

new degree

IRAO OFFICE USE ONLY	
Received	5/8/17
In Banner	
MTVCOMP/Codeset	
Master Curriculum	
CIP Code	
Program Code	
Program Description	

University of Hawai'i  
Code Request Form for Academic Programs for

**NEW OR MODIFY PROGRAM CODE**

Reset Form

**New Program Code**     **Modify Program Code**

Date: April 20, 2017

**REQUESTOR CONTACT INFORMATION**

Name Stuart Lau Campus UH Manoa  
 Title University Registrar Email stuartl@hawaii.edu  
 Office/Dept Office of the Registrar Phone 956-5322

**NEW PROGRAM CODE TO CREATE**

Institution MAN - UH Manoa Campus MAN - UH Manoa  
 Level GR - Graduate Effective Term Spring 2017

	Code (Max. Characters)	Description	Check if requesting new code:
College	(2) <u>50</u>	<u>Graduate</u>	<input type="checkbox"/> See Banner form STV_COLL
Department	(4) <u>NREM</u>	<u>Natural Res &amp; Environmentl Mgt</u>	<input type="checkbox"/> See Banner form STV_DEPT
Degree/Certificate	(6) <u>MEM</u>	<u>Master of Environmental Mgmt</u>	<input checked="" type="checkbox"/> See Banner form STV_DEGC
Major	(4) <u>NREM</u>	<u>Natural Res &amp; Environmentl Mgt</u>	<input type="checkbox"/> See Banner form STV_MAJR
Concentration	(4) _____	_____	<input type="checkbox"/> See Banner form STV_MAJR
Minor	(4) _____	_____	<input type="checkbox"/> See Banner form STV_MAJR

If a similar major/concentration code exists in Banner, please list the code: \_\_\_\_\_

Justification to warrant a new major/concentration code similar to an existing major/concentration code: \_\_\_\_\_

Is this major/concentration code being used the same way at the other UH campuses?  Yes  No

Should this program be available for applicants to select as their planned course of study on the online application? *If yes, student may select the code as their only program of study.*  Yes  No

**RULES PERTAINING TO FINANCIAL AID AND 150% DIRECT SUBSIDIZED LOAN LIMIT LEGISLATION**

Is 50% or greater of the classes in this program offered at a location other than the Home Campus?  Yes  No

Is this program/major/certificate financial aid eligible?  Yes  No

Does this certificate qualify as a Gainful Employment Program (Title IV-eligible certificate program)?  Yes  No

See <http://www.ifap.ed.gov/GainfulEmploymentInfo/index.html>

**Program Length**

*In academic years; decimals are acceptable. The length of the program should match what is published by the campus in any online and/or written publication.*

2 years

Special Program Designations  A  B  N  P  T  U

See *Special Program Designations Code Definitions on IRAO Program Code Request webpage*

Required Terms of Enrollment:  Fall  Spring  Summer  Extended

1234

ADDITIONAL COMMENTS

Credits required: 36

ATTACHMENTS

**BOR Approved:** Associate, Bachelor and Graduate Degrees, and sole credential certificates

BOR Meeting Minutes & Supporting Documents  Curriculum

**Chancellor Approved:** Certificates related to authorized BOR program & Associate in Technical Studies (ATS) Degree

Memo from Chancellor to notify VPAA about new program  Curriculum

For new certificates approved by the Chancellor, the related BOR authorized academic program is:

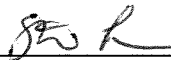
VERIFICATIONS

*By signing below, I verify that I have reviewed and confirm the above information that is pertinent to my position.*

**Registrar:**

Stuart Lau

Print Name



Signature

4/20/17

Date

**Financial Aid Officer:**

Jodie Kuba

Print Name



Signature

5/4/2017

Date

**For Community Colleges, verification of consultation with OVPCC Academic Affairs:**

Print Name

Signature

Date



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**Re: FW: Approval of Established Master of Environmental Management at the University of Hawaii at Manoa**

1 message

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**Catherine Chan** <chanhalb@hawaii.edu>  
To: Stuart Lau <stuartl@hawaii.edu>  
Cc: Wendy Pearson <pearsonw@hawaii.edu>, Jodi Chee <jodichee@hawaii.edu>

Wed, Apr 12, 2017 at 1:26 PM

Hi Stuart:  
Here are the changes.

Master of Environmental Mgmt.  
Field of study is Natural Resources and Environmental Management .

Aloha,  
Catherine  
**Catherine Chan, Ph.D.**  
Professor and Chair  
CTAHR/NREM

Vision

*NREM discovers and extends innovative, integrated solutions for sustainable natural resource use and environmental management for the tropics and beyond.*

Mission: *NREM integrates natural and social sciences to educate students and global citizens, research solutions, and extends information for sustainable use and management of natural resources and the environment.*



On Wed, Apr 12, 2017 at 12:58 PM, Stuart Lau <stuartl@hawaii.edu> wrote:

The description, "Master of Environmental Management" is 34 characters in length. The field is limited to 30 characters. Therefore, 4 characters need to be removed.

Can you confirm whether the major (i.e/ filed of study) is "Natural Resources and Environmental Management" or "Environmental Management"?

Thanks,  
Stuart

On Tue, Apr 11, 2017 at 4:23 PM, Wendy Pearson <pearsonw@hawaii.edu> wrote:

Aloha Stuart,

Please see response below. Catherine needs the description you are referencing. Thanks.

**Wendy L. Pearson, Program Officer**  
Office of the Vice Chancellor for Academic Affairs  
University of Hawai'i at Mānoa  
2500 Campus Road, Hawaii Hall 209  
Honolulu, HI 96822  
(808) 956-6145 / FAX (808) 956-7115  
<http://www.manoa.hawaii.edu>

----- Forwarded message -----

From: **Catherine Chan** <chanhalb@hawaii.edu>

Date: Tue, Apr 11, 2017 at 4:17 PM

Subject: Re: FW: Approval of Established Master of Environmental Management at the University of Hawaii at Manoa

To: Wendy Pearson <pearsonw@hawaii.edu>, Tomoaki Miura <tomoakim@hawaii.edu>

Cc: Anna Wieczorek <ania@hawaii.edu>, Jodi Chee <jodichee@hawaii.edu>

Hi Wendy:  
Thanks for the follow up.

Here are my responses below. I NEED the description to delete 4 characters.

Degree to be awarded: Master of Environmental Management

If yes, need a code (four characters) and a description (30 characters)

Possible code: MEM

Description: Currently at 34 characters. Would need four characters removed.

As a graduate program, college will be designated as Office of Graduate Education YES

Will the department be NREM or some other department?

NREM

Field of Study (i.e. major). NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

Confirm that "Environmental Management" is acceptable.

Need the following program information:

1. Length of program in years

2 YEARS

2. Minimum number of credits required

36 CREDITS

3. Required semesters (Fall/Spring/Summer/Extension)

FALL/SPRING REQUIRED, Need about four semesters to finish. SUMMER IS OPTIONAL

4. Is 50% of the program offered at a location other than the home campus.

NO

Are there any students that will need to be moved from the existing NREM-MS program to this new program?

NOT CURRENT STUDENTS, MAYBE INCOMING STUDENTS IN THE FALL 2017

Any information you are able to provide is appreciated.

Thanks,

Stuart

—  
\*\*\*\*\*  
Stuart Lau  
University Registrar  
Office of the Registrar  
University of Hawaii at Manoa  
Ph: 808 956-8010  
\*\*\*\*\*

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## Re: Approval of Established Master of Environmental Management at the University of Hawaii at Manoa

1 message

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Stuart Lau <stuartl@hawaii.edu>  
To: Jodi Chee <jodichee@hawaii.edu>  
Cc: Stuart Lau <stuartl@hawaii.edu>

Thu, Feb 16, 2017 at 9:18 AM

Hi Jodi,

I am working on have the new code created in Banner. In order to request to have a new code created, the following needs to be clarified or confirmed:

Degree to be awarded: Master of Environmental Management

If yes, need a code (four characters) and a description (30 characters)

Possible code: MEM

Description: Currently at 34 characters. Would need four characters removed.

As a graduate program, college will be designated as Office of Graduate Education

Will the department be NREM or some other department?

Field of Study (i.e. major).

Confirm that "Environmental Management" is acceptable.

Need the following program information:

1. Length of program in years
2. Minimum number of credits required
3. Required semesters (Fall/Spring/Summer/Extension)
4. Is 50% of the program offered at a location other than the home campus.

Are there any students that will need to be moved from the existing NREM-MS program to this new program?

Any information you are able to provide is appreciated.

Thanks,  
Stuart

On Fri, Feb 3, 2017 at 9:17 AM, Jodi Chee <jodichee@hawaii.edu> wrote:

Good morning AVC Shabazz,

The initial transmittal that was sent to you had an error in the cover memo. The attached contains the revised version. Please replace this with the previous version.

Thank you,

Jodi

---

**From:** Jodi Chee [mailto:jodichee@hawaii.edu]  
**Sent:** Wednesday, February 1, 2017 3:43 PM  
**To:** 'Roxie Shabazz' <rshabazz@hawaii.edu>; 'Irene Kato' <ijacinto@hawaii.edu>  
**Cc:** novotnyr@ctahr.hawaii.edu; ania@hawaii.edu; 'Krystyna Aune' <krystyna@hawaii.edu>; 'Holli Kihara' <holli@hawaii.edu>; iboshi@hawaii.edu; 'Stuart Lau' <stuartl@hawaii.edu>; 'Wendy Pearson' <pearsonw@hawaii.edu>  
**Subject:** Approval of Established Master of Environmental Management at the University of Hawaii at Manoa

Hi AVC Shabazz,

Attached please find the Action Memo that was approved by the Board of Regents at their last meeting on January 26, 2017. This will serve as your official document, as the original will be kept in the OVCAA files.

Thank you,

Jodi Chee

Institutional Support

Assistant to the Associate Vice Chancellor for Academic Affairs

Office of the Vice Chancellor for Academic Affairs

2500 Campus Road, Hawai'i Hall 209

Honolulu, HI 96822

Phone: 808-956-7486

Fax: 808-956-7155

---

\*\*\*\*\*

Stuart Lau  
University Registrar  
Office of the Registrar  
University of Hawaii at Manoa  
Ph: 808 956-8010  
\*\*\*\*\*

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MĀNOA


Office of the Vice Chancellor for Academic Affairs

February 2, 2017

REVISED

**MEMORANDUM**

TO: Roxie Shabazz  
Associate Vice Chancellor  
for Students and Enrollment Management,  
and Director of Admissions

FROM: Michael Bruno  
Interim Vice Chancellor  
for Academic Affairs 

SUBJECT: Approval of Established Master of Environmental Management at the  
University of Hawai'i at Mānoa

This memo is to inform your office that the Board of Regents approved the establishment of the Master of Environmental Management in the College of Tropical Agriculture and Human Resources. The effective term is Spring 2017. The approved proposal is attached for your information.

If you have any questions concerning this new established degree program, please contact Wendy Pearson, Program Officer, at 956-6146. Thank you for your attention to this matter.

Attachments

C: Vice President Dickson  
Interim Dean Novotny  
Interim Associate Dean Wieczorek  
Dean Aune  
Director Iboshi  
Registrar Lau

2500 Campus Road, Hawai'i Hall 209  
Honolulu, Hawai'i 96822  
Telephone: (808) 956-8447  
Fax: (808) 956-7115

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UNIVERSITY OF HAWAII  
BOARD OF REGENTS

October 12, 2016

16 NOV 22 A9:27

**MEMORANDUM**

	<b>APPROVED</b>
	1/26/17
	DATE
	<i>Cynthia...</i>
	BOARD SECRETARY UNIVERSITY OF HAWAII BOARD OF REGENTS

TO: Jan N. Sullivan  
Chairperson, Board of Regents

VIA: David Lassner  
President *David Lassner*

VIA: Risa Dickson  
Vice President for Academic Planning and Policy *Risa Dickson*

VIA: David Lassner  
Interim Chancellor *David Lassner*

FROM: Michael Bruno  
Interim Vice Chancellor for Academic Affairs  
and Vice Chancellor for Research *Michael Bruno*

UNIVERSITY OF HAWAII  
PRESIDENT'S OFFICE

16 OCT 28 AM 11

RECEIVED

SUBJECT: APPROVAL OF ESTABLISHED MASTER OF ENVIRONMENTAL  
MANAGEMENT AT THE UNIVERSITY OF HAWAII AT MĀNOA

SPECIFIC ACTION REQUESTED:

It is requested that the Board of Regents approve as established the Master of Environmental Management in the College of Tropical Agriculture and Human Resources at the University of Hawai'i at Mānoa.

RECOMMENDED EFFECTIVE DATE:

Effective upon Board approval.

ADDITIONAL COST:

No additional costs are associated with this request.

PURPOSE:

Essentially, this is a proposal to rename part of an existing degree, the plan B or non-thesis Master of Science in Natural Resources and Environmental Management (NREM) to a Master of Environmental Management (MEM). This simple name change will make our graduates more competitive by providing them with a degree title that clearly describes their preparation as a professional in environmental management.




UNIVERSITY  
of HAWAII®  
MĀNOA

Office of the Vice Chancellor for Academic Affairs

January 31, 2017

**MEMORANDUM**

**TO:** Roxie Shabazz  
Associate Vice Chancellor  
for Students and Enrollment Management,  
and Director of Admissions

**FROM:** Michael Bruno   
Interim Vice Chancellor  
for Academic Affairs

**SUBJECT:** Approval of Established Master of Environmental Management at the  
University of Hawai'i at Mānoa

This memo is to inform your office that the Board of Regents approved the establishment of the Master of Environmental Management in the College of Tropical Agriculture and Human Resources. The effective term is **Spring 2017**. The approved proposal is attached for your information.

If you have any questions concerning this new provisional degree program, please contact Wendy Pearson, Program Officer, at 956-6146. Thank you for your attention to this matter.

**Attachment**

**C:** Vice President Dickson  
Interim Dean Novotny  
Interim Associate Dean Wiczorek  
Dean Aune  
Director Iboshi  
Registrar Lau

2500 Campus Road, Hawai'i Hall 209  
Honolulu, Hawai'i 96822  
Telephone: (808) 956-8447  
Fax: (808) 956-7115

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UNIVERSITY  
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MĀNOA

UNIVERSITY OF HAWAII  
BOARD OF REGENTS

October 12, 2016

16 NOV 22 A9:27

	<b>APPROVED</b>
	1/26/17 DATE
	<i>Cynthia...</i> BOARD SECRETARY UNIVERSITY OF HAWAII BOARD OF REGENTS

**MEMORANDUM**

TO: Jan N. Sullivan  
Chairperson, Board of Regents

VIA: David Lassner  
President *David Lassner*

VIA: Risa Dickson  
Vice President for Academic Planning and Policy *Risa Dickson*

VIA: David Lassner  
Interim Chancellor *David Lassner*

FROM: Michael Bruno  
Interim Vice Chancellor for Academic Affairs  
and Vice Chancellor for Research *Michael Bruno*

UNIVERSITY OF HAWAII  
PRESIDENT'S OFFICE

16 OCT 28 AM 11

RECEIVED

SUBJECT: APPROVAL OF ESTABLISHED MASTER OF ENVIRONMENTAL MANAGEMENT AT THE UNIVERSITY OF HAWAII AT MĀNOA

**SPECIFIC ACTION REQUESTED:**

It is requested that the Board of Regents approve as established the Master of Environmental Management in the College of Tropical Agriculture and Human Resources at the University of Hawai'i at Mānoa.

**RECOMMENDED EFFECTIVE DATE:**

Effective upon Board approval.

**ADDITIONAL COST:**

No additional costs are associated with this request.

**PURPOSE:**

Essentially, this is a proposal to rename part of an existing degree, the plan B or non-thesis Master of Science in Natural Resources and Environmental Management (NREM) to a Master of Environmental Management (MEM). This simple name change will make our graduates more competitive by providing them with a degree title that clearly describes their preparation as a professional in environmental management.

**BACKGROUND INFORMATION:**

Board of Regents' Policy 5-1a (1) states that "The Board shall approve the establishment of all new instructional programs granting academic credit leading to a degree or credential."

***Significance/Contribution of this Degree:*** Since the 1960's, there has been increasing interest in both the public and private sectors in environmental management and this has been augmented by the recent increased interest in sustainability. This has resulted in a continuing demand for professionals with training in environmental management. A recent UHERO<sup>1</sup> report estimated that there will be 49 new jobs per year in Hawai'i's natural resource management sector, while the State projects an 8 percent increase in the demand for planners and 11 percent increase in the demand for biologists. MEM graduates will have the professional skills necessary to meet the demands of both.

***Cost and resource allocation/reallocation implications:*** No new or additional resources are required. This proposal is designed to be budget neutral, i.e., to be implemented with existing resources. The renamed program will utilize the same resources as the current MS non-thesis program.

***Demand projections:*** Based on recent enrollments in the plan-B (non-thesis) option of the MS in NREM, we expect to enroll 10 to 15 students per year, resulting in a standing enrollment of 25 to 35 students, and a graduation rate of 9 to 14 students per year.

***Accreditation impact (if any):*** None.

***Examples (2-3) of similar models from peer institutions:***

The Master of Environmental Management or MEM degree is currently being offered by Yale University, Duke University, and Portland State University. Very similar professional master's degrees are being offered at many U.S. institutions, including Sustainability & Environmental Management (Harvard University), Environmental Studies (University of Pennsylvania), Environmental Science and Management (University of California at Santa Barbara), Environmental Policy and Management (Denver University and American Public University) and Environmental Science and Management (University of Rhode Island).

***Similar Programs at other UH campuses (if there is duplication, why is this program necessary):*** UH Hilo offers the Master of Science in Tropical Conservation Biology and Environmental Science. The MEM degree is designed to provide professional training in the management of environmental and agricultural resources. In

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<sup>1</sup> UH Economic Research Organization.

contrast, the Hilo program is a science degree designed to provide advanced training to prepare students for doctoral studies.

***Statement from campus administration of the program's strategic value within UH priorities.*** As an island state, Hawai'i needs to be a model of sustainability for our way of life here truly to be sustainable. How we use and conserve natural resources is a key part of this. While the NREM proposal only takes an existing track and turns this into a separate degree, we expect that this will make it easier for students to graduate with a credential preparing them to enter the workforce of the state immediately prepared for the myriad of careers in natural resources and environmental management.

***Impact of program change request on campus budget allocations and mission priority.*** Creating a stand-alone Master of Environmental Management degree is not expected to require any new resources flowing into the department, college or university, nor will any such resources be required. This is really more of a nomenclature change than the creation of a new program.

**ACTION RECOMMENDED:**

It is recommended that the Board of Regents approve as established the Master of Environmental Management in the College of Tropical Agriculture and Human Resources at the University of Hawai'i at Mānoa.

**Attachments**

1. *Proposal for a Master of Environmental Management*

c: Executive Administrator and Secretary of the Board Cynthia Quinn  
Interim Dean Rachel Novotny  
Graduate Education Dean Krystyna Aune



**Proposal for a Master of Environmental Management**

**Department of Natural Resources & Environmental Management  
College of Tropical Agriculture & Human Resources  
University of Hawai'i at Mānoa**

**College:** College of Tropical Agriculture & Human Resources

**Planning Committee:** Peter Garrod, Researcher, Catherine Chan-Halbrecht, Chair  
Natural Resources and Environmental Management

**Program Category:** New

**Department:** Natural Resources and Environmental Management

**Level of Program:** Graduate

**Degree Proposed:** Master of Environmental Management

**Proposed Implementation:** Academic Year 2016-17

P H 1  
1 4

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## **Executive Summary**

Essentially, this is a proposal to rename part of an existing degree, the plan B or non-thesis Master of Science in Natural Resources and Environmental Management, to a Master of Environmental Management. This simple name change will have two significant impacts. The first and most significant is that it will make our graduates more competitive, by providing them with a degree title that clearly describes their preparation as a professional in environmental management. For the same reason it will also facilitate future recruitment.

No new resources are requested and no impact on current course loads is anticipated. However, because this will create a new degree (Master of Environmental Management) while leaving the existing degree (Master of Science in Natural Resources and Environmental Management) in place for students writing a thesis, this is also a proposal for a new degree program.

### **Overview**

The Department of Natural Resources and Environmental Management (NREM) offers the Bachelor of Science, Master of Science, and Doctor of Philosophy degrees with current enrollments of 90, 39, and 13 students respectively (Fall 2016). The MS program has two tracks, Academic and Professional. The Academic or Plan A track requires a thesis and the Professional or Plan B track, requires more course work plus an externship/practicum. The first master's degree was awarded in 2004, and since then, 132 master's degrees have been awarded; of which 64 were academic (thesis) and 68 were professional (non-thesis).

This proposal to change the degree title for the non-thesis or Plan B track from a Master of Science in Natural Resources and Environmental Management to a Master of Environmental Management (MEM) is consistent with the national Professional Science Masters movement.<sup>1</sup> If approved, the department will offer two master's degrees, the professional Master of Environmental Management, and the academic Master of Science in Natural Resources and Environmental Management (thesis only).

The MEM degree is offered by Yale University, Duke University, Portland State University, Salisbury University, University of New South Wales, Webster University, University of Queensland, the Freie University (Berlin), and others. Similar professional master's degrees are offered at many U.S. institutions, including Harvard University (Sustainability & Environmental Management), the University of Pennsylvania (Environmental Studies), the University of California at Santa Barbara (Environmental Science and Management),

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<sup>1</sup> "The Professional Science Master's (PSM) is an innovative, new graduate degree designed to allow students to pursue advanced training in science or mathematics, while simultaneously developing workplace skills highly valued by employers. PSM programs consist of two years of academic training in an emerging or interdisciplinary area, along with a professional component that may include internships and "cross-training" in workplace skills, such as business, communications, and regulatory affairs. All have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities." <http://www.sciencemasters.com>.

**Denver University (Environmental Policy and Management), and the University of Rhode Island (Environmental Science and Management).**

**If this change is approved, NREM will then offer a BS, MS, and PhD in Natural Resources and Environmental Management and a Master of Environmental Management. The MS degree will no longer have the non-thesis (Plan B) option. Most of our Plan B students (and future MEM students) are expected to be self-funded.**

## **I. Program Purpose and Outcomes**

Since the 1960's, there has been increasing interest in both the public and private sectors in environmental management and this has been augmented by the recent increased interest in sustainability. This has resulted in a continuing demand for professionals with training in environmental management. NREM M.S. graduates have consistently found jobs in public agencies (local, state, national, and global), and in the private sector in Hawai'i and overseas.

The State projects an 8 percent increase in the demand for planners, and an 11 percent increase in the demand for biologists<sup>2</sup>. MEM graduates will have the professional skills necessary to meet the demands of both. On any given day, there are typically at least a half a dozen or more postings on the county, state, and federal sites that would be appropriate for NREM graduates. There are also jobs available in the private sector, ranging from EIS (Environmental Impact Statement) work to management positions in private firms. A 2016 UHERO<sup>3</sup> report estimates that there will be 49 new jobs per year in Hawai'i's natural resource management sector.

Of the seven students who graduated in May 2015 with the non-thesis masters (the professional masters), five found employment consistent with their degree, one continued on for his Ph.D., and one was still in the process of applying for a position (see page 10 for more information). This is truly an outstanding outcome.

The educational objectives are well summarized by the NREM Graduate Student Learning Outcomes:

- Students demonstrate knowledge of social and ecological principles and the interdisciplinary aspects of natural resource and environmental management issues;
- Students can analyze and address natural resource and environmental management problems by using appropriate methods from social and/or natural science disciplines;
- Students can communicate effectively, both orally and in writing, to diverse audiences including professionals, resource managers, local communities and policy makers;
- Students can conduct a capstone project of professional quality to acquire practical experience by applying social and ecological principles; and
- Students can function as professionals in their specialization area by demonstrating responsible and ethical conduct, effective collaboration, informed decision-making, and life-long learning.

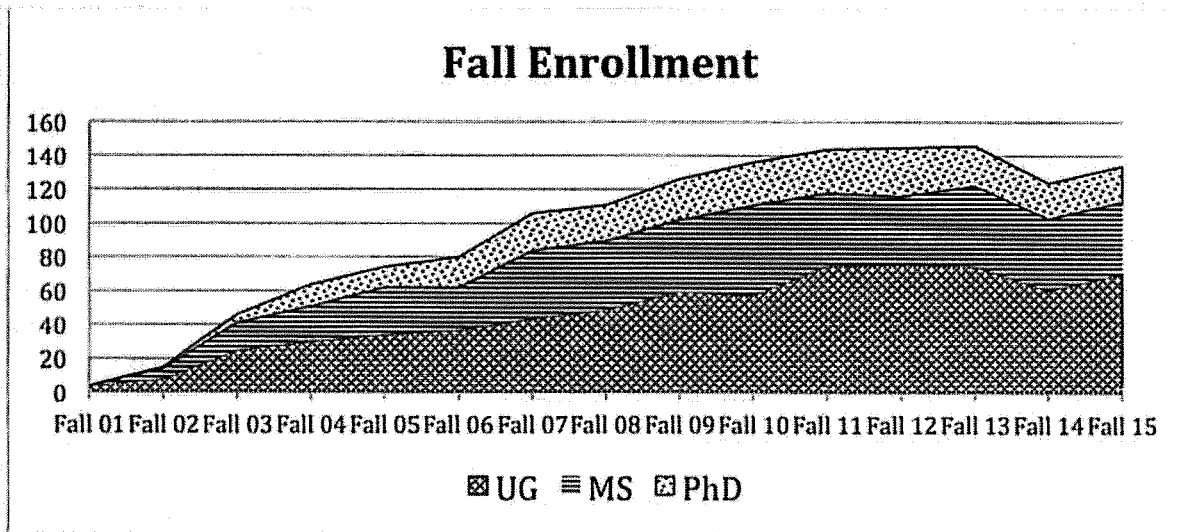
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<sup>2</sup> Employment Projections for Industries and Occupations 2008-2018, Sept. 2010, State of Hawai'i, Department of Labor and Industrial Relations, Research and Statistics Office.

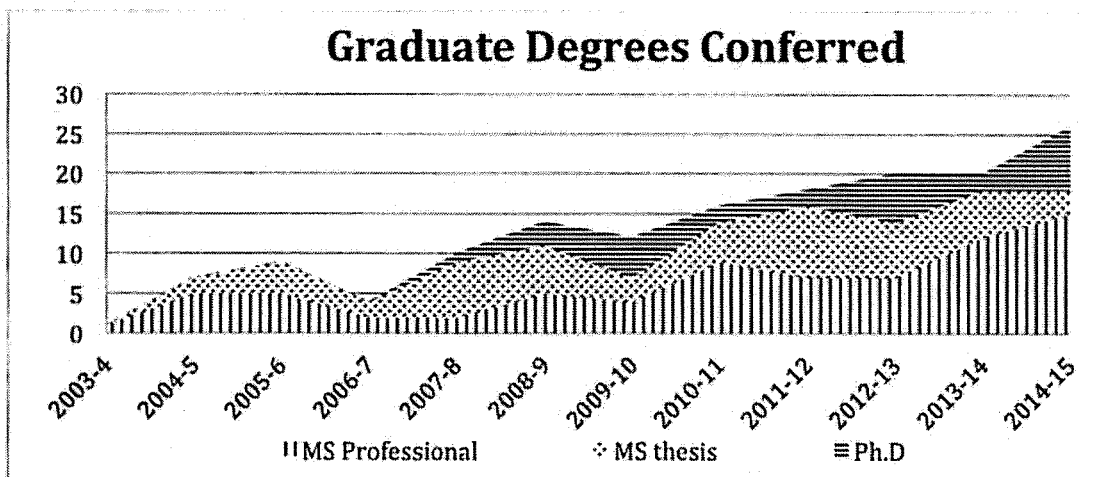
<sup>3</sup> Recent Trends in Hawai'i's Green Economy, K. Burnett and C. Wada, UHERO, Jan. 2016.

Based on recent enrollment in the Plan-B (non-thesis) option of the MS in NREM, we expect to enroll 10 to 15 students per year, resulting in a standing enrollment of 25 to 35 students and a graduation rate of 9 to 14 students per year.

NREM is a relatively new department formed by merging the UHM Department of Agricultural and Resource Economics with part of the Agronomy and Soil Science Department. Enrollment has been steadily increasing since the Department was created in 2001, reaching a high of 146. Current enrollment (Fall 16) is 142<sup>4</sup>.



The number of graduate students graduating per year has also increased, reaching 15 for academic year 2015-16. In recent years, about 2/3 of the M.S. degrees were awarded to students completing the (non-thesis) professional master's degree program.



<sup>4</sup>The decline appears to be due to a temporary decline in undergraduate enrollment. Initial data for the upcoming semester indicate the undergraduate enrollment will revert to previous levels.

Students graduating with a master's degree have found jobs in higher education, government agencies, the private sector, and non-profits. Anecdotally, our graduates with (non-thesis) professional science master's degrees have been quite successful in finding jobs directly related to their training, often with the organization where they interned. Some have also progressed to doctoral programs.

The past and potential future impact of population growth, climate change, invasive species, past and future military activities, expanding infrastructure, and many other changes in Hawai'i's environment and agriculture sector have created a demand for trained professionals in environmental management, both in the private and public sectors.

Food security and sustainability are becoming increasingly more important locally, nationally, and internationally, creating a demand for professionals trained in both the natural and social science aspects of environmental management.

The proposed program is entirely consistent with the Department's mission, "To be the premier resource for creating new knowledge and innovative solutions for agricultural, natural resource, and environmental management issues for the tropics."<sup>5</sup>

## **II. Program Organization**

The MEM program described below is the same as the existing Plan B MS program in NREM.

**Admission:** Applicants must have completed an undergraduate degree with the qualifications necessary to gain admission to UH Mānoa (including TOEFL or IELTS scores for international applicants) as well as (i) undergraduate coursework documenting adequate preparation in the natural, social, and quantitative sciences; (ii) a minimum GRE score of 302-308 combined Verbal and Quantitative Reasoning; (iii) a well-written statement of objectives; and (iv) recommendation letters.

**Advising:** All MEM students will have a faculty advisor who is a member of the graduate faculty. See Attachment 1.

**Academic Program:** The MEM is a course-driven professional degree and requires a total of 36 credits. Students are required to declare a concentration from one of four possible concentration areas (see below). Courses include the Primary MS Core (9 credits), research methods (3 credits), a minimum of 9 elective credits from the chosen concentration area, a minimum of 3 elective credits from each of the other three concentration areas, and a 6-credit capstone experience. Of the 18 elective credits required:

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<sup>5</sup> The Department's mission and vision statements are currently being revised.

- at least 12 credits must be NREM courses; and
- a maximum of 6 credits of upper-division undergraduate course credits (400-level) are allowed.

**Primary Core (9 credits)**

- NREM 600 Evaluation of Natural Resources Management (3)
- NREM 601 Economic Analysis of Natural Resource Management (3)
- NREM 605 Research Skills (2)
- NREM 701 Research Seminar in NREM (1)

**Research Methods (3 credits)**

- A course in graduate research methods (3)

**MEM Concentration Areas (total 18 credits)**

MEM students will select a concentration area from the 4 listed below. Each student is required to take a minimum of 9 credits from their selected concentration area, and 3 credits from each of the other areas. The following list is not comprehensive, as substitutions are considered by the NREM Graduate Committee upon request.

*a. Environmental Policy & Economics (18 courses, 9 NREM)* Focus is on the relationship between public policy, economics, and the environment as well as the design and implementation of appropriate policy.

- GEOG 413 Resource Management
- NREM 420 Community and Natural Resource Management
- NREM/ECON/TPSS 429 Spreadsheet Modeling for Business and Economic Analysis
- NREM 611 Resource and Environmental Policy
- PLAN 620 Environmental Policies and Programs
- GEOG 621 Coastal Management and Planning
- GEOG 622 Environmental Impact Assessment
- PLAN 625 Environmental Planning
- NREM 627 Applied Microeconomic Analysis
- PLAN 628 Urban Environmental Problems
- NREM 637 Resource Economics
- GEOG/PLAN 637 Environment and Development
- PLAN 640 Land Use Policies and Programs
- NREM 658 Advanced Environmental Benefit-Cost Analysis
- NREM 671 International Agricultural Systems
- PLAN 671 Disaster Management: Understanding the Nature of Hazards
- NREM 691 Valuing Nature
- NREM 691 Collaborative Natural Resource Management

*b. Land & Water Resource Management (14 courses, 7 NREM)* Focuses on the relationship between land and water policy and management and the environment.

- ZOOL 410 Corals and Coral Reefs
- GEOG 423 Human Dimensions of the Coastal Ocean



- BOT/ZOOL 450 Natural History of Hawaiian Islands
- HWST 457 'Āina Mauliōla: Hawaiian Ecosystems
- NREM 461 Soil and Water Conservation
- NREM 463 Irrigation and Water Management
- NREM 467 Natural Resource Conservation Planning
- LWEV 588 Legal Aspects of Water Resources and Control
- NREM 612 Predicting & Controlling Degradation in Human-Dominated Ecosystems
- GEOG 618 Human Environment Systems
- HWST 650 Hawaiian Geography and Resource Management
- NREM 660 Hydrologic Processes in Soils
- NREM 662 Watershed Hydrology
- NREM 665 Coastal and Wetland Ecology and Management

*c. Applied Terrestrial Ecology (12 courses, 7 NREM)* Focuses on the interaction of ecology with environmental management.

- BOT 444 Ethnoecology and Conservation
- NREM 450 Wildlife Ecology & Management
- NREM 480 Applied Forest Ecology
- TPSS 481 Weed Science
- TPSS 604 Advanced Soil Microbiology
- BOT 651 Invasion Biology
- BOT 661 Hawaiian Vascular Plants
- NREM 680 Ecosystem Ecology
- NREM 682 Restoration Ecology
- NREM 685 Landscape Ecology
- NREM/BOT/ZOOL 690 Conservation Biology
- NREM 691 Forest Nutrition and Biogeochemistry

*d. Geospatial Analysis & Modeling (8 courses, 3 NREM)* Provides training in geospatial analysis and modeling in the context of effectively and efficiently managing the environment.

- GEOG 470 Remote Sensing
- GEOG 472 Field Mapping
- NREM 477 GIS for Resource Managers
- NREM 664 Small Watershed Modeling
- NREM 677 Remote Sensing of the Environment
- TPSS/GEOG 680 Geospatial Analysis of Natural Resource Data
- PLAN 673 Information Systems for Disaster Management and Humanitarian Assistance
- ZOOL 750 Topics in Conservation Biology

**MEM Capstone Experience (6 credits):** A capstone experience is required for all MEM students. The capstone experience consists of:

- NREM 695 (1 cr.) Capstone Preparation, to be taken when the student is preparing their proposal;

- NREM 696 (3 cr.) Capstone Experience; and
- NREM 699 (2 cr.) Directed Research (with faculty advisor); to be taken when the student has completed their capstone experience and is writing their final document.

All capstone experiences require approval from the MEM Capstone Panel, which consists of the faculty advisor, the NREM 695 course instructor, and an at-large panel member. The Capstone Experience requirement may be fulfilled in a number of ways, based on each individual student's interests. Typical capstone experiences include:

- (i) an internship, cooperative, or special field experience<sup>6</sup>;
- (ii) the investigation of a special topic; and/or
- (iii) the development of a research project.

Each student is expected to take the primary role in identifying and organizing their capstone experience, and to provide and publically defend a written proposal. Upon completion of the capstone, a written report and a public defense will be evaluated by the MEM Capstone Panel.

### III. Student Demand

Each year we receive 50 or more completed applications for our MS program and many more inquires from students in Hawai'i, on the mainland, and overseas. These are individuals interested in pursuing careers in resource management. Interests range from agricultural development, soil, water, pest, and forest management, to geospatial resource analysis.

The interest of potential students in a professional NREM master's degree reflects both their interest in resource management and sustainability and the fact that there are jobs available for professionally trained individuals in this area. Support for this hypothesis can be found in the attached support letters as well in the employment history of past graduates.

However, it is not expected that changing the name will cause enrollment patterns to change. So far, about 60% of the graduates have been female, about 80% have been US citizens, and slightly fewer than 10% held a UH bachelor's degree (more or less equally divided between Mānoa and Hilo). Based on last year's enrollment in the MS program, about 50 percent of the students are Hawai'i residents.

As is true for many interdisciplinary programs, students come from a variety of academic disciplines. Past students had academic backgrounds ranging from social sciences to natural sciences, and also included students from professional schools such as business and education.

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<sup>6</sup> Professional science masters (non-thesis) students have internships in the public, private, and non-profit sectors. For a significant number, the internship has led directly to professional placement in the same organization.

We believe that the name change, besides making our graduates more competitive in the market place, will also attract additional students interested in professional careers to our program.

#### **IV. Program Resources and Efficiency**

No new or additional resources are required. This proposal is designed to be budget neutral, i.e., to be implemented with existing resources. The renamed program will utilize the same resources as the current MS non-thesis program. NREM currently has offices in Sherman Labs and offers twenty-eight graduate courses. The renamed degree will utilize existing faculty and courses. A list of faculty is attached (Attachment 1) as well as a list of the current course offerings (Attachment 2).

In terms of resources that are used only by the professional masters, there are three courses, including one directed reading/research class. Also, each student has a faculty advisor (some faculty are advising more than one student). This is a total of 4 units of scheduled classes, equivalent to 1/6 of an instructional FTE.

**Library Resources:** UHM is fortunate to have an excellent research library on campus. A quick online search of the Hamilton Library database for the main areas covered in the professional master's program reveal extensive holdings. These include book titles as well as journal articles.

<b>Search Entry</b>	<b>Number of Holdings</b>
Environmental Policy	563,486
Environmental Economics	157,377
Land Resource Management	60,298
Water Resource Management	60,364
Applied Ecology	91,394
Geospatial Analysis	13,116

Hamilton Library carries all the relevant major journals in the field.

To calculate the cost of a new program, the best way is to estimate the amount of new resources, including faculty time, required to provide the new degree. This is the marginal cost of the additional degree. In this case, inasmuch as the degree is currently being offered, marginal cost should be approximated by the amount of resources that would be saved if the degree were not offered. As described above, this is 1/6 of an instructional FTE. With a standing enrollment of 25 plus students, this makes the program extremely efficient.

An alternative way would be to examine revenue generation. Last year, there were 932 students who enrolled in and completed an NREM class. Of these, 80 were enrolled in graduate courses. If instructional faculty FTE were prorated accordingly, slightly less than

.5 FTE would be attributed to the graduate program, or less than .25 FTE to the professional master's program.

The accompanying spreadsheet is designed to approximate average cost. There are currently 5.2 instructional FTE in the Department. Undergraduate courses account for seventy-five percent of the course offering, leaving 1.3 FTE for the graduate courses. Based on current enrollment, it is projected that less than half the graduate students will enroll in the professional master's program. (The other half will be thesis master's and doctoral students.) However, all the graduate courses are used by all the graduate students.

In completing the attached spreadsheet, it was assumed that, on average, 0.65 instructional FTE will be used in the professional master's program. It also includes a modest increase in enrollment. We also assumed that the professional master's students would be taking, on average, 9 units a semester, which is the necessary course load to graduate in 2 years. Note that per the cost template, the program generates enough tuition to support the program. Like most programs where the faculty are heavily engaged in research, a lot of research time is jointly used for instruction.

Overall, this proposal is cost neutral. Tuition revenues will continue to be a function of the number of revenue generating students. Revenues should increase if the estimated demand projections for the professional master's degree are correct. Most of our future MEM students are expected to be self-funded.

## **V. Program Effectiveness**

There are several ways to assess the effectiveness of a professional program. The bottom line, however, is the rate at which graduates find relevant employment and if this results in a successful career.

### **Spring 2015 MS Plan B "Professional Masters" Employment**

- U.S. Fish and Wildlife Service
- Secretariat of the Pacific Community, Geoscience for Development Program
- Kupu - also a PhD candidate in NREM
- Same as previous employment
- O'ahu Army Natural Resource Program
- B & L Seafood

Of the seven students who graduated this past spring, five found employment, one enrolled in the Ph.D. program, and only one was searching for employment. This is an outstanding employment statistic. NREM has initiated a program to track graduates, and social media is assisting greatly in keeping in touch with alumni.

Each year, NREM evaluates whether or not the Student Learning Outcomes (SLOs) are met. Before the start of the Fall semester, the graduate committee (a standing faculty

committee) reviews the syllabi for all the graduate courses to determine to what extent each class satisfies some or all of the SLOs (listed on page 3). This is only part of the assessment process. The key to the professional master's degree is the capstone experience. Each student is required to submit a capstone paper and to make an oral public presentation describing their project. Both the paper and the presentation are reviewed by the capstone committee composed of three faculty members, including their advisor, the instructor of their capstone course, and an at-large faculty member. To be judged satisfactory, not only must the paper and the presentation meet professional standards, the student must also demonstrate that they were utilizing "NREM Skills" as defined in the SLO's in a real world problem situation. Examples of recent capstone presentations by students in the professional master's program follow:

<b>Capstone Presentations for Academic Year 2014-15</b>
• <b>Mapping Invasive Pine Trees with High Resolution Remote Sensing</b>
• <b>Using Conceptual Ecosystem Modeling to Support the West Hawai'i Integrated Ecosystem Assessment</b>
• <b>Urban Forest Landscape Management Plan</b>
• <b>Kōke'e Post Fire Restoration Management Plan</b>
• <b>Evaluation of Integrated Hawai'i-Based Curriculum in Waipahu High School's Natural Resource Pathway</b>
• <b>Towards a Greener Campus - Planting Guidelines for Sustainable Landscaping at UH-Mānoa</b>
• <b>Agricultural Tourism in Hawai'i: What Do Farmers Need in Order to Participate?</b>
• <b>Valuing the Aesthetics of a Primary Koa Forest in Hawai'i</b>
• <b>Optimization of Baseline Soil Carbon Stock Assessment Across the Hawaiian Islands</b>
• <b>Documenting the Genuine Progress Indicator in Hawai'i</b>
• <b>Inventory and Assessment of Native Uplands on the Benton Lake National Wildlife Refuge</b>
• <b>Enhancing and Promoting Hawai'i's Trails and Public Health</b>
• <b>Consumer Preference for Banana Chip Product Attributes in Cagayan de Oro, Mindanao, Philippines</b>
• <b>Evaluating the Efficacy of Large-Scale Rat Control Grids in Hawai'i</b>
• <b>Internship at the Secretariat of the Pacific Community, Applied Geoscience &amp; Technical Division</b>
• <b>Drafting an Intellectual Property Rights Statement &amp; Data Sharing Agreement for the Maui Nui Makai Network</b>
• <b>Waipahu High School Natural Resources Pathway Program</b>

To give an indication of the quality of the students in the non-thesis masters' program and how well they are prepared for professional careers in resource management, a copy of the report sent to the Hau'oli Mau Loa Foundation detailing the accomplishments of the first cohort of NREM plan B students they sponsored is attached (Attachment 3).

## **Conclusion**

**The proposed Master of Environmental Management is a simple name change that better reflects the purpose of the existing non-thesis degree option. There are no additional costs. Moreover, the title is consistent with national trends and is the same as or similar to degrees awarded at other leading U.S. and international universities. Approval of the MEM will result in a degree that is more attractive, and UH alumni who are even more competitive in the expanding field of resource management.**

## **Attachment 1 - Faculty Resources**

K. Carlson, PhD - Agro ecosystems and human dimensions  
C. Chan-Halbrecht, PhD —International agricultural development and environmental economics  
L. J. Cox, PhD—Community economic development  
S. E. Crow, PhD—Soil ecology and biogeochemistry  
C. I. Evensen, PhD—Natural resource management, environmental quality  
J. B. Friday, PhD—Tropical forestry/agroforestry extension  
P. V. Garrod, PhD—Marketing and production economics  
T. W. Idol, PhD—Tropical forestry/agroforestry  
J. J. K. Leary, PhD—Invasive species control  
P. S. Leung, PhD—Aquaculture and fisheries economics, systems modeling  
C. Litton, PhD—Terrestrial ecosystem ecology, biogeochemistry  
T. Miura, PhD—Geospatial analysis, remote sensing  
F. Inman-Narahari, PhD - Hardwood tree improvement and forest regeneration  
K. L. Oleson, PhD - Ecosystem service valuation, environmental ethics, policy analysis  
R. Ryals, PhD - Agricultural Ecosystem Ecology  
Y. Tsang, PhD - Tropical Soils and Watershed Hydrology  
M. Vaughan, PhD - Eco-cultural Restoration  
J. F. Yanagida, PhD—Production economics, price analysis, international trade

### Cooperating NREM Graduate Faculty

K. Burnett, PhD (UHERO)—Invasive species assessment and management  
J. DeFrank, PhD (TPSS)—Herbicide management  
A. El-Kadi, PhD (G&G/CEE)—Groundwater hydrology  
T. Giambelluca, PhD (GEOG)—Climatology, hydrology  
M. Habte, PhD (TPSS)—Soil ecology, microbiology  
N. V. Hue, PhD (TPSS)—Organic cycling  
Q. Li, PhD (MBBE)—Environmental chemistry  
T. Radovich, PhD (TPSS)—Organic and Sustainable farming  
C. Ray, PhD (CEE)—Ground water hydrology and chemistry  
H. Valenzuela, PhD (TPSS)—Vegetation physiology and management

### Affiliate NREM Graduate Faculty

G. Bruland, PhD (Principia College)—Soil and water conservation  
K. Chaston (NOAA)—Coral and coastal management  
D. Drigot (US Army Corp of Engineers)—Natural resource management  
J. Fox, PhD (East-West Center)—Social forestry  
C. Giardina, PhD (IPIF - USDA-FS)—Forest Ecology  
S. A. Gray, PhD - Social-Ecological Modeling, Collaborative Resource Management  
S. Hess (USGS-BRD)—Wildlife ecology and management  
Y. Li, PhD (UH Hilo)—Forest ecosystem management  
R. Mackenzie, PhD (USDA Forest Service)—Aquatic ecology  
D. Meason, PhD (Scion, New Zealand)—Forest ecosystem analysis and modeling  
M. Pan, PhD (NOAA Fisheries)—Fishery economics

S. Pooley, PhD (NMFS)— Marine resource economics  
M. Robotham, PhD (USDA)—Conservation technology  
C. Smith (USDA)—Soil genesis, survey and classification  
M. Walker, PhD (Univ. of Nevada, Reno)—Water quality, microbiology



## **Attachment 2 - Current Graduate Courses Offered by NREM**

**NREM 500 Master's Plan B/C Studies (V)** Enrollment for degree completion. Repeatable up to 3 credits. Pre: master's Plan B or C candidate and consent.

**NREM 600 Evaluation of Natural Resource Management (3)** Critical evaluation of natural resource management approaches. Emphasis on the physical, chemical, and biological aspects within an environmental context. Pre: graduate standing or advanced undergraduate standing, and consent.

**NREM 601 Economic Analysis of Natural Resource Management (3)** Lecture/discussion providing an economic framework for assessing natural resource management projects and environmental policies. Use of case studies to demonstrate applications of the framework in selected subject areas. (Spring only) Pre: one ECON course.

**NREM 605 Research Skills (2)** Assists the student in developing skills necessary to write a research grant and design a research proposal. NREM majors only. A-F only. (Fall only)

**NREM 611 Resource and Environmental Policy (3)** Exploration of institutional and policy dimensions of natural resource development, management, allocation, markets and pricing, focusing on their environmental impacts. Emphasis on policy analysis using case studies and empirical findings. Original paper required. A-F only. Pre: ECON 300 or ECON 301, or consent. (Fall only)

**NREM 612 Predicting and Controlling Degradation in Human-Dominated Terrestrial Ecosystems (3)** Historic, present, and projected trends in understanding and managing human-dominated ecosystems; predicting, measuring and mitigating degradation especially in terrestrial ecosystems with a focus on small volcanic islands in tropical settings. A-F only. Pre: 301 and 304 (or equivalent) and 600. Recommended 461, or consent. (Fall only)

**NREM 627 Applied Microeconomic Analysis (3)** Economic applications to the agricultural and nonagricultural industries are emphasized. Econometric techniques are used to estimate demand, supply, production and cost functions, which are analyzed in terms of economic theory and market information. A-F only. Pre: AREC 626 and ECON 627, or consent.

**NREM 631 Sustainable Agriculture Seminar (2)** Critical evaluation of existing and alternative cropping systems from a long-term perspective. Value conflicts and resolution. Pre: graduate standing or advanced undergraduate standing, and consent.

**NREM 637 Resource Economics (3)** Analysis of problems of development and management of natural resources with emphasis on resources in agriculture and role in economic development. Pre: ECON 608 and ECON 629. (Cross-listed as ECON 637)

**NREM 652 Information Research Skills (1)** Examines the use of libraries and information technology for scholarly investigation in support of scientific research; provides experience utilizing and critically evaluating a variety of print and electronic

sources in basic and applied sciences. Pre: consent. (Cross-listed as ANSC 652, FSHN 652, and TPSS 652)

**NREM 658 Advanced Environmental Benefit Cost Analysis (3)** Advanced environmental benefit-cost analysis will require that proficiency be demonstrated on fundamentals and address topics related to sustainability, including income equality, non-market goods, risk, cost of public funds, and the social discount rate.

**NREM 660 Hydrologic Processes in Soils (3)** (2 Lec, 1 3-hr Lab) Hydrologic properties in soils and the processes involved in water infiltration drainage and solute transport. Emphasis on key parameters required for modeling. Recommended: CEE 424 or consent. (Fall only) (Cross-listed as BE 664 and CEE 625)

**NREM 662 Watershed Hydrology (3)** Application of basic hydrologic processes and management practices occurring on small islands watersheds. Pre: 203 or equivalent and 304 or equivalent; or consent. (Once a year)

**NREM 664 Small Watershed Modeling (3)** Introduction to process-based modeling of watershed with emphasis on model applications. Deals with the characterization and simulation of small watershed hydrologic and pollutant transport processes. Pre: CEE 424 (or concurrent) or GG 425 (or concurrent) or BS degree from NREM, or consent. (Spring only)

**NREM 665 Coastal and Wetland Ecology and Management (3)** Study of marshes, mangroves, sea grass beds, and coral reefs. Emphasis on the hydrology, biogeochemistry, productivity, and community dynamics of these systems. Response to perturbations and management strategies will also be discussed. Pre: advanced undergraduate coursework in hydrology, soils, and ecosystem ecology recommended. (Alt. years)

**NREM 671 International Agricultural Systems (2)** Analysis of trends and strategies in international agricultural research and development. International agricultural research centers (IARC), Food and Agriculture Organization (FAO), university networks and consortia, and private voluntary organizations (PVOs). Pre: graduate standing or advanced undergraduate standing, and consent.

**NREM 677 Remote Sensing of the Environment (3)** Fundamentals, techniques, and applications of remote sensing for natural resource assessments and environmental monitoring. Lab consisting of field radiometric exercises, computer modeling of energy-matter interaction, processing, and analysis of remotely sensed imagery. Pre: one physics course (e.g. PHYS 151), one calculus course (e.g. 203), and one statistics course (e.g. 310), or consent. Recommended: either GEOG 470 or GG 460 or one introductory remote sensing course. (Alt. years)

**NREM 680 Ecosystem Ecology (4)** (2 Lec, 1 3-hr Lab) Principles of ecosystem ecology with emphasis on tropical forests, human impacts, and global environmental change. Factors controlling ecosystem structure, productivity, nutrient cycling, plant-soil-atmosphere interactions, and energy balance. Field and laboratory methods in ecosystem science. Pre: advanced undergraduate coursework in ecology and soil science; graduate standing; and consent. (Alt. years: spring)

**NREM 682 Restoration Ecology (3)** Graduate seminar on foundations of restoration ecology, application of ecological theory to restoration practice. Emphasis on restoration of structure and function in degraded terrestrial ecosystems using case studies from Hawai'i and around the world. Pre: advanced undergraduate ecology course and graduate standing, or consent. Completion of 680 recommended, but not required. (Alt. years)

**NREM 685 Landscape Ecology (3)** Focuses on the history, theories, and contemporary views of landscapes; including scale, land cover, land use, landscape metrics, disturbance regimes, land management, landscape change, the relationship of landscapes to species, and modeling. Pre: graduate students, or consent. (Alt. years)

**NREM 690 Conservation Biology (3)** Theories and concepts of ecology, evolution and genetics for conservation of biological diversity. Topics will include restoration ecology, management planning, laws and policies, biological invasions. Pre: BIOL 375 and either ZOO 480 or BOT 462; and either ZOO 410, 439, 620, 623, BOT 453, 454, 456, or 492. (Cross-listed as BOT 690 and ZOO 690)

**NREM 691 Advanced Topics in Natural Resources and Environmental Management (V)** Study and discussion of significant topics and problems at an advanced level. Offered by visiting or existing faculty as a special course. Repeatable one time. Pre: graduate standing or consent.

**NREM 695 Master's Plan B Capstone Preparation (1)** Preparation for NREM Master's Plan B capstone experience. NREM majors only. A-F only. Pre: 600 (or concurrent), 601, 605 (or concurrent), a graduate methods course, and at least 12 graduate elective credits. (Fall only)

**NREM 696 Master's Plan B Capstone Experience (3)** Capstone experience for NREM Master's Plan B students. NREM majors only. A-F only. Pre: 695 or concurrent.

**NREM 699 Directed Research (V)** Repeatable unlimited times. Pre: graduate standing.

**NREM 700 Thesis Research (V)** Repeatable unlimited times.

**NREM 701 Research Seminar (1)** Presentation and discussion of student research proposals, theses and dissertations, and research presentations by NREM faculty, students, and invited speakers. A-F only. Pre: consent.

**NREM 800 Dissertation Research (V)** Repeatable.

### **Attachment 3 - Hau'oli Mau Loa Fellowship Recipients**

The selectees for the 2012 Hau'oli Mau Loa Fellowships in the Department of Natural Resources and Environmental Management (NREM) at the University of Hawai'i at Mānoa (UHM) successfully graduated in May 2014 with M.S. Plan B degrees in Natural Resources and Environmental Management (professional, course-driven M.S. degrees) focused in the *Applied Terrestrial Ecology* concentration area. Each student is currently employed as follows:

**Student #1:** After graduating from the NREM M.S. program at UH Manoa, Student #1 has been working as an aquaponics consultant for educational programs on O'ahu to extend public awareness and understanding of concepts of sustainable agricultural in Hawai'i. Student #1 has also been working as a hatchery assistant at a disease-free tilapia hatchery and will soon begin training start-up farmers in techniques of aquaponic farming through a two-year training program. Additionally, in partnership with the Ko'olau Mountains Watershed Partnership, Student #1 has been propagating native plants for a restoration project at the Pali Lookout, aimed at raising public awareness of issues threatening native Hawaiian ecosystems and current efforts to restore them.

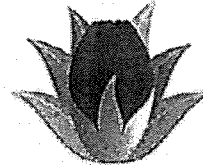
**Student #2** is currently working on the O'ahu Early Detection Program (OED), a partnership between the O'ahu Invasive Species Committee and the Bishop Museum's Herbarium Pacificum. The goal of the OED program is to make efficient use of limited natural resource management agency funds by connecting scientific, herbarium-based data to invasive plant management in Hawai'i. This is done primarily by providing up-to-date distribution and weed threat information from herbarium records on invasive or potentially invasive species of concern to agencies, which then allows agencies to make informed decisions and keep weed management goals realistic. The work involves site surveys of plant introductions, plant identification, and communication with other land management agencies. The work also includes the opportunity to participate in the development of policies and plans for site-led weed management, as well as biosecurity issues statewide.

**Student #3** is currently employed with the Mauna Kea Watershed Alliance as a contractor to conduct botanical surveys for Kamehameha Schools Land Assets Division. Student #3 will start a full-time position with Mauna Kea Watershed Alliance on October 1, 2014 to assist with a variety of current projects: native ecosystem restoration (out-planting, weed control, fencing), youth education and public outreach, and botanical surveys.

**Attachment 4**

**Letters of Support**

H A U ' O L I M A U L O A  
F O U N D A T I O N



February 11, 2015

Dr. Reed Dassenbrock  
Office of the Vice Chancellor for Academic Affairs  
University of Hawai'i, at Mānoa  
2500 Campus Road  
Hawai'i Hall 209  
Honolulu, HI 96822

Dear Dr. Dassenbrock,

I have learned that the Department of Natural Resources and Environmental Management (NREM) at the University of Hawai'i at Mānoa is proposing to change the degree title for the non-thesis, or Plan B, degree from a Master of Science (M.S.) in Natural Resources and Environmental Management to a Master of Environmental Management (M.E.M). I am writing to tell you that we support the proposed graduate degree name change.

Hau'oli Mau Loa Foundation has been working with NREM for the past several years by providing funding to support graduate assistantships for students from Hawai'i who are interested in pursuing this degree so that they can obtain important conservation jobs across our state. This degree prepares them for such jobs and ensures they are well qualified when they apply. Through research we have done, both with UHERO and independently, we have found there are approximately 3,200 conservation jobs in our state and many of these require or prefer candidates who have a graduate degree. Thus far, we have found that the graduates of the NREM, Plan B M.S. are well qualified and able to secure good jobs in Hawai'i. It is both the interdisciplinary skills in the natural and social sciences and the practical experiences they gain from their practicum that seem to prepare them well for employment.

We hope that you will support the proposed name change as proposed by NREM. Should you have any questions, please contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "Janis A. Reischmann". The signature is fluid and cursive, written over the printed name.

Janis A. Reischmann  
Executive Director



To whom it may concern:

2/19/15

Kupu is a 501c3 nonprofit organization that provides meaningful environmental experiences for youth between the ages of 16 to 24. Over the past several years Kupu has partnered with UH Manoa's Natural Resource and Environmental Management Department to provide college credit for youth participating in Kupu's Summer Hawaii Youth Conservation Corps Gateway and Frontiers program. Some of Kupu's program participants continue into the NREM Department after completing the Kupu internship.

Kupu is supportive of The Department of Natural Resources and Environmental Management offering a Master of Environmental Management (MEM) for students that are completing a non-thesis or Plan B track. This name change is consistent with the national Professional Science Masters movement.

The Master of Environmental Management or MEM degree is currently being offered by Yale, Duke, Portland State, Salisbury University, University of New South Wales, Webster University, University of Queensland, the Freie University (Berlin), and others. Very similar professional master's degrees are being offered at many Mainland institutions, including Sustainability & Environmental Management (Harvard, St. Edward's University), Environmental Studies (University of Pennsylvania), Environmental Science and Management (UCSB), Environmental Policy and Management (Denver University, American Public University) and Environmental Science and Management (University of Rhode Island).

This simple name change will have two significant impacts. The first and most significant is that it will make our graduates more competitive, providing students with a degree title that describes their preparation and that is similar to those awarded by other institutions providing this professional degree.

Mahalo again for your time!

Matthew Bauer

Chief Operating Officer- Kupu



United States  
Department of  
Agriculture

Forest  
Service

Institute of Pacific  
Islands Forestry

60 Nowelo Street  
Hilo, HI 96729  
(808)-933-8121

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02/13/2015

Dr. Catherine Chad-Halbrent  
Department of Natural Resources and Natural  
University of Hawaii at Manoa  
Honolulu, HI 96822

To: Office of the Vice Chancellor for Academic Affairs, University of Hawaii at Manoa

This letter is regarding your request for my thoughts on a possible name change for the non-thesis, or Plan B, Master's program in the Department of Natural Resources and Environmental Management (NREM) at the University of Hawaii at Manoa from a "Master of Science (M.S.) in Natural Resources and Environmental Management" to a "Master of Environmental Management (M.E.M)". This change is certainly reasonable as it more accurately captures the nature of the program – a program that I have interacted with on multiple occasions and find to be one of the gems at the University of Hawaii. The change is in line with a national trend at top ranked universities to offer an MEM option to students seeking professional degrees in the natural resources. I see all positives and am in support of the proposed graduate degree name change. The USDA Forest Service, other conservation and natural resources management oriented organizations in Hawaii, and organizations across the tropics benefit enormously from the graduate-level professionals that leave NREM programs. They acquire the skill sets that this professional graduate degree offers, providing them with the background and training to fill much-needed positions in Hawaii and the region. Thank you for this opportunity to weigh in on this possible change.

Sincerely

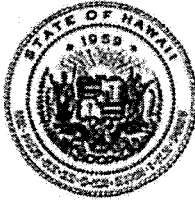
*Christian P. Giardina*

Christian P. Giardina  
Research Ecologist  
Pacific Southwest Research Station





DAVID Y. IGE  
GOVERNOR OF HAWAII



**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

CARTY S. CHIANG  
INTERIM CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES  
COMMISSION ON WATER RESOURCE MANAGEMENT

DANIEL S. QUINN  
INTERIM FIRST DEPUTY

W. ROY HARDY  
ACTING DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
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CONSERVATION AND COASTAL LANDS  
CONSERVATION AND RESOURCES ENFORCEMENT  
ENGINEERING  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
KAHOOLAWE ISLAND RESERVE COMMISSION  
LAND  
STATE PARKS

February 13, 2015

Office of the Vice Chancellor for Academic Affairs  
University of Hawaii at Manoa  
2500 Campus Road  
Hawaii Hall 209  
Honolulu, HI 9622

Dear Sir or Madam:

It has been brought to our attention that the Department of Natural Resources and Environmental Management (NREM) at the University of Hawaii at Manoa is proposing to change the degree title for the non-thesis, or Plan B, degree from a Master of Science (M.S.) in Natural Resources and Environmental Management to a Master of Environmental Management (M.E.M). The Division of Forestry and Wildlife supports the proposed graduate degree name change.

Our agency and partner organizations have a need for graduate-level professionals with the skill sets that this professional graduate degree offers. With the interdisciplinary skills in the natural and social sciences that these graduates gain in this professional graduate program, they will have the background and training to fill much-needed positions throughout the state. We frequently advertise for a variety of natural resource management positions in the fields of forestry, wildlife management, and GIS and often have difficulty in finding qualified applicants. We hope this program can continue to provide natural resource management agencies in Hawaii with locally educated professionals.

Sincerely,

A handwritten signature in black ink, appearing to read "Lisa J. Hadway".

Lisa J. Hadway  
Administrator

## **Attachment 5 – Costs and Revenues**

### **Narrative for Academic Cost and Revenue Template**

**Headcount Enrollment and Annual SSH:** Based on the number of students currently enrolled in the Plan B option of the MS in Natural Resources & Environmental Management degree.

**Faculty FTE and Instructional Costs.** There are three courses, including one directed reading/research course, dedicated to the professional master's degree. Each student has a faculty advisor (some faculty members advise more than one student). We've estimated these faculty resources to total 4 units of scheduled classes, or the equivalent of 1/6 of an instructional faculty FTE. Total salaries (Section K) were calculated accordingly, using the average of faculty salaries in the Department.

**Comparable Program:** The Master of Business Administration degree was used as the comparable program. The MBA is a professional degree housed within a College that also offers a research degree (the PhD).

A	B	C	D	E	F	G	H	I	J	K
1	Academic Cost and Revenue Template - New Program (adjust template for appropriate number of years) (Updated 06/27/12)									
2	ENTER VALUES IN YELLOW CELLS ONLY									
3	CAMPUS/Program									
4										
5										
6	ENTER ACADEMIC YEAR (i.e., 2011-2012)		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6		
7	Students & SSH		2015-2016	2016-2017	2017-2018					
8	A. Headcount enrollment (Fall)		25	26	28					
9	B. Annual SSH		450	468	504					
10										
11	Direct and Incremental Program Costs Without Fringe									
12	C. Instructional Cost without Fringe		68,000	70,720	73,549					
13	C1. Number (FTE) of FT Faculty/Lecturers		0.65	0.65	0.65					
14	C2. Number (FTE) of PT Lecturers									
15	D. Other Personnel Costs									
16	E. Unique Program Costs									
17	F. Total Direct and Incremental Costs		68,000	70,720	73,549					
18	Revenue									
19	G. Tuition		266,850	298,116	321,048					
20	Tuition rate per credit		593	637	637					
21	H. Other									
22	I. Total Revenue		266,850	298,116	321,048					
23										
24										
25										
26	J. Net Cost (Revenue)		-198,850	-227,396	-247,499					
27										
28										
29										
30	Program Cost per SSH with Fringe									
31	K. Instructional Cost with Fringe/SSH		204	204	197					
32	K1. Total Salary FT Faculty/Lecturers		68,000	70,720	73,549					
33	K2. Cost including Fringe of K1		91,800	95,472	99,291					
34	K3. Total Salary PT Lecturers									
35	K4. Cost including fringe of K3									
36	L. Support Cost/SSH		467	467	467					
37	Non-Instructional Exp/SSH		534	534	534					
38	System-wide Support/SSH		68	68	68					
39	Organized Research/SSH		135	135	135					
40	M. Total Program Cost/SSH		671	671	664					
41	N. Total Campus Expenditure/SSH		971	971	971					
42										
43	Instruction Cost with Fringe per SSH		204	204	197					
44	K. Instructional Cost/SSH		204	204	197					
45	O. Comparable Cost/SSH		736	736	736					
46	Program used for comparison:		Shidler College - Master of Business Administration							
47										
48	Reviewed by campus VC for Administrative Affairs:									
49										

*Approved for K. [Signature]*

*Blotz*

(signature and date)

	A	B	C	D	E	F	G	H	I	J	K	
50	Instructions											
51	Please include an explanation of this template in your narrative.											
52	A. Headcount Enrollment: Headcount enrollment of majors each Fall semester. Located at url: <a href="http://www.hawaii.edu/ro/maps.php?category=Enrollment">http://www.hawaii.edu/ro/maps.php?category=Enrollment</a> Campus data may be used when majors are a subset of enrollment reported in IRO reports.											
53	B. Annual SSH: Course Registration Report located at url: <a href="http://www.hawaii.edu/ro/maps.php?title=Courses+Registration+Report">http://www.hawaii.edu/ro/maps.php?title=Courses+Registration+Report</a> Add the SSH for the Fall and Spring reports to obtain the annual SSH. This is all SSH taught by the program, including to non-majors. Adjust if majors are subset of SSH reported.											
54	C. Instructional Cost without Fringe (automated calculation): Direct salary cost for all faculty and lecturers teaching in the program. *Formula for column D: =IF(OR(D32<>),D32+D34,*)											
55	C1. Number of full time faculty and lecturers who are >= 5 FTE.											
56	C2. Number of part time lecturers who are <= 5 FTE.											
57	D. Other Personnel Cost: Salary cost (part or full time) for personnel supporting the program (APT, clerical lab support, advisor, etc.) This includes personnel providing necessary support for the program who may not be directly employed by the program and may include partial FTEs. Add negotiated collective bargaining increases and 4% per year for inflation thereafter.											
58	E. Unique Program Cost: Costs specific to the program for equipment, supplies, insurance, etc. For provisional years, this would be actual cost. For established years, this would be projected costs using amortization for equipment and add 4% per year for inflation thereafter.											
59	F. Total Direct and Incremental Cost: C + D + E *Formula for column D: =IF(OR(D13<=,D16<>0,D17<>0),SUM(D13,D16,D17,*)											
60	G. Tuition: Annual SSH X resident tuition rate/credit *Formula for column D: =IF(D10>0,D10*D22,*)											
61	H. Other: Other sources of revenue including grants, program fees, etc. This should not include in-kind contributions unless the services or goods contributed are recorded in the financial records of the campus and included in Direct and Incremental Costs in this template.											
62	I. Total Revenue: G + H *Formula for column D: =IF(OR(D21<>,D23<>0),SUM(D21,D23,*)											
63	J. Net Cost: F - I This is the net incremental cost of the program to the campus. A negative number here represents net revenue (i.e., revenue in excess of cost.) If there is a net cost, please explain how this cost will be funded. *Formula for column D: =IF(AND(D18<>,D24<>),D18-D24,*)											
64	K. Instructional Costs with Fringe/SSH: (K2 + K4) / B *Formula for column D: =IF(D10<>),SUM(D33,D35)/D10,*)											
65	K1. Salaries without Fringe of Full Time Faculty and Lecturers who are >= .5 FTE based on FTE directly related to the program. Add negotiated collective bargaining increases and 4% per year for inflation thereafter.											
66	K2. K1 X 1.35 *Formula for column D: =IF(D32<>,D32*1.35)											
67	K3. Salaries without Fringe for Lecturers who are <= .5 FTE based on FTE directly related to the program. Add negotiated collective bargaining increases and 4% per year for inflation thereafter.											
68	K4. K3 X 1.05 *Formula for column D: =IF(D34<>,D34*1.05)											
69	L. Support Cost/SSH: The campus' non instructional expenditure/ssh + systemwide support - organized research (UHM only) as provided by UH Expenditure Report ( <a href="http://www.hawaii.edu/budget/expense.html">http://www.hawaii.edu/budget/expense.html</a> ) *Formula for column D: =IF(OR(D37>0,D38>0,D39>0),D37+D38-D39,*)											
70	For example, from the 2010-11 UH Expenditure Report ( <a href="http://www.hawaii.edu/cgi-bin/ro/maps?asubty=1011.pdf">http://www.hawaii.edu/cgi-bin/ro/maps?asubty=1011.pdf</a> ), the support expenditure/ssh per campus is:											
71	UHM	\$507,00 + \$56	\$128	for organized research	= \$435							
72	UHH	\$437,00 + \$45	\$482									
73	UHWO	\$230,00 + \$28	\$258									
74	Haw CC	\$155,00 + \$34	\$189									
75	Hon CC	\$234,00 + \$44	\$278									
76	Kap CC	\$123,00 + \$29	\$152									
77	Kau CC	\$328,00 + \$59	\$387									
78	Lee CC	\$123,00 + \$27	\$150									
79	Maui CC	\$160,00 + \$35	\$195									
80	Win CC	\$284,00 + \$40	\$304									
81												
82												
83												
84	M. Total Program Cost/SSH: K + L *Formula for column D: =IF(OR(D31<>,D38<>),D31+D36,*)											
85	N. Total Campus Expenditure/SSH: Taken from UH Expenditures Report For example, for 2009-2010: UHM = \$923-131 (organized research) = \$792, UHH = \$682, UHWO = \$501, HawCC = \$408, HonCC = \$505, KapCC = \$316, KauCC = \$703, LeeCC=\$300, Maui CC=\$396, WinCC=\$457											
86	O. Comparable Program/Division Instructional Cost/SSH: Taken from UH Expenditures Report ( <a href="http://www.hawaii.edu/budget/expense.html">http://www.hawaii.edu/budget/expense.html</a> ) or campus data, as available. Please note in the space provided, the program used for the comparison.											
87												
88	Rev. 06.12.12											