

# GEOGRAPHY

## PROGRAM REVIEW 2013

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## EXECUTIVE SUMMARY

In the last five years, the Geography Subject Area Committee (SAC) at Portland Community College (PCC) has seen tremendous growth and experienced many new opportunities. Since our last program review in 2008, we designed and started a 44-credit, less-than one-year Certificate program in Geographic Information Systems (GIS); increased our full-time and part-time faculty capacity; revised curriculum in several courses to meet current geographic thought and advances in technology; designed and offered new courses, both Distance Learning and on-campus; and reached close to 5,000 students between 2007 and 2012.

This report presents our assessment of the department over the last five years, to see where we have been and where we are going. It contains both quantitative and qualitative data from many sources, including: students, Geography full and part-time faculty, PCC colleagues and departments, community partners, and the GIS advisory committee. Data were obtained through student surveys, assessments, and evaluations; faculty and advisory meeting notes; and demographic data from the Office of Institutional Effectiveness. Using a variety of data sources and analytical methods allowed us to look at department trends, as well as individual needs within the department.

The report was compiled by the Geography SAC Chair, Christina Friedle, with direct contributions from Matt Constantino, Kerry Pataki, and Marcelle Caturia. Other members of the SAC participated in data gathering and reporting.

## A. GEOGRAPHIC EDUCATION

Geography is more than just knowing the names of countries, cities, mountains, rivers, etc. It is the study of the Earth and its peoples, landforms, and features. Geographers analyze the relationship between humans and the environment, which includes current topics such as climate change and resource use. In addition, computer cartography and GIS software allow geographers to explore the world in much greater detail. The need for improved Geography and GIS education in the United States has been well-researched and documented in the academic as well as commercial spheres.

The American Geographical Society (AGS) recently conducted a nationwide survey of public attitudes toward and knowledge about Geography. According to the AGS report, “The results of the survey show that geographic knowledge is weak, but respondents clearly want, for themselves and their children, more and better Geography education than the U.S. educational system is providing. The respondents recognize the importance of geographic knowledge and skills in the workforce and in their everyday lives.” (Kozak et. al., “The AGS Geographic Knowledge and Values Survey: Report of Results for the United States”, March 5, 2013)

ESRI, the predominant supplier of GIS software around the world, emphasizes the connection between and importance of both Geography and GIS. “The role of Geography is a platform for understanding the world. GIS is making Geography come alive. It condenses our data, information and science into a language that we can easily understand: maps. These maps help us integrate and apply our knowledge. The same maps tell stories - stories about almost everything in our world. We need to better harness the power of GIS maps to engage everyone, telling the stories of what’s happening to the world and creating maps that create a better future, a future with better outcomes.” (Jack Dangermond, ArcNews, Fall 2012, Geography: A Platform for Understanding)

The U.S. Bureau of Labor Statistics (BLS) has commented on the currently increasing need for geographers and geographic analysis, stating that “Due to an increasing focus on environmental and sustainable practices, geographers are increasingly needed to understand human impacts on the environment” and “Geographic analysis will be used to inform developers and policy makers of sustainable business practices and ensure adherence to increased regulations.” (US BLS, Occupational Outlook Handbook, 2012-13, [www.bls.gov/ooh/life-physical-and-social-science/](http://www.bls.gov/ooh/life-physical-and-social-science/))



## B. EDUCATIONAL GOALS AND OBJECTIVES

The educational goals of the Geography/GIS program at PCC are to prepare students for entry-level GIS careers or for a major in Geography at a four-year college or university, to provide opportunities for a diverse group of students to engage in geographic knowledge and content, and to make real-world connections through local service-learning opportunities.

To meet these goals, the program strives to provide a relevant curriculum balancing geographic and GIS theory, technology, and real-world experience.

A Geography education prepares students to identify, understand, and solve geographic questions and/or problems; increase global awareness and cultural understanding; integrate multidisciplinary perspectives to interpret the physical and cultural landscape; and develop skills in problem solving, critical thinking, and observation.

## C. NATIONAL TRENDS

The PCC Geography and GIS Certificate programs focus on meeting national academic and industry guidelines.

Our Geography program and related courses follow the National Geography Standards, first published in 1994 by the National Geographic Society (NGS). The NGS outlines themes considered essential to the successful implementation and instruction of Geography at a secondary school or higher level. The National Standards in Geography are organized into 18 standards under six “essential elements.” These elements represent the essentials and fundamental ideas of Geography: (1) The world in spatial terms, (2) Places and regions, (3) Physical systems, (4) Human systems, (5) Environment and society, and (6) The uses of Geography. The goal of a sound standards-based Geography education is a geographically-informed person who sees meaning in the arrangement of things across the Earth’s surface; who appreciates the relationships between people, places, and environments; who uses geographic skills; and who applies geographic perspectives to life situations.

Our GIS Certificate program is based on the U.S. Department of Labor Employment and Training Administration’s Geospatial Technology Competency Model (GTCM) (Appendix A). The GTCM, published in June of 2010, was the first nationwide set of recommended essential “competencies” (i.e. skills, knowledge and abilities) for successful worker performance in the field of geospatial technology.



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The GTCM recommends that all geospatial practitioners, regardless of job role or position, be able to demonstrate ability in the following areas:

1. Earth Geometry and Geodesy
2. Data Quality
3. Satellite Positioning and Other Measurement Systems
4. Remote Sensing and Photogrammetry
5. Cartography
6. Geographic Information Systems (GIS)
7. Programming, Application Development, and Geospatial Information Technology
8. Professionalism

Our curriculum covers these areas with the following courses:

- **GEO 264** - Maps & Geospatial Concepts
- **GEO 265** - Intro to GIS
- **GEO 266** - GIS Analysis
- **GEO 267** - GIS Applications
- **GEO 221** - Field Geography: The Local Landscape
- **GEO 223** - Field Geography: GPS & GIS
- **GEO 299(x)\*** - Cartographic Design & Principles, and GIS Programming

\* Our intention is to make these courses permanent for the next academic year.

## D. NEXT FIVE YEARS

The goals of the Geography program have been consistent since the last program review. The methods for achieving those goals have been modified, in response to constantly changing world geography and the development of the new GIS Certificate. We continually update our curriculum to meet the evolving state of industry, technology, environment, and global cultures.





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## E. LAST FIVE YEARS

### ***New GIS Certificate Program***

The most significant change has been the creation of the GIS Certificate program in 2010-2011. Currently we are in our third academic year of offering the (less-than one-year) certificate and have fourteen graduates from the program as of the Winter 2013 term. The program was designed in 2009-2010 using existing Geography and other PCC courses. Since then, it has grown to include a new core requirement, GEO 264 (Maps & Geospatial Concepts), as well as new elective courses in Cartography, GPS, and GIS Programming. Since the program is still in its infancy, we are continually reviewing and revising the requirements and electives list to ensure that students receive a balanced education that is properly preparing them for the current needs of the geospatial industry.

The GIS Certificate is not an official Career and Technical Education (CTE) program, but it still necessitates that we implement many of the tasks required for CTE programs. One example of this is having faculty serve in an advisory role to students interested in or already working towards the Certificate. Another example is the establishment of an Advisory Committee, in order to keep a pulse on current industry needs. Our Advisory Committee first convened in Fall 2010, and consists of GIS professionals from the public, private and academic sectors; and PCC faculty and administration. The committee meets biannually to discuss curriculum, course offerings, GIS events, and student opportunities, among other topics.

### ***Increased Demand for Geography***

With the increased demand and expanding list of Geography courses, a new full-time Geography position was added at Sylvania campus. This is the first time in over a decade that a full-time Geographer is on staff at Sylvania. We see this as a notable triumph for Geography as a discipline at PCC, as well as a huge benefit for our Geography and GIS students.

This has also allowed us to expand our Geography course offerings at all four campuses. We now offer GEO 265 (Introduction to GIS) at both Cascade and Southeast Center. Our GEO 221 (Field Geography: The Local Landscape) course has been revived and is now offered each spring. Our core Human Geography courses (GEO 105, 106, 107) are now offered as Distance Learning (DL) classes at both Rock Creek and Sylvania. Lastly, we are in the process of creating two new experimental classes for Fall 2013 - Geography of Europe and Historical Geography of the United States.



## ***Curriculum Changes***

We have made revisions to the CCOGs for all the Geography courses that are approved as general education classes, so as to meet the current format used by the Curriculum Committee. This was completed in Spring 2012 in order to renew the status of our courses as general education. Additionally, GEO 105, 106, 107, 204, 206 and 230 were all renewed as Cultural Literacy designated courses.

Changes were also made to the titles and descriptions of two Geography courses: GEO 106 and 107. Previously named “Geography of the Developed World” and “Geography of the Developing World”, respectively, these changes were made to reorient towards a more progressive perspective on regions of the world, and to better reflect current geographic thought. GEO 106 is now titled “World Regional Geography”, while GEO 107 is titled “Geography of Global Issues”. The changes in these course titles went into effect in Winter 2013; therefore, it is too early to determine if those changes have significantly affected enrollment.

### A. COURSE LEVEL

Geography courses are a combination of core/general education classes and GIS specialty courses that are part of the GIS Certificate program. There is some variance in the assessment practices between the core/general education and GIS classes.

#### *General Education Course Assessments*

Geography faculty continually evaluate student performance through a wide variety of assessment methods, including exams, term papers, class discussions, activities, and presentations. This information is used to make changes to the presentation of material, in order to improve student attainment of course-level learning outcomes. In 2012, the Geography SAC submitted our first learning outcomes assessment report, which focused on the outcomes of Self-Reflection and Cultural Awareness. The feedback we received focused mostly on the small sample size. We are working with our assessment coach to improve our methodology and to develop strategies for the classroom. Since the last program review, the following assessment-driven changes have been made:

- **Create class activities to accommodate different learning styles and to engage students.** For example, when covering Global Positioning Systems (GPS) in the GEO 264 (Maps & Geospatial Concepts) course, we have students take two different GPS models into the field (i.e. around campus) and actually use them to collect data - rather than simply lecturing on how a GPS unit works. This experience allows students to experience concepts such as GPS accuracy, satellite availability, environmental limitations (e.g. weather and/or building effects), and the effects of adding WAAS (wide area augmentation system) technology.
- **Create class activities that allow students to connect geographic concepts to the real world.** An example of this is an activity in the GEO 105 (Intro to Human Geography) course. When discussing migration and ethnic enclaves, students are asked to visit an ethnic grocery store in Portland. The visit includes finding items unfamiliar to them, taking photos, conducting research on the items, and writing a reaction paper. This activity directly addresses multiple PCC core outcomes, such as: Cultural Awareness, Self-Reflection, and Critical Thinking. It also provides an opportunity for students to understand how migration directly relates to the place where they live.



## **GIS Course Assessments**

The GIS course sequences are consecutive, each class building on skills learned in a previous class. This structure requires that we remain consistent regarding the skills presented in each course, and that proper assessment is applied to ensure that students are prepared to move on to the next set of skills. In order to do this, all faculty teaching the GIS course sequence use the same textbook, course materials, and assessment methods. An example of an assessment is the final project in GEO 266 (GIS Analysis), where students are required to develop a research question and then answer that question using spatial analysis. The project is presented orally and students are required to articulate the methods and results of their analyses using maps and other forms of data visualization. A standard rubric is used to assess students on the quality of their analysis methodology, maps, and presentation.

## **B. COLLEGE LEVEL: ADDRESSING COLLEGE CORE OUTCOMES**

**Communication:** Students in Geography courses communicate orally, in writing, or both. GIS final projects are presented orally by students to their peers and community partners. Students in Human Geography courses are asked to complete research papers, participate in discussion questions, and give small group presentations. Geography is also a visual field - when creating maps, students must identify an audience and design the map to effectively communicate information to that group. During map critiques, students defend their cartographic choices to their peers and instructor.

**Community and Environmental Responsibility:** The nature of Geography brings together the community and its surrounding environment. We are all part of a community in which we have a responsibility to the physical landscape, as part of its ecosystem and the spatial-temporal continuum. We do articulate these concepts in our courses. For example, in the GEO 106 (World Regional Geography) course, students create maps and/or photo essays describing Portland's sub-cultures and their physical-cultural landscapes within the city.

**Critical Thinking and Problem Solving:** Geography courses are designed not only to get students to understand geographic concepts, but also to apply those concepts to interpret past, present, and future trends. Assessment of student learning is done through exercises designed to test logic and applications of geographic concepts. As an example, students in the GEO 105 (Intro to Human Geography) course examine population changes in small communities over time, in order to determine the set of factors or events that have affected such changes.



Additionally, the Geospatial Technology Competency Model (GTCM) states that a core competency for a GIS Professional is the ability to use critical thinking and problem solving skills. These skills include being able to identify a problem, think creatively to come up with various solutions, and make decisions in a timely manner. Our GIS classes are based on the GTCM.

**Cultural Awareness:** Geography, as a discipline, studies cultures from around the world in the human, physical, and spatial dimensions. An emphasis on cultural awareness is consistently present and requires students to develop an appreciation for this core factor of behavior, how it affects environmental decision making, and its spatio-temporal expression on the landscape.

All six of the National Geography Standards - (1) The world in spatial terms, (2) Places and regions, (3) Physical systems, (4) Human systems, (5) Environment and society, and (6) The uses of Geography - can prepare students “to constructively address issues that arise out of cultural difference in the workplace and community,” as suggested in the Cultural Awareness core outcome. Our Geography courses focus on concepts found in the NGS standards.

**Professional Competence:** There are many skills in Geography and GIS that students establish through our courses. Many courses require working in groups, thus building interpersonal skills. Public Speaking is a required course for the GIS Certificate, building students’ ability to clearly articulate their ideas, thoughts, and decisions.

**Self-Reflection:** Self-reflection is widespread in education. Instructors are reflective of student assessments and personal teaching techniques. In turn, instructors require that students be reflective of their work as well. Our task is to promote student self-awareness of learning and the meaning that they see (or do not see) in their lives and the lives of others. Students frequently write reaction papers in Geography courses on topics such as the geographic distribution of the clothes in their closet, or react to an article such as Maps are Territories: Science is an Atlas (<http://territories.indigenouknowledge.org/home/contents>). GIS students frequently analyze their work - both the analytical methodologies and the cartographic design of their maps.

Table 1 (below) provides the Core Outcomes Mapping Matrix for the GEO (Geography) SAC.

Mapping Level Indicators:		Core Outcomes:	
0	Not Applicable	CO1	Communication
1	Limited demonstration or application of knowledge and skills	CO2	Community and Environmental Responsibility
2	Basic demonstration and application of knowledge and skills	CO3	Critical Thinking and Problem Solving
3	Demonstrates comprehension and is able to apply essential knowledge and skills	CO4	Cultural Awareness
4	Demonstrates thorough, effective and/or sophisticated application of knowledge and skills	CO5	Professional Competence
		CO6	Self-Reflection

Course #	Course Name	CO1	CO2	CO3	CO4	CO5	CO6
GEO 105	Introduction to Human Geography	2	3	3	4	3	3
GEO 106	World Regional Geography	2	3	3	4	3	3
GEO 107	Geography of Global Issues	2	3	3	4	3	3
GEO 204	Geography of the Middle East	3	3	4	4	3	3
GEO 206	Geography of Oregon	3	3	4	4	3	3
GEO 209	Physical Geography: Weather and Climate	2	2	3	2	3	2
GEO 210	Geography of the Natural Environment	3	3	4	4	3	3
GEO 221	Field Geography: The Local Landscape	4	4	4	4	3	3
GEO 223	Field Geography: GPS & GIS	4	4	4	2	4	3
GEO 230	Race and Ethnic Relations	3	3	4	4	3	3
GEO 250	Geography of Africa	3	3	4	4	3	3
GEO 264	Maps & Geospacial Concepts	3	2	4	2	4	3
GEO 265	Introduction to GIS	4	3	4	2	4	3
GEO 266	GIS Analysis	4	3	4	2	4	3
GEO 267	GIS Applications	4	4	4	2	4	3
GEO 280	Co-op Education	4	4	4	2	4	4
GEO 298	Independent Study	4	4	4	2	4	4

## C. ASSESSMENT PLAN

We have focused on the Cultural Awareness and Self-Reflection outcomes for our assessment plan. A direct assessment was used to evaluate a written reaction paper from students in a variety of Geography courses between 2011 and 2013.

The following rubric was used for the assessment process:

	<b>Cultural Awareness (5 points)</b>	<b>Self-Reflection (5 points)</b>
<b>Does not meet expectations: (1 point)</b>	Does not demonstrate an understanding of the ways in which culture impacts decision making, nor the variations in cultural perspectives.	No attempt at self-criticism.
<b>Partially meets expectations: (2 points)</b>	Understands that culture impacts decision making, but tends to view these issues in black and white. Knowledge is either sparse or includes significant misconceptions.	There is some attempt at self-criticism, but the self-reflection fails to demonstrate awareness of personal bias.
<b>Meets expectations: (3-4 points)</b>	Understands some specific ways in which culture impacts decision making.	The reflection demonstrates ability of the student to question their own biases, stereotypes, and preconceptions.
<b>Exceeds expectations: (5 points)</b>	Fully understands the ways in which culture impacts decision making of specific individuals, nations or groups and takes into account multiple cultural perspectives.	Demonstrates ability of the student to question their own biases, stereotypes, preconceptions and/or assumptions and define new modes of thinking as a result.

Student scores fell across the full range. Between the 2011 and 2013 academic years, 75 students were assessed for Cultural Awareness and seventeen for Self-Reflection. Overall, students performed well in these two areas. The average for both outcomes fell within “Meets expectations.” We continue to collect data on all of the core outcomes in order to be able to assess them with a greater sample size.

### 3 OTHER CURRICULAR ISSUES

#### A. DISTANCE LEARNING

Geography has been offering classes in the Distance Learning (DL) modality since 2004. Currently, six of our courses are offered as DL and one is offered as a Hybrid (Table 2).

**Table 2. Distance Learning and Hybrid Courses List**

Distance Learning Courses	Hybrid Courses
GEO 105 - Intro to Human Geography GEO 106 - World Regional Geography GEO 107 - Geography of Global Issues GEO 204 - Geography of the Middle East GEO 210 - The Natural Environment GEO 230 - Geography of Race & Ethnic Conflicts	GEO 267 - GIS Applications

Student success in our on-campus and DL courses has some variations (Table 3). With the exception of GEO 106 (World Regional Geography) at Sylvania, a larger percentage of on-campus students were passing.

**Table 3. Distance Learning and On-Campus Success Rates, 2011-2012**

Campus	Subject	Course	On-Campus Enrollments	On-Campus Passing %	Distance Learning Enrollments	Distance Learning Passing %
RC	GEO	105	120	90.8	89	80.9
RC	GEO	106	30	93.3	112	71.4
SY	GEO	106	46	69.6	38	76.3
SY	GEO	107	52	82.7	32	68.8

Since starting to offer DL and Hybrid courses, the Geography faculty have observed the following revelations and/or concerns:

- Students are fairly proficient with technology and the Desire to Learn (D2L) environment, as reflected in the quality of their work, and interactions with the faculty and their peers.
- Communication is essential. This includes communication between faculty, students, IT staff, and amongst each other.
- This academic year, we have experienced a number of technical issues with D2L which have made us all aware that the reliability of technology can be precarious. These issues contribute to student stress and require that both faculty and students stay flexible.
- The changes in DL software over the last few years have led to some confusion and the need for retraining of both students and faculty.





The Geography SAC has discussed offering more classes in the DL modality, including the development of more GIS classes as hybrid courses. Additionally, more faculty have been trained to teach DL courses. At our last review, only one faculty member was trained and today there are four - Masoud Kheirabadi, Kerry Pataki, Kelsey Brain, and Christina Friedle.

## B. EDUCATIONAL INITIATIVES

Fieldwork, service-learning, and global and cultural competency are inherent in a geographic education. A few examples of incorporating these educational initiatives into our curriculum include: map contributions for the ***Cultural Atlas of Portland***; mapping and spatial analyses to assess the accessibility of healthy and affordable foods to low-income residents in North/Northeast Portland; contributions to OpenStreetMap (an online global database and world map); creating a map for the “Honoring Histories Installation Project” on North Williams Avenue; various mapping and spatial analyses projects with Tryon Creek, Columbia Slough, and Johnson Creek Watershed Councils; and ongoing mapping projects with PCC’s Sustainability Office and Habitat Team. We continue to work in collaboration with community partners to provide opportunities for students to enhance their education with service-learning and cultural awareness.

Student work samples for these projects are provided in Appendix B. Additional student GIS and mapping projects can be reviewed here: [www.christinafriedle.com/projects.html](http://www.christinafriedle.com/projects.html)

## C. DUAL CREDIT

Currently, there is one class offered as Dual Credit at Rosemary Anderson High School in North Portland. Our GEO 298 (Independent Study) class was offered in Fall 2012 as a way to introduce students to Geographic Information Systems (GIS). Students developed and implemented a GIS project and learned basic skills to navigate through GIS software. Since GIS is a specialized skill in which many high school faculty have little training, Christina Friedle (PCC Geography Faculty) taught the course.

There are no future plans to develop any additional Dual Credit agreements at this time. The largest barrier to doing so is the lack of high school teachers trained in Geography and/or GIS.



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## D. SIGNIFICANT CHANGES

Since our last Program Review in 2008, we have made the following changes to our curriculum:

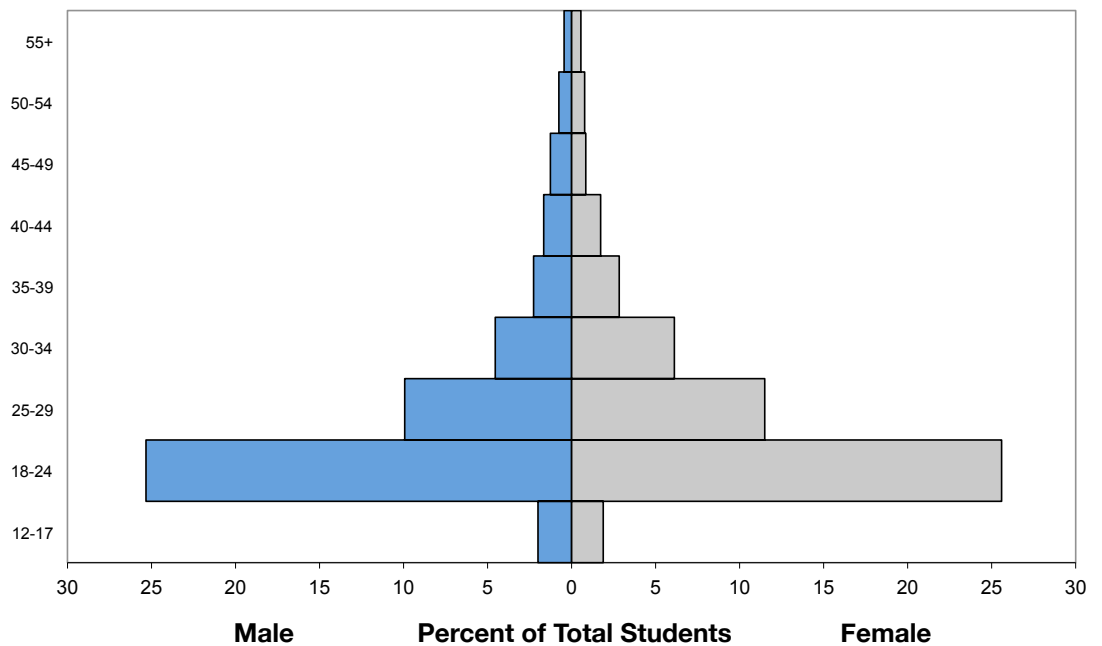
- Updated our core Human Geography courses to reflect current geographic thought and emulate the structure at universities to where our students typically transfer.
- Created new courses to meet the growing demand for our GIS Certificate Program, including GEO 264 (Maps and Geospatial Concepts) and GEO 223 (Field Geography: GPS & GIS).
- Currently in the process of creating two new technical classes: GEO 299(x) (Cartographic Design & Principles, and GIS Programming). Our intention is to make these courses permanent for the next academic year.

## 4 NEEDS OF STUDENTS AND THE COMMUNITY

### A. STUDENT DEMOGRAPHICS

There are noticeable age differences when we compare all of our Geography students to just those who have enrolled in GIS classes. Figure 1 below shows the age distribution for all GEO courses, while Figure 2 shows the age distribution for only the GIS courses.

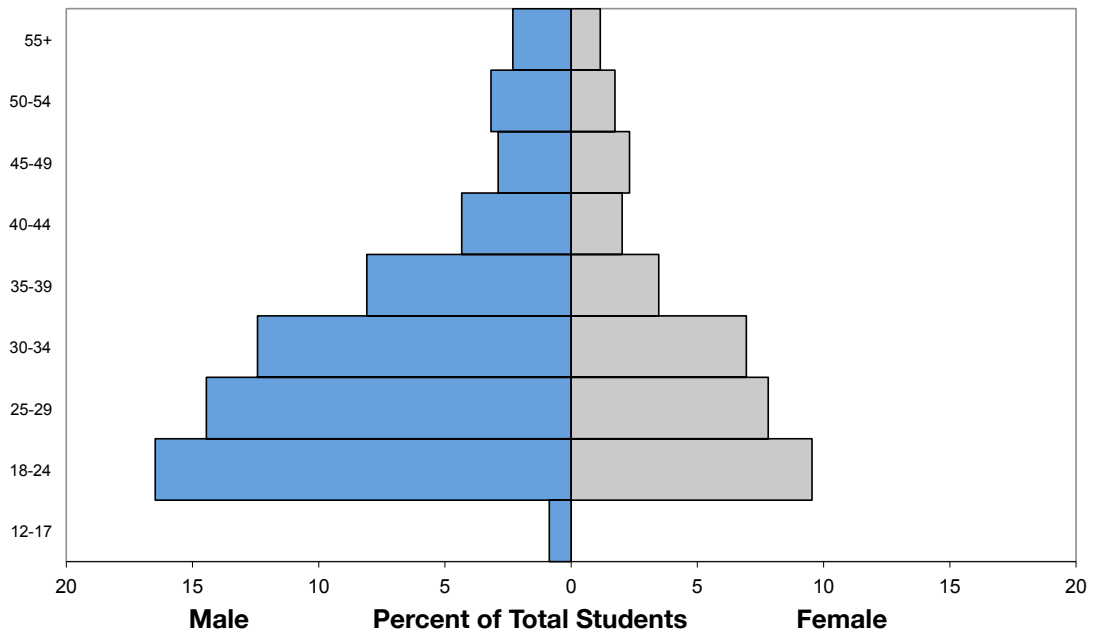
**Figure 1. Age Distribution for all PCC Geography Students, 2007-2012**



The mean age for all students who enrolled in a Geography course from 2007 to 2012 was 25.9 years old. The median age was 24 years old and the mode was 19 years old.



**Figure 2. Age Distribution for only GIS Students, 2007-2012**



For the GIS courses, the mean age for all students from 2007 to 2012 was 31.8 years old. The median age was 30 years old, and the mode was 24 years old.

These age statistics reinforce both anecdotal and published evidence about GIS courses at PCC and across the United States. Technical courses often attract students who have either already attended college and are looking to expand their skill set, or those who have been in the workforce and are seeking a change in employment.

The male majority in GIS classes also reinforces evidence that females are underrepresented in science and technology fields. There are programs, such as STEM (Science, Technology, Engineering, and Mathematics) and IDES (Increasing Diversity in Earth Sciences - <http://ides.science.oregonstate.edu>), which aim to bring in more females and minorities into Science-based disciplines. Our GIS Faculty encourage students to participate in these programs; in the 2012-2013 academic year three GIS students applied to participate in the IDES program.

## B. CHANGES IN INSTRUCTION

The Geography program at PCC has experienced significant growth since the last program review in 2008. Table 4 shows total enrollments for all campuses from the 2007-2008 to 2011-2012 school years.

Year 1	#	Year 2	#	Year 3	#	Year 4	#	Year 5	#
2007F	317	2008F	294	2009F	360	2010F	366	2011F	424
2008W	285	2009W	314	2010W	364	2011W	413	2012W	412
2008Sp	290	2009Sp	313	2010Sp	410	2011Sp	371	2012Sp	360
2008S	155	2009S	127	2010S	237	2011S	246	2012S	253
<b>TOTAL</b>	<b>1047</b>		<b>1048</b>		<b>1371</b>		<b>1396</b>		<b>1449</b>

Total enrollment increased from 1,047 students in 2007-2008 to 1,449 students in 2011-2012, an increase of 38.4%. If such a growth rate were to continue over the next five years, we would expect an increase of 556 students. As the Geography program continues to expand, we will need to consider adding additional faculty, classroom space, and computer hardware in order to accommodate our new students.

The growth in the number of Geography students has led to an increase in new course offerings, as well as sections of existing courses at all four campuses.

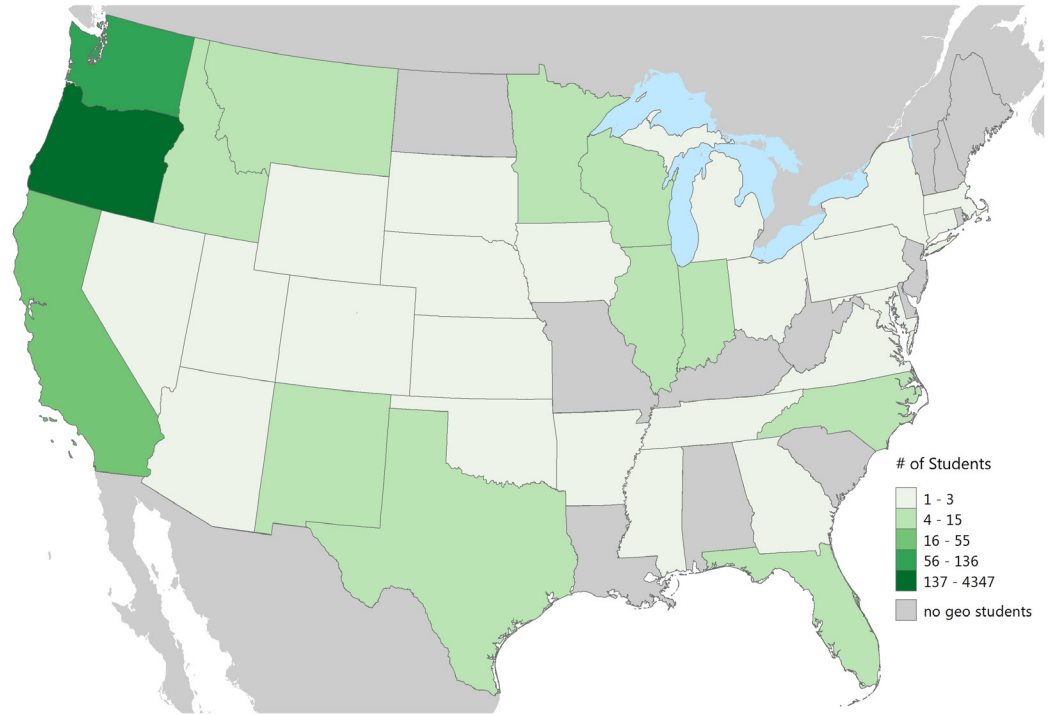
## C. ENROLLMENT PATTERNS

A total of 4,699 students enrolled in at least one Geography course from the years 2007 to 2012. More than 20% of those students enrolled in more than one Geography course, whether in the same term or later terms. Total enrollment from 2007 to 2012 was 6,288 students.

If only GIS courses are considered (GEO 221, 265, 266, 267, and 299), a total of 349 students enrolled in at least one course between 2007 and 2012. Roughly 25% of those students enrolled in more than one GIS course. Total enrollment for all GIS courses from 2007 to 2012 was 503 students.

The map below shows how geographically diverse our students are, with 35 states represented. Figure 3 shows the state of residence listed by our enrolled students. There have also been 50 foreign students enrolled in at least one Geography course over the last five years.

**Figure 3. State of Residence for Enrolled Geography Students, 2007-2012**

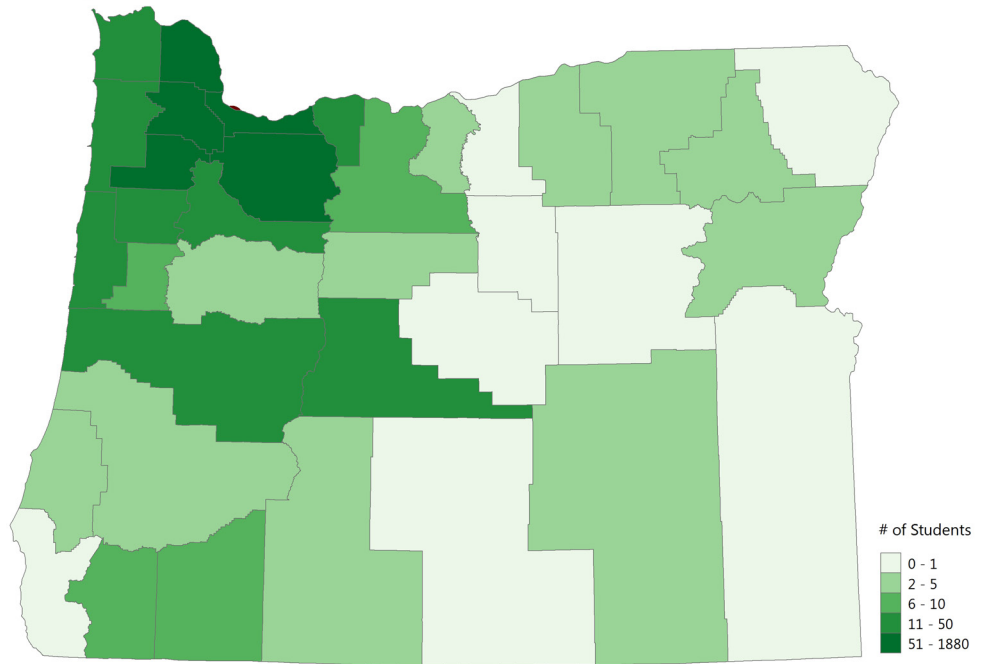


Since we offer Geography courses at all four main campuses, it is worth looking at enrollment at each campus, as well as where our students come from geographically. Table 5 breaks down the county of origin for each student who lives in Oregon, as well as the campus at which he or she first enrolled in a Geography course.

County of Origin	Total	Cascade	Rock Creek	Southeast	Sylvania
Clackamas	397	3.5%	30.5%	1.8%	64.2%
Columbia	128	0.8%	80.5%	0.8%	18.0%
Multnomah	1663	17.7%	36.6%	8.3%	37.4%
Washington	1828	0.9%	66.7%	0.8%	31.6%
Yamhill	80	1.3%	40.0%	0.0%	58.8%

Figure 4 shows the county-by-county distribution of Geography students throughout the state. The Portland Metro area is clearly where most students live, although we do reach more broadly throughout the state.

**Figure 4. PCC Geography Student Distribution, by County**



We can also look at enrolled students' ZIP codes to obtain a more local perspective. Table 6 shows most common resident Oregon ZIP codes for PCC Geography students over the last five years.

ZIP	Location	County	Total	Cascade	Rock Creek	Southeast	Sylvania
97007	Beaverton	Washington	268	0.7%	62.7%	0.7%	35.8%
97006	Beaverton	Washington	238	0.8%	80.3%	0.8%	18.1%
97229	Portland (NW; Bethany)	Washington	197	0.5%	85.3%	1.0%	13.2%
97124	Hillsboro	Washington	175	1.1%	87.4%	0.0%	11.4%
97223	Portland (SW; Tigard)	Washington	162	0.6%	37.7%	1.2%	60.5%
97219	Portland (SW; Sylvania)	Multnomah	155	2.6%	24.5%	1.3%	71.6%
97008	Beaverton	Washington	135	1.5%	49.6%	1.5%	47.4%
97202	Portland (SE; Sellwood)	Multnomah	130	12.3%	33.8%	12.3%	41.5%
97206	Portland (SE; Foster)	Multnomah	129	7.0%	30.2%	26.4%	36.4%
97123	Hillsboro	Washington	119	0.8%	83.2%	0.8%	15.1%
97224	Portland (SW; Bull Mt.)	Washington	117	0.9%	33.3%	0.0%	65.8%
97214	Portland (E; Hawthorne)	Multnomah	110	24.5%	38.2%	8.2%	29.1%
97217	Portland (N; Cascade)	Multnomah	107	29.0%	48.6%	3.7%	18.7%
97211	Portland (N; Alberta)	Multnomah	104	37.5%	37.5%	1.9%	22.1%



Table 7 lists the county of origin for only those students enrolled in a GIS course.

County of Origin	Total	Cascade	Rock Creek	Sylvania
Clackamas	27	11.1%	44.4%	48.1%
Columbia	5	0.0%	100.0%	0.0%
Multnomah	179	7.8%	62.0%	30.2%
Washington	99	2.0%	72.7%	25.3%
Yamhill	3	0.0%	33.3%	66.7%

Most of PCC’s GIS courses are offered at either Rock Creek or Sylvania campuses. Two courses have been offered at Cascade Campus: GEO 221 (Field Geography: The Local Landscape) and GEO 265 (Introduction to GIS). Our first GIS course was not offered at Southeast until this current spring term (Spring 2013). In Appendix C, you will find a series of five maps, one for each academic year between 2007 and 2012. When we look at the distribution of our students it becomes clear that there is a significant GIS student population that lives in the vicinity of Cascade and Southeast campuses. This was the impetus behind expanding GIS courses to both locations.

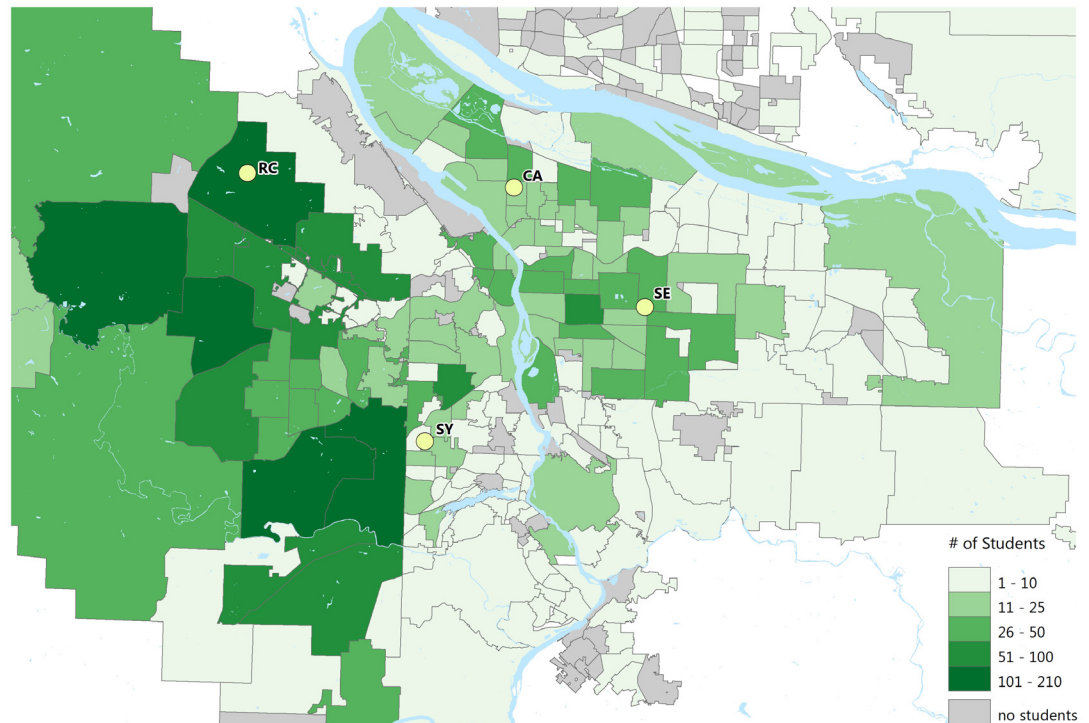
GIS students are more likely to reside in Multnomah County. If we look at the ZIP code data in Table 8, we can see which specific areas GIS students originate.

ZIP	Location	County	Total	Cascade	Rock Creek	Southeast	Sylvania
97211	Portland (N; Alberta)	Multnomah	19	15.8%	63.2%	0.0%	21.1%
97219	Portland (SW; Sylvania)	Multnomah	18	0.0%	72.2%	0.0%	27.8%
97214	Portland (E; Hawthorne)	Multnomah	16	12.5%	56.3%	0.0%	31.3%
97007	Beaverton	Washington	16	0.0%	93.8%	0.0%	6.3%
97223	Portland (SW; Tigard)	Washington	16	6.3%	56.3%	0.0%	37.5%
97217	Portland (N; Cascade)	Multnomah	14	14.3%	57.1%	0.0%	28.6%
97202	Portland (SE; Sellwood)	Multnomah	13	0.0%	61.5%	0.0%	38.5%
97206	Portland (SE; Foster)	Multnomah	13	7.7%	38.5%	0.0%	53.8%
97006	Beaverton	Washington	12	0.0%	66.7%	0.0%	33.3%
97229	Portland (Nw; Bethany)	Washington	12	0.0%	66.7%	0.0%	33.3%
97124	Hillsboro	Washington	10	0.0%	100%	0.0%	0.0%



To examine Geography student distribution in an additional way, Figure 5 focuses on the Portland Metro area, and shows the residence of PCC Geography students by neighborhood.

**Figure 5. Neighborhood of Residence for Enrolled Geography Students, 2007-2012**



In general, we have found that Geography students are dispersed across the Portland Metro area, state, country and world. Each time we offer a new course or expand course offerings to a new campus, the class has been well-received by students. Currently, the number of classes offered at Cascade Campus is far less than at either Sylvania or Rock Creek, even though several hundred of our students live closest to Cascade. Similarly, several hundred of our students live in Southeast Portland, closest to the Southeast Campus, where there is only one Geography course taught every quarter. This supports our interests in expanding course offerings to both Cascade and Southeast.



## D. ACCESS AND DIVERSITY

The Geography SAC has implemented (and continues to implement) the following strategies to facilitate access and diversity:

- Worked district-wide to develop class schedules that will reach the greatest number of students.
- Developed multiple class scheduling options to provide flexibility for students' complex lives, including various times during the day/evening or week.
- Offered courses in a variety of formats (on-campus, hybrid, and distance learning) to meet the diverse needs of students.
- Designated six Geography courses as Cultural Literacy courses (GEO 105, 106, 107, 204, 206, 230).

## E. COMMUNITY FEEDBACK

Feedback from students, community partners, advisory committee members, and universities all play a significant role in developing our curriculum.

### ***Student Feedback***

Student evaluations have consistently been used by Geography/GIS faculty to receive feedback about individual classes and incorporated into revising the class. With the new on-line evaluation system, all GIS classes use the following questions:

- What did you like best about the class?
- What did you like least about the class?
- Is there any other feedback you can provide for the instructor to improve the class in the future?
- Did you feel there was adequate access to the GIS lab?
- Is there anything the Geography department can do to better support you in the GIS Certificate program?
- Did you take advantage of the GIS tutor? Did the hours and support provided by the tutor help you succeed in the course?
- Did you experience any barriers to your success in the course and/or learning GIS?
- Is there any equipment, technology, or other resource that PCC could provide that would help your success in learning GIS?

Other anecdotal information from past, present, and future students is continuously used to shape our current and new course offerings.



### ***Community Partners***

When students work on service-learning projects in GEO 221 (Field Geography: The Local Landscape) or GEO 267 (GIS Applications), the community partner is asked to discuss the quality of the students' work and their preparedness to do the work. Community partners are invited to attend student presentations at the end of the term. Feedback from our partners is used to make changes in the curriculum to better prepare students for their projects.

### ***GIS Advisory Committee***

With regular Advisory Committee meetings, we have many opportunities to consult GIS industry professionals about the developments and changes in the industry and how it relates to our GIS Certificate program. They are an engaged group that has helped guide us in the development of our program and course offerings, as well as connected us to part-time instructors who have specialized skills (for example, GIS Programming).

### ***University Articulation***

Since the majority of our students transfer to Portland State University (PSU), we work closely with the PSU Geography department to ensure that the courses we offer here at PCC are equivalent to their Geography courses. When developing our new GEO 264 (Maps & Geospatial Concepts), we met with PSU faculty on multiple occasions to discuss the curriculum so that it would be a direct equivalent to their GEO 380 (Maps & Spatial Information) course, which is a prerequisite to all of their GIS Technical courses. Additionally, we connect with faculty from Oregon State University, Lane Community College, Central Oregon Community College, Clackamas Community College, and University of Oregon to discuss curriculum compatibility.

## 5 GEOGRAPHY FACULTY

### A. OVERVIEW

Currently, the PCC Geography faculty is comprised of two full-time instructors, ten adjunct instructors, and growing (Table 9). With the increased GIS course offerings, our adjunct faculty needs to continue to expand. We anticipate adding two new adjunct faculty this summer.

**Table 9. Current Geography Instructors at Portland Community College**

Full-time Faculty	Campus	Degree	Specialty Area
<b><i>Matt Constantino</i></b>	RC	MA, Geography	Cultural Geography, Ethnicity and Immigration, United States, Europe
<b><i>Christina Friedle</i></b>	SY	MS, Geography	GIS, Cultural Mapping, Central America, Natural Resource Use
Part-time Faculty	Campus	Degree	Specialty Area
Kelsey Brain	SY, RC	MS, Geography	Cultural Geography, Latin America, Food Systems
Margaret Campbell	SY, CA	MA, Geography	Cultural Geography, Asia
Marcelle Caturia	RC	MGIS, Geographic Information Science	GIS, GPS, Physical Geography
Dimitar Dimitrov	SY, RC, CA	Ph.D. Geography	Asia, Eastern Europe, Political Geography
Jon Gehrig	RC, CA	MS, Geography	GIS, Cultural and Political Ecology, Latin America, Food Security
Steve Jett	SE	MS, Geography	GIS, Remote Sensing, Emergency Management
Masoud Kheirabadi	RC	Ph.D. Geography	Middle East, Contemporary Geopolitical Issues
James Manzione	SY	MS, Geography	GIS, Water Resource Management, Physical Geography
Elizabeth McAuliffe	SE	MS, Geography	Cultural Geography
Kerry Pataki	SY	MA, Geography Ph.D. Anthropology	Statistical Geography, Migration, Melanesia

Faculty turnover is low. At the end of the 2012-13 academic year, Margaret Campbell will be retiring after eleven years at Sylvania and Cascade campuses. We do not anticipate any other faculty changes, other than hiring additional instructors to meet our growing need to offer more GIS-specific classes. In Fall 2012, Christina Friedle became Faculty Department Chair of Geography/GIS at Sylvania. Having a content expert in this position has contributed to the hiring and assessment of part-time faculty.



In Fall 2012, a second full-time Geographer started at Sylvania campus after a decade-long absence. With this addition, there is currently a 5:1 ratio of part-time to full-time faculty. The Geography faculty is as diverse as the discipline. Currently, all faculty hold at least a Master's degree, all in Geography or Geographic Information Science. Four out of our nine adjunct faculty have additional jobs in GIS, Geography, or a related field. Our faculty are diverse in their backgrounds. We have two foreign-born faculty, from Bulgaria and Iran. As Geographers, our faculty have traveled and worked in Bolivia, Bulgaria, Canada, China, Japan, Honduras, Mexico, Malaysia, Peru and Papua New Guinea. The experience of our faculty around the globe brings an international perspective into the classroom and a heightened understanding of cultural awareness.

### **Full-Time Geographer Biographies**

Christina Friedle came to PCC with professional work experience as a GIS Analyst/Conservation Geographer, GIS Consultant, Education Program Director, and High School Teacher. She holds a Master's degree in Geography and a Bachelor's degree in Psychology and Secondary Education (Social Studies). Her diverse background in GIS/Geography, as well as Education, brings a strong combination of content knowledge, professional experience, and pedagogy. Christina currently serves as the Geography/GIS Faculty Department Chair at Sylvania and Geography SAC Chair.

Matt Constantino is in his eighth year as a Geography Instructor at PCC, mostly at the Rock Creek Campus. He graduated with a Bachelor of Science in Geography from the University of Oklahoma, and completed graduate work at UCLA before receiving a Master's Degree in Geography from the University of South Carolina. He has taught classes in Human Geography, Regional Geography, Weather & Climate, and GIS. Matt served as Geography SAC Chair for 6.5 years.

## **B. INSTRUCTOR QUALIFICATIONS**

Instructor qualifications were revised in March 2013. Changes were made in order to meet the growing demand of geotechnical courses offered, and thus engage a larger range of instructors who have professional experience, specialized skills, and academic credentials. The nature of Geography is to present a diversity of perspectives on a given place - political, social, physical, economic, cultural - and our students benefit from having faculty members who are as equally diverse. In addition, with working geospatial professionals contributing as faculty in the GIS program, students get exposure to current tools and applications in preparation for employment.



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The current qualifications are as follows:

***GEO 264, 265, 266, 267, 221, 223***

- Same requirements as for general Geography courses.
  - Or -
- Master's degree in a related field\* and have completed at least 30 hours of graduate quarter credits in Geography or GIS with three years of current, full time work experience in GIS.
  - Or -
- Bachelor's degree in Geography, GIS, or in a related field\* with four years of current, full time work experience in GIS.
  - Or -
- Bachelor's degree in a related field\* with a GIS certificate with twelve or more quarter credit hours in GIS, and four years of current, full time work experience.

***General Geography Courses***

- Master's Degree in Geography or a Master's Degree in a related field\* plus 30 hours of graduate quarter credits in Geography.

\*Related fields include GIS, Forestry, Computer Science, Environmental Science, Urban Planning, Anthropology/Archeology, Economics, History, Political Science, Geology, Engineering, Public/Community Health, Architecture, Earth/Physical Sciences, Conservation Science, and other similar degrees.

## **C. PROFESSIONAL DEVELOPMENT**

The Geography/GIS faculty participate in professional activities, events, and memberships that allow them to network with the Geography and GIS communities, and stay current in our discipline. Instructors incorporate these experiences into the classroom, bringing information to students regarding current research, geographic thought, and techniques. Additionally, our faculty are active participants in the PCC community, with representation or participation on the Education Advisory Committee, Completion Investment Council, Mentoring program, Internationalization of courses, and Teacher Improvement Program.



### ***Full-time Faculty Professional Development***

Christina Friedle is a member of the Association of American Geographers (AAG), American Pacific Coast Geographers (APCG), North American Cartographic Information Society (NACIS), Women in GIS, and Society for Conservation GIS (SCGIS). She presented at the Oregon Public Health Association Annual Conference in Fall 2011. In Spring 2013, Christina will organize, present, and moderate a half-day session on GIS in Education at the annual GIS in Action conference in Portland. With support provided by the Staff Development Office, Christina attended the NACIS annual conference in Fall 2012.

Matt Constantino is a member of the Association of American Geographers (AAG) and has attended and presented at a number of past regional and national conferences. He is a member of the American Bosnian Association (ABAUSA), Carpatho-Rusyn Society (C-RS), Congress of Russian Americans (CRA), Croatian-American Society (CAS), National Slovak Society (NSS), North American Society for Serbian Studies (NASSS), Polish American Congress (PAC), and the Slovenian-American Heritage Society, as he works to chronicle and preserve the heritage of Slavic-American immigrant groups.

### ***Part-time Faculty Professional Development***

Geography/GIS part-time faculty are actively presenting at conferences both locally and nationally. Multiple GIS faculty participate in the annual GIS in Action conference. Most faculty are members of the American Association of Geographers (AAG), which is an educational and scientific organization focused on the theory, methods, and practice of Geography, and the leading geographic association in the U.S. Dimitar Dimitrov, Steve Jett, Masoud Kheirabadi, Kelsey Brain, and Kerry Pataki have all published papers, scientific journals, and/or books. Our faculty are always encouraged to seek opportunities to keep current in the discipline.



## 6 FACILITIES AND SUPPORT

### A. CLASSROOMS

Currently, Geography classes are offered at all four PCC campuses, as well as the Newberg Center. Classes are offered in a number of buildings and classrooms. A number of faculty regularly use Google Earth in the classroom as a tool for learning Geography content and understanding spatial concepts. Faculty have started allowing the use of iPads, smart phones, and tablets to research and report on current events and global issues discussed in class.

GIS courses are unique within the Geography SAC and Social Sciences division in regard to their technology needs and classroom requirements, including lab space. GIS-specific courses are currently being offered in HT301 (SY), 5-125 (RC), TEB (CA), and Mt. Scott Hall (SE). These classrooms, where we hold both lecture and lab, are all computer-equipped. This format has proven to be highly successful, as students can participate in GIS software demonstrations, access the Internet for course materials, and troubleshoot labs during class. Our greatest barrier to expanding GIS course offerings, at this given time, is computer lab access.

As the number of offered GIS courses has increased, student demand on available computer labs (both during and outside of class time) has risen. For example, the primary computer lab used by GIS students on the Sylvania campus is HT301 - please see Appendix D for a summary of Geography department use of this lab. Over the past three academic years, the total number of students visiting HT301 from the Geography department (i.e. taking GIS courses) has increased from being in the top six departments to the top three. These students appear to make multiple visits to this lab, as the total number of visits made by Geography students has risen from being in the top five departments to number one. In addition, these students use HT301 for longer periods of time compared with students from most other departments - the total visit hours for Geography students have been in the top four departments each year. Some GIS students are able to work at home on their assignments - but those who need to come to campus need ample lab time.

Our specialized software needs include: ESRI ArcGIS (statewide use license), Trimble GPS Pathfinder Office, and DNRGPS. ArcGIS, an essential program for all GIS courses, is installed in the classroom labs, as well as the SCC/ CRC at each campus. Students can now access the software and work on their assignments at four separate locations.





The GIS software needs are demanding on computers and require a large amount of processing speed and memory. In computer labs where other high-demand software programs are installed, ArcGIS runs slowly and shuts down sporadically. Currently, this is a major concern in HT301 (SY), where a large number of programs share the lab, many with specialized software needs (Appendix D).

In Winter 2013, student evaluations for GIS courses included several questions related to the GIS computer labs. We plan to continue asking students these questions in order to get a clear understanding of their needs and barriers. Below is a summary of the comments we received from students:

- For students who rely on using PCC computers, lab access was insufficient and identified as a barrier to their success.
- The computers in the lab were not capable of running ArcGIS at a reasonable speed and the monitors were of insufficient size. (e.g. a specific quote from the Winter 2013 Student Evaluations: “The lab computers always seemed to be really slow to get set-up. Sometimes it would take up to fifteen minutes to get online, get my flash drive installed, and get ArcMap open.”)
- Students would like to see a dedicated workspace location for class, tutoring, study hall, and working on class assignments.
- The GIS tutor should be available for more hours to accommodate a wide range of student schedules.

Additionally, Geography maintains ten Trimble Juno GPS units and ten Garmin GPS62s GPS units, currently being used in four GIS classes. A new course, GEO 223 (Field Geography: GPS & GIS), which is entirely dependent on having access to this technology, was approved and offered in 2012-2013.

The Geography department at Sylvania campus has purchased a color printer for HT301. This will allow students to print out color copies of maps for presentations, critiques, and to present to community partners. Geography has also been working with the Architecture department at Sylvania to allow Cartography students to access the plotters in their labs in order to print out their final cartographic products.



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## B. LIBRARY

Our students use the library as a computer resource when the GIS lab is not available, to check out books, and conduct research for class projects. The library has recently purchased, per our request, a wide selection of map atlases which have been used regularly in our mapping-related courses. As there are still more resources that we would like to have available for students, we have compiled a working list that we will soon submit to the library.

Although our GIS classes are held in computer labs, the labs we currently use are being used by other departments most of the time. With limited open lab hours, students tend to use the library quite often to access the software required for the core GIS classes. Additionally, the GIS tutor holds tutoring sessions at the library.

Geography faculty also take advantage of the resources available through the library such as Video on Demand, e-books, and project-specific resource pages created by the campus librarian.

## C. TUTORING

GIS tutoring has been available to students each term since Winter 2012 (except summers). Our GIS tutor is on hand for a set schedule each week, to assist students with questions relating to course lectures and/or lab assignments. Students have the option of working with the tutor in-person or via email. At the Sylvania campus, tutoring has been offered in HT301 and the Student Computing Center (SCC). Tutoring has been offered at the Rock Creek campus in various locations depending on the term: 5-125, the Student Learning Center (SLC), or the Student Computing Center (SCC).

At Rock Creek, an in-class teaching assistant (TA) was also provided during Winter 2012 and Spring 2012 terms. In cooperation with the course instructor, the TA primarily helped students work on their lab assignments, but also answered general GIS questions. A summary of GIS tutoring and Teaching Assistant resources is provided in Table 10.



**Table 10. GIS Tutoring and Teaching Assistant Resources**

Term	SY Tutor Availability (Hours/Week)	RC Tutor Availability (Hours/Week)	RC TA Availability (Hours/Week)	Total Resources (Hours/Week)
Winter 2012	5	2	6	13
Spring 2012	5	2	3	10
Fall 2012	6	-	-	6
Winter 2013	6	3	-	9
Spring 2013	6	3	-	9

When the GIS Certificate program began, students had inquired about the possibility of having a GIS tutor and/or in-class TA. Once such resources became available, students have increasingly made use of them each term, at both Sylvania and Rock Creek campuses. The GIS tutor for the 2012-2013 academic year states that “Attendance to [tutoring] hours has gone up each term and this term I think I have only had 1 or 2 days where no one shows.”

According to the GIS tutors, the majority of tutoring session attendees have consistently come in more than once per term, and the remaining attendees came in on a single occasion. Some students would attend available tutoring sessions at only one campus, while others would attend at both. Students have made full use of the available tutoring hours, as expressed by the GIS tutor for the 2011-2012 academic year: “I am almost always occupied with one or more students during the entire duration of the tutoring sessions.”

Our GIS tutors have also reported positive feedback from students regarding the importance of having such resources available. The 2011-2012 GIS tutor commented: “Much like I do in the classroom where I serve as an instructor’s assistant, I would frequently inform [students] of tools and demonstrate techniques they could use to complete their GIS course assignments, and encourage [them] to try some of the techniques on their own. In some cases, I would be sitting with them and guide them through the steps. One student would take notes as I informed them of certain processes they’d have to go through to accomplish a certain geoprocessing task and it was often that a student would say something along the lines of ‘you just saved me hours of frustration’ or ‘I don’t think I could have made this analysis without your help’.”



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## D. STUDENT SERVICES

Geography/GIS faculty direct students towards Academic Advisers, Counselors, and Disability Services for support. Faculty work with individual students to make whatever accommodations are necessary for student learning and success. We are committed to supporting all students.

Students in the GIS Certificate program require academic advice that is specific to the program, and provided by full-time Geography faculty Christina Friedle and Matt Constantino. GIS program representatives have attended the Advising Team spring meeting for the last two years to provide an overview of the program, informational materials, and a chance to answer questions. The GIS Certificate program has a brochure that it distributes to advisers, potential and current students, and support staff (Appendix E).

## E. SCHEDULING PATTERNS

Currently, we strive to increase Geography/GIS course offerings at multiple PCC locations. Student diversity necessitates various options for students, such as classes offered in the evenings, mornings, distance learning, various days of the week, etc. We need to be creative to meet the needs of students who may be working full-time, raising a family, and/or juggling many responsibilities.

Geography courses are currently offered at all four campuses and the Newberg Center, and at all times of the day and evening. All of our Human or Physical Geography courses offered have a 35-student limit and meet for four hours a week or in Distance modality.

The GIS-specific courses are mostly offered at Sylvania campus, with Christina Friedle as a full-time faculty member dedicating to teaching those courses. Rock Creek offers three GIS-specific courses, and the GEO 265 (Intro to GIS) course is offered at Cascade and Southeast. These courses are all lecture/lab classes that meet in a computer lab for three-hour-long meetings, twice a week. These courses are limited to 24-27 students, depending on the number of computers in the lab.

The courses that are required as part of the GIS Certificate demand special attention with regards to scheduling. We need to ensure that courses are offered for students to complete the Certificate within a year. Currently, that is a challenge for us given the competitions for computer lab space and shortage of faculty capacity. Geography faculty and department chairs from multiple campuses usually meet annually to discuss the upcoming academic year's schedule in regards to GIS classes. This allows us to plan a schedule that accommodates students with an assortment of needs, and also assists everyone involved with advising students.

## 7 GIS CERTIFICATE

### A. OVERVIEW

The GIS Certificate program was first approved by the state in 2010, and PCC began offering it during the 2010-2011 academic year. It is not technically a CTE program, although it operates as one. The program was designed to prepare students for entry-level GIS careers, with a solid foundation in geographic knowledge and GIS technical skills. The program has identified the following outcomes for students successfully completing the Certificate:

- Communicate geographic information, verbally and graphically, to a variety of audiences using geographic tools and technologies.
- Analyze geographic problems and questions critically.
- Collect, create, analyze, and document geographic information for various applications and disciplines.
- Use geographic concepts and GIS technologies to input, store, query, and retrieve spatial and attribute data.

The program was also designed to include a hands-on component (based on the “Psychomotor” skills domain of Bloom’s Taxonomy) interwoven into various GIS courses, such as GEO 267 (GIS Applications), GEO 221 (Field Geography: The Local Landscape), GEO 223 (Field Geography: GPS & GIS), GEO 298 (Independent Study) and GEO 280 (Co-op Ed). Examples of hands-on projects that students have completed in these classes include: designing and implementing a GIS project with a community partner; working on the **Cultural Atlas of Portland** in collaboration with PSU; collecting data and conducting local Food Access analysis in collaboration with the Portland Community Reinvestment Initiative; and collecting data and creating maps using GPS units.

Between Fall 2010 and today, fourteen students have already graduated from the program (see Table 11). Some students have continued with their education, pursuing either a Bachelor’s or Master’s degree. Other students are currently working or looking for employment.

Dates	# of Students
September 2010 - August 2011	2
September 2011 - August 2012	8
September 2012 - December 2012	4
December 2012 - August 2013 (Estimated)	10
<b>Total</b>	<b>24</b>



The GIS program has been actively involved in campus life, hosting an annual GIS Day celebration since 2010. This event is observed around the globe and “provides an international forum for users of Geographic Information Systems (GIS) technology to demonstrate real-world applications that are making a difference in our society ([www.gisday.com](http://www.gisday.com)).” Each year has featured guest speakers who are widely-respected in the local GIS community, from organizations such as the Portland Metro Regional Government, U.S. Army Corps of Engineers (USACE), and U.S. Geological Survey (USGS).

GIS Day 2012 included an expanded program, featuring guest speaker Molly Vogt (Metro GIS Supervisor) and hosting a Geography trivia contest. This event was sponsored in partnership with two GIS professional organizations: the Urban and Regional Information Systems Association (URISA) Young Professionals Portland chapter, and the American Society of Photogrammetry and Remote Sensing (ASPRS) Portland State University chapter. PCC students, faculty and the general public are all invited to attend GIS Day, which provides our students with valuable networking opportunities.

In Spring 2012, Rock Creek faculty received a Classroom Enhancement Grant (and matching division funding) to host a four-hour workshop on an advanced GIS topic: Open Source GIS Programming. The workshop was taught by James Manzione, Physical Scientist at the U.S. Army Corps of Engineers, and had 25 attendees. Since the event was free and open to the public, it was attended by students as well as local GIS professionals. This not only provided PCC students with an excellent hands-on learning experience to extend their GIS knowledge outside of the classroom, it also offered a targeted networking opportunity.

Guest speakers are also regularly welcomed into GIS classes from Ecotrust, Watershed Sciences, ASPRS, U.S. Bureau of Land Management (BLM), The Resource Group, Oregon Department of Geology and Mineral Industries (DOGAMI), TriMet, and the Willamette Pedestrian Coalition.

Since the creation of the program, we have continued to make changes to the curriculum by creating new core classes and GIS-specific courses (Table 12), and adjusting the general list of electives.

**Table 12. New Courses since Start of GIS Certificate Program**

Course	Current Status
GEO 264 - Maps & Geospatial Concepts	Core course
GEO 223 - Field Geography: GPS & GIS	Program elective
GEO 299A/E. - Cartographic Design & Principles, GIS Programming	Convert to permanent courses and add to program electives



Last but not least, we work closely with the Portland State University Geography department, the destination of the majority of our university-bound students, in order to create equivalencies between courses and allow students to transfer smoothly into the PSU Geography program. We also work with faculty at Oregon State University, Lane Community College, and participate in statewide meetings amongst community colleges and universities regarding articulation.

The GIS program is off to a great start. Every year we have more students and offer more classes. The program will only continue to grow and will need the space to do so.

## B. ADVISORY COMMITTEE

The Advisory Committee for the GIS Certificate Program first met in Fall 2010. Since then, we have met twice a year during Fall and Spring terms. The Advisory Committee currently consists of seven members from the private, public, and academic GIS sectors (see Table 13).

**Table 13. GIS Certificate Program Advisory Committee Members**

Member Name	Affiliation
Tommy Albo	Metro, Natural Areas Program
David Banis	Portland State University, Geography Department
Analisa Fenix	Ecotrust
Steven Jett	Innovate!, Inc.
Kevin Martin	City of Portland, Office of Planning and Sustainability
Tyler Vick	Maul, Foster & Alongi
Molly Vogt	Metro, Data Resource Center

The Advisory Committee has provided guidance regarding curriculum, course offerings, and part-time instruction, especially within the context of what skills are currently most needed for GIS professionals. Based on those needs, they have provided input for the following new courses: GEO 264 (Maps & Geospatial Concepts), and GEO 299(x) (Cartographic Design & Principles, and GIS Programming). One of our Advisory members has also recently started as a part-time instructor for GIS courses, and we hope that additional members will offer their expertise in that capacity.

Appendix F includes the meeting notes from the last three Advisory Committee Meetings on December 15, 2011; May 24, 2012; and December 13, 2012.



## C. PROGRAM ENTRY

Currently there is no application process or requirements for entering the GIS Certificate Program. Students are encouraged to speak with a full-time Geography faculty member prior to starting the program, for the purposes of advising and course planning.

## D. JOB PLACEMENT

We do not have an official, institutionally-supported reporting system in place to keep track of our graduates once they leave PCC. However, we do informally keep in touch with some of our graduates via email and Facebook ([www.facebook.com/PortlandGIS](http://www.facebook.com/PortlandGIS)). Alumni of our program have reported securing employment at various local, state and national companies and organizations (see Table 14).

**Table 14. GIS Certificate Alumni Job Placement**

Place of Employment	Type of Position	Completed GIS Certificate (Y/N)
Army Corps of Engineers	Student Internship	Y
Clackamas County	Internship	N
Tri-Met	Internship	N
Watershed Sciences	Remote Sensing Technician	Y
Peerbolt Crop Management	Field Program Manager	N
State of Oregon - Dept of Health	GIS Contractor	Y
Malheur Wildlife Refuge (USFW)	Summer Park Ranger	Y
Oregon Fish and Wildlife	Student Internship	Y
WeoGeo	GIS Specialist	N
Columbia Slough Watershed Council	GIS Consultant	N

### ***Future Employment Forecasts***

The U.S. Bureau of Labor Statistics (BLS) has categorized GIS-related jobs as an emerging industry and one that should experience higher-than-average employment growth over the next ten years. According to the BLS, Geographers with GIS experience or knowledge have the strongest job outlook, especially with government, business, local municipalities, real estate developers, utilities, and environmental consulting.

There will also be an increase in opportunities to apply GIS skills and technologies in non-traditional areas, such as emergency assistance. Oregon has the second highest concentration of people employed in the Geography field, with a mean annual wage of \$61,420.





Table 15 provides a summary of the BLS-projected employment data for Surveyors, Cartographers, Photogrammetrists, Survey and Mapping Technicians, Environmental Scientists, Urban/Regional Planners, and Geographers - all industries with a strong GIS focus.

**Table 15. Projected Employment for Industries with a Strong GIS Focus**  
(US BLS, Occupational Outlook Handbook, 2012-13 Edition, [www.bls.gov/ooh/](http://www.bls.gov/ooh/))

Occupational Title	Employment 2010	Projected Employment 2020	Mean Annual Wage 2010
Geographers	1,600	2,200	\$74,170
Cartographers & Photogrammetrists	13,800	16,900	\$60,110
Geoscientists	33,800	40,900	\$82,500
Surveying & Mapping Technicians	56,900	66,000	\$42,050
Environmental Scientist & Protection Technicians	29,600	36,600	\$41,380
Urban & Regional Planners	40,300	46,800	\$67,350

## E. BARRIERS

### ***Limitations in Course Offerings***

Since the program is still in its infancy, many courses are only offered once a year and limited to one campus. Students may only be one class away from completion, but will have to wait one or more terms before being able to take their final course. The wait usually is long enough that some students do not return.

Without a dedicated space on any campus, it is a constant struggle to find a computer lab classroom to offer additional courses. Technical Support Services (TSS) has also expressed a concern about installing and managing the ArcGIS software in more than one classroom because of the increase in workload.

### ***Transfer of Students Prior to Program Completion***

A number of students begin taking GIS classes at PCC and end up transferring to a four-year university before completing the program. Current limitations in our course offerings contribute to this barrier.



### ***Course Enrollment With No Intention of Program Completion***

Some students come to PCC to take just the GIS-specific courses, either as professional development or to refresh outdated skills. These students typically complete the GIS sequence (GEO 265-266-267) or a portion of it (GEO 265 and/or 266).

### ***Lack of Knowing What to Expect in a GIS Program***

It is common that students are relatively unfamiliar with GIS prior to taking their first class. They usually all know they love maps, but they do not have a true understanding for what it takes to make one. GIS also includes spatial analysis and statistics, aesthetics and design, basic understanding of Earth Science, and advanced computer skills. Organizational skills, such as time and data management, are essential when working in the GIS field and this is required of students in the program. Students can become overwhelmed learning this complex set of skills.

### ***Financial Aid Issues***

Currently, if a student has declared the GIS Certificate is their only major, they cannot receive financial aid. Most students are receiving an Associate degree as well, so the issue has only affected a few students. However, this issue needs to be investigated.

## **F. CONTINUING EDUCATION**

### ***Online Resources***

ESRI, the producer of ArcGIS software, provides a number of free training opportunities online, as well as tutorials focused on specific tools within the software program. With the amount of information hosted on sites like YouTube, Vimeo, the National Geographic Society's education website, and various government agencies, among others, students have a slew of resources at their fingertips.

### ***Internships / Co-op Ed Courses***

Students are encouraged to get internships while or after completing the GIS Certificate. They can choose to receive credit towards program electives if they decide to turn the internship into a Co-op Ed class as well. Internships are somewhat of a necessity in GIS, in order to prepare novice users to work alongside other GIS professionals and gain on-the-job skills.



### ***Local GIS Community***

Portland has a well-established and strong GIS community. Students can get involved in a number of ways. There are GIS conferences held in Portland annually. Portland State University, Portland Metro, and other agencies host GIS speaker series. There are GIS-specific groups that meet regularly for networking and to “talk shop”, such as Open Source GIS, Women in GIS, and Conservation GIS. Each year, the American Society of Photogrammetry and Remote Sensing (ASPRS) hosts a one-day GIS technical exchange in Vancouver, WA. ESRI hosts (free) technical workshops in town occasionally. Christina Friedle maintains a blog ([www.christinafriedle.com/blog.html](http://www.christinafriedle.com/blog.html)) and Facebook page ([www.facebook.com/PortlandGIS](http://www.facebook.com/PortlandGIS)) that posts information about local events and opportunities.

### ***Four-year Degree***

If students wish to continue their studies in GIS, they can transfer to many four-year universities or colleges that offer a degree in Geography or GIS. For example, Portland State University has an undergraduate Geography program, as well as a GIS minor, and GIS Graduate Certificate.

## **G. ADDITIONAL CHANGES**

The GIS Certificate program was first offered in Fall 2010. This is the first program review since the program has started.



## 8 RECOMMENDATIONS

### A. TEACHING AND LEARNING

#### ***Create New Permanent Courses***

We recommend that our two experimental GEO 299(x) courses (Cartographic Design & Principles and GIS Programming) go through the Curriculum Committee for approval as permanent. Additionally, a few experimental Regional Geography courses will be offered this upcoming year. Assuming that they are well received, we recommend those courses also become permanent.

#### ***Improve Assessment***

We recommend that the Geography SAC continue to improve upon our assessment methods by creating standard rubrics for assessing all of PCC's core outcomes in our courses. We also recommend that GIS Certificate program students build and create a portfolio of their work to use as an assessment tool, as well as for students to use in job interviews.

#### ***Revise General Electives for GIS Certificate Program***

Currently, there are over 20 electives that count towards the GIS Certificate. We recommend that the electives list be reviewed and updated to include all Geography courses, minimize the environmental science focus, and include some relevant computer science courses.

#### ***GIS Certificate as a Career and Technical Education Program***

We recommend that the GIS Certificate Program be considered as an official Career and Technical Education (CTE) program. The advantages and disadvantages will need to be thoroughly evaluated before making this transition.

#### ***Geography as a Social Science***

We recommend that an evaluation be conducted to determine the best placement for Geography and the GIS Certificate Program. Currently, we are in Social Sciences and this has worked to serve our needs. As the technical GIS courses become a larger part of the department, it may be advantageous to be part of a division where we can utilize resources more efficiently.



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## B. REQUIRE FUNDING

The Geography/GIS program prepares students for entry-level GIS careers or for a major in Geography at a four-year college or university. It also connects students to real-world opportunities through local service-learning projects. In order to do this most effectively, we make the following recommendations:

### ***Create a Dedicated GIS Lab***

We recommend that Geography/GIS get priority in at least one computer lab to allow us to offer more sections and more courses. This lab should be equipped with the necessary hardware (computers, printers, plotter) and software (GIS, GPS). A dedicated lab, including a GIS tutor and/or lab assistant, would provide a space for students to work on labs and projects, collaborate on assignments, get assistance on technical/software issues, and build professional relationships with their classmates. Currently, lack of access to a computer lab has been our most significant limitation to offering new or additional sections of classes.

### ***Provide Additional Technological Support***

We recommend that additional technological support be provided to the GIS Certificate program. This includes dedicated funds to support an increasing demand for software, printers and plotters for student work; supply funds for printing needs; and maintenance needs for existing software.

### ***Increase Classroom and Faculty Capacity***

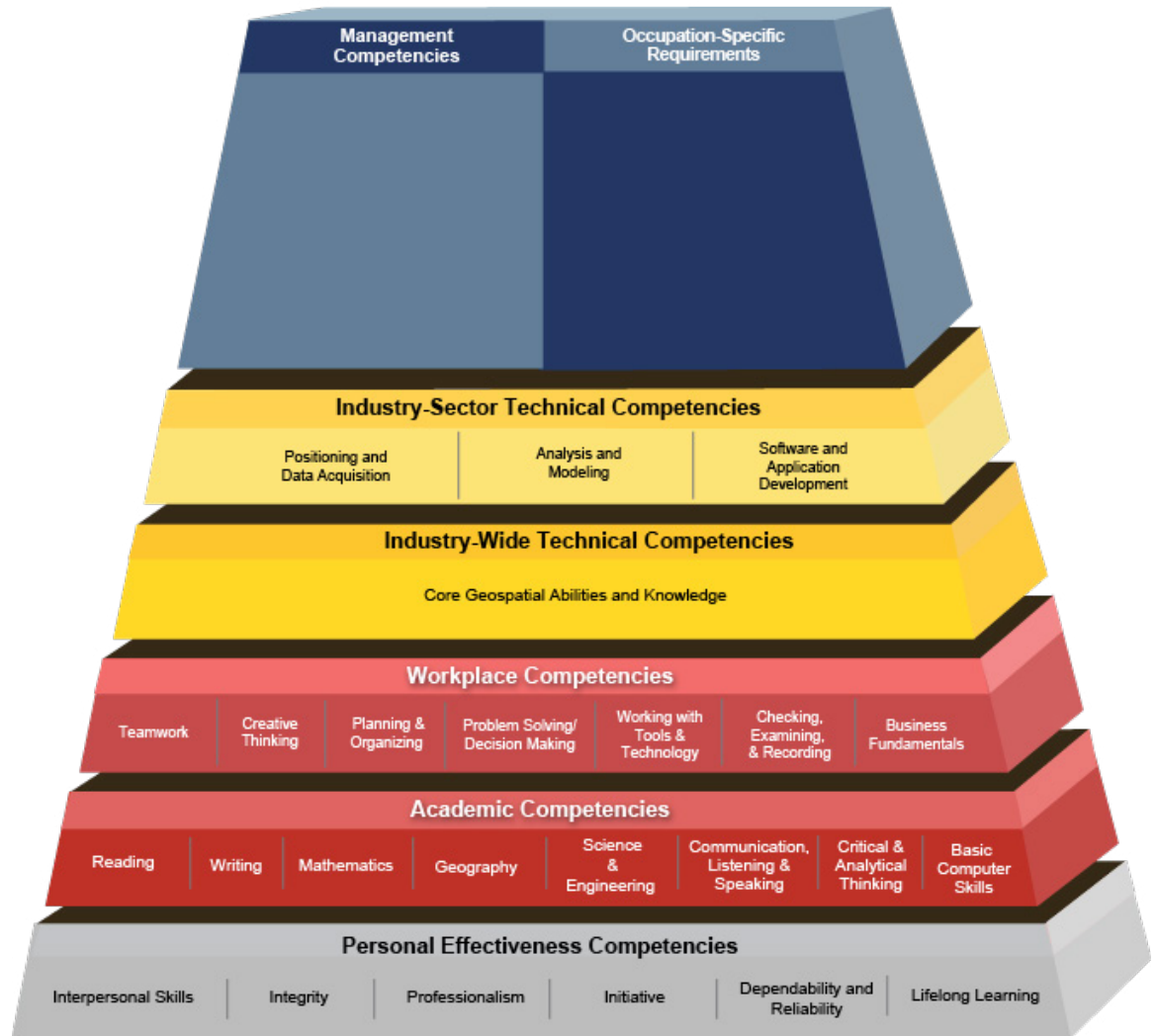
We recommend that GIS program classes continue to expand to Cascade and Southeast campuses, as well as Newberg Center. This requires more lab space, faculty, and support.

### ***Expand Instructional Support System***

Because the GIS Certificate is not an official CTE program, we do not receive the same instructional support even though we are dealing with all of the same support needs of a CTE program. We recommend that the GIS program have a more dedicated instructional support system for advising; program entry processes; and developments in co-op education, internships, and job placement.

# APPENDIX A

## GEOSPATIAL TECHNOLOGY COMPETENCY MODEL



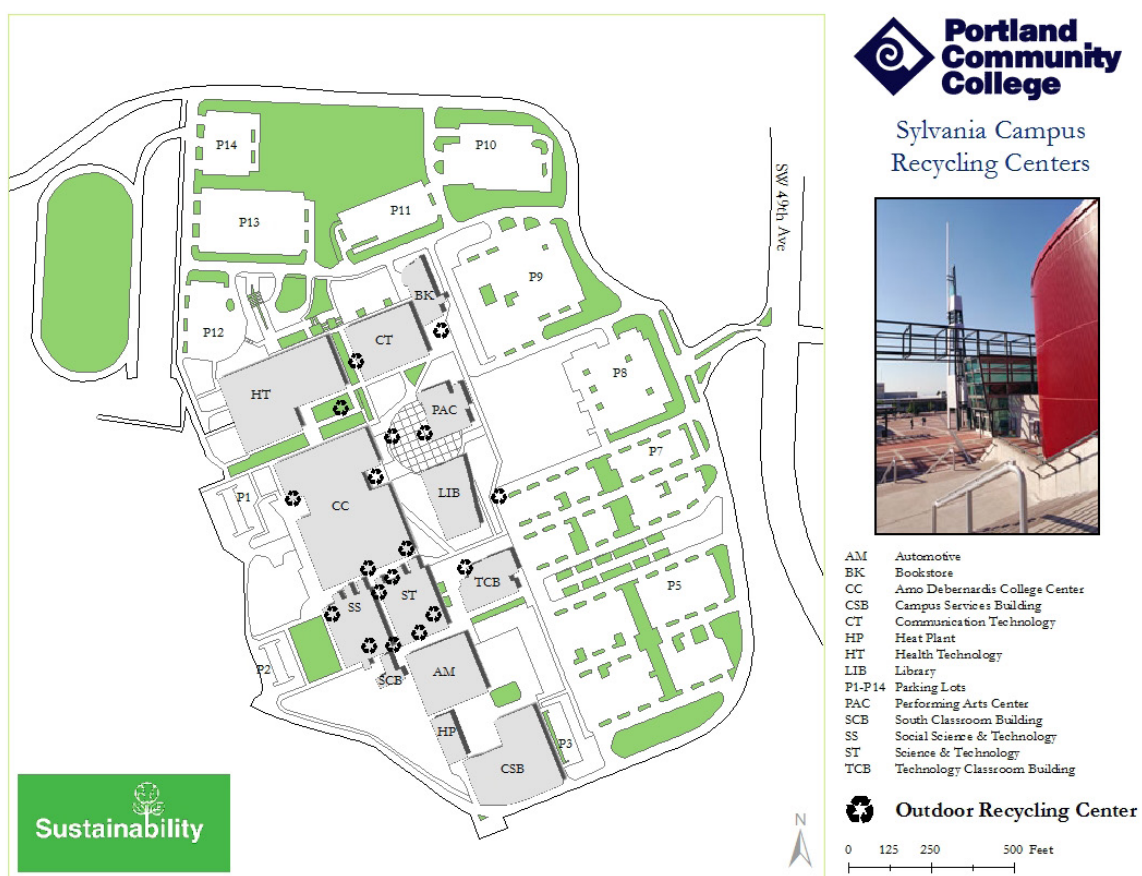
## APPENDIX B

### STUDENT WORK SAMPLES

Below are a series of work samples created by students in either GEO 267 (GIS Applications) or GEO 221 (Field Geography: Local Landscape).

#### **Sample 1. Sylvania Recycles**

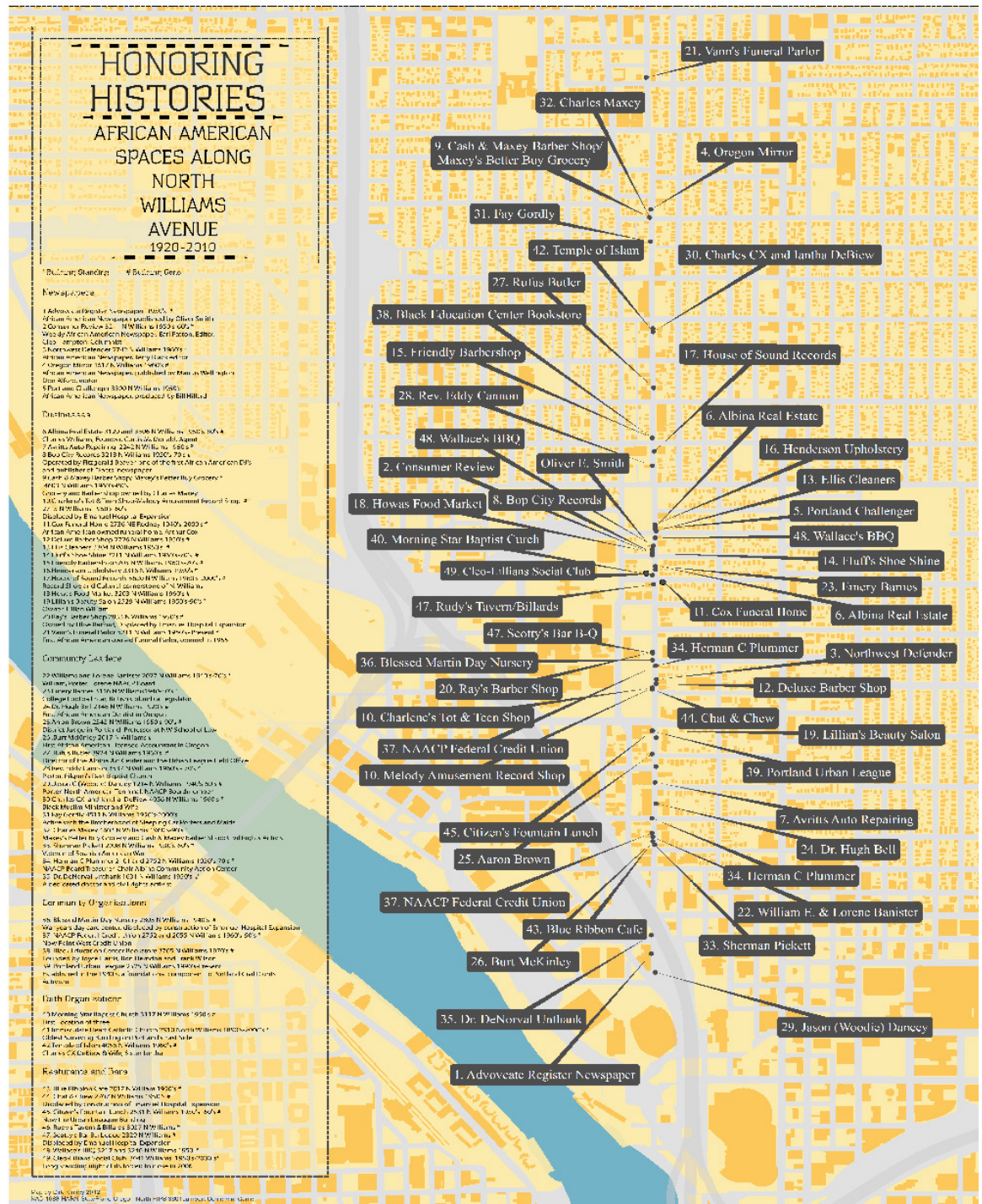
As part of the Sustainability and Recycling Program with PCC Sustainability, Jodi Kansagor collected GPS data on the location of recycling centers and created maps for Cascade, Rock Creek, and Sylvania campuses.



# APPENDIX B

## Sample 2. North Williams Traffic Operations Safety Project

The purpose of this project was to identify and map historic African-American businesses, homes and community organizations along North Williams Avenue in Portland. Dirk Kinsey worked with this organization to create two maps and Google Earth files. The **Honoring Histories** map shows potential locations for the Honoring Histories installation project, and locations that have been identified as historically significant places along North Williams Avenue.

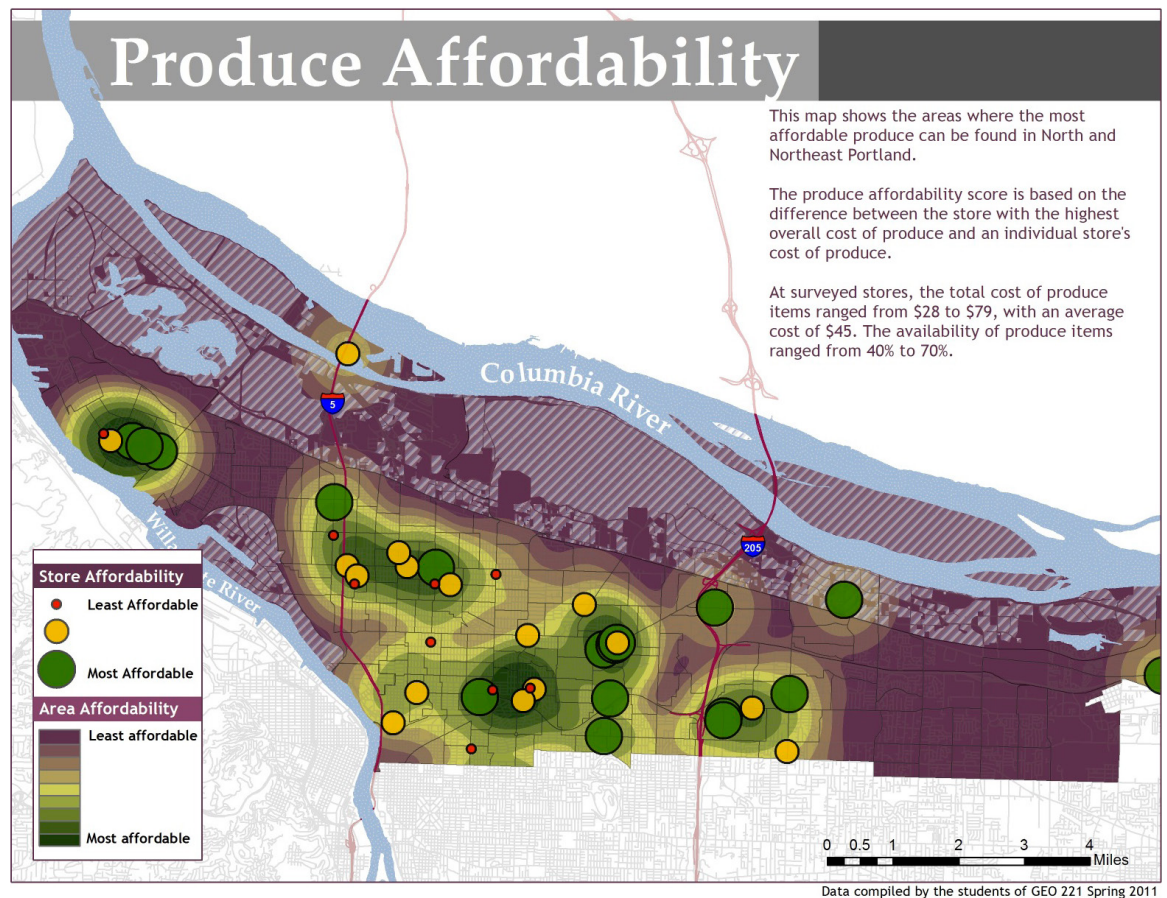




## APPENDIX B

### Sample 3. Produce Affordability

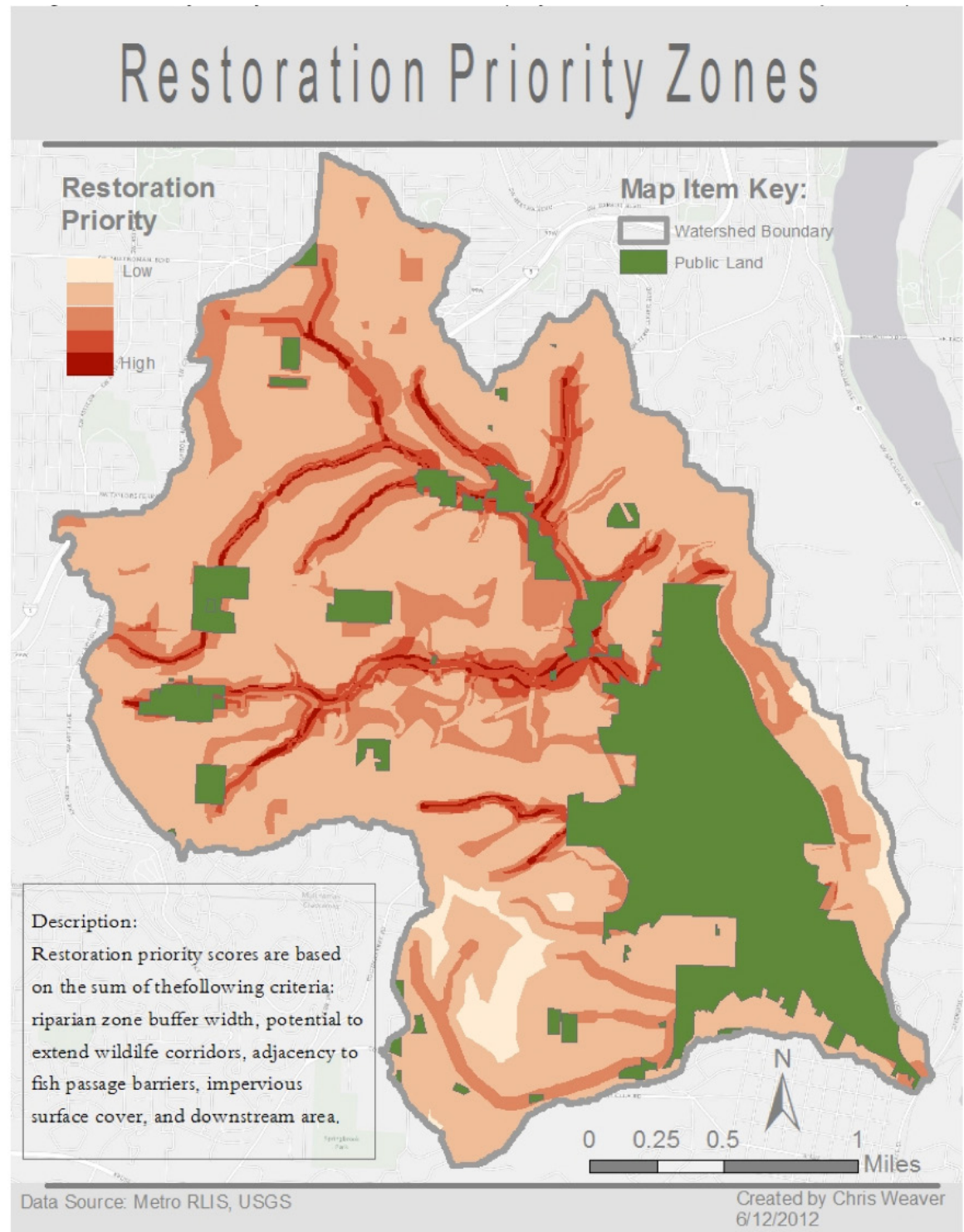
This study is a community mapping project centered on the accessibility to affordable and healthy food, created in partnership with the Housing Organizations of Color Coalition (HOCC). The HOCC is a collaboration of three community development organizations: Portland Community Reinvestment Initiative, Hacienda CDC, and the Native American Youth & Family Center (NAYA). The coalition is concerned with the health disparities that exist within North and Northeast Portland.



## APPENDIX B

### **Sample 4. Restoration Priorities in Tryon Creek Watershed**

In collaboration with Tryon Creek Watershed Council, Chris Weaver completed a GIS analysis to prioritize potential restoration locations within the watershed. This was done by looking at impervious surface, adjacency to known fish barriers, riparian buffer zones, affected downstream area, and potential for wildlife corridors.



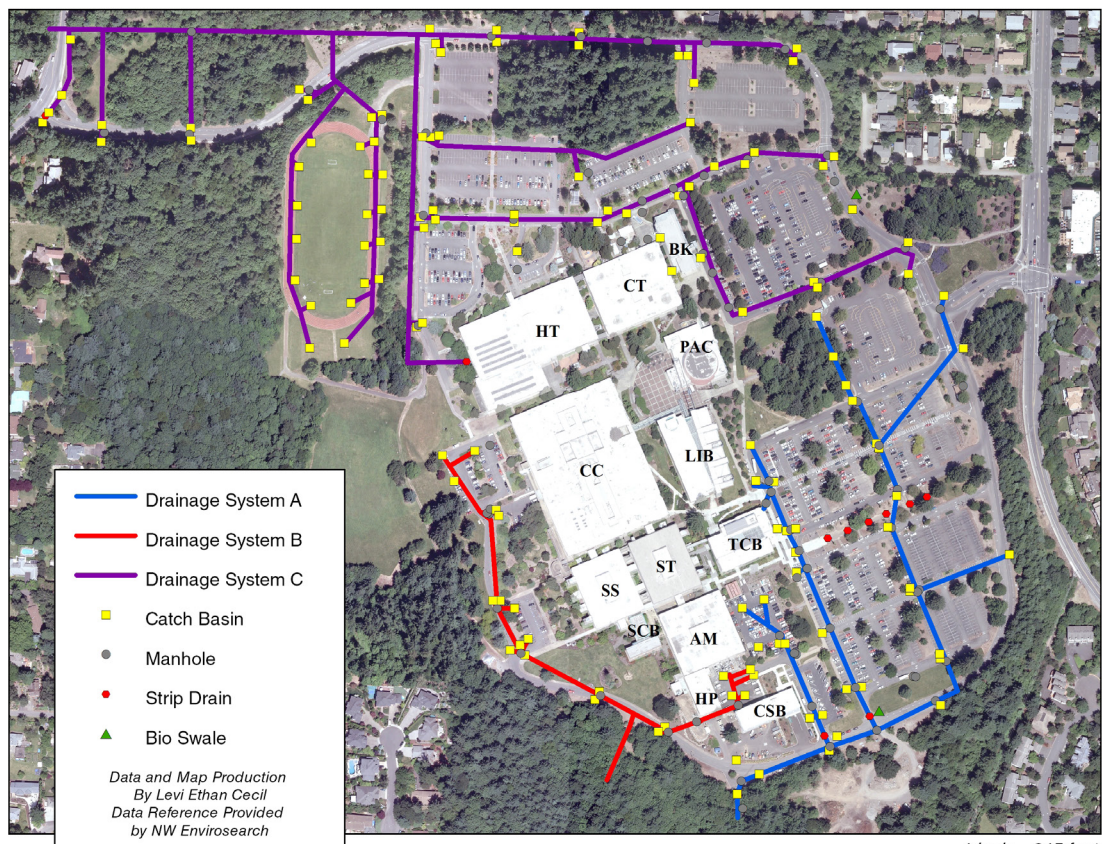
## APPENDIX B

### Sample 5. PCC Stormwater Analysis

Levi Cecil created a watershed map for PCC's Sylvania campus based on the network of drainage pipes and stormwater outfalls, using GPS and a hydrology toolset. This project is part of an interdisciplinary project between the Geography, Engineering, Biology, Chemistry, and Geology departments in order to assess stormwater runoff on campus before, during, and after Bond improvements.



### Sylvania Campus Storm Water System

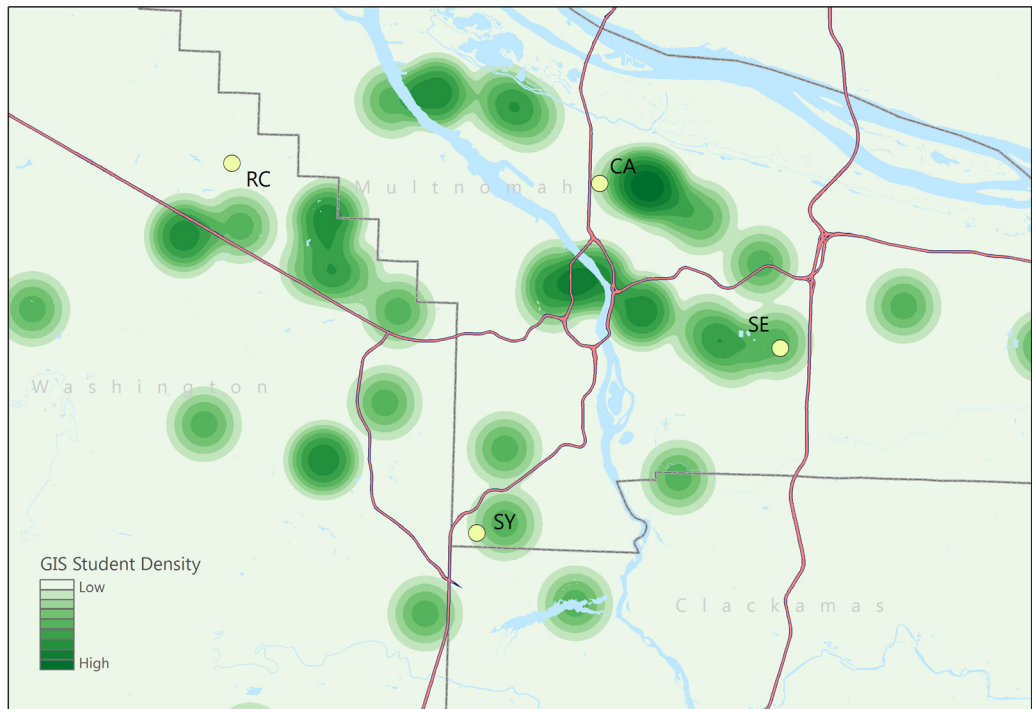


1 inch = 315 feet

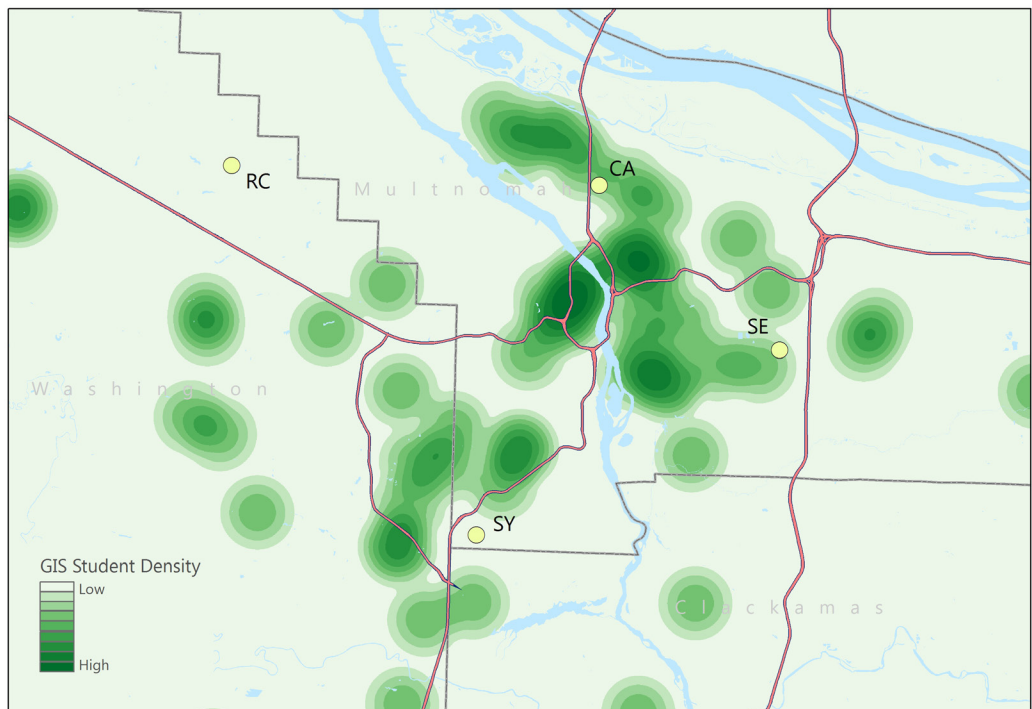
## APPENDIX C

### GIS STUDENT DISTRIBUTION MAPS, 2007-2012

#### GIS Student Distribution 2007 - 2008

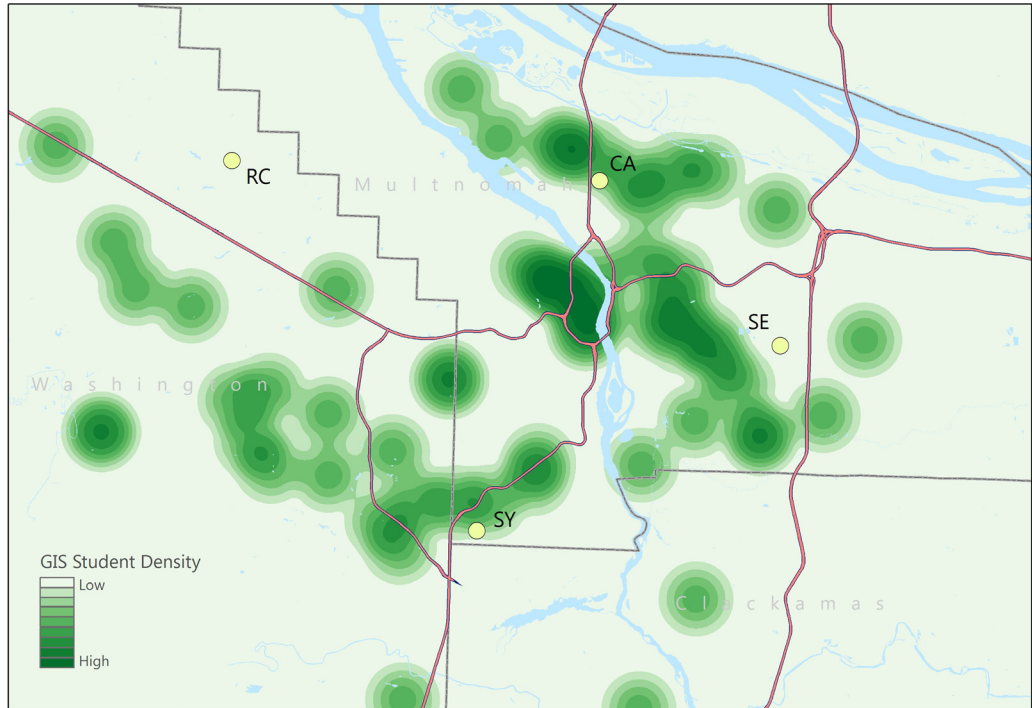


#### GIS Student Distribution 2008 - 2009

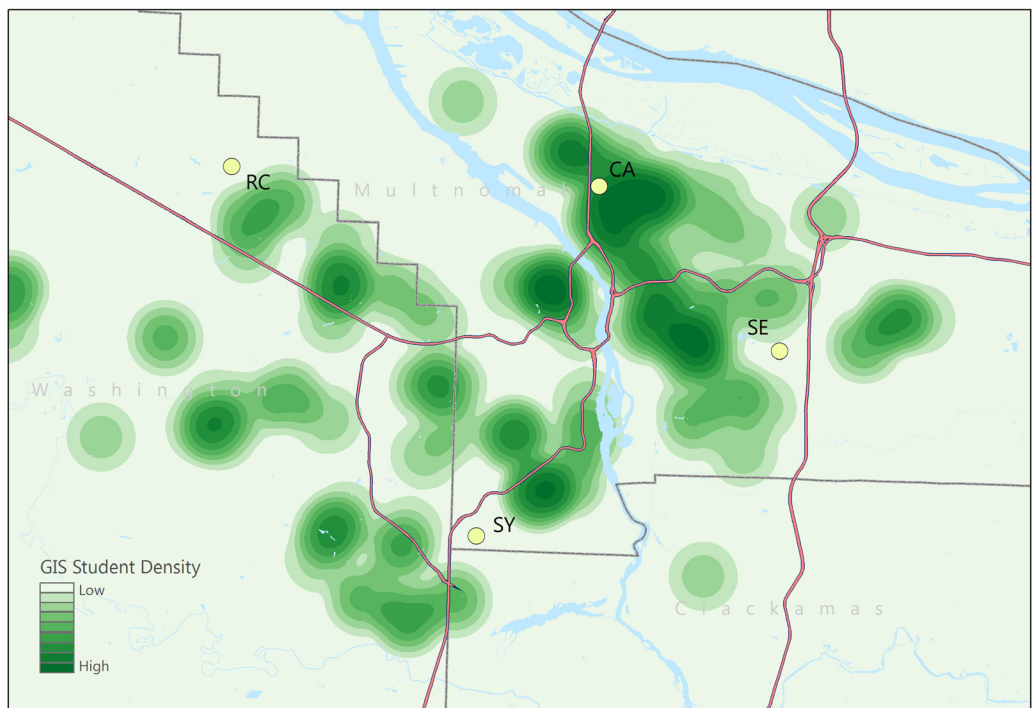


## APPENDIX C

### GIS Student Distribution 2009 - 2010

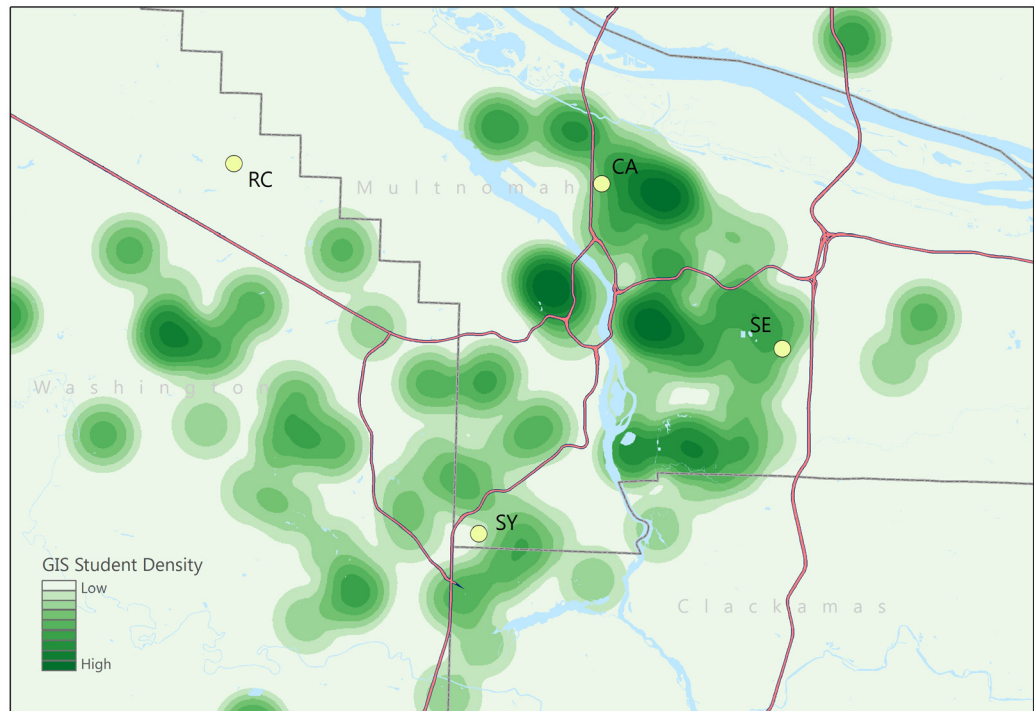


### GIS Student Distribution 2010 - 2011



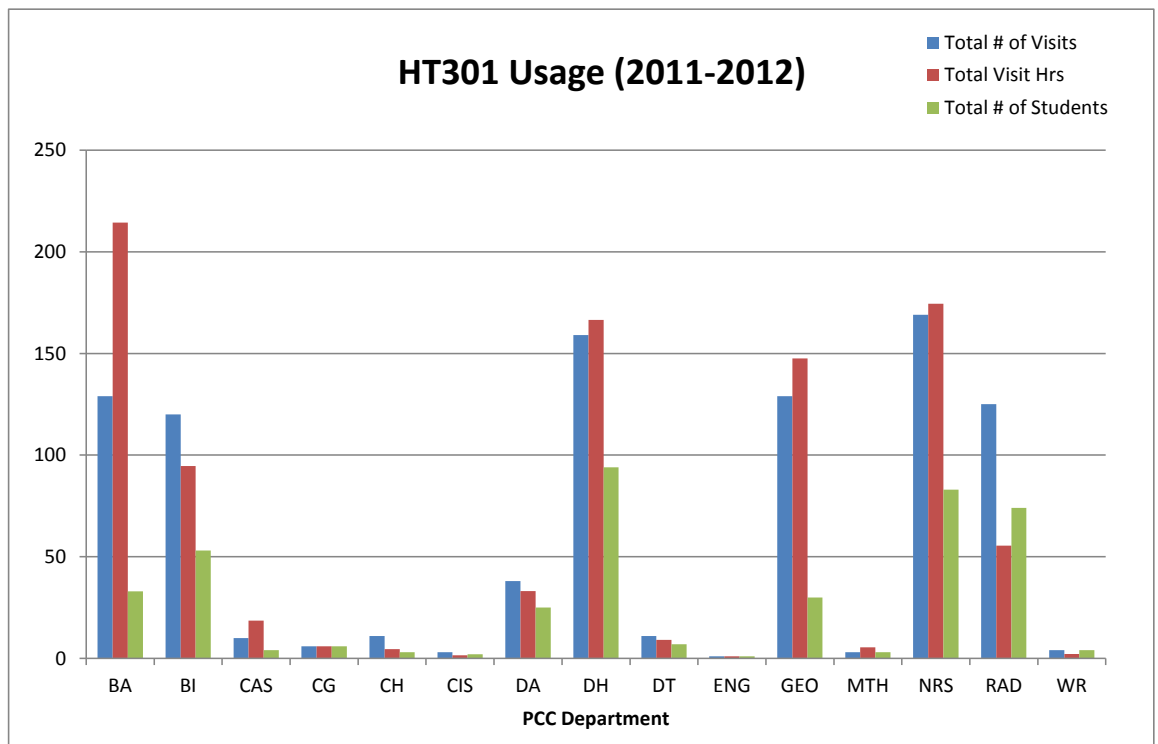
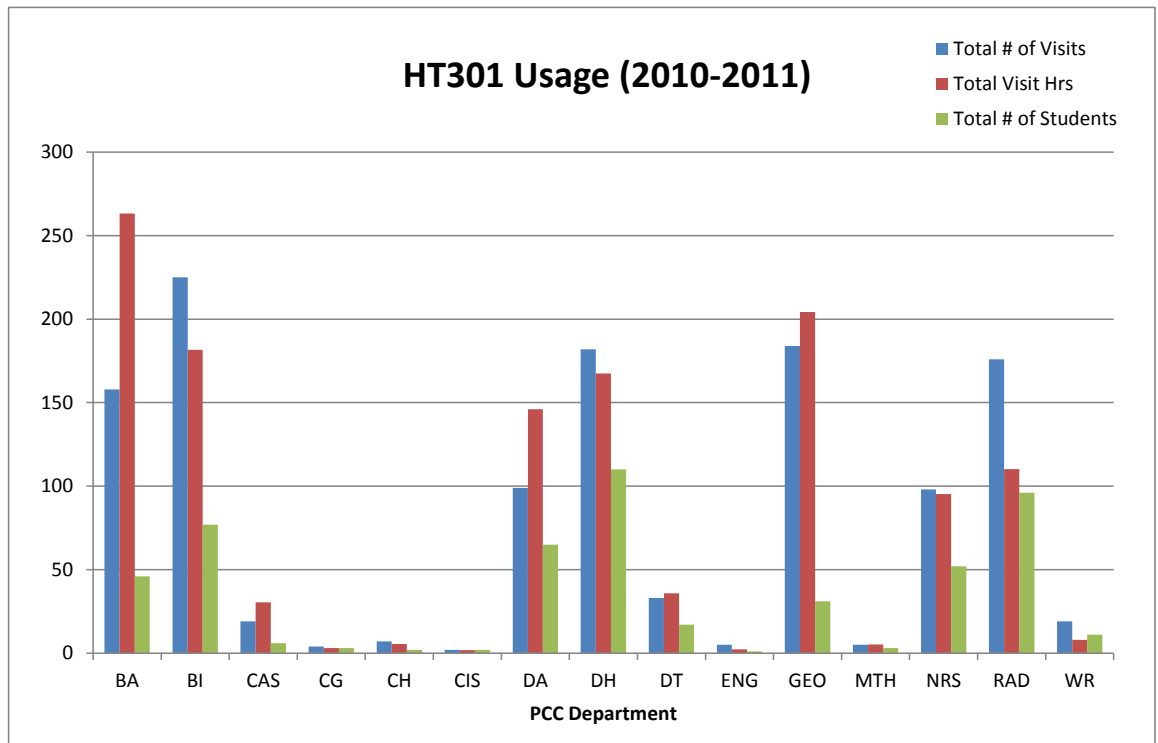
## APPENDIX C

### GIS Student Distribution 2011 - 2012

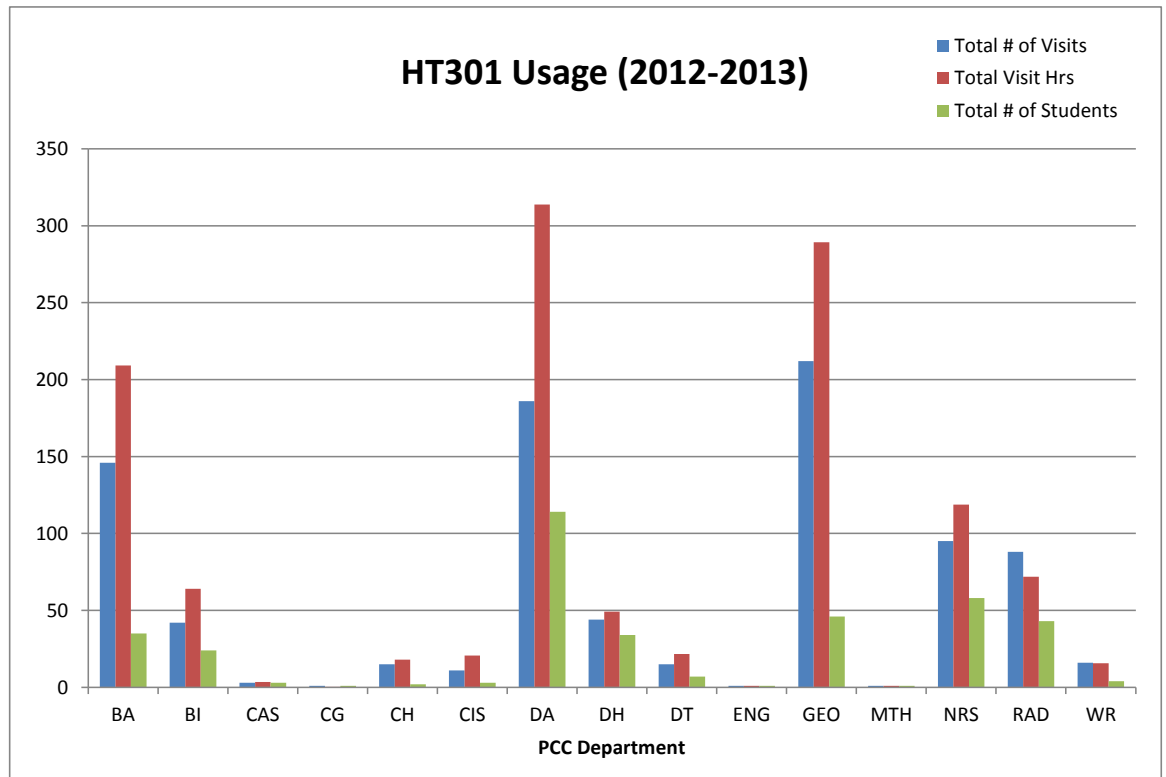


## APPENDIX D

### GIS STUDENT LAB ACCESS (HT301), 2010-2013



## APPENDIX D





## APPENDIX E

### APPENDIX E: GIS CERTIFICATE PROGRAM BROCHURE

# GIS Technical Certificate Program

Geographic information systems (GIS) is one of the top emerging industries in the 21st century. It combines cartography, spatial analysis, and data management to support research and inform decision making. The Geography Department at Portland Community College offers a one-year GIS Certificate that combines GIS concepts, technology, and real-world experience.

## Are you...

1. A student who wishes to acquire technical and topical knowledge to support your major or professional field?
2. A student who wishes to acquire specialized training to meet current or future job requirement calling for GIS knowledge?
3. Spending hours looking at maps to better understand the world you live in?

## What is GIS?

GIS is a framework to acquire, store, manage, analyze and visualize spatial data. Traditional paper maps are able to display just one view of data, at one point in time. Using GIS allows the display of information in various spaces and times. GIS provides a suite of tools used to support decision-making, as well as statistical and spatial analysis.

## GIS Program

The GIS Certificate prepares students to apply GIS with a solid theoretical foundation. A diverse range of GIS skills are covered including data capture, spatial & statistical analysis, modeling and cartography.

The GIS courses take a practical, hands-on approach. Students will not only learn how to use a specific software – they will apply GIS using a variety of projects and methodologies. With a combination of lab exercises, individual projects, and a community-based, collaborative long-term project, students will learn how to plan, design, and execute GIS projects.



### Required Coursework (32 Credits)

SP 111: Public Speaking  
GEO 105: Introduction to Human Geography  
GEO 106: World Regional Geography  
GEO 107: Geography of Global Issues  
GEO 264: Maps & Geospatial Concepts  
GEO 265: Introduction to GIS  
GEO 266: GIS Analysis  
GEO 267: GIS Applications

### Electives (12 credits)

GEO 204: Geography of the Middle East  
GEO 206 - Geography of OREGON  
GEO 209: Physical Geography: Weather and Climate  
GEO 210: The Natural Environment  
GEO 221: Field Geography: The Local Landscape  
GEO 223: Field Geography: GPS & GIS  
GEO 230: Geography of Race and Ethnic Conflicts  
GEO 280A: Cooperative Ed Geography  
GEO 280B: Cooperative Ed Geography Seminar  
GEO 298: Geography Independent Study  
GEO 299: Various topics

Check the current course catalog for additional elective courses from other departments.

[www.pcc.edu/programs/geography/gis.html](http://www.pcc.edu/programs/geography/gis.html)



## APPENDIX F

### ADVISORY COMMITTEE MEETING NOTES

#### PCC GIS Advisory Committee Meeting Notes

December 15, 2011

5:15 – 6:30pm

CLIMB Center

**Present:** Christina Friedle, Marcelle Caturia, Loretta Goldy, Matt Constantino, David Banis, Tommy Albo, Analisa Fenix

#### AGENDA

- 1| Geography / GIS Program News
  - a. New part-time GIS Faculty
  - b. GIS Day events
  - c. New faculty position (Sylvania campus) for 2012-13
  - d. New certificate courses
    - i. Field Geography: GPS & GIS
    - ii. Maps & Geospatial Concepts
- **Christina, Marcelle, Loretta & Matt provided an update on the program events since last meeting**
- **Discussion with David Banis about articulation of the new course to PSU (equivalent class is PSU's GEOG 380). Christina will touch base with Martha Works & Tom Harvey at PSU to formalize the equivalency.**
- 2| GIS Certificate coursework & requirements
  - a. Review existing & new
  - b. Criticism
- **A lively discussion! Thanks for participating and providing some great ideas.**
- **Christina presented the current course requirements for the program, as well as the new requirements that will start in the 2012-13 academic year. The group discussed and reviewed that coursework with an emphasis on providing students with 'technical skills and a breadth of geospatial concepts & technologies.' We discussed the following topics:**
  - **The possibility of making all technical courses (both Field Geography courses) part of the core requirements**
  - **Changing some of course titles to reflect, more specifically, the GIS skills of the class (Local landscape, for example)**
  - **Include Statistics courses as electives (Mth 243 & 244) – they cover spatial stats concepts that could be helpful for students who want to pursue that route in GIS**
  - **Definitely add a Cartography course**

## APPENDIX F

- Provide 'short courses' for students to explore a wider variety of GIS class. This could be in spatial stats & modeling, Microsoft office (ppt, excel), Python programming, remote sensing, GIS overview (with case studies for students contemplating GIS). The short courses could be a weekend course, 4-week, 1 credit - we would have to explore PCC options and the obstacles that may exist for each of those.
- 3| Private sector representation on Advisory Committee
- Christina is soliciting recommendations for new committee members in the private sector - can anyone recommend a GIS professional that may be interested in participating on the committee? If so, please provide Christina with their names & contact info.
- 4| Advertising / Publicizing the program outside of PCC
- PSU does not advertise at all - never has. PSU does not track how people find about the program, but David believes it is mostly from having an online presence.
  - I did a quick Google search (thanks Analisa) and PSU has the first three results and PCC is second. I searched "Portland GIS certificate."
  - David also suggested talking to other community colleges about their approaches for student recruitment. Both Lane and Central Oregon CC have programs. Christina can make contact and find out more about their strategies.
- 5| GeoTech Career Fair (Spring)
- Marcelle provided an overview of what a GeoTech Career fair would look like. Some concerns & suggestions were brought up:
    - It might be hard to get companies to commit to a long time frame to be present, as well as setting up a booth
    - A lot of work to coordinate and get set up from a logistical standpoint
    - PSU has a career panel in the spring - representatives come for a 2-hour commitment and students are invited to come and ask questions, and here about the companies/organizations
    - Host a career event at Metro (or some other location in the community), where GIS professionals from that organization present their work and provide career advise and answer questions. Could invite other community orgs/companies as well.
    - "Follow a GIS professional" for a day - set up students with GIS professionals for a ½ day, 'day in the life of....'



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## APPENDIX F

- **Tie into our existing GIS day / geography awareness week activities**

### 6| Wrap-up

- **Thanks everyone for participating! We will meet again at some point in the spring term (April - June). Until then....**

## APPENDIX F

### PCC GIS Advisory Committee Meeting Notes

May 24, 2012  
6:00 – 7:30pm  
CLIMB Center

**Present:** Christina Friedle, David Banis, Kevin Martin, Molly Vogt, Tommy Albo

#### AGENDA

- 1| Geography / GIS Program News
  - a. New full-time Geography/GIS position @ Sylvania
  - b. Python Seminar @ Rock Creek – June 2
  - c. Private sector representation on committee
  - **Christina provided an update on the program since we met in the fall**
  - **Distributed information to Committee on the Python workshop being held at PCC to invite co-workers, students, other interested persons**
  - **Christina has invited 3 new members to participate on the Advisory Committee. So far, two of the three have agreed to participate. At the fall meeting Rafael Gutierrez @ Grafa Geographic Design and Tyler Vick @ Maul, Foster & Alongi. Christina is still trying to recruit someone from Watershed Sciences.**
- 2| New GIS Certificate Courses
  - a. Cartography
  - b. Upcoming...
  - **There was a long discussion on the content that should be covered in a new Cartography course including (but not limited to): web cartography, Cartography & communications; graphs & charts; quantitative data (Tufte); how to make a ‘non-GIS’ map; stick with cartography in ArcGIS (as opposed to a design program); general graphic design principles;**
  - **The committee discussed other new courses that could be developed that are not already being offered elsewhere, and would be beneficial to students looking for employment.**
  - **The one that rose to the top: Spatial Statistics. This can take many directions, including Information graphics, Data Visualization, Visual Representations, etc. Possible to co-teach with a math instructor?**
  - **Web Mapping – another course that we discussed. This presents a few issues with software, but as more software becomes open source and user-friendly that may no longer be an obstacle.**
- 3| Part-time instructors for GIS & Specialty courses (GPS)



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## APPENDIX F

- **PCC is always in need of more GIS instructors, especially as the program grows. Christina asked for help with potential instructors and getting the word out to the GIS community. The committee requested a 'job description' to pass around as a way to get more instructors into the PCC pool. Christina will create something and email it to the others.**

#### 4| Student opportunities w/ NACIS conference

- **David Banis is working with the planning committee for the NACIS conference - he will let Christina know of any opportunities for students as the date gets closer**
- **The committee discussed other ways students could get involved in Professional organizations - GIS in Action, ASPRS (getting a PCC chapter?) & forming a GIS club on campus**

#### 5| Wrap-up

- **Always great to get this group together! Thanks for participating and we will meet again in the Fall.**

## APPENDIX F

### GIS Advisory Committee Meeting

December 13, 2012

6:00 - 7:30pm

CLIMB Center

**Present:** Christina Friedle, David Banis, Analisa Fenix, Molly Vogt, Tommy Albo, Tonya Booker, Steven Jett, Matt Constantino

#### 1 Welcome & introductions

- Since we had a few new members join the group, each person introduced themselves. Welcome Steve & Tonya!

#### 2 Fall Update

- a New class offerings in 2012-13
  - b GIS classes at SE Campus
- Christina provided an overview of the new classes being offered in the Geography Department this year – Maps & Geospatial Concepts, Cartographic Principles & Design, GIS Programming.
  - Steve Jett will be teaching our first GIS class at SE campus this spring – exciting! This means that we will now be offering at least one GIS class at all four campuses.

#### 3 Geography / GIS Program Review

- a Role of GIS (broad & local)
  - b Current Status of GIS Certificate Program
  - c GIS job market & trends
  - d Other topics
- This initiated a long discussion that touched upon the following topics:
    - David asked about an outside review from another academic institution for program review. PSU has a similar policy, in which an outside person from another academic institution is required to review the program more subjectively.
    - Internships – what is the role of internships in the GIS program? We discussed the existing model of agency & college partnerships that provide an opportunity for GIS students to get real-world experience while still in school.
    - Judging ‘Success’ of the program – graduation rates are not the only measurement of student success in the program. What are other ways that we can pull upon the successes of the program?
      - Growth in GIS, geographic, and spatial knowledge in our students.





## APPENDIX F

- King County (WA) just completed a study on the ROI (Return on Investment) in adopting and using GIS. Look at the study as a reference.
- How can we incorporate GIS into STEM (Science, Technology, Engineering, and Mathematics)? There is a clear and obvious connection. How can we capitalize on this in our program?
- Job Market & Employability –
  - there are a number of issues with tracking this because not all ‘GIS jobs’ have GIS in the title. For example, it could be Research Analyst, or Wildlife Biologist (utilizing GIS).
  - Not many ‘strictly’ GIS jobs in PDX
  - GIS is a tool or skillset that supplements or complements another area of study (environmental science, business, urban planning, engineering, etc).
  - How does one get a GIS job?
    - Somewhat serendipitous – important to network
    - Capitalize on previous knowledge, skills, background with GIS as a tool
    - Businesses have not fully adopted GIS tools/technology
    - Portland has a strong GIS community, making many resources available here that cannot be found elsewhere
  - What is the current GIS employability situation in Portland?
    - Geologi – potential for research & development jobs in GIS if ESRI does develop into a Research Hub.
    - GIS Analysts, GIS technicians, GIS programmers/developers
    - Necessary skill: Think spatially.
    - GIS + Geography = spatial thinking
    - Analisa mentioned the increasing requests in her job for infographics
    - Ecotrust – currently has 7 GIS employees & 4 GIS programmers. Any increase in this will be in the GIS programming department. They have not hired any new GIS employee since 2010.
    - Metro (DRC) – in the last year has hired 2 Limited term GIS positions, 2 temporary, and 1 internship (planning).
    - Largest employers – Watershed sciences, DOGAMI

#### 4 Wrap-up

- Always great to get this group together! Thanks for participating and we will meet again in the Fall.