

# **Saddleback College Program Review for Geology**



**Submitted Spring 2006**

## Table of Contents

Team Members and Approval Page.....	3
Program Review Checklist.....	4
Program Overview.....	5
Review Report.....	9
Needs Assessment.....	24
Appendices.....	27

## Program Review Team Members and Approvals

### Program Review Team Chair:

Dr. James Repka

### Program Review Team Members:

Dr. James Repka

Dr. Peter Borella

Dr. Merton Hill

Dr. Anthony Huntley

### Approvals:

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Division Dean

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Program Review Chair

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Academic Senate President

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Vice President of Instruction

## Program Review Checklist

Date Completed	Action
	Contact Program Review Chair for orientation
<i>February 10, 2006</i>	Form Program Review Team
<i>February 2006</i>	Gather documents (Org Chart/Staffing Profile/SLO Assessment Forms/Data Sets)
<i>February 2006</i>	Solicit Input from faculty and students
<i>May 26, 2006</i>	Determine if additional research is needed
<i>May 26, 2006</i>	Contact College Research Analyst if necessary
<i>May/June 2006</i>	Write Program Review report
<i>June 15, 2006</i>	Submit report to Dean and Program Review Chair for approval
	Report submitted to Academic Senate for approval
	Report submitted to Office of Instruction for approval
	Report submitted to College President and Office of Institutional Effectiveness
	Report posted to the IE web site
	Open, formal presentation to the Program Review Committee and other interested parties

# I. Program Overview

The mission of the South Orange County Community College District requires a systematic review of the Geology Program to ensure quality and relevance, and the effective use of resources. This program review is used for making judgments about the effectiveness of the program and to improve student learning. It is a means of ensuring that the Geology Program is effective and responsive to the local college community.

The results of the Geology Program Review will be incorporated into the strategic planning process. This program review will also support the WASC accreditation standards, interface with the college Enrollment Management Plan and most importantly, provide information for program planning and improvement.

This document begins with an overview of the Geology Program and key recommendations. The overview begins with the mission and goals of Saddleback College, the Mathematics, Science and Engineering Division, and the Department of Earth and Ocean Science. It describes the historical background and unique characteristics of the Geology Program, and its current strengths, opportunities and challenges. The main document describes and provides recommendations for: curriculum, instruction, student success, faculty and staff, staff development, facilities and community outreach.

## A. The Mission of the Program and its link to the College's Mission and Goals

### 1. College Mission Statement and Goals

#### a. College Mission Statement

To provide access to learning opportunities that promote student success; to foster intellectual growth, individual expression, and character development; and to support a dynamic environment of innovation and collegiality.

#### b. College Goals

The primary goal of Saddleback College is to provide a comprehensive post secondary education and a full range of student services. Emphasis is placed on open access to all students, including a changing and diverse student population. Academic success and student achievement are joint responsibilities of the students, the staff, and the college. To this end, the college will:

- i.* Provide educational programs leading to the Associate in Arts and Associate in Science Degrees.
- ii.* Provide a comprehensive, broad range of high quality courses and programs to enable students to pursue their educational objectives and career goals.
- iii.* Provide a meaningful general educational program including baccalaureate-level transfer and occupational curricula.

- iv.* Provide necessary developmental, remedial, and basic skills instruction so that students may be successful in their chosen course of study.
- v.* Provide access for the community to the educational, cultural and recreational resources of the college.
- vi.* Provide counseling and other support services that are responsive to the needs of the students.
- vii.* Provide opportunities in continuing education and community services, including courses for skill upgrading, retraining for professionals, and life long learning for older adults.
- viii.* Provide opportunities for the promotion of economic development within the scope of the mission of the District and the College.

## **2. Math, Science and Engineering Division Mission Statement and Goals**

### **a. MSE Mission Statement**

To instruct and inspire all students in rigorous, high quality post-secondary education in lower division courses in mathematics, science and engineering with a vision for tomorrow.

### **b. MSE Goals**

- i.* Review and revise, as necessary, the division Mission Statement.
- ii.* Facilitate and implement retention and enrollment management with a focus on outreach, student success, access, increased productivity, growth, higher WSCH/FTEF and sound course management.
- iii.* Increase student enrollment and retention in distance education classes, including classes offered in a hybrid instructional mode where appropriate.
- iv.* Initiate program review per established process, instrument(s) and timeline with a focus on improving student learning outcomes, persistence, retention and student success.
- v.* Increase student transfer rate.
- vi.* Provide division resources for the completion and submission of the accreditation self-study.
- vii.* Improve internal and external communication
- viii.* Recommend, monitor and complete new construction and renovation of college facilities per the Five-Year Facilities and Master Plan including a new Science-Math Building.
- ix.* Participate in needs assessments and discussions of programs, services and uses for new educational sites.
- x.* Provide increased administrative, technological and maintenance support and services to students and the departments by prioritizing expenditures.
- xi.* Improve respect, consideration of and sensitivity for diverse groups and perspectives.
- xii.* Manage and maintain board-approved budget to reach division and college goals.

### 3. Geology Program Mission and Goals

#### a. Geology Program Mission Statement

To educate students about the Earth and its processes so that they may apply this knowledge to problems concerning the environment, natural disasters, and natural resources. To provide educational opportunities for the diverse community of Saddleback College students through: general education courses; K-12 teacher training and professional development; a rigorous curriculum for students seeking to transfer to 4-year institutions as Geology majors.

#### b. Geology Program Goals

- i.* Provide quality lower-division lecture/laboratory courses for transfer students in Geology and related fields. We offer a three course sequence for Geology majors: Geology 1 – Introduction to Physical Geology; Geology 2 – Historical Geology; and Geology 6 – Introduction to Mineralogy. Related to College goals *i, ii, iii, vii.*
- ii.* Provide general education courses in the Earth Sciences for transfer students in all majors. We offer lecture/laboratory courses such as: Geology 5 – Marine Geology; Geology 20 – Introduction to Earth Science; and Geology 23 – Environmental Geology. We also offer lecture-only courses on specific topics such as: Geology 3 – California Geology; Geology 4 – Natural Disasters; Geology 7 – Weather and Climate; Geology 10 – Geology of National Parks; and Geology 21 – The Solar System. In addition, we offer several Geology field studies courses. These courses have no prerequisite requirements and can be taken by any student. Related to College goals *i, ii, iii, vii.*
- iii.* Increase student retention rate and transfer rate to universities by offering quality instruction with a diverse schedule. Related to College goals *i, ii, iii, v, vii.*

#### 4. Historical Background and Unique Characteristics of the Program

##### a. Historical Background

The Geology Program at Saddleback College is one of two academic disciplines within the Earth and Ocean Science Department, the other being the Oceanography Program. Saddleback College has offered Geology classes since the school was founded. In the 1970's the department began a geology field studies program to introduce interested students to geological processes and features in-situ. Over the years the department has acquired, mostly by collection in the field, one of the most diverse collections of minerals and rocks found on any college campus in southern California. A decade ago the department merged with the oceanography program, creating the Earth and Ocean Science Department. Since then we have been gradually expanding our course offerings to reflect greater public attention on human interactions with Earth's environment, interest in what makes the surface of our planet an ideal niche in which life can take hold and flourish, and the issues surrounding the search for, and acquisition of, the resources necessary to supply an increasing population.

##### b. Unique Characteristics

The Geology Program serves three populations of students: Geology majors, Education majors, and General Education students.

The Saddleback College Geology Majors program is structured after programs offered at universities and 4-year colleges such as the University of California and California State Universities. A majority of our students transfer to the UC or to CSU systems, thus the Majors Program must be compatible with the programs offered at these institutions.

However, unlike the courses offered at these major universities, Saddleback College offers relatively small class sizes. For example, the lower division geology courses offered at the UC and CSU campuses often have enrollments of 100-200 students. While the lecture sections of these courses are often taught by professors, the laboratory sections are usually taught by graduate students. At Saddleback College, our enrollments in Geology sections are capped at 30 students, and the same faculty member generally teaches both the lecture and the laboratory portions of the course. This allows the faculty member more contact time with the students, leading to more interaction and better focus on individual learning styles and objectives.

In addition, while our faculty members are experts in their fields, they are fully dedicated to undergraduate instruction. Many of our transfer students praise the quality of education they received at Saddleback College.

In general the laboratory courses offered in the Geology Program have state-of-the-art equipment available for student use. Equipment is available for use by instructors for classroom demonstrations and for use by students for hands-on instruction during laboratory sessions.

## **5. Progress Since the Last Program Review**

This is the first formalized Program Review in which the Geology Department has participated.

## **6. Current Strengths, Opportunities, and Challenges**

### **a. Current Strengths**

Courses taught within the Geology Program are rigorous and demanding. Students who transfer from Saddleback College to a four-year institution having completed the program are well-qualified to handle upper division coursework. Anecdotal reports from students who have transferred in the past reaffirm the strength of their grounding in lower division coursework, whether in geology, in mathematics or in the other core sciences.

The Geology Program is fortunate to have two excellent and dedicated full-time instructors, supported by a full-time Oceanography instructor who also teaches Geology classes, and several bright and energetic part-time instructors. Also we are fortunate to have the services of an intelligent and hard-working laboratory technician.

### **b. Current Opportunities**

Advances in the field of Geology today are coming from disciplines studying energy resources, natural disasters, global climate change and planetary surface science. Students are fascinated to learn about Hurricane Katrina and the flooding of New Orleans, the Indian Ocean earthquake and tsunami, the Cassini Mission to Saturn and the Mars Rovers, landslides in Laguna Beach and the depletion of Earth's fossil fuel resources. Topics such as these are ubiquitous in the news today, leading to many "teaching opportunities" in our classes.

### **c. Current Challenges**

The most important challenge the Geology Program faces is the perception that the only jobs available in Geological Sciences are in energy and mineral exploration and extraction.

## II. Review Report

### A. Faculty and Staff

#### 1. Faculty

Within the Department of Earth and Ocean Science (which includes the Oceanography Program) we have four full-time instructors, two geologists and two oceanographers. One of our oceanography instructors teaches geology courses when the need presents itself. Our range of expertise includes field geology, engineering geology, micropaleontology, sedimentary petrology, petroleum geology, tectonic and landscape geomorphology, fluvial processes and radiometric dating techniques.

In addition we have several part-time instructors who have specialties in engineering geology, hydrogeology, marine geology, historical geology, vertebrate paleontology and fossil preparation.

#### 2. Staff

The Geology Program shares one staff member with the Oceanography Program: John Robinson who is the acting technician in the medical absence of Mary Amelotte. Our department is also very appreciative of the extensive help we receive from the division staff.

The department currently offers 12 lab sections (6 Geology labs and 6 Oceanography labs) and 2 weekend field trip courses each semester. The vast majority of the lab sections are equipment-heavy, and require extensive preparation beforehand and clean-up afterward. Each field course involves several days of advance preparation, including inventorying equipment, shopping and packing of food, and several days of subsequent clean-up. In addition to the two field courses, the majority of our lecture courses have a required one-day local field trip for which the technician must prepare.

### B. Curriculum and Instruction

#### 1. Curriculum

Table B.1-1 on the next page lists the Geology courses offered within the Earth and Ocean Science Department, the date of the most recent course outline and the curriculum update, and the transferability of the courses to the U.C. and CSU systems. Saddleback College offers an Associate of Science Degree in Geology. The contents of each course are evaluated every five years and on an as needed basis. The curriculum is revised and sent to the curriculum committee for approval at that time. Over the past five years the geology course outlines have been updated to reflect Title V guidelines.

**Table B.1-1: Geology Courses offered**

<b>Course #</b>	<b>Course Title</b>	<b>Last Curriculum Review</b>	<b>Transferability</b>
Geology 1	Introduction to Physical Geology	07/22/02	<ul style="list-style-type: none"> <li>• AA G. E. breadth requirement</li> <li>• IGETC area 5A</li> <li>• CSU area B1, B3</li> <li>• UC Credit</li> </ul>
Geology 2	Historical Geology	09/01/05	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1, B3</li> <li>• UC Credit</li> </ul>
Geology 3	Geology of California	08/20/01	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1</li> <li>• UC Credit</li> </ul>
Geology 4	Natural Disasters	09/01/05	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1</li> <li>• UC Credit</li> </ul>
Geology 5	Marine Geology	08/20/01	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1, B3</li> <li>• UC Credit</li> </ul>
Geology 6	Principles of Mineralogy	07/22/02	<ul style="list-style-type: none"> <li>• UC Credit</li> </ul>
Geology 7	Weather and Climate	09/17/02	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1</li> <li>• UC Credit</li> </ul>
Geology 7-DE	Weather and Climate <i>Distance Ed.</i>	04/07/04	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1</li> <li>• UC Credit</li> </ul>
Geology 10	Geology of National Parks	09/08/04	<ul style="list-style-type: none"> <li>• UC Credit</li> </ul>
Geology 20	Introduction to Earth Science	08/20/01	<ul style="list-style-type: none"> <li>• AA G. E. breadth requirement</li> <li>• IGETC area 5A</li> <li>• CSU area B1, B3</li> <li>• UC Credit</li> </ul>
Geology 21	The Solar System	09/01/05	<ul style="list-style-type: none"> <li>• IGETC area 5A</li> <li>• CSU area B1</li> <li>• UC Credit</li> </ul>
Geology 23	Environmental Geology	08/20/01	<ul style="list-style-type: none"> <li>• AA G. E. breadth requirement</li> <li>• CSU area B1, B3</li> <li>• UC Credit</li> </ul>
Geology 162	Gems and Minerals	07/22/02	<ul style="list-style-type: none"> <li>• None</li> </ul>
Geology 170	GFS: National Parks and Monuments	09/01/05	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 172	GFS: Mojave Desert	08/20/01	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 173	GFS: Death Valley	08/20/01	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 174	GFS: Eastern Sierra Region	08/20/01	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 175	GFS: San Andreas Fault	09/01/05	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 179	GFS: Kings Canyon/Sequoia	08/20/01	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 182	GFS: Coast Range/Morro Bay	08/20/01	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 183	GFS: Anza-Borrego Desert	08/20/01	<ul style="list-style-type: none"> <li>• none</li> </ul>
Geology 185	GFS: Yosemite	09/01/05	<ul style="list-style-type: none"> <li>• none</li> </ul>
SPSW 1	Fossil Preparation Workshop <i>Beginning</i>	09/22/94	<ul style="list-style-type: none"> <li>• none</li> </ul>
SPSW 1	Fossil Preparation Workshop <i>Intermediate</i>	04/26/06	<ul style="list-style-type: none"> <li>• none</li> </ul>

Of these courses only Geology 6, Principles of Mineralogy, has a prerequisite of Geology 1 or 20. Several courses have recommended preparatory courses: Geology 2 (recommended preparation: Geology 1 or 20); Geology 5 (recommended preparation: Geology 1 or 20 or Marine Science 20); and Geology 6 (recommended preparation: Chemistry 1A).

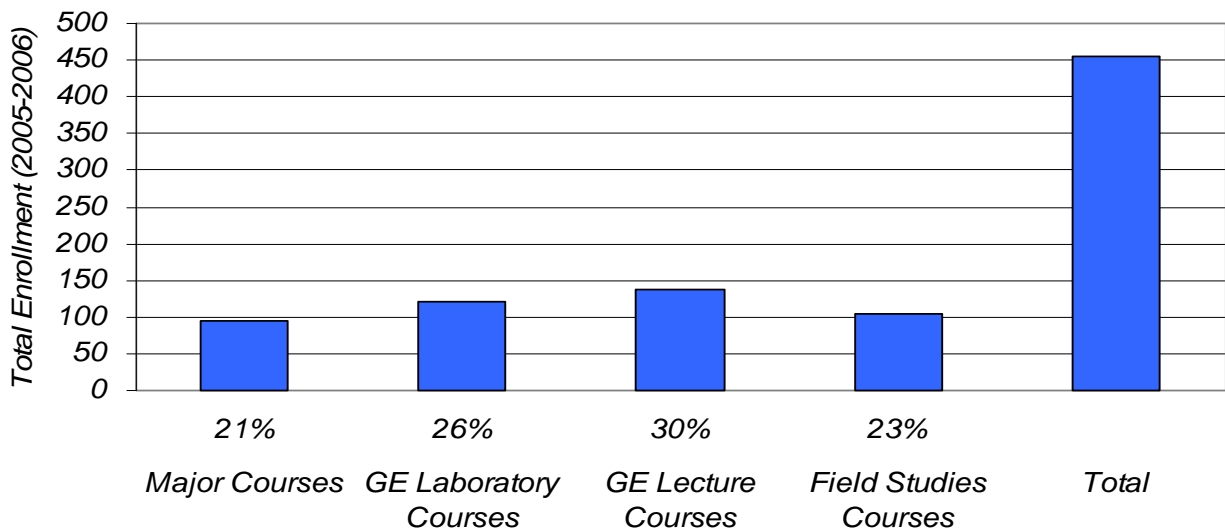
The Saddleback College Geology program must be compatible with university undergraduate programs. The faculty and chair of the Earth Science Department periodically review relevant programs in the CSU and UC systems, and communicate regularly with the faculty of departments at Cal State Long Beach, Cal State Fullerton, UC Berkeley, UC Santa Cruz, and UCSD.

**2. Instruction**

The Saddleback College Geology Program consists of three sub-programs:

- General Education courses
  - Lecture-Lab courses
  - Lecture-only courses
  - Workshop courses
- Geology Major courses
- Field courses

Each of these serves a specific student population and will be dealt with independently. Figure B.2-1 Shows the contribution of each of these to the total enrollment in past school year:



**Figure B.2-1: Geology Program enrollment for 2005-2006**

Learning objectives are documented in the curriculum for each course and are included in the course syllabi. Objectives are re-evaluated by the faculty each time a course is reviewed.

In order to maintain consistency within courses:

- All faculty (including associate faculty) are kept up-to-date on course curriculum;
- Full-time faculty actively participate in curriculum updates;
- Textbooks are reviewed and discussed by all faculty before adoption;
- Course syllabi from previous terms are available for review;
- Course materials from previous terms are available for review

Assessment methods vary from course to course but generally include regular quizzes, written exams, laboratory/homework assignments, and classroom presentations. Student Learning Outcomes (SLOs) were developed and implemented by the faculty for Geology 1 (Introduction to Physical Geology) in the spring term of 2006 and will be developed and implemented for the rest of the courses over the next school year.

All of our full-time faculty are computer literate and make use of available technologies in lecture presentations. Faculty members have their own websites (or they use Blackboard) where syllabi, course objectives, lecture outlines, study guides and additional handouts are regularly posted.

While approximately one third of our enrollment is in lecture-only courses, geology is, at least in part, a tactile science. A philosophy shared by our faculty is that *all* of our students should spend some class time with hands-on activities normally associated only with lab classes, such as identification of minerals and rocks and interpretation of topographic and geologic maps.

#### a. General Education Courses

These courses are designed for non-major, general education students. Each course fulfills either a science lecture requirement or a lecture/lab requirement for transfer to the California State University or to the University of California. Table B.2-1 lists the department's general education courses and their enrollments for the period beginning in Fall 2000. Geology 23 is cross-listed as Environmental Studies 23. Geology 21 is cross-listed as Astronomy 21, and though the Astronomy program is the class "parent" it is included here because it includes a significant geological component and has traditionally been taught by a member of the Geology faculty.

**Table B.2-1: Enrollment in General Education courses**

	<b>Course Name</b>	<b>S01</b>	<b>F01</b>	<b>S02</b>	<b>F02</b>	<b>S03</b>	<b>F03</b>	<b>S04</b>	<b>F04</b>	<b>S05</b>	<b>F05</b>
Geol 3	Geology of California	30	31	30	35	22	25	14		12	14
Geol 4	Natural Disasters								20		
Geol 5	Marine Geology * †										
Geol 7	Weather and Climate						22	27	48	19	68
Geol 10	Geology of National Parks										
Geol 20	Intro. to Earth Science *	22	32	13	38	40	51	50	21	25	14
Geol 21	The Solar System ††	16	18			30		29		15	
Geol 23	Environmental Geology * †††	59	69	71	77	54	60	40	39	31	50
Geol 162	Gems and Minerals										
SPSW 1	Fossil Preparation			5				8	2	6	3
	<b>Totals:</b>	<b>127</b>	<b>150</b>	<b>119</b>	<b>150</b>	<b>146</b>	<b>158</b>	<b>168</b>	<b>130</b>	<b>108</b>	<b>149</b>

\* Indicates that the course is a lab course

† Also listed as Marine Science 5

†† Also listed as Astronomy 20 ("parent" department is Astronomy)

††† Also listed as Environmental Studies 23 ("parent" department is Geology)

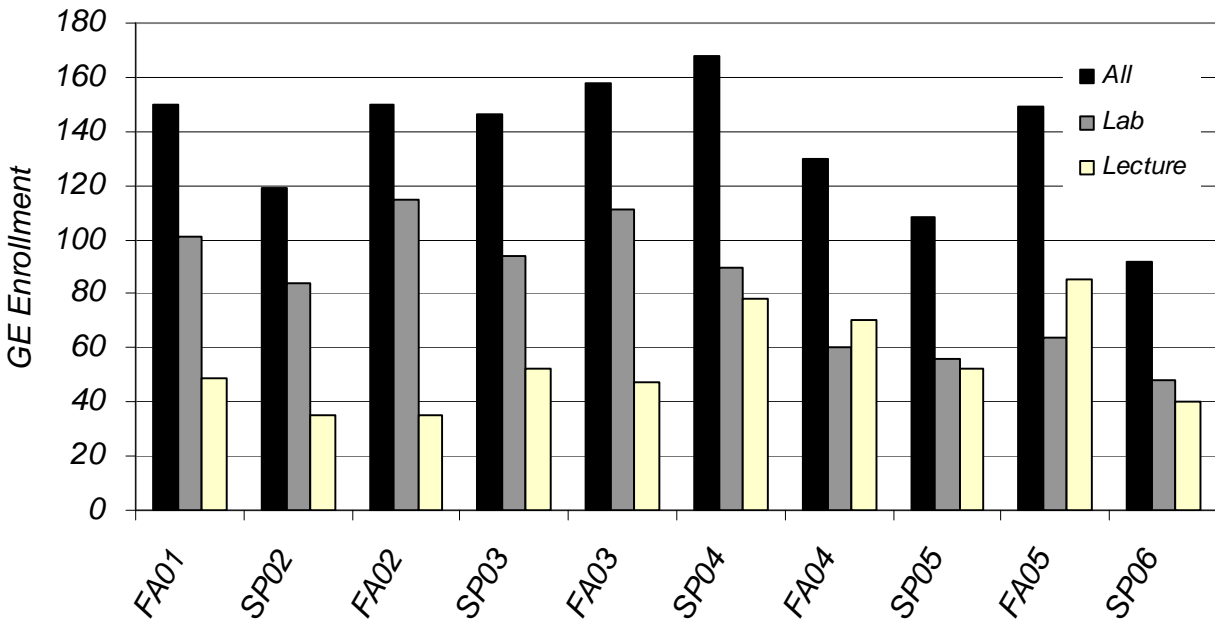


Figure B.2-2: General Education enrollment for 2001-2006

**i. Laboratory courses**

Geology 20 and Geology 23 are both lecture/lab courses that fulfill the lab course requirement in most degree and transfer programs. Students completing the course are required to demonstrate a mastery of the stated learning objectives measured by the ability to recall basic geological information, explain physical processes, and tie disparate concepts together to demonstrate critical thinking skills. Learning outcomes are assessed through lecture and lab exams, quizzes, laboratory/homework assignments, and oral presentations.

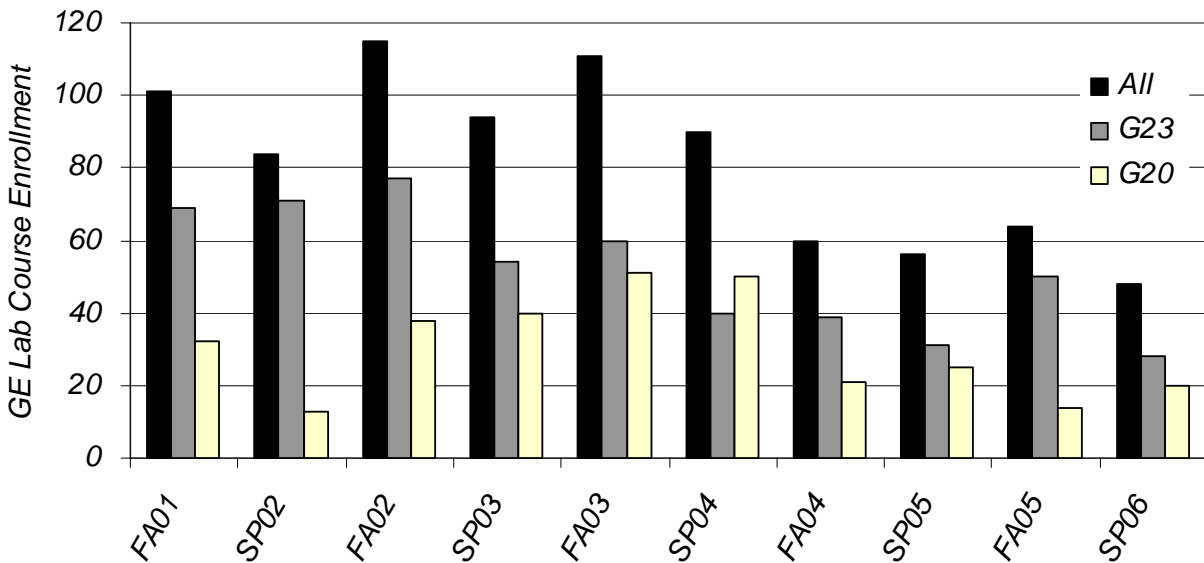


Figure B.2-3: General Education lab course enrollment for 2001-2006

**Geology 20 (Introduction to Earth Science)** is a survey course that covers the basic principles of geology, oceanography, meteorology, and astronomy. This course also is one of a core group of science classes recommended (along with Biology 20 and Physics 20) to students planning on entering the teaching credential program in the CSU system. A version of this class is offered as an honors course, fulfilling (along with Geology 7 and Biology 20) a science component of the Honors Program.

While we have not made major curriculum changes to this class we have begun, in the past five years, to present the material from the perspective of Earth System Science, emphasizing the interactions among the various sciences covered. In addition we have begun to incorporate new lab exercises, developed in-house, that require students to collect and interpret real-world data.

**Geology 23 (Environmental Geology)** is a survey course that covers the relationship between humans and their geologic environment. In the first third of the class students are introduced to basic geologic principles, materials and processes. The rest of the course emphasizes surface processes and interactions that affect human societies, communities and individuals.

**ii. Lecture courses**

These general education courses are designed for non-major students who need transferable units in science without a laboratory. They are also designed to be attractive to general education students who are interested in learning more about the natural world. Successful completion of any of these courses requires students to demonstrate a mastery of the stated learning objectives as measured by standard metric tools. Students are tested on their ability to recall basic geological information, explain physical processes, and tie disparate concepts together to demonstrate critical thinking skills. Learning outcome assessments are determined by each instructor and may include written exams, quizzes, homework assignments, and oral presentations.

California Geology (Geol 3) and Weather and Climate (Geol 7) have been offered each semester, while most of the other courses are offered once each year. The National Parks course (Geol 10) and Natural Disasters (Geol 4) are both relatively new courses. Marine Geology (Geol 5, also listed as MS 5) has not been offered during the study period. Geology 162, Gems and Minerals, is co-offered with introduction to Mineralogy (Geol 6), thus it has also not been offered during the study period

**iii. Workshop courses**

The fossil preparation workshop was established a decade ago as a result of an agreement between Saddleback College and the City of Mission Viejo wherein the City would lend the College fossil jackets obtained from various excavations and the College would train students to extract, clean and curate the fossils.

Five years ago the workshop was improved when we hired Sarah Siren, a fossil preparation expert from The Keith Companies, to supervise. Sarah works with our faculty and with Larry Barnes, an expert in vertebrate paleontology with the LA County Museum of Natural History, to train the students in extraction, preservation and identification of fossils typically found in south Orange County. This class has been run as a Special Studies Workshop (SPSW 1) with a small number of students, as training requires a lot of individual attention and some of the specimens are of high scientific value.

This workshop has already resulted in the identification of a new dolphin species and a peer-reviewed article co-authored by Dr. Barnes and Dr. Anthony Huntley of Saddleback College's Department of Biology.

We have recently moved the workshop to the PA building (Paleontology Lab) located at the campus entrance across from Medical Center Drive. The site is being renovated to create space for storage of additional fossils and workspace.

This fall we will be adding a second section (SPSW 2) to allow advanced students to begin training in preparing museum-quality displays of specimens. These displays will be visible to the public in the front of the lab, as well as at various public facilities within the city.

**iv. Recommendations**

- *Reevaluate courses that have been offered infrequently due to low enrollment, considering deletion.*
- *Develop new general education courses to meet student needs or interests. Courses under development include: Earth's Climate System; Water Resources; and Earthquakes.*
- *Begin offering weekend sections of general education courses.*
- *Expand availability of internet-based materials to include all course syllabi, some notes and presentations, online quizzes and laboratory handouts.*
- *Create more field- or observation-based laboratory assignments and exercises to replace or supplement workbook-based assignments.*

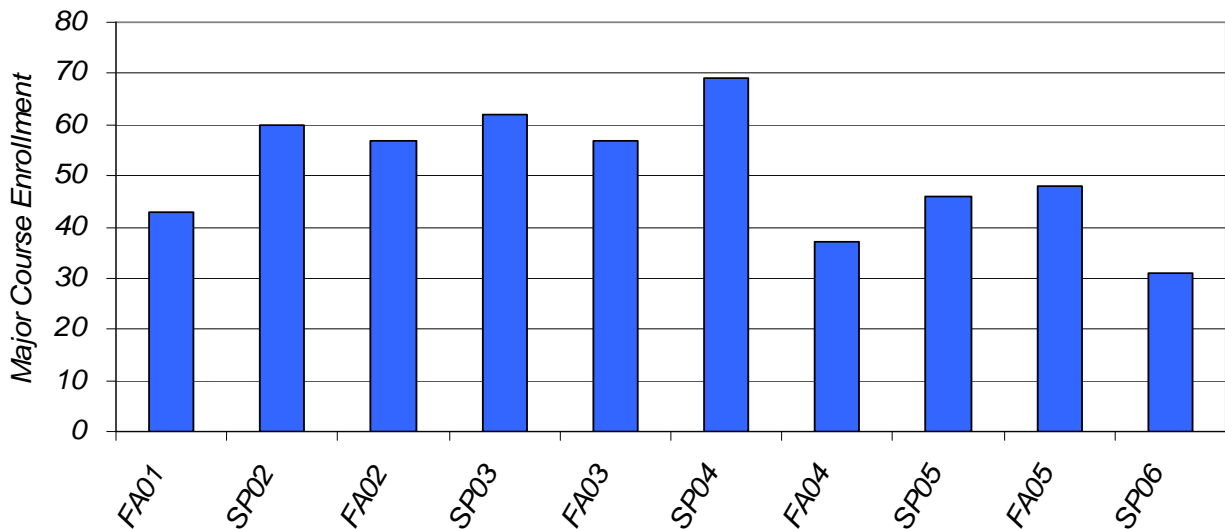
**b. Geology Major Courses**

These courses are designed for students who intend to transfer to a four-year institution and major in Geology. Physical Geology is the only course required for an Associate Degree. The other two courses are electives within the program but represent important knowledge and skill sets for students who intend to transfer.

At the university level, most Geology majors classes are offered only as upper-division courses, with Calculus, Calculus-based Physics, and Inorganic chemistry as pre-requisites. Our Geology major program is designed to cater to these programs, emphasizing the math/chemistry/physics sequence so that students are prepared for upper-division work when they transfer.

**Table B.2-2: Enrollment in Geology major courses**

Course Name	S01	F01	S02	F02	S03	F03	S04	F04	S05	F05
Geol 1 Intro. to Physical Geology	58	43	49	57	62	57	63	37	46	48
Geol 2 Historical Geology			11				6			
Geol 6 Principles of Mineralogy	10									
<b>Totals:</b>	<b>68</b>	<b>43</b>	<b>60</b>	<b>57</b>	<b>62</b>	<b>57</b>	<b>69</b>	<b>37</b>	<b>46</b>	<b>48</b>



**Figure B.2-4: Geology major course enrollment for 2001-2006**

**i. Geology 1 (Introduction to Physical Geology)**

This course is designed to be a general overview of geologic thought and science. Though it is the introductory course for students intending to major in Earth Sciences, its subject matter is broad enough for general education students.

**ii. Geology 2 (Historical Geology)**

One of the most important concepts in geological thought is the concept of “deep time.” This course is designed for students who are interested in geology, paleontology, physical anthropology, or biology. It covers the physical, chemical and biological evolution of the Earth, with an emphasis on methods used to decipher the geologic record and to develop the geologic time scale.

This course is generally offered every other year. Low enrollment led to the cancellation of the section offered in the spring of 2006.

**iii. Geology 6 (Introduction to Mineralogy)**

This course is designed as an introduction to the materials of the Earth, with an emphasis on learning to identify minerals based on their fundamental physical and chemical properties. As stated above, Geology 6 has a pre-requisite of Geology 1 and a recommended preparation of Chemistry 1A; however, programs at Cal State Long Beach and Cal State Fullerton require Chemistry 1A be taken *before* Geology 6 in order to have it accepted for transfer.

This course was last offered in the spring of 2001. Interest in the course varies with the number of geology majors. As transfer of the units can be difficult unless the student has already taken inorganic chemistry, it is sometimes difficult to get enough students to take the course.

**iv. Recommendations**

- *Reevaluate courses that have been offered infrequently due to low enrollment, considering deletion.*
- *Expand availability of internet-based materials to include all course syllabi, some notes and presentations, online quizzes and laboratory handouts.*
- *Create more field- or observation-based laboratory assignments and exercises to replace or supplement workbook-based assignments.*

**c. Geology Field Courses**

Geology is concerned entirely with materials and processes that occur outside the classroom. These courses give students the opportunity to spend three days learning geology in field settings throughout southern California or, in the case of longer trips, the western United States.

We generally offer two of these field courses each semester. Several of the listed courses have not been offered over the period of study: The National Parks class (Geol 170) is usually offered as a six-day summer course, typically in the summer session. It was offered in summer 2006 but was cancelled due to low enrollment. The Kings Canyon course was offered in fall 2004 but was cancelled due to illness, and the San Andreas Fault trip was offered in the spring of 2006. the LA/Orange County/San Diego course has not been offered since the mid-1990s and has been put on the list to be deleted in the next school year.

Learning objectives for these courses vary with location, but all courses require students to maintain field notebooks with site-specific information, sketches or pictures of significant features and interpretations. Students are assessed on their field notebook and on their participation in field activities.

**iv. Recommendations**

- *Review existing courses.*
- *Reevaluate courses that have been offered infrequently due to low enrollment, considering deletion.*
- *Include more introductory material, perhaps by separating the pre-trip meeting into two meetings.*

**Table B.2-3: Enrollment in Geology Field Studies courses**

<b>Course Name</b>	<b>S01</b>	<b>F01</b>	<b>S02</b>	<b>F02</b>	<b>S03</b>	<b>F03</b>	<b>S04</b>	<b>F04</b>	<b>S05</b>	<b>F05</b>
Geol 170 National Parks										
Geol 172 Mojave Desert			20				22			
Geol 173 Death Valley		29			32		16		22	
Geol 174 Eastern Sierra		17		32		16		24		18
Geol 175 San Andreas Fault										
Geol 179 Kings Canyon/Sequoia										
Geol 182 Coast Range/Morro Bay			23				14	12		
Geol 183 Anza-Borrego Desert	20		23		31				38	
Geol 184 LA/Orange/San Diego	<i>-- class to be deleted in Fall 2006 --</i>									
Geol 185 Yosemite		27		25						26
<b>Totals:</b>	<b>20</b>	<b>73</b>	<b>66</b>	<b>57</b>	<b>63</b>	<b>16</b>	<b>52</b>	<b>36</b>	<b>60</b>	<b>44</b>

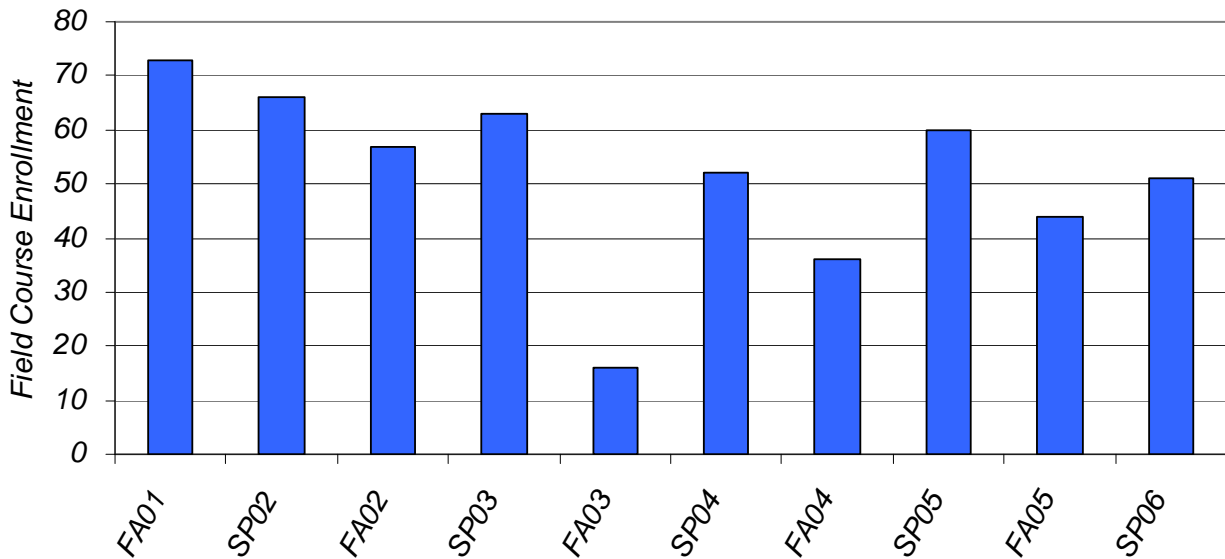


Figure B.2-5: Field Studies course enrollment for 2001-2006

## C. Student Success

### 1. Demographic Trends

It is interesting that over the past five years there has been very little change in the overall demography of the student population served by the Geology Department. The student enrollment has increased by approximately 20.1%; however, the ratio of male to female students and the distribution by age has remained essentially unchanged. Small changes in ethnicity and zip code of enrolled student are seen.

#### a. Gender (appendix, table IV-D-3)

Analysis of the gender figures for all classes for the past five years indicate that there have been no trends or changes (chi-square,  $P > 0.80$ ). In addition, the ratio of male to female students over the past five years is not significantly different from 1:1 (chi square, goodness of fit,  $P > 0.50$ ). These data are interesting, since the college regularly reports that there has been a positive shift in the number of female students over the past few years.

**b. Age (appendix, table IV-D-6)**

Typically, 19-21 year olds make up  $57.4 \pm 1.8\%$  of all classes for the past five years. In spring this group made up 71% of the student population. As might be expected, 22-25 year olds are the second most populous group in our courses (19.3%). The older students, 26-65 make the significant remainder of 20%.

**c. Ethnicity (appendix, table IV-D-5)**

Stated ethnic background of our students has also been remarkably stable over the past five years. The "White" category makes up  $69.8 \pm 1.2\%$  of all enrolled students. The only unstable enrollment figures based upon ethnicity seem to be the "Hispanic" category which varies unpredictable between 8 and 21%. Some of this variation may be accounted for by the "unknown," or failure to state category figures.

**2. Student Success (appendix, table IV-D-2)**

Student retention in all geology courses averages  $90.3 \pm 1.0\%$  for the past three years. The overall student success rate for the same period for all courses taught at Saddleback College was  $88.9 \pm 0.19\%$ ; an unpaired t-test shows no significant difference between the geology retention rate and the college as a whole ( $P=0.13$ ).

Student success measured as the number of students receiving a grade divided by all students enrolled at any time in the class averages  $70.2 \pm 1.4\%$ . The overall Saddleback College average retention rate for the past three years is  $72.0 \pm 0.37\%$ ; there is no significant difference between the geology course success rate and the overall Saddleback College success rate for the past three years ( $P=0.13$ , one-tailed t-test).

Student retention and success is consistently very high in the majors' area. Retention and success in the general education area is more variable. We perceive a need to increase student retention and success in these courses. To this end, Dr. Jim Repka will spend the Fall semester (sabbatical project) working on a web-based laboratory manual and study guides for these courses.

There is a general conception that science courses are "difficult." If this were true, then one would expect that grades in geology courses would reflect this difficulty. Overall, A's make up between 22 and 33% of the total grades given in all sections over the past five years, while F's make up only 12 to 7%.

### **3. Strengths, Weaknesses and Changes**

Over the past five years we made many changes that should affect the success of students in our classes. These include:

- Writing laboratory exercises that are specific to our students and our area.
- Creating web-based course support sites that aid in note taking, study guides and lab support
- Creation of new courses or alteration of existing courses to meet student need or assist in articulation
  - Geology 4 – Natural Disasters
  - Geology 7 – Weather and Climate
  - Geology 10 – Geology of National Parks (formerly Geology 110)
  - Geology 21 – The Solar System

## **D. Facilities, Technical Infrastructure and Resources**

### **1. Laboratory Teaching Space**

Geology currently has two dedicated teaching laboratories, SM130 and PA1 (the paleontology building, PA, formerly called the Regional Health and Occupational Resource Center, RHORC, building). Room SM130 is used exclusively for Geology lab classes. When the need arises, SM129 is used for the teaching of Geology laboratory courses. Room PA1 is used for the fossil and museum preparation classes. In addition, SM106 and 107 are also used for small group laboratory teaching. SM 106 is the x-ray diffraction lab and SM 107 is the soils and sediment testing lab. These rooms are used as extensions to the main laboratory room (SM130, 129).

### **2. Laboratory Preparation and Storage Space**

At this time, the Geology department maintains laboratory preparation and support in rooms SM 112 and 114. Room SM 114 serves as an office for the laboratory technician, as well. SM 112 has storage lockers and a computer workstation with slide and paper scanning, and color printing capability. Connected to SM 114 is a small contained space referred to as the lapidary area. This is used for storage of rock and mineral specimens, assembly of rock and mineral kits for Geology and Oceanography class use, and equipment for the cutting, polishing and display of rock and mineral samples. SM 108 is used for field trip storage and preparation, and storage of classroom and laboratory materials and equipment. In addition, a loading dock field trip storage locker is maintained for larger equipment used during field courses. In the Paleontology Building (PA) there is limited storage space in a converted bathroom. This area is used for storage of jacketed specimens prior to cleaning and preparation.

### 3. Technical Resources

#### a. Equipment

At this time, the Geology department maintains a very good collection of state-of-the-art equipment. Many of these items are unique at the community college level. These include

- Rigaku X-Ray Diffraction Unit
- Nikon Petrographic microscope
- GeoMetrics Seismic Refraction Unit
- Direct residual shear box
- Sediment consolidation tester
- Unconfined sediment compression tester
- Sieve shaker

In addition, our laboratories are well-equipped with Leica microscopes, USGS topographic maps, and numerous demonstration devices.

#### b. Collections

Being a geology department requires the maintenance of a large collection of rocks and minerals. At this time, we have an extensive teaching collection of mostly hand samples rocks and minerals representing the full spectrum of igneous, sedimentary and metamorphic environments from around the world. This collection easily exceeds 10,000 specimens.

A large collection of fossils and a small collection of worldwide sediments are also maintained.

Paleontological specimens prepared in the fossil preparation courses are stored in the paleontology building until they are displayed or transferred to the city of Mission Viejo.

### III. Needs Assessment

#### A. Human Resources Needs

##### 1. Full-Time Faculty

At this time our teaching needs are met by the current full time faculty complement. However, we anticipate the retirement of Dr. Peter Borella within the next two years. To maintain the quality of instruction, it will be critical to re-hire for this position as soon as this retirement takes place.

##### 2. Classified Staff

We currently have one full-time senior lab technician, John Robinson. This position is responsible for laboratory preparation for oceanography and geology as well as field trip and field course preparation and support of the paleontology laboratory. After careful assessment of the workload we have determined that no further classified assistance is need at this time.

#### B. Instructional/Service Needs

##### 1. Night and Weekend Sections

At this time, we offer most courses at evening times, however, only field courses are offered on weekends. We are considering offering geology course sections on Fridays and Saturdays to meet the need of non-traditional students.

##### 2. Distance Education Courses

There are no distance education courses in the geology department at this time. Discussion of the development of a DE version of the Geol 1 course, with a post course field trip fulfilling the laboratory requirement, has taken place. This would most likely take place during the summer session.

##### 3. New Courses

We are currently developing several three-unit general education courses:

- Earthquakes and Seismology
- Water and Water Resources
- Global Climate Change

We need to re-designate the current SPSW1 course, Fossil Preparation, as a geology course. In addition, we will develop new advanced courses in this area:

- Museum Methods (paleontology)
- Advanced courses in Fossil Preparation

## **C. Research Needs**

### **1. Faculty and Course Evaluations**

We should develop on-line department faculty and course evaluation to assist us in our mission to improve instruction and meet student needs.

### **2. Triennial Survey**

We should develop an online student survey regarding course offerings, faculty performance, and student demographics. These data could be used in determining section days and times and course offerings that better fit our students needs.

## **D. Technical, Equipment and Other Resource Needs**

### **1. Laboratory Equipment Needs**

At this time, the most pressing need is a new seismograph and seismometer. This device should be installed at an appropriate place on campus with on-line internet access to its output.

Up to this point, the current budget has been sufficient for the replacement of expendable materials used in the geology laboratory program.

### **2. Field Trip Equipment Needs**

Equipment and material used for field trips and field courses are continually replaced. At this time, the greatest needs are new stoves, lanterns, and cookware. We anticipate purchase of these items in the next fiscal year.

### **3. Technical Needs**

Our most pressing need at this time is upgrade of classroom technology. Since all instructors use PowerPoint, DVD, and internet resources in the laboratory and lecture, it is imperative that we have the most up-to-date computer hardware and software. These requests have been made to the technology committee.

## **E. Facilities Needs**

### **1. Paleontology Laboratory Building**

The acquisition of the Paleontology Laboratory building (PA) has greatly enhanced that part of our program. However, this building has required expensive renovation carried through our budget. At this time, we still need to fence the yard at this facility, to provide space for the fossils still stored on lower campus. We anticipate installation of this fence by Fall of 2006.

We have ordered paleontology cabinets to provide appropriate storage for the fossils completed by this program.

The front room of this building (PA2), will become a museum display space. We will need to develop this area and the display facilities.

### **2. Other Facilities Needs**

At this time, we see no other facilities needs.

## **F. Marketing and Outreach Needs**

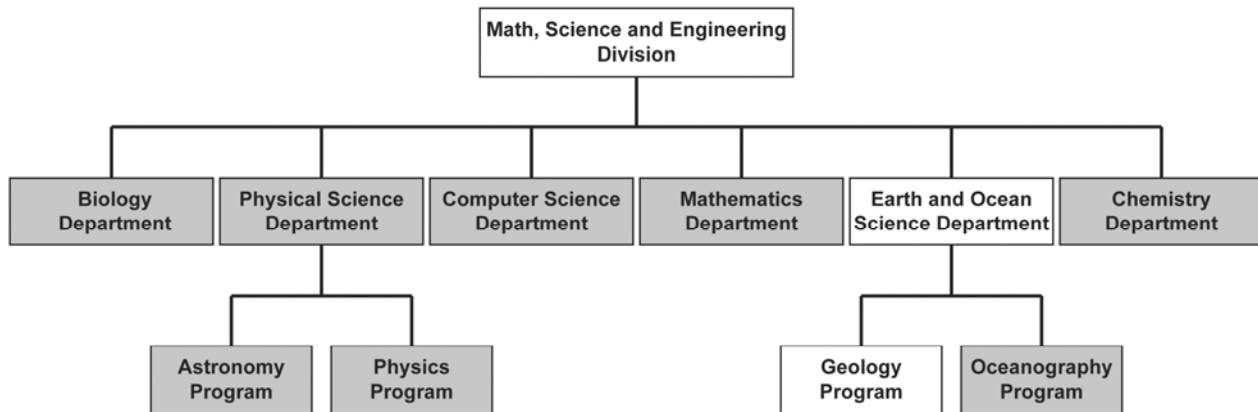
### **1. Brochure**

We should develop a brochure that advertises the geology program, its courses and its faculty. In particular, this brochure should showcase the fossil preparation program.

## IV. Appendices

### A. Five-Year Program Staffing Profile

Program Organizational Chart



### B. Five-Year Geology Program Staffing Profile

Staffing for Geology classes:

Position	Staffing Levels for Each of the Previous Five Years					% Change from Year 1 to Year 5
	2001	2002	2003	2004	2005	
Bargaining Classified Staff FT	1	1	1	1	1	0%
Faculty FT	2	2	2	2	2	0%
Faculty PT	2	1	1	2	2	0%

In the Fall of 2004 one of our full-time instructors, Dr. Peter Borella, was on Sabbatical. In the Fall of 2005 we hired Dr. Merton Hill as an Oceanography instructor. Though he did not teach any geology classes until Spring 2006, he is fully qualified to teach these courses.

**C. SLO Assessment Forms**

The Earth Science Department has developed Student Learning Outcomes for the Geology Program. SLO assessment forms are currently being developed by the department.

**D. Data Sets**

**IV-D-1: Geology courses  
Summary of All Courses by Grade/Success/Retention**

		Grades											success	retention
		A	B	C	CR	D	F	I	NC	W	XX	Total	Percent	Percent
2001	Spring	51	26	29	3	7	18	4	0	29	11	178	61.2%	83.7%
	Fall	48	29	40	4	11	13	2	0	20	14	181	66.9%	89.0%
2002	Spring	33	24	28	2	3	7	4	1	17	17	136	64.0%	87.5%
	Fall	33	31	29	0	9	13	4	0	25	14	158	58.9%	84.2%
2003	Spring	30	43	37	0	13	17	0	0	17	10	167	65.9%	89.8%
	Fall	46	46	48	0	11	12	0	2	15	12	192	72.9%	92.2%
2004	Spring	74	60	28	9	4	23	0	2	22	20	242	70.7%	90.9%
	Fall	75	42	22	1	2	10	2	0	27	24	205	68.3%	86.8%
2005	Spring	74	31	31	9	6	22	0	1	12	7	193	75.1%	93.8%
	Fall	71	37	29	9	3	16	3	2	25	19	214	68.2%	88.3%

Grade XX: none of the above/unknown

*Success Rate: percent of students successful in courses out of total enrolled in courses (RP Group, 1996).  
The success rate is determined by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).*

*Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).  
The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).*

**IV-D-2: Geology courses  
Individual Courses by Grade/Success/Retention**

			Grades									Total	Success Percent	Retention Percent	
			A	B	C	CR	D	F	I	NC	W				XX
Geol 1	2001	Spring	8	10	12	0	4	8	0	0	13	3	58	51.7%	77.6%
		Fall	5	8	13	0	2	5	0	0	6	3	42	61.9%	85.7%
	2002	Spring	13	8	9	0	1	1	4	0	7	6	49	61.2%	85.7%
		Fall	11	14	7	0	3	6	1	0	10	6	58	55.2%	82.8%
	2003	Spring	9	15	18	0	4	8	0	0	5	4	63	66.7%	92.1%
		Fall	11	15	15	0	2	4	0	0	6	3	56	73.2%	89.3%
	2004	Spring	7	18	14	0	4	9	0	0	4	6	62	62.9%	93.5%
		Fall	7	14	8	0	2	2	0	0	4	1	38	76.3%	89.5%
	2005	Spring	4	8	16	0	0	11	0	0	5	2	46	60.9%	89.1%
		Fall	8	11	15	0	0	5	0	0	6	2	47	72.3%	87.2%
Geol 2	2002	Spring	3	3	2	0	0	0	0	0	1	2	11	72.7%	90.9%
	2004	Spring	0	6	0	0	0	0	0	0	0	0	6	100.0%	100.0%
Geol 3	2001	Spring	4	4	10	0	0	1	0	0	5	5	29	62.1%	82.8%
		Fall	4	4	13	0	1	1	0	0	2	6	31	67.7%	93.5%
	2002	Spring	3	3	11	1	0	3	0	1	3	5	30	60.0%	90.0%
		Fall	10	1	4	0	3	2	2	0	11	2	35	42.9%	68.6%
	2003	Spring	4	4	3	0	5	2	0	0	1	3	22	50.0%	95.5%
		Fall	3	2	7	0	3	3	0	0	2	2	22	54.5%	90.9%
	2004	Spring	2	2	2	0	0	3	0	0	2	3	14	42.9%	85.7%
		2005	Spring	1	5	2	0	1	0	0	0	1	2	12	66.7%
		Fall	1	1	5	0	1	5	0	0	1	0	14	50.0%	92.9%
	Geol 4	2004	Fall	6	7	1	0	0	3	0	0	3	3	23	60.9%
Geol 6	2001	Spring	0	3	0	0	0	0	1	0	0	0	4	75.0%	100.0%
Geol 7	2003	Fall	3	9	1	0	5	1	0	0	2	1	22	59.1%	90.9%
		Spring	9	5	3	0	0	3	0	0	4	2	26	65.4%	84.6%
	2004	Fall	21	7	6	0	0	0	0	0	13	18	65	52.3%	80.0%
		Spring	5	4	4	0	2	4	0	0	0	0	19	68.4%	100.0%
	Fall	20	14	4	0	2	3	3	0	15	16	77	49.4%	80.5%	

Grade XX: none of the above/unknown

*Success Rate: percent of students successful in courses out of total enrolled in courses (RP Group, 1996).  
The success rate is determined by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).*

*Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).  
The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).*

**IV-D-2: Geology courses  
Individual Courses by Grade/Success/Retention**

			Grades										Total	Success Percent	Retention Percent
			A	B	C	CR	D	F	I	NC	W	XX			
Geol 20	2001	Spring	10	1	2	0	2	2	0	0	3	1	21	61.9%	85.7%
		Fall	0	6	8	1	5	3	0	0	8	1	32	46.9%	75.0%
	2002	Spring	1	3	3	0	2	1	0	0	2	1	13	53.8%	84.6%
		Fall	8	10	9	0	3	3	0	0	2	4	39	69.2%	94.9%
	2003	Spring	10	13	4	0	3	3	0	0	5	0	38	71.1%	86.8%
		Fall	12	14	14	0	1	3	0	0	3	4	51	78.4%	94.1%
	2004	Spring	4	15	2	0	0	0	0	0	3	1	25	84.0%	88.0%
		Fall	3	11	5	0	0	2	0	0	0	1	22	86.4%	100.0%
2005	Spring	4	11	3	0	1	1	0	0	4	1	25	72.0%	84.0%	
	Fall	3	7	2	0	0	1	0	0	2	0	15	80.0%	86.7%	
Geol 21	2001	Spring	0	1	0	0	0	0	1	0	1	0	3	33.3%	66.7%
		Fall	1	3	0	0	0	1	0	0	0	1	6	66.7%	100.0%
	2003	Spring	2	2	4	0	0	1	0	0	2	0	11	72.7%	81.8%
	2004	Spring	3	3	0	0	0	0	0	0	0	0	6	100.0%	100.0%
	2005	Spring	2	0	1	0	0	0	0	0	1	0	4	75.0%	75.0%
Geol 21 (Astr 21)	2001	Spring	2	3	0	1	0	3	2	0	1	1	13	46.2%	92.3%
		Fall	2	4	1	0	0	1	0	0	1	3	12	58.3%	91.7%
	2003	Spring	4	9	1	0	0	1	0	0	2	2	19	73.7%	89.5%
	2004	Spring	5	6	0	0	0	8	0	0	1	3	23	47.8%	95.7%
	2005	Spring	1	3	1	0	1	4	0	0	1	0	11	45.5%	90.9%
Geol 23	2001	Spring	8	3	5	0	1	3	0	0	2	0	22	72.7%	90.9%
		Fall	3	4	5	0	3	2	0	0	2	0	19	63.2%	89.5%
	2002	Spring	8	7	3	1	0	2	0	0	3	2	26	73.1%	88.5%
		Fall	4	6	9	0	0	2	1	0	2	2	26	73.1%	92.3%
	2003	Spring	1	0	7	0	1	2	0	0	2	1	14	57.1%	85.7%
		Fall	3	6	11	0	0	1	0	0	2	2	25	80.0%	92.0%
	2004	Spring	1	2	4	0	0	0	0	0	3	1	11	63.6%	72.7%
		Fall	1	3	2	0	0	3	2	0	5	1	17	35.3%	70.6%
	2005	Spring	1	0	4	0	1	2	0	0	0	1	9	55.6%	100.0%
		Fall	3	4	3	0	0	2	0	0	1	0	13	76.9%	92.3%
Geol 162	2001	Spring	2	1	0	0	0	1	0	2	0	6	50.0%	100.0%	

Grade XX: none of the above/unknown

Success Rate: percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is determined by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

**IV-D-2: Geology courses  
Individual Courses by Grade/Success/Retention**

			Grades										Total	Success Percent	Retention Percent	
			A	B	C	CR	D	F	I	NC	W	XX				
Geol 172	2002	Spring	20	0	0	0	0	0	0	0	0	4	0	24	83.3%	83.3%
	2004	Spring	17	0	1	3	0	0	0	1	5	0	0	27	77.8%	81.5%
Geol 173	2001	Fall	26	0	0	3	0	0	0	0	0	0	0	29	100.0%	100.0%
	2003	Spring	18	0	0	7	0	0	0	6	1	0	0	32	78.1%	96.9%
	2004	Spring	14	0	0	2	0	0	0	0	0	0	0	16	100.0%	100.0%
	2005	Spring	18	0	0	4	0	0	0	0	0	0	0	22	100.0%	100.0%
	2005	Fall	14	0	0	3	0	0	0	1	0	0	0	18	94.4%	100.0%
Geol 174	2001	Fall	17	0	0	0	0	0	0	0	9	0	0	26	65.4%	65.4%
	2002	Fall	29	0	1	2	0	0	0	0	7	0	0	39	82.1%	82.1%
	2003	Fall	14	0	0	0	0	0	0	2	0	0	0	16	87.5%	100.0%
	2004	Fall	24	0	0	0	0	0	0	0	0	0	0	24	100.0%	100.0%
	2005	Fall	14	0	0	3	0	0	0	1	0	0	0	18	94.4%	100.0%
Geol 182	2002	Spring	20	0	0	3	0	0	0	0	6	0	0	29	79.3%	79.3%
	2004	Spring	7	2	0	4	0	0	0	1	0	0	0	14	92.9%	100.0%
	2004	Fall	11	0	0	1	0	0	0	0	0	0	0	12	100.0%	100.0%
Geol 183	2001	Spring	16	0	0	2	0	0	0	0	2	1	0	21	85.7%	90.5%
	2002	Spring	20	0	0	3	0	0	0	0	1	0	0	24	95.8%	95.8%
	2003	Spring	25	0	0	6	0	0	0	0	1	0	0	32	96.9%	96.9%
	2005	Spring	32	0	0	5	0	0	0	1	0	0	0	38	97.4%	100.0%
Geol 185	2001	Fall	27	0	0	0	0	0	0	0	1	0	0	28	96.4%	96.4%
	2002	Fall	22	0	0	3	0	0	0	0	0	0	0	25	100.0%	100.0%
	2005	Fall	19	0	0	6	0	0	0	1	0	0	0	26	96.2%	100.0%
SPSW 1	2001	Spring	1	0	0	0	0	0	0	0	0	0	0	1	100.0%	100.0%
	2001	Fall	7	0	0	0	0	0	2	0	1	0	0	10	70.0%	90.0%
	2002	Spring	5	0	0	0	0	0	0	0	1	1	0	7	71.4%	85.7%
	2004	Spring	5	1	2	0	0	0	0	0	0	4	0	12	66.7%	100.0%
	2004	Fall	2	0	0	0	0	0	0	0	2	0	0	4	50.0%	50.0%
	2005	Spring	6	0	0	0	0	0	0	0	0	1	0	7	85.7%	100.0%
	2005	Fall	3	0	0	0	0	0	0	0	0	1	0	4	75.0%	100.0%

Grade XX: none of the above/unknown

Success Rate: percent of students successful in courses out of total enrolled in courses (RP Group, 1996).

The success rate is determined by dividing the numerator (number of students duplicated with A, B, C, CR) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

Retention Rate: Percent of students retained in courses out of total students enrolled in courses (RP Group, 1996).

The retention rate is calculated by dividing the numerator (number of students duplicated with A, B, C, D, F, CR, NC, I, XX) by the denominator (number of students with A, B, C, D, F, CR, NC, W, I, XX).

**IV-D-3: Geology courses  
Gender by Year/Term**

		<i>Female</i>		<i>Male</i>		<i>Unstated</i>		<i>Total</i>	
<b>2001</b>	<b>Spring</b>	91	51.1%	87	48.9%	0	0.0%	178	100.0%
	<b>Fall</b>	98	54.1%	82	45.3%	1	0.6%	181	100.0%
<b>2002</b>	<b>Spring</b>	62	45.6%	74	54.4%	0	0.0%	136	100.0%
	<b>Fall</b>	83	52.5%	75	47.5%	0	0.0%	158	100.0%
<b>2003</b>	<b>Spring</b>	68	40.7%	99	59.3%	0	0.0%	167	100.0%
	<b>Fall</b>	116	60.4%	76	39.6%	0	0.0%	192	100.0%
<b>2004</b>	<b>Spring</b>	139	57.4%	103	42.6%	0	0.0%	242	100.0%
	<b>Fall</b>	119	58.0%	86	42.0%	0	0.0%	205	100.0%
<b>2005</b>	<b>Spring</b>	92	47.7%	101	52.3%	0	0.0%	193	100.0%
	<b>Fall</b>	113	52.8%	101	47.2%	0	0.0%	214	100.0%

**IV-D-4: Geology courses  
By Zip Code**

		<i>Saddleback ZIP</i>		<i>Irvine ZIP</i>		<i>Out of District or Missing</i>		<i>Total</i>	
<b>2001</b>	<b>Spring</b>	157	88.2%	7	3.9%	14	7.9%	178	100.0%
	<b>Fall</b>	165	91.2%	5	2.8%	11	6.1%	181	100.0%
<b>2002</b>	<b>Spring</b>	119	87.5%	4	2.9%	13	9.6%	136	100.0%
	<b>Fall</b>	140	88.6%	5	3.2%	13	8.2%	158	100.0%
<b>2003</b>	<b>Spring</b>	148	88.6%	4	2.4%	15	9.0%	167	100.0%
	<b>Fall</b>	176	91.7%	5	2.6%	11	5.7%	192	100.0%
<b>2004</b>	<b>Spring</b>	214	88.4%	12	5.0%	16	6.6%	242	100.0%
	<b>Fall</b>	183	89.3%	6	2.9%	16	7.8%	205	100.0%
<b>2005</b>	<b>Spring</b>	169	87.6%	10	5.2%	14	7.3%	193	100.0%
	<b>Fall</b>	186	86.9%	8	3.7%	20	9.3%	214	100.0%

**IV-D-5: Geology courses  
Ethnicity by Year/Term**

		<i>Asian</i>		<i>African American</i>		<i>Hispanic</i>		<i>American Indian/ Alaskan Native</i>		<i>Other</i>		<i>Pacific Islander</i>		<i>White</i>		<i>Unknown</i>		<i>Total</i>	
<b>2001</b>	<b>Spring</b>	7	3.9%	5	2.8%	21	11.8%	1	0.6%	2	1.1%	0	0.0%	129	72.5%	13	7.3%	178	100.0%
	<b>Fall</b>	9	5.0%	1	0.6%	21	11.6%	4	2.2%	4	2.2%	0	0.0%	125	69.1%	17	9.4%	181	100.0%
<b>2002</b>	<b>Spring</b>	6	4.4%	2	1.5%	28	20.6%	3	2.2%	0	0.0%	1	0.7%	86	63.2%	10	7.4%	136	100.0%
	<b>Fall</b>	10	6.3%	4	2.5%	16	10.1%	2	1.3%	3	1.9%	0	0.0%	119	75.3%	4	2.5%	158	100.0%
<b>2003</b>	<b>Spring</b>	13	7.8%	0	0.0%	25	15.0%	2	1.2%	2	1.2%	2	1.2%	110	65.9%	13	7.8%	167	100.0%
	<b>Fall</b>	12	6.3%	6	3.1%	23	12.0%	1	0.5%	4	2.1%	2	1.0%	130	67.7%	14	7.3%	192	100.0%
<b>2004</b>	<b>Spring</b>	11	4.5%	1	0.4%	20	8.3%	0	0.0%	3	1.2%	2	0.8%	177	73.1%	28	11.6%	242	100.0%
	<b>Fall</b>	9	4.4%	3	1.5%	30	14.6%	4	2.0%	4	2.0%	2	1.0%	144	70.2%	9	4.4%	205	100.0%
<b>2005</b>	<b>Spring</b>	7	3.6%	3	1.6%	17	8.8%	3	1.6%	0	0.0%	3	1.6%	142	73.6%	18	9.3%	193	100.0%
	<b>Fall</b>	10	4.7%	1	0.5%	26	12.1%	4	1.9%	2	0.9%	5	2.3%	153	71.5%	13	6.1%	214	100.0%

**IV-D-6: Geology courses  
Age Group Distribution by Year/Term**

		<i>Under 17</i>		<i>18-21</i>		<i>22-25</i>		<i>26-35</i>		<i>36-50</i>		<i>51-65</i>		<i>Over 65</i>		<i>Total</i>	
<b>2001</b>	<b>Spring</b>	1	0.6%	100	56.2%	34	19.1%	21	11.8%	14	7.9%	7	3.9%	1	0.6%	178	100.0%
	<b>Fall</b>	0	0.0%	100	55.2%	24	13.3%	28	15.5%	19	10.5%	10	5.5%	0	0.0%	181	100.0%
<b>2002</b>	<b>Spring</b>	1	0.7%	71	52.2%	25	18.4%	16	11.8%	15	11.0%	7	5.1%	1	0.7%	136	100.0%
	<b>Fall</b>	4	2.5%	91	57.6%	32	20.3%	14	8.9%	12	7.6%	3	1.9%	2	1.3%	158	100.0%
<b>2003</b>	<b>Spring</b>	2	1.2%	120	71.9%	20	12.0%	19	11.4%	6	3.6%	0	0.0%	0	0.0%	167	100.0%
	<b>Fall</b>	5	2.6%	104	54.2%	44	22.9%	17	8.9%	16	8.3%	5	2.6%	1	0.5%	192	100.0%
<b>2004</b>	<b>Spring</b>	2	0.8%	134	55.4%	39	16.1%	37	15.3%	22	9.1%	7	2.9%	1	0.4%	242	100.0%
	<b>Fall</b>	0	0.0%	129	62.9%	30	14.6%	25	12.2%	13	6.3%	5	2.4%	3	1.5%	205	100.0%
<b>2005</b>	<b>Spring</b>	3	1.6%	115	59.6%	28	14.5%	15	7.8%	20	10.4%	9	4.7%	3	1.6%	193	100.0%
	<b>Fall</b>	3	1.4%	112	52.3%	39	18.2%	16	7.5%	31	14.5%	13	6.1%	0	0.0%	214	100.0%

**IV-D-7: Geology courses  
Educational Goals by Year/Term**

	2001		2002		2003		2004		2005											
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall										
<i>AA/AS and transfer</i>	53	29.8%	55	30.4%	52	38.2%	59	37.3%	62	37.1%	89	46.4%	93	38.4%	105	51.2%	65	33.7%	82	38.3%
<i>Transfer w/o AA/AS</i>	17	9.6%	25	13.8%	15	11.0%	18	11.4%	28	16.8%	23	12.0%	35	14.5%	24	11.7%	28	14.5%	38	17.8%
<i>AA/AS w/o transfer</i>	2	1.1%	8	4.4%	4	2.9%	0	0.0%	0	0.0%	2	1.0%	0	0.0%	0	0.0%	2	1.0%	2	0.9%
<i>2-yr Vocational w/o transfer</i>	7	3.9%	3	1.7%	5	3.7%	1	0.6%	0	0.0%	1	0.5%	1	0.4%	2	1.0%	1	0.5%	4	1.9%
<i>Vocational Certificate w/o transfer</i>	20	11.2%	18	9.9%	16	11.8%	27	17.1%	32	19.2%	25	13.0%	34	14.0%	21	10.2%	20	10.4%	28	13.1%
<i>Discover interests</i>	19	10.7%	15	8.3%	8	5.9%	10	6.3%	3	1.8%	7	3.6%	14	5.8%	5	2.4%	11	5.7%	5	2.3%
<i>Acquire job skills</i>	12	6.7%	17	9.4%	13	9.6%	15	9.5%	10	6.0%	8	4.2%	18	7.4%	9	4.4%	14	7.3%	14	6.5%
<i>Update job skills</i>	5	2.8%	2	1.1%	3	2.2%	3	1.9%	4	2.4%	4	2.1%	7	2.9%	4	2.0%	4	2.1%	5	2.3%
<i>Maintain certificate or license</i>	2	1.1%	0	0.0%	0	0.0%	1	0.6%	0	0.0%	0	0.0%	0	0.0%	3	1.5%	0	0.0%	0	0.0%
<i>Educational development</i>	18	10.1%	7	3.9%	7	5.1%	5	3.2%	3	1.8%	4	2.1%	10	4.1%	5	2.4%	23	11.9%	14	6.5%
<i>Basic Skills</i>	0	0.0%	1	0.6%	0	0.0%	0	0.0%	0	0.0%	3	1.6%	3	1.2%	4	2.0%	0	0.0%	0	0.0%
<i>HS or GED</i>	1	0.6%	0	0.0%	0	0.0%	1	0.6%	3	1.8%	2	1.0%	2	0.8%	0	0.0%	3	1.6%	1	0.5%
<i>Undecided</i>	22	12.4%	30	16.6%	13	9.6%	18	11.4%	22	13.2%	24	12.5%	25	10.3%	23	11.2%	22	11.4%	21	9.8%
<b>Total</b>	<b>178</b>		<b>181</b>		<b>136</b>		<b>158</b>		<b>167</b>		<b>192</b>		<b>242</b>		<b>205</b>		<b>193</b>		<b>214</b>	