The CNRS Strategic Plan for 2019 – 2024

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Executive Summary

Formed in February 2017, a committee of CNRS faculty, staff, students, and administrators set out to develop the first-ever strategic plan for following through on the college's revised Mission, Vision, and Values. The Mission (i.e., *what we are here to do*) of CNRS is now the following:

> *The College of Natural Resources and Sciences provides a high-quality education through student-centered, hands-on learning in inclusive environments; prepares students to be scientifically literate global citizens who incorporate diverse cultural and cross-disciplinary knowledge systems into their work; graduates STEM professionals to meet state and national needs; collaborates with campus and community partners; and carries out transformative research that advances scientific understanding and benefits all members of society.*

Originally envisioned as a one-year project, the strategic planning process continued through 2018 due to the need for comprehensive environmental scans of the many facets of CNRS, the recent change in budget and enrollment, and the appointment of Interim Deans. The environmental scans include student and faculty perceptions, budgets, teaching power, teaching practices, curricular structures, bottleneck courses, graduate programs, and scholarship. Each scan generated its own recommendations, which became the foundational material for the Goals, Objectives and Implementation Plan within the overall Strategic Plan.

The environmental scans show the CNRS to be a national leader among science colleges focused on natural resources, conservation, ecology, and evolution. The diverse and unique programs and resources in the CNRS are well matched to HSU's geographic setting. The CNRS enjoys one of the highest rankings in the country for subject areas (e.g., natural resources & conservation), as well as high per capita rates for undergraduates who continue on for post-graduate degrees (e.g., within the CSU, HSU's CNRS ranks #1 for students who continue on to earn a PhD). Other achievements include a high level of extramural funding that supports hundreds of students in meaningful employment, 6-year graduation rates that meet or exceed the overall HSU 6-year graduation rate, and faculty and staff who design and implement demonstrably effective curricular and pedagogical changes. The reputation resulting from these successes is partly responsible for CNRS accounting for 81.7% of HSU's growth in FTES from 2006 to 2016, and for having a slightly higher yield rate for applicants to HSU.

The environmental scans also show that CNRS faces significant challenges. There has been a steady erosion of teaching power and staff support while, at the same time, 4-year graduation rates for all CNRS students have become too low (i.e., 11%). Moreover, the gap between 4- and 6-year graduation rates of underrepresented and traditional groups is unacceptable. The CNRS Place-Based Learning Communities, supported primarily by extramural funds, are improving retention rates as well as closing equity gaps for first-year students. However, additional progress on closing equity gaps will require targeted professional development for CNRS instructors (i.e., tenure-track faculty, lecturers, teaching associates) so that all students in the CNRS experience culturally responsive curricula and pedagogies in the classroom, laboratory, and field. Additional limitations for the CNRS include a lack of office space and quality research space for faculty and students, as well as shrinking enrollments and slow graduation rates of the CNRS graduate students. All of these issues need to be addressed for the vitality and functioning of our professional community.

Taking actions to support what the CNRS does well, or to address what the college needs to do better, will require two changes to the HSU financial process. First, HSU needs to use a financial model that is linked to the instructional costs required by STEM programs. Second, College Deans must have a stronger voice in the campus-wide financial process. Only a Dean has the depth and breadth of understanding of a college's programs necessary to discuss the implications of shifting budgets to college priorities. Thus, including the Deans prominently in the campus financial process would promote transparent and inclusive budgetary decision-making across the campus.

The process of researching and discussing the strengths and challenges of CNRS led the SPC to identify six Goals, each with a series of Objectives. Those Goals are to:

1. Raise the quality of education for undergraduate and graduate students by addressing issues from pedagogy, to hiring, to support,
2. Promote attitudes and activities that support inclusivity and equity,
3. Exemplify, promote, and teach environmental sustainability in recognition that healthy social and economic systems depend on the resilience of ecological systems,
4. Be a regionally and nationally recognized research center for student-engaged research,
5. Ensure that student, staff, faculty and administrative employees have satisfaction in their work in CNRS,
6. Obtain and distribute funding to achieve strategic plan objectives.

Achieving the Goals and Objectives does not happen without an Implementation Plan, which is the part of an SP that contains details and a timeline on how a phased and prioritized set of actions are taken. For the CNRS, Phase I of implementation covers the remaining time of the interim Dean's appointment and includes some key starting points for the work ahead. Phase II will be the responsibility of a Strategic Plan Implementation Committee as defined under the new permanent Dean, who will begin on July 1, 2019. The following actions are planned for Phase I:

December 2018

- Work with OIE, HSI STEM, & HHMI to build a set of prototype data dashboards (e.g., Diversity, Equity, and Inclusion, and Strategic Resource Budgeting) that will support college-level strategic planning. [Goals 1.2, 1.3, 2, 3.2, 3.3, 4, 6]

January 2019

- Set up a CNRS Strategic plan website, which will also serve as a vehicle to mark progress on the implementation of the plan. [Goals 5, 6]
- Professional Development Theme for the CNRS Spring Welcome (January 16, 10:30 - Noon, FH 118) on inclusive and culturally-relevant pedagogy, particularly for gateway courses with large opportunity gaps. [Goals 1, 2]

February 2019

- Form a CNRS diversity committee to lay the foundation for Department-specific diversity plans for removing opportunity gaps, to occur through Fall, 2019. [Goal 2]
- Share a budget page that explains the CNRS financial process and tracks college-wide progress and concerns. [Goal 6]

March 2019

- HHMI and HSI STEM use the CECE survey of faculty (https://www.indiana.edu/~cece/wordpress/faculty-survey/) (and again in Spring '22) to gauge: faculty receptivity to/knowledge of cultural sensitivity/awareness. [Goal 5]

April 2019

- Gather assessment data from departments about student learning for their majors, and summarize in a college-wide status report. [Goal 1.4]

May 2019

- Hold a forum on sustainability for faculty, students, and staff (a continuation of the May 2018 sustainability forum) to identify ways to strengthen our sustainability curriculum. [Goal 3]

Summer 2019 – September 2019

- Design and implement an alumni and employer surveys. [Goal 5]

Introduction

Purposes of the CNRS Strategic Plan (SP)

1. The first purpose of the CNRS Strategic Plan is to provide a comprehensive plan that advances the mission, vision, and values (MVV) of CNRS. It will inform thinking and guide actions on CNRS priorities, structure, and processes and its relationship with the rest of the university, the community, and external stakeholders. The phases of the strategic planning process are the following: develop environmental scans relevant to the MVV where each scan includes a set of recommendations derived from available data (I), use the recommendations to develop Goals and Objectives (II), develop a phased Implementation Plan, components of which advance specific Goals and Objectives (III).
2. The second purpose is to provide a detailed background of the CNRS conditions and processes that would help new administrators, staff and faculty to more rapidly understand the CNRS accomplishments and challenges. This purpose is particularly important given the high rate of turnover of HSU administrators. This detailed background is located in the section "The CNRS-HSU Student" and each of the environmental scans, which occur as appendices.

The CNRS Strategic Planning Committee (SPC)

At the CNRS Chairs retreat in August 2016, Dean Boone identified the need for a strategic plan for the college and how it could define priorities and determine the allocation of resources. The group discussed the features of successful and failed strategic plans and laid out a process for a strategic planning process. Chairs also individually articulated the Strengths, Weaknesses, Opportunities, and Threats plus the urgent Needs for their departments. The group decided to form an ad hoc committee that would plan the CNRS strategic planning process.

Following the Chairs retreat, the Dean formed an ad hoc committee, comprising two faculty and three staff plus the Associate Dean and himself, that evaluated strategic planning guides, examined strategic plans from several academic institutions, and formulated recommendations for the CNRS strategic planning process. The ad hoc committee recommended the development of new CNRS Mission, Vision and Values statements; a plan that should apply to the next 3-5-years; a committee size of roughly 12 people, including faculty, staff, and student representatives; completion of the plan by December 2017; engagement of an external consultant; and a public vetting process that would include public presentations and feedback from key stakeholders (e.g., recent alumni and employers of graduates). The ad hoc committee met twice and made its recommendations to the CNRS Council of Chairs in early Fall 2016.

The Council of Chairs adopted most of the ad hoc committee's recommendations with slight modifications. It decided to include both tenure-track faculty and lecturers, determined by election; not to engage an external consultant, and; to consider making the committee a standing committee after completion of the plan. The initial term of service for committee membership was set at two semesters. Faculty and staff members were chosen by a CNRS-wide election in November 2016; faculty selected faculty representative, staff chose the staff representatives. In addition, the Dean selected an undergraduate student representative in cooperation with Associated Students and a graduate student representative nominated by the CNRS Chairs. The final committee membership after the elections was 5 tenure-track faculty, 2 lecturers, 4 staff members, 2 students (one undergraduate, one graduate), and the Associate Dean and Dean. When the strategic planning process became longer than anticipated, committee members that stepped off were replaced with the intention of maintaining the diversity of perspectives, jobs and departments in the college.

The CNRS SPC held its first meeting in December 2016 and agreed upon committee leadership, meeting frequency, and membership responsibilities. The CNRS SPC was led by two co-chairs — one tenure-track faculty member and the Dean. The faculty co-chair was elected by the committee, with a term of service for the faculty co-chair position (independent of term of service on the committee) being 1-2 semesters, as determined by committee consensus. Regular attendance and active contributions were expected of members. Originally, if a member could not be present, the intention was to find an alternate representative but this did not work well because, as time passed, it became difficult for alternates to build on the work from previous meetings.

For the structure of this SP, the committee followed the format of the HSU Strategic Plan as much as possible, and the advice of Hinton (2012). The CNRS SPC chose to define "Goals" and "Objectives" in the same way that the HSU SP did, which was the opposite of how these two parts of a SP are defined by [1]Hinton (2012). The CNRS SP includes data scans, which are not part of the HSU SP. With respect to the language used to describe groups of people, we have followed the advice of [2]Reynoso (2018) whenever possible, but the reader should know that some figures in this SP, which come from other sources, predate Reynoso (2018).

Meeting Format

Weekly CNRS SPC meetings occurred during Spring 2017 semester; Dr. Allison O'Dowd was the co-chair. Dr. Frank Shaughnessy became the co-chair during the Fall 2017 semester, but meetings were suspended for the semester when it became clear that there was no time when everyone could meet. However, Dean Boone and Dr. Shaughnessy agreed to use the Fall 2017 semester to produce an SPC report outline, to complete scans as necessary, and to summarize the findings of each scan so that they could be presented for editing and discussion to the full SPC at the beginning of the Spring 2018 semester. The completion date for CNRS SPC work was extended to the end of the Fall 2018 semester.

Outreach

SWOT + N. These surveys, described above, were opportunities for CNRS faculty and students to express their views of CNRS. Data from these surveys became one of the scans in this SP.

CNRS SP website. The front page of the CNRS website (http://www2.humboldt.edu/cnrs/) contains a link to the SPC charge as well as meeting minutes. The front page also has a link to receive feedback from faculty and students on the MVV or any other issue they choose to comment upon.

CNRS SP Forums. The CNRS SPC held a public forum on April 28, 2017 to present highlights of the environmental scans and the draft Mission, Vision, and Values statements. Attendees afterward submitted comments via a survey form and independently by email. The written comments were uploaded to the CNRS SP website and have been used to inform the SP and improve the planning process. The last public forum, to which all CNRS students, instructors, and staff were invited, occurred

[1] Hinton, K. E. (2012). *A practical guide to strategic planning in higher education*. Ann Arbor, MI: Society for College and University Planning.

[2] Reynoso, E. (2018). Changing Language for Equity. Office of Diversity, Quity and Inclusion. HSU.

during December 2018. The feedback during this meeting was recorded in a set of notes that have been placed in the CNRS SP team drive.

CNRS Faculty & Staff Semester Meetings. At every college meeting held at each semester start since the inception of the committee the SPC, chairs have updated the college on the plan and encouraged input. At the college meeting held at the beginning of the Spring and Fall 2017 semesters, Dean Boone and the SPC co-chairs updated faculty and staff on the plan. Interim Dean Oliver and the SPC Chair updated CNRS faculty again at the beginning of the Fall 2018 semester and Dean Oliver updated the CNRS Department Chairs during the Fall 2018 semester.

Acknowledgments

The CNRS Strategic Planning Committee thanks all of the CNRS students, staff and instructors who provided feedback via email, the SP website and public forums. We also appreciate the comments and text from faculty who were asked to review specific sections of this document – Dr. Jules for the Graduate Program scan, Dr. O'Gara for the issues surrounding the hiring of Lecturers, Dr. Martin for clarifying data about seat usage as related to course capacities. We are especially appreciative of the many people in HSU OIE who dug data for us, and of Dr. Castellino for helping us with the survey data in her presentations about Student Engagement.

Mission, Vision & Values

Mission (What we are here to do)

The College of Natural Resources and Sciences provides high quality education through student-centered, hands-on learning in inclusive learning environments; collaborates with campus and community partners; serves the region and the State of California; prepares students to be scientifically literate global citizens who incorporate diverse cultural and cross-disciplinary knowledge systems into their work; and carries out transformative research that advances scientific understanding and benefits all members of society.

Vision (What we aspire to accomplish by Fall 2024)

The Vision of the College of Natural Resources and Science is to

- Provide a high-quality education through student-centered, hands-on learning in inclusive environments,
- Prepare students to be scientifically literate global citizens who incorporate diverse cultural and cross-disciplinary knowledge systems into their work,
- Graduate STEM professionals to meet state and national needs,
- Collaborate with campus and community partners,
- Carry out transformative research that advances scientific understanding and benefits all members of society.

Values (Our guiding principles and ideals)

In the College of Natural Resources and Sciences, we value:

- Self-directed lifelong learning with transferrable professional skills
- Excellence in hands-on field and laboratory learning, student-centered learning, and other evidence-based pedagogies
- Our responsibility as a Hispanic Serving Institution and to support students historically underrepresented in the sciences
- Investment in the physical, emotional, and mental health of students, staff, and faculty
- Native American cultures and indigenous knowledge
- Environmental stewardship and social justice
- The North Coast of California as a natural laboratory for teaching and research
- High quality academic and career advising tailored to students' individual needs.
- The teacher-scholar model for faculty
- Undergraduate and graduate student research, discovery, and innovation.
- Interdisciplinarity in education and research
- Professional development of faculty and staff

The CNRS-HSU Student

The College of Natural Resources & Sciences has a long tradition of excellence, many of its programs enjoy strong national and regional reputations, and the students it attracts are vital to the success of the entire university. However, the college also faces challenges and has identified areas that urgently need improvement. The changing demographics and needs of California and our students demand that the college adapts to maintain its excellence. This section briefly highlights the unique nature of the CNRS, accomplishments and standings in the CSU and nationally, current conditions, and areas for improvement.

The Unique Nature of CNRS

CNRS contains ~40% of all the students on the HSU campus, making it proportionally the largest science college on any CSU campus; this is the case without the inclusion of the Department of Psychology in CNRS, a department which is included in the science colleges of some other CSU campuses. The CNRS mix of programs is also unique, including Botany, Wildlife Management, Forestry & Wildland Resources, Environmental Science & Management, Oceanography, Geology, Fisheries Biology, Zoology, and Environmental Engineering. Even programs that might superficially appear similar to other science colleges – such as Biology, Chemistry, Computer Science, Mathematics, and Physics – often have a distinctive cross-section of students. For example, many Biology departments across the county are numerically dominated by students whose primary interest is in biotechnology and/or medical school, with a much smaller number of students being interested in organismal biology, evolution, and conservation. This numerical dominance is reversed in HSU's Department of Biological Sciences. Geographically, CNRS is unique because it is located in a part of the world with a very large diversity of species, habitats, and management challenges many of which are incorporated into hands-on learning opportunities by CNRS instructors.

A high percentage of CNRS graduates continue on for a post-baccalaureate degree and CNRS graduates are well regarded by many of state and federal agencies as well as the private consulting companies that hire them. While CNRS should continue to train students for these job niches, faculty should realize that there is a mismatch between the types of jobs that are projected to grow in California (**Figure 1**) versus the types of programs in CNRS; the only CNRS program that appears on the **Figure 1** list is Computer Science. Nationally, the percent of science students getting a job in their major is low. For example, less than 30% of Biological, Environmental or Agricultural majors are employed as "STEM Workers"; the rest are spread over non-STEM occupations many of which are listed in **Figure 1**.[3] The implication of these national findings for CNRS faculty is that they need to give some thought about how to balance the training of students for a particular science discipline along with providing the skills that transfer to a wide variety of potential jobs.

[3] https://www.census.gov/dataviz/visualizations/stem/stem-html/

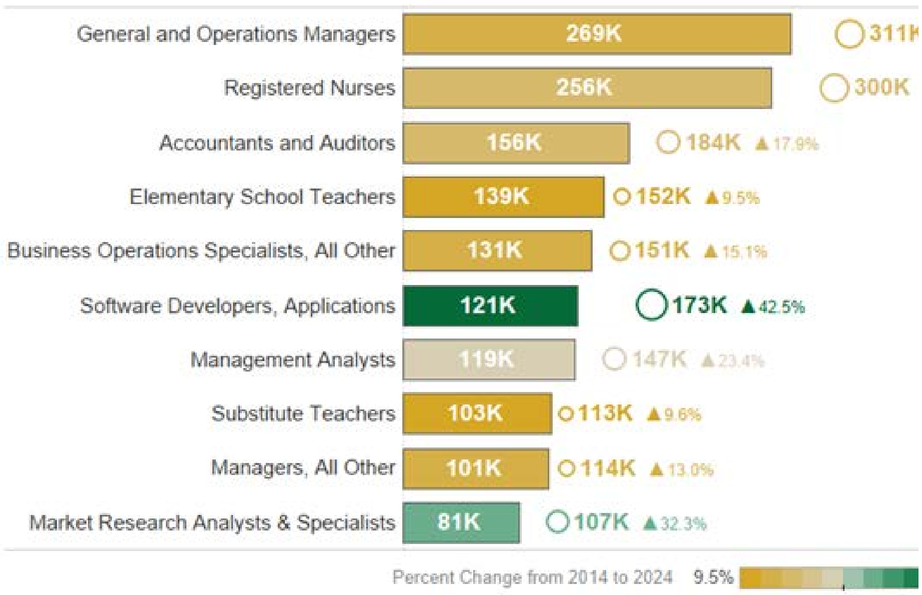

Figure 1. Projected growth of top California occupations requiring a Bachelor's degree or higher (2014 – 2024). From: California Industry Employment Projections Between 2014-2024. Published: August 2016. http://www.labormarketinfo.edd.ca.gov/file/indproj/cal$indnarr-2014-2024.pdf

Accomplishments

Humboldt enjoys a strong national and state-wide reputation, especially in the natural and life sciences. There are several national systems that rank universities based on subject areas, including all campuses regardless of whether they are research-intensive, teaching, public, private, Master's or PhD-granting, or liberal arts colleges. Humboldt is often ranked highly. For example, among the latest rankings (2017 & 2018): College Factual[4] ranks Humboldt #24 in the nation (#3 in California) in Natural Resources & Conservation; Environmental Colleges[5] ranks us #46 in the nation (#8 overall in California, and #1 in Wildlife and #6 in Environmental Engineering); and Business Management Degree[6] ranks us as #7 in top Master's programs in Natural Resources (#1 in CA).

[4] https://www.collegefactual.com/majors/natural-resources-conservation/rankings/top-ranked/
[5] https://environmental-colleges.com/humboldt-state-university
[6] https://www.business-management-degree.net/20-best-masters-programs-natural-sciences-management/

Why does Humboldt rank so highly in STEM disciplines nationally and in the state? There are of course many reasons, but several lines of evidence suggest the college's commitment to integrating teaching and research offers undergraduate and graduate students excellent opportunities to learn and propel their careers in STEM. First, the National Science Foundation tracks the Baccalaureate origin of all PhDs awarded in the US, and among 660 Master's granting institutions, Humboldt ranks #8 in the nation, and #1 among all CSUs in the percentage of undergraduates who went go on to earn a PhD – a remarkable achievement (**Table 1**). Second, teaching in the college emphasizes hands-on and experiential learning, and an increasing number of faculty are employing active learning pedagogical techniques and are engaged in training to better foster inclusive excellence in the classroom (**Appendix E – Scan: Teaching Practices & Learning Opportunities).** Third, faculty from CNRS submit and are awarded the most grants by far on campus, and HSU receives more grants (both by number and dollar value) than other similarly sized CSU campuses (**Appendix I – Scan: Scholarship**). Fourth, hundreds of students are employed by these grants, earning both money and vital experience, and the vast majority of undergraduate students in CNRS are engaged in at least one curricular-based research project during their time at HSU (**Appendix I – Scan: Scholarship**).

Table 1. Baccalaureate origins of STEM PhDs (2006-2015) among Master's granting institutions (n=660). PhDs per 100 undergraduates, CSU and National Rankings.

Institution	PhDs per 100 UG	Rank CSU	Rank National
Humboldt State Univ.	3.02	1	8
Cal Polytech. State Univ. –San Luis Obispo	2.54	2	11
Cal Polytech. State Univ. – Pomona	0.97	3	19
San Francisco State Univ.	0.93	4	21
San Jose State Univ.	0.82	5	22
California State Univ. – Long Beach	0.80	6	23
California State Univ. – Northridge	0.68	7	24
California State Univ. – Fullerton	0.67	8	25

Source: National Science Foundation, National Center for Science and Engineering Statistics, 2015 Survey of Earned Doctorates, special tabulation (April 2017).

These accomplishments are reflected in student performance metrics. While HSU overall suffers from a low overall graduation rate – 44.3%, ranked 19th out of 23 CSU campuses[7] – retention and graduation rates for STEM students are comparatively better. The 6-year graduation rate for first-time undergraduates who enter HSU as STEM majors and graduate in any discipline (called "STEM institution rate") is 48.4%, ranking HSU 15th in the CSU. The graduation rate of incoming STEM students in a STEM degree (called "STEM discipline rate") is 32.6%, ranking HSU 8th in the CSU (**Table 2**; note this list includes two polytechnic universities and one research university). At most campuses, the STEM graduation rate is *lower* than the rate for non-STEM students; the opposite is true at HSU. In fact, we are the only CSU campus for whom the 6-yr institutional graduation rate of incoming STEM students is higher than the overall 6-yr graduation rate. However, while HSU STEM students fare comparatively well on campus, graduation rates remain unacceptably low in absolute terms, with the 4-year rate especially low (5 year average of 14% for CNRS). Moreover, opportunity gaps between underrepresented students, low-income students, and their counterparts are larger in CNRS than the other colleges. *These gaps reveal that the college is inadequately serving all its students, which demands immediate attention and urgent improvement to advance equity-minded practices.*

Table 2. Six-year graduate rates of first-time freshmen (2007-2011 cohorts) overall, and for student who entered at STEM majors and graduate at the institution (regardless of final major, STEM institution) or specifically with a STEM degree (STEM discipline); only the top 10 CSUs in STEM discipline are shown. Rank among the 23 CSU campuses is provided for Humboldt.

Institution	**STEM Discipline**	**STEM Institution**	**Overall**
Cal Polytech. State Univ. –San Luis Obispo	62.9	70.7	75.8
California Maritime Academy	51.9	52.9	59.4
Cal Polytech. State Univ. – Pomona	45.3	59.5	61.2
San Diego State Univ.	41.2	64.1	69.6
California State Univ. – Channel Islands	36.8	57.4	57.9
Chico State Univ.	34.0	57.9	62.6
California State University – Long Beach	33.9	62.0	66.0
Humboldt State Univ.	**32.6 (8)**	**48.4 (15)**	**44.3 (19)**
Sonoma State Univ.	32.1	53.8	57.6
San Jose State Univ.	31.0	50.5	55.1

Source: CSU Analytics (April 2018)

The attraction of students to majors in CNRS has been vital for the viability of HSU admissions and enrollment. From 2006 to 2016, CNRS experienced a 46.1% increase in FTES. Over that time period, the FTES for the entire university rose from 6794 to 7925 (16.5% increase), and 81.7% of that growth

[7] These are 5-year averages (cohorts starting 2007-2011); all data from the CSU system-wide analytics data http://asd.calstate.edu/csrde/index.shtml

was in the CNRS alone[8]. The overall yield rate in the CNRS (% of students accepted that actually enroll) is 19.7%, which is slightly higher than for the other colleges (16.3% and 15.8% for CAHSS and CPS, and yield is remarkably high for some of the CNRS's most unique programs such as Fisheries [41%], Wildlife [36%], Forestry & Wildland Resources [34%], Environmental Science [26%], and Oceanography [26%][9]). Many college students change their majors before degree completion, and overall CNRS is a net source of students for the other colleges: from 2013-2017, on average, about 116 students per year changed from a major in the CNRS to a major in another college (100 to CAHSS and 16 to CPS), whereas 28 students changed from the CAHSS (21) or the CPS (7) to the CNRS.

Faculty in the CNRS, followed by support from HSU, launched the first Place-Based Learning Communities (PBLC) in Fall '15 in order to improve the quality of the first-year experience for HSU students (**Appendix F – Scan: Curricular Structures & Learning Opportunities**). We use the term 'learning community' in its strictest sense – a curricular approach that intentionally links a cluster of courses around an interdisciplinary theme and enrolls a common cohort of students[10]. In particular, the CNRS's PBLCs integrate five proven high impact practices with an interdisciplinary place-based theme: a summer immersion experience, block enrollment, a first-year seminar, peer mentoring, and an optional living-learning opportunity in housing. The foundational philosophy is that the PBLC can build community among students, faculty, and staff to better foster a sense of belonging, cultivate academic behaviors, and lead to higher academic achievement, learning, retention, and degree completion. We are encouraged after analyzing our first PBLC data from the first three cohorts of the *Klamath Connection* (AY 2015-2016, AY 2016-2017, AY 2017-2018). Comparing 250 students in the Klamath Connection to 450 students not in the program but matched by six variables[11], the PBLC increased 1st-year retention by 11% (from 70% to 81%). This effect was inclusive of underrepresented students; for example, Hispanic students in Klamath Connection had a retention rate 11 percentage points higher than those not in the program (80% vs. 69%). Moreover, the opportunity gap in 1st-year retention between Hispanic students and their non-Hispanic counterparts in the Klamath Connection was reduced to just 1.2%. These benefits also extended to underrepresented students more generally (though this is driven mainly by large numbers of Hispanic students) though, so far, the evidence suggests the while the PBLC improved retention for low-income students (by 4%), it was less effective at reducing opportunity gaps for low-income students.

Current Conditions

Continuing the excellence of CNRS, along with improving graduation rates and removing opportunity gaps, will require a heightened instructor awareness, willingness, capacity, and knowledge to modify curricula and pedagogical practices to better reach all our students. The CNRS's student body has changed, and the college must adapt accordingly. High educational standards should not change. Rather, the college must successfully revise its curricula and methods of instruction to meet student needs. CNRS faculty have already carried out instructional changes with positive results (**Appendix F –**

[8] Data from HSU Tableau Annual Program Report accessed 12 April 2018

[9] Enrollment Management Key Metrics: http://www2.humboldt.edu/irp/Dashboards/Enroll.Manage/EMWG-KeyMetrics.html

[10] Smith, B. L., MacGregor, J., Matthews, R., & Gabelnick, F. (2009), Sommo, C., Mayer, A. K., Rudd, T., & Cullinan, D. (2012).

[11] Analysis involved "propensity matching" on the following 6 variables: STEM major, high school GPA, math preparedness, gender, ethnicity, and # of AP and other credits.

Scan: <u>Curricular Structures</u> & Learning Opportunities & Learning Opportunities), but this innovation needs to be more pervasive.

The CNRS currently (2017-2018) has about 3,350 students distributed in 15 majors among 12 departments. The largest majors are in the life and environmental sciences, with the majors of three departments -- Biological Sciences, Environmental Sciences and Management, and Wildlife -- together comprising 55% of all CNRS students. About 58% of majors enter the college as Freshmen, 34% enter as transfers, and 8% change their major to the CNRS from another college at HSU. Most students come from Southern California or the Bay Area (49%), with only 11% coming from the local area, 4% coming from out of state, and 1% internationally.

The current demographic of the CNRS students has changed dramatically in the last five to ten years. The percent of all enrolled students who are the first members of their family to attend university (i.e., "first generation") has steadily increased from F2010 (First time UG 46%, Transfer UG 45%) to F2017 (First time UG 57%, Transfer UG 54%).[12] This upward trend is even stronger for incoming students who are *both* first generation and from an underrepresented group (URG) (**Figure 2**). Enrollment of URG students has almost doubled since 2010, and now stands at ~35%. This is driven largely by sharp increases in Hispanic student enrollment (now at 34%), and since 2013 HSU has been a federally recognized Hispanic Serving Institution (HSI). In California, the number of Hispanic high school graduates is predicted to rise until ~2025 whereas the number of Asian/Pacific graduates should fluctuate around their 2014 levels. White, Black, and American Indian / Alaska Natives are predicted to decline over this same time period.[13]

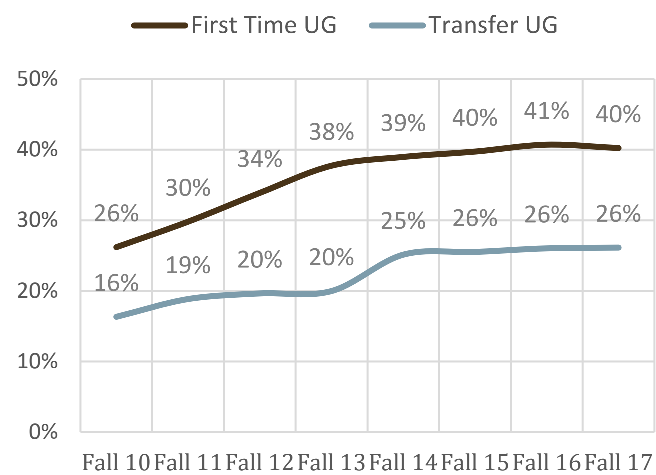

Figure 2. The % of HSU enrolled students who are both first generation and from an URG (Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; "We are Here: A Snapshot of HSU's Current Conditions, Circumstances, and Influences".) Data from OIE SDR.

The student gender ratio in CNRS is about 50:50. Most of these figures are fairly similar to the rest of HSU, although CNRS is more white (6%), more male (6%), and some programs in CNRS have less ethnic diversity (e.g., Forestry & Wildland Resources) and gender balance (e.g., Computer Science, Physics & Astronomy) than others.

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[12] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; "We are Here: A Snapshot of HSU's Current Conditions, Circumstances and Influences".) Data from OIE SDR.

[13] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; "We are Here: A Snapshot of HSU's Current Conditions, Circumstances and Influences".) Data from: Knocking at the College Door- WICHE. https://knocking.wiche.edu/

Challenges & Areas for Improvement

1. Close opportunity gaps: Currently, there are troubling gaps in 4- and 6-year graduation rates between URG and non-URG first-time undergraduates who enter HSU majoring in STEM (**Figure 3**). Many students leave between the first and second year (1st-year retention is only ~71%) with gaps between URG and non-URG students (-3%). To help close these gaps, the college must assess and remain committed to efforts that show success, which could result in the adoption of PBLCs (see above, **Appendix F – Scan: Curricular Structures & Learning Opportunities**), revised developmental math curricula (see point #2 below), and better integration with student support services and faculty training in culturally inclusive pedagogy (see point #4). For transfer students, gaps between URG and traditional students are much smaller (just a few percentage points), but progress toward degrees is slow, with 2-year graduation only 6%, rising to 35% and 59% for 3- and 4-year marks, respectively, highlighting needs for more efficient degree progress (see point #5 below).

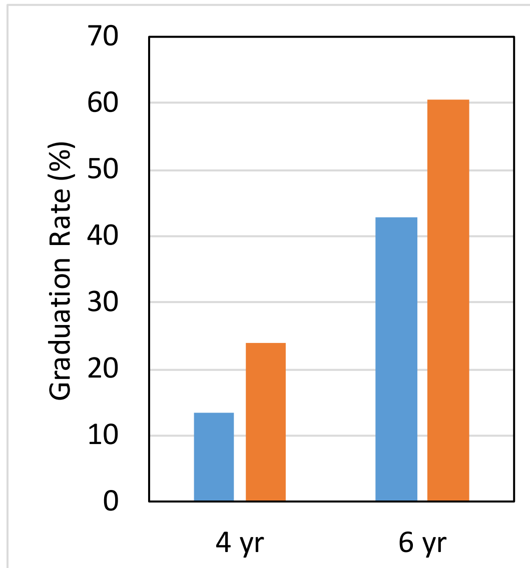


Figure 3. Four and six-year graduation rates of URG and non-URG first-time undergraduates starting in STEM majors (6 yr: 2012 cohort, 4 yr: 2014 cohort).

2. Academic Readiness: Median high school (HS) GPA for each college has been relatively constant from 2000 to 2017; this is the case when HS GPA is disaggregated into non-URG, URG, and students who did not identify as either group (i.e., "unknown"; **Figure 4**). The exception to this generalization is the CNRS URG students whose HS GPAs have been steadily increasing since ~2006 and have recently converged on the non-URG GPAs. With respect to the variability of HS GPA, interquartile ranges for CNRS are becoming narrower with time (**Figure 4**).

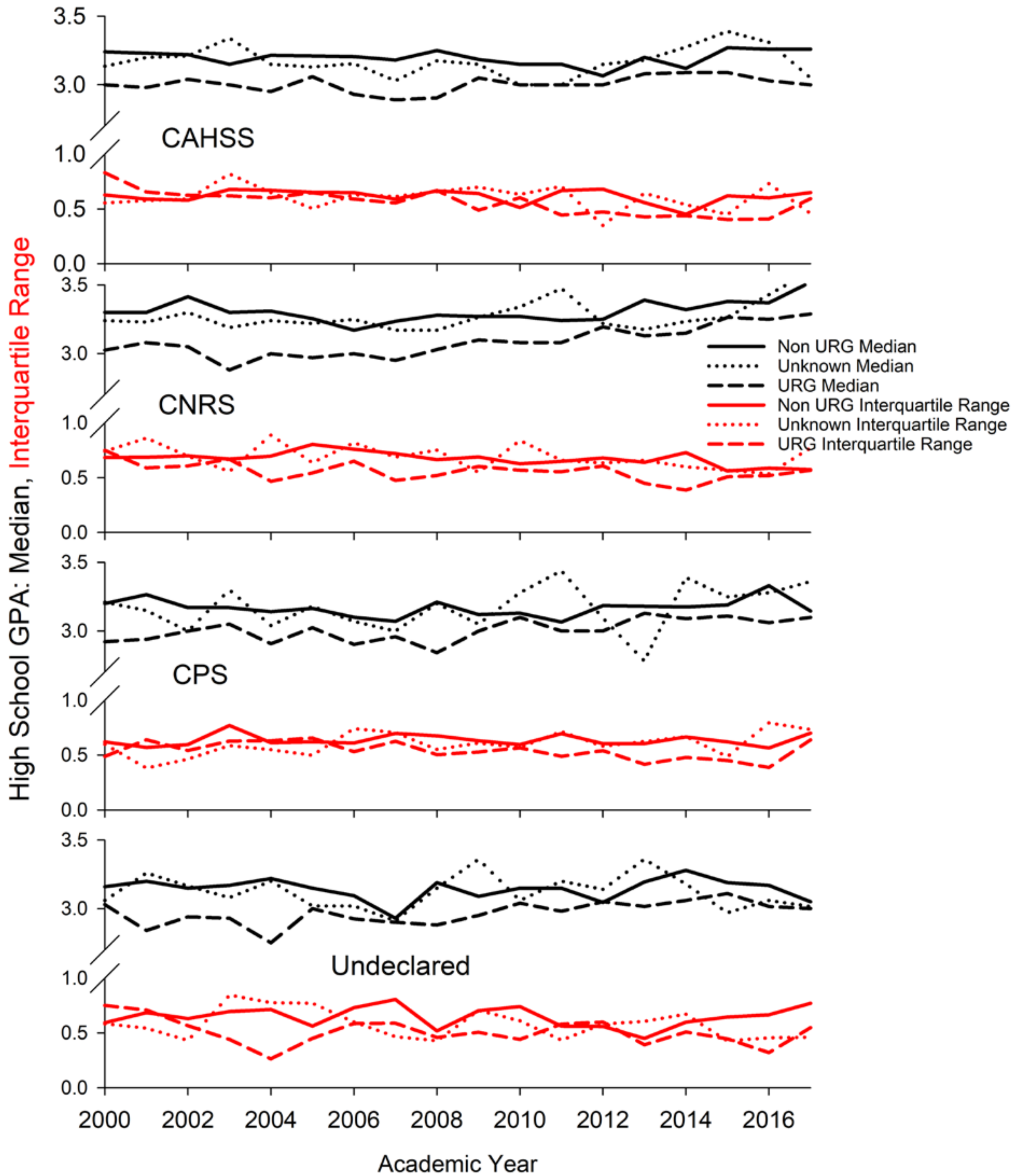


Figure 4. Median high school (HS) GPA and the variability of HS GPA as interquartile range for the three colleges and undeclared students. GPA data have been disaggregated into non URG, URG and students who did not identify as either group (i.e., "unknown"). Data from HSU OIE (May, 2018).

With respect to math, there needs to be a better pathway for first-year students developing math skills. Overall, about 28% of incoming CNRS Freshmen are not college-ready in mathematics. This figure varies some by major (i.e., lower in Engineering), is higher for URG students (40%), and does not show a strong trend over time, although the recently impacted majors (e.g., Biology, Wildlife) have shown corresponding increases in the math preparedness among admitted students. Of the 2,762 incoming STEM transfer students from 2009-2015, 36% still needed to take college algebra or calculus, 33% still needed to take introductory chemistry, and 33% still needed to take HSU's introductory botany course. From F2013 to F2017 52% to 55% of incoming students were college ready and of the remaining balance, 16% to 20% were identified as needing support in *both* math and writing over this period (**Figure 5**). The college has abandoned its traditional "remedial" math courses and is currently launching new "co-curricular" math courses based on proven high impact practices from other campuses. If successful, these courses should better serve students because they will be less marginalizing, and they can shorten prerequisite chains for foundation math and science courses. Preliminary data show promise, and the college is offering co-curricular math courses ("supported") for all incoming GE math courses beginning in Fall 2018, with plans for rigorous assessment and improvement cycles.

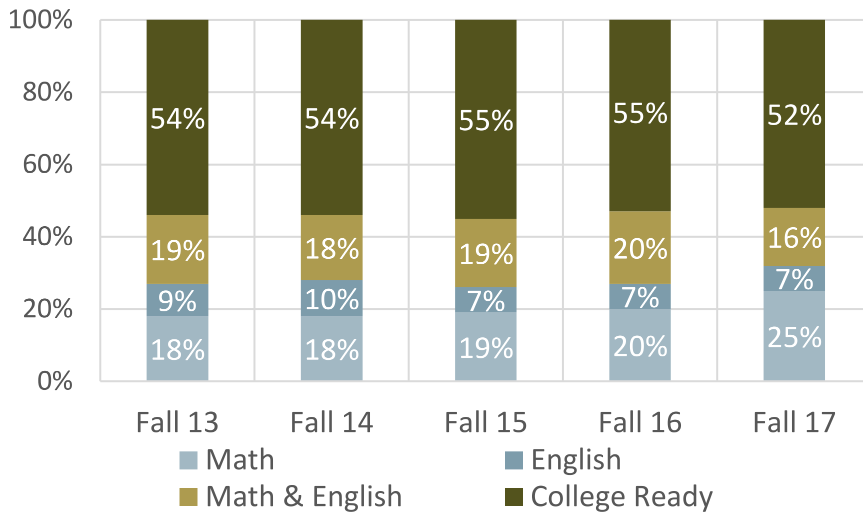


Figure 5. HSU incoming student readiness according to HSU determination (Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; "We are Here: A Snapshot of HSU's Current Conditions, Circumstances, and Influences".) Data from OIE SDR, ERSS Reports.

3. Financial Stress: Pell-eligible enrollment was 46% and 49% in F2010 for, respectively, first time UG and transfer students. By F2017 these numbers increased to 54% and 62%.[14] The percent of enrolled students who are both Pell-eligible and URG also increased over this time period (**Figure 6**). A 2013 survey of off-campus work hours for students from 13 CSU campuses shows that students increased the number of off-campus hours from their freshmen to senior years; (Freshmen: 87% used five or less hours, 6% used 16 or more hours; Seniors: 63% used five or less

[14] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; "We are Here: A Snapshot of HSU's Current Conditions, Circumstances and Influences".) Data from OIE SDR.

hours, 23% used 16 or more hours).[15] Coincidentally, 23% of HSU Seniors in 2017 reported that they devoted "very much" or "quite a bit" of time working for pay off-campus.[16]

There are many consequences from this financial stress. During AY 2017-2018 42% of all CSU students, but 46% of HSU students, experienced low food security. For housing, 11% of CSU students were homeless during this academic year, and 19% of HSU students were "housing insecure" over this time period.[17] In addition to food and housing, this financial stress limits access to mental and physical health services. Having to work more than 10-15 hours a week is particularly limiting for CNRS students because of the number of course fieldtrips and laboratory review times that occur during the evenings and on weekends. The college must actively work with campus-wide efforts to reduce costs (e.g., for textbooks), offer more on-campus jobs, and be mindful of learning opportunities that are inequitably accessed by students that must work many hours to offset financial need (e.g., time to volunteer for research opportunities).

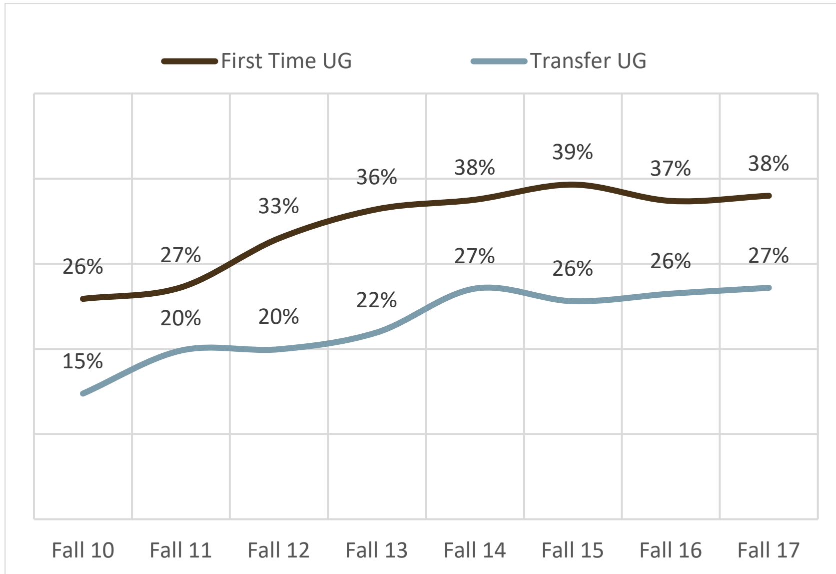


Figure 6. The percent of first-year and transfer students who are both Pell-eligible and URG (Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; "We are Here: A Snapshot of HSU's Current Conditions, Circumstances, and Influences") Data from OIE SDR.

4. Campus community & support services: HSU seniors from 2017 were surveyed on whether or not they felt a "sense of community" on the HSU campus. The results were the following for URG seniors: "not at all" 1%, "very little" 7%, "some" 46%, "very much" 46%. For non-URG seniors the

[15] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 9/22/2017; "Part I: A Primer - National Survey of Student Engagement".) Data from 2013 National Survey of Student Engagement; 13 CSU campuses; 151 first-year students (61% female, 58% first-generation, 59% diverse backgrounds); 298 seniors (61% female, 58% first-generation, 51% diverse backgrounds).
[16] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 11/3/2017; "Part II: The Faculty view - National Survey of Student Engagement".) Data from 2017 National Survey of Student Engagement. The sample contained 226 HSU Faculty (25% Biological Sciences, Agriculture; 23% Arts & Humanities; 19% Social Sciences; 13% Physical Sciences, Mathematics; 4% Engineering; 3% Social Service Professions, 3% Business; 3% Communications, Media; 3% Education; 2% health professions; 3% all other).
[17] http://now.humboldt.edu/news/print/an-unprecedented-look-at-csu-students-food-and-housing-insecurity/

responses were similar: "very little" 4%, "some" 47%, "very much" 49%.[18] With respect to campus support services, HSU faculty had a more optimistic view of the effectiveness of campus support, in general, than the 2017 HSU graduating seniors who were not as impressed (**Appendix B – Scan: Student & Faculty Perceptions of HSU & CNRS**).

National evidence suggests that integrated Freshmen learning communities effectively foster a sense of belonging and the development of academic behaviors in the first-year. HSU's survey data (MapWorks) indicate that CNRS's PBLCs increase first-year students' sense of belonging and community, especially early in their time at HSU, but to date the college has not focused as much attention on transfer students. The campus also has powerful co-curricular student support efforts, including INRSEP, and multiple cultural centers for academic excellence, but so far the integration of the CNRS curriculum and faculty with these efforts has been uneven and insufficient. Recent revisions to Area E general education (SCI 100) may help advance this important area of improvement.

Over the last several years students at HSU have repeatedly called for better and more widespread faculty awareness of issues surrounding macro- and microaggressions, explicit and unconscious bias, and culturally inclusive pedagogy. Training in these topics for faculty and staff can help raise awareness and improve inclusivity, a shared sense of belonging, self-efficacy, and student success. The college should work to make educational opportunities on these topics widely available, incentivized, and acknowledged.

5. <u>Slow progress toward degree</u>: It is important to recognize that many STEM students change their major while at HSU. In many cases, they change to another relatively similar major (i.e., Physics to Engineering, or Wildlife to Zoology). The college should work to establish more consistency in its first-year curricula, especially among closely related majors, so as to decrease the impact of such major changes on students' progress toward degrees. Arranging PBLCs by clusters of related majors and aligning their first-year maps would substantively improve this situation, but even with that approach some differences in curricula remain. The most conspicuous divergences in core science courses among majors include different basic chemistry courses (Chem 107 vs. Chem 109), and different mathematics and statistics requirements. For example, a student may have completed a chemistry series for one major, but if they switch majors the other chemistry series is required.

   For transfer students, 4-year graduation rates are relatively high (60-70% and opportunities gaps between students are comparatively small). However, 2-year graduates are very low (<15%), highlighting the need to help students make more rapid progress toward degree completion. For incoming transfers, many come to HSU with a high number of GE units but not having completed necessary gateway science courses. For example, of 2,762 incoming STEM transfer students from 2009-2015, an alarming 36% still needed to take college algebra or calculus, 33% still needed to take introductory chemistry, and 33% still needed to take HSU's introductory botany course. For many STEM majors, these courses are the first links in prerequisite chains necessary for students to

[18] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/1/2017; "Part III: Diverse Lens - National Survey of Student Engagement". Data from 2017 National Survey of Student Engagement. The sample contained 265 HSU Seniors (43% diverse; 65% female; 53% Pell; 52% first generation).

complete their degrees, making it impossible for some transfer students to complete their degrees within two years or in some cases even three years. For transfer students, improvements in academic advising, clarity and availability of transfer recruiting materials, and streamlined articulation agreements can increase the proportion of transfer students that complete foundational science courses before transferring, and accelerate their progress toward degrees. Moreover, the college should collaborate with admissions to reach out to prospective students at community colleges before they have committed to attend HSU, and better connect them with resources to increase the likelihood they complete prerequisite courses at their community college.

6. <u>Lack of course sections</u>: The CNRS students clearly indicated in a CNRS 2017 survey that one of their largest sources of frustration is the lack of course sections (i.e., capacity bottlenecks), which slows their progress to graduation (**Appendix B – Scan: Student & Faculty Perceptions of HSU & CNRS**). Over 85% of CNRS seats are filled during an academic year and nearly all of these courses offered are non-elective (**Appendix G – Scan: Capacity & Success Bottlenecks**). This challenge has a simple solution: the college must be funded to adequately offer students the courses they need to make timely progress toward their degrees.

7. <u>Decreasing support for course field trips & course supplies</u>: HSU and the CNRS pride themselves on their commitment to hands-on learning and experiential opportunities, yet support for field trips and supplies for running courses are dwindling, and some of these costs are being passed on to students. From AY 2010-2011 to AY 2017-2018 the CNRS was allocated the same level of funding for the Supplies & Services budget category (i.e., from Academic Affairs), and while the CNRS is allotted 50% of HSU's MSF fees, each year sees more of those fees used for the CNRS' Staff salaries, leaving less for field trips and course supplies (**Appendix C – Scan: HSU & CNRS Budget**).

8. <u>Low tenure-track density</u>: The number of course sections, types of courses, the quality of academic and research mentoring, service, curricular innovation and grantsmanship is limited by the percent of tenure-track faculty in CNRS, which ranged from 61% to 69% of CNRS FTEF from AY 2012-2013 to AY 2015-2016. The number of TT faculty per 100 majors was relatively stable over this time period, but there was wide variation among CNRS departments; the Chemistry and Math departments had over 8 faculty per 100 majors whereas Biology, ESM and Wildlife had less than 2 TT faculty per 100 majors (**Appendix D – Scan: Erosion of Teaching & Mentoring Power in CNRS**).

One of the leading negative consequences of a low TT density is the limited amount of time professors have for academic and research mentoring, as well as talking about life choices with students. HSU generally scored higher than the CSU average in 2013 when first-year and senior students were asked about the quality of the different types of interactions they had with both faculty as well as a variety of other support people on campus.[19] Depending upon the type of survey question, anywhere from 31% to 61% of HSU students responded favorably about their interaction experiences, and while it is encouraging that these responses are often higher than the CSU average, the reverse perspective from these values is that 39% to 69% of HSU students in this survey did *not* find their interactions to be satisfactory. In other words, for many of the questions addressing interaction quality, many students were not impressed (**Appendix B – Scan: Student & Faculty Perceptions of HSU & CNRS**). Moreover, while the college is investing more deliberately in first-year courses and freshmen seminars (e.g., PBLCs and SCI 100), national evidence[20] affirms that these approaches are most effective when they are taught by TT faculty or long-term lecturers with knowledge of campus resources and opportunities for student support and engagement on campus.

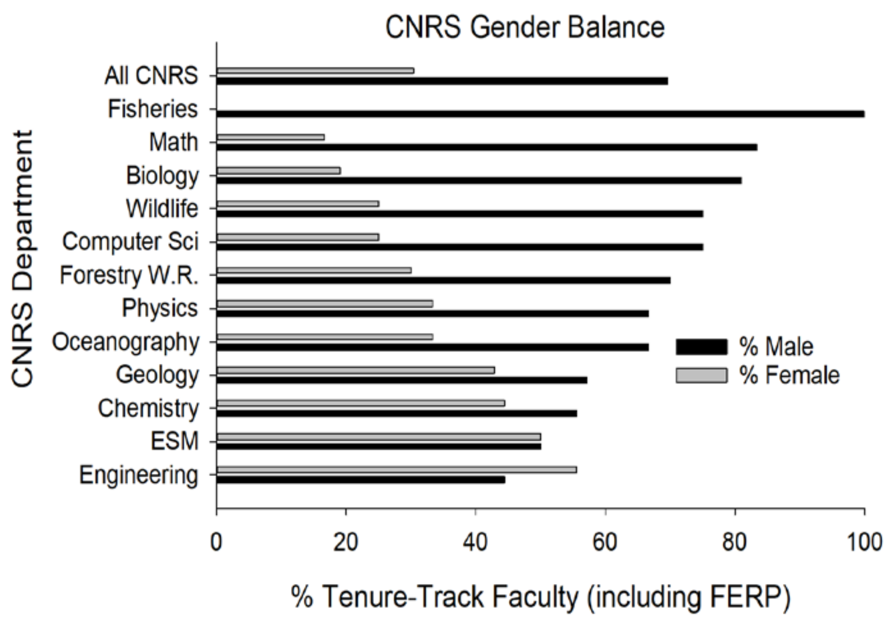


Figure 7. The percent of male and female tenure-track faculty (including FERP) in each CNRS Department (Data from HSU OIB, 12/2017).

9. Mismatch of gender & ethnic composition between TT faculty & students: The gender and ethnic demographics of students will generally evolve much faster than these demographics for TT faculty. As of 12/2017, 70% of the CNRS TT faculty are male, and there is large variability in the gender ratio among the CNRS departments, with Fisheries Biology being 100% male to ESM being 50% male (**Figure 7**).

[19] Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 9/22/2017; "Part I: A Primer - National Survey of Student Engagement".) Data from 2013 National Survey of Student Engagement; 13 CSU campuses; 151 first-year students (61% female, 58% first-generation, 59% diverse backgrounds); 298 seniors (61% female, 58% first-generation, 51% diverse backgrounds).

[20] Supiano (2018). It Matters a Lot Who Teaches Introductory Courses. Here's Why. https://www.chronicle.com/article/It-Matters-a-Lot-Who-Teaches/243125

Goals & Objectives of the 2019 – 2024 CNRS Strategic Plan

Goal 1 - **Raise quality of education for undergraduate and graduate students by addressing issues from pedagogy to hiring to support**

Objective 1.1 Provide rigorous and accessible curriculum that prepares students for professional careers and lifelong learning

Performance Indicator	*Baseline*	*Action Item*
Student success metrics, including retention and graduation rates, post-graduate employment rates, and graduate school rates.	Most Recent data (Fall 2018) FTF retention: 63% (2 yrs) FTF graduation: 15% (4 yrs), 54% (6 yrs) UDT graduation: 19% (2 yrs), 71% (4 yrs) NSF Per capita Ph.D. ranking (# 1 CSU, #8 Nation, April 2017) Employment and graduate school rates have not been measured.	Begin collecting data on employment rates and graduate school enrollment.
Course effectiveness metrics, including reduction of Bottleneck and Gateway courses, elimination of opportunity gaps, and increase percent of students with a research experience.	(2017-18) Number of identified Gateway courses: 74 Number of identified Bottleneck courses: 42 Number of courses with opportunity gap > 10%: 56 Additional data in Appendix J Percent of students with a research experience: 75% (see Appendix I)	Professional development for faculty to reduce opportunity gaps and increase overall student success. Conduct a periodic scan of student research or related experiences.
Teaching capacity metrics, including Tenure-Track Density and the ratio of Tenure-Track to majors.	TT Density TT/Student majors Percent of Students taught by TT Faculty: 40% (all students), 43% (LD), 36% (UD), Fall 2011 – Spring 2016.	Measure and track these metrics annually
Alumni and Employer satisfaction	N/A	Create and implement a satisfaction survey

Objective 1.2 Provide comprehensive Professional Development for faculty, staff and administrators that promotes inclusive pedagogy and active learning		
Performance Indicator	*Baseline*	*Action Item*
Faculty participation rates: campus-led Professional Development events; Faculty learning communities (e.g. PBLC, Math Pathways); discipline-specific pedagogical conferences.	From 2015 survey: 28 self-identified pedagogical resources, 17 different strategies for engaging students. Sixteen faculty have participated in ESCALA institute training as of Fall 2018. Other performance indicators have not been collected	Begin annual collections of these and other performance indicators, in cooperation with HSU's Center for Teaching and Learning
Dollars invested in Professional Development.	CNRS has not tracked this data.	Begin tracking the data (annually)
Number of publications addressing teaching and learning in a STEM discipline	CNRS has not tracked this data	Begin tracking the data (annually)
Inclusive learning opportunities experienced by students in labs and classrooms, as captured through observations and surveys.	CNRS has not tracked this data	Design and implement an observational protocol for which meaningful data can be collected.

Objective 1.3 Provide co-curricular support to raise the probability of student success		
Performance Indicator	*Baseline*	*Action Item*
Student participation rates in clubs, mentoring programs, advising, INRSEP, other STEM events	CNRS has student clubs and advising available to all majors. CNRS has not centrally tracked data on student participation	Begin tracking data annually Write external grants for mentoring and other STEM supports for students
Direct Student Support: Scholarships, Internships, campus employment	Student Business Services tracks some of this information (through Financial Aid). We also have had approximately 200 CNRS Students who have been employed annually on CNRS-based grants and contracts.	Make use of the statistical reports from Financial aid to contribute to an annual report on direct student support.
Student sense of belonging in STEM, as measured through STEM-specific surveys and tools such as MapWorks	The HSI-STEM grant measured and compared a sense of belonging for first-time students who participated in a PBLC, and those who did not.	Continue to refine and deploy the HSI-STEM survey on belonging for PBLC students annually.

Objective 1.4 All academic programs are fully engaged in a cycle of continuous improvement		
Performance Indicator	*Baseline*	*Action Item*
Assessment plans are established for all programs	All departments have assessment plans through previous program review cycles.	All departments will review and revise their assessments plans by the end of the 2018-19 academic year as directed by the Center for Teaching and Learning. These plans will integrate assessment of the CORE competencies.
Assessment data are collected and reviewed annually by program faculty	The accredited programs (Engineering, Forestry, Soils, Rangeland, and Chemistry) have collected and reviewed student-learning data annually and reported this data formally.	All departments will collect and review student learning data annually, and share with the CNRS.
Program review processes (and/or accreditation) are current for all programs	All but one of the CNRS programs are current in their program review process	Implement the new (2019/2020) program review process beginning in Fall 2019.

Goal 2 - **Promote attitudes and activities that support inclusivity and equity**		
Objective 2.1 Attract and Support URG faculty, staff, and Administrators		
Performance Indicator	*Baseline*	*Action Item*
Diversify candidate pools for faculty, staff, and administrative searches	CNRS participates in training on implicit bias and advertises in	In a CNRS diversity plan, outline and implement processes to ensure
Percent of URG faculty, staff and administrators in the college	CNRS has not tracked these measures.	Track these and related measures (e.g., gender in some disciplines) in the context of a CNRS diversity plan.
No Opportunity gaps for URG faculty and staff in terms of professional development, release time or in-range progressions, starting salary, travel, start-up, and workload	CNRS has not tracked these measures, although the Office of Diversity and Inclusion has supported faculty of color with additional start-up funding of $5,000 per new faculty member.	Track these and relative measures in the context of a CNRS diversity plan.

Objective 2.2 Provide or facilitate Professional Development of student, faculty, and staff on creating an inclusive and equitable learning community		
Performance Indicator	Baseline	Action Item
Rate of participation in campus events (e.g., Campus Dialogue on Race) or relevant professional development	Sixteen faculty (about 15% of permanent faculty) have completed the ESCALA training within the last two years. CNRS is typically well represented in campus professional development, but data have not been collected.	Promote more participation in campus events like the Campus Dialogue on Race, and record rates of participation annually.
Grants awarded that improve URG participation and success in STEM	The HSI STEM grant ($200,000 per year for 5 years) is in its third year. The active grant adds to the efforts of the past several years to support URM participation in STEM.	Track grant awards and annual investments in discipline-specific or college-wide efforts to improve the success of URG in STEM.
Budgetary support for programs like INRSEP, SACNAS, and others	INRSEP has been returned to full staffing (October 2018), with a Director, Associate Director, and Student Support Professional.	Quantify and track investments in these and related programs.

Objective 2.3 Faculty deploy inclusive pedagogies and content in lectures, laboratories, and field trips		
Performance Indicator	*Baseline*	*Action Item*
Inclusive learning opportunities experienced by students in labs and classrooms, as captured through observations and surveys.	We have not surveyed students or collected anything other than self-reported data from instructors	In collaboration with ODEI and related groups, design and implement a process by which student experience of inclusive pedagogies can be measured.
Student sense of belonging in STEM, as measured through STEM-specific surveys and tools, such as MapWorks	In the Fall of 2018 a new survey of incoming freshman (3 weeks into the semester) was launched to evaluate students' self-reported senses of: belonging; connection with peers, faculty, and staff; engagement, efficacy, and motivation in STEM; and welcoming and community. Overall, the mean responses were each greater than 3.5 on a scale of 1 (low) to 5 (high). Gaps between URM and non-URM students were not statistically significant. For each of these senses, participation in PBLC corresponded to higher ratings for all student groups.	Refine and continue to administer the survey to first-time freshman students. Consider Expansion to first-time transfer students. Follow-up with a second time before graduation. Coordinate with OEI.
Content connects to culture so that students recognize the contributions from and impacts on their cultural contexts.	The PBLC curriculum includes a component of Traditional Ecological Knowledge, delivered in conjunction with faculty from the Native American Studies Department. By the end of Summer 2018, at least 16 faculty have become ESCALA scholars to learn to offer a more culturally responsive curriculum and to move from HSI-serving to HSI-thriving.	Continue culturally-relevant curriculum development as PBLC programs expand to serve all incoming CNRS students.

Objective 2.4 Eliminate Opportunity gaps for all students		
Performance Indicator	*Baseline*	*Action Item*
Opportunity gaps in CNRS Courses	In 2017-2018, out of 202 course sections which had at least 10 URM students and 10 non-URM Students, The gaps (% successful Non-URM - % successful URM) for the courses are distributed as follows: 55%: less than 5% gap (some are negative) 18%: above 5%, but no larger than 10% gap 27%: more than 10% gap	Identify courses by department with large opportunity gaps (> 10%) and encourage faculty curricular and pedagogical improvements.
Participation rates	In Fall of 2017, the % of CNRS majors was 36% URG students, compared with total HSU Enrollment at 43% URG students	Facilitate Departmental Diversity Plans in the next round of program review.
Retention and Graduation rates in CNRS	The fall 2017 data indicates the following gaps: (Non-URG)-(URG) Retention 1 year: 1.7% 2 year: 10.2% Graduation 4-year FTF graduation: 14.6% 6-year FTF graduation: 18.5%	Facilitate Departmental Diversity Plans in the next round of program review.

Goal 3 - **To exemplify, promote, and teach environmental sustainability in recognition that healthy social and economic systems depend on the resilience of ecological systems**

Objective 3.1 Every student has the opportunity to learn about environmental sustainability

Performance Indicator	*Baseline*	*Action Item*
Disciplinary Coursework addressing environmental sustainability is included in every academic program.	The campus STARS report awarded HSU a score of 9.77/14 for access to Academic courses related to sustainability. CNRS has 96 courses in the 2018-19 course catalog (41% of such courses at HSU) that are designated as Sustainability-focused or sustainability-related. The majority of these are included in the degree programs offered by the following departments: ERE, ESM, FISH, FWR, GEOL, OCN, and WLDF. In May of 2018 a campus-wide sustainability working group, led by CNRS faculty, drafted a climate change Resilience Curriculum Proposal. The STARS report of 2017 rated HSU in its top category.	Identify programs of study where there are no explicit requirements for sustainability coursework, and find ways to include sustainability in existing or new coursework, in both undergraduate and graduate programs.
Area B General Education coursework offered in CNRS addresses environmental sustainability.	Of the 96 courses listed above, 23 are included in the General Education Curriculum	Work toward a majority of area B courses to receive the designation of sustainability-focused or sustainability-related.
Community outreach, including public lectures, demonstrations, workshops, partnerships with K-12 educators, and printed information, emphasizes environmental sustainability.	CNRS has not tracked this activity	Track and encourage such outreach

Objective 3.2 Faculty, Staff, and Students practice environmental stewardship		
Performance Indicator	*Baseline*	*Action Item*
Laboratory materials maximize the use of reusable materials and minimize the use of disposable materials.	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure environmental stewardship practices.
Field trips maximize the use efficient transportation, staying local when feasible	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure environmental stewardship practices.
Paperless versions of course materials (syllabi, etc.) and assignment submissions are available for all courses	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure environmental stewardship practices.
Faculty/Staff/Student participation in carpool programs, public and human-powered transportation.	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure environmental stewardship practices.

Objective 3.3 Students, staff, and faculty engage in scholarship and creative activities in support of environmental sustainability or to study or mitigate the effects of climate change		
Performance Indicator	*Baseline*	*Action Item*
Grants and contracts awarded that address environmental sustainability or climate change	The campus STARS report (2017) rated the campus for sustainability research as 8.23/12. 15 of the 18 researchers and 34 of the 39 grant projects identified in the HSU report are from CNRS	Continue monitoring the STARS (Sustainability Tracking, Assessment & Rating System) report
The number of students engaged in directed studies or research projects (undergrad or grad) that address environmental sustainability or climate change	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure student engagement in sustainability.

Goal 4 - **Regionally and nationally recognized research center for applied, student-engaged research**

Objective 4.1 Faculty and students publish results in scientific journals and share insights from their research through scholarly conferences and workshops

Performance Indicator	*Baseline*	*Action Item*
The number of scholarly publications, and the number of distinct student authors or co-authors	See Appendix I – Scan: Scholarship	Design and implement a tracking system to measure scholarly work production data.
The number of scholarly presentations, and the number of distinct student presenters or co-presenters	See Appendix I – Scan: Scholarship.	Design and implement a tracking system to measure scholarly work production data.
The number of students participating in research programs at HSU and at other institutions	See Appendix I – Scan: Scholarship	Design and implement a tracking system to measure scholarly work production data.

Objective 4.2 Faculty seek and are awarded grants and contracts to conduct research activities that engage students		
Performance Indicator	*Baseline*	*Action Item*
The number and value of grants and contracts	See Appendix I – Scan: Scholarship	Design and implement a system by which these data can be delivered in an annual report from the sponsored program foundation.
The number of distinct PI's and co-PI's on grant-funded projects.	See Appendix I – Scan: Scholarship	Design and implement a system by which these data can be delivered in an annual report from the sponsored program foundation. Maintain a faculty-mentoring program to bring new faculty into the PI/co-PI community.
The number of Research Program placements offered by CNRS faculty.	See Appendix I – Scan: Scholarship	Design and implement a system by which these data can be delivered in an annual report from the sponsored program foundation.
The number of employed students on grant and contracts	See Appendix I – Scan: Scholarship	Design and implement a system by which these data can be delivered in an annual report from the sponsored program foundation.

Objective 4.3 Engage in research that informs and benefits the Community and our Regional Partners		
Performance Indicator	*Baseline*	*Action Item*
The percent of research projects with community or regional partners	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure community and regional engagement.
Investment by community or regional partners in support of research	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure community and regional engagement.
Internships (paid or volunteer) provided to CNRS student in community or regional partners	CNRS has not tracked metrics for this indicator.	Design and implement a tracking system to measure community and regional engagement.

Objective 4.4 Provide research facilities and services to enable faculty and student to participate in research experiences		
Performance Indicator	*Baseline*	*Action Item*
Area (sq. ft) of facilities dedicated to research keeps pace with growth in research activities and is equitably distributed	CNRS has not regularly gathered for this indicator, nor has it regularly examined the connection between assigned space and research productivity.	With CNRS Department Chairs, design and implement a space assignment plan that matches research needs with productivity. Design and implement a tracking system to measure facilities and services that support research.
S-factor units tied to faculty engagement with students in research	CNRS has not regularly gathered for this indicator.	With CNRS Department Chairs, design and implement a tracking system to measure facilities and services that support research.
Investments in research equipment, technical staff, start-up, travel, release time	CNRS has not regularly gathered for this indicator.	With CNRS Department Chairs, design and implement a tracking system to measure facilities and services that support research.

Goal 5 - **Student, staff, faculty and administrative employees have satisfaction in their work in CNRS**

Objective 5.1 Administrators, faculty, staff, and students contribute to a culture of mutual respect

Performance Indicator	*Baseline*	*Action Item*
Consistent evaluation processes are followed at all levels	Approximately 85% compliance with all processes.	Improve compliance to 100%
Shared governance includes representation from all stakeholders	The CNRS administrative handbook provides a structure for shared governance with the CNRS.	Review the CNRS administrative handbook annually and ensure the guidelines therein are implemented.
Number of grievances and similar reports of disrespectful behavior decrease	The CNRS has not gathered this information.	Design and implement a tracking system to measure grievances and related incidents.

Objective 5.2 Review and update position descriptions, performance expectations, and RTP criteria periodically

Performance Indicator	*Baseline*	*Action Item*
RTP guidelines for academic departments are current	All departments have approved RTP guidelines.	Periodically review and calibrate RTP guidelines.
Workload is evaluated for consistency with classifications and position descriptions	Workload evaluation is carefully evaluated prior to the reappointment of new staff and faculty, but not always after several years into the appointment.	Conduct periodic workload evaluations for faculty and staff, to bring greater equity across the college and alignment with reasonable expectations.

Objective 5.3 Receive and respond to issues and concerns of faculty and staff

Performance Indicator	*Baseline*	*Action Item*
Faculty and staff have opportunity to report their level of **satisfaction** (survey) and express issues and concerns	CNRS relies on ad hoc measures for expressing issues and concern through department chairs, union representatives, and the dean's office.	Design and implement an annual employee satisfaction survey that allows for individual issues and concerns to be addressed.
An **issues** website is updated monthly for faculty and for staff	CNRS has not publicly communicated its efforts to resolve issues.	Do this.

Goal 6 - **Obtain and distribute funding to achieve strategic plan objectives**

Objective 6.1 Develop and sustain a budgeting process that is consultative and responsive to changes in student demand

Performance Indicator	*Baseline*	*Action Item*
The CNRS administrators meet monthly with the **URPC representative** with CNRS	CNRS budget and academic resource analyst is a member of the URPC (18/19-19/20)	Begin monthly meetings.
Annual budget forecasts are produced by the CNRS administrators and made available to all department chairs and relevant staff employees for review and input	Budget forecasts have not been available for review and input.	Provide a next-year budget forecast for each unit in CNRS by February of the prior academic year.
The CNRS administrators **publish** a college-wide budget and narrative prior to the start of each academic year.	CNRS has not done so.	Publish a budget and narrative by August 1 prior to the start of the fall semester.
All department chairs and relevant staff employees have access to **monitor financial activity** throughout the academic year. Included is an ability to track General Fund allocations related to $/FTES, MSF/FTES	OBI access have been given to each unit in the CNRS	Provide mentoring and training to new staff and department chairs.

Objective 6.2 Enhance the Revenue Streams to the college

Performance Indicator	*Baseline*	*Action Item*
Indirect Cost Recovery applies to grants and contracts with IDC rates of 15% or more	CNRS received $314,862 from indirect cost recovery from SPF for grant activities in 2017-2018, with an additional $125,945 to departments and $188,917 to PI's	Develop and implement (with SPF) a program to mentor and incentivize faculty participation in grants and contracts with at least 15% IDC rates.
Investments in philanthropy campaigns that will support students through scholarships and experiential learning opportunities	Some CNRS departments participate in donor development, but CNRS has not facilitated a college-wide program.	Coordinate with university advancement to support philanthropy for all CNRS programs.
Investment in institutional grants (e.g., HSI-STEM) to increase URM participation and success in STEM disciplines	Individual faculty have championed institutional grants related to curriculum development, but CNRS has not developed a long-term plan for pursuing such grants.	Mentor and incentivize a college-wide institutional grant writing program.

CNRS Implementation Plan

Phase I (2019)

The below actions are planned by the CNRS Dean's Office for Spring and Summer 2018 and draw upon some of the Goals and Objectives from this strategic plan.

<u>December 2018</u>

- Work with OIE, HSI STEM, & HHMI to build a set of prototype data dashboards (e.g., Diversity, Equity, and Inclusion, and Strategic Resource Budgeting) that will support college-level strategic planning. [Goals 1.2, 1.3, 2, 3.2, 3.3, 4, 6]

<u>January 2019</u>

- Set up a CNRS Strategic plan website, which will also serve as a vehicle to mark progress on the implementation of the plan. [Goals 5, 6]
- Professional Development Theme for the CNRS Spring Welcome (January 16, 10:30 - Noon, FH 118) on inclusive and culturally-relevant pedagogy, particularly for gateway courses with large opportunity gaps. [Goals 1, 2]

<u>February 2019</u>

- Form a CNRS diversity committee to lay the foundation for Department-specific diversity plans for removing opportunity gaps, to occur through Fall, 2019. [Goal 2]
- Share a budget page that explains the CNRS financial process and tracks college-wide progress and concerns. [Goal 6]

<u>March 2019</u>

- HHMI and HSI STEM use the CECE survey of faculty (https://www.indiana.edu/~cece/wordpress/faculty-survey/) (and again in Spring '22) to gauge: faculty receptivity to/knowledge of cultural sensitivity/awareness. [Goal 5]

<u>April 2019</u>

- Gather assessment data from departments about student learning for their majors, and summarize in a college-wide status report. [Goal 1.4]

<u>May 2019</u>

- Hold a forum on sustainability for faculty, students, and staff (a continuation of the May 2018 sustainability forum) to identify ways to strengthen our sustainability curriculum. [Goal 3]

<u>Summer 2019 – September 2019</u>

- Design and implement an alumni and employer surveys. [Goal 5]

Phase II (2019 – 2024)

A more extensive implementation plan will be necessary to address all of the Goals and Objectives in this SP. That plan has not been drawn up in recognition that CNRS will have a new Dean starting in Fall 2018, and that person will have a leading role in designing and helping to implement that plan. Examples of some high priority action items for the Phase II part of the plan are the following:

- Develop a satisfaction survey for faculty and staff (Objective 5.3, first performance indicator).

- Develop a process for allocations space that keeps pace with growth in research activities and is equitably distributed (Objective 4.4, first performance indicator).
- Develop a process for allocation of tenure-track positions based on need and performance (third performance indicator in Objective 1.1)

Appendix A – Terms & Acronyms

Base Budget, or General Fund: The level of state funding received by HSU from the CSU Chancellor's Office needed to support the essential services of a university unit, such as a college. This funding is supposed to be sensitive to the size and function of the unit but is not intended to support special initiatives (i.e., one-time allocations).[21] The base budget allocation is strongly affected by HSU's annualized FTES [i.e., (summer + fall + spring) / 2))] from the previous fiscal year.

Capacity Bottleneck: Considered by HSU OIE to be a course that has three or fewer seats open in a course at the time of census.

College of Arts, Humanities & Social Sciences (CAHSS)

College of Natural Resources & Sciences (CNRS)

College of Professional Studies (CPS)

Encumbrance: A portion of a budget set aside to pay for spending (e.g., purchases, contracts) that has occurred during the budget cycle.

Full Time Equivalent Faculty (FTEF): FTEF for a particular course taught by a specific instructor = (course WTUs / total WTUs for the instructor) * time base of the instructor.[22]

Full Time Equivalent Student (FTES): FTES for a particular course = ((# course units * # enrolled undergraduate students) / 15) + ((# course units * # enrolled graduate students) / 12). Course FTES is therefore the sum of undergraduate FTES and graduate FTES.

Headcount: The number of students.

Major Business Unit (MBU): Budget categories from the perspective of campus units (e.g., a college, Sponsored Programs Foundation) rather than allocation categories within a unit (e.g., Wages, Benefits, Supplies & Services).

Materials, Services Fee (MSF)

Non-college budget: All HSU allocations not directed to the three colleges.

Oracle Business Intelligence (OBI): The software used by OIE and HSU's Budget Office for budget analysis.

Office of Institutional Effectiveness (OIE): This office is responsible for most of HSU's administrative analytical needs.

Place-based Learning Community (PBLC): An approach to learning that "immerses students in local heritage, cultures, landscapes, opportunities and experiences, using these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum".[23]

[21] https://policy.humboldt.edu/vpaa-96-01-budget-principles-calendar-categories-and-protocol-annual-unit-presentations
[22] http://pine.humboldt.edu/~anstud/images/FTEF_and_SFR_calcs.pdf
[23] http://promiseofplace.org/what-is-pbe/what-is-place-based-education

Retention, Tenure, Promotion (RTP): The general name for the processes that tenure-track and lecturer faculty go through when being evaluated to see if they should be retained, tenured and promoted.

Revised Budget: The budget resulting from changes made to the base budget by HSU due to enrollment variation and HSU allocation priorities.

Student Faculty Ratio (SFR): determined by FTES / FTEF.

Success Bottleneck: Considered by HSU OIE to be a course where more than 15% of students receive a grade lower than a C-.

Weighted Teaching Unit (WTU): These are the units received by an instructor of a course. The number of units is affected by the mode of instruction (i.e., K-factor or S-factor); further adjustments are made if the course is cross-listed.

Appendix B – Scan: Student & Faculty Perceptions of HSU & CNRS

Narrative

The purpose of this scan was to expose the gaps in HSU and the CNRS faculty and student experiences and perceptions. HSU is a public, undergraduate-serving four-year institution that prioritizes excellence in teaching and learning. In the CNRS, the Mission, Vision and Values (MVV) statement emphasizes hands-on, student-centered learning. Therefore, it is imperative to ensure the quality of student-faculty interactions. This perceptions scan adds valuable information that may be not be measurable or even detectable in other data collection methods that address student success and teaching effectiveness. In addition, the National Survey of Student Engagement (NSSE) collects data annually to identify how students feel in the first and final years of enrollment at institutions, and we use relevant data from NSSE (prepared by HSU OIE) in this scan. In addition, to identify perceptions internal to the CNRS, we also conducted a SWOT+N (Strengths, Weaknesses, Opportunities, and Threats + Needs) analysis, which would enable us to identify any gaps between the CNRS's Mission Vision and Values (MVV) statement and current perceptions of students and faculty toward the college.

Methods

CNRS Faculty and Students Survey

In August 2016, before the formation of the CNRS Strategic Planning Committee (SPC), Dean Boone sent a SWOT+N (Strength, Weakness, Opportunity, Threats + Needs) template to CNRS department chairs who engaged their departments to work together in collecting responses. A total of 172 faculty responses were received (**Figure 8)**. In Spring 2017, the SPC sent a SWOT+N survey to all CNRS students as a Google Forms survey with a similar template. We encouraged students to participate the survey while entering into a drawing to win an iPad mini. A total of 496 CNRS student responses were received; 21% of responses were from students affiliated with either Environmental Science and Management or Biological Sciences (**Figure 9**). The SWOT+N survey for faculty and student results were exported to a spreadsheet and coded using similar word phrases. The data were analyzed using word cloud and active content analyses. The weight of words or phrases is displayed as different font sizes and colors in the figures. The low responses for some CNRS programs (i.e., Chemistry and Mathematics) caused limitations since the survey did not fully represent the CNRS population. The online survey was open for responses over a two week period with one mid-survey reminder.

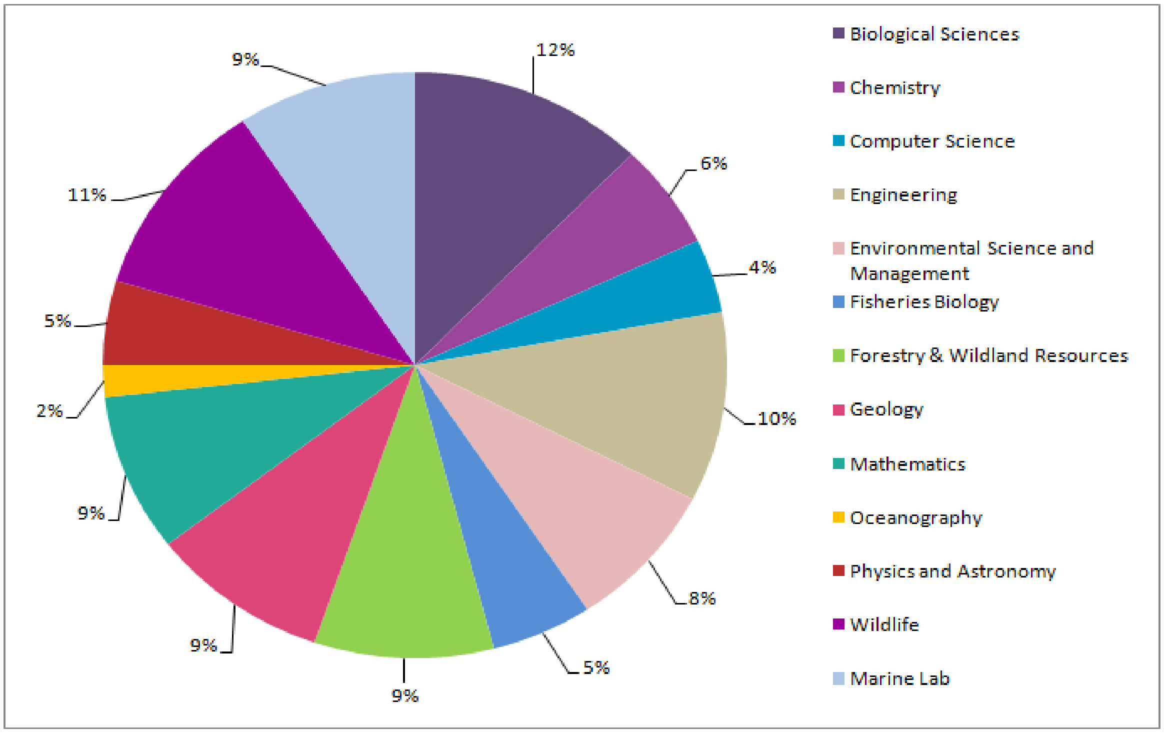


Figure 8. CNRS Faculty survey participation by department (total responses =172).

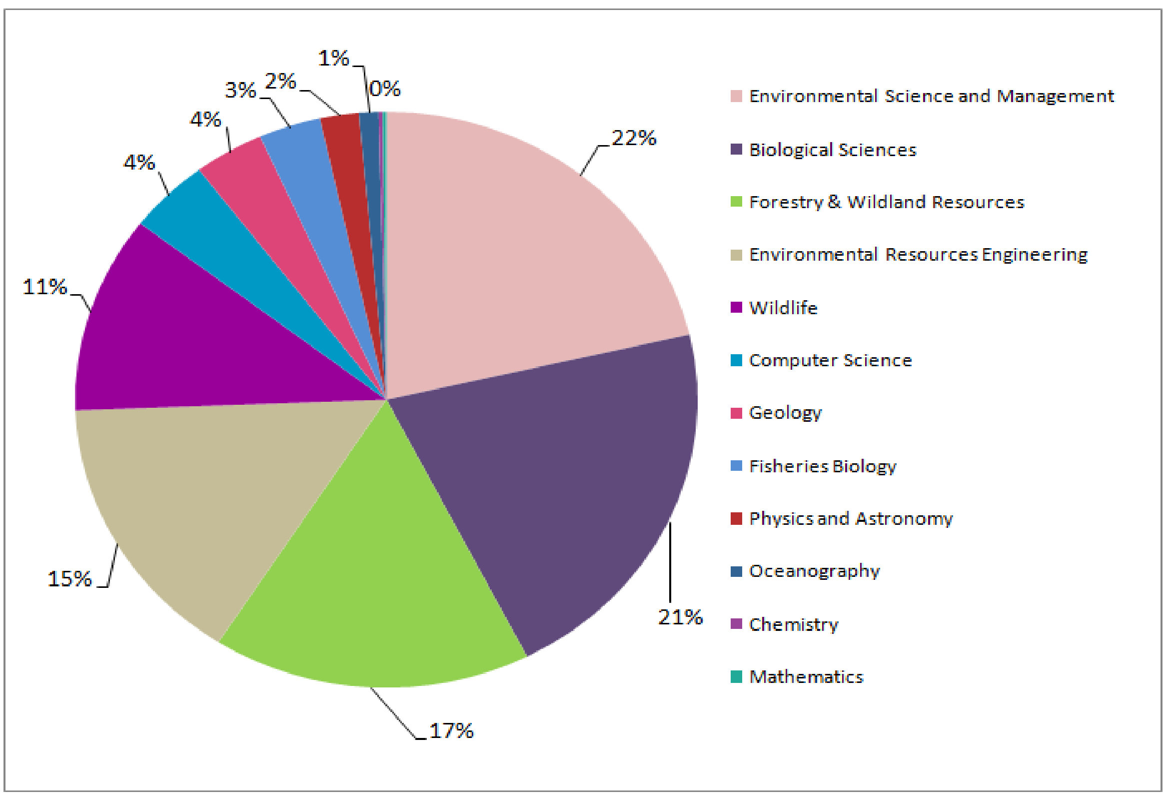


Figure 9. Student survey responses in terms of CNRS programs (total response = 496).

Other Methods

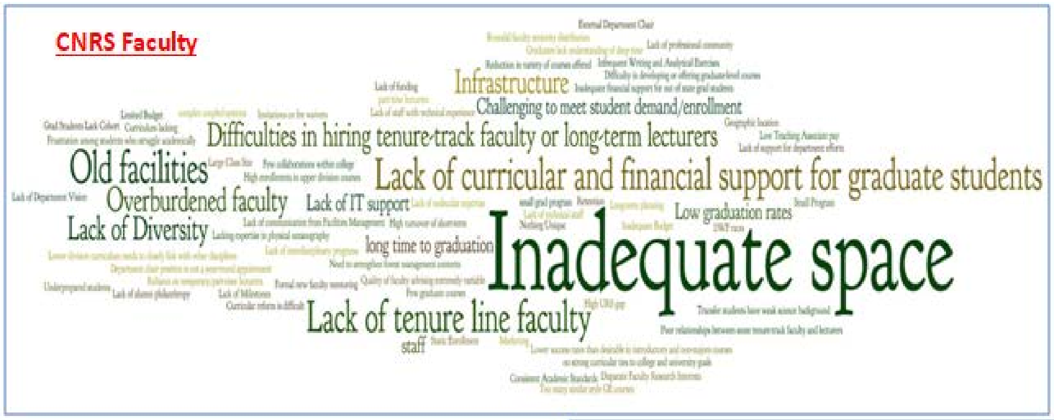
The National Survey of Student Engagement (NSSE) annually collects data from students and faculty about first-year and senior students' participation in programs and activities that institutions provide. According to NSSE, "the results provide an estimate of how undergraduates spend their time and what they gain from attending college." In 2017, the NSSE for an HSU sample contained 226 HSU Faculty (25% Biological Sciences, Agriculture; 23% Arts & Humanities; 19% Social Sciences; 13% Physical Sciences, Mathematics; 4% Engineering; 3% Social Service Professions, 3% Business; 3% Communications, Media; 3% Education; 2% health professions; 3% all other). The NSSE and other sources of data were used in presentations by L. Castellino (HSU Office of Institutional Effectiveness) to HSU, and a subset of figures from those presentations are included and referenced in this scan.

Results

SWOT+N results for CNRS Faculty and Students

Figure 10. Strengths reported by CNRS Faculty (above) and CNRS Students (below).

Both Faculty and Students identified hands-on learning, the people they work with, and the surrounding environment, filed programs and field trips as an important strength of CNRS. Faculty also emphasized connections to agencies and the surrounding communities (**Figure 10**).



Weaknesses

Figure 11. Weaknesses reported by CNRS Faculty (above) and CNRS Students (below).

CNRS faculty and students overwhelmingly identified the issue inadequate availability of courses in CNRS; faculty referred to this issue as “inadequate space” whereas students referred to “classes” and “class availability” (**Figure 11**).

Figure 12. Opportunities reported by CNRS Faculty (above) and CNRS Students (below).

CNRS Faculty indicate opportunities such as funding, and interdisciplinary and undergraduate research whereas CNRS student comments report that clubs, internships and field experiences are opportunities. We interpret this apparent misalignment to be attributed to the students vs. faculty understanding of the word “opportunities”- faculty likely perceive this to be *future* opportunities whereas students think of opportunities *currently* available to them (**Figure 12**).

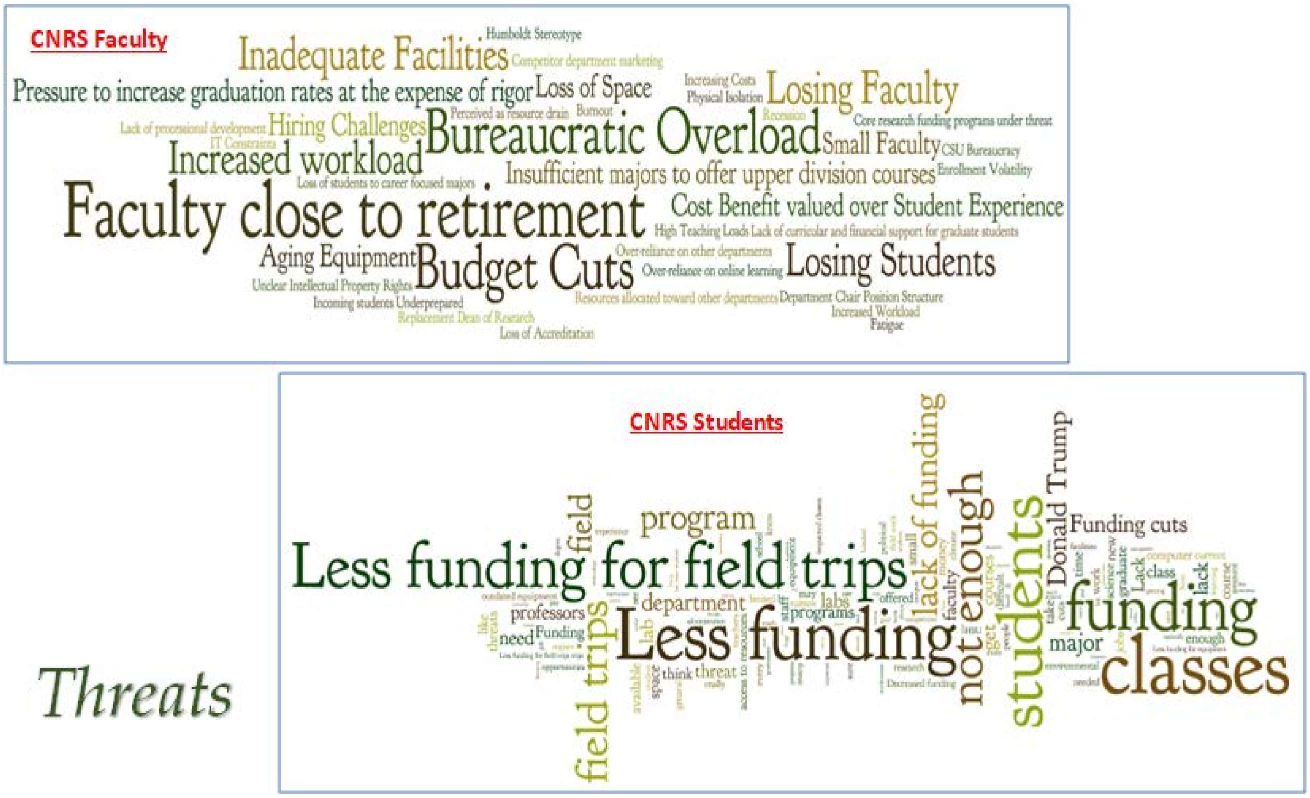


Figure 13. Threats reported by CNRS Faculty (above) and CNRS Students (below).

Both CNRS faculty and students think that less funding in general and budget cuts are threats to the College. Faculty note that increasing workload and less faculty are secondary threats, and students comment that less field trips and classes are secondary threats (**Figure 13**).

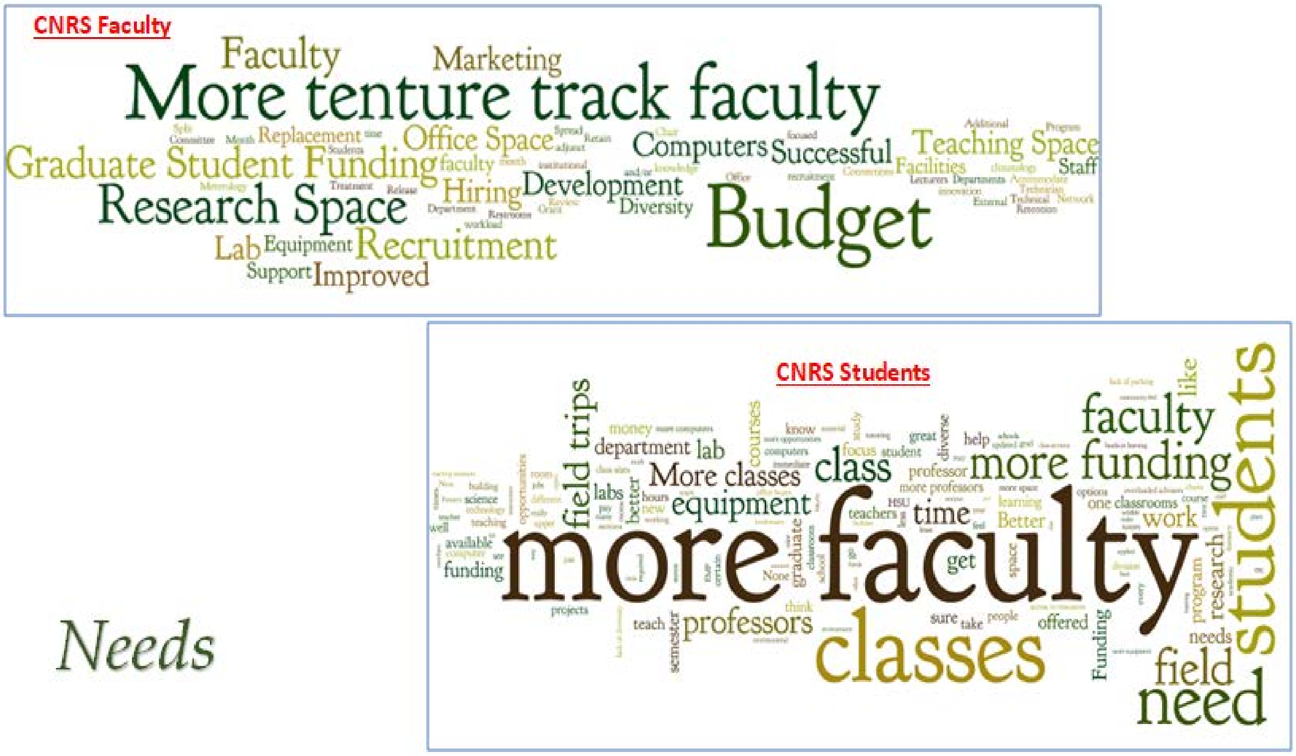


Figure 14. Needs reported by CNRS Faculty (above) and CNRS Students (below).

CRNS faculty and students both overwhelmingly report that the College needs more faculty (**Figure 14**).

Faculty vs. Student Perceptions

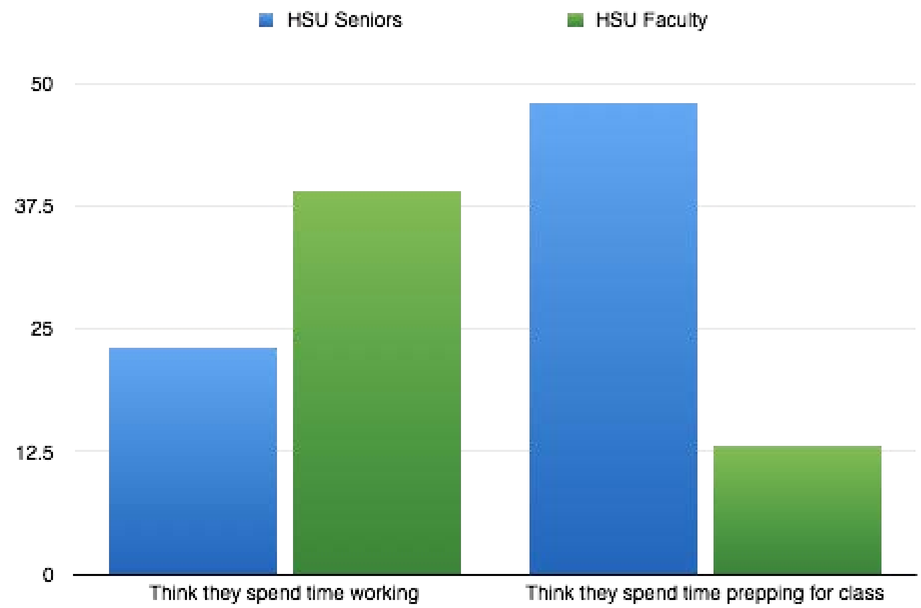


Figure 15. Percentage (y-axis) of HSU Seniors (blue) vs. HSU Faculty (green) who think that they spend "very much" or "quite a bit" of time working off-campus for pay, and the percentage of HSU Seniors vs. Faculty who think that they spend "very much" or "quite a bit" of time prepping for courses. Data from 2017 National Perceptions Survey, from presentation by L. Castellino, HSU Office of Institutional Effectiveness, 11/3/2017.

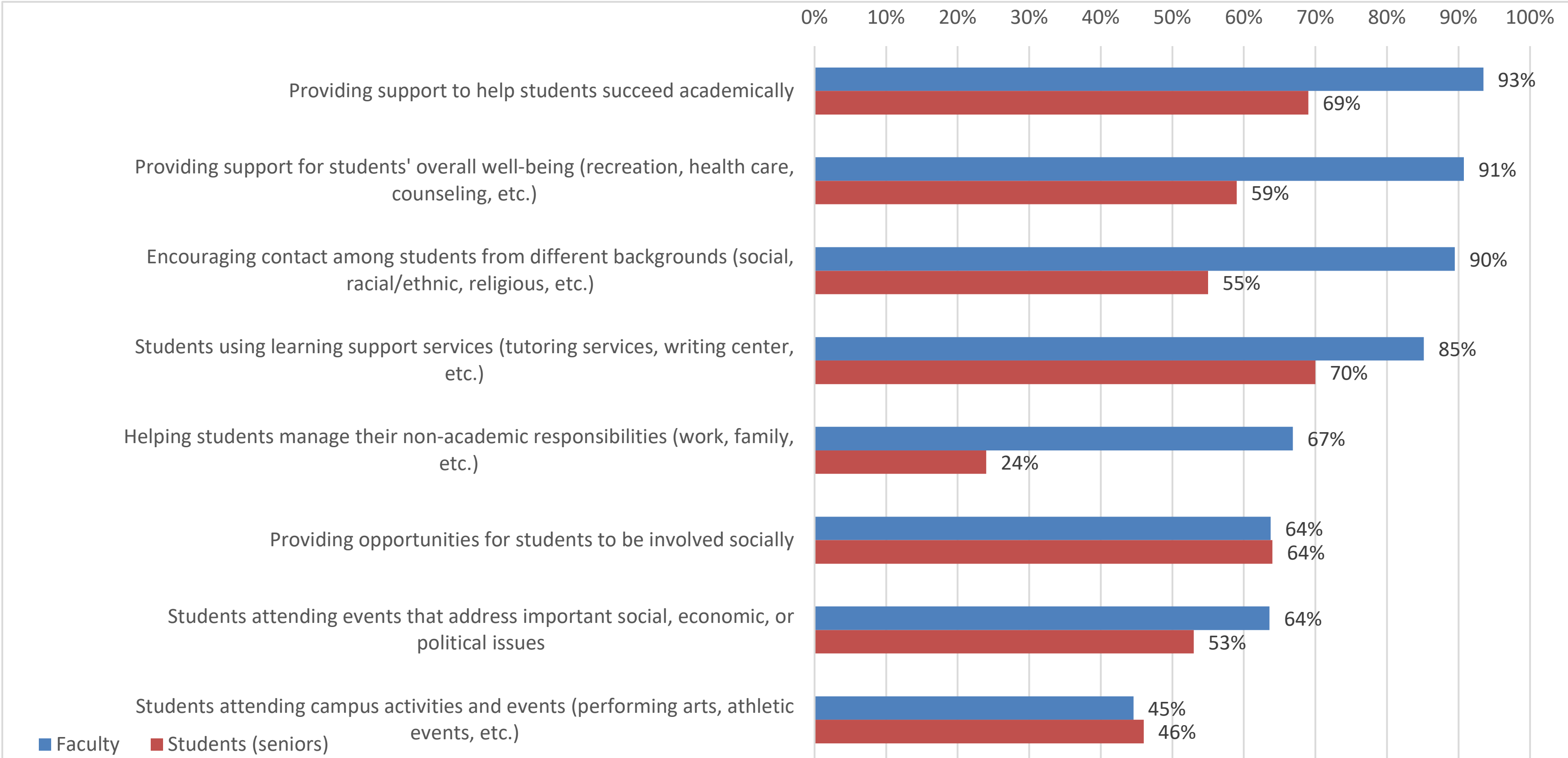


Figure 16. The perception of HSU faculty (in blue) who think that a service is being provided versus the % of HSU Seniors (in brown) who agree that actual support is provided. Data from 2017 National Perceptions Survey, from presentation by L. Castellino, HSU Office of Institutional Effectiveness, 11/3/2017.

General perceptions of HSU vs. other CSUs

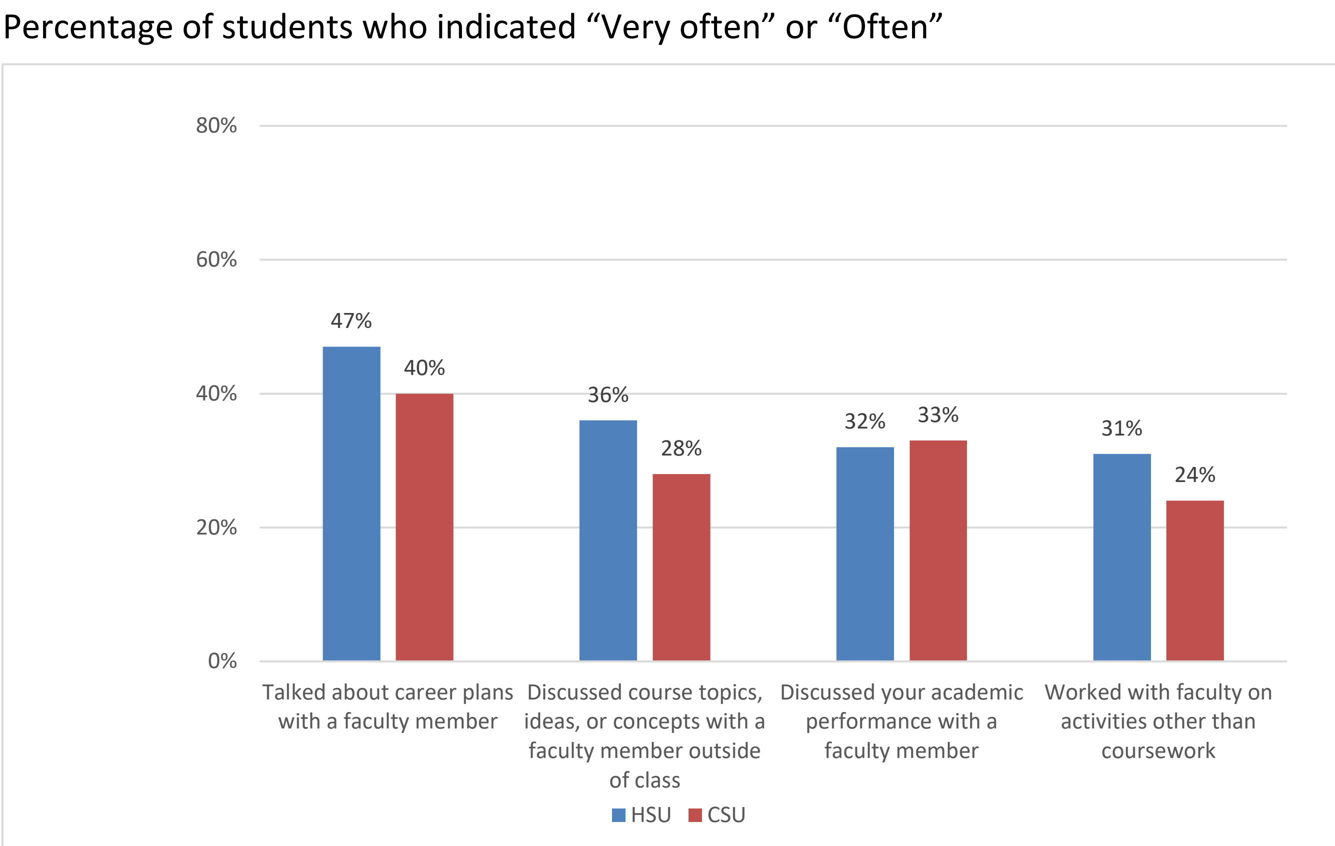


Figure 17. Comparison of student-faculty interactions at HSU versus for all CSU students. (From: Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 9/22/2017; "Part I: A Primer - National Survey of Student Engagement".) Data from 2013 National Survey of Student Engagement; 13 CSU campuses; HSU students are 151 first-year students (61% female, 58% first-generation, 59% diverse backgrounds) and 298 seniors (61% female, 58% first-generation, 51% diverse backgrounds).

On a scale of 1 (Poor) to 7 (Excellent) – percentage responding 6 or 7

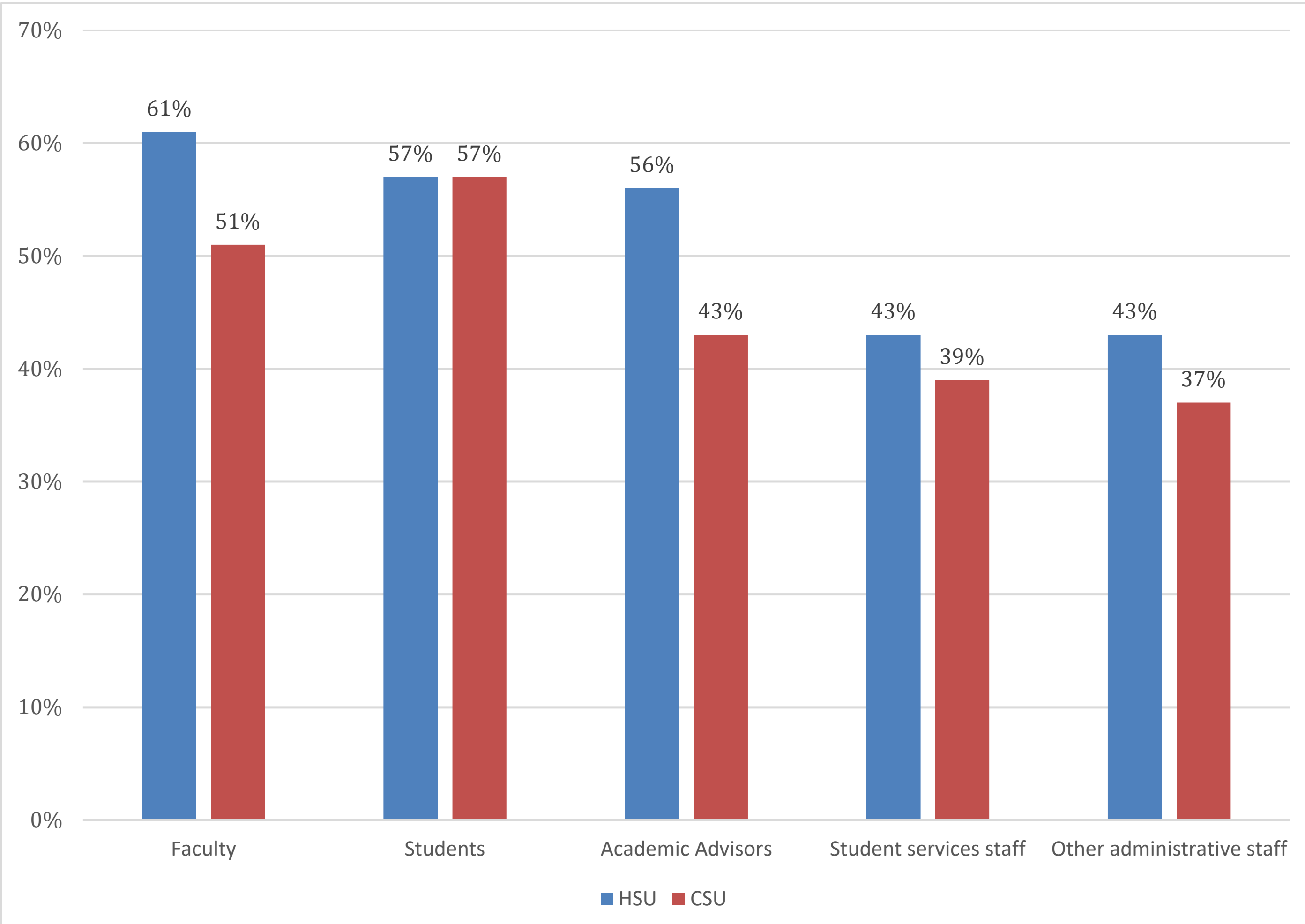


Figure 18. Comparison of the quality of interactions that occur on campus for HSU and other CSU students. (From: Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 9/22/2017; "Part I: A Primer - National Survey of Student Engagement".) Data from 2013 National Survey of Student Engagement; 13 CSU campuses; 151 first-year students (61% female, 58% first-generation, 59% diverse backgrounds); 298 seniors (61% female, 58% first-generation, 51% diverse backgrounds).

Student responses of “Very much” or “Quite a bit” to how much the institution emphasized:

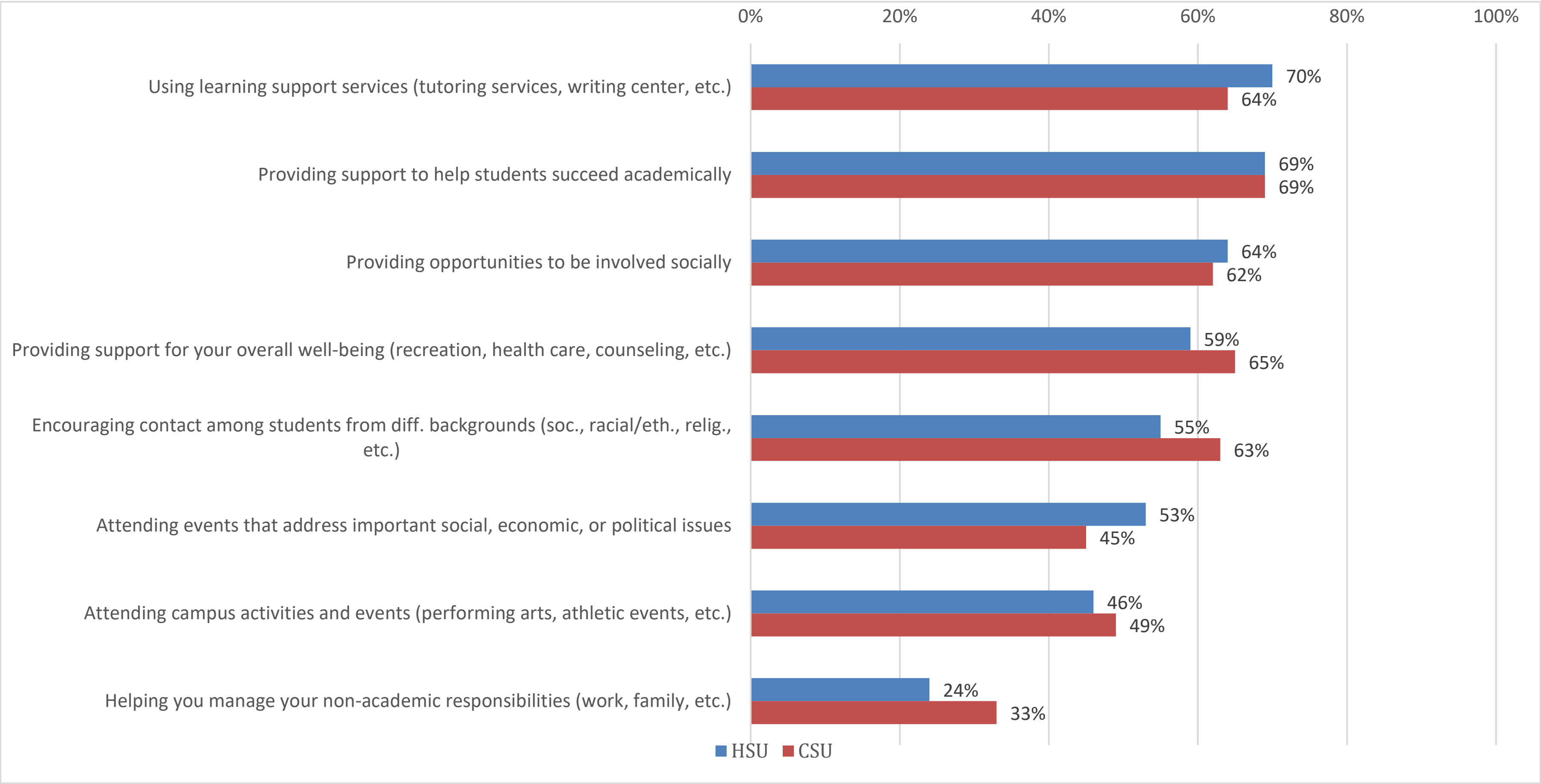
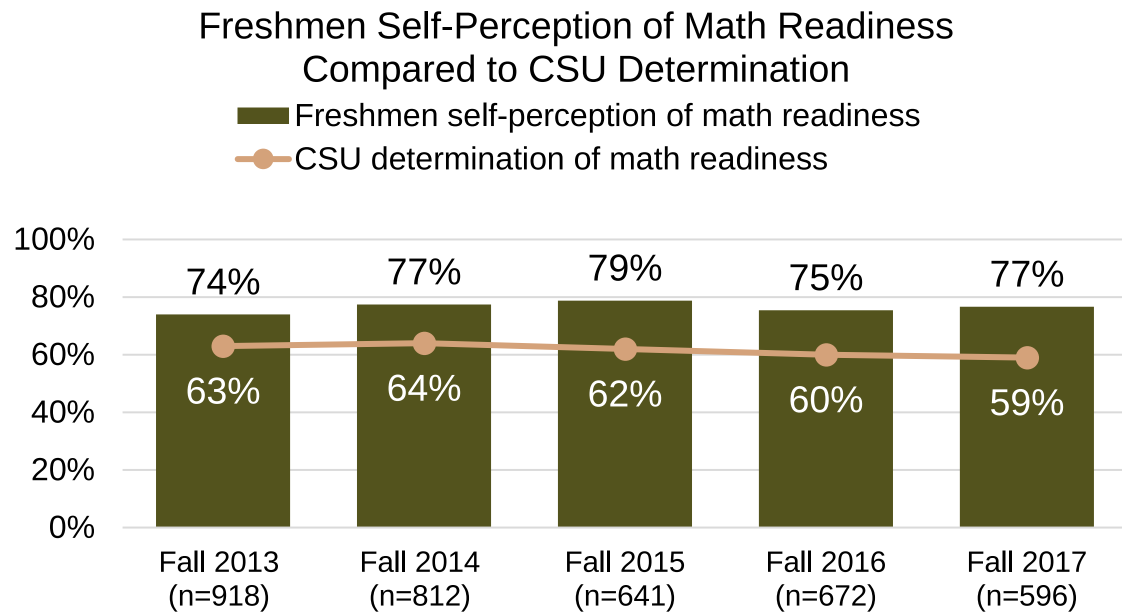


Figure 19. Comparison of how supportive the campus environment is for HSU and other CSU students. (From: Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 9/22/2017; “Part I: A Primer - National Survey of Student Engagement”.) Data from 2013 National Survey of Student Engagement; 13 CSU campuses; 151 first-year students (61% female, 58% first-generation, 59% diverse backgrounds); 298 seniors (61% female, 58% first-generation, 51% diverse backgrounds).



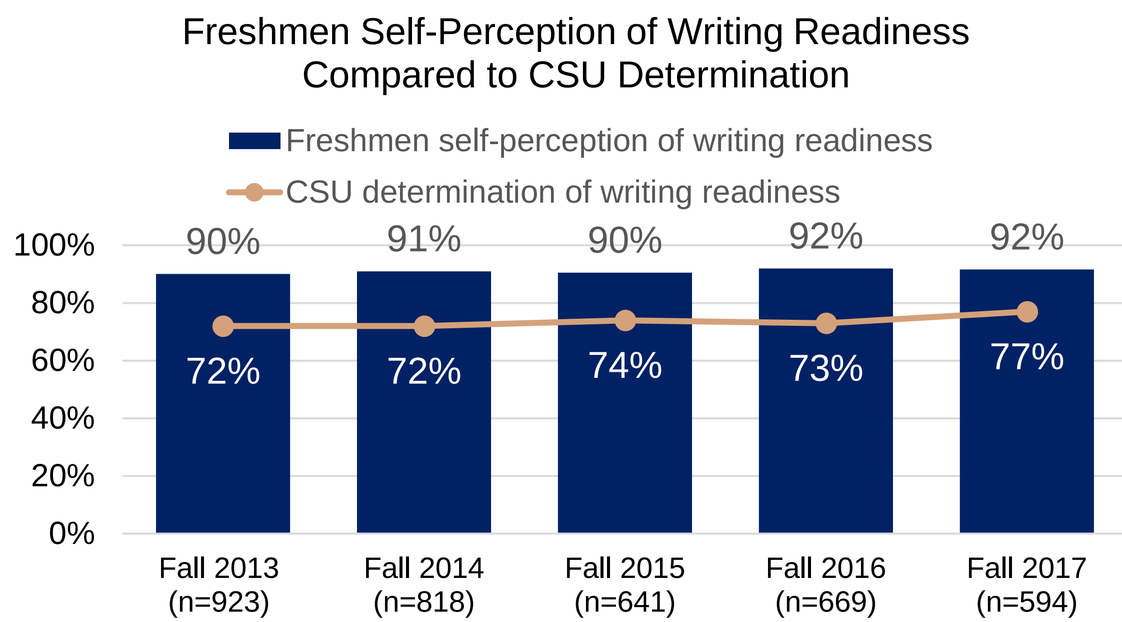


Figure 20. The % of first-year students who consider themselves to be ready (solid bars) for math compared to the CSU determination of math readiness (grey line). (From: Presentation by L. Castellino, HSU Office of Institutional Effectiveness, 12/11/2017; “We are Here: A Snapshot of HSU’s Current Conditions, Circumstances and Influences”.) Data from MAP-Works Survey 2013 through 2017.

Recommendations

1. Ensure that there are sufficient numbers of faculty necessary to sustain classes and opportunities for hands-on learning, with enough frequency for students to graduate on schedule.
2. Address course scheduling conflicts, and apparent lack of course sections, with more efficient and higher quality academic advising that is tailored to specific department needs. For example, utilizing the DARS planner tool, increasing collaboration between CNRS and available campus resources, and include academic advising in the RTP process.
3. Invest in the teacher-scholar model so that faculty are incentivized by receiving release time or summer salary to apply for grants that directly support student research. All faculty (lecturers and tenure-track faculty) should be given equal opportunities.
4. Eliminate the gap in understanding between students and faculty about course expectations and the time that needs to be invested in order to succeed in an environment where students today have less time to dedicate to courses. For example, use the SCI 100 course to facilitate expectation-setting. In addition, require that each department rotates through instructors for SCI 100 so that all faculty work closely with freshman-level students.
5. Provide the opportunity for faculty and students to understand the gap between students' perception of self-readiness in their first semester at HSU and the CSU's determination of student readiness.
6. Increase faculty awareness of substantial mental health and work-life balance limitations of students and encourage faculty to work with students for flexibility in course assignments. Faculty and staff should strongly advocate for student well-being support outside of the College.

Appendix C – Scan: HSU & CNRS Budget

Narrative

Implementation of recommendations from this strategic plan require an understanding of three elements of the larger financial process: 1) the degree to which the CNRS is able to participate in choosing HSU funding priorities, 2) how actual funding levels to major business units (MBU) are calculated, 3) the history of HSU's underfunding of the CNRS instructional costs. The Results sections of this scan therefore has a section for each of these three elements. With respect to #3, we describe budget allocations and then the mismatch between those allocations and instructional costs. This last section also summarizes the use of MSF fees within CNRS, as well as the distribution of workspace.

Methods

Information about budget planning processes came from the HSU President's Charge to HSU's University Resources Planning Committee (URPC)[24] and from interviews with CNRS Deans and Chairs. HSU budget data was taken from HSU Oracle Business Intelligence (OBI), the HSU Office of Institutional Effectiveness (OIE) – Strategic Data Repository, and HSU's University Budget Office.

Results

#1. The Decision-Making Process

CSU & HSU

The HSU budget office structures a request to the CSU Chancellor's office reflecting HSU's base costs (e.g., salaries and benefits) and projections of student enrollment targets. The Chancellor's office receives this request in September and adopts a budget in November. In January, the California Governor proposes the state budget (which may revise the Chancellor's budget), which may be further revised in May. By summer, HSU receives a final **Base Budget** (i.e., also called the HSU Operating Fund) from the Chancellor's office. Final budget numbers arrive at HSU after students have enrolled in the Fall semester. Therefore, HSU has to make a financial commitment to teach students before the budget is determined.

HSU

HSU's University Resources Planning Committee (URPC) makes budget recommendations to HSU's President. Membership on the URPC includes the following people: 3 elected faculty, 1 college Dean appointed by the President, 3 Vice Presidents (i.e., Administrative Affairs, Student Affairs, University Advancement), 2 staff, and 2 students. Advisors to the URPC include the Budget Director and Budget Analysts for each division (e.g., Office of Academic Affairs, Student Affairs). The HSU Budget Office supplies budget details to the URPC. The URPC votes on the dollar amount for each division based on divisional budgets put forth by the Vice Presidents that serve on the committee.

The URPC's recommendations are presented to the President who consults with the HSU Cabinet. These are closed meetings. Cabinet membership includes the following people: President, Provost, Vice President for Administration and Finance, Vice President for University Advancement, and the Executive Director for Diversity, Equity and Inclusion, and a Chief of Staff. The Provost, as Vice

[24] https://budget.humboldt.edu/sites/default/files/budget/documents/FY17-18/Budget%20Update%20083117.pdf

President of Academic Affairs, is the only committee member who directly represents the academic experience. The amount of funding to each college depends upon the level of funding this committee allocates to the Office of Academic Affairs.

CNRS

Experiences from two recent CNRS Deans (Dr. Steven Smith, Dr. Richard Boone) indicate that substantive opportunities for a CNRS Dean to negotiate, provide input, or discuss changes to budget allocations with either the URPC or the President's Office do not occur. This experience contradicts language in the 2016/2017 CNRS Administrative Handbook, which reads that budget allocation methodology should be "open to inspection and be explainable" and "subject to verification and correction" (p. 71). However, since Spring of 2018, the Office of the Provost has been engaged in building a budget model that will reflect the true cost of instruction, be responsive to changes in student enrollment, and re-engages the colleges in the budget process. The model is a work in progress.

Before the HSU budget is submitted to the Chancellor's office, and working with the University Budget Office, the original budget for instructional costs is determined by each Dean's office. Historically, funds for salaries and benefits for faculty and staff are allocated to departments while those for lecturers, TA's, GA's, department chairs, student assistants and other flexible unbudgeted costs are held in a central college-wide department. Under the emerging model, all except the lecturer funding is distributed at the beginning of the academic year.

There are several versions of a **Revised Budget** that occur throughout the academic year. During this process the Base Budget is augmented with one-time dollars to meet specific needs (e.g., additional money to support more course sections). The final version of this budget is considered *the* Revised Budget. The dollar amounts received by each Department come from the Dean and are divided into four categories: Operating Expenses, Supplies, MSF (Materials, Services, Facilities fees) and Extended Education. Salaries and Benefits are distributed centrally from HSU and the auxiliaries.

In summary, while there are real constraints due to the timing of negotiations between the state, the Chancellor's Office and HSU, once a final Base Budget arrives to HSU there is little effective representation of CNRS priorities within the URPC or by the Vice-President for Academic Affairs. Allocation recommendations from the URPC and Vice-Presidents to the President have not been first discussed with the CNRS Dean to understand the implications of a new budget to the CNRS mission. An effective and truly representative discussion of how shifts in funding priorities affect unit budgets is also prevented by the lack of an actual HSU budget model (see #2). Ongoing work during AY 2018-2019 year is intended to begin addressing this problem.

#2. Calculation of Funding Levels

Recommendations by the URPC and Vice-Presidents are made by using the long-standing HSU practice of relying on historical based budgeting (i.e., money is allocated based on what was received the previous year with some up or down adjustment) rather than a budget model that is directly tied to instructional costs. Similar to the University, the CNRS budget planning process has largely been based on historical and "one off" allocations. This has resulted in a situation where departments that are increasing their FTES levels are constrained by budget while those that have decreasing FTES would appear to have excess funding. The CNRS budget model is undergoing revision to more closely align with an *"activity-based costing", department-responsibility based,* or similar budget planning process, that will allow funding levels to change based on student enrollment and other measures.

#3. University & College Budgeting & Costs

Base Budget Allocations

The Base Budget, which is a state appropriation, is not the only source of revenue for HSU. HSU Revenue sources, with their relative 2017 contributions were the following: tuition and fees (20%), grants and contracts (23%), auxiliaries (3%), the state appropriated Base Budget (45%), other (8%). Although the focus of this part of the scan is on the HSU Base Budget, decisions to enhance or cut

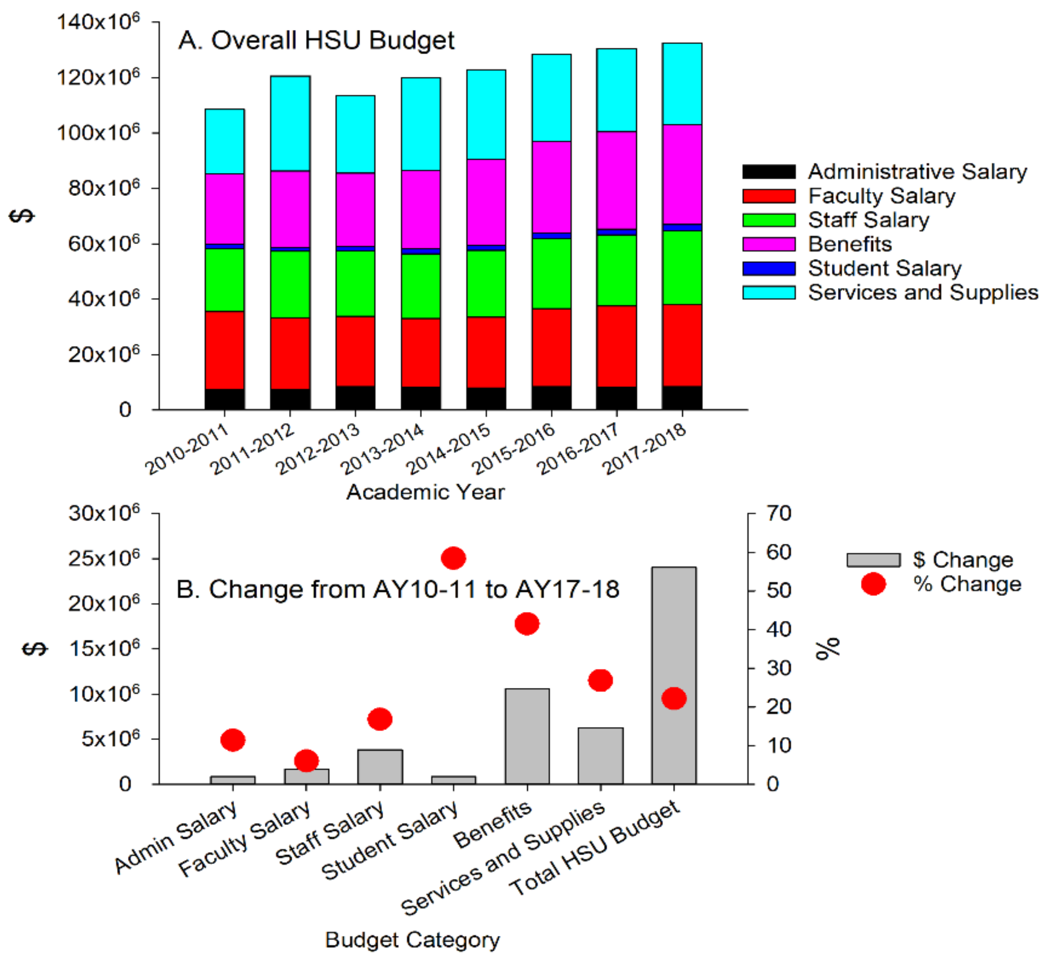


Figure 21. The overall HSU Base Budget by category (A.) and the absolute and % change in each budget category from AY 2010-2011 to AY 2017-2018 (B.). Data from HSU OBI (4/2018). All $ values were modified to be adjusted to 2017 inflation.

funds are not only affected by the Base Budget, but also on what is held in reserve by HSU, and that the size of these reserves is affected by all revenue sources.

The structure of the overall HSU budget is the self-funding organizations including the auxiliaries (Sponsored Programs, University Center, Advancement Foundation, and Associated Students), other self-funding organizations (Parking, Housing, Dining, etc.) and the HSU Base Budget. The latter is the primary source of revenue for the colleges.

At the scale of the entire university, the Base Budget steadily increased from AY 2010-2011 to AY 2017-2018, with Benefits having a larger dollar and percentage increase than other budget categories (**Figure 21**). Student Salaries had the greatest percentage increase but, in absolute dollars, this increase was small. The percentage change in allocations for Administrative, Faculty (Tenure-Track + Lecturer) and Staff salaries increased, respectively, by 11%, 6%, and 17% over this period (**Figure 21**).

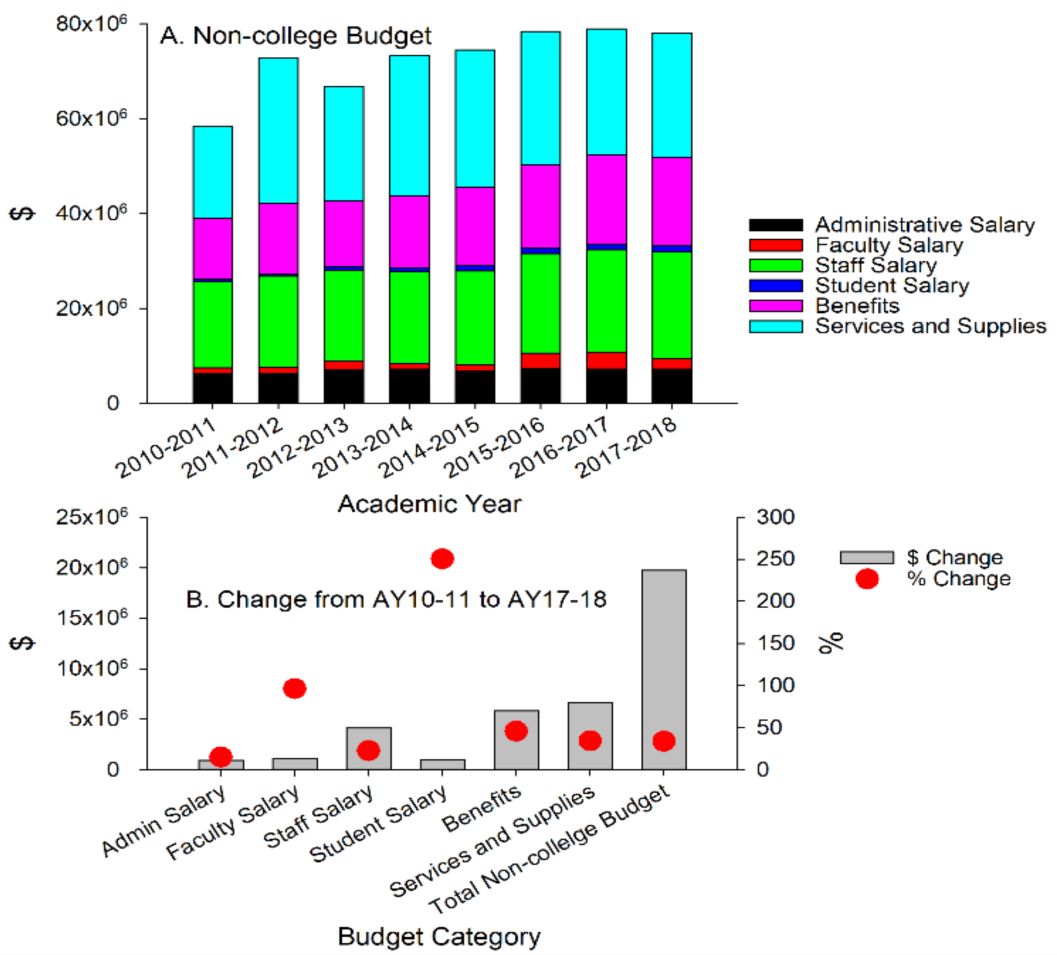


Figure 22. The overall non-college base budget by category (A.) and the absolute and % change in each budget category from AY 2010-2011 to AY 2017-2018 (B.). Data from HSU OBI (4/2018). All $ values were modified to be adjusted to 2017 inflation.

The non-college Base Budget followed a similar general pattern of allocation increase over time (**Figure 22**). The total percent change in the non-college budget from AY 2010-2011 to AY 2017-2018, when adjusted to 2017 inflation, was 33.8% ($19,743,013.76). When considered by each budget category, non-college faculty salaries increased by 96.5%, increases for non-college Administrative and Staff salaries, Benefits as well as Services and Supplies ranged from 15.1% to 45.5%, and non-college Student Salaries increased by 250.3% over this time period (**Figure 22**).

Base Budget allocations to all three colleges declined from AY 2010-2011 to AY 2013-2014 (**Figure 23**) while the total HSU and non-college budgets increased (**Figure 21, Figure 22**). College budgets rose from AY 2014-2015 to AY 2017-2018, with very similar budgets for CAHSS and CNRS, and a consistently lower budget for CPS (**Figure 23**). The largest budget categories for each college were Benefits and Faculty Salaries.

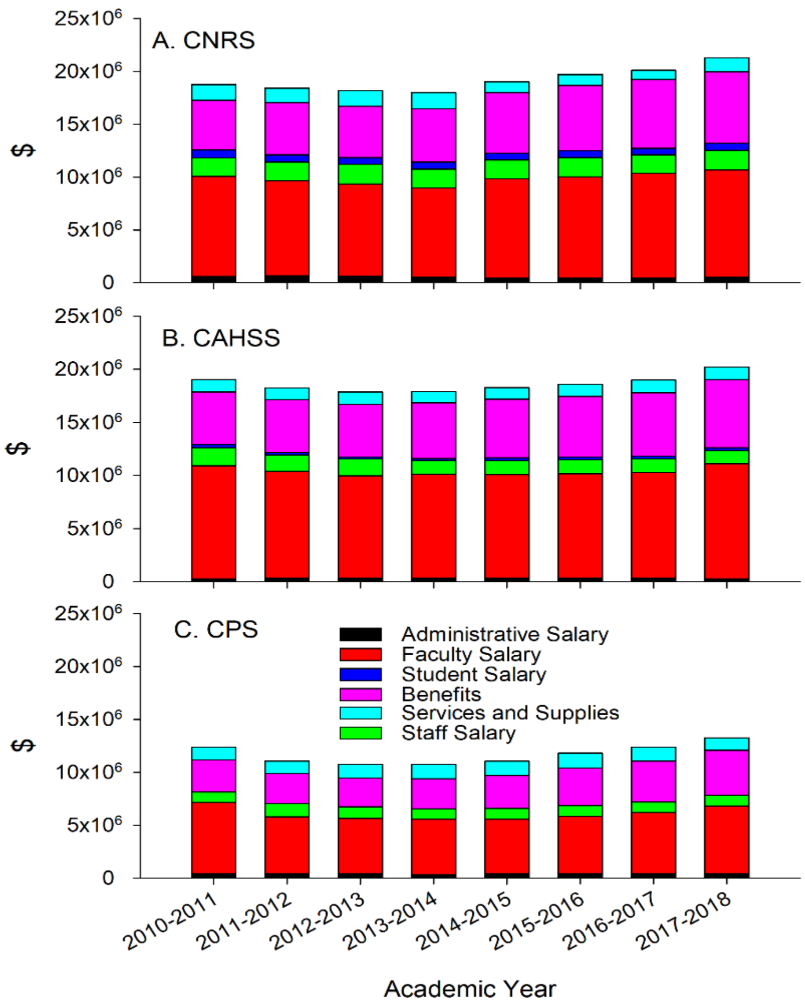


Figure 23. The base budget for each HSU college. Data from HSU OBI (4/2018). All $ values were modified to be adjusted to 2017 inflation.

With respect to college level Base Budget category changes from AY 2010-2011 to AY 2017-2018 (**Figure 24**), slightly positive or negative changes in absolute dollars occurred in all three colleges for Administrative, Faculty, Staff and Student Salaries. The percent changes in the total Base Budget for each college from AY 2010-2011 to AY 2017-2018, when adjusted to 2017 inflation, were 11.8% ($2,208.475.93; CNRS), 6.1% ($1,160,907.84; CAHSS), and 7.4% ($911,105.91; CPS). When considered by each budget category over this time period, Benefits had the largest percent increase for each college; 43.1% (CNRS), 29.7% (CAHSS), 39.8% (CPS). All colleges had some categories with a negative percent change (Figure 24); CNRS had -13.7% (Admin. Salaries), -11.9% (Student Salaries), -11.05 (Supplies & Services).

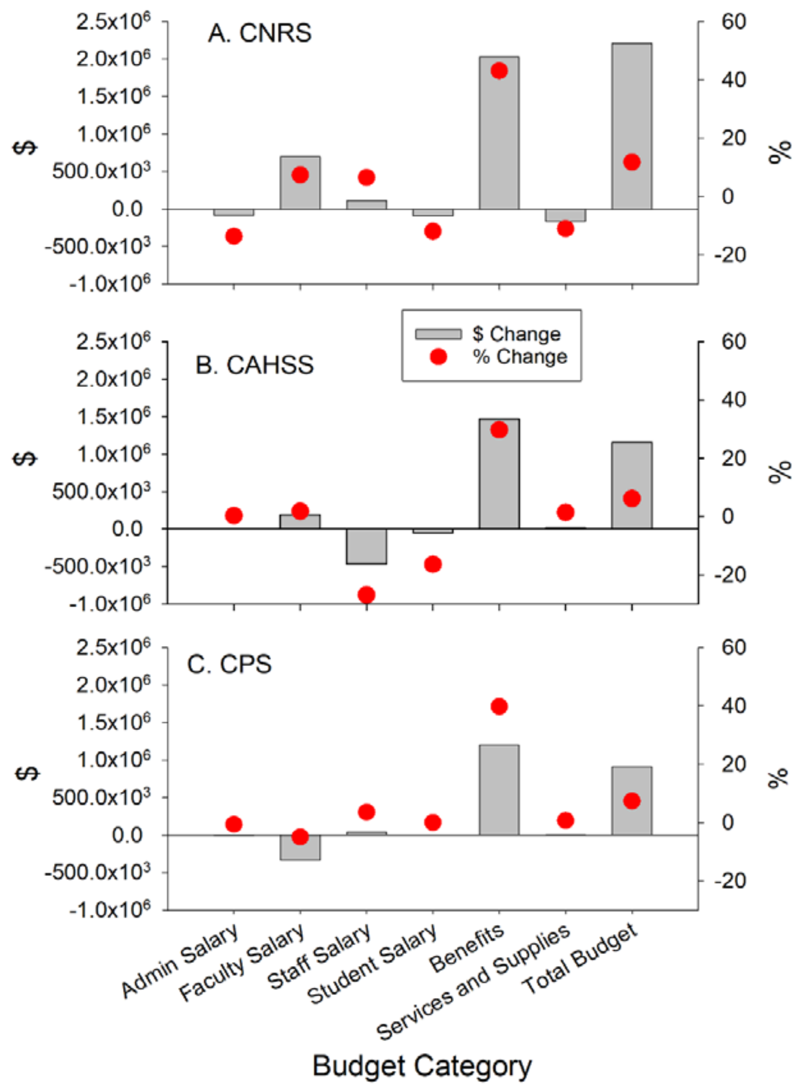


Figure 24. The absolute and % change for each base budget category from AY 2010-2011 to 2017-2018 for each HSU college. Data from HSU OBI (4/2018). All $ values were modified to be adjusted to 2017 inflation.

The Mismatch Between Base Budget & Instructional Costs

The number of students served by HSU is described by the total number of majors (i.e., headcount) including undeclared majors, as well as by the number of Full-Time Equivalent Students (FTES). One FTES equals 30 credit hours per year, and total FTES per College is total FTES/30. Credit hours used for FTES by College are the total credit hours taught within a given College, regardless of whether the credit hours are taken by majors or non-majors within the College.

Immediately following the 2008 and 2009 state budget crisis during which time CNRS cut instructional costs (e.g., dropping laboratory sections from courses, replacing tenure-track positions with lecturers, cutting Staff, Services & Supplies, cutting elective courses), CNRS experienced considerable student growth while the other colleges remained relatively steady (CAHSS) or grew at a moderate rate (CPS). From AY 2009-2010 to AY 2013-2014 the CNRS had the most majors, and the largest increase in majors, of the three colleges (**Figure 25 A**) whereas, for FTES, the CAHSS was highest from AY 2009 to AY 2016-2017, but FTES for the CNRS steadily increased over this entire period (**Figure 25 B**). More specifically for the CNRS, net changes from AY 2009-2010 to AY 2016-2017 were 474 (17%) for the number of majors and 579 (25%) for FTES. The largest CNRS increases in FTES occurred in Biology, Mathematics and Chemistry. Over this same time period the CAHSS declined in both number of majors (-190, or -8%) and FTES (-72, or -2%); the CPS showed a moderate to slight rise in number of majors (277, or 12%) and FTES (64, or 3%).

The CNRS Base Budget allocation decreased every year from AY 2009-2010 to AY 2013-2014 (**Figure 25 C**) at the same time that the number of majors and FTES was increasing for the CNRS. All three colleges saw a slight increase in Base Budget from AY 2014-2015 – 2016-2017. Since AY 2012-2013 the CNRS Base Budget has been slightly higher and parallel to the CAHSS and CPS allocations, which barely recognizes the national fact that the cost of educating a science student is greater than for other disciplines. National surveys show that engineering is the most expensive per student, and many of the CNRS's disciplines (physical sciences, natural resources) are above the national mean for all science disciplines.[25] Though not all the CNRS majors are expensive disciplines (e.g., mathematics) and not all expensive majors are in the CNRS (e.g., visual arts), a disproportionate number of typically expensive majors are within the CNRS, driving up overall cost of instruction. The CNRS is disadvantaged by a budgeting formula that considers the cost of educating a student to be the same for all HSU programs.

With respect to what was actually spent on each student (i.e., Actual Cost per FTES; **Figure 25 D**), rather than what was budgeted for each student, it is remarkable – but not a positive development for quality education – that the cost per student has been held close to level by the three colleges from AY 2009-2010 to 2016-2017. In the CNRS the approximately level cost per FTES (**Figure 25 D**) from AY 2009-2010 to AY 2013-2014 is particularly instructive and provides an example of how not to move forward with strategic planning. This level part of the CNRS curve was achieved because large, lower division courses met new, high Student:Faculty Ratio (SFR) targets (i.e., the number of students per course section – from 140 to 200 students) set by the HSU administration, and instructional costs were reduced by cutting laboratory sections and having some of these courses taught by lecturers rather than tenure-track faculty. These financially motivated steps broke many linkages between students and instructors at a time when HSU was, and still is, experiencing a large demographic shift in student composition.

Revised Budgets, in contrast to Base Budgets received by colleges at the beginning of the fiscal year, include special distributions for equipment or travel (in past years), some additional class sections, compensation (release time) for designated service (e.g., UFPC), and university or system-wide initiatives (e.g, EO 1110 course development). In general, Revised Budgets for each college have not kept pace with expenditures since AY 2012-2013, with the largest mismatch between the Revised Budget and instructional costs (i.e., expenditures + encumbrances) occurring in CNRS (**Figure 26**). In the

[25] Altonji and Zimmerman 2018

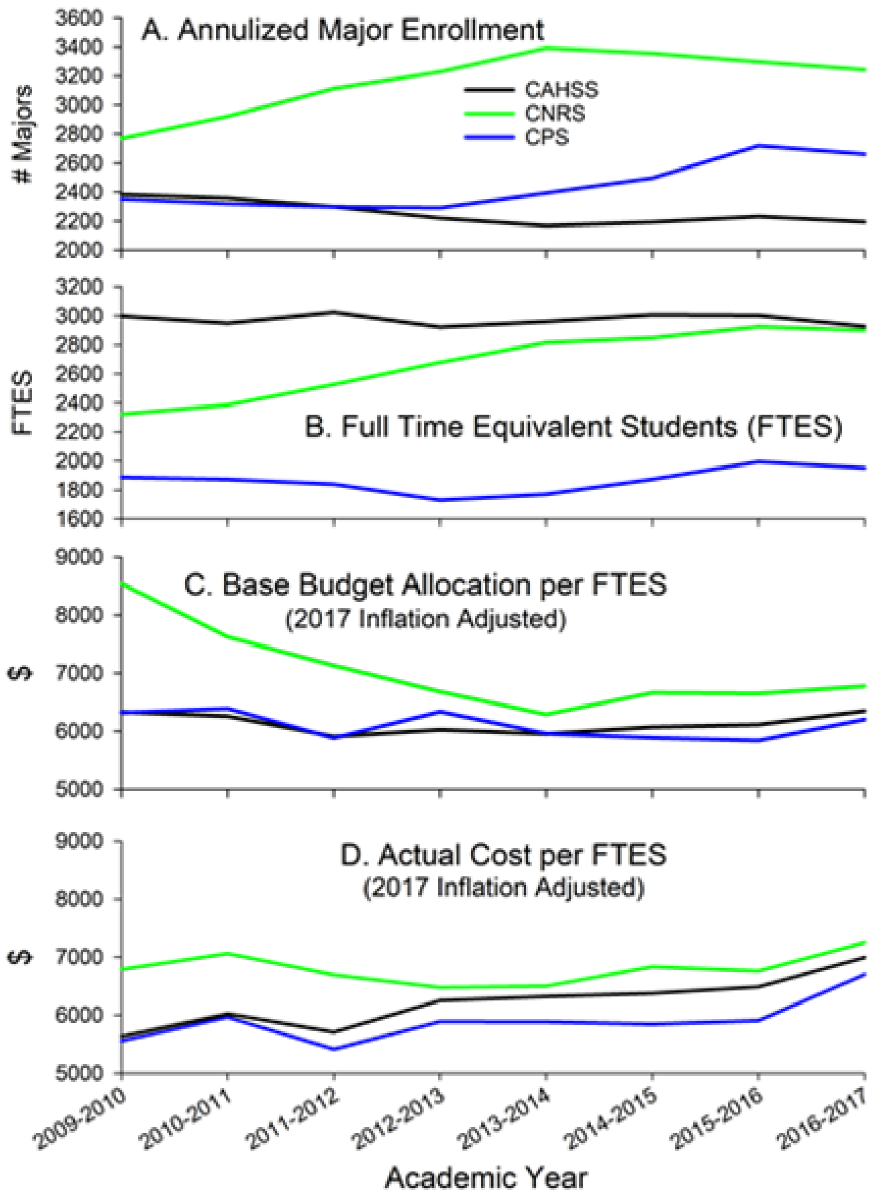


Figure 25. **(A)** The number of declared majors by College where values are the average over both semesters of the academic year and double majors are assigned to each respective College (Source: HSU OIE, Strategic Data Repository, Table: DM_ERSS_ALLMAJ, 10/19/2017). **(B)** FTES by college, regardless of whether or not the credit hours are taken by majors or non-majors within the College (Source: OIE, Strategic Data Repository, Table: DM_INSTRLOAD, 10/19/2017). **(C)** Base Budget allocation per FTES (Source: FTES data from OIE, Strategic Data Repository, Table: DM_INSTRLOAD, 10/19/2017; budget data from University Budget Office http://www2.humboldt.edu/budget/operating-budget, Accessed December 3, 2017). **(D)** Expenditures per FTES by College from Academic Year 2009-10 to 2016-17 (Source: HSU Office of Institutional Effectiveness, Strategic Data Repository, Table: DM_EXPEND_ACAD & DM_INSTRLOAD, 10/19/2017).

absence of a university budgetary model used during the planning process, HSU has used reserve funds to pay off these deficits at the end of each recent fiscal year. The diminishment of these reserves prompted additional budget cuts during AY 2017-2018, some of which will be additional stresses on the quality of the student experience (e.g., loss of large lecture WTUs for instructors, retiring Staff not being replaced).

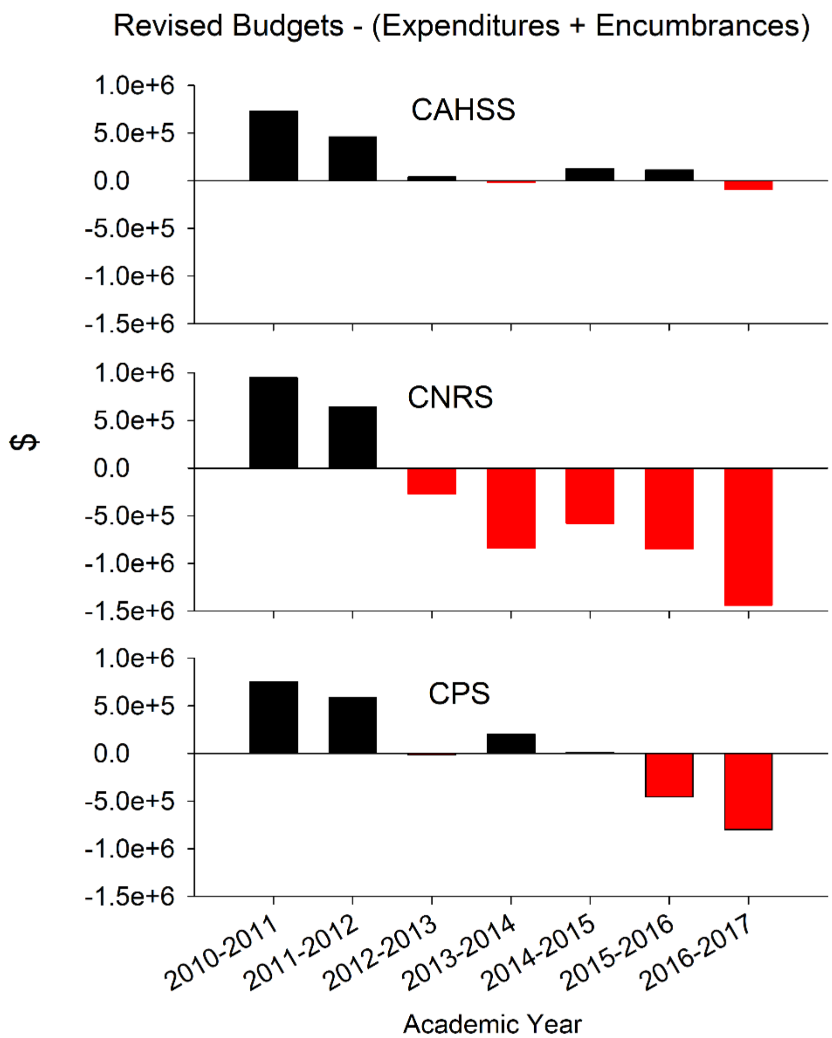


Figure 26. Difference between Revised Budgets and Expenditures plus Encumbrances by College for Academic Years 2010-11 to 2016-17. Data from OBI 2.5.00-UBO203 - Operating Fund Expenditures (Major Business Unit Point in time). Run date 02/05/18.

Materials, Services, and Facilities Fee

The student Materials, Services, and Facilities (MSF) fee provides significant revenue to CNRS. Revenue in AY 2016-2017 was $1.29M and largely supported salaries for technical staff. In the 1990s students proposed the fee, and it was adopted, following a reduction in the funding allocation from the state. According to the students' proposal, "The MSF Fee will allow HSU to maintain its current strengths and ensure that the campus continues to offer the best possible hands-on educational experiences to our students." The following are the six types of expenditure types associated with the structure of the fee request:

1. Maintenance contracts for specialized facilities
2. Field trip costs <$50 per student

3. Equipment for specialized Facilities
4. Staff Salaries/Benefits for specialized programs and facilities
5. Faculty-assisted undergraduate research (supplies, software, other)
6. Guest lecturers to supplement instruction

Until several years ago, most of the MSF revenue provide support for non-personnel costs. However, because of a CNRS shortfall several years ago (Figure 26), a number of support staff were moved from stateside to MSF support. In AY 2016-2017, the cost of CNRS support personnel supported with MSF was $1.072M or 83% of the MSF allocation, leaving a balance of $213,887 that was distributed among the departments, mostly for field trip costs, and the CNRS Core Facility (**Figure 27, Figure 28**). The distribution of the MSF balance, after personnel costs are subtracted, varies highly with the largest portions allocated to the Core Facility, Forestry, Geology, Wildlife, and Biology. MSF provides significant revenue towards field trip costs in Forestry, Wildlife, and Geology. The distribution of MSF among departments currently does not take into consideration the MSF revenue generated by the total FTES per department. Criteria for the distribution of MSF have not been found so far and may well reflect negotiations between the Dean and the department chairs when the MSF fee was adopted in the 1990s. It should also be noted that the formula for HSU distribution of MSF is 50% CNRS and 25% each to CAHSS and CPS, though recently there has been some campus-level discussion of re-considering the formula.

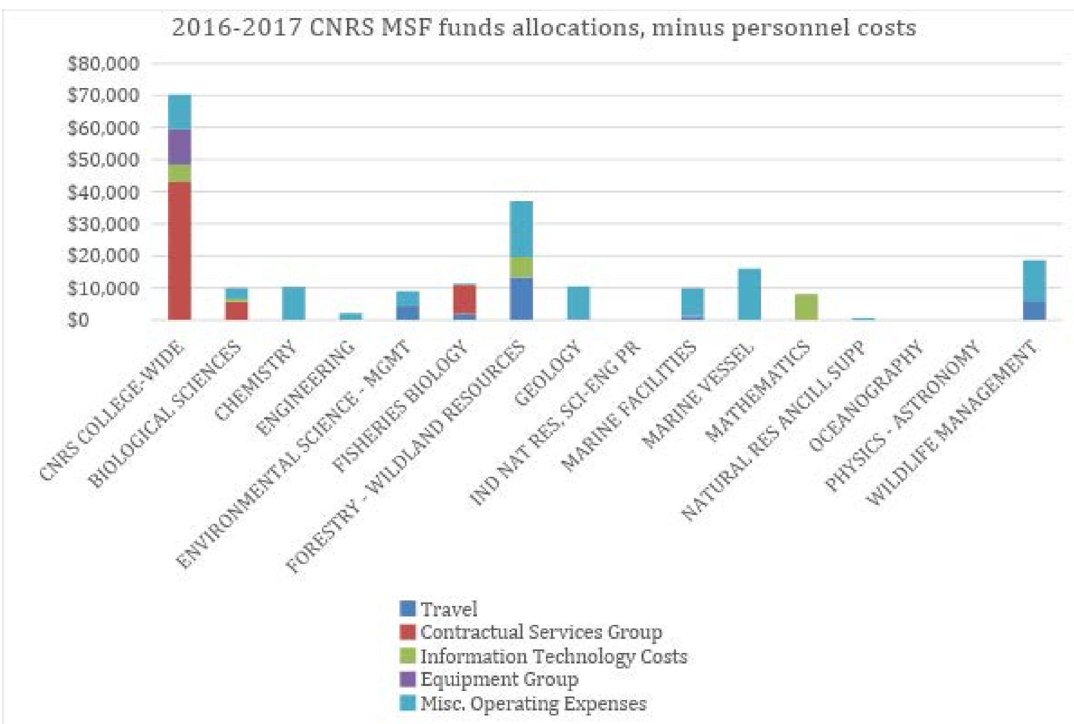


Figure 27. Dollar distributions of MSF, after subtracting for personnel costs, among departments and the CNRS Core Facility. Values are based on the 2016-17 MSF allocation.

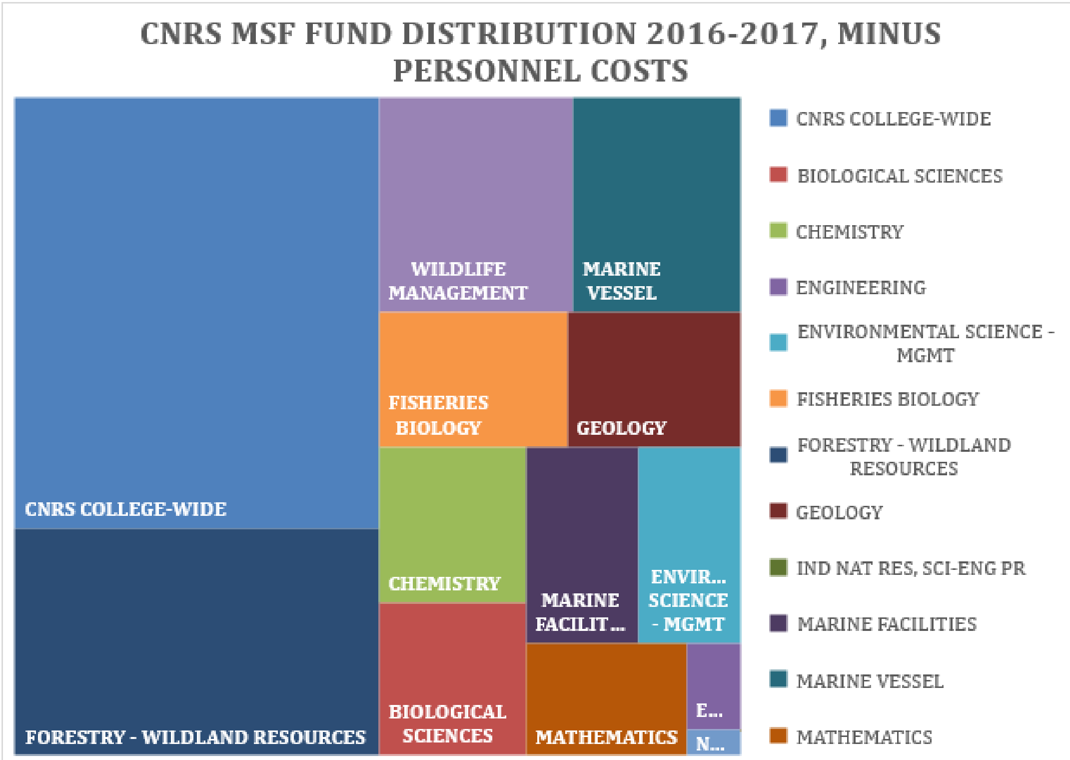


Figure 28. Distribution proportions of MSF, after subtracting for personnel costs, among departments and the CNRS Core Facility. Values are based on the 2016-17 MSF allocation.

Workspace

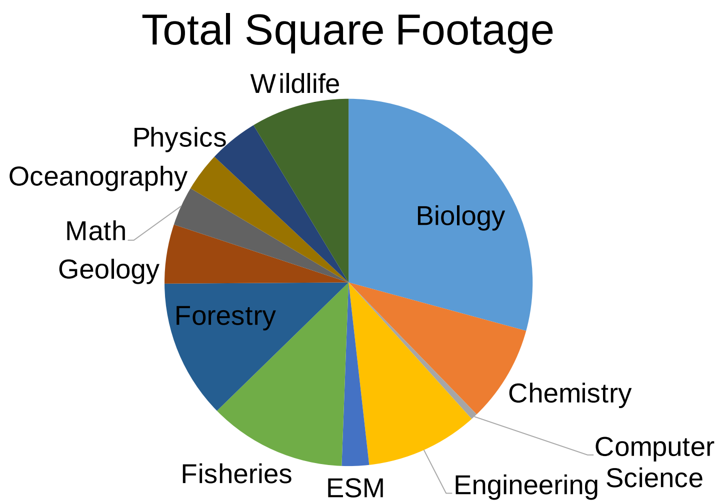


Figure 29. The total square footage for each department in CNRS.

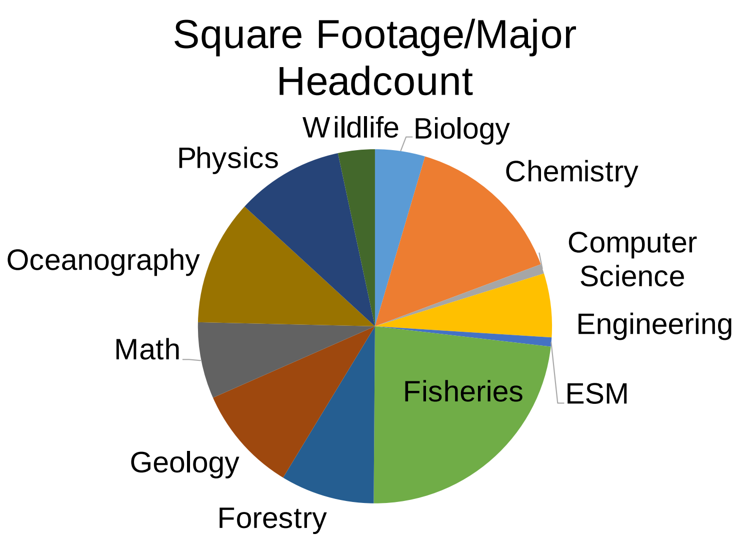


Figure 30. Square footage of workspace per major for each department in CNRS.

With respect to the amount of total workspace available, the Biology, Forestry and Fisheries departments have the most space whereas the ESM and Computer Science departments have the least space (**Figure 30**). When space is expressed as the amount of area available to each student in a particular department then the Fisheries, Chemistry and Oceanography departments have the most space whereas the ESM, Computer Science, Biology and Wildlife departments have the least space (**Figure 31**). However, the adjustment shown in **Figure 31** is more accurate for some departments than others because some departments have a higher service component to their course offerings. If the latter were included then the square footage per student would be smaller, particularly for the Math, Chemistry and Biology departments.

Recommendations

1. Each Dean should be a member of the URPC and college budget personnel should attend as advisers. Deans should replace college faculty representatives on the URPC. This would allow Deans to participate in early discussions of university-wide priorities and to advocate for the missions of their respective colleges. This membership change to the URPC would also increase the transparency of the budget process because Deans would report on URPC proceedings during their weekly meetings with department Chairs. This recommendation is in line with what HSU Chairs advocated for in their Spring 2018 letter to, and meeting with, the HSU President.[26]
2. Share the methods and data used to formulate budgets and allow sufficient time for Colleges and Departments to understand those data.[22]
3. The university should use an actual budget model early in the process of budget deliberations to more accurately understand the effects of changing budget priorities on the missions of campus units, and to tie budget allocations to instructional costs. CNRS also needs to adopt the practice of using an actual budget model rather than historical based budgeting.
4. The University needs to take seriously proposals from departments regarding creative funding (e.g., using industry or grant funding) for faculty positions. This will require that Advancement work with Colleges and Departments to facilitate private fundraising. CNRS in consultation with the Provost and potentially the Dean of Research should develop a policy or MOU regarding funding sources for faculty start-up.
5. Within CNRS, MSF funds need to be distributed according to pre-determined criteria. The present distribution of MSF funds within the college is not matched to departmental needs. The criteria for dissemination should be created by a task force, which would also be responsible for MSF allocation. Students should be part of this task force, since they initially established MSF funds as an additional student fee, and they should be involved in decision making regarding MSF allocations.

5. CNRS should develop criteria for the distribution of grant indirect costs (IDC) returned to departments and the Dean's office to improve and enhance research capacity.
6. CNRS should develop a sustainable budget model for the RV Coral Sea. CNRS, in collaboration with the other Colleges and APS, should develop a model for fair compensation of department chairs.

[26] Letter to the HSU President from HSU Chairs & meeting notes from meeting with the President on 3/27/2018.

Appendix D – Scan: Erosion of Teaching & Mentoring Power in CNRS

Narrative

The efforts of Tenure-Track (TT) and Lecturer Faculty along with graduate Teaching Associates (TA) are combined to produce a potentially powerful learning environment for CNRS students. The ability of CNRS to continue to provide a high quality learning environment has been damaged by not hiring enough TT Faculty, by the poor practices used by HSU to hire Lecturers, and by the limited pedagogical and content training received by TAs. All of these issues have become worse in the past decade.

In addition to course instructional duties, TT faculty are expected to be leaders in programmatic, curricular and pedagogical innovation, extramural grantsmanship, scholarship, student advising and HSU and non-HSU service. CNRS lecturers participate in some of these duties, but without enough tenure-track faculty, these duties get eroded or dropped. Lecturers carry heavy teaching loads but, even so, volunteer to serve on committees and mentor students. Graduate TAs have their largest impact on the undergraduate experience when the TAs run course laboratory sections, but undergraduates also assist graduate students in their M.Sc. thesis research.

Methods

Annual data on the full-time equivalent faculty for lecturers and tenure-track (TT) as well as full time equivalent students (FTES) for each department and for the entire college were obtained from the Faculty Assignments by Department (FAD) reports[27], and from APR[28].

Results

Tenure-Track Faculty

As a whole, the level of TT teaching is below 70% FTEF with five departments regularly occurring below the % TT CNRS mean (**Figure 31,** blue curve). Departments with large service courses and/or graduate programs have the lowest TT FTEF. The ESM department is an exception to this pattern because they have the lowest % TT in CNRS but do not have many service courses and they do have a graduate program (**Figure 31**).

[27] https://www.google.com/url?q=http://pine.humboldt.edu/~oaa/fad-index.html&sa=U&ved=0ahUKEwjH2d2psNfcAhVC0KwKHR9dDNAQFggEMAA&client=internal-uds-cse&cx=016116879625100262331:nyxfuocjlyc&usg=AOvVaw0RjMxxwB8OFcZD4KLeV6xM

[28] Data from HSU Tableau Annual Program Report accessed 12 April 2018

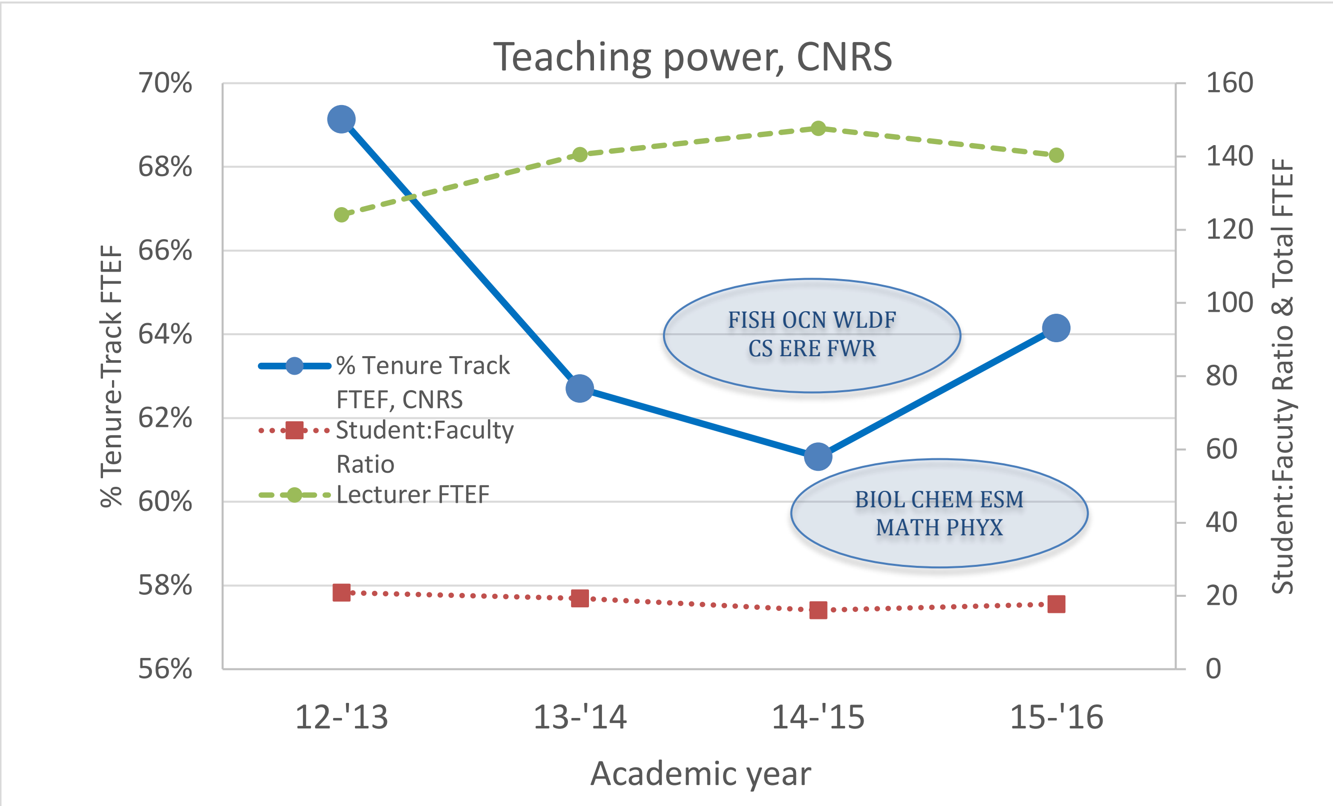


Figure 32. The number of tenure-track faculty (FTEF) per 100 majors (headcount) from AY 2012-2013 to AY 2015-2016. These values did not change too much over time, but they vary markedly among departments.

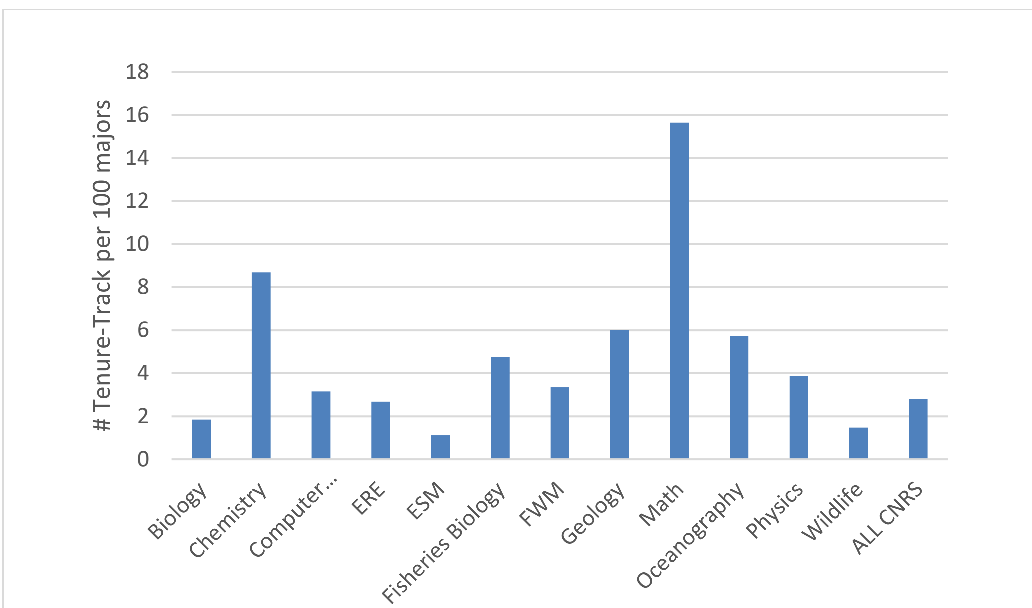


Figure 31. Tenure-track density as # TT faculty per 100 students.

The # of TT faculty per 100 majors hasn't changed much over time, but it varies widely among departments (**Figure 32**). Three departments that do a lot of undergraduate and graduate research and have large numbers of majors (obligations that fall almost totally on TT faculty) yet have proportionately few TT faculty stand out: Biology, ESM, and Wildlife.

Introductory Course Instructor Assignments

We analyzed the percentage of students taught by lecturer versus tenure-track (TT) faculty in 100-level CNRS courses taken by CNRS majors. Results are from AY 2011-2012 to 2015-2016 and are broken down by student standing (**Table 3**). There is extreme variability in whether students in introductory courses are taught by lecturers or TT faculty, with some courses taught exclusively by lecturers (i.e., CHEM 107, EMP 105, MATH 114, PHYX 106, PHYX 107, PHYX 111) and others exclusively by TT faculty (i.e., ENVS 111, MATH 110).

It can be challenging for a lecturer to maintain a high quality of teaching because of the untenable position that lecturers and the people hiring them – often Department Chairs – are put in. Department Chairs generally create an estimated number of fall semester course sections for the normal early registration period during the preceding spring semester. The number of sections created is based upon estimated enrollment and not the availability of TT and lecturer faculty. When there are more sections than instructors, the Chair must hire additional lecturers during the spring and summer. There is some time to find a new lecturer to appoint for the following Fall semester, but Chairs often have to do this task alone because the search ends up not occurring on 'green days'. The time crunch for hiring new lecturers is even tighter for sections that have to be taught in the spring semester because there is such a short period of time between fall registration and the beginning of the spring semester.

There are high quality lecturers at HSU, but the ability to hire more of them is severely constrained by HSU's hiring practices – more specifically, the advertisement and the appointment letter language describing the length of the position, and salaries. With respect to the position description, HSU must rely on bringing in both local and distant applicants since the former pool is small relative to urban CSU campuses. In some fields, the pool is nonexistent. Potential full-time teaching loads developed by Chairs are in some cases a patchwork of courses and, in other cases, a more stable set of courses that will need to be taught indefinitely. The policies of Academic Personnel Services (APS) are large impediments to the recruitment of lecturers for these positions. For example, if there is a position where the need will extend several years, APS will not allow the Vacancy Announcement to state the multi-year terms and instead requires the advertisement state a term of "one-year with the possibility of renewal". There is a huge difference in a potential candidate's mind between a three-year position versus a one-year position with only the possibility of renewal. The problem is more acute when considering HSU's remote location, and that moving expenses are typically not covered for a temporary lecturer position.

Low salaries are also a hindrance to developing an applicant pool that is large enough to ensure a strong match between a person's training and the course(s) that he/she will teach. This is particularly the case for applicants who would have to move hundreds if not thousands of miles to work at HSU. As an example, during summer 2015 a search was held for a full-time CNRS lecturer. The search committee performed Skype interviews of the six top candidates. When the likely salary was quoted, each candidate visibly registered shock and one of them immediately dropped out. None of the top six candidates accepted an offer of the position. The seventh candidate accepted the position; however, this person dropped out one week prior to the start of the semester, at least partially because of the wording of the appointment letter. There is a pretty good Benefits package if there is a workload of at least 6 WTUs each semester, but this positive aspect of the job may be offset by the language "one-year with the possibility of renewal". This is a common experience in the CNRS.

The CNRS departments have mentoring/review policies for lecturers, but they are not designed to fill the gap in subject knowledge and/or teaching practices that can occur when there is a large mismatch between the background of a new hire and that person's teaching load. Furthermore, implementation of these departmental policies (e.g., class observations that must adhere to contract language, reading student evaluations, meeting with the lecturer, writing Personnel letters) increases the workload for TT faculty, especially the relatively small percentage of Full Professors. For example, 12 lecturers in the Department of Biological Sciences had to be reviewed during Fall'17 in addition to the TT faculty up for promotion or review.

Table 3. The % of CNRS students in lower division CNRS courses taught by lecturers and tenure-track (TT) faculty. The distribution of students according to course and instructor is presented as all CNRS students, as well as lower division (LD) and upper division (UD) CNRS students. The data are from the Fall 2011 to Spring 2016 semesters. The semester by semester data was provided by HSU OIE during Spring 2017; non-CNRS students in these courses were excluded from this summary.

		Overall % of Students						**Overall % of Students**		
Course	**Instructor**	**ALL**	**LD**	**UD**		**Course**	**Instructor**	**ALL**	**LD**	**UD**
BIOL 105	Lecturer	83%	82%	84%		MATH 113	Lecturer	92%	91%	100%
	TT	17%	18%	16%			TT	8%	9%	0%
BOT 105	Lecturer	42%	43%	42%		MATH 114	Lecturer	100%	100%	100%
	TT	58%	57%	58%			TT	0%	0%	0%
CHEM 107	Lecturer	100%	100%	100%		MATH 115	Lecturer	80%	80%	81%
	TT	0%	0%	0%			TT	19%	19%	19%
CHEM 109	Lecturer	35%	35%	34%		OCN 109	Lecturer	7%	7%	7%
	TT	65%	65%	66%			TT	93%	93%	93%
CHEM 110	Lecturer	14%	13%	14%		PHYX 106	Lecturer	100%	100%	100%
	TT	86%	87%	86%			TT	0%	0%	0%
EMP 105	Lecturer	100%	100%	100%		PHYX 107	Lecturer	100%	100%	100%
	TT	0%	0%	0%			TT	0%	0%	0%
ENVS 110	Lecturer	57%	58%	55%		PHYX 109	Lecturer	95%	93%	96%
	TT	43%	42%	45%			TT	5%	7%	4%
ENVS 111	Lecturer	0%	0%	0%		PHYX 110	Lecturer	89%	95%	88%

	TT	100%	100%	100%			TT	11%	5%	12%
MATH 105	Lecturer	83%	81%	84%		PHYX 111	Lecturer	100%	100%	100%
	TT	17%	19%	16%			TT	0%	0%	0%
MATH 109	Lecturer	9%	9%	9%		ZOOL 110	Lecturer	52%	51%	53%
	TT	91%	91%	91%			TT	48%	49%	47%
MATH 110	Lecturer	0%	0%	0%		**All Courses Summary**	**Lecturer**	**60%**	**57%**	**64%**
	TT	100%	100%	100%			**TT**	**40%**	**43%**	**36%**

Training of Graduate Student TAs

Over 1000 students each semester were taught by graduate student Teaching Associates (TAs) from the Fall 2009 to Fall 2017 (**Figure 33**). Across four years though, the % of all CNRS students taught by graduate students must be very high because almost every degree program in CNRS contains courses where undergraduates enroll in a laboratory section run by a TA. The majority of TAs occur in Biological Sciences due to the large number of lower division laboratory sections and the moderate number of large upper division courses with laboratory sections in this department.

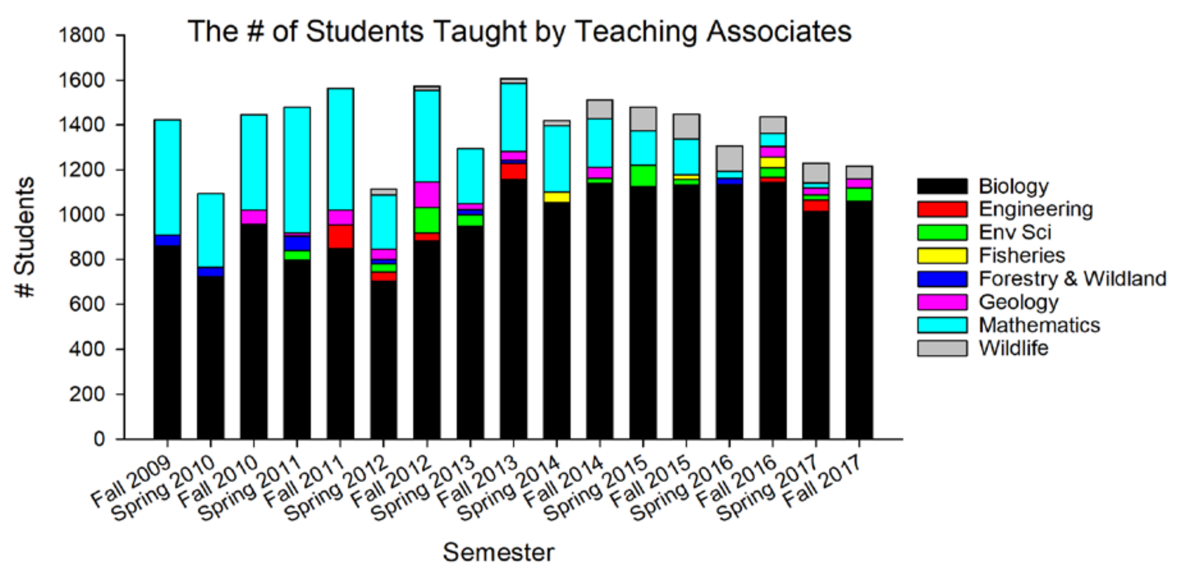


Figure 33. Teaching impact (as # students taught from all 3 colleges) of CNRS graduate Teaching Associates. Note: A student could be double counted if they were taking more than one lab course in the same semester. Data from OIE (December 2017).

The teaching effect of graduate students extends beyond CNRS because several of the lower division courses offered by Biological Sciences and other CNRS departments are lower division Area B GE courses (e.g., BIOL 102, 104, BOT 105, OCN 109). Among year variation in the number of students taught by TAs, and in the number of TAs, is driven by changes to enrollment levels and fluctuations in the number of laboratory sections taught by TT and lecturer faculty rather than TAs.

The training that graduate students receive in how to teach their laboratory sections therefore potentially has a very large effect on the quality of the education experienced by undergraduates – particularly those in CNRS. Current TA training practices in Biological Sciences exemplify developments that support and erode the readiness level of TAs. A course in laboratory instruction for first semester graduate students was cancelled in 2009 due to budget cuts and was restarted in Fall'17. This course now covers issues such as how to introduce the lab of the day, interacting with students, managing the learning atmosphere, and how to interface with the course instructor.

A different facet of TA training is the level of preparation for the lab exercises each week provided by the course instructor. While an accepted best practice is to have TAs do the lab exercises before they teach them (i.e., not just be told about the upcoming lab), this level of preparation does not always happen in the Department of Biological Sciences. This is problematic because some graduate students are assigned to teach courses for which they have little background – a scenario that occurs due to schedule conflicts between when lab sections are offered versus the timing of courses that the graduate student needs to take for his/her own program. TA preparation was further diminished by the 2016 TA Unit 11 contract that changed graduate TA positions from an Exempt to a non-Exempt status, thereby restricting the TA work to 5.33 hours / 2 WTUs (1 three-hour lab section) / week). Faced with multiple course related tasks taking 10-15 hours / week, some TT and lecturer faculty during Fall'17 elected to cut or not increase preparation time for TAs.

Recommendations

Tenure-Track Faculty

1. The number of TT faculty must be increased in many CNRS Departments in order for the college to continue its excellent record in curricular innovation, mentoring, advising, scholarship and service. The low number of TT faculty are being overwhelmed in their attempts to provide a complete and high quality educational experience for CNRS students.

Lecturer Faculty

2. There needs to be guaranteed appointment durations (assuming adequate performance) for lecturers. Departments would need to verify a need for a temporary faculty member for at least that term. This would include an analysis stating that student demand would be adequate to meet the workload for the new hire over the appointment duration.
3. A new category of faculty member needs to be created – one who is permanent (assuming adequate performance), but not expected to conduct research.
4. A mechanism needs to be provided (e.g., space, equipment, money) to allow temporary faculty to continue to perform research in their specialty. Without such an opportunity, someone taking one of our temporary appointments is sacrificing their opportunity to successfully compete for a tenure line position sometime in the future. Temporary faculty

applicants are aware they may be trading a short time job now for the possibility of a later permanent position, which makes it less likely they will accept an HSU position.

Teaching Associates

5. All CNRS TAs, not just those in the Department of Biological Sciences, should take either the TA training course offered by Biological Sciences, or a very similar course in another CNRS Department.
6. The number of hours per WTU for which a TA is paid should be doubled (e.g., 10.6 hrs rather than 5.3 for one three-hour laboratory section) in order to open up time for better preparation of the TA by the course instructor, and to complete other course duties.
7. Course instructors need to train TAs on how to do the laboratory rather than only telling TAs what the laboratory will be about.

Appendix E – Scan: Teaching Practices & Learning Opportunities

Narrative

This scan focused on aspects of HSU *teaching, hiring and training practices* that could affect the quality of the learning opportunities for students. This scan separates teaching practices (e.g., approaches taken by instructors with their students) from the potential effects of curricular structures on learning opportunities, which are summarized in **Appendix G – Scan: Curricular Structures & Learning Opportunities**. It is important to note that neither scan attempts to summarize the effect of particular teaching practices or curricular structures on the *amount of learning* by undergraduate and graduate students. Our avoidance of the latter subject is based on the rarity of this very focused kind of assessment.

Methods

As instructors one of the most important things we do is to review our pedagogical approaches and factors that affect the quality of the learning opportunities and so, from the perspective of this scan, it is frustrating that it has been so difficult to gather information about the pedagogical approaches, successes and failures of CNRS instructors. For teaching methods used by CNRS faculty, we report on the survey taken by Dr. Mazzag on the techniques used by faculty members who were willing to act as a resource for other faculty – but this list is not a comprehensive account of all the different types of CNRS teaching practices. CNRS has also sponsored several people to travel to HSU and give presentations and/or workshops on specific teaching practices, and anecdotally we can report that all of these people were very impressed by the diversity and thoughtfulness of the teaching practices used by the CNRS instructors.

The amount of faculty attending HSU and non-HSU pedagogy workshops and luncheons also would have given a sense of what the faculty are considering, but this information was not included in the scan. Similarly, we have not presented anything about the degree to which CNRS faculty participate in inclusivity workshops, or what types of inclusivity practices faculty use, but we have summarized the inclusivity resources available to HSU students and faculty. The primary reason for not tracking down this information, which does exist, is that it is scattered among so many people and campus groups that the time it would take to assemble it was prohibitive.

There are other metrics that could be valuable indicators of whether or not teaching practices are resulting in quality learning opportunities. Examples include surveys of undergraduate and graduate student alumni for their opinions about their HSU experience and the jobs that they have obtained. Other valuable indicators would be the types of course and non-course related research experiences for students, and the percent of undergraduate and graduate students who present or publish HSU mentored research. None of these metrics are in this scan because of the funds and large amount of time it would take to obtain and analyze this information were not available at the time of this scan.

Results

CNRS Faculty Teaching Methods Survey

Dr. Bori Mazzag (Mathematics) conducted a survey of CNRS faculty in 2015 to assess expertise in various pedagogical techniques. In summary, 28 CNRS faculty identified themselves as pedagogical resources for others wanting to learn more about a variety of teaching techniques, including a number of active learning strategies, student writing and peer review, and service learning. Overall, 17 different techniques were identified to have local expertise, with 1-12 CNRS faculty self-identifying as a resource for each.

Developing an Inclusive Educational Environment

An inclusive education is one that intends to remove social exclusion resulting from historical attitudes towards races, economic class, ethnicity, religion and gender[29]. The diversity of the HSU student body has increased from 13% in 2003 to 31% in 2013[30], as exemplified by HSU becoming a Hispanic Serving Institution in 2013 when the Hispanic-Latinx enrollment became 26.6%.

A variety of steps have been taken by the HSU administration, faculty and students to address inclusivity. These include:

- The formation of units that support specific groups of people – i.e., the Native American Studies program, the Ethnic Studies program, clubs/services such as the African-American Center for Academic Excellence, the Center for Academic Excellence in STEM (INRSEP), the Black Student Union, the Latinx Center, the Multicultural Center, and the Native American Center (ITEPP).
- A website exists for HSU's Office of Diversity, Equity and Inclusion. Among other things, this site contains a Diversity Resources Guide, as well as an extensive Faculty Resources (e.g., inclusive syllabi, course transformation) section.
- HSU has offered training opportunities for unconscious bias as well as macro- and microaggressions.
- Faculty have obtained extramural funds to improve all aspects of the university experience for a 1st-year CNRS student. For example, the HIS STEM grant funds have helped develop and launch PBLCs that introduce students to both traditional ecological knowledge as well as western science, and a point is made to present gains in knowledge made by scientists of color.
- The HHMI Inclusive Excellence project is working collaboratively with the Center for Teaching & Learning and the Office of Diversity, Equity, and Inclusion to provide professional development opportunities to enhance faculty understanding of inclusive pedagogy, and to cultivate more cultural humility.

Recommendations

1. CNRS/HSU should continue to sponsor the presentation of pedagogical workshops on the HSU campus by specialists who are either HSU or non-HSU instructors.
2. CNRS/HSU should sponsor groups of HSU instructors to attend other pedagogical workshops with the proviso that the same HSU instructors lead their own workshop back on the HSU campus.

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[29] Ainscow, M. (2005). Developing inclusive education systems: what are the levers for change? *Journal of educational change*, *6*(2), 109-124.

[30] http://now.humboldt.edu/news/hsu-qualifies-as-hispanic-serving-institution

3. Faculty need to be *enabled* and *incentivized* to make tests of hypotheses regarding the effects of pedagogical practices (i.e., including steps to improve inclusivity) on actual student learning *and* the student sense of community. This recommendation would allow CNRS to move beyond the effects of teaching practices on the learning environment (i.e., this scan), which we 'hope' are the best ones possible, to looking instead at the effect of a particular practice(s) *on what is actually learned*. It is not a trivial undertaking to produce well designed studies to test these hypotheses, and so instructors would have to be *enabled* by working with a data analysis specialist and HSU OIE (e.g., the analysis approaches used by the PBLCs). Given their high level of dedication to students, many instructors have the desire and interest, but not the time, to undertake this type of study – even though such a study could lead to improvements in student outcomes and make teaching more fun for instructors. *Incentivization* has to be accompanied by WTU release time, or honorariums.
4. A subset of collegial observations (and so subsequent letters) during the retention, tenure and promotion (RTP) process should be based on discussions between faculty and faculty candidates about the pedagogical reasoning behind a candidate's course and whether or not the candidate thinks, or has data to demonstrate, that his/her teaching practices are effective. *Failed pedagogical experiments should be recognized as progress in the RTP process*, assuming that the candidate has a plan to improve outcomes. Letters based on classroom observations should be continued as they allow observations of instructor-student interactions, the effectiveness of active learning exercises, and these observations can provide context for student evaluations of the candidate.
5. The Working Personnel Action File (WPAF) of RTP candidates should more consistently document a candidate's activities to improve pedagogy (e.g., workshop presentations/attendance, inclusivity training, changes to any part of the course to improve both learning effectiveness and a sense of community).

Appendix F – Scan: Curricular Structures & Learning Opportunities

Narrative

This scan focused on aspects of the HSU curriculum (i.e., content and course structures determined by departments) that could affect the quality of the learning opportunities for students. We distinguish Learning Practices (**Appendix E – Scan: Teaching Practices & Learning Opportunities**) and the Curricular Structures addressed in this scan because, while changes to the two of them may occur in tandem, this is not necessarily the case. The intent of this scan is to summarize what we know about the effects of curricular structures on student performance in CNRS. While the type of data we were able to obtain for student performance (e.g., grades, retention) is very useful, it is important to note that they are not direct measures of the *amount of learning* by undergraduate and graduate students. Our avoidance of the latter subject is based on the rarity of this very focused kind of assessment.

Methods

We considered many curricular structures for this scan. Those for which there was data of reasonable quality included the following: international experiences 2013-2017 from the HSU Office of International Programs, the Klamath Connection Place-Based Learning Community, courses specifically designed for capstone research experiences (**Appendix I – Scan: Scholarship**), the CHEM 109/110 restructure, and the availability and enrollment in courses specifically designed to improve writing or quantitative skills.

Important parts of the curricula for which data were unavailable and/or of poor quality were the following:

- Course learning outcomes from 2013-2014 Department Annual Reports (i.e., not all courses provided course SLOs; some outcomes were unclear or too vague to assess if actual research was embedded in the course, or what kind of writing or quantitative skills were used)
- MATH 113, 114 and remediation changes
- Frequency of 500 & 600 level course offerings

Results

Study Abroad

On average, about 0.5% of the CNRS students participate in study abroad programs each year. Since AY 2013-2014, fewer than 100 CNRS students have studied abroad through HSU or CSU programs. This is comparable to rates of CPS students, but much lower than CAHSS (**Figure 34**).

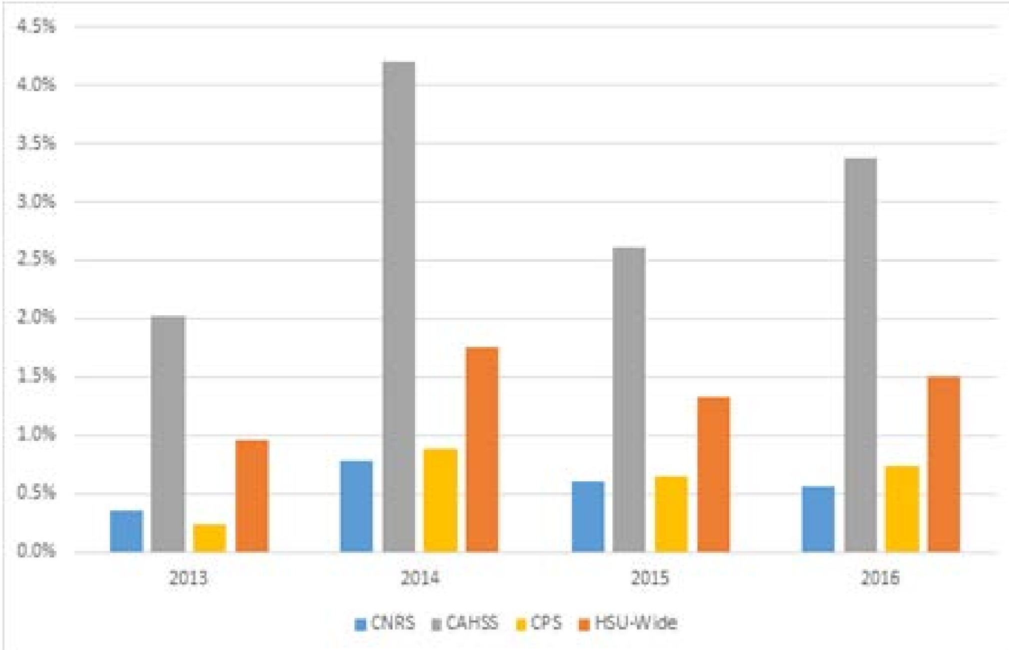

Figure 34. Percentage of enrolled students that participate in study abroad each calendar year by college and total enrollment at HSU. Enrollment numbers are from fall semester of each year. (Data from HSU Office of International Programs; provided Spring 2017).

CHEM 109/110 Restructure

Chemistry faculty restructured the allocation of basic chemistry topics between CHEM 109/110 (and also moved a couple into upper division courses) starting in Fall 2012, with the full restructure in place by Fall 2013. In Fall 2014, freshman-only lab sections were offered for CHEM 109. Prior to Fall 2012, success rates (C- or better) in CHEM 109 were 55-60% for freshman. After Fall 2013, average success rose to ~70% (**Figure 35**). Additionally, the success rate of sophomores enrolled in the freshman-only sections was often 5-15% higher than sophomores in the non-freshman sections during this time. However, success rates of upperclassmen have been similar to slightly higher than before the curricular change, but the total numbers of successful students have decreased. Chemistry attributes this to higher success rates of underclassmen leading to fewer students needing to retake CHEM 109 later in their academic career. Overall, the cumulative changes in the curriculum appears to be an improvement for students. Increased success of freshman allows them to proceed through their degree programs more efficiently and also leads to fewer non-freshman students retaking the course, therefore opening up more seats for freshman and sophomores to take chemistry early in their careers.

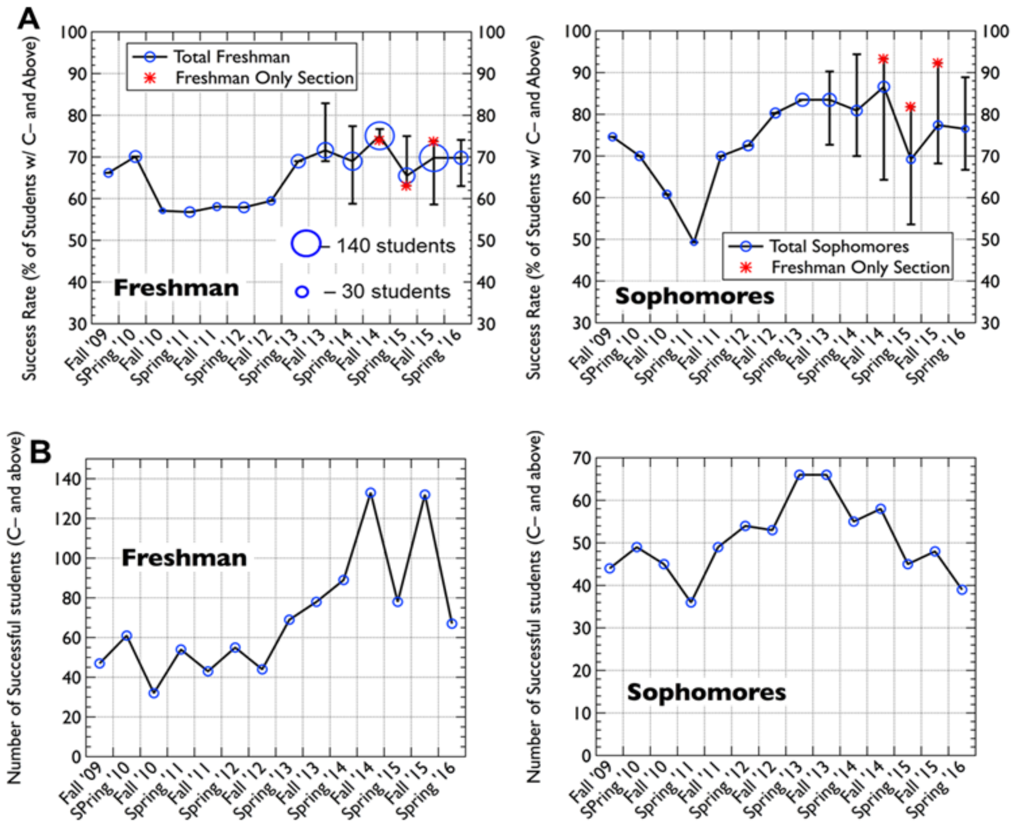

Figure 35. Success (C- or better) of underclassmen in CHEM 109 per semester by (A) percentage of students at each class level and (B) number of individual students. Success is defined as earning a C- or better in the course. Blue circles indicate average values, with the size of the circle scaled to number of students represented in part (A). Red stars note success rates of students enrolled in specific freshman-only sections. Graphs provided by Chris Harmon.

Klamath Connection (KC) Place-Based Learning Community (PBLC)

Initiated by M. Johnson (Dept. Wildlife, HSU) and A. Sprowles (Dept. Biological Sciences, HSU) with extramural funds (CSU STEM Collaborative grant a Department of Education Hispanic Serving Institution (HSI STEM) grant), and supplemental HSU funds, a place-based learning community (PBLC) called the Klamath Connection (KC) was launched Fall 2015. The long-term goal of this program is to raise retention and graduation rates for all freshmen and to close gaps between URM and non-URM STEM students. Culture shock upon arriving to live in a small town on the North Coast of California is considered one of the reasons why HSU freshmen retention rates are poor. This is the premise for an HSU PBLC (e.g., KC), rather than a learning community with some other kind of theme. KC activities in and outside of the classroom are specifically designed to introduce students to the ecosystems and cultures of the Klamath River basin so that they may feel more welcome and rooted into the North Coast culture.

Learning communities improve student success rates by building curricular structures that strengthen social bonds among students, as well as between students, staff and faculty. The KC curricular structure is therefore a combination of a summer immersion experience, a first-year seminar, STEM peer mentors, a cohort of students in blocked courses that address a linked KC research project, and the option to live together in themed housing.

A more rigorous and complete analysis of two years of KC data is summarized in an earlier section of this Strategic Planning document – see **The CNRS Student, Accomplishments**. In short though, the KC students have demonstrated better academic scores and retention rates than any other approach tried by HSU (e.g., Freshmen Interest Groups, Living and Learning Communities). What follows is some specific data on the performance of KC and non-KC first-year students in General Botany (BOT 105).

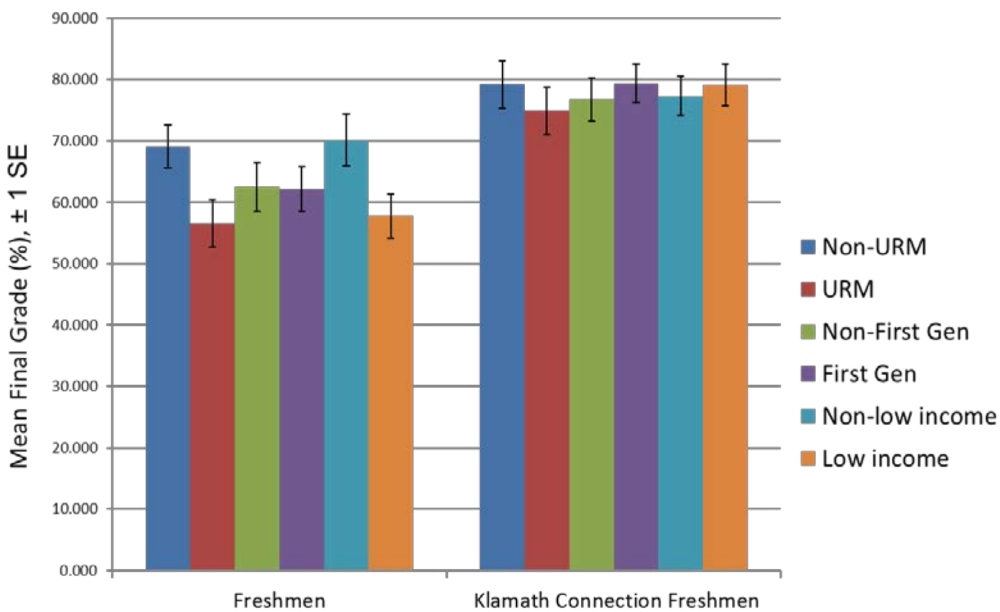

Figure 36. Fall'15 final grades for freshmen in the same section of BOT 105. "Freshmen" were not in the Klamath Connection PBLC, whereas "Klamath Connection Freshmen" were. "Freshmen" needing remedial math were excluded from this figure to make that population more comparable to the "KC freshmen". As well, academic performance of the "KC Freshmen" was still higher when high school GPA was used in an Analysis of Covariance to account for possible bias in admitting students to the PBLC.

The F15 and F16 KC cohorts in the BOT 105 sections taught by the same instructor received higher grades than non-KC freshmen in the same sections, and opportunity gaps were closed (**Figure 36**). By the second and third weeks of the F15 and F16 semesters BOT 105 freshmen in the KC Learning Community demonstrated greater resilience (i.e., as course grades & attendance) than the non-KC freshmen in the same section, suggesting a positive effect of the social support built into the structure of the KC PBLC (**Figure 37**).

A calculation from two sections of BOT 105 (F15, F16) demonstrates one of the several benefits of using the learning community approach to remove opportunity gaps. If all of the freshmen in BOT 105

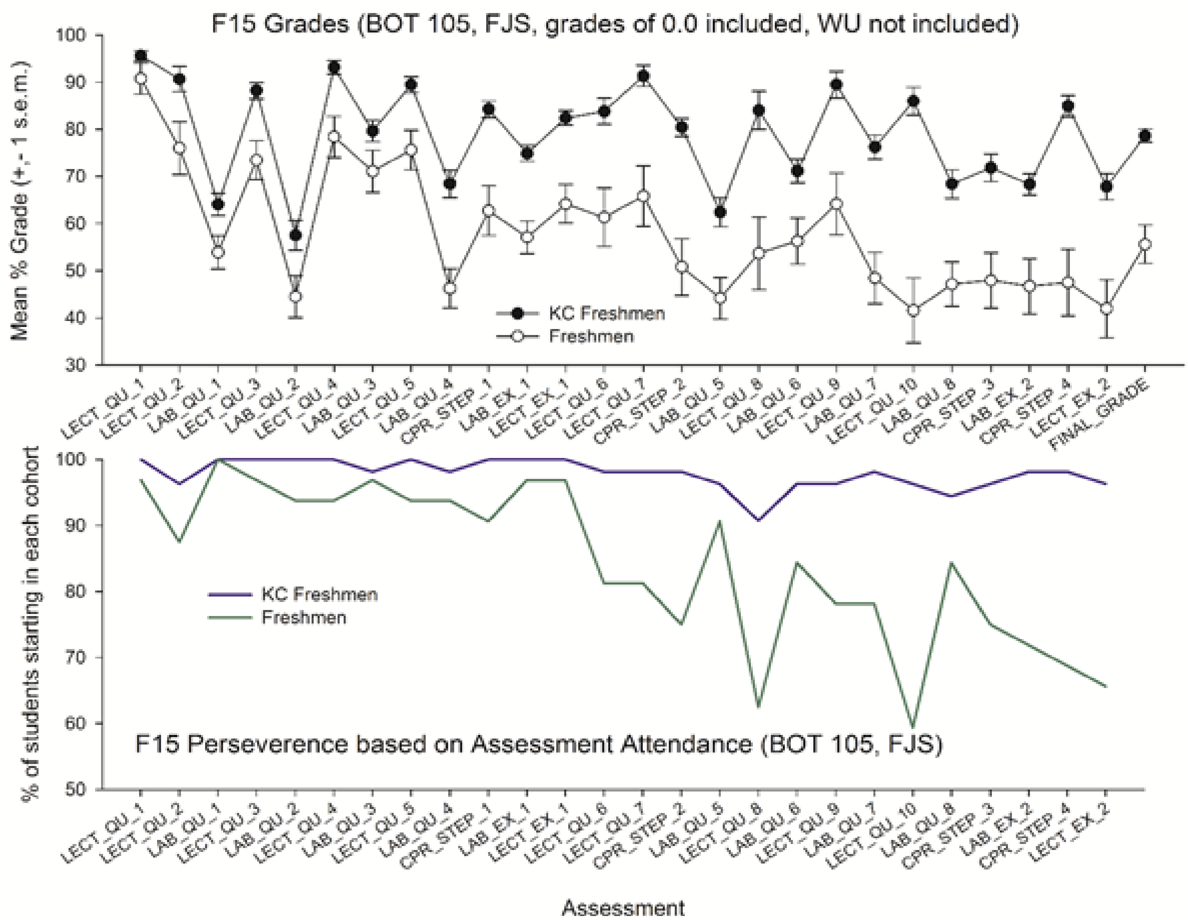

Figure 37. Running mean of course grade and attendance (as indicated by participating in all kinds of course assessments, which are chronologically arranged on the x-axis) for KC freshmen and non-KC freshmen in the same section of BOT 105 during Fall 2015. Data from F. Shaughnessy.

received the grades that were achieved by the subset of KC freshmen, then the % of all students in the course (i.e., freshmen, sophomores, juniors, seniors) failing (D, F, WU) is estimated to range from 15.2% – 26.7%, whereas if none of the freshmen were in the KC Learning Community then the percent failing could range from 42.3% - 46.3% (**Table 4**). The % of students failing in a given year (F15, F16) is lower when the % of freshmen in the KC PBLC is higher (data not shown).

The initial success of the KC Learning Community has led to the addition of two new PBLCs, Stars to Rocks, which started Fall 2017, and Rising Tides which started Fall 2018. Dr. Sprowles and Dr. Johnson have also secured another extramural grant (HHMI 2017 Inclusive Excellence) to support, among other objectives, the eventual placement of almost all STEM freshmen in a learning community.

Table 4. The potential effect of the KC PBLC on the entire course grade distribution of BOT 105. All data are the % of students receiving a D or F or WU. The calculations are based on all students that enrolled, except for three withdrawals each semester. F15 data are from CRN 42235, F16 data are from CRN 43694.

Semester	[1]Estimate if all freshmen were KC, + real grades for Soph., Jun., Sen., Grad.	Real grades for KC freshmen, non-KC freshmen, + real grades for Soph., Jun., Sen., Grad.	[2]Estimate if no freshmen were in KC, + real grades for Soph., Jun., Sen., Grad.
F15	15.2	26.8	46.3
F16	26.7	34.8	42.3

Courses Focused on Writing or Quantitative Skills

By reporting on the enrollment and frequency of offerings of courses solely dedicated to writing (**Table 5, Table 6**) or quantitative skills (**Table 7, Table 8**), this part of the scan indicates which majors might need to have more writing and quantitative skills embedded in other courses (i.e., courses not specifically targeting writing or quantitative skills). For example, since the Department of Biological Sciences has not been able to offer BIOL 369 (Writing in the Life Sciences) since Spring'12, majors in that Department will not have the opportunity to improve their writing unless it is embedded in other BIOL, BOT or ZOOL courses. In the absence of data about writing and quantitative activities from courses not included in this analysis, Tables 5, 6, 7 and 8 should not be used to indicate the percent of CNRS students getting the opportunity to build these skills.

Table 5. Enrollment of CNRS undergraduates (UG) in courses solely dedicated to writing, or with a large component of the course focused on writing. This table does not include UG writing embedded in other types of courses. % of UG major = # of students from a major enrolled for a semester / # of students in the major the same semester. The data were provided by OIE during Spring 2017.

		% of UG Major									
Course	**Course Title/Student Level & Major**	**Fall 11**	**Spring 12**	**Fall 12**	**Spring 13**	**Fall 13**	**Spring 14**	**Fall 14**	**Spring 15**	**Fall 15**	**Spring 16**
BIOL 369	Writing in the Life Sciences										
	Biology		2.0								
	Botany		0.9								
	Fisheries Biology		1.0								
	Zoology		0.5								
EMP 435	Grant Proposal Writing										
	Biology	0.3	0.5	0.1	0.7	0.4	0.1	0.1	0.4	0.3	0.6
	Botany	2.5				0.8	0.8				
	Environmental Management & Prot	11.0	15.1	14.0	18.4	14.5	13.8	14.5	22.4	12.7	13.9
	Environmental Resources Engr	0.6		0.9							
	Environmental Science	12.0	13.5	11.4	14.7	13.5	12.8	14.2	11.3	11.8	11.3
	Fisheries Biology			1.1		1.2		1.0			1.2

	Forestry						0.5	0.5	0.5		1.5
	Nat Resources Plng & Interptn	70.0	60.0	100.0	16.7		20.0				
	Oceanography			1.6	1.6				2.0	1.8	
	Rangeland Resource Science	6.5								2.0	2.1
	Wildlife	1.0		0.5	0.5	0.2	0.4	1.1	0.2	0.7	0.2
	Zoology		0.5			0.4	0.4				
OCN 370	Library Research/Rpt Writing										
	Biology					0.1					
	Geology					1.0					
	Oceanography	27.1		14.1		15.1		27.3			

Table 6. Enrollment of CNRS graduate students (PBAC) in courses solely dedicated to writing, or with a large component of the course focused on writing. This table does not include PBAC writing embedded in other types of courses. % of PBAC major = # of students from a major enrolled for a semester / # of students in the major the same semester. The data were provided by OIE during Spring 2017.

% of PBAC Major

Course	Course Title/Student Level & Major	Fall 11	Spring 12	Fall 12	Spring 13	Fall 13	Spring 14	Fall 14	Spring 15	Fall 15	Spring 16
BIOL 369	Writing in the Life Sciences										
	Biology		3.6								
BIOL 684	Introduction to Grad Research										
	Biology		19.6		42.6		25.5		27.7		37.5
EMP 435	Grant Proposal Writing										
	Biology	1.8		8.9			3.9			2.3	
	Env Systems(Enrgy,Envrn & Soc)	12.5									
	Environmental Science										
	Environmental Systems (Engr)	8.3					10.0				7.7
	Environmental Systems (Geol)	14.3									
	Nat Resources (Plan & Interp)	10.0					40.0			12.5	20.0

Nat Resources Plng & Interptn		10.0						
Natural Resources		25.0						
Natural Resources (Fisheries)						7.1		6.7
Natural Resources (Wildlife)	7.1	5.0					3.0	4.0

Table 7. Enrollment of CNRS undergraduates (UG) in courses solely dedicated to quantitative or programming skills, or with a large component of the course focused these skills. This table does not include UG quantitative exercises embedded in other types of courses. % of UG major = # of students from a major enrolled for a semester / # of students in the major the same semester. The data were provided by OIE during Spring 2017.

		% of UG Major									
Course	**Course Title/Student Level & Major**	**Fall 11**	**Spring 12**	**Fall 12**	**Spring 13**	**Fall 13**	**Spring 14**	**Fall 14**	**Spring 15**	**Fall 15**	**Spring 16**
CS 325	Database Design										
	Biology									0.4	
	Computer Science					22.8		22.3		25.5	
	Environmental Resources Engr									0.3	
	Mathematics					1.1		2.3			
CS 328	Web Apps Using Databases										
	Biology										0.3
	Computer Science						17.2		18.9		26.4
	Mathematics						2.5		2.4		
CS 346	Telecommunications & Networks										
	Computer Science					19.8		18.8		20.4	
	Environmental Resources Engr									0.3	

CS	374	Operating Systems									
		Computer Science				12.9		18.8		16.6	
CS	444	Robotics									
		Computer Science			15.9				18.9		
		Oceanography			1.6						
		Physics									
CS	449	Computer Security									
		Computer Science					19.2		16.4		18.2
		Environmental Resources Engr									0.4
CS	458	Software Engineering									
		Computer Science						14.3		11.5	
CS	461	Computational Models									
		Computer Science							17.2		14.5
		Mathematics							1.2		
CS	482	Internship									
		Computer Information Systems	8.3								
		Computer Science	7.4	4.1							

CS 499	Directed Study										
	Computer Science	2.2	1.9	1.4		2.0					0.6
ENGR 322	Envrnmntl Data Modeling & Anly										
	Biology					0.1		0.1			
	Environmental Resources Engr	6.6	8.9	5.4	12.4	14.1	9.0	7.2	9.5	4.5	8.7
ENGR 325	Comp Mthds for Env Engnring II										
	Biology					0.2					
	Environmental Resources Engr	6.0	8.0	12.0	10.7	10.7	7.0	8.5	7.1	10.0	15.2
ENGR 326	Comp Mthds for Env Eng III										
	Biology						0.1	0.1			
	Environmental Resources Engr	8.2	7.0	9.0	12.4	10.4	10.7	8.2	12.4	8.3	6.5
ENGR 421	Advanced Numerical Methods I										
	Environmental Resources Engr					4.3					
FISH 314	Fishery Science Communication										
	Biology	0.1		0.1						0.1	

	Fisheries Biology	23.0		15.2		27.7		22.9		29.8	
FOR 365	Forest Economics and Finance										
	Forestry										11.7
	Environmental Science		0.3								
	Forestry		6.7		10.1		10.2		12.0		
GSP 318	Geospatial Programming I										
	Environmental Managemnt & Prot										1.3
	Environmental Science										2.5
	Forestry										1.0
MATH 311	Vector Calculus (2) F.										
	Chemistry			1.0				1.0			
	Computer Science	2.2									
	Environmental Resources Engr	0.3									
	Mathematics	2.0		1.0							
	Physics			2.1		12.7		18.8		8.8	

MATH 313	Ordinary Differential Equation										
	Biology							0.1			
	Chemistry	1.1				2.2		1.0			
	Computer Science		1.9	1.4		2.0				0.6	0.6
	Environmental Resources Engr	0.3	0.3	0.3			0.3	0.3		0.3	0.8
	Geology	1.2									
	Mathematics	8.9	10.8	4.1		9.9	5.0	15.9	10.7	18.2	21.6
	Oceanography	1.4				3.8			2.0	1.8	
	Physics	4.1	7.8	12.8		19.0	10.9	6.3	12.2	5.0	7.2
MATH 314	Partial Differential Equations										
	Biology										0.2
	Chemistry						1.3				
	Environmental Resources Engr		0.6								0.4
	Geology		1.3								
	Mathematics		3.9		8.0		3.8				10.8
	Oceanography						4.8				2.4

	Physics		7.8		7.5		1.6				9.6
MATH 315	Advanced Calculus (4) F.										
	Biology							0.1			
	Environmental Resources Engr	0.9		0.9		0.3					
	Mathematics	10.9		7.2		8.8		4.5		9.1	
	Oceanography					3.8				1.8	
	Physics	10.2		6.4		1.6		2.5		6.3	
MATH 316	Real Analysis I										
	Biology										0.2
	Computer Science		1.9		1.4						
	Environmental Resources Engr						0.3		0.4		0.8
	Mathematics		20.6		23.0		15.0		22.6		18.9
	Physics		2.0								1.2
MATH 343	Intro Algebraic Struct (4) S.										
	Computer Science		3.7		1.4		1.0		0.8		

	Environmental Resources Engr						0.3				
	Mathematics		8.8		18.4		22.5		17.9		36.5
	Physics								1.4		2.4
MATH 344	Linear Algebra (3) F.										
	Biology	0.1						0.1			
	Computer Science			2.7		1.0					
	Environmental Resources Engr			0.3						0.3	
	Mathematics	10.9		7.2		12.1		17.0		7.8	
	Physics					1.6		1.3		2.5	
MATH 351	Intro to Num. Analysis [4] F										
	Biology							0.1		0.1	
	Computer Science			1.4				0.9		0.6	
	Environmental Resources Engr							0.3		0.3	
	Mathematics			14.4		4.4		10.2		7.8	
	Physics					1.6		1.3		1.3	

MATH 361	Intro to Math Modeling (4) S.					
	Biology			0.1	0.1	
	Computer Science	1.9	1.4			1.3
	Environmental Resources Engr	0.3		0.7	0.4	
	Environmental Science	0.7				
	Fisheries Biology		1.2			
	Mathematics	15.7	9.2	5.0	7.1	17.6
	Oceanography		3.3	4.8	2.0	
	Physics		1.9		1.4	
	Wildlife		0.3			
MATH 371	Geometry					
	Computer Science	1.9	1.4			
	Environmental Science		0.3			
	Mathematics	13.7	13.8	13.8	16.7	5.4
	Physics			1.6		1.2

MATH 416	Real Analysis II					
	Mathematics		8.8			3.9
MATH 418	Intro To Complex Analysis					
	Computer Science				0.8	
	Environmental Resources Engr				0.4	
	Mathematics				4.8	
	Physics				1.4	
MATH 443	Adv. Algebraic Struct (3) F.					
	Computer Science	1.4				
	Mathematics	7.2		12.5		
MATH 474	Graph Theory					
	Computer Science					1.9
	Mathematics					10.4
MATH 521	Applied Stochastic Processes					

	Mathematics		2.9				1.3				1.4
	Physics		2.0								
MATH 562	Model Fitting										
	Biology								0.1		
	Environmental Resources Engr				0.3						
	Fisheries Biology				1.2						
	Mathematics				1.1						
PHYX 340	Math and Computational Methods										
	Chemistry								1.1		0.9
	Physics								33.8		19.3
STAT 323	Probability & Statistics										
	Biology	0.1						0.1			
	Chemistry	1.1									
	Computer Science	4.4		2.7		2.0					
	Environmental Resources Engr			0.3				0.3			
	Geology			1.1							

	Mathematics	17.8		24.7		25.3		23.9		31.2	
	Physics	2.0						1.3			
STAT 333	**Linear Regression Models/ANOVA**										
	Biology	0.7	0.6	0.9	1.2	0.9	0.4	1.3	1.4	1.5	1.4
	Botany		0.9						1.9		
	Chemistry								1.1		
	Environmental Resources Engr							0.3	0.4		
	Environmental Science	0.3	0.3			0.3				0.3	0.3
	Fisheries Biology	6.0	6.3	20.7	6.0	10.8	3.7	2.1	6.0	8.3	3.6
	Forestry		0.6		1.0						
	Mathematics		2.0	1.0	2.3			2.3		1.3	2.7
	Nat Resources Plng & Interptn			40.0							
	Oceanography		1.6	3.1				1.8			
	Wildlife	1.0		0.5	0.8	0.4	0.2	0.6	0.9	0.4	0.5
	Zoology				0.4					0.8	
STAT 404	**Multivariate Statistics**										

	Biology					0.5		0.1			
	Environmental Science	0.3									
	Fisheries Biology					1.2		1.0			
	Mathematics			1.0		1.1				2.6	
	Nat Resources Plng & Interptn			5.9		12.5					
	Wildlife	0.5				0.4				0.2	
	Zoology	0.5						0.4			
STAT 406	Sampling Design and Analysis										
	Fisheries Biology							6.3			
	Wildlife							0.9			
STAT 410	Modern Statistical Modeling										
	Biology		0.6		0.7		0.5		0.7		
	Botany		0.9								
	Environmental Science										0.3
	Fisheries Biology		11.5				2.5		14.3		2.4
	Mathematics		1.0		2.3						1.4
	Oceanography		1.6								

Wildlife	0.3	0.2	0.2	0.7
Zoology			0.4	

Table 8. Enrollment of CNRS graduate students (PBAC) in courses solely dedicated to quantitative or programming skills, or with a large component of the course focused these skills. This table does not include PBAC quantitative exercises embedded in other types of courses. % of PBAC major = # of students from a major enrolled for a semester / # of students in the major the same semester. The data were provided by OIE during Spring 2017.

		% of PBAC Major									
Course	**Course Title/Student Level & Major**	**Fall 11**	**Spring 12**	**Fall 12**	**Spring 13**	**Fall 13**	**Spring 14**	**Fall 14**	**Spring 15**	**Fall 15**	**Spring 16**
CS 325	Database Design										
	Biology							2.0			
	Computer Science										
	Env Systems (Math Modeling)									33.3	
	Nat Resources (Plan & Interp)							12.5			
CS 328	Web Apps Using Databases										
	Biology								2.1		
	Nat Resources (Plan & Interp)								16.7		
ENGR 322	Envrnmntl Data Modeling & Anly										
	Env Systems(Enrgy,Envrn & Soc)				50.0						
	Environmental Systems (Engr)				7.7	5.9					
ENGR 325	Comp Mthds for Env Engnring II										
	Environmental Systems (Engr)		12.5								

ENGR 326	Comp Mthds for Env Eng III										
	Env Systems(Enrgy,Envrn & Soc)	12.5									
	Environmental Resources Engr	8.3	12.5	6.3				9.1			
	Environmental Systems (Engr)			6.3							
GSP 318	Geospatial Programming I										
	Natural Resources										4.8
MATH 316	Real Analysis I										
	Env Systems (Math Modeling)		16.7				11.1		20.0		
MATH 351	Intro to Num. Analysis [4] F										
	Env Systems (Math Modeling)			10.0							
MATH 361	Intro to Math Modeling (4) S.										
	Natural Resources (Wildlife)						3.8				
MATH 521	Applied Stochastic Processes										
	Env Systems (Math Modeling)		50.0				66.7				100.0
MATH 561	Dynamic Systems										
	Env Systems (Math Modeling)			60.0				66.7			
MATH 562	Model Fitting										

	Env Systems (Math Modeling)				85.7				80.0		
	Natural Resources (Wildlife)								4.0		
MATH 595	Modeling Practicum										
	Env Systems (Math Modeling)	66.7				77.8				66.7	
PHYX 340	Math and Computational Methods										
	Physics								33.8		19.3
STAT 323	Probability & Statistics										
	Env Systems (Math Modeling)	22.2		10.0				33.3			
	Mathematics										
	Natural Resources (Fisheries)	5.9									
	Natural Resources (Wildlife)							3.0			
STAT 333	Linear Regression Models/ANOVA										
	Biology	1.8		16.1	4.3	2.0	7.8	14.0	4.3	9.1	6.3
	Env Systems (Math Modeling)			10.0							
	Nat Resources (Plan & Interp)	10.0	10.0			16.7		12.5			20.0
	Nat Resources (Range & Soils)	50.0									
	Nat Resources (Watershed Mgmt)		20.0								

	Natural Resources		25.0	60.0	16.7	7.7	5.9	5.3	14.3	28.6	9.5
	Natural Resources (Fisheries)		11.1	37.5	6.3	20.0	21.4		6.7	7.1	
	Natural Resources (Forestry)	25.0	14.3								
	Natural Resources (Wildlife)			5.3	16.7	32.1	19.2	21.2		20.0	
STAT 404	Multivariate Statistics										
	Natural Resources (Fisheries)	5.9									
STAT 406	Sampling Design and Analysis										
	Natural Resources (Fisheries)							6.3			
STAT 410	Modern Statistical Modeling										
	Biology		1.8		2.1						
	Nat Resources (Watershed Mgmt)		20.0								
	Natural Resources (Fisheries)		11.1								
	Natural Resources (Wildlife)		15.0		5.6				4.0		
STAT 506	Sampling Design and Analysis										
	Biology							2.0			
	Nat Resources (Plan & Interp)							12.5			
	Natural Resources (Fisheries)							12.5			

	Natural Resources (Wildlife)			3.0		
STAT 510	Modern Statistical Modeling					
	Biology	10.7	8.5	5.9	6.4	21.9
	Env Systems (Math Modeling)	16.7				
	Environmental Systems (Geol)	20.0				
	Nat Resources (Watershed Mgmt)	20.0				
	Natural Resources		83.3	23.5	9.5	19.0
	Natural Resources (Fisheries)	38.9	12.5	50.0	66.7	7.7
	Natural Resources (Forestry)	14.3				
	Natural Resources (Wildlife)	15.0	11.1	23.1	28.0	31.8
STAT 630	Data Collection & Analysis					
	Biology			5.9		
	Env Systems (Math Modeling)	50.0	28.6	33.3		100.0
	Env Systems(Enrgy,Envrn & Soc)	25.0				
	Environmental Systems (Engr)		15.4	10.0	50.0	23.1
	Environmental Systems (Geol)		77.8	20.0	62.5	
	Nat Resources (Plan & Interp)	10.0	16.7			

Nat Resources (Wastewater Utl)	100.0				
Natural Resources			11.8		4.8
Natural Resources (Fisheries)				6.7	
Natural Resources (Wildlife)			3.8		4.5

Recommendations

1. CNRS should have a focused discussion on whether or not international experiences should become a more important option of the CNRS learning environment.
2. The promising start of the CHEM 109/110 restructure should continue to be evaluated, especially with the subsequent addition of the Stars to Rocks PBLC.
3. The number of PBLCs in CNRS should be increased to include the highest possible number of first-year CNRS students.
4. Rigorous data analyses of the different facets of the PBLC programs should continue in order to find out which components of the programs need to be improved and how they could be more cost effective.
5. PBLC programs should be institutionalized within the HSU Base Budget.
6. CNRS Departments that lack courses dedicated to writing and quantitative skills, which is the case for most Departments, should produce an accurate and in-depth course map of where these skills are being obtained – the assumption being that these skills are already embedded in many courses. Course Learning Outcomes from Department Progress Reports are often completely inadequate for producing this map. Having a departmental course solely devoted to one of these skills, especially writing, is not necessarily the best choice – especially for large Departments where the percentage of students able to take the course would be quite low unless a high number of sections was offered. As well, it may make more pedagogical sense to have these skills embedded in courses where the skill is tied to a course research project.

Appendix G – Scan: Capacity & Success Bottlenecks

Narrative

The overall purpose of this scan is to understand the extent to which seat limitation and/or low academic success rates, which can result in students repeating a course, are slowing the time until degree. HSU OIE uses specific definitions for “bottleneck-capacity” and “bottleneck-success” courses, which are followed in this scan. However, another perspective for understanding capacity limitations is to look at the overall efficiency of seat availability and usage, which is also addressed in this scan.

Methods

Efficiency of Seat Usage

The first objective was to examine the historical percent of seats used in courses offered by the three HSU colleges to understand the extent to which inefficient use of seats might be contributing to the bottleneck capacity problem. This analysis was done at the level of the entire college, not for each course. Metrics describing the efficiency of seat usage are strongly affected by which courses are considered. The following filters were used by the HSU OIE during Spring 2018 in their calculation of seat usage: independent study (identified based on course number, title, or enrollment of 1 student) was excluded; supervised instruction (S factor) was excluded because enrollment results in additional cost; course laboratory and activity sections were excluded to avoid double counting students in a course; when the room capacity was smaller than the enrollment cap for the course, the course capacity was adjusted to match the room capacity; capacities for off-campus, TBA or online courses used either the enrolled or the registration limit, depending upon which one was greater; all PE courses were omitted because they are not degree related courses and often are listed with excessive capacities since they can meet outdoors or in very large facilities.

Capacity Bottlenecks sensu OIE

The second objective for capacity bottlenecks was to describe the % of all course offerings (i.e., multiple sections of a course in the same semester were treated as one course) across the five semesters that met the definition of bottleneck capacity used by OIE - i.e., three or fewer seats open at the time of census. Thus, in this analysis, if a course was only bottlenecked for one of five semesters then it was counted as “bottlenecked” one time and “not bottlenecked” four times. This analysis by OIE did not include sections of independent study, supervised instruction, or laboratory sections. Double-listed courses (i.e., usually at the 300 and 500 levels) were treated as independent courses, which means that neither can meet the bottleneck definition even though the enrollments of the two listings, when tallied because they meet at the same time in the same room, could meet this definition. The analysis for this objective therefore gives a *general description* of the % of courses that could be bottlenecked during any one semester, but this part of the scan does not focus on how often a *particular* course was bottlenecked.

The third objective was to determine if some courses were bottlenecked more frequently than other courses. Unlike the analysis for the second objective, only courses that were bottlenecked for at least 70% of the times they were offered across the five semesters are included in this third objective. Another threshold for this analysis was that OIE did not include a course if its enrollments tallied to less than 50 students across the five semesters.

Several of the OIE variables used for this part of the scan require explanation. The "**% of Terms Bottlenecked**" is the percentage of those offerings across the five semesters where the course met the bottleneck criteria (i.e., by definition, this percentage can't be less than 70%). If a course was offered each of the five semesters and met the criteria each of the five semesters, the course would score as 100%. As well, if the course was only offered three of the five semesters and met the criteria each of those three semesters, this variable would also score as 100%. This variable does not recognize sections within a semester – multiple sections of a course occurring during the same semester were considered as one offering.

Two other variables were examined for this third objective. "**Max Waitlist**" is the maximum number of students that appeared on the Waitlist during the enrollment cycle for Spring 2017. Waitlist data are not currently archived. These data must be interpreted with caution because some waitlist numbers might be held down by departments that limit the size of a waitlist; some departments open up new sections earlier in the cycle than other departments; the Registrar's Office can make changes to the Waitlist during the cycle. *These data are therefore a rough indicator of the demand for a course.* The next variable, "**Repeat Rate**", is the total of students repeating the course across the five semesters divided by the total number of grades for that course across the same five semesters.

Success Bottlenecks sensu OIE

The fourth objective was to describe the % of all CNRS course offerings (i.e., multiple sections of a course in the same semester were treated as one offering) across the five semesters that met the definition of bottleneck success used by OIE - i.e., a course where more than 15% of students received a grade lower than a C-. Thus, in this analysis, it is possible for a course to be success bottlenecked for some of the five semesters but not bottlenecked for other semesters. This analysis by OIE did not include sections of independent study, supervised instruction, or laboratory sections. However, separately listed labs, discussion sections and sections of Supplemental Instruction were included. For this third objective, courses with any level of enrollment were included. *The analysis for this objective therefore gives a general description of the % of course offerings that could be success bottlenecked during any one semester*, but this part of the scan does not focus on how often a particular course is bottlenecked.

The fifth objective was to determine *if some courses are success bottlenecked more frequently than other courses*. Lack of success was, again, defined as receiving a grade lower than a C- and a course was arbitrarily considered as a success bottleneck if more than 15% of its students did not succeed. Unlike the analyses for the previous objectives where OIE definitions and criteria were used, we decided to include courses with enrollments greater than 10 students for our own analysis for this fifth objective. The % not succeeding was calculated as: 100 - (total # students passing from Spring'15 to Spring'17 / total # students enrolled Spring'15 to Spring'17).

Results

Efficiency of Seat Usage

Since Fall 2009 the CAHSS has had the highest total seat capacity, the most unused seats and therefore the greatest rate of unused seats (**Figure 38**). The CNRS and the CPS have had similar rates of unused seats from Fall 2009 to Spring 2018, ranging from 8.1% to 14.9%, whereas the rate for the CAHSS varied from 15.1% - 23.2% over the same time span. For the CNRS, this analysis of seat usage indicates that only small improvements to the bottleneck capacity problem can be made by becoming more efficient at filling seats. Funding more instructors so that there can be more course sections would have a larger effect on this impediment to student graduation.

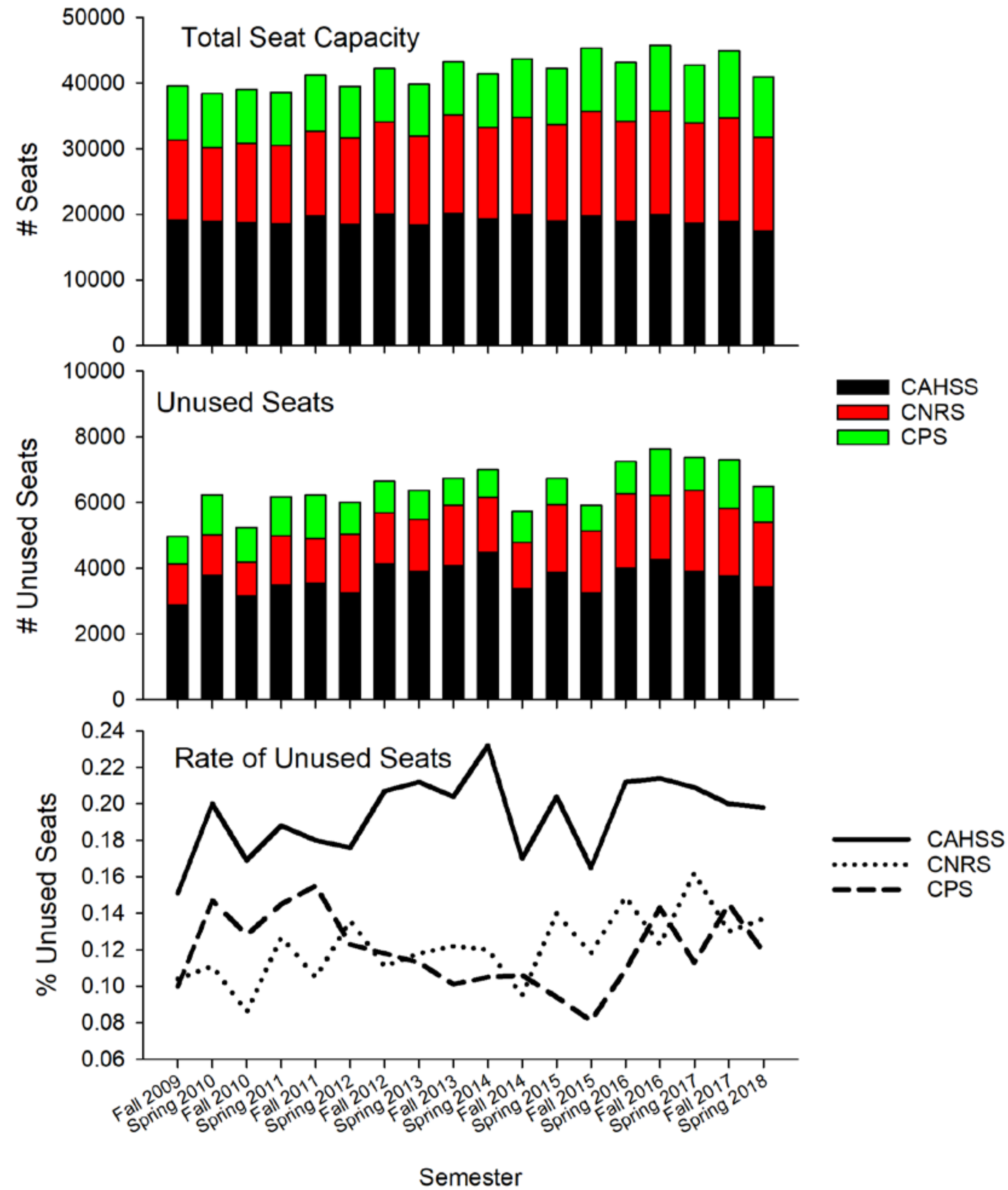

Figure 38. Historical seat usage by the three HSU colleges. Data from HSU OIE (April 2018).

Capacity Bottlenecks sensu OIE

The total number of course offerings across the five semesters was highest for CAHSS and lowest for CNRS (i.e., 1,324) and CPS (i.e., 1,203) (**Figure 39**). The % of these same offerings that were capacity bottlenecked ranged from 31.2% to 41.1%, with CNRS at 38.3% (**Figure 39**). CAHSS, with the least efficient use of seats (**Figure 38**) also has the lowest percent of bottlenecked courses. **Figure 39** describes the % of courses that were bottlenecked but not how frequently a specific course was capacity bottlenecked. For CNRS, 46, 14 and 2 courses were bottlenecked for, respectively, 100%, 80% and 75% of the semesters (terms) that they were offered (**Figure 40**). These numbers are lower than for the CAHSS and the CPS, but what is not represented in **Figure 40** is the percent of the bottlenecked courses that are required for a major and/or are part of a list of restricted electives. For the CNRS, these 62 courses (i.e., 46 + 14 + 2) were all necessary for a major.

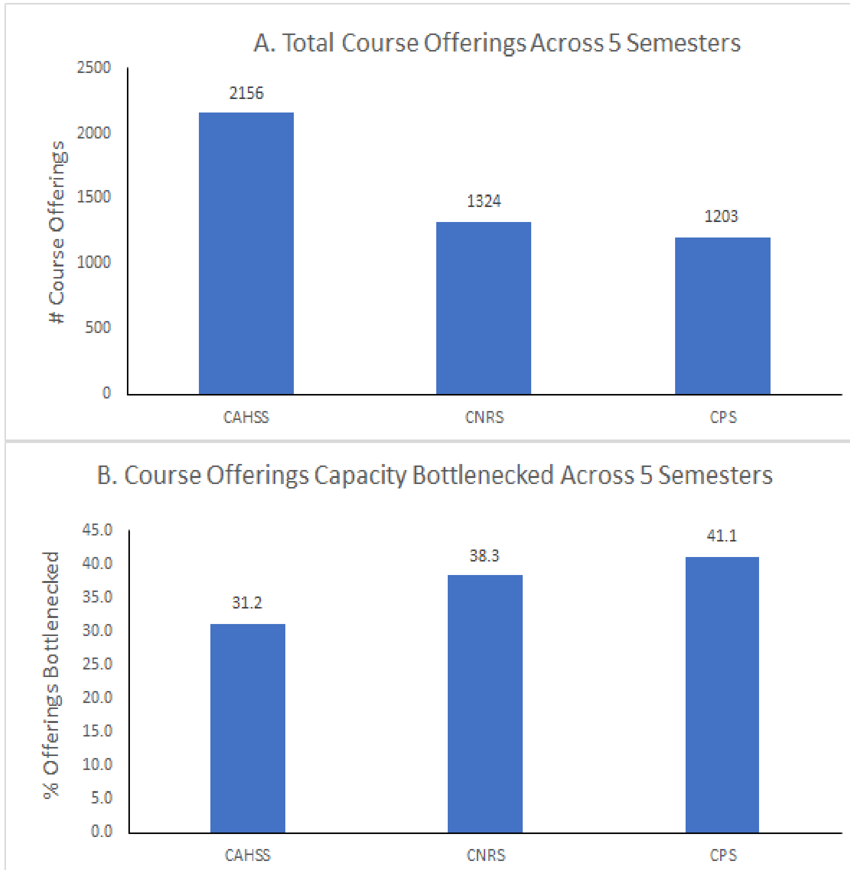

Figure 39. **(A.)** The total number of course offerings from Spring'15 to Spring'17. An "offering" is the combination of all of the sections of a course taught during a particular semester (term). **(B.)** The % of all course offerings across the five semesters that met the OIE definition of being capacity bottlenecked (i.e., =< 3 seats open at the time of census). Data from OIE (12/2017).

Only four of the 62 capacity bottlenecked courses in CNRS are at the 100 course level (**Table 9**). Enrollments in 100 level CNRS courses are generally very high, but these courses are not capacity bottlenecked (OIE definition) for several reasons:

- The combination of graduate student Teaching Associates, Lecturers and TT faculty collectively result in a large enough number of people to teach many course sections, as well as the lab sections within those courses.
- The faculty in charge of 100 level courses often overenroll each lab section.

- Lecture hall venues for 100 level courses are large (e.g., KBR) and in some cases a course can offer more than one lab section at the same time because two laboratory rooms are used (e.g., BOT 105).

There are many upper division courses in CNRS that are potentially increasing the time it takes to graduate. Success rates in 100 level courses are low, but ironically, if those rates improve then the capacity bottleneck problem for upper division courses could worsen.

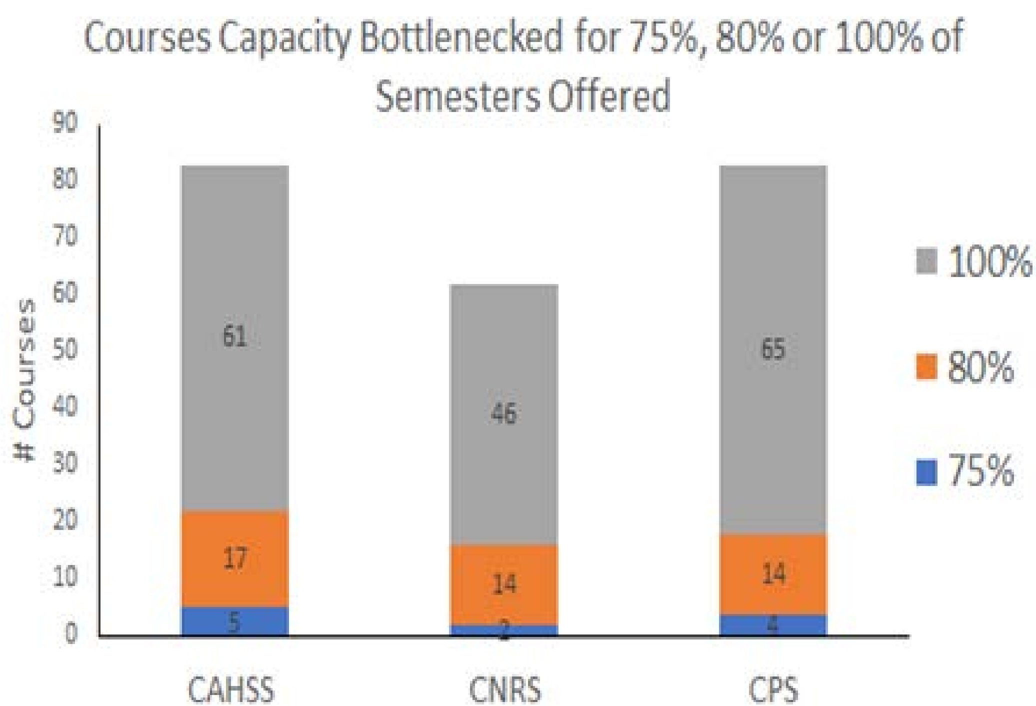

Figure 40. The number of courses capacity bottlenecked for 75%, 80% or 100% of the semesters (terms) these courses were offered from Spring'15 to Spring'17. For example, 46 CNRS courses were capacity bottlenecked for 100% of the semesters they were offered. Data from OIE (12/2017).

Table 9. The 62 CNRS courses that were capacity bottlenecked for 100%, 80% or 75% of the semesters they were offered from Spring'15 to Spring'17. Data from OIE (12/2017).

Course	% Semesters Capacity Bottlenecked	Course	% Semesters Capacity Bottlenecked	Course	% Semesters Capacity Bottlenecked
BIOL 330	100%	FOR 131	100%	ZOOL 354	100%
BIOL 340	100%	FOR 302	100%	ZOOL 356	100%
BIOL 410	100%	FOR 359	100%	ZOOL 358	100%
BIOL 412	100%	GEOL 303	100%	ZOOL 476	100%
BOT 310	100%	GEOL 305	100%	CHEM 328	80%
BOT 350	100%	GEOL 485	100%	CHEM 438	80%
BOT 355	100%	OCN 310	100%	CS 112	80%
BOT 358	100%	PHYX 111	100%	CS 309	80%
CHEM 321	100%	PHYX 118	100%	EMP 425	80%
CHEM 431	100%	RRS 430	100%	EMP 430	80%
CHEM 432	100%	STAT 323	100%	ENVS 450	80%
CS 243	100%	WLDF 365	100%	GEOL 306	80%
CS 328	100%	WLDF 420	100%	GSP 216	80%
CS 346	100%	WLDF 460	100%	SCI 331	80%
EMP 305	100%	WLDF 475	100%	STAT 333	80%
EMP 309B	100%	WSHD 424	100%	WLDF 244	80%
ENVS 410	100%	WSHD 458	100%	WLDF 450	80%
FISH 260	100%	ZOOL 270	100%	WSHD 310	80%
FISH 310	100%	ZOOL 310	100%	FISH 300	75%
FISH 320	100%	ZOOL 312	100%	WLDF 431	75%
FISH 460	100%	ZOOL 314	100%		

Students repeating a course contribute to the capacity bottleneck problem. There are courses where the repeat rate is low but the waitlist # is high, indicating that the course is bottlenecked for reasons not related to repeat students, and there are courses where the both the repeat rate and waitlist number is high (**Figure 41**). The trend in **Figure 41** must be interpreted with caution though because HSU does not archive waitlist numbers; the comparison in **Figure 41** is possible only because OIE recorded the Spring'17 waitlist data.

There are 11 CNRS *capacity bottlenecked* courses with a repeat rate higher than 5% across the five semesters (**Table 10**). The absolute number of repeat takers divided by 24 students per lab section gives an estimate of the degree to which repeat students contributed to the capacity bottleneck problem over the five semesters. This estimate is usually greater than one lab section's worth of repeat students, with BIOL 340 demonstrating the highest number of 'repeat lab sections' (i.e., 5.3; **Table 10**). Repeat rates and the number of repeat takers in 100 level courses are as high or higher than for any courses in Table 10, but since 100 level courses are not capacity bottlenecked they do not appear in Table 10.

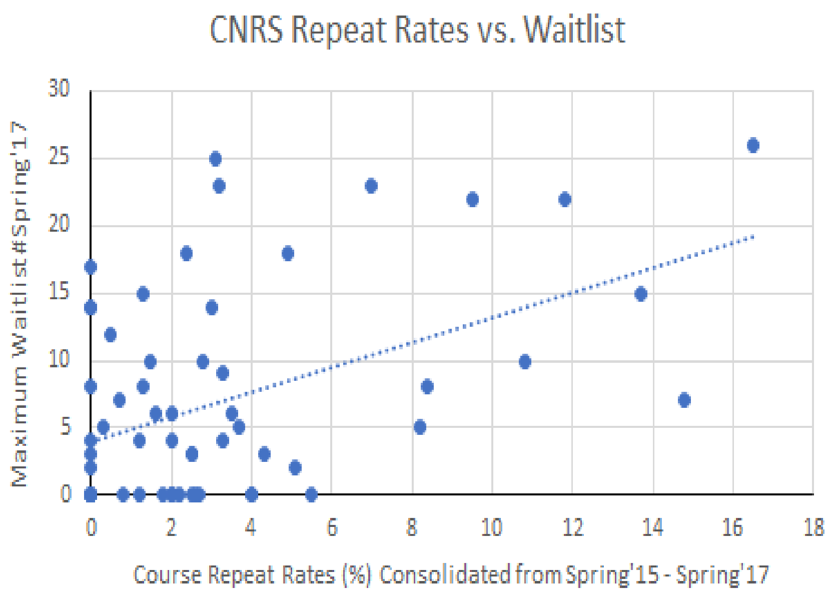

Figure 41. The CNRS relationship between course repeat rates across five semesters versus the maximum # of students on the Spring'17 waitlists. "Course Repeat Rate" = Total Repeat Takers Spring'15 to Spring '17 / Total Grades Spring'15 to Spring'17. Courses designed to be repeated were excluded from this comparison. Data from OIE (12/2017).

Table 10. The highest to lowest repeat rates only for CNRS capacity bottlenecked courses (i.e., =< 3 seats open at census). "Course Repeat Rate" = Total Repeat Takers Spring'15 - Spring '17 / Total Grades Spring'15 - Spring'17. "Estimated # Lab Sections Occupied by Repeat Takers over 5 Semesters" = "Total # Repeat Takers over 5 Semesters" / 24; the latter is often the maximum enrollment for a laboratory section. Note that a course could have had more than 5 sections offered over 5 semesters, but have been offered for fewer than 5 semesters. Also, courses with high repeat rates will not appear in this table if they are not also capacity bottlenecked. Data from OIE (12/2017).

Course	Repeat Rate (%) over 5 Semesters	Maximum Waitlist # Sp'17	Total # Repeat Takers over 5 Semesters	Estimated # Lab Sections Occupied by Repeat Takers over 5 Semesters
BIOL 340	16.5	26	127	5.3
CS 112	14.8	7	28	1.2
ZOOL 270	13.7	15	52	2.2
CHEM 328	11.8	22	62	2.6
CHEM 321	10.8	10	23	1
BOT 350	9.5	22	58	2.4
ZOOL 356	8.4	8	38	1.6
CS 328	8.2	5	10	0.4
EMP 305	7	23	29	1.2
FISH 310	5.5	0	15	0.6
BIOL 410	5.1	2	10	0.4
CHEM 438	4.9	18	8	0.3
CS 243	4.3	3	4	0.2
BOT 358	4	0	2	0.1
STAT 323	4	0	2	0.1
EMP 430	3.7	5	4	0.2
ZOOL 310	3.5	6	11	0.5
ZOOL 314	3.3	9	10	0.4
WLDF 365	3.3	4	11	0.5
EMP 425	3.2	23	12	0.5
BIOL 412	3.1	25	9	0.4
GSP 216	3	14	10	0.4
ZOOL 312	2.8	10	4	0.2
CS 346	2.7	0	2	0.1
FISH 320	2.6	0	2	0.1
GEOL 306	2.5	3	4	0.2
EMP 309B	2.5	3	9	0.4
FOR 302	2.5	0	4	0.2

BIOL 330	2.4	18	13	0.5
WLDF 450	2.2	0	3	0.1
WSHD 310	2	6	7	0.3
WLDF 244	2	0	7	0.3
WSHD 424	2	4	1	0
WLDF 420	2	0	1	0
RRS 430	1.8	0	1	0
CHEM 432	1.6	6	1	0
WLDF 431	1.5	10	3	0.1
BOT 355	1.3	15	1	0
ZOOL 476	1.3	8	1	0
FISH 300	1.2	0	4	0.2
STAT 333	1.2	4	2	0.1
WLDF 475	0.8	0	1	0
FOR 131	0.7	7	2	0.1
PHYX 118	0.5	12	2	0.1
CS 309	0.3	5	1	0
ENVS 450	0	2	0	0
SCI 331	0	3	0	0
BOT 310	0	0	0	0
ZOOL 354	0	8	0	0
ZOOL 358	0	0	0	0
CHEM 431	0	0	0	0
ENVS 410	0	0	0	0
FISH 260	0	0	0	0
FISH 460	0	0	0	0
FOR 359	0	14	0	0
WSHD 458	0	0	0	0
GEOL 303	0	0	0	0
GEOL 305	0	14	0	0
OCN 310	0	0	0	0
PHYX 111	0	4	0	0
WLDF 460	0	17	0	0

Success Bottlenecks sensu OIE

From Spring'15 to Spring'17 26.2% of the *course offerings* were success bottlenecked as defined by OIE – meaning that in each of these offerings more than 15% of the students received a final grade of less than a C- (**Table 11**). When reconsidered from the perspective of how well students performed in *each course* across the five semesters (i.e., so offerings were tallied) it is clear that rates of non-success were low for most of the courses offered (**Figure 42**). Described in a more positive light, 63.1% ((175 + 89) / 418) of the courses had at least 90% of their students succeed (**Figure 42**).

Table 11. The percent of CNRS course offerings across five semesters (Spring'15 to Spring'17; one course could therefore be "offered" as many as five times) that were success bottlenecked (i.e., lack of success was a grade of < C-; a course was considered success bottlenecked if more than 15% of students did not succeed).

# of Course Offerings	# of Course Offerings Success Bottlenecked	% of Course Offerings Success Bottlenecked
1324	347	26.2

Varying levels of non-success (i.e., <C-) in lower and upper division CNRS courses are presented in **Table 12**. Non-successful students decrease the retention rate and/or increase the repeat rate, and the latter contributes to the capacity bottleneck problem of some courses. Underlined courses in **Table 12** have the potential have a large effect on the retention of first-year students because these courses are often taken during their first-year. This is not the case for all 100 level courses. For example, STAT 109 is often taken during the 3rd or 4th semester. The reasons

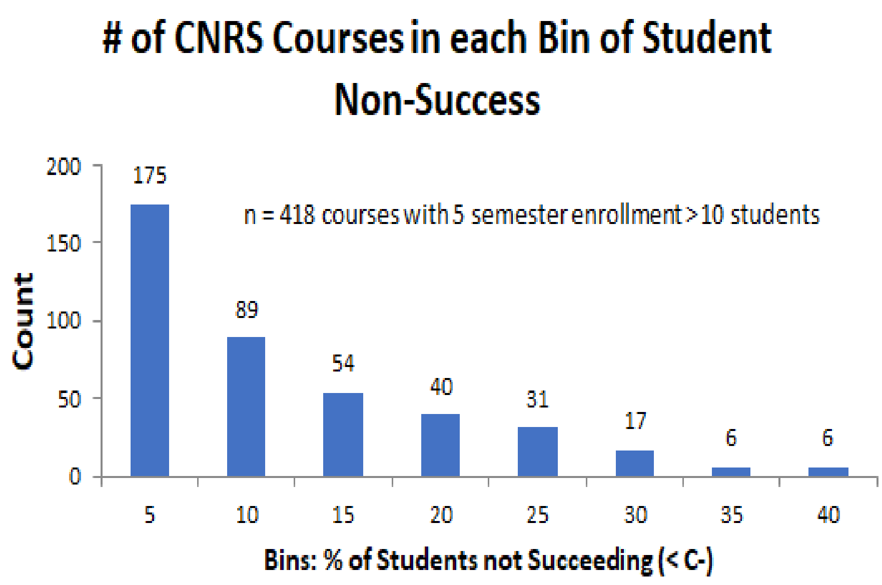

Figure 42. The distribution of CNRS courses (not offerings) with different levels (bins) of student non-success (< C-). For example, 31 CNRS courses have a non-success rate of > 20% and =< 25%. For each course, the "%" not succeeding = 100 - (total # students passing from Spring'15 to Spring'17 / total # students enrolled Spring'15 to Spring'17). Data from OIE (12/2017).

for non-success in the underlined courses are likely to be very different from the reasons for low success in the other courses – and so solutions need to be tailored accordingly.

Table 12. The highest to lowest % of students not succeeding (< C-) in a subset of CNRS courses. The "%" not succeeding = 100 - (total # students passing from Spring'15 to Spring'17 / total # students enrolled Spring'15 to Spring'17). Only courses with a non-success rate of **20% or higher** are included in the table; all courses from this time period are included in *Figure 44*. Courses often taken during the freshmen year are underlined. (check on BIOL 102 & CS 112). Data from OIE (12/2017).

Course	%	Course	%	Course	%	Course	%
MATH 042	39.5	ENGR 325	27.7	PHYX 325	23.3	ENGR 331	20.8
MATH 109	39.5	ENGR 280	27.1	BOT 359	23.2	CS 100	20.4
PHYX 303	38	MATH 316	27	BIOL 102L	23	BIOL 484	20.4
CS 112	37.1	MATH 114	26.5	BIOL 418	22.7	BOT 354	20
MATH 253	35.4	BIOL 340	25.9	BIOL 104	22.7	CS 235	20
MATH 105	35.4	ENGR 326	25.9	CHEM 198	22.7		
ZOOL 110	34.7	BIOL 102	25.7	CHEM 107	22.6		
MATH 113	32.4	CS 111	25.6	BIOL 180	22.4		
MATH 418	31.6	CHEM 328	25.3	FOR 400	22.3		
CHEM 109	30.4	ZOOL 198	25.1	MATH 311	22.2		
MATH 108	30.3	ENGR 313	25	MATH 044	22.2		
BOT 105	30.3	RRS 285	25	BIOL 105	22.2		
MATH 115	29.7	WLDF 426	25	GEOL 300L	21.6		
STAT 108	29.4	STAT 109	24.9	ZOOL 270	21.5		
MATH 110	29.4	BOT 198	24.4	BIOL 433	21.4		
MATH 240	28.6	ENVS 108	24.3	BIOL 433D	21.4		
ZOOL 356	27.9	PHYX 104	24.2	ENGR 210	21.4		
BOT 350	27.8	CHEM 321	24.2	MATH 301	21.1		
PHYX 198	27.7	CHEM 310	23.8	FOR 130	20.9		

Recommendations

1) Category: Data Collection
   a) Obtain data to track the pathways of non-successful & successful students. Offer incentives and training in areas that foster success.
      i) Determine when and if repeating students graduate.
      ii) Determine specific trajectories of unsuccessful students (i.e., do they drop out of HSU? Change major/minor so course is not required? Repeat the course (and how many times)?
   b) Disaggregate data in order to show longitudinal and demographic trends in non-success of students in CNRS courses (e.g., gender, URM status, first gen, etc.)

c) Another approach to understanding the efficiency of seat usage could be used. Rather than counting unused seats, minimum enrollment criteria could be set for different types of courses and then the number of course sections that fail to meet those criteria could be enumerated. For example, the minimum enrollment for a lower division course could be 24 students, the number for upper division courses could be 15 and the minimum number for a graduate student course could be eight.

2) Category: Student Success in Courses
   a) Ensure that CNRS faculty are familiar with existing campus resources and encourage their students to utilize them
      i) Write and require a syllabus addendum for CNRS that specifically outlines academic support resources.
      ii) Incorporate visiting and using resources as part of assignments (e.g., require students to use writing studio for a draft as part of their grade).
      iii) How do we get the information to faculty in the first place?? - CNRS meeting, mandate departments implement into those courses' assignments
   b) Restructure the way that CNRS interfaces with existing campus resources to build partnerships that more effectively serve CNRS students.
      i) Get high non-success CNRS courses on the Learning Center list of courses tutored.
      ii) Partner with cultural centers.
   c) Add new resources for CNRS students, specifically in upper division bottleneck courses that have high rates of non-success.
      i) Add SI sections to courses that don't currently offer SI.
      ii) Expand existing SI support, specifically more sections, and targeted toward students that are more likely to not succeed in the course (major GPA, grades in prerequisite courses).
      iii) Identify GI 2025 funds as a potential source to increase the pool of SI instructors.
      iv) Offer support to instructors teaching courses with high non-success rates in order to promote restructuring within their courses (using new pedagogical tools, refer to CTL, instructors who have demonstrated success in changing success rates).

3) Category: Course Scheduling and Offerings
   a) Require that all advisors approve of three semester plans in DARS planner prior to releasing academic holds. Include a how-to tutorial on using DARS degree planner in SCI 100.
   b) Increase effectiveness of CNRS academic advisors to ensure students' have a reasonable and successful academic plan.
      i) Mentor new and existing faculty in effective advising practices, in both major and GE.
      ii) Assess effectiveness of professional advisors and consider an expanded role.

iii) Establish guidelines for number of advisees for each faculty member. Develop alternative strategies (e.g., group advising) for departments who have advising loads larger than recommended guidelines.
iv) Identify dept-owned spaces that might be shared specifically to allow greater scheduling flexibility for bottlenecked courses.

c) Each department should review potential for online or hybrid course components to reduce number of hours requiring physical classroom spaces.
d) Note: we recommend better transparency in room scheduling, but are aware this may be outside the scope of the CNRS strategic plan.

Appendix H – Scan: Graduate Programs

Narrative

This scan assesses the condition of the CNRS Graduate Programs with particular attention to the issue of financial support and time until degree. Our findings suggest that the Graduate Program is in a process of slow decline.

The goal of the CNRS MSc graduate program is to provide an advanced opportunity for people to receive further training in the sciences so that they can contribute to their respective fields and become employed in science related jobs. At least 20-30% of the CNRS graduate students also get their first experiences as teachers when, as Teaching Associates, they run their own laboratory sections. Beyond benefitting the graduate students themselves, the mentoring of graduate students by some TT faculty allows these faculty to persist as active scholars which, in turn, directly improves the content and atmosphere of the undergraduate courses they teach.

Methods

CNRS has documented positive accomplishments by graduate students. Assessment scores are high for Student Learning Outcomes focused on oral defense presentations, written theses, and information literacy.[31] [32] Faculty are also able to describe many positive examples of their graduate students completing high quality research, going on for doctoral degrees, and getting jobs in science related fields. Unfortunately, these accomplishments are not emphasized in this scan because there are no readily available datasets or methods for obtaining comprehensive data on, for example, MSc theses converted to peer reviewed primary literature, or the current jobs of graduate student alumni. Instead, this scan focuses more the potential limitations and threats to the CNRS Graduate Program. Objectives of this scan are therefore to describe the 1) demographic trends, and 2) financial support for graduate students.

Data on demographic trends of CNRS graduate students (e.g., enrollment, graduation rate, semesters to complete a degree) and part of the information about Teaching Associates (e.g., # TAs, # students taught by TAs, TA WTUs) was provided by HSU OIE with the data that were available to them during Fall 2017 and Spring 2018. Data on TA and Graduate Assistant (GA) pay rates and total wages was provided by the CNRS, and the HSU Office of Graduate Studies provided a list of available graduate scholarships. The record of Student Salary support was provided by the HSU Sponsored Programs Foundation, but that financial information cannot be disaggregated into undergraduate and graduate student funds. Finally, 5-Year Graduate Program Reviews were completed during 2016 for Natural Resources (i.e., including all of the Natural Resource graduate program options) and Biology. These reviews contain assessments of graduate student learning outcomes, what is known about diversity and inclusive excellence, strengths and weaknesses, and a 5-year action plan. Information from these reviews was used in the Results and Recommendations sections of this scan.

[31] Five-Year Program Review for Natural Resources Graduate Program (2016)

[32] Graduate Program Review AY 15_16

Results

Enrollment Trends

The total number of the CNRS graduate students has steadily declined at least since 2005 (**Figure 43**). More specifically, Biology, Wildlife and Fisheries Biology have moderately declined in the last 3-5 years. As well, the number of students in Environmental Systems (Intl. Dev. Tech.) and Environmental Systems (Math Modelling) has dropped and/or these programs have been discontinued.

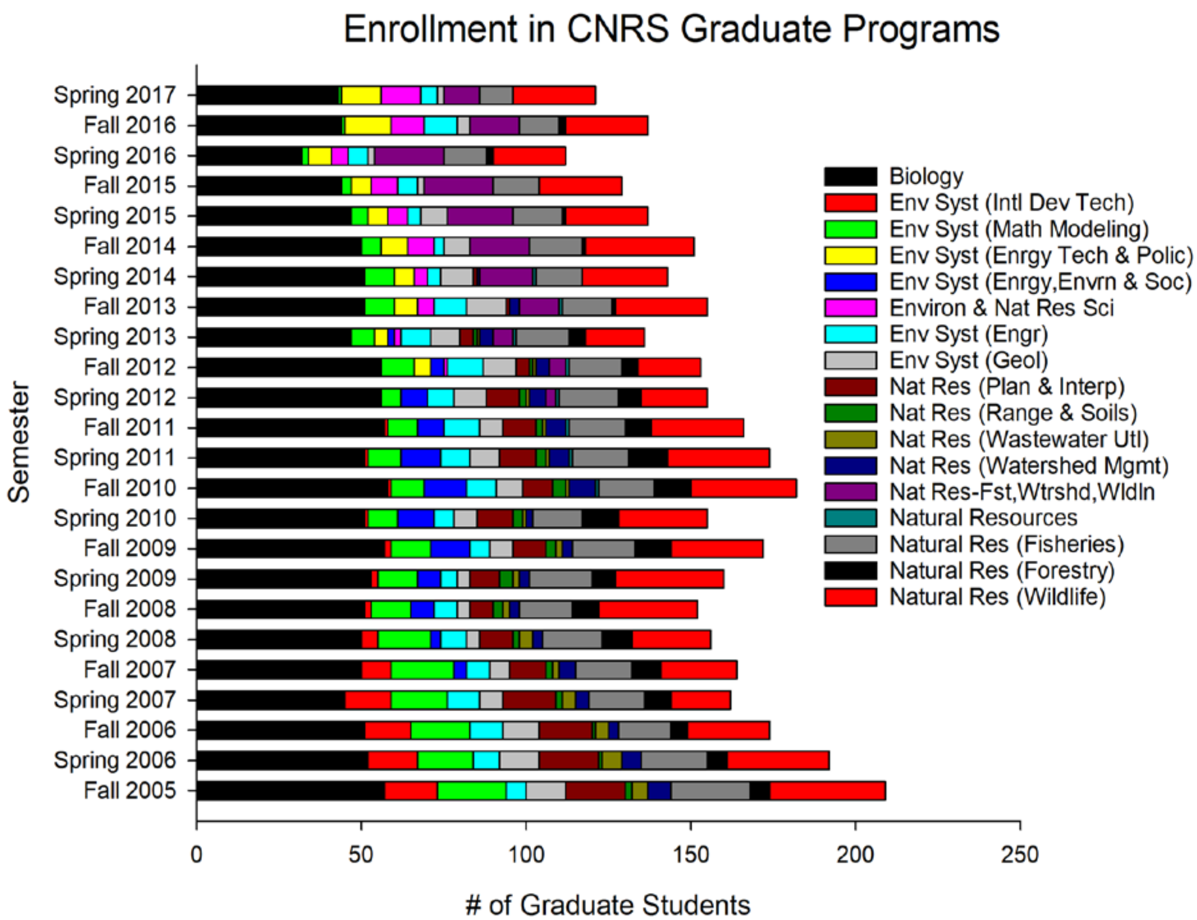

Figure 43. Graduate student headcount for each graduate program in CNRS. These data do not include students enrolled in Extended Education. Data from OIE (December 2017).

Enrollments in parts of the Natural Resource program appear as declines but are in fact changes to the number of NR options. Natural Resources (Planning & Interpretation) declined from AY 2010-2011 to AY 2015-2016 but was renamed Environment and Natural Resources Science in AY 2011-2012. Similarly, the Natural Resource options for Range & Soils, Watershed Management and Forestry were combined into Natural Resources (Forestry, Watershed & Wildland Sciences) in AY 2011-2012 and the Wastewater option was discontinued in AY 2010-2011 (**Figure 43**).

Financial Support

The lack of financial support is considered one of the main reasons why it takes the CNRS graduate students so long to finish or why some students drop out of the programs. Ideally, there would be a complete financial picture for each graduate student that could then be compared to the time it takes to graduate and the quality of the student's research project. This comparison is not possible because an individual student will use multiple sources of funding, such as personal savings, loans, HSU trust accounts, Research Associates from extramural grants, Graduate Assistant (GA) and TA tuition waivers as well as the hourly wages that go with those positions, the State University Grant (SUG), scholarships administered by the Office of Graduate Studies, and Federal Work Study. The below summary reviews the level of support provided by some of these sources, but the extensive experience of faculty who work with graduate students is that the amount of support received by many graduate students falls far short of what is needed to attend HSU and live on the North Coast.

With respect to GA/TA tuition waivers and the SUG, both can cover the in-state portion of tuition, but not the smaller fees (e.g., Materials, Services & Facilities Fees; see https://www2.humboldt.edu/financialservices/node/46). Most other CSU campuses do not provide a fee waiver. How these tuition waivers get allocated and how they are governed causes much confusion for students and faculty. Students are limited to receiving a maximum of five semesters of GA/TA support, while the SUG can only be given to CA residents who have less than 37.5 units of courses completed. What can get complicated is that, for example, a student might receive the SUG for their first four semesters. When that happens, they can only receive one more semester using the GA/TA waiver. That is, a student doesn't necessarily get five semesters of GA/TA support – rather, the university guarantees they can get the GA/TA waiver up until their fifth semester. These waivers are helping graduate students, and the recent development to extend this support to a fifth semester is a positive one – although having it cover three complete years would be more realistic.

The most recent HSU policy for the allocation of Masters out-of-state tuition fee waiver units is based on the percentage of the average number of non-resident graduate students enrolled in that specific program over the prior three years. The total number of waiver units on the HSU campus has been steadily decreasing at least since AY 2012-2013 (**Table 13**). The waivers are critical for attracting high quality students to our programs. How important they are, and how they are used, varies across the HSU campus. For instance, Biological Sciences uses them to pay for the full amount of out-of-state tuition for selected students, while other programs may give a few units to several students to reduce tuition, but not entirely cover it.

One recent change will likely reduce the need for these waivers, although the magnitude of the change remains unclear. Until the AY 2018-2019, some graduate programs were eligible to participate in the Western Regional Graduate Program (WGRP), which allows graduate students from 15 western states to pay only in-state tuition at schools within the program area. Starting in AY 2018-2019, all programs are eligible to participate. For instance, graduate students in the Biological Sciences were previously not allowed to participate but now can do so. This should reduce the need for out-of-state fee waivers, but we do not have estimates of what fraction of our out-of-state students have come from the WGRP program area.

Table 13. HSU allocation of GA/TA non-resident tuition waiver units for each HSU graduate program. Data are from the HSU Department of Graduate Studies.

Graduate Program	Units Allocated 2012/13	Units Allocated 2013/14	Units Allocated 2014/15	Units Allocated 2015/16	Units Allocated 2016/17	Units Allocated 2017/18
Biological Sciences	30	72	102	84	48	40
Business	18			6	6	
Education	6	12	6	6	6	
Engineering						
Env Systems (enrgy Tech & Polic)		18	18	24		24
Env Systems (Enrgy,Envrn & Soc)		6	12		18	
Environmental Systems (Engr)		12			6	
Total Environmental Systems:	48	36	30	24	24	24
Geology		6	6	6		
English	12	0	12	12	6	18
Kinesiology	18	36	30	18	6	6
Mathematics	6	12	12			
NR College Offerings						
Nat Resources (Plan & Interp)		12	18		12	
Natural Resources (Fisheries)		6	12	18	6	6
Natural Resources (Wildlife)		18		12	18	12
Environ & Nat Resourcs Sci				6		
Natural Resources (Forestry)				12	6	12
Total Natural Resources:	48	36	30	48	42	30
Environment & Community	12	30	12	12	18	30
Psychology	12	18			24	20
Social Work	12	18	18	6	24	6
Sociology	12	18	24	12		6
HSU Total:	**234**	**294**	**282**	**234**	**204**	**180**

The amount of money a TA can make is constrained by the number of WTUs they teach, the TA pay rate, and the number of hours each week that a TA is allowed to work. With respect to their teaching loads as defined by WTUs (i.e., 2 WTUs = one 3 hour laboratory section), many graduate students teach only one laboratory section (**Figure 44, Figure 45**) either because there aren't that many laboratory sections in a particular department, or as in the case of the Biological Sciences, there are many laboratory sections but other demands on graduate student time (i.e., their own courses, thesis research) prevent these students from teaching more than two lab sections.

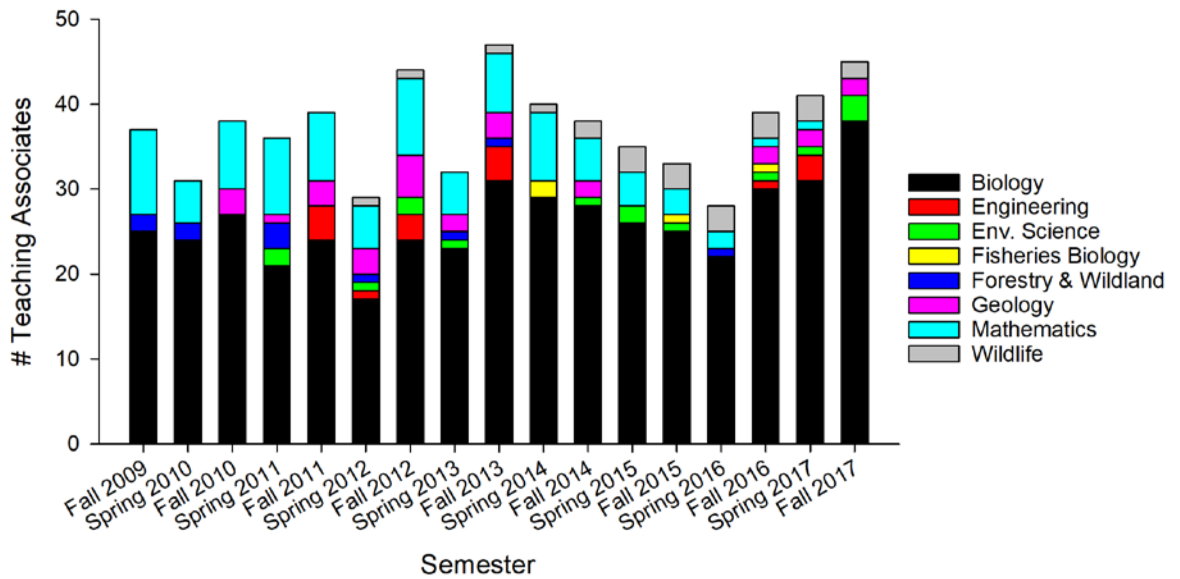

Figure 44. The number of CNRS graduate students each semester (Fall 2009 to Fall 2017) who were Teaching Associates. Data from OIE (December 2017).

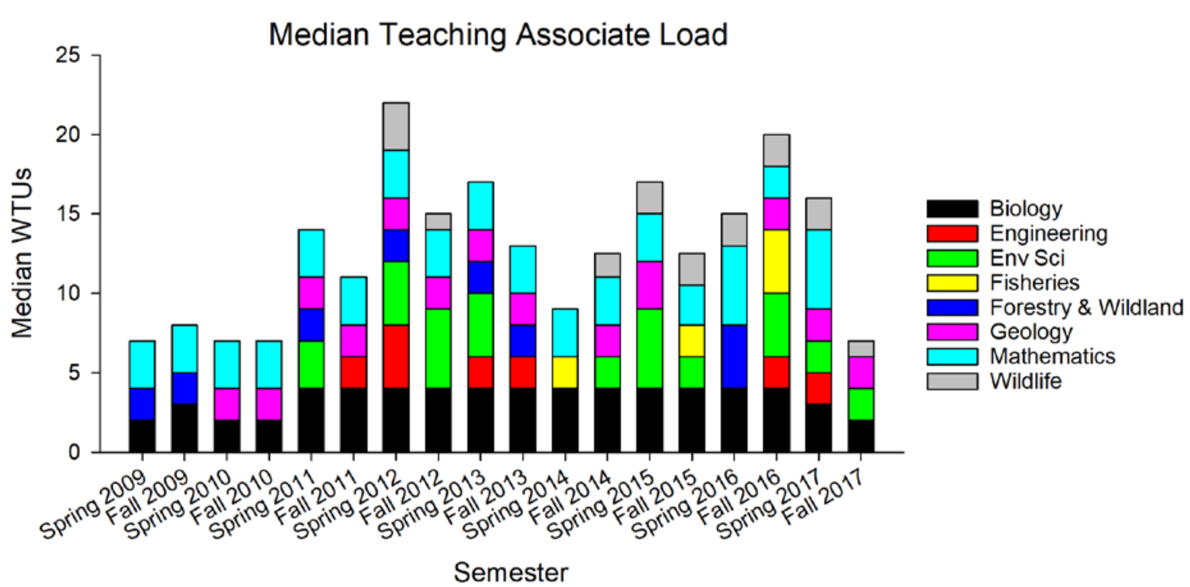

Figure 45. Median teaching loads of CNRS graduate student Teaching Associates (2 WTUs = one 3 hour laboratory section). Data from HSU OIE (December 2017).

The TA pay rate is set by CNRS. That rate, for a two WTU load, has been \$365 month^{-1} (Fall'14), \$384 month^{-1} (Fall'15) and \$404 month^{-1}(Fall'17), whereas the number of hours a TA can work / week – as a TA – is set by the 2016 TA union contract (i.e., 5.33 hours / 2 WTUs, which includes the 3 hour lab that they teach). The total number of hours any graduate student can work each week, regardless of the HSU source of support, is 20 hours.

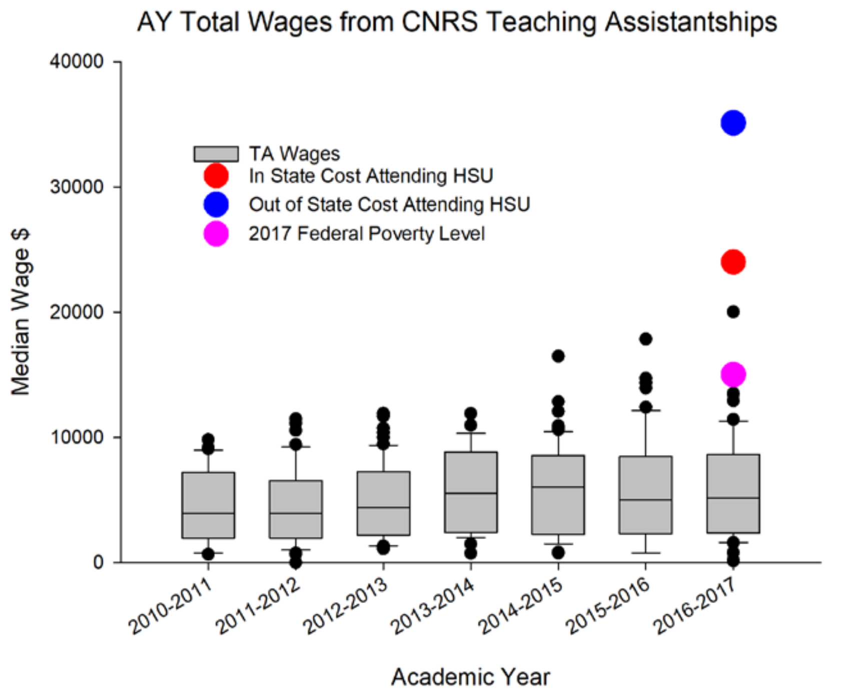

Figure 46. Median CNRS TA wages before deductions from the population of graduate student Teaching Associates each academic year. Data from CNRS (December 2017).

Median academic year total TA wages for the CNRS TAs – before deductions – have been level since at least AY 2010-2011 and are well below the 2017 Federal Poverty Level (**Figure 46**). TA funds come from the CNRS budget, which in turn is part of the HSU Academic Affairs budget. Similar to TAs, GA pay rates are set by the CNRS and depend on CNRS funds. All of the GAs reside in either Fisheries Biology, Wildlife Management or Forestry & Wildland Resources. Median academic year total wages for the CNRS GAs have also been level and have been lower than for TAs (**Figure 47**).

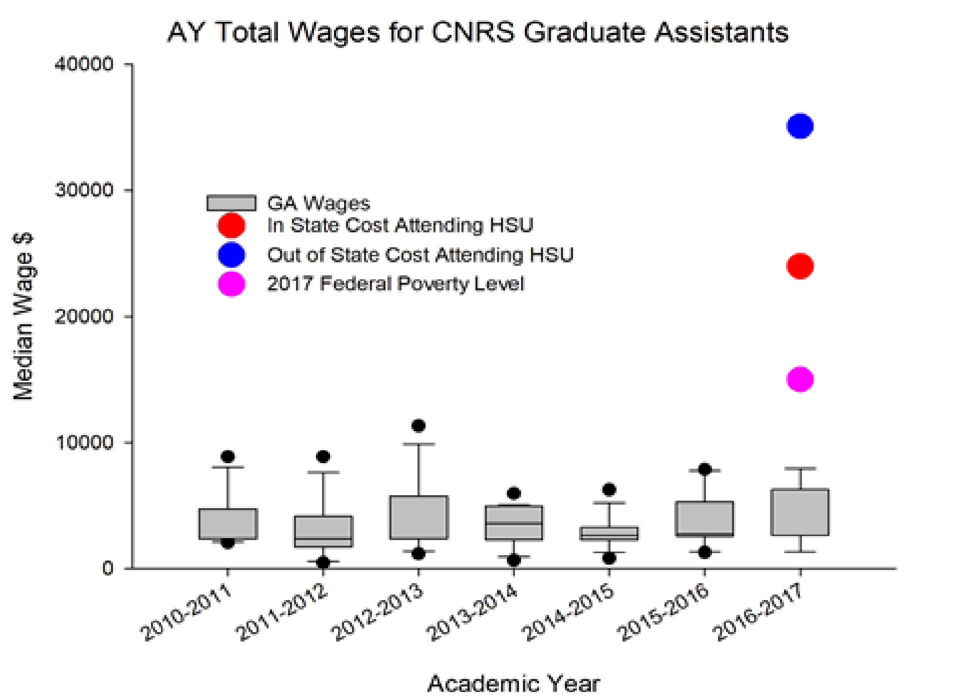

Figure 47. CNRS Graduate Assistant wages before deductions from the population of GAs each academic year. Data from CNRS (December 2017).

Extramural grantsmanship has been increasing in CNRS (**Appendix I – Scan: Scholarship**) and so we assume that the frequency of graduate students who receive living wages is also increasing, but the type of data available make it difficult to determine *the degree to which* graduate students, in particular, are benefitting from these grants. There are large grants that accomplish important work but do not directly support graduate students, and in our experience, there are some graduate students who are well supported by grants and others who receive no extramural living wage support. HSU SPF does not currently disaggregate their "Student Wages" line item into undergraduate and graduate levels of extramural support. However, of those funds managed by SPF, the primary supplier of student wages on the HSU campus is CNRS – by far (**Figure 48**). Within CNRS, the total amount of money raised for students has increased each year since FY 2012-2013, with Forestry & Wildland Resources, Chemistry and Wildlife Management contributing the most to the growth of student living wage support (**Figure 49**). The trend in **Figure 48** is encouraging, but since it can't be disaggregated into separate undergraduate and graduate student salaries, it is difficult to know the degree to which graduate student financial stress is being ameliorated by CNRS grants and trust funds.

Another potential source of funding for graduate students are the scholarships and fellowships administered by the HSU Office of Graduate Studies. These include the CSU Student Research Competition, the Woolford & Hegy Scholarship, the Robert and Patricia Switzer Foundation Environmental Fellowship Program, the Graduate Equity Fellowship Award, the Fullbright U.S. Postgraduate Scholarship, and Federal Graduate Work Study. More information about these awards can be found at the Fellowships and Scholarships page.

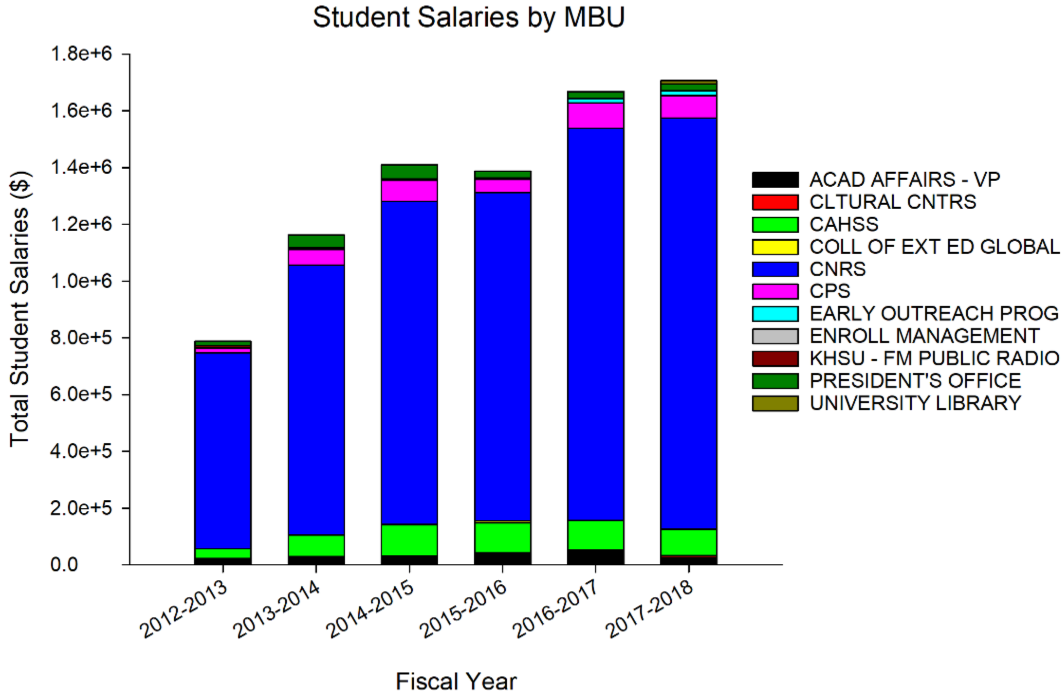

Figure 48. Student salaries (UG + G) for each HSU MBU (Major Business Unit) managed by HSU Sponsored Programs Foundation (SPF); revenue streams are SPF grants and contracts, SPF General Operating Funds and SPF Trusts. Stipends, and student salary funds from Advancement and the State are not included. Data from SPF, April 2018.

Although the financial picture for CNRS graduate students is incomplete, everything we know so far indicates the combination of all of their revenue sources likely falls far short of the costs of attending HSU, regardless if the student is from in- or out-of-state. Graduate students tell us that they are taking out loans and some have declared bankruptcy. Not surprisingly, these students take on- and off-campus jobs that decrease the time they have for advancing themselves as scientists. The number of hours per week that undergraduates work off-campus increases from their freshmen to senior years, and this off-campus working pattern is our observation for CNRS graduate students as well.

Graduation & Drop Rates

The data for graduation rates (**Table 14**) of graduate students were split into three groups: Biology, Natural Resources, Environmental Systems. The latter program is typically considered part of Natural Resources (see Graduate Program Reviews), but since there are many options within NR this scan opted for a finer grain summary of the data. The options included in this summary of NR include all of the options appearing in **Figure 41** except for Environmental Systems. This does mean that the NR summary in this scan may not completely match the NR Graduate Program Review summary. For Biology and Environmental Systems, the better sample sizes for understanding graduation rates occur during fall semesters.

On average, three-year graduation rates are highest for Natural Resources (i.e., 45.8%), followed by Environmental Systems (i.e., 42.5%) and then Biology (i.e., 33.8%) (**Table 14**). Even sixth-year graduation rates are low, ranging from 64.4% to 76.6% for the three programs. Second and third-year drop rates, which are early enough years in most graduate programs to make it unlikely that a graduate student has switched to Extended Education (**Table 15**, see caption), range from 0.0% to 66.7%.

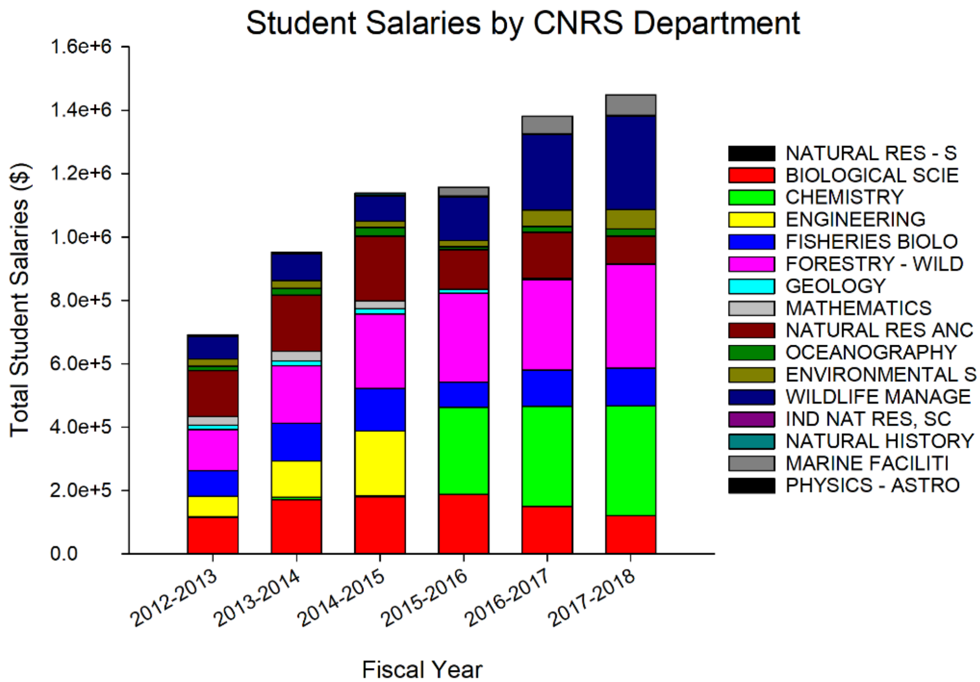

Figure 49. Student salaries (UG + G) for each CNRS Department managed by HSU Sponsored Programs Foundation (SPF); revenue streams are SPF grants and contracts, SPF General Operating Funds and SPF Trusts. Stipends, and student salary funds from Advancement and the State are not included. Data from SPF, April 2018.

Sixth-year drop rates range from 0.0% to 58.3%. While some of these drop rates must be overestimates – when comparable graduation and drop rates are summed and are greater than 100% - many tallies of graduation and drop rates are just over 100%, indicating that those particular drop rates are barely exaggerated. Some tallies of sixth-year graduation and drop rates fall well short of 100%, suggesting that some graduate students are taking longer than six years to finish their degrees.

Table 14. First through sixth year graduation rates over time for graduate students each of the three main graduate programs in CNRS. Using the HSU OIE variables, graduation rate was: # students graduating on a given year / headcount at the start of that cohort. Students graduating through Extended Education are included in these rates. Data from HSU OIE (March, 2018).

		Fall Cohorts, % Graduating															
Program	Graduation Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average %
Biology	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Biology	2	20.0	8.3	9.1	0.0	18.2	20.0	0.0	0.0	10.0	0.0	4.8	9.1	0.0	9.1		7.8
Biology	3	50.0	41.7	36.4	12.5	36.4	60.0	12.5	37.5	40.0	8.3	33.3	54.5	16.7			33.8
Biology	4	70.0	75.0	54.5	31.3	63.6	60.0	31.3	56.3	40.0	41.7	57.1	72.7				54.5
Biology	5	70.0	83.3	63.6	37.5	72.7	70.0	50.0	62.5	50.0	50.0	61.9					61.1
Biology	6	80.0	91.7	63.6	50.0	72.7	80.0	56.3	68.8	60.0	50.0						67.3
Env. Systems	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0	0.0	0.4
Env. Systems	2	30.8	8.3	6.7	11.1	11.1	0.0	11.1	33.3	33.3	7.7	26.3	25.0	14.3	57.1		19.7
Env. Systems	3	38.5	33.3	20.0	27.8	44.4	44.4	33.3	61.1	46.7	38.5	63.2	58.3	42.9			42.5
Env. Systems	4	38.5	33.3	20.0	38.9	66.7	77.8	55.6	77.8	53.3	46.2	68.4	66.7				53.6
Env. Systems	5	61.5	41.7	46.7	44.4	77.8	77.8	55.6	88.9	73.3	46.2	68.4					62.0
Env. Systems	6	61.5	41.7	60.0	50.0	77.8	77.8	66.7	88.9	73.3	46.2						64.4
Nat. Resources	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nat. Resources	2	0.0	0.0	0.0	5.6	0.0	6.7	7.1	26.7	24.2	0.0	9.1	21.7	16.7	6.7		8.9
Nat. Resources	3	33.3	31.6	50.0	38.9	22.2	46.7	42.9	46.7	45.5	75.0	54.5	52.2	55.6			45.8
Nat. Resources	4	40.0	47.4	63.6	72.2	44.4	66.7	64.3	60.0	63.6	75.0	90.9	65.2				62.8
Nat. Resources	5	46.7	63.2	68.2	77.8	55.6	73.3	71.4	66.7	78.8	83.3	100.0					71.4
Nat. Resources	6	53.3	73.7	77.3	83.3	77.8	73.3	92.9	66.7	84.8	83.3						76.6

Table 15. First through sixth year drop rates over time for graduate students each of the three main graduate programs in CNRS. Using the HSU OIE variables, drop rate was: headcount at start of cohort – (# students persisting to a given year + # students graduating the same year). These drop rates might be overestimates if a student who is viewed as not persisting by OIE in fact moved to Extended Education where they are invisible to the OIE database. Data from HSU OIE (March, 2018).

		Fall Cohorts, % Dropping (overestimated)															
Program	Drop Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average %
Biology	1	10.0	8.3	9.1	0.0	0.0	0.0	0.0	12.5	0.0	16.7	9.5	18.2	16.7	9.1	7.7	7.8
Biology	2	10.0	8.3	27.3	25.0	0.0	10.0	6.3	25.0	30.0	41.7	23.8	36.4	25.0	27.3		21.1
Biology	3	20.0	8.3	36.4	43.8	9.1	0.0	25.0	31.3	40.0	66.7	19.0	18.2	41.7			27.6
Biology	4	20.0	0.0	27.3	56.3	9.1	0.0	43.8	31.3	50.0	50.0	23.8	18.2				27.5
Biology	5	20.0	8.3	27.3	43.8	9.1	20.0	31.3	31.3	40.0	50.0	28.6					28.1
Biology	6	20.0	0.0	27.3	43.8	9.1	10.0	31.3	31.3	40.0	50.0						26.3
Env. Systems	1	15.4	8.3	13.3	27.8	11.1	11.1	22.2	5.6	0.0	23.1	5.3	16.7	14.3	0.0	9.1	12.2
Env. Systems	2	23.1	16.7	26.7	38.9	33.3	33.3	44.4	50.0	26.7	61.5	47.4	50.0	28.6	14.3		35.3
Env. Systems	3	38.5	33.3	66.7	66.7	55.6	55.6	55.6	38.9	46.7	53.8	36.8	33.3	57.1			49.1
Env. Systems	4	61.5	41.7	80.0	55.6	33.3	22.2	44.4	22.2	40.0	53.8	26.3	33.3				42.9
Env. Systems	5	38.5	50.0	46.7	55.6	22.2	22.2	44.4	11.1	26.7	53.8	26.3					36.1
Env. Systems	6	30.8	58.3	40.0	44.4	22.2	11.1	33.3	11.1	13.3	53.8						31.9
Nat. Resources	1	13.3	5.3	4.5	11.1	11.1	6.7	0.0	6.7	9.1	0.0	0.0	8.7	0.0	6.7	0.0	5.5
Nat. Resources	2	33.3	26.3	31.8	16.7	22.2	13.3	21.4	13.3	24.2	50.0	18.2	47.8	55.6	46.7		30.1
Nat. Resources	3	40.0	52.6	40.9	50.0	55.6	40.0	35.7	40.0	36.4	16.7	27.3	39.1	44.4			39.9
Nat. Resources	4	60.0	36.8	22.7	27.8	33.3	20.0	28.6	40.0	33.3	16.7	9.1	26.1				29.5
Nat. Resources	5	46.7	31.6	27.3	22.2	22.2	13.3	21.4	26.7	21.2	16.7	0.0					22.7
Nat. Resources	6	40.0	26.3	18.2	16.7	22.2	13.3	7.1	33.3	15.2	8.3						20.1

Recommendations

These recommendations come from the Results section of this scan as well as the 2016 Progress Reports submitted by the Department of Biological Sciences Graduate Program and the Natural Resources Graduate Program.

Graduate Student Enrollment

1. *Increase the number of URG graduate students*. There are presently fewer degrees granted to URG than non-URG graduate students.[33]
2. *Increase the graduation rate for URG graduate students*. These rates are currently lower for URG than non-URG students.[34]
3. *Dramatically raise the prominence of the different types of graduate student scholarly and job successes*.

Financial Support

4. *Each department should consider whether or not they want to make the acceptance of a graduate student contingent upon HSU/Supervisor being able to provide a particular level of funding.*
5. *Extend Teaching Associate (TA) positions from five to six semesters*. This would result in a closer alignment between this level of support and the time until the degree is awarded.
6. *For TAs, increase the number of hours / WTU from 5.33 hrs / 2 WTUs (for one 3 hour lab) to 10 hrs / 2 WTUs*. This would accommodate the actual preparation, collecting, grading, lecture attendance, and office hours necessary to teach a laboratory section.
7. *Increase the number of NR TAs*.
8. *Define the priorities for CNRS graduate students within the Advancement Office at HSU*. No such priorities currently exist.

Course & Training Opportunities

9. *Increase the number and breadth of 500 and 600 level course available to graduate students*. Since at least the late 1990's, the combination of having fewer tenure-track (TT) faculty and, until very recently, more students, has pulled TT faculty out of 500 and 600 level courses in order to teach 100 - 400 level courses. As well, HSU has a policy of suspending a course if it has not been taught in the previous five years, which has made 500 and 600 level courses even less available to be taught and/or used in position justifications. The lack of graduate level courses is particularly evident in some of the more rapidly advancing fields of science, such as genetics and cell biology.
10. *Require a course in grant writing, and/or that a grant writing experience occurs in one of the courses taken by the graduate student*.
11. *Require a course in professional and environmental ethics, and/or ensure that the subject of ethics is addressed in an existing course*.
12. *Departments should work with course instructors to ensure 1) that training is provided on how to be generally effective as a laboratory instructor, and 2) that course instructors work closely with TAs to ensure that the TAs know the material and procedures before they have to teach it.* These steps address the fact that laboratory instruction is the first

[33] Five-Year Program Review for Natural Resources Graduate Program (2016).
[34] Five-Year Program Review for Natural Resources Graduate Program (2016).

teaching experience for most graduate students, and that graduate students can be assigned to courses for which they have little background.

13. "*Develop a transparent policy about lab space that enables more graduate students to utilize a wide variety of HSU lab spaces*".[35]
14. *Increase the amount of lab and office space for graduate students*. Current graduate student office space and computing resources are not equitable across the different CNRS programs.
15. *Create opportunities for mentoring by HSU alumni*. [e.g., online forums, etc.]
16. *Include training opportunities for building marketable skills beyond those needed to complete the thesis research.* This recommendation is based on the assumption that many graduate students will get jobs outside their area of science training, or jobs that only partly overlap with that training.

Improving the Graduate Program Scan

17. *Improve the type and quality of data used to understand and improve the CNRS graduate programs*. For example, a potentially large part of the funding picture for graduate students is unknown because SPF does not disaggregate the extramural funding between undergraduate and graduate students. As well, there is no CNRS survey of graduate student alumni that would allow their HSU program to be compared to aspects of their current professional life (e.g., job type, satisfaction, thesis publications, doctoral degrees, income).
18. Develop and employ one survey instrument to identify the expectations and training goals for entering graduate students and another survey to assess outcomes and satisfaction of students who leave their programs (both graduated and those who withdrew).

[35] Five-Year Program Review for Natural Resources Graduate Program (2016).

Appendix I – Scan: Scholarship

Narrative

The intent of this scan is to describe the level of scholarship in CNRS, the extramural grantsmanship to support this scholarship, and the level of undergraduate student involvement in research.

Methods

Scholarship across CNRS was measured by using Google Scholar to search for peer-reviewed publications authored by HSU faculty, Sponsored Programs Foundation reports, and student enrollment in research-based courses. These data represent only a portion of the scholastic activities in CNRS, therefore further data collection is needed to gain a more accurate representation of scholarship in CNRS.

Results

Publications and Presentations

There is high variability of productivity (# of publications) among faculty and departments in CNRS (**Figure 50**).

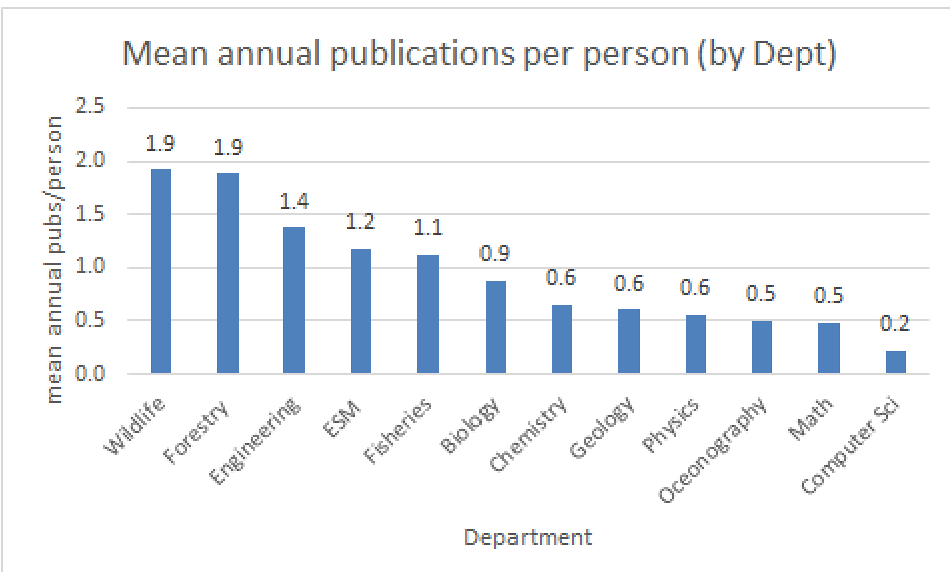

Figure 50. Mean annual publications per TT faculty in CNRS (separated by department). ESM = Environmental Science & Management.

CNRS faculty and students are presenting their research at professional conferences via posters & presentations. In AY 2016-2017 twelve CNRS students received Presidential Scholar Travel awards to present their research at professional conferences totaling $2,750.00. The total amount requested was $15,595 for 42 students. This indicates that the demand for financial support to attend professional conferences is much higher than funds allocated.

Research Funding

HSU is generally doing better at external fundraising for research compared to other CSUs of similar size (i.e., enrollment between 6,000-12,000 students). For example, HSU has generally submitted more proposals per year since AY 2011-2012 than most other CSUs of similar size (**Table 16**).

Table 16. Grant proposals submitted from comparable CSU's between FY2011-12 and FY 2016-17. Humboldt State University is highlighted in green. Source: HSU Sponsored Programs.

CSU Research & Sponsored Programs
Grant Proposals Submitted from Comparable Insitutions*

	FY 2011-12		FY 2012-13		FY 2013-14		FY 2014-15		FY 2015-16		FY 2016-17 YTD	
Campus	Proposal $	Proposal #	Proposal $	Proposal #	Proposal $	Proposal #	Proposal $	Proposal #	Proposal $	Proposal #	Proposal $	Proposal #
Bakersfield	5,101,858	49	19,904,616	59	15,068,255	41	44,637,140	60	49,097,238	66	2,032,647	8
Humboldt	**29,198,975**	**204**	**38,656,273**	**251**	**49,214,179**	**270**	**44,525,827**	**278**	**48,673,366**	**245**	**25,653,454**	**48**
San Marcos	27,554,597	68	31,733,802	57	30,282,391	57	26,988,194	62	43,290,533	85	7,241,812	23
Monterey Bay	63,342,673	112	17,180,914	104	23,495,565	117	19,572,823	82	30,134,837	97	5,658,067	36
Channel Islands	12,320,709	40	4,314,979	40	13,636,566	61	12,107,515	62	27,955,334	72	1,683,852	15
Sonoma	15,208,555	70	12,354,345	63	21,701,355	74	14,480,151	74	17,987,393	62	2,233,812	14
Stanislaus	30,370,751	138	12,872,789	115	13,494,186	82	14,998,788	107	17,207,383	91	726,618	5

** Comparable Institutions are defined as having between 6,000-12,000 enrollment*

HSU has also generally received more grant awards since AY 2011-2012 compared to other CSUs of similar size (**Table 17**).

Table 17. Grant award dollars awarded to comparable CSU's between FY2011-12 and FY 2016-17. Humboldt State University is highlighted in green. Source: HSU Sponsored Programs.

CSU Research & Sponsored Programs
Grant Awards from Comparable Institutions*

	FY 2011-12		FY 2012-13		FY 2013-14		FY 2014-15		FY 2015-16		FY 2016-17 YTD	
Campus	Award $	Award #	Award $	Award #	Award $	Award #	Award $	Award #	Award $	Award #	Award $	Award #
Humboldt	13,468,394	126	8,983,237	147	23,279,131	164	22,882,887	231	26,449,823	166	5,603,795	40
Monterey Bay	12,159,855	66	13,605,880	70	12,037,871	74	15,363,228	77	14,475,425	88	6,827,125	25
Bakersfield	17,858,587	91	13,254,649	84	12,550,925	73	11,069,808	88	12,807,475	68	5,164,663	25
San Marcos	7,617,867	61	7,768,159	59	7,904,949	50	7,961,387	46	9,248,506	47	6,280,361	16
Sonoma	11,060,043	73	15,658,011	56	8,475,273	57	4,704,741	57	6,389,989	47	4,098,613	16
Stanislaus	13,447,110	94	5,018,530	77	4,025,234	59	7,670,086	89	5,440,773	68	369,860	3
Channel Islands	2,618,180	21	1,311,207	23	6,012,799	39	6,440,767	35	4,682,794	23	41,510	4

** Comparable Institutions are defined as having between 6,000-12,000 enrollment*

Within HSU, CNRS submitted 63% of all grant proposals from HSU and was awarded 59% of the total grant funds between AY 2013-2014 and AY 2015-2016 (**Figure 51**).

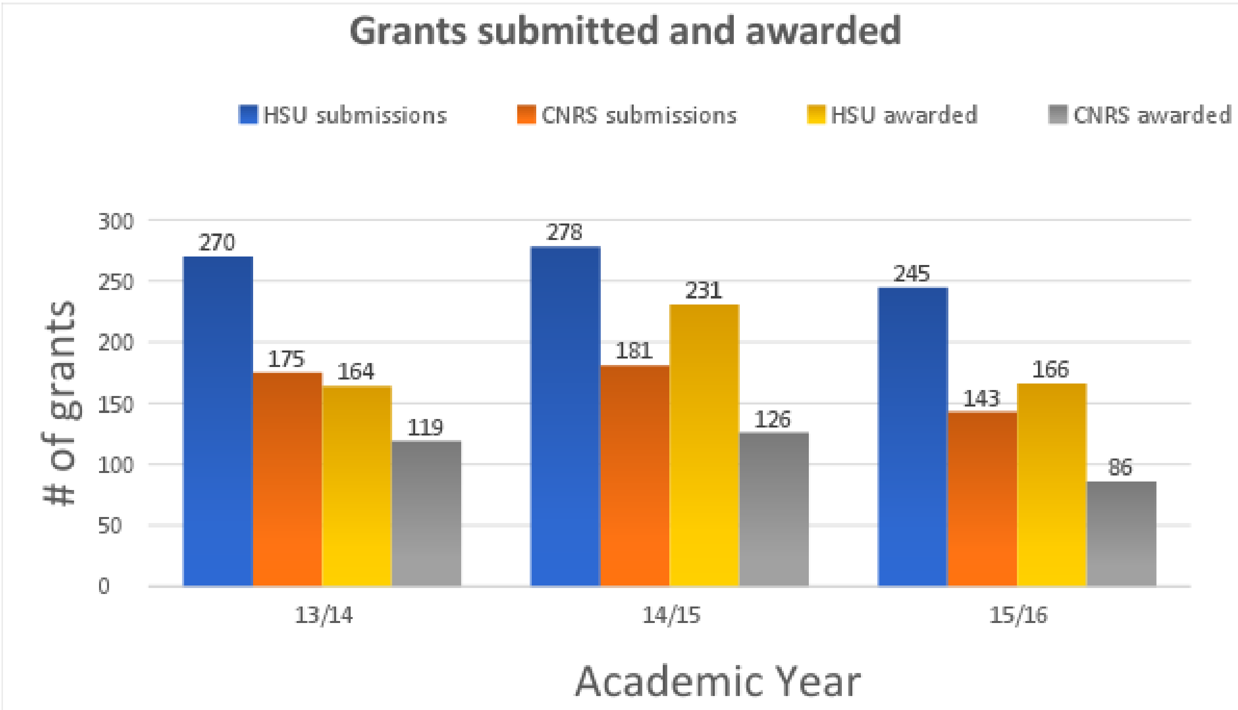

Figure 51. Number of HSU University-wide and CNRS grant submissions and awards between AY 2013-2014 and AY 2015-2016. Source: HSU Sponsored Programs Foundation.

Moreover, CNRS grant submissions from CNRS represented 64% of all HSU grant submissions by dollar amount and 58% of all grant monies were awarded to CNRS (**Figure 52**).

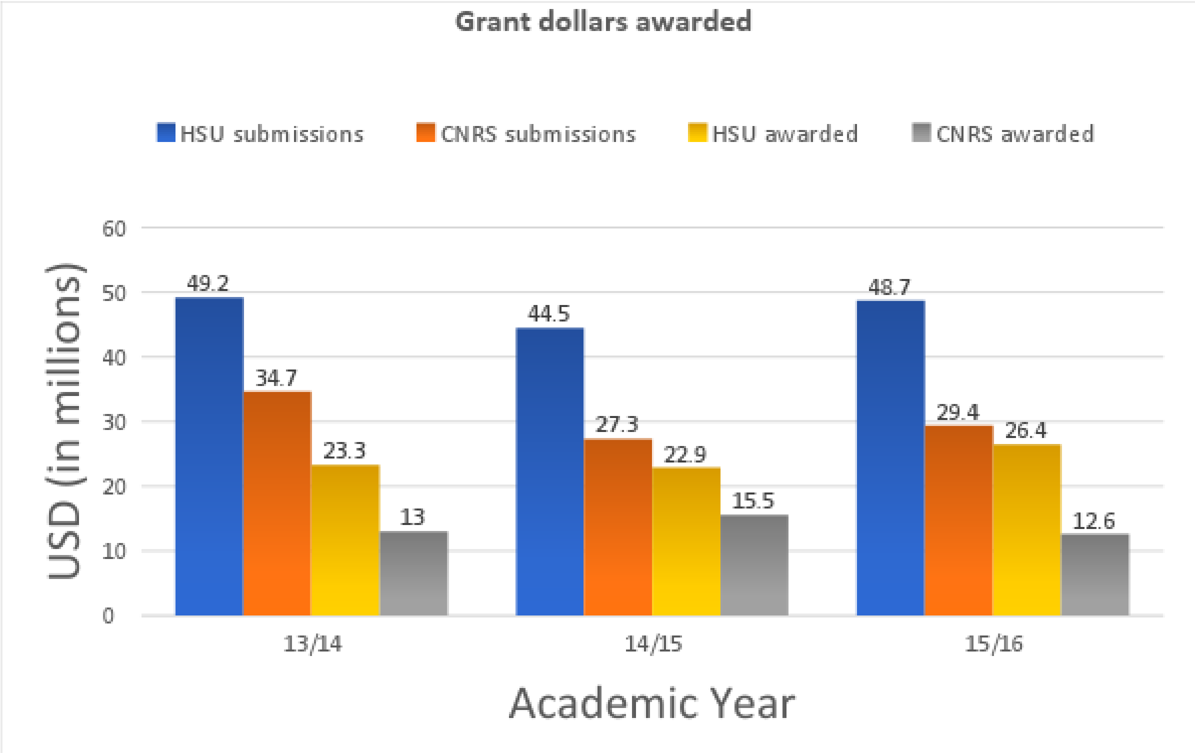

Figure 52. Total grant dollars submitted and awarded to HSU and CNRS between AY 2013-2014 and AY 2015-2016. Source: HSU Sponsored Programs Foundation.

Involvement of Students in Research

A partial indicator of the extent of undergraduate involvement in research is their enrollment in capstone courses (e.g., 490, 495 and 499) and/or upper level courses with an independent research expectation (**Table 18**). Some degree programs use more than one capstone course whereas other programs, like Zoology, have no explicitly identified course. Nearly all of the degree programs in CNRS require a capstone course. Based on enrollment in the courses listed in **Table 18**, the percent of CNRS majors participating in a capstone course has been trending upward to over 30% by Sp2018. Some degree programs, like Biology & Botany, Chemistry and Wildlife have had steady participation from F12 to F18 whereas other programs, like Rangeland Resource Sciences, Physics and Oceanography swing from ~40% to over 100% among semesters (**Figure 53**).

Undergraduate participation in hands-on research is even higher than what is indicated by **Figure 53**. Required courses have embedded research projects and so students in degree programs without a capstone course (e.g., Zoology) are still getting this kind of experience. Other types of undergraduate research experience include working with graduate students, HSU and non-HSU research internships, and attending professional science conferences. Overall, the percent of CNRS students experiencing hands-on research is extremely high due the combination of capstone courses and other kinds of research activities.

Table 18. The courses considered as capstone experiences for each CNRS degree program; only these courses are included in the data used to generate Figure 53.

Degree Program	**Capstone Course**
Biology & Botany	BIOL 482
	BIOL 484
	BIOL 490
	BIOL 498
	BIOL 499
Chemistry	CHEM 485
	CHEM 495
	CHEM 499
Computer Science	CS 461
	CS 482
	CS 492
	CS 499
Environmental Management and Protection	EMP462
	EMP 482
	EMP 499
Environmental Resources Engineering	ENGR 481
	ENGR 492
	ENGR 496
	ENGR 498
	ENGR 499
Environmental Science and Management	ESM 475
	ESM 450
	ESM 453
	ESM 455
	ESM 462
	ESM 499
Fisheries	FISH 485
	FISH 490
	FISH 499
Forestry	FOR 479
	FOR 482
	FOR 490
	FOR 499
Geology	GEOL 482
	GEOL 485
	GEOL 490
	GEOL 491
	GEOL 492
	GEOL 499

Math	MATH 481
	MATH 485
	MATH 499
Oceanography	OCN 485
	OCN 495
	OCN 496
	OCN 499
Physics	PHYX 462
	PHYX 484
	PHYX 485
	PHYX 490
	PHYX 495
	PHYX 499
Rangeland Resources Sciences	RRS 461
	RRS 492
	RRS 499
Soils	SOIL 461
	SOIL 462
	SOIL 499
Wildlife	WLDF 482
	WLDF 485
	WLDF 490
	WLDF 492S
	WLDF 495
	WLDF 499

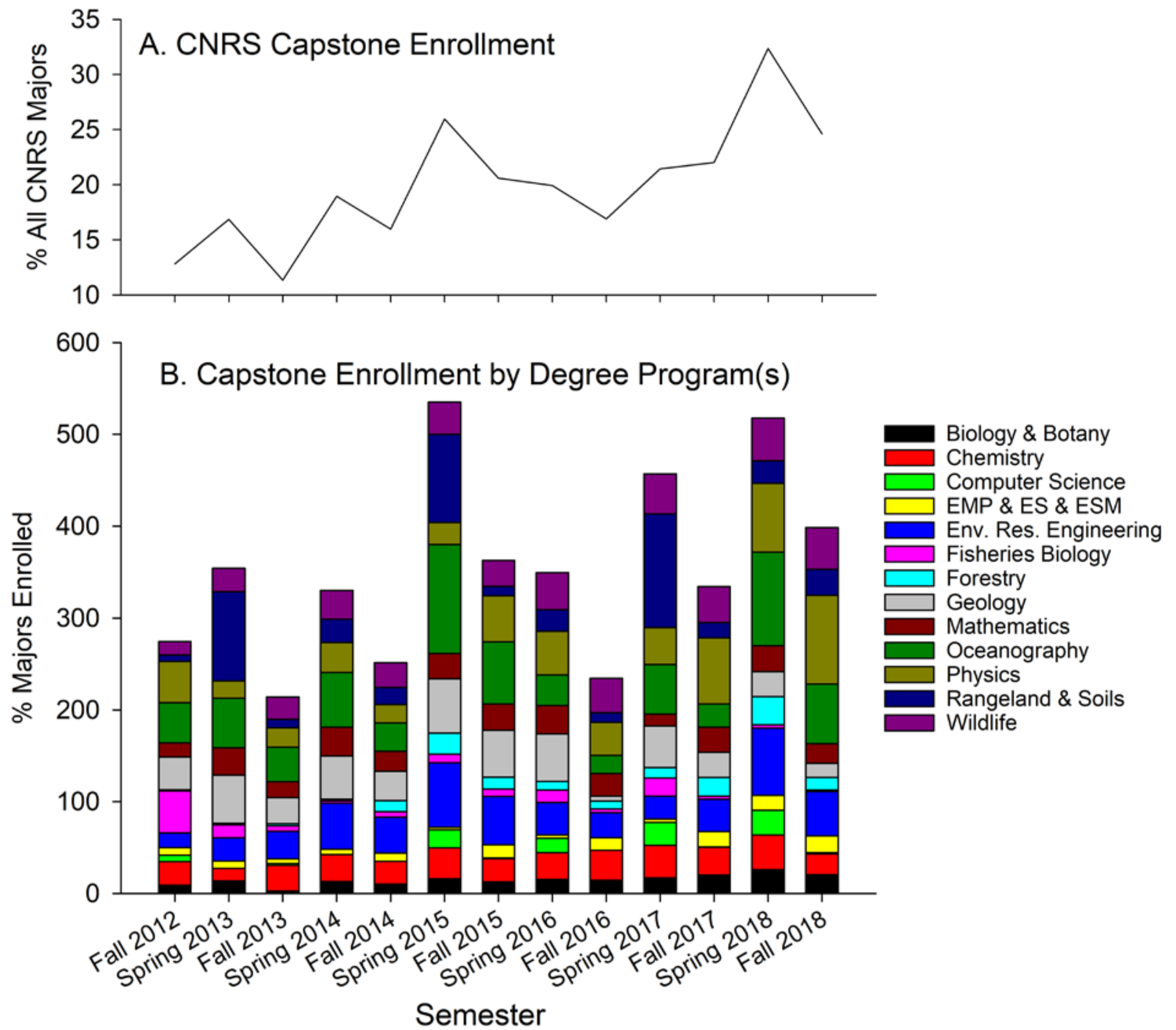

Figure 54. (A) The percent of total CNRS majors (headcount) who have enrolled in the capstone courses listed in Table 18. (B) The percent of majors in each degree program who enrolled in the capstone courses listed in Table 18. Biology and Botany majors use the same capstone courses. Environmental Management and Protection (EMP) and Environmental Science (ES) changed to Environmental Science Management (ESM) starting F17. Rangeland Resources Sciences and Soils use different capstone courses (Table 18) but are parts of the same major. (Data from HSU OIE, 12/2018.)

Recommendations

1. Encourage equity across CNRS departments in terms of support for research to ensure consistent opportunities for students.
2. Increase financial support for faculty, staff, and students to regularly attend professional conferences. Philanthropic giving could be a potential source of these funds. Consider utilizing departmental IDC for this cost.
3. Departments should include expectations in their RTP criteria for engagement of students in faculty research.
4. Establish metrics to define what constitutes an effective undergraduate student research experience. Use this measure as a baseline to set future targets for what percentage of students we would like to be involved in research by the time they graduate. Set the goal that all CNRS undergraduates will have an independent research experience before graduation.
5. Expand the dataset for student research wages paid through SPF 5 years back, and see if SPF can change the way do their accounting so that wages paid to undergraduate and graduate students can be disaggregated. Obtain student internship, REU, and study abroad data for CNRS.