LDC Program Review – Annual Discipline Update for 2021-2022
PART A

SECTION 1: BASIC PROGRAM/DISCIPLINE INFORMATION

SAC Name: **Environmental Studies**

Disciplines included in this SAC: Science

SAC Chair(s): Valance Brenneis

Faculty Department Chair(s): Jennifer Hill, Sandy Neps, Elizabeth Rodrigues, Aaron Payette

Program Dean/ SAC Administrative Liaison: Ken Friedrich

Pathway Dean: Alyson Lighthart

Please highlight where your classes are offered.

Classes/Services offered at: CA / RC / SE / SY / NB / HC / WCC / Metro / CLIMB

Other: We would be interested in offering ESR courses at centers, such as Newberg or Hillsboro, if support such as lab facilities, vans, and staff were available.

SECTION 2: REFLECTING ON DATA

All data cited below can be found here: https://www.pcc.edu/institutional-effectiveness/program-profiles/

Please include data from at least the last three years and up to the last five years. A 3-year enrollment review is recommended. SACs may have unique circumstances and reasons for looking more or less broadly.

2A.Enrollment (SFTE) per year; Location (where course is taught); Modality

The following graphs show our college-wide SFTE for each ESR course. Please note that prior to 2020, all classes were on-campus. Beginning in Spring 2020 - and continuing through Spring 2021, all classes were remote. While we saw some declines in enrollment from 2016 to 2019, we saw constant or increased enrollment in most ESR courses during remote learning and the COVID pandemic (with the exception of ESR 141 and ESR 202, which was not offered in Fall 2020). Offerings of and demand for environmental studies courses have generally increased during remote learning.

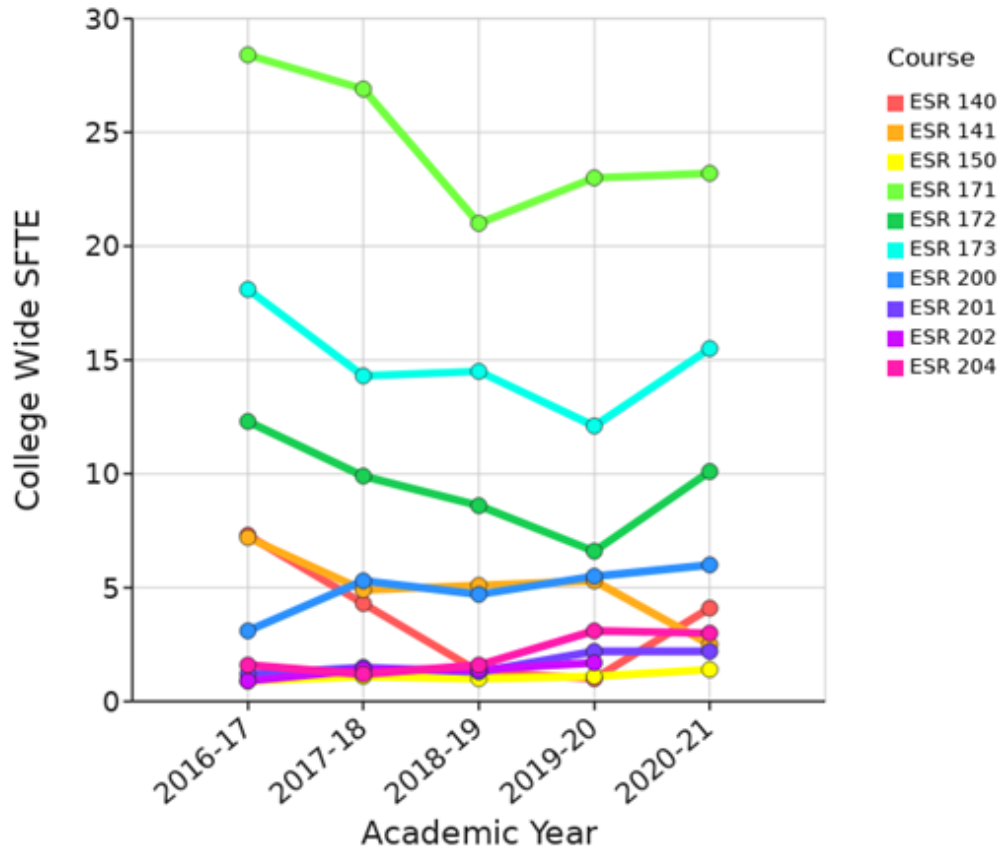

Figure 1. College-wide SFTE for ESR courses (Summer 2016 - Spring 2021).

Figures 2 and 3 show the offering of sustainability courses by campus over the past five years. As you can see, particular courses are more frequently offered through some campuses. For example, ESR 140: Introduction to Sustainability, was exclusively offered through Sylvania from 2018 - Spring 2021, however, during the pandemic, remote instruction allowed students from all over the PCC service-area (and beyond) to attend. We anticipate that enrollment in ESR 140 will continue to increase as it now fulfills the General Education science requirement (but is not a lab class). On the other hand, ESR 141: Introduction to Individual Sustainability does not fulfill the General Education science requirement and we have seen enrollment decline, in part due to changes in staffing and the reduction in faculty available to teach this course. However, this course fills whenever it is offered, so we believe that we could potentially increase offerings of this course in the future.

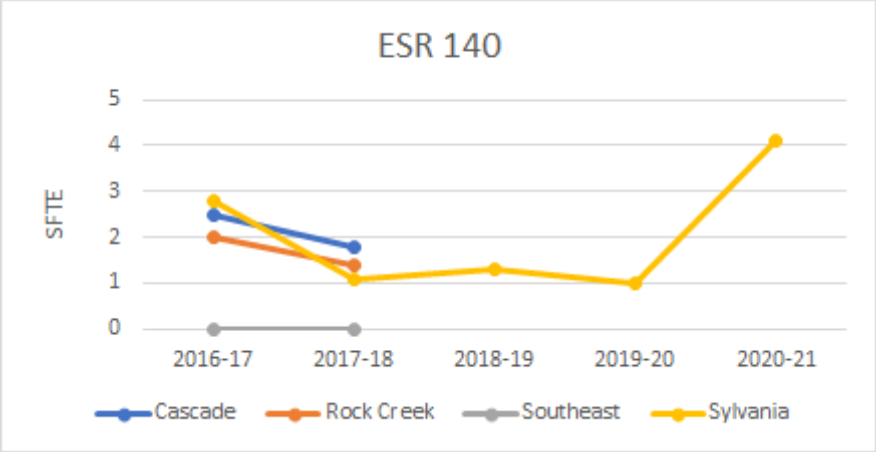

Figure 2. Enrollment in ESR 140 (General Education science course as of Fall 2020).

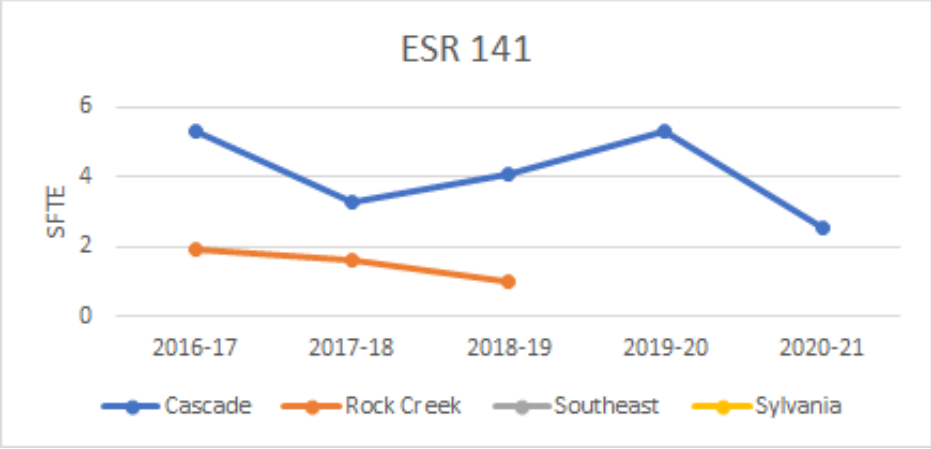

Figure 3. Enrollment in ESR 141 (does not fill General Education science requirement).

ESR 171: Environmental Science - Biological Perspectives has the highest enrollment of all of our courses, with multiple sections offered per term at multiple campuses. There was a decline in enrollment at Rock Creek due to a retirement, but we anticipate that enrollment in ESR 171 will continue to be high in the future.

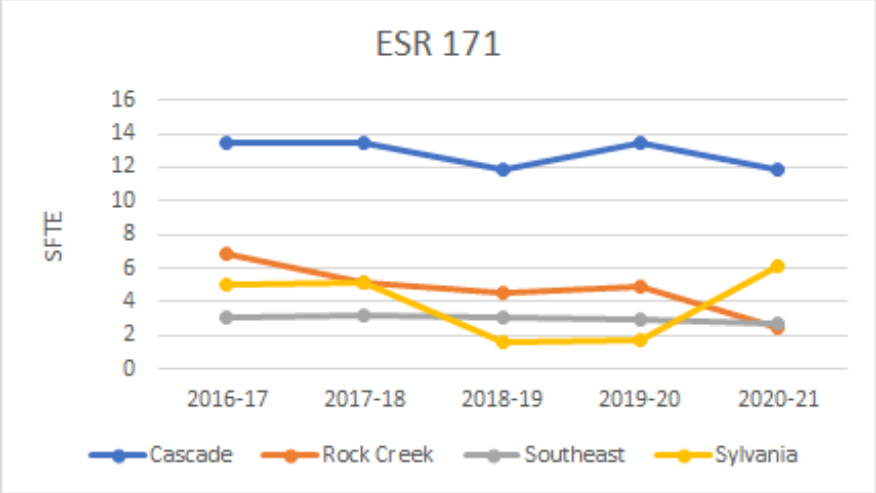

Figure 4. Enrollment in ESR 171 (General Education lab science course)

Figures 5 and 6 show the uneven distribution of ESR 172: Environmental Science - Chemical Perspectives and ESR 173: Environmental Science - Geological Perspectives offerings. Environmental Science is an interdisciplinary field; and these courses can be taught by chemists and geologists, as well as faculty with environmental science backgrounds. We hope to develop a coordinated annual schedule that allows us to offer at least one section of each of these at each campus over the course of the year. We believe that with better communication and planning facilitation by our 'one college' model, we should be able to offer and fill these courses more frequently.

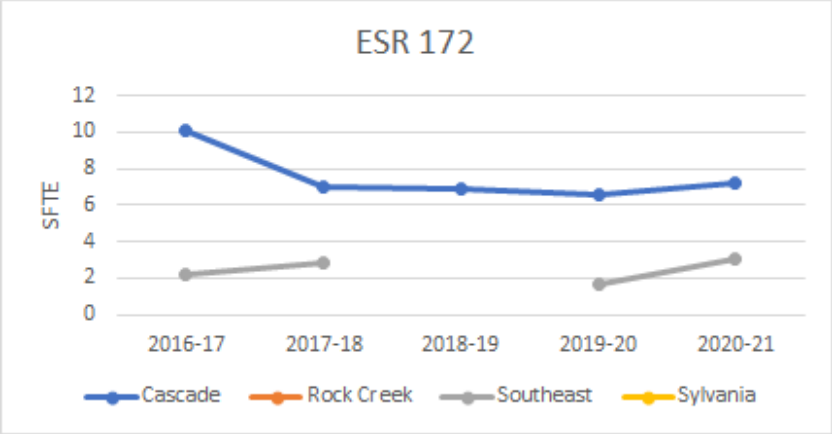

Figure 5. Enrollment in ESR 172 (General Education lab science course)

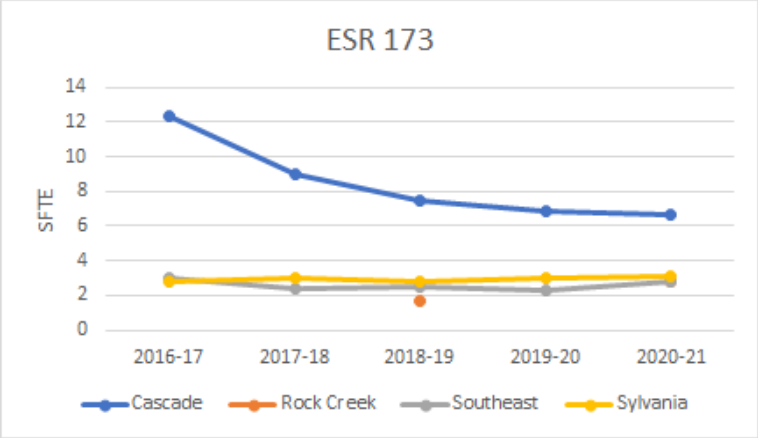

Figure 6. Enrollment in ESR 173 (General Education lab science course)

Finally, the Environmental Studies majors courses, which are equivalent to environmental science courses offered at Portland State University, have seen increased enrollment over the past five years, as shown in Figure 7. ESR 202, the applied field methods course, was not offered during Fall 2020 due to the pandemic, but is being offered as a hybrid course with an in-person lab during the Fall of 2021. Historically, ESR majors' courses were only offered in-person at the Rock Creek campus due to the access to the 110-acre Rock Creek Environmental Studies Center on campus (as well as the location of the full-time ESR faculty member). In the future, we hope to offer these courses in a hybrid modality, with labs on-campus, and would consider expanding offerings to other campuses, such as Southeast, in order to facilitate greater access for students across our service area. For example, our current FT ESR faculty member, Dr. Brenneis, could teach ESR 150, 200, and 202 at the Rock Creek campus during the fall term and then offer ESR 150, 200, and 201 at the Southeast campus in the winter term, and finally, ESR 204 (and BI 143) at the Rock Creek campus in the spring. Another option is that the new FT ESR hire could also teach a section of ESR 150 and 200 during the spring term at a third campus.

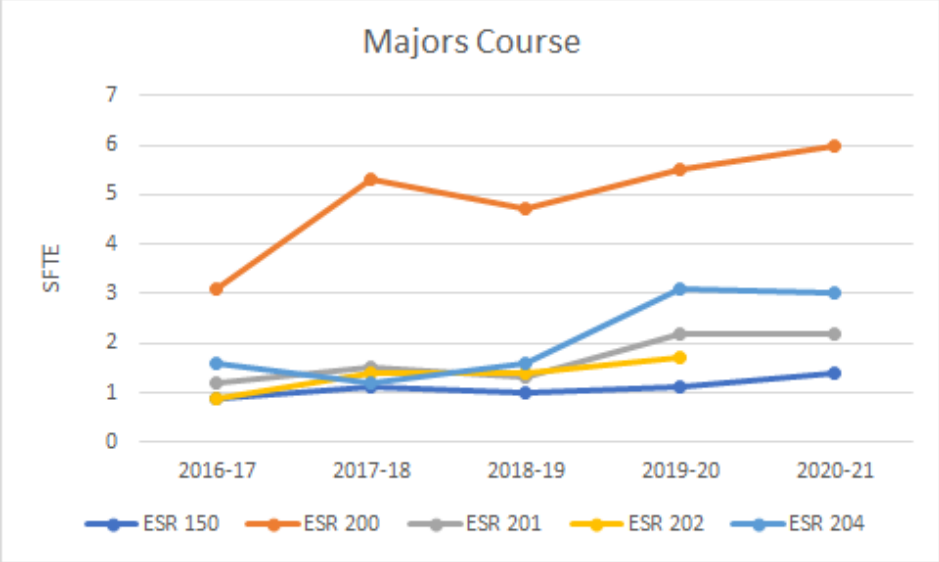

Figure 7. Enrollment in ESR majors' courses (only offered through Rock Creek)

2A1. Does this data suggest any questions that the SAC would like to pursue?

As the ESR SAC contemplates a 'thoughtful return' to in-person classes on campus, we have several suggestions and questions. At this point, we anticipate having most labs in-person again, but would like to be creative and flexible. If possible, it might make sense for our courses to be listed as lec/lab so that faculty can use the 'on-campus' blocks for either 'lab' or 'lecture' activities. For example, we could schedule a 3-hour session in-person each week, and some weeks that time would be used for data collection labs while other weeks it could be used for discussions or exams, and for the 'lab' activity we would use one of the high-quality remote labs that we've developed. We would also like to see more laptop carts available for use during on-campus labs. We are considering whether it might make sense to have at least one remote version of each course per year - with synchronous class sessions, but no on-campus requirements. If we go down that route, we'd like to see support for that modality as well as funding for lab kits that could be mailed to students.

We advocate for thoughtful lab scheduling in terms of space and time - this includes coordinating across all campuses to avoid potential cancellations of classes as well as offering labs at a variety of times that work well for students and faculty. We would like to request (in the next ADU cycle) additional funding to provide more equal lab equipment and opportunities at each campus. For example, Rock Creek has a great supply of dedicated ESR equipment and a lab tech, while this is not the case at other campuses. We have questions about if and how we will be able to offer field trips in the future. We'd like to use the living labs, such as the learning gardens and natural areas on campuses as resources for teaching environmental science, and we'd like to see those essential facilities supported. Where there are fewer on-campus resources, we'd like to help support continued development of living labs, as well as support for field trips, specifically through the purchases of vans that can be used by faculty to provide transportation.

When we talk about support, this generally means more time or funding. For example, one faculty member (Brenneis), has release time of 0.2 FTE to serve as caretaker of the 110-acre Rock Creek Environmental Studies Center. This time is used to coordinate with partners such as Clean Water Services, Portland Audubon, Tualatin Soil and Water Conservation District on environmental enhancement of our wetlands, community science activities, and forest health projects. Dr. Brenneis maintains wildlife cameras, photopoint monitoring, and engages students in place-based research including forest tree surveys (for PCC Sustainability), and amphibian egg mass monitoring (with the Wetlands Conservancy and CWS). These projects have continued to provide authentic research opportunities for students during the pandemic and remote and hybrid learning. We would like to see an increased budget for work done to maintain the safety of this living lab, such as a budget for hazard tree removal and trail clearing.

The PCC Rock Creek Environmental Studies Center is located on traditional lands of the Tualatin Kalapuya people, now part of the Confederated Tribes of the Grande Ronde. PCC faculty and staff, including Miriam Latzer of the Rock Creek Learning Garden, and the directors of the Five Oaks Museum, are in a developing partnership with Beaverton School District's Native Education Coordinator, Brandon Culbertson (Northern Arapaho Nation/ Assiniboine &

Sioux Fort Peck Tribes) and local Indigenous leaders including OSU Professor David Lewis (Santiam, Takelma, Molalla, and Chinook, member of the Conf. Tribes of Grand Ronde), Isabel LaCourse (Indigenous Community Liaison, Metro Regional Government Parks and Nature Department), and Gabe Sheoships (Executive Director of Friends of Tryon Creek - Cayuse/Walla Walla). Our goals include bringing Native students and teachers to the Rock Creek Environmental Studies center to engage in cultural and ecological practices such as camas tending and harvest, collaborative management/caretaking of the wetland, prairies, and oak woodland using Traditional Ecological Knowledge, and outreach to the wider community. This could be a really exciting opportunity to engage PCC faculty and students from a wide-range of disciplines. In this case, an example of increased support could include more funding for projects in the RCESC, pay for guest speakers, and offer more release time or pay for faculty, staff, and students.

At the Sylvania Campus, the ESR 171 lab is housed within biology and ESR 172 and 173 within the physical sciences. With the remodel of the ST building for biology, ESR 171 will now be physically located in the same building as other ESR courses and can lead to shared equipment, space, lab, and other resources. ESR 171 has “borrowed” equipment and labs from biology, but the time has come to allocate space, equipment, and other resources to ESR. The PCC Sylvania Habitat Restoration Team has run with minimal support since 1995 and could use space for equipment and meetings, and other support. Initially, the Habitat Restoration Team was the “only” environmental entity on campus and has partnered with the Sylvania Learning Garden, Environmental Center, Portland Parks & Recreation, the Tryon Creek Watershed Council, Metro, The Bureau of Environmental Services’ Community Watershed Stewardship Program (BES CWSP), Boy Scouts, Food Services, and other groups to contribute to many aspects of Sustainability at PCC. The team has also written and received 12 small grants (Metro, CWSP, Seaworld, and Hardy Plant Society) for a total of $64,544.55 over the years, all of which provided tools for habitat restoration, gloves for work parties, native plants (mostly installed on campus or adjacent city parks), bus tickets, conference fees, and food for volunteers. The PCC Sylvania Habitat Restoration Team would benefit from release time to run the team, funds for PT faculty coordination and participation, funding for student workers (for bus fare, raingear, and funds for UERC conference attendance and other professional meetings), and a small fund for a yearly environmental biology project (such as installing a green wall, creating signage for our wildflower display garden, native plant installation, etc.).

At Cascade Campus, ESR shares lab equipment with Biology and Geology, which means that despite our amazing lab techs, sometimes lab equipment, such as Vernier probes, are not available for ESR students to use. Furthermore, ESR 173 sections are often offered in the lab space used for all of Geology and General Science classes, and facilities are less than adequate (dry lab only). Having a budget and more extensive lab equipment dedicated to ESR classes could allow our students more equitable laboratory and field experiences. Additionally, at Cascade, ESR labs share space with other science labs and oftentimes our lab spaces do not have all of the materials we need. This means faculty need to check room schedules to see when they are able to get the supplies they need, cart them to their class, and then wait until the lab is once again empty so that they can be returned. As computer lab space is also limited at Cascade campus, it can be hard to book computer time with a class. If a class is offered in

Jackson Hall, faculty can check out a computer cart of Chromebooks to use in class, however, these are often left uncharged or are not working. If classes are held outside of Jackson Hall, these laptops are unavailable. If we had better access to working computers, or even iPads, our lab experiences could be much smoother for the students.

ESR 171 and 173 courses at Southeast Campus are well supported with excellent lab tech support, in a workable lab space, and laptops available. However, the available laptops are not adequate for all labs, as the processing power is not adequate enough to run Google Earth. Having equipment dedicated specifically to ESR (again, like Vernier probes) would allow students to have access to this equipment throughout the term and allow them to have richer lab experiences and research opportunities.

For our more urban and remote campuses (Cascade, Southeast, and Newberg), access to a PCC campus vanpool would greatly help our lab needs. These vans could be shared with other disciplines such as Geology/General Science in order to facilitate field trips. Environmental science is best experienced out and about in the environment, but our urban campuses are without direct access to open space. Historically, carpools have been used to get students from campus to off-campus locations. However, examining how that will work post-Covid brings up new challenges. Access to vans would eliminate the stress and complexity of student-led carpools, and would provide a much more equitable learning situation for all students.

2A2. Do the data suggest adjustments be made in your discipline, such as schedule or course offerings, with regards to enrollment? If yes, what ideas/strategies do you have that you would like to implement or have help with in the upcoming academic year?

Where we see enrollment declines for non-majors' courses, reflected in the graphs above, these changes reflect that we have offered fewer sections in recent years. We have not experienced low enrollment within any sections; if we offer them, they fill. Our offerings are limited by instructor capacity. ESR is an interdisciplinary field and most, but not all, ESR SAC members belong to multiple SACs (Geology/General Science, Biology, Chemistry). Instructors are stretched thin with added responsibilities to an additional SAC.

We would like to see more coordinated planning across the district for course offerings. As of the 2021-2022 academic year, the Biology Faculty Department Chairs (FDC) at each campus are in charge of scheduling and hiring for ESR courses. In the future, it might be beneficial to have a FDC devoted entirely to ESR. This person would need to coordinate with chairs in Biology (ESR 171), Chemistry (ESR 172), and General Science/Geology (ESR 173) in regards to scheduling the most appropriate lab spaces. Currently, the type of lab space provided for ESR classes generally depends on the other discipline to which it is anchored.

2A3. Are there other data reports that you would find informative/useful with regards to enrollment? How would this information support decision-making for the SAC/discipline?

Above, we suggest that student FTE is limited not by interest but by the number of course offerings at each campus. Data on the number of sections offered each term, along with enrollment in each of those sections, would help us to determine if this were true. Data that included the number of sections and enrollment (as well as location and days and times) would allow us to look for patterns to see when the best days/time and locations are to maximize enrollment in our offerings.

We also decided to look at enrollment in other General Education Lab science credits by race, to see how ESR compared to other disciplines (Figure 8). Comparing enrollment in introductory level lab science classes from biology, chemistry, environmental studies, geology/general science and physics shows that we have a high percentage of white students in our non-majors' courses (higher than all other science disciplines, aside from physics). Additionally, on average, we have much lower Latinx representation than all other sciences. This gives us some good insight on where to focus future recruitment and changes to curriculum. For a small SAC like ours, it is important for us to know why students are (or are not) choosing to take ESR classes as opposed to other lab sciences. Could offering our classes at different times or locations make them more appealing to BIPOC students? Will the modality of future classes impact who decides to enroll?

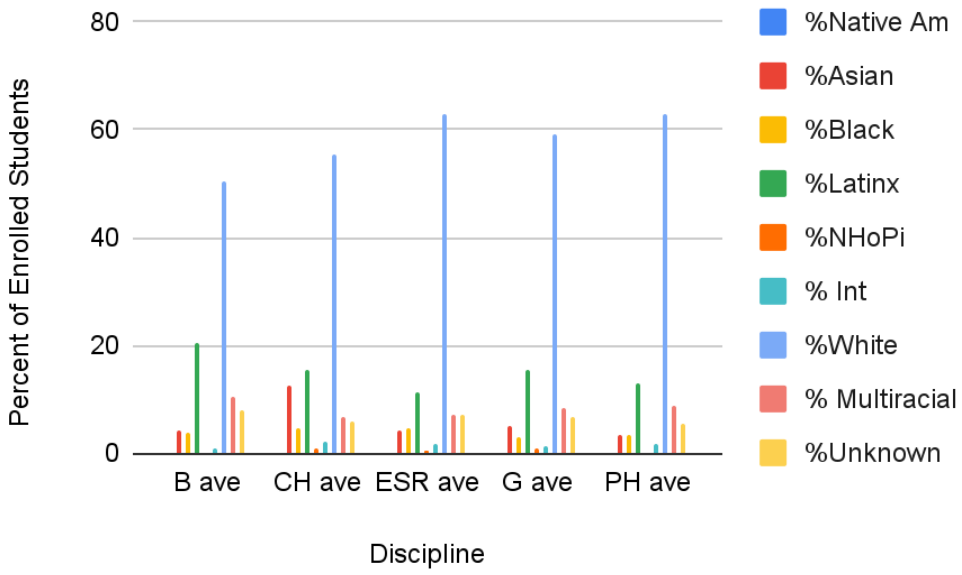

Figure 8. Enrollment in introductory level General Education Science courses by race from 2020-2021. Averages calculated with the following classes: Biology (B102, B103, B104), Chemistry (CH104, CH151), Environmental Studies (ESR171, ESR172, ESR173), Geology/General Science (G106, G107, G108, G109), Physics (PH101, PH121, PH122, PH123).

2A4. Is your program aware of any external influences that strongly affect recent enrollment? For example, state requirements, transferability challenges, other university policies, etc. Please explain.

No, we are not aware of any policy changes that affect enrollment.

2B. Course Success Rates

Data Definition: Success rate represents the percentage of students who successfully complete a course. It is calculated as:

$$\%\ S = \frac{\text{Number of students receiving a grade of A, B, C, P, PR, or CM}}{\text{Number of students receiving a grade of A, B, C, D, F, P, NP, I, W, PR, CM, N, UP}}$$

PR, CM, N, and UP are non-credit grades used in the Adult Basic Education program.

Success rates for gender and race are not calculated when the enrollment is less than 5. For any success rate that is not calculated, the total for that column is also not calculated.

% Success By Course and Modality

SEE Modality Tab

2B1a. Are there any courses with lower or higher pass rates than others (over time, over many sections, or a notably higher or lower rate)? If so, which ones?

Success rates are the lowest for ESR 140 and 141 (~70%); these are the two sustainability courses that do not require a lab component. Average success rates are above 75% for ESR 171, 172, and 173. Success rates for majors' courses (ESR 150, 200, 201, 202 and 204) are above 80%.

ESR 141 has historically been taught on Fridays and often has a lot of late-adds presumably from students who are not necessarily interested in the subject matter, but who need more credits to maintain full time status. Anecdotally, these students often have lower success rates than their peers who enrolled in the course before the start of the term. Offering this class at other days/times could help increase the success of students in this course.

2B1b. Are there any modalities with lower or higher pass rates than others (over time, over many sections, or a notably higher or lower rate)? If so, which ones?

The two modalities in which our courses were offered from 2017 - 2021 were onsite and remote. While there may be some differences in success rates, it is hard to determine whether or not they are meaningful. Please see Figures 9 and 10 for more information on each ESR course.

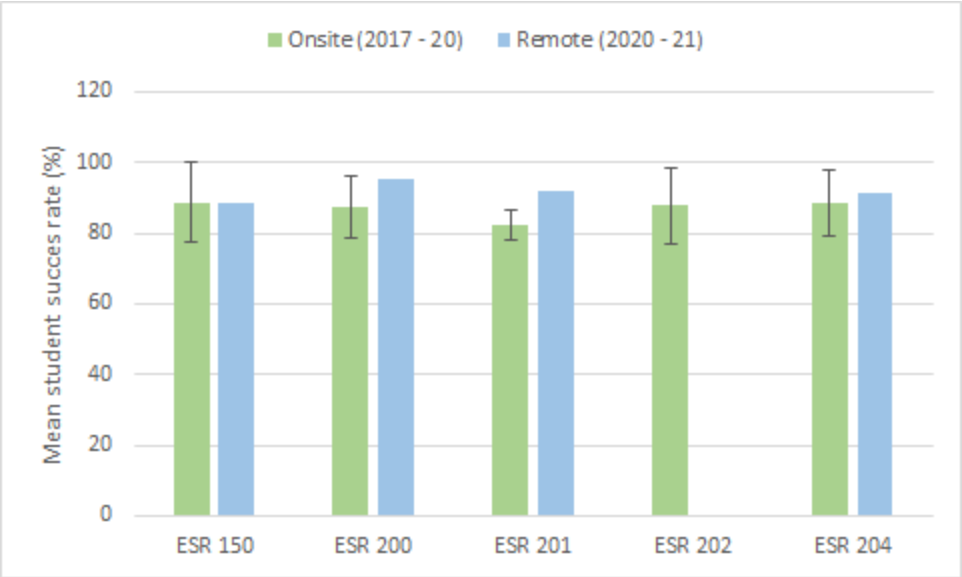

Figure 9. Student success in ESR majors' courses by modality. Pass rates are high in both modalities and it does not appear that there are significant differences (small sample size for remote courses). Total student enrollment for ESR 150 = 291, ESR 200 = 157, ESR 201 = 81, ESR 202 = 32, ESR 204 = 68).

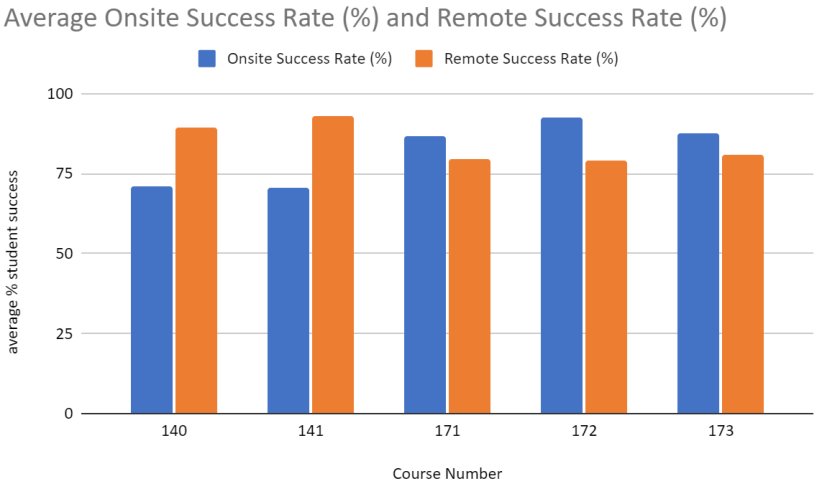

Figure 10. Student success in ESR non-majors' courses by modality. Remote success rates appear higher than onsite success rates for the courses without labs (140 and 141) but slightly lower for courses with labs (171-173). Total student enrollment for ESR 140 = 189, ESR 141 = 261, ESR 171 = 826, ESR 172 = 308, and ESR 173 = 512.

2B2. Strategy Insights

What strategies have you used to maintain high success rates? What can be learned that might be applied to courses with lower success rates? What are possible actions to be taken to understand/address lower success rates? Please clearly explain how your discipline intends to explore content/curriculum, pedagogy/teaching, course material selection, etc. using culturally

responsive teaching approaches throughout the next year. Try to identify a realistic one year goal.

Strategies used to maintain high success rates

Each of our courses generally have high success rates, regardless of modality, campus or year. Strategies we use to promote student retention/success in both onsite and remote formats include:

- Flexibility and reasonable accommodations for students with external life challenges
- Quick turn-around on assessments
- Providing useful feedback on assessments
- Providing grading rubrics to students along with the assignments for larger assignments/projects
- Defining the point value for each component of assignments
- Building scaffolding into assignments- building on learning
- Utilizing both formative and summative assessments
- Providing detailed study objectives to students
- Content that explicitly connects science and community - topics and questions that deeply engage students.
- In our ESR 150: Orientation to Environmental Studies course we bring in guest speakers from within PCC to share library and career center resources, as well as external guests working in a range of environmental fields and representing a diversity of backgrounds and life experiences. This helps students make connections and see pathways that might make sense for themselves.

When we switched to remote learning, we adopted these additional tools to leverage D2L Brightspace to enhance student success (and equity) in our courses:

- Use of the announcements tool to build connections with students and to provide timely reminders of class activities
- Strategic organization of course content (using weekly modules, structuring modules for linear presentation of learning, connecting, demonstrating, and then feedback)
- Using start, end and due dates for all assignments
- Recording class “live” sessions and posting them for students who missed class
- Recording and posting tutorial videos demonstrating the methods for various lab assignments (e.g., how to collect soil and water samples and use test strips, how to create bar graphs in Excel, etc.).
- Using the discussion feature in D2L to ask open-ended, thought-provoking questions and requiring students to respond to each other in order to help build community.
- Using a ‘flipped classroom’ for some courses by providing recorded lectures and reading quizzes due before the live class sessions which were spent in discussion and used for group breakout rooms.
- Meeting one-on-one with students via zoom, when they need help.
- Reaching out to students who are missing assignments or falling behind.
- Making time in remote courses to build community to enhance student success.
- Providing technical support as students navigate the various online platforms and media and software required to participate in the class

- For ESR 200, we developed lab kits that could be sent to students' homes to allow for collection of environmental data and design of controlled group experiments.
- We used wildlife camera data from the Rock Creek Environmental Studies center as a topic for authentic research experiences in ESR 200. This led to a student research presentation at the Urban Ecosystem Research Consortium in March 2021.
- For ESR 200, 202, and 204 we purchased an instructor license for DataClassroom - an online data analysis and graphing software that was used to introduce statistical methods and create graphs for instructor provided and student collected data sets. Students also used Google Sheets and Microsoft Excel for data analysis, but those can have a somewhat steep learning curve while DataClassroom has several tutorial features and walks students through the process.

Actions to understand lower success rates

Generally, students who do not succeed in our courses are those who do not complete assignments or withdraw from the course entirely. It is rare for a student to complete all coursework and not pass a class. However, we do pay attention to areas where students struggle with course content. We have recently adopted a new textbook for ESR 171, for several reasons including that it includes a very user-friendly online learning and studying platform. This new text also includes a lot of information from multiple perspectives and considers environmental justice throughout the text.

Possible actions to address success rates

Our faculty have participated in a TIIP grant to create and revise transparent assignments and scaffold the content needed to successfully complete these lab activities. We have also worked to increase our understanding of and use of culturally responsive teaching approaches and will continue to do this in the next year.

Enrollment and % Passing By Course and Student Demographics

SEE Gender, Race, and Pell Tabs

2B3. The data may indicate a pattern of inequities (in gender, race, or Pell eligibility) in student enrollment or success. Please clearly explain how your program intends to explore content/curriculum, pedagogy/teaching, course material selection, etc. using culturally responsive teaching approaches throughout the next year. Try to identify a realistic one year goal.

The sample size for all of the ESR majors' courses (ESR 150, 200, 201, 202, 204) is small due to the limited number of sections, as well as the low enrollment numbers for students of color. This points to a need to increase outreach and recruitment efforts, as well as offering more sections across multiple campuses. In the next two years, we propose to broaden our offering of ESR 150 and 200 to additional campuses in order to increase access to students across the college. We think increased outreach and opportunity for access are the major issues here. Success rates for female and male identifying students (Figure 1) appear similar.

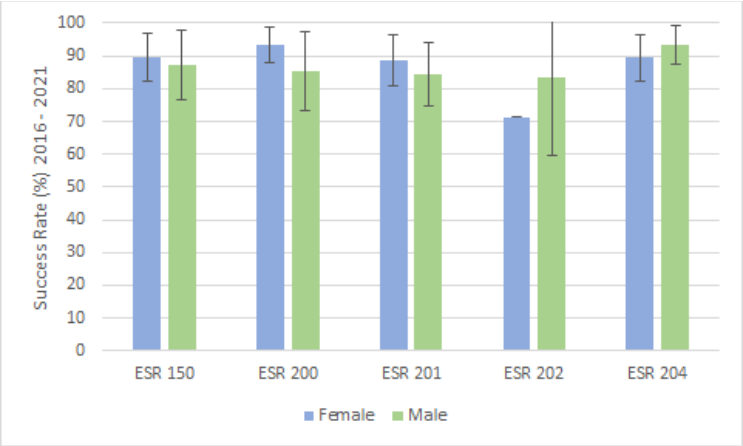

Figure 11. Average success rate for ESR majors' courses for 2016 - 2021. Error bars show standard deviation.

Success rates do not appear to differ significantly by Pell grant offer status, although success may be slightly lower in ESR 202 and 204 for students offered Pell grants (Figure 12). In regards to success rates by race/ethnicity, we are not able to compare outcomes for Black, Native American, Asian American, or Native Hawaiian/Pacific Islander due to the low numbers of individuals (less than 5 out of a 24 person course offered once or twice a year). For ESR 150 and 200, which are both offered twice a year, we have some data on Latinx and multiracial student success rates as compared to white students' success rates. In both ESR 150 and 200, success rates for Latinx students (~70%) appear to be lower than success rates for white students (~90%). In ESR 200, the introductory lab science course, multiracial students have a success rate of ~70%. It is important to note however, that we only have data on Latinx student success rates for 2017-2018 and 2020-2021, and for multiracial students only in 2017-2018.

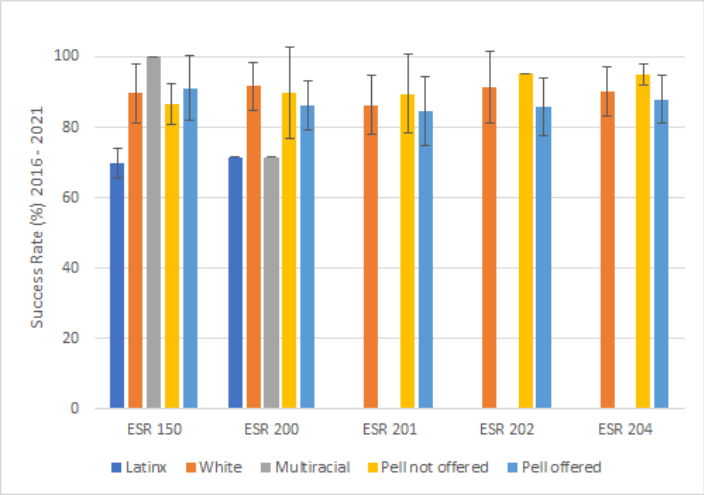

Figure 12. Average success rate for ESR majors' courses for 2016 - 2021. Error bars show standard deviation. Missing bars and demographic categories indicate that the number of students per course was too low to include in the analysis.

In the non-majors' courses, our data do suggest a pattern of inequities in particular for black students, although this group had the highest success rate for ESR 172 over the past 5 years

(see Figure 13 below). Multiracial students' success rates are similar to the white success rate for all but ESR 140, where their success rates were greatest of any group. We do note that low sample sizes can skew these data and be misleading. Regardless, we do want to continue to evaluate our class culture, content and assessment protocols to reveal behaviors that put students at a disadvantage. Employing the strategies noted (the bulleted list) in section 2B2, reflect our current efforts at this.

During the past year, several of our SAC members have been working on a TIIP-funded grant to increase equitability in general education science lab classes and one of our instructors has created an antiracism in STEM library research guide. Many of our SAC members have been prioritizing professional development opportunities and educating ourselves on issues of equity and justice. Over the next year, our SAC hopes to continue to improve equity in ESR courses through continuing improvement our curriculum and pedagogy. As we begin to move back and hold more courses on-campus, we will take the lessons we have learned during remote learning and translate these to the in-person environment. Our SAC will continue to examine our lab work and assignments to make sure we are including the voices of BIPOC and to ensure that our content continues to be culturally relevant for our student population.

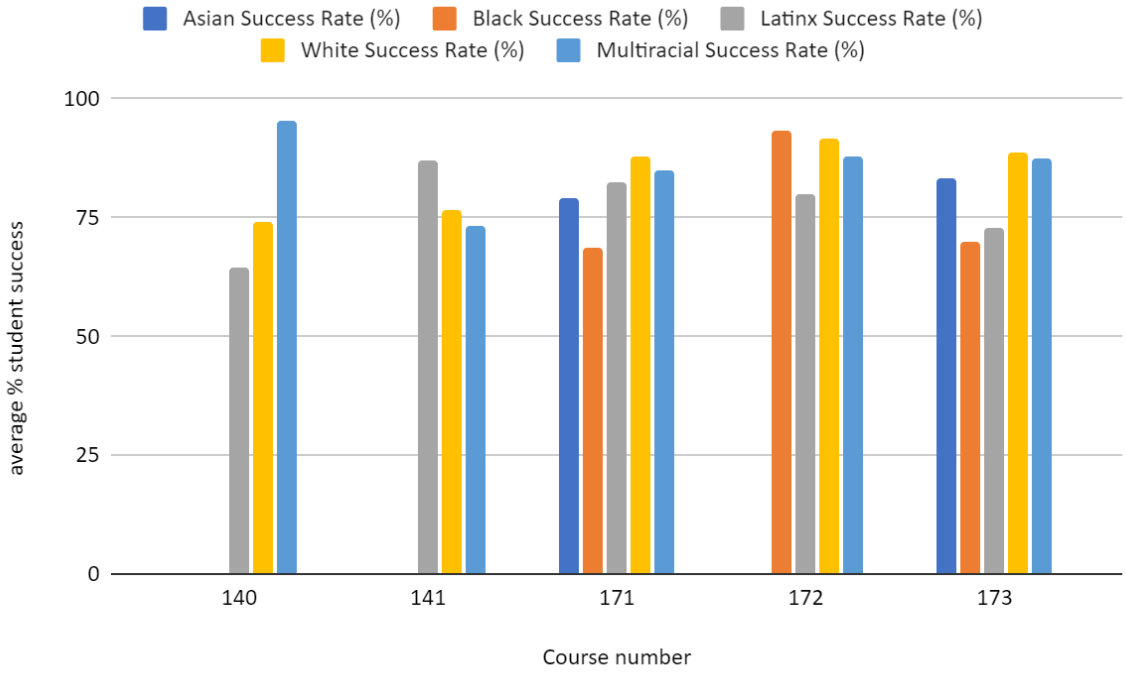

Figure 13. Average success rate for non-majors ESR courses for 2016 - 2021 by race/ethnicity.

Differences are minimal regarding success rates between students who are Pell grant recipients and non-Pell grant recipients (Figure 14).

Figure 14. Success rate for non-majors ESR courses for 2016 - 2021 by Pell grant offer status.

2B4. What support does your SAC need to fully explore inequities in enrollment or student success? For example, are there any other data reports you would find useful to have related to student success?

As a small SAC that often only offers 1-2 sections of a course per year, we often have demographic categories with a sample size too small for the data to be shared. This makes it difficult for us to know how well we are doing teaching these students. We do understand the concerns with privacy for these students, however, it also makes it difficult to see where we should put our focus when we don't see the whole picture.

Additionally, it would be very helpful for us to see success rates in students who have added a course late versus students who enrolled before the start of the term. ESR 141 and one of the sections of ESR 171 run on Fridays, and anecdotally faculty have noticed that students who add the course after the start date oftentimes don't complete the course successfully. If the data supports this, we may want to consider having more communications about late-adds and their impacts on student success in ESR.

SECTION 3: REFLECTION ON ASSESSMENT OF STUDENT LEARNING

3A. Assessment Reports

Please note: The following questions link directly to your Annual Learning Assessment Reports for the Learning Assessment Council. Feel free to cut and paste between this document and your other assessment documentation.

3A1. Which student learning outcomes from your SAC's available courses will you assess this year and will you use direct assessment strategies?
(These can be larger, program-level outcomes or course-level outcomes from your CCOGs).

Quantitative reasoning using the signature assignment for direct assessment in ESR 171.

3A2. Which courses do you plan to assess this year; how and why will your SAC choose the sections?

We will assess all sections of ESR 171 from Fall 2021 and Winter 2022. We are choosing all sections from fall and winter term as it will give us a chance to assess the most students and faculty and give a better picture of our SAC as a whole.

3A3. In general terms, describe the assessment project for the year from implementation to data collection. What steps will you take in carrying out the project?

For this assessment, we will be using our ESR 171 signature assignment to examine quantitative reasoning.

- We will collect artifacts from all 4 of the ESR 171 sections from fall term, as well as the one section running from winter term. We will determine a statistically significant sample size based on the number of students enrolled during fall and winter terms.
- Student work will be submitted via D2L. Assignments from D2L will be uploaded into a shared Google folder. Names will be redacted from the assignments and they each will be given an identifying number. A random number generator will be used to select student assignments based on the sample ID number.
- We will score the student work during our spring SAC meeting, or shortly thereafter, using the Quantitative Reasoning rubric v. 2.5. Some of the questions in this assignment have right or wrong answers and will not need to be normed. For the questions that involve interpretation, we will have a norming session and come to consensus before scoring.
- We will use our assessment to modify and improve our signature assignment and then will complete a reassessment next year to evaluate our modifications.

3B. Response to LAC Assessment Question

Please respond to the question below, which relates to your SAC's 2020-2021 Learning Assessment Report to the Learning Assessment Council (LAC).

Commendations: An excellent assessment as usual, ESR! We really appreciate your attention to detail and determination to do this assessment even in the face of challenging circumstances: COVID and limited staff. Thank you for working so hard on having a good signature assignment for ESR 172. And, we are pleased to see that you got some useful information out of the process.

Suggestions: Our only suggestion is to do a little double-scoring. In this case, you planned to score 29 artifacts but instead scored 35. By making those additional six artifacts instead double-scored ones, you could check inter-rater reliability, too.

This is an excellent thing to reassess. Please keep in mind, however, that you are welcome to test other things that are useful to the SAC. Please check in with your LAC coach if needed.

Question: The SAC has some really great ideas for changes to support student learning. How will the SAC modify instruction going forward so that benchmarks are met for dimensions 3, 4 and 5? Additionally, what is the SAC planning on assessing next year? Finally, are there ways the LAC can assist the SAC in continuing to identify avenues for meaningful assessment?

SAC Response:

The faculty teaching ESR 172 have been working on scaffolding quantitative reasoning skills over the entire term that will build up to the skills needed to complete our signature assignment. This will give students multiple chances to develop their quantitative reasoning skills and receive feedback before submitting their signature assignment. Additionally, we have created a graphing tutorial slideshow and a video tutorial for students that may need some extra instruction and resources.

This year we will be assessing our signature assignment for our ESR 171 courses, the details of which are discussed above.

Currently, using these assessments to evaluate our signature assignments seems like a perfect fit. We gained some valuable insight from the ESR 172 assessment and reassessment, which allowed us to make some modifications to the assignment, and we hope to find similar value in our ESR 171 assessment.

SECTION 4: ADDITIONAL ACHIEVEMENTS, CHALLENGES or OPPORTUNITIES

4A. Is there anything further you would like to share about your program's achievements at this time?

As a small SAC, all of our faculty members have put in a tremendous amount of work to transition our classes to remote learning. Several ESR courses are only taught by one faculty member, and no classes are taught by more than four faculty members (ESR 171). This means that most faculty had to transition entire courses completely on their own, without a team. During the transition, we used this opportunity to create thoughtful assignments that were culturally relevant and addressed environmental and social inequities.

4B. Are there any challenges not described above that you would like to note here?

Although we want to continue to expand our ESR offerings at all campuses, we also need to consider the unequal access to open space and natural areas. Cascade campus is in a very urban setting, which can have benefits for environmental education, but can also make data collection more difficult for some topics. Pre-pandemic, ESR classes at Cascade campus would utilize carpools to travel to off-campus locations to do field work (a crucial part of environmental science). As we transition back to more hybrid and face-to-face classes, we need to consider the potential for students to be allowed/feel safe carpooling. Access to campus vans for off-campus field trips would make our labs much more equitable for our students at many PCC campuses. These vans could be shared with other disciplines who are struggling with the same issues.

Access issues at our campuses such as:

- Access to school vans for field trips that faculty could reserve.
- Computers in all science classrooms (or better access to chrome books or laptops) so that computer-based labs could be substituted for field activities as needed.
- Dedicated ESR lab equipment at all campuses.
- Access to portions of urban campuses (at Cascade and Southeast) where students could be allowed to dig holes, take soil samples, and practice other basic scientific measurements right on campus, reducing the need to travel off campus for field trips
- Expanding our learning garden space at our urban campuses so these campuses can continue to be used as learning laboratories. If classes could have access to space within the learning gardens (or another space on campus) to conduct outdoor experiments, dig into the soil, measure soil and plant characteristics, etc., it could relieve some of our need to head off-campus for our labs.
- Allowing flexibility with student field trip attendance (maybe allowing for students to choose between off-campus field trips or remote lab activities) while we transition back to in-person activities.

4C. Do you see any opportunities in the near or long term that you would like to share?

We would like to express our appreciation for the recent creation of a second, full-time faculty position dedicated to the ESR non-majors' courses, as well as the hiring of a second MYC

position. This increased stability of employment will allow ESR faculty to strengthen our program and offerings for students. As we move forward, we acknowledge that there is much work to do, including the development of hybrid (and possibly remote) versions of our courses and sharing of curricular resources to make it easier to bring new PT faculty on board to teach additional sections of ESR courses. We are dedicated to continually improving our courses, with a focus on increasing access to our classes across the college, constantly re-evaluating our curricula, and deepening our practice of culturally relevant teaching.