As part of the West Virginia University Board of Governor’s Rule 2.2 Program Review process, the WVU Provost’s Office required that a single Program Review Self-Study Form be completed on behalf of all identified programs in the department or unit. This Program Review Self-Study Form was to be submitted to the Provost’s Office by end of day on August 1, 2023. The Provost’s Office reviewed the submitted Program Review Self-Study Forms in early August.

Self-Study content is unvetted by the Provost’s Office. As such, the WVU Provost’s Office cannot attest to the accuracy of any data, analyses, or statements provided within. Also, redactions were made where warranted for the protection of individual identities around sensitive information.
Q1.1.
BOG Program Review Self-Study Form

This is the self-study form that will be completed in support of the summer 2023 academic transformation program portfolio review.

Only one program review self-study is to be submitted per unit; all of the unit's programs will be covered by one self-study.

Q1.2. Select the appropriate academic unit under review.

<table>
<thead>
<tr>
<th>College</th>
<th>Davis College of Agriculture, Natural Resources, and Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department or School</td>
<td>Forestry and Natural Resources</td>
</tr>
</tbody>
</table>

Q1.3. List all of the unit's programs.

Example:

BA Biology
BS Biology
MS Biology
PhD Biology
Ph.D. Natural Resources (previously, Ph.D. in Forest Resources) MS Forestry MS Recreation, Parks and Tourism – discontinued in 2023. MS Wildlife and Fisheries BS Energy Land Management BS Forest Resources Management BS Recreation Parks and Tourism Resources BS Wildlife and Fisheries BS Wood Science and Technology – Moving to BSF 2024-25 academic year.

Q1.4. Name and Email of the person completing the self-study

Name
Kyle Hartman/Alan Collins

Email Address
kyle.hartman@mail.wvu.edu

Q1.5. How were faculty given the opportunity to contribute to, review and provide feedback on this self-study?

The Program Coordinators for the FNR programs provided text for the self-study with input from faculty mentors in their programs. A draft self-study was provided to faculty on the morning of 24 July 2023 and feedback was requested from faculty via an internal (FNR) Qualtrics link. Faculty feedback was accepted via the online comment form or direct email reply to the Director. Faculty were also made aware of an external (Provost Office) Qualtrics links. The second draft of the self-study attempting to incorporate faculty input was provided to faculty prior to a Zoom meeting held on 28 July 2023.

Q2.1. Explain how the unit and its programs contributes to WVU's mission.

This response is limited to 7500 characters, approximately 2 single spaced pages.
Q3.1. Resources, Revenue, and Expenses

The purpose of this section is to ensure the accessibility and adequacy of the unit's infrastructure and resources and its financial viability.

Responses in this section are limited to 7500 characters or approximately 2 single spaced pages.

Q3.2. Has the unit experienced significant issues with any of the following during the past five years?

By "significant," we mean issues that interfere with either the unit's ability to deliver its programs to its students or the students' ability to complete those programs in a timely manner.
Q3.3. Describe the issues the program has faced in the area(s) identified above.

Only one program within the Division (WFP) noted issues with inadequate spaces: The Wildlife and Fisheries Resources program is consistently the second largest undergraduate program in the Davis College. However, we continue to operate in teaching and research labs in Percival Hall, which was completed in 1965 and has not been adequately updated. Wildlife and Fisheries has two main lab rooms (Rooms 308 and 309 in Percival Hall). Each room is often too small to adequately accommodate our large lab sections. For instance, a plastic folding table with folding chairs is used in room 308 when labs are at capacity. There are no other teaching laboratory classrooms on the Evansdale campus that can accommodate our sections and, due to our already large Faculty: Student ratio, we do not have the human resources to be able to accommodate more numerous smaller lab sections. In room 309, we do not have a projector mounted to the ceiling nor a contemporary computer. Neither space is equipped with the usual operating systems that control lights, microphones, projectors, computers, etc. Additionally, for some courses we utilize a teaching collection consisting of specimens. Those collections are haphazardly organized in both classrooms and it should instead have a designated space. The spaces are cluttered, outdated, and too small to accommodate our growing student body.

Q3.4. Data have been provided on the unit's last three years of tuition revenue, expenses, and net revenue. Address any negative net revenue or any significant changes (positive or negative) to unit's net position.

Revenue by department is the actual tuition revenue, net of any discounting, paid by students taking courses in course subject codes affiliated with the department.

Expense by department is the actual unrestricted, operating expenditures by department within the functions of instruction and academic support.

Net revenue is the revenue minus the expense.
The data provided show the Division operating at a net negative position. However, cost saving actions are being taken within the Division: the Director position for Resource Economics and Management has been combined with the Director position for Forestry and Natural Resources to create a Director position for the School of Natural Resources. One pending faculty retirement will not be replaced within the Division. Teaching responsibilities from this position will be re-allocated to existing faculty in order to maintain existing academic programs. Further, we are proposing a merger of the Forest Management and Wood Science programs into a single major with two areas of emphasis and restructuring of the course offerings and schedule/frequency to increase efficiency (class size) for lower enrollment classes. Expected repositioning of RPTR program may allow for greater coursework (SCH) and major enrollment by partnering closely with the Adventure WV and OEDC programming. Finally, ELM has eliminated one adjunct instructor whose teaching responsibilities will be taken on by an existing ELM faculty member for Fall 2023. Additional cost savings will come from recent and anticipated faculty retirements and departures from programs falling below the median Faculty:Student ratios for the Division and College. During 2023, one FRM faculty moved to 100% administration, one WST faculty retired, and one WST faculty member will leave the university on 12-31-2023. We anticipate that none of these positions will be rehired. We also anticipate that at least one other faculty in WST will also retire who will likely not be replaced. Further savings may be made by combining the Appalachian Hardwood Center with other allied centers within the Davis College. Specifically, we recommend the merger of the Appalachian Hardwood Center (AHC), the proposed Appalachian Forestry and Entrepreneurship Center (AFEC) and the Center for Sustainable Bio-materials and Bioenergy (CSBio). Doing so would permit increased efficiencies by combining support staff. Beyond these strategies to reduce costs, additional savings would only be possible by eliminating faculty or staff positions. On the revenue side of the ledger, the Division of Forestry and Natural Resources is poised to grow enrollment in the following ways over the next several years. The merged ELM and Environmental Energy and Resource Management (EERM) programs will attract new students with its up-to-date changes, including investment into emerging energy technologies (wind, water, solar, etc.). The merged Forestry and Wood Science Technology program’s new alignment will better utilize the faculty members associated with both majors. This will result in faculty efficiency which will enable faculty to continue building critical relationships with industry partners in West Virginia and surrounding states. With over $1M in cutting edge wood science shop equipment committed to DFNR through a Congressionally Directed Spending Request the Wood Science is expected to draw additional students. The funding will allow Wood Science faculty to focus on real-life problem solutions, such as cross-laminated timber homes for low income communities in West Virginia and beyond. Recreation, Parks and Tourism Resources will become more relevant to programs in which the state of West Virginia and WVU are positioned to excel in. A re-orientation to focus on mountain biking use, trail use, adventure programs, and a stronger partnership with federal and state partners, the RPTR program will create benchmarks with other regional recreation, parks and tourism programs (Penn State, Virginia Tech, etc.) and will be held accountable for performing in ways that increase enrollment. Finally, the Wildlife and Fisheries program has the ability to increase its student numbers through additional faculty. The WFR program is healthy in all aspects (teaching, research and service) and can increase its student numbers with additional investment.

Q4.1.
Faculty Composition and Productivity

Responses should be concise but also specific and supported by evidence. Responses in this section are limited to 7500 characters or approximately 2 single spaced pages.

Specific data definitions for these metrics are available on the Academic Transformation webpage.

Q4.2. Data have been provided on the unit's faculty full-time equivalency (FTE) to the median of all majors for fall 18 to fall 22.

Address any differences in the unit's student to FTE ratio and the institution's student-to-faculty ratio of 18-to-1 per IPEDS reporting for academic year 2021-2022.
The DFNR operated at a Median All Majors 18-22 / FY23 Faculty ratio of 21 versus the University average of 18 for non-HSC majors (17% higher than the University median). Two programs contributed to the increased ratio; (WFR=ratio of 36, ELM=ratio of 25). The extremely high ratio for the WFR program (twice the median) demonstrates that this program is under-resourced and has tremendous growth potential. Given the undergraduate enrollment in WFR, a total of 16 faculty would be needed to reach the university median. With a FTE ratio closer to the institution's ratio, we could offer more laboratory sections at a more reasonable capacity, resulting in more available laboratory spaces across campus for our use. The ELM program is 38% over ratio based on the median. This program has seen a decline, and much of this can be contributed to the extremely high student/FTE ratio the program has seen over the past 5 years. The ELM program ideal target is 80 students which is an FTE ratio of 27. This target is readily reachable as evidenced by Fall 2023 enrollment. These metrics suggest that ELM is nearing “right size” as defined by IPEDS reporting. FTE to student ratios for other programs in the Division are below this metric for FRM (8.5:1), RPTR (13.8:1), and WST (2.75:1).

Q4.3. This question is optional and required only if a unit's doctoral programs are under review.

Data have been provided on the unit's tenure-track / tenured FTE to doctoral student headcount ratio across all of the unit's doctoral programs.

Address any differences in the unit's doctoral student to tenure-track and tenured faculty FTE ratio to the institutional expectation of 2-to-1.
Q4.4. Data have been provided that show the changes to the unit's total number of faculty over the review period. Data have also been provided that show the total student headcount enrolled in all of the unit's programs over the same period of time as well as a three-year trend in student credit hour (SCH) production.

Explain the relationship between the change in the number of faculty in the unit and the change in the unit's total headcount enrollment and SCH production trends.
Q4.5. Data have been provided that shows the unit's research expenditures per the Higher Education Research and Development Survey (HERD).

Does this data capture all of the unit's research expenditures? If not, explain the difference here and provide evidence of additional research expenditures below.
The FY2022 research expenditure data for DFNR was provided by the Davis College business office (Table 2, supplemental files). (Note the HERD data show a slightly higher total research expenditure for FNR). These data are provided below and total $4.733M. Of these, $4.228M were grant expenditures which make up 59.1% of all grant expenditures for the entire Davis College illustrating the outstanding contribution Forestry and Natural Resources makes towards the WVU mission and R1 status.

Q4.6. Upload evidence of research expenditures here.

Q5.1.
Student Enrollment and Graduation History

Responses in this section are limited to 7500 characters (approximately 1.5 single spaced pages). Responses should be concise but also specific and supported by evidence.

Specific data definitions for these metrics are available on the Academic Transformation webpage.

Q5.2. Data have been provided on all of the unit's program's student enrollment trends.

That data includes:

4-year median fall enrollment (fall 18 through fall 21);
Fall 2022 change from 4-year median (in headcount and in percentage).

Units should address any programs with enrollment below the median for the program level or which has experienced a negative change in enrollment.
Four DFNR programs fell below the fall 2018-2021 enrollment median. (ELM, FRM, RPTR, and WST. The WFR program increased 3% over the median, FRM declined by 2.5 students (-4%). The WST program fall 2022 enrollment dropped 3.5 students (-23%). Enrollment in RPTR declined by 48% (72.5 to 38). The ELM program data was calculated as a median fall value of 97.5 students to 50 students in Fall 2022 (-48.7%). ELM It should be noted that while the ELM program declined to 50 students in 2022, the FTS Ratio exceeded the University median of 18 (50 / 2.5 FTE = 20). Enrollment in this program increased for Fall 2023. A plan is in place to address enrollment trends and increase efficiencies by merging the Environmental Energy and Resource Management (EERM) major with the ELM program, also in the School of Natural Resources. Merging undergraduate programs will positively impact enrollment/revenue, simplify recruiting and marketing by consolidating one energy/environmental management degree making it easier for potential students/parents to find one energy/environmental management program at WVU. The merger will also reduce instructional expenses and increase efficient delivery of curriculum by streamlining course offerings and reducing redundancy. Sharing faculty across two units will reduce reliance on part-time instructors and reduce barriers to student retention and timely degree completion. There is projected improvement in assessment of student learning by adding the option of capstone course instead of required internship for EERM along with improved assessment of student learning with capstone course. A merged program will lead to a robust degree program able to better weather downturns in the economy/associated industry. Enrollment in environmental (management) majors is likely to continue to increase given the national focus on environmental issues and renewable energy sources. RPTR The RPTR program has numerous ongoing collaborations with multiple units across WVU that will lead to higher enrollment and SCH generation. We outline a potential pathway for reorganizing the various recreation and tourism opportunities across all WVU campuses. The RPTR program would strengthen its commitment to the outdoor economy by focusing on the recreation industry, community development, natural resource management, and public lands. From 2021-2023, as part of the first phase in the AT process, RPTR, HTOR, and the Wildlife and Fisheries Resources (WFR) programs formed the core of the new WVU Tourism Alliance. The purpose of alliance was to change and build on our undergraduate curriculums to create efficiencies and new opportunities for our students. This led to course sharing between the RPTR and HTOR program. It also led to the creation of a new Multidisciplinary Studies (MDS) degree which can lead to more potential career opportunities. Building on this commitment to the outdoor economy would strengthen existing coordination, collaboration, and shared courses with several across Davis College and throughout the University, and across its campuses. These changes and collaborations will result in an increased efficiency and increased enrollment and SCH generation by faculty in the RPTR program. WDST With low student enrollment and highly specialized classes, the WDST program must be adjusted to continue to meet the demands of the forest products sector for our graduates. To improve efficiency, enrollment, and cost effectiveness we propose to merge the WDST and FRM programs and make each an area of emphasis within the FRM program. As part of this transformation, the FRM program will be tasked with developing a curriculum for the WDST emphasis area that effectively matches the current and future needs of industry and employers with reimagined courses and the capacity of faculty instruction.

Q5.3. Data have been provided on the unit's three-year trend in student credit hour (SCH) production. Units should address any programs with a negative trend in SCH production.
Q5.3 Data have been provided on the unit’s three-year trend in student credit hour (SCH) production. Except for the prefixes in the FRM program (all FMAN, FHYD, and most FOR and FNRS classes), the programs in the FNR Division have generated fewer student credit hours over the last three years (Table 3-supplemental files). Some of this decline is related to declining enrollment at the University and in several programs in the Division. However, some reduction in SCHs has been as a result of changes in the revenue stream for off-campus and online classes. Previously faculty had been incentivized to create and teach off campus and online classes. However, over the last 3 years the incentives have been removed and as a result these additional, out-of-load classes have decreased rapidly. The FOR/FNRS prefix has been steady at 2558-2748 SCHs over the 3 years. The RPTR program has declined from 1,203 to 824 SCHs. This has been largely attributed to the hands-on nature of the program and a decline in students related to the COVID pandemic. The WST program has declined from 1218 SCH in 2019-20 to 930 SCH in 2020-21 before increasing to 1006 in 2021-22. Despite the low number of students in this major, WDSC generated 641-841 SCH per FTE over the three-year period. The WFR program under the WMAN prefix generates 50-54% of the SCHs in the Division of Forestry and Natural Resources. WMAN SCHs declined from 7071 to 6116 to 5321 over the last 3 years—largely due to declines in the online class schedule. Despite this, WMAN produces 1835-2438 SCH/FTE. Student credit hours generated by ELM have declined from 1018 to 782 to 711 over the 3-year period. We present the metric of SCH/FTE as an additional metric to consider with the FNR programs (Table 4-supplemental files). The rationale is that some programs may be under enrolled, but they also offer service classes to other programs and GEF classes that serve the entire University. For example, the WST program enrolls only 11-13 students in its degree program. However, through classes such as WDSC 100 (now FNRS 100 and a GEF) the 1.45 FTEs generates 641-841 SCH per year. Under the new funding model this SCH per FTE metric may be a better measure of revenue generated by a program. A benchmark for the equivalent SCHs that one FTE would be expected to teach can be generated by assuming eight 3 credit hour classes per year, each with 25 students. This results in 570 SCH generated per 1.0 FTE. Based on this metric the SCH/FTE were calculated and provided in Table 4. Over the period from 2017-18 to 2021-22 all programs in FNR generated more SCHs per FTE than expected. The exception was for the ELM program from 2019-20 through 2021-22. Based upon the available data and metrics, and except for ELM, the academic programs in the Division of Forestry and Natural Resources appear to be meeting or exceeding SCH generation expectations. Planning is underway to improve efficiency in the ELM program by merging it with EERM program in the Division of Resource Management (see Q5.2).

Q6.1. Assessment of Learning and Program Improvement

The Provost’s Office will review the self-studies from the most recent Board of Governor’s five-year program reviews for this section. Units may provide updated information below if they so choose.

Q6.2. Provide the unit’s plans or ideas to make significant changes to its operations, structure, offerings, or personnel in order to reduce its costs or improve its efficiency.

Provide any significant changes to the department’s program curricula, its assessment of learning practices, or any other improvements that have been made since the department’s programs completed their most recent Board of Governor’s five-year review.
The ENLM program completed a BOG follow-up report related to program assessment in January 2023. The assessment was approved by the undergraduate student council and went to BOG for June 2023 meeting. We have not received the results from this assessment. The ELM program was identified as a program with growth opportunities in the Davis College. This included majors that had growth potential with the right attention and possibly with additional resources. Other opportunities include new majors/programs that were identified through a review of external data (student interest, job demand, competitive landscape, etc.). The WVU ELM program submitted follow-up reports specifying needed resources and was selected for further development (see information in attached below in the following section). The program has also received over $1,000,000 in financial support from industry partners since its inception in 2014. These funds help support the ELM program, students, and WVU in general. For instance, they help support diversity and inclusion efforts at WVU by allowing ELM to host the E3 Camp and E3 Academy. This unique summer camp program recently hosted 24 minority students from Baltimore and surrounding areas to learn about energy, and energy development, which most have never been exposed to. The E3 Camp is also an excellent recruiting tool for ELM and WVU. Without an engaged industry support network, programs such as these would not be available. FRM/WST The FRM faculty restructured the FRM curriculum for the 2021-2022 Catalogue year to appeal more to prospective and current forestry students by allowing them to declare an area of emphasis in one of three areas: 1) Forest Management; 2) Forest Ecosystem Science and Sustainability; 3) Arboriculture and Urban Forestry. The WST faculty updated their curriculum which has been approved to launch for the 2023-2024 Catalogue year. This updated WST curriculum consists of 90 credit hours and offers a general education in basic sciences, math, engineering, communications, business, and forestry. Flexibility is built in through the selection of a minor (15 credit hours) and elective courses (16 credit hours) that complement the Major. The other significant change is that the WST major has been moved under the Bachelor of Science of Forestry where FRM is already located. This will allow for better integration of the FRM and WST programs. A future plan is to have one major with two AoE (Forestry Management (all forestry academic offerings) and Forest Science (all wood science academic offerings). RPTR RPTR was identified as a Program or Opportunity as earlier in the WVU Academic Transformation process. The RPTR program has made several curriculum changes to create efficiencies and student opportunities. As part of our transformation, we decided not to renew our Accreditation with Society of American Foresters (SAF), and instead pursue future Accreditation with the Council on Accreditation of Parks, Recreation, Tourism and Related Professions (COAPRT), a better fit with our curriculum. As part of the AT process, RPTR partnered with Hospitality and Tourism Management (HTOR) to share courses, and provide cross-curricular classes, benefiting both majors (e.g., HTOR courses will help RPTR attain accreditation). Our BSR curriculum changes were approved in late 2022, which also entailed modifying our Learning Outcomes. In doing this, we modified them to reflect COAPRT requirements, setting ourselves up for the Accreditation process (to be undertaken in the near future). Over 2021-2023, RPTR, HTO, and the Wildlife and Fisheries Resources programs also formed the core of the new WVU Tourism Alliance. This led to the creation of a new Multidisciplinary Studies (MDS) degree which can be an opportunity for all students within FNR. The next step of the Tourism Alliance is to partner with other state, community, and other stakeholders (e.g., the WVU Institute of Technology Adventure Recreation Management B.S., and Hospitality/Culinary A.A.S.). These efforts all link directly to the WV State Tourism mission to increase tourism visitation, grow community economies, and provide training opportunities for the hospitality and tourism workforce (https://wvtourism.com/TourismWorks/). RPTR classes are required by multiple programs and Colleges—including HTOR, Landscape Architecture, & Forestry (all potential homes for RPTR during this restructuring process). Our faculty also helped develop and now teach classes in the recently launched (2021-22) Sustainable Trails Management Certificate and minor (interdisciplinary program within the Davis College). WFR The Wildlife and Fisheries Resources program recently revised its B.S. degree curriculum to optimize instructional efficiencies, clarify degree requirements for students, and conform to certification requirements for our associated professional societies. The ability of students to be certifiable by The Wildlife Society and the American Fisheries Society has been appealing to prospective students and a key recruitment tool. Faculty Senate approved the new curriculum May 2023 and it will be effective for the 2024-25 academic year. With the new curriculum in place, the WFR program is now working on its assessment plan, which will be completed by December 2023.

Q6.3. The program may provide additional evidence of program improvement here.

Q7.1. The unit may provide any additional context or information about the unit's programs here.
Q7.2. You may use this section to provide any additional evidence referenced in the program review.
Q7.3. You may use this section to provide any additional evidence referenced in the program review.

Q7.4. You may use this section to provide any additional evidence referenced in the program review.

Q8.1. Thank you for completing your self-study for the West Virginia University Board of Governors program review. You may now submit the survey and your self-study will be passed on to the Provost's Office for review.

<table>
<thead>
<tr>
<th>Location Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
</tr>
<tr>
<td>Source:</td>
</tr>
</tbody>
</table>

Location: [Map of West Virginia showing location]