

Report of the 10-Year Review Committee for the Program in Quantitative Ecology and Resource Management (QERM)

The members of the Review Committee were appointed by the Graduate School in consultation with the Program. The members of the committee are:

A. Internal members:

Chair: Ka-Kit Tung, Professor, Department of Applied Mathematics
Christine Bae, Associate Professor, Department of Urban Design and Planning
Craig ZumBrunnen, Professor, Department of Geography

B. External members:

Alan M. Hastings, Professor, Department of Environmental Science and Policy,
University of California, Davis.
Charles E. Smith, Associate Professor, Department of Statistics, North Carolina
State University.

The site visit took place on April 16 and 17, 2009. During that time the entire Committee met with the Program Director, Program Steering Committee, its faculty members, students, staff, alumni and government agencies employing the Program graduates. Exit discussions were held with the representative Deans from the College of Ocean and Fishery Sciences, College of Forest Resources, College of Arts and Sciences-Division of Natural Sciences, College of the Environment and the Graduate School first in the presence of the Program Steering Committee and then in their absence. A copy of the Site Visit Agenda is enclosed in this report as Appendix 1. Prior to the meeting, the Committee members each received a copy of the Self Study expertly prepared by the Program, including much useful information in a large number of appendices. The Committee was given only four weeks to complete its deliberations and prepare a final report.

Findings:

The QERM graduate program is a high-quality interdisciplinary program housed within the Graduate School focused on educating quantitative ecologists and resource managers that meet an urgent national need in both the public and private sectors. There is an essentially 100% success rate in the placement of QERM graduates, mostly within government agencies. Current and past students, alumni and employers have unusually high praise for the QERM education, and almost uniformly they are pleased with how the program is being run and with both the M.S. and Ph.D. programs. The Committee recommends the continuation of the M.S. and Ph.D. degree offerings by the QERM program with a subsequent review in 10 year's time.

QERM does not have its own faculty and depends on the goodwill of the participating colleges and the participating faculty in volunteering their efforts in teaching, supervision of students and the management of the program. The Committee is impressed by how well-run the Program is, due no doubt to the dedication of its Director, Loveday Conquest, the Steering Committee consisting of David Ford (who is a former Director), Peter Guttorp, James Anderson and Mark Kot (who served as Acting Director during the previous year). It is also apparent to the Committee after interviewing students, alumni and faculty, that the Graduate Program Assistant, Joane Besch, is indispensable to the day-to-day operation of the Program, in providing the identity and glue that holds the program together and the moral and administrative support that the students need throughout their graduate years. This is especially so given that none of the faculty members, including the Director of the Program, has an office space in the QERM space.

Since the last program review the space issue has been solved under the Graduate School, which now provides bright and pleasant offices for the students and staff, a library and a conference room where faculty and students can meet. The students and faculty are happy with the space provided. The relationship with the Center for Quantitative Sciences (CQS) has improved. There is now a small annual budget (\$76K per year) from the Graduate School (since 1996), mostly going to support three students during their first year of intense study, and paying for 0.5 FTE of a staff support. The QERM faculty, especially the Steering Committee, emphasizes the importance of the Graduate School student support in the first year. The Committee did not find that there is a problem of student support during the second and higher years, as faculty members in participating departments take up the support of the QERM students with their research grants. It is important to note that second-year and beyond QERM students are highly sought after as research assistants because of their quantitative skills. The recent cut by the Graduate School, triggered by the State of Washington's budgetary situation, of the funding for the support of the first-year students from 3 to 2 fellowships threatens to bring the number of incoming students below critical mass. All parties should work together to come up with a creative solution, and we can offer some suggestions; see the Recommendations section.

The small graduate program of QERM, producing on average 3 M.S. and 2 Ph.D. degree recipients each year, appears to be finely tuned and optimized from admissions to placements.

The students applying to the program are mostly self-selected and motivated. They have looked for a specific interdisciplinary program for graduate study and somehow found the QERM program at UW. Many told us that they found out about QERM through online search and were attracted to it by the very effective website of the Program, which also highlights the career paths its graduates have taken. Some apply only to UW, saying that this unique QERM program is exactly what they were looking for. Some students already have a quantitative background and would like

to apply it to ecological and resource management fields, while others have a biological background and wish to acquire the quantitative skills in an interdisciplinary program. There is currently a shortage of such ecologists and resource management scientists with strong statistical and modeling skills in the U.S., and the students can see the good job opportunities after they graduate. We were told by the Director that the Program “can’t produce graduates fast enough for the available job openings”. On average the Program receives 18 applications per year. The Program interviews on site every student it admits, carefully choosing the student that it thinks will “fit” the program. There was a mild criticism from one Program faculty member that it tends to choose “only one flavor” of students, those who have a strong background in statistics and mathematics with perhaps a weaker background in biology or ecology, over those who have a strong background in biology or ecology but weaker preparation in mathematics and statistics. Certainly, the students QERM admits have high GRE Quantitative scores (750 averaged). Mindful of the demanding statistics curriculum in QERM’s first-year required courses and the Qualifying Exam in statistics that all its students must take alongside students from Statistics, it is not surprising that the Program is concerned with those applicants who may not have the necessary quantitative prerequisites for its demanding first-year curriculum. (The prerequisites for the first statistics course, Stat 512, include 4 undergraduate statistics courses, over and above that required for a B.S. degree in Biology at the University.) Furthermore, of the three students admitted and enrolled last year, two had strong backgrounds in quantitative fields (statistics and actuarial science) and one had a prior degree in Fishery Sciences, a non-quantitative background, but possessed strong motivation to make up the needed quantitative prerequisites before classes started. All of them seem to be doing quite well. Nevertheless, we will revisit this interesting issue later in this report, as it also relates to how the students can be supported during their first year of study.

First-year students are currently supported in their studies by either the Graduate School fellowship or a Cooperative Agreement with a government agency. They do not need to choose to go into a particular faculty member’s laboratory. In this sense they are uncommitted and are free to explore their options and develop career paths. All in the cohort take the same courses in statistics, mathematical and ecological modeling and data analysis. During the first summer they study together to pass the two Qualifying Examinations, one on statistical theory, administered jointly by Statistics, Biostatistics and QERM and the other on applied methods exclusively for QERM. The students pride themselves in passing the rigorous statistical theory exam, the same exam taken by “real Statistics students”, and feel that they have thus earned their credential in doing so. Having the same small group of peers going through the same process of taking the courses and passing the rigorous exams develops camaraderie and bonding, and it explains the close ties that exist among its students, which we were told is a very positive part of their on-going educational experience.

Judging the educational program solely on its first-year curriculum common to all students, one may arrive at the conclusion that the education is focused more on the “Q” than on the “ERM”. Indeed, the committee that reviewed QERM in 1998 commented in its report: “As it is, only the ‘Q’ of QERM should be capitalized”. However, after one year of quantitative and interdisciplinary training, a typical student then finds a disciplinary advisor and begins his or her disciplinary training, in fishery, forestry, biology or ecology. These disciplines contain strong component of RM (e.g. management of fish stocks and forest resources, wildlife management and decision making), and E (e.g. population dynamics). Even a M.S. student is required to write a masters thesis with a faculty member in a discipline. As a consequence, it takes at least two years to finish a M.S. degree and typically more than six years for a Ph.D. degree. Even a cursory listing of recent Ph.D. and M.S. thesis titles would reveal the unique strength of the Program in combining knowledge of several disciplines in solving real ecological and resource management problems. The strong statistical and quantitative component that the students bring to their interdisciplinary research team is much appreciated by their disciplinary peers, faculty advisors and future employers. It also fulfills an urgent national need.

In Appendix 2, a list of student publications in peer-reviewed journals is attached. It was prepared by Joanne Besch, and communicated to the Committee through Augustine McCaffery. We deleted conference proceedings from the list, which normally are not peer-reviewed. The Committee is pleasantly surprised to find the strong ecological and resource management contents of the research that these publications represent. Since 1996, the 22 students who completed their Ph.D. degrees co-authored a total of 84 peer-reviewed journal articles, at an average of 4 per student, which is a very impressive record indeed.

Incidentally, but importantly, Appendix 2 also shows that QERM students, by working with faculty members in participating departments in their research team, are serving the important function of integrating across disciplines and supplying the needed quantitative component to the final research product. We heard that the QERM students actually make quantitative research projects possible in many faculty labs. This is one of the many ways that QERM is benefiting the departments that participate in the QERM program.

In Exit Surveys, Ph.D. students generally give the highest possible rating (5 out of 5) to the important categories of “departmental academic standards”, unit’s “response to recent developments or trends”, “quality of the faculty”, “overall quality of the program” and “confidence as an independent scholar/researcher in field”. Even M.S. students give the Program very high ratings (only about 0.5 point lower than the Ph.D. students). This is evidence that the students appreciate the high standards maintained by the Program and feel that they have benefited from their education.

Even a finely tuned program needs to change to adapt to changing conditions.

The number of students admitted to the Program fluctuates between 2 to 6 yearly for the past 10 years (see Appendix V in the Self Study). In 2008 it is 3. Due to the success of the QERM last year in graduating a large number of students, the total student body is further depleted. The current enrollment is, in the opinion of the Committee, on the borderline of being below the critical mass for a healthy program, both in terms of creating a meaningful cohort of students and in justifying the efforts by its faculty and the (admittedly small) budget provided by the Graduate School. Any possible further decline in the enrollment is of serious concern to the Committee. There is no lack of qualified applicants, even without active advertisement or recruiting by the Program. There is no lack of Research Assistantship support once the students pass the Qualifying Exam. The limiting factor appears to be the fellowship support for the first-year students. The recent cut by the Graduate School further reduces the unrestricted fellowships from 3 to 2, threatening to bring the class size to 2. In the revised Charge Letter by the Graduate School to our Committee, the Committee is asked to explore “creative funding options” for student support. Other modes of funding the first-year students will necessarily involve some changes to the program. The committee that reviewed QERM ten years ago commented on the Program’s “inflexibility”. Although we also noted some tendency on the part of the QERM Steering Committee to defend why the status quo is the optimal way of doing business and should not be changed, this is entirely understandable. The problem with a program operating at its (local) optimum is that any change to its way of doing business would at least initially be suboptimal and thus regarded as undesirable. However, this Program is facing not a minor perturbation, but a major one that would have serious consequences if corrective action is not taken quickly. There is no option but for the Program to change and adapt. Through change perhaps it will find a better overall optimum.

An equivalent of at least three-quarters of TA support from CQS and Biology—both units expressed to the Committee the availability of TA support for assisting in their undergraduate courses that could be committed upon further negotiation---could be shared among three first-year QERM students, whose first-year support would then consist of two quarters of fellowship and one quarter of TAship. This simple change would remedy the cut by the Graduate School. Being a TA would also address a concern expressed by the M.S. students in their Exit Survey: a lack of teaching experience provided by the Program in their education. In the eyes of the Program Steering Committee, having a student work as a TA, even for a quarter, is viewed as undesirable for distracting the students from their intense first-year study. Having the students serve as a TA is common among many graduate programs on campus, including the Statistics department. It is the price to pay for allowing the students to remain as uncommitted during their initial year of study, and most students understand that. The response by the Steering Committee to a suggestion by us of increasing the number of students admitted was that in addition to funding issues there are also not enough faculty members to mentor them. On the other hand, we heard that the Program’s student size used to be larger in 1991-1995 (and the students liked that), and that a number of new young faculty

members have been added to QERM as core faculty in recent years, who are eager to mentor more students. We also heard that faculty members in the disciplinary departments such as Aquatic and Fishery Sciences “fight over” uncommitted QERM students with good quantitative background to work for them. And in fact, it is sometimes the good QERM students that attract the faculty members into the QERM program...

Other funding sources should be explored to increase the student body size. See the Recommendation section.

The Committee struggles with the question of whether the focus of the Program is too narrow, or the sharp focus is its unique character and the source of its strength.

The blend of interdisciplinary education provided by QERM is unique; there is no other program like it in the country. The type of students that the Program produces is clearly in demand and is of short supply, although some other universities are beginning to discover this niche and will also be trying to fill it. The alumni from this program we interviewed are satisfied with their career paths enabled by their QERM education. On the other hand, the committee that reviewed this program ten years ago remarked that “this program is simply not oriented to training students to becoming academics,” and that “many students would probably not be competitive for faculty slots in biology or zoology departments. They might be competitive for a resource management-type position, but more likely (not) for a statistics department”. Some of us in the Committee do not view this situation as something that needs to be remedied. The QERM program is a small program on a shoestring budget, and is doing very well in its niche. It does not pretend that it is educating a statistician who would advance the field of statistics, but a scientist who can apply statistical techniques to ecology or resource management. Since a student in say, Fishery or Forestry, who desires to acquire some quantitative skills, can do so by taking the Statistics or QERM courses, requiring the Program to give more disciplinary emphasis or to admit a wider spectrum of students (such as a Fishery student with weak quantitative background) may blur the line between this program and its parent departments. Once this distinction is lost, the justification for the existence of QERM alongside its parent departments may be lost. So politically such a change in focus may not be advisable. On the other hand, since there is no Ecology department at the University of Washington, QERM can potentially play an important role in becoming a disciplinary player in that area. However, since QERM does not have its own faculty line, any progress made in this area will depend on the additional hiring of theoretical ecologists in Applied Mathematics, Statistics, Wildlife Science in Forestry and Biology departments, and the new College of the Environment. *Ecology*, being the study of *ecos* (*oikos*, “house” in Greek)---the environment and its organisms--- should be the proper disciplinary mission of the new College of the Environment. We hope that this new College will incorporate it in its missions and foster its development in this University.

The record provided to us shows that of the 29 Ph.D. graduates since 1991, 19 currently work for the government, five hold academic positions and five work in the private sector. So it appears that this program does produce graduates who are qualified for academic positions, but we share the conclusion by the previous review committee that the Program is not “oriented” to training students to becoming academics. While not all programs should be oriented to training students to becoming academics, and QERM is doing well in fulfilling its own mission, it is interesting to explore why the Program’s focus is so directed. The Program’s Steering Committee believes that academic careers are not what its students want: “Jobs in government and in private consulting are really good. Why go to academics to work harder for less pay?” Having interviewed the current students and alumni, we came away with the feeling that perhaps the Program underestimated the spectrum of career interests by its students. Some first- and second-year students expressed interests in pursuing an academic career, though the number of such students dwindles rapidly the longer they stay in the Program. One alumnus, who currently works for a government agency, told us that he/she had wanted to pursue an academic career when entering the Program and that even now that is still a desire. In the recent Exit Surveys conducted in 2008 on its M.S. and Ph.D. graduates, relatively low scores were given by students on career mentoring---relative, that is, to the stellar scores given to the Program in other categories. (The scores are 3.5 from M.S. students, and 3.33 from Ph.D. students. These are only slightly below average for the College and University as a whole). This at first appears puzzling to us given the close relationship between its faculty and the students and the fact that many students get their first job through their thesis advisor’s professional connections. We think that it concerns a lack of career choices and directions. There is currently no perceived need by the Program to broaden the training of its students for other career paths because the Program is too busy doing what it does best and can’t produce enough graduates to satisfy the job market it targets.

The quality of the core faculty is very high, and the new additions recently have broadened the areas covered by its faculty and lowered the mean age of the faculty.

The Program has 30 faculty members, 21 of them are core faculty and 9 affiliate faculty. The research accomplishments by the core faculty members are described in detail in the Self Study. The Committee is impressed both by the interdisciplinary nature of their work and by how relevant the research is to their respective discipline and to the national interest in resource management. We are happy to see the needed broadening of the faculty expertise and the lowering of the mean age of the core faculty by 13 years achieved by the new core faculty and affiliate faculty additions to the Program. We interviewed three of them, Sandor Toth of College of Forest Resources, Jennifer Ruesink of Biology and Ashley Steel of the Northwest Fishery Science Center. We are very impressed by their vitality, enthusiasm and their varied research expertise.

Recommendations

The QERM M.S. and Ph.D. degree program should be continued.

There is no question that the QERM's degree programs are exceptionally well run and that they should be renewed. To answer the key questions posed for the Committee by the Charge Letter, we found that the quality of the Program's instruction and research, and the value to the students' general education and preparation for society, are exceedingly high, and the impact on other units and colleges in the University is exceptional, while the extra resource requirement for running this program has been minimal. While the purpose of this review process mandated by the State's Higher Education Coordinating Board is to ensure quality and rigor of the degree programs, ironically some of the recommendations by this Committee concern the fact that these two QERM degree programs may be too rigorous. However, despite the rigorous degree requirements and the length of time needed for a student to satisfy them, the Committee has not heard a single complaint from the students about either degree programs. On the contrary, Exit Surveys show that the QERM students recognize the quality of the Program and appear to be satisfied with the rigor of the degree programs.

Instead of reducing the number of incoming students in response to the budget cut in student support from the Graduate School, the Committee recommends that the Program increase the first-year class enrollment to 6 from the current 3 and perhaps broaden the focus of the program commensurate with the proposed doubling of enrollment.

As discussed in the main text, the Committee observed that the current level of enrollment is almost below critical mass, and that 5-6 would be a healthier annual enrollment. There is no lack of applicants, no lack of student support for second-year and higher students, and no shortage of job openings for the Program graduates. The rate-limiting step is the support for the first-year uncommitted students. NOAA in the past provided RA funding for research projects, but not educational fellowships. There is now a change in its attitude towards education, and educational fellowships are beginning to be available. The Program should consider sending in a proposal to NOAA. Another source of money could come from donations. Currently there are two endowed funds donated by Loveday Conquest and one by Jim Anderson, but the current income is not sufficient to provide for a full fellowship. QERM has a group of very loyal alumni who expressed to us a desire to help, but so far they have not been asked to do so by the Program. So an increased development effort is another approach that can be taken. The question of whether the Program should allow the use of Research Assistantship to fund its first-year students is a hotly debated one. We encourage the Program to continue the debate and be flexible in allowing a spectrum of funding modes.

It appears that none of the Program's students came to the Program with their own fellowship, such as NSF and NSERC graduate fellowships. The Program should develop a recruitment procedure to attract these students. The current recruitment method is rather passive.

It is mentioned in the Self Study that QERM is considering developing a Graduate Certificate in quantitative ecology and resource management. This may be a way to bring in some resource from the tuition earned. However, in all cases, our probing for further details on the plan yields the response that "we are just beginning to think about it". At this point we are unable to comment meaningfully on this future endeavor.

The interdisciplinary nature of the Program would recognize that the students have real skills in a variety of areas. By allowing for more flexibility QERM can open up the program to a wider variety of students with different backgrounds, and might also allow more flexibility in support during the first year.

Currently the program is very narrowly focused, which is at once its strength and weakness. Some of the recommendations of the last 10-year review are still relevant: "In the deliberations for its long-term plan, the leadership of QERM should address explicitly the issue of the careers for which their students are being trained. (item 3)" "We recommend that QERM should consider increasing the program's flexibility...QERM should accept a broader spectrum of students (2)". As discussed in the main text of this report, we feel that the Program is doing very well for its students with the current narrow focus, but as the size of the student enrollment increases, a broader spectrum of students would necessarily arrive and the broadened spectrum of career interests need to be accommodated. For example it seems to us that QERM is well situated to grow by responding to the myriad scientific issues and problems surrounding climate change. This will present both very significant opportunities and substantial challenges to the Program in the next 10 years and beyond.

The Program should re-examine its M.S. degree requirements, and should pro-actively monitor its Ph.D. student progress with the aim of reducing the length of time it takes for a student to complete a Ph.D. degree.

We note that the time to complete the M.S. and Ph.D. degrees is relatively long. While some of this is due to the interdisciplinary nature of the program, other parts may be related to issues that could be changed by the Program. More flexibility would be advised. It should be mentioned that the Program has done an excellent job in monitoring its students' progress through the two degrees. There are annual student reports of progress and reviews by the Graduate Program Coordinator. The paper trail of these reports and comments is very impressive, and is the envy of any graduate program. However *time to degree* does not appear to be a closely monitored concern to the Program.

The Graduate School requirement for M.S. degree can be satisfied within one year, and a Masters thesis is not required. A Final Exam is required for the M.S. degree but it could be an oral review of literature. Each unit is free to add additional requirements. In the case of QERM the additional requirements appear to us to be excessive. After a yearlong set of required courses, and two qualifying exams administered by two bodies during the summer of the first year, a student then starts on the research leading to a M.S. thesis. The Self Study states: "the QERM M.S. requires a thesis and is expected to take two to three years". Sometimes it takes 4 years (mean time to M.S. degree: 3.5 years), almost as long as it takes for a student in other graduate programs on campus to finish a Ph.D. degree. In comparison, Applied Mathematics M.S. is earned with one-year course work with no thesis requirement, and Ph.D. programs in the United Kingdom have three-year deadlines. While we have not received complaints from students for this excessive length of time for a M.S. degree, we feel that the lengthy thesis research blurs the line between a M.S. degree and a Ph.D. degree, and consequently the interest of the students is not well served. The Committee believes that only under rare circumstances should a student take longer than two years to finish a M.S. degree. We recommend that the current open-ended (i.e. no time deadline) M.S. thesis requirement be abolished. One possibility would be to offer a non-thesis option for the Masters degree, or alternatively to allow the use of a journal article written (or co-authored) by the student to serve as a substitute. Although we hesitate to recommend that the Program adopt a two-year deadline for a M.S. degree, recognizing that there will always be special circumstances and exceptions, the Committee feels that the Program should institute strong guidelines that will enable the completion of the M.S. degree in the recommended time frame.

The time it takes for a typical QERM student to finish a Ph.D. degree is also excessively long (mean time to Ph.D. degree: 6.75 years). We have interviewed students in their seventh and eighth years, and we know of past students taking nine years. Furthermore some of these students already had a M.S. degree from another department or university before coming to QERM, and started afresh as first-year students taking the M.S. required courses. The Program has implemented a Master's Bypass, which allows a student already with a Masters degree from another university or department to substitute a journal article for the Masters thesis, but the bypass is currently intended to be used only "under exceptional circumstances". We suggest that this option be made more generally available and the numerous other requirements for the Bypass (described in Appendix Q) be streamlined. As it stands, the Bypass requirements are so onerous that not much is being "bypassed", other than the privilege of being awarded a M.S. degree. The Graduate School intends the General Exam be used by the unit to ascertain the competency of the candidate to pursue a Ph.D. degree, and can also be used by the unit for a Ph.D. dissertation proposal defense. The Master Degree Bypass requirements unnecessarily duplicate the function of the General Exam. Furthermore, the Committee feels that the Program should allow the possibility of admitting qualified students already with a M.S. degree directly to its Ph.D. program, bypassing these numerous "Bypass" requirements. Nevertheless we understand the concern of the Program in allowing the students to go directly into

disciplinary research without the common quantitative first-year training---this would have blurred the line between a QERM student and a student in a parent department. However, the Program can still insist on all the requirement of statistics and applied modeling be met, but this can be done by a student while carrying on a research project. We also understand that to the Program the M.S. thesis serves as necessary training for effective scientific writing, but we believe that this writing practice can still be required without it being a hurdle at the same level as a thesis requirement.

Current leadership for the group is superb, but as the original founders and the current group of leaders age a new generation of leaders need to be developed, and ways need to be found to engage the broadest set of faculty.

While we do not have specific recommendations, we strongly encourage the group to consider innovative ways to groom future leadership. While the current committee structure in the Program is very open and democratic, it places an undue burden on the Director in carrying out new initiatives. In line with our other recommendations it might be optimal to have a committee with fundraising responsibilities, a working group for writing block grant proposals and also to have more formal guidance avenues that explore ranges of career and other options for students.

Appendix 1: Site visit agenda

**The Graduate School
Interdisciplinary Quantitative Ecology and Resource Management
Graduate Program Review Site Visit
April 16-17, 2009
AGENDA**

WEDNESDAY, APRIL 15, 2009

6:00 p.m. Restaurant	Review Committee Dinner Meeting – Ray’s Boathouse 6049 Seaview NW (Shilshole) – (206) 789-3770
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THURSDAY, APRIL 16, 2009

Loew Hall 310

8:30 – 9:15 a.m.	Loveday Conquest, Professor and Director
9:15 – 10:15 a.m.	QERM Steering Committee Loveday Conquest, School of Aquatic and Fishery Sciences Mark Kot, Department of Applied Mathematics David Ford, College of Forest Resources James Anderson, School of Aquatic and Fishery Sciences Peter Guttorp, Department of Statistics
10:15–10:30 a.m.	BREAK
10:30 – 11:00 a.m.	Ray Hilborn, Professor School of Aquatic and Fishery Sciences & QERM <i>TBA/OPEN FOR NOW</i>
11:00 – 11:30 a.m.	Sandor Toth, Assistant Professor of Natural Resource Informatics, College of Forest Resources & QERM
11:30 – 12:00 noon	LUNCH - Committee: Colleen Rohrbaugh Room
12:00 – 1:00 p.m. – UW Club	
1:00 – 2:00 p.m.	QERM Graduate Students & GPSS Representative
2:00 – 3:00 p.m.	QERM Alumni Ian Taylor, Ph.D.; Maureen Kennedy, Ph.D. Rebecca Buchanan, Ph.D.; Teresa A’mar, Ph.D. Mike Keim, Ph.D.; Tamre Cardoso, Ph.D.
3:00 – 3:30 p.m.	BREAK
3:30 – 4:00 p.m.	Jennifer Ruesink, Associate Professor Department of Biology & QERM
4:00 – 4:30 p.m.	John Skalski, Professor School of Aquatic and Fishery Sciences & QERM
4:30 – 5:00 p.m.	<i>TBA</i>

6:00/6:30 p.m.

Dinner – Review Committee (TBD)
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FRIDAY, APRIL 17, 2009

Loew Hall 310

8:30 – 9:00 a.m. Assistant	Joanne Besch, QERM Graduate Program
9:00 – 9:30 a.m.	Ashley Steel, Ph.D. (QERM) Ecologist (Quantitative), Team Leader, Landscape Ecology & Recovery Science Northwest Fisheries Science Center & QERM Faculty
9:30 – 10:00 a.m.	Richard D. Methot, Jr., Ph.D., NOAA. Northwest Fisheries Science Center
10:00 – 10:30 a.m.	Usha Varanasi, Ph.D., Science and Research Director, DOC/NOAA/NMFS Northwest Fisheries Science Center
10:30 – 11:00 a.m.	Tilmann Gneiting, Professor Department of Statistics & QERM
11:00 – 11:30 a.m.	Jim Ianelli, Ph.D. Bill Karp, Ph.D. (tentative) DOC/NOAA/NMFS Alaska Fisheries Science Center
11:30 – 12:15 p.m. Conference Room)	LUNCH – Review Committee (Catered to
12:15 – 2:00 p.m.	Review Committee Executive Session
2:00 – 3:00 p.m.	Exit Discussion Loveday Conquest and QERM Steering Committee: Mark Kot, Department of Applied Mathematics Peter Guttorp, Department of Statistics David Ford, College of Forest Resources Jim Anderson, School of Aquatic and Fishery Sciences Deans: Vincent Gallucci, for the College of Ocean and Fishery Sciences B. Bruce Bare, Dean, College of Forest Resources Werner Stuetzle, Divisional Dean, Natural Sciences, College of Arts and Sciences Dennis Hartmann, Interim Dean, College of the

Environment

Thomas Gething, Assistant Dean, The Graduate School

Augustine McCaffery, Senior Academic Program Specialist,

The Graduate School

3:00 – 4:00 p.m.

4:00 – 4:30 p.m.

Exit Discussion Continues w/out QERM Faculty Committee Debriefing

Appendix 2: Quantitative Ecology and Resource Management
Graduate Student Peer Reviewed Publications with QERM Faculty

Students Completing Program 1996 – 2009 (36 Total)

Teresa A'mar, Ph.D.

A'mar, Z.T., A.E. Punt, and M.W. Dorn. In review. The impact of regime shifts on the performance of management strategies for the Gulf of Alaska walleye pollock fishery. *Canadian Journal of Fisheries and Aquatic Sciences*.

A'mar, Z.T., A.E. Punt, and M.W. Dorn. In press. The evaluation of two management strategies for the Gulf of Alaska walleye pollock fishery under climate change. *ICES Journal of Marine Science*.

Eric Anderson, Ph.D.

Anderson, E.C. and Thompson, E.A. (2002) A model-based method for identifying species hybrids using multilocus genetic data. *Genetics* 160: 1217–1229.

Anderson, E.C. and Scheet, P.A. (2001) Improving the estimation of bacterial allele frequencies. *Genetics* 158: 1383–1386.

Anderson, E.C., Williamson, E.G. and Thompson, E.A. (2000) Monte Carlo evaluation of the likelihood for N_e from temporally-spaced samples. *Genetics* 156: 2109–2118.

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Craig Aumann, Ph.D.

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17 CURRENT QERM STUDENTS:

Elizabeth Atwood

Chloe Bracis

Eileen Burns

Marta Danielsdottir

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Dawn Dougherty

Tommy Garrison

Chris Gast

Aditya Khanna

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Amber Parsons

Kevin See, M.S. (pursuing QERM Ph.D.)

Manuscript submitted to *Biological Invasions*.

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Motoki Wu

