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November 27, 2013

CHAIR BRUNO NACHTERGAELE
Academic Senate

RE: Request for Comments on the John Muir Institute of the Environment 15-Year Review

Dear ~~Chair Nachtergaele~~ Bruno:

Following UC Administrative Policies and Procedures concerning Organized Research Units (ORUs), an *ad hoc* review committee has completed an in-depth fifteen-year review of the John Muir Institute of the Environment (JMIE) ORU. Enclosed is a copy of the *ad hoc* review committee's report as well as comments on the committee's report by Interim Dean Mary Delany and Director Mark Schwartz.

I request formal Academic Review of these documents and ask that the report and comments be reviewed by appropriate Divisional Academic Senate committees. Furthermore, I respectfully request that, if possible, the Academic Senate review be completed **by Friday, January 31, 2014.**

Thank you in advance for your cooperation.

Sincerely,

Harris A. Lewin, Ph.D.
Vice Chancellor for Research

Attachments:
JMIE 15-Year *ad hoc* Review Committee Report
Interim Dean Mary Delany's Comments
Director Mark Schwartz's Comments

/cep

c: Associate Vice Chancellor Paul Dodd
Executive Director Nancy Bulger
Research Program Coordinator Christine Parks

John Muir Institute of the Environment
University of California Davis
5-Year Organized Research Unit Review, 2008-2013

Findings and Recommendations
October 23, 2013

Lisa J. Graumlich, Chair of External Review Committee and Dean, College of the Environment, University of Washington
Sharon K. Collinge, Director, Environmental Studies Program and Professor, Department of Ecology & Evolutionary Biology, University of Colorado-Boulder
Susan Harrison, Professor, Department of Environmental Science and Policy, University of California, Davis
Diana Liverman, Co-Director, Institute on the Environment and Regents Professor, School of Geography and Development, The University of Arizona
Geerat J. Vermeij, Distinguished Professor, Earth and Planetary Sciences, University of California, Davis

Summary

The External Review Committee, after reviewing the documents prepared for the John Muir Institute of the Environment (JMIE) 5-year review and interviewing key JMIE faculty, staff, students, collaborators, and key UCD administrators, concludes that JMIE has succeeded in achieving its goals of catalyzing and supporting interdisciplinary research, teaching and outreach in support of environmental science linked to important decision-making processes.

We strongly recommend continued support for JMIE. Further, we recommend that UCD make targeted investments over the next five years to expand the scope and effectiveness of JMIE in ways that are consistent with campus-wide aspirations for continued preeminence in the environmental sciences and map onto emerging opportunities.

1. Context

Understanding and managing environmental change is one of the great challenges of the 21st century. The human impact on the environment in the Anthropocene is so complex, widespread and significant that research and information on environmental science and policy has become a priority for governments, business, and civil society around the world. Some universities, including UC Davis,

recognized the importance of interdisciplinary environmental research in the 1960s and 1970s, establishing research institutes and degree programs to serve the interests of students, faculty and funders. Now, major interdisciplinary environmental programs can be found at the world's best universities, including Research 1 and land grant institutions such as UC Davis. The record shows that interdisciplinary environmental programs and institutes can attract major research funding and endowments and have significant impacts on public policy.

In the US there have been several models for building interdisciplinary environmental excellence and programs. One we might call the 'Empire Model' in which departments are moved into a flagship College or School of the Environment with their own Dean, academic programs, disciplinary departments, tenured faculty, permanent budgets and identity. Examples include the Nicholas School at Duke or the College of the Environment at University of Washington. One potential disadvantage of this model is that faculty and departments outside the college who also do environmental research may feel left out and key skills may not be located within the School or College. A version of this model is to create a School or Department that is explicitly interdisciplinary with its own tenured faculty and academic programs (e.g. ASU School of Sustainability, Environmental Studies at UC Santa Cruz, Bren at UCSB).

Others have chosen more of a 'Network' model where an environmental institute reporting to central administration coordinates the work of faculty who are mostly based within other colleges. This model may not allow for tenure within the institute, may not offer academic programs, and may rely on grant or temporary funds. Examples include several within the UC system such as UCLA's Institute of the Environment or the Berkeley Institute of the Environment. A hybrid model might have joint appointments; offer interdisciplinary professional, graduate or undergraduate degrees, and host major research initiatives and centers (an example would be the Nelson Institute at University of Wisconsin-Madison). The challenges of the network or hybrid model include maintaining faculty involvement and coordinating across the whole university where many colleges and departments may be vying to shape and own the environmental brand. In some cases the environmental institute may be competing with other high profile units that have some element of the environment, ecology or energy in their mandate. The Review Committee notes that JMIE is the nucleus of a network model, differing from the UCLA or Berkeley models most notably by the level of investment to date.

The decision to establish a university-wide Institute of the Environment can be seen as a long-term commitment to and by the institution and to stakeholders. For most people, an institute of or for the environment implies something that represents the university's environmental excellence to the outside world and that is a portal to all the environmental expertise at the university. ***Naming such an institute after one of the world's eminent environmentalists – John Muir – signals an ambition and a promise on the part of UC Davis that has meaning beyond the intricacies of university politics and organization.***

2. Research

Overview: The JMIE self-study presents a convincing case that JMIE researchers are productive (e.g., >1400 publications during review period), successful in garnering external funding (e.g., $52M from 203 grants during review period), and deeply engaged in graduate student and postdoctoral researcher education (eg., 467 graduate students and 137 postdoctoral researchers during review period). The External Review Committee notes that while there is growing integration in the outreach and communication functions of JMIE, its research contributions remain strongly grounded in the component centers and other projects. For the purposes of this review, we highlight exemplary research results for each major center.

This summary of top scientific contributions of 2008-2013 illustrates the highly diverse and decentralized nature of JMIE research. While a few potential common themes are evident (e.g., climate change, aquatic ecosystem health), there are no obvious incentives for the various centers to work closely together in their research. Discussions with JMIE center directors indicated this situation is unlikely to change under the current administrative and funding configuration.

Each JMIE program fulfills its own research mission and draws on a unique set of scientists, stakeholders, funding opportunities, and other resources. Indeed, close ties with well-defined stakeholders, especially in state and federal government, are a critical strength of most of the JMIE centers and projects. This facilitates a steady flow of research funding and ensures an exemplary rate of translation of research into regional, state, and federal policy. However, we note that we also would like to have seen a better developed discussion in the self-study report of the larger (national, international, scholarly, long-term) impacts of JMIE research.

Noteworthy contributions from JMIE Centers: One of the most significant accomplishments by the ***Center for Watershed Studies*** was the completion of its study of nitrate contamination of groundwater, headed by Thomas Harter and funded by a $1.7 million grant from the State Water Board. An interdisciplinary team of 25 faculty, researchers, and students in the College of Engineering and the College of Agriculture and Environmental Sciences developed state-of-the-art 3D fate and transport modeling using estimates of past and future land use and nitrate loading to predict the development of nitrate contamination in ground water. The team combined their understanding of the extent and causes of nitrate contamination of drinking water from groundwater supplies in agricultural areas with economic and engineering analysis and modeling to estimate the most promising responses for 400 drinking water systems. Among the most striking new findings of this study were the extent of agricultural responsibility for nitrate loadings to these regions, the impossibility of eliminating this problem via source controls alone, and the need to focus on providing safe drinking water to small water systems. As a result of this report, the State Water Board is making major new recommendations to the State Legislature. The nitrate report (see Harter &

Lund 2012a, 2012b) received over 500 mentions in the national press, including the New York Times, ABC News, and MSNBC News, and is now being disseminated in peer-reviewed publications.

The **Tahoe Environmental Research Center** used time-series modeling of long-term datasets from the San Francisco Bay estuary to discover that ecosystem-altering biological invasions can be triggered by the synergy of anomalous droughts and excessive water withdrawals (Winder et al. 2011). In its most recent work on aquatic invasive species, TERC detected unprecedentedly high densities of Asian clams in Lake Tahoe, and is currently using autonomous underwater vehicles to quantify their abundances and their impacts on nutrients, as well as to develop a barrier-based method to control them (Forrest et al. 2012, Gamble et al 2011, 2012). Limnological modeling at TERC is yielding unexpected predictions of effects of climate change on large lakes, including a drastic decline in the effectiveness of deep mixing processes that bring dissolved oxygen to the lake bottom, resulting in nutrient releases that are expected to impair water quality (Sahoo et al. 2012, Coats et al. 2012). As next steps, a comprehensive, real-time lake observing system is being developed to test this novel hypothesis. An important element of the observation system will be the incorporation of observations made by lake basin residents, thereby increasing the awareness of this issue in the community and increasing the scientific literacy of these "citizen scientists."

Research led by the **Center for Health and the Environment** yielded the discovery of a previously unsuspected gene contributing to male infertility (Tollner et al. 2011). These findings, reported in *Science,* were extensively covered by the media, including >300 national and international news outlets. The paper was named one of the "Top 100 Stories of 2011" by *Discover* magazine. This as well as other CHE initiatives offers opportunities for commercialization. Notable other CHE research in the review period brought new scientific understanding to issues ranging from the impacts of heat exposure in farmworkers, the exposure of farmworker families to pesticides, and the health effects of nanoparticles. The results from such studies form the basis for a vibrant and well-funded outreach program, The Western Center for Agriculture and Health, which has a history of 22 years of funding by the National Institute for Occupational Safety and Health. CHE continues to seek new collaborations and teams as evidence by their leadership of an international working group that recently published a definitive review of the impacts of climate change on global public health (Pinkerton et al. 2012).

The **Natural Reserve System** facilitates research in a range of critical ecosystems by providing not just logistical infrastructure (e.g., housing, security), but also advanced monitoring systems, cyber infrastructure, and legacy data sets. An indication of the national significance of the Natural Reserve System sites is the investment by the National Science Foundation in research infrastructure, including over $1.1 M at the Quail Ridge Reserve for a unique automated animal tracking system and $1.8 M from NSF and other sources to support climate change studies at the McLaughlin Reserve.

The Natural Reserve System is an important asset for studying fundamental ecological processes that inform resource management. For example, research at the Jepson Prairie Preserve on the threatened California Tiger Salamander quantified migration distance by age and developmental stage, as well as age-specific survivorship and reproductive value (Searcy and Shaffer 2008, Searcy et al. 2013). These findings were used to calculate how much land the salamander uses, which, in turn, informs the policies of the U.S. Fish and Wildlife Service for protecting vernal pools. Underscoring the unique value of protected, long-term, University-managed natural lands, this research had been conducted on private land until 10 years ago when the owner decided to develop the property.

Research in the Natural Reserve System extends beyond the borders of the properties. Scientists at the Bodega Marine Reserve took advantage of the high-frequency radar system of Central and Northern California Ocean Observing Node (CeNCOOS) to detect and monitor the 2011 tsunami that devastated Japan, long before it reached the US West Coast. This system was established on the Bodega Marine Reserve 10 years ago to study ocean currents (Lips et al. 2011). Researchers found that the radar picks up not the actual tsunami wave -- which is small in height while out at sea -- but changes in currents as the wave passes over ocean floors of different depth. This was the first successful use of radar for tsunami detection, and raises the prospect of an effective early warning system.

As viewed by the External Review Committee, the research categorized as JMIE **"Core"** actually represents an important emerging research area in biodiversity, conservation and climate change. Several groups fall under this umbrella notably the Forest Biology Program, the Managed Relocation working group, and the Southwest Climate Science Center.

Experimental work by the **Forest Biology** program has shown that forest fuel loads and flammability can be reduced while high-quality habitat for sensitive forest wildlife species can be maintained (North 2012). This work has been so successful that the US Forest Service is planning to test it at a landscape scale in newly created experimental forest districts across California. JMIE PI Malcolm North has been a leading spokesperson to the media on the on-going Rim Fire.

The **Managed Relocation working group** produced the most widely cited paper on the costs and benefits of moving species in anticipation of climate change (McLachlan et al 2007). While managed relocation was thought of as highly unorthodox just several years ago, new work by this group has found moderate support by scientists for translocating species outside current distributions, but only under constrained circumstances where the potential adverse impacts on recipient ecosystems has been thoroughly evaluated (Schwartz et al 2012, Schwartz and Martin 2013). Working group co-leaders have discussed these findings with agency and congressional delegates in Washington DC; provided guidance to the prestigious International Union for the Conservation of Nature; made presentations

to the Association of State Fish and Wildlife Associations and US Fish and Wildlife Service; and formed a federal agency working group.

The **Climate Change Adaptation in National Parks** project used a suite of future climate models and current land coverage to find that over 85% of the landscape in Sequoia and Kings Canyon National Parks will be vulnerable to fire-driven vegetation change by end of century. Papers are just emerging, but this research has already led to new national parks resource stewardship strategies in response to climate change, and media coverage has been especially intense in response to the Rim Fire.

3. Education

Overview: JMIE serves as a valuable resource for graduate and postdoctoral training and professional development at UC Davis through programs aimed at enhancing graduate student and faculty interaction across graduate groups, offering unique research opportunities through federal partnerships, and providing intensive workshops for writing grant proposals. The JMIE's strengths in graduate and postdoctoral training lie in the ability to provide interdisciplinary experiences that are not widely available to students elsewhere on the campus. Areas for improvement include greater coordination among units within JMIE that provide resources for graduate students and postdoctoral scholars, design and implementation of assessments of student training outcomes, and an expansion of the portfolio of educational and training experiences available to a wide variety of learners via the development of professional education programs.

Successes: The External Review Committee recognized several key examples of JMIE's strength in graduate training and professional development. For example, the initiation of the NSF Graduate Research Fellowship training workshops, co-sponsored by JMIE and the Graduate Group in Ecology, provide intensive writing workshops for students preparing to submit fellowship applications. The success rate of students applying for these highly competitive fellowships has risen dramatically (from 2 to 19 students) in the three years that these sessions have been offered. There is clear positive impact for the students, their graduate groups and departments, and for the campus as a whole derived from these workshops. The JMIE is to be applauded for providing the venue for such a meaningful and productive graduate training experience.

The four large Centers within the JMIE provide excellent resources for students and postdoctoral scholars for research support. The CHE offers imaging and analytical equipment found nowhere else on campus, facilitating innovative research and providing training in the use of this equipment; the NRS provides field sites and infrastructure for student researchers, and the CWS and TERC provide facilities, equipment and expertise for student training. The connections among entities within JMIE and in the broader campus community are fostered and maintained by newsletters, websites, and seminars that are accessible to all; hence, JMIE has

created an impressive virtual infrastructure for interaction among environmentally-oriented graduate students across the large number of graduate groups on the UC Davis campus.

The committee recognized a particularly powerful interaction that occurs between the JMIE and federal partners in agencies including USGS and USFWS. For USGS, the JMIE has facilitated the acquisition of space for federal scientists on campus, and importantly has enabled the hiring and training of students to conduct research with federal partners. The USGS in particular hires a large number of students and the JMIE appears to provide a critical mechanism through which graduate students can be funded. This enhances the capacity of the federal agencies as well, since they are able to hire part-time temporary researchers relatively easily via this mechanism.

Education Summary and Recommendations: The External Review Committee noted at least three areas of improvement for the JMIE in the context of graduate student and postdoctoral training and professional development. First, there appear to be opportunities for greater coordination of the training activities taking place within the various entities of the JMIE. We suggest the development of a strategic plan to integrate student training, educational programs, communication and translation workshops, and professional development into an integrated collection of interdisciplinary experiences for which the JMIE can clearly be recognized as the "hub" on the UC Davis campus.

Second, we suggest that the JMIE seek partnerships and mechanisms for evaluation of educational programs that are already in place, as well as new programs that are developed. There are opportunities to collaborate with individuals or organizations that specialize in assessment of educational programs to develop tools that could be used to evaluate existing programs and provide learning outcomes and indicators of impact. These can be relatively low-cost if conducted in the context of research collaboration, but may also serve as good investments if they provide evidence of impact to bolster fundraising efforts (for example, for the Natural Reserve System).

Third, and most importantly, we recommend that the JMIE and the campus move forward in developing professionally oriented educational and training programs centered on interdisciplinary instruction and practice in the realm of environment and sustainability. We noted that there are long-standing plans for a master's degree in environmental policy, which appear to be stalled. We suggest that the JMIE and campus think more broadly (including, but going beyond environmental *policy*) about the types of professional degree programs that could be designed and offered at UC Davis, given the exceptional strengths of the faculty. Because the JMIE has already forged strong connections with federal, regional, and local agencies and non-governmental organizations throughout California, we recommend a more comprehensive and strategic examination of the demand that exists for training experiences aimed at career professionals in these organizations. We can envision a robust portfolio of professional masters' programs that address various aspects of

environmental technologies and skills (e.g., geospatial sciences and technologies, environmental communication, environmental monitoring, quantitative tools for public health professionals, water resource management, and so on) and possibly shorter-duration workshops, certificate programs, or other types of training sessions for mid-career professionals. These programs have the potential to provide significant revenue generation for the JMIE and for the campus and take advantage of the broad and deep expertise represented on the UC-Davis campus in critical research areas related to the environment and sustainability.

4. Impact on Campus and Public Service

Overview: The External Review Committee found strong evidence that JMIE plays a critical role in catalyzing interdisciplinary research, teaching and outreach in environmental sciences across the UCD campus. In addition, JMIE is key player in fostering partnerships between UCD scientists and federal and state resource management agencies with tangible benefits for both UCD and resource managers. JMIE accomplishes its mission by leveraging its minimal core financial support with a broad portfolio of external funding. In this manner, JMIE provides unique opportunities for faculty and students and enhances the reputation of UCD as a leader in environmental sciences and a valued provider of science in the public interest. We see the impact on campus and JMIE's role in public service as intimately linked and, as such, have combined these two aspects of the evaluation. Evidence to support our assessment is detailed below

JMIE provides significant opportunities for **UCD faculty**. JMIE engages over 200 faculty representing all campus colleges, as well as the schools of Education, Veterinary Medicine, Law and Medicine. JMIE plays a key role in attracting highly entrepreneurial research faculty to UCD by providing these faculty with support and facilities that are not found within the existing departmental structures. The External Review Committee was impressed with JMIE research faculty's outstanding strengths in 1) connecting UCD scientists with regional and national networks of scholars and practitioners and 2) pioneering technologies to understand and address complex environmental issues. JMIE also creates opportunities to expand faculty breadth by recruiting affiliate faculty from federal resource management agencies at no cost to UCD. The External Review Committee observed that JMIE is identifying leading scholars within the federal ranks to join JMIE and makes use of the affiliate faculty expertise in collaborative research and graduate student education.

JMIE provides **undergraduate and graduate students** with unique opportunities for interdisciplinary, problem focused research in the environmental sciences. The External Review Committee heard from many graduate students that the opportunities associated with JMIE were instrumental in their decision to pursue graduate work at UCD and that they were highly satisfied with their decision. The External Review Committee was particularly impressed with the large numbers of

graduate students and postdocs (> 600) involved with JMIE given the size of its faculty and staff, indicating a strong dedication to education on the part of core JMIE faculty. JMIE provides a clear added value to the campus community through efforts such as a National Science Foundation Graduate Research Fellowship writing consortium that has helped students write competitive research fellowship proposals. This consortium has been very successful, with the number of NSF fellows in the Graduate Group in Ecology, for example, rising from 2 in three years prior to these efforts to 19 in the three years since they have been offering this course. The Fall 2010 consortium, coordinated by JMIE Director Mark Schwartz, resulted in 13 new NSF Graduate Research Fellowships totaling ~$1.95 million in graduate funding to campus. Another example of JMIE's impact is the Environmental Leaders Program and Translating Research beyond Academia seminar series, which, along with associated workshops and forums, have provided over 350 graduate students with professional skills training and career information in science communication and writing, communication with policy-makers and stakeholders, and education outreach and broader impacts.

JMIE activities have extraordinarily **broad reach across the UCD campus,** engaging more than fifty academic departments throughout eight colleges and professional schools at UC Davis. The JMIE network includes forty-nine graduate groups and interacts with more than sixty-eight additional units, programs, centers, and labs not housed within the institute. JMIE fills an important niche in building on fundamental disciplinary expertise within departments to address big picture applied problems. JMIE not only provides intellectual leadership but also builds and nurtures ongoing relationships with stakeholders and decision makers. Tangible proof of the effectiveness of this approach includes the sustained, strong external support from private foundations that recognizes the impact of JMIE science on national as well as California natural resources policies and practices.

JMIE provides **core analytic facilities** that are open to the campus community but that could not be supported within campus departments, including;

- Critical and cutting edge core facilities and equipment, on campus and in critical ecosystems:
- Globally unique in situ research facilities at the Natural Reserve System and the Tahoe Environmental Research Center;
- Unique exposure and imaging facility: Center for health and the environment core facilities in microscopy and imaging, animal facilities (rodents, fish, insects and birds), and toxic pollutant exposure facilities (e.g., individual exposure rooms, toxic materials preparation room);
- Groundbreaking nanotechnology analytic capacity that led to funding of National Center for Nanomaterial Health Implications Research Center; and
- An administrative staff willing to take on challenges and burdens of large complex multi-investigator, multi-institutional grants.

JMIE fosters community across campus and facilitates **information transfer to the public by providing multiple portals for information. JMIE's weekly e-bulletin *Field Notes*** is distributed to over 1400 environmental professionals on and off campus. JMIE's informal science education programs build on traditional extension strategies to reach out to citizens and stakeholders across the state. JMIE is active in pursuing external funding to support informal science education as evidenced by the National Science Foundation funding for the Tahoe Environmental Research Center's informal education programs. TERC collaborates with the Lawrence Hall of Science and the UC Davis KeckCAVEs, to develop 3-D visualization of freshwater ecosystems, tapping into huge spatial data sets such as LiDAR, hyperspectral remote sensing, and the output from 3-D hydrodynamic models to gain new understandings of how lakes work.

Impact on Campus and Public Survey Summary
JMIE adds important and unique value to the already strong campus programs in ecology and environmental sciences by simultaneously integrating research across campus and linking science with policy and decision-making.

5. Justification for Continuation

JMIE effectively leverages its core funding to garner external resources to accomplish its mission. JMIE currently receives about $2M/year in core funding. The External Review Committee notes that this figure can be misleading as it implies a potential availability of these funds to invest in new initiatives or innovations in outreach and engagement. In fact, a large fraction (i.e., ~75%) of general funds support fixed costs of facilities including the Natural Reserve System and Tahoe Environmental Research Center (~ $800K) and core administrative staff (~$900k). Funding at this level has been essentially static for the past five years.

JMIE review documents provide ample evidence that external support is robust and growing. The return on investment of general funds is high: external support in the form of grants and contracts and gifts and endowments has grown from ~$9.5M/yr to $14.5M/yr during past five years.

There are strong advantages to continuation and strengthening of the core support for JMIE. JMIE has a proven track record of delivering research, teaching and outreach in the arena of interdisciplinary applied environmental sciences. Now more than ever there are growing opportunities for external funding for interdisciplinary environmental sciences. These opportunities include new programs within the National Science Foundation (e.g., Science, Engineering and Education for Sustainability programs) as well as potential for strong and ongoing support from major private foundations, many of them based in California. Undergraduate and graduate students increasingly expect that major research universities will offer innovative programs that allow them to engage in problem-

focused interdisciplinary research as part of their education programs. The External Advisory Committee strongly believes that nimble cross-campus units such as JMIE are the best vehicles to meet students' rising expectations for authentic engagement in the environmental sciences.

UCD's reputation as a leader in environmental sciences would be damaged if JMIE were to be disestablished. There would be many rippling effects across the UCD campus were JMIE to be disestablished. Disestablishment would send a strong and damaging signal to junior faculty that UCD does not place high value on interdisciplinary environmental science. Significant shared core analytic facilities and field stations would need to be disbanded or moved to less optimal departmental homes. Most importantly, UCD would lose its platform for creating and communicating science to address environmental issues at a point in time when such science is needed and wanted by citizens and stakeholders within the state and across the country. Disestablishment would weaken relationships with state and federal agencies at a in time where cross-sectoral collaboration is seen as the route not only to robust science to support decision making but also as effective business practice in times of declining resources.

6. Imagining the Future of JMIE

Returning to the our opening regarding the larger national context of this review, the External Review Committee believes that JMIE is poised to take on a stronger leadership role across campus adopting the "network" environmental institute model that has been successful at other major research universities. Given the breadth and depth of talent in environmental sciences at UC Davis combined with the growing research, education and engagement opportunities in this arena, imaging a more comprehensive and robust JMIE makes sense. To be successful, however, the following conditions must be met:

- JMIE needs to develop ***a stronger, more integrated overarching vision of both what it is <u>and</u> what it is not.*** The breadth of expertise at UC Davis opens a very wide range of opportunities with varying intellectual ripeness and potential return on investment. Process will be key to success here: JMIE leadership needs to foster more participatory governance and undertake strategic planning that involves the entire campus. The strategic planning process should consider expanding and redefining the core function of JMIE to include supporting existing centers and providing University-wide education and outreach as well as incubating research projects and convening cross-campus environmental initiatives.

- JMIE needs to play a ***more visible and more vital academic role on campus*** in order to fully engage students. The most obvious strategy, given faculty expertise and student demand, would be to initiate a professional MS degree. The External Review Committee recognizes that this idea has a legacy at UCD but

urges JMIE to begin anew with a strategic assessment of the suite of degree concentrations that map JMIE expertise onto opportunities in workforce development.

- We recognize that to accomplish these objectives JMIE needs an ***increase in funding to support core activities*** such as campus-wide outreach, research incubation, and academic program development. Based on our collective experience, we believe that such an investment will pay off fiscally and politically as increasing numbers of students, faculty and staff are engaged with creating a new understanding of long-standing and emerging environmental problems and creatively engaging with off campus partners in deploying innovative and workable solutions.

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JOHN MUIR INSTITUTE OF THE ENVIRONMENT

ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616-8527

November 23, 2013

Dear Vice Chancellor Lewin;

We appreciate the time and attention that the review team (Drs. Graumlich, Collinge, Harrison, Liverman and Vermeij) have invested into reviewing the John Muir Institute of the Environment (JMIE). The review provides a good base from which our campus community can evaluate directions for JMIE. The first and foremost conclusion that the committee highlighted is that JMIE has succeeded in its mission of catalyzing and supporting interdisciplinary research, teaching and outreach in support of environmental decisions. The report is particularly strong in highlighting our research excellence.

The committee clearly stressed that UC Davis, is stronger because of the existence of JMIE. Our campus is widely recognized as a global leader in environmental research, leading the world each and every year in research productivity in these areas (Thomson-Reuters). The committee recognized the significant role that JMIE has played in building and maintaining that reputation through our interdisciplinary policy-relevant science. We strongly endorse these conclusions and thank the committee for their careful evaluation of JMIE.

In addition to endorsing JMIE's accomplishments, the committee also recognized significant constraints. Identifying three models for interdisciplinary environmental institutes ('empire', 'network' and a hybrid), the committee noted that while an empire model (e.g., The Bren School, with a dean and faculty) provides a direct path to broad name recognition, the network model (e.g., University of Arizona) may also succeed. The committee noted that the prime difference between the network model and JMIE is the modest level of campus investment in building a strong environmental institute, relative to other strong environmental programs around the country. Specifically, they noted that naming the institute after John Muir signifies bold ambition, but that campus investment has not been commensurate with that ambition. This claim comes in sharp contrast to common beliefs that JMIE garners a large campus investment relative to other campus ORU's. This discrepancy derives from the fact that JMIE's budget reflects the significant campus investment in JMIE-managed facilities (e.g., The Natural Reserve System, Lake Tahoe facilities, analytical facilities at the Center for Health and Environment). Facilities cost money to manage, and a significant proportion of campus investment in JMIE goes to maintain these facilities. Hence, there are sparse resources with which to leverage research opportunities through strategic investment. The recent increase in ICR return has helped offset budget cuts and, to some small extent, provide resources for strategic initiatives.

The review committee provided a strong justification for continuance in their report. The key points in this justification is that we leverage our funding into research granting success with our ~$2 million annual budget returning between ~$10 and $15 million in grants, despite ~75% of our budget being locked into fixed costs (facilities support). Perhaps the key point regarding continuance, however, is the damage to our campus reputation that may result through failing an interdisciplinary environmental unit that has built such a strong research reputation. We agree with their arguments in their entirety.

These endorsements aside, the committee pointed to three primary areas for re-consideration. The first is for JMIE to develop a stronger vision for what it is, and what it is not. In the past, JMIE has tried to behave as 'all things environmental' for the campus. Without a centralized campus mandate (the 'empire' model) this is simply no longer possible. As a consequence, the committee is correct in suggesting that JMIE needs to engage in reflection in order to narrow our focus on achievable components of leadership within the broader

rubric of the environment. We look forward to engaging in such a discussion with the campus. Our leadership team has several ideas for re-engaging with relevant colleges and departments and focusing our mission.

The second two recommendations are not recommendations for JMIE as much as they are for our campus. Both are recommendations that JMIE heartily endorses. The first is for campus to create a visible and vital academic role for JMIE. JMIE has been severely limited in our academic senate faculty leadership's capacity to drive our future because of a lack of capacity to provide long-term secure careers for young scientists who come into our ranks. These researchers have, by every measure of an academic community, succeeded. Providing a formal capacity for JMIE to hire and retain faculty (e.g., as an Interdisciplinary Instructional Unit as with UCLA's Institute of the Environment) would resolve this challenge. Hence we are seeking closer ties with departments, but fear that aligning departmental and research unit interests is only occasionally successful. Hence, we also seek definition as an academic unit in order to resolve this crisis in our ranks. While we endorse the recommendation to provide JMIE with the capability to develop strategic research, education and outreach capacities, implementing appropriate reforms requires support from campus administrative leadership and action from the Academic Senate. We have begun such discussions and continue to seek to campus support in this effort.

The third recommendation is for increased campus support for JMIE core activities. JMIE is currently acting as a tremendous public relations outlet for our campus through Lake Tahoe, the Watershed Science Center, the Natural Reserve System, our role in the US Department of Interior Climate Science Center and through our federal research partners on campus. We have the capacity, with investment, to work with the new Coastal Marine Sciences Institute and the Institute for Transportation Studies to make UCD the *justifiably recognized* world leader in environmental research, education and outreach. Resources are needed to solidify our activities that visibly reach out to the world with our programs and opportunities for using UCD to engage society with science on important environmental management issues. This effort requires research, but also requires much more. We see a structural problem in achieving that goal within the constraints as an Organized Research Unit. For example, JMIE has achieved considerable success in development over the past three years (>$12 million). This has been accomplished lacking an executive director, or a dedicated development officer. Although we enjoy our fair share of OVCR development office attention, we feel that we could significantly broaden our external funding base with additional resources.

Our campus is faced with three generalized options for the future of JMIE. First, the campus could decide for discontinuance. The evidence from our five year report and the external review committee strongly argues against this conclusion. We recognize that JMIE is now 15 years old, and that this benchmark triggers a special larger review. However, the evidence clearly recognizing that discontinuing JMIE would be a poor outcome for the campus, the University and California. Second, the campus could maintain a status quo future where JMIE is re-authorized mostly as it now exists. We also think that this is a poor choice. Environmental research institutes are in a very competitive environment, and our lack of capacity to further develop outreach, public relations, education and fundraising will ultimately lead to a JMIE that will fail. There are not the same funding opportunities in the environment as there are in health or other industry-connected fields; and much of our funding comes in at reduced ICR. Nevertheless, this is a clear strength of our campus and JMIE does very well within this competitive environment.

The third option is for increased campus investment. This investment is not simply in terms of money, but in terms of solidifying the role of JMIE in education and outreach. There are many different ways that these goals could be accomplished, but the investment option is the only one of the three options that we see as a viable strategy that is consistent with this external review.

Sincerely,

Mark Schwartz
Director, John Muir Institute

Christine Parks

From: Delany, Mary <medelany@ucdavis.edu>
Sent: Wednesday, November 20, 2013 1:52 PM
To: Harris A Lewin
Cc: Paul Dodd; Nancy A Bulger; Christine Parks; Perry King; Jan Hopmans; Delany - CA&ES Dean
Subject: CA&ES Comments on the JMIE Review 11-20-13

Dear Harris,

The following outlines our CA&ES perspectives on the JMIE review developed in consultation with Assoc Dean Jan Hopmans and reviewed by our internal Policy Council.

- We concur with the overall positive review which outlines the value of JMIE and its relevance to campus as a leader in environmental sciences.
- In summary the review suggests that JMIE:
    - Increase faculty involvement
    - Develop incentives for centers within JMIE to work together
    - Seek ways to become more relevant nationally and internationally
    - Coordinate graduate student and outreach activities across centers within JMIE
    - Expand professional degree and training programs.
- We concur with these suggestions.
- We are very proud of the leadership provided by our faculty colleague Professor Mark Schwartz for campus-wide environmental sciences efforts.

Regards,

Mary

Mary E. Delany
Interim Dean, College of Agricultural & Environmental Sciences
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From: Perry King
Sent: Wednesday, October 30, 2013 8:48 AM
To: Delany, Mary
Cc: Paul Dodd; Nancy A Bulger; Christine Parks
Subject: Request for Comments on the JMIE 15-Year Review

Dean Delany, attached is a formal request for comments from Vice Chancellor Lewin on the Crocker Nuclear Laboratory 5-Year Review. Please send your comments and feedback to VC Lewin at lewin@ucdavis.edu by **Monday, November 14, 2013**. Thank you.

Perry King
Executive Analyst for

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