

Louis Stokes Colorado Alliance for Minority Participation
(LS CO-AMP)

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Abstract

In the summer of 1994, representatives from eleven colleges and universities in Colorado and nearby states and from four tribal nations met several times to discuss the creation of a unique alliance. The purpose of this alliance would be to better serve undergraduate students from underrepresented minority populations in the areas of Science, Technology, Engineering, and Mathematics (STEM). After undergoing a rigorous selection process, the Colorado Alliance for Minority Participation (CO-AMP) was officially sanctioned on November 1, 1996. The primary objective of CO-AMP is to double the number of underrepresented minority students receiving baccalaureate degrees in STEM disciplines within a period of five years.

In the summer of 1994, representatives from eleven colleges and universities in Colorado and the Four Corners Region (Colorado, Utah, New Mexico, and Arizona) and from four tribal nations convened several times to discuss the possibility of creating a unique educational alliance. The purpose for the creation of this alliance would be to better serve students from underrepresented minority populations including African Americans, Hispanics, and Native Americans in Colorado and the Four Corners Region in the areas of Science, Technology, Engineering, and Mathematics (STEM). The vehicle that was selected to achieve this goal was the National Science Foundation Alliance for Minority Participation (AMP) program. After undergoing a rigorous selection process, the Louis Stokes Colorado Alliance for Minority Participation (CO-AMP), named in honor of the former congressman and his support to diversity, was officially sanctioned on November 1, 1996, joining several other AMP programs nationwide (see Figure 1.).

Building upon the infrastructure and the momentum gained through previous NSF grants in the state of Colorado, CO-AMP was originally comprised of three community colleges (Front Range Community College, Pueblo Community College, and Diné College), one junior college (Trinidad State Junior College), six baccalaureate degree-granting colleges and universities (Colorado State University, University of Colorado-Boulder, University of Colorado-Denver, Metropolitan State College, Colorado State University-Pueblo, and Fort Lewis College), several corporations, governmental agencies, professional membership organizations, and community members. In the second year of Phase I, a baccalaureate degree-granting college (Adams State College) along with the University of Colorado-Colorado Springs joined the alliance, and in year six, the first year of Phase II, one community college (Aims Community College) and one baccalaureate degree-granting institution (Colorado School of Mines) were added. Now, in year

nine, the Alliance is comprised of five community colleges, junior college, and eight baccalaureate degree-granting colleges and universities (see Figure 2.) and is proud of the partnerships that have been established with four tribal nations (Jicarilla Apache Tribe, Navajo Nation, Southern Ute Tribe, and Ute Mountain Ute Tribe) since its inception, as well (see Figure 3.). Colorado State University, the lead institute, administers the funds that are shared among the participating institutions and houses the CO-AMP offices. A Site Coordinator at each participating institution and a representative at each tribal nation serve as key contacts for CO-AMP, creating a statewide and Four Corners network of direct links for CO-AMP students.

Diné College is a public institution of higher education chartered by the Navajo Nation. The mission of Diné College is to apply the Sa'ah Naagháí Bik'eh Hózhóón principles to advance quality student learning through Nitsáhákees (Thinking), Nahatá (Planning, Iiná (Living) and Sihasin (Assurance), studying the Diné language, history and culture, preparation for further studies and employment in a multi-cultural and technological world, and fostering social responsibility, community service and scholarly research that contribute to the social, economic and cultural well being of the Navajo Nation.

CO-AMP has moved quickly to achieve program effectiveness within the participating institutions and among its tribal partners, and has entered into several collaborative efforts with existing federally- and state-funded programs, professional non-profit organizations, corporations, and government agencies/laboratories. Also, CO-AMP has aimed for the continued institutionalization of its programs through in-depth communication and collaboration with CO-AMP partner institutions and with Colorado Institute of Technology (CIT) activities initiated by Colorado Governor Bill Owens. CO-AMP's activities continue to build upon those of previous years, further demonstrating the Alliance's overall goal of creating strong retention

programs to support underrepresented students in STEM disciplines, at all levels of their academic and professional careers.

Goals and Objectives

The primary goal of CO-AMP is to substantially increase the quantity and quality of education for African American, Hispanic, Native American, Alaskan Native, and Pacific Islander students receiving baccalaureate degrees in Science, Technology, Engineering, and Mathematics from member educational institutions. Other key goals are to increase the number of underrepresented minority students pursuing and obtaining Ph.D. degrees and to institutionalize CO-AMP programs and activities at participating institutions. Institutionalization occurs when the university itself assumes funding for programs originally funded through CO-AMP.

The primary objective of CO-AMP, to double the number of underrepresented minority students successfully completing baccalaureate degrees in STEM disciplines from 400 to 800 by the year 2006, will be achieved through the following efforts:

- Comprehensive retention programs targeting CO-AMP students
- Continuation of Summer Bridge Programs to enable students to successfully transition from community colleges to four-year universities
- Increasing the institutionalization of CO-AMP programs at participating colleges and universities
- Building the infrastructure of effective programs at all CO-AMP institutions
- Increasing funding from corporate and government agency partners
- Graduating CO-AMP seniors
- Graduate School placement program

- Offering faculty development opportunities that will enhance diversity initiatives in partner institutions
- Recruitment and Leadership programs for incoming and transfer students
- K-12 outreach programs
- Tracking of CO-AMP participants
- Providing other general support programs for CO-AMP students to facilitate completion of degrees

Program Overview: Current and Future

After successful completion of Phase I (1996-2001), CO-AMP is in its ninth year of operation and in its fourth year of Phase II, which was achieved through a second competitive proposal award process. The Phase I goal of doubling the number of underrepresented minority students successfully completing baccalaureate degrees in STEM disciplines from 200 to 400 was achieved in 2001, the sixth year of operation (see Figure 4.). The consortium is now challenged by the National Science Foundation to double the number once again from 400 to 800 by the end of Phase II (201-2006). Phase III will be implemented after completion of another competitive proposal.

In addition to its collaborative efforts with existing federally- and state-funded programs, professional non-profit organizations, corporations, and government agencies/laboratories, CO-AMP has aimed for continued institutionalization of its programs through in-depth communication with CO-AMP partner institutions and the advocacy offices at each institution. Such programs include the outreach Math Science Partnership summer camps for middle and high school students, the Colorado Institute of Technology (CIT) Summer Bridge Research Program for undergraduates, and the Junior Engineering Technical Society Uninitiate's

Introduction to Engineering (JETS-UNITE) Summer Bridge Program for high school students. CO-AMP's activities continue to build upon programs of previous years, further demonstrating the Alliance's overall goal: to create strong retention programs statewide and within the Four Corners region that support underrepresented minority students in the STEM disciplines. Moreover, the Colorado Alliance for Graduate Education and the Professoriate (AGEP) partnership was established in the fall of 2000 between the University of Colorado at Boulder (the lead institution) and Colorado State University. This AGEP partnership has been built upon the success of the CO-AMP consortium and the CO-AMP pool of students with potential to pursue graduate education and to enter the professoriate.

Phase I (1996-2001) Key Statistics

(See Figures 5. and 6.)

- The projected goal of CO-AMP was 400 underrepresented STEM Bachelor's degrees per year. By the sixth year, Co-AMP has met this goal with exactly 400 underrepresented Bachelor's degrees awarded.
- The rate of increase from baseline to degrees awarded to underrepresented students in STEM disciplines from Phase I (from 215 to 400 degrees) was 86%.
- The rate of increase from baseline to year six in the number of *all* STEM degrees awarded (from 2,789 to 4,425 degrees) was 58.6%.
- It is concluded that the rate of increase of underrepresented STEM degrees awarded from baseline to year six was greater (86% versus 58.6%) than that of the increase in all STEM degrees awarded.
- There was a marked increase in STEM enrollment of underrepresented minority students of 72.8% (from 1,922 to 3,322).

- The number of African American students graduating in STEM fields has increased by 91.6% (from 36 to 69).
- The number of Hispanic students graduating in STEM fields has increased by 41% (from 181 to 256).
- The number of Native American students and multi-race students receiving STEM degrees has increased by 120.5% (34 to 75).
- Figure 5. illustrates the Bachelor's degrees awarded to underrepresented minorities by year. In the 1997-98 academic year, the addition of the University of Colorado-Colorado Springs and Adams State College resulted in the updating of baseline data (1995-96) from 186 to 215. During Phase II (2000-01), Colorado School of Mines was added, which resulted in the growth shown (from 319 to 400).
- Figure 6. illustrates the percent of underrepresented minority STEM students by institution for the academic year 2003-04.

Focus for Phase II (2001-2006)

CO-AMP Phase II has undertaken a comprehensive effort to place emphasis in the following areas: recruitment programs, retention and leadership, graduating CO-AMP seniors, summer outreach programs, tracking, and graduate school placement. Phase II of CO-AMP builds upon the momentum and the success of Phase I. The underrepresented Hispanic, African American, Native American, and Pacific Islander students who are enrolled in the undergraduate STEM degree program at participating institution will benefit greatly from the proposed activities. The efforts of the consortium in Phase II will extend from the pre-freshman level to enrollment in graduate school programs. The CO-AMP consortium has been the major driving force at the institutions involved since 1995 to encourage and motivate targeted students to excel

and graduate with a Bachelor's degree in the STEM fields and possibly enter graduate school. The enrollment and visibility of diverse students has increased at the participating institutions. Student performance in their respective disciplines has improved tremendously as measured by grade point average. In addition to that from the National Science Foundation, a significant level of support (matching funds at a 1:1 ratio) has been provided by the central administrations in the departments and colleges of the consortium institutions, by industry, and by the State of Colorado. Funds received from the National Science Foundation for CO-AMP total \$5 million, and has been matched at a ratio of 1:1.

Very importantly, the faculty and staff members of the consortium institutions have provided essential support without which the activities of CO-AMP could not have been so successful. CO-AMP participating institutions, industry, tribal councils, and the State of Colorado are expected to continue their support of the project from 2001 to 2006. The success of this consortium will continue to be shared with the other Louis Stokes AMPs in the nation, including: sharing of best practices, sharing of lessons learned regarding institutionalization of activities, and sharing of potential graduate students who can attend summer bridge programs at Colorado State University or other partner universities.

The Future

For Phase II and continuation into the planned Phase III, CO-AMP will continue to place emphasis in the areas of recruitment, retention, leadership, graduating CO-AMP seniors, summer outreach, tracking, and graduate school placement, and underrepresented students in STEM majors will continue to benefit from these activities.

A 72% increase (from 1,922 to 3,200) in CO-AMP enrollment from baseline year to year eight is proof of the growing visibility and enrollment of a diverse population at participating

institutions. Improvement in student performance is demonstrated not only by grade point average, but also through leadership experience, conference poster presentations, and communication skills.

In addition, the new National Science Foundation Bridge to the Doctorate Program (BDP) that was launched by the National Science Foundation AMP program in the fall of 2003 (during Phase III of the national AMP program) serves some of the best and brightest beginning minority graduate students in STEM disciplines. This program aims to recruit and retain potential underrepresented minority graduate students as future faculty members in higher education institutions in STEM majors. The program is associated with Phase III of CO-AMP and supports the minority graduate students with fellowships for two years. Ten students at thirteen nationwide AMP sites were selected by graduate institutions in ten states and in Puerto Rico (University of California-Los Angeles, San Francisco State University, Arizona State University, New Mexico State University, University of Texas-El Paso, Texas A & M, Jackson State University, North Carolina A & T, Auburn University, University of Delaware, City College of New York, Florida State University, and University of Puerto Rico-Rio Piedras).

Conclusion

CO-AMP has moved quickly to implement retention programs within the participating institutions with the support of its corporate partners. CO-AMP has entered into several collaborative efforts with existing federally-funded and state-funded programs, professional non-profit organizations, corporations, and government agencies/laboratories. Also, CO-AMP has aimed for the continued institutionalization of its programs through collaboration and sharing of successful programs with CO-AMP partner institution, and with Colorado Institute of Technology (CIT) activities. Furthermore, the consortium is seeking the support of other outside

resources to enhance these successful programs for institutionalization. The CO-AMP consortium has been the major driving force at the institutions involved to encourage and motivate students to excel and graduate with B.S. degrees and to attend graduate school. The overall performance of students has been dramatically improving as demonstrated by higher grade point averages and the gaining of leadership experience and professional development skills, and enrollment of underrepresented students at partner institutions has increased by 72% since the program's inception.

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- Dr. Tony Frank, Senior Vice President for Academic Affairs and Interim Provost, Colorado State University
- Dr. Johannes Gessler, Former Associate Dean for Undergraduate Studies and Professor of Civil Engineering, Colorado State University
- Dr. Larry Johnson, Professor of Mathematics, Metropolitan State College
- Dr. Don May, Professor of Engineering, Fort Lewis College
- Dr. Larry Penley, President and Chancellor, Colorado State University
- Dr. Fred Smith, Professor of Mechanical Engineering, Colorado State University

- Mr. Ty Smith, Former Project Coordinator, Director of Native American Student Services, Colorado State University
- Ms. Tricia Wright, Program Assistant
- Dr. Albert Yates, Former CSU Chancellor

References

Colorado Alliance for Minority Participation (CO-AMP) web-AMP data (sponsored by the National Science Foundation).

Government Performance and Result Act (GPRA) reports, 1996-2004.

Biography

Dr. Omnia El-Hakim earned her Bachelor's degree in Civil Engineering from Ein Shams University in Cairo, Egypt, her Master's degree in Civil Engineering from Cairo University in Cairo, Egypt, and her Ph.D. in Civil Engineering from Colorado State University in 1984. She then held a joint appointment with Colorado State University and Fort Lewis College in Durango, Colorado as a Professor of Civil Engineering and Chair of the Department of Physics and Engineering. Currently, she is the Assistant Dean for Diversity in the College of Engineering at Colorado State University and Director of the Women and Minorities in Engineering Program (WMEP).

Throughout the past nine years, she has led the Colorado Alliance for Minority Participation (CO-AMP) consortium as the principal investigator and Director. In addition, Dr. El-Hakim has built a bridge program in Colorado that is expanding the educational and career opportunities for diverse populations. It was her vision to create a partnership among Colorado's institutions of higher education to address the needs of women and underrepresented students, and she plans to continue to expand the Colorado diversity programs, providing new opportunities for tomorrow's leaders.

Dr. El-Hakim also serves as co-principal investigator at the Colorado State University site as director of the Colorado Alliance for Graduate Education and the Professoriate (AGEP). She is principal investigator for the Fast Track to Work Graduate Scholarship Program, CSEMS Undergraduate Scholarship Program, and the Technology Transfer and Training Center Program, as well, and has directed peer advising, training, and enrichment programs for Hispanic and Native American youth in the Four Corners Region. She continues to write and be awarded grants to raise funds to support K-12, undergraduate, and graduate students.

Appendices

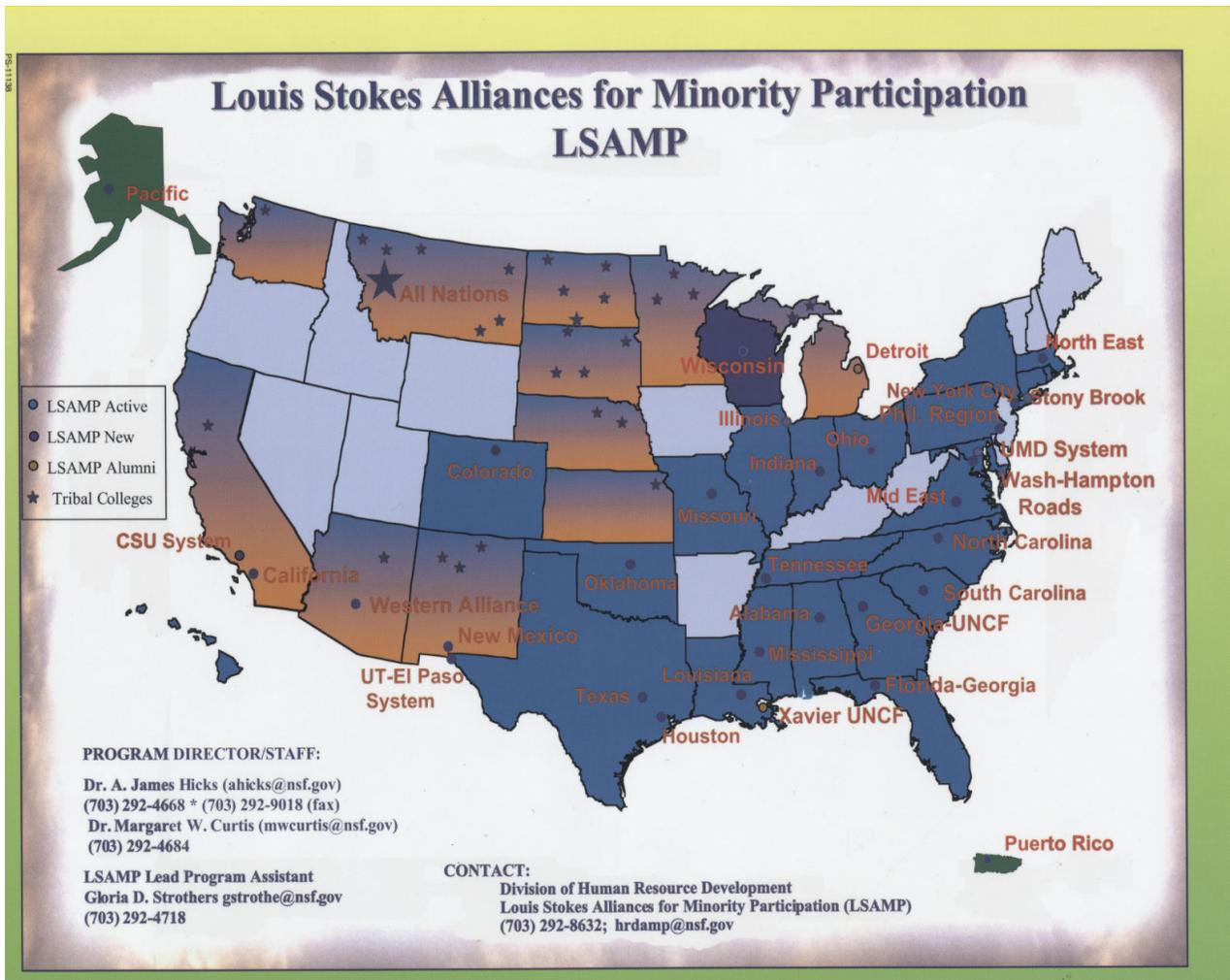


Figure 1. Map of AMP Programs Nationwide

(The Louis Stokes Alliance for Minority Participation (LSAMP) program is designed to develop the comprehensive strategies necessary to strengthen the preparation and increase the number of minority students who successfully complete baccalaureate degrees in STEM fields. This objective facilitates the long-term goal of increasing the production of Ph.D.'s in STEM fields, with an emphasis on entry into faculty positions. The LSAMP program requires each awardee to establish meaningful partnerships among academic institutions, and encourages the inclusion of government agencies and laboratories, industry, and professional organizations. It is expected that successful partnerships will enable development of approaches tailored to the institutional setting for achievement of program goals in STEM undergraduate education. Supported activities include, among others: student enrichment, such as collaborative learning, skill development, and mentoring; academic enrichment, such as curricular and instructional improvement; and direct student support, such as summer activities.)

*Louis Stokes Colorado Alliance for Minority Participation
Serving Colorado and the Four Corners Region*

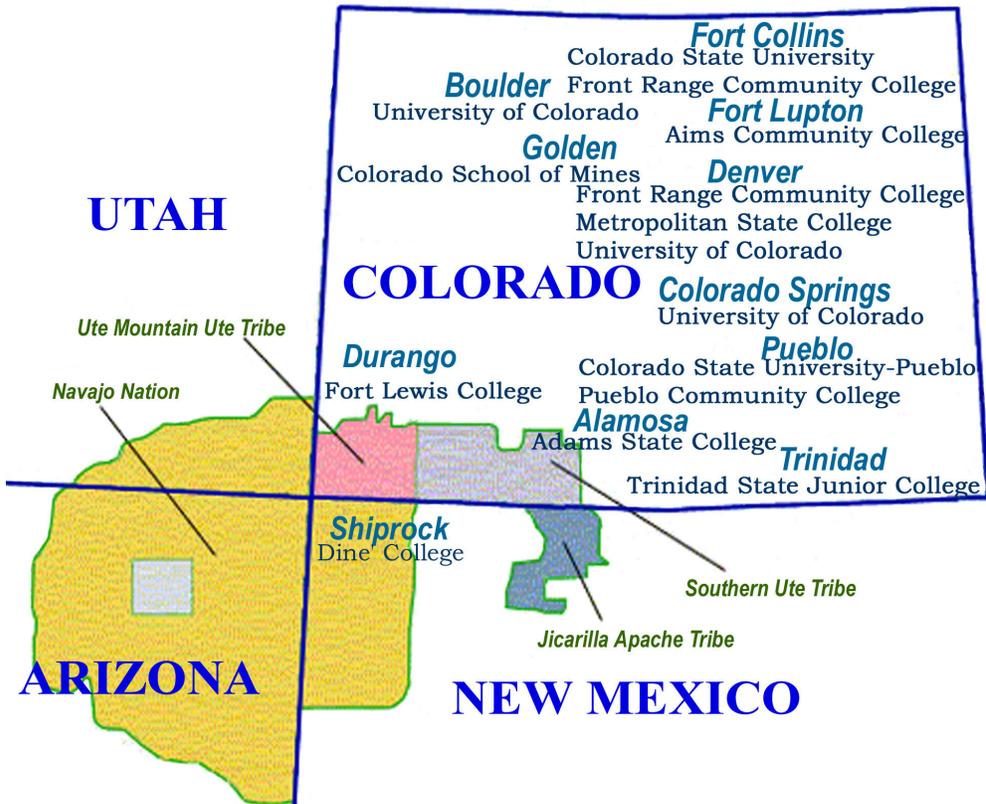


Figure 2. CO-AMP Participating Institutions

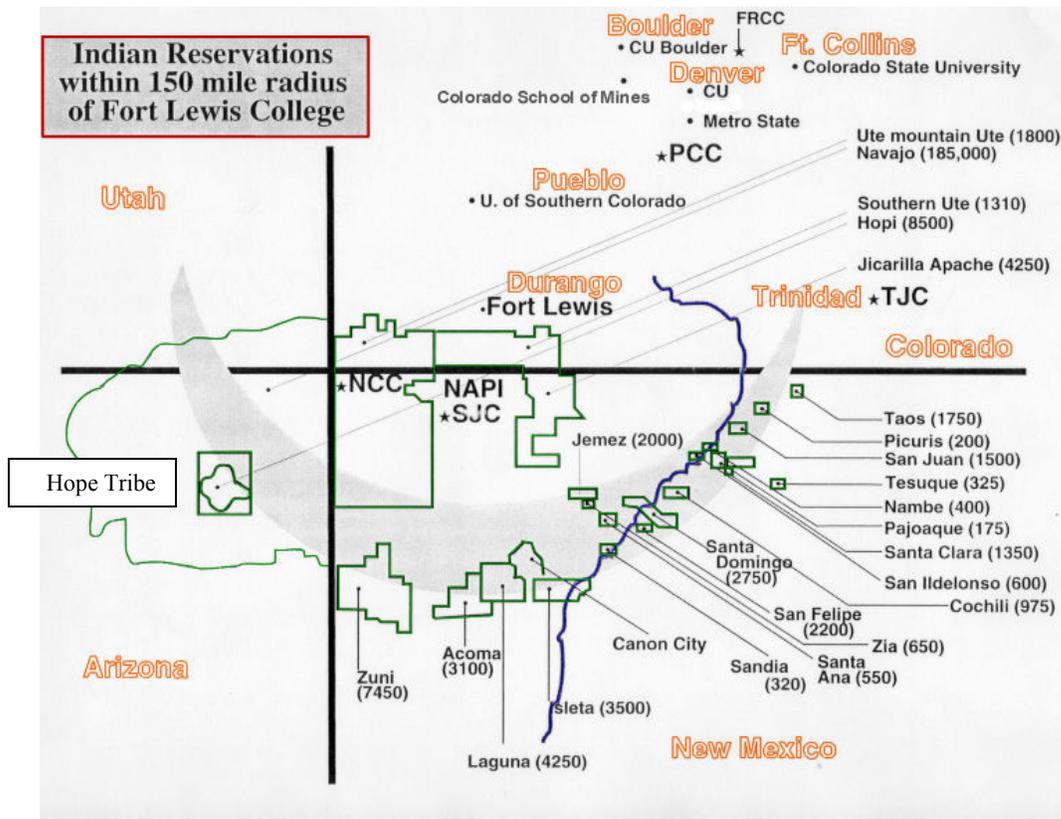


Figure 3. Indian Reservations within a 150-mile Radius of Fort Lewis College

PCC = Pueblo Community College
TJC = Trinidad State Junior College

**STEM Bachelor's Degrees Awarded
by the Nine LS CO-AMP 4-Year Institutions**

Site	1995-96 Baseline			
	Black	Hispanic	¹ NA, etc.	Total
ASC	na	na	na	na
CSU	7	46	14	67
FLC	0	6	15	21
MSCD	2	22	2	26
UC-B	4	44	6	54
UC-CS	na	na	na	na
UC-D	5	12	3	20
USC	2	23	2	27
Total	20	153	42	215

Site	1996-97 Year 1			
	Black	Hispanic	¹ NA, etc.	Total
ASC	0	5	0	5
CSU	8	47	10	65
FLC	0	5	13	18
MSCD	8	25	2	35
UC-B	11	38	4	53
UC-CS	4	17	4	25
UC-D	4	21	1	26
USC	1	23	0	24
Total	36	181	34	251

Site	1997-98 Year 2			
	Black	Hispanic	¹ NA, etc.	Total
ASC	0	7	1	8
CSU	11	52	14	77
FLC	1	4	8	13
MSCD	10	31	3	44
UC-B	7	49	2	58
UC-CS	2	10	5	17
UC-D	2	18	3	23
USC	3	29	3	35
Total	36	200	39	275

Site	1998-99 Year 3			
	Black	Hispanic	¹ NA, etc.	Total
ASC	0	8	2	10
CSU	8	52	28	88
FLC	0	2	14	16
MSCD	14	29	2	45
UC-B	11	57	7	75
UC-CS	3	9	5	17
UC-D	14	32	5	51
USC	0	26	2	28
Total	50	215	65	330

Site	1999-2000 Year 4			
	Black	Hispanic	¹ NA, etc.	Total
ASC	0	0	1	1
CSU	10	56	23	89
FLC	0	5	10	15
MSCD	18	26	2	46
UC-B	13	42	4	59
UC-CS	4	10	2	16
UC-D	8	27	3	38
USC	3	23	2	28
Total	56	189	47	292

Site	2000-01 Year 5				
	Black	Hispanic	¹ NA, etc.	² Multi Race	Total
ASC	0	2	3	0	5
CSU	11	59	13	30	113
FLC	0	3	7	0	10
MSCD	12	33	4	0	49
UC-B	11	58	4	0	73
UC-CS	1	8	1	0	10
UC-D	8	16	5	0	29
USC	4	24	2	0	30
Total	47	203	39	30	319

Site	2001-02 Year 6				
	Black	Hispanic	¹ NA, etc.	² Multi Race	Total
ASC	0	9	4	3	16
CSM	3	25	4	0	32
CSU	12	56	5	16	89
FLC	1	2	17	2	22
MSCD	21	39	3	0	63
UC-B	13	60	12	0	85
UC-CS	6	15	1	0	22
UC-D	12	19	4	0	35
USC	1	31	4	0	36
Total	69	256	54	21	400

Site	2002-03 Year 7				
	Black	Hispanic	¹ NA, etc.	² Multi Race	Total
ASC	0	4	1	0	5
CSM	7	32	3	0	42
CSU	7	63	4	19	93
FLC	4	4	7	0	15
MSCD	19	31	1	0	51
UC-B	21	57	9	0	87
UC-CS	3	14	2	0	19
UC-D	12	20	2	0	34
CSU-P (usc)	4	21	1	0	26
Total	77	246	30	19	372

Site					
	Black	Hispanic	¹ NA, etc.	² Multi Race	Total
ASC	1	2	1	0	4
CSM	7	32	3	0	42
CSU	13	64	8	17	102
FLC	0	8	10	1	19
MSCD	27	26	2	0	55
UC-B	12	50	7	0	69
UC-CS	5	20	3	0	28
UC-D	13	24	2	0	39
CSU-P	3	30	3	0	36
Total	81	256	39	18	394

¹Native American, Alaskan Native, Pacific Islander

Figure 4. STEM Bachelor's Degrees Awarded by the Nine LS CO-AMP 4-Year Institutions

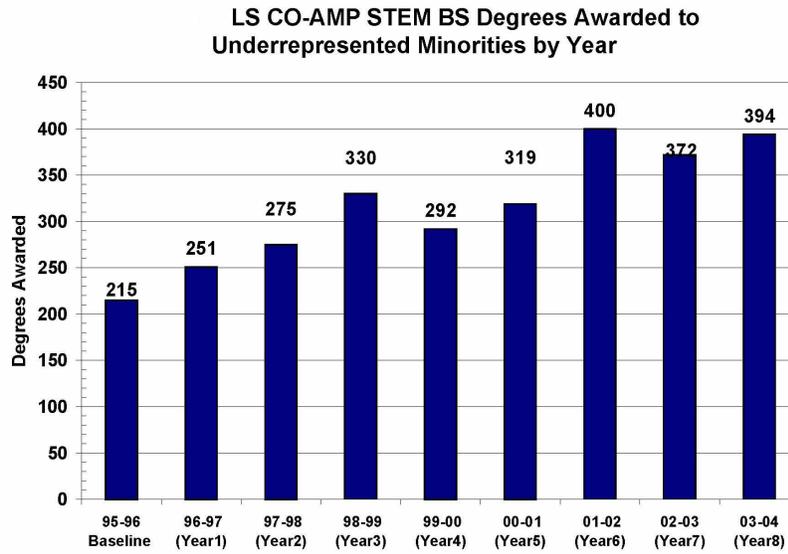


Figure 5. LS CO-AMP STEM BS Degrees Awarded to Underrepresented Minorities by Year

Institution	Total Institution STEM Enrollment	Underrepresented Minority STEM Enrollment	Percent of STEM Students who are Underrepresented Minorities
Adams State College	299	95	32%
Colorado State University	7,415	573	8%
Colorado School of Mines	2000	188	9%
Dine' College	254	254	100%
Fort Lewis College	770	243	32%
Front Range Community College	880	113	13%
Metropolitan State College of Denver	3364	642	19%
Pueblo Community College	535	210	39%
Trinidad State Junior College	37	36	97%
University of Colorado - Boulder	6365	466	7%
University of Colorado - Colo. Springs	1421	160	11%
University of Colorado - Denver	1317	195	15%
Colorado State University - Pueblo (USC)	830	264	32%
LS CO-AMP TOTALS	25,487	3,439	13%

Figure 6. Percent of STEM Students Who Are Underrepresented Minorities by Institution