The Watershed Institute is an Educational, Research, Public Outreach, and Service component of the Division of Science and Environmental Policy (SEP) at CSUMB.

MISSION
The primary mission of the Watershed institute is to support the vision and academic programs of SEP and CSUMB through education, research, restoration, and policy that will protect and enhance the watersheds of the Monterey Bay Area and beyond.
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1 Preamble to the 2014 Annual Report

In 2011, the Watershed Institute was selected to conduct its first five-year Program Review. The review included an external review that was completed in July 2011. The subsequent campus-wide review was completed in spring 2012. Following consultation with Academic Affairs, the final analysis of the program review, including a five-year strategic plan, was submitted in August of 2013.

2 Introduction

The Watershed Institute is an educational, research, public outreach, and service component of the Division of Science and Environmental Policy (SEP) at CSUMB.

2.1 Primary Mission

The primary mission of the CSUMB Watershed institute is to support the vision and academic programs of SEP and CSUMB through education, research, restoration, and policy that will protect and enhance the watersheds of the Monterey Bay Area and beyond.

2.2 Purpose

The purpose of the Watershed Institute is to:

1) Assist CSUMB to fulfill its mission, goals, and objectives by providing community outreach and education, research, and Service Learning opportunities, environmental restoration, and resource policy development.

2) Provide an institutional base for visiting scholars, adjunct faculty, and post-doctoral and other academic fellows, thus augmenting the teaching and scholarship efforts of CSUMB faculty and students.

3) Provide research opportunities and association for CSUMB faculty, staff, and students.

The CSUMB Watershed Institute has been continuously operational and self-funded since 1994, one year before CSUMB admitted its first students. The mission of the Watershed Institute remains vital and unchanged in 18 years of operation. While the mission statement is specific to conservation and restoration of watershed systems of the Monterey Bay region, our work influences a much broader region, and now continues to spread outward through an army of trained watershed scientists who take the values and skills of the CSUMB Watershed Systems curriculum to their various careers and graduate school experiences.
The Institute was envisioned as a center for research, education, and outreach with the simple goal of improving the flora, land, and water resources of the Monterey Bay region. Today that vision continues to be realized, and the regional scope has increased as new faculty and staff continue to bring diverse interests and expertise to the table.

Figure 1: CSUMB Building 42 is the headquarters of the Watershed Institute. It is surrounded by planted native gardens that offer a snapshot of restored California vegetation. This photo was taken in the Spring of 1998 when the Watershed Institute was 3 years old.

This Annual Report complies with CSUMB Policy and Procedures for Centers and Institutes (Academic Affairs, 2009a, 2009b).

Annual Report Distribution
Chair, Division of Science and Environmental Policy
Dean, College of Science, Media Arts, and Technology
University Provost
University Associate Vice President for Academic Planning and Institutional Effectiveness
University Corporation
Watershed Institute Advisory Committee
3 Activities

The 2013–2014 Watershed Institute activities are organized as annotated lists with headings that place the activity within the context of the Watershed Institute mission statement and purpose. While the individual activities usually fulfill more than one part of the mission statement, they are presented only once, under the most representative heading. These lists are renewed annually as evidence of recent mission fulfillment.

3.1 Article One of the Watershed Institute Purpose

Article one of the Watershed Institute purpose states that we will, “Assist CSUMB fulfill its mission, goals, and objectives by providing community outreach and education, research and Service Learning opportunities, environmental restoration, and resource policy development.”

3.1.1 Resource Policy Development and Community Outreach

We are very deeply involved in resource policy development in our region and beyond. We serve the community in this regard by giving lectures, developing curriculum, organizing symposia, and holding community–based watershed restoration events. We have a history of strong civic engagement in local resource management, and currently represent CSUMB at several important venues. Collectively, the Watershed Institute Faculty and Staff serve on numerous technical advisory committees (TAC) and advisory boards to foster science–based environmental decision making, and to advocate for community involvement in environmental decision making. A sample of 2012–2013 activities is presented below.

1) Technical Advisory Committee, City of Pacific Grove
   Greenwood Park Storm water Treatment

2) CSU –Water Resources Policy Initiative
   Active participation and leadership role in the newly–established CSU initiative.

3) Integrated Regional Water Management Plan” (IRWMP)
   Charter committee members fostered CSUMB and regional collaboration in the State bond process to develop sustainable water quantity and quality

4) Central Coast Wetlands Working Group

5) Yellowstone Bison Program
   Provides landscape data and model predictions on a routine basis to inform wildlife management activities
6) Zambian Carnivore Program

Conducts research for protected area management through local capacity building including training and employment of Zambian nationals in ecological research techniques (e.g. habitat mapping)

7) Fort Ord Land Use

Creates trail master plans, maps, and spatial analyses of Fort Ord Land Cover in collaboration with open-space community groups and agencies.

8) Camp SEA Lab Board

Provides guidance for residential marine science education program

9) Satellite Irrigation Management Support (SIMS)

Collaborative effort to develop new information products from satellite data to support optimization of agricultural water management; project partners include NASA Ames Research Center, CA Department of Water Resources, CSU Fresno, USDA ARS, UC Davis, UC Cooperative Extension, USGS; Dole, Tanimura and Antle, Chiquita, http://ecocast.arc.nasa.gov/sims/

10) Salmon Ecosystem Simulation and Management Evaluation (SESAME)

Research effort to couple stream and estuarine models with a basin-scale ocean model in order to simultaneously model the entire early life history (freshwater, estuarine, and coastal ocean habitats) of the Chinook salmon migrating through the San Francisco Bay estuary system. SESAME will provide the ecosystem models needed as the basis of the ecosystem-based management and ecological risk assessment framework necessary to improve management of water and fishery resources in California. SESAME is led by NOAA NMFS, and is a collaborative effort that include the NOAA SWFSC, CSUMB, MBARI, UCSC, and NASA.

11) Fallowed Area Mapping Project

Research to develop within-season maps of drought impacts on agricultural production, and map land fallowing across the state during drought events. Project partners include CA DWR and the CA Department of Food and Agriculture.

3.1.2 Service Learning

Each semester, the Watershed Institute Staff provide many undergraduate students with service learning opportunities through a course called “Community-Based Watershed Restoration.” In that experience, students come to understand the value of creating community events where residents can emotionally connect with the land on which they live. It is believed that through this connection individual citizens grow to become better stewards of the environment. A key
component of this effort is working with K–12 students on hands–on plant ecology restoration projects that foster good stewardship at a young age. Other service learning courses from across campus also utilize watershed topics in their curricula with their students completing their service through the Watershed Institute’s Return of the Natives Restoration Education Project, RON. These classes include, ENSTU349S, ENSTU 369S, ENSTU384S, ENVS 212s, and SL200s.

### 3.1.3 Environmental Restoration

Environmental restoration is the intentional, incremental improvement of natural ecological or resource function of the landscape in direct response to centuries of unintentional incremental degradation. The Watershed Institute is directly involved with environmental restoration in three ways. First, we have led community–based restoration efforts for many years in the region around CSUMB. This effort has brought thousands of hands, young and old, to work on ecological restoration of native plant communities and the eradication of non–native invasive species. Second, we design and implement river/floodplain restoration projects, and review and improve the designs of others. There is a Watershed Institute presence on a variety of technical advisory committees whose purpose is to restore specific sites in California. Examples of these TAC positions are listed in Resource Policy Development section. Less directly, we have educated hundreds of CSUMB students in the value and skills of environmental– and community based–habitat restoration.

### 3.1.4 Presentations to the local community


### 3.2 Article Two of the Watershed Institute Purpose

The second article of the Watershed Institute purpose states that we will, 

*Provide an institutional base for visiting scholars, adjunct faculty, and post–doctoral and other academic fellows, thus augmenting the teaching and scholarship efforts of CSUMB faculty and students.*

Dr. Lars Pierce and Forrest Melton are adjunct professors currently associated with the Watershed Institute.

Dr. Pierce is leading plant and fire ecology studies on Fort Ord FORA and ESCA property located adjacent to campus. In conjunction with researchers at NASA Ames Research Center, he is also working to combine a suite of geospatial and modeling tools to help improve irrigation efficiency in California vineyards. Dr. Pierce has been associated with CSUMB for over a decade and continues to serve CSUMB in a variety of ways through his association with the Watershed Institute. Dr. Pierce has continuously generated financial support and mentorship for student
Forrest Melton is leading a research mission to develop new information products from satellite data and surface sensor networks to address agricultural water management challenges in the western U.S. Ongoing work conducted in collaboration with growers in the Salinas Valley and across California is developing near real-time estimates of crop conditions and crop water requirements across millions of acres of irrigated farmland. The project is also developing web and mobile data interfaces to enhance the ability of growers to access and use satellite information in irrigation management. His work integrates CSUMB students in a variety of paid, research and technology–based internships. Forrest is also a co–investigator on the NASA Earth Exchange project at NASA Ames Research Center, which integrates NASA’s supercomputing resources and large Earth observation datasets to accelerate global change research. Forrest is one of our key collaborative links with the NASA Ames Research Center research group. For more information, please see http://ecocast.arc.nasa.gov/peop/forrest.php.

3.3 Article Three of the Watershed Institute Purpose

The third article of the Article of the Watershed Institute purpose states that we will, “Provide research opportunities and association for CSUMB faculty, staff, and student.” The faculty, staff, and students of the Watershed Institute have published a great number of peer–review journal articles, abstracts, technical reports, and theses as evidence of the research opportunities we enjoy. Since 2000, over 200 publications have been generated by the Watershed Institute faculty, and a great number of those have student coauthors. A nearly complete list of publications is kept up to date at the Watershed Institute Publications website http://ccows.csumb.edu/pubs/ . These publications focus on serving community research needs, so they represent solid evidence of CSUMB community outreach via Watershed Institute associates. One tangible way that the Watershed Institute enables publication is through the “Watershed Institute Publication Series,” an internally–reviewed and moderated technical report series that archives applied science performed by the research arm of the Watershed Institute. To date there are over 110 Watershed Institute technical reports published on the Watershed Institute Publications website; virtually all of them have at least one student co–author. The great majority of the technical reports were commissioned contract products, underscoring a strong record of grantsmanship through the CSUMB University Corporation. The Watershed Institute Publication Series has been highlighted in the Environmental Monitor, the quarterly publication of the Association of Environmental professionals http://ccows.csumb.edu/pubs/magazine_articles/EM–Summer–2012.pdf
The publications representing activity in 2013–2014 are listed below, including CSUMB student co-authors.


Watson, F., Becker, M.S., Milanzi, J., & Nyirenda, M. Human Encroachment into Protected Area Networks in Zambia: Implications for Large Carnivore Conservation. Accepted with minor revisions, Regional Environmental Change.


3.3.1 Book Chapters (2013–2014)

3.3.2 Published Abstracts/Posters (2013–2014)


Snyder, A., Kvitek, R., and Smith, D.P. 2013. Employing LiDAR and RTK GPS to evaluate small-scale beach nourishment in southern Monterey Bay. AGU Fall meeting


3.3.4 Theses (Master of Science in Coastal and Watershed Science & Policy)

2013 Violetta Pristel An alternative compliance framework for stormwater management in the Central Coast Region

2013 Sean Castorani Analysis of environmental factors affecting fruit quality for the 2007 growing season in a California vineyard

2013 Erin Stanfield Environmental factors associated with toxic cyanobacteria in Pinto Lake, a coastal lake in the Monterey Bay area

2013 Bart Kowalski Effects of landscape covariates on the distribution and detection probabilities of mammalian carnivores on the Former Fort Ord, California.

3.3.6 Class Reports 2013–2014


4 Connection to University

The Watershed Institute exists to serve the CSUMB mission. That commitment is explicitly stated in the mission and purpose statements of the Watershed Institute and is demonstrated in evidence throughout the report. The Watershed Institute is fully integrated with the University because it is run by dedicated CSUMB professors and long–term staff.
Impact of Activities on the Academic Program(s) of the University

The Watershed Institute positively impacts the academic programs of the university in a variety of significant ways. The Watershed Institute faculty design, continually improve, and deliver the core curriculum in the Watershed Systems concentration of the B.S. in Environmental Science, Technology, and Policy and the watershed emphasis of the M.S. in Coastal and Watershed Science & Policy. Course activities within this core curriculum are often tied to real-world projects based in the local community. We teach watershed-centric service learning courses and coordinate service learning for the Service Learning Institute. Research projects and contracts associated with The Watershed Institute provide continual student opportunities for meaningful work, internships, research, and publication. These projects provide CSUMB students with hands-on experience in real-world projects, and provide external funding to support undergraduate capstone projects and graduate theses.

The "Bob Curry Watershed Scholarship Fund" was established by the Institute in early 2012 for the annual benefit of a Watershed Science graduate student and a Watershed Concentration undergraduate student. Funds were obtained from a gift from Bob Curry and the sale of a collection of 19th Century maps. Dr. Robert Curry was the founding faculty member of the Watershed Institute. Bob also mentored numerous CSUMB faculty as they became acquainted with the unique geology and hydrology of Central California. The 2013–2014 "Bob Curry Watershed Scholarship Fund" recipients were: Watershed Concentration, undergraduate student, Michael Layne and Coastal and Watershed Science graduate student Andrea Goodmansen.

The Watershed Institute is also instrumental in choosing winners of CSUMB's annual "Garden Club of America" scholarship. The 2013–2014 winner was Hayley Reitman, who worked with Return of the Natives for three years of her undergraduate education.

The Watershed Institute has been a key organizer of the yearly Central Coast Invasive Plant Conference (formerly the "War on Weeds" Conference). November 2013 featured the 14th annual conference attended by 110+ agency and academic personnel. The Institute also hosts an annual welcome reception for incoming science graduate students, and an annual post-semester reception celebrating students finishing their degrees.

In 2013, Watershed Institute faculty fostered the creation of a student chapter of the Association of Environmental Professionals. The group was very active this year, organizing a fee CEQA workshop for the region and bringing in several professional speakers to benefit all SEP students.
6 Finances

The Watershed Institute has an incentive account that was funded by the University Corporation as part of PI grant overhead. As of April 9, 2007, institutional incentive overhead generated by Watershed PI’s is now pooled with SEP.org incentive funds. Institute activities this year were supported by the following categorized expenses (Table 1). The total budget is provided in Table 2.

Table 1. The Watershed Institute Donation Fund 72038 1027 Approximate annual expenses between April 24, 2013 and May 27, 2014

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting balance April 24, 2013</td>
<td>$2,357.75</td>
</tr>
<tr>
<td>Income</td>
<td>0</td>
</tr>
<tr>
<td>Expenses (grad student stipend)</td>
<td>(343.35)</td>
</tr>
<tr>
<td>Ending Balance May 27, 2014</td>
<td>$2,014.40</td>
</tr>
</tbody>
</table>

Table 2: Watershed Institute Incentive Fund Annual budget between April 24, 2013 and May 27, 2013

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting balance April 24, 2013</td>
<td>$10,842</td>
</tr>
<tr>
<td>Income</td>
<td>0</td>
</tr>
<tr>
<td>Expenses</td>
<td>0</td>
</tr>
<tr>
<td>Ending balance May 27, 2014</td>
<td>$10,842</td>
</tr>
</tbody>
</table>

In 2013, the Watershed Institute was authorized to spend up to $5,000 of SEP.org funds in support of web site improvement, newsletter production, and computer equipment and grant-writing support.
7  Budget Forecast

The Watershed institute personnel have been actively pursuing extramural finds to support ongoing, new, and future research and outreach activities. Evidence is provided in the following two lists of current and proposed contracts. None of these contracts have increased the Watershed Institute operating budget since 2007, when all grant incentive funds were pooled with SEP.org.

7.1 Research Grants Received and Current Contracts (2013–2014).

2013 CSU President’s Commission Scholarship $8,000, Edvin Sahami "Bioremediation Processes in the Molera Treatment Wetland", mentor Arlene Haffa, summer 2013.


Burleson Consulting. Seeds Plants and Burls. For native plant restoration on Army Lands for eventual turnover to BLM. Includes seed collection and plant propagation. ($47,629 + $67,252 + $62,452)

CA Dept of Fish and Game, "Big Sur Watershed Assessment" ($30,000). Hydrologic analysis and sediment source inventory of the Big Sur Watershed. Subcontract with Monterey RCD.

CA Dept. of Water Resources, Automated farm–based irrigation scheduling using VSIM/TOPS ($192,390 / 2 yrs ; 2014–15), L. Pierce PI.


CA State Parks/Aramark Corporation for community based habitat restoration services at Asilomar State Beach ($800)


California American Water "Pre–Dam–Removal Studies of the Carmel River" (20,000)

California Sea Grant Program “Climate change and restoration factors affecting fecal pathogen

California State Parks Foundation: For native plant restoration on the Ft. Ord Dunes State Park ($6000)

California State Parks, “Trail Erosion Hazard Mapping at Hollister Hills SVRA" ($74,961), augmentation ($20,000).
California State Parks. Watershed analysis focusing on sediment sources at Hollister Hills SRVA (143,095)

City of Monterey, “Assessment of Water Quality in Majors Creek” ($7670) Graduate student internship.

Community Foundation for Monterey County: To support Return of the Natives weekend youth and community programs in Salinas. ($10,000)

CSUMB Campus Planning and Development: a contract for Return of the Natives plants and out-planting on CSUMB wild lands ($8910)

CSUMB Faculty Incentive Grant, Microbial Bioremediation Processes in the Molera Wetland ($4,703) PI: Haffa

Dynamics in wetland systems” (3rd year, at ~$22K/year to CSUMB as both a grant and a scholarship)

Habitat Conservation Fund. For youth oriented weekend stewardship programs for Salinas youth ($50,400)

Harden Foundation: To involve Salinas Youth in Environmental Science and Stewardship ($10,000)

Jiji Foundation: Nature Detectives: Exposing nature to children at the UCSC Ft. Ord Reserve in Marina ($7,000)


Monterey Bay Aquarium Conservation Fund: “Reorganizing the WI Greenhouse Area for Growth” ($3000)

Monterey County Water Pollution Control Agency, Stormwater Sponsorship Program for Return of the Natives help in establishing native gardens/plantings in Seaside, CA ($1800)

Monterey Peninsula Regional Park District and City of Marina Habitat Conservation Fund: For community based habitat conservation in Marina’s Coastal Zone parks. ($161,204 over three years).

Monterey Peninsula Regional Park District. For community based habitat restoration in Marina area. Includes student salaries (completed $25,000 +$12,000 + $4000 + $3000)

Monterey Peninsula Regional Park District. graduate student internship to evaluate land-use improvements around Frog Pond Regional Park ($19,000)

Morro Bay Foundation and Center for Low Impact Development. 2011. An alternative compliance framework for stormwater management in the Central Coast Region. $16K. PI: Watson
NASA Climate & Biodiversity, 2011–2015. A. Hansen, MSU (PI), F. Melton (Co–I), Using NASA resources to inform climate and land use adaptation: Ecological forecasting, vulnerability assessment, and evaluation of management options across two USDI Landscape Conservation Cooperatives. $1.8M.

National Park Service. Snow modeling for bison/elk habitat assessments. ~$11K


NOAA–CA Bay Watershed Education and Training. Meaningful Professional Development for Teachers in the Creeks of Salinas –Year 4 (continued $59,999)

NOAA–CA Bay Watershed Education and Training. Vocational Adult Watershed Literacy in Salinas. (Continuing $59,185)


Ord Terrace School, Seaside, NOAA_BWET, Ocean Guardian Program in Support of Return of the Natives work in their school garden programs ($2442+$1440)

Portion of: Dept of Ed grant to UROC for HSI/STEM. 2011. (~$150,000 portion) PI: Head. WI leads: Watson, Smith, Los Huertos.

Portion of: USDA grant to CSUSB for funding internships. (~$162,000) awarded to 32 CSUMB students. CSUMB lead: Haffa.


REI Bannff Mountain Film Festival Co–sponsorship ($12,700)

REI Grant Programs. Inspiring Volunteers to Restore Monterey Bay Habitats ($10,000)

US Department of Interior/BLM. For Return of the Natives’ community based restoration programs in schools and with general public, includes plant production and outplanting. Many student assistant positions ($68,000 + $32,000 + $33,000+$48,000)

USDA–HSI. Linking Curriculum and Student Internships with USDA Critical Needs Opportunities ($300,000).


Whale Tail Grant Program: Dune Habitat Stewards – Community Based Habitat Restoration on the Fort Ord Dunes State Park ($25,000)


CA Dept of Fish and Game: Restoration of Brackish and Freshwater Wetlands in the Coastal Monterey Bay Area. With MLML partnership ($90,000)


Monterey Bay Aquarium Conservation Fund: "Greenhouse Shading for Plants and Volunteers" ($3000)

NOAA BWET: Professional Development for Creeks of Salinas to the Bay—Empowering Teachers ($67,949) not funded

REI: Return of the Natives Restoration Education Project: Restoring with Return of the Natives: Impactful Service Leading to Recreation? ($10,000)

Sean Parker Conservation Fund: Bringing Marginalized Students to Monterey Coast ($200,000)


USDA: Improving Student Success in Agriculture–Related Sciences with Academic Support and Career Mentoring Pending, submitted March 2014 ($299,859)
7.3 Future Income

While the Watershed Institute continues to be a very productive source of extramural funds, the Watershed Institute incentive account no longer receives direct incentive fund deposits. On April 9, 2007, SEP.org was established to pool and manage institutional incentive funds for all institutes under the Division of Science and Environmental Policy. Watershed Institute faculty have no direct management or oversight of those funds, other than by providing single votes on spending proposals that are brought to the table, in accordance with the bylaws of SEP.org. Incentive funds used to support Watershed Institute activities must be approved by a majority of voting members present at SEP.org meetings, including those members not related to the Watershed Institute. The direct benefit of membership with SEP.org is indispensable post-award accounting and budget tracking support for Watershed Institute principal investigators. SEP.org has supported Watershed Institute projects such as purchase of necessary technology, small salaries for graduate students attending meetings on behalf of Watershed Institute PI's, production of an e-newsletter and travel funds for PIs to attend in-state watershed meetings.

8 As reported above, the Watershed Institute has two small sources of residual funds, the Watershed Institute Donation Fund and the Watershed Institute Incentive Account.

9 Personnel

The following list includes CSUMB faculty and staff who identify themselves with the Mission of the Watershed Institute via grant-funded activities, unfunded service, or by providing mission-specific curriculum in SEP courses during the 2013-2014 year in review.

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laura Lee Lienk</td>
<td>Adjunct Faculty</td>
<td>Co-Director, PI, instructor</td>
</tr>
<tr>
<td>Dr. Lars Pierce</td>
<td>Adjunct Faculty</td>
<td>Co-Director, PI</td>
</tr>
<tr>
<td>Dr. Fred Watson</td>
<td>Faculty</td>
<td>PI, instructor</td>
</tr>
<tr>
<td>Dr. Marc Los Huertos</td>
<td>Faculty</td>
<td>PI, instructor</td>
</tr>
<tr>
<td>Dr. Suzanne Worcester</td>
<td>Faculty</td>
<td>PI, instructor</td>
</tr>
<tr>
<td>Dr. Dan Fernandez</td>
<td>Faculty</td>
<td>PI, instructor</td>
</tr>
<tr>
<td>Dr. Arlene Haffa</td>
<td>Faculty</td>
<td>PI, instructor</td>
</tr>
<tr>
<td>Dr. Doug Smith</td>
<td>Faculty</td>
<td>PI, instructor</td>
</tr>
<tr>
<td>Forrest Melton</td>
<td>Adjunct Faculty</td>
<td>PI</td>
</tr>
<tr>
<td>Emily Howard</td>
<td>Staff</td>
<td>Return of the Natives</td>
</tr>
<tr>
<td>Christine McKnew</td>
<td>Staff</td>
<td>Return of the Natives</td>
</tr>
</tbody>
</table>
10 Organizational Structure

The organizational structure of the Watershed Institute includes a director (or two co-directors) nominated and elected by simple majority of the SEP faculty who actively lead, or participate in, Watershed Institute activities (Figure 2). The directorship involves oversight of Watershed Institute incentive and donation accounts, setting meeting agendas, scheduling meetings, research and writing of the annual report, and fostering periodic institute review. In collaboration with the Watershed institute Advisory Board, the director fosters work leading toward achieving the Institute Mission.

While not officially part of the Institute Structure, several "programs" have emerged as distinct entities. These programs are shown schematically below. The research arm represents faculty, staff, and students involved in applied science driven by community needs. The community outreach arm includes faculty and staff involved in several long-term initiatives to improve the environment through community education and community-based restoration projects.
Figure 2: Watershed Institute Organization –

College of Science, Media Arts, & Technology (SMART; Dean)

Division of Science & Environmental Policy (SEP; Chair)

Local Community (e.g. Resource Management, Agriculture, Education, etc.)

Watershed Institute Advisory Board (SMART Dean, SEP chair, SEP faculty, Community members)

The Watershed Institute (Laura Lee Lienk, Lars Pierce co-directors) Watershed-based SEP faculty, staff, students, alumni

Education & Service Learning Conservation & Restoration Central Coast Watershed Studies Crop Water & Nutrient Management

(See Section 7 above for a list of current & pending research, education, & outreach projects)
11 Facilities

Between 1994 and 2003, the Watershed institute housed many of its core faculty, researchers, and operations in Building 42. Building 42 provides 2400 sq ft of space for offices, restroom, utility room and hallway. It also provides a 760 sq ft teaching space. The Watershed Institute nursery, occupies approximately 3000 sq ft of open land. The nursery is essential to cornerstones of the Watershed Institute mission—community outreach, education, and restoration. The native plant nursery is used to grow thousands of plants every year in support of WI restoration projects, and provide meaningful activities for a variety of community members, including a developmentally disabled adult group the “Green Thumbs.”

In 2003, simultaneous overcrowding in Building 42, and opportunities for office and teaching lab space in the new Chapman Science Center (Bldg. 53) led to decentralization of Watershed Institute operations and faculty. In essence, the research arm of the Watershed Institute moved offices to building 53 and expanded the research and teaching laboratory operations to available space in Building 13 and the new capstone laboratory spaces in Building 53.

It is now very difficult to judge how much space the Watershed Institute operations occupy, since faculty activities are inextricably integrated with everyday operations of SEP and State teaching space and State offices. While we distinguish State–funded and Corporation–funded activities and equipment, they occur seamlessly in shared spaces across campus, including Building 42, where the Institute was founded and still thrives today.

The space needs of the Watershed Institute are forecast to increase as new science analytical equipment is purchased. Nursery operations will need to expand in response to funded community needs. Building 13 space is efficiently utilized to employ 2 staff and a number of graduate and undergraduate students who work on externally funded projects. Currently, all the available office space is being used, and there remains a critical need for more office space, especially if more students are to benefit from grant–funded research.

12 Community Service

The CSUMB Watershed Institute has a very strong presence in the community. Community service is central to the Watershed Institute mission, and is embodied in its support of the CSUMB mission statement. The community we serve includes students, local, state, federal, and international resource agencies, NGOs, municipalities, other academic institutions, and individual stakeholders.

As detailed in section 2.1 of this report, the faculty volunteer on several regional technical advisory committees and advisory boards. In that role, we provide scientific input aimed at sound environmental policy decisions. As detailed in section 2 of this report we serve the community’s environmental needs through funded research, technical reports, and very substantially through community–based restoration projects (Tables 3 and 4).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Community Served</th>
</tr>
</thead>
<tbody>
<tr>
<td>General public Involved in watershed restoration with</td>
<td>979</td>
</tr>
<tr>
<td>Return of the Natives</td>
<td></td>
</tr>
<tr>
<td>K–12 school children involved in watershed restoration with</td>
<td>4660</td>
</tr>
<tr>
<td>Return of the Natives</td>
<td></td>
</tr>
<tr>
<td>K–12 Classroom teachers involved in watershed restoration with</td>
<td>24</td>
</tr>
<tr>
<td>Return of the Natives</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Return of the Natives Brings CSUMB students to Community Service (2013–2014)

<table>
<thead>
<tr>
<th>Annual Activity</th>
<th>Hours of Community Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return of the Natives staff supervise CSUMB Service Learning</td>
<td>47 students x 30 hours = 1,410 community hours</td>
</tr>
<tr>
<td>Students From Courses Across Campus</td>
<td></td>
</tr>
<tr>
<td>Return of the Natives hires CSUMB student assistants as</td>
<td>10 students x 10 hours/week x 35 weeks/year = 3500 community hours</td>
</tr>
<tr>
<td>mentors and leaders in the community</td>
<td></td>
</tr>
</tbody>
</table>

Further, Watershed Institute faculty regularly train regional environmental docents. Recent activity includes several hours of training on regional geology for 30 Docents in training at Pacific Grove Natural History Museum’s “California Naturalists” class.

Dr. Smith also presented a lecture called “‘Geomorphology:’ The Science Behind Stunning Central Coast Landscapes” in support of a painting exhibit at the P.G. Natural History Museum.

Dr Watson works with numerous stakeholders in the reuse of the Former Fort Ord, most actively with respect to master planning for recreational trails and greenways.

Dr. Pierce works with growers on the North Coast and Central Coast, as well as in the San Joaquin Valley, applying remote sensing and water balance modeling towards the design and development of efficient irrigation schedules in winegrape vineyards. He also works with local resource agency personnel (US Army, BLM, FORA) in assessing the effects of prescribed fire on the Fort Ord Maritime Chaparral plant community.
13 Plans for Future Activities

We anticipate that the next year will closely follow the success of the past 17 years of operation. The following un-prioritized bullet points provide insight into topical areas where we anticipate expansion of current initiatives and development of new work.

- Continue pro-bono trail & greenway master planning, GIS, & land-use mapping activities on Fort Ord for the general benefit of open-space planning
- Continue working with local municipalities on stormwater measurement and prediction
- Fort Ord BLM restoration grant for $32,000
- Continue to work with the Army, BLM, FORA, and the Ft. Ord CRMP Group to assist with the transition of former Ft. Ord Army lands to the public and private sectors. This will also include subcontract work with numerous Army restoration sub-contractors.
- Include increasing numbers of Environmental Studies undergraduate major students in RON outreach programs.
- Initiate opportunities for Coastal Watershed Science and Policy graduate students to become more fully involved in strengthening the Watershed Institute infrastructure, ie., through the re-creation of the Watershed Institute website, or, in representing the Watershed Institute in local and regional meetings/events.
- Increase the number of volunteers working with Return of the Natives through the RON's DONs Volunteer Program
- Expand the use of GIS and modeling tools in the local agricultural community to enhance grower-understanding of crop water needs and to improve irrigation efficiency.
- Continue to expand the Watershed Institute role in the new CSU-Water Resources Policy Initiative.
- Create a “Growing/Learning Center.” The outreach and education programs of the Watershed Institute have in the past included an active Farm to School Program, the work of this program has been subsumed by a local non-profit agency. However, a great deal of student interest in sustainability, gardening and food production is occurring on campus. In the future, the idea of creating a “Growing/Learning Center” on campus open space may again be possible. Much work and visioning has gone into the creation of rough preliminary designs accompanied by narrative.
- Support undergraduate student gardening club, EDEN, in the establishment of an “official” student garden adjacent to the Watershed Institute greenhouses.
- Continue to influence emerging water supply policy along the central coast.
- Maintain the capacity to analyze and process water quality samples as a means to provide high quality data in the region and train students in analytic skills for future careers.
- Increase the collaboration with the agricultural industry to promote practices that protect the region’s water quality and water supply using external sponsored funds, e.g. USDA, CSU ARI, etc.
• Continue collaboration with organizations working on wildlife–landscape interactions in primarily international developing regions.
• Develop environmental service and outreach programs for youth in Salinas both for CSUMB outreach but also to address issues of marginalization and violence.
• Expand existing network of regional fog water collection instruments to document the relationships between the fog and the local flora, fauna, geography, and climate change.
• Continue to build linkages to the local agricultural community by providing access to summaries of satellite imagery and weather data, as well as modeling, for use in irrigation planning and assessment.
• Continue collaborations with the US Army, BLM, FORA, and local community to better understand the need for and the effects of fire on plant species composition in maritime chaparral, a special-status plant community with a limited distribution.

14 Problems to be Addressed
The following bullets identify areas that we would like to improve or explore.
• CSU–support (buyout or overload) for faculty leading the newly mandated annual reports and periodic program reviews, especially in the context of furloughs or salary cuts.
• Improve web site and re–institute production of the WI newsletter
• Review and revise Mission Statement and Purpose
• Attracting post docs (from UCSC and elsewhere)
• Future vehicle and vehicle funding
• Solicit community advisory board member(s)
• Building 13 water distilling facility upgrade
• Building 13 compressor and vacuum pump system functional check
• Building 13 – updating all computers
• Building 13 – finding alternative storage for gear and equipment.
15 Advisory Board

The Founding Agreement between WI and CSUMB (CSUMB, 1999) dictates that we maintain an advisory board that guides the Watershed Institute toward fulfilling its mission to the university and community (Table 1). The Watershed Institute Advisory Board has not met in 2013. It will convene again in fall 2013 to review the emerging Watershed Institute strategic plan. In 2013 Steve Bachman (Monterey District Planner, CA State Parks) indicate interest in being the community member of the advisory board.

Table 1: Advisory Board

<table>
<thead>
<tr>
<th>Required Membership</th>
<th>Spring 2014 Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMART Dean</td>
<td>Moroh</td>
</tr>
<tr>
<td>SEP Chair</td>
<td>Smith</td>
</tr>
<tr>
<td>University Corporation</td>
<td>Lopez</td>
</tr>
<tr>
<td>Watershed Institute Director(s)</td>
<td>Pierce &amp; Lienk</td>
</tr>
<tr>
<td>Two SEP faculty</td>
<td>Watson &amp; Los Huertos</td>
</tr>
<tr>
<td>One community member</td>
<td>Steve Bachman, CA State Parks</td>
</tr>
</tbody>
</table>

The Watershed Institute Executive Committee is a subset of the Advisory Board (Table 2). The Executive Committee selects the community member and SEP faculty members of the Advisory Board by simple majority vote.

Table 2: Advisory Board Executive Committee

<table>
<thead>
<tr>
<th>Required Membership</th>
<th>Spring 2010 Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMART Dean</td>
<td>Moroh</td>
</tr>
<tr>
<td>SEP Chair</td>
<td>Smith</td>
</tr>
<tr>
<td>Watershed Institute Director(s)</td>
<td>Pierce &amp; Lienk</td>
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</tbody>
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16 References


