

Adopted: June 5, 2018

**ACADEMIC SENATE
Of
CALIFORNIA POLYTECHNIC STATE UNIVERSITY
San Luis Obispo, CA**

AS-854-18

**RESOLUTION ON PROPOSED NEW DEGREE PROGRAM: MASTER OF SCIENCE IN
ENVIRONMENTAL SCIENCES AND MANAGEMENT**

- 1 WHEREAS, The Department of Natural Resources Management and Environmental
2 Science has a history of preparing Master students for careers in natural
3 resource management and environmental sciences; and
4
- 5 WHEREAS, The purpose of the proposed Master of Science in Environmental Sciences
6 and Management is to provide graduate students with the knowledge,
7 advanced critical thinking, skills, ethics, and experiences to address current
8 and future environmental problems, and to meet workforce demands in a
9 growing field that addresses major environmental challenges such as global
10 climate change, air and water pollution, depletion and degradation of
11 natural resources, and population growth; and
12
- 13 WHEREAS, The faculty in the Natural Resources Management and Environmental
14 Science Department have the expertise to deliver a Master of Science in
15 Environmental Sciences and Management with a focus on environmental
16 sustainability, broadly defined; and
17
- 18 WHEREAS, There is substantial interest by California Polytechnic, nation, and
19 international students who desire the opportunity to pursue their education
20 with a Master of Science in Environmental Sciences and Management as a
21 pathway to an environmental career; and
22
- 23 WHEREAS, The program is distinctive within the CSU and UC systems in requiring the
24 integration of environmental science knowledge with applied environmental
25 management; and
26
- 27 WHEREAS, Cal Poly graduates with a Master of Science in Environmental Sciences and
28 Management can assist the state of California in addressing major
29 environmental Concerns such as water quality and supply, forest health,
30 energy supply, and conservation of biodiversity; therefore be it
31
- 32 RESOLVED: That the proposed new degree program for the Master of Science in
33 Environmental Sciences and Management be approve.

Proposed by: Greg Brown, Professor, on behalf of the Natural
Resources Management and Environmental
Sciences Faculty

Date: May 22, 2018



DRAFT v. 1.3

*New Degree Program
Master of Science
in Environmental Sciences and Management*

(replaces MS Forestry Sciences and
MS Agriculture with a Specialization in Soil Science)

College of Agriculture, Food, and Environmental Sciences (CAFES)

May 18, 2018

Submitted by

Greg Brown, Professor, Department of Natural Resources Management and Environmental Sciences
Chris Surfleet, Associate Professor, Department of Natural Resources Management and Environmental Sciences
Christopher Appel, Professor, Department of Natural Resources Management and Environmental Sciences

CSU Degree Program Proposal Template
Revised November 2016

Please confirm (✓) that the following are included in the degree proposal:

- ✓ **Board of Trustees Academic Master Plan approval date.** (March 2017)
- ✓ **Title 5 minimum requirements for proposed master's degree have been met, including:**
 - ✓ *minimum of 30 semester (45 quarter) units of approved graduate work*
 - ✓ *no more than 50% of required units are organized primarily for undergraduate students*
 - ✓ *maximum of 6 semester units (9 quarter units) are allowed for thesis or project*

**CSU DEGREE PROPOSAL
Faculty Check List**

1. PROGRAM TYPE

- a. State-Support
- b. Delivery Type: Fully face to face
- c. New Program

2. PROGRAM IDENTIFICATION

- a. *Campus*
California Polytechnic State University, San Luis Obispo
- b. *Full and exact degree designation and title*
Master of Science in Environmental Sciences and Management
- c. *Date the Board of Trustees approved adding this program projection to the campus Academic Master Plan*
March 2017
- d. *Term and academic year of intended implementation (e.g., fall 2018)*
Fall 2019
- e. *Total number of units required for graduation. This will include all requirements (and campus-specific graduation requirements), not just major requirements.*
45 quarter units
- f. *Name of the department(s), division, or other unit of the campus that would offer the proposed degree major program. Please identify the unit that will have primary responsibility.*
Department of Natural Resources Management and Environmental Sciences, College of Agriculture, Food, and Environmental Sciences
- g. *Name, title, and rank of the individual(s) primarily responsible for drafting the proposed degree major program.*
Dr. Greg Brown, Professor, Environmental Management (ggbrown@calpoly.edu)
Dr. Chris Surfleet, Assoc. Professor, Environmental Sciences (csurflee@calpoly.edu)
- h. *Statement from the appropriate campus administrative authority that the addition of this program supports the campus mission and will not impede the successful operation and growth of existing academic programs.*
Support Letter from Mary Pedersen, Senior Vice Provost
Academic Programs and Planning (Appendix 1.1)

- i. *Any other campus approval documents that may apply (e.g. curriculum committee approvals).*
 - Approval Letter from Jeffrey D. Armstrong, President (Appendix 1.2) including the approval of Master of Science Degree, Academic Senate Resolution xxxxxx
 - Letter from Jim Prince, CAFES Associate Dean of Research and Graduate Programs, CAFES (Appendix 1.3)
 - Letter from Michael McCullough, Chair CAFES Curriculum Committee (Appendix 1.4)
 - Report from Katherine O'Clair, College Librarian for CAFES (Appendix 1.5)
- j. *Please specify whether this proposed program is subject to WASC Substantive Change review. The campus may submit a copy of the WASC Sub-Change proposal in lieu of this CSU proposal format. If campuses choose to submit the WASC Substantive Change Proposal, they will also be required to submit a program assessment plan using the format found in the CSU program proposal template.*

N/A

- k. *Optional: Proposed Classification of Instructional Programs and CSU Degree Program Code*
 Master of Science in Environmental Sciences and Management
 CSU Degree Program Code 49011
 CIP Code 03.0104

3. PROGRAM OVERVIEW AND RATIONALE

- a. *Provide a brief descriptive overview of the program citing its purpose, and strengths, fit with the institutional mission or institutional learning outcomes, and compelling reasons for offering the program at this time.*

1. Purpose and strengths.

The purpose of the Masters of Science in Environmental Sciences and Management program is to provide advanced education and training in a growing field with strong career opportunities and to provide an advanced degree option for students graduating from Cal Poly with continuing educational interests in environmental studies. The occupational outlook for environmental scientists and specialists published by the Bureau of Labor Statistics projects employment growth of 11 percent from 2016 to 2026, faster than the average for all occupations. Heightened public interest in the environment, as well as increasing demands placed on the environment by population growth, are expected to spur demand for environmental scientists and specialists.

The strengths of the program: (1) provides core knowledge in research skills and scientific literacy; (2) provides core knowledge in both environmental sciences and environmental management; (3) is multidisciplinary and allows students to specialize in an environmental science or management sub-discipline through choice of electives, (4) is flexible, providing options for student to apply their knowledge through both a traditional thesis or a professional project.

2. Fit with the institutional mission.

Our Mission: Cal Poly fosters teaching, scholarship, and service in a Learn by Doing environment in which students, staff, and faculty are partners in discovery. As a polytechnic university, Cal Poly promotes the application of theory to practice. As a comprehensive institution, Cal Poly provides a balanced education in the arts, sciences, and technology, while encouraging cross-disciplinary and co-curricular experiences. As an academic community, Cal Poly values free inquiry, cultural and intellectual diversity, mutual respect, civic engagement, and social and environmental responsibility.

The proposed MS in Environmental Sciences and Management degree program *fits Cal Poly's mission* because it will provide students the opportunity to partner with other students, staff, faculty, industry, and government to apply environmental science and management principles to advance environmental knowledge, theory, and practice. Successful graduates will acquire a comprehensive education in research methods, environmental science, and environmental management.

The vision for the Natural Resources Management & Environmental Sciences Department (NRES) is to be one of the premier educational and applied research programs in Natural Resources Management and Environmental Sciences in the Western United States (approved by faculty vote, April 16, 2013). The mission of the NRES Department is to graduate passionate, ethical leaders in the science and sustainable management of natural resources and the environment using a "Learn by Doing" approach (approved by faculty vote, September 11, 2012). The new MS degree program is consistent with this vision, mission, and the NRES strategic plan (adopted July 30, 2013) which calls for improvements to the graduate program.

3. Reasons for offering the program at this time.

On a global scale, the world is confronted with major environmental challenges such as global climate change, air and water pollution, depletion and degradation of natural resources, and population growth. Within the state of California, major environmental concerns include water quality and supply, forest health, energy supply, endangered species, and population growth. There is a critical need to provide advanced education opportunities to future environmental professionals to research and find solutions to these environmental challenges.

At Cal Poly, our undergraduate curriculum currently supports three sub-disciplines (majors) in the environmental sciences: Forestry & Natural Resources, Environmental Earth & Soil Sciences, and Environmental Management and Protection. Our current Master's programs (MS in Forestry Sciences and MS in Agriculture with a specialization in Soil Science) do not support all of these sub-disciplines which limits our ability to recruit and accept students with educational interests in Environmental Management and Protection, our largest undergraduate major (~350 students). The new MS degree would build on Department strengths that reflect the strong linkage between environmental science knowledge and management of the environment, while maintaining sub-discipline graduate studies in forestry sciences, earth sciences, and soil sciences.

Provide the proposed catalog description. The description should include:

1. A narrative description of the program

The Master of Science in Environmental Sciences and Management degree is an interdisciplinary degree designed to provide core knowledge in research methods and planning, environmental science, and environmental management, while providing for sub-disciplinary environmental specialization through directed electives. Primary topics of sub-disciplinary studies are environmental management, forestry science, earth science, and soil science. The program prepares students for a broad range of careers in science, research, and environmental management.

The program is open to students from any undergraduate major who have demonstrated high academic achievement. The program requires completion of a core curriculum (research skills, sciences, management) and directed electives for a total of 45 units. Students admitted to the program are expected to begin their studies in the fall quarter as a cohort, but students with prerequisite coursework deficiencies may be admitted in other quarters.

2. Admission requirements

Admission requirements for this program require that students have at least a 3.0 GPA in the final 90 quarter units of their undergraduate degree. Students must take the GRE exam and have at least 3 letters of reference. All other requirements for admission to Cal Poly apply.

3. A list of all required courses for graduation including electives, specifying course catalog numbers, course titles, prerequisites or co-requisites (ensuring there are no "hidden prerequisites" that would drive the total units required to graduate beyond the total reported in 2e above), course unit requirements, and any units associated with demonstration of proficiency.

Catalog number	Course title	Units	Prerequisites
Research skills core			
ESCI 501	Research Planning	4	Graduate standing or consent of instructor
ESCI 502	Research Methods and Data Analysis	4	Graduate standing or consent of instructor
ESCI 581	Graduate Seminar in Environmental Sciences	2	Graduate standing or consent of instructor
ESCI 599	Thesis	9	
or	or	or	
ESCI 596 + 500 level course	Professional project	5 + 4	
Environmental Sciences core			
ESCI 550	Advanced Environmental Sciences	4	Graduate standing or consent of instructor
Environmental Management core			
ESCI 590	Advanced Environmental Management	4	Graduate standing or consent of instructor
Total required coursework		27	
Directed electives (must be 400 or 500 level)*		18	

*Elective course selections will depend on students' interests and sub-discipline emphasis. Students in the research thesis option will consult with their research supervisor to ensure appropriate alignment of student learning objectives with selected courses. Students in the professional project option will consult with the graduate program coordinator for the selection of electives.

The following courses at Cal Poly are indicative of potential electives for students with interests in the following areas:

Environmental soil science: SS 421, SS 422, SS 423, SS 431, SS 432, SS 440, SS 442, SS522

Environmental policy and management: NR 404, NR 408, BIO446, CM425, GSE 532

Environmental planning: NR 416, NR 425, NR 455, CRP 420, CRP 440, CRP 545

Forestry and natural resources: NR 402, NR 414, NR 420, NR 475, NR 503

Geospatial technology: NR418, EE 424, GEOG 440, CRP 457, SS 582, CE 536

Sustainable agriculture: EDES 406, CRP 504, AEPS 445

c. *Total units required to complete the degree:* 45 quarter units

d. *If a master's degree, catalog copy describing the culminating experience requirement(s)*

The degree culminates in completion of a *thesis* or *professional project*. The thesis option is for students interested in advanced graduate coursework and experience in completing an original research project. The findings of this thesis should be publishable in a peer-reviewed scientific journal. The project option is for students interested in pursuing a professional, non-research project, often working with or for an environmental agency or organization.

1. CURRICULUM

a. *These program proposal elements are required:*

- *Institutional Learning Outcomes (ILOs)*
- *Program Learning Outcomes (PLOs)*
- *Student Learning Outcomes (SLOs)*

Institutional Learning Outcomes

When students graduate from Cal Poly, they should be able to:

1. Think critically and creatively
2. Communicate effectively
3. Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology
4. Work productively as individuals and in groups
5. Use their knowledge and skills to make a positive contribution to society

6. Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability
7. Engage in lifelong learning

Program Learning Outcomes (PLOs)

Graduates of the MS in Environmental Science and Management will be able to:

1. Apply appropriate research methods for data collection, analyses, and communication of environmental science and management problems. (Bloom's taxonomy—knowledge, comprehension, application)
2. Analyze a research problem or objective/hypothesis (knowledge gap) and develop a research plan to address the problem or objective/hypothesis (Bloom's taxonomy: analysis and application)
3. Execute a research plan (research design, data collection, analyses, and communication) or professional project plan to completion (Bloom's taxonomy: application and creation).
4. Communicate research or professional project outcomes effectively using oral, written and digital media communication appropriate for the discipline (Bloom's taxonomy: synthesis)
5. Synthesize and communicate core knowledge content contained within at least one environmental science sub-discipline (Bloom's taxonomy: synthesis and evaluation)
6. Apply scientific knowledge to the management of environmental problems (Bloom's taxonomy: application, evaluation and synthesis)
7. Demonstrate ethical reasoning and choose an appropriate course of action based on ethical standards in the research discipline and the research process in general, including publication and intellectual property (Bloom's taxonomy: evaluation and application).
8. Analyze, interpret and explain how environmental, economic, and social systems interact to promote the sustainable management of environmental and natural resources. (Bloom's taxonomy—comprehension, analysis, synthesis)

Student Learning Outcomes (SLOs)

Students who successfully complete the MS in Environmental Sciences and Management will be able to:

1. Evaluate theory and critique research and defend a position.
2. Design and critique a scientific experiment using steps in the scientific method.
3. Test hypotheses and draw correct inferences using both quantitative and qualitative analysis.
4. Analyze and evaluate multiple perspectives and interpretations associated with various environmental and social science theories and defend or refute their merits.
5. Research, design, develop, and implement a capstone research study or professional project that solves a scientific problem or affects positive organizational and/or social change.

b. *These program proposal elements are required:*

- *Comprehensive assessment plan addressing all assessment elements*
(See Appendix 2)
- *Curriculum map matrix indicating where student learning outcomes are introduced (I), developed (D), and mastered (M).*
(See Appendix 3)

The NRES Department has a standing Assessment Committee that will evaluate MS program assessment elements identified in the comprehensive assessment plan. The Assessment Committee will summarize its assessment activities at the end of each academic year and will then report the results to the full NRES Department faculty. More specifically, four PLOS will be assessed each year on a rotating cycle for a complete two-year cycle. Following the two-year cycle, the assessment results will be compiled in preparation for program review and self-study.

The Assessment Committee will make recommendations on how the degree program can be improved based on the assessment results. The Department will decide upon and perform additional curricular follow-ups to all assessment activities, which may involve consultation with external bodies.

Direct Assessment

The types of artifacts that will be used to collect direct assessment include:

Embedded questions in exams linked to specific SLOs/PLOs

Projects, term papers, oral presentations, lab reports, and field experience. We will use rubrics developed around certain criteria for specific learning outcome to be assessed. Each course will have artifacts linked to SLOs and PLOs.

Capstone Experience: Thesis Project or Professional Project

Progress through the MS degree provides a cumulative experience beginning with foundational coursework in research methods, environmental science, and environmental management, and culminating with implementation of a research thesis or professional project. Students can experience this milestone through completion of the research thesis course (ESCI 599) or the professional project course (ESCI 596). In both cases, written reports will be evaluated using an appropriate rubric to assess many of the PLOs.

The comprehensive assessment plan provides a structure to evaluate achievement of PLOs. The assessment plan aligns the University Learning Outcomes, and the Program Learning Outcomes with the assessment activities, tools, schedule, reports, program findings and closing the loop strategies for program assessment and improvement.

Indirect Assessment

The following methods will be used to collect data that reflects indirect assessment:

Surveys/Interviews:

The MS degree program will survey graduating students and alumni to gather data and feedback for assessment of program objectives.

Graduate Status Report:

External indicators can serve as excellent feedback that the MS degree is meeting its program goals. The Graduate Status reports will help determine the success of graduates in securing positions in the private sector, governmental agencies, and non-profits.

c. Indicate total number of units required for graduation.

45 quarter units

d. Include a justification for any baccalaureate program that requires more than 120-semester units or 180-quarter units. Programs proposed at more than 120 semester units will have to provide either a Title 5 justification for the higher units or a campus-approved request for an exception to the Title 5 unit limit for this kind of baccalaureate program.

Not applicable for an MS Program.

e. If any formal options, concentrations, or special emphases are planned under the proposed major, identify and list the required courses. Optional: You may propose a CSU degree program code and CIP code for each concentration that you would like to report separately from the major program.

Not applicable. MS Program will not have formal options, emphasis areas, or concentrations.

f. List any new courses that are: needed to initiate the program or needed during the first two years after implementation. Include proposed catalog descriptions for new courses.

(1) Needed to initiate the program

ESCI 501 – Research Planning (4) – modified existing course

Problem solving and research planning for agriculture, natural resources and related sciences.

Preparation of study plans that identify problems, review appropriate literature, formulate objectives, develop methods and provide for presentation and interpretation of results. Oral reports.
4 lectures.

ESCI 502 – Research Methods and Data Analysis (4) – new course

Quantitative and qualitative research methods for environmental science and management including research design, sampling, data collection, and data analysis. 3 lectures 1 lab.

Prerequisite: Undergraduate course in statistics.

ESCI 550 – Advanced Environmental Science (4) – new course

Advanced study of earth system processes and environmental problems. Advanced application of systems thinking to study of energy, geologic systems, groundwater and surface water resources, soils, environmental pollution and degradation, atmospheric and ocean dynamics, and the global climate system.

ESCI 590 – Advanced Environmental Management (4) – new course
Principles of environmental management focused on human and ecosystem health. Examines topics such as air and water pollution, water use and management, aquatic ecosystems, energy and climate change, biodiversity, toxic substances, solid waste management, and strategies for risk management.

(2) Needed in the second year of implementation

ESCI 596– Project (5) – new course
Research or study toward a completed project that leads to an improved understanding of the physical environment, solution of an environmental problem, improved interaction between human society and the natural environment, or natural resources management.

ESCI 599 – Thesis (9) – modified existing course
Individual research in environmental science or management under the general supervision of faculty, leading to a graduate thesis. Degree credit limited to 9 units.

g. Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.

Fall 2019

- ESCI 501 Research Planning (Appel)
- ESCI 550 Advanced Environmental Sciences (Malama)

Winter 2020

- ESCI 502 Research Methods and Data Analysis (Brown)
- ESCI 590 Advanced Environmental Management (Verma, Chiu)

Spring 2020

- ESCI 581 Graduate Seminar (Surfleet)

Summer 2020

- ESCI 596 Professional Project (Various faculty)

Fall 2020

- ESCI 501 Research Planning (Appel)
- ESCI 550 Advanced Environmental Sciences (Malama)

Winter 2021

- ESCI 502 Research Methods and Data Analysis (Brown)
- ESCI 590 Advanced Environmental Management (Verma, Chiu)

Spring 2021

- ESCI 581 Graduate Seminar (Surfleet)

Summer 2021

- ESCI 596 Professional Project (Various faculty)

Fall 2021

- ESCI 501 Research Planning (Appel)
- ESCI 550 Advanced Environmental Sciences (Malama)

Winter 2022

- ESCI 502 Research Methods and Data Analysis (Brown)
- ESCI 590 Advanced Environmental Management (Verma, Chiu)

Spring 2022

- ESCI 581 Graduate Seminar (Surfleet)
- ESCI 596 Professional Project (Surfleet)

Summer 2021

- ESCI 596 Professional Project (Various faculty)

Proposed Course Offerings 2020 – 2022.

Fall 2020 – Spring 2022

Course	Fall	Winter	Spring	Summer
ESCI 501	X			
ESCI 502		X		
ESCI 550	X			
ESCI 590		X		
ESCI 581			X	
ESCI 596				X
ESCI 599	As needed	As needed	As needed	As needed

- h. For master's degree proposals, include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in Section 40510 of Title 5 of the California Code of Regulations.*

Per Section 40510 of Title 5 of the California Code of Regulations:

- (1) The completion of a specified pattern of study approved by the appropriate campus authority.

The MS Degree was approved by Faculty Senate on XXXXXX.

- (2) A minimum of thirty semester units of approved graduate work completed within a maximum time to be established by each campus.

The MS degree requires completion of 45 quarter units, equivalent to 30 semester unit.

- (A) Not less than 21 semester units (32 quarter units) shall be completed in residence.

The MS degree requires at least 32 quarter units be completed in residence.

- (B) Not less than one-half of the units required for the degree shall be in courses organized primarily for graduate students.

The MS degree requires a minimum of 27 quarter units of 500 level courses.

- (C) Not more than six semester units shall be allowed for a thesis or project.

The MS degree does not allow more than 9 quarter units for thesis or project.

- (3) Satisfactory completion of a thesis, project, or comprehensive examination, defined as follows:

The MS degree requires completion of a thesis (9 quarter units) or a professional project (5 quarter units).

- (4) A grade point average of 3.0 (grade of B) or better in all courses taken to satisfy the requirements for the degree, except that a course in which no letter grade is assigned shall not be used in computing the grade point average.

The MS degree requires a grade point average of 3.0 or better.

- i. For graduate degree proposals, cite the corresponding bachelor's program and specify whether it is (a) subject to accreditation and (b) currently accredited.**

There are several corresponding Cal Poly bachelor's programs for the proposed MS in Environmental Sciences and Management. Most relevant are the BS degrees in Environmental Management and Protection (ENVM), Environmental Earth and Soil Sciences (EESS), and Forestry and Natural Resources (FNR) offered through the NRES Department. The Forestry and Natural Resources degree is subject to accreditation by the Society of American Foresters (SAF) and is currently accredited through 2024. Graduates of these majors would have the necessary undergraduate coursework to enter the proposed MS degree program. Graduates from other programs such as Biology, City and Regional Planning, Geography, and Civil and Environmental Engineering may also be eligible subject to meeting program admission requirements. Our City and Regional Planning program is currently accredited by the Planning Accreditation Board (PAB) and our Civil and Environmental Engineering program is currently accredited by the Accreditation Board for Engineering and Technology (ABET).

- j. For graduate degree programs, specify admission criteria, including any prerequisite coursework.**

Minimum requirements for applicants to be considered are:

- Filing of an application for Graduate Admission via <https://www2.calstate.edu/apply> by the deadlines specified at <http://admissions.calpoly.edu/applicants/>
 - Submission of Graduate Record Exam (GRE) General Test scores electronically to Institution Code: R4038. While no minimum GRE scores have been established, they will be used along with other factors (statement of purpose, transcripts, recommendations, etc.) by potential thesis committee chairpersons as they consider student applications
 - Submission of three letters of recommendation from a source that can attest to the academic capabilities of the applicant. All letters of recommendation must be uploaded through Cal State Apply
 - Completion of a bachelor's degree from an accredited college/university with a minimum grade point average of 3.0 in the last 90-quarter units and completion of the following undergraduate coursework:
 - Sciences**— three quarters or two semesters of any combination of chemistry, biology, ecology, physics, earth science, or atmospheric science
 - Statistics**—one quarter or one semester
 - Calculus**—one quarter or one semester

All applicants who do not speak and write English as their primary language are required to complete the Test of English as a Foreign Language (TOEFL), taken within the last 2 years with a minimum score of 550 (paper version), 213 (computerized version), or 80 (internet based). Submit scores electronically to Institution Code: 4038. This requirement does not apply if country of citizenship is listed on Cal Poly Admissions website: <http://admissions.calpoly.edu/applicants/international/checklist.html>

Beyond the minimum requirements, the following considerations are relevant:

- Completed undergraduate coursework in environmental studies subjects, broadly defined. An applicant who lacks prerequisite coursework may be admitted as a conditionally classified student and must make up any deficiencies (12 unit limit) before advancement to classified graduate standing.

k. *For graduate degree programs, specify criteria for student continuation in the program.*

Each quarter students are enrolled, satisfactory progress on the Formal Study Plan is expected to be made. Satisfactory academic progress shall be defined as maintaining a 3.0 graduate GPA. In addition, per University requirement, "graduate students are required to maintain continuous enrollment from the time of first enrollment in a graduate program until completion of the degree. Continuous enrollment is defined as being enrolled during Fall, Winter, and Spring quarters each year. Students can maintain continuous enrollment either by being enrolled as a regular student; obtaining approval for an education or medical leave prior to the quarter when such a leave would begin; or by registering in a special course designated for this purpose, during quarters in which they are not regularly enrolled. Students who fail to fulfill this continuous enrollment requirement will be not be permitted to graduate even if all degree requirements have been completed until payment has been made for all quarters of non-enrollment. In addition, all graduate students must be enrolled the quarter they graduate."

l. For undergraduate programs, specify planned provisions for articulation of the proposed major with community college programs.

Not applicable for MS Degree.

m. Provide an advising “roadmap” developed for the major.

No applicable for MS Degree.

n. Describe how accreditation requirements will be met, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

Not applicable.

2. SOCIETAL AND PUBLIC NEED FOR PROPOSED DEGREE MAJOR PROGRAM

a. List other California State University campuses currently offering or projecting the proposed degree major program; list neighboring institutions, public and private, currently offering the proposed degree major program.

There are seven MS programs in in the CSU with titles of “Environmental Science” or “Environmental Studies”. Some offer specific concentrations within the degree.

CSU	Degree	Title (Concentration)
Chico	MS	Environmental Science (Professional Science Master's)
Chico	MS	Environmental Science (General)
Dominguez Hills	MS	Environmental Science (General)
Fullerton	MS	Environmental Studies (Environment and Society)
Fullerton	MS	Environmental Studies (Environmental Sciences and Technology)
Los Angeles	MS	Environmental Science (Environmental Biology)
Los Angeles	MS	Environmental Science (Environmental Engineering Science)
Los Angeles	MS	Environmental Science (Environmental Hydrology)
Los Angeles	MS	Environmental Science (Geospatial Sciences)
San Bernardino	MS	Earth and Environmental Sciences (Geology)
San Bernardino	MS	Earth and Environmental Sciences (Professional Science)
San Jose	MS	Environmental Studies (Environmental Studies)
Monterey Bay (Fall 2018)	MS	Environmental Science (Marine and Watershed Studies)

University of California masters programs

The University of California has masters programs with an environmental science or management focus at the following campuses:

UC Berkeley

- Master of Forestry
- Master of Science in Range Management

UC Davis

- Master of Environmental Policy and Management (EPM)

UC Merced

- Master of Environmental Systems

UC Riverside

- Master of Science in Environmental Science
 - Environmental Chemistry and Ecotoxicology
 - Environmental Microbiology
 - Soil and Water Sciences

UC Santa Barbara

- MSEM—Master of Science in Environmental Science—two-year professional degree program designed for individuals who plan to enter or re-enter the workforce upon graduation

b. Describe differences between the proposed program and programs listed in Section 5a above.

The proposed MS-ESCI Cal Poly is an interdisciplinary degree that combines curriculum from the environmental sciences (natural and physical sciences) and environmental management. Students complete required core coursework in research methods, environmental science, and environmental management. The capstone degree requirement is completion of traditional research thesis (9 units) or a professional project (5 units). The Cal Poly program has both common and distinctive elements with other CSU Environmental Science programs described below.

Similarities and differences with other CSU Environmental Science programs:

- The Cal Poly MS-ESCI does not provide for specific concentrations like CSU Los Angeles and CSU San Bernardino but allows students to *design their own disciplinary concentration* through directed electives that comprise 18 out of 45 units.
- The option to complete either a professional project or traditional thesis as a culminating experience is similar to the MS program at CSU Los Angeles that provides for either a “Professional” or “Research” Experience.
- The MS-ESCI program does not require an internship, but students may complete an internship as an elective or as an embedded component of their professional project.
- Research and scientific literacy is emphasized in the Cal Poly curriculum (Research core) whether or not the student pursues a research project through the thesis option.
- A key component of the Cal Poly curriculum is an emphasis on management and protection of the environment and natural resources.
- The MS-ESCI program is distinctive in requiring students to integrate environmental science understanding with applied environmental management. The degree emphasizes the *integration* of science and management and does not favor one over the other.

Synopses of CSU Programs

The MS program at *Chico State University* emphasizes the geosciences (general MS option) and includes a Professional Sciences option that offers broader disciplinary coverage for students seeking management and non-academic positions.

The MS program at *CSU Dominguez Hills* has required courses in the natural and social sciences. An internship for credit is required. The capstone experience is completion of a thesis.

The MS program at *CSU Fullerton* is titled "Environment Studies" and is administered through the College of Humanities and Social Sciences. The program is interdisciplinary and spans environmental sciences, environmental policy and planning, and environmental education and communication. The culminating experience requires completion of a thesis, project, or comprehensive exam

The MS program at *CSU Los Angeles* offers three environmental science options in Environmental Biology, Environmental Engineering Science, or Environmental Hydrology. The degree offers two training experiences—Professional Experience and Research Experience. The culminating experience for the "Professional" option is completion of an internship and project and for "Research" option, the passing of an oral exam and completion of a thesis.

The MS program at *CSU San Bernardino* offers options in Geology and "Professional Science". The latter option is multidisciplinary and requires completion of an internship while the Geology requires completion of a thesis.

The MS program at *San Jose State* is titled "Environmental Studies" and provides students with foundational courses in the natural and social sciences and is thematically focused on "sustainability". The culminating experience is completion of a thesis.

The MS program at *Monterey Bay* will start in fall 2019 and is titled "Environmental Sciences" and will offer training in science and technology in the context of environmental policy. The current focus for their MS is in marine and watershed sciences. The culminating experience is completion of a thesis or a professional internship.

c. List other curricula currently offered by the campus that are closely related to the proposed program.

The College of Agricultural, Food, and Environmental Sciences (CAFES) offers an MS degree in Agriculture with 10 different specializations. The new MS degree in Environmental Sciences and Management is related to, and will replace, the current MS degree in Agriculture with a specialization in Soil Science and the current MS degree in Forestry Sciences which are administered through the NRES Department.

d. Describe community participation, if any, in the planning process. This may include prospective employers of graduates.

Community participation will not be required during the planning process.

e. Provide applicable workforce demand projections and other relevant data.

Cal Poly students with a MS Degree in Environmental Sciences and Management will meet the workforce needs for a range of environmental professions with employment opportunities in the following sectors:

- Local, state and federal agencies (e.g., research, natural resource management, environmental planning)
- Non-profit environmental organizations
- Universities and other educational settings
- Corporate (e.g., environmental consulting, environmental impact assessment, sustainability coordination)
- Government and Military Settings

The occupational outlook for *environmental scientists and specialists* published by the U.S. Bureau of Labor Statistics projects employment growth of 11 percent from 2016 to 2026, faster than the average for all occupations. The occupational outlook for *environmental science and protection technicians* is projected to grow 12 percent from 2016 to 2026, faster than the average for all occupations. The occupational outlook for *conservation scientists and foresters* is projected to grow 6 percent from 2016 to 2026, about as fast as the average for all occupations.

Source: <https://www.bls.gov/ooh/life-physical-and-social-science/environmental-scientists-and-specialists.htm> (visited January 16, 2018).

Data from State of California Employment Development Department shows employment estimates for environmental science and management related professions to be even stronger than federal estimates.

Area of Specialization	Sources of Data	Projected Growth 2014-2024	Avg. Annual Openings
Environmental Scientists and Specialists	State of California Employment Development Department	25.3%	880
Natural Sciences Managers	State of California Employment Development Department	20.7%	360
Soil and Plant Scientists	State of California Employment Development Department	27.3%	140
Foresters	State of California Employment Development Department	36.4%	90
Conservation Scientists SOC Code : 19-1031	State of California Employment Development Department	16.7 %	70

3. STUDENT DEMAND

- a. Provide compelling evidence of student interest in enrolling in the proposed program. Types of evidence vary and may include (for example), national, statewide, and professional employment**

forecasts and surveys; petitions; lists of related associate degree programs at feeder community colleges; reports from community college transfer centers; and enrollments from feeder baccalaureate programs.

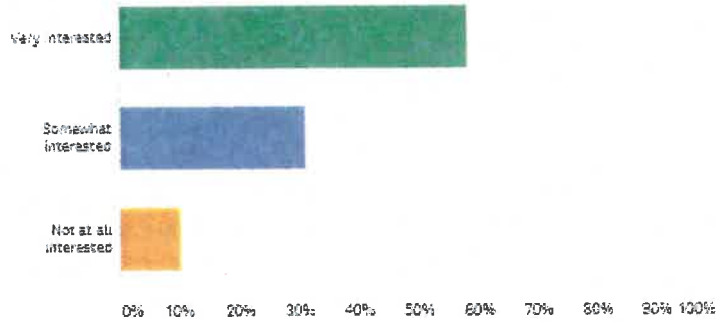
We anticipate student demand will come from a mix of undergraduate Cal Poly students seeking an advanced degree and external applications from other institutions. Conservatively, at least half of the target admission cohort each year (n=24) will likely come from Cal Poly graduates based on responses to an internal student demand survey presented below. This conclusion is based on an analysis of survey data indicating strong interest in the proposed MS degree.

In January 2018, we conducted a survey of undergraduate students in the NRES Department to determine the level of interest in the proposed MS program. The survey was completed by 147 students of which 58.5% were "very interested" in the MS degree (n=86). The data (see figures below) further indicate strong interest in professional training, supporting a professional project option as a culminating experience.

Each year we receive 10-20 inquiries for our existing MS in Forestry Sciences and MS in Agriculture with emphasis in Soil Science programs. This is followed by 4-8 applications each year for admission to one or the other program. The application numbers are limited due to the current thesis-only requirement, which discourages many students due to the admission requirement that a faculty member agree to be the student's adviser. Often faculty will not accept students without research funding, limiting our acceptance rate. Discussions with students inquiring about admission to our MS programs express interest in the new degree with a project-based culminating experience option.

If Cal Poly (NRES Department) were to offer a new Masters program in Environmental Sciences and Management in 2019, what would be your level of interest in enrolling in the program?

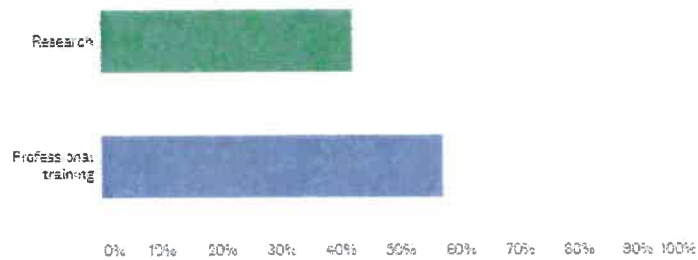
Answered: 147 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very interested	58.50%	86
Somewhat interested	31.23%	46
Not at all interested	10.27%	15
TOTAL		147

In the future, if you did enroll in a Masters program, would you be more interested in research or professional training?

Answered: 146 Skipped: 0



ANSWER CHOICES	RESPONSES	
Research	42.47%	62
Professional training	37.53%	54
TOTAL		146

Students were allowed the option to provide open-ended comments (verbatim below). Students wanted more information about the program content, inquired about whether the program would be

offered as a 4+1 degree option (not initially), and expressed interests in multiple environmental sub-disciplines.

Student Comments about Proposed MS Degree
This Master's program should tie in with the CRP Masters Program
I am very interested
Sounds really interesting. I will do my research on the program if the information is available.
I am currently looking into masters programs
Would need more information on topics
I would interested in knowing what kinds of emphasis areas or concentrations would be offered in this program.
I plan on completing a Master's Program and if Cal Poly offered one it would be my first choice!
I would jump at the opportunity to get my masters while creating a career project.
I fully plan to apply to Cal poly for a masters in ENVM once I graduate though I am currently a freshman
I am not personally interested in a masters program but I believe that having the option there is a great idea for our college.
I would very likely apply for a masters program starting in 2020.
For the above question, if there was a option in between not at all interested and somewhat interested, I would have chosen that one...maybe just slightly interested. I'd have to see what the course offerings would be and what they would cover. If it were more CEQA, policy, and EIR stuff for the upper divisions, count me out!
Please do this! Please
Affordability should remain a priority
I'd love that! It would also be extremely popular amongst my peers.
What would the program offer in comparison to the Forestry Sciences M.S.?
I would be more inclined to enroll if it were on the 4-1 program.
I'm an EES major and I would be extremely interested in this program. I'd be interested to see what the focus of this would be.
Glad this is on its way!
Sounds awesome that's what i wanted mymajor to be
The master would be too broad. Y'all still have this attachment to the word Management, it needs to go. Employers get confused when the see management and protection, and typically reduce it to what in their minds as a bachelors or art degree in environmental studies.
PLEASE OFFER THIS. I am absolutely planning on going to grad school and being able to stay at Cal Poly would make the entire process so much easier. I love the staff at Cal Poly and I would love to have any one from our department as an advisor.
I aim to have a PhD in Environmental Management and hope to laboratory research in the future studying the urban environment and pollution.
I would be very interested but I haven't had a chance to think about it since there isn't a masters program and have already made plans to do something after. If the college

finalized the masters program but summer, I think it would be better because it would give a chance to think about it and make adjustment to future plans.
I support the creation of an Environmental Sciences and Management Masters program and would definitely plan on applying.
My enrollment would depend on the price of tuition, and the concentrations available to students. GO MUSTANGS
An example curriculum would peak my interest; it seems like most undergraduate classes prepare students for a variety of professional contexts. It almost seems like the current curriculum is a little lost and does not know where it is headed; a more specialized, career driven masters program would definitely interest me.
I would be interested in seeing what course offerings would be available for this masters degree. I am more interested in hydrology classes
I have been hoping the Cal Poly NRES department would offer a masters for ENVM since I got here!!
I would be interested in a Masters program directly focused on Public Policy and Environmental Law rather than a more science focused one.
Please make this a program!
I want to do a masters in environmental engineering so that I would have that background, it would be great if an ENVM master incorporated more engineering and science than the current bachelors does.
I am interested in applying for my masters.
I am planning on getting my masters in education here at calpoly
Depends on what the details of the program would be. As to next question, unsure because my career path may change significantly post-college.
Sounds like a great idea!
This would be a great option and opportunity for students at cal poly !
What is the curriculum proposed for said masters program?
I just wish this had been up for 2018 as I have already applied to master's programs for 2018, but I would absolutely apply for this program if it existed when I was a senior in undergrad.
yes please
Cal Poly is a great school and should definitely try to provide this program, the only reason I would not apply is because I would prefer to go to a graduate school separate from my undergraduate.
I would love to be a part of this graduate program, but am somewhat hesitant to be a "guinea pig" student at the very start of the program.

- b. Identify how issues of diversity and access to the university were considered when planning this program. Describe what steps the program will take to insure ALL prospective candidates have equitable access to the program. This description may include recruitment strategies and any other techniques to insure a diverse and qualified candidate pool.***

We are committed to achieving a diverse student group in the MS program. The Cal Poly undergraduate students most likely to enroll in the new program are already gender diverse

(ENVM, EESS programs) thus contributing to a gender diverse MS program. For example, the 2017 incoming freshman class for the Environmental Management and Protection major (ENVM) was 61% female while the incoming freshman class for the Environmental Earth and Soil Science major (EESS) was 55%. A growing MS program with funded research projects will provide an opportunity to recruit individuals from diverse ethnic backgrounds and lower socio-economic status. Because the proposed program involves on-campus delivery of courses, issues of access for non-traditional students cannot be solved via a distance MS program approach. However, we will accommodate when possible, within the timeframe of grant funding, non-traditional students such as those in the workforce who may take a longer path to completion of the MS degree.

- c. *For master's degree proposals, cite the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.*

	Undergraduate enrollment (Fall census)			Total degrees awarded		
	2017	2016	2015	2017	2016	2015
Environmental Management and Protection (ENVM)	341	276	257	51	49	46
Environmental Earth and Social Sciences (EESS, ESS, or ERSC)	245	210	157	33	40	27
Forestry and Natural Resources (FNR)	134	138	151	33	39	28

- d. *Describe professional uses of the proposed degree program.*

Numerous opportunities exist for professional uses of the proposed MS degree program. The principal anticipated jobs and career paths are listed below:

- Local, state and federal agencies (e.g., research, natural resource management, environmental planning)
- Non-profit environmental organizations
- Universities and other educational settings
- Corporate (e.g., environmental consulting, environmental impact assessment, sustainability coordination)
- Government and military settings (e.g., environmental remediation)
- Research Scientist
- Environmental managers
- Postsecondary Educators
- Junior Colleges
- Lecturers at Universities
- MS as preparation for PhD in a broad range of areas

- e. *Specify the expected number of majors in the initial year, and three years and five years thereafter. Specify the expected number of graduates in the initial year, and three years and five years thereafter.*

Numbers are based on an initial admission cohort of 24 students, an annual intake of 24 students, and an expected degree completion time of 1.5 years. The average degree completion time for the current thesis-only option is two years.

	At initiation	After 3 years	After 5 years
Number of Majors	24	36	36
Number of Graduates (total)	**	36	≥75
Basis for projection	Students that will be admitted	Anticipated # of students program can support	Anticipated # of students program can support

4. **EXISTING SUPPORT RESOURCES FOR THE PROPOSED DEGREE PROGRAM**

Note: Sections 7 and 8 should be prepared in consultation with the campus administrators responsible for faculty staffing and instructional facilities allocation and planning. A statement from the responsible administrator(s) should be attached to the proposal assuring that such consultation has taken place.

	At initiation	At 3 years	After 5 years
Faculty	1-2 new	Existing	Existing
Support staff	1 new	Existing	Existing
Facilities	Existing	Existing	Existing
Equipment	Existing	Existing	Existing
Information resources	Existing	Existing	Existing

List faculty who would teach in the program, indicating rank, appointment status, highest degree earned, date and field of highest degree, professional experience, and affiliations with other campus programs. Note: For all proposed graduate degree programs, there must be a minimum of five full-time faculty members with the appropriate terminal degree. (Coded Memo EP&R 85-20)

Name	Title	Areas of expertise
Dr. Chip Appel	Professor	- Soil and Water Chemistry - Tropical Soils
Dr. Greg Brown	Professor	- Environmental Planning and Policy - Natural Resource Management - Public Participation

Dr. Yi-Wen Chiu	Assistant Professor	<ul style="list-style-type: none"> - Environmental Management - Application of GIS - Life Cycle Analysis - Quantitative Simulation
Dr. Richard Cobb	Assistant Professor	<ul style="list-style-type: none"> - Forest Pathology - Forest Entomology - Ecosystem Ecology - Epidemiology
Dr. Charlotte Decock	Assistant Professor	<ul style="list-style-type: none"> - Soil health - Soil science
Dr. Chris Dicus	Professor	<ul style="list-style-type: none"> - Wildland Fire & Fuels Management
Dr. Samantha Gill	Professor	<ul style="list-style-type: none"> - Forest Biometrics - Forest Mensuration - Geographic Information Systems
Dr. Daniel Johnson	Lecturer	<ul style="list-style-type: none"> - Soil Science
Dr. Cristina Lazcano	Assistant Professor	<ul style="list-style-type: none"> - Sustainable Soil Management - Belowground ecological interactions and their effect in biogeochemical cycles - Carbon and nitrogen cycling in soils - Use of organic waste materials as fertilizers in agriculture - Environmental impacts of different fertilization strategies
Dr. Bwalya Malama	Assistant Professor	<ul style="list-style-type: none"> - Soil biophysics - Groundwater hydrogeology - Hydrogeophysics - Contaminant transport
Dr. Gordon Rees	Assistant Professor	<ul style="list-style-type: none"> - Pedology - Soil Mineralogy - Forest and Range Soils
Ms. Sarah Spann	Lecturer	<ul style="list-style-type: none"> - Environmental Impact Analysis - Environmental Regulations and Permitting - Environmental Planning
Dr. Chris Surfleet	Associate Professor	<ul style="list-style-type: none"> - Hydrologic Change due to Land Management - Water Quality - Watershed Assessment and Monitoring - Hydrologic modeling - Hydrologic Effects due to Climate Change
Dr. Stella Cousins	Assistant Professor	<ul style="list-style-type: none"> - Silvics - Silviculture - Forest ecology - Forest operations
Dr. Nick Babin	Assistant Professor	<ul style="list-style-type: none"> - Agroecology - Food systems - Sustainable development

a. Describe facilities that would be used in support of the proposed program.

Cal Poly has 5.8 million square feet in 149 major buildings to support educational activities. The majority of the courses for this MS program will occur in general purpose classrooms or computer laboratories utilized by the College of Agriculture, Food, and Environmental Sciences. All classrooms at Cal Poly are internet (Wi-Fi and Ethernet) ready and utilize Smart Room technology, including electronic projectors or monitors.

The NRES Department has three (3) computer labs and three (3) science lab rooms assigned to the Department for instruction and 13 lab spaces for research and support. When needed, other lab rooms are used on a shared basis. Assigned space under the direction of the Department is shown below.

Instructional Labs (6,300 sf)

The instructional classrooms are internet (Wi-Fi and Ethernet) ready and utilize Smart Room technology, including electronic projectors or monitors.

11-105 – Computer lab	837 sf (26 computers)
11-304 – Computer lab	1,075 sf (32 computers)
180-230 Computer lab	881 sf (32 computers)
11-302 Dendrology Science lab	1,140 sf (24 student capacity benches)
180-237 Soil Science lab	1,183 sf (24 student capacity benches)
180-239 Soil Fertility lab	1,184 sf (24 student capacity benches)

Research & Support Labs (20,585 sf)

All labs are equipped and monitored for academic-level instruction and research.

11-302A Lab Prep	240 sf
11-303 Equipment Room	450 sf
180-248 – Soil Prep lab	512 sf
180-248a Forest Health Research lab	93 sf
180-250 Chemistry Stock Room	432 sf
180-252 – Instrument lab	692 sf
180-241 – General Research lab	864 sf
180-254 – Equip Support	269 sf
52-D18 – Soil Health Research lab	1194 sf
52-D24 – Subsurface Water Research lab	137 sf
52-D25 – Subsurface Water Research lab	1202 sf
Soils Greenhouse	13,534 sf
Bldg. 11 Greenhouse	966 sf

Field Sites (6,000+ acres)

All NRES classes have a wide variety of university lands including forests, rangeland, cropland, reservoirs, streams and watersheds available to them for instruction, research and practice. The Department contributes to teaching and management of the Swanton Pacific Ranch, a living laboratory located in Santa Cruz County at the northern reaches of California's Central Coast and the Monterey Bay. The 3,200 acre property is a landscape composed of a majestic redwood

forest, lush riverine ecosystems and expansive coastal grassland overlooking the bay and the Pacific Ocean. Faculty, graduate students and undergraduates actively pursue research opportunities, utilizing the forest, range, and watershed resources within the ranch.

Lab Equipment in 180-252

Supports academic environmental exercises and research.

Horiba Ultima II - Inductively coupled plasma optical emission spectrometry (ICP-OES) used for the detection of chemical elements in aqueous solutions.

Varian 55B - Atomic absorption spectroscopy (AAS) used for the quantitative determination of chemical elements using the absorption of optical radiation (light) by free atoms in the gaseous state.

Elementar VarioMAX - Carbon and Nitrogen Combustion Analyzer used for carbon and nitrogen determination in plants and soils and a variety of other materials and have important applications in environmental studies.

Shimadzu GC 2014 - Gas Chromatograph (GC) used for greenhouse gas analysis by measuring the content of various components in a sample.

- b. *Provide evidence that the institution provides adequate access to both electronic and physical library and learning resources.*

See Appendix 1.5.

- c. *Describe available academic technology, equipment, and other specialized materials.*

Faculty and Students have access to the following:

- University-wide Information Technology
- PolyLearn Portal (Moodle)
- Office 365 email and calendar service
- Mustang Wireless Wi-Fi access.
- Office 365: One Drive (1 TB backup drive)
- Classroom response system technology (clickers, wi-fi enabled devices)
- Kennedy Library computer resources
(<http://lib.calpoly.edu/use-tech-and-print/borrow-laptops-ipads-and-more/>)
- Over 300 computers throughout library
- Equipment loans: laptops, iPads, Kindles, and associated peripherals (e.g. headphones etc.), projectors, cameras,
- Data Studio: Assistance with large computing needs including GIS, data and maps.
- Cal Poly Print: print, copy and scanning services
- Assistive technology stations

5. ADDITIONAL SUPPORT RESOURCES REQUIRED

Note: If additional support resources will be needed to implement and maintain the program, a statement by the responsible administrator(s) should be attached to the proposal assuring that such resources will be provided.

- a. *Describe additional faculty or staff support positions needed to implement the proposed program.*

The NRES Department will need to hire one new faculty member and one support technician to coincide with implementation of the new MS program. In addition to supporting the new program, the faculty member and technical support staff will also contribute to meeting teaching and support needs for undergraduate students in the department.

See letter of support - Dean of the CAFES.

- b. *Describe the amount of additional lecture and/or laboratory space required to initiate and to sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy. Major capital outlay construction projects are those projects whose total cost is \$610,000 or more (as adjusted pursuant to Cal. Pub. Cont. Code §§ 10705(a); 10105 and 10108).*

The program will utilize existing space and resources to implement the curriculum.

- c. *Include a report written in consultation with the campus librarian which indicates any necessary library resources not available through the CSU library system. Indicate the commitment of the campus to purchase these additional resources.*

See Appendix 1.5 for report from the Librarian for the College of Agriculture, Food, and Environmental Sciences.

- d. *Indicate additional academic technology, equipment, or specialized materials that will be (1) needed to implement the program, and (2) needed during the first two years after initiation. Indicate the source of funds and priority to secure these resource needs.*

No additional academic technology, equipment or specialized materials are required to implement the program or during the first two years of the program.

6. SELF SUPPORT PROGRAMS

Not applicable. This degree is a state support program.

Appendix 1.3. Letter from Jim Prince, CAFES Associate Dean of Research and Graduate Programs

College of Agriculture, Food and Environmental Sciences
Dean's Office

CAL POLY

Date: April 30, 2018

To: Brian Self, Chair
Academic Senate Curriculum Committee

CC: Michael McCullough, Chair, CAFES Curriculum Committee
Richard Savage, Dean, Graduate Education
Greg Brown, Head, NRES Department

From: Jim Prince, Associate Dean for Research and Graduate Programs
College of Agriculture, Food, and Environmental Sciences

Re: New program: Master of Science in Environmental Science and Management

The CAFES Dean's Office strongly supports the proposal from the faculty of the Natural Resources and Environmental Sciences Department for a new Master of Science in Environmental Science and Management program. The program is thoughtfully constructed and does not involve the allocation of significant additional resources. It has been carefully vetted by both the departmental curriculum committee and the CAFES Curriculum Committee, and the faculty have incorporated feedback from Graduate Education and Academic Programs as well as the Dean's office.

This program will replace the current Master of Science in Agriculture with a specialization in Soil Science as well as the Master of Science in Forestry Sciences.

Appendix 1.4. Letter from Michael McCullough, Chair CAFES Curriculum Committee

State of California



Memorandum

Date: April 30, 2018

To: Brian Self, Chair Academic Senate Curriculum Committee

Copy: Richard Savage, Dean, Graduate Education
Susan Olivas, Office of the Registrar

From: Michael McCullough, Chair
CAFES Curriculum Committee

Subject: Submission of 2019-21 Catalog Proposals

The CAFES Curriculum committee has finished reviewing the proposal for the new Master of Science in Environmental Sciences and Management. The committee unanimously voted to approve the proposal on April 27, 2018. This memo serves as notification, so the Academic Senate curriculum committee may begin their review.

Appendix 1.5. Library report.



CAL POLY
Robert E. Kennedy Library

To: Dr. Greg Brown
Natural Resources Management and Environmental Sciences
College of Agriculture, Food and Environmental Sciences (CAFES)

From: Katherine O'Clair
College Librarian for the College of Agriculture, Food and Environmental Sciences

CC: Adriana Popescu, Interim Dean of Library Services
Tim Strawn, Interim Associate Dean

Date: March 13, 2018

Re: Library Resources to Support Master of Science in Environmental Sciences and Management

Summary

The Robert E. Kennedy Library at Cal Poly, San Luis Obispo has sufficient resources to support the new Masters of Science (MS) in Environmental Sciences and Management at an adequate level.

Kennedy Library provides access to a core collection of resources, including scholarly journals, indexing and abstracting databases, print and eBooks, to support teaching and learning in the new MS in Environmental Sciences and Management program. High-level research assistance and instructional support are currently offered to graduate students in the MS in Forestry Sciences and MS in Agriculture with Specialization in Soil Science programs, and these will continue to be available to students in the new MS in Environmental Sciences and Management program. Kennedy Library maintains a core collection of resources in print and electronic formats to support the natural resources management and environmental sciences curriculum at the undergraduate and graduate levels (MS in Forestry Sciences and MS in Agriculture with Specialization in Soil Science), and these will also be suitable for the new MS in Environmental Sciences and Management degree program. **This new degree program would benefit from the addition of several journals that would require additional funding of approximately \$20,000.00 per year.** The need for other specific library materials may become apparent as students matriculate and the program develops. The Department of Natural Resources Management and Environmental Sciences should work with the CAFES College Librarian and the library's Data and GIS Specialist to request additional materials and services as they are identified.

Research Assistance, Instructional Support, and Facilities

Kennedy Library provides a subject-specialist (College Librarian), who is assigned to the College of Agriculture, Food and Environmental Sciences, to support students with their literature research and information seeking needs. The College Librarian is available to provide instruction on library resources for specific courses on an as-needed basis. The College Librarian also designs, develops, and maintains online Research Guides to connect users with information resources that are of use and value for specific disciplines and courses. The library's Data and GIS Specialist also provides instruction, online guides, and

individual research assistance on data and GIS resources and tools. It is recommended that all students enrolled in the MS in Environmental Sciences and Management program receive advanced, discipline-specific library and data/GIS instruction that is integrated into the curriculum to build proficiency in finding and using the information resources and tools that will be important to their studies and their careers as environmental science and management professionals. In addition, the library provides services and programs for all graduate students including Thesis Coaching and Graduate Student Boot Camp. Graduate students at Cal Poly also have access to dedicated facilities and spaces in the library. These include a group study room, a quiet study room, and personal lockers.

Information Resources to Support the MS in Environmental Sciences and Management

Indexing and Abstracting Databases

Kennedy Library provides access to several indexing and abstracting databases that students in the MS in Environmental Sciences and Management program will use for searching the literature to find articles and other publications. These include:

- **BIOSIS Previews** - Index to life sciences and biomedical research from journals, meetings, books, and patents. Covers pre-clinical and experimental research, methods and instrumentation, animal studies, and more. Includes BIOSIS indexing and enhanced MeSH disease terms.
- **CABI: CAB Abstracts** - CAB Abstracts provides research information on agriculture and related applied life sciences, including Agriculture, Animal Health, Forestry, Human Health and Nutrition, and Natural Resources Management. Global Health from CABI is the definitive international public health database.
- **GeoRef** - This comprehensive geoscience database covers topics in mineralogy and crystallography, general mineralogy, mineralogy of silicates, and mineralogy of non-silicates. Indexed content includes journal articles, books, maps, conference papers, reports, and theses. The geology of North America is covered from 1669 to the present, and global coverage dates back to 1933.
- **GreenFILE** - GreenFILE offers well-researched information covering all aspects of human impact to the environment, including global warming, green building, pollution, sustainable agriculture, renewable energy, recycling, and more.
- **Web of Science** - A multidisciplinary science database to search for articles from more than 8,500 of the most prestigious, high impact research journals in the world (1972-present).

Scholarly Journals

Scholarly journals are an important information resource for graduate-level study in Environmental Sciences and Management. Kennedy Library maintains a collection of over 2,100 electronic journals to support students in the degree programs currently offered by the Natural Resources Management and Environmental Sciences Department. The resources required to support these aforementioned degree programs will be equally important to the MS in Environmental Sciences and Management.

Journal Citation Reports was used to generate a list of environmental sciences-related journal titles. Of the top 40 journal titles ranked by impact factor (4.0 or greater), Kennedy Library maintains current online subscriptions to 29 of these, including:

- *Nature Climate Change* (19.304)
- *Land Degradation & Development* (9.787)
- *Environmental Health Perspectives* (9.776)

- *Frontiers in Ecology and the Environment* (8.039)
- *Environment International* (7.088)
- *Water Research* (6.942)
- *Global Environmental Change-Human and Policy Dimensions* (6.327)
- *Remote Sensing of Environment* (6.265)
- *Environmental Science & Technology* (6.198)
- *Journal of Hazardous Materials* (6.065)
- *Journal of Cleaner Production* (5.715)
- *Environmental Pollution* (5.099)
- *Earths Future* (4.938)
- *Science of the Total Environment* (4.90)
- *Conservation Biology* (4.842)
- *Environmental Modeling & Software* (4.404)
- *Environmental Research Letters* (4.404)
- *Reviews in Environmental Science and Bio-Technology* (4.40)
- *Water Resources Research* (4.397)
- *Environmental and Experimental Botany* (4.369)
- *Applied Catalysis A-General* (4.339)
- *Ecological Applications* (4.314)
- *Chemosphere* (4.208)
- *Energy Policy* (4.14)
- *Journal of Industrial Ecology* (4.123)
- *Agriculture Ecosystems & Environment* (4.099)
- *Waste Management* (4.03)
- *Biological Conservation* (4.022)
- *Journal of Environmental Management* (4.01)

New online subscriptions through the library should be considered for the following journals (based on turn-away and interlibrary loan data):

- *Global Change Biology* (8.502) - ~\$7,500.00/year
- *Annual Review of Environment and Resources* (6.268) - ~\$300.00/year
- *Critical Reviews in Environmental Science and Technology* (5.79) - ~\$8,000.00/year
- *Global Biogeochemical Cycles* (4.655) - ~\$900.00/year
- *Ecosystem Services* (4.072) - annual subscription cost to be determined

Journal articles not available through the library's subscriptions can be acquired by individual users through Interlibrary Loan, a service provided by the library free of charge to affiliated users. Interlibrary Loan requests for scholarly articles and book chapters are delivered digitally and usually within 1-2 days.

Books

In addition to journal articles, books will also be needed and utilized by students in the MS in Environmental Sciences and Management program. Kennedy Library provides over 7,100 print books and more than 12,000 electronic books covering the following ranges:

- G 70-70.6 - Geography - Methodology
- GB 450-460 - Coasts - Oceanography
- GB 651-2998 - Hydrology. Water

- GE – Environmental Sciences
- K 3581-3598 – Environmental Law
- QA 273-280 – Probabilities. Mathematical Statistics
- QE 1-350.62 – General Geology
- QH 1-278.5 – Natural History
- S 590-599.9 – Soils. Soil Science
- S 900-972 – Conservation of Natural Resources
- SD 411-428 – Conservation and protection (Forests)
- TD – Environmental Technology. Sanitary Engineering

These collection areas were reviewed in 2014 and 2016 and have been identified as an area of focus for ongoing monograph refresh with emphasis on eBooks and other electronic resources. As additional one-time monies are identified, either by CAFES or Kennedy Library, additional information resources should be acquired to continue to support this advanced degree program.

In addition to the monographs available at Kennedy Library, students also have access to over 20 million print monographs and journal volumes at the other CSU libraries through the CSU+ Resource Sharing Network. Requests for these books may be placed through OneSearch, and delivery of the item to Kennedy Library usually occurs within 3-5 business days.

Data and GIS

Robert E. Kennedy Library provides a range of information resources and services to support the academic needs of the program, including specific support for working with data, analysis, visualization, and GIS.

Data and GIS resources provided through the library include:

- Annual updates of the ESRI Demographics, Consumer Spending, and US Census American Community Survey geodatabases.
- Subscription to the ESRI ArcGIS Online platform and Living Atlas, an authoritative collection of GIS data from around the globe including satellite imagery, global land cover, soil and geology, climate, water resources and many other layers.
- Subscription to the Social Explorer online database with access to historical US Census and other datasets, in map or tabular format, from 1790 to present.
- Cal Poly campus, local government, and geospatial datasets from county, city, agency, and public sources stored on the campus GIS file server.

Reference support, class instruction, and in-depth research consultations with data and GIS projects are available through the Data & GIS Specialist, Russ White, and with student peer assistants, with backgrounds in data science and GIS.

The 300 computer workstations throughout the library provide access to the full suite of technical software licensed by Cal Poly including ArcGIS, AutoCAD, SPSS, Matlab, R, Python, Adobe and many others.

Special thanks to Nikki DeMerville, Jeremy Hobbs, Chris Lee, and Russ White, all from Kennedy Library, for their contributions to this report.

Appendix 2. Master of Science in Environmental Sciences and Management (MS-ESCI) Comprehensive Program Assessment Plan.

University Learning Objectives (ULOs)	Program Learning Objectives (PLOs)	Student Learning Objectives (SLOs)	Course where each SLO is assessed	Assessment activity (signature assignment) used to measure each SLO	Assessment tool used to measure outcome success	Assessment schedule – how often SLOs will be assessed	How assessment data will be reported as evidence SLO performance criteria have been met	Designated personnel to collect, analyze, and interpret student learning outcome data for the program	Student learning outcome data dissemination schedule	Closing the loop strategies
<p>ULO1: Think critically and creatively</p> <p>ULO2: Communicate effectively</p> <p>ULO3: Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology</p> <p>ULO4: Work productively as individuals and in groups</p>	<p>PLO1: Apply appropriate research methods for data collection, analyses, and communication of environmental science and management problems.</p> <p>PLO2: Analyze a research problem or objective/ hypothesis (knowledge gap) and develop a research plan to address the problem or objective/ hypothesis</p>	<p>SLO1: Evaluate theory and critique research and defend a position.</p> <p>SLO2: Design and critique a scientific experiment using steps in the scientific method</p> <p>SLO3: Test hypotheses and draw correct inferences using both quantitative and qualitative analysis</p>	<p>ESCI 501 Research Planning</p> <p>ESCI 502 Research Methods and Data Analysis</p>	<p>Research proposal</p>	<p>Rubric designed for each SLO.</p>	<p>First year then every other year</p>	<p>Report on minimum percentage of students that meet or exceed standards for each SLO.</p>	<p>SLO instructor will assign and grade assessment using rubric developed for this assignment.</p> <p>An assessment committee will analyze rubric data.</p>	<p>Assessment data will be report to Academic Planning and Programs. The University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.</p>	<p>The assessment committee will review the data and identify where improvement is needed.</p>
<p>ULO1: Think critically and creatively</p> <p>ULO2: Communicate effectively</p> <p>ULO3 Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology</p> <p>ULO4: Work productively as individuals and in groups</p>	<p>PLO3: Execute a research plan (research design, data collection, analyses, and communication) or professional project plan to completion</p> <p>PLO4: Communicate research or professional project outcomes effectively using oral, written and digital media appropriate for the discipline</p> <p>PLO5: Synthesize and communicate core knowledge content</p>	<p>SLO5: Research, design, develop, and implement a capstone research study or professional project that solves a scientific problem or affects positive organizational and/or social change</p> <p>SLO5: Research, design, develop, and implement a capstone</p>	<p>ESCI 599</p> <p>ESCI 596</p>	<p>Thesis project/ oral presentation</p> <p>Professional oral presentation</p>	<p>Rubric designed for each SLO.</p>	<p>Once every two years starting in year two.</p> <p>Once every two years starting</p>	<p>Report on minimum percentage of students that meet or exceed standards for each SLO.</p>	<p>The thesis chair will administer and grade the assessment using rubric to assess the thesis.</p> <p>An assessment committee will analyze rubric data.</p> <p>SLO instructor for project course will assign and grade project</p>	<p>Assessment data will be report to Academic Planning and Programs. The University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.</p> <p>Assessment data will be report to Academic Planning and Programs. The</p>	<p>The assessment committee will review the data and identify where improvement is needed.</p> <p>The assessment committee will review the data and identify where improvement is needed.</p>

<p>individuals and in groups</p> <p>ULO5: Use their knowledge and skills to make a positive contribution to society</p> <p>ULO6: Make reasoned decisions based on an understanding of ethics, a respect for diversity, and an awareness of issues related to sustainability</p> <p>ULO7: Engage in lifelong learning</p>	<p>contained within at least one environmental science sub-discipline</p> <p>PLO6: Apply scientific knowledge to the management of environmental problems</p> <p>PLO7: Demonstrate ethical reasoning and choose an appropriate course of action based on ethical standards in the research discipline and the research process in general including publication and intellectual property</p> <p>PLO8: Analyze, interpret and explain how environmental, economic, and social systems interact to promote the sustainable management of environmental and natural resources</p>	<p>research study or professional project that solves a scientific problem or affects positive organizational and/or social change</p>	<p>ESCI 550 Advanced Environmental Science</p> <p>ESCI 590 Advanced Environmental Management</p>	<p>Written paper</p>	<p>Rubric designed for each SLO.</p>	<p>First year then every other year</p>	<p>Report on minimum percentage of students that meet or exceed standards for each SLO.</p>	<p>using rubric developed for professional project</p>	<p>University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.</p>	<p>improvement is needed.</p>
<p>ULO2: Communicate effectively</p> <p>ULO3 Demonstrate expertise in a scholarly discipline and understand that discipline in relation to the larger world of the arts, sciences, and technology</p> <p>ULO4: Work productively as individuals and in groups</p>	<p>PLO5: Synthesize and communicate the core knowledge content contained within at least one environmental science sub-discipline.</p> <p>PLO8: Analyze, interpret, and explain how environmental, economic, and social systems interact to promote the sustainable management of environmental and natural resources</p>	<p>SLO4: Analyze and evaluate multiple perspectives and interpretations associated with various environmental and social science theories and defend or refute their merits</p>	<p>ESCI 550 Advanced Environmental Science</p> <p>ESCI 590 Advanced Environmental Management</p>	<p>Written paper</p>	<p>Rubric designed for each SLO.</p>	<p>First year then every other year</p>	<p>Report on minimum percentage of students that meet or exceed standards for each SLO.</p>	<p>SLO instructor will assign and grade assessment using rubric developed for this assignment. An assessment committee will analyze rubric data.</p>	<p>Assessment data will be report to Academic Planning and Programs. The University Academic Assessment Council will review the reports and provide feedback. Feedback will be used to improve assessment for the following year.</p>	<p>The assessment committee will review the data and identify where improvement is needed.</p>

Appendix 3. Master of Science in Environmental Sciences and Management (MS-ESCI) Curriculum Mapping Matrix.

	COURSE ESCI 501 Research Planning	COURSE ESCI 502 Research Methods and Data Analysis	COURSE ESCI 581 Graduate Seminar in Environmental Sciences	COURSE ESCI 550 Advanced Environmental Science	COURSE ESCI 590 Advanced Environmental Management	COURSE ESCI 596 Professional Project	COURSE ESCI 599 Thesis
SLO1: Evaluate theory and critique research and defend a position.	I/D		D	D	D	M	M
SLO2: Design and critique a scientific experiment using steps in the scientific method	I/D	M				M	M
SLO3: Test hypotheses and draw correct inferences using both quantitative and qualitative analysis	I/D	M				M	M
SLO4: Analyze and evaluate multiple perspectives and interpretations associated with various environmental and social science theories and defend or refute their merits			D	M	M		
SLO5: Research, design, develop, and implement a capstone research study or professional project that solves a scientific problem or affects positive organizational and/or social change	I/D					M	M

Program content is introduced (I), developed (D), and/or mastered (M).

FW: MS ESCI

Gregory Gordon Brown

Tue 5/22/2018 10:14 AM

To: Gladys E. Gregory <gggregory@calpoly.edu>;

2 attachments (373 KB)

MS-ESCI proposal v26 Draft 1-bps.docx; RE: MS ESCI;

See email below. ASCC is supportive. Changes requested were minor and have been implemented.

--

Greg Brown (ggbrown@calpoly.edu)
Professor and Department Head
Natural Resource Management & Environmental Sciences
California Polytechnic State University

Visit the Landscape Values & PPGIS Institute (www.landscapevalues.org)

From: Brian P. Self
Sent: Friday, May 18, 2018 10:01 AM
To: Gregory Gordon Brown <ggbrown@calpoly.edu>
Cc: Michael P. McCullough <mpmccull@calpoly.edu>; Susan Olivas <solivas@calpoly.edu>
Subject: MS ESCI

Hi Greg

In general, the ASCC was supportive of the proposal. We did have a few suggestions, many of which are included in the attached document using Track Changes. I have just rolled back the different courses to the proposers – although perhaps I should have done this to the NRES Curr Chair instead. We would like to make sure the PLOs listed in the Course Proposals match those that are in your Program Proposal. Additionally, some of the different quarters of when classes will be offered do not match up.

Finally, we think the curriculum would be improved by adding in some pre-requisites. One natural one would be to have ESCI 501 serve as a pre-req to ESCI 502. Other pre-req and/or concurrent requirements would also add some flow to the offerings.

Mike can also help with some guidance since he was at the meeting. If you would like Susan to adjust the Workflow of the courses so that they come to one of you, please let her know. If you can do the adjustments on the courses before Tuesday, we can get them on the Senate consent agenda this year.

Best,
Brian

Brian P. Self, PhD
Chair, Academic Senate Curriculum Committee
Professor of Mechanical Engineering
California Polytechnic State University
San Luis Obispo, CA 93407-0001
805-756-7993

Spring Office Hours
M 3-4pm, W 230-330pm, Th 10-11am
Sunday online, 9-10pm

Memorandum

To: Greg Brown, NRES Dept, Department Head
From: Terry Jones, Anthropology and Geography, Department Chair

Date: February 14, 2018
File:

Subject: PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT

Copies:

We are proposing the following program change which involves a course in your department:

Table with 2 columns: Current Requirement, Proposed Requirement. Content: None. New program. / Some MS-ESCI students may choose to take 400 level elective courses offered in Geography

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1.5 year completion rate.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

- I have no concerns regarding the proposed curriculum change. (Comments below are optional)
I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

Blank lines for statement of support or concern.

Signature of Department Head or Chair

Date 5/11/18

Print Name Terry Jones

Memorandum

To: Greg Brown, NRES Dept, Department Head
From: Ken Hillers, Biology Department, Department Chair

Date: February 14, 2018
File:

Subject: PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT
Copies:

We are proposing the following program change which involves a course in your department:

Table with 2 columns: Current Requirement, Proposed Requirement. Content: None. New program. vs. Some MS-ESCI students may choose to take 400 or 500 elective courses offered in the undergraduate and graduate Biology programs

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1.5 year completion rate.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

- I have no concerns regarding the proposed curriculum change. (Comments below are optional)
I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

Handwritten lines for statement of support or concern.

Signature of Department Head or Chair

Date 3-13-18

Print Name Ken Hillers

Memorandum

To: Greg Brown, NRES Dept, Department Head
From: Charles Chadwell, Civil and Environmental Engineering, Department Chair

Date: February 14, 2018
File:

Subject: PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT

Copies:

We are proposing the following program change which involves a course in your department:

Table with 2 columns: Current Requirement, Proposed Requirement. Content: None. New program. vs Some MS-ESCI students may choose to take 400 or 500 elective courses offered in the Civil and Environmental Engineering programs

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1.5 year completion rate.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

- x I have no concerns regarding the proposed curriculum change. (Comments below are optional)
I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

I have no concerns and look forward to collaborating with the students of the new MS-ESCI Program.

Signature of Department Head or Chair

Charles Chadwell

Print Name

Date

2/14/18

Memorandum

To: Greg Brown, NRES Dept, Department Head
 From: Michael Boswell, City and Regional Planning, Department Head
 Date: February 14, 2018
 File:
 Subject: PROGRAM REQUIREMENT CHANGE WHICH INVOLVES A COURSE IN YOUR DEPARTMENT
 Copies:

We are proposing the following program change which involves a course in your department:

Current Requirement	Proposed Requirement
None. New program.	Some MS-ESCI students may choose to take 400 or 500 elective courses offered in the undergraduate and graduate CRP programs, especially those student interested in environmental planning

Program (Major/Concentration/Minor): MS in Environmental Sciences and Management (MS-ESCI)

Approximate number of students enrolled in program: Annual admissions cohort of 24. On average, 35 students in program given 1.5 year completion.

Reason for change: Adding new MS program

Please check the appropriate box and return a signed copy of this memo to me.

- I have no concerns regarding the proposed curriculum change. (Comments below are optional)
- I have concerns regarding the proposed curriculum change and have included comments below.

Statement of support or concern:

We look forward to the opportunity to work with NRES on offering supporting elections.


 Signature of Department Head or Chair

5/12/18
 Date

Michael R Boswell
 Print Name

MEMORANDUM

Cal Poly | Office of the President



To: Dustin Stegner
Chair, Academic Senate

Date: July 2, 2018

From: Jeffrey D. Armstrong
President

Jeffrey D. Armstrong

Copies: K. Enz Finken
M. Pederson
A. Thulin
R. Cavaletto
J. Prince
R. Savage
G. Brown

Subject: Response to Academic Senate Resolution AS-854-18 - Resolution on Proposed New Degree Program: Master of Science in Environmental Sciences and Management

I am pleased to approve the above-entitled Academic Senate resolution. The proposal will now be sent to the Chancellor's Office for approval.

Please express my appreciation to the Academic Senate members for their attention to this important curricular matter.