



**HBS ACADEMIC PROGRAM REVIEW  
RESPONSE TO STANDARDS  
June 2015**

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**I. Significance and Scope of the Program**

*Standard 1. The purpose of the program reflects and supports the mission and strategic vision of Western Carolina University and the mission of its School and/or College.*

i. Purpose and scope of program

The Highlands Biological Station (HBS) was founded in 1927 and operated as an independent non-profit scientific organization for its first fifty years. Field stations like HBS are intentional place-based research and education organizations (Wilson 1982, Kohler 2002, Kingsland 2010), characteristically sited in ecologically significant regions (Ricketts et al. 1999) in order to provide a base of operation for immersive field-based teaching, training, and research (Klug et al. 2002, Hodder 2009, Michener et al. 2009). Biological field stations are increasingly recognized as important repositories of knowledge and long-term data in local organismal biology and ecology (Brussard 1982, Callahan 1984, Schmidly 2005, Michener et al. 2009, Tewksbury et al. 2014).

Owing to its location, growing facilities, and other assets the Highlands Biological Station was acquired by the University of North Carolina system in 1976 through an agreement with the founding Corporation. At that time the Corporation was reorganized as the Highlands Biological Foundation, Inc., a 501(c)3 non-profit that now partners with and helps support HBS. Since 1981 Western Carolina University (WCU) has administered HBS on behalf of the greater University of North Carolina system.

HBS has a long tradition of programs in education, research and service for the WCU community, our region, UNC, and the national and international scientific community. Specifically, HBS creates or supports (1) experiential learning opportunities in diverse biological /environmental sciences, (2) research experience for undergraduates, graduates, and post-graduates, and (3) service and community engagement for local, state, and federal organizations (e.g., programming provided for K-12 schools of the surrounding western North Carolina counties, the NC Wildlife Resources Commission, USDA-Forest Service, and the US Army Public Health Command). HBS is further

valued for its role in regional tourism and informal education in western North Carolina through its Nature Center museum and Botanical Garden.

Now in its 88th year, HBS has grown to a campus of 23 acres with the infrastructure, facilities, equipment and other amenities necessary to support its educational and research mission (see "About," "Research" and "Education" links at [highlandsbiological.org](http://highlandsbiological.org)). These include classrooms and teaching labs, research labs, dorms (sleeping 38), maintenance shop, self-service dining hall, public natural history museum, and a 12-acre public native-plant botanical garden. HBS continues to strive to meet its founding purpose: providing a base for high-quality teaching, training, and research in field biology, with a focus on the rich regional diversity of organisms and ecological systems. The community that HBS serves is large, including visiting senior and graduate student researchers, undergraduate and graduate field course students, interns, primary and secondary science educators, governmental and non-profit conservation professionals, and an extensive outreach community ranging from K-12 students to life-long learners.

#### ii. Alignment of program with the University's mission

Although WCU has a long relationship with HBS it is only in recent years that the University articulated specific strategic directions that resonate with the mission and purpose of HBS in field biology education and research. The mission and products of HBS align with several of the goals and initiatives of WCU's *2020 Vision* strategic plan. For example: (1) Goal 1.1, delivering high-quality academic programs designed to promote regional economic and community development, with curricular focus areas that include education and environment and promoting regional leadership in the study of the environment and environmental policy; (2) Goal 2.1, pertaining to academic excellence and personal growth, realized in part by enhancing the total student experience through experiential opportunities; and (3) Goal 3.1, aiming to enhance external partnerships, achieved through long-standing partnerships with local businesses, non-profits, government agencies, and others. Additionally, though not a primary focus of the HBS mission, our role in regional tourism — realized through the extensive public programming of our nature center museum and botanical garden — further resonates with WCU's initiative 1.1.2, committing to advancing the recreation and tourism industries of western North Carolina.

In a given year between 5% and 10% of the students taking HBS courses come from WCU. Sean O'Connell and I have been discussing the possibility of requiring at least one HBS course experience for all students in the Ecology & Evolution Concentration of the Department of Biology at WCU. Instituting such a requirement has its challenges, however, since these are summer courses necessitating additional fees beyond the students' annual tuition.

#### iii. Distinctive aspects of the program in terms of its relationship with WCU

WCU and the University of North Carolina system are fortunate to boast one of the oldest and best-known biological field stations in the US. The special relationship between HBS

and WCU means that WCU students and faculty have privileged access to the Station and its programs. One or more WCU graduate students conduct their thesis research at HBS annually, and a growing number of WCU faculty teach courses at HBS, valuing the immersive model that is not available on any college campus. These course opportunities afford a level of training not readily duplicated in traditional academic departments, as students gain significantly more hands-on experience with their subject than in a traditional classroom course. Being purposely sited in a "natural classroom" with ready access to diverse ecological zones from low- to high-elevation, river gorges of the Blue Ridge Escarpment, and National Forest and National Park lands, HBS offers a base for unparalleled learning and research opportunities in temperate-zone terrestrial and aquatic systems.

Contributing to the educational experience, too, is the setting of such field courses in the context of the purpose-driven field biology-oriented scientific community that develops at field stations and marine labs each summer. Much informal learning goes on after class time in social spaces as students from different courses, faculty, researchers, etc. have opportunities to interact.

#### iv. Primary strengths/weaknesses of the program

Strengths of the HBS program include (1) overall excellent facilities and equipment for the support of a range of field-based research and educational opportunities; (2) a robust and highly popular menu of science-based outreach educational programming for all ages; (3) a talented and dedicated staff who strive for continued improvement of operations and providing a high-quality visitor experience; and (4) a robust Foundation, with an active membership and volunteer Board that dedicate considerable time and resources to advancing the HBS mission.

Primary weaknesses of the HBS program largely stem from facilities and space-related issues\*, foremost among them:

- Some facilities that are dated and are in need of renovation (e.g., Aquatics Lab) or replacement (e.g., Weyman Building; Wright, Deacon, & Howell Cottage dorms).
- Housing space constraints, limiting our ability to fully utilize all available teaching and research space, limiting the diversity of user groups that can be accommodated at any one time on-site, and limiting our ability to diversify with additional future programming.
- Inadequate budgetary support from the university system, with deep cuts in recent years and regular threats of further cuts.

*\*Plans are in place to address facilities deficiencies, including NSF-FSML grants (of which HBS has received 2 in recent years) and the state of NC Capital Improvements budget process.*

Other weaknesses pertain to management of historical data. HBS has an extensive archive of historical data, much of it stemming from a long-term series of studies through the 1960s and 1970s on the biota and ecology of several Blue Ridge Escarpment river

gorges. Some of these data have been published in the scientific literature, but we are grappling with the most useful and cost-effective means of making the hard-copy data files available to the scientific community. We are also exploring how to capitalize on these data by repeating some of the studies for comparative analysis to determine if there have been significant changes after 50+ years.

Similarly, HBS has an extensive herbarium including approx. 200 accessions from the Biltmore collection, dating to the late 19th and early 20th centuries. Following the example of herbaria and museums worldwide, we need to raise awareness in the scientific community about these collections and foster their use by make them available digitally.

On balance the HBS program is extremely robust. One revealing measure of this is how well HBS relates to a set of goals identified in a recent NSF-sponsored report, conducted by the Organization of Biological Field Stations (OBFS), to help field stations and marine labs (FSMLs) maximize their unique value to the scientific community and society in general. Entitled "Field Stations and Marine Laboratories of the Future: A Strategic Vision" (Billick et al. 2013; available at: [www.obfs.org/fsml-future](http://www.obfs.org/fsml-future)), this report includes the following recommended goals, most of which HBS already meets or is actively engaged in meeting:

**Goal 1:** Increase the value to society of the science done at FMSLs, as well as the public understanding of that value.

Beyond routine teaching and training the next generation of scientists and policy-makers, HBS fosters applied research aimed at solving concrete environmental problems (e.g., restoration ecology for American Chestnut and Fraser Fir; assessment of the health of local river and stream systems; assessing the effects of different timber harvest practices on salamander populations. Public understanding of that value is fostered through our Zahner Lectures in Conservation Biology series, "Science à la Cart" programs, and other outreach programs and activities.

**Goal 2:** Increase the scientific value of FSMLs by increasing the flow of information, both between FSMLs and scientists and among FSMLs themselves. Objective A: Develop a more comprehensive network of FSMLs; Objective B: Increase the ability of scientists to take advantage of FSMLs.

HBS regularly engages with a neighboring field site: the Coweeta Hydrologic Laboratory. This is mainly accomplished through student research interns from our fall IE program. We increase the ability of scientists to take advantage of HBS by making our facilities available at low cost, actively supporting their work through our Grant-in-Aid program.

**Goal 3:** Enhance the synergies between research and education.

Some HBS course instructors build rigorous scientific investigations into the course experience. One example is Ray Semlitsch, whose course *Conservation Biology of Amphibians* regularly involved group research projects that were subsequently published in the scientific literature. Another is staff member Patrick Brannon, who has several times published papers based on research conducted with interns in the HBS fall IE program (see Appendix 7: Semlitsch et al. 2007, 2009, 2012, and Brannon and Bargelt 2013, Brannon and

Rogers 2005, Brannon et al. 2010, 2014). Finally, we endeavor to share research conducted at HBS with the visiting public through exhibits and the "Science à la Cart" programs in the Nature Center.

**Goal 4:** Promote the flow of scientific information for environmental stewardship by ensuring appropriate access by scientists and students to terrestrial, aquatic, and marine systems.

By welcoming visiting researchers and providing a cost-effective and well run research base for their investigations we make it possible for researchers from around the US and the world to gain easy access to local organismal and ecological systems. Visiting scientists are further supported by readily granting permission to base their work or conduct sampling on the HBS grounds or other HBS properties (e.g., Dulany Bog).

**Goal 5:** Increase the operational effectiveness of FSMLs. Objective A: Enhance the effectiveness of individuals working at FSMLs; Objective B: Maintain and improve critical infrastructure.

We have made great advances over the past decade in facilities, infrastructure, and equipment improvements. More must be done in this regard, as noted above, and we are constantly engaged in planning for continued improvements as detailed in the next section.

*Standard 2. The program engages in ongoing, systematic planning that is reflective of the University's strategic priorities.*

i. The program's strategic goals or objectives

The current strategic goals/objectives of HBS focus on facilities and programming, with the aim of doubling the academic programs and increasing residential occupancy from 38 to 50 beds over 2006 levels. Having recently completed a Master Site Planning process (see item ii. below) we have identified a new residence facility sleeping 30 as the greatest priority to advance the Station. This facility has cascading effects on budget, programming capacity, and other site improvements. Specifically, with improved and expanded residential space we aim to (1) expand our regular field course offerings to 12 annually while also being able to accommodate workshops, visiting classes, graduate and senior researchers, and projected new residential programs aimed at retired life-long learners; (2) decommission the oldest and least functional existing dorms and transform the center of campus into garden and workshop space; and (3) double the revenue-based portion of the HBS budget (from \$102K to \$200K), which is the most likely avenue for realizing a budget increase.

Accordingly we have been actively planning for this facility, engaging an architect to develop a design and provide estimates of probable cost. Funding for the facility (\$3.9M) is currently under consideration in the UNC six-year Capital Improvements budget.

ii. Process for developing goals and objectives

In the past decade HBS has undertaken two extensive, year-long, planning exercises. The first, conducted in collaboration with the Board of Directors, was undertaken soon after my arrival in 2006-2007. This Preliminary Master Plan identified strategic programmatic and facilities goals and provided a guide for advancing the institution. I systematically pursued these goals and accomplished several, among them: (1) installation of a sanitary sewer system; (2) renovation of the Bruce Biodiversity Lab with new classrooms and a molecular biology laboratory; (3) renovation of the W. C. Coker Laboratory and Howell Administration Building; (4) acquisition of new vehicles for student transport on field trips; (5) demolition of the condemned Illges Cottage dorm; (6) upgrade of campus-wide wireless internet; and (7) upgrades to all remaining dorms (windows, appliances, etc.). The second planning exercise, supported by private donors, was undertaken in 2012-2013 and facilitated by Tres Frommé Design of Atlanta. This process yielded an updated Master Site Plan taking into account accomplishments vis-à-vis the Preliminary Master Plan and identifying new options for facilities and program development. The top priorities of this updated plan are being pursued, with progress to be evaluated every 5 years. The Master Site Plan document "HBS Master Site Plan Booklet.November 2013.pdf" can be downloaded at:

<https://dl.dropboxusercontent.com/u/26470143/HBS%20Master%20Site%20Plan%20Booklet.November%202013.pdf>

Additionally, we have recently undertaken a separate planning process focusing on the HBS Botanical Garden. In May 2015 we convened a panel of experts (regional botanists, ecologists, and directors of university-affiliated public gardens) for a 2-day Botanical Garden Forum (Appendix 1), designed to assess the botanical garden, identify strengths and weaknesses, and provide advice on management options relating to the diversity and display of the collections and associated interpretation. The results of the Forum are being summarized by members of the HBF Botanical Garden Committee.

Finally, this year we have expanded our outreach education staff to two, with the hiring of a new Nature Center Educator. This new Foundation-funded position will permit us to offer more in-school and in-house educational services. We are also introducing new exhibits in the Nature Center. This is a work in progress, with the young children's section recently redone, a new pollinator exhibit under development, and a makeover for the southern Appalachian biodiversity exhibit nearly complete.

*Standard 3. The program provides and evaluates a high-quality curriculum that emphasizes student learning as its primary purpose.*

i. Alignment of curriculum with disciplinary standards

Field-based educational opportunities in the biological sciences (ecology, evolution, and traditional organismal "ology" courses) are waning at many colleges and universities, largely owing to budget constraints, limited travel/field time, and pressures for programs in the biological sciences to move increasingly in the direction of cellular, molecular, and biomedical biology. Field stations and marine labs (FSMLs) are thus becoming crucial

repositories of deep place-based field knowledge, where new generations of students can come for discipline-specific training. The growing importance of the distinctive teaching and training offerings of FSMLs, and the effectiveness of the immersive educational model for STEM education that characterizes these institutions, was recently highlighted in reports issued by the Organization of Biological Field Stations (Billick et al. 2013) and a National Research Council committee set up to examine the value and sustainability of field stations and marine laboratories (Committee on Value and Sustainability of Biological Field Stations..., 2014).

ii. Nature of the program's curriculum

HBS does not offer a degree program or course of study, but rather academic course offerings in summer and fall programs. In the summer program HBS offers up to 16 1- and 2-week accredited courses, with credit available through WCU (graduate or undergraduate) or UNC-CH (undergraduate only). The subjects run the gamut of field biology studies: herpetology, botany, entomology, mycology, conservation biology, ichthyology, etc. Most are on a 2-year rotation, but some high-demand courses are offered annually. Instructors for these specialized courses are recruited from colleges and universities throughout the US on the basis of professional reputation and experience in specific subject areas. HBS summer courses are thus designed to be high-quality immersive experiences, often specialized, with a high field/lab to classroom/lecture ratio. (See Appendix 2 for sample syllabi.) All HBS courses are evaluated by students, and the results compiled, reviewed, and shared with instructors. We keep a running database of ratings pertaining to two key questions on the evaluations, namely overall quality scores for each course and instructor (Appendix 3).

The HBS fall semester-in-residence program is offered in cooperation with the UNC-CH Institute for the Environment. Successful applicants to this program take a 17 credit-hour course of study (UNC-CH credit), including:

*Mountain Biodiversity* (4 credits) & *Conservation Biology in Theory and Practice* (3 credits). Complementary courses that provide an introduction to facets of regional biodiversity within the framework of biogeography theory and principles.

*Landscape Analysis* (3 credits). A study of GIS and other methods of landscape-level analysis (e.g. remote sensing, aerial photography), an important tool for conservation biology.

*Appalachian Culture History and Land Use Seminar* (1 credit). An excursion- and discussion-based seminar tracing the history of the southern Appalachians from the pre-contact era to the modern day, helping students to understand the complex ways in which people have interacted with the land over the millennia, and their lasting effects.

*Individual Research Internship* (3 credits) and *Capstone* group research project (3 credits).

The HBS-IE program is coordinated by HBS Associate Director Karen Kandl with my assistance, and is taught by us as well as selected specialist faculty recruited to teach

certain course segments. These courses are subject to UNC-CH's on-line course evaluation protocol. (See Appendix 4 for HBS-IE course syllabi.)

Finally, in May 2015 we developed a 2-week "Maymester" course for WCU students entitled *The Southern Appalachian Landscape* (3 credits). Jointly taught by faculty from the Departments of Biology, History, and Philosophy, this course was designed to introduce students to the southern mountain environment from complementary disciplinary perspectives, with the intent to foster a deeper understanding of the interplay of environmental and cultural factors in shaping how people interact with the land (Appendix 5).

## **II. Faculty Resources, Teaching, Scholarship, and Service**

*Standard 4. The program has sufficient faculty resources to meet its mission and goals.*

Unlike a traditional campus-based academic department, the model at HBS with its seasonal course offerings is to work contractually with instructors on a per-course basis. Faculty are recruited by reputation and standing in their field, and come from a diversity of institutions nationwide. For example, in summer 2014 and summer 2015 HBS course instructors came from (alphabetically): Auburn University, Austin Peay State University, Buffalo State University, Clemson University, Duke University, Eastern Illinois University, Field Museum (Chicago), Hampden-Sydney College, North Carolina State University, New York Botanical Garden, UNC-Chapel Hill, UNC-Charlotte, University of Illinois, University of Minnesota, University of Missouri, University of North Alabama, UT-Chattanooga, Warren Wilson College, and of course Western Carolina University. Instructors are hired per UNC system / WCU hiring protocol as part time summer instructors, subject to standard vetting (background checks) and are given van safety training.

We have been fortunate in being able to recruit high-quality faculty to teach HBS courses despite inadequate compensation. However, this is becoming more difficult as HBS summer course stipends have stagnated. For example, HBS summer instructors teaching a 3-credit course are paid approximately 45% lower than summer instructors at WCU. HBS instructors, who are often well-established senior faculty in their fields, are currently paid \$2,500 for a 3-credit summer course, as compared to \$4,500 for summer session instructors at WCU. This low stipend at HBS has not changed in >10 years. We have sought to bring these stipends to a level commensurate with those at WCU in the interests of both fairness and competitiveness, but after suffering budget cuts in 2007-2008 we have been unable to do so with our current budget. At annual budget hearings at WCU, which oversees HBS budget and finances, we have requested restored funding necessary to increase stipends by \$2,000 per course, but thus far these requests have been unsuccessful.

*Standard 5. The program attracts, retains, and graduates high quality students.*

i. Attracting students to HBS programs

The relevant part of Standard 5 with respect to HBS is attraction of high quality students (and others) to HBS courses and facilities. We actively recruit for our courses in a number of formats, including printed posters and brochures, electronic postings on the e-bulletin boards of scientific organizations, and social media. Applicants to the HBS summer program must submit transcripts as part of their application; they are vetted to ensure they meet any pre-requisites and also for performance in their home biology program. We do not use a pre-determined GPA cutoff in the major in admissions; some students who do not perform especially well in a traditional course framework can excel in a field course setting. We consult with the course instructor before admitting any questionable students, but such applicants are rare.

We do not actively recruit graduate student and other researchers; rather, we widely advertise the availability and quality of our facilities and equipment, and especially our annual Grant-in-Aid program (competitive grants mainly in support of graduate research). The Highlands Biological Foundation, Inc. annually funds up to about a dozen of these grants, totaling approx. \$20K. This grant program has been in place since the early 1960s.

#### ii. Enrollment in HBS courses

HBS summer courses and workshops are typically capped at 10-12 students, with fewer or more students on a case by case basis. This is the optimal class size range for personal attention, van space, and teaching & learning in a field context. Courses and workshops may also be capped at lower numbers due to space constraints (with only 38 beds shared among HBS courses, interns, graduate students, researchers, etc. we must sometimes turn students away). Five students is typically the minimum enrollment to permit a course to run.

2013-2014 was a transitional year as the main HBS teaching facility, the Coker Laboratory, was closed for renovation in 2012-2013 and reopened but was not fully operational in summer 2013. The renovations increased teaching capacity and modernized classrooms and labs. In summer 2014 HBS enrolled 132 students in 15 courses and workshops, or approx. 88% "course capacity" based on a 10 student cap per course/workshop. This percentage does not entirely reflect interest or demand for courses, because limited space availability necessitated lower cutoffs in some cases. However, enrollments in a given course tend to vary from year to year for reasons that are not altogether clear, with timing and variable demand the most likely factors.

#### iii. Overall HBS usage

HBS is a resource for several constituencies, from day visitors (art groups, garden clubs, etc.) to groups staying on-site (visiting classes, HBS course attendees, interns, researchers, graduate students, etc.). Appendix 6 presents a breakdown of HBS residential users from May 2014 through April 2015, as a representative year. (May-April

is the reporting period utilized by the Board of Directors rather than fiscal year, as this better captures the peak-activity summer season.)

Perhaps the most important indicator of scholarly productivity stemming from use of facilities and resources of HBS are graduate theses/dissertations and peer-reviewed scientific publications acknowledging HBS. These are summarized for the period 2000-2015 (year to date) in Appendix 7.

#### iv. Outreach programming enrollment/attendance

Public outreach education at HBS takes many forms, broadly divided into on-site and off-site (school) programs. On-site programs include Botanical Garden tours and workshops as well as daily and weekly programs, summer camps, and special events offered through the Nature Center. Appendix 8 presents summary attendance data for all outreach programming for calendar year 2014.

### **III. Administrative Structure and Operational Resources**

*Standard 6. The program has an administrative structure that facilitates achievement of program goals and objectives.*

#### i. HBS oversight / governance structure

Since its inception as a shared center of the UNC system HBS has operated according to bylaws and is overseen by a Board of Directors (Appendix 9). Currently the Board consists of six voting and six non-voting or *ex officio* members, a structure that reflects the long inter-institutional history and multiple partnerships of HBS. Among the voting Board members three represent institutions from the University of North Carolina system and three represent non-UNC institutions. These Board members are elected to an initial 3-year term renewable up to a total of three consecutive terms, with the possibility of additional terms after one year of absence from the Board.

HBS *ex officio* Board members include the Executive Director, leaders at UNC-General Administration and WCU who provide joint oversight of HBS, and leaders of three organizations with a special relationship to HBS operations and programming: the current President of the Highlands Biological Foundation, Inc; the Chair of the Executive Director's home academic department (Dept. of Biology at WCU), and the current Director of the UNC-CH Institute for the Environment. Although *ex officio* Board members are non-voting they provide the valuable advice and perspectives of the major stakeholder institutions and organizations of HBS.

#### ii. Evaluation of administrators and staff of HBS

As Executive Director I make three reports to the Board of Directors annually, one at each Board meeting (see Appendix 10 for examples from 2014), and I am subject to two annual performance evaluations: an AFE conducted by the Department of Biology at

WCU, and an annual evaluation conducted by the Board of Directors. I provide an annual performance evaluation for EPA and SPA staff, assisted by Assoc. Director Karen Kandl.

*Standard 7. The program has adequate resources to meet its goals and objectives.*

i. HBS Budget

The HBS budget, just over \$600K, consists of two general components: a state or General Fund appropriation ("Operating Budget," ~ 45% of total budget) and "other" including HBS-generated receipts (course, housing, and classroom & bench fees), contributions from our Foundation, and a contribution from the UNC-Chapel Hill Institute for the Environment (~55% total budget). Data for FY13-14 are fairly typical:

General Fund + Other receipts: \$268,359 + \$338,694 = \$607,053 budget total  
GF appropriation: \$268,359  
Other receipts: \$338,694  
    \$102,904 in HBS-generated receipts  
    \*\$136,774 in contributions from the HBF  
    \$99,016 for UNC-CH Institute for the Environment program

\*HBF breakdown for FY13-14 is as follows:

Grants-in-Aid of Research: \$23,842  
Course Instructor Grants (travel, supplies): \$2,594  
Other support ('Rally for Reinke' & 'Give for Gear'): \$18,016  
Personnel support: \$29,506 [Note: this increased to ~ \$46K in FY14-15 and ~\$83K in FY15-16]  
Grassroots grant for Nature Center: \$62,816

Banner reports for the HBS state operating budget for the past three years are presented in Appendix 11.

ii. Adequacy of the budget to support the mission and goals of the program

The state portion of the HBS budget is **not** adequate to support the mission and goals of HBS. The state component of budget has in fact declined in recent years, with a nearly \$30K budget cut in 2010-2011 that is yet to be restored. We are fortunate to have received non-recurring year-end funds in recent years from the Provost's Office at WCU, supporting equipment, appliance upgrades, etc. We are also fortunate to receive financial support through our non-profit Foundation and generous donors, but this is not sustainable insofar as about half of the operating budget of the Foundation currently goes toward staff salaries (Appendix 11). We continue to grow in facilities and programming — doing more with less as far as our state budget goes, with resources inadequate to cover key operational costs and fairly compensate personnel.

i. HBS staff compensation

The SPA and EPA Non-Faculty Salary Task Force at WCU recently conducted salary studies for several HBS positions, revealing significant under-compensation. For example, the salary of our Office/Business Manager, is currently at 78% of the national average, and the Associate Director position is at 76% of the national "Market Rate" as defined by the North Carolina Office of State Human Resources. WCU's overall market index is 87%, indicating that these HBS positions are compensated at a level significantly lower than even the WCU average.

The ongoing salary study at WCU may result in mandated increases for undercompensated staff, but this must not come at the expense of the operating budget. Appropriate resources should be provided, not simply taken from other HBS budget pools — otherwise, that would only further undermine our ability to cover operational costs (discussed below).

Finally, some HBS positions are in need of funding consolidation — that is, rather than cobbling together funds from multiple sources for certain positions (e.g., the Associate Director and HBS Program Assistant positions) we need adequate resources in our State budget to cover them.

#### ii. Summer faculty stipends

I noted earlier in this report that HBS summer instructors are paid approximately 45% lower than summer instructors at WCU for the same course (\$2,500 for a 3-credit summer course, as compared to \$4,500 at WCU). This low stipend at HBS has not changed in over a decade and has begun to undermine our ability to recruit high-caliber summer faculty.

#### iii. Operational costs

HBS operational costs have inevitably increased, not simply owing to general "cost-of-living" increases, but owing to our successes in realizing improvements and growth. However, with our state budget remaining flat, these added costs are now siphoning resources from other important budget pools.

To give a concrete example, while we have been fortunate in obtaining considerable funding for modernized equipment such as state-of-the-art -80 freezers, autoclaves, and thermal cyclers (to name a few), we do not have the funds in our budget to support service contracts for the equipment. And, consider our increased utilities costs. Within the past five years the primary research and teaching lab and classroom buildings at HBS (specifically the Bruce Biodiversity Building and William Chambers Coker Laboratory) have undergone expansion and modernization with support from state funds and NSF grants. The number of classrooms and research labs has nearly doubled and additional furnaces were installed to heat and cool the expanded functional space. These buildings are also now connected to the Town's water treatment system. As a result of these improvements, our utilities costs have increased approx. \$1,000/month, while our utilities budget has been flat for at least a decade. The additional funds needed to cover these

increases end up being taken from other budget pools, but we can only take so much. We have an annual budget allocation of \$25K for utilities, and when propane costs are high (as they have been until recently) we have been over \$10K in the red; in FY13-14 we had to be "bailed out" with a special \$10K grant award from UNC-General Administration to cover utilities. In the current (14-15) FY, even with lower propane costs we are \$4K overbudget for utilities.

We have annually sought a recurring budget increase through our fiscal agent, WCU, to cover higher utilities costs, but thus far these requests have been declined. This is a core resource investment issue (one of the University's stated strategic goals) that must be addressed; having invested in modernizing HBS facilities, it is critically important to follow through with the resources necessary to run and maintain them.

iii. Currency and adequacy of facilities and laboratories, library, etc. to support the mission and goals of the program

HBS facilities and equipment are, for the most part, high quality and support the mission and goals of the institution very well. With funding from the state as well as NSF and other grants and private donations over the past decade, we have made systematic improvements to HBS infrastructure (sanitary sewer system, internet, overhauled walk-in environmental chambers), classrooms and laboratories (major renovations in the Coker and Bruce Labs, new outdoor classroom, molecular lab), field course support (new vans & bus for field trips, field equipment), dorms (windows, furniture, renovated bathrooms, etc.), and equipment (high-quality microscopes, freezers, water purification systems, molecular equipment, etc.).

The Reinke Library, named for the first HBS director, Edwin Reinke of Vanderbilt and located in the Coker Laboratory, has been expanded to accommodate more monographs, and new furniture facilitates studying and meetings in a comfortable environment (funded with private donations through our 'Rally for Reinke' initiative). In the 2010-2011 budget cuts we dropped our subscription to all scientific journals; HBS users must now rely on electronic access through their home institution or through WCU (local computers).

Areas for facilities improvement currently in our plans include (1) a new / replacement residential facility, allowing us to decommission the oldest and least serviceable of the dorms (Wright, Deacon, and Howell Cottages); (2) replacing or adding on to the Weyman building to create a central "commons" that would serve as a social space for HBS residents and visitors, important for promoting informal teaching, learning, and collegial interaction; and (3) renovating and expanding the Aquatics Lab, providing bench space, climate control, and overhauling the lab housing the Living Stream tanks and chillers.

iv. Program staffing needs

The HBS staff (summarized in Appendix 12) currently consists of 10 full and part-time employees variously supported by state funds, Foundation funds, other sources such as

grants or the Institute for the Environment, or some combination of these. We also contract out services such as housekeeping, IT, and in the summer months we have four paid interns: two for the Nature Center and two for the Botanical Garden. At this level HBS is adequately staffed, though in several cases compensation is woefully inadequate as noted above.

v. Effective and appropriate use of staff

Roles and responsibilities for HBS staff are reasonably clear, although by necessity the staff work collaboratively, often wearing several hats as needed. Although always a work in progress, procedures and practices are carried out smoothly through a cooperative division of labor. Procedures and protocols are established for important HBS functions such as oversight of the housing calendar, receiving and processing course applications and payments, course admissions and financial aid, registering students for courses, maintenance requests, invoicing and purchasing, oversight of the HBS operating budget, summer faculty and intern hiring, course set-up and clean-up, ordering course supplies, etc. etc. Foundation business is overseen by the HBF director and a temporary office assistant. There are some gray areas that could be better clarified, such as the amount and kind of work performed for the Foundation by HBS staff such as the Business Manager. In many respects Station and Foundation work together as one, so it is often difficult to clearly delineate Station and Foundation business.

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## Appendices

1. HBS Botanical Garden Forum agenda
2. Syllabi for a selection of five 2015 HBS summer courses and workshops
3. HBS course evaluation summary spreadsheet, 2007-2014
4. HBS-IE course syllabi
5. HBS-WCU "Maymester" course syllabus
6. Summary of HBS residential user groups, April 2014 – May 2015
7. Summary of graduate theses & dissertations and scientific publications stemming from research conducted at HBS, 2000-2015.
8. Summary of outreach programming attendance, calendar year 2014
9. Bylaws of the Highlands Biological Station and Foundation
10. Sample Executive Director's reports to the HBS Board of Directors, 2014
11. HBS Operating Budget (1-10930) for FYs 13-14, 14-15, & 15-16
12. HBS personnel summary with salary sources, June 2015