NCAR Workforce Management Plan – Subcommittee Report

Subcommittee: WMP3
Date: August 14, 2009 Version: 3.0

Subcommittee members: Chris Davis (chair), Tom Bettge (since retired), Mike Daniels, Sarah Gibson, Gene Harano, Joanie Kleypas, Janice Kauvar, Scott Spuler, Sarah Tessendorf, Olga Wilhelmi and Bobbie Weaver

Summary of Process

The WMP3 subcommittee charge is

To assess the makeup and career paths of NCAR staff and recommend changes, as needed, in order to advance NCAR's scientific leadership and service to the university and broader scientific community.

During its early deliberations, the committee defined two overarching questions related to this charge:

1. Makeup of staff: Do we have the balance and breadth of staff to support the NCAR strategic science and service objectives?

2. University collaborations: Are we making the most of interactions with universities to further science and service objectives?

Data to address these questions were collected by subcommittee in the form of external scans of peer institutions and time series of numbers of NCAR staff in each job category from 1997 through 2008. These were augmented by surveys of selected job categories and focus group meetings with selected job categories as well as an institution-wide survey.

Job categories selected for either a survey, focus group meeting, or both, were project scientists (PS), associate scientists (AS), engineers (software, network, mechanical, electrical, facilities, and system administrators) and Administrators (administrator assistants and administrators). The career path of scientists and research engineers, a major aspect being the ARG process and tenure issue, was considered by subcommittee IV.

For PS, both a survey and a focus group meeting were conducted. This was the first group examined and therefore it was not known which approach would provide more information, so both were tried. PS represent the fastest growing job category at NCAR (Fig. 1) and a job category with considerable breadth of function. Associate scientists represent a large group (nearly 100) that has a long history at NCAR, but one that has undergone some notable changes. First, much fewer associate scientists are base funded. Second, very few entry-level AS are hired (fewer than 3 AS-Is currently). Third, the model of an associate scientist tied to a particular scientist is rapidly vanishing.

The engineering group (of which most are software engineers or systems administrators) represented the largest group, and one that has grown consistently over the past decade. Because of its size, it was important to examine the career tracks of employees in this group. Finally, the Admin. group was examined because it was a large group (about 90, including administrative assistants and administrators) but it has not grown in 12 years despite the increase of staff overall. This fact implied a change in workload or job duties over time.

We could not examine all job categories. Scientists were not examined by our group because it was felt that the scientist career path was being examined by subcommittee IV. However, some issues we examined do pertain to scientists, such as recognition of management responsibilities and the inequities introduced by the varied amount and requirements of external funding. In all, the job categories we examined cover nearly 60% of NCAR. In general, we included UCP employees as well in surveys and focus groups.

Overarching questions and link to the NCAR Strategic Plan

The first overarching question about the balance of staff appears to have two answers depending on the source of funding, and this underscores the importance of external funding in shaping the fabric of NCAR. Although accurate statistics are not available, there is a consensus that base-funded support positions have declined within the past 10 years and have been increasingly tied to large projects instead of individual scientists. The number of AS has increased slightly, but there has been a perceived shift toward external funding. Project scientists represent scientists funded mainly from external sources and tied to specific projects. Project scientists are not support scientists in general, but they often contribute to large projects. If “support” is defined as contributing either to individual scientists or to large projects (with one person often contributing to more than one), then it is clear that the support for science has increased, and much of the increase appears to be externally funded.

The science goals in the NCAR strategic plan emphasize large projects, both in the Imperatives and Frontiers. Although the research of individuals will continue to contribute fundamentally to the goals of NCAR, it is likely in 5-10 years that NCAR will have most of its scientific staff contributing a nontrivial fraction of their time to large projects. It has been repeatedly emphasized that NCAR should be primarily engaged in large projects that university researchers cannot realistically do. In this scenario, it is likely that the importance of project scientists, associate scientists and engineers will increase. Furthermore, the need for effective project management will also increase. This could have one of three consequences: increasing the managerial demands on scientists, increasing the role of project scientists in management, or expanding the job class of project managers. In the first two cases, there will be increased emphasis on individuals who can do both management and cutting-edge research. If the job class of project manager is expanded, the job matrix needs to be publicized, and NCAR should proactively seek highly skilled project managers for large projects.

At present, the tie of NCAR to the university model of faculty tends to downplay the role of effective project management. NCAR tends to be reactive rather than proactive about

ensuring that people with project management skills are available. Among scientists and perhaps project scientists as well, NCAR tends to measure productivity in publications, citations and perhaps success in obtaining external funding (to highly varying degrees) and de-emphasizes project management skills. This is clearly aligned with the university value system. As large projects become more important, the university model will grow less relevant.

An important question to answer is to what extent NCAR will value management skill as part of a scientist appointment, and to what extent NCAR will proactively seek individuals that exhibit research excellence and managerial promise. A second question is whether the NCAR scientist evaluation process will evolve as large projects become increasingly important. Will NCAR continue to adopt the university model, will NCAR move more toward a NASA model (where project managers have considerable power), or will we move to a position somewhere in between? NCAR is currently at a crossroads with non-NSF funding prominent and the scientific structure of ESSL being reorganized. The non-NSF funding is providing tension within the staff (discussed more below) and the scientific reorganization provides an opportunity to reduce this tension and position the organization for the next decade of research. *As part of this repositioning, we recommend that NCAR be proactive to ensure that sufficient attention is paid to attracting people with skills to contribute to and lead large projects, to recognize the various manifestations of leadership skills in evaluation and promotion or reclassification, and to state explicitly what those valued skills are.*

The NCAR strategic plan emphasizes “predictive science and modeling”. A crucial question is whether NCAR has the balance of staff to support the development, use and community support of its models to the user community. Areas of possible disciplinary understaffing, either because of too few current staff or potential retirements in the next 5-10 years are (a) base-funded expertise in developing new earth-system models; and (b) base-funded data assimilation, combining observations and models. Currently much of the data assimilation effort is funded through external grants. The available pool of talent for data assimilation is also questionable because few universities provide this training. However, the trend appears positive (for example, Andersen et al., 2009, BAMS). NCAR, through effective partnerships with universities could help provide the necessary knowledge base for this important area.

We also acknowledge that the advent of larger, more complex projects will necessitate the continued hiring of higher-level engineers, project scientists and associate scientists in the coming years. The advancement of community facilities will require further increases in staff, in a variety of technical job categories, to support those facilities to the broad atmospheric science community.

Below is a series of more specific recommendations that have been derived from the composite of external and internal scan information referred to above.

1 Post-doctoral program and Visitors

By far, the greatest number of visitors on base funds resides in the post-doctoral program. This represents a significant shift from the late 1990’s where the number of

base-funded-salaried visitors FTEs exceeded 30 (37 in 1997). Currently NCAR has about 30 post-docs per year. This number has been roughly constant over the past 12 years despite a 20% increase in the number of NCAR staff. NCAR-wide, the number of visitors (including postdocs) on base funds has decreased from about 10% of the workforce to about 4%. We would argue that this trend is unfavorable for 2 reasons. First, NCAR is a national center, and as such it should attract visitors that stay for relatively long periods (e.g. at least 2 years) in addition to facilitating short-term visits. Long-term visits are especially beneficial for early-career scientists (postdocs) prior to beginning their careers in more permanent jobs because it allows these scientists to collaborate, explore new research areas, and publish papers. Second, the turnover rate at NCAR is extremely low (1-2% per year). Increasing the number of visitors is a natural mechanism to increase the turnover rate. A potential problem related to low turnover rates is an aging workforce. This issue becomes more acute in bad budget times that tend to limit hiring of early career employees.

We note that ASP selects roughly 10% of applicants or less. We often turn away highly qualified people. NCAR could probably choose the top 15% each year and not dilute the talent pool. This way we could make offers to nearly all the top candidates. Post-docs benefit from greater collaboration potential, development of incipient colleague relationships, etc. Since so many staff members are hired through post-docs (for example, about 1/3 of scientists I, II and III), NCAR would benefit by increasing the number of post-docs and thus providing the organization with a broader pool of people who have already undergone extensive screening and with whom we are familiar. Increasing the number of postdocs would also counter the trend of an aging workforce and increase the turnover rate.

Recommendation: Expand the total number of postdocs to 40 at any one time by augmenting the ASP program.
Level of importance: high
Degree of difficulty : low (apart from tradeoffs that have to be made to find the money)
Cost of implementation: At about $120K per post doc per year, this amounts to a nearly $1.2M budget increase to support an additional 10 post docs fully on base.

There is apparent confusion about the freedom of non-ASP postdoctoral positions. Technically there are no constraints on what postdoctoral fellows do, but they are often hired for specific projects. Perhaps the use of Postgraduate scientists could be more publicized and utilized to support soft-money programs. To the extent that external funding can augment large, base-funded programs, postgraduate scientists would offer a less expensive option for contributing to specific program option than increasing the number of ASP postdocs. Further, being a fully term appointment, there would be turnover consistent with changes in projects. However, there some confusion about distinction between Postgraduate scientist and an entry level Project Scientist on a term appointment. This should be clarified.

Recommendation: Encourage the hire of post-graduate scientists instead of post docs when the goal is work on a specific project. Hire post-doctoral fellows when the intended work is on a particular topic without explicit ties to a particular project. Postgraduate scientists would effectively augment the number of postdocs in a more affordable way (from a base-funding perspective).

Level of importance: medium-high
Degree of difficulty: low
Cost: essentially zero to base

Finally, we note that an alternative approach would be to increase the number of long-term visitors on base funds, where these visitors could be junior- or senior-level people. In particular areas where there is an acute need for expertise, this is a possible strategy. However, in many cases, hiring a project scientist may be the best way to meet such a need. Another motivation for enhancing long-term visitor support would be to attract internationally renowned scientists who could catalyze an area of research through their visit. This is an important consideration for use of base funds.

2 Evaluation of employees in job categories with diverse functions

Focus group meetings and surveys indicated that the evaluation and compensation process may not function adequately for job categories whose function is diverse. Examples of how job diversity affects different job classes appear below:

- Project scientists may be doing mainly management or mainly research, yet PS are evaluated with the same form used for scientists. There is a tendency to project the same criteria for performance onto both categories, which typically means publications carry more weight than management. Yet for many project scientists, publications are difficult to produce because of project demands (62% of PSs responding to the survey indicated they did not have adequate time to publish). Some enhancement of publication opportunity is discussed in item 3 (below).

- Administrators have seen their job functions shift to the point where new matrices have been developed (not yet released). The changes in job duties have occurred in response to the increased number of staff without increase in administrative staff, plus new technologies (requiring computer and web skills).

- Associate scientists have increasingly taken on responsibility for obtaining external funding and also project leadership roles in addition to traditional science support.

- Engineers, particularly software engineers, have seen a growth in programming languages, distributed computing, and management responsibility.

Some of the above changes are expected in a technical field. Others, particularly securing external funding and increasing management roles, present challenges for fairly evaluating and compensating employees.

Recommendation:

More clearly define how highly diverse job functions should be evaluated within a given job category, especially for project scientists. The relative importance should be indicated by the PDQ of each employee, but it is not clear whether the PDQs are

consulted during the evaluation of project scientists. It is also possible that over time, the PDQ has become a less accurate description of how the employee allocates time. It is also possible that this issue affects other job classes, but project scientists seem to have a particularly large diversity of job tasks.

Priority: medium-high
Difficulty: medium
Cost: some additional effort for HR and supervisors; hard to estimate cost.

3 Promotion and reclassification

At present, there is considerable confusion about expectations for advancement to higher levels in job-based positions (references to duration at a given level as criteria for advancement are not relevant in a strict sense). The very notion of a job based position seems at odds with the concept of a career path. Most employees feel they should have a career path but it is not clear that they do. Furthermore the process of promotion or reclassification appears highly variable across units. There is a need for improved communication of the reclassification process (for job-based positions) at the time of hire and during performance evaluations. This includes clarification of who and what factors initiate the process.

Furthermore, focus group meetings have suggested that some employees who wish to advance feel frustrated that the duties of the current job make it very hard to advance. Specific examples are: (a) project scientists are required to develop a substantial body of refereed publications to advance to level III, but publications are not required for levels I and II. In many cases, based on the focus group discussion and survey results, project scientists would like to produce publications but their current tasks allow essentially no time for this; (b) Many large models are coded in Fortran, but software engineers often have no training in this language and there is essentially no market for Fortran experience in the general job market relevant to software engineers; (c) administrators have noted the gradual increase of job requirements that makes it more challenging to demonstrate they are functioning at a higher level.

The idea of a career track is not uniformly realizable for members of a given job category because access to higher level positions is tied to specific job duties at least as much as performance of those duties. In the engineer survey, about 20% of respondents felt this way. Many PS respondents indicate that even 15% of their time would be valuable for pursuing publications. Typically these publications would result directly from the work that is being done on projects, and it would help NCAR to have externally-funded work published.

Recommendations:

a. Address to the extent possible inconsistencies between career advancement and duties of a current job while recognizing that not everyone wishes to advance or has the skills to do so.

For those who express a desire to advance to a higher job category, supervisors or project managers should be encouraged to create flexibility that allows the employee to demonstrate skills commensurate with the higher level. Subcommittee V recommended that a fraction of each FTE be set aside for professional development. With a similar intent, we recommend that a pool of funds be created that can be used for this purpose. It would be a competed pool of money whose amount and administration are to be determined. It would be used to cover time for writing a paper, classes, or sabbaticals for those on external funds. A suggestion is roughly $100K per lab per year (in the post-ESSL reorganizational structure). By making this a competitive process, one could select the opportunities most likely to be helpful to NCAR as well as an individual.

In the case of software engineers and the Fortran issue, the career path should be considered at the time of hire or as part of decisions about which projects SEs will be working on and with what tools. For new hires, associate scientists or project scientists, adopting standard software engineering practices, might be a better fit than software engineers to work on large Fortran codes. These individuals are more likely to remain in the atmospheric sciences for their career, where large models written in Fortran will continue to be used for some time. More generally, associate scientists and project scientists would benefit from adopting more standard software engineering practices.

b. Job matrices may need updating in cases where there is a sudden appearance of entirely new skills at a higher level. For example, the PS matrix does not emphasize publications until level III. By adding something about publications at level II it could make it easier to satisfy the higher-level requirement, provided (a) is also enacted). Also the new job matrix for the Admin. group should be implemented as soon as possible.

c. Improve communication of the process for job-based reclassification at hiring (generally speaking) and at performance evaluation time (on a personal basis).

d. Better define the equivalence of a Ph. D. Associate scientists who have a desire to move to PS but do not have a Ph. D. are unclear about what constitutes Ph. D. equivalence. The Dickson (2002) study of the AS and PS categories recommended better defining the equivalence of the Ph.D. and there is still a need to do this.

Priority:
a. high
b. medium
c. high
d. medium

Leve of Difficulty:
a. medium
b. low
c. low
d. low-medium

Cost:
a. $500K - $1M per year
b. $50K in HR personnel cost

c. nearly zero
d. probably a small cost, hard to quantify

4 Base funding versus external funding

a. Funding source affects job function, career advancement and also university interaction. External funding may be described as a great “unequalizer”. Base funded people usually enjoy more freedom to pursue research, publish papers, attend meetings, serve on university committees, go on sabbaticals, etc. Recommendation 3a may help alleviate some of the career advancement concerns faced by those funded externally.

b. Nearly all scientists desire assistance in research from “support staff”. Few of the externally scanned institutes provide such support as a matter of course. The notion of a support person linked to a particular scientist is vanishing and being replaced by more project-linked, distributed support. Much of this support is externally funded. However, an increased emphasis on large projects in the future will likely require additional science and technical support, or a more efficient arrangement of the support that exists. Furthermore, the support for publications and travel is highly variable across units.

Recommendation: Better define the expectations and process for obtaining research assistance from science or engineering support staff and expectations for publication and travel support. Consider models such as a “pool” of technical expertise to which scientists or project scientists can apply. These would be partly base-funded, perhaps from a redistribution of existing resources for base-funded support (e.g. close to budget neutral). For travel and publication support, consider an institute pool of resources that can be competed if unit funds are insufficient.

c. Currently there is no substantive constraint on the type of external funding that is sought. There is a perceived danger that NCAR is becoming more of a “job shop” as pressure to acquire additional funds rises.

Recommendation: More effort should be made to link external funding with strategic priorities. This could reduce some of the unevenness associated with external funding across the institute by (i) making less distinction between funding sources; (ii) making shared science support for research feasible (shared between base and external); (iii) making more efficient use of overall talent to accomplish broad research objectives; (iv) reducing complaints of direct competition with universities by focusing on larger projects. The NCAR strategic objectives emphasize large projects.

Importance:
b. high
c. high

Difficulty:
b. medium
c. high

Cost:
b. definition costs little: pool of support people would have cost associated its oversight
c. unknown; leveraging external and base funds would be cost saving; but saying ‘no’ to external funds has a definite cost in terms of staffing (non-base).

5 Relationships with universities and other agencies

a. Sabbaticals are seldom taken by NCAR employees. They should be encouraged, but it is not clear that a drastic increase is needed or even wanted by the university community. Furthermore, sabbaticals at non-university institutes are even less common, but could be more beneficial to NCAR in the long run, establishing working relationships on large collaborative projects. The external scan data suggested that few sabbaticals are taken by staff at non-university facilities. There is also the difficulty of taking a sabbatical when funded by soft money or managing ongoing projects with high demands. We recommend that sabbaticals continue to be encouraged, but not emphasized more than they have been in the recent past.

b. It is recommended that “safety nets” (extended-time contingencies for returning to NCAR for people accepting jobs elsewhere) be drastically reduced or eliminated. People seldom do return and the situation creates budget pressure and lack of flexibility for new hires.

Importance:
a. low-medium
b. high

Difficulty:
a. low
b. low

Cost:
a. no additional cost
b. some cost saving if any salary is going to people working elsewhere. Otherwise, benefit is in budget flexibility.

6 Job Categories

More than 100 jobs jobs have single or no current incumbents. A concern is that it may be difficult to properly evaluate those in single incumbent positions. In some cases there may be enough overlap of these positions with other job classes to consider combining. For instance, many single incumbants are in the management class. Perhaps some of these could be considered project managers.

Recommendation: Reduce the number of single-incumbent positions by evaluating which positions are either obsolete or can be combined into larger job categories.

Priority: low-medium
Difficulty: low
Cost: low

Appendices (references, charts, graphs)

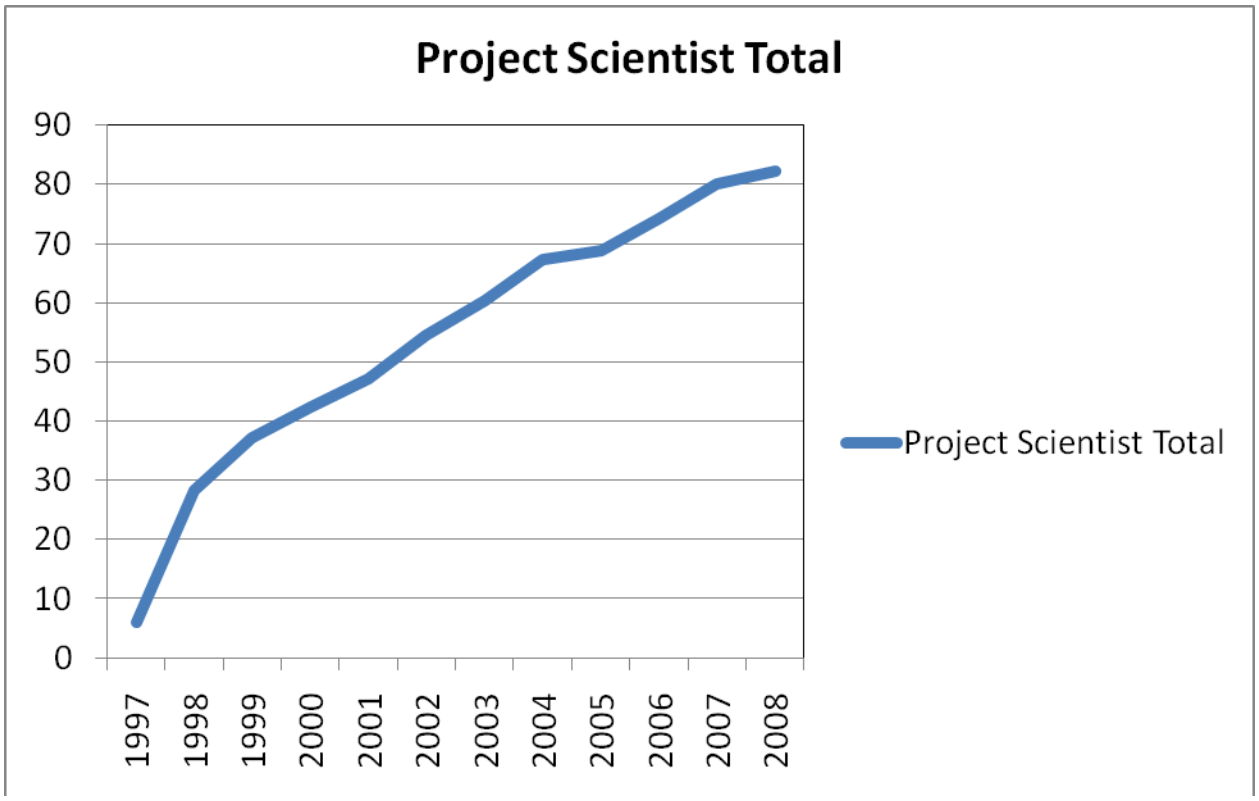

Figure 1. Project Scientists versus time (the PS job class began in 1997).