Evaluation of University of California, Irvine
NSF Partnerships for International Research and Education
WaterPIRE Project

Quarter 1
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Section 1. Executive Summary

1.1 Overview

In the summer of 2012, the University of California, Irvine (UCI) Departments of Civil and Environmental Engineering and Chemical Engineering and Materials Science received a National Science Foundation (NSF) grant to establish a Partnerships for International Research and Education (PIRE) program. The NSF PIRE program seeks to catalyze a higher level of international engagement in the U.S. science and engineering community by supporting innovative, international research and education collaborations. The UCI Water-PIRE project supports the NSF PIRE mission with five goals addressing knowledge, education/workforce development, partnerships, and institutional capacity. UCI will address these goals by establishing collaborative relationships with worldwide academic institutions and organizations that conduct urban water sustainability research and conducting student and faculty exchange programs with these institutions. Project components include national and international workshops, research abroad opportunities, and ongoing collaborative research.

The focus of this evaluation is to provide an informed analysis based on the data to improve project implementation and increase decision-making capacity to ensure the project's success in meeting established goals and objectives. Two types of evaluation are being conducted for this project: (1) a formative evaluation to monitor project implementation and give ongoing feedback to the principal investigators, and (2) a summative evaluation to assess the quality and impact of the project in reaching its stated goals and objectives. Both types of evaluation use a combination of qualitative and quantitative indicators. Guiding evaluation questions of this PIRE project are based on project goals.

In the summer of 2013 and 2014, University of California students attended the six week UPP Down Under program which took place in both the U.S. and Australia at three universities: UC Irvine, University of Melbourne, and Monash University. These participants completed three evaluation forms; one every two weeks of the UPP Down Under program. In addition, high school students participated in The American Indian Summer Institute in Earth System Science (AISIESS) program, a UCI-run program in which PIRE students and faculty participated, held at UC Irvine in Irvine, California and in the La Jolla Band of Luiseno Indians Reservation Campground in Pauma Valley, California.

1.2 Summary of findings

Key findings and recommendations for program components and impacts of the UCI UPP Down Under and AISIESS program are provided below. A complete discussion of findings and recommendations can be found in Section 4 of this report.

Key Findings	Recommendations
UPP Down Under Program	
Demographics **2014 Cohort** ▪ Three males and nine females participated. ▪ Nearly half (42%) were Caucasian, with 25% Hispanic and 33% Asian. ▪ Six participants were from UCI, two were from UCLA, and four were from UCSD. **2013 Follow-up** ▪ Nine of the 12 UPP participants (3 male/6 female) completed the follow-up survey. ▪ Respondents are representative of the 2013 group.	▪ Continue to seek a balanced gender participation ▪ Continue to recruit URM students in future summers, with a focus on recruiting African-American students. ▪ Remind UPP Down Under participants at the end of the program to respond to the follow-up survey when they receive it 1-3 years after participating in the summer program.
Program components ▪ Most project components were rated as *very* or *extremely useful*. ▪ Students suggested more efficient program organization and planning. ▪ Participants indicated that involvement in the program contributed to personal and professional growth and played a role in their career plans. ▪ Partners believed their relationship with UCI has strengthened as a result of the UPP Down Under program.	▪ Provide students with more information and preparation time before activities. ▪ Incorporate information about statistical tools, sampling, types of data students will collect, and how to conduct analyses. ▪ Include additional topics requested by students in: • Engineering • Construction of wetlands ▪ Engage students with research and writing so as to foster a pathway to publications and presentations in the years following the program. ▪ Maintain connections with Australian partners and encourage more opportunities for students to engage in hands-on research while abroad.
Program logistics ▪ Participants rated most program logistics as *good* or *excellent*. ▪ Students were most satisfied with program's atmosphere, leadership, and student involvement. ▪ Students were least satisfied with advertising, application process, and organizational management.	▪ Increase advertising efforts to attract more students and increase participant knowledge about the program beforehand. ▪ Improve organization of application process and ensure participants have all the information they need before going abroad. ▪ More thoroughly plan and organize activities.
Impacts on participants ▪ Participants reported large gains in all goal areas. ▪ By the end of the summer program, students' rated their knowledge of sustainable urban water systems and understanding of cross-cultural approaches to sustainability as *extensive*. ▪ Gains in students' collaborations with researchers and knowledge of research abroad opportunities were rated between *moderate* and *extensive*.	▪ Provide additional training and experience in: • Knowledge of careers • Collaborations and interactions with SCCWRP, governmental and Australian researchers • Knowledge of how to work with the university to participate in research abroad ▪ Include more preparation for students about Australian cultural norms and history. ▪ Encourage students to share their work abroad with partners in the U.S.
American Indian Summer Institute in Earth System Science (AISIESS) program	
Program components and impact ▪ Participants showed significant increases in familiarity with all of the water sustainability topics covered, but the following topics were rated lowest after the program: • *How constructed wetlands treat waste/storm water* • *How biofiltration system contributes to water purification* ▪ Participants expressed that the program activities useful; most rated all of the program activities as *somewhat* to *extremely useful*. The web forum was rated the lowest. ▪ Students experienced great improvement in their understanding of and interest in the topics.	▪ Increase content on how wetlands are used to treat waste water and biofiltration systems. ▪ Emphasize the importance of wetlands and marshes. ▪ Continue tying lessons to students' experiences. ▪ Seek undergraduate student feedback to improve the web forum. ▪ Coordinate UPP Down Under with AISIESS to ensure direct interactions between participants. ▪ Work more closely with AISIESS program leaders to improve PIRE participation in the AISIESS program.

Section 2. Introduction

2.1 Background of the project

In the summer of 2012, the University of California, Irvine (UCI) Departments of Civil and Environmental Engineering and Chemical Engineering and Materials Science received a National Science Foundation (NSF) grant to establish a Partnerships for International Research and Education (PIRE) program. The mission of the NSF PIRE program is to "catalyze a higher level of international engagement in the U.S. science and engineering community by supporting innovative, international research and education collaborations. The program will enable U.S. scientists and engineers to establish collaborative relationships with international colleagues in order to advance new knowledge and discoveries at the frontiers of science and engineering and to promote the development of a diverse, globally-engaged U.S. scientific and engineering workforce… It is also intended to facilitate greater student preparation for and participation in international research collaboration, and to contribute to the development of a diverse, globally-engaged U.S. science and engineering workforce. The program aims to support partnerships that will strengthen the capacity of institutions, multi-institutional consortia, and networks to engage in and benefit from international research and education collaborations."[1]

Project mission, goals and objectives

The focus of the UCI Water-PIRE project is to develop and install low-energy options (LEOs) for the sustainability and production of water resources. In partnership with universities in water-stressed regions of the United States and Australia, UCI conducts research on water sustainability and the use of LEOs while also educating and training students in sustainability options that will protect the health of humans and ecosystems. The UCI Water-PIRE project supports the NSF PIRE program with the following mission, four goals, and corresponding objectives:

Mission: Working together with our Australian and local partners, the PIRE will foster changes in the way the U.S. designs its urban water infrastructure, toward a paradigm in which lower-quality water is viewed as a resource and higher-quality water is used more efficiently.

GOAL 1: KNOWLEDGE/RESEARCH/DISCOVERY

Increase knowledge and understanding of sustainable urban water systems, and in the process equip a new generation of engineers, natural, physical, and social scientists, policy makers, and educators with multi-disciplinary skills and sensitivities.

Objective 1 (Layer 1): Work with our Australian partners to improve the engineering science associated with low-energy approaches for removing pollutants from urban and peri-urban runoff in streams and biofilters.

Objective 2 (Layer 2): Work with our Australian partners to improve understanding of the benefits and risks associated with adoption of low-energy treatment technology, such as biofilters, relative to public health, energy consumption, and greenhouse gas production/emission.

Objective 3 (Layer 3): Analyze economic, regulatory, institutional, regional planning, and public acceptance factors that could hinder the adoption of low energy options (LEOs) based on

[1] NSF PIRE Program Solicitation 09-505: http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12819

the Australian experience; identify economic incentives, innovative regulations, institutional changes, and planning practices that could foster the adoption of LEOs in the Southwestern U.S.
Objective 4 (Layer 4): Work with Australian partners to improve understanding of the impacts of distributed approaches for capturing and reusing runoff in urban and peri-urban settings, relative to improving water productivity (for example, as measured by declines in per capita use of drinking water), and returning downstream rivers and riparian zones to more natural hydrological and ecological states.
Objective 5 (Cross-cutting): Work with Australian partners to improve understanding of urban water supply challenges and solutions that require an interdisciplinary (cross-layer) research approach, including elements of climate science, ecosystem science, engineering, and water supply and water demand modeling.

GOAL 2: EDUCATION/WORKFORCE DEVELOPMENT
Accelerate education and training in the area of urban water sustainability, and diffuse knowledge about sustainability options to U.S. middle-school and high-school students, undergraduate STEM majors, graduate students, post-doctoral researchers, and practitioners. Contribute to the development of a workforce in urban sustainability science, engineering, and policy that will thrive in the face of transdisciplinary problems.
Objective 1: Foster an interdisciplinary approach to urban water sustainability that informs undergraduates, graduate students, post-docs and faculty.
Objective 2: Foster a cross-cultural approach to urban water sustainability that informs undergraduates, graduate students, post-docs and faculty.
Objective 3: Leverage the PIRE research findings into curriculum tools and teacher training programs that increase the quality and depth of understanding about urban sustainability issues for K-12 students.
Objective 4: Place students associated with the PIRE in internships, graduate school, post-doctoral positions, and professional positions related to urban water sustainability science, engineering, and policy.

GOAL 3: PARTNERSHIPS
Improve urban water sustainability research and application through the establishment of new partnerships between university researchers, non-university researchers, and urban water managers.
Objective 1: Foster new relationships between the PIRE research team and Australian researchers at the University of Melbourne and Monash University.
Objective 2: Foster new relationships between the PIRE research team and non-university researchers at the Southern California Coastal Water Research Project (SCCWRP) and its affiliated governmental and non-governmental agencies.
Objective 3: Participate in practice-oriented professional meetings organized through SCCWRP and its affiliated governmental and non-governmental agencies.

GOAL 4: INSTITUTIONAL CAPACITY
Increase the capacity of UCI's Henry Samueli School of Engineering (HSSoE) to lead research and educational exchange programs with other units on campus, other universities, non-university research programs, and international partners.
Objective 1: Increase HSSoE's engagement in research with other schools, departments, and programs at UCI.
Objective 2: Increase HSSoE's engagement in research with other universities in Southern California.
Objective 3: Improve HSSoE's engagement in effective international research and educational exchange programs, including the development of new linkages with existing education abroad programs administered through UCI.

2.2 Background of the evaluation

The focus of this evaluation is to provide an informed analysis based on the data to improve project implementation and increase decision-making capacity to ensure the project's success in meeting established goals and objectives. Two types of evaluation are being conducted for this PIRE project: (1) a formative evaluation to monitor project implementation and give ongoing feedback to the principal investigators, and (2) a summative evaluation to assess the impact of the project and progress made toward reaching stated goals and objectives.

Formative evaluation monitors the effectiveness of project implementation with ongoing feedback to the leadership team, including assessment of the usefulness of project activities, progress toward goals, and recommendations for project improvement. The external evaluator works collaboratively with the project leadership team to evaluate effectiveness and improve implementation of project activities. All project activities are evaluated using activity evaluation forms, on-site interviews, discussion groups, and annual post-surveys. Evaluation forms will use Likert scale and free response questions to assess each activity, perceived benefit to participants, and how they plan to use what they have learned. Analyses of response frequencies identify strengths and areas for improvement, with timely feedback to the leadership team. The formative evaluation results should be used by project leaders to identify potential problems and seek solutions early during the implementation.

The summative evaluation examines the project's overall success and benefit to participating students, faculty, researchers, universities, and the scientific community. Summative procedures include conducting a project baseline and post-survey of all project participants when they enter the PIRE project and at the end of each project year. The evaluation measures participants' gains in the advancement of knowledge and understanding of sustainable urban water systems, the acceleration of education and training in urban water sustainability and the diffusion of knowledge of sustainability options to students, the establishment of partnerships between researchers and urban water managers, and increase in capacity of HSSoE to lead research and educational exchange programs. At the end of each project year, the evaluator interviews key personnel at each participating university to assess growth in institutional capacity to participate in and benefit from international collaborations. Growth in workforce development is indicated by the number of new people who join the PIRE project and continue in STEM studies and careers. After several years of grant implementation, the evaluation will examine the broader impact of this PIRE project on developing a diverse, globally-engaged science and engineering

workforce by assessing the number of high school, undergraduate, and graduate students who participated in the PIRE project and choose to pursue a STEM academic path and career. The evaluator disaggregates data by gender, ethnicity, academic position, citizenship, and university affiliation when possible. The evaluation also tracks expansion of participation in water sustainability training to additional universities and countries.

Guiding evaluation questions

Guiding evaluation questions are based on and aligned with UCI Water-PIRE goals. Has the PIRE project:

Goal 1: Scientific knowledge/research/discovery – Increased knowledge and understanding of sustainable urban water systems, and equipped participants with multi-disciplinary skills and sensitivities?

Goal 2: Education/workforce development – Accelerated education and training in the area of urban water sustainability, diffused knowledge about sustainability options, and contributed to the development of a workforce in urban sustainability science, engineering, and policy that will thrive in the face of transdisciplinary problems?

Goal 3: Partnerships – Improved urban water sustainability research and application through the establishment of new partnerships?

Goal 4: Institutional capacity – Increased the capacity of UCI's Henry Samueli School of Engineering to lead research and educational exchange programs?

Assessment development

The following assessment instruments have been or will be developed for this PIRE project:

- Evaluation forms for all project activities, seminars, workshops, trainings, and meetings
- Project baseline/post-survey
- UPP Down Under evaluation forms
- UPP Down Under follow-up survey
- Research abroad post-survey
- Mentor interview protocol
- Student focus group protocols
- Senior personnel interview protocol
- Intercultural Development Inventory (IDI) (Developed by the IDI corporation)

Evaluation forms are based on seminar, workshop, and meeting agendas. Forms include rating scales of usefulness of agenda items as well as open-ended questions so participants can comment on agenda items and the overall training. Baseline/post surveys' Likert scale, open-ended, and perceived gains questions are adapted from validated surveys[2]. Instrument development is guided by a systematic, iterative process of construct identification, creation, and instrument review or validation (Wilson, 2005). To develop the surveys, the evaluator discussed the project goals and the impact principal investigators would like participation in the project to have on participants. Next, the evaluator generated questions that address key constructs identified in the goals. Survey drafts were sent to principal investigators. Feedback and suggestions were incorporated into the surveys and the surveys were finalized. Questions are

[2]Survey sources can be found in the References section.

repeated on baseline and post-surveys to measure changes in outcome areas. Focus group and interview protocol questions are based on assessment of project goal achievement. Principal investigators provide feedback to better align all evaluation forms to the project goals and activities.

Data collection methods and analysis

Survey instruments were generated using Survey Gizmo (www.surveygizmo.com), in which a link is sent to participants' email addresses. The evaluator may conduct student focus group at annual meetings. The evaluator conducts telephone interviews with research abroad mentors after students return from research abroad experiences and with senior members of each participating institution at the end of each project year. The pre/post-Intercultural Development Inventory (IDI)[3] is administered online. The SmartStart IDI-trained administrator emails a link to the IDI before students participate in a research abroad experience then sends them feedback on their results and makes recommendations for growth. She also emails a link to the post-IDI after students return from their research abroad experience. The IDI administrator downloads students' responses, conducts the analysis according to IDI protocols, and completes the IDI report.

Quantitative results of all evaluations are analyzed using SPSS software. Results of workshop and meeting evaluations are analyzed using means and response frequencies. Likert scale results of project baseline/post surveys and the research abroad experience post-survey are analyzed using paired t-tests to measure gains that can be attributed to participation. Responses to open-ended questions are included in reports.

Evaluation components conducted during Quarter 1

The following evaluation activities were conducted during Quarter 1:

- Administration of the 2014 UPP Down Under evaluation form to undergraduate students who traveled to Australia (Appendices A-C)
- Development and administration of the UPP Down Under follow-up survey (Appendix D)
- Development and use of the UPP Down Under partners interview protocol (Appendix E)
- Development and administration of the AISIESS program evaluation form (Appendix F)

[3] See IDI website for further information regarding assessing cultural competence: http://idiinventory.com/

Section 3. Evaluation Findings

3.1 Evaluation of project components

UPP Down Under Program

Background

The UPP Down Under program was held at UC Irvine in Irvine, California and in Victoria and Monash, Australia. The six-week program was held from June 16 - July 25, 2014. In this program, undergraduate students learned about water challenges that Australia faces and the research, policy, and infrastructure engineering that is in place to address these challenges. This program consisted of lectures, presentations, activities, and a two-week field trip to Australia. A summary of the program schedule is as follows:

- **UCI Week 1-2:** Attend student orientation, field trips and lectures on water sustainability, careers in environmental engineering, climate change, stormwater capture and reuse, biofilter treatment systems, and low energy treatment systems.
- **Australia Week 3-4:** Tour of lab facilities, wetland, Hampton, and Royal Park sampling, and lectures on economics and governance, urban water supply, and public perception of water risks presentations. Tour of Monash facilities and learn data analysis techniques.
- **UCI Week 5-6:** Tours of various facilities, lectures on policies and governance, panel on desalination, tour of Aquarium of the Pacific, group work on final papers and presentations, final student presentations.

2014 Evaluation participants

All twelve UPP Down Under participants completed evaluation forms. As shown in Figure 1, about three-quarters are female, 42% are Caucasian and 25% are Hispanic. Demographics of participants are moderately representative of UCI student demographics[4], where just over half are female (54%), 17% are Caucasian, and 22% are Hispanic. While representing a very small percentage of the UCI population, African-Americans, Pacific Islanders, and American Indians were not represented. Half are affiliated with UCI.

Figure 1. 2013-14 PIRE UPP Down Under project participants

	2013 (n=12)		2014 (n=12)	
	#	%	#	%
Gender				
Male	5	42%	3	25%
Female	7	58%	9	75%
Ethnicity				
Asian	5	42%	4	33%
Caucasian	4	33%	5	42%
Hispanic or Latino	3	25%	3	25%
Year in Fall				
Junior	2	17%	--	--
Senior	7	58%	8	67%
Graduated	3	25%	4	33%
University affiliation				
UCI	8	67%	6	50%
UCLA	3	25%	2	17%
UCSD	1	8%	4	33%

[4] UCI student demographics from: http://www.oir.uci.edu/files/portrait/uci-college-portrait.pdf

Evaluation findings

Students rated the usefulness of weekly activities to their undergraduate studies and future plans on a scale from 1-5, 1=*not useful at all* to 5=*extremely useful*. Ratings can be considered to trend towards positive or negative based on the following scale:

Extremely useful	4.21 – 5.00
Very useful	3.41 – 4.20
Somewhat useful	2.61 – 3.40
Fairly useful	1.81 – 2.60
Not useful at all	1.00 – 1.80

Due to changes in the daily activities in 2014 relative to the previous year, most ratings cannot be compared from the first to the second year of the program. Comparisons are made when possible.

Week 1: UC Irvine June 16-22, 2014

Aside from the *June 20th lecture* with a mean rating of *very useful*, students rated all Week 1 activities as *extremely useful.* Students made a few suggestions pertaining to logistical issues, such as providing pre-program information and making certain lectures more interactive. Generally, students had commendations for the first week of activities as shown in Figure 2.

Figure 2. Student mean ratings of UPP Down Under Week 1 activities

Activity	Rating	Comments
Week 1: June 16-22, 2014 at UCI		
June 16: Student Orientation and Overview	4.67	• *I wish some of the information presented would have been provided earlier to students since more detail about the project earlier would have been appreciated. (2)* • *Communicate that there would be a shuttle to pick up students from the hotel at a designated time. Parking permits available throughout the entire duration of the program.* • *They are good and useful. Start with games to get to know partners. (3)*
June 17: Lectures on Urban Water Sustainability, Direct Potable Reuse, and Careers in Environmental Engineering	4.83	• *I especially liked the panel discussion on careers in environmental engineering since it was a great opportunity to speak with some professionals in industry. (2)* • *I really enjoyed the Careers panel. It is often hard to translate what we learn in class to a day-to-day job, and the program has done a good job at bringing in people with all sorts of background, working in a variety of fields related to water sustainability. (2)* • *The panel was great! (2)* • *More examples.*
June 18: Lectures on Climate Change, Drainage Systems, and Constructed Wetlands & Tour of OC Drainage Systems	4.33	• *It was helpful to have these lectures right before the tour of the drainage systems. (3)* • *Excellent.* • *More interesting lectures. More enthusiasm.* • *I enjoyed this tour very much.*
June 19: Lectures on Stormwater Capture, and Reuse & Tour of IRWD San Joaquin Marsh System	4.42	• *I would have preferred the tours to have been separated.* • *Very useful and informative. (3)* • *Great examples. More hands on.*
June 20: Lectures on Biofilter Treatment Systems	4.08	• *Lectures themselves were interesting but I think 7 hours of lectures was difficult for us students to sit through. (3)* • *Excellent.* • *Useful to provide background.* • *Perhaps tie the lectures more to engineering design.*

Week 2: UC Irvine June 23-29, 2014

The usefulness of Week 2 activities was rated very positively, as students assigned mean ratings of *very* or *extremely useful* for each activity. Again, students commended many of the activities, and also appreciated the change from groups of two to four during sampling trips to work more collaboratively. Students described the sampling visits as very helpful and that they provided context to supplement the lectures. Students provided some suggestions for future scheduling.

Figure 3. Student mean ratings of UPP Down Under Week 2 activities

Activity	Rating	Comments
Week 2: June 23-29, 2014 at Irvine		
June 23: Field Excursion - Old Laguna Sampling	4.17	• *It was a good first exposure to field work but I wish it was organized better so that we wouldn't have to sample all day and stay late in lab. (4)* • *I really enjoyed getting out to the field and sampling. I thought that the decision to combine us into groups of 4 for the second sampling trip was an important improvement from this day. I would have liked the opportunity to fully process the samples taken from this day. We did the initial sample processing, but I know a ton of work was done in the lab the following day by Meg, Stan, etc. Personally, the lab experience was a huge reason why I joined this program, and I would like to be a part of as much lab work as possible. In terms of comprehension of the whole research design, it is important to see the process through from start to finish. (2)* • *Good for one on one time to focus on specific tasks and reinforce topics covered in class.*
June 24: Lectures on Biofilters & Tour of CalTrans Biofilter	4.25	• *Great site to visit to see how various organizations are doing their part and collaborating with researchers. (5)* • *It's good to see real biofilters, not just learning about [them] on PowerPoint.* • *I wish there was more hands on design stuff for us to do regarding the biofilters.*
June 25: Field Excursion - Forge and Orchard Meadow Sampling	4.42	• *This second sampling day was a better experience than the first one. (3)* • *Better after being split up into groups of 4. Good for one on one time to focus on specific tasks and reinforce topics covered in class. (2)* • *Add in some breaks or lecture while doing sampling to tie in the dots.* • *Somewhat unorganized. Met at 8:00, but didn't leave [until] past 9, and many students were just sitting around not sure how to help.* • *Same as old Laguna.*
June 26: Detecting Human Pathogenic Viruses & Field Work Follow Up	4.33	• *This day was a good example of good balance with lecture, demonstrations, and lab work. (4)* • *It was very helpful to be a part of all the sample processing from start to finish for the samples from the second trip. I would suggest doing this before scheduling a second sampling trip so that we have a better grasp of what we end up doing with all our samples.* • *The material may have been somewhat hard to follow. (2)*
June 27: Lectures on Low Energy Treatment Systems & Tours of UCI Stormwater Capture Reuse Projects and South Coast Research and Extension Center	4.17	• *I enjoyed the tour of the pilot homes at South Coast Research and Extension Center since we were able to see things we could implement in our own homes to make a difference. (2)* • *I didn't find the UCI stormwater capture reuse projects very helpful. I actually found that title misleading because from what I gathered, they aren't really reusing stormwater. I really enjoyed the South Coast Research and Extension Center. It has been my favorite thus far, and I think that the research project quantifying water use for three different landscaped houses is a tangible way to understand how this all really makes a difference.* • *Excellent. (2)* • *The Tour of the UCI Stormwater Capture Reuse could have been a lot better if the lecturer/presenter had a mic (like the Campus Reps).* • *More information about the effects of low water requirement plants on the environment would be useful.*

Week 3: University of Melbourne July 1-6, 2014

Students rated the usefulness of field excursions in Victoria, Australia and a mini-symposium in Monash, Australia to their undergraduate studies and future plans. While students rated each day's field excursion activities to be *very* or *extremely useful*, individual comments noted some scheduling issues and lack of preparation for the activities. The mini-symposium activities received mean ratings of *very useful*, and while comments were positive, students also noted the presentations were too detailed and technical for everyone to understand. Figure 4 shows mean ratings and student comments for activities in the third week.

Figure 4. Student mean ratings of UPP Down Under Week 3 activities

Activity	Rating	Comments
Week 3: July 1-6, 2014 Field Excursions in Victoria, Australia		
July 2: Tour of Lab Facilities & Preparation of Lab Materials for Sampling	4.08	• *I liked getting an introduction to the facilities before we started working there. Most of the equipment was already familiar since we've worked with them in the United States. (4)* • *It was a good idea to prep the sampling materials ahead of time. A suggestion would be to use a template on word to print the labels instead of writing them all out by hand.* • *Good to see the preparation that goes into a field day. It could have been done a bit more efficiently (maybe have a video tutorial or table of key information available prior) but it was still good overall.*
July 3: Field Excursion - Lynbrook Biofilter Tour and Wetland Sampling	4.25	• *This was our first sampling site in Australia. I think it went really well since we've already practiced similar procedures earlier in U.S. sites. (2)* • *It was exciting to go to a much larger wetland. It took a long time to leave the laboratory to go to the site. We should have been told about the water proof boots since the first sampling day because a lot of people got their feet wet and were cold.* • *We had to start late this day and ended up staying out very late. If it's possible to ensure an early departure, this would be preferable. (2)*
July 4: Lectures on Economics and Governance & Field Work Follow-Up and Data Analysis	3.83	• *I enjoyed the lectures, which gave an overarching idea of how these kinds of projects work. Additionally, it is always interesting to analyze and see what we find from samples that we've personally collected. (2)* • *Jean-Daniel tended to have way too much material to present on. Due to this, he often had to speed through his slides. I found his content very interesting, and wish I had the chance to retain more of it. The data analysis portions would have been helpful once we were actually back in the US and working with data. At this point we hadn't seen any of it yet. (2)* • *Very brief and people who haven't taken Saphores's class probably wouldn't have understood the topics involved. Basically covered an entire quarter in a couple lectures and I know some people didn't understand most of it. Perhaps shorten and go more in depth. (2)*

Week 4: Victoria, Australia and Monash University July 7-16, 2014

Students evaluated the usefulness of Week 4 activities. As with previous weeks, overall, students rated the activities to be *very* or *extremely useful* for their undergraduate studies or future plans, but again noted concerns with the logistics and management of the activities, such as task allocation or needing information about basic statistics/designing experiments prior to field work in Australia. Several comments also addressed the size of the sites, mentioning that alternate transportation or some kind of preparation would have been helpful. Some students mentioned a desire to work with postdocs. Figure 5 presents the students' comments and mean ratings of the Week 4 activities.

Figure 5. Student mean ratings of UPP Down Under Week 4 activities

Activity	Rating	Comments
Week 4: July 7-16, 2014 at UCI		
July 7: Field Excursion - Hampton Park Sampling	4.25	• *This site was relatively larger compared to the other ones we've been to, so I feel there could have been more organization to make the process more efficient.* • *Helpful if we had a map of the wetland and knew where the stakes are placed* • *Very useful sampling day. (2)* • *This sight is huge, have some method of transportation besides only walking to cut down on time.*
July 8: Field Excursion - Royal Park Sampling	4.58	• *Having done sampling multiple times before, this last sampling day was by far our most efficient. Allocation of tasks could have been improved so that there weren't as many students without tasks to do while waiting for other students to finish. (2)* • *Helpful if we had a map of the wetland and knew where the stakes are placed.* • *I was sick did not go.*
July 9: Lectures on Urban Water Supply and Public Perception of Water Risks & Field Work Catch-Up and Data Analysis	4.42	• *I found these lectures really relatable and necessary for understanding how new projects are implemented. (2)* • *Public Perception Lecture was good- definitely something that should be kept in the program since it highlights public policy.* • *Sick, did not go.*
July 9: Lectures on Urban Water Supply and Public Perception of Water Risks & Field Work Catch-Up and Data Analysis	4.33	• *It was really interesting to get to see a water treatment plant in Australia. However, I feel that the lectures that the Western Plant gave may have been too technical for some of us students.* • *This was one of my favorite days! Western water was very hospitable, and I really enjoyed the mix of US and AUS presenters.(4)* • *Did not go sick.*
July 9: Lectures on Urban Water Supply and Public Perception of Water Risks & Field Work Catch-Up and Data Analysis	4.08	• *I thought this lecture was very useful and exciting in that we will get to utilize these learned statistical tools to apply to our data. However, it was a lot of information at once, especially for those who don't have much of a statistics background. (3)* • *This should be given after we have looked at our data. That way, it would be more beneficial for us to be able to ask questions pertinent to our projects. Otherwise, it was hard to know how this would all apply. (2)* • *Would have been nice to have had a data analysis lab session/workshop/tutorial.* • *Very useful, break this up into multiple sections so we can work with the post docs on some examples. (2)*
July 14: Tour of Monash Facilities & Lectures on Communicating Scientific Findings	3.92	• *Instead of touring Monash, we actually received a lecture and got to see some biofilter systems around the neighborhoods, which was interesting since we've mostly been working with wetlands. In conjunction with the communication lecture, I liked learning about how to interact with the rest of the community regarding water issues. (5)*

Week 5: UC Irvine July 17-20, 2014

Students rated the usefulness of Week 5 activities. Each day of Week 5 received positive ratings of *extremely useful*. Participants rated the tours highly and indicated an improved understanding of how wastewater is treated. Students noted the usefulness of the policies and governance lecture, but specifically, they indicated that they wanted to have more time for the tours as well as for an in-depth discussion of the policies. Figure 6 provides mean ratings and student comments for Week 5 activities.

Figure 6. Student mean ratings of UPP Down Under Week 5 activities

Activity	Rating	Comments
Week 5: July 17-20, 2014 at UCI		
July 17: Tours of OCWD, GWRS & OCSD	4.75	• *The sanitation district tour was a cool comparison to the Western Water District tour in Australia.* • *Was interesting to be able to see advanced water treatment technology and how it was integrated into the community and its water supply. Unfortunate midday flat tire caused us to arrive to the OCSD tour late, which was consequently rushed and not as informative as the other tours.* • *Awesome. Definitely keep for next year.* • *They were very useful. Seeing firsthand how these systems operate makes understanding their processes that much easier. (3)* • *Yes they show that recycled water is drinkable. It is perfect.*
July 18: Policies and Governance & Group Discussion	4.25	• *This really helped me put all the pieces of the puzzle together with governance, especially the activity they planned for us--if we had more time to understand and talk amongst one another, I think it would have been even more beneficial. (2)* • *Interactive activity where students acted as different members in negotiating a decision related to previously explored water issue in a treatment plant in Australia was great in giving students exposure to decision-making process and thinking from different perspectives.* • *I felt like we never actually talked about specific legislation, just vaguely about the role of governments. It would be interesting to go into specific policies and how they are enforced.* • *Great. It would be nice to include a panel of policy makers, lawyers, and managers to get their perspectives.(2)* • *I was not personally interested in policies.*

Week 6: UC Irvine July 21-25, 2014

Students rated the usefulness of most Week 6 activities as *extremely useful*, although the first day was rated as *somewhat useful* and the second day was rated as *very useful*. Many comments addressed the lack of time and knowledge of the statistics necessary to prepare final papers and presentations. Suggestions for the symposium mainly focused on increasing attendance. Overall, students felt the final week was helpful and informative, but feel that they need more time to prepare. Figure 7 shows the mean ratings and students comments for Week 6 activities.

Figure 7. Student mean ratings of UPP Down Under Week 6 activities

Activity	Rating	Comments
Week 6: July 21-25, 2014 at UCI		
July 21: Group Work & Informal Presentations of Data Analyses and Presentation Ideas for Review-Groups	3.33	• *I understand data analysis was supposed to have started earlier with guidance from Postdocs and Professors in Australia earlier, but that did not go according to plan. As a result, most of the students seemed to be lost without guidance this morning. Would have been nice to have had Stan and Meg at this point, since the feedback provided by them on Friday during practice presentations were very helpful and most likely would have affected the direction of our analyses if we had heard from them earlier. (2)* • *Practice presentations weren't useful. We didn't have anything to informally present yet. Time better spent preparing for final presentations in groups. (5)* • *More of a guided session with the statistics would be useful to help us model our data.* • *It was nice to have the free time to work together.*
July 22: Group Work & Practice Presentations for Review-Groups	3.58	• *Feedback was helpful, but additional guidance earlier, and more personally, is preferred. More time to work on the summary and presentation would have been appreciated. (3)* • *We did not practice the presentation until the day of, but I actually preferred this. By this point, we had just started the data analysis. (2)* • *Practice presentations were helpful. (2)*
July 23: Desalination Panel & Tour of Aquarium of the Pacific	4.33	• *Great panelists and the tour was a nice break during the hectic week. (5)* • *Good to learn about another method/technology to emphasize the diversity of water solutions. (3)*
July 24: Review of Final Papers	4.25	• *Professor Jiang was very helpful and thorough in reviewing our group's summary. I appreciated the benefit of her professional experience with the subject, and also that she understood the circumstances under which we were working, having been involved in the UPP program last year also.* • *Peer review is always very beneficial. It also helped to be able to sit down with the professors and edit the paper in its entirety. However, I would have preferred this happened earlier, as we did it 1hour before they were due. (4)* • *Nice to have time to work on papers.*
July 25: Final Presentations	4.33	• *It was uplifting to see people who we've met before show up to see our presentations and support us on this final day. Invaluable to be able to see the fruits of all the students' labor and the final conclusions that we came to. Contributors provided great constructive criticism. Final week itself with summary and presentation was great learning experience for future work.* • *I enjoyed the opportunity to practice presenting scientific findings. The feedback from the attendees was very helpful. (3)* • *We shouldn't have a gap in between presentations. I think it would be better to have them all after lunch so that more people can attend also.* • *I wish there was a bigger audience and it was more official. (2)*

Additional suggestions for improvement provided by students

Students provided suggestions to improve the UPP Down Under program activities for future years. For weeks 1-2, students primarily recommended mixing lecture and activity components throughout the day to avoid monotony. At the end of weeks 3-4, many students requested activity information in advance to optimize their learning experience. The primary recommendation from weeks 5-6 was to make multiple changes to ensure students have more time to work on their final papers and presentations. In addition, several students mentioned a desire to develop a poster as a final product along with the paper.

Weeks 1-2

More variety between lecture and activity components

- *I think having the professionals visit in the later end of the program might be more helpful and to go over the science first.*
- *As mentioned above, I prefer daily schedules with better balanced activities in order to have more variety.*
- *Try to mix field trips with lecture days as much as possible.*
- *More discussions would be useful instead of a day of straight lectures in the beginning.*
- *Integrate more hands on approaches within the first 2 weeks to be mixed in with lectures.*
- *I think splitting field work between USA and AUS is a really good idea. Maybe adding another career panel, that was my favorite "lecture" so far.*

Minor logistical improvements

- *Parking permits for the duration of the program. UCI resnet IDs available for the duration of the program. Shuttling schedule available for UCLA and UCSD students that stay at the hotel.*
- *Provide dinner for students in America.*
- *It just needs to be more on schedule. Other than that perfectly done.*

Providing accessible schedule information and activity direction

- *Can the slides presented be uploaded and provided to the students as the program progresses (at the end of each day). If there was a table or more diagrams for each topic/tour.*
- *A more thorough explanation of what is being done during sampling while being out there at site. So we are not just mechanically doing something without knowing why.*

Weeks 3-4

Providing pre-activity information and resources to ensure optimal field practice

- *I would have liked some more information about Australian governance and terminology before visiting Western Water.*
- *For sampling, it would be helpful if we had a map of the wetland and had markings of where the stakes are placed.*
- *Before any sampling begins, force students to formulate a hypothesis. It seems as though we did it backwards. We sampled first then tried to come up with questions that can be answered with our data. Be sure that students know that they will be coming up with their own projects.*
- *I would have preferred to develop research questions/ hypothesis prior to field sampling. That way, we could have modified the sampling design in order to be able to properly answer our final project questions.*
- *For field days, it would be great to have vans set and ready to go the day before to ensure an on-time start. Starting late meant some very late nights were spent in the lab, which was not ideal. Other than that, the program was great!*
- *Maybe just during the sampling show why we do it the way it is done.*
- *Teaching on the field for sampling concepts.*

Adding components to avoid monotony of lectures

- *Break up the lectures.*
- *Use more hands on learning rather than bombarding students with a variety of lectures.*
- *Include a panel of water lawyers, policy makers, and water managers.*

Weeks 5-6

Having more time to work on paper/presentations

- *All the groups used their time wisely for data analysis, but if we could have started the analysis sooner, it would have been nicer so we could have a nice paper to have at the end. I liked presenting on our topics, but there wasn't a large turnout and I think it was because [of] how long the presentations were. Maybe shortening the presentations and allowing for more time to write a short report instead of summary would be more beneficial because writing is essential.*
- *Have the schedule adjusted so the groups/topics are formed earlier so the students have more time to put their presentations and results together. Have a running online folder with the field datasheet information that is updated after each site. So by the time the students get to analyze the data, all the information is there and accessible.*
- *We need more time to work on presentations and papers. We only were given about 4 days for data analysis, paper writing, and PowerPoint making. Also, we should be required to make a poster because those can be used at various symposiums.*
- *More time to write the final paper.*
- *These were all really great. I hope we can just get more time to do what needs to be done.*
- *The project and presentation is a great hands on practice for organizing and delivering scientific information. A more interactive lecture that involved everyone on the computers learning the statistical methods at once would have been really helpful. Next time, I think that all of the data and statistics should be processed a little earlier so that the groups don't feel quite a crunch in turning in the papers and presentations. A little more time in this area would allow for more accurate and carefully analyzed results.*

Clearer expectations of final paper/presentation

- *A more streamlined goal for what the papers should accomplish.*
- *Have a more general idea of what we should be working towards with our papers and presentations. Also, bring the posters back as a requirement in addition to the papers.*

Miscellaneous

- *I would have loved to make a poster like last year's cohort. It's a great final product take-away from the program and can be used again in presentations.*
- *Focus less on informal presentations and more on group work.*
- *A bit more about desalination would be useful.*

Students listed other concepts or topics they would have liked covered during the UPP Down Under program activities, citing various specific engineering, water-related, and policy-related topics throughout weeks 1-4, and to a lesser amount during weeks 5-6. In the last couple of weeks, students requested more time to work with data and information on wetland construction.

Weeks 1-2

Engineering-related concepts/topics

- *Most of the lectures were more science based where I would have liked some more engineering lectures also to address the environmental engineering topics.*
- *More Engineering aspects.*
- *Maybe a little more on the engineering/design of infrastructure could be included. A more in depth coverage of traditional treatment methods in addition to the biofilter information would be nice.*
- *More about the physical design issues when creating a constructed wetland or biofilter. More of the engineering aspect in terms of what flows are allowed and how we can ensure the system meets more physical requirements such as flow speeds, retention times, and flood control.*
- *I would absolutely love to see design concepts for us who are more focused on the engineering side of things.*

Water-related concepts/topics

- *A lecture or speaker from Water Resources- provides a perspective on how reliant our current systems are and how they function.*
- *Besides storm water reuse, perhaps water conservation techniques and how to switch over to drought tolerant plants, as well as how this might change the environment.*
- *I would like to learn more about other water treatment systems. While natural treatment systems are great, it would be interesting to learn more about other systems, such as desalination. As an engineer, I want to expand my knowledge of the different methods of water treatment to be able to design own system.*

Policy-related concepts/topics

- *More policy, regulatory, and PR/public interest and awareness lectures.*
- *More policy and law since it's difficult to do scientific innovations without both of those.*

Background information

- *More background information before we go to sample. Additional information on both the site, and what samples we will be taking and how would be helpful! Most of us felt like we showed up to sampling days having no idea what we were going to be doing.*

Weeks 3-4

Engineering-related concepts/topics

- *More topics of the more engineering side of things.*
- *Perhaps a little more emphasis could be put on design, or a few more lectures could be dedicated to this topic. Sometimes the biology components heavily outweighed the engineering components.*
- *I would have liked more about the actual design phase of the constructed wetlands. This would explain what constraints were being imposed on the design team and what options were considered and which ones proved viable. I think this would give more context to the systems and be a nice window into the more technical aspects of creating a biofilter or constructed wetland.*
- *Much more engineering based topics such as design.*

Water-related concepts/topics

- *Possibly a brief introduction on Victoria's water system prior- One of the first speakers (Andrew Hamilton) did go over it; but I think it would have been easier if we knew more going into it. In general, it would be nice to the design plans for the various systems.*
- *More water conservation efforts.*
- *How to design a constructed wetland/biofilter.*
- *Water law and water management.*

Policy-related concepts/topics

- *Many of us had mentioned possibly more lectures on environmental/water law, and well as some coverage of more detailed engineering topics.*
- *More info on the millennium drought. Ie: Australian policies on water conservation during the drought, supply stats, etc.*

Miscellaneous

- *I really enjoyed hearing from the researchers at the University of Melbourne, so maybe more interactions with the grad students or researchers at the Uni would be nice.*

Weeks 5-6

Engineering/Water/Engineering-related concepts/topics

- *Alternative energy in combination with water recycling.*
- *More governance and policy as well as law.*
- *More engineering design concepts.*

More time to work with data

- *I don't think more topics need to be covered, I think the knowledge we received was all encompassing. But I think spending more time on each topic and more time to analyze the data would really help in learning the writing and presentation process of the research. Because that can be the hardest part of research--communicating what you have been working on to others.*
- *If there was more time to work with the data, the data analyses could have been more thorough. So if there was more time, more computer software or data analysis tutorials would make for better results.*

Wetland construction

- *How to actually construct a wetland!*
- *More specifics about the math and models used to create a constructed wetland with desired residence times and filtration rates.*

Miscellaneous

- *Maybe next year they can give groups the option of putting together a power point and paper as we did this year, or a poster like last year. That way, students can pick which they think will be more useful to them, and have the option of learning either form of data analysis and presentation.*

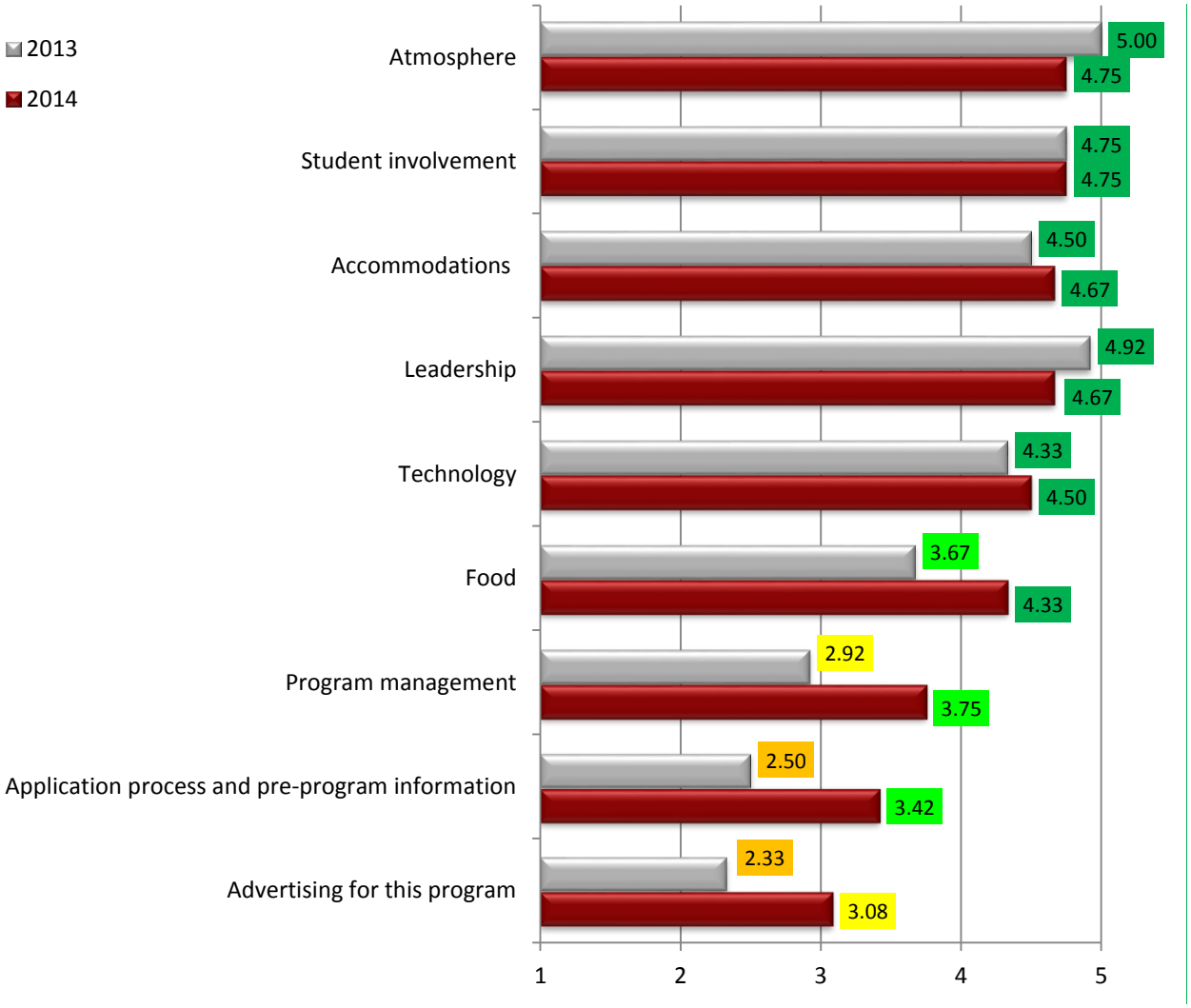
Logistical aspects

Students rated various aspects of the UPP Down Under program, including advertising, program management, and accommodations, on a scale from 1 to 5; 1=*poor* to 5=*excellent.* Ratings can be considered to trend towards positive or negative based on the following scale:

Excellent	4.21 – 5.00
Good	3.41 – 4.20
Average	2.61 – 3.40
Fair	1.81 – 2.60
Poor	1.00 – 1.80

When considering all logistical aspects of the program, results indicate that participants rated most to be *good* or *excellent*, but were least satisfied with the advertising. However, advertising ratings, as well as food, program management, and the application process, improved considerably from 2013 to 2014. Students were the most satisfied with the atmosphere, student involvement, accommodations, and leadership. These results can be seen in Figure 8 below.

Figure 8. Student mean ratings of logistical aspects



Students' suggestions for improvement

Students provided suggestions to improve aspects of the UPP Down Under program for the next year. Many comments were related to program organization, pre-program information, and costs for food.

Improved organization

- *A bit more organized so there isn't always waiting around periods. I understand samples need the 24-hour period etc., but there were other times where an hour was wasted due to cars not being available or just last minute running around.*
- *With time this program will naturally become more organized.*
- *More organization.*

Pre-program information

- *I would have appreciated more information about the program and its details earlier. I was lucky enough to know students who participated last year to help me fill in the gaps. I think that would attract more students. However, I do understand that there were logistical issues and delays. All faculty involved were really nice and helpful. Would be nice to have more meals provided for the program since we were given the impression that students would not need to spend much for the necessaries. Staff was generally prompt and professional in addressing our needs and suggestions throughout program.*
- *I would have liked more information about the program before it started and maybe an email introduction from the team members would be a nice warm welcome.*
- *Have more flyers out since the beginning of the year, have a page on Facebook, hold information session in the fall quarter, can even start a club.*
- *More information before the program starts.*

Food

- *Food was a major expense for many of us, if there is any way to incorporate some sort of food stipend that would be amazing.*
- *Maybe have more money set aside for meals for us. Each one of us spent quite a bit of money just on groceries and feeding ourselves every day.*

Content-specific

- *Perhaps new technology to observe chlorophyll concentrations.*
- *If I can refocus one thing in the program, it would be to target more ecology and marine biology majors instead of engineers. However, if much more design and other engineering facets are going to be included next year, then target environmental engineers again.*

Miscellaneous

- *Would be nice to have a more even boy to girl ratio.*

Impact of participation in the UPP Down Under program

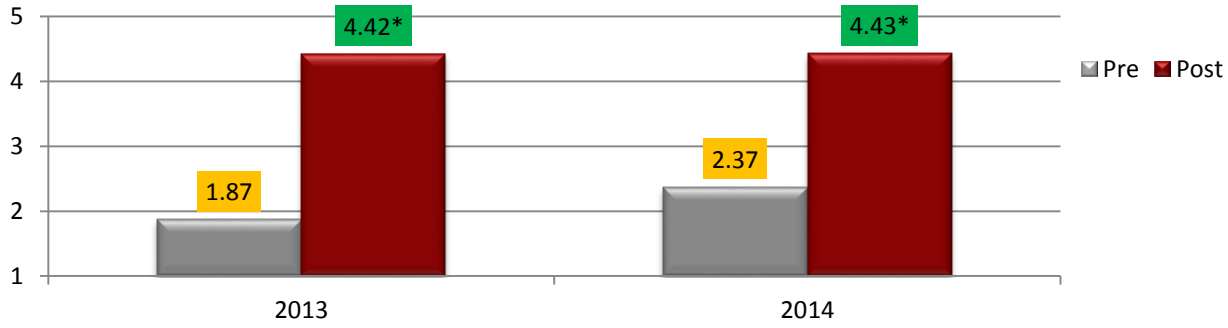
To assess level of achievement of goals 1-5, students completed questions at the end of the UPP Down Under program to reflect on their knowledge, skills, and understanding of urban water sustainability science before and after participating in the program. Students rated themselves in each of the goal areas on a scale from 1 to 5, 1=*minimal* and 5=*extensive*, considering their level of knowledge prior to and after their participation in the UPP Down Under program. Differences between reflective pre and post means were tested using a paired samples t-test and statistically significant differences in reflective pre and post scores are indicated with an asterisk. Means can be considered to trend towards positive or negative based on the following scale:

Extensive	4.21 – 5.00
Good	3.41 – 4.20
Moderate	2.61 – 3.40
Fair	1.81 – 2.60
Minimal	1.00 – 1.80

Goal 1: Knowledge/Research/Discovery

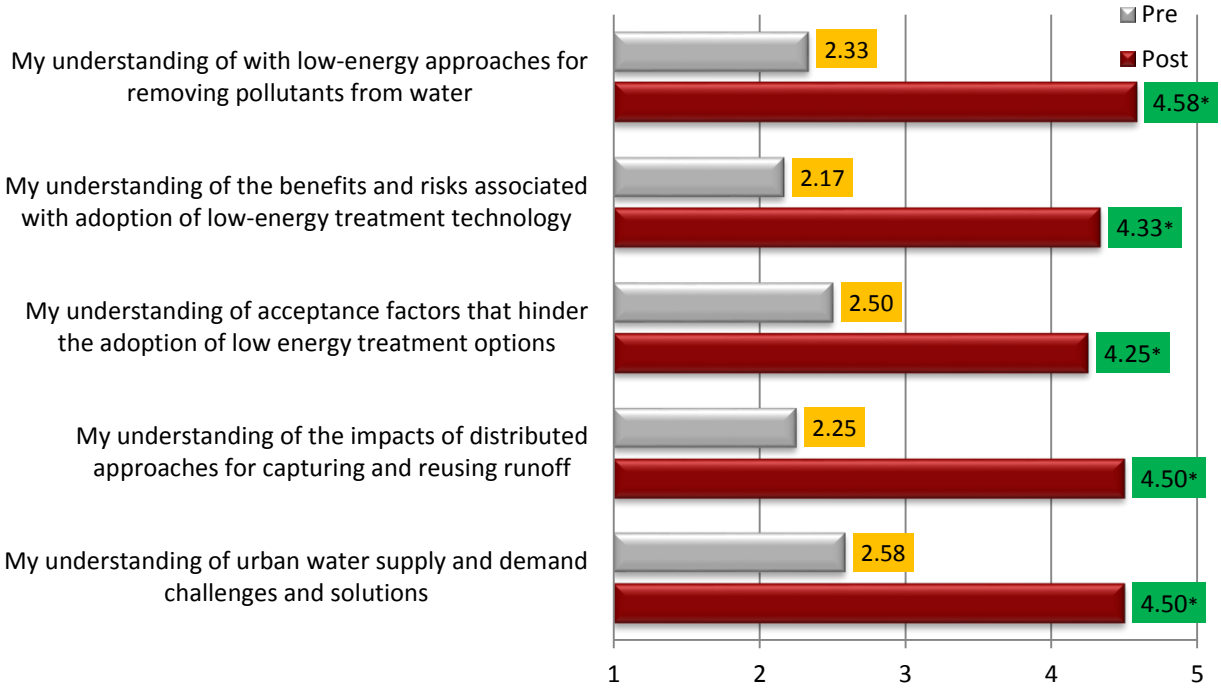
When asked to reflect on their knowledge and understanding of sustainable urban water systems, 2013 and 2014 students rated themselves as having a *fair* understanding prior to participation in the UPP Down Under program. Their ratings showed statistically significant improvements with *extensive* understanding of sustainable urban water systems after participation in the UPP Down Under program. Results are shown in Figure 9. The 2014 ratings of pre-program knowledge were higher than 2013 possibly indicating that the Water PIRE program is having a greater influence on the general student population at UCI.

Figure 9. Students' average Goal 1 impact ratings before and after participation



Students' evaluation of the individual items that make up the Goal 1 composite also improved significantly with students rating themselves as having *extensive* understanding of sustainable urban water systems on all items after participation in the UPP Down Under program. These results are displayed in Figure 10 below.

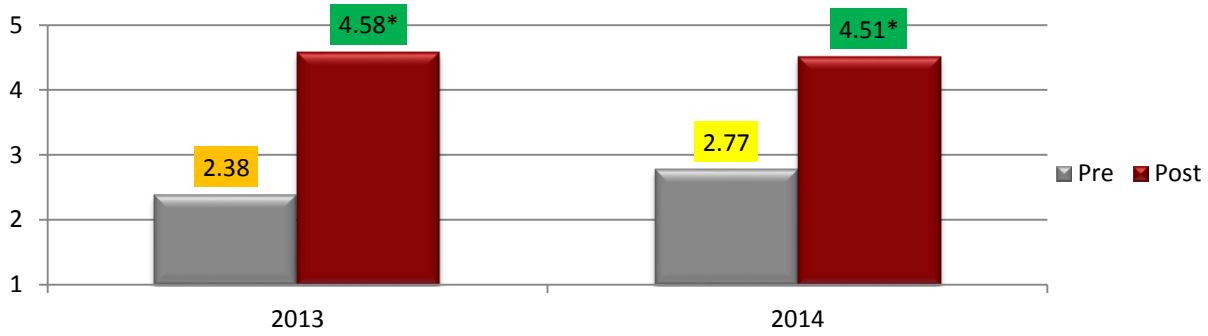
Figure 10. 2014 students' Goal 1 impact ratings before and after participation



Goal 2: Education/Workforce Development

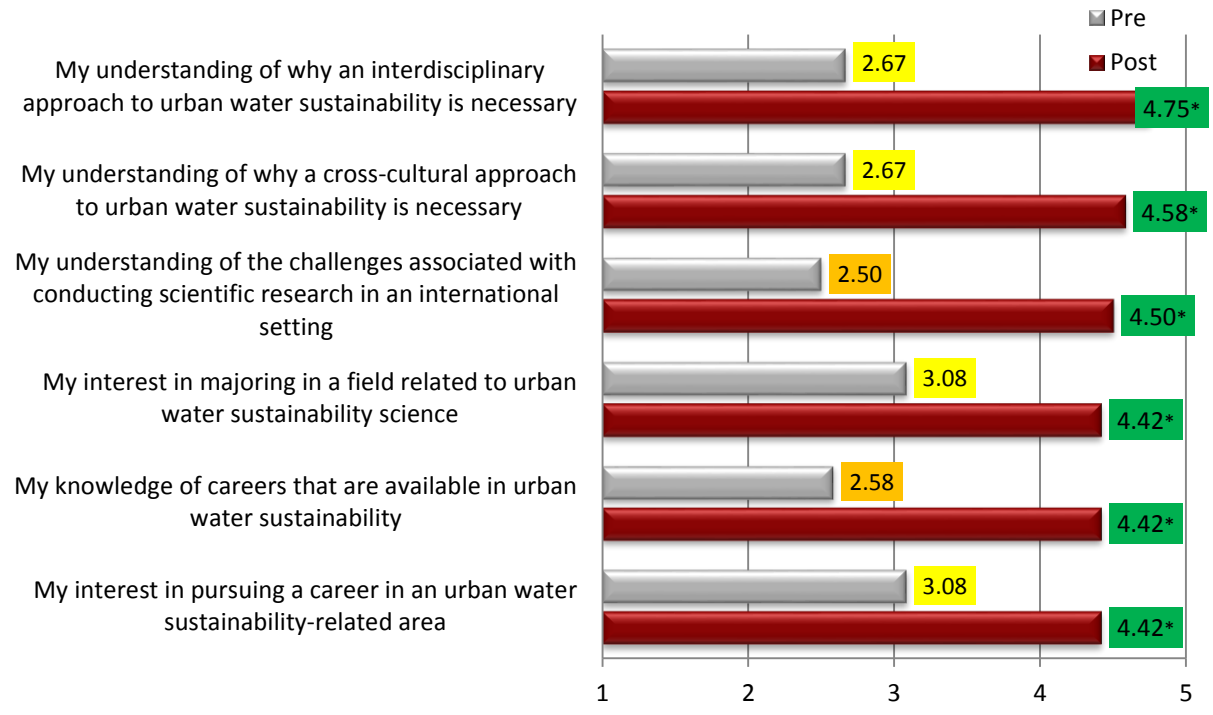
Students also reflected on their understanding of using interdisciplinary and cross-cultural approaches to urban water sustainability and their interest and knowledge of careers in urban water sustainability. Students reflectively rated themselves as having *fair* (in 2013) to *moderate* (in 2014) understanding prior to participation in the UPP Down Under program. In both years, students indicated an average rating of *extensive* understanding by the end of the summer program. These findings can be found below in Figure 11.

Figure 11. Students' average Goal 2 impact ratings before and after participation



Students in 2014 also reported statistically significant improvements in all Goal 2 items after participating in the UPP Down Under program. Figure 12 below shows the results from the individual items that make up the Goal 2 composite.

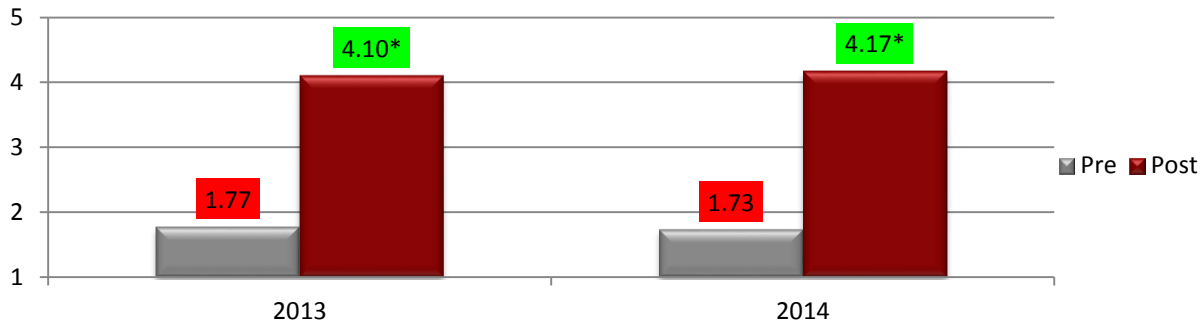
Figure 12. 2014 students' Goal 2 impact ratings before and after participation



Goal 3: Partnerships

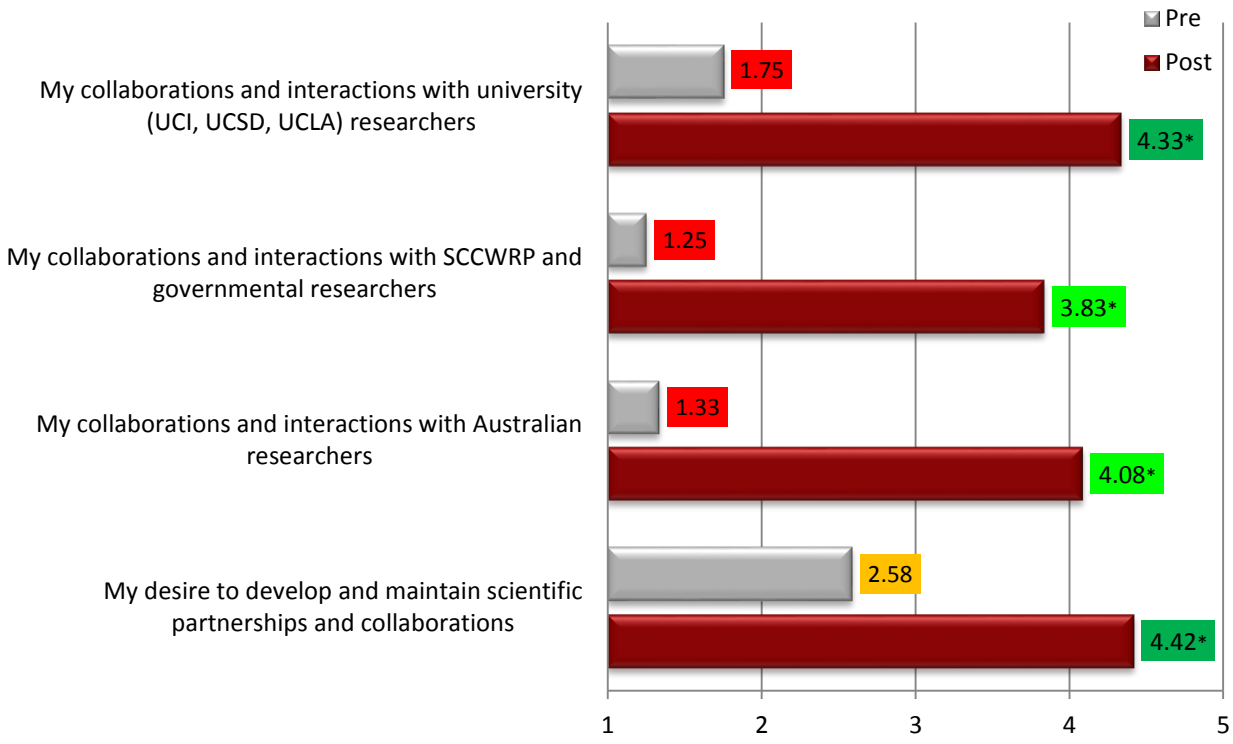
In reflecting on collaborations and interactions with other researchers, 2013 and 2014 students on average rated themselves as having *minimal* interactions with other researchers before joining the program. Average ratings increased significantly by the end of the summer, with students rating their partnerships as *good*. Results are shown in Figure 13.

Figure 13. Students' average Goal 3 impact ratings before and after participation



While students rated that they had *minimal* interactions with researchers before the program, they did have a *fair* amount of interest in developing those partnerships and collaborations. After participation, student ratings showed statistically significant improvements in all areas regarding their scientific collaborations and interactions. These findings can be found below in Figure 14.

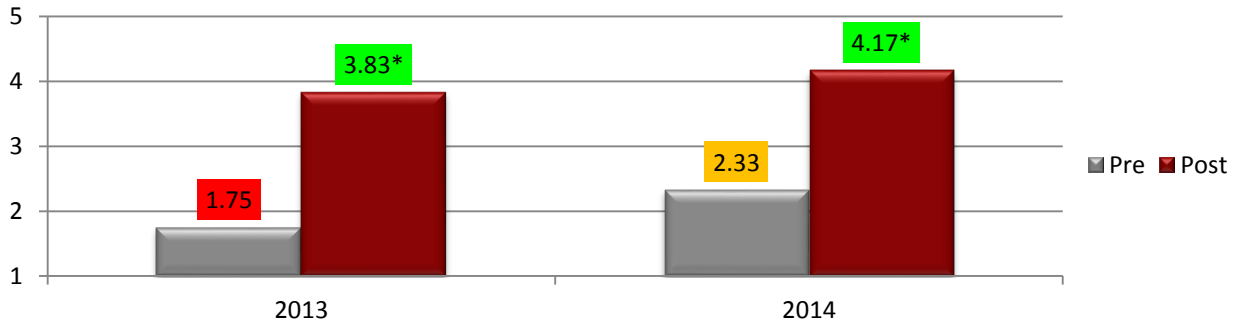
Figure 14. 2014 students' Goal 3 impact ratings before and after participation



Goal 4: Institutional Capacity

At the end of the UPP Down Under program, students reflected on their knowledge of how to work with their university to participate in a research abroad visit. Prior to participation in the UPP Down Under program, students reflectively rated themselves as having *fair* knowledge of how to work with their university to participate in a research abroad visit, a slight increase from 2013. After participation in the UPP Down Under program, both 2013 and 2014 student ratings showed statistically significant improvements and rated themselves as *good* in this area. Students were only asked to rate one item for Goal four. Results are shown below in Figure 15.

Figure 15. 2014 students' average Goal 4 rating before and after participation



Use of information learned

Students rated their likelihood of using the information they learned in the UPP Down Under program in their studies, research, or career on a scale from *not likely* to *extremely likely*. Results were very positive, as ten of the twelve students indicated they were *very likely* (8%) or *extremely likely* (75%) to utilize the information they learned. They primarily plan to incorporate what they have learned in their future graduate studies and with prospective employers.

Desire to pursue degree at the graduate level

- *What I have learned in this program will guide me in what I will continue studying and maybe researching during my pursuit of an M.S. degree, which will consequently affect my future career. More specifically, what I've learned has not only expanded my knowledge but also broadened my perspective on the topic of urban water sustainability.*
- *I plan to attend graduate school for Environmental Engineering, and have always been passionate about water. Initially, I was interested in water simply because all of my favorite courses had been related to water. Now, I have gained a tremendous amount of hands-on experience in the field of urban water management. I know these skills and experiences will benefit me as I pursue higher education, and ultimately, a related career. This program has given me both a broader and deeper understanding of the challenges faced in urban water management in a way that I feel equipped to have intellectual conversations with professionals in the field.*
- *I want to pursue graduate school in water sustainability and I would love to continue with PIRE as a graduate student. (3)*

Will implement knowledge gained at current or future places of employment/internship

- *I am very interested in working on the development of the potable re-use program in San Diego, and am actively applying to internships and entry level positions. On a broader scale, I can use this experience in many ways, as it has taught me a lot about collaboration, lab work, and field work.*
- *If I end up going to a field such as well hydraulics or ground water modeling, I will have a broader understanding of the water system.*
- *The new information has provided me with ideas I can use/ suggest to future employers.*
- *For my career, the knowledge I have gained from this program in regards to the current government, research, public reception, and infrastructure (facilities) has given me a better understanding about the*

dynamic among them. In my interactions between fields/parties, I will be better informed about where they are coming from (what goals and challenges they have). For research, I have a better understanding of current infrastructure and consequently, feasibility that should be considered.

Public presentations and outreach

- *Wherever I end up in my career, I can pass along the knowledge I gleaned from this program and explain to people I encounter the ways that water can be sustained, captured, and reused.*
- *My experiences with communication across multiple disciplines, as well as the presentation and speaking skills I have learned.*

Familiarity with research methods

- *I will know how real research is done.*

Next professional steps

Students detailed their next academic and/or professional steps, and indicated whether or not participation in the UPP Down Under program influenced their path. All respondents plan on either entering graduate programs or careers in water-related issues or using what they have learned about water science in their future work.

Plans for graduate, post-graduate study / law school in water-related field

- *I will [be] pursuing an M.S. degree in Environmental Engineering and Science coming fall. Participation in the UPP Down Under program has solidified my interests in this field and helped me understand better what aspects of it I was specifically interested in. Undoubtedly, this program will also influence my future career decisions. (3)*
- *I will begin studying for the GRE and take the exam at the end of summer. I wasn't sure if I wanted to pursue a masters or doctoral degree. However, now I see how rewarding it is to work out in the field/lab and working with others who share the same interests and desire to solve current problems. (2)*
- *Yes, I want to go to law school and study water law.*
- *The next step is to finish my BS in Env. Engineering. I plan to go into industry after that, but the UPP program has encouraged me to perhaps pursue an MS degree, so I may do that in combination with starting work. UPP has absolutely sparked my interest in a post graduate degree.*

Pursuing employment

- *Get a job in writing. My participation in the UPP Down Under program has influenced my next steps in that I will take the knowledge and appreciation for water science with me and share it with my future colleagues.*
- *I plan on working and then going back to school. I now know what research is like and how a good team can make the experience enjoyable, and how conflicts can also arise. (2)*
- *I have one more year as an undergraduate. Then I hope to get a job in something like well hydrology, but if I cannot get said job within a year or so I plan to return to grad school. This program helped me understand what grad school might be like for me.*

Uncertain

- *I am uncertain if I want to work in the industry first or go for a master's degree after I graduate next year. I still have one more year of school so I am still keeping an open mind. My participation in the program has not really influenced my next step in any way. However, I feel that I am better informed about many different career paths now and will definitely keep them in mind.*

Students would like to share the following with project directors:

- *All in all, I thoroughly enjoyed the program. I've learned so much, both about water sustainability and about myself. I highly recommend it to future students.*
- *I LOVE YOU ALL THANKS FOR SUCH AN AMAZING EXPERIENCE!!!*
- *Great job and thank you so much! It was a great experience for me. I learned a lot and enjoyed it immensely. I really appreciate all the hard work and time you put into this program. I look forward to seeing the program grow and its future accomplishments.*
- *Thank you so much for everything! The entire experience was amazing. I feel like I learned so much about how to be a better student, researcher and professional. I know a lot of people generously donated time and energy to the program, and I am extremely grateful for the opportunity. Your hard work has certainly opened many doors for me, and I'm excited to continue working on projects like this.*
- *I thoroughly enjoyed everything. Great program. Really pleased I participated and would recommend it to others in the future.*

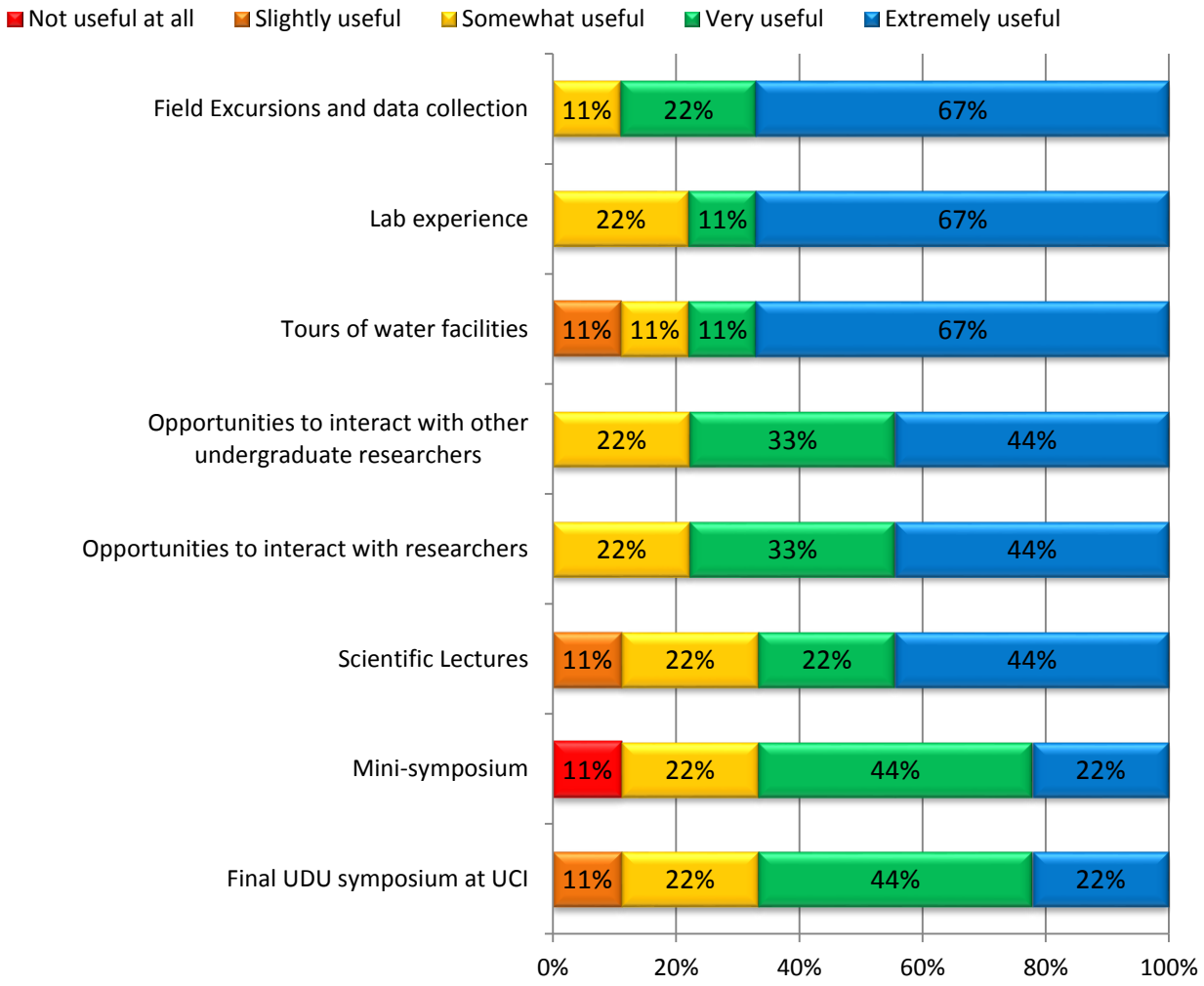
Follow-up with 2013 UPP Down Under students

Usefulness of program activities

Of the 12 students who participated in the UPP Down Under program during the summer of 2013, nine completed a follow-up survey to determine how the program influenced their academic and career trajectories.

Students reflected on their participation in the program and rated the usefulness of project components for their professional and personal development. Activities were rated on a scale from 1-5 where 1=*not useful at all* and 5=*extremely useful.* Ratings are provided in Figure 16. The highest rated activities, field excursions, lab experience, and tours of water facilities, were rated as *extremely useful* by more than half of the students (67%). Over 75% rated the opportunities to interact with other researchers (including undergraduate students, graduate students, postdocs, professors, and non-academic professionals) *very or extremely useful.* Over half (66%) rated scientific lectures, mini-symposium, and final symposium *very* or *extremely useful.* Overall, students rated program activities *very* or *extremely useful.*

Figure 16. 2013 participant's rating of usefulness of program activities



When asked about the most valuable aspect of the UPP Down Under program to their professional and personal development, participants commented about experience and knowledge gained, connections to other professionals, and inspiration to pursue further education. In addition, several mentioned the value of developing relationships and collaborations with other researchers and other fields of study.

Relationships and collaborations

- *The opportunity made long lasting relationships with undergraduates, professionals, and professors. Also, the opportunity the conduct research in a different country on water quality and water resources.*
- *I saw how collaborations can get you to another country.*
- *Network! Development of different social skills and realization of social skills that I need to develop, seeing how other researchers interact with one another and the hard work that goes into research, learning that the scientific method does not happen as 'linearly' as we're taught in school. Realizing my appreciation for nature and how important it is to preserve it not just for future generations, but just for the sake of it as well. Saw great leadership among faculty as well.*

Experience and information gained

- *Hands on experience with field research, networking with other students in the same field and working in the field and lab with professors in Australia and the USA.*
- *Learning about waste water treatment plants. The company I now work for deals with various waste water treatment projects.*
- *The most valuable aspect was the field excursions and data collection because they are skills I used in my undergraduate research and skills that I hope to use in my future career.*
- *No correlation between the proxies and nitrogen or phosphate concentrations. While the sampling and laboratory experience was interesting to me, the most valuable thing I learned was the coordination involved in solving multi-faceted problems such as droughts. In particular, I started understanding the importance of collaboration between scientists from different fields (engineers, planners, economists) to resolve these environmental issues. This made me aware that the benefits of research are not realized unless there are open channels of communication with the public.*

Impact on future plans

- *Inspired me to pursue graduate study in environmental engineering.*

Growth in goal areas

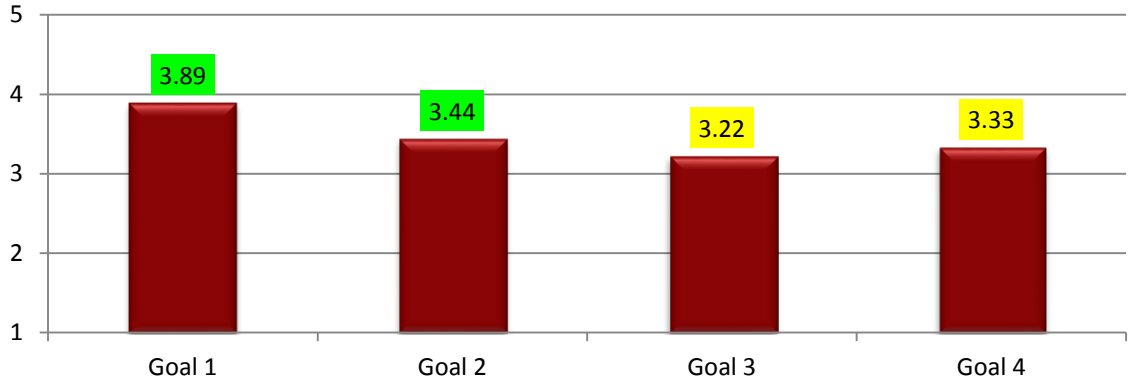
Students rated the amount of growth they had in each of the four goal areas due to participation in the UPP Down Under program. Growth was rated on a scale of 1-5 with 1=*no growth* and 5=*great growth*. Ratings can be considered to trend towards positive or negative based on the following scale:

Great	4.21 – 5.00
Good	3.41 – 4.20
Moderate	2.61 – 3.40
Little	1.81 – 2.60
None	1.00 – 1.80

Goal 1: Knowledge/research
Goal 2: Education/workforce development
Goal 3: Partnerships
Goal 4: Institutional capacity

On average, students noted *moderate* to *good growth* in each of the goal areas, with the most growth occurring in Goal 1: Education/research. The average growth for each goal item is presented below in Figure 17.

Figure 17. 2013 students' average growth in each goal area



Impact on academic and career plans

Participants completed a series of questions related to personal and professional decisions they have made and whether or not (and how) participation in the UPP Down Under program influenced those decisions. Figure 18 provides information on the nine follow-up survey respondents. Each student's gender and ethnicity are included and information about their major, current status, future career plans, achievements since program participation, and the influence of the UPP Down Under program on relevant areas are provided. Students' progress will be tracked all five project years.

Influence on choice of major

Eight of the nine respondents were pursuing a STEM related major prior to participation in the UPP Down Under program. None declared or changed a major as a result of participation.

Influence on decision to attend graduate school and career plans

Participants who are currently in graduate school responded to whether or not the program influenced their decision to continue their education. Those who are not currently in graduate school were part of a skip pattern in the survey and did not respond to that specific question, indicated by N/A in the table. Four of the five current PhD students indicated that participation in the program played a role in their decision to attend graduate school, one expressing a desire to become a leader and specialist in the field. Of the four participants who are not currently in graduate school, two expressed a desire to attend and attributed participation in the program to these long-term career goals. One of these two participants was a social science major as an undergraduate and is now interested in working outdoors with water science. While she expressed interest in pursuing a PhD in a water related field, she also mentioned an interest in pursuing a cognitive neuroscience PhD. The other was an environmental engineer, she has continued to work as an engineer, and has long-term goals of working on water related projects and attending graduate school. She attributes these goals to participation in the UPP Down Under program. More than half expressed that the program helped them personally or professionally and played a role in their career plans.

Influence on achievements

When asked about achievements (internships, research, publications, and/or involvement in solving urban water sustainability problems) four participants described water-related research, internships or projects that have followed the program, and one additional participant continues to support and advocate for water sustainability.

Figure 18. 2013 PIRE UPP Down Under follow-up participants

Student	Major	Current status	Project played role?	Achievements	Long-term career plans	Project played role?	Additional personal or professional Influence
1 Male Asian	Biological Science	PhD student: Scripps Institution of Oceanography	No	Supporting and advocating for water sustainability	Professor in Marine Biology	No	Yes: It subsided fear for greywater treatment and reuse
2 Female Caucasian	Environmental Science	PhD graduate student: UCI, Environmental Engineering	Yes: Graduate school seemed much less scary	• Presentation of research: PIRE PI Conference, May 2014, Washington, DC. Oral presentation about student experience • Senior project at UCLA focused on researching and recommending methods for water efficiency at small nonprofit summer camp • Urban water research	Work for a non-profit to encourage urban water sustainability	Yes: Clearer understanding of what water solutions would want to be part of	No
3 Male Hispanic	Chemical Engineering	PhD graduate student: UCI, Environmental Engineering	Yes: Become a leader and specialist in field	• Engineering Intern, Moulton Niguel Water District, June 2014 to present • Leading an aggressive water conservation effort at Moulton Niguel Water District	• Graduate with a Ph.D. • Professor at a research university.	Yes: Enjoy working to discover new knowledge and helping people	Yes: Created more lectures with guest from industry
4 Female Caucasian	Environmental Engineering	Undergraduate at UCI	N/A	--	PhD	No	No
5 Male Asian	Civil Engineering	PhD graduate student: UCI, Environmental Engineering	Yes: The program strengthened my resolve	--	Work in industry and continue research	No	No
6 Female Asian	Atmospheric, Oceanic, and Environmental Sciences	PhD graduate student: UCI, Civil Engineering	Yes: Became involved in PIRE at graduate level.	--	• Complete PhD • Work as a professor	Yes: Decided to go to graduate school	Yes: Networked with professors and entered graduate school
7 Female Asian	Social Science	Employed as assistant clinical research coordinator	N/A	• Non water related internship • Urban water sustainability research	PhD in water related field or cognitive neuroscience	Yes: Created more interest in working outdoors	No

Student	Major	Current status	Project played role?	Achievements	Long-term career plans	Project played role?	Additional personal or professional Influence
8 Female Caucasian	Environmental Engineering	Employed in non-academic position: staff engineer	N/A	--	• Graduate school • Work as engineer in water resources, consultant in private sector/municipality • Work for a state agency • Own firm	No	Yes: Helped to better understand what role could be played in solving water sustainability issues
9 Female Hispanic	Environmental Engineering	Employed in non-academic position: civil engineer	N/A	Intern at Tetratech Irvine Surface Water Group Feb 2014 to June 2014	• Continue working in water resources • Explore career opportunities in projects involving water distribution systems, environmental remediation, water quality • Return to school to complete a MS	Yes: • Openness to attend graduate school • Provided idea of what life would be like as a graduate student • Realized should explore field of civil and environmental engineering before embarking on graduate school plans	• Learned about research, how theories developed, tested, communicated. • Most invaluable experience received was growth in presentation skills and confidence to express ideas to other people in multidisciplinary fields

Australian Partner interviews

Background

The purpose of the UPP Down Under Partner Interview is to assess the quality of the undergraduate students' experience abroad, the hosting institution's experience, and to identify ways to improve the program. To conduct interviews with the partners, the evaluator contacted the coordinator of the UPP Down Under program for the names and contact information of the partners in Australia. Next, the evaluator emailed each of the partners to set up dates to conduct a telephone or Skype interview. The evaluator conducted interviews with six of the seven Australian partners in the fall following students' return to the U.S. Six of the partners work at the University of Melbourne and one works at Western Water. Several attempts were made to include all faculty partners, but one member was not available for an interview at any of the times contacted. Interview responses were written, typed, and are provided below.

Partners' role on the PIRE project

In explaining their role, half of the partners indicated they are working on the PIRE project beyond the UPP Down Under program, while the other half mentioned that they have a minimal role.

- *Hosting PhD students and guest lecturer for the UPP Down Under Program.*
- *Working on research with David Feldman.*
- *Looking at the impact of urban flooding with Brett Sanders and Joe S. at UCI.*
- *Very small. Spoke with students along with 2 other presenters (senior academic and postdoc) on the progressions into an engineer career.*
- *Whenever Stan brings students to Australia, I engage students in panel discussions.*
- *Don't have a role (not really part of the project). I have a relationship with Vin Pettigrove since we do research together.*

Partners' interactions with students

Partners described their level of engagement with the students including the setting in which those interactions took place. The predominant locations of partner-student interactions occurred either at the University of Melbourne or at the Western Water treatment plant. Partners mainly reported having informal conversations with students and engaged them through various Q&A sessions.

- *2013: Tour of Western Water treatment plant, which is the largest in the world. 2014: In an informal lecture area (in addition to an outdoor setting) in the Engineering Department near the water lab where water samples are located. Faculty engaged with students through a panel discussion and Q&A session on careers in water sustainability.*
- *Interacted with students in study area at the University as well as on the bus and facility during the field trip and tour. As they were restricted to the bus during the tours, interactions were casual and mainly included a series of presentations by faculty and Western Water.*
- *From the university, students took a bus on a field trip to visit rain gardens in a suburban, residential area of Melbourne. This is the only location of intensive application of rain gardens. Led the tour and explained how the rain gardens work. Students expressed interest in the topic and participated in a Q&A session with PIRE partners.*
- *In "lecture" area. Informal, off the cuff interactions with Q&A.*
- *Open discussion with students about water issues. Colleagues (other faculty members) participate as well. Few hours of Q&A discussions.*
- *One day with presentations in the morning and tour of the treatment plants at Western Water where the project is based. Students were mainly looking and listening on the bus tour, but some asked questions.*

Discussion topics

Partners recounted the topics they reviewed during their time with students. Most partners focused on the ecosystems and research in Australia, how this informs issues with water management in the U.S. (specifically, California) and career/research opportunities for students in the field of engineering.

- *Topics included the study of storm water treatment wetlands, sewage systems in Australia, history of Melbourne's ecosystem, what we can learn from different parts of the world, and how this all ties to the issues faced in California.*
- *Integrative watershed management, ecosystems and their economic and social values as well as potential threats.*
- *Discussed the impacts of organized and strained ecosystems in addition to how to mitigate the impacts such as by using rain gardens.*
- *Engineering career (good/bad) choices, staying in math even if student is going into environmental engineering, funding opportunities in other countries, integrating family into the academic life, how to be mobile and open to moving, challenges of choosing the right grants.*
- *Timeline of research, expected outcomes, consulting work, how research informs the link with different industries, some theory and applied work, level of resilience in the US.*
- *Mainly showcasing project to show people from the other side of the world what they're doing. Discussed water quality offset framework, offset of recycled water.*

All partners believe the students were academically prepared, had a basic understanding of Australian cultural norms, and were willing to host the students again next year. Five out of the six partners said they were willing to engage students in hands-on research. Partners' specific comments follow:

Students' knowledge and preparation

Mentors explained that the students had enough general knowledge and academic preparation to participate in a discussion of the research topic. Generally, mentors felt their students had adequate content knowledge relative to their education level.

- *Very good students. With the intimate setting, it was an interactive discussion. The students are "switched-on" and had appropriate questions. The students also come from diverse backgrounds even though it was geared toward engineers.*
- *Very good knowledge, and appreciation for general understanding and interest in hydrology water quality and how the systems work.*
- *Very knowledgeable and engaged. "Not greeted with silence." Had a lot of good questions.*
- *Not technical, but they definitely thought about bigger ideas and implications. Quite impressed with the students. About half of them offered opinions or asked questions.*

Students' background of research skills

Partners were asked generally about what type of research skills would be necessary for students to have before they arrived in Australia in order to engage students in hands-on research. Three of the six partners were concerned about not having enough time for students to do more than field work. However, many were open to the idea if it was organized appropriately.

- *I agree with student comments that the program needs to be more interactive. They would need some understanding of water quality structures (water storage, run off, effects of treatment plants, healthy aquatic systems, stressors).*
- *Not really appropriate or necessary since the students can only do so much while they are in Australia*[5]*. It may be useful to include expertise from Monash faculty (such as David McCarthy).*
- *In such a short time, nothing more than field work and collecting water samples would be necessary for this research. In that case, students would have to be willing to get their hands dirty. Any undergraduate student would be able to help with that. If there was more time to organize, then I would say being able to analyze data and have basic math skills necessary for those calculations.*
- *Don't know enough about the PIRE project, but maybe field work for research conducted in rural Victoria (as opposed to urban locations). Students won't need in-depth research skills (e.g. conducting analyses or identifying plants/animals). I'm willing to play the same role as this past year.*
- *Wouldn't be appropriate to have students engage in hands-on research with such a short amount of time in Australia. However, if it was organized some skills students need are a basic understanding of statistics, environmental statistics (time series, spatial concepts) and knowledge of ground water research. High level statistics would be too much.*
- *Definitely! It would be great to do ongoing collaborative work. From the business perspective, this is very exciting. They even had articles in the local paper about having visitors from Southern California to implement what was learned in Australia.*

Students' cultural capabilities

The partners were generally satisfied with regard to the student's cultural competence since their culture is similar to that in the U.S.

- *No issues, everything fine.*
- *Fit in perfectly fine.*
- *Not a challenge.*
- *No one looked confused. Hard to tell when they didn't really have a discussion. Joked with students that it was okay if they did not understand the accents, and provided some terms that were different in Australia.*
- *Found that Australia is more egalitarian compared to those in the U.S. For example, students referred to the PI as Professor Grant while at UCI, but in Australia got use to calling him Stan as students often do in Australia. Students expected too much of a hierarchy, but they were a very aware cohort and great kids.*

Partners' willingness to host more PIRE students

Partners were asked based on their experience if they would be willing to host PIRE students again next year. All partners indicated that they would welcome future students, with two partners each making a comment about the importance of sharing their work with others.

- *Definitely! And will involve the students more next time around.*
- *Will discuss with staff what the priorities would be.*
- *Because it's not exactly "showing off," but allows one to share with the world and enhances the connection with UCI. One student was inspired by the work and may now go to University of Melbourne.*
- *Stan and the Engineering Department at Melbourne will engage students again. Graduate and PhD students were a very valuable addition to the program.*
- *Happy to do the same thing again.*
- *Western Water is very excited to share their work with others.*

[5] This respondent answered "no" when asked about engaging students in hands-on research (see Figure 21).

Partners' relationship with PIRE project after mentorship

Partners were asked if hosting the PIRE student affected their relationship with UCI and the project, and if the relationship strengthened, stayed the same, or weakened. Four partners believed that it had strengthened, whereas two partners thought it had stayed the same since they were quite familiar with the project to begin with. Most notably the partners discussed the significance of the collaborative efforts of this project.

- *Currently, co-supervising a UCI student with a UCI advisor and researcher. She (the student) will be visiting Australia soon (University of Melbourne) and is from the first cohort of UPP Down Under students.*
- *There is no direct effect on the day-to-day activities, but it has reinforced links with colleagues and students alike. For example, hosting international students provides support to speak with other researchers or postdocs.*
- *No direct experience, but met UCI faculty (Stan, David, Jean) to work on research. Positive because of collaborations without responsibilities and to open up future opportunities with a potential for larger work.*
- *Definitely! Wasn't connected with some researchers and students before, but now has LinkedIn contacts at UCI.*
- *Hard to say. It's good to have chats with colleagues, but there's not enough time.*

Partners' suggestions for improvement

Partners made the following suggestions to improve the UPP Down Under program. Partners mainly noted the organizational aspect of the program and recognized that advanced planning could help with facilitating staff meetings, documenting activities, and simply doing more with the students.

- *Recognize that is takes a lot of planning, but it works out well.*
- *Organization. Document activities and more meeting minutes/outcomes/next steps. Group of fun, wonderful people. Challenge is the distance; things don't always work out the way you want (e.g. technology).*
- *Although I was involved in one day only, one suggestion was to potentially think about more things to do with the students and allow enough planning time for that to make it more interactive.*
- *Coordinate more time for staff to interact with each other. It would be beneficial for everyone.*
- *Perhaps more of a discussion with students instead of presenting information.*
- *Don't know enough about the project to comment.*

UPP Down Under partners would like to share the following with project directors:

- *This part of the project is working well.*
- *Great initiative! Happy to lend a hand.*
- *This is a great opportunity for students!*
- *More than happy to be involved. Keep in contact and do it again next year.*

American Indian Summer Institute in Earth System Science

Background

The American Indian Summer Institute in Earth System Science (AISIESS) two-week program was held at UC Irvine in Irvine, California and in the La Jolla Band of Luiseno Indians Reservation Campground in Pauma Valley, California from June 29 - July 12, 2014. AISIESS is a UCI-run program in which PIRE students and faculty participated as part of K-12 mentoring. In this program, high school students learn about Earth System Science and how to address environmental issues faced by tribal populations. They also receive support in preparation for college (e.g. study skills, dorm life, etc.) and guidance throughout the college application process. During the July 8-11 timeframe, the 2014 UPP Down Under participants in Australia interacted virtually with the ASIESS students to help them with their research projects, and one UCI faculty member led a marsh tour and discussion on water sustainability in southern California.

Evaluation participants

PIRE participants engaged with the 35 students in the AISIESS program. Participants were primarily female (71%) and many were in their senior year (40%). Most were residents of Arizona (31%), California (34%), or New Mexico (17%). Overall, students had a mean high school GPA of 3.55. GPAs ranged from 2.67 to 4.80, with more than three quarters having a GPA above 3.00. Participants indicated a variety of tribal affiliations, with a total of 20 tribes mentioned. The two most represented tribes are the Navajo (23%) and the Hopi (11%). Participant demographics are displayed below in Figure 22.

Figure 19. 2014 AISIESS student participants

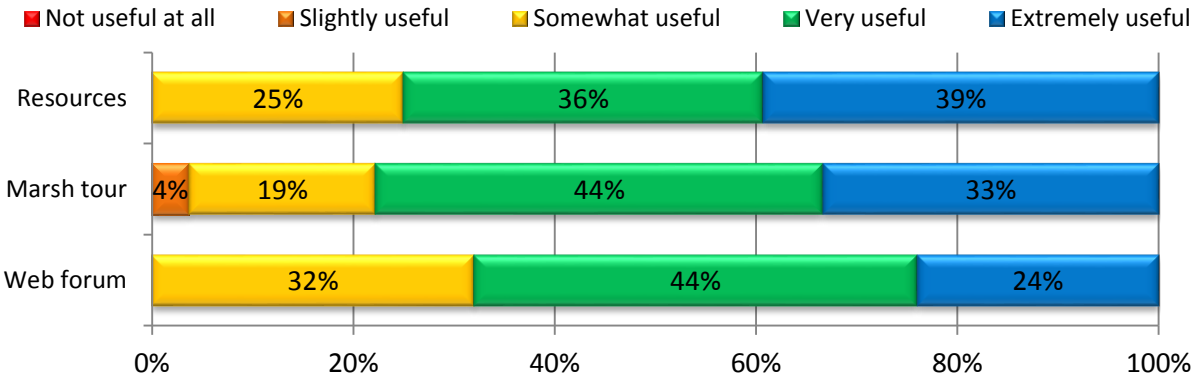
	2014 AISIESS Participants (n=35)	
	#	%
Gender		
Male	10	29%
Female	25	71%
State residency		
Arizona	11	31%
California	12	34%
Missouri	2	6%
North Carolina	1	3%
New Mexico	6	17%
South Dakota	3	9%
Grade level (2014-15)		
Freshman	9	26%
Sophomore	9	26%
Junior	3	9%
Senior	14	40%

Evaluation findings

Usefulness of activities

On the post-survey, students rated usefulness of each activity to them personally, on a scale of 1 to 5; 1=*not useful at all* to 5=*extremely useful*. Results are shown in Figure 20. About 75% or more of students believe the resources provided and marsh tour activity were *very* to *extremely useful*. Sixty-eight percent of students also thought the web forum was *very* to *extremely useful*.

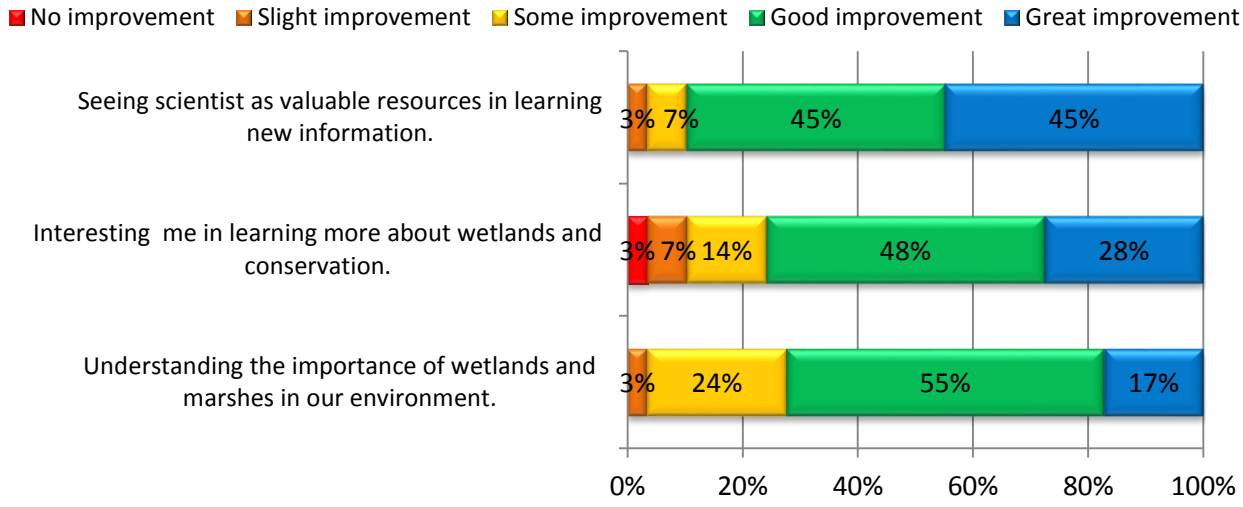
Figure 20. AISIESS students' ratings of usefulness of program activities



Impact on participants

Students rated how much their interest and understanding of wetlands, marshes, and conservations, as well as their views on scientists, have improved since the beginning of the summer program. Statements rated their improvement on a scale of 1 to 5; 1= *no improvement* to 5= *great improvement*. Results are shown in Figure 21. Ninety percent of students indicated *good* to *great* improvement in the amount they view scientists as valuable resources to gain new information. Over 75% experienced *good* to *great improvement* in how much they were interested in learning more about wetlands and conservation. More than 70% expressed *good* to *great improvement* in their understanding of wetlands and marshes in our environment.

Figure 21. AISIESS student's areas of improvement



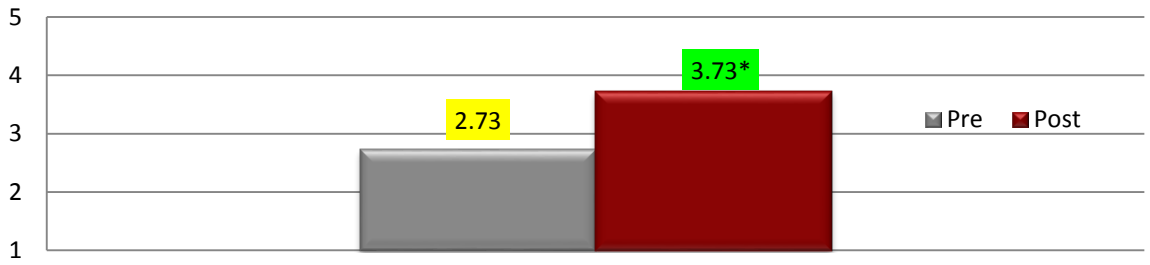
AISIESS students rated their familiarity with a variety of areas related to environmental issues on a pre- and post-survey to assess their growth during the program. They rated their familiarity on a scale of 1 to 5; 1=*not familiar at all* to 5=*extremely familiar*, before and after participating in the AISIESS summer program. Paired samples t-tests were performed to compare students' pre-survey to post-survey scores.

Ratings can be considered to trend towards positive or negative based on the following scale:

Extremely familiar	4.21 – 5.00
Very familiar	3.41 – 4.20
Somewhat familiar	2.61 – 3.40
Slightly familiar	1.81 – 2.60
Not familiar at all	1.00 – 1.80

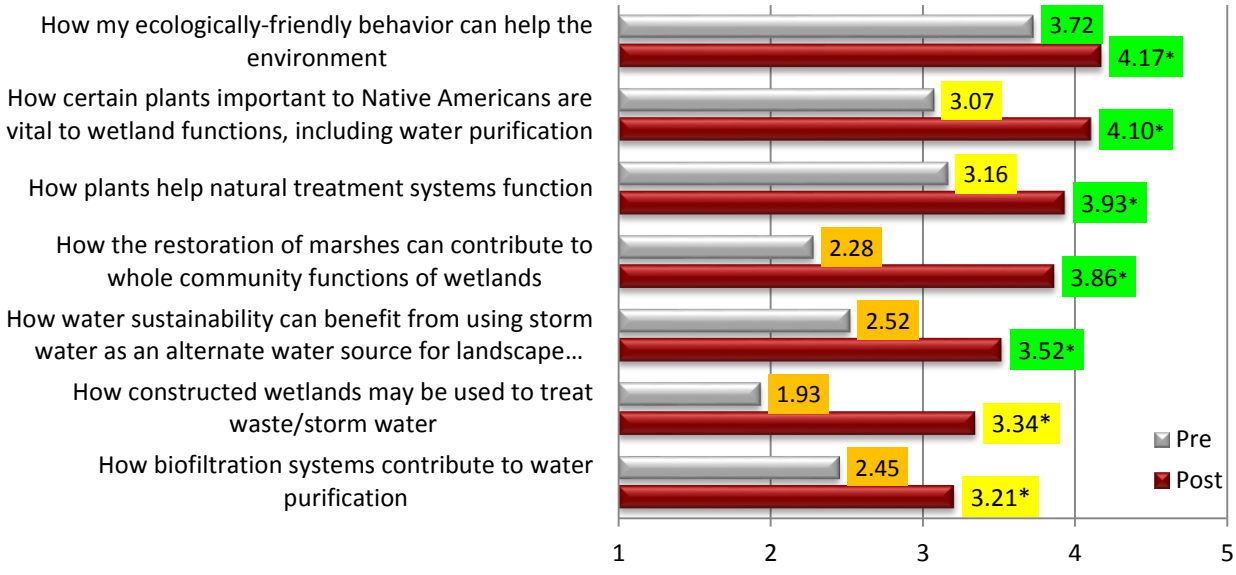
Figure 22 shows that, overall, participants' familiarity with the environmental issues addressed in the AISIESS program increased significantly.

Figure 22. AISIESS students' familiarity with environmental issues



In addition, each specific statement that comprised the composite presented above was analyzed individually. Every item had statistically significant gains; however, as shown in Figure 23, only two items were rated below *somewhat familiar* on the after score.

Figure 23. AISIESS students' familiarity with environmental issues before and after participation



Section 4. Key Findings and Recommendations

Key findings and recommendations are listed below for program components and impacts of the UCI UPP Down Under and AISIESS programs.

UPP Down Under Program

Key findings for program components and logistics

Demographics

Twelve students attended the 2014 UPP Down Under program. All participants (n=12) completed three program evaluation forms. Most participants were female (75%) and Caucasian (42%). Most are affiliated with UCI (50%) and indicated they would be seniors (67%) in the Fall of 2014. In addition to the 2014 participants, nine participants (out of 12) from the summer 2013 UPP Down Under program responded to a follow-up survey. Six of the seven UPP Down Under Australian partners participated in an interview with the evaluator. Five were from the University of Melbourne and one from Western Water. Half believed they were officially a PIRE project participant.

Program components

UPP Down Under participants rated most of the weekly activities as *very* or *extremely useful*; however, one presentation day was rated as *somewhat useful*. Student suggested more efficient program organization and planning. Concepts and topics that students would like to have seen include developing hypotheses prior to collecting data, comparing Australian and American methods of water conservation, and having more opportunities to learn specific content knowledge.

Reflecting on program components the majority of those from the 2013 group rated tours of water facilities, lab experience, and field excursions/data collection as *extremely useful*. The symposiums and opportunities to interact with researchers were rated by many as *very useful*. Eight of the nine respondents were majoring in a STEM related area before participation in the UPP Down Under program, five of those respondents continued on to graduate school in a STEM field. Many students remained engaged after PIRE, participating in internships and working on urban water sustainability projects. More than half of the participants indicated that involvement in the program contributed to personal and professional growth and played a role in their career plans.

Australian partners mainly reported having informal conversations with students about the ecosystems and research in Australia, how this understanding informs water management problems in the U.S., and engineering career opportunities. All partners believed that the students were academically prepared and had a basic understanding of Australian cultural norms, and were willing to host the students again next year. Of the five that said they were interested in engaging students in hands-on research, most commented on the need for field work such as sampling. The majority of partners believe their relationship with UCI has strengthened as a result of the UPP Down Under program.

Program logistics

UPP Down Under participants rated most program logistics as *good* or *excellent*. Participants were the most satisfied with the atmosphere, student involvement, and accommodations. Program advertising, the application process, and program management received the lowest ratings. Many participants suggested improvements in preparation for field work days and general organization.

Recommendations for program components and logistics

- *Increase advertising efforts and visibility of the program.*
  - *Connect with the Director of Science Education and Media at UCI to help with marketing, perhaps in the form of a video for media graduate students' capstone project.*
  - *Continue to seek a balanced gender participation and continue to recruit URM students in future summers, with a focus on recruitment of African-American students.*
- *Improve the application process and clarify the pre-program information.*
  - *Compile student work from past years and share this with potential applicants as an example of the work they will be engaged in during the summer.*
- *More thoroughly plan and organize program activities.*
  - *If possible, have students conduct research that builds off of the previous cohort's work. Ask students to create posters that are shared not only with the next cohort, but disseminated at various conferences as well.*
  - *Organize time for faculty to interact more with each other as well as with the students in different settings and covering various topics.*
- *Provide students with more information and preparation before lectures and visits to maximize their time engaged in the activities.*
  - *In addition to the abstracts provided, improve the way readings are shared with students by creating a more official collection of appropriate literature. This could be expanded to the entire PIRE project to include faculty, postdoc, and student work. Students should also receive this information well before the start of the program and be expected to read articles as a requirement for joining the project; nevertheless, expectations should remain realistic about the workload.*
- *Before engaging participants in research, incorporate information about statistical tools, sampling, types of data students will collect, and how to conduct analyses on the data.*
- *Include additional topics requested by students in the lessons and training at UCI and in Australia such as developing their hypotheses prior to data collection, comparisons of Australian and US methods of water conservation, and involving industry in presentations.*
- *Target students from majors outside of the STEM area for participation in the PIRE project.*
- *Engage students with research and writing so as to foster a pathway to publications and presentations in the years following the program.*
- *Incorporate a focus on continuing education to both provide information on graduate school, as well as offer opportunities to engage in internships and affiliated projects.*
- *Maintain connections with Australian partners and encourage more opportunities for students to engage in hands-on research while abroad.*

Key findings for program impacts

UPP Down Under participants reported large gains in all impact areas. The area with the largest gains include developing collaborations and interactions with U.S. and Australian researchers.

Goal 1: Knowledge/Research/Discovery

Students' knowledge and understanding of sustainable urban water systems increased significantly from before to after participation in the UPP Down Under program. Students rated themselves as having *extensive* knowledge and understanding of sustainable urban water systems after participation in the program. Reflecting back, participants from the 2013 group experienced the most growth with regard to goal 1 due to their participation in the program.

Goal 2: Education/Workforce Development

Students' understanding of interdisciplinary and cross-cultural approaches to urban water sustainability and their challenges as well as their interest and knowledge in urban water sustainability careers increased significantly by participation in the UPP Down Under program. After participation in the program, students rated their knowledge and understanding in these areas as *extensive*. Participants from 2013 expressed a *good* amount of growth with regard to goal 2 a year after participation in the program.

Goal 3: Partnerships

Students' collaborations and interactions with U.S. and Australian researchers as well as their desire to develop and maintain scientific partnerships increased significantly by the end of the summer program. At this point, participants' average rating of their collaborations was between *moderate* and *extensive*. Participants from the 2013 group reported moderate growth with regard to goal 3 after engaging with the program.

Goal 4: Institutional Capacity

Students' knowledge of how to work with their university to participate in a research abroad visit increased significantly. After participation in the UPP Down Under program, participants' rating of this area was between *moderate* and *extensive*. Participants from the 2013 group also reported moderate growth with regard to goal 4 a year after participating.

Recommendations for program impacts

- *Provide additional training and experience in areas rated the lowest on the post survey:*
  - *Knowledge of acceptance factors that hinder the adoption of low-energy treatment technology.*
  - *Collaborations and interactions with Australian, SCCWRP, and governmental researchers.*
  - *Knowledge of how to work with the university to participate in research abroad.*
- *Incorporate information about Australian culture in the UPP Down Under materials and lessons. Encourage students to do cultural research about Australia prior to leaving for Australia.*
- *Increase opportunities for students to disseminate their work through presentations, papers, or outreach for UCI, PIRE, and partners.*
- *Since 2013 students reported the least amount of growth with regard to Goal 3: Partnerships and Goal 4: Institutional capacity, focus on these areas when planning the UPP Down Under program.*

PIRE participation in UC Irvine AISIESS program

Key findings for program components and impacts

AISIESS participants reported gains in all areas that were measured. In particular, their familiarity with various environmental issues increased.

- Participants showed significant increases in familiarity with all of the topics, although they showed the least gain in knowledge about how wetlands can be used to treat waste/storm water and how biofiltration systems contribute to water purification.
- Participants expressed that the program activities were useful. They almost unanimously rated the program activities as *somewhat* to *extremely useful*. The lowest rated activity was the web forum, with 32% of participants rating it as *somewhat useful*.
- Participants experienced great improvement in their understanding of and interest in the topic, as well as in how valuable they perceive scientists to be.

Recommendations for program components and impacts

- *Increase content on how constructed wetlands can be used to treat waste/storm water and how biofiltration systems function in water purification.*
- *Emphasize the importance of wetlands and marshes, and continue to make connections to students' real-world experiences.*
- *Seek UPP Down Under student feedback on how to improve the web forum with AISIESS high school students.*
- *Coordinate the UPP Down Under program to correspond with the AISIESS program schedule in order to engage high school students directly with more PIRE participants and partners, UCI faculty, and UPP Down Under undergraduates.*
- *Encourage PIRE principal investigator to talk with AISIESS program leaders for suggestions to learn what can be improved.*

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Appendix A. 2014 UCI Water PIRE UPP Down Under for Water Sustainability Survey - Weeks 1/2

Undergraduate PIRE Program Down Under for Water Sustainability
UPP Down Under!
June 16 – July 25, 2014

About you

What year will you be in Fall 2014?*
( ) Sophomore
( ) Junior
( ) Senior
( ) Graduated in Spring 2014

With which gender do you identify?*
( ) Male
( ) Female

Select the ethnicity with which you most closely identify.*
( ) Asian American or Asian
( ) African American or Black
( ) Caucasian or White (non-Hispanic)
( ) Hispanic or Latino
( ) Native American or Alaska Native
( ) Native Hawaiian or Pacific Islander
( ) Do not wish to specify
( ) Other, please specify: _____

With which organization are you most closely affiliated?*
( ) University of California, Irvine
( ) University of California, Los Angeles
( ) University of California, San Diego/Scripps Institution of Oceanography
( ) Other, please specify: _____

UPP Down Under Activities - Weeks 1 and 2
Please rate each weeks activities from 1-5; 1=not useful at all, 5=extremely useful to you in your undergraduate studies and your future plans.
Comment on the activities in the area provided. Were the presenters easy to understand? Were the activities and presentations useful? How can they be improved?

Week 1: June 16-20 at UC Irvine*

	Ratings					Were these presentations and activities useful? How can they be improved?
	1*	2*	3*	4*	5*	
June 16: Student Orientation and Overview	( )	( )	( )	( )	( )	
June 17: Lectures on Urban Water Sustainability, Direct Potable Reuse, and Careers in Environmental Engineering	( )	( )	( )	( )	( )	
June 18: Lectures on Climate Change, Drainage Systems, and Constructed Wetlands & Tour of OC Drainage Systems	( )	( )	( )	( )	( )	
June 19: Lectures on Stormwater Capture, and Reuse & Tour of IRWD San Joaquin Marsh System	( )	( )	( )	( )	( )	
June 20: Lectures on Biofilter Treatment Systems	( )	( )	( )	( )	( )	

Week 2: June 23-27 in UC Irvine*

	Ratings					Were these presentations and activities useful? How can they be improved?
	1*	2*	3*	4*	5*	
June 23: Field Excursion - Old Laguna Sampling	( )	( )	( )	( )	( )	
June 24: Lectures on Biofilters & Tour of CalTrans Biofilter	( )	( )	( )	( )	( )	
June 25: Field Excursion - Forge and Orchard Meadow Sampling	( )	( )	( )	( )	( )	
June 26: Detecting Human Pathogenic Viruses & Field Work Follow Up	( )	( )	( )	( )	( )	
June 27: Lectures on Low Energy Treatment Systems & Tours of UCI Stormwater Capture Reuse Projects and South Coast Research and Extension Center	( )	( )	( )	( )	( )	

Do you have any suggestions to improve any the UPP Down Under programs activities listed above in future years?*

What other concepts or topics would you like to have seen covered during the UPP Down Under programs activities listed above?*

Thank You

Appendix B. 2014 UCI Water PIRE UPP Down Under for Water Sustainability Survey - Weeks 3/4

Undergraduate PIRE Program Down Under for Water Sustainability
UPP Down Under!
June 16 – July 25, 2014

UPP Down Under Activities - Weeks 3 and 4

Please rate each weeks activities from 1-5; 1=not useful at all, 5=extremely useful to you in your undergraduate studies and your future plans. Comment on the activities in the area provided. Were the presenters easy to understand? Were the activities and presentations useful? How can they be improved?

Week 3: June 30 - July 4 in Australia *

	Ratings					Were these presentations and activities useful? How can they be improved?
	1*	2*	3*	4*	5*	
July 2: Tour of Lab Facilities & Preparation of Lab Materials for Sampling	( )	( )	( )	( )	( )	
July 3: Field Excursion - Lynbrook Biofilter Tour and Wetland Sampling	( )	( )	( )	( )	( )	
July 4: Lectures on Economics and Governance & Field Work Follow-Up and Data Analysis	( )	( )	( )	( )	( )	

July 7 - July 14 in Australia*

	Ratings					Were these presentations and activities useful? How can they be improved?
	1*	2*	3*	4*	5*	
July 7: Field Excursion - Hampton Park Sampling	( )	( )	( )	( )	( )	
July 8: Field Excursion - Royal Park Sampling	( )	( )	( )	( )	( )	
July 9: Lectures on Urban Water Supply and Public Perception of Water Risks & Field Work Catch-Up and Data Analysis	( )	( )	( )	( )	( )	
July 10: Tour of Maribynrong/Jackson Creek and Western Water Treatment Plant	( )	( )	( )	( )	( )	
July 11: Lectures on Statistical Tools for Data Analysis	( )	( )	( )	( )	( )	
July 14: Tour of Monash Facilities & Lectures on Communicating Scientific Findings	( )	( )	( )	( )	( )	

Do you have any suggestions to improve any of the UPP Down Under programs activities listed above in future years?*

What other concepts or topics would you like to have seen covered during the UPP Down Under programs activities listed above?*

Thank You!

Appendix C. 2014 UCI Water PIRE UPP Down Under for Water Sustainability Survey - Weeks 5/6

Please rate each weeks activities from 1-5; 1=not useful at all, 5=extremely useful to you in your undergraduate studies and your future plans. Comment on the activities in the area provided. Were the presenters easy to understand? Were the activities and presentations useful? How can they be improved?

Week 5: July 17-18 in UC Irvine*

	Ratings		Were these presentations and activities useful? How can they be improved?			
	1*	2*	3*	4*	5*	
July 17: Tours of OCWD, GWRS & OCSD	( )	( )	( )	( )	( )	___
July 18: Policies and Governance & Group Discussion	( )	( )	( )	( )	( )	___

Week 6: July 21 - July 25 in UC Irvine*

	Ratings					Were these activities useful? How can they be improved?
	1*	2*	3*	4*	5*	
July 21: Group Work & Informal Presentations of Data Analyses and Presentation Ideas for Review-Groups	( )	( )	( )	( )	( )	___
July 22: Group Work & Practice Presentations for Review-Groups	( )	( )	( )	( )	( )	___
July 23: Desalination Panel & Tour of Aquarium of the Pacific	( )	( )	( )	( )	( )	___
July 24: Review of Final Papers	( )	( )	( )	( )	( )	___
July 25: Final Presentations	( )	( )	( )	( )	( )	___

Do you have suggestions to improve any of the UPP Down Under programs activities listed above in future years?*

What other concepts or topics would you like to have seen covered during the UPP Down Under programs activities listed above?*

Program Organization and Logistics

Please rate your satisfaction with the following aspects of this program on a scale of 1-5; 1=poor, 5=excellent.*

	Poor	Fair	Average	Good	Excellent
Advertising for this program (Interesting advertisements, clear explanations, sufficient distribution/notification time)	( )	( )	( )	( )	( )
Application process and pre-program information (clear communication, information, forms)	( )	( )	( )	( )	( )
Program management (focused, well-prepared, coordinated, sessions started/ended on time, equipment was ready)	( )	( )	( )	( )	( )
Atmosphere (friendly, supportive, promoted teamwork)	( )	( )	( )	( )	( )
Leadership (fostered working relationships, encouraged involvement)	( )	( )	( )	( )	( )
Student involvement (presentations at appropriate level, collaboration, networking)	( )	( )	( )	( )	( )
Technology (availability/quality of equipment and internet)	( )	( )	( )	( )	( )
Accommodations (physical comforts, facilities, safety, location)	( )	( )	( )	( )	( )
Food (quality, dietary needs, preferences, freshness)	( )	( )	( )	( )	( )

Do you have suggestions to improve any aspect of this UPP Down Under program next year?*

Program Impacts

Please rate your knowledge and skills in each of the following areas before and after participation in this program.
RATING SCALE: 1= MINIMAL 3= MODERATE 5=EXTENSIVE*

	Before UPP Down Under					After UPP Down Under				
	1*	2*	3*	4*	5*	1*	2*	3*	4*	5*
My understanding of with low-energy approaches for removing pollutants from water	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of the benefits and risks associated with adoption of low-energy treatment technology	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of acceptance factors that hinder the adoption of low energy treatment options	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of the impacts of distributed approaches for capturing and reusing runoff	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of urban water supply and demand challenges and solutions	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of why an interdisciplinary approach to urban water sustainability is necessary	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of why a cross-cultural approach to urban water sustainability is necessary	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My understanding of the challenges associated with conducting scientific research in an international setting	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My collaborations and interactions with university (UCI, UCSD, UCLA) researchers	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My collaborations and interactions with SCCWRP and governmental researchers	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My collaborations and interactions with Australian researchers	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My desire to develop and maintain scientific partnerships and collaborations	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My knowledge of how to work with my university to participate in a research abroad visit	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My interest in majoring in a field related to urban water sustainability science	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My knowledge of careers that are available in urban water sustainability	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
My interest in pursuing a career in an urban water sustainability-related area	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

How likely are you to utilize the information you learned in the UPP Down Under program in your studies, research, or career?*

( ) Not likely
( ) Fairly likely
( ) Somewhat likely
( ) Very likely
( ) Extremely likely

How will you use or implement what you have learned in your studies, research, and/or career?*

What are your next academic and or professional steps in life? Has participation in this UPP Down Under program influenced your next steps in any way? If so, please explain.*

Is there anything else you would like to share with the team of faculty and scientists who planned and organized this program?*

Appendix D: UCI Water-PIRE UPP Down Under Follow-up

DEMOGRAPHICS - ABOUT YOU

1) Are you a first generation college student?*

(The term "first generation college student" means: An individual both of whose parents or guardians did not complete a baccalaureate degree; OR in the case of an individual who regularly resided with and receive support from only one parent or guardian, an individual whose only parent or guardian did not complete a baccalaureate degree.)

( ) Yes
( ) No
( ) I'm not sure

2) Did your family qualify for free or reduced lunch while you were in high school?
( ) No
( ) Yes
( ) I'm not sure/prefer to not answer

3) What is your current position?*
( ) Undergraduate student, please write your major and name of college/university:
( ) Master's graduate student, please write your area of study and name of university:
( ) PhD graduate student, please write your area of study and name of university:
( ) Employed in an academic position, please write your job title/position:
( ) Employed in a non-academic position, please write your job title/position:
( ) None of the above, please explain:

USEFULNESS OF PROJECT COMPONENTS

4) Reflect back on your experience. Rate the value of the following project components to your professional and/or personal development on a scale of *not useful at all* to *extremely useful*.*

	We didn't do this	Not useful at all	Slightly useful	Somewhat useful	Very useful	Extremely useful
Scientific lectures	( )	( )	( )	( )	( )	( )
Field excursions, data collection	( )	( )	( )	( )	( )	( )
Lab experience	( )	( )	( )	( )	( )	( )
Mini-Symposium: Stormwater Management, Monash University	( )	( )	( )	( )	( )	( )
Final UPP Down Under Symposium, UC Irvine	( )	( )	( )	( )	( )	( )
Tours of water facilities (La County and Orange County Water Districts, Melbourne's Water Supply and Wastewater Treatment)	( )	( )	( )	( )	( )	( )
Opportunities to interact / socialize with other undergraduate researchers	( )	( )	( )	( )	( )	( )
Opportunities to interact with researchers (graduate student, postdocs, professors, and non-academic professionals)	( )	( )	( )	( )	( )	( )

5) What was the most valuable aspect of this project to your professional and/or personal development?*

ACHIEVEMENT OF PROJECT GOALS

6) Please rate the amount of growth you had in each of the following areas due to participation in this project.*

	No growth	A little growth	Moderate growth	Good growth	Great growth
GOAL 1: KNOWLEDGE/RESEARCH/DISCOVERY - Work with Australian partners to improve engineering science associated with low-energy approaches and understanding related to urban water science topics/technologies/approaches. Use the Australian experience to analyze and identify economic incentives, innovative regulations, institutional changes, and planning practices that could foster the adoption of low energy options in the Southwestern U.S.	( )	( )	( )	( )	( )
GOAL 2: EDUCATION/WORKFORCE DEVELOPMENT - Foster an interdisciplinary, cross-cultural approach to urban water sustainability and research about sustainability and use these results to inform higher education populations, as well as K-12 curriculum tools and teacher training. Place students in internships, graduate school, post-doctoral positions, and professional positions related to Water-PIRE areas.	( )	( )	( )	( )	( )
GOAL 3: PARTNERSHIPS - Foster new relationships between PIRE researchers and Australian researchers, SCCWRP researchers, and affiliated governmental/non-governmental agencies. Participate in practice-oriented professional meetings.	( )	( )	( )	( )	( )
GOAL 4: INSTITUTIONAL CAPACITY - Increase the capacity of the HSSoE to engage in research within UCI, with other universities in Southern California, and internationally. Improve HSSoE's engagement in effective educational exchange programs.	( )	( )	( )	( )	( )

7) Did you participate in any type of internship after your experience with the UCI Water PIRE project?
( ) No, or not yet
( ) Yes, please tell us the name of the internship, location, and year:

8) Did you present your research at any university, regional, national or international conferences?*
( ) No, or not yet
( ) Yes, please provide the full citation (authors, title, poster/oral; meeting name; meeting location; dates):

9) Have any publications in which you have been included resulted from the work you did while you participated in this UCI Water PIRE project?*
( ) No, or not yet
( ) Yes, please provide full citation: _____*

10) What is/was (if you graduated) your undergraduate major?*
( ) Biological Science
( ) Civil Engineering
( ) Environmental Engineering
( ) Earth System Science
( ) Social Science
( ) Other, please specify:

11) Did participation in the project play a role in your decision to change or declare a major?*
( ) No
( ) Yes, please explain why: _____*

Display Logic: everyone but "Master's" or "PhD graduate students"
12) Do you plan to attend graduate school?*
( ) No
( ) Yes

Display Logic: only "Master's" or "PhD graduate students"
13) Did participation in the project play a role in your decision to attend graduate school?
( ) No
( ) Yes, please explain why: _____*

14) What are your long-term career plans?*

15) Did participation in the project play a role in your career plans?*
( ) No
( ) Yes, please explain why: _____*

16) After your experience in this project, did you participate in solving urban water sustainability problems?*
( ) No
( ) Yes, please explain how: _____*

17) Is there any other way that the project helped you personally or professionally?
( ) No
( ) Yes, please explain how: _____*

Appendix E: UCI Water-PIRE UPP Down Under Partner Interview Protocol

Date of interview		Time difference	
Partner		Partner institution	
Email address		Telephone number	

Thank you for taking time to talk with me about your experience hosting a PIRE study abroad student. I am going to ask you some questions about your experience. This interview will take about 30 minutes. Are you ready to begin?

1. **What is your role on the project?**
    a. Do you believe you are still part of the project? (PIRE participant?)
2. **Please describe the setting in which you interacted with the UPP Down Under students.**
    a. What was your level of engagement with the students?
3. **What type of research/topics did you share with the students?**
4. **Please describe the students' general knowledge and academic preparedness.**
    a. Do you believe the student had enough knowledge and was academically prepared to participate in a discussion of this type of research/topic? If not, what additional knowledge (that would be appropriate for this level of student) would be beneficial?
5. **Would you like to engage students in hands-on research?**
    a. If so, what type of research skills would be necessary for students to have before they arrived in Australia?
6. **Please describe their knowledge of the basic cultural norms in Australia.**
    a. Did he/she have sufficient knowledge of the basic cultural norms of your country and your culture? If not, what additional knowledge would be beneficial?
7. **How has hosting this international PIRE student affected your institution's relationship with UCI? Has the relationship strengthened, stayed the same, or weakened? Why?**
8. **Would you be willing to host an international PIRE student again? Why/not?**
9. **What suggestions do you have to improve the research abroad portion of the PIRE project?**
10. **Is there anything else you would like to share with the PIRE project directors?**

Appendix F: AISIESS Program Evaluation Form

American Indian Summer Institute in Earth System Science

Post-Survey

Please rate your familiarity with the following areas below. Select the response that corresponds with your level of familiarity on a scale from *not familiar at all* to *extremely familiar.* There are no right or wrong answers. Please be honest so your pre-survey responses can be compared with your post-survey responses.

	Not familiar at all	Slightly familiar	Somewhat familiar	Very familiar	Extremely familiar
How constructed wetlands may be used to treat waste/storm water	O	O	O	O	O
How biofiltration systems contribute to water purification	O	O	O	O	O
How water sustainability can benefit from using storm water as an alternate water source for landscape sustenance	O	O	O	O	O
How plants help natural treatment systems function	O	O	O	O	O
How certain plants important to Native Americans are vital to wetland functions, including water purification	O	O	O	O	O
How the restoration of marshes can contribute to whole community functions of wetlands	O	O	O	O	O
How my ecologically-friendly behavior can help the environment	O	O	O	O	O

Based on what the UCI PIRE Experts shared, please indicate how useful each activity was for you.

	Not useful at all	Slightly useful	Somewh at useful	Very useful	Extremel y useful	Did not attend
Web forum	O	O	O	O	O	O
Marsh tour	O	O	O	O	O	O
Resources from web forum and marsh tour activities	O	O	O	O	O	O

Thinking back to when you began this summer program, please select how much improvement you have experienced in following areas.

	No	Slight	Some	Good	Great
Understanding the importance of wetlands and marshes in our environment.	O	O	O	O	O
Seeing scientists as valuable resources in learning new information.	O	O	O	O	O
Interesting me in learning more about wetlands and conservation.	O	O	O	O	O