tend to be explored in an interdisciplinary manner so that specialized knowledge is brought to bear on the greater whole. Scholarship often takes a deliberately applied focus as significant value is given to providing relevant graduate education for professional and pre-professionals. Included in our mission is service to dispersed, rural communities as well as quickly expanding urban populations, both of which represent challenges in the West.

The Task Force proposes that NAU adopt the concept of "**Integrated, Focused Scholarship and Graduate Education**," allowing us to identify our particular areas of strength, and support these areas as we move forward with our research and graduate programs. We have identified four areas of strength, which build upon NAU's location and our historic mission, and also address areas of state and national need. These are not conceived as isolated concepts, but rather as interconnected and overlapping areas of strength and emerging directions for the future.

Moreover, the theme of technology and the interface of technology with human concerns is an overarching concern that is relevant to all the areas identified by the Task Force.

The use of the word "Integrated" recognizes that one of our strengths is the unique integration of research, graduate education, and undergraduate education, an integration that needs to be celebrated and supported. The word "focused" refers to focused intention at the university level, not at the individual faculty level. We recognize that faculty research will always be driven to some extent by individual interests, strengths, and changing research areas within a particular field. On the other hand, it is clear that if we are to move forward as a university, we must focus our efforts and not try to be "all things to all people." In other words, we advocate that as we grow our research and scholarly activities, we intentionally focus on leveraging our identified areas of strength. These areas should be embraced by the university and become incorporated into strategic planning at all levels, starting with the university plan, and extending into academic unit planning. These areas should be continually re-visited and refined over time, as part of our normal strategic planning processes.

The areas and emerging directions that we have identified, through discussions on campus as well as by looking at state and national priorities, are the following:

- Biotechnology and Health – Arizona's focus for near term economic development with a biotechnology corridor from Flagstaff to Tucson.
- Environment and Sustainable Systems -- one of four economic development priorities for Arizona.
- Learning and Teaching – meeting the needs of P-20 for Arizona and beyond.
- Human Connections and Diversity of the Human Experience – particularly focused on Native American issues.

With respect to research and scholarship, we recommend that Northern Arizona University:

- 1) Continue to support and invest in research opportunities; these enable the university to carry out its mission of creating and disseminating knowledge – including knowledge aimed at solving societal problems.
- 2) Focus investments on the above-listed areas of strength. Intramural Grant Program funding is an example of a resource that could be invested (wholly or partially) to enhance these areas of strength.
- 3) Capitalize on the integration of centers/institutes with the colleges in order to fully enable us to build our research capacity. We recommend that the distribution of indirect costs recovered from center/institute grants and contracts be changed. Currently, 70% is retained centrally and 30% is distributed to the centers, with none allocated to the colleges. We recommend that 60% be retained centrally, 30% be distributed to the centers/institutes, and 10% to the colleges. We recommend that this change be phased in over no more than 5-years (minimum of 2% per year).
- 4) Perform an in-depth study of the current situation with respect to funding sources for start-up costs and grant matches (sources may include IDC return to the colleges, Provost's Office, department and college budgets, etc.). The information from the study should then be used to develop a coherent strategy that will enable us to support these needs consistently across the university.
- 5) Address staffing issues in Research and Graduate Studies area (see point 9 below).

With respect to graduate programs, we recommend that Northern Arizona University:

- 1) Assess our current graduate programs for academic rigor, quality and relevance to NAU's stated priorities and the research themes/strengths outlined above. Assessment should be outcomes-focused, and should be led by the University Graduate Committee. Programs that are appropriate should be supported adequately, and new programs should not be started if there is not adequate support. We recommend that we begin this process by hiring an outside consultant (e.g., Yardley Research Group) or team of graduate program experts to evaluate NAU graduate program quality and vitality. This is envisioned as similar to a program review, with this document serving as the background self-study.
- 2) Expand our strong Master's degree programming, which has a clear professional and applied focus. Continue to develop and assess programs for web-based, hybrid, or agency/corporate environments--i.e., take the programs to the students. (National studies indicate that access is a key issue for underrepresented groups. National data also show that Master's degrees have shown the most dramatic growth in graduate education over the last 15 years, growth that is predicted to continue until at least 2013. The largest enrollment growth has been in students who are women or from underrepresented groups.)
- 3) Provide adequate support for current successful doctoral programs. Any new proposed doctoral programs should be targeted, focused, and build on our strengths and mission.

- 4) Assess and possibly initiate 3+2 programs, further strengthening our undergraduate/graduate ties and providing unique opportunities that will enable us to recruit strong undergraduate students.
- 5) Look for opportunities to expand international student opportunities, particularly in selected programs such as business, engineering, natural sciences, and linguistics.
- 6) Develop cooperative graduate programs (e.g., with U of A and ASU) to enhance our ability to deliver graduate education.
- 7) Initiate new graduate programs (both degree programs and certificates) in areas of greatest demand and need. Proposed new programs must consider potential student populations (nationally, current graduate students are mostly women, married, with children, with an average age of 33 years, and attending school part-time). Further, look toward the development of vital, new interdisciplinary areas that can be the foundation of new degree programs. New programs should not be started if there is not adequate support. New programs (whether Master's or Doctoral) must build on our strengths and strategic directions.
- 8) Enhance the ability of our graduate programs to remain competitive in their ability to attract excellent students, a critical element of high-quality graduate programs. We propose that NAU address the competitiveness of our graduate programs by doing the following:
 - a) Implement a three year plan to provide full tuition waivers for graduate teaching assistants and full tuition remission for graduate research and graduate service assistants. This will make our assistantships more competitive, and assure that all graduate assistant tuition waivers and remissions are handled consistently, no matter what the funding source. Part of this projected additional expense could be covered by shifting the funds now used to pay the health insurance benefit.
 - b) Provide competitive funds for graduate program development including: student recruitment (including diversifying the graduate student population), support for enhanced web sites, printed materials, travel, curricular innovations, strategic partnerships, and new program implementation, in line with the overall focused priorities outlined above.
 - c) Increase availability of graduate assistantships by setting aside 25% of the recovered indirect cost funds above the \$4M mark for graduate assistantships.
- 9) Address staffing issues in the Graduate College. Given that so many graduate students are distance learning students, funds should be allocated from Distance Learning to help with the admissions and processing functions of the Graduate College. In addition, NAU should add at least one administrator to the current structure in Research and Graduate Studies - either a full-time Graduate Dean or an Associate Vice President for Research.

Graduate education and research have grown tremendously at Northern Arizona University over the last several decades. We offer these recommendations in the spirit of continuing to strengthen and grow in these important aspects of Northern Arizona University's mission.