

**BASIC PROGRAM INFORMATION**

*Program Review is a self-study of your discipline. It is about documenting the plans you have for improving student success in your program and sharing that information with the college community. Through the review of and reflection on key program elements, program review and planning identifies program strengths as well as strategies necessary to improve the academic discipline, program, or service to support student success. With that in mind, please answer the following questions:*

**Discipline Name:** Oceanography

**Department Name:** Earth, Space, & Aviation Sciences

**Division Name:** MNHS

Please list all participants in this Program Review :

Name	Position
Patty Deen	Faculty, Oceanography and Earth Science
Al Trujillo	Faculty, Oceanography
Lisa Yon	Faculty, Oceanography and Earth Science

**Number of Full Time Faculty:** 3

**Number of Part Time Faculty:** 3

**Please list the Classified positions (and their FTE) that support this discipline:**

Academic Department Assistant (20%)  
Department Technician (10%)

**What additional hourly staff support this discipline and/or department:**

None

**Discipline mission statement:** [Link to "How to Build a Mission Statement"](#)

The mission of the Oceanography Program at Palomar College is to fulfill the general education physical science requirement for degree or transfer. The Oceanography Program offers students the opportunity to study the dynamic processes and interconnections that affect Earth's marine systems including the study of geologic, chemical, physical, and biologic oceanography. Further, the Oceanography Program seeks to help students develop an understanding of the ocean's influence on humans as well as their impact on the ocean environment. Students who successfully complete the program will be able to make informed and responsible decisions regarding the oceans and its resources.

**List any new degrees and certificates offered within this discipline since your last comprehensive review:**

None

Discipline Level Data: <https://sharepoint2.palomar.edu/sites/IRPA/SitePages/PRP%20Summary%20Source.aspx>

## SECTION 1: PROGRAM REFLECTION

### 1A. Program Analysis: Reflect upon and provide an analysis of your summary data.

Oceanography enrollments have remained stable and high with some variation over the past six years of data and compare favorably with campus averages. For most of this analysis, six full years of data were used and included 12 semesters: Fall 2010 to Spring 2016 (most recent data). Note that there is no data for online offerings during Fall 2010 as Trujillo was on sabbatical. The variables that are examined in detail in this analysis include: (1) Enrollments, (2) Fill Rate, (3) Total FTEF, (4) WSCH/FTEF, (5) Success Rate, and (6) Retention Rate.

#### Enrollments

During the past 12 semesters, Oceanography Program enrollments have averaged 610 students per semester at census, which represents an average of 28% of the total enrollment of the ESAS Department. Enrollments have been as low as 516 (Fall 2010) and reached an all-time high of 717 (Spring 2014). The Oceanography Program is one of the largest single-subject programs in the sciences: Each semester, there are on average about 500 students enrolled in Oceanography 100 Lecture and about 110 students enrolled in Oceanography 100 Lab.

#### Fill Rate

During the past 12 semesters, average fill rate for the Oceanography Program was 93.6% as compared to the college average of 85.8% over the same period. In fact, the fill rate for the Oceanography Program sometimes exceeded 100% (Spring 2012, Fall 2012). The data shows a significant drop-off of Oceanography Program fill rate (80.21%) in Spring 2015, most likely due to the same reasons the college-wide fill rate has decreased (80.45%) and why enrollments for the college as a whole have decreased. The Oceanography Program non-Distance Education (DE) Fill Rate is 94.9%, and the Distance Education (DE) Fill Rate was 85.8%. It is noted that the DE fill rate has been decreasing over time from 94.54% during Fall 2010 to 80.24% in Spring 2016. This is most likely a result of increasing the class size of Oceanography 100 Online from 32 to 42 students (Spring 2016), which represents a 31% increase in class size.

#### Total FTEF

The Oceanography Program has 3 full-time faculty members, but not all of them teach a full load in oceanography. For the past 12 semesters of data, Total FTEF for the program is 3.6 per semester, indicating that the oceanography teaching load is more than what can be taught by 3 full-time instructors. Part-time/Total FTEF % has also varied markedly during the past 12 semesters depending on faculty sabbaticals and various leaves, ranging from a high of 64.52% (Spring 2011) to a low of 37.14% (Fall 2012). It is likely that the Part-time/Total FTEF% will remain high as long as full-time instructors teach a substantial proportion of their load in other Earth Science disciplines.

#### WSCH/FTEF

It is noted that a desirable target for WSCH/FTEF is 550. During the past 12 semesters, the Oceanography Program WSCH/FTEF averaged 561.4, which is very high and is a result of teaching large class sections that mostly fill to capacity. It is also noted that during Fall 2015, the Oceanography Program WSCH/FTEF reached an all-time high for WSCH/FTEF of 592.5. This value will continue to increase if the proposed class size in Oceanography 100 Online is increased from 42 to 60 (a total increase from 32 to 60 students, which represents an 87.5% increase in class size). However, the increase will very likely adversely affect student success and retention rates.

#### Success Rate

The Oceanography Program success rate has remained relatively stable and moderate with some variation over the past 12 semesters of data, ranging from 63.6% in Spring 2014 to 73.1% in Fall 2010. During the 12 semesters of data, Oceanography Program success rates have averaged 67.9%, which is lower than the average success rate for the college as a whole (71.4%). This is very typical for what students consider difficult science classes. Still, the average success rate of Oceanography 100 Online (67.2%) is higher than the overall college DE success rate of 63.4%. However, it is also noted that the average success rate for Oceanography 100 Online (67.2%) has been decreasing over time, from a high of 76.9% in Spring 2012 to a low of 55.9% in Fall 2015. This decrease over time may be due to the fact that more sections of Oceanography 100 Online were being offered, and even though the classes were full with students on the waitlist, the waitlists are shorter and no students are being turned away as they have been in the past. In essence, demand for the class is reduced, thereby creating less competition for the class. This could allow under-prepared students to enroll in the class, thereby lowering the overall success rate through time. It is also noted that the college-wide success rate for DE classes follows a similar trend that is decreasing over time. Further, it is likely that the success rate of Oceanography 100 Lecture online classes will continue to decrease as Oceanography 100 Online class sizes are increased from 42 to 60 as has been proposed for Fall 2017. Also, with the increase in Oceanography 100 Online class size from 32 to 42, it has reduced one section of Oceanography 100 Online; if the proposed class size is increased to 60, it will reduce another section of

Oceanography 100 Online. It is noted that larger class size are more difficult for an instructor to create a positive learning environment for online students and inhibits student-to-student as well as instructor-to-student interaction.

#### Retention Rate

The Oceanography Program retention rate has remained stable and high with some variation over the past 12 semesters of data. Oceanography retention rates have varied from 87.5% (Spring 2015) to 95.9% (Spring 2012) and have averaged 92.3%, which nearly matches the college-wide DE average (92.6%). Oceanography 100 Online has a retention rate that averaged 87.8% (high of 96.6% in Spring 2012) and exceeds the college DE retention rate of 86.7%. It is also noted that there is a substantial drop-off of Oceanography 100 Online class retention rate (80.3%) in Fall 2014, coinciding with a similar drop-off of the overall college retention rate for DE classes of 83.2% in Fall 2014. The downward trend of online retention rate is ascribed to less demand for online classes, thereby resulting in shorter waitlists and less prepared students registering in online Oceanography 100 Lecture classes. Overall, the college is experiencing a similar decline in DE retention rates (down from a high of 91.7% in Spring 2012 to 83.2% in Fall 2014). It is anticipated that the retention rate of Oceanography 100 Lecture online classes will continue to decrease as online class sizes have increased from 32 to 42 beginning in Spring 2016, with further increases in class size to 60 to match face-to-face classes anticipated in the future. Also, with the increase in online class size, one section of Oceanography 100 Online has been dropped.

#### Analysis of Oceanography Labs

Over the 6 years, the lab has consistently had a high enrollment at census with an average of 90%. The WSCH for Fall 2015 was 378.75, which was the highest by far in all 6 years. The next closest was in Fall 2010, which was 356.25. % total FTEF for Fall 2015 was 50%. This varies considerably depending on full-time faculty on leave. Due to the numerous field trips and the large time commitment for set-up, the goal is for OCN lab to be taught largely by full-time faculty. Patty's pending retirement in July 2018 will have a high impact in this area.

Success and retention data for OCN Lab is combined with OCN Lecture, so there is no way to analyze these factors for OCN Lab apart from the program. However, based on instructor knowledge, both success and retention rates are very strong.

There are two major factors that we see impacting the OCN Lab. 1) The first is that there is no official wait list. We have been told that because OCN Lab has a pre-requisite of enrollment in OCN Lecture, which must be verified by registration software, a waitlist cannot be generated. As sections fill before the beginning of the semester, potential students are not given the opportunity to be added to a wait list, which gives students the impression that the class is unavailable for them. Seats are only opened up as students drop in the pre-semester registration period. Only students who happen to check at the right time are able to register for the class. Students have complained about this! We are no doubt losing students to this software issue. 2) Surveys of enrolled lab students show that most students are taking face-to-face sections. Approximately 30% of oceanography lecture students are enrolled in online lecture sections. As enrollment in online sections increase resulting from increased caps (from 28 to 42) and offered sections (from 4 to 5), the pool of potential students for lab declines. A decline in Oceanography lab students will impact our ability to offer the unique field experience (boat and lab) at the Ocean Institute in Dana Point, a favorite of students.

Due to the limited capacity and difficulties reaching minimum class size for lab at the Escondido campus, the administration needs to make a decision to either support offering the Oceanography lab at Escondido with a smaller class size or to not offer the class at that site. If that section were to be offered on the main campus, the class would likely fill to higher capacity. However, with the current limitations on how many sections we can offer, we lose enrollment by offering the class at PCEC. Also, the PCEC lab and lecture classes are typically very low enrollment; by cancelling these classes at the last minute we put faculty schedules into flux.

**1B. Standards:** ACCJC requires that colleges establish institutional and program level standards in the area of course success rates. These standards represent the lowest success rate (% A, B, C, or Credit) deemed acceptable by the College. In other words, if you were to notice a drop below the rate, you would seek further information to examine why the drop occurred and strategies to address the rate.

#### Discipline Level Course Success Rate:

- The College's institutional standard for course success rate is **70%**.
- Review your discipline's course success rates over the past five years.
- Identify the minimum acceptable course success rate for your discipline. When setting this rate, consider the level of curriculum (e.g., basic skills, AA, Transfer) and other factors that influence success rates within your area. If you set your discipline standard below the College's standard, please explain why.

Standard for Discipline Course Success Rate: 67.5

#### Why?

For a variety of reasons, science courses are deemed more difficult by students. Over the past 12 semesters of data, the Oceanography Program success rate has varied from a high of 73.1% (Fall 2010) to a low of 63.6% (Spring 2014) and averages

67.9%, which is just slightly below the college's institutional standard of 70%.

**1C. Program Update:** Describe your proudest moments or achievements related to student success and outcome.

The Oceanography Program remains one of the cornerstones of the Earth, Space, & Aviation Sciences Department. During the past 16 semesters, average student enrollment at census in Oceanography 100 Lecture has been 381 students. During Spring 2014, average student enrollment reached an all-time high of 555 students and an all-time high of 15 sections of Oceanography 100 Lecture (both face-to-face and online). In addition, during Fall 2015, the Oceanography Program WSCH/FTEF reached an all-time high of 592.5.

A new, updated lab manual was produced in Summer 2016 covering timely topics (i.e. ocean acidification and satellite observation of Earth's oceans) utilizing technology and current data from research sites.

Oceanography students at Palomar continue to provide valuable feedback for revisions of the textbook Essentials of Oceanography, which is authored by Trujillo and is the world's best-selling college-level oceanography textbook. In fact, Essentials of Oceanography 12th Edition was recently awarded the 2017 Textbook and Academic Authors Association McGuffey Longevity Award for its long history of publication.

During the past SLOAC cycle, all three SLOs for Oceanography 100 Lecture were met or exceeded.

In addition, the Oceanography Program at Palomar College is participating in two nationwide college-level curriculum development/Beta testing projects, both of which are funded by NSF to incorporate the use of near real-time oceanographic data into student activities, which are being used by a host of oceanography institutions across the country. These projects are: (1) Ocean Tracks, which uses satellite tracking of marine animals to study migration patterns and behaviors (see: <http://oceantracks.org/>), and (2) the Ocean Observatories Initiative (OOI) Data Explorations: Exploring Primary Production with Data (see: <http://education.oceanobservatories.org/productivity/>). Trujillo continues to work with curriculum development teams and has been asked to participate in an upcoming OOI Data Explorations national workshop at Rutgers University (New Jersey) entitled Exploring Geological Oceanography with Data (June, 2017).

**1D. Program Improvement:** What areas or activities are you working on this year to improve your program? Please respond to new data as well as feedback from last year's program review.

The new laboratory manual with updated visual and data-rich resources better addresses the learning styles of the current student population.

To increase enrollments and offer students non-traditional course offerings, a new section of Oceanography 100 Lecture Hybrid is being offered during Fall 2017 (CPPEN-S, FT1). In addition, the Oceanography Program will assess the Oceanography 100 Lecture SLOs during Fall 2017. The program will also convene an annual Oceanography Lecture Instructor's Meeting in January 2018 to discuss SLOACs and demonstrate best practices in teaching SLO content areas, both of which help ensure quality and consistency of instruction.

**1E. Unanticipated Factors:** Have there been any unanticipated factors that have affected the progress of your previous plan?

Scheduling issues with new compressed schedule: Early lab times (11:20am) overlap with existing lecture courses thus reducing the potential population to enroll in lab; Timing also limits time availability for lab set-up (10 minutes is not sufficient causing the start time for some labs to be delayed), and field trips are impacted by lunch-time traffic and overlap with public school groups; end of lab travel time is insufficient causing conflict with student schedules. Later lab times (2:40pm) present issues with availability of daylight for field trips, especially during the fall semester. Increased costs for the program at the Ocean Institute, combined with declines in enrollment are putting upward pressure on the cost we must charge students to participate in this field experience.

Facilities, specifically computers... lap tops (used in 50% of the in-class lab activities), are old, hand-me-downs which do not charge fully, have defective touch pads, have limited memory capacity, and often crash during use causing students to lose valuable learning time.

**Increasing Oceanography 100 Online Class Size**

In Spring 2016, the class size of Oceanography 100 Online was increased from 32 to 42 students (a 31% increase in class size). The district is proposing to increase Oceanography 100 Online class size from 42 to 60 (a total increase from 32 to 60 students, which represents an 87.5% increase in class size). If online class size is increased to 60, it will kill quality teaching in the sciences at

Palomar. In fact, the increase from 32 to 42 students has already negatively affected online course offerings in the sciences. Limiting the number of online class offerings in the sciences is not good for our students, who will likely seek other colleges to enroll in these classes. And it's not good for Palomar, especially in a time when the college is trying to achieve enrollment stability.

There is abundant evidence from educational studies that show that smaller class sizes facilitate student interaction (see references below). Since online classes require specific pedagogy to increase student-to-student and student-to-instructor interaction, it's a mistake to enforce the same large class sizes as face-to-face classes. Anyone who has taught both face-to-face and online knows how different the two types of classes are.

Increasing online class size to 60 is pedagogically unsound. It's counter to the principles of small class sizes in community colleges. It's not good for our students, instructors, or Palomar College class offerings. Trujillo asks for administrative support to help keep his carefully-designed Oceanography 100 Online classes that emphasize active learning and student interaction from turning into the equivalent of a massive online course.

Refs:  
Bettinger, Eric, et al., 2014. The Effects of Class Size in Online College Courses: Experimental Evidence, Center for Economic Studies CESifo Area Conference Program Munich Germany at: <http://www.cesifo-group.de/ifoHome/events/Archive/conferences/2014/09/2014-09-12-ee14-Hanushek/Programme.html>

Key statements: "... interactions substantially change in an online setting [in large classes] where discussion boards are the primary forum where peers interact." and "While online courses may present an opportunity to reduce higher education costs, any adverse impact of class size could lead to a deterioration in the overall quality of college courses."

Orellana, Anymir, 2006. Class size and interaction in online courses. The Quarterly Review of Distance Education, Volume 7(3), pp. 229–248 at: [http://wps.prenhall.com/wps/media/objects/4512/4621309/Survey\\_Online\\_Class\\_Size.pdf](http://wps.prenhall.com/wps/media/objects/4512/4621309/Survey_Online_Class_Size.pdf)

Key statement: "... [an online] class size of 18.9 was perceived as optimal to better achieve the course's actual level of interaction, and [an online] class size of 15.9 was perceived as optimal to achieve the highest level of interaction."

Worthen, Helena, 2013. What Do We Know about Teaching Online? American Association of University Professors Report of Survey Findings at: <https://www.aap.org/article/what-do-we-know-about-teaching-online#.WKMI0X8zWUI>

Key statement: "The typical [online] class size for our respondents, regardless of sector, was twenty to forty."

**1F. SLOACs:** Describe your course and program SLO activities this past year. How have you used the results of your assessments to improve your courses and programs? [Refer to the SLO/PRP report – https://outcomes.palomar.edu:8443/tracdat/](https://outcomes.palomar.edu:8443/tracdat/)

Course SLO assessments were conducted during the Fall 2014 Semester for all Oceanography 100 Lecture courses and the agreed-upon time interval for assessments is once every three years. Trujillo organized and compiled the results of the assessments.

Oceanography 100 Lecture students participated in an assessment for the following SLOs: (1) processes of plate tectonics, (2) El Niño/La Niña cycles, and (3) middle latitude marine productivity. Students were assessed by a series of multiple choice questions on the final exam for the course. The assessment states that for the assessment goal to be met, 70% of the students must provide a correct answer.

For the first SLO assessment on processes of plate tectonics, a total of 346 students from 13 lecture sections (both face-to-face and online) participated in the assessment activity. The results show that the average score on the assessment was 73.4%, which indicates that this assessment goal is being met.

For the second SLO assessment on El Niño/La Niña cycles, a total of 337 students from 13 lecture sections (both face-to-face and online) participated in the assessment activity. The results show that the average score on the assessment was 70.0%, which indicates that this assessment goal is being met.

For the third SLO assessment on middle latitude marine productivity, a total of 345 students from 13 lecture sections (both face-to-face and online) participated in the assessment activity. The results show that the average score on the assessment was 80.3%, which was the highest score of the three assessments and indicates that this assessment goal is indeed being met.

The likely reason for the high assessment score for the third SLO assessment on middle latitude marine productivity is due to the fact that it was the most recent topic covered of the three SLO topics, all of which were assessed during the final exam in the course. In all three SLO assessments, slightly different content covered by various instructors may have resulted in the range of scores on the assessment. For example, some of our new adjunct faculty had very low assessment scores, which will likely improve as these new instructors gain experience in teaching this subject matter. It is also noted that online sections had some of the highest assessment scores overall, but this is likely to change as Oceanography 100 Online class sizes are increased from 32 to 60

(which represents an 87.5% increase in class size).

The results of the SLO assessments were discussed with all adjunct faculty during the Oceanography 100 Lecture Instructor's Meeting that was held on January 8, 2015. By sharing the ways in which various instructors teach each SLO content area, there is an effort to ensure quality and consistency of instruction. In fact, some of these successful teaching techniques have been adopted by other instructors. In this way, the SLO assessments have improved our courses and program.

Lastly, Oceanography 100 Lecture SLOs will be re-assessed during Fall 2017 and there will be a similar meeting and discussion of SLO assessments at the January 2018 Oceanography 100 Lecture Instructor's Meeting.

With regard to labs, we have updated SLOs in May 2016 and are in the process of designing a new assessment to be used with updated SLOs.

**SECTION 2: PROGRAM GOALS**

**2A. Progress on Previous Year's Goals:** Please list discipline goals from the previous year's reviews and provide an update by checking the appropriate status box .

Goal	Completed	Ongoing	No Longer a Goal
Convene an annual Oceanography Lecture Instructor's Meeting	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide travel funds for encouraging both full-time and adjunct oce	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Being aware of the needs of minority students in our classes to incre	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Obtaining waitlists for OCN 100L	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Purchase materials for PCEC labs	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

**2B. New Discipline Goals:** Please list all discipline goals for this three-year planning cycle (including those continued from previous planning cycle):

GOAL #1	
Program or discipline goal	Reduce online class size from 42 to 32; resist district efforts to increase Oceanography 100 Online class size to 60 students
Strategies for implementation	This is a working condition issue, so Trujillo is working with the union to fight the district's attempt to increase Oceanography 100 Online class size to 60 students
Timeline for Implementation	Fall 2017
Outcome(s) expected (qualitative/quantitative)	Increasing Oceanography 100 Online class size from 32 to 42 has already negatively affected the success and retention rates of Oceanography 100 Online; these trends need to be reversed
GOAL #2	
Program or discipline goal	Develop a hybrid course offering for Oceanography 100 Lecture
Strategies for implementation	A new hybrid section of Oceanography 100 Lecture is being developed by AI Trujillo
Timeline for Implementation	Fall 2017 at CPPEN-S (FT1)
Outcome(s) expected (qualitative/quantitative)	Increase enrollments by offering students non-traditional course offerings at off-campus locations
GOAL #3	
Program or discipline goal	Consider hiring a replacement oceanographer since Patty Deen is retiring in July, 2018.
Strategies for implementation	Assess status of program. Complete Faculty Rationale Form.
Timeline for Implementation	FY 2017-2018
Outcome(s) expected (qualitative/quantitative)	Ensure consistency and quality of instruction

**Department Chair/  
Designee Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Division Dean Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Vice President Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_