Academic Program Assessment Report

Assessment is a term commonly used to encompass the process of gathering and using evidence to guide improvements.

SACSCOC requires that an institution "identifies expected outcomes, assesses the extent to which it achieves these outcomes, and provides evidence of seeking improvement based on analysis of the results".

Be sure to SAVE your progress as you work!

Academic Program
Environmental Science, B.S.

Submission Year
2022-2023

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Program Goal

Goal

Goal 1

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will demonstrate an understanding of the scientific basis (chemistry, biology, geology, basic environmental sciences) for environmental challenges and proposed solutions.

Pillar of Success Supported
Graduates Who Are Gainfully Employed or Admitted to Graduate School

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores on specific questions related to content knowledge on the presentation, poster or written assignment rubric in ES 301, 302, 310, 407, 490, GEOL 405 or PSCI 499.

Timeframe for this Outcome
Academic year 2021-2022

Performance Target for "Met"
The mean of all student scores are at or above 2.0

Performance Target for "Partially Met"
The mean of all student scores are greater than 1.7 and less than 2.0

Performance Target for "Not Met"
The mean of all student scores are less than or equal to 1.7

Assessment Measure Used
Rubrics for posters, presentations and written assignments in ES 301, ES 302, ES 310, GEOL 405 and PSCI 499.

Frequency of Assessment
At the end of the semesters in which each of these courses are taught.

Data Collected for this Timeframe (Results)
The data collected were the presentation rubrics for the final reports in ES 310 (n=8) and GEOL 405 (n= 4) and the presentation rubrics for the presentations in PSCI 499 (n=1).

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
The mean scores across all students and the three courses assessed on the item on the rubrics related to content knowledge was 2.73. This goal was met. No improvements are indicated necessary. The instructors of the courses have students hand in several deliverables for evaluation prior to delivery of the final written and verbal reports. These include, at a minimum, an approved topic, outline for the project, draft report, final report, and presentation (in PSCI 499 only) based on the final report. Detailed written comments are provided by the instructor as guidance for improvement. This approach has been shown to be effective and will be continued in all upper level ES courses indicated.

Resources Needed to Meet/Sustain Results
The resources needed to sustain this result are the hiring of at least one, though preferably two, full time faculty with a background in environmental science. As of writing this assessment, there are zero full time faculty with the background to teach any of the required major courses identified for this learning outcome. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students on a timely basis to allow for students to graduate in a reasonable time frame. The costs would be $45,000 + fringe benefits per position.

Explanation of How Resources Will Be Used
The resources used would be to make sure that all required classes and other classes that are related to major (ES 111, ES 301, ES 302, ES 310, ES 314, ES 407, GEOL 111, GEOL 405, CHEM 420, CHEM 360) will still be offered with the quality levels that are expected for major classes at Lander. Without the faculty these classes may not be offered as frequently as the students need to be able to complete the major within a reasonable time frame.

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores on specific questions related to chemistry content knowledge on a locally designed environmental science exit exam.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores is greater than 50% on specific questions related to chemistry.

Performance Target for "Partially Met"
The mean score of all student scores is greater than 35% and less than 50% on specific questions related to chemistry.

Performance Target for "Not Met"
The mean score of all student scores is equal to or less than 35% on specific questions related to chemistry.

Assessment Measure Used
A locally designed environmental science exit exam.

Frequency of Assessment
Every spring semester, offered in conjunction with PSCI 499 (Senior Seminar in Physical Science).

Data Collected for this Timeframe (Results)
The ES exit exam was given during PSCI 499 during Spring 2022. One ES student took the exam. The mean score for the chemistry related questions on the exam was 47.6%. There were 15 multiple choice questions on the exam that were specifically related to chemistry.

Score (Met=3, Partially Met=2, Not Met=1)
2

Comments/Narrative
Since March 14, 2020 until December 2021, instruction at Lander has been modified as a result of the pandemic. This resulted in change of delivery method in all courses. These rapid and persistent changes may very well have affected content delivered and retention of content. Thus, it is a challenge to put the results of this assessment into the context of the performance of the program at large.

The Exit Exam was unchanged relative to the one given during the Spring of 2021.

It is not really valid to use the scores of single student to assess the program, though i can be mentioned that this set of scores does reflect those of the previous assessment.

Because the chemistry related content of chemistry courses and ES curriculum have changed from time to time, and are still undergoing modification, a process is in place to review the questions on the exam to ensure that they reflect the major concepts taught in the four (4) to six (6) chemistry courses Environmental Science program students complete, as well as the chemistry related content in ES courses. Going forward, for students who have entered the program after 2018, new students will have to complete Environmental Chemistry (CHEM 420) as a core course, among a total of five chemistry courses (inclusive of CHEM 420) rather than having it be completed by some students as one option of several ES related electives. This is anticipated to improve the mean performance on this learning objective even further.

Moving forward, the content of the Exit Exam will be reviewed against the changing content of the chemistry related material in ES courses and in the Chemistry courses that are part of the ES core curriculum. Topics of particular focus will be the chemistry of disinfection of water with chlorine, dissolved oxygen equilibria, stoichiometry of reactions with dissolved organics and dissolved oxygen, and calculations among units.

Resources Needed to Meet/Sustain Results
Due to the exit of a faculty member who taught in the ES program, including being the exclusive faculty member to cover ES 420, as well as CHEM 360 (Toxicology), and who also covered CHEM 221 and other CHEM courses as needed, resources are required to hire one new faculty member to sustain current status and make progress in this objective. Hiring a new faculty member would cost $45K + benefits.

Explanation of How Resources Will Be Used
The faculty line is a replacement who will teach CHEM 420 and other CHEM courses in the ES program, which are no longer being covered. This faculty line has not been approved for replacement as of this writing.

Outcome 3

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores on specific questions related to biology content knowledge on a locally designed exit exam.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores is greater than 50% on specific questions related to biology.

Performance Target for "Partially Met"
The mean score of all student scores is greater than 35% and less than 50% on specific questions related to biology.

Performance Target for "Not Met"
The mean score of all student scores is equal to or less than 35% on specific questions related to biology.

Assessment Measure Used
A locally designed environmental science exit exam.

Frequency of Assessment
Every spring semester, offered in conjunction with PSCI 499 (Senior Seminar in Physical Science).

Data Collected for this Timeframe (Results)
The ES exit exam was given during PSCI 499 during Spring 2022. One ES student took the exam. The mean score for the biology related questions on the exam was 54.5%. There were 22 multiple choice questions on the exam that were specifically related to biology, the majority of which were related to ecology.

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
Since March 14, 2020 until December 2021, instruction at Lander has been modified as a result of the pandemic. This resulted in change of delivery method in all courses. These rapid and persistent changes may very well have affected content delivered and retention of content. Thus, it is a challenge to put the results of this assessment into the context of the performance of the program at large.

The Exit Exam was unchanged relative to the one given during the Spring of 2021.

It is not really valid to use the scores of single student to assess the program, though i can be mentioned that this set of scores does reflect those of the previous assessment.

Because the biology related content of biology courses and ES curriculum have changed from time to time, and are still undergoing modification, a process is in place to review the questions on the exam to ensure that they reflect the major concepts taught in the three (3) biology courses Environmental Science program students complete, as well as the biology related content in ES courses, particularly ES 301.

Because this learning objective was met for this assessment period (though only for a single student), no changes are currently anticipated, except to continue to review Exit Exam questions as they reflect the actual course content in biology.

Some of the Biology related content in this exam was covered in ES 301 and ES 302, as well as the 3 BIOL courses required in the ES curriculum. The ES faculty member teaching ES 301 and ES 302 has retired from the university. This faculty member is different than the faculty member who covered CHEM 420 and CHEM related courses in the ES curriculum, such as CHEM 360, and was also the

coordinator of the ES program.

Resources Needed to Meet/Sustain Results
A replacement faculty member will be necessary to cover the biology related content that is not covered by the BIOL courses in the curriculum. Although the retirement of this faculty member requiring replacement was known and planned since early Fall 2021, this university has not yet approved this position. The new position would require a minimum of $45K plus benefits

Explanation of How Resources Will Be Used
Resources will be used to hire a replacement faculty member to teach ES 301 and ES 302 (plus ES 111), where some biology content is delivered, plus other relevant courses, and serve as the coordinator of the program.

Outcome 4

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores on specific questions related to geology content knowledge on a locally designed exit exam.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores is greater than 50% on specific questions related to geology.

Performance Target for "Partially Met"
The mean score of all student scores is greater than 35% and less than 50% on specific questions related to geology.

Performance Target for "Not Met"
The mean score of all student scores is equal to or less than 35% on specific questions related to geology.

Assessment Measure Used
A locally designed environmental science exit exam

Frequency of Assessment
Every spring semester, offered in conjunction with PSCI 499 (Senior Seminar in Physical Science)

Data Collected for this Timeframe (Results)
The ES exit exam was given during PSCI 499

Score (Met=3, Partially Met=2, Not Met=1)

during Spring 2021. One ES student took the exam. The mean score for the geology related questions on the exam was 63.6%. There were 22 multiple choice questions on the exam that were specifically related to geology.	3

Comments/Narrative
Since March 14, 2020 and concluding in Fall 2021, instruction at Lander has been modified as a result of the pandemic. This resulted in change of delivery method in all courses. These rapid and persistent changes may very well have affected content delivered and retention of content. Thus, it is a challenge to put the results of this assessment into the context of the performance of the program at large.

Because this learning objective was met for this assessment period (though only for a single student), no changes are currently anticipated, except to continue to review Exit Exam questions as they reflect the actual course content in geology.

It is noted that the faculty member who taught all GEOLOGY (3) and Earth SCIENCE (1) courses at Lander, and who also has been the exclusive instructor of ES 301, ES 302 and ES 314 (Global Climate Change) retired in Spring 2022. Although the retirement was announced early Fall 2021, this position has not yet been approved for replacement.

Resources Needed to Meet/Sustain Results
Replacement of retired faculty member to instruct all geology related courses at Lander. The cost would be a minimum of $45k plus benefits

Explanation of How Resources Will Be Used
Replacement faculty member to teach all three geology related courses at Lander and in the ES curriculum, plus additional ES courses, and serve as ES coordinator.

Outcome 5

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores on specific questions related to general environmental science content knowledge on a locally designed exit exam.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"

The mean score of all student scores is greater than 50% on specific questions related to general environmental science.

Performance Target for "Partially Met"
The mean score of all student scores is greater than 35% and equal to or less that 50% on specific questions related to general environmental science.

Performance Target for "Not Met"
The mean score of all student scores is equal to or less than 35% on specific questions related to general environmental science.

Assessment Measure Used
A locally designed environmental science exit exam

Frequency of Assessment
Every spring semester, offered in conjunction with PSCI 499 (Senior Seminar in Physical Science)

Data Collected for this Timeframe (Results)
The ES exit exam was given during PSCI 499 during Spring 2022. One ES student took the exam. The mean score for the general environmental science related questions on the exam was 57.9%. There were 38 multiple choice questions on the exam that were specifically related to general environmental science.

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
Since March 14, 2020 and concluding in Fall 2021, instruction at Lander has been modified as a result of the pandemic. This resulted in change of delivery method in all courses. These rapid and persistent changes may very well have affected content delivered and retention of content. Thus, it is a challenge to put the results of this assessment into the context of the performance of the program at large.

Because this learning objective was met for this assessment period (though only for a single student), no changes are currently anticipated, except to continue to review Exit Exam questions as they reflect the actual course content in geology.

It is noted that the faculty member who had been the exclusive instructor of ES 301, ES 302 (much of the ES related content on the Exit exam) and ES 314 (Global Climate Change) retired in Spring 2022. This faculty member also taught all Geology (3) courses and Earth Science courses at Lander, as well as assisted with ES 111, and served as the coordinator for the program. Although the retirement was announced early Fall 2021, this position has not yet been approved for replacement.

Resources Needed to Meet/Sustain Results
Hire replacement faculty member to instruct the general ES content of the ES program (ES 301, ES 302, ES 111 and other courses such as ES 314). Cost will be a minimum of $45k plus benefits.

Explanation of How Resources Will Be Used
Hire replacement faculty member to instruct general ES content of the program (ES 111, ES 301, ES 302, ES 314 and other relevant courses). The geology part of the program (GEOL 111, ES 310, GEOL 405 and PSCI 112) could also be covered by this position, as it was by the retired faculty member to be replaced.

Goal Summary

Goal Summary/Comments

This goal met the goal for four of the learning outcomes and partially met for one (chemistry).

It should be noted, that in the last three academic years, there have been changes in the ES curriculum, the Biology curriculum and Chemistry curriculum, and well as the general education curriculum at Lander University. In future assessments, the impacts of these changed curriculum requirements and content will be felt. It is not uncommon for the content of individual courses to change as instructors change and instructors innovate to improve their courses. Not all of these changes are captured by the Exit Exam, one of the key instruments used in evaluating this particular assessment goal (Goal 1).

It should also be noticed that the period from mid Spring (March 14) term 2020 through AY 2020-2021 was a period of many changes in course delivery due to the pandemic. The impacts of these changes will be felt for several more years. Specifically to the ES program, GEOL 111 times 2, GEOL 405, ES 301, ES 302, ES 111, BIOL 306, BIOL 415, CHEM 330, CHEM 220, CHEM 420, CHEM 111, CHEM 112, at a minimum, have been impacted by this. Whether the changes are positive, negative or neutral will be difficult to predict going forward.

The ES curriculum added two core course requirements, ES 111 (Sustainability) and CHEM 420 (Environmental Chemistry) in 2018. These course requirements should lead to improvement in general ES knowledge and knowledge in Chemistry, beginning with the AY 2021-2022, with the first ES students to start graduating with one or both requirements changed. With only one student completing the Exit Exam in 2022, it is difficult, at this point in time, to determine whether any improvements have been make. Note: The faculty member responsible for both of these courses left Lander University after Spring 2022.

However, it is essentially impossible to sustain current performance, let alone make any progress, when both faculty members dedicated to the ES program have left Lander University at the end of AY 2021-2022. The announcement for retirement of one faculty member was made early in Fall 2021. The exit of the second faculty member was unanticipated. Aside from the coordinator position, courses needing coverage now include: ES 111, ES 301, ES 302, ES 314, ES 310, GEOL 111, GEOL 405, CHEM 420, CHEM 360, PSCI 112. Two faculty are required because it is highly unlikely that any one faculty member will be able to cover such a wide range of subject matter and areas of expertise.

Changes Made/Proposed Related to Goal
Two replacement faculty members are needed to simply sustain the program, to meet this first goal. Neither position has been approved at this point in time. One or both will be needed by Fall 2023, at the latest, though preferably earlier, if at all possible. The addition of two, replacement faculty members could also allow the program to continue to grow and improve in many ways.

The Exit Exam will undergo review based on changes that may have occurred in the content and emphases of the courses covered in the exam. The Exit Exam was taken by only 1 ES major this Spring (2022) term. Statistical analysis of such a low population is suspect. It i anticipated that 5 students will be taking the exit exam Spring 2023.

Upload Rubrics/Other Files

Goal 2

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will demonstrate the ability to use the scientific method and associated critical thinking skills to

formulate questions, design experiments and interpret and evaluate data to answer them.

Pillar of Success Supported
Graduates Who Are Gainfully Employed or Admitted to Graduate School

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Mean scores of the portions of a written research report, presentation or poster rubric that ask reviewers to assess critical thinking skills and use of the scientific method in semester assignments in ES 310/302, 310, 407, 490, GEOL 405 or PSCI 499.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean of all student scores are at or above 2.0

Performance Target for "Partially Met"
The mean of all student scores are above 1.7 and less than 2.0.

Performance Target for "Not Met"
The mean of all student scores are less than 1.7

Assessment Measure Used
Mean score of the portions of a written research report and rubric that ask reviewers to assess critical thinking skills and use of the scientific method in semester assignments in ES 301, ES 302, ES 310, GEOL 405 or PSCI 499

Frequency of Assessment
ES 301, ES 302, ES 310 and GEOL 405 are offered every other year. ES 310 and GEOL 405 were offered in Academic Year 2019-2030. PSCI 499 is offered every Spring term.

Data Collected for this Timeframe (Results)
Mean score of the portions of a written research report and rubric that ask reviewers to assess critical thinking skills and use of the scientific method in semester assignments in ES 310(n=8), GEOL 405 (n=4), and PSCI 499. (N=1). The mean

Score (Met=3, Partially Met=2, Not Met=1)
3

score was 2.4.

Comments/Narrative
The goal was met, according to this student learning outcome, on average. Further, this learning outcome was met for each of the three classes. This is a strength to be retained by the ES program.

Resources Needed to Meet/Sustain Results
The resources needed to sustain this result is the hiring of at least one, though preferably two, full time faculty with a background in environmental science. As of writing this assessment, there are zero full time faculty with the background to teach any of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to graduate in a reasonable time frame. The costs would be $45,000 + fringe benefits per position.

Explanation of How Resources Will Be Used
The resources used would be to make sure that all required classes and other classes that are related to major (ES 111, ES 301, ES 302, ES 310, ES 314, ES 407, GEOL 111, GEOL 405, CHEM 360, CHEM 420) will still be offered with the quality levels that are expected for major classes at Lander.

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores on specific questions requiring students to demonstrate critical thinking and/or use the scientific method on a locally written environmental science exit exam

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores is greater than 50% on specific questions related to this indicator of success.

Performance Target for "Partially Met"
The mean score of all student scores is greater than 35% and equal to or less than 50% on specific questions related to this indicator of success.

Performance Target for "Not Met"
The mean score of all student scores is equal to or less than 35% on specific questions related to this

indicator of success.

Assessment Measure Used
A locally written environmental science exit exam.

Frequency of Assessment
This assessment instrument is administered every spring term in conjunction with PSCI 499.

Data Collected for this Timeframe (Results)
The first essay question in the Exit Exam was used in the current assessment cycle. The score for the single students was 71.4%. This in a relatively high score for this portion of the Exit Exam

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
Although only based on one student, the score on the first essay question, used to assess this learning outcome, was 71.4%, which met the goal for this learning outcome. The question required each student to pick an environmental challenge from a list of six (6) specific environmental challenges. In the essay, students were to describe the challenge, identify the proximate and ultimate causes of the challenge and describe potential solutions to the challenge, as well as impacts of the solutions themselves. This question requires a high degree of critical thinking in order for students to make appropriate responses.

The student made effective responses, performing quite well.

Three courses in the ES curriculum are essential for success in this learning outcome, ES 111, ES 301 and ES 302. All 6 of the environmental challenges, plus others, that may be selected in completing this essay portion of the Exit Exam are detailed in ES 301 and ES 302. Consideration of the different perspectives needed to adequately respond to this portion of the Exit Exam is first covered in ES 111 in the program. The faculty member(s) covering these courses has/have left Lander University. One faculty member was responsible for ES 111 while the other was responsible for ES 301 and ES 302, as well as ES 314 (Global Climate Change), which also deals with these multiple perspectives of understanding environmental challenges. Global Climate Change is one of the six, major environmental challenges in the list from which students could choose. Thus, the university will need to replace at least one of those positions to have this learning objective and goal met in the future.

Resources Needed to Meet/Sustain Results
Hire two replacement faculty members to instruct the material and skills that support this goal and learning objective. This goal is addressed in essentially all science based courses in the ES curriculum, which are all of the courses. The costs for this are a minimum of $90k plus benefits.

Explanation of How Resources Will Be Used
Hire two replacement faculty members to instruct all ES courses, each of which which supports this goal and learning objective. (GEOL 111, PSCI 112, ES 111, ES 301, ES 302, ES 310, ES 314, ES 407, GEOL 405, CHEM 420, CHEM 360). Other courses that support this goal are taught by current, full time faculty.

Outcome 3

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of

performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores of the portion of the supervisor completed rubric for internships (ES 490) related to critical thinking and/or the use of the scientific method

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores is greater than 3.6 on the relevant section of the supervisor completed rubric for internships in environmental science (A. Problem Solving/Inquiry) .

Performance Target for "Partially Met"
The mean score of all student scores is greater than 3.0 and less than 3.6 on the relevant section of the supervisor completed rubric for internships in environmental science (A. Problem Solving/Inquiry) .

Performance Target for "Not Met"
The mean score of all student scores is less than 3.0 on the relevant section of the supervisor completed rubric for internships in environmental science (A. Problem Solving/Inquiry) .

Assessment Measure Used
A supervisor completed rubric for environmental science internships (ES 490). This is the rubric used in the Lander University EYE Program

Frequency of Assessment
Completed at the end of each environmental science internship, which is offered on demand in the program.

Data Collected for this Timeframe (Results)
One student completed an internship during the current assessment period. The employer evaluation rubric (EYE Program) was used. That score was 4.7/5.0 for the three (3) items related to critical thinking/the scientific method. On the rubric, those items were found under the subtitle, Problem Solving.

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
One student completed an environmental internship over the current assessment period.

The student who completed an internship, who worked for the US Army Corp of Engineers on the J. Strom Thurmond Lake, did quite well. In fact, the supervisor indicated a willingness, even enthusiasm, to place other students from the Lander ES program into such internships in the future.

Resources Needed to Meet/Sustain Results
A new individual will need to coordinate these internships for the ES program and act as faculty supervisor, but a current faculty member should be able to meet that requirement with a reasonable time invested. There are generally only a handful of individuals completing internships in any, given year. This task usually falls upon the Coordinator for the ES program, who has retired, and the person

who was expected to take on that role left Lander University after Spring 2022. Cost for 1 replacement faculty member to serve as ES coordinator and mentor for internships is $45k plus benefits.

Explanation of How Resources Will Be Used
Th replacement faculty member will serve as the Coordinator for the ES program and as mentor for all ES internships.

Goal Summary

Goal Summary/Comments
The goal was met, according to all three of the learning outcomes identified for the goal. This is a strength of the ES program, considering the results in the current assessment period.

Changes Made/Proposed Related to Goal
Students have met this goal. Every upper level course in ES requires a research project with multiple deliverables, and critical thinking is front and center of each of those research projects. All research projects of this sort require a paper and a presentation. The paper is first turned in as a draft, allowing students to make improvements, including the collection of additional data/information, if necessary. All projects go through an initial problem definition stage, which requires high levels of critical thinking and framing consistent with the scientific method. These strengths will continue and be built upon in the future.

Proposed to maintain this goal is the hiring of two, replacement faculty members. As of writing this assessment, there are zero full time faculty with the background to teach any of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to graduate in a reasonable time frame. Furthermore, the program lacks a coordinator and faculty mentor for ES internships.

Upload Rubrics/Other Files

Goal 3

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will demonstrate the development of writing and presentation skills appropriate for students and practitioners in the discipline of environmental science.

Pillar of Success Supported
Graduates Who Are Gainfully Employed or Admitted to Graduate School

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Mean scores on questions related to the demonstration of writing or presentation skills on assignment rubrics from ES 301/302, ES 310, ES 407, GEOL 405 or PSCI 499.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean or all students scores is at or above 2.0

Performance Target for "Partially Met"
The mean or all students scores is above 1.7 and below 2.0

Performance Target for "Not Met"
The mean or all students scores is less than or equal to 1.7.

Assessment Measure Used
Presentation rubrics in ES 301, ES 302, ES 310 and GEOL 405, plus PSCI 499. And written report rubrics in ES 310, ES 301, ES 302 and GEOL 405.

Frequency of Assessment
Each of these courses is offered every other year (except PSCI 499, which is offered every Spring semester). Assessments are completed in at least two courses each academic year, with specific courses alternating.

Data Collected for this Timeframe (Results)
Report rubrics in ES 310 (N=8) and GEOL (N=4), and presentation rubrics in PSCI 499 (N=1). For written communication (reports), the mean was 2.63 (N=14). For presentations, the mean was 2.67 (N=15)

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
The goal was met according to this learning outcome. Presentation skills had a mean score of 2.63 while written communications skills had a mean of 2.67, both similar in number.

These scores suggest that course embedded communications assignments, written and presentation, are working quite well in the Environmental Science program. This could become lower in future semesters or years if these classes are not consistently offered due to the lack of faculty expert in the relevant content areas.

Resources Needed to Meet/Sustain Results
The resources needed to sustain this result are the hiring of at least one, though preferably two, full time faculty with a background in environmental science. As of writing this assessment, there are zero full time faculty with the background to teach any of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to

semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to graduate in a reasonable time frame. The costs would be $45,000 + fringe benefits per position.

Explanation of How Resources Will Be Used
The resources used would be to make sure that all required classes and other classes that are related to major (ES 111, ES 301, ES 302, ES 310, ES 314, ES 407, GEOL 111, GEOL 407, CHEM 360, CHEM 420) will still be offered with the quality levels that are expected for major classes here at Lander. Each of these courses consist of work relating to presentation skills.

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Mean scores on questions related to the demonstration of presentation skills on a presentation rubric from ES 490 (Internship) or ES 407 (Research).

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean or all students scores is at or above 2.0

Performance Target for "Partially Met"
The mean or all students scores is above 1.7 and below 2.0

Performance Target for "Not Met"
The mean or all students scores is less than or equal to 1.7.

Assessment Measure Used
Mean scores on questions related to the demonstration of presentation skills on a presentation rubric from ES 490 (Internship)

Frequency of Assessment
Both ES 490 and ES 407 are available on demand for juniors or seniors. Seniors most frequently pursue ES 490 (internship).

Data Collected for this Timeframe (Results)
No presentations were made for research (ES 407) or internship (ES 490) were completed for this assessment period.

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative

No internships or research project presentations were completed for this assessment period. The pandemic impacted the opportunity for face to face presentations in the current assessment period. It is anticipated that face-to-face presentations will return in the next assessment period.

Resources Needed to Meet/Sustain Results
It would be preferred to have a faculty member with the background in environmental science to be able to cover research and internships though that can be covered by other faculty. No full time faculty are currently assigned to supporting the ES program. Cost will be a minimum of $45k plus benefits.

Explanation of How Resources Will Be Used
A replacement faculty member will serve as a faculty mentor for internships and coordinate presentations for internships and ES research projects.

Outcome 3

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
The mean scores of the portion of the supervisor completed rubric for internships (ES 490) related to written or verbal communication.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores is greater than 3.6 on the relevant section of the supervisor completed rubric for internships in environmental science (B. Communications) .

Performance Target for "Partially Met"
The mean score of all student scores is greater than 3.0 and less than 3.6 on the relevant section of the supervisor completed rubric for internships in environmental science (B. Communications) .

Performance Target for "Not Met"
The mean score of all student scores is less than 3.0 on the relevant section of the supervisor completed rubric for internships in environmental science (B.Communications)

Assessment Measure Used
A supervisor completed rubric for environmental science internships (ES 490). This is the rubric used in the Lander University EYE Program

Frequency of Assessment
Completed at the end of each environmental science internship, which is offered on demand in the program.

Data Collected for this Timeframe (Results)	Score (Met=3, Partially Met=2, Not Met=1)
A single internship was completed during the assessment period. The mean score of the five (5) communication items included on the supervisor rubric was 4.4/5.0.	3

Comments/Narrative
The learning outcome was met, although it was for a single student. The pandemic made it quite challenging for students to find suitable internships during this assessment period. It is anticipated that more students will be successful in obtaining internships during the next assessment period.

Resources Needed to Meet/Sustain Results
A new individual will need to coordinate these internships for the ES program and act as faculty supervisor. There are generally a handful of individuals completing internships in any, given year. This task usually falls upon the Coordinator for the ES program, who has retired, and the person who was expected to take on that role left Lander University after Spring 2022. The cost of hiring a replacement faculty member will be a minimum of $45K plus benefits.

Explanation of How Resources Will Be Used
The replacement faculty member will be the Coordinator for the ES program, and be the faculty mentor for ES internships.

Goal Summary

Goal Summary/Comments
All students met the learning outcome for this goal. This is not surprising given the effort and focus of program and department faculty on written and verbal communications skills in many of the classes, plus internships, research and PSCI 499 presentations. Research reports and presentations are required for ES 111, ES 301, ES 302, ES 310, ES 314 and GEOL 405, as well as selected courses in Chemistry and Biology within the ES curriculum. Students have had opportunity for much practice and feedback by the time they become seniors. This is an area of strength to keep and develop for this program.

Changes Made/Proposed Related to Goal
Proposed to maintain this goal is the hiring of two, replacement faculty members. As of writing this assessment, there are zero full time faculty with the background to teach any of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to graduate in a reasonable time frame. Furthermore, the program lacks a coordinator and faculty mentor for ES internships.

Presentations to outside conferences, such as the Upstate Research Symposium, as well as presentations to the Academic Symposium at Lander, are encouraged at several points in the environmental science program. This will continue.

Upload Rubrics/Other Files
R.Wall Training Evaluation[75706].docx

Goal 4

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
Students will develop an ability to develop and articulate well informed and reasoned views on environmental issues, based on an understanding of legal, ethical, social, political and economic ramifications of environmental problems, policies and decisions.

Pillar of Success Supported
Graduates Who Are Gainfully Employed or Admitted to Graduate School

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Student Learning Outcome

Enter Outcome
Mean score on portions of a locally written environmental science exit exam assessing student demonstration of developing and articulating well informed and reasoned views on legal, ethical, social and political ramifications of environmental problems, policies and decisions.

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
The mean score of all student scores for the sum of the selected questions is greater than 50%.

Performance Target for "Partially Met"
The mean score of all student scores for the sum of the selected questions is greater than 35% and equal to or less than 50%.

Performance Target for "Not Met"
The mean score of all student scores for the sum of the selected questions is less than 35%.

Assessment Measure Used	**Frequency of Assessment**
Selected questions on a locally written environmental science exit exam.	The exam is given each spring semester in conjunction with PSCI 499, the senior seminar for the Department of Physical Sciences, a class which includes graduating seniors in both the Environmental Science and Chemistry programs..
Data Collected for this Timeframe (Results)	**Score (Met=3, Partially Met=2, Not Met=1)**

Three (3) selected questions on the Exit Exam, in the first essay, were assessed for this learning outcome. One student completed the exam. The mean percent score of the responses to the three questions was 60%.	3

Comments/Narrative
The student who completed the Exit Exam met the learning outcome. This section of the Exit Exam required students to select an environmental challenge, describe it, determine its proximal and ultimate causes and determine solutions for it. The selected questions within that essay had to do with broad aspects of the environmental challenge such as economics, politics, etc.

This goal has been the one that has been most difficult to assess within the ES program. Opportunity for improvement can be found in ES 301/ES 302, perhaps through the mechanism of case studies of environmental challenges. A challenge is that ES 301/ES 302 are currently offered every other year. The next opportunity for improvement of the course along these lines would be in AY 2022-2023. However, it might be worthwhile to consider teaching both courses every year, given recent increase in major numbers, the increase in numbers of students seeking minors in ES, and the increased interest in environmental issues among students across campus. Enrollment in these two courses has increased over the last few years, a trend that is anticipated to continue.

Another opportunity relates to ES 314, which is a general education course that meets the requirement for Global Cultures. In fact, this course does focus on the multidisciplinary and cross-cultural ramifications of climate change, including significant attention to climate change economics, national policy, international agreements, and law. The course is not currently included in the assessment because it is popular with students across campus, such that ES students make up a minority of the enrollment. This course is offered every Fall term going forward. Perhaps means can be found to assess the ES majors among the students for this goal without risking putting in a bias in instruction or student evaluation, overall. This will be studied in the next assessment period, and perhaps implemented, as well.

However, the greatest challenge of all, related to this goal, is that ES 301, ES 302 and ES 314 were covered by a faculty member who retired at the end of the year, AY 2021-2022. Although the impending retirement was announced at the beginning of Fall term 2021, this replacement position has not yet been approved by the university. This puts the ES program into a difficult situation.

Resources Needed to Meet/Sustain Results
Hire a replacement faculty member in the ES program who is capable of covering ES 301, ES 302, ES 314 and related courses, such as ES 111. The costs will be a minimum of $45k plus benefits.

Explanation of How Resources Will Be Used
Hire a replacement faculty member in the ES program who is capable of covering ES 301, ES 302, ES 314 and related courses, such as ES 111.

Goal Summary

Goal Summary/Comments
The student who completed the Exit Exam met the learning outcome. In fact, the student did well on this particular essay question, overall, which required students to select an environmental challenge, describe it, determine its proximal and ultimate causes and determine solutions for it. The selected questions within that essay had to do with broad aspects of the environmental challenge such as economics, politics, etc.

This goal has been the one that has been most difficult to assess within the ES program. Opportunity for improvement can be found in ES 301/ES 302, perhaps through the mechanism of case studies of environmental challenges. This avenue could not be pursued readily in the current assessment cycle because all of the courses had to be transferred to online delivery during the academic year. There was little available opportunity to expand the use of case studies and develop appropriate assignments. Another challenge is that ES 301/ES 302 are currently offered every other year. The next opportunity for improvement of the course along these lines would be in AY 2022-2023. However, it might be worthwhile to consider teaching both courses every year, given recent increase in major numbers, the increase in numbers of students seeking minors in ES, and the increased interest in environmental issues among students across campus. Enrollment in these two courses has increased over the last few years, a trend that is anticipated to continue.

Another opportunity relates to ES 314, which is a general education course that meets the requirement for Global Cultures. In fact, this course does focus on the multidisciplinary and cross-cultural ramifications of climate change, including significant attention to climate change economics, national policy, international agreements, and law. The course is not currently included in the assessment because it is popular with students across campus, such that ES students make up a minority of the enrollment. ES 314 was offered for the first time during Spring 2021. This course is offered every Fall term going forward. Perhaps means can be found to assess the ES majors among the students for this goal without risking putting in a bias in instruction or student evaluation, overall. This will be studied in the next assessment period, and perhaps implemented, as well.

Beginning in Fall 2019, new students in the Environmental Science program were required to take ES 111, a course in sustainability that introduces students to the evaluation of environmental challenges by separately considering the environmental, social and economic aspects of the challenges. This presents an opportunity for ES 301/ES 302 to build from this background, perhaps as early as 2023-2023, when many of those students would have taken ES 111 prior to ES 301/ES 302, though there is no current intention of making ES 111 a prerequisite for either course, due to the significant number of non-ES majors who take the course at this time. ES 111 occurs too early in the program to be used for program assessment, being a freshman level course.

Changes Made/Proposed Related to Goal
Proposed to maintain this goal is the hiring of two, replacement faculty members. As of writing this assessment, there are zero full time faculty with the background to teach any of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to graduate in a reasonable time frame. Furthermore, the program lacks a coordinator and faculty mentor for ES internships.

Upload Rubrics/Other Files

Goal 5

Program Goals are broad and overarching statements about the skills, knowledge, and dispositions students are expected to gain by the end of their course of study (big picture). They support the Institution's Mission/Goals.

Program Goal
To comply with Program Productivity standards as defined by the South Carolina Commission on Higher Education

Pillar of Success Supported
High-Demand, Market-Driven Programs

Outcomes

Outcome 1

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Operational Outcome

Enter Outcome
Major Enrollment

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
Using a five-year rolling average, the number of students enrolled in the major for Baccalaureate programs is greater than or equal to 12.5.

Performance Target for "Partially Met"
Not Applicable

Performance Target for "Not Met"
Using a five-year rolling average, the number of students enrolled in the major for Baccalaureate programs is less than 12.5.

Assessment Measure Used
Enrollment and Graduation data extracted from Banner

Frequency of Assessment
Annually

Data Collected for this Timeframe (Results)
The five-year rolling mean for student enrollment was 19.8

Score (Met=3, Partially Met=2, Not Met=1)
3

Comments/Narrative
The goal was met according to this operational outcome. No changes are indicated. There does seem to be some progress, however. The enrollment in 2019-2020 was 16 students, while that in 2018-2019 was 20, with the previous three years below 15. The Fall 2020 enrollment in the Environmental Science program was a record high of 31 students, quite a surprise jump in the number. Fall 2021 had a small decrease but still had the second highest freshman class of 21. This increase in enrollment numbers in the Environmental Science program seems to reflect the total increase in enrollment at Lander University.

However, both full-time faculty associated with the ES Program at Lander University have left the University, the first from retirement announced during early Fall 2021, and the second after Spring 2022. Neither replacement position has been approved as of this assessment report. At least two students have left the program, and several others have stated concerns of the future of the program, or who their academic advisors would be, because of this fact. There are questions among them concerning the future of the ES program, especially among those who are earlier into it. This situation will not change, and will likely become aggravated, without university commitment to replace at least one of the two vacancies, putting sustainability of achieving this goal into question.

There does appear to be evidence that environmental concerns are growing among Lander students, as is also supported by the rise in the number of students pursuing Environmental Science minors, most of whom are Biology and Chemistry majors. With issues such as Global Climate Change so often in the public awareness, and messaging around those issues in our culture and public media increasing in both frequency and severity, it would not be unreasonable to expect this trend to continue on its upward path.

A few minor changes to the program may also have impacted the rise in enrollment numbers. The first is that, for the first time in spring 2019-2020, ES 111, a freshman level course in environmental sustainability, was added to the curriculum. This course meets the general education science requirement for a non-lab science course. It attracts students from across campus. The reason this might be an effective recruitment opportunity is that most students at Lander are unaware of the major, and very few are even aware of environmental science as an educational or career opportunity, given the short shrift this discipline has been given on South Carolina's career cluster scheme that is used by guidance counselors in public schools. Further, there has been a trend of high schools discontinuing environmental science courses in South Carolina due to low enrollment. Recruiting for this vital field has always been a challenge for these reasons. The Coordinator of the ES program has been responsible for most recruiting efforts to the program. This position is vacant, with the retirement of the Coordinator at the end of AY 2021-2022.

The second recent change is the approval of an addition of an area of concentration in Environmental Forensics, which takes advantage of new courses offered in forensic science at Lander University. This area of concentration was approved by CHE during the summer of 2019. This should broaden the interest of students in ES, and indeed has, given the consistent increase in the number of students in the Environmental Forensic Science concentration each year since it was introduced.

A third factor is that the student group, Environmental Science Student Organization (ESSO) has expanded in membership over the last two years. This will put more students in touch with the program and should lead to more interest in the major. However, given that ESSO and other student groups have not been able to meet in person during 2020-2021 because of the pandemic, the academic year 2021-2022, will be a rebuilding year for that organization.

A fourth item is, that in the last four years or so, there has been an increase in Biology students earning minors in ES, with two recently graduating with double majors in Biology and ES. This trend is expected to continue, given that it has support among faculty in Biology as well as the department and college. All of these factors, taken together, should lead to continued growth of the Environmental Science program.

Resources Needed to Meet/Sustain Results

The resources needed to sustain this result is the hiring of two full time faculty with a background in environmental science. As of writing this assessment, there are zero full time faculty with the background to teach all of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to

graduate in a reasonable time frame. The costs would be $90,000 + fringe benefit per position. As of currently writing this program there are ES majors entering their freshman year and currently there is no one to offer the ES 111 for spring 2023 for those students. Further, current students have expressed concerns about the longer term sustainability of the program, such as that there is real risk that several will transfer to another major or even leave Lander University. Two students, at least, did that in the current AY.

Further, recruitment into the program and advising are essential for maintaining productivity. The Coordinator has generally been responsible for all ES recruitment efforts, including serving as faculty mentor to the student organization, ESSO, and all outreach activities. The Coordinator has also served as the academic advisor for essentially all ES students beyond the freshman year, though informally advising freshmen from time to time. There is no full time faculty assigned as the Coordinator for the ES program.

Explanation of How Resources Will Be Used
The resources used would be to make sure that all required classes and other classes that are related to major (ES 111, ES 301, ES 302, ES 310, ES 314, ES 407, GEOL 111, GEOL 405, CHEM 360, CHEM 420) will still be offered with the quality levels that are expected for major classes here at Lander. They will also be used to Coordinate the ES program, with all of the responsibilities assigned to that position, as well as to advise all students in the program, except freshmen, and act an coordinator and faculty advisor for internships and ES research projects, and advocate for the program at the appropriate levels of the university.

Outcome 2

Outcomes are specific, **measurable** statements that reflect the broader goals.

Academic Programs are required to develop **Student Learning Outcomes**, which describe knowledge, skills, and values that students are expected to gain as a result of their educational experiences.

Academic Programs may also develop **Operational Outcomes**, which describe the level of performance of an operational aspect of a program or office (ex. graduation rates, retention, employment data).

Most goals have at least two outcomes measured.

What type of Outcome would you like to add?
Operational Outcome

Enter Outcome
Completions (Degrees Awarded

Timeframe for this Outcome
Academic Year 2021-2022

Performance Target for "Met"
Using a five-year rolling average, the number of degrees awarded for Baccalaureate programs is greater than or equal to 8.

Performance Target for "Partially Met"
Not Applicable

Performance Target for "Not Met"

Using a five-year rolling average, the number of degrees awarded for Baccalaureate programs is less than 8.

Assessment Measure Used
Enrollment and Graduation data extracted from Banner

Frequency of Assessment
Annually

Data Collected for this Timeframe (Results)
The five-year rolling average for degrees earned was 2.6 for this assessment period.

Score (Met=3, Partially Met=2, Not Met=1)
1

Comments/Narrative
This goal was not met for this operational outcome, at 2.6 versus a requirement of 8 degrees awarded, based on a five-year rolling average. There are two possible explanations for this result, 1) low total enrollment, although they met the requirement, are still not sufficiently high to lead to an expectation that the program would graduate the minimum of 8 students, and b) graduation rates for the program are low (though apparently higher, as a proportion of total enrollment, than many other academic programs at Lander University). In analyzing the data, the first alternative seems most likely to be responsible for the program not meeting this goal. For example, a program that just meets the 8 degrees awarded requirement, in a four year program, would have no fewer than 32 students, with a graduation rate of 100% of incoming students. The Environmental Science program had a total of 19.8students in the five-year rolling average. Assuming equal numbers in all four grades and a 100% degree award rate, we would expect a five-year rolling average of 4.5 degrees awarded. This is higher than the result obtained, but not unexpected, because there was a sharp rise in program enrollment in the last academic year (31), and most of these students are Freshmen or Sophomores. It is expected that the program graduation numbers will continue to rise as this large cohort of students moves through the program, especially if the program enrollment numbers remain steady or grow. Five students are expected to graduate in Soring 2023. The takeaway from that is that the Environmental Science Program is doing a satisfactory job graduating students in the program, but that the total numbers have not been high enough to guarantee success against this requirement for 8 degrees awarded, at least not for three more years, as the largest cohort on record moves through and reaches graduation.

The implication of this for Environmental Science is that the program has actually been doing quite well to help students complete their degrees. As a caution, however, several Environmental Science students have had challenges during the pandemic year of 2021-2022, and at least two have withdrawn from the university or been put on academic suspension. This will impact the graduation numbers in the next two to three years. A further bottle neck in graduates rates would not be unexpected under these conditions, especially considering the several students who withdrew from core ES courses (ES 301 and ES 302), which are taught only every other year.

The most critical factor relating to the future potential to meet this goal is the fact that both fulltime faculty in ES, including the Program Coordinator, have left Lander University, and neither position has yet been approved for recruitment. This has led to concerns among students about the long-term sustainability of the program and the ability of Lander to offer the courses needed for them to meet all program requirements, and thus graduate on time. At least two students exited the program in the current assessment cycle. It is anticipated that these concerns will be aggravated as long as both replacement positions remain open.

With the replacement of both faculty members, we anticipate total student numbers in the program, and consequently total degrees awarded, to increase over the next few years based on improved total student enrollment numbers at Lander University and other factors and recent changes to the Environmental science program, as summarized for the previous operational outcome.

Resources Needed to Meet/Sustain Results
The resources needed to meet this learning outcome, at a minimum, is the hiring of two, full time, replacement faculty with a background in environmental science. As of writing this assessment, there are zero full time faculty with the background to teach all of the required major courses. The lack of faculty makes it challenging to be able to have the quality and consistency of results from semester to semester. Also this will cause challenges in being able to offer the classes needed to students in a timely basis to allow for students to graduate in a reasonable time frame. The costs would be $90,000 + fringe benefit per position. As of currently writing this program there are ES majors entering their freshman year and currently there is no one to offer the ES 111 for spring 2023 for those students. Further, current students have expressed concerns about the longer term sustainability of the program, such as that there is real risk that several will transfer to another major or even leave Lander University. Two students, at least, did that in the current AY.

Further, recruitment into the program and advising are essential for maintaining productivity. The Coordinator has generally been responsible for all ES recruitment efforts, including serving as faculty mentor to the student organization, ESSO, and all outreach activities. The Coordinator has also served as the academic advisor for essentially all ES students beyond the freshman year, though informally advising freshmen from time to time. There is no full time faculty assigned as the Coordinator for the ES program.

Explanation of How Resources Will Be Used
The resources used would be to make sure that all required classes and other classes that are related to major (ES 111, ES 301, ES 302, ES 310, ES 314, ES 407, GEOL 111, GEOL 405, CHEM 360, CHEM 420) will still be offered with the quality levels that are expected for major classes here at Lander. They will also be used to Coordinate the ES program, with all of the responsibilities assigned to that position, as well as to advise all students in the program, except freshmen, and act an coordinator and faculty advisor for internships and ES research projects, and advocate for the program at the appropriate levels of the university. This is essential to increase both total numbers of enrolled students and, consequently, retention and graduation of the requisite number of graduates from the program.

Goal Summary

Goal Summary/Comments
This goal was not met. Although the goal of student enrollment in the program was met, the number of degrees awarded is below the requirement. Based on a more detailed analysis of the enrollment and degrees awarded data, it is apparent that the challenge is more one of recruiting students to the program than a lack of success in having students reach graduation. In fact, the Environmental Science program is above average among baccalaureate programs at Lander University in terms of awarding degrees as a proportion of the students enrolled in the program.

The most critical factor relating to the future potential to meet this goal is the fact that both fulltime faculty in ES, including the Program Coordinator, have left Lander University, and neither position has yet been approved for recruitment. This has led to concerns among students about teh long-term sustainability of the program and the ability of Lander to offer the courses needed for them to meet all program requirements, and thus graduate on time.

Recent changes in the ES program are expected to increase enrollment numbers, assuming the replacement of the faculty members in ES. These include the addition of a freshman, general education science course (ES 111) that will provide students who may not have firmly decided which major to pursue an opportunity to 'taste' what environmental science has to offer. This course was offered at Lander University for the first time during spring of 2019.

A recently approved concentration in environmental science, Environmental Forensics, was placed in the 2020-2021 academic catalog, which is expected to attract students with an interest in forensic science and environmental issues. Several students are currently enrolled in this new concentration, providing early support of this idea.

In addition to academic changes to the program and course offerings, the Environmental Science Student Organization has been growing in membership. This provides an opportunity for recruitment into the major. However, due to the pandemic, the organization was not able to meet face-to-face or conduct activities in 2020-2021. AY 202102022 will be a rebuilding year for ESSO, as well as many other student organizations.

There has also been a recent trend of Biology majors pursuing environmental science minors, and the first Biology and Environmental science double majors have graduated recently. Biology faculty appear to approve and support ES minors and the double major for interested and qualified students. This is an example of an effective, cross-discipline relationship. Environmental Science minors are also occasionally pursued by Chemistry majors, but none have yet considered the double major as a possibility in recent memory, though it is feasible.

As a last comment, the ES program is one that appears to be doing quite well in terms of awarding degrees and in placing graduates in positions related to the discipline. It addresses a need in the state. Yet, recruitment has been a long challenge with this program, at least until 2020-2021, when the program jumped to 31 total students. The challenges seem to be more related to the lack of awareness of environmental science as a potential area of study and a good career option. This challenge goes to the K-12 school system in the state and public lack of understanding of what environmental science is and does. This implies that a significant and sustained outreach effort will be needed over the longer term to effect sustained increase in this and other environmental science related programs in the state.

Changes Made/Proposed Related to Goal
The most critical factor relating to the future potential to meet this goal is the fact that both fulltime faculty in ES, including the Program Coordinator, have left Lander University at the end of AY 2021-2022, and neither position has yet been approved for recruitment. It is proposed, and strongly urged, that both faculty members be replaced.

With the replacement of both faculty members, we anticipate total student numbers in the program, and consequently total degrees awarded, to increase over the next few years based on improved total student enrollment numbers at Lander University and other factors and recent changes to the Environmental science program, as summarized for the previous operational outcome.

Recent changes in the ES program are expected to increase enrollment numbers, and consequently total number of students graduating, assuming that the open faculty positions in ES are replaced. These include the addition of a freshman, general education science course (ES 111) that provides students who may not have firmly decided which major to pursue an opportunity to 'taste' what environmental science has to offer. This course was offered at Lander University for the first time during spring of 2019. A recently approved concentration in environmental science, Environmental Forensics, was placed in the 2020-2021 academic catalog, which has attracted students with an interest in forensic science and environmental issues. The fact that several students are enrolled in the Environmental Forensics concentration provides early confirmation of this idea.

In addition to academic changes to the program and course offerings, the Environmental Science Student Organization has been growing in membership. This provides an opportunity for recruitment into the major.

There has also been a recent trend of Biology majors pursuing environmental science minors, and the

first Biology and Environmental science double majors have graduated recently. Biology faculty appear to approve and support ES minors and the double major for interested and qualified students. This is an example of an effective, cross-discipline relationship. Environmental Science minors are also occasionally pursued by Chemistry majors, but none have yet considered the double major as a possibility in recent memory, though it is feasible.

A sustained outreach and recruiting program would likely need to be initiated for longer term success. This will involve working with the appropriate areas of administration to effect. Opportunities may include magazine or newspaper articles, a blog or other web site dedicated to the major, public outreach such as events celebrating the 25th anniversary of the ES program at Lander University, Earth Day activities, active presence of the program on high school college and/or career days, communications with high school science teachers and guidance councilors, and other opportunities.

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