

PROGRAM REVIEW PANEL

FINAL REPORT

COOPERATIVE INSTITUTE FOR RESEARCH IN ENVIRONMENTAL SCIENCES

1999

I. REVIEW PROCESS.

With a committee of ten, the Institute prepared a Self-Study. An Internal Review Committee of three faculty, one graduate and one undergraduate student was empanelled from outside the unit. The IRC held a series of meetings and conversations with CIRES members, including the director, fellows, administration and staff, professional research associates, undergraduate students, graduate students and postdoctoral fellows. The IRC summarized its findings in May 1999. In preparation for an external review the PRP Liaison held a one and one-half hour interview with the institute director in early October. An External Review Committee of three distinguished scientists, chosen from outside establishments of research and learning, visited CIRES for two days in October, extended their interview to include Affiliated Departmental Chairs, the Member Council and the NOAA lab directors, and submitted a report.

It is noted that the Self-Study committee comprised seven men and three women, the IRC three men and two women.

The PRP reviewed all three reports. This public document contains the PRP findings and recommendations.

II. BACKGROUND.

The following description and analysis of the unit is taken from the 1999 CIRES Self-Study and gives an inside-view. It is in two parts, an overview, and a discussion of related undergraduate and graduate programs.

OVERVIEW OF CIRES.

The Cooperative Institute for Research in Environmental Sciences (CIRES) is a joint institute between the University of Colorado and the National Oceanic and Atmospheric Administration (NOAA) that establishes links between many units in both organizations

CIRES Centers	CIRES Divisions
Center for Limnology	Atmospheric & Climate Dynamics
Center for the Study of Earth from Space	Cryospheric & Polar Processes
Climate Diagnostics Center	Environmental Chemistry & Biology
Colorado Center for Chaos & Complexity	Solid Earth Sciences
National Snow & Ice Data Center	

Affiliated departments form the disciplinary academic foundation for the interdisciplinary and transdisciplinary research conducted within CIRES, while the academic programs are themselves interdisciplinary.

As the largest of the eleven NOAA Cooperative or Joint Institutes, CIRES maintains close affiliation with ten NOAA laboratories, many within the Boulder community. CIRES currently has over five hundred employees distributed between Fellows, graduate students, undergraduate students, research scientists, associated scientists, and administrative staff. About half of the organization is associated with NOAA laboratories, the remaining half with University departments.

The major CIRES contribution in the University environment is to facilitate integration of education and research, to conduct end-to-end science, and to promote cross-disciplinary and interdisciplinary investigation. This is done through: 1) teaching and research affiliations with campus interdisciplinary academic programs and NOAA laboratories; 2) mentoring of graduate and undergraduate students tied to disciplinary academic departments; 3) an active outreach program; 4) sponsorship of a new CIRES interdisciplinary Distinguished Lecturer Series with member departments; and 5) effectively representing the University in the national and international arena.

Areas for future development include: 1) the improvement of outreach beyond the K-12 and University system to the public, using business networks and internet-based information systems; 2) developing educational programs that parallel our interdisciplinary research initiatives, including short courses, focused seminar series and educational materials, 3) developing stronger ties with such organizations as the *Center for the American West* and the *School of Journalism*; and 4) better use of the CIRES affiliate category.

A recent addition to CIRES is a new K-12 Outreach Program, whose projects combine rigorous science with innovative learning practices. Ongoing projects include training for school teachers and practicing scientists, classroom presentations, public exhibits, and organization and partial sponsorship of the *National Ocean Sciences Bowl* for high school students. Projects under development include a major initiative for girls and women in science that will incorporate extensive collaboration between local and regional organizations, and a curriculum development project based on NOAA/NASA field missions.

While no national data are available that rank or evaluate institutes such as CIRES, research personnel and faculty within CIRES have been highly recognized for their work and are among the most nationally and internationally prominent scientists in their fields. National and international scientific recognition of CIRES Fellows include: 1) four winners of the American Geophysical Union's Macelwane award given to promising young scientists; 2) a Senior Research Prize given by the Alexander von Humboldt Foundation of Germany; 3) one winner of an NSF career award for young scientists; 4) a Bowie lecturer of the American Geophysical Union and an Association Lecturer of the International Association of Seismology and Earth's Interior; 5) two Distinguished Visiting Scientists at the Jet Propulsion Laboratory; 6) two Outstanding Research Awards presented by DOE; 7) a winner of a Golden Senior Visiting Fellowship at the University of Western Australia; 8) the Chair of the NSF/Geosciences Advisory Committee; 9) a Tsunami Society Award; 10) a member of the National Academy of Sciences (and its French equivalent); 11) chair of the U.S. National Committee for URSI; and 12) several best-paper awards at a variety of recent national meetings. In addition, several CIRES scientists are Fellows of various scientific societies including AGU, IEEE and AMS. Finally, a number of CIRES personnel are active in service to national agencies and scientific societies, including the current chair of the NAS/NRC committee on wetlands, two members of the NSF Vision 2000 committee, a member of the NASA ESSAAC committee advisory to the Associate Administrator of NASA, and the current chair of the AGU technical committee on Nonlinear Geophysics. Finally, CIRES Fellows and Members continue to be active researchers publishing in refereed scientific journals and providing service to the research community.

During April 1997, CIRES underwent a thorough scientific review in accordance with NOAA policies that included an external team of four distinguished scientists for two days. Reviewers were impressed with the high level of scientific quality, the interdisciplinary emphasis, the active educational programs, and “the unusually effective partnership between the University and NOAA.” Issues that surfaced included the retention of outstanding scientists, the development of private funding sources, creation of University budget strategies to accommodate federal funding fluctuations, maintenance of high quality computational facilities, enhanced planning for the Water in the Interior West initiative, and enhanced participation of CIRES staff in educational programs. It also encouraged stronger connections between CIRES, the *Environmental Technology Laboratory* (ETL) and the *Climate Monitoring and Diagnostics Laboratory* (CMDL). Overall CIRES was referred to a “a jewel in CU’s crown.”

The financial status of CIRES is excellent with contracts and grants awarded from federal funding agencies increasing from \$8.3 to \$10.9 million in five years. In addition, funding from NOAA resulting from the Cooperative Agreement has increased during this period for \$10.3 to \$15.0 million.

UNDERGRADUATE AND GRADUATE PROGRAMS ATTACHED TO CIRES.

While academic departments establish and evaluate their own curricula, they benefit in many ways through their CIRES affiliation. All CIRES tenure-track faculty have their teaching affiliation track in one of the eight collaborative departments. In addition, many CIRES researchers and NOAA scientists have formal academic ties, teach courses, and serve as graduate student mentors and advisors.

CIRES does not directly participate in undergraduate instruction, but indirectly does so through faculty who teach at the undergraduate level in various departments and through several programs. At present, CIRES has 73 undergraduate students supported through various programs including research grants, work-study, and the *Undergraduate Research Opportunity Program* (UROP). A major program that occurred during the last seven years was the *Colorado Commission on Higher Education Program of Excellence* (CCHE) award for the support of undergraduate-related instruction. Originally made for five years beginning in FY89, cost savings allowed CIRES to continue the program through June of 1998. The award supported the enhancement of teaching through the purchase of equipment, renovation of teaching laboratories, and provision of environmental science research internships for undergraduates. Total funding of the program was \$1,345,000. The undergraduate research internships are one activity CIRES would like to continue. As such, CIRES will be seeking support through the NSF *Research Experience for Undergraduates* (REU) program.

CIRES also helps sponsor academic classes through its interdisciplinary Centers and contract-supported educational programs. A recent example is the course on “Climate and the Future of the Western U.S.” class co-sponsored with Geography in 1996 as a part of the University Critical Thinking curriculum. As a 4000-level cross-listed course, it involved seven guest lecturers from CIRES, Environmental, Population and Organismic Biology (EPOB), Geography, Economics, and other departments, and was shaped around the Global Change Symposium on “The Role of University-Based Research in Public and Environmental Decisions.” Another example of support is the NASA *Center of Excellence Program* co-sponsored by CIRES, Geology, Geography, and EPOB that provided funding for laboratory equipment (spectrometer, sun photometer, GPS, Photosynthetic Active Radiometer, and 15 workstations) to support a new course in Remote Sensing-Field Methods in ground-truthing satellite data for both undergraduate and graduate students. Researchers who are not departmental faculty may also co-teach classes. For example, CIRES Fellow and NOAA Senior Scientist Susan Solomon taught an Atmospheric Chemistry course with Margaret Tolbert and Guy

Brasseur during spring of 1995. CIRES faculty have also been active participants in teaching courses for the new Certificate in Remote Sensing.

CIRES currently supports 91 graduate students through its research activities. Several graduate students are also supported directly (salary and tuition) by the Federal laboratories through their connection with CIRES. Each year, CIRES funds a competitive graduate fellowship program that covers tuition and 50% of salary and benefits for about seven students. CIRES provides office and laboratory space, computing facilities, research instrumentation, access to the integrated instrument design facility (including machining, electronic and glass blowing), conferencing, academic symposia, recruitment travel costs, and administrative support for the graduate students.

CIRES annually supports a *Graduate Student Atmospheric Chemistry Symposium*. It is organized by the 5-6 graduate students who receive a one-year fellowship from an NSF-sponsored atmospheric chemistry training grant. Fellowship recipients give oral presentations while local students and scientists are invited to present posters. A featured speaker chosen by the students presents a keynote address on current "hot" issues. Recent speakers have included John Seinfeld (aerosols and climate coupling), Barbara Finlayson-Pitts (sea-salt aerosols), Bill Chameides (atmospheric impacts from an emerging China), Joe Farman (discovery of the ozone hole), and Ralph Cicerone (atmospheric chemistry). This annual event has received tremendous support and typically draws several hundred people.

CIRES graduates have had remarkable success securing jobs within their fields. Of a sample of 88 recent CIRES graduates, 33% found positions in academic institutions, 35% found positions in government or other research laboratories, and 21% found jobs in industry. Of the remaining graduates, several have taken environmental consulting positions while some have continued on to medical school."

An expert outside-view of CIRES is given in the report of the External Review Committee.

"The Cooperative Institute for Research in Environmental Sciences (CIRES/Institute) is a scientific research institute jointly sponsored by the University of Colorado (CU/University) and the National Oceanic and Atmospheric Administration (NOAA) Environmental Research Laboratories (ERL). CIRES is a \$28M enterprise with about 500 employees and is devoted to research and teaching in the wide-ranging disciplines of the environmental sciences.

The ERC is in complete agreement with earlier reviews stating that CIRES is a "jewel in CU's crown". The Institute is unique in the country, and a leader in earth systems science, both nationally and internationally. It engages in socially relevant research, and the overall quality of the science and the participating scientists is high. CIRES is arguably the best example of CU's emphasis on multi-disciplinary integrative research. Significant benefits accrue to the University and to the many graduate students, post-doctoral researchers, and visitors attracted to its programs.

The coupling of CIRES to NOAA/ERL is a win-win situation for both CU and NOAA in many respects. For example, CU/CIRES students and post-doctoral fellows can gain valuable experience at a national lab, giving them practical experience and broadening their career choices, while NOAA/ERL benefits from the continued influx of "new blood" and academic expertise. The relatively new initiative "Water in the West" is a good example of how the CIRES perspective of "high-profile, higher-risk" shorter-term science meshes nicely with the traditional long-term mission-oriented approach of a national laboratory. Few Research universities have the benefit of close ties to national laboratories, and it is important that the University recognize the value of such interaction,

and ensure that it is nurtured at the highest levels within both organizations. The ERC strongly recommends that the University continue its support of CIRES, and work in partnership with Director Susan Avery to guarantee the long-term viability and success of the Institute.

CIRES maintains positive relationships with major CU departments in science and engineering, specifically physics, chemistry, biology, geology, geography, electrical engineering and civil engineering. Faculty rostered in CIRES supply needed manpower in their home departments, and provide important links between the departments and the Institute. In addition to the faculty themselves, major beneficiaries are typically students and post-doctoral fellows. Although these linkages can also create tensions such as in hiring and tenure decisions, the ERC found that the positives outweigh the negatives. It is important for the Deans of the Colleges of Arts and Sciences and Engineering and Applied Sciences to work with the Dean of the Graduate School to foster and maintain the most positive interface possible between the departments and CIRES. The unique mix of institutes and traditional departments at CU demands that this be given high priority within the University.

The ERC found that employee and student morale was generally high, and that CIRES is, for the most part, an attractive place to work. As such, attrition is low, and people are proud of their contributions to the Institute and feel compelled to put in whatever time it takes to get the work done. There are some problem areas. These include the apparent disenfranchisement of the professional research staff and faculty who continue to be classified by the University as “temporary employees”, the tight space situation, and a general lack of communication between the various components of CIRES and between the different campuses.”

To these quotations should be added that research in CIRES divisions focuses broadly on the interactive dynamic Earth System from the Earth’s core to the Sun. A measure of the current importance and vitality of this research is that in the year 1997-1998, CIRES expenses were funded at \$14,974,690 by NOAA, \$10,868,728 by individual contracts and grants, \$2,582,990 by CU.

Since the last PRP report CIRES personnel has increased from around 400 to 525.

III. RESPONSE TO PREVIOUS PRP RECOMMENDATIONS

The following list summarizes the major actions taken by CIRES to address problems and issues raised in the 1992 Program Review.

Develop Strategic Plan: Two retreats have led to a new Strategic Plan.

Improve Internal Communications: Given the size and multiple locations of CIRES internal communications will always require constant attention. A number of new mechanisms for communication have been implemented. Increased delegation to the Executive Committee and other active committees has increased Fellows’ participation in CIRES governance.

Future Growth and Faculty Collaboration: Careful consideration has been made to enhance NOAA/University collaborations.

Integrate Solid Earth Sciences: Solid Earth Sciences have for the past two years been seamlessly incorporated into CIRES activities, goals and opportunities.

Develop Career Track: An internal CIRES *Career Track* has been established. It is hoped that this will act as a template for a University-wide *Career Track* and that future implementation of parallel benefits will develop as recommended by the University Career Track Committee report.

Provide Bridging Funds: This recommendation required higher administrative action and has not yet been implemented.

Manage Conflict of Interest: This issue has been resolved with the change of CIRES Directorship.

Enhance NOAA Base Funding: Base funding from NOAA has remained constant in recent years while NOAA research funding has increased.

Allow for Open Self-Study Process: The current self-study has been inclusive with wide-spread participation.

Enhance Recruitment of Under-Represented Groups: This is a problem with the national pipeline of qualified applicants in general. Efforts have already been implemented to widen the circulation of job advertisements. The CIRES Diversity Plan was a first step towards enhanced diversity, but will be reviewed and updated in the near future. Diversity action items are integrated into the Strategic Plan.

IV. LEADERSHIP

Leadership is clearly a strong point within CIRES as perceived from both inside and outside the organization. In response to the 1992 PRP report a new Director of CIRES was appointed. Current Director Susan Avery is now in her 5th year at the helm of CIRES, and by all accounts is doing an excellent job. When asked by the ERC to comment on the effectiveness of Avery as Director of CIRES, one ERL Lab Director said it could be summed up in one word "superb". As a result of differences in Avery's management style from that of her predecessor, tensions apparently developed between her and some of the Staff and Institute Members early in her tenure. However, the ERC found that improved communications and the development of procedures to better define career positions for employees at CIRES, initiated by Avery, has largely ameliorated the earlier situation. CIRES Fellows, Staff, Members, and Students all agree that communication channels are generally open, that tensions have largely dissipated, and that the administrative structure is working well. Many individuals singled out Paul Sperry as a particularly valuable addition to the CIRES administrative structure in his role as Executive Director.

Except for four, the issues raised by the IRC were also raised by the ERC. The first three were:

(i) There was a relatively strong consensus among the fellows, with some dissent, for new positions in atmospheric and environmental biology. The IRC felt that to proceed with this, possibly the most important and the most delicate issue of programmatic growth, seemed appropriate but would require considerable consultation and further consensus building.

(ii) The IRC felt that additional seed money to stimulate further cross-disciplinary collaborations with CIRES would represent a wise long-term investment. The impression gained from talking to Fellows was that modest additional support could make a significant difference in more effectively taking advantage of the distinctive cross-disciplinary interests of the CIRES faculty.

(iii) The IRC agreed with CIRES in recognizing that 'the success of the Institute depends critically upon its human resources and the infrastructure necessary to enable research and education'. The IRC was impressed by the uniformly high quality of research and administrative support staff. Director

Susan Avery, in particular, is seen as pivotal to the effective operation of such a large and complex organization. The committee felt that ways should be found to reduce some of the pressures and demands that currently fall upon the Director.

These issues were raised in the May report of the IRC. The Susan Avery style of Directorship may perhaps be illustrated by the way that she addressed them in the October Liaison interview.

Concerning (i): There was no dissent. The discussion involved the kind of biologist to hire, not whether to hire one at all. In fact there is to be a new faculty member and Fellow joint with MCDB and the search is currently in progress.

Concerning (ii): Until recently the University charged CIRES over \$500,000 in annual rent. With the help of Vice Chancellor DiStefano, CIRES has recently renegotiated this liability and assumed instead the payments of capital plus interest according to the CIRES Building bond schedule. This has clarified future liabilities and allowed the Director to begin funding internal proposals which, because they were novel or not in standard areas, could not in the usual way expect support.

It should be added the CIRES will still be charged some rent for space in the East Campus. According to a member of the External Review Committee, his home institution funds internal research initiatives to the amount of \$500,000 per year.

Concerning (iii): Susan Avery has appointed an Executive Director (see above), has delegated (with rewards), and feels that the running of CIRES is 'coming under control'. Susan is getting ready for a sabbatical, to bring her personal research up to speed.

The attention paid to these three issues by the Director caused them, between May and October, to sink below the External Review Committee's horizon of concern.

The 1992 PRP mentioned, in passing, cost over-runs on research contracts. Asked, during the Liaison interview, to comment on the stewardship of research contracts, the Director fielded immediately: Each Principal Investigator is assigned to an accounting person; only the Integrated Instrumentation Shop and Computing Services are experiencing over-runs, which are now being closely monitored by the Executive Director.

Susan Avery's reputation as an excellent Director of CIRES is fully merited.

The ERC felt that the Director and Executive Director of CIRES must continue to work on communication to ensure that morale remains high and employees retain a sense of value – two issues that rank high among Member and Staff concerns. In addition management must continue in its efforts to ensure that the processes regarding career advancement, annual evaluations, and promotions to Fellow are clearly articulated and objectively followed.

The ERC was also impressed with the role of the Council of Fellows in providing continuous intellectual leadership to the CIRES endeavor, and facilitating collaboration between the University and NOAA components of CIRES. However, the ERC was not able to evaluate the role of either the Division or Center Director or the NOAA-ERL Lab Directors in the Administrative structure of the Institute. At least one person suggested that the clout wielded by Center Directors, as well as their pursuit of personal agendas, may at times impede efforts of the Institute Director to organize their work along interdisciplinary lines.

V. ISSUES

MAJOR ISSUES FOR CIRES.

There is a nexus of problems involving size and space.

“Space is tight with virtually no room for expansion. Furthermore, communication is hindered due to the separation of CIRES personnel into different locations on and off campus. The most serious division is between activities on the main campus and those on the east campus. Such division of personnel is not conducive to optimizing cooperation and multidisciplinary interaction – The essence of CIRES. Often the right hand doesn’t know what the left hand is doing, particularly at the Associate Scientist and Graduate Student levels. Unfortunately, a significant degree of physical separation between CIRES personnel would appear to be unavoidable given the wide range of activities carried out under the CIRES umbrella and the necessity to have a significant fraction of CIRES personnel working in NOAA facilities. These concerns beg the question, raised by several key individuals, as to whether CIRES is too large and what is its optimum size.”

It should be added that the East Campus (“snow and ice”) branch of CIRES contains 60-80 people. The remaining personnel of CIRES are apportioned roughly evenly between Broadway and campus locations. Whilst the availability of Eco-Pass is extremely helpful, problems with on-campus parking exacerbate the difficulty of maintaining regular physical connections between the various parts of CIRES.

The ERC goes on to consider the issue of size in more detail:

“CIRES is a complex organization and the issue of its ultimate size needs to be addressed in conjunction with the University. Given CIRES’ national preeminence and its multidisciplinary expertise in societally relevant science, opportunities clearly exist for expansion. However, it doesn’t make sense to add new programs/projects given the tight space situation that currently exists, unless older, existing programs are concomitantly reduced in size. Also, expansion must be consistent with CIRES’ mission, its long-term goals, the way it does science, its role in the University, and how it wants to be perceived by the rest of the scientific community.”

The strategic plan is wanting.

The issue of the ultimate size of CIRES is hardly addressed in the Strategic Plan. Indeed the ERC found CIRES’ Strategic Plan to be too general and lacking in a clear discussion of goals, priorities, tasks and timelines. As an example, they noted that the plan calls for a “common approach” to earth system science without any discussion of what that concept means or how it is to be implemented throughout the CIRES complex and multi-faceted structure. The plan also appeared to be very, perhaps too, ambitious with new hires planned in the biospheric sciences and two new initiatives on the drawing board in addition to the ‘Water in the West’ initiative. Of particular concern in this regard is the lack of a discussion on how the Institute would provide the human and physical resources to meet the challenges of the ‘Water in the West’ initiative.

The following concern of the ERC should be added:

“Solid earth sciences (specifically geophysics) played an important role during CIRES’ formative years. More recently, however, there has been a shift in research emphasis at CIRES, largely in response to NOAA’s changing interests. As such, it appears that, although there are a number of

distinguished geophysics faculty at CU who are rostered in CIRES, their roles vis-à-vis CIRES current coordinated research initiatives and future plans are unclear.”

It is appropriate to insert here the fourth and last of the IRC issues not subsumed under those of the ERC.

The relation of CIRES to individual departments is felt to be ambiguous.

Personnel discussions between e.g. Department heads and the CIRES directorate are currently carried out on a case-by-case basis. Although seconded to a department, faculty rostered in the Graduate School stay rostered there. There is unhappiness if CIRES decides to fill a vacated position with emphasis on another discipline – the department feels the “loss” of a position on which they have come to rely. This important issue should be clarified and any new structure put in place.

Professional Research Staff have restricted opportunities.

The ERC report is unequivocal:

“The status of CIRES professional research staff remains a festering problem. For example, research scientists who have been at CIRES for more than a decade and are essential to the CIRES endeavor continue to be designated by the University as “temporary personnel”. Professional Research Assistant (PRA’s) are denied the ability to pursue an MS or Ph.D. degree at CU, a policy that would seem to be at odds with a University’s mission to foster life-long learning and career development. There also was some concern expressed that senior research faculty are under-represented on the Council of Fellows. Director Avery and the Council of Fellows are to be commended for their efforts to address this problem, for example, by implementing the CIRES Career Tracks and the Members’ Council. However, much remains to be done, especially at the University level. The ERC was astonished to learn that the recommendations of the University Career Track Report of February 1996 have yet to be acted upon.”

The Director would like Professional Research Assistants to be allowed to pursue higher educational degrees. Such a change would require intervention by the Regents.

Outreach is unfocused and underfunded.

The ERC had no contact with Outreach during the interview process. To the ERC the relatively modest Outreach component of CIRES appeared to have many supporters within the Institute family, and it was of interest that graduate students were among the strongest proponents. There appeared to be a highly dedicated staff. Nevertheless, based on experiences elsewhere (e.g. the Southern California Earthquake Center-SCEC, and the Incorporated Research Institutions in Seismology-IRIS), the External Review Committee felt that the CIRES outreach effort is woefully underfunded if it expects to make a substantial and sustainable impact on K-12 curriculum. It also seemed somewhat unfocused (given the available resources), and appeared to lack a formal up-front partnership needed with science teachers and curriculum specialists in programmatic and product design, particularly as they relate to suitability for classroom use.

It was also listed as a major issue in the ERC report that CIRES appears not to have been closely aligned with the College of Engineering and Applied Sciences. Director Avery is from the Electrical

Engineering Department and indicated that she would like to enhance the remote sensing program in collaboration with that department.

OTHER ISSUES FOR CIRES.

A large part of CIRES' funding comes from the cooperative agreement between NOAA and CIRES/CU. As a result much of CIRES' research is NOAA-driven. The ERC felt that CIRES should continue in its efforts to be proactive, both in its partnership with NOAA and through other projects, and that the "Water in the West" initiative is a good start. It was noted by an earlier reviewer that "CIRES can bring to the table its interdisciplinary perspective and its ability to bridge academic research with programmatic science".

The ERC was somewhat confused as to the respective roles of the Centers and Divisions and how these two administrative entities dovetail with the so-called "research initiatives".

The ERC was uncertain as to the role of the Center for Chaos and Complexity in CIRES' new research initiatives and long-term goals. There were comments about it being an overarching theme, but at least part of the ERC felt that the issue was sufficiently vague.

The ERC had the impression that insufficient thought had been given to the relationship between CIRES and the new Environmental Studies program at CU, or what the impact might be.

The ERC would like to commend CIRES' administration for recently increasing the emphasis on computational facilities and support services within the Institute. This development has struck a positive cord among the graduate students that should not be overlooked.

VI. PROGRAM REVIEW PANEL DETERMINATIONS AND RECOMMENDATIONS

CIRES is an important asset for CU. It represents a substantial portion of the University's external funding, and carries out research in socially relevant areas. It currently supports more than 90 graduate and 70 undergraduate students, and bridges the research interests of faculty in seven different departments. Its partnership with NOAA provides additional research and professional opportunities for both students and faculty. The Director and Executive Director, working in concert with the Council of Fellows, have brought stability to the Institute and established a working environment in which morale is high and employees are valued for what they do. As a result, productivity is high.

CIRES is a large and complex organization that interacts in a variety of ways with academic departments and institutes at CU, as well as with the many relevant NOAA laboratories. Despite this complexity, the Institute is working well and is largely succeeding in meeting its mission and goals. Given this state of affairs, major changes and/or redirections are not needed, and probably ill-advised. On the other hand, modest adjustments, internally, and in terms of the Institute's relationship with the University, would facilitate CIRES' rise in national and international stature.

First Priority Recommendations

1. The CIRES strategic plan should be deepened and refined. More specificity, including priorities, scope of work, long-term goals and timelines to reach various milestones are necessary. Particular attention should be paid to possible future short- and long-term expansion or contraction in disciplines, physical space and financial support. Moreover the relationships between the various changes should be considered so as to identify an optimum size for CIRES and to maximize the

use of available resources IN CONCERT WITH STRATEGIC PLANNING FOR RESEARCH GROWTH ON THE BOULDER CAMPUS OVERALL. This plan should be completed and presented to the Associate Vice Chancellor for Research by the end of Fall Semester 2000.

2. A coordinating committee made up of Department Chairs, Deans, Institute Directors, etc. associated with CIRES, and chaired by the Associate Vice Chancellor for Research should meet annually to review matters of common interest and concern.
3. CIRES and the University should work jointly to ensure that CIRES' salaries are kept competitive, and that merit is appropriately rewarded, so that the best researchers are not lost to other research organizations.
4. CIRES should continue to be proactive towards NOAA in research initiatives following the model of 'Water in the Interior West'. In addition CIRES should pursue increased base funding in order to improve outreach, participation by minorities, etc.
5. THE DIRECTOR SHOULD EXPLORE WITH the Associate Vice Chancellor for Research ways of enhancing the contribution to CIRES from the University General Fund, particularly in support of CIRES functions that would leverage additional external funding.
6. The Associate Vice Chancellor for Research should act upon the Report of Recommendations of the Research Career-Track Committee (February 1996) with appropriate updating. Of particular significance to the welfare of CIRES and other CU institutes, and the morale of their PRAs, is the recommendation pertaining to the professional development of PRAs and their ability to enter into degree granting programs.
7. The campus administration should work expeditiously with CIRES to address the issue of space. Serious thought should be given to a plan for consolidating the east campus and main campus components of the Institute. As an example, the possibility of an environmental research building in the Grandview area might be explored. In the short-term, the University (Parking) should work with CIRES to seek creative solutions to ameliorate parking problems at the CIRES campus location, e.g. by differential parking fees and/or designated shared parking spaces.

Other Recommendations

8. CIRES should consider organizing, possibly in connection with Outreach, an annual one or two-day Institute-wide symposium featuring a few well-chosen internal and external speakers, a student oriented poster session, and a series of breakouts or mini-workshops on Institute initiatives. Extended symposia of this type are not only effective communication and interactive mechanisms, but also provide students and post-docs with the incentive to organize and showcase their work. Students in particular feel the need for more interdisciplinary interaction. CIRES might even consider instituting an awards ceremony at the symposium recognizing meritorious service, research excellence, leadership, etc.

CIRES must report annually to the Associate Vice Chancellor for Research and to the Vice Chancellor for Academic Affairs on the implementation of these recommendations.

(CAPITIALIZED text added during review by the Vice Chancellor for Academic Affairs)