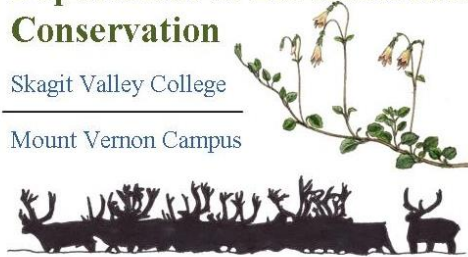**Assessment and program evaluation
for
Bachelor of Applied Science in Environmental Conservation
22 September, 2017**

**by
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The assessment plan for the Bachelor of Applied Science in Environmental Conservation (BASEC) consists of four sections that will complement each other to get a full overview of the program's performance. The assessment will guide an action plan for possible changes.

The general context and pattern for creating an assessment plan for a college program from beginning to end is outlined in Fig. 1. This document will outline the sources of data that will be needed to assess how well the BASEC program are meeting the overall program outcomes listed below in section 3.

Rubrics are useful to assess existing classroom assessments. Once they are created using program expectations, the data collection is relatively easy. Rubrics should be on assignments that reflects most, if not all, the program level outcomes. These typically occur in capstone project courses. Experiential learning experiences, or courses offered at the end of the degree sequence. Sometimes it may be necessary to create more than one rubric to cover all the program level outcomes.

In contrast to this approach, Oregon require that workforce associate degrees administer a comprehensive exit exam (WINRT 2017[1])

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[1]Western Instructors in Natural Resource Technologies Conference. Mt. Hood Community College, Gresham, OR. September 7-8, 2017.

Create rubrics for existing course assessments
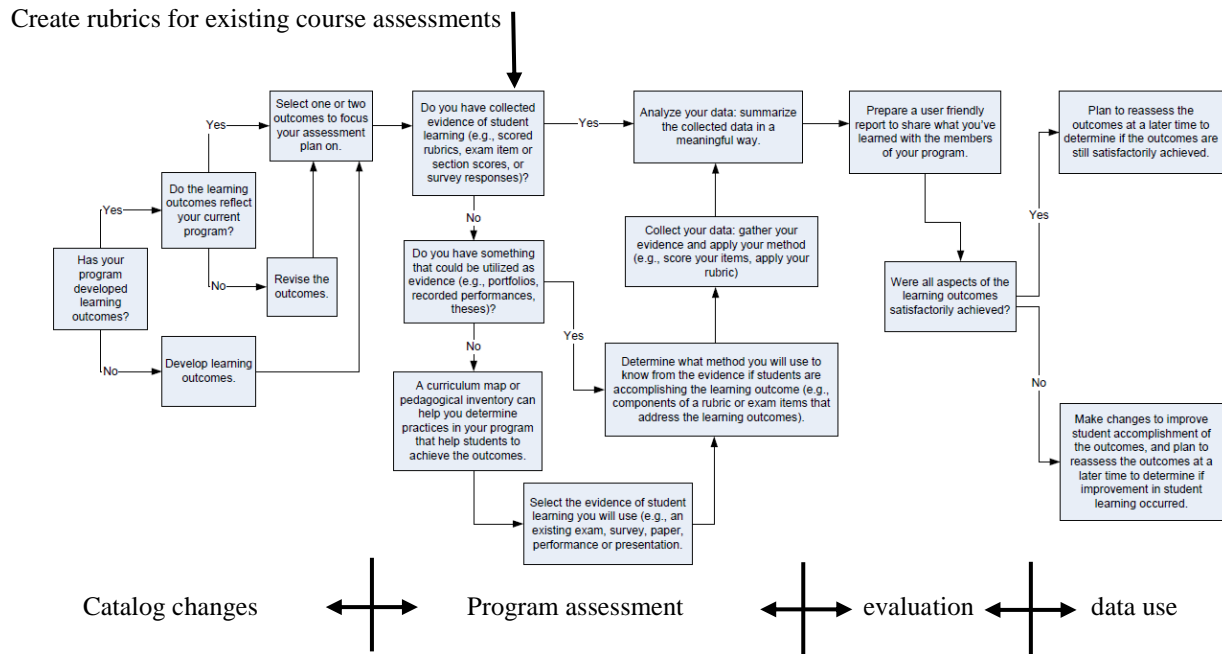
Fig. 1. Generalized flowchart outlining four steps necessary to conduct a learning outcomes assessment plan. Source: https://complianceassistsupport.campuslabs.com 2017.

1. Dashboard data (Tableau)

As part of the admissions process, students provide information to the college that can inform a program of its student population demographic:
- Gender
- Ethnicity
- Age
- Program Gross FTEs

Note, that program tracks have several codes. For the Environmental Conservation Program the following data categories will be used. Program course prefixes are: ENVC, QSCI, GIS, and ENVAG. The program track codes are: BASEC 16B, Aquatic/terrestrial 165A, Marine 190, Parks Management 165P, Water/wastewater 862, Sustainable Agriculture 127T, Environmental Conservation Certificate 165C.

This information can be used in several contexts. The age mix of a student population will inform about what type of support students may need. Returning older students have different needs than young high school transfers. Ethnicity and gender may inform of recruitment needs to increase the program diversity.

In addition, student performance is automatically tracked when grades are submitted. This data will also inform on student retention, graduation rates, and how many quarters it take students to graduate.

- Retention from quarter to quarter
- Retention from fall to fall
- Number of quarters to graduation
- Degree and certificate completions
- Average GPA
- Average GPA per class; this will help with indicator courses
- Program progress from a given course number
- Grade distribution
- Employment rate

Data examples are shown in Appendix A. The dashboard data can also reveal if there are certain courses that has a large failing rate. It should be noted that the employment data only covers Oregon and Washington. In addition, the current quarter data does not reflect all enrolled students. Students enrolling just before the quarter start has not been captured at the beginning of Fall Quarter.

Once the dashboard data has been collected, the ENVC Department Chair will analyze the outcomes and evaluate areas of improvement. Thereafter, the data will be shared with program faculty and the advisory committee to look for program improvements. Strategies for program recruitment, delivery mode, as well as course content will be examined and modified according to the program findings.

2. Student questionnaire

It is necessary to implement a couple of student questionnaires in order to get at data that cannot be obtained from any other source. These data will help in future planning of the BASEC as well as guide future outreach efforts and marketing.

For the 100-level entry students during fall quarter the questionnaire will be administered in the ENVC 104 Introduction to Natural Resources, which is required for all program students regardless of their track choice. This questionnaire will also guide the number of potential students continuing their education at SVC's BASEC after graduating with an ENVC degree.

Questionnaire incoming students associates degrees:

Indicate the track you selected:
- ☐ Aquatic Terrestrial;
- ☐ Marine;

☐ Parks Resource Management;

☐ Water/wastewater;

☐ U of I & UW transfer;

☐ Sustainable Agriculture

How did you learn about the Environmental Program?

☐ SVC home page;

☐ SVC counselor;

☐ An environmental fair or presentation;

☐ High school event;

☐ Web searches in Washington State educational database;

☐ Previous student or other person:_____

☐ Employment security;

☐ Web searches such as Google;

☐ Other:_____

What Math level did you start with?

☐ MATH 96;

☐ MATH 97;

☐ MATH 98;

☐ MATH 99;

☐ MATH& 141;

Do you plan to be a part-time student ☐ or a full-time student ☐ ?

After completing your associate's degree do you plan to:

☐ Enter the workforce; Desired work area:_____

☐ Transfer to a 4-year institution;

☐ Transfer to WSU Everett, Sustainable Agriculture;

☐ Transfer to the Bachelor of Applied Science in Environmental Conservation at SVC;

What kind of job do you see yourself do in 5 years after college?

_____

My tuition is paid for by (check all that apply):

☐ I finance it myself;

☐ Student loans;

☐ Scholarships; Please specify:_____

Please indicate zip code where you live now:_____

If you moved to the area to go to school please indicate the zip code you came from:_____

The questionnaire for incoming students in the BASEC program is designed to inform us on where students gain knowledge about the BASEC program. This will in turn help us on marketing the program. In addition, the questionnaire will help us in advising students if they need additional coursework in order to be eligible to enter the BASEC program.

Questionnaire incoming BASEC students:

How did you learn about the Bachelor of Applied Science in Environmental Conservation?
☐ SVC home page;
☐ SVC counselor;
☐ An environmental fair or presentation;
☐ High school event;
☐ Web searches in Washington State educational database;
☐ Previous student or other person:_____
☐ Employment security;
☐ Web searches such as Google;
☐ Other community college; indicate the institution:_____
☐ Other:_____

Please indicate your associates/bachelor degree you entered the BASEC
with:_____

Which institution did you graduate from:_____

Before transferring, did you need to take additional courses? ☐ Yes; ☐ No.
If yes, please list:_____

Did you apply to another institution before applying to SVC? ☐ Yes; ☐ No; if yes please list:

_____

You had to go through an application process as well as an enrollment process. Please rank the process (5 High, 1 low):

	5	4	3	2	1
The process was clearly outlined at the SVC website	○	○	○	○	○
The application paperwork was easily achievable	○	○	○	○	○
I received a response letter to my application promptly	○	○	○	○	○
The financial aid process went smoothly	○	○	○	○	○
Signing up for courses went smoothly	○	○	○	○	○

Do you plan to be a Part-time student ☐ or a full-time student ☐ ?

After completing your BASEC degree do you plan to:
☐ Enter the workforce; Desired work area:_____
☐ Transfer to a Master's program;

My tuition is paid for by (check all that apply):
☐ I finance it myself;
☐ Student loans;
☐ Scholarships; Please specify:_____

Interview questionnaire by ENVC 104 students of earlier cohorts:

Incoming students will be required to interview students of earlier cohorts. The questionnaire will accomplish two objectives. First, the interview will connect incoming students with existing students and get tips and help to navigate the Environmental Conservation Program. Second, it will provide an assessment of student challenges and perceptions.

Interview Questions for 200 level ENVC Student

Name of interviewer_____

The interviewed student can be anonymous. Quarters at SVC:_____

- What got you interested in the Environmental Conservation Program?
- Do you apply for scholarships at SVC or from outside sources?
- How do you prepare for an exam?
- Do you have some study tips for me?
- Are you involved in the Environmental Club? If yes, what motivates you?
- How do you manage the hybrid learning environment?
- What was the greatest challenge during the first year?
- What helped you get through the challenge?

- What did you find most rewarding?
- What would be the best advice you can give me?
- Have you made connections with someone at SVC or the ENVC program; faculty, stall, other?

3. Assessment of program learning outcomes

The BASEC program learning outcomes are:

1. Understand and apply federal, state, and tribal policies driving natural resource policies.
2. Use landscape ecology principles and technology to analyze ecological scenarios for management decisions at the watershed level.
3. Apply forest ecology and silvicultural techniques to develop management scenarios for working forests.
4. Use salmon biology to inform and to make management decisions regarding individual salmon stocks and outline ecological restoration measures.
5. Contribute to natural resource decision-making groups utilizing effective communication techniques.
6. Apply conservation biology strategies and community ecology principles in the management of biodiversity at the landscape level.
7. Incorporate watershed management science in management strategies for managing watersheds sustainably for ecosystem services and natural resources.
8. Develop and implement management actions for aquatic habitats.
9. Develop and demonstrate leadership skills within the environmental sciences and natural resources management.

The best place to assess if the BASEC program have achieved these outcomes would be in the last quarter of the two-year education just before their graduation (400 level). Assessing the learning program outcomes (LOAPS) for these courses will also ensure that part-time students get assessed at the end of their program tenure; just before graduation. The three courses that is suited for program assessment are:

ENVC 422 Capstone Project   Measure student's research ability
ENVC 410 Conservation Biology   Measure student's ability to contextualize ecology
ENVC 420 Estuarine/nearshore Ecology Measure student's ability to construct flow diagrams

All three courses integrates knowledge, skills, and broad ecological scope from numerous courses within the BASEC as well as general education and knowledge carried forward from their Associate's degree. For each course a rubric will measure one specific ability from each course, which will be an indicator of the program outcomes within the BASEC. The three courses will cover program learning outcomes 1-8. The ninth outcomes is covered in their CMST 413 Leadership Development in Natural Resources and through their internship ENVC 499 Internship – Service Learning, which require that the student have a leadership role in their internship experience. The Internship has its own evaluation forms similar to the Cooperative Education Program at the associate level.

For each rubric (Table 1-3), descriptive statistics for the scores will be calculated ($\bar{X}$ and s.d.). The target value for a satisfactory average would be 3.5 with a low standard deviation.

Research Ability:
The capstone project is an excellent opportunity to evaluate student's ability to conduct research, do statistical analysis and write a report that conforms to the standards within the environmental science and natural resource fields.

Table 1. The following rubric can easily be obtained after the exercise and cover program outcomes 2, 5, 6, & 7:

Rubric	**Rubric analysis**	**Student numbers in ENVC 422**
4	≥25 peer reviewed resources used for the report. Descriptive and inferential statistics used for data analysis. Tables and figures formatted correctly. All 9 elements of a scientific report present.	
3	≥20 peer reviewed resources used for the report. Descriptive and inferential statistics used for data analysis inadequate. Tables and figures formatted somewhat correctly. <9 elements of a scientific report present.	
2	≥15 peer reviewed resources used for the report. Only descriptive statistics used for data analysis. Tables and figures formatted incorrectly. <7 elements of a scientific report present.	
1	≥10 peer reviewed resources used for the report. Statistics inadequate. Tables and figures formatted incorrectly. <5 elements of a scientific report present.	
0	Report totally inadequate.	

Ecological contextualization:

The final exam in Conservation Biology (ENVC 210) is an oral exam. Each student is given a scientific peer-reviewed paper and they also bring their textbook. There are questions regarding the paper, and the students need to connect it to three different chapters in the textbook. Thereafter, the student must use the knowledge and apply it to the Pacific Northwest. Finally, there is a more open-ended question that they need to reflect on (Examples listed in Appendix B).
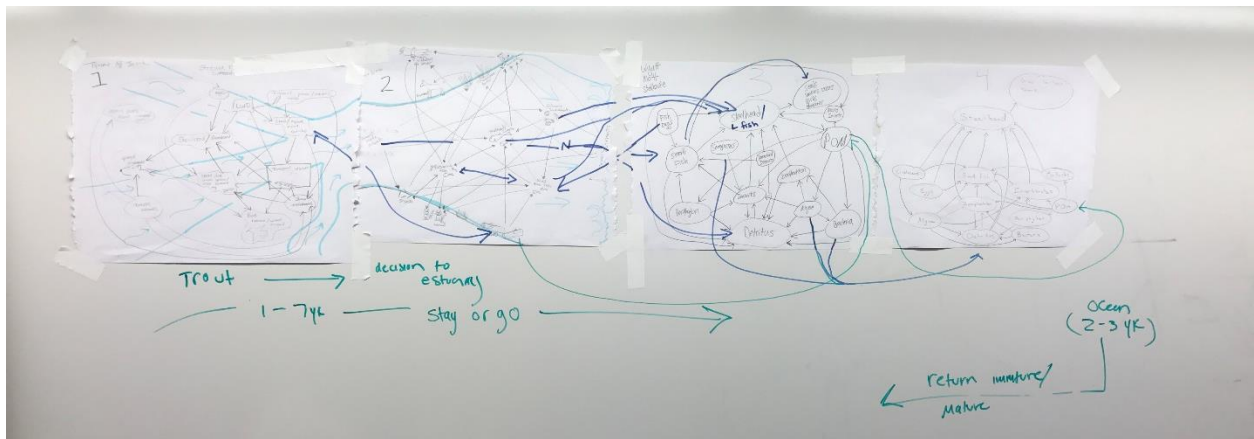
Table 2. The following rubric can easily be obtained after the exercise and cover program outcomes 1, 2, 6, & 7:

Rubric	Rubric analysis	Student numbers in ENVC 410
4	Answer all questions correctly. Have the ability to translate foreign ecology to PNW. Have ability to translate foreign anthropogenic issues to the PNW. Ability to connect the paper to all the textbook chapters. Able to answer the open ended question rationally.	
3	Answer 80% of the questions correctly. Have the ability to translate foreign ecology to PNW somewhat. Have ability to translate foreign anthropogenic issues to the PNW somewhat. Ability to connect the paper to two of the textbook chapters. Able to answer the open ended question somewhat.	
2	Answer 70% of the questions correctly. Do not have the ability to translate foreign ecology to PNW. Do not have the ability to translate foreign anthropogenic issues to the PNW. Ability to connect the paper to one of the textbook chapters. Not able to answer the open ended question rationally.	
1	Answer 60% of the questions correctly. Many missing elements in translating foreign ecology to PNW. Many missing elements in translating foreign anthropogenic issues to the PNW. Ability to connect the paper to all the textbook chapters.	

| | The answer to the open ended question not connected rationally. | |

Construction of Flow Diagrams:

The in-class assignment in ENVC 420 centers around the rainbow trout/steelhead lifecycle, which is quite complex. Students are assigned in groups at different locations in the trout/steelhead life cycle. Groups are: 1) spawning/rearing habitat, 2) Estuary, 3) Nearshore, 4) Pacific Ocean, 5) Headwater streams above fish barrier. Each group must generate a flow diagram indicating the ecological interactions of trout/steelhead within each habitat type. They also need to outline anthropogenic limitations and possible restoration measures. Thereafter, each habitat diagram will be connected from headwater to the Pacific Ocean with additional ecological connections. Finally, anthropogenic limitations for trout/steelhead will be discussed in class. The entire exercise take about 50 minutes. An example of the flow diagrams is shown in Fig. 2.

Fig. 2. Example of student outcomes for a flow diagram construction exercise with four working groups in ENVC 420 Estuarine/nearshore Ecology.

Table 3. The following rubric can easily be obtained after the exercise and cover program outcomes 1, 2, 3, 4, 5, 7, & 8:

Rubric	Rubric analysis	Student numbers in ENVC 420
4	≥10 ecological element identified interacting with trout/steelhead. ≥20 ecological processes identified interacting with trout/steelhead. Collectively ≥10 interconnections between habitat units. Identify ≥4 anthropogenic challenges.	
3	≥8 ecological element identified interacting with trout/steelhead. ≥15 ecological processes identified interacting with trout/steelhead.	

	Collectively ≥8 interconnections between habitat units. Identify ≥3 anthropogenic challenges.	
2	≥6 ecological element identified interacting with trout/steelhead. ≥10 ecological processes identified interacting with trout/steelhead. Collectively ≥6 interconnections between habitat units. Identify ≥2 anthropogenic challenges.	
1	≥4 ecological element identified interacting with trout/steelhead. ≥7 ecological processes identified interacting with trout/steelhead. Collectively ≥4 interconnections between habitat units. Identify ≥1 anthropogenic challenges.	
0	Inadequate connections and elements. Not able to identify any anthropogenic challenges.	

4. Employment data

For each graduating cohort, alumni students will be contacted 6-9 months after graduation to get an evaluation of the employment pattern; job title, organization employing the student, and salary range.

In addition, employment data, including salary information, nationally (Bureau of Labor Statistics; www.bls.gov) and from Washington State (Employment Security Department; https://esd.wa.gov/labormarketinfo) will be gathered. The employment data will be gathered for the state as well as by county for the northwest Washington and Snohomish County.

## 5. Action plans in response to the program assessment

Once all the data is gathered, each group of data will be used to make changes if needed, which are outlined in Fig. 3. The dashboard data will inform on the number of students enrolled, retention fall to fall, and part-time vs full-time students. The enrollment data will guide recruitment efforts, and be shared with the program Advisory Committee.

The student questionnaires will inform on the sources of student coming into the AAS-T and BASEC programs, which provide insights into recruitment efforts, and projections on future

cohort sizes of BASEC students. The questionnaires will also inform on how students navigate and evaluate program coursework.

The learning outcomes assessment rubrics will assess how well we are meeting the overall program learning outcomes. This will provide a guide to how well our students are doing.
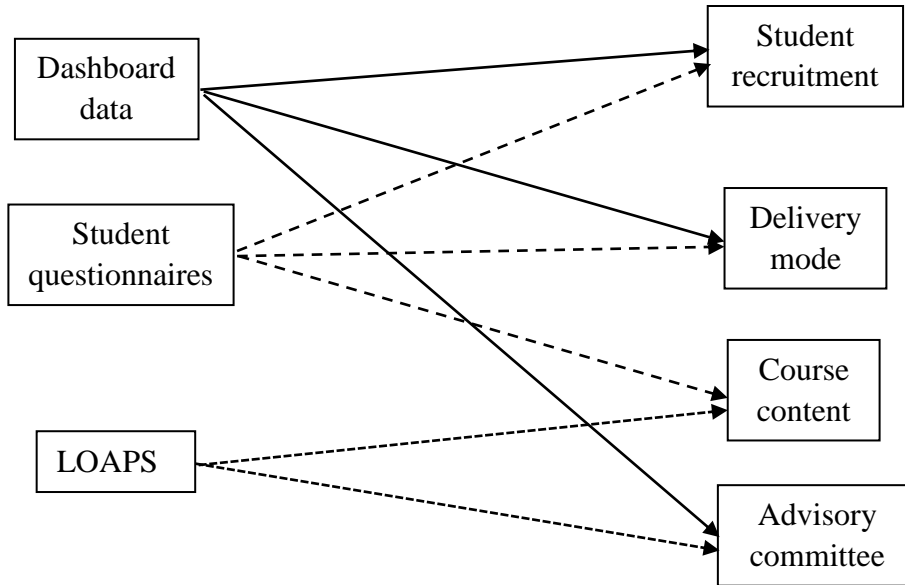
Fig. 3. Flow diagram for use of data from the program assessment of the BASEC at SVC.

The three types of data collected will be used to adjust efforts in student recruitment, course content, potential delivery modes as well as course content. The program review will conclude with a strategy for improvements in areas suggested by the data.

Appendix A

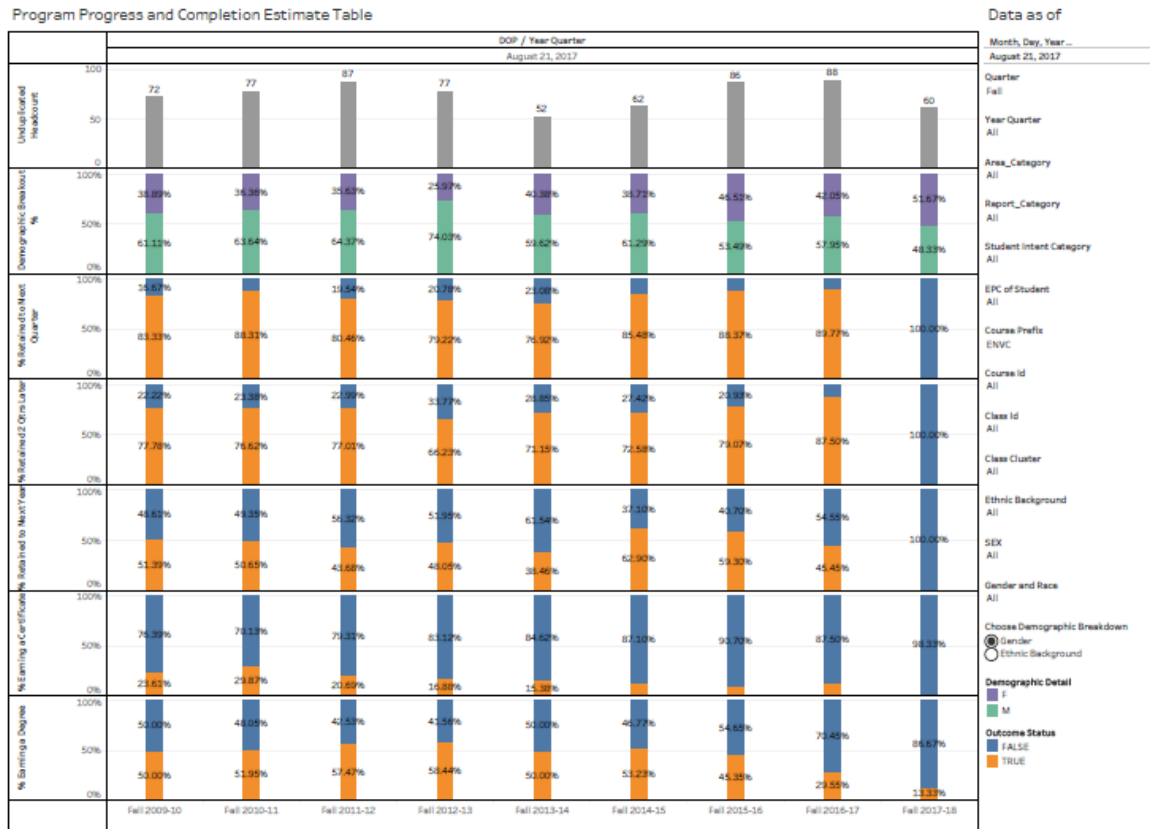Program level data available in Tableau:
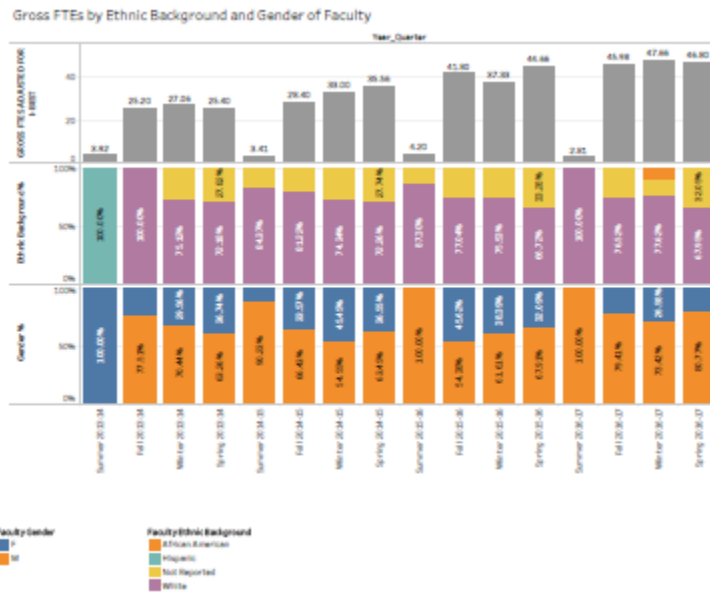

Fig. A-1. Completion rate for the ENVC program.
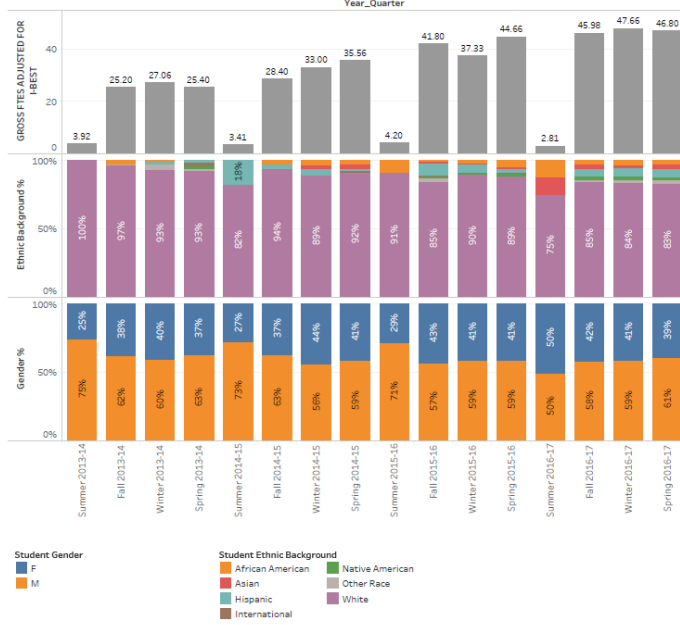

Fig. A-2. Ethnic background of faculty.

Fig A-3. Gender and ethnic background of students.
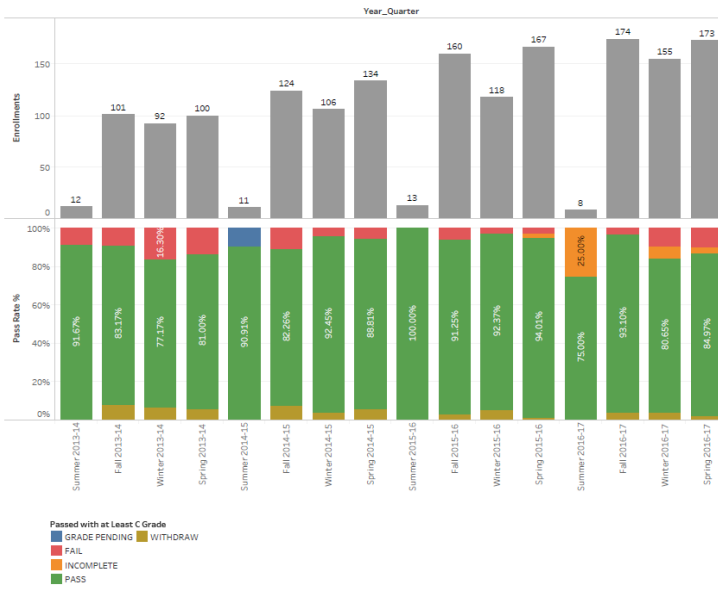

Fig. A-4. Pass rate of students by quarter including withdrawals.

Employment Rate by Program Crosstab

Program Title & EPC Detail	Completion Status Upon Leaving SVC	Placement_Status	Last Year of Enrollment at SVC								
			2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Gran
	Earned a Degree	Employed in WA or OR	100.00%	50.00%	25.00%	75.00%	45.45%	66.67%	72.73%	66.67%	
		Enrolled in College		12.50%	25.00%			8.33%			
		Not Employed in WA or OR and Not in College		37.50%	50.00%	25.00%	54.55%	25.00%	27.27%	33.33%	
	Earned a Certificate	Employed in WA or OR		100.00%		60.00%	50.00%	50.00%	100.00%	50.00%	
		Enrolled in College								50.00%	
		Not Employed in WA or OR and Not in College			100.00%	40.00%	50.00%	50.00%			
	Earned at least 45 Credits but no Certificate or Degree	Employed in WA or OR	50.00%		100.00%		100.00%	100.00%	50.00%	100.00%	
		Not Employed in WA or OR and Not in College	50.00%						50.00%		
	Early Leaver with Less than 45 College Level Credits and no Certificate or Degree	Employed in WA or OR	100.00%	55.56%	58.33%	47.06%	28.57%	61.54%	38.46%	50.00%	
		Enrolled in College					5.88%		7.69%		
		Not Employed in WA or OR and Not in College		44.44%	41.67%	47.06%	71.43%	30.77%	61.54%	50.00%	

Fig. A-5. Program employment rate of all ENVC students.

Grade Distribution Table - Percentages and Counts

% of Total Enrollments
0.00% ——————————————————————————— 30.00%

Grade Distribution Table %

Demographic Detail	Course Prefix Split	Broad Course Split	Distance Ed Split	Outcome Detail	Time Detail		
					2014-15	2015-16	2016-17
	Null		DE + On GRND	Fail	6.17%	3.52%	7.30%
				Pass	88.20%	93.61%	89.25%
				Withdrawal	5.63%	2.86%	3.45%

Fig. A-6. Percent of students passing or failing in ENVC courses including withdrawals.
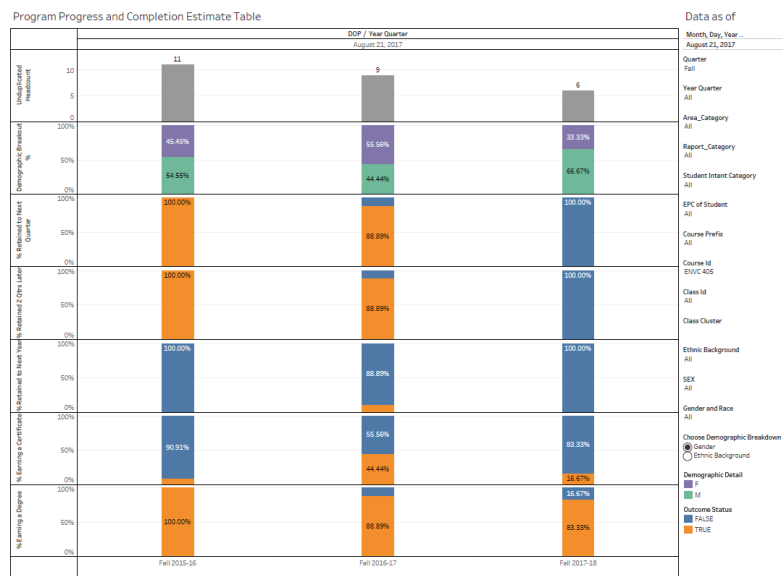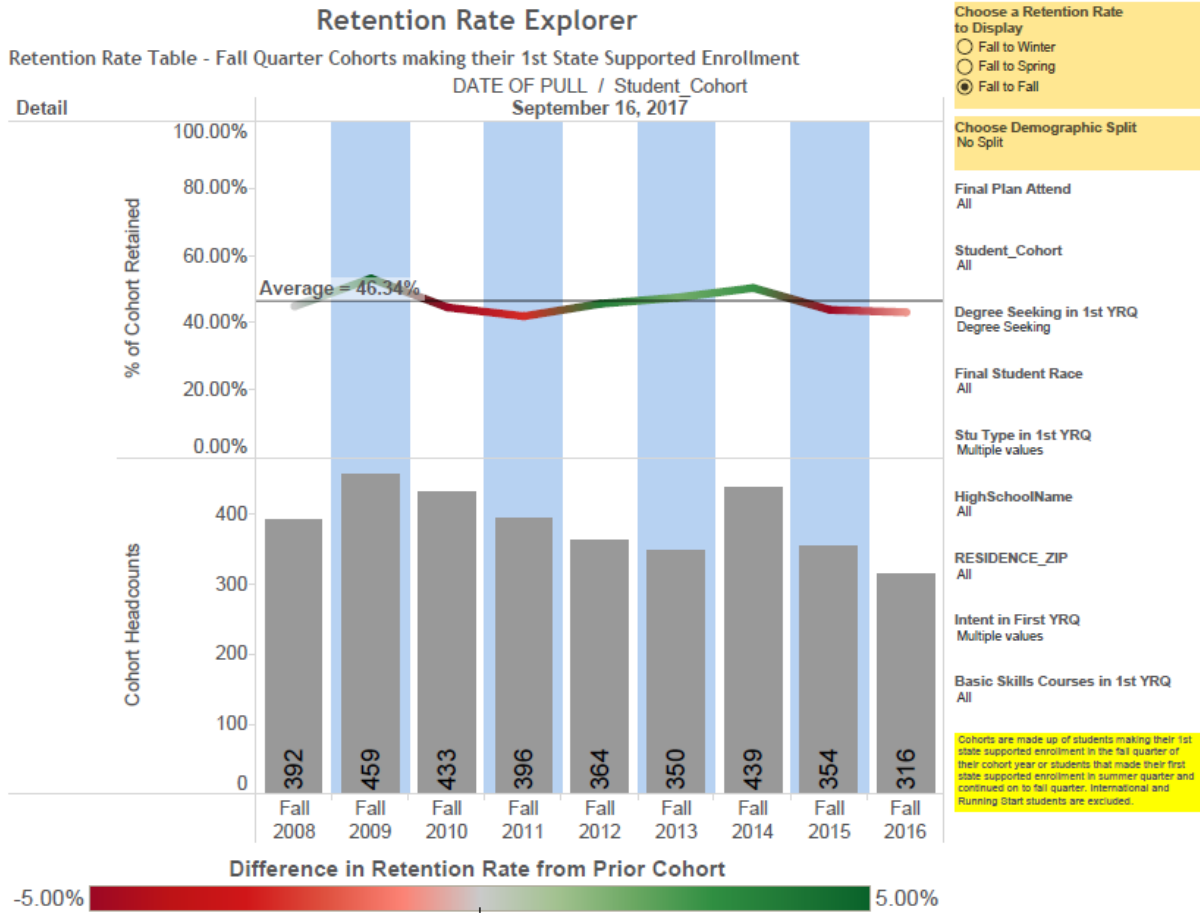

Fig A-7. Program completion for BASEC students enrolled in ENVC 405 Animal behavior.

Fig. A-8. Retention Fall to Fall for the Professional Technical students.

Fig. A-9. Completion rate for BASEC students.
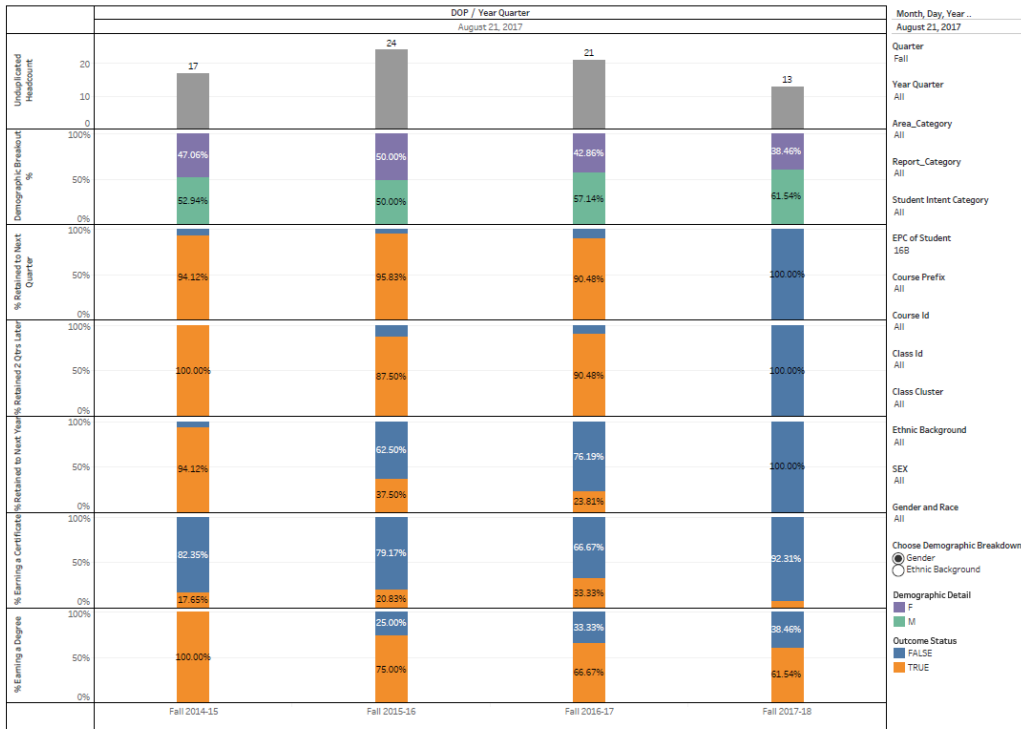

Fig. A-10. Gross FTEs for the Environmental Conservation Program.

ORAL QUESTION NUMBER 6

You have 60 minutes to prepare your answers. You are welcome to take notes and bring them to the examination. Good luck!

Paper:
D'Amico, M., J. Román, L. de los Reyes, and E. Revilla 2015. Vertebrate road-kill patterns in Mediterranean habitats: Who, when, and where. Biological Conservation 191:234-242.

Questions:
1. What do we know regarding road kills?

2. What did their results show regarding taxonomy?

3. What does Table 4 tell us?

4. What vertebrate group seem to be missing? Any thought on why?

Given the information in the paper and chapters 9, 16, and 18 in your textbook you need to look at the Salish Sea watersheds. What taxonomic groups are most vulnerable in the Puget Sound? How would you increase the survival rate in 1) Urban, 2) Rural, and 3) Forest lands? What measures could we provide for wildlife crossings for various taxonomic groups? Second, what species would benefit from these increases?

Add any other benefits that you see from these increases?

ORAL QUESTION NUMBER 1

You have 60 minutes to prepare your answers. You are welcome to take notes and bring them to the examination. Good luck!

Paper:

Fuller, R.J., K.W. Smith, and S.A. Hinsley 2012. Temperate western European woodland as a dynamic environment for birds: a resource-based view. Pages 352-380 in R.J. Fuller ed., Birds and habitat: relationships in changing landscapes. Cambridge University Press, Cambridge, UK.

Questions:
1. Explain Fig. 14.1 and how it would apply to river valleys in the Puget Sound lowlands.

2. What does Fig. 14.3 tell you? How would it apply to Puget Sound lowlands?

3. How could large herbivores help maintain shrub layers?

4. How important is dead wood and woodpeckers?

Given the information in the paper and chapters 8, 9, and 10 in your textbook you need to create an action plan followed by a management plan for improving bird habitat along a river corridor along a high stream order stream currently dominated by cottonwood *Populus trichocarpa*, big-leaf maple *Acer macrophyllum*, and alder *Alnus rubra*. Most speciments area around 50-60 years old. The landscape matrix is mostly agriculture, small woodlots, and rural single-family dwellings. You have about 1000m of streamside to work with and the habitat is about 20m wide on average.

What bird species would you be able to recruit after the action plan and what species would you discourage? What will the management plan provide over time?

ORAL QUESTION NUMBER 9

You have 60 minutes to prepare your answers. You are welcome to take notes and bring them to the examination. Good luck!

Paper:

Catelotti, K., R.T. Kingsford, G. Bino, and P. Bacon 2015. Incorporating movement behavior into conservation prioritization in fragmented landscapes: An example of western hoolock gibbons in Garo Hills, India. Biological Conservation 184:346-356.

Questions:
1. Why are red river gums important?

2. How is the riparian and floodplain vegetation viewed in the introduction?

3. Could the scoring metrics be used here?

4. What do Figs. 2, 3, and 5 tell us?

Given the information in the paper and chapters 4, 5, and 9 in your textbook you need to look at the Puget Sound lowlands. How could we use the red river gum research to manage our floodplains? Second, what species (woody vegetation as well as vertebrates) would benefit from this?

Add any other benefits that you see from these insights?

ORAL QUESTION NUMBER 4

You have 60 minutes to prepare your answers. You are welcome to take notes and bring them to the examination. Good luck!

Paper:

Moran, M.D., N.T. Taylor, T.F. Mullins, S.S. Sardar, and M.R. McClung 2017. Land-use and ecosystem services costs of unconventional US oil and gas development. Frontiers in Ecology and the Environment 15(5):237-242.

Questions:

1. How does unconventional oil and gas extraction modify habitat?

2. Which habitats were modified the most?

3. Looking at their results, what changes have occurred between 2004 and 2015?

4. What are the projections?

Given the information in the paper and chapters 4, 5, and 6 in your textbook you need to look at the Salish Sea watershed. What ecosystem services and biodiversity values have been lost the most in the past two decades? In addition, how would you add ecosystem services in the human-dominated landscape outside urban areas? What organisms would you emphasize; terrestrial as well as aquatic?