

Natural Resource Graduate Program Learning Outcomes Assessment Rubric for Oral Presentation (updated 10-27-16)

Instructions: Please bring this form to your graduate student's oral presentation/defense and score them on a scale of 1-5 (see explanation of scale below).

Please submit your completed rubric to the CNRS Dean's office (FR 101) or email to cnrsmast@humboldt.edu

Graduate Student Name: _____ Name of Thesis Chair: _____

NR Option (circle one): FWWS Wildlife ENRS Fisheries

Date/time/location of Oral presentation/Defense: _____

Outcome: **Student communicates scientific investigation in oral presentation, using accepted conventions for the discipline.**

Score the student outcome (presentation) based on the following criteria:

CRITERIA	Not demonstrated 1	2	Demonstrated 3	4	Mastered 5	Score (1-5)
Organization	Presentation poorly organized and suggests minimal preparation		Presentation was well- organized and reflects adequate preparation		Presentation organization was excellent	
Content	Content was not clearly presented and did not reflect adequate scientific rigor		Content was clearly presented and reflected adequate scientific rigor		Student is able to clearly communicate complex ideas and outstanding level of scientific rigor	
Visual Aids	Visual aids absent or of poor quality.		Effective visual aids		Outstanding visual aids	
Speaking Skills	Poor speaking skills		Adequate speaking for communication to specialized audience		Excellent speaking skills (eloquence, fluidity, clear communication with audience)	
Response to questions	Responds with difficulty		Responds appropriately to questions		Responds to questions with in-depth answers	

Natural Resource Graduate Program Learning Outcomes Assessment Rubric for Graduate Written Thesis (updated 10-27-16)

Instructions: Score elements of your graduate student's written thesis on a scale of 1-5 (see explanation of scale below). Please submit your completed rubric to the CNRS Dean's office (FR 101) or email to cnrsmast@humboldt.edu

Name of Graduate Student: _____ Name of Thesis Chair: _____ Date of defense: _____

OUTCOME	Not demonstrated 1	2	Demonstrated 3	4	Mastered 5	Score (1-5)
<p>1. Student carries out a scientific investigation of phenomena in a natural system that includes:</p> <p>a) Formulation and statement of a research question based on literature review</p>	Student's research problem is poorly defined, the literature review is inadequate and research question is inadequate to address the problem.		Student defines research problem, provides an appropriate review of the literature, and states a suitable research question.		Student defines a challenging research problem, effectively reviews the pertinent literature, and states an innovative research question suitable to address the problem.	
b) Design and implementation of study using appropriate quantitative or qualitative methodology	Study design is not adequate to address the research question and/or the methodology is insufficient. Data collection and analysis are inadequate.		Study design is sufficient for addressing the research question and study employs appropriate methodology. Data collection and analysis are adequate.		Study design is elegant and the methodology is innovative or complex. Data collection and analysis are extensive.	
c) Presentation of research results.	Results are lacking and are poorly presented in tables and figures		Results are satisfactory and are presented clearly in the text and in tables and figures.		Results are comprehensive and presented with exceptional clarity. Tables and figures effectively display complex information in innovative ways.	
d) Discussion of the relationship of the research results to the field of study and their broader relevance in natural resources.	Student does not adequately discuss research results in relationship to the current literature in their field or apply their research results to the ecological, and socioeconomic implications of their research problem.		Student adequately discusses research results in relationship to the current literature in their field and applies them to ecological, and socioeconomic implications of their research problem.		Student eloquently discusses the relationship of their research results to the current literature in their field and illuminates their results' implications for ecological, and socioeconomic aspects of their research problem.	
2. Student communicates scientific investigation in writing, using accepted conventions for the discipline.	Thesis is poorly organized. Writing is unprofessional and contains significant errors.		Thesis is organized and coherently written with only minor errors. Student communicates ideas and technical information in a formal, professional manner.		Student meets all conditions in "demonstrated" category. In addition, the thesis is particularly well presented, is sufficient in scope and content for peer-reviewed publication, and contains few errors.	

PR AY 15/16

**Natural Resources - Graduate Program
Program Review 2015-2016**

Date: 9/2/2016

I.A.

Mission

Update your program mission in the narrative section if there are any changes. See the university catalog at <http://pine.humboldt.edu/registrar/catalog/documents/HSUcatalog2015-16.pdf>

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

The overall mission of the MS program in Natural Resources is to provide our students with the knowledge, skills, and motivation required to conserve our natural resources in the face of increasing societal demands.

I.B.

Goals

Update your program goals in the narrative space below.

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

Program Goals of the Natural Resources Graduate Program:

1. Contribute to academic excellence by engaging faculty and students in the exploration and advancement of knowledge.
2. Enhance effective verbal and written communication skills in all students.
3. Enhance in all students the quantitative and/or analytical skills necessary for problem-solving in a complex society.
4. Provide students with the knowledge and experience necessary to address natural resource problems and carry out scientific investigations, including design, implementation and evaluation of research in their specific area of study.
5. Provide students with an in-depth understanding of their specific area of study as well as an appreciation for the interdisciplinary character of natural resource problems.
6. Nurture open mindedness, professional ethics, and life-long learning in all students.

I.C.

Program Student Learning Outcomes

Update your program student learning outcomes in the narrative section below if there are changes.

Status

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Due Date: 3/30/2016

Narrative

The Student Learning Outcomes of the Natural Resources Graduate Program are:

1. **Scientific Investigation.** Student carries out a scientific investigation of phenomena in a natural system that includes: a) Formulation and statement of a research question based on literature review, b) Design and implementation of study using appropriate quantitative or qualitative methodology, c) Presentation of research results, and d) Discussion of the relationship of the research results to the field of study and their broader relevance.
2. **Written Communication.** Student communicates scientific investigation in writing, using accepted structure, style, and format for scientific reports and papers in the discipline.
3. **Oral Communication.** Student communicates scientific investigation in oral presentation, using accepted structure, format, and visual aids for scientific presentations in the discipline.
4. **Quantitative Skills.** Student applies appropriate mathematical, computer simulation, and/or statistical models to quantify evidence for and against scientific hypotheses.
5. **Natural Resources Conservation.** Student articulates the relationship of his/her scientific investigation to the physical, ecological, and socioeconomic aspects of a problem in natural resources management and/or conservation.

I.D.

Program Update

This 1-3-page update on program planning includes the following elements:

- A summary of any program changes (curriculum, faculty, staff, facilities) over the past year. FTES, FTEF, and SFR by College, Department, and Discipline
- A report on progress on the five-year plan and MOU (if available).
- A discussion of opportunities and obstacles that have affected this progress.
- If necessary, a discussion of strategies for overcoming the identified obstacles.
- Analyze the key developments in your programs over the last 5 years (1-2 pages).

Copy and paste program update in the Narrative section below.

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

Summary of program changes

Since the last program review (2010/11) the following changes have occurred in the NR Masters program:

Curriculum

- **Minimum GRE score requirement.** New GRE admission criteria were discussed and approved by the GAC to reflect the new GRE scoring system (130-180). New text in the NR Masters Program Policies and Procedures reads, "Normally, applicants must have a minimum Grade Point Average (GPA) of 3.0 for the last 60 undergraduate units and a minimum score of 150 in the Verbal section and minimum score of 150 in the Quantitative section on the general Graduate Record Exam (GRE). Applicants with extensive work experience, exceptionally high GPA, or exceptionally high GRE scores may be accepted without meeting the minimum requirements for both GPA and GRE scores by appeal of the department faculty to the Graduate Advisory Council, through the Graduate Coordinator."
- The ENRS option in the NR Masters Program no longer requires enrollment in three units of EMP 690 the semester that students gain committee approval of their thesis, defend the thesis, and submit their thesis to the NR graduate coordinator.

Faculty

The following faculty members have joined the graduate faculty in the Natural Resources Masters program since the last program review in 2010/2011:

ENRS: Dr. Laurie Richmond, Dr. James Graham, Dr. Kevin Fingerman, Dr. David Gwenzi

- ENRS: Dr. Laurie Richmond, Dr. James Graham, Dr. Kevin Fingerman, Dr. David Gwenzi
- Fisheries: Dr. Rafael Cuevas Uribe, Dr. Andre Buchheister,
- FWWS: Dr. Jeffrey Kane, Dr. Erin Kelly, Dr. David Greene,
- Wildlife: Dr. William Bean, Dr. Daniel Barton, Dr. Barbara Clucas

Staff

- **ASC.** Since the last program review in 2010/2011, the ASC for the NR Masters program has changed hands several times. Former ASC’s for the NR Masters program include Julie Tucker, Pat Comella, and Lorraine Taggart. The current ASC for the NR Masters program is Violet McCrigler.
- **Associate Dean.** Since the last program review, the CNRS Associate Dean position has been held by Dr. Dale Oliver (Interim Associate Dean) and Rick Zechman (current Associate Dean).
- **NR Graduate Coordinator.** Since the last program review the NR Graduate Coordinator position has been held by Robert VanKirk, Alison O’Dowd (current NR Grad Coordinator) and Yvonne Everett (for 1 year during Alison O’Dowd’s sabbatical).

Facilities

The following changes to facilities have occurred since the last program review in 2010/2011:

- Minor renovations at the Marine Lab include: 1) the conversion of a rarely used instrument room to a faculty/student research lab used by Paul Bourdeau and Brian Tissot; and 2) Merging of two small rooms into a larger microscope/instrument room for faculty and students. These two renovations coast about \$15,000 and funds were allocated by Dean Smith in CNRS and Dean Williamson in Research.
 - The HSU Fish Hatchery had new lighting installed in hatchery rooms, the addition of a recirculating aquaculture system (RAS) with modern biofiltration units, the addition of cutting-edge water quality monitoring system that can also be accessed and utilized in the classroom, connection of artificial stream tanks to the hatchery system, which can now be fully utilized for class projects, and purchased a new spectrophotometer in 2013.

Progress on Five-Year Plan and MOU

An MOU dated April 15, 2011 written by Interim Associate Dean Dale Oliver set forth six categories of expectations for the NR Graduate Program. Below are updates on each of the six items:

- **Sustainability.** The 2011 MOU stated, “We propose the following guidelines for program size and efficiency over the next five years, given the current levels of resources” (targets for each option are shown in columns 2 and 4, with actual data from the past 5 years in columns 3 and 5 in the table below).

Option	TARGET: new admits/year (5-yr avg.)	ACTUAL: 5-year average of new admits/year (AY10/11-AY14/15)*	TARGET: Graduates/year (5-yr avg.)	ACTUAL: 5-year average of graduates/year (AY10/11-AY14/15)*
ENRS	5	4.6	4	3.4
Fisheries	7	7.8	6	6.8
FWWS	7	10.4	6	6.2
Wildlife	9	11.6	8	9.8

* data acquired from http://pine.humboldt.edu/anstud/cgi-bin/filter.pl?relevant=degreesallopts_M.out

The results in the table above show that all NR Masters options exceeded their targets for new admits and graduates per year with the exception of the ENRS option. Possible reasons for the targets not being met in ENRS include: 1) four tenure-track faculty left the ENRS option between 2008-2011 and as a result there were only three tenure-track faculty in ENRS option in AY2011-12, which limited the number of graduate students in the program. The number of tenure-track faculty in ENRS has slowly increased to seven faculty as of AY 2015-16; 2) several of the ENRS tenure-track faculty advise graduate students in other graduate programs at HSU (e.g. Environment and Community graduate program and Environmental Systems graduate program) and these graduate students aren't counted in the ENRS numbers. Although the number of tenure-track faculty in ENRS has increased since AY11/12, because of the second reason stated above it is recommended that the targets for ENRS remain the same for the next five years to be reassessed in the next Program Review. It is also recommended that the targets for the three other options remain the same for the next five years.

Suggestions for ways to increase the number of new admits and graduates per year in ENRS include: 1) increasing the number of graduate faculty in ENRS, and 2) increasing the number of graduate students per tenure-track faculty that are enrolled in the ENRS option (instead of other graduate programs at HSU). The ENRS program will gain one new tenure-track faculty member in AY16/17 and is conducting a faculty search for another tenure-track faculty position that will begin in AY 7/18.

2. Personnel. The 2011 MOU stated, "at least four tenured/tenure-track faculty or qualified adjunct faculty (e.g. members of the Cooperative Fisheries Unit) should be active participants in each option."

As of AY15/16 there are at least four tenured/tenure-track faculty or qualified adjunct faculty (e.g. members of the Cooperative Fisheries Unit) as active participants in each option. See table below:

Graduate Faculty in the NR Masters Program by Option

Option	Number of active graduate faculty as of AY15/16	Faculty names
ENRS	7	Yvonne Everett, Kevin Fingerman, James Graham, Steven Martin, Alison O'Dowd, Laurie Richmond, William Trush
Fisheries	11	Andre Buchheister, Rafael Cuevas Uribe, Andrew Kinziger, Darren Ward, Eric Bjorkstedt, Bret Harvey, Nicholas Som, Mark Henderson (Kristine Brenneman, Timothy Mulligan, and Peggy Wilzbach are no longer accepting new graduate students because they are close to retirement)
FWWS	9	Pascal Berrill, David Greene, Han-Sup Han, Jeffrey Kane, Erin Kelly, Susan Marshall, Rosemary Sheriff, Stephen Sillett, Andrew Stubblefield

Wildlife	10	Daniel Barton, Tim Bean, Jeff Black, Rick Brown, Mark Colwell, Micaela Szykman Gunther, Matthew Johnson, Barbara Clucas, Lowell Diller, Brian Hudgens.
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3. Curriculum. The 2011 MOU stated, "The NR program faculty are charged with exploring options for expanding the graduate core curriculum."

This topic has been a discussion of the graduate advisory committee (GAC) and the following curriculum initiatives occurred since 2011:

- All NR graduate students are encouraged to enroll in FWWS 501 (research methods and planning) their first semester in order to develop their research proposal. This course is predominately made up of FWWS and ENRS graduate students, but there is interest in expanding the focus to also accommodate Fisheries and Wildlife graduate students.
- A series of graduate seminars are offered to explore the scientific literature and for students and faculty to share their research with others. These seminars include WLDF 585, EMP 685, WSHD 685, and FISH 685. Graduate students from other NR options often enroll in several of the aforementioned seminars over the course of their time in the graduate program.

In addition to the above actions, it is recommended that the GAC continue to explore ways to expand the graduate core curriculum.

4. Assessment. The 2011 MOU stated, "By September 30, 2011, the Natural Resources Graduate Program is to review the draft assessment plan, including learning outcomes, collection and analysis of data, and send a revised plan to the CNRS Associate Dean. Thereafter, the program coordinator makes annual assessment reports through the program review, evaluation, and planning (PREP) process that will be instituted during the 2011 - 12 academic year."

An assessment plan as described above was developed by the NR Graduate Coordinator and approved by the GAC. This assessment plan has been enacted over the past few years. For details see the assessment section (Section II).

5. Diversity. The 2011 MOU stated, "We recommend that the option coordinators meet periodically with the HSU office of diversity and inclusion to review best recruitment practices to help build a diverse pool of candidates for graduate study."

Although the option coordinators have not met periodically with the HSU office of diversity and inclusion, there are several ways in which the NR Masters program have worked to increase diversity and inclusion among our graduate students including:

- Encouraging and supporting URM undergraduate and graduate students to apply for the National Science Foundation's graduate Fellowship
- The Forestry and Wildland Resources Dept received a four-year, \$1 million dollar grant from the USDA Hispanic Serving Institutions Program to increase diversity in the natural resources workforce. Funding will support 10 graduate students to study forest watershed and wildland science topics, including annual \$10,000 stipends, support for research supplies, conference travel, and mentoring.

In addition to the above actions, it is recommended that the GAC continue to explore ways to build a diverse pool of candidates for graduate study.

6. Other. The 2011 MOU stated, “the program should update the policies and practices of the natural resources graduate program that were established in 2004. The revisions should include relevant portions of the assessment plan.”

Over the past five years, the NR Graduate Coordinator worked with the GAC to revise and approve updated policies for the NR graduate program. These new policies are now in place (as of May 2016) and are posted on the CNRS graduate website (<http://www2.humboldt.edu/cnrs/grad-programs/current/policies/>)

Key Developments over the Last 5 Years

Some of the key developments in the NR graduate program over the past five years include:

- Development and approval of updated Policies & Procedures for the NR graduate program (<http://www2.humboldt.edu/cnrs/grad-programs/current/policies/>)
- Development and implementation of an assessment plan for the NR graduate program (see new policies and procedure document)
- Development of a ‘timeline to graduation’ to assist and encourage students to complete the graduate program in four semesters (<http://www2.humboldt.edu/cnrs/grad-programs/current/timeline/>)
- Development of NR graduate thesis template document to assist students in thesis formatting (<http://www2.humboldt.edu/cnrs/grad-programs/current/thesis/>)
- Using FWWS 501 as a way to assist incoming NR graduate students with the development of their research proposal during their first semester.
- Encouraging and/or requiring graduate students to enroll in graduate seminars within the NR program

- The facility formally known as the ‘Biology Stockroom’ was renamed the ‘CNRS Core Research Facility’ and now serves all of CNRS, not just the Biology Department.
- A new Geospatial Computer Lab was installed in NR 203 in Fall 2015.
- A new Aquaponics lab was installed in Samoa.
- The Marine Wildlife Care Facility got a major upgrade.

- The HSU Marine Lab in Trinidad had a major remodel of the wet lab facilities in 2010-2012. The seawater storage tanks were replaced in 2015-2016 and will be finished in Fall 2016. Both projects had significant support from the National Science Foundation but the wet lab remodel also had support of external donors.

II.A.

Assessment of Student Learning Outcomes

Summarize information gleaned from assessment activities from the past 5 years (limit 2 pages).

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

The following is an excerpt from NR Masters Program Policies and Procedures:

“Methodology for Assessing Student Learning Outcomes

1. Each student’s written thesis shall be evaluated by every member of the graduate committee (including the major adviser).
2. Each student’s oral presentation and defense of the thesis shall be evaluated by every member of the graduate committee (including the major adviser).
3. Student-level evaluations shall be conducted using the rubric below, which allows rating on a three-point scale (“not demonstrated”, “demonstrated”, “mastered”) of each of the learning outcomes. Note that the ratings do not need to be consistent across all evaluators and that approval of the thesis does not automatically indicate that all outcomes are “mastered”. In rare cases, an evaluator may rate one of the learning outcomes as “not demonstrated”, even though the overall performance of the student in preparing, presenting and defending the thesis merits approval of the thesis by the committee and program coordinator.
4. These student-level evaluations are to be submitted to the CNRS Dean’s office or the NR Graduate Coordinator, who will summarize, report, and interpret aggregated statistics. This program-level assessment will occur once each year and be submitted and archived through the Program Review, Evaluation, and Planning (PREP) system.”

Narrative

Summarize the major findings.

1. Assessment of the Oral Defense Presentation

Table 1 below includes the scores given by committee members using the rubric to evaluate the **Oral presentation** (defense). Score interpretation: 0 = not demonstrated, 1 = demonstrated, 2 = mastered. See rubric for details of each criteria and score. Overall means for each category are given at the bottom of each column.

TABLE 1. Assessment scores for **oral presentations** by graduate students in the NR Masters program. Scores <1 are in bold. Multiple

TABLE 1. Assessment scores for **oral presentations** by graduate students in the NR Masters program. Scores <1 are in bold. Multiple entries for a single student indicate assessment by multiple committee members. A single entry for a single student indicates that the committee submitted a single assessment form.

Option	Student UniqueID	Defense Date	Organization	Content	Visual Aids	Speaking Skills	Response to Questions
ENRS	1	12/4/2015	1	1	2	1	1
ENRS	2	12/4/2016	2	2	2	2	2
ENRS	2	12/4/2016	2	2	2	1	2
ENRS	2	12/4/2016	2	2	2	1.5	2
ENRS	3	5/3/2016	2	2	2	2	2
ENRS	3	5/3/2016	2	2	2	2	2
ENRS	3	5/3/2016	1	1	1	1	1
ENRS	3	5/3/2016	2	2	2	2	2
Fisheries	4	3/23/2016	1	1	1	1	1
Fisheries	4	3/23/2016	2	1	2	1	1
Fisheries	5	4/18/2016	1	1	1	1	1
Fisheries	5	4/18/2016	1	1	1	1	2
Fisheries	5	4/18/2016	1	1	1	1	1
Fisheries	5	4/18/2016	1	1	1	1	1
Forestry	6	10/30/2015	1.8	1.8	1.5	1.5	1.5
Forestry	6	10/30/2015	1.8	1.8	1.5	1.8	1.8
Forestry	6	10/30/2015	2	2	2	1	2
Forestry	7	12/2/2015	2	1	1	1	2
Forestry	7	12/2/2015	2	1	1	2	2
Forestry	7	12/2/2015	1	1	1	1	2
Forestry	8	11/4/2015	2	2	1	2	2
Forestry	9	12/2/2015	2	2	1	2	2
Forestry	9	12/2/2015	1.5	2	1	1	2
Forestry	9	12/2/2015	2	1	2	1	1
Forestry	10	12/4/2015	1	0.5	1	1	1
Forestry	10	12/4/2015	2	2	1	1	2
Forestry	10	12/4/2015	2	1	2	2	2
Forestry	11	4/25/2016	2	2	1	1	2
Forestry	11	4/25/2016	1	2	1	2	2
Forestry	11	4/25/2016	1	2	1	2	2
Forestry	12	4/29/2016	2	1.8	1.8	1.8	1.8

Option	Student UniqueID	Defense Date	Organization	Content	Visual Aids	Speaking Skills	Response to Questions
Forestry	12	4/29/2016	1	2	1	2	2
Forestry	12	4/29/2016	2	2	1	2	2
Forestry	13	4/25/2016	2	1	1.5	2	2
Forestry	13	4/25/2016	2	1.5	1.8	2	2
Forestry	13	4/25/2016	2	2	1	2	2
Wildlife	14	12/4/2015	1	1	2	1	0
Wildlife	14	12/4/2015	2	2	2	2	2
Wildlife	14	12/4/2015	1.5	2	2	1.5	1
Wildlife	15	11/12/2015	2	2	2	2	2
Wildlife	15	11/12/2015	2	2	2	2	2
Wildlife	15	11/12/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	1	2	2
Wildlife	17	5/3/2016	2	2	2	2	2
Wildlife	17	5/3/2016	2	2	2	2	2
Wildlife	17	5/3/2016	2	2	2	2	2
Forestry	18	3/12/2015	1	1	1	1	1
Forestry	18	3/12/2015	2	2	2	2	2
Forestry	18	3/12/2015	2	1	1	2	2
ENRS	19	3/30/2015	2	2	2	2	1
ENRS	19	3/30/2015	2	2	1	2	1.5
ENRS	19	3/30/2015	2	1	1	2	1
ENRS	20	4/3/2015	2	1	1	1	2
ENRS	20	4/3/2015	2	1	1	2	2
ENRS	20	4/3/2015	2	1	2	1	2
Fisheries	21	4/24/2015	1	1	2	1	2
Wildlife	22	4/24/2015	2	2	2	2	2
ENRS	23	4/30/2015	2	1	1	2	1
ENRS	23	4/30/2015	1	1	1.5	1	1
ENRS	23	4/30/2015	2	1	2	2	1
Wildlife	24	5/11/2015	2	2	1	2	2
Fisheries	25	5/29/2015	1	2	2	1	2

Option	Student UniqueID	Defense Date	Organization	Content	Visual Aids	Speaking Skills	Response to Questions
Wildlife	26	7/1/2015	2	2	2	1	2
Wildlife	27	7/7/2015	2	1.5	1.5	1.5	2
Wildlife	28	7/10/2015	2	2	2	2	2
	Mean		1.73	1.59	1.53	1.60	1.71

Conclusions for Oral Defense Presentation Assessment

The data in Table 1 show that overall NR graduate students are doing well in all of the assessed elements for their oral defense, which are directly related to learning outcome #3 of the program. Mean scores in each criteria category reveal that students are doing best in terms of their organization (mean=1.73) and ability to respond to questions (mean=1.71). Mean scores for the quality of visual aids used in presentations were slightly lower(mean=1.53) but all mean scores fell within a range of 1.53-1.73 indicating that almost all students assessed are either demonstrating or mastering the oral presentation skills expected of them. There was only one score of zero and one score of 0.5 (bolded in Table 1) out of all the students assessed and the score of zero was in the criteria 'response to questions.' The overall mean for all scores related to the oral presentation was 1.63.

The implications of these assessment results are that graduate students are successfully meeting or exceeding the oral communication learning outcome for the program. Therefore it is recommended that all of the mechanisms currently being used to help students prepare their oral presentation should continue. The mechanisms that currently help graduate students prepare their oral defense presentation include (but are not limited to): 1) help from their thesis advisor and/or other committee members, 2) doing practice talks for other graduate students either informally or formally as part of a graduate seminar, and 3) formal instruction on oral presentation best practices in graduate courses.

2. Assessment of the Written Thesis

Table 2 below summarizes the scores given by committee members using the rubric to evaluate the written thesis. Score interpretation: 0 = not demonstrated, 1 = demonstrated, 2 = mastered. See rubric for details of each criteria and score.

TABLE 2. Assessment scores for written theses by graduate students in the NR Masters program. Multiple entries for a single student indicate assessment by multiple committee members. A single entry for a single student indicates that the committee submitted a single assessment form.

Option	Student UniqueID	Defense Date	Research Q/Lit Review	Methods	Results	Discussion	Accepted conventions
ENRS	1	12/4/2015	1	2	1	1	1
ENRS	2	12/4/2016	2	1	2	2	2
ENRS	2	12/4/2016	2	1	2	2	2
ENRS	2	12/4/2016	2	2	2	2	2
ENRS	3	5/3/2016	2	2	2	2	2
ENRS	3	5/3/2016	2	2	2	2	2
ENRS	3	5/3/2016	2	2	1	1	1
ENRS	3	5/3/2016	2	2	2	2	2
Fisheries	4	3/23/2016	1	2	1	1	1

Option	Student UniqueID	Defense Date	Research Q/Lit Review	Methods	Results	Discussion	Accepted conventions
Fisheries	4	3/23/2016	1	1	1	1	1
Fisheries	5	4/18/2016	1	1	1	1	1
Fisheries	5	4/18/2016	1	0	1	1	1
Fisheries	5	4/18/2016	1	1	1	1	1
Fisheries	5	4/18/2016	1	1	2	1	1
Forestry	6	10/30/2015	2	2	1.5	1.5	1.5
Forestry	6	10/30/2015	2	2	1.8	1	1.8
Forestry	6	10/30/2015	2	2	2	1	1
Forestry	7	12/2/2015	2	1	2	2	2
Forestry	7	12/2/2015	2	1	2	2	2
Forestry	7	12/2/2015	2	1	2	2	1
Forestry	8	11/4/2015	2	2	2	1	1
Forestry	9	12/2/2015	1	1	1	1	1
Forestry	9	12/2/2015	1	1.5	1.5	1	2
Forestry	9	12/2/2015	1	2	2	1	1
Forestry	10	12/4/2015	1	0	0.5	0	1
Forestry	10	12/4/2015	2	2	1	2	1
Forestry	10	12/4/2015	1	1	1	2	1.5
Forestry	11	4/25/2016	2	2	1	1	1
Forestry	11	4/25/2016	1	2	2	1	1
Forestry	11	4/25/2016	1	2	2	1	2
Forestry	12	4/29/2016	2	1.5	1.5	2	2
Forestry	12	4/29/2016	2	2	2	1	2
Forestry	12	4/29/2016	2	2	2	2	2
Forestry	13	4/25/2016	1	1.5	1	1.5	1
Forestry	13	4/25/2016	1.8	2	2	1.8	1.8
Forestry	13	4/25/2016	2	1.8	1.7	1.8	1.8
Wildlife	14	12/4/2015	2	1	2	2	2
Wildlife	14	12/4/2015	2	2	2	2	2
Wildlife	14	12/4/2015	2	2	2	2	2
Wildlife	15	11/12/2015	2	2	2	2	2
Wildlife	15	11/12/2015	2	2	2	2	2
Wildlife	15	11/12/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	2	2	2

Option	Student UniqueID	Defense Date	Research Q/Lit Review	Methods	Results	Discussion	Accepted conventions
Wildlife	16	11/18/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	2	2	2
Wildlife	16	11/18/2015	2	2	1	1	2
Wildlife	17	5/3/2016	2	2	2	2	2
Wildlife	17	5/3/2016	2	2	2	2	2
Wildlife	17	5/3/2016	2	2	2	2	2
ENRS	19	3/30/2015	1	1	1	1	1
ENRS	19	3/30/2015	1	2	2	2	2
ENRS	19	3/30/2015	2	1	2	1	2
ENRS	20	4/3/2015	2	2	1	2	1
ENRS	20	4/3/2015	2	2	1	2	1
ENRS	20	4/3/2015	2	2	2	2	1
Fisheries	21	4/24/2015	1	1	1	1	1
Wildlife	22	4/24/2015	2	2	2	2	2
ENRS	23	4/30/2015	1	2	1	2	1
ENRS	23	4/30/2015	1	1	1	1	1
ENRS	23	4/30/2015	2	2	1	1	1
Wildlife	24	5/11/2015	2	2	2	2	2
Fisheries	25	5/29/2015	2	2	2	2	2
Wildlife	26	7/1/2015	2	2	2	1	1
Wildlife	27	7/7/2015	2	2	2	2	2
Wildlife	28	7/10/2015	2	2	2	2	2
		Mean	1.69	1.67	1.64	1.56	1.56

Conclusions for Written Thesis Assessment

Table 2 shows that overall NR graduate students are doing well in all of the assessed elements for their written theses, which are directly related to learning outcomes #1 and #2 of the program. Mean scores in each criteria category reveal that students are doing best in terms of their ability to formulate a research question based on a literature review (mean=1.69) and their methodology (mean=1.67). Overall mean scores for the discussion section of the written thesis (mean=1.56) and the students' ability to communicate scientific investigation in writing using accepted conventions for the discipline (mean=1.56) were slightly lower but all mean scores fell within a range of 1.56-1.69 indicating that almost all students assessed are either demonstrating or mastering the learning outcomes related to the written thesis. The overall mean for all scores related to the written thesis was 1.62 (very similar to the overall mean for the oral presentation, which was 1.63).

There was only one student out of all graduate students assessed that earned scores <1 (failed to demonstrate expected criteria) in the areas of the written methods, results and discussion. These scores were given by one committee member, while the other 2 committee

members gave scores of 1 or 2 for the same criteria.

Summarize the impact of the results on the program.

The results of the learning outcomes assessment were very encouraging. Graduate committee members have been very cooperative with assessing oral presentations and written theses over the last couple years. The CNRS Dean's office and graduate coordinator have worked together to dutifully remind faculty to fill out the assessment rubrics at each oral presentation (or shortly thereafter). This accumulation of data is helpful to see how graduate students are performing overall and whether they are meeting the learning outcomes of the program.

Because there is no single area where students are underperforming, I don't recommend any concrete changes be made to the program. However, it is important to reinforce the elements of the graduate program that are already working well and helping students to meet the learning outcomes. Therefore, I recommend the following:

- **Continue to offer FWWS 501 (Research Methods & Planning) every fall semester.** *This course guides new graduate students in the development of their research proposal. Students must do a literature review and write a draft of their proposal as assignments for this course. This course has been invaluable in helping students to develop their research methods and to get feedback from peers and other professors in the process.*
- **Expand the scope of FWWS 501 so it meets the needs of all NR graduate students.** *Encourage Fisheries and Wildlife graduate students to enroll in this course their first semester.*
- **Continue to offer graduate seminars (such as EMP 685, FISH 685, WLDF 585, and WSHD 685)** *where students can get feedback on their writing and their oral presentation skills.*

One area where the assessment process could be improved, is to make sure all learning outcomes are assessed. Currently the following learning outcomes are not directly assessed in the establish rubrics:

- Quantitative and Qualitative Methods. Student applies appropriate mathematical, computer simulation, statistical models and/or qualitative methods in their research.
- Link to Natural Resources. Student articulates the relationship of his/her scientific investigation to the physical, ecological, and/or socioeconomic aspects of a problem in the natural environment.

What are the next steps?

The next steps are to continue to assess program learning outcomes using the established rubric to follow the recommendations stated in the previous section.

In addition, I recommend that learning outcomes #5 and #6 (listed above) that not currently being assessed by the rubric be added to the assessment rubric.

Sources

 NR Grad Assessment Rubric data

II.B.

Other Program Assessment

Analyze the additional assessments of your program over the last 5 years. Additional program assessments may address key program features including, but not limited to: academic advising, supplemental instruction courses, graduate school and/or employment placements, discipline specific accreditation standards, and alumni surveys. [Enter text in narrative section below.]

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

No additional assessments were conducted for the NR Grad program over the last 5 years.

III.A.

Enrollment

Program Level Data

Enrollment (disaggregated by gender and ethnicity): FTES by applicable course code(s), FTES generated by program code, major headcount, number of graduates, course enrollments.

Retention (disaggregated by gender and ethnicity): Graduate rates for FTF and transfer students; student migration data into the program and out from the program, courses with low success rates.

Investments Faculty and staff FTEF (by type, gender, and ethnicity); release-time report; cost-center reports which include expenditures for TT Faculty, Temp Faculty, Staff, and OE; a summary of Departmental/Program trust fund activity.

Efficiency SFR by course code and by department; cost per FTES by course code; average class size (lower division, upper division, and graduate).

Please comment (less than 2 pages total) on one or all of the following topics:

1. If part of the recent data has changed significantly from prior years, provide an explanation of the changes.
2. If part of the data is not reflected in the institutional data, please specify why.
3. If part of the data is misleading, explain how so that reviewers can better understand the real situation.
4. Analyze trends in the data over the last five years.

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

Program Level Data

Enrollment (disaggregated by gender and ethnicity): FTES by applicable course code(s), FTES generated by program code, major headcount, number of graduates, course enrollments.

Compiling data for the NR graduate options was exceedingly difficult because the ENRS and FWWS options have changed over the past five years. The FWWS option was formed as a combination of the RRS, FOR, SOIL, Wastewater Utl and WSHD options and the ENRS option changed its name from NRPI, but in the institutional data it is listed under several codes such as ENV5, ENRS, EMP and NRPI. Therefore, the data presented below incorporate all of the former and current names of these options.

Total NR Graduate student FTES, FTEF and SFR (includes graduate students listed for departments: ENRS, ENV5, ESM, FISH, FWM, and WLDF. Disciplines: EMP, Fisheries, FWWS, Forestry, NR, NR Planning and Interp, RRS, Soils, Watershed Mgt, Wildlife). Data acquired from:
http://www2.humboldt.edu/irp/Dashboards/FAD/FTES_FTEF_SFR.html

	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15
FTES	98.36	69.25	56.03	63.36	65.96
FTEF	14.17	11.34	8.64	9.63	11.58
SFR	6.94	6.11	6.49.	6.58	5.69

NR Graduate Program FTES (by option)*

	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15
ENRS (NRPI+EMP)	1	5.6	3.3	NA	NA
FISH	11.6	8.9	9.63	7.75	6.66
FWWS (FOR+RRS+SOIL+WSHD+FWWS)	11.3	10	4.9	NA	NA
WLDF	15.4	10.1	10.1	NA	NA
Total FTES	39.3	34.6	27.9	NA	NA

*Sources: FTES, FTEF, and SFR Report (Fall 2004 to Spring 2013) - www.humboldt.edu/irp//Dashboards/FAD/FTES_FTEF_SFR_2004-13.pdf

Enrollment – organized by Option
(data acquired from: http://pine.humboldt.edu/anstud/cgi-bin/filter.pl?relevant=pindex_M.out)

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NRPI (total)	10	10	4	1	0	0	5
ENRS (total)	0	0	2	5	7	7	4
NRPI + ENRS	10	10	6	6	7	7	8
Female	3	5	4	4	5	3	5
Male	8	5	2	2	3	4	5
Latino	1	0	0	0	2	1	1
Am Indian	0	0	0	0	0	1	0
Asian	1	0	0	0	0	0	0
Two or more	0	0	0	0	1	2	0
White	7	10	6	4	4	2	6
Unknown	2	0	0	2	1	1	1
Not URM	7	10	6	4	3	2	5
URM	1	0	0	0	3	4	1

Summary: enrollment in NRPI declined between 10/11 and AY 15/16 because the option name switched to ENRS AY 11/12. Male and female enrollments were similar and non-URM students outnumbered the URM students.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR (Range & Soils)	4	2	1	0	0	0	1
Female	2	1	1	0	0	0	0
Male	2	1	0	0	0	0	1
White	3	1	1	0	0	0	1
Unknown	1	0	0	0	0	0	0
Not URM	3	1	1	0	0	0	1
URM	0	0	0	0	0	0	0

fish

Summary: Range and Soils enrollment decreased over time because the option was discontinued AY 11/12 and incorporated into the FWWS option. Male and female enrollments were similar and non-URM students outnumbered the URM students.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR (Wastewater Utl)	1	1	1	0	0	0	0
Female	0	0	0	0	0	0	0

Male	1	1	1	0	0	0	0
White	1	1	1	0	0	0	0
Not URM	1	1	1	0	0	0	0
URM	0	0	0	0	0	0	0

Summary: Wastewater Utl enrollment decreased over time because option was discontinued AY 10/11. Male and female enrollments were similar and non-URM students outnumbered URM students.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR (Watershed Mgt)	7	6	4	2	0	0	3
Female	2	3	2	2	0	0	2
Male	5	3	2	1	0	0	2
White	5	5	3	1	0	0	2
Unknown	3	1	1	1	0	0	1
Not URM	5	5	3	1	0	0	2
URM	3	1	1	1	0	0	1

Summary: Watershed Mgt enrollment decreased over time because option was discontinued AY 11/12 and incorporated into the FWWS option. Male enrollment generally outnumbered female enrollment and non-URM students outnumbered URM students.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR	1	1	0	1	1	0	1
Nat Resources-Fst, Wtrshd, WldIn	0	2	6	14	19	21	10
Female	1	2	0	5	9	9	4
Male	0	1	6	11	12	12	7
Asian					1	1	1
Latino				2	2	5	3
Two or more					1	1	1
Unknown				1	5	4	3
White	1	3	6	13	12	11	8
Not URM	1	3	6	13	12	11	8
URM				2	3	6	4

Summary: The FWWS option began in AY 11/12, replacing Range & Soils, Forestry, Watershed Mgt and Wastewater Utl. Thus enrollment in FWWS increased since AY 11/12 accordingly. The percentage of URM's in FWWS has increased in recent years, particularly Latino students (partially a result of HSI grant). Despite these gains in diversity, the number of non-URM students still outnumbers URM students.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR (Fisheries)	17	18	16	15	16	14	16
Female	4	6	6	6	7	4	6
Male	13	12	10	9	9	10	11
Asian	1	2	2	3	1	1	1
Two or more	1	1	1	0	1	2	1
Unknown	3	7	5	3	4	5	5
White	12	9	10	12	10	6	10
Not URM	14	11	11	12	11	7	11
URM	1	1	0	0	2	3	1

Summary: Fisheries enrollment has remained steady over the past 5 years and males outnumber females. URM students make up a small proportion of the program.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR (Forestry)	12	8	5	1	1	0	5
Female	4	2	2	0	0	0	1
Male	8	6	3	1	1	0	3
Asian	0	1	1	1	0	0	1
White	9	6	3	0	1	0	3
Unknown	3	1	1	0	0	0	1
Not URM	9	7	4	1	1	0	4
URM	0	0	0	0	0	0	0

Summary: The Forestry option enrollment decreased over time because option was discontinued AY 11/12 and incorporated into the FWWS option. Male students outnumbered female students and this option had no URM students in the last 6 years.

Enrollment	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16	6-yr avg
NR (Wildlife)	32	24	19	27	29	24	26
Female	19	16	12	16	19	15	16
Male	13	9	7	11	11	9	10
Am Indian	0	0	0	0	0	1	0
Latino	1	1	0	2	1	3	1
Two or more	0	0	1	2	2	1	1
White	20	14	13	20	24	19	18
Unknown	11	10	5	4	3	1	6
Not URM	19	13	14	22	26	20	19
URM	1	1	0	2	1	4	2

Summary: The Wildlife option has fluctuated from a high of 32 students in AY10/11 to a low of 19 students in AY 12/13. Females outnumber males and URM students make up a small percentage (0-15%).

DEGREES GRANTED – ORGANIZED BY OPTION

(data acquired from: http://pine.humboldt.edu/anstud/cgi-bin/filter.pl?relevant=pindex_M.out)

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg
NRPI (total)	2	3	5	2	0	2
ENRS (total)	0	0	1	0	3	1
NRPI + ENRS	2	3	6	2	3	3
Female	1	1	0	1	3	1
Male	1	2	6	1	0	2
Latino	0	1	0	0	0	0
Asian	1	0	0	0	0	0
White	1	1	6	2	3	3
Unknown	0	1	0	0	0	0
Not URM	2	1	6	2	3	3
URM	0	1	0	0	0	0

Summary: The number of ENRS/NRPI graduates has ranged from 0-6 over the past five years. The number of graduates in NRPI declined and ENRS increased because of the name change.

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg

Range & Soils	1	0	1	2	0	1
Female	0	0	1	2	0	1
Male	1	0	0	0	0	0
White	1	0	1	2	0	1
Not URM	1	0	1	2	0	1
URM	0	0	0	0	0	0

Summary: The Range and Soils option was discontinued and had a low number of graduates per year during the past five years (range of 0-2). There were no URM graduates in this option since AY 10/11.

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg
Watershed Mgt	2	4	2	0	0	2
Female	2	1	0	0	0	1
Male	0	3	2	0	0	1
White	2	2	1	0	0	1
Unknown	0	2	1	0	0	1
Not URM	2	2	1	0	0	1
URM	0	2	1	0	0	1

Summary: The Watershed Management option was incorporated into FWWS and therefore declined during the past five years. The number of URM and non-URM graduates in Watershed Mgt were the same in AY11/12 - AY12/13.

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg
NR	0	0	1	0	0	0
Nat Resources- Fst,Wtrshd,WldIn	0	0	0	1	7	2
Female	0	0	1	1	2	1
Male	0	0	0	0	5	1
White	0	0	1	1	7	2
Not URM	0	0	1	1	7	2

Summary: The number of FWWS graduates increased during the past five years because the option didn't exist until AY 11/12. There were no data about URM graduates during this time.

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg
NR (Fisheries)	4	6	8	6	5	7
Female	1	4	1	2	3	2
Male	5	4	5	3	4	4
Asian	0	0	0	2	0	0
White	6	7	4	2	5	5
Unknown	0	1	2	2	2	1
Not URM	6	7	4	3	5	5
URM	0	1	0	0	0	0

Summary: The number of Fisheries graduates was fairly stable over the past 5 years (mean=7 graduates/year). There were very few URM graduates in Fisheries during this time.

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg
NR (Forestry)	5	4	3	1	4	3
Female	1	1	0	2	0	1

Male	3	2	1	2	0	2
Asian	0	0	0	1	0	0
Two or more	0	1	0	0	0	0
White	4	1	1	2	0	2
Unknown	0	1	0	1	0	0
Not URM	4	1	1	3	0	2
URM	0	1	0	0	0	0

Summary: Surprisingly, the number of Forestry graduates did not substantially decline over the past 5 years. The Forestry graduate program was incorporated into FWWS in AY 11/12. The graduates in AY12/13 – AY 14/15 were those that most likely started the graduate program in the Forestry option and chose not to switch to the newer FWWS option. Male Forestry graduates generally outnumbered female graduates and there was only 1 URM graduate during this time.

Degrees Granted	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15	5-yr avg
NR (Wildlife)	10	11	12	7	6	9
Female	4	8	8	5	2	5
Male	6	3	4	2	4	4
Black	1	0	0	0	0	0
Latino	0	0	1	0	0	0
Two or more	0	1	0	0	0	0
White	7	7	10	7	6	7
Unknown	2	4	1	0	0	1
Not URM	7	7	10	7	6	7
URM	1	0	1	0	0	0

Summary: The number of Wildlife graduates over the past year was fairly stable (mean=9 graduates/yr). Non-URM graduates outnumbered URM graduates.

Retention (disaggregated by gender and ethnicity): Graduate rates for FTF and transfer students; student migration data into the program and out from the program, courses with low success rates. http://pine.humboldt.edu/anstud/cgi-bin/filter.pl?relevant=gradrateall_mast4.out

First time freshman (FTF) and transfer students do not apply to graduate programs. Student migration and course success rate data were not available for graduate programs.

Graduation rates

Two-year graduation rate data were only available for Fall 10 – Fall 13, three-year graduation rate data were only available for F10-F12, four-year graduation rate data were only available for Fall10-Fall11 and seven year graduation rate data were only available for through Fall 2008.

Two-year graduation rates

Two-year graduation rates were 33% or lower for all options in all years examined with the exception of NRPI, which had a 80% two-year graduation rate in Fall 2010 and ENRS, which had a 100% graduation rate in fall 2010. Fisheries' two-year graduation rate from Fall 2010 – Fall 2013 was 0% and Wildlife's two-year graduation rate ranged from 0-27% in the same time period. FWWS had a two-year graduation rate of 33% in F12 and F13 (once the new name was established).

Three-year graduation rates

Three-year graduation rates were slightly higher for all options in Fall 2010, Fall 2011 and Fall 2012. ENRS had the highest graduation rate of all the options with an average three-year graduation rate of 100% in these three years of data. FWWS had the second highest average three-year graduation rate of 83.5% and NRPI was 76.7%. Fisheries and Wildlife had lower mean three-year graduation rates of 48.3% and 63.3% respectively.

Four-year graduation rates

Since only two data points (Fall 2010 and Fall 2011) were available for four-year graduation rates it is hard to gain much from these data. ENRS and FWWS had the highest rates (both 100%) and Wildlife and Fisheries were similar (74.5% and 77.5% respectively).

Investments Faculty and staff FTEF

FTEF of faculty in the Natural Resources Masters Program

(a "-" indicates that the program option was not in existence for that Academic Year)

Option	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15
FISH (Fisheries)	1.3	1.0	1.0	0.7	0.7
FOR (Forestry)	1.1	0.3	0.0	0.07	0.07
NRPI (NR Planning & Interp)	1.3	0.4	0.0	-	-
RRS (Rangeland Resource Science)	0.1	-	-	-	-
SOIL (Soils)	-	-	-	-	-
WLDF (Wildlife)	2.6	1.6	1.5	2.1	2.3
WSHD (Watershed Mgt)	0.7	0.1	0.0	0.02	0.03
FWWS (Forest, Watershed & Wildland Science)	-	1.9	1.1	1.1	1.7
EMP (Envt Mgt & Protection)	-	0.3	0.8	0.8	1.0

**Data were collected from the HSU Data Dashboard website (http://www2.humboldt.edu/irp/Dashboards/FAD/FTES_FTEF_SFR.html).

Efficiency SFR

SFR for the Graduate Level in the Natural Resources Masters Program

(a "-" indicates that the program option was not in existence for that Academic Year)

Option	AY 10/11	AY 11/12	AY 12/13	AY 13/14	AY 14/15
FISH (Fisheries)	8.8	8.6	10.1	10.5	9.9
FOR (Forestry)	5.9	7.0	19.1	20.9	16.6
NRPI (NR Planning & Interp)	8.2	7.2	-	-	-
RRS (Rangeland Resource Science)	12.2	-	-	-	-
SOIL (Soils)	6.7	-	-	-	-
WLDF (Wildlife)	6.0	6.4	6.9	7.3	6.2
WSHD (Watershed Mgt)	5.5	5.9	-	26.9	41.1
FWWS (Forest, Watershed & Wildland Science)	-	3.8	4.2	3.7	3.2
EMP (Envt Mgt & Protection)	-	8.1	4.3	3.7	4.6

**Data were collected from the HSU Data Dashboard website (http://www2.humboldt.edu/irp/Dashboards/FAD/FTES_FTEF_SFR.html).

OVERALL SUMMARY

Enrollment

Enrollment in the NRPI option declined between AY10/11 and AY15/16 because the option name was changed to ENRS in AY 11/12. Male and female enrollments in NRPI and ENRS were similar and non-URM students outnumbered the URM students.

The Range and Soils, Watershed Management and Forestry options were combined into FWWS in AY 11/12

and the Wastewater Utl option was discontinued AY 10/11. Therefore, all four of these former options saw a decline in enrollment over the past 6 years because they were no longer offered. The FWWS option began in AY 11/12, replacing Range & Soils, Forestry, Wastershed Mgt and Wastewater Utl. Thus enrollment in FWWS increased since AY 11/12 accordingly. The percentage of URM's in FWWS has increased in recent years, particularly Latino students (partially a result of HSI grant).

Enrollment in the Fisheries option has remained steady over the past 5 years and males outnumber females. URM students make up a small proportion of the program.

The Wildlife option had a decline in enrollment from AY10/11 to AY11/12, but enrollment has held steady since then (range of 19-29 students enrolled each AY). Females outnumber males and URMs make up a small percentage (0-15%).

Degrees Granted

The number degrees granted in the NRPI option declined between AY 10/11 and AY 14/15 because the name of this degree option was changed to ENRS in AY 11/12. Therefore, the number of degrees granted in the ENRS option increased between AY 10/11 and AY 14/15. The total number of degrees granted when combining these two option names was an average of 3 degrees per year over five years. The overall low enrollments and low number of graduate students in these options can be attributed to the low number of graduate faculty in this option during this time. Although several new tenure-track faculty were hired recently in the ESM Department, many of these faculty advise graduate students in other programs such as the Environment and Community Masters program and the Environmental Systems Masters program. Male students in these options earned more degrees than females during the same time period. The number of degrees granted to URM students was only one out of 15.

When FWWS began in AY 11/12 and replaced the Range & Soils, Forestry, Wastershed Mgt and Wastewater Utl options, the number of degrees awarded in the discontinued options declined while the number of degrees in the FWWS option increased. The number of URM degrees granted in these options has been very low.

The number of degrees granted in the Fisheries option has held steady over the past five years with a five-year average of 7 degrees granted per year. The number of male students in this option outnumber female students by 2:1 on average. There have been very few URM students in the Fisheries option in the past five years.

The number of degrees granted in the Wildlife option has declined over the past five years with an average of 9 degrees granted per year. There are generally more females than males earning graduate degrees in Wildlife. The number of degrees granted to URM students in the wildlife option is very low compared to non-URM students.

It should be noted that when graduate faculty were asked to review the data provided in the tables above there were many instances where data were listed incorrectly. For example there were instances where no or very few URM students were listed in the tables, but a faculty member knew personally of many URM graduate students that were in the program at this time. Therefore, one should assume these data potentially underestimate the actual number of URM students in the program. It is recommended that the NR Program work with the Office of Institutional Research to improve the accuracy of these data.

III.B.

Diversity and Inclusive Excellence

The Goal: *Ensuring academic excellence and educational equity for traditionally under-represented students in the areas of student access, persistence, and graduation by embracing diversity as central to the educational process for all HSU students.*

Programs undergoing their 5-year program review are asked to use the template provided to undertake a more comprehensive review and evaluation of the departmental diversity plan in place. Based on that review, programs are asked to submit a brief report that responds to the same core questions as in the annual report (but, in this case, with respect to a review of the previous 5 years, not only the most recent year), and to modify the existing diversity plan by outlining strategies to be implemented and tracked over the upcoming five years.

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

HSU Diversity & Inclusive Excellence Report for AY 2015-16
College: CNRS
Program: Natural Resources Masters Program
Report prepared by: Alison O'Dowd (NR Graduate Coordinator)
Report date: 7/19/2016

For your program's five year diversity and inclusive excellence review, please comment on the following:

1. **Using the multi-year program data provided in the Data Dashboards, summarize the areas of disproportional impact** that you observe in each of the following areas.** (*If there are no areas of disproportional impact, please state this.*)

The 'Data Dashboard' site only has data for undergraduate students and there are not graduate student data. However, based on information presented in the 'Enrollment' section of this Program Review the following was determined.

Areas of disproportional impacts:

- Lower enrollment of URM grad students in most NR options
- Course success data not available for graduate courses
- Fewer degrees granted and lower graduation rates for URM graduate students compared to non-URM grad students.

2. Summarize the initiatives undertaken by your department in the past year to address the issues described in Point #1, above. For most departments, these initiatives will be those that were summarized in your most recent departmental diversity plan. If your department has undertaken additional initiatives since that most recent plan, please also summarize those here.

The four options of the NR Graduate Program are housed, respectively, in the departments of Environmental Science and Management, Fisheries Biology, Forestry and Wildland Resources, and Wildlife. Each of these departments has its own diversity plan and initiatives, which apply both to undergraduate and graduate students in the departments. Thus, the NR Graduate Program does not have a diversity plan, as acknowledged in the most recent NR Graduate Program review (2010/2011). However, the program review recommended that each of four participating departments consult with the Office of Diversity and Inclusion for ways to increase the diversity of the pool of graduate students applying for admission.

Over the past five years, the option coordinators have not met periodically with the HSU office of diversity and inclusion, but there are several ways in which the NR Masters program have worked to increase diversity and inclusion among our graduate students including:

- Encouraging and supporting URM undergraduate and graduate students to apply for the National Science Foundation's graduate Fellowship
- The Forestry and Wildland Resources Department received a four-year, \$1 million dollar grant from the USDA Hispanic Serving Institutions Program to increase diversity in the natural resources workforce. Funding will support 10 graduate students to study forest watershed and wildland science topics, including annual \$10,000 stipends, support for research supplies, conference travel, and mentoring. This has significantly increased the proportion of Hispanic graduate students in the FWWS program.

3. Discuss the effectiveness and/or results of each of these initiatives in addressing the areas of disproportional impact outlined above. *This discussion should be based on the procedures, outlined in your most recent departmental diversity plan, for measuring and assessing the results and progress of your departmental diversity plan.*

Not applicable for this program; see item 2 above and the individual department reports.

4. Based on this assessment of your department's current work to address areas of disproportional impact, outline any modifications to the departmental diversity plan that your department deems necessary to effectively address the areas of concern that you have identified. *Specifically, what changes (if any) will your department undertake in the coming five years to address any evident inequities in the areas of student access, retention and success, in addition to those already outlined in your departmental diversity plan? What modifications will your department make to existing initiatives? If, based on this review, your department chooses to completely re-write your working diversity plan, please upload that new plan below (under "Document Directory Sources") and make a note of that change here.*

Not applicable for this program; see item 2 above and the individual department reports.

IV.

Strengths and Challenges

Based on the program review, evaluation, and planning of the past 5 years, identify three to five themes relative to the strengths and weakness of the program in the narrative box below. The discussion of these themes should provide a rationale for the five-year action plan to follow. Themes may include:

- Trends in the discipline that have impacted your curricular and co-curricular programs and your actions or planned actions in response to these changes.
- Scholarly and professional contributions made by your students, graduates and faculty to their disciplines and/or local, regional, global society and and plans to enhance the development of opportunities for faculty and students to pursue research and scholarly activities.
- Resources (faculty, staff, funding, space, IT and/or equipment) that have been crucial in enhancing or hindering your programs.
- External funding and/or entrepreneurial activities that have enhanced your programs.
- How learning communities engage students, faculty and staff.

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During the fall semester 2015 a brainstorm of the strengths, weaknesses, and future actions was conducted in the ESM Graduate Seminar class (EMP 685). Graduate students in this class were from the ENRS, FWWS, and Fisheries options and included both first-year, second-year, third-year and third+ year students so the results below came from graduate students and faculty that represent a nice cross section of the of the NR Graduate Program. The table below shows the results of the brainstorm.

Table 1. Strengths, Weaknesses, and Future Actions of the NR Graduate Program

Strengths	Weaknesses	Future Actions
<ul style="list-style-type: none">• Regular meetings with advisors (690/695 units encourage this)• A high level of access to professors Engaged faculty who want to help students	<ul style="list-style-type: none">• Financial burden if not funded• high cost of living in the local area• Low number of tuition waiver and teaching assistant opportunities	<ul style="list-style-type: none">• Develop a transparent policy about lab space that enables more graduate students to utilize a wide variety of HSU

<ul style="list-style-type: none"> • Engaged faculty who want to help students • Graduate seminars – encourage faculty/student interaction • Graduate seminars offered in different departments • Interdisciplinary nature of program; links to soak social science • Research methods class (FWWS 501) allows students to share ideas with fellow grad students and is highly relevant to thesis development • Ability for graduate students to take many courses • Access to Klamath bioregion and other ecosystems on the North coast • Close proximity of campus to nature and natural diversity • Local community has passion for NR policies and issues (e.g. fisheries, restoration) • Good reputation of NR Masters program can help employability after completing degree • This program has produced many professionals that are now alumni and allows for networking opportunities in the professional realm • Includes the only Fisheries-specific Masters program in California • A large number of professionals engage with graduate program in the form of presentations, access to data, and mentoring. 	<p>teaching assistant opportunities</p> <ul style="list-style-type: none"> • GTA limited to 20 hours per week (limits opportunities to work on multiple projects or TA) • Lack of graduate-level and dual listed courses • Lack of graduate lab space/access • IT policies limit abilities • time limits associated with access to labs. 	<p>utilize a wide variety of HSU lab spaces</p> <ul style="list-style-type: none"> • Give graduate more students administrative privileges on computers • Have a liaison to IT from the graduate program • More space dedicated to graduate students • More intentional mentorship by alumni (online forum, Facebook page, events announcements) • Increase visibility of research groups, forums, institutes (e.g. FERN, River Institute, etc.) • More advocacy for graduate students • Accountability of faculty advisors in their mentorship of graduate students
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Below are some of the themes that emerged from the brainstorm above and a discussion of each.

1. **Mentoring of graduate students by faculty, alumni, and professionals**

It is clear that graduate students in the NR Masters program appreciate the mentoring they receive from faculty at HSU and from alumni and professionals in their field. Graduate students receive a high level of interaction with faculty in classes, seminars, research groups and individual meetings. Despite this, there is not a formal process for holding faculty accountable to their responsibilities as a graduate advisor. If the graduate advisor does not fulfill their responsibilities adequately (e.g. is hard to get a hold of, doesn't provide

help to the graduate student, doesn't return thesis drafts in a timely manner) there are no procedure for correcting this behavior. In order to ensure high quality mentorship of graduate students by faculty advisors, it is recommended that the four departments in the NR Masters Program (ESM, FWR, Fisheries Biology and Wildlife) include the evaluation of faculty mentorship of graduate students in their department RTP criteria.

2. Dedicated lab space for graduate students

One of the most common complaints from NR graduate students is the lack of lab space. This lack of lab space is often tied to the limited lab space provided to faculty and the lack of lab-space sharing among faculty.

3. Graduate-level courses/seminars

Graduate seminars are providing valuable forums for interaction between faculty and graduate students and among graduate students. Seminars also expose students to each other's research and the associated literature. They also provide venues for faculty and graduate students to give presentations. Despite the high praise for graduate-level seminars, there are a limited number of graduate-level (500/600) courses offered. This limited offering of graduate level courses can hinder a graduate student's ability to meet the requirement of 50% of their overall units must be 500- or 600-level courses.

4. Issues with IT procedures and access

Graduate students are limited in their ability to use software or programs on campus computers because they do not have administrative privileges.

5. Limited number of GA and TA positions for NR graduate students

There is a limited number of TA (Teaching Assistantship) and GA (Graduate Assistantship) positions for NR graduate students (which provide tuition waivers). An increase in TA and GA positions would help to ease the financial burden of graduate school on NR graduate students.

V.A.

5-Year Action Plan

Based on Sections I through IV, recommend a 5-year plan of action to improve the program. [Paste text in the narrative section below.]

Status

Under Development In Review Published

Due Date: 3/30/2016

Narrative

5-Year Action Plan for the Natural Resources Masters Program

The following action items are recommended to be pursued over the next five years in the NR Masters Program:

1. Increase graduate student access to (lab/work) space

There are a lot of politics involved with how lab and office space is allocated at HSU. Once a department has a dedicated lab, classroom or office space it can be difficult to re-allocate or share that space if the needs of that department (or another department) change over time. As a result, graduate students in options with limited space are disproportionately affected by the lack of access to adequate lab/work space. Moreover, a graduate student in one option may have equipment and space needs that can only be provided by a department outside of that option.

It is recommended that the four departments in the NR graduate program (ESM, FWR, FISH, WLDF) work together and with other HSU departments to ensure adequate lab/work space is provided to as many NR graduate students as possible. Mechanisms for achieving this include sharing lab space with graduate students from other NR options that has traditionally been used by only a single department or opening up un-used lab space to graduate students in other options. MOUs can help to clarify who is being allowed to use what space and for how long. This can also be facilitated through graduate thesis committees in which the graduate student and/or graduate advisor can work with the thesis committee to collectively ensure that the graduate student's space and equipment needs are met.

2. Graduate Courses: (a) Continue to offer key graduate courses and seminars, (b) consider making FWWS 501 a core course for all incoming NR graduate students in all options and (c) increase the number of graduate-level and dual-listed courses offered regularly for NR graduate students

(a) Graduate seminars offered in the NR graduate program (e.g. EMP 685, WDLF 585, WSHD 685, FISH 685) have proven to be effective ways to increase interaction between faculty and graduate students, provide opportunities for presentations by HSU faculty, students and outside speakers, and to review the literature. It is recommended that these four seminars continue to be offered regularly and that graduate students across the four NR graduate options be encouraged to enroll in seminars within and across options (if appropriate).

Another way to use the seminar in order to make the NR Graduate program more cohesive is to offer only a single graduate seminar that is interdisciplinary and taken by a mixture of graduate students from the four options. Graduate students would be required to take the graduate seminar twice during their graduate career (for example).

(b) FWWS 501 (Research Methods and Planning) was originally developed primarily for FWWS graduate students, but in recent years has included ENRS graduate students as well. This course has proven to be important in helping first-semester graduate students bond as a cohort and develop their individual research proposals. It is recommended that FWWS 501 become a core course for all in-coming NR graduate students to help them develop their research proposals in the first semester, similar to how BIOL 683 (Intro to Graduate Studies) functions in the Biology graduate program. It is also recommended that a standardized set of expectations for the proposal be developed and implemented via this core course. Having FWWS 501 as the core course for incoming NR graduate students will also build program cohesiveness.

(c) Lastly, NR graduate students often struggle to find adequate graduate courses to enroll in because so few graduate-level courses are offered. For example, in AY15/16 the following graduate-level courses were offered in the NR Masters program:

Graduate-level courses offered in the NR Masters program (AY15/16)

Fall 2015	Enrollment	Spring 2016	Enrollment
EMP 597	1	EMP 510	12
EMP 620	0	EMP 597	1
EMP 685 (seminar)	11	EMP 685	0
FISH 576	8	FISH 558	10
FWWS 501	14	FISH 578	5
WLDF 531	15	FISH 685 (seminar)	9
WLDF 578	19	WLDF 510	16
WLDF 585 (seminar)	8	WLDF 585	9
		WSHD 685	6

It is recommended that departments in the NR Masters program develop new graduate-level or dual-listed courses to help graduate students meet the requirement of 50% of their units being graduate-level and/or work with other departments to ensure adequate graduate-level courses are offered. It should be noted that the above list of courses underrepresents the graduate-level courses available for NR graduate students to take because they often take graduate course in others departments.

3. Increase the number of Teaching Assistant (TA) positions for NR graduate students

Over the past 5 years there have been very few TA positions for NR graduate students (see table below).

Number of TA's in the NR Masters Program (by option)

Option	AY 11/12	AY 12/13	AY 13/14	AY 14/15	AY 15/16
Fisheries	0	0	0	1	0
FWWS	0	0	0	0	0
Wildlife	0	3	1	2	2
ENRS	0	0	0	0	0

Only Wildlife and Fisheries had TA positions over the past five years, while FWWS and ENRS had none. There are two primary aspects to make TA positions happen: 1) the graduate student must be eligible for a TA position (i.e. they submit their FAFSA by the March 2 deadline and are eligible for a state university grant), and 2) departments must have a need or be willing for graduate student instructors to teach course(s)/lab section(s)/discussion section(s).

It is recommended that departments in the NR Masters program explore possibilities for sections that

could be taught by graduate students in order to increase the number of TA positions offered. Not only does a TA position provide financial relief to graduate students, it also provides them with valuable teaching experience.

4. Pursue grants to fund URM graduate students

Faculty in the FWR department set an excellent precedent for increasing the proportion of URM graduate students in the NR graduate program when they wrote a grant and were funded for a four-year, \$1 million dollar grant from the USDA Hispanic Serving Institutions Program to increase diversity in the natural resources workforce. Funding was to support 10 graduate students to study forest watershed and wildland science topics, including annual \$10,000 stipends, support for research supplies, conference travel, and mentoring. This has significantly increased the proportion of Hispanic/URM graduate students in the FWWS program.

It is recommended that NR graduate faculty continue to pursue these type of funding opportunities as a way to increase URM participation in the NR graduate program.

V.B.

External Review

The purpose for the external review is to assist faculty in improving program quality by providing a new comparative and broader perspective on the program and student learning.

External Reviewers: Please provide a commentary on each of the sections listed below. Under each is a set of suggested questions to address in your commentary. [Enter text in the narrative section below.]

Status

Under Development In Review Published

Due Date: 4/30/2016

Narrative

I. Mission, Goals, and Programs (≤ 1 page)

- a) What are the strengths and weaknesses of the curriculum?
- b) What is unique about the curriculum?
- c) Can the department achieve its mission, goals, and student learning outcomes with the program curriculum it has?

II. Assessment (≤ 1 page)

- a) What are strengths and weaknesses of the assessment plan that has been carried out over the past five years?
- b) In what ways has the assessment process enabled faculty to make decisions to improve student learning?
- c) How might the assessment plan for the next five years be improved so that program faculty and administration make better use of the opportunities imbedded in conducting annual assessments?

III. Diversity and Inclusive Excellence (≤ 1 page)

- a) What are strengths and weaknesses of the diversity plan that has been carried out over the past five years?
- b) In what ways has the practice of focusing on diversity enabled faculty to make decisions to improve student learning?
- c) How might the diversity plan for the next five years be improved so that program faculty and administration make better use of the opportunities imbedded in annual actions and reflections surrounding diversity?

IV. Strengths and Challenges (≤ 2 pages)

To what extent does the program's assessment of its strengths and challenges match your assessment? What, if anything, is missing from the lists? What, if anything, should not be on the lists?

If there were additional resources available, what is the most pressing need for maintaining or improving the program?

If there were fewer resources, where can the program be cut so that student learning suffers least.

Five-year Action Plan (≤ 2 pages)

To what extent do you agree with the proposed action plan?

b) Which items on the action plan can be implemented without additional resources? Which will require additional resources?

c) What additional actions might you suggest, and how would you measure the effectiveness of these actions?

V.C.

Memorandum of Understanding

The Dean, College Council of Chairs, ICC, and Provost work with program faculty to create a memorandum of understanding that contextualizes the five-year plan for the academic program within the priorities of the college and university.

Status

Under Development In Review Published

Due Date: 4/30/2016

Narrative

VI.

Departmental Activity

Summarize how activities such as, student accomplishments, faculty scholarships, grants and contracts, professional events, and community outreach over the past 5 years support the program's mission and goals and/or program planning. [Paste text into the narrative section below.]

Status

Under Development In Review Published

Due Date: 5/29/2016

Narrative

Summary

From the extensive list of departmental activity below it is clear that faculty and students in the NR Masters Program are extremely productive in terms of awards, scholarship, grants/contracts, and community outreach. It is recommended that faculty continue to encourage graduate students to attend and present their research at professional meetings and publish their results in peer-reviewed journals. It is also recommended that faculty help graduate students acquire funding/grants for their research and to attend professional meetings. CNRS and the University should continue to offer financial support to faculty and students to attend professional meetings.

Departmental activity for the four departments associated with the NR Masters program (ESM, FWR, Fisheries Biology and Wildlife) is presented below.

ANNUAL DEPARTMENT ACTIVITY REPORT – DEPT. OF ENVIRONMENTAL SCIENCE AND MANAGEMENT

List faculty awards received since May 2015.

Dr. Steven Martin was awarded the 2015 national award for Excellence in Wilderness Stewardship Research, awarded by the Chief of the U.S. Forest Service on behalf of the USFS, NPS, BLM and USFWS.

List student awards received since May 2015.

Graduate student **Emily Cooper** was selected as a USDA-WRPI Water Resources Intern (\$5,060) and awarded the COAST Graduate Student Research Award (\$3,500).

Graduate student **Anthony Barela Nystrom** received the 2015 Switzer Environmental Fellowship of \$15,000 to support his graduate research.

Graduate student **Emma Lundberg** received the 2015 California Lake Management Society (CALMS) student scholarship – an award of \$1,000

Graduate student **Claudia Voigt** won the Patricia McConkey award for Outstanding Graduate Student in the Natural Resources graduate program.

List faculty scholarship (e.g. exhibits, presentations, publications) conducted since May 2015.

Martin, Steven and Blackwell. 2016. Personal Locator Beacons: Influences on Wilderness Visitor Behavior. *International Journal of Wilderness* 22(1):25-31.

Watson, **Martin, Steven**, Christenson, Fauth and Williams. 2015. Relationship between perceptions of wilderness character, attitudes toward management intervention to adapt biophysical resources to a changing climate, and nature restoration at Sequoia and Kings Canyon National Parks. *Environmental Management*. 56:653-663.

Watson, Cordell, Manning and **Martin, Steven**. In Press. The evolution of wilderness social science and future research to protect experiences, resources and societal benefits. *Journal of Forestry*. May 2016

issue.

Dunk, Jeff, B. Woodbridge, E. M. Glenn, R. J. Davis, K. Fitzgerald, P. Henson, D. W. LaPlante, B. G. Marcot, B. R. Noon, M. G. Raphael, N. H. Schumaker, and B. White. 2015. The Scientific Basis for Modeling Northern Spotted Owl Habitat: A Response to Loehle, Irwin, Manly, and Merrill. *Forest Ecology and Management* 358:355-360

Zielinski, W. J., F. V. Schlexer, **Jeff Dunk**, M. J. Lau, and J. J. Graham. 2015. A range-wide occupancy estimate and habitat model for the endangered Point Arena mountain beaver (*Aplodontia rufa nigra*). *Journal of Mammalogy* 96:380-393.

Fingerman, Kevin, L Iriarte, U Fritsche, GJ Nabuurs, B Elberson, I Staritsky, T Mai-Moulin, L Visser, and M Junginger. 2016. Biomass for export from the United States Southeast to the European Union: sustainable potentials 2015 to 2030. European Commission. Intelligent Energy Europe. IEE/13/577/SI2.675534. Brussels.

Fingerman, Kevin and J Gwynn. 2015. The water-biofuel-poverty nexus: Investigating the water resource impacts of biofuel expansion and the resulting links to poverty in susceptible regions. ActionAid. Washington, DC.

Fingerman, Kevin, M Rocheleau, and J Zoellick. 2015. Northwest California alternative transportation fuels planning project – Incentives evaluation.” California Energy Commission. CEC-ARV-13-012.

Fingerman, Kevin. 2015. Alternative fuel portfolio analysis using a stochastic MAC curve approach. Energy Policy Research Conference.” Denver, CO.

Fingerman, Kevin. 2015. Alternative fuel readiness planning for Northwest California. Schatz Energy Research Center research seminar.

Montero, J., Chesney, T., Bauer, J., Froeschke, J., **Graham, James**. Brown shrimp (*Farfantepenaeus aztecus*) density distribution in the Northern Gulf of Mexico: an approach using Boosted Regression Trees, *Fisheries Oceanography*, (In Press).

Sim, L.; **Graham, James**.; Rose, K.; Duran, R.; Nelson, J.; Umhoefer, J.; Vielma, J. Developing a Comprehensive Deepwater Blowout and Spill Model; NETL-TRS-9-2015; EPA Technical Report Series; U.S. Department of Energy, National Energy Technology Laboratory: Albany, OR, 2015; p 44.

Richmond, Laurie, L. Ordonez Gauger, S. Hackett, C. Chen. 2016. It’s a Trust Thing: Assessing Fishermen’s Perceptions of the California North Coast MPA Network.

Richmond, Laurie, L. Ordonez Gauger, S. Hackett, C. Chen. 2016. Socioeconomic Dimensions of MPAs: Establishing a Baseline and Assessing Initial Changes in California North Coast Fisheries. North Coast MPA Collaborative Forum, November 17, 2015.

O’Dowd, Alison P. and A. Chin. 2016. Do bio-physical attributes of steps and pools differ in high-gradient mountain streams? *Hydrobiologia* DOI: 10.1007/s10750-016-2735-5

Alison O’Dowd will present two talks at the Society for Freshwater Science’s annual meeting in Sacramento, CA, May 2016.

Tarlton, Jennifer. NAI Region 9 Conference Half-Day Presentation – Questing 101: How to Create an Interpretive Scavenger Hunt.

McCavour, Melanie gave a poster presentation at the 2016 SERNW Regional Conference on ecological restoration – Ecological Restoration Plan for the Baker Cypress in the Upper Burney Creek Baker Cypress Research Natural Area of California.

List student scholarship (e.g. exhibits, presentations, publications) conducted since May 2015.

Graham, James., **C. Muhl**. 2015. What we could be doing with UAVs? Presentation at CalGIS, May, 2015. Graduate student **Emily Ferrell** presented a poster at the California Bioassessment Working Group meeting in Davis, CA in October 2015 entitled “Post-fire recovery of benthic macroinvertebrate communities & periphyton in Klamath Mountain headwaters.”

EMP 475 Environmental Planning Practicum Students in May 2015:

- Worked for Humboldt County Department of Public Works Natural Resources Division to develop a series of maps of Firewise Communities and to help the Upper Jacoby Creek Firewise Community survey their residents and put on a community fuel reduction day.
- Worked with the Area 1 Agency on Aging to develop a report on *What Seniors Want- Responsive Development for Aging in Place in McKinleyville* and presented their work to the County Board of Supervisors.
- Developed Public Access Recommendations and a Sea Level Rise Assessment for the NorthCoast Regional Land Trust.
- Developed a proposed amendment recommendation for the Big Lagoon Estates Area of Deferred Certification under the North Coast Area Plan / Humboldt County Local Coastal Plan for Humboldt

County Planning and Building Department and presented their project to Humboldt County Senior Planners

- Developed a property monitoring protocol and baseline reports for the Trinidad Coastal Land Trust and presented their work to the TCLT Board of Directors.

Martin and **Jessica Blackwell**. 2016. Personal Locator Beacons: Influences on Wilderness Visitor Behavior. *International Journal of Wilderness* 22(1):25-31.

Ordonez Gauger, L. 2015. Assessing Fishermen's Perceptions of the Ecology and Management of the California North Coast MPA Network. Western Society of Naturalists Annual Meeting.

Lundberg, E. 2016. Using Q-methodology to Understand Social Conflict in Wilderness Fisheries Management of Northern California. Association of American Geographers Annual Meeting March, 2016.

- Association of Experiential Education Spring Conference
10 student attendees
- National Association of Interpretation Region 9 Conference
 - 28 student attendees
 - Session Presentation entitled, "Cultivating Connection through the Twelve Principles of Permaculture."
 - Session Presentation entitled, "Connecting Youth to the Outdoors."
 - Session Presentation entitled, "The Visitor Experience Revolution: Has it Passed You By?"
 - Student served as Volunteer Coordinator on the conference planning committee.
 - Students co-created the conference logo.
- North American Association of Environmental Education Guidelines for Excellence Training- eight students completed certification.
- North American Association of Environmental Education Guidelines for Excellence Train the Trainer- Two students completed certification.
- Talk About Trees Training, Forest Foundation.
10 students became certified Talk About Trees presenters.
- ZIP Orientation Training, Sequoia Park Zoo
8 students completed training to become Zoo Interpretive Program volunteers.
- Project Learning Tree K-8. Thirty-eight students completed certification in this forest themed environmental education curriculum.
- Project Learning Tree Early Education. Fourteen students completed certification in this pre-school based environmental education curriculum.
- Project WILD. Thirty-eight students completed certification in this wildlife based environmental education curriculum.
- Project WET. Fourteen students completed certification in this water based environmental education curriculum.

List grants and contracts received since May 2015.

O'Dowd and Trush:

Hydrographs & Steelhead (NMFS): \$82,000

Mono Basin Stream Monitoring (LA Dept of Water & Power): \$67,000

Eel River Study Plan Development (CalTrout): \$4,500

Upper Eel River Habitat Assessment and Geospatial Analysis, Phase I: \$18,000

Eel River Salmonid habitat assessment (RSCA): \$3,500

McCavour. 10-year \$800,000 grant from the Bureau of Land Management for a study of Baker Cypress.

Malloy:

Virtual Labs Course Redesign Grant. \$25,000

Promising Practices Course Redesign Grant. \$48,000

Fingerman:

California Energy Commission – North State Regional Energy Innovation Cluster. \$200,000.

US Department of Energy – Dynamic modeling and validation of electrolyzers in real-time grid simulation. \$252,000.

California State University Office of the Chancellor – Campus as a Living Lab. \$27,000.

ActionAid USA – Water/biofuel/poverty nexus implications of US biofuel demand. \$14,000.

Richmond. Research, Scholarship, and Creative Activities Program (RSCA) to support the project “Collaborative Research and Publication with Undergraduate Students Related to the Governance of Marine Protected Areas in the Western Pacific.” \$3,970.

Martin. Habitat Conservation Plan Monitoring. Humboldt Redwood Co. \$265,000.

Dunk. Spotted Owl Wildfire Effects. \$40,000. U.S. Fish and Wildlife Service, Yreka, California.

List other professional events in which faculty participated since May 2015.

O’Dowd:

Attended the California Bioassessment Working Group meeting in Davis, CA in October 2015.

Attended the Salmonid Restoration Federation Annual Meeting in Fortuna in April 2016.

Will attend the Society for Freshwater Science’s annual meeting in Sacramento, CA, May 2016.

Malloy:

Course Redesign Intensive Workshop

Sustainable Learning Workshop

How to Apply the QOLT Instrument Workshop

Presented at HSU Library Teaching & Learning Luncheon & Forums

Fingerman. Serve on Board of Directors of Roundtable on Sustainable Biomaterials.

Tarlton:

National Association of Interpretation Certified Interpretive Train the Trainer Workshop- Certification pending.

National Association of Interpretation Region 9 Conference Planning Co-Chair.

North American Association of Environmental Education Guidelines for Excellence Train the Trainer- Certificate Complete.

List community outreach activities since May 2015.

O’Dowd. Co-organizer of the Earth Day Festival at the Humboldt Unitarian Universalist Fellowship (April 2015).

McCavour:

May 2015. Organizer with the HBBCA for Bike Month. Tap demonstration for a fundraiser at the Eureka waterfront.

May 2015. Gave a workshop on Bee health to the HSU advanced beekeeping class: microscopical identification of varroa vs tracheal mites and how to quantify them using the Ontario extension powdered sugar method.

April 2016. Gave a lecture and demonstration on beekeeping and pollination ecology to the HSU Master Gardener class.

Malloy. Organized a Science Without Borders Summer Internship.

Fingerman.

Outreach in support of student capstone projects. Students benefit from real-world engagement and application in their capstone projects and community entities benefit from the focused and guided assistance of talented groups of graduating seniors. Collaborations this year have included:

McKinleyville Land Trust

Northwest Regional Land Trust

HSU Sustainability Office/Facilities

North Coast Co-op

Zero Waste Humboldt

Humboldt Baykeeper

Arcata School District

Redwood National Park

Martin. Serves on City of Arcata Parks and Recreation Advisory Committee.

Tarlton:

- EMP 453 Course Projects
 - Bureau of Land Management. Students developed 4 interpretive panels for the Lighthouse Ranch property. The panels covered lighthouse history, historical timeline of the site, significance of eelgrass and marine protection areas, and dune restoration and effects on snowy plovers and endangered plants.
 - Humboldt Office of Education. Students developed and delivered standards-based STEM lessons in three after-school programs including South Bay Elementary, Grant Elementary, and Peninsula Elementary Schools. Each school site was visited weekly over the course of Spring semester.
 - Trinidad Coastal Land Trust. Students created an interpretive docent manual that covered topics such as TCLT history, geology, marine mammals, intertidal zone, birds, coastal trees and plants, seaweeds, Trinidad history, interpretive techniques, and a sample interpretive walk.
- EMP 450 Course Projects
 - Wonders of Wetlands Program, Friends of the Arcata Marsh and City of Arcata. Students delivered both a classroom and field-trip based presentation to 5th grade students at Union Street Charter School, Coastal Grove Charter School, and Freshwater Elementary School (approximately 90 students). The program content focused on wetland ecology and wastewater treatment.
 - Environmental Education Day Camp, Freshwater Elementary School.- Students developed and delivered a half day environmental education camp based on the Next Generation Science Standards. Approximately 50 third graders attended.
- EMP 353 Course Projects
 - Campus Center for Appropriate Technology. Students designed three interpretive panels for CCAT's Edible Garden, Yurt, and Earthen Oven.
 - Center Activities. Students designed an interpretive sign to educate summer camp participants about Humboldt Bay.
 - Environmental Science Practicum. Students designed an interpretive sign for HSU's edible landscape project.
- EMP 309B Course Projects
 - Friends of the Dunes. Students created communication tools including press releases, public service announcements, and fact sheets to educate the public about dune restoration.
 - Redwood Coast Energy Authority. Students created communication tools including press releases, public service announcements, and fact sheets to educate the public about energy efficiency.
 - Green Campus. Students created communication tools including press releases, public service announcements, and fact sheets to educate the students and faculty about composting and food waste.
- Redwood Chapter of Environmental Educators and Interpreters
 - Talk About Trees Education Program, Forest Foundation. Club members delivered 1 hour educational programs to local 2nd-5th grade classes focused on sustainable forestry. This academic year, 12 programs were conducted reaching over 500 elementary school students.
 - March for Parks, Washington Elementary School. A full day of environmental education activities to connect school children to their local regional park. Three 5th grade classes attended (approximately 90 students).
 - Earth Day, Union Street Charter School. Developed and delivered an environmental education station focused on habitat requirements and their impact on species (approximately 100 students participated).
 - Earth Day, Freshwater Elementary School. Developed and delivered a science based station focused on the benefits of trees (approximately 120 students participated).
 - Take a Child Outdoors Day, California Regional Environmental Education Consortium. Students developed and delivered a science based activity station that reached over 200 children.
 - Zoo Interpretive Program (ZIP), Sequoia Park Zoo, City of Eureka. Students participated in multiple events throughout the year, usually focused on leading science base activities for visiting families.
- Boo at the Zoo- leading educational activities
- Party for the Planet- leading educational activities

- Educational Volunteer- using a Zoo Interpretive Cart to interact with and educate zoo visitors.

If any of the activities listed above are particularly significant to the HSU mission, goals, and/or planning, or to program mission, goals, and/or planning, please highlight them here and briefly explain their significance.

Martin, Steven. 2015 national award for Excellence in Wilderness Stewardship Research, awarded by the Chief of the U.S. Forest Service on behalf of the USFS, NPS, BLM and USFWS. This is a national research award that is made to one person in the country each year. This brings significant recognition to the scholarship of HSU faculty.

O'Dowd. Conducted research and service related to sustainability and threatened species.

ANNUAL DEPARTMENT ACTIVITY REPORT – DEPT. OF FORESTRY AND WILDLAND STUDIES

Recent Sillett publications (former HSU graduate students in **bold**)

Van Pelt, R. S.C. Sillett, W.A. Kruse, J.A. Freund, **R.D. Kramer.** 2016. Emergent crowns and light-use complementarity lead to global maximum biomass and leaf area in *Sequoia sempervirens* forests. *Forest Ecology and Management* **349**: in press.

Chin, A.R.O, S.C. Sillett. 2016. Phenotypic plasticity of leaves enhances water-stress tolerance and promotes hydraulic conductivity in a tall conifer. *American Journal of Botany* **103**: in press.

Coonen, E.J., S.C. Sillett. 2015. Separating effects of crown structure and competition for light on trunk growth of *Sequoia sempervirens*. *Forest Ecology and Management* **358**: 26-40.

Sillett, S.C., R. Van Pelt, A.L. Carroll, **R.D. Kramer, A.R. Ambrose,** D. Trask. 2015. How do tree structure and old age affect growth potential of California redwoods? *Ecological Monographs* **85**: 181-212.

Carroll, A.L., S.C. Sillett, **R.D. Kramer.** 2014. Millennium-scale crossdating and inter-annual climate sensitivities of standing California redwoods. *PLOS ONE* **9**: 1-18.

Ishii, H., W. Azuma, K. Kuroda, S.C. Sillett. 2014. Pushing the limits to tree height: could foliar water storage compensate for hydraulic constraints in *Sequoia sempervirens*? *Functional Ecology* **28**: 1087-1093.

Kennedy, J.-P., S.C. Sillett, J.M. Szewczak. 2014. Bat activity across the vertical gradient of an old-growth *Sequoia sempervirens* forest. *Acta Chiropterologica* **16**: 53-63.

Kramer, R.D., S.C. Sillett, A.L. Carroll. 2014. Structural development of redwood branches and its effects on wood growth. *Tree Physiology* **34**: 314-330.

Han-Sup Han

Graduate students over the last 5 years (2011 – 2016):

- Brian Vitorelo, completed in 2011
- Timothy Montgomery, completed in 2014
- Heesung Woo, completed in 2015
- Jeffrey Paulson, completed in 2016
- Joel Bisson, completed in 2016

Publications (*graduate student co-author):

- Woo*, H, and **H.-S. Han.** 2016. Evaluation of two screening systems (Star and Deck) for productivity, fuel consumption, and size distributions. Submitted to *Biomass and Bioenergy*.

- Woo*, H, and **H.-S. Han.** 2016. Harvesting productivity and cost of grapple yarding using a running skyline system. Submitted to *Biomass and Bioenergy*.

- Bisson*, J. and **H.-S. Han.** 2016. Quality of feedstock produced from sorted forest residues. *American Journal of Biomass and Bioenergy*. Vol. 5 (2):81-97.

- Montgomery*, T. and **H.-S. Han.** 2016. A. Kizhakkepurakkal. A GIS-based method for locating and planning centralized biomass grinding operations. Accepted for publication and in press. *Biomass & Bioenergy*. Vol.85: 262-270.

- Bisson, J., S.-K. Han, and **H.-S. Han.** 2015. Evaluating the system logistics of a biomass recovery operation in northern California. *Forest Products Journal*. Vol. 66(1/2):88-96.

- Han, S.-K., **H.-S. Han,** and J. Bisson*. 2015. Effects of grate size on grinding productivity, fuel consumption, and particle size distribution. *Forest Products Journal*. Vol. (65): 209-216.

- Vitorelo*, B., **H.-S. Han** W. Elliot. 2012. Productivity and cost of integrated harvesting for fuel reduction thinning. *Forest Products Journal*, Vol. 61(8):664-674.

- Harrill*, H. and **H.-S. Han**. 2012. Productivity and cost of integrated harvesting of wood chips and sawlogs in stand conversion operations. *International Journal of Forestry Research*. Article ID: 893079 (Open Journal), 10p.
- Bruce*, J., **H.-S. Han**, A.E. Akay, and W. Chung. 2011. Computer-aided cost estimation for forest road construction. *Western Journal of Applied Forestry*. Vol. 26(4):189-197.

ANNUAL DEPARTMENT ACTIVITY REPORT – DEPT. OF FISHERIES

Here is a link to a google doc with the Annual Activity Report for Fisheries Biology. This is a work in progress as not all faculty have added their information:

<https://docs.google.com/a/humboldt.edu/document/d/1a9aiwaLIZCXlugjafOIN7c3CUkj9Uasq-2QKx3QSI48/edit?usp=sharing>

List faculty awards received since May 2015.

Rafael Cuevas Uribe: American Association of Hispanics in Higher Education (AAHHE) Faculty Fellow, 2016 AAHHE National Conference, Costa Mesa, CA

List student awards received since May 2015.

Graduate Student Scholarships

Danielle Plum Zunbrum Scholarship(2@\$2000 each): Ryan Whitmore and Nicholas Van Vleet Salo (1@\$1000): Katherine Osborn

Fisheries Founding Faculty (1@\$2000 each): Corianna Flannery, Jon Hollis

James Joseph Inter-American Tropical Tuna Scholarship (1@\$7500): Laura Solinger

Marin Rod and Gun Club (2@\$2000 each): Jon Hollis and Ian Kelmartin

Granite Bay Flycasters Robert B. Morton Fellowship Grant (1 @ \$2000): Peter Drobny

George and Beverly Allen Student Assistantship in Fisheries Biology (2 @ \$3000 each): Miki Takada and Grace Ghrist

Malcolm Oliphant Scholarship (2@\$3000 each): Corianna Flannery and Katherine Osborn

Awards

2016 Best Student Abstract Travel Award, U.S. Aquaculture Society: James Schwartz. Evaluating effects of fish oil replacement with algal oil (*Schizochytrium* sp.) in the diet of *Oncorhynchus mykiss*.

<http://usaquaculture.org/2016-best-student-abstract-travel-award>

2016 RAS "Yellow Book" Undergraduate Student Travel Grant: Jayme Yee

<http://usaquaculture.org/2016-ras-yellow-book-undergraduate-student-travel-grant>

2016 Katrina Martens Memorial Poster Award, 41st Annual Meeting of the California-Nevada Chapter and the Western Division of the American Fisheries Society: Sylvester, C.Z., F.D. Mele, A.M. Kee, S.G. Janofsky, and R. Cuevas-Urbe. Aquaponics in the classroom: a students' perspective.

List faculty scholarship (e.g. exhibits, presentations, publications) conducted since May 2015.

Peer Reviewed Publications

Bjorkstedt, E.P. and W.T. Peterson. (2015) Zooplankton data from high-frequency coastal transects: enriching the contributions of ocean observing systems to ecosystem-based management in the northern California Current. p 128-142 in Y. Liu, H. Kerkering, and R. H. Weisberg (eds.) Coastal Ocean Observing Systems: Advances and Syntheses. Elsevier.

Bjorkstedt, E. P., J. G. Field, M. Love, L. Rogers-Bennett, R. Starr. 2016. Marine Fisheries. pp.779-816 in Zavaleta E. and Mooney, H. (eds.) Ecosystems of California. University of California Press.

Buchheister, A., M. J. Wilberg, T. J. Miller, and R. J. Latour. 2015. Simulating bottom-up effects on predator productivity and consequences for the rebuilding timeline of a depleted population. *Ecological Modelling*. 311:48-62.

Buchheister, A., and R. J. Latour. 2016. Dynamic trophic linkages in a large estuarine system – support for supply-driven dietary changes using delta generalized additive models. *Canadian Journal of Fisheries and Aquatic Sciences*. 73:5-17. doi: 10.1139/cjfas-2014-0441.

Buchheister, A., T. J. Miller, E. D. Houde, D. H. Secor, and R. J. Latour. 2016. Spatial and temporal dynamics of Atlantic menhaden (*Brevoortia tyrannus*) recruitment in the Northwest Atlantic Ocean. *ICES Journal of Marine Sciences*. 73:1147-1159. doi: 10.1093/icesjms/fsv260

Cuevas-Uribe, R., S.D. Mims. 2015. Contaminants in muscle tissue from paddlefish (*Polyodon spathula*) and hybrid striped bass (*Morone chrysops* x *M. saxatilis*) after being raised in reclaimed effluent water. *Journal of Applied Ichthyology* 31s2: 71-74. doi: 10.1111/jai.12854

Cuevas-Uribe, R., E.J. Chesney, J. Daly, T.R. Tiersch. 2015. Vitrification of sperm from marine fish: effect on motility and membrane integrity. *Aquaculture Research* 46: 1770-1784. doi: 10.1111/are.12337

Danehy, R., M. A. Wilzbach, Young, M. et al. Regional specific interactions of forests and fish. *in* Danehy, R. and A. Dolloff (eds.). *Reflections on forest management: can fish and fiber coexist?* American Fisheries Society, Bethesda. In review.

Hassrick, J., M. Henderson, D. Huff, W. Sydeman, M. Sabal, J. Harding, A. Ammann, E. Crandall, E. Bjorkstedt, J. Garza, S. Hayes. (2016) Early ocean distribution of juvenile Chinook salmon in an upwelling ecosystem. *Fisheries Oceanography*. doi:10.1111/fog.12141.

Hodge, B.*, M. A. Wilzbach, W.D. Duffy, R. M. Quiñones, and J. A. Hobbs. Life history diversity in Klamath River steelhead. 2015. *Transactions of the American Fisheries Society*, 145:2,227-238, DOI: 10.1080/00028487.2015.1111257.

Kinziger, A.P., M. Hellmair*, W. T. McCraney*, D.K. Jacobs, G. Goldsmith. 2015. Temporal genetic analysis of the endangered tidewater goby: extinction-colonization dynamics or drift in isolation? *Molecular Ecology*. 24: 5544–5560. doi: 10.1111/mec.13424

Mulligan, T.J. and M. K. Jones. 2016. Seasonal Variability In Subtidal Fish Assemblages Inhabiting Sandy Bottom Habitats Off Humboldt Bay, California. *Northwestern Naturalist*. (accepted with minor revision).

Roddam, M.*, and Ward, D.M. 2015. Life-history differences of juvenile Chinook salmon *Oncorhynchus tshawytscha* across rearing locations in the Shasta River, California. *Ecology of Freshwater Fish*. doi:10.1111/eff.12265.

Schmelzle, M.C.*, and A.P. Kinziger. 2016. Using occupancy modeling to compare environmental DNA to traditional field methods for regional-scale monitoring of an endangered aquatic species. *Molecular Ecology Resources*. Early View. doi: 10.1111/1755-0998.12501

Wallace, M., E.W. Ojerholm, A.J. Scheiff, and A.P. Kinziger. 2015. First record of striped mullet (*Mugil cephalus*) in Humboldt Bay, California. *California Fish and Game*. 101:286-288.

*Vazquez, R., Ward, D.M., and Sepulveda, A. 2016. Does water chemistry limit the distribution of New Zealand mud snails in Redwood National Park? *Biological Invasions* doi:10.1007/s10530-016-1098-1.

*Student coauthors

Reports

Leising, A., I D. Schroeder, S J. Bograd, J. Abell, R. Durazo, G. Gaxiola-Castro, E. P. Bjorkstedt, J. Field, K. Sakuma, R. R. Robertson, R. Goericke, W. T. Peterson, R. Brodeur, C. Barceló, T. D. Auth, E. A. Daly, R. M. Suryan, A. J. Gladics, J. M. Porquez, S. McClatchie, E. D. Weber, W. Watson, J. A. Santora, W. J. Sydeman, S. R. Melin, F. P. Chavez, R. T. Golightly, S. R. Schneider, J. Fisher, C.I Morgan, R. Bradley, and

P. Warybok. 2015. State of the California Current 2014-15: Impacts of the Warm-Water "Blob". CalCOFI Reports 56: 31-69.

Moore, T.L. and M.A. Wilzbach. 2016. Distribution and relative abundance of juvenile Coho Salmon in the Redwood Creek Basin, Humboldt County, California. Report to the California Department of Fish and Wildlife, Fisheries Restoration Grants Program (Project No. P1210320), 36 p.

Mulligan, T.J. 2016. The ecological state of Northern California's sandy beaches and surf zones: A baseline characterization for MPA assessment. Sea Grant Annual Report, 11 pp.

Mulligan, T.J. 2016. Characterizing Diversity, Abundance, and Habitat of Fish Communities Associated with Nearshore Rocky Reefs in Northern California Through Collaborative Research. Sea Grant Annual Report, 12 pp.

Sparkman, M.D., R. Park, L. Osborn, S. Holt, and M.A. Wilzbach. 2016. Lower Redwood Creek juvenile salmonid (smolt) abundance project, study year 2015: Report to the California Department of Fish and Wildlife, Fisheries Restoration Grants Program (Project No. P1210322). 85 p.

Wilzbach, M. 2016. State of the Fisheries & Aquatic Resources of Prairie Creek. Final report to Redwood National and State Parks, Cooperative Agreement No. P13AC00848.

Wilzbach, M.A., M.D. Sparkman, P.Y. Drobny*, M.E. Gordon, and C.M.G. Boone. 2016. Prairie Creek Monitoring Project, 2015 Season: Report to the California Department of Fish and Wildlife, Fisheries Restoration Grants Program (Project No. P1210321), 98 p.

*Student coauthors

Presentations

Bjorkstedt, E.P., J. Abell, J. Jacobsen, B. Tissot, F. Shaughnessy, J. Tyburczy, P. Bourdeau. Ocean acidification studies off northern California: recent, ongoing, and future work. Presentation to NOAA's Ocean Acidification Roundtable. 12 August 2015.

Bjorkstedt, E. P., R. Robertson, W. T. Peterson. The Warm Event of 2014 off northern California: Observations from the Trinidad Head Line. Pacific Anomalies Workshop I. May 2015, SIO, La Jolla, CA

Bjorkstedt, E. P., R. Robertson, W. T. Peterson. Response of mid-shelf zooplankton assemblages off northern California to warming events of 2014. Pacific Anomalies Workshop II. January 2016, Seattle, WA

Bjorkstedt, E. P., R. Robertson, W. T. Peterson. Structure and variability in the mid-shelf copepod assemblage off northern California and its response to the the warming event of 2014-2015. Eastern Pacific Ocean Conference, September 2015, Fallen Leaf Lake, CA.

Bjorkstedt, E. P., R. Robertson, W. T. Peterson. Responses of copepod and euphausiid communities off northern California to warm anomalies of 2014-2015. CalCOFI Annual Meeting, December 2015, Moss Landing, CA

Cuevas-Uribe, R., S.D. Mims. 2016. Bioaccumulation of contaminants in market-size hybrid striped bass grown in reclaimed water. Oral presentation at the Annual Meeting of the World Aquaculture Society. Las Vegas, Nevada. February 2016.

Gamez, E.R., R. Cuevas-Uribe, S.D. Mims, A.J. Ray. 2016. Tissue concentrations of heavy metals and endocrine disrupting compounds in hybrids striped bass growth in a municipal reclaimed water aquaculture facility. Poster presented at Annual Meeting of the World Aquaculture Society. Las Vegas, Nevada. February 2016.

Kelmartin, Ian*, Jay Staton, Drew Barrett, Tim Mulligan, and Joe Tyburczy. 15 Oct 2015. Collaborative Research to Characterize Nearshore Rocky Reef Fish Communities on the Northern California Coast. Talk

presented at HSU Sponsored Programs Foundation PI Celebration, Arcata, CA.

Kelmartin, Ian*, Jay Staton, Drew Barrett, Tim Mulligan, and Joe Tyburczy. 7 Nov 2015. Collaborative Research Methods for Surveying Fish Communities Associated with Nearshore Rocky Reefs in Northern California MPAs. Poster presented at the Western Society of Naturalists Annual Meeting, Sacramento, CA.

Kelmartin, Ian*, Jay Staton, Drew Barrett, Tim Mulligan, and Joe Tyburczy. 17 Nov 2015. Baseline Characterization of Fish Communities Associated with Nearshore Rocky Reefs. Talk presented at the North Coast Collaborative Forum, Fortuna, CA.

Kelmartin, Ian*, Jay Staton*, Drew Barrett, Tim Mulligan, Joe Tyburczy, and Tim Bean. 8 March 2016. Characterizing Diversity, Abundance, and Habitat of Fish Communities Associated with Nearshore Rocky Reefs in Northern California Through Collaborative Research. Poster presented at CSU Council on Ocean Affairs, Science & Technology Annual Student Research Poster Reception, Office of the Chancellor, Long Beach, CA.

Kelmartin, Ian*, Jay Staton, Drew Barrett, Tim Mulligan, Joe Tyburczy, and Tim Bean. 23 March 2016. Characterization of Fish Communities Associated with Nearshore Rocky Reefs in Northern California Through Collaborative Research. Talk presented at Western Division of the American Fisheries Society Annual Meeting, Reno, NV.

Kelmartin, Ian*, Jay Staton*, Drew Barrett, Tim Mulligan, Joe Tyburczy, and Tim Bean. 30 April 2016. Characterizing Diversity, Abundance, and Habitat of Fish Communities Associated with Nearshore Rocky Reefs in Northern California Through Collaborative Research. Poster presented at Humboldt Area Saltwater Anglers Annual Fundraiser, Arcata, CA.

Osborn, K. November 17, 2015. "Getting to Know You – Learning about our local estuaries". River Lodge Conference Center, Fortuna, CA. IGNITE Session – MPA Forum.

Osborn, K., E. LeBlanc, T. Mulligan, and F. Shaughnessy. March 23, 2016. "The Big, the Mad, and the Ten: Fish and Invertebrate Communities in Three Northern California Riverine Estuaries". Grand Sierra Resort, Reno, NV. American Fisheries Society, Western Division Meeting.

Osborn, K., E. LeBlanc, T. Mulligan, and F. Shaughnessy. May 6, 2016. "The Big, the Mad, and the Ten: Fish and Invertebrate Communities in Three Northern California Riverine Estuaries". Native American Forum, Humboldt State University, Arcata, CA. Wildlife and Fisheries Annual Symposium.

Osborn, K., E. LeBlanc, T. Mulligan, and F. Shaughnessy. May 7, 2016. "The Big, the Mad, and the Ten: Fish and Invertebrate Communities in Three Northern California Riverine Estuaries". Humboldt Bay Aquatic Center, Eureka, CA. Marine Sciences Student Association Annual Symposium.

Rizza, S*., A. P. Kinziger, J. C. Garza, and M. A. Wilzbach. Asymmetric introgression between Coastal Cutthroat Trout and steelhead in the Smith River Basin, California. Oral presentation at the 145th Annual Meeting of the American Fisheries Society. Portland, Oregon. August 2015.

Robertson, R., E. P. Bjorkstedt. Community composition of euphausiids off northern California: An overview of the Trinidad Head Line time series and responses to the 2014-2015 warming event. Eastern Pacific Ocean Conference, September 2015, Fallen Leaf Lake, CA.

Shaughnessy, F., S. Kaulmann, K. Osborn, T. Mulligan, E. LeBlanc, N. Kalson, and A. Pererra. November 7, 2015. "An Unexpected Party: The convoluted and rewarding path of estuarine MPA monitoring on the north coast of California". Hilton Hotel, Sacramento, CA. Western Society of Naturalists Meeting.

Staton, Jay*, Ian Kelmartin, Drew Barrett, Tim Mulligan, and Joe Tyburczy. 7 Nov 2015. *Distance From Port as a Proxy for Historical Fishing Pressure on Nearshore Rocky Reefs in Northern California*. Poster presented at the Western Society of Naturalists Annual Meeting, Sacramento, CA.

Staton, Jay*, Ian Kelmartin, Drew Barrett, Tim Mulligan, Joe Tyburczy, and Tim Bean. 7 May 2016. Characterization of Fish Communities Associated with Nearshore Rocky Reefs in Northern California Through Collaborative Research. Talk presented at Humboldt Marine Science Student Associate Annual Student Research Symposium, Eureka, CA.

Succow, M.L., Nielsen, K.J., Dugan, J., Laucci, R., Mulligan, T.J., and S.F. Craig. The ecological state of Northern California's sandy beaches and surf zones: A baseline characterization for MPA assessment. Presentation, 2015 North Coast Collaborative Forum, Fortuna, CA.

Succow, M.L., Barrett, D.R., Mulligan, H.L., Mulligan, T.J., Nielsen, K.J., and S.F. Craig. Got crabs? Predation by redbtail surfperch on pacific sand crabs on Northern California sandy beaches. Presentation, 2015 Western Society of Naturalists, Sacramento, CA.

Succow, M.L. Annual patterns of predation by redbtail surfperch on the pacific sand crab. Presentation, 2015 Marine Science Student Association student symposium, Trinidad, CA.

Takada, M., L. Perkins, J. Tyburczy, T. Mulligan, D. Hankin. 2016. Comparing age, growth, and maturation of Pacific halibut landed off Northern California and Southern Oregon. Poster presentation at the biennial Western Groundfish Conference, 2/9/14, Newport, Oregon.

Takada, M., L. Perkins, J. Tyburczy, T. Mulligan, D. Hankin. 2016. Comparing age, growth, and maturation of Pacific halibut landed off Northern California and Southern Oregon. Poster presentation at the Humboldt Area Saltwater Anglers (HASA) board meeting on 2/4/16, Eureka, CA.

Takada, M., L. Perkins, J. Tyburczy, T. Mulligan, D. Hankin. 2016. Comparing age, growth, and maturation of Pacific halibut landed off Northern California and Southern Oregon. Poster presentation at the annual HASA Fundraiser. 4/30/16, Arcata, CA.

Ward, D.M. 2015. Organized and moderated a special session: The plastic portfolio effect: managing the life history composition of populations. American Fisheries Society annual meeting. Portland, Oregon.

Wilzbach, M. 2015. Role and source of macroinvertebrates in fish growth. Invited oral presentation, Riparian Summit Conference, Korb, California.

Wilzbach, M.A. Fisheries and Aquatic Resources of Prairie Creek. Invited oral presentation, Prairie Creek Technical Advisory Committee, Redwood National Park, Orick, CA. April 2016.

Wilzbach, M., B. Hodge*, W. D. Duffy, R. M. Quiñones, and J. A. Hobbs. Life history variation in Klamath River steelhead. Invited oral presentation, 145th Annual Meeting of the American Fisheries Society, Portland, Oregon. Aug 2015.

*Student coauthors

List student scholarship (e.g. exhibits, presentations, publications) conducted since May 2015.

Alvarez, J. 2016. Assessing the Impact of Brown Trout on the Trinity River, CA. Presentation at the Salmonid Restoration Federation. Fortuna, California.

Bosma, K., L. McIntire, R. Cuevas-Urbe, S. Mader. 2015. Degree day marks during embryogenesis of *Oncorhynchus mykiss* and *Oncorhynchus clarkii clarkii*. Poster presented at American Fisheries Society 145th Annual Meeting. Portland, Oregon. August 2015.

Dockham, A. 2016. Comparison of benthic invertebrate community structure and diet composition of steelhead (*Oncorhynchus mykiss*) in Dry Creek, California. MS thesis. College of Natural Resources and Sciences, Humboldt State University, Arcata, CA.

Drobny, P. 2016. Influence of intra-and inter-specific salmonid densities and habitat on overwinter survival of juvenile Coho salmon in Prairie Creek. MS thesis. College of Natural Resources and Sciences, Humboldt State University, Arcata, CA.

Gorman, M. 2015. Outmigration Behavior and Marine Survival as a Function of Rearing Habitat for Coho Salmon in the Shasta River, CA. Poster presentation at the American Fisheries Society. Portland, Oregon.

Gorman, M. 2016. Outmigration Behavior and Marine Survival as a Function of Rearing Habitat for Coho Salmon in the Shasta River, CA. Presentation at the CALNEVA Chapter of the American Fisheries Society. Reno, Nevada.

Gorman, M. 2015. Outmigration Behavior and Marine Survival as a Function of Rearing Habitat for Coho Salmon in the Shasta River, CA. Poster presentation at the Salmonid Restoration Federation. Fortuna, California.

Hillis, A. 2016. Salinity tolerance in endangered Tidewater Goby. Presentation at the CALNEVA Chapter of the American Fisheries Society. Reno, Nevada.

Hollis, J. 2015. Export of invertebrate drift from fishless headwater streams: Evaluating the use of this subsidy by downstream salmonids (*Oncorhynchus* spp.) and its potential contribution to fish production. Oral presentation, Riparian Summit Conference. Korb, California. 2015.

Krall, M. 2015. The influence of habitat characteristics on abundance and growth of juvenile Coho Salmon in constructed habitats in the middle Klamath River basin. Presentation at the American Fisheries Society. Portland, Oregon.

Krall, M. 2016. The influence of habitat characteristics on abundance and growth of juvenile Coho Salmon in constructed habitats in the middle Klamath River basin. Presentation at the Salmonid Restoration Federation. Fortuna, California.

Scheer, G. 2015. Coho Salmon Life Cycle Modeling in Freshwater Creek. Presentation at the American Fisheries Society. Portland, Oregon

Scheer, G. 2016. Coho Salmon Life Cycle Modeling in Coastal Northern California. Presentation at the Salmonid Restoration Federation. Fortuna, California.

Schwartz, J.L., J. Yee, D.S. Baston, R. Cuevas-Uribe. 2016. Evaluating effects of fish oil replacement with algal oil (*Schizochytrium* sp.) in the diet of *Oncorhynchus mykiss*. Oral presentation at the Annual Meeting of the World Aquaculture Society. Las Vegas, Nevada. February 2016.

Sylvester, C.Z., F.D. Mele, A.M. Kee, S.G. Janofsky, R. Cuevas-Uribe. 2016. Aquaponics in the classroom: a students' perspective. Poster presented at 41st Annual Meeting of the California-Nevada Chapter and the Western Division of the American Fisheries Society. Reno, Nevada. March 2016.

Rizza, S. 2015. Asymmetric introgression between Coastal Cutthroat Trout and steelhead: variable introgression by linkage group. MS thesis. College of Natural Resources and Sciences, Humboldt State University, Arcata, CA.

List grants and contracts received since May 2015.

Cuevas Uribe, R. 2016. Aquaponics an opportunity for diversity education. HSU Faculty Diversity Development. \$2,242.

Cuevas Uribe, R. 2016. Effect of two filtration systems on fish and plant production in an aquaponics system. HSU Emeritus and Retired Faculty Association Faculty Award. \$1,000.

Kinziger, A.P. 2016. Genetic structure of Mad River Steelhead - hatchery genetic monitoring. California Steelhead Report Card. \$128,327

Kinziger, A.P., and M. Wilzbach. 2015. Develop a tidewater goby survey method using environmental DNA. California Department of Transportation. \$88,183.

Kinziger, A.P., and S. Craig. 2015. Major Research Instrumentation: Acquisition of a Fluidigm BioMark HD system for research and training at Humboldt State University. National Science Foundation. \$457,101.

Kinziger, A.P., and M. Wilzbach. 2015. Range-wide presence/absence surveys of the endangered tidewater goby (*Eucyclogobius newberryi*) using environmental DNA. US Fish and Wildlife Service. \$59,236.

Woodland, R., Houde, E. D., and A. Buchheister. 2016. Drivers of forage population trends and consumption patterns: Environmental, Spatial and Temporal Patterns in Chesapeake Bay Forage Population

Distributions and Predator Consumption. Chesapeake Bay Trust. \$60,000.

Ward, D.M. 2015. Bureau of Land Management summer student internship. US BLM \$7874.

Ward, D.M. 2015. Freshwater fish ecology research collaboration. National Oceanic and Atmospheric Administration \$52,000.

Colwell, M. and M.A. Wilzbach. 2015. Habitat selection in an Arctic Seabird.: Implications for climate change. USGS Alaska Science Center. \$40,225.

Wilzbach, M.A. 2015. Redwood Creek DIDSON 2015-2017. CDFW \$27,241.

Szewczak, J. and M. Wilzbach. 2015. Townsend's Big Eared Bat Statewide Assessment. CDFW \$129,800.

Bean, W. T. and M. Wilzbach. 2015. Giant Kangaroo Rat Population Monitoring in Panoche Valley. CDFW \$20,939.

Bjorkstedt, E. P., C. A. Edwards, M. Moore, W. T. Peterson 2015. Transport indices of ecosystem structure and productivity in the California Current. NOAA's FATE (Fisheries and the Environment) Program. \$81,989

Tissot, B., E. P. Bjorkstedt 2015. Ocean observing and fisheries oceanographic research off northern California. NOAA via Cooperative Institute for Marine Ecosystems and Climate (CI-MEC), \$136,722

Ray, J., E. P. Bjorkstedt, M. Gilroy. 2015. Spawning and larval distribution of longfin smelt in Humboldt Bay, CA. CDFW/USFWS. \$50,112

List other professional events in which faculty participated since May 2015.

Darren Ward hosted a workshop at Humboldt State on the use of Beaver Dam analogs in stream habitat enhancement. More than 50 individuals from state and federal agencies, non-profit groups, and consulting firms attended. 6 January 2016.

Peggy Wilzbach participates on technical review committees for Elk River, Prairie Creek and serves as an alternate member of the California Advisory Committee on Salmon and Steelhead.

Bjorkstedt, E. P. President of Eastern Pacific Ocean Conference

Bjorkstedt, E. P. Member, Governing Council for Central and Northern California Coastal Ocean Observing System (CeNCOOS)

Bjorkstedt, E.P. 2014-15 in northern and central California. Invited oral presentation. Pacific Anomalies Workshop II. January 2016, Seattle, WA

Cuevas-Uribe, R. Member of the Ocean Resources Enhancement and Hatchery Program Advisory Panel

List community outreach activities since May 2015.

December 4, 2015: IBAC ("I've been admitted to College") Workshop: "Fish Hatchery Exploration - Introduction to the Relation of Water Quality and Fish". IBAC is an event that brings every 8th grade student in Humboldt County to HSU over the course of several sessions. Students are exposed to lectures, workshops, and tours of campus with the aim of encouraging them to begin planning for their higher education. This event is a partnership between SASOP, Talent Search, HSU Admissions, HCOE's Decade of Difference, and CalSOAP.

September 3, 2015: Presentation by Rafael Cuevas-Uribe on " Ex-situ conservation through cryopreservation, a new tool for genetic improvement in aquaculture" at Moss Landing Marine

Laboratories, CA.

March 3, 2016: Presentation by Eric Bjorkstedt and Roxanne Robertson on "El mundial del zooplancton" ("The world of zooplankton") at Fuente Nueva Charter School Science Night

March 18, 2016: Graduate student Justin Alvarez presented an introduction to fisheries biology at Hoopa Valley Elementary School.

March 2, 2016: Presentation by Darren Ward and undergraduate students Leon Davis and Garrett Pierce at the McKinleyville Union School District Science night. Introduced K-5 students to fish biology and anatomy with hands-on displays.

March 30, 2016: Presentation by Rafael Cuevas-Urbe on "Aquaponics on the bay" to: Humboldt Bay Harbor Working Group, Samoa, CA.

April 29, 2016: Presentation by Andrew Kinziger at the Klamath/Trinity Fish Fair at the Hoopa Valley High School. Introduced 9-12th graders to global and local fish biodiversity and conservation issues.

Annual Department Activity Report – Dept. of Wildlife Graduate student related activities

Faculty awards received since May 2015.

Micaela Szykman Gunther - Trione Scholarship, Humboldt State University, for support of graduate student.

Student scholarship (e.g. exhibits, presentations, publications) conducted since May 2015.

Publications and Reports (Note: * indicates graduate student author)

- Milligan*, M. C., Johnson, M. D., Garfinkel*, M., Smith*, C. J., & Njoroge, P. (2016). Quantifying pest control services by birds and ants in Kenyan coffee farms. **Biological Conservation** 194: 58-65.
- Smith*, C., D. Barton, M.D. Johnson, C. Wendt*, M.C. Milligan, P. Njoroge, P. Gichuki. (2016) Bird communities in sun and shade coffee farms in Kenya. **Global Ecology and Conservation** 4: 479-490
- Delgado de al Flor, Y.A.** and M.D. Johnson. (2015) Influence of invasive European beachgrass on mesopredator activity in the coastal dunes of Northern California. **Western Wildlife** 2: 29-34.
- Garfinkel, M.* and M.D. Johnson. (2015) Pest-removal services provided by birds on small organic farms in northern California. **Agriculture, Ecosystems, and the Environment** 211: 24-31.
- Dulava*, S., W.T. Bean, and O.M.W. Richmond. (2015) Applications of unmanned aircraft systems (UAS) for waterbird surveys. **Environmental Practice** 17:201-210.
- Slauson, K., M. Delheimer*, B. Zielinski, **M.S. Gunther**. 2015. The effect of restoring cavity structures on mammals in young post-logging forests of the redwood region. Report submitted to Save the Redwoods League.
- **Szykman Gunther, M.** and C. Cummins*. 2015. Den-attendance of fishers (*Pekania pennanti*) and potential impacts of timber harvest on fisher den ecology. Report submitted to the Oregon Zoo Foundation.

Presentations

- Mendia*, S.M, M.D. Johnson, and J.M. Higley. Examining Ecosystem Services and Dis-services by Black Bears on the Hoopa Valley Indian Reservation. Oral presentation, **2016 Joint meeting of the American Ornithologists' Union and Cooper Ornithological Society**; Norman, Oklahoma July 2015.
- Wendt*, C. and M.D. Johnson. Barn Owl Nest Box Selection in Napa Valley: A Landscape Perspective. Poster presentation, **2015 Raptor Research Society (Carrie) Raptor Research**

Foundation, Sacramento, California, October 2015.

- Mencia*, S.M, M.D. Johnson, and J.M. Higley. Examining Ecosystem Services and Dis-services by Black Bears on the Hoopa Valley Indian Reservation. Oral presentation, **2016 Annual Conference of the Western Section of the Wildlife Society**. Pomona, California, February 2016.
- Blake, D*, M.D. Johnson, and J.M. Higley. Habitat selection of pileated woodpeckers on the Hoopa Valley Indian Reservation. Western Section of the Wildlife Society. Oral presentation, **2016 Annual Conference of the Western Section of the Wildlife Society**. Pomona, California, February 2016.