



Water Technology Instructional Program Review 2011-2012

Spring 2013

Prepared by

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Water Technology Program Review Committee Members

Name	Title
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PROGRAM REVIEW – Water Technology

The final summary of the program review process for Water Technology is attached to this page.

I affirm that this program has been reviewed according to the accepted District procedures for program review and that the final summary accurately reflects the consensus of the members of the review committee.

_____ Jim Lancaster, Dean of Career/Technical and Continuing Education	_____ date
_____ Michelle Plug, Articulation Officer	_____ date
_____ David Kary,, Chair of Curriculum Committee	_____ date
_____ Irene Malmgren, Vice President of Academic Affairs	_____ date
_____ Jim Woolum,, Academic Senate President	_____ date
_____ Geraldine M. Perri, Superintendent/President	_____ date

It will be the department's responsibility to communicate review recommendations with additional offices and services.

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1. Executive Summary

A. Program History/Description

This program is designed to prepare students who wish to seek employment in the public drinking water supply industry or qualify for a more responsible position within the industry. These courses will be helpful to students who wish to prepare for the T-1, T-2, T-3, T-4, and T-5 Water Treatment Operator and D-1, D-2, D-3, D-4, and D-5 Water Distribution Operator certification examinations given by the California Department of Public Health. Coursework also provides contact hours for Operator Certification maintenance requirements.

B. Strengths/Effective Practices

1. Adjunct faculty have done a very good job staying up to date with SLO Assessments.
2. Pool of adjunct faculty is strong and has depth.
3. The program is primarily attended by incumbent workers needing training to maintain or add additional Department of Public Health certifications.
4. The number of certificate completers has increased steadily in the last two years due to "intrusive counseling" in the CTE division.
5. There is a large number of close to retirement age workers in the industry.
6. Water Conservation and storm water run-off control are expected areas of study requiring attention in the next few years.
7. Current completer output across three counties appears to match current need in the industry.
8. Program is scheduled to allow for completion in one year.

C. Weaknesses/Lessons Learned

1. Program suffers from not having full-time faculty leadership.
2. Dean of division responsible for curriculum changes, program review and other 10+1 items within the program.
3. Program lacks technical math component.
4. Water Awareness Day has not been offered for the last two years due to lack of staffing in the Water Technology program.
5. The industry and the program remain male dominated.
6. Employment in the industry will remain fairly flat in the next few years. There will be few new jobs and many retirements are being replaced with technology.

D. Recommendations/Next Steps

1. Hire a Full-time faculty member in either Public Works or Water Technology to coordinate both programs and provide program level leadership.
2. Explore the development of an internship program to assist new students with entry into the industry.
3. Modify WATR 150 to include technical math, write a WATR math course or partner with math department to develop a technical math course that will become part of the program requirements.
4. Explore curriculum development in storm water control.
5. Closely monitor regional labor market data and trends.
6. Maintain "intrusive" counseling technique in the program.

2. Faculty

Full-Time Faculty

Glancy, James
 Gramling, Cary
 Maestas, Albert
 Maestas, Michael

Adjunct Faculty

Martinez, Jose
 Sherman, Stephen
 Vagnozzi, Jeannette

3. Program description

This program is designed to prepare students who wish to seek entry level employment in the public water supply industry or qualify for a more responsible position within the industry. These courses will be helpful to students who wish to prepare for the T1, T2, T3, T4 and T5 Water Treatment Operator and D1, D2, D3, D4, and D5 Water Distribution Operator certification examinations given by the Department of Health Services. The Citrus College Water Technology program is approved by the Department of Health Services as a provider of Specialized Training for operator certification requirements as well as for contact hours for operator certificate renewal.

4. Program Goals and Objectives

The goals and objectives of the Water Technology Program are:

- a) Provide training for incumbant workforce to maintain or increase their Department of Public Health certification level (D-1through D-5 and/or T-1 through T-5)
- b) Prepare students for entry level employment in the water treatment and/or water distribution industries.

5. List and Review of Degrees, Certificates, and Awards

Both the Certificate and the AS Degree were reviewed during the 2011 Advisory meeting, modifications were made to remove math requirement. The committee reviewed the certificate and degree again in 2012. Additional minor modifications suggested in 2012 to remove Biology and PUB courses from the list and add WATR 162.

Degree or Certificate Title	Date last reviewed by Curriculum	Average number of awards each year	Date degree SLOs written	Date degree SLOs Assessed	Date last reviewed by Advisory Council
Associate in Science, Applied Arts	2011				6/2012
Water Technology Certificate	2011	9			6/2012

Water Technology Certificate

Required

WATR 150 Introduction to Water Systems
WATR 151 Water Resources and Distribution
WATR 156 Water Treatment I
WATR 153 Water Resources and Distribution II
WATR 157 Water Treatment II

Plus One of the Following

WATR 162 Water Conservation
BUS 151 Business Spelling and Vocabulary
BUS 152 Business Communications
CSIS 100 Introduction to Computers
CSIS 130 Microcomputer Applications I
PUB 155 Public Works Inspection
PUB 160 Public Works Administration
PUB 161 California Occupational Safety & Health
SPCH 101 Public Address
SPCH 106 Small Group Communication

6. List of Industry-Based Standard Certificates and Licenses

Department of Public Health Water Distribution D1-D5 certification
Department of Public Health Water Treatment T1-T5 certification

7. Advisory Committee or Council

Name	Position / Company
Steve Sherman	Field Operations Supervisor – Covina Irrigating Co
Mike Maestas	Water and Sewer Manager – City of Chino Hills
A. Michael Maestas	Controls Analyst – Cucamonga Valley Water District
Ken Deck	General Manager – Rowland Water District
Daniel Marquez	Operations - Valley County Water District
Gary Gramling	Water Production Operations – City of Lakewood
Jose Martinez	Administration Services Manager – Walnut Valley
Gary Williams	Employee Development Specialist – Golden State Water

8. Program Student Learning Outcomes

The Water Technology Program has adopted the Institutional General Education Competencies of Citrus College (as approved by Steering December 8, 2008). General education competencies serve as a common set of core curricular components identified and defined by faculty. Student learning outcomes are behaviors based on these competencies.

Any student transferring, completing a degree or certificate from Citrus College, must demonstrate effectively assessed awareness, understanding, knowledge, skills, and abilities in the selected competencies.

Students completing courses in the Water Technology Program will have acquired the following competencies:

1) Communication (personal expression and information acquisition)

- (a) Describe and explain regulatory issues that relate to the public drinking water supply.
- (b) Diagram and explain the fundamentals of the water distribution system including SCADA (supervisory control and data acquisition), maintenance, pumps, hydraulics, and valves.

2) Computation

3) Creative, Critical, and Analytical Thinking, and Information Competency

Given a scenario involving water contamination; identify the contaminants, recommend the best treatment, administer the treatment and then verify the contaminants are below allowable safety thresholds.

4) Community/Global Consciousness and Responsibility

5) Technology

6) Discipline / (Subject Area Specific Content Material)

Demonstrate the safe handling of chemicals used in the Water industry and describe the Occupational Safety and Health Administration (OSHA) regulations related to public drinking water.

9. Curriculum Review and Student Learning Outcomes Assessment

Curriculum/ SLO Assessment Map: Water Technology

CC 1: Communication	CC 4: Community/global consciousness and responsibility
CC 2: Computation	CC 5: Technology
CC 3: Creative, Critical, and analytical thinking, information competency	CC 6: Discipline/Subject Area Specific Content Material

	CC 1 (a) Describe and explain regulatory issues	CC 1 (b) Diagram water system.	CC 3 Identify contaminants and recommend treatment	CC 6 Demonstrate safe handling of chemicals used in industry			Date of SLO Assessment semester / year or CA=(Ongoing, Continuing Assessment)
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WATR 150 –Introduction to Water Systems (3 Units), Applicability-D/C Last Offered-S 13, Last Curriculum Date: S09 , Curriculum Revision Date: S15 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1		I					
SLO 2			I				
SLO 3			I				
SLO 4	I						F 12
SLO 5			I				
SLO 6		I					
SLO 7		I					
SLO Key: I= Introduced, D=Developed, M=Mastered							

WATR 151 –Water Resources and Distribution I (3 Units), Applicability-D/C Last Offered-F 12, Last Curriculum Date:F09 , Curriculum Revision Date: F15 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1			I				F 12
SLO 2	I						
SLO 3		I					
SLO 4		I					
SLO 5		I					
SLO Key: I= Introduced, D=Developed, M=Mastered							

	CC 1 (a) Describe and explain regulatory issues	CC 1 (b) Diagram water system.	CC 3 Identify contaminants and recommend treatment	CC 6 Demonstrate safe handling of chemicals used in industry			Date of SLO Assessment semester / year or CA=(Ongoing, Continuing Assessment)
--	---	--	--	--	--	--	---

WATR 153 –Water Resources and Distribution II(3 Units), Applicability-D/C Last Offered-S 13 , Last Curriculum Date:F09 , Curriculum Revision Date: F15 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1		I					S 12
SLO 2	I	I					
SLO 3		I					
SLO 4			I				
SLO5	I						
SLO 6		I					
SLO Key: I= Introduced, D=Developed, M=Mastered							

WATR 155 –Water Distribution Operator Exam Preparation (1 Unit), Applicability (Stand Alone) Last Offered-W 11, Last Curriculum Date:S07 , Curriculum Revision Date: S13 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1		I					WHEN OFFERED
SLO 2			I	I			
SLO 3	I						
SLO 4	I						
SLO 5		I					
SLO 6	I			I			
SLO 7		I	I	I			
SLO Key: I= Introduced, D=Developed, M=Mastered							

WATR 156 –Water Treatment I (3 Units), Applicability-D/C Last Offered-S 13, Last Curriculum Date:F06 , Curriculum Revision Date: F12 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1			I				F 12
SLO 2			I				
SLO 3	I						
SLO 4			I				
SLO 5			I				
SLO 6	I			I			
SLO 7			I	I			
SLO Key: I= Introduced, D=Developed, M=Mastered							

	CC 1 (a) Describe and explain regulatory issues	CC 1 (b) Diagram water system.	CC 3 Identify contaminants and recommend treatment	CC 6 Demonstrate safe handling of chemicals used in industry			Date of SLO Assessment semester / year or CA=(Ongoing, Continuing Assessment)
--	---	--	--	--	--	--	---

WATR 157–Water Treatment II (3 Units), Applicability-D/C Last Offered-F 12, Last Curriculum Date:F06 , Curriculum Revision Date: F12 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1							F 12
SLO 2							
SLO 3							
SLO 4							
SLO 5							
SLO 6							
SLO 7							
SLO 8							
SLO 9							
SLO Key: I= Introduced, D=Developed, M=Mastered							

WATR 162–Water Conservation (3 Units), Applicability-D/C Last Offered-S 13, Last Curriculum Date:S09 , Curriculum Revision Date: under review Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1							S 13
SLO 2							
SLO 3							
SLO 4							
SLO 5							
SLO 6							
SLO Key: I= Introduced, D=Developed, M=Mastered							

WATR 165–Water Systems Operations and Technology Update (1 Unit), Applicability (Stand Alone) Last Offered-S 08, Last Curriculum Date:S09 , Curriculum Revision Date: S15 Course Applicability Key: T=Transfer, D= Degree, C= Certificate, S= Skill Award							
SLO 1							WHEN OFFERED
SLO 2							
SLO 3							
SLO 4							
SLO 5							
SLO 6							
SLO 7							
SLO Key: I= Introduced, D=Developed, M=Mastered							

10. Review of previous recommendations

Mission:

By headcount, there are fewer than 100 Water Technology students enrolled at Citrus College at any given time, most taking one class per semester. A portion of these students are working toward their Water Technology Certificate, and others are taking coursework specifically for their operator certification. Six classes are required for the Water Technology Certificate. The Certificate is reviewed annually by the Water Technology Advisory Council for relevancy to industry standards. It would therefore be expected that up to 10 Certificates Water Technology would be awarded each year. Certificate awards range from 1-3 in this program annually. It is recommended that staff redouble their efforts to encourage eligible students to apply for their certificate, especially students who are completing WATR 153 Water Resources and Distribution II and WATR 157 Water Treatment II.

-- Response: Certification requirements were reviewed in 2011 and 2012. "Intrusive" counseling was implemented. Certificate completers increased to 12 in 2011 and 23 in 2012.

Though employees in the water industry are overwhelmingly male, it is recommended that a concerted effort be put forth to attract female students into the program.

-- Response: WATR 162, Water Conservation, was added to the curriculum. This course typically sees a higher concentration of nontraditional students

Need:

The ratio of full-time equivalent student to full-time equivalent faculty has gone from 19:1 in 2000-01 to 42:1 in 2004-05. It is recommended that alternatives to the large class size for the introductory course be explored such as a second section or an on-line class.

-- Response: Water Technology class enrollment remains at 40-60+ per course

It is recommended that alternate delivery modes be explored to meet industry needs such as contract education or seminar style workshops of six hours at water agency locations to facilitate the award of Contact Hours.

-- Response: Mt. SAC has moved all Water Technology to fee-based and noncredit specifically to meet this need in the region. Citrus will maintain its focus on credit instruction for the next few years as labor market predictions suggest a very slow increase in demand.

Quality:

It is recommended that the proposed distance education class "Updates in the Water Industry" be offered, after approval, on a regular schedule to meet the needs of students who need to obtain contact hours and renew their operator certification.

-- Response: No faculty expertise to develop the curriculum

Syllabi will be revised for the fall 2006 semester to reflect the recently approved Student Learning Outcomes.

-- Response: All syllabi now have SLOs.

Feasibility:

No recommendations

Compliance:

No recommendations

11. Evaluation Criteria – Mission

Current status

The Water Technology program supports the mission of the college in the areas of degrees (one), certificates (one), and preparation of the workforce. The program provides training to meet state mandates for employment and the preparation for state certification in the areas of water distribution and treatment. Coursework in this area also improves the skill level of incumbent employees.

Commendations

a.

Recommendations

12. Evaluation Criteria – Need

Current status

The Citrus College Water Technology program is approved by the Department of Health Services as a provider of Specialized Training for operator certification requirements as well as for contact hours for operator certificate renewal. Employment in the area remains level. While some groups believe that technology will reduce the workforce, this trend has not emerged and the workforce numbers have remained steady.

Mount San Antonio College has a similar program but they have recently moved all classes to Non Credit or Fee Based status.

Commendations

a.

Recommendations

- a. Closely monitor regional labor market data and trends.
- b. Explore the development of an internship program to assist new students with entry into the industry.

13. Evaluation Criteria – Quality

Current status

The quality of the program has been, and remains, strong. Our part-time instructors are working professionals in the field who are aware of the trends, issues, and operation of water treatment and distribution systems. A full time faculty member is needed to maintain and improve the quality of the program.

Commendations

a.

Recommendations

- a. Hire a Full-time faculty member in either Public Works or Water Technology to coordinate both programs and provide program level leadership.
- b. Modify WATR 150 to include technical math, write a WATR math course or partner with math department to develop a technical math course that will become part of the program requirements.
- c. Explore curriculum development in storm water control.
- d. Modify Certificate to make WATR 162 - Water Conservation a requirement for the certificate

14. Evaluation Criteria – Feasibility

Current status

The water program is designed to prepare student for certification in their area of employment (treatment and/or distribution). Timing is not a critical factor in this discipline as the state includes "years of experience" in the field as a requirement for various levels of certification. As a result, the pace for students is generally slow with students taking one course at a time and spending up to a decade to complete their studies and certification. The California State University system does not have a transfer program related to this curriculum.

Classes are generally offered in the evening after a work day or in a distance learning format. In the past, the college has hosted a Water Awareness Day during spring break that was well attended. Participants received continuing education hourly credit for the event. Due to the intensive planning required for the event, it has not been scheduled for the past two years. A full time faculty member would have sufficient time to coordinate an event like the Water Awareness Day.

Commendations

a.

Recommendations

- a. Maintain "intrusive" counseling technique in the program.

15. Evaluation Criteria – Compliance

Current status

The Water Technology program is in substantial compliance with federal, state, and district requirements. Advisory meetings are conducted on a regular basis, facilities are in compliance with ADA standards, and required reports are completed in a timely manner.

Curriculum updates for WATR 150 and 162 have been initiated. Updates for WATR 155, 156, and 157 are due or overdue. WATR 155 and 165 are stand alone courses that have not been offered in several years and are being reviewed for deactivation.

Commendations

a.

Recommendations

16. Recommendations

Rank	Description of recommendation (actions or behaviors to be completed)	Responsible person(s)	Target Date	Personnel	Facilities	Equip. / Software	Supplies
1	Hire a Full-time faculty member in either Public Works or Water Technology to coordinate both programs and provide program level leadership.	Dean	Fall, 2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Explore the development of an internship program to assist new students with entry into the industry.	Dean/FT faculty	Fall 2015	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Modify WATR 150 to include technical math, write a WATR math course or partner with math department to develop a technical math course that will become part of the program requirements.	Dean / faculty	Spring 2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Explore curriculum development in storm water control.	Dean / faculty	Fall 2014	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Closely monitor regional labor market data and trends.	Dean	Annually	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Maintain "intrusive" counseling technique in the program.	Dean		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	Modify Certificate to make WATR 162 - Water Conservation a requirement for the certificate	Dean / faculty	Fall 2014	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments

17. Budget Recommendations

Resources are needed in the following areas:

Certificated Personnel (FNIC)

Position	Discuss impact on goals / SLOs	Impact ◇	Priority ‡
FT faculty	needed to facilitate program dev and maintenance	N, Q, C	B

Classified Personnel

Position	Discuss impact on goals / SLOs	Impact ◇	Priority ‡

Facilities

Facilities / repairs or modifications needed	Discuss impact on goals / SLOs	Bldg / Room	Impact ◇	Priority ‡

Computers / Software (Tecs)

Item	Discuss impact on goals / SLOs	Cost	Impact ◇	Priority ‡

Equipment

Item	Discuss impact on goals / SLOs	Cost	Impact ◇	Priority ‡

Supplies (Division)

Item	Discuss impact on goals / SLOs	Cost	Impact ◇	Priority ‡

Additional information:

◇ **Impact:**

M = Mission: Does program meet the District's mission and established core competencies? Does program reflect the District's diversity?

N = Need: How is program addressing needs based on labor market data, enrollment, articulation, advisory committee, regional agreements, etc.?

Q = Quality: Are lecture/lab unit values appropriate? Have the course outlines been reviewed / updated regularly? Are disciplines appropriate? Is faculty development adequate? Does program support State and District emphasis on critical thinking, problem solving and written expression? Does program meet stated objectives in the form of SLOs? Are course pre-requisites and co-requisites validated?

F = Feasibility: Are facilities, equipment, and library resources adequate? Are evening programs and services adequate? Are course offerings frequent enough for students to make adequate progress in both day and evening programs? Does the program have adequate communication with & support from Counseling?

C = Compliance: Do course requisites meet Federal, State & District requirements? Do the course outlines meet state, district & federal regulations for content? Do vocational programs have regular advisory meetings?

‡ **Priority: (Note: When discussing priority, consider the following and address in Column 2)**

A. Is this goal mandated by law, rule, or district policy?

B. Is this goal essential to program success?

C. Is this goal necessary to maintain / improve program student learning outcomes?

Attachment A: Key Performance Indicator data pages

WATR Program Review

	Key Performance Indicators	Fall04	Fall05	Fall06	Fall07	Fall08	Fall09
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered	3.0	3.0	3.0	4.0	3.0	4.0
4	Sections Offered	3.0	3.0	3.0	5.0	3.0	4.0
5	Morning Sections						
6	Afternoon Sections				2.0		
7	Evening Sections	3.0	3.0	3.0	3.0	3.0	4.0
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections	0.0	0.0	0.0	1.0	0.0	0.0
11	DistanceEd Full-Term Sections	0.0	0.0	0.0	0.0	0.0	0.0
12	DistanceEd Short-Term Sections				0.0		
13	Enrollment	123	104	120	144	138	204
14	Weekly Student Contact hours (WSCH)	358.8	303.3	352.9	448.8	472.8	693.8
15	Full-Time Equivalent Students (FTES)	12.3	10.4	12.1	13.9	14.6	21.4
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)	0.4	0.4	0.4	0.7	0.5	0.7
17	Credit Reimbursement Rate	\$2,922.30	\$3,259.71	\$3,476.34	\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF	854.2	722.2	840.3	650.5	964.9	1067.5
19	FTES/FTEF	29.3	24.8	28.8	20.1	29.8	32.9
20	Fill Rate at Census	86.1	70.1	81.3	60.3	79.2	100.5
Program Success							
21	Course Retention	94.3	90.4	93.3	97.9	99.3	94.6
22	Course Success	69.9	70.2	67.5	81.9	81.9	75.5

WATR Program Review

	Key Performance Indicators				Winter08	Winter09	Winter10
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered				1.0	1.0	2.0
4	Sections Offered				1.0	1.0	2.0
5	Morning Sections						
6	Afternoon Sections				1.0		
7	Evening Sections					1.0	1.0
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections				1.0	1.0	1.0
11	DistanceEd Full-Term Sections						
12	DistanceEd Short-Term Sections				0.0	0.0	1.0
13	Enrollment				17	47	69
14	Weekly Student Contact hours (WSCH)				18.8	52.2	165.6
15	Full-Time Equivalent Students (FTES)				0.6	1.6	5.1
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)				0.1	0.1	0.2
17	Credit Reimbursement Rate				\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF				375.9	1043.5	828.0
19	FTES/FTEF				11.6	32.2	25.6
20	Fill Rate at Census				24.6	89.6	69.8
Program Success							
21	Course Retention				94.1	91.5	97.1
22	Course Success				88.2	72.3	82.6

WATR Program Review

	Key Performance Indicators	Spring05	Spring06	Spring07	Spring08	Spring09	Spring10
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered	3.0	3.0	4.0	3.0	3.0	3.0
4	Sections Offered	3.0	3.0	4.0	3.0	3.0	3.0
5	Morning Sections						
6	Afternoon Sections						
7	Evening Sections	3.0	3.0	3.0	3.0	3.0	3.0
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections	0.0	0.0	0.0	0.0	0.0	0.0
11	DistanceEd Full-Term Sections	0.0	0.0	1.0	0.0	0.0	0.0
12	DistanceEd Short-Term Sections						
13	Enrollment	148	113	84	146	168	215
14	Weekly Student Contact hours (WSCH)	431.7	332.5	227.5	508.1	571.3	731.1
15	Full-Time Equivalent Students (FTES)	14.8	11.4	7.8	15.7	17.6	22.6
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)	0.4	0.4	0.5	0.5	0.5	0.6
17	Credit Reimbursement Rate	\$2,922.30	\$3,259.71	\$3,476.34	\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF	1027.8	791.7	494.6	1016.3	1166.0	1218.5
19	FTES/FTEF	35.2	27.1	17.0	31.4	36.0	37.6
20	Fill Rate at Census	99.3	73.3	41.3	78.9	104.5	144.5
Program Success							
21	Course Retention	91.9	96.5	92.9	97.3	97.0	97.2
22	Course Success	66.2	70.8	67.9	69.9	76.2	79.1

WATR Program Review

	Key Performance Indicators	Summer04	Summer05	Summer06	Summer07	Summer08	Summer09
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Program Access							
1	Majors (total)						
2	New Majors						
3	Courses Offered				1.0	2.0	2.0
4	Sections Offered				1.0	2.0	2.0
5	Morning Sections						
6	Afternoon Sections					1.0	
7	Evening Sections				1.0	1.0	1.0
8	Arranged Sections						
9	Weekend Sections						
10	Short Term Sections				1.0	1.0	1.0
11	DistanceEd Full-Term Sections					0.0	
12	DistanceEd Short-Term Sections				0.0	0.0	1.0
13	Enrollment				28	48	71
14	Weekly Student Contact hours (WSCH)	0.0	0.0	0.0	23.3	141.0	173.4
15	Full-Time Equivalent Students (FTES)				0.8	4.4	5.4
Program Resources							
16	Full-Time Equivalent Faculty (FTEF)				0.0	0.2	0.2
17	Credit Reimbursement Rate	\$2,922.30	\$3,259.71	\$3,476.34	\$3,668.28	\$3,834.46	\$3,834.46
Program Operation							
18	WSCH/FTEF				583.3	671.3	866.9
19	FTES/FTEF				20.0	20.7	26.8
20	Fill Rate at Census				56.0	64.7	87.2
Program Success							
21	Course Retention				100.0	100.0	97.2
22	Course Success				71.4	72.9	77.5

		04-05		05-06		06-07		07-08		08-09		09-10	
		Year1		Year2		Year3		Year4		Year5		Year6	
Gender													
	Female	13	6.3%	13	7.7%	14	8.2%	20	7.7%	20	7.0%	37	9.6%
	Male	19		15		15		23		26		34	
		4	93.7%	6	92.3%	6	91.8%	8	91.9%	0	91.2%	4	89.4%
	Missing							1	0.4%	5	1.8%	4	1.0%
	Total	20	100.0%	16	100.0%	17	100.0%	25	100.0%	28	100.0%	38	100.0%
		7		9		0		9		5		5	
Age													
	19 or younger	5	2.4%	10	5.9%	6	3.5%	17	6.6%	11	3.9%	28	7.3%
	20-24	33	15.9%	30	17.8%	32	18.8%	29	11.2%	52	18.2%	75	19.5%
	25-29	37	17.9%	33	19.5%	34	20.0%	53	20.5%	62	21.8%	88	22.9%
	30-34	27	13.0%	25	14.8%	32	18.8%	47	18.1%	45	15.8%	65	16.9%
	35-39	28	13.5%	21	12.4%	22	12.9%	41	15.8%	37	13.0%	32	8.3%
	40-49	52	25.1%	35	20.7%	30	17.6%	54	20.8%	60	21.1%	72	18.7%
	50 and above	25	12.1%	14	8.3%	13	7.6%	17	6.6%	18	6.3%	25	6.5%
	Missing			1	0.6%	1	0.6%	1	0.4%				
	Total	20	100.0%	16	100.0%	17	100.0%	25	100.0%	28	100.0%	38	100.0%
		7		9		0		9		5		5	
Ethnicity													
	Asian	12	5.8%	9	5.3%	6	3.5%	10	3.9%	14	4.9%	7	1.8%
	Black or African American	14	6.8%	10	5.9%	7	4.1%	28	10.8%	11	3.9%	10	2.6%
	Hispanic/Latino	92	44.4%	80	47.3%	88	51.8%	121	46.7%	138	48.4%	125	32.5%
	American Indian or Alaska Native	5	2.4%			1	0.6%			1	0.4%		
	White	72	34.8%	61	36.1%	53	31.2%	62	23.9%	76	26.7%	84	21.8%
	Unknown/Non-Respondent	12	5.8%	9	5.3%	15	8.8%	38	14.7%	45	15.8%	15	4.3%
		9		9		0		9		5		9	
	Total	20	100.0%	16	100.0%	17	100.0%	25	100.0%	28	100.0%	38	100.0%
		7		9		0		9		5		5	
Educational Goal													
	Degree & Transfer	19	9.2%	12	7.1%	17	10.0%	8	3.1%	12	4.2%	43	11.2%
	Transfer	7	3.4%	6	3.6%	10	5.9%			1	0.4%	12	3.1%
	AA/AS	4	1.9%	6	3.6%	4	2.4%	31	12.0%	36	12.6%	39	10.1%
	License	7	3.4%	9	5.3%	6	3.5%	7	2.7%	7	2.5%	4	1.0%
	Certificate	68	32.9%	59	34.9%	49	28.8%	43	16.6%	36	12.6%	50	13.0%
	Job Skills	80	38.6%	64	37.9%	71	41.8%	110	42.5%	142	49.8%	158	41.0%
	Basic Skills							6	2.3%	15	5.3%	19	4.9%
	Personal											2	0.5%
	Undecided							15	5.8%	15	5.3%	40	10.4%
	Not Reported	22	10.6%	13	7.7%	13	7.6%	39	15.1%	21	7.4%	18	4.7%
	Total	20	100.0%	16	100.0%	17	100.0%	25	100.0%	28	100.0%	38	100.0%
		7		9		0		9		5		5	
	Total	13	100.0%	12	100.0%	78	100.0%	22	100.0%	26	100.0%	20	100.0%
		5		0				1		9		9	

	Key Performance Indicators	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
		Year1	Year2	Year3	Year4	Year5	Year6
Program Resources							
23	Revenue: FTES* Reimbursement Rate	\$79,140.13	\$70,735.71	\$68,831.53	\$112,652.88	\$135,624.85	\$208,249.52
24	Total District Adopted Program Budget	21,810	23,558	19,387	24,349	37,819	49,794
25	Support Personnel (wage without benefit, 2200 and 2400 in budget)	n/a	n/a	n/a	n/a	0	N/A
26	Supplies (4300 in budget)	0	0	0	N/A	104	0
27	Cost	22,893	18,322	18,361	22,419	28,523	
28	Total FTES for the year	27.1	21.7	19.8	30.71	35.37	54.31
29	Cost per FTES	844.76	844.33	927.32	730.02	806.42	
Degrees and Certificates							
30	Degree: Water and Wastewater Technology	0	0	0	2	7	3
31	Certificates: Water and Wastewater Technology	2	8	10	5	7	12
32	Skill Awards						
33	Licenses (reported by department)						
Career Technical Education Programs							
34	VTEA Grant						
35	Industry Contributions to Program Resources						
36	Available Jobs						
37	Attach one copy of the three most recent College Core Indicator Information forms for each of the appropriate TOP codes						
38	Please include "Student Satisfaction" and "Employer Satisfaction" in the program review write-up.						
39	Labor market data						

Attachment B: Water Technology—Supplemental Data

Regional Breakdown by County for Wastewater and Water Treatment/Distribution Operators

2011-2012 changes

County	County Name	2011 Jobs	2012 Jobs	2012 Annual Openings	Median Hourly Earnings	2011 National Location Quotient
6037	Los Angeles	2,009	1,976	54	\$35.24	0.60
6059	Orange	446	439	12	\$27.16	0.39
6071	San Bernardino	362	362	10	\$28.44	0.71
	Total	2,817	2,777	76	\$33.08	

LA/OC/SB Program Completions for Wastewater and Water Treatment/Distribution Programs

Institution	Award Level	2011 Completions
Santiago Canyon College	Award of less than 1 academic year	66
Citrus College	Award of less than 1 academic year	23
San Bernardino Valley College	Award of less than 1 academic year	14
Mt. San Antonio College	Award of less than 1 academic year	12
College of the Canyons	Award of less than 1 academic year	10
Los Angeles Trade Technical College	Award of less than 1 academic year	2
Santiago Canyon College	Associates degree	33
Citrus College	Associates degree	8
College of the Canyons	Associates degree	6
San Bernardino Valley College	Associates degree	3
Los Angeles Trade Technical College	Associates degree	2

Attachment C:

Draft Report for the San Gabriel Valley Economic Partnership

Gap Assessment: Water-Industry Educational Needs and Available Programs

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Purpose

The purpose of this project was to assess the gap between water-industry educational needs and available programs to meet those needs. This project serves to inform targeted development in the San Gabriel Valley.

The project involved meeting with water sector representatives to understand the current and coming needs. In addition, current programs in the region were assessed including community colleges, universities, and research centers. Lastly, programs and agencies outside of the regions were contacted to understand innovation in other areas.

Needs and Input from Water Sector Representatives

To understand the current gaps in skills and future needs, several representatives invited to Education Coalition meetings of the Partnership. In addition, several water sector reports were reviewed, and others were contacted and interviewed. Organizations contacted included:

- Golden State Water Company
- Los Angeles Department of Water and Power
- Metropolitan Water District
- San Gabriel Basin Water Quality Authority
- Southern California Edison
- Three Valley Municipal Water District
- Upper San Gabriel Valley Municipal Water District

Outside of the region, the following agencies were contacted:

- Albuquerque Bernalillo County Water Utility Authority
- Baywork, San Francisco/Bay Area
- Orange County Sanitation District
- Sacramento Area Sewer District
- Thames Coromandel District Council, New Zealand
- Timaru District Council, New Zealand

Summaries of the representative's comments are found in Appendix B.

According to a survey conducted by the Partnership, 25% of respondents have had difficulty finding candidates with skills they need. The water-sector representatives provided insight on current needs and general observations, as well as a vision for what skills will be needed in the future. Issues described by water sector representatives revolve around expected turnover due to retirements, under-met candidate needs, on-going needs for employees, gaining interest in the field when students are considering career options, educating students on career paths in the water sector, internships, and future needs.

Some agencies may experience 25-30% turnover in next few years. Metropolitan Water District projects that 1/3 of its work force will be eligible for retirement in a few years. During the meeting with the Department of Labor in July 2012, some agency representatives indicated that they may not refill all positions, but may downsize in the process. Reducing staff may cause a shift in work to the private sector through contracts.

Interest in Water and Outreach

High turnover is expected in next few years, and organizations need a strong pipeline of employees. Recruiting starts by gaining interest in the water sector. There is a need to gain interest early, possibly targeting high school students and encouraging math and science courses. Other methods have included using high school students to work on customer surveys. This may build interest and future skilled employees. Regional Occupational Programs may also be a means of gaining interest. Labor unions have also been a source of help with recruitment, and many water agencies have relationships with schools. Upper San Gabriel Valley Municipal Water District has an existing relationship with Rio Hondo Community College on training for skilled craft workers.

Certificates and Training

Many students do not seem aware of options and the variety of water-related careers with varied levels of required training and education. Not all positions require a college degree, but some do. Certain positions do require certifications, which are generally transferable between agencies provided they are doing roughly the same job.

There are three state regulated water certifications: 1) Water Treatment, 2) Water Distribution, and 3) Wastewater Treatment. Water Treatment and Water Distribution are certified through the State of California Department of Public Health. Wastewater Operator certification is through the State Water Resource Control Board. Other certificates are available through the California Water Environment Association (a non-profit state level water association). These include Collection System Maintenance, Wastewater Treatment Plant Maintenance (includes Electrical/Instrumentation and Mechanical Technologist), Laboratory Analysis, Biosolids Land Application Management, Environmental Compliance Inspection, and Industrial Treatment Plant Operations. Some licenses are required by the state, some may be required by employers, and some may just be desired by the employee. Some of the certificates have multiple levels with a separate written test for each and escalating years of experience required. The American Public Works Association also administers a Stormwater Management Certificate.

General Skills

There is a general gap in qualified skilled craft positions (operators, mechanics, machinists, welders, pump specialists, etc.). It was noted by one water sector representative that there is not a strong pool of trained managers ready to take place top positions. In general, the pool of candidates for professional staff has been sufficient, but one representative relayed concern with recent cutbacks at California State Universities, which has been feeder schools. This may create a gap in professional candidates in the coming years. There is an on-going need for professional

positions such as scientists, engineers, and accountants. Students need basic skills in math and science. Many organizations are willing to train for craft positions, but they must have basic math (i.e. grasp fractions) and reading skills, Math skills are typically required to advance within organizations.

Internships

Lastly, student internship programs exist, but are traditionally focused on professional positions. Members of the Education Coalition expressed concern that there are not enough intern positions for the crafts. This is valuable to engage students, help them develop further interest and skills, and begin to lead to full-time employment.

Future Needs

There are a wide range of needs and developing areas for the water sector that will create exciting opportunities. A few of these concepts include:

- Changing landscaping regulations may open opportunities,
- Growing need for water conservation and technology to reduce water use, (LAEDC, 2008),
- Exploration of the water-energy link (MWD report, 2011),
- Standard specifications needed before industry invests in product development so there will be less uncertainty by manufacturers and entrepreneurs (MWD report, 2011),
- ‘Great efficiency’ technologies, energy reduction, and gray and green water infrastructure (MWD report, 2011),
- New needs for intraregional water trading with expertise in planning, engineering, marketing, commodity trading and finance (MWD report, 2011),
- Water reuse,
- Train employees to manage new generation,
- Water industry employees don’t match the demographics of their customer, which hinders communication and future employees need to be much more diverse,
- Need by new workforce generation to have information and data ready immediately,
- Less obtrusive means for material/equipment/pipe replacement,
- Predictive tools for failure and conditions,
- Product testing, product development, training, trouble shooting,
- A new water pricing structure - conflict of conservation and less income (MWD report, 2011),
- Growing needs (MWD report, 2011), informatics, sensors, metrology, and management technology,
- Technology leads to more accurate information and more regulations, which will cause changes in the industry,
- Significant investment in water infrastructure, which will create good construction jobs also research and development, and
- Need to rethink approach and also consider how things can be done better. Employees who are innovative and willing to challenge the status quo.

Existing Programs and Research Centers

The University of La Verne conducted a survey of regional programs. The details of this review are presented in Appendix C. The results present San Gabriel Valley schools with water or environmental programs. In addition, the educational backgrounds of the Managers of water agencies were provided. It was noted that additional information on these programs would be available in the *2012-2014 Occupational Programs in California Community Colleges* guide and on the website www.californiacolleges.edu.

Within the San Gabriel Valley, there are numerous programs providing certificates, associate degrees, bachelor, and master degrees in water-related fields. At the associate level, Rio Hondo and Citrus Colleges have water programs. It appears that Citrus College focuses on preparing students for the Water Treatment and Water Distribution Certificate career path. Rio Hondo's specialization focuses on the wastewater certification career path.

Santiago Canyon College (SCC) has a water certificate program and is moving to a web/tele-presence delivery, which may enable more students to participate. In addition, students currently attending SCC's water program come from Los Angeles, Orange, and Riverside Counties. SCC has also implemented a regular forum with water agencies to ensure that the program is serving the needs in the area. The need for an internship program was identified several years ago. This program was successfully implemented in 2011-12.

The Office of Water Programs based at Cal State Sacramento was contacted. This is a completely self-funded program that provides on-line courses and preparation books for any individual who wants to prepare for a water certification exam. The Office of Water Programs also provides training and research on a contract basis.

The Baywork organization was also reviewed. This is a collaborative of water and wastewater utilities working together to create the workforce of the future. It has created a roadmap for supporting operational reliability by assuring a prepared workforce. It is also a community college consortium. Their website, www.baywork.org, provides a one-stop means for individuals to identify water-related jobs, typical job descriptions, and training in the Bay Area Region.

The Gap

Several gaps between agency needs and the status quo surfaced during this project. These include:

- Lack of interest by young adults in the water sector,
- Students are not aware of options for water-related careers and variety of positions with varied levels of training and education,
- Lack of qualified candidates for skilled craft positions,
- Poor skills in math and reading of those entering the field in craft positions, and
- The availability of internship programs for craft positions.

In summary the gap appears to be with connecting people with information. Information is needed to make it easy for potential employees to know the needs, to know the value of the water industry, the training required, the certification necessary, where training is available, and jobs available.

Recommendations and Conclusions

To fill the gap, several actions may be pursued, including formation of an information clearinghouse to better inform potential candidates of training and jobs, utilization and promotion of existing training and available programs in the region for water-related careers, bolstering interest in the water sector, integrating practical examples in coursework, internships, and on-going open dialogue with stakeholders.

Identify/Select/Form a Lead Organization

It is recommended that one organization serve in a lead capacity to function as a clearinghouse of regional information on water careers, jobs, and training. This could be achieved through an existing school or organization, or a newly created organization. A website would be critical to share information with potential students and job candidates. Baywork (www.Baywork.org) may be used as a model website. This would provide an information resource center on water careers, consolidated job listings for the region, access to courses and training available, describe types of jobs, and coordination/collaboration for career outreach events. The available information would include training for mechanical repair and maintenance, welding, machining in addition to water operator. Through the website and outreach, it should be apparent to student that there are careers in the water sector with degree and non-degree options and show students how to get these jobs and what is required. As the website is fully developed, apps for phones and tablets may increase access by the target audience.

Utilize existing programs

Rio Hondo and Citrus Colleges have water programs that may be able to sufficiently serve the region. If these programs are not meeting the enrollment demands of the region, it is recommended to explore why. In addition, it appears that other colleges in the region provide training in machining, welding, and mechanics. It should be further explored to determine if these educational programs are sufficient to meet the minimum qualifications for entry level positions in water agencies.

Santiago Canyon College provides a strong water program to students in the region, and they are moving to a web/tele-presence delivery mode, which would be available to students anywhere. In addition, the on-line courses and study books are available through the Office of Water Programs based at Cal State Sacramento. Both would supplement the programs available within the San Gabriel Valley.

It is also recommended that the Coalition and regional colleges look at leveraging resources by offering students the ability to enroll at multiple schools to access the courses they need. There may be three tracks that students are pursuing, and the greater the flexibility provided by academic institutions, the greater opportunity for students to enroll and achieve their goals.

Various paths to water careers include:

- 1) Students take courses for the purpose of gaining knowledge to pass the certification exams or satisfy specific educational coursework requirements for certification. It is recommended to build cross-campus programs for non-degree seekers and show examples of courses available at different schools to satisfy knowledge for various exams or jobs.
- 2) Students seek an Associate degree or college-level certificate in water or a related craft. It is recommended to build/show a cross-campus program for degree seekers and show how courses at multiple community colleges could be used to obtain an Associate degree
- 3) Students seek to transfer to a four-year institution. It is recommended to build/show a cross-campus selection of options in water-related courses that could be transferred for those seeking a four-year degree.

Building Interest

Building interest in the water sector may simultaneously create more candidates for employment. If a lead organization is selected, it is recommended that regular outreach take place. Possible recipients of the outreach would be Regional Occupational Programs, Workforce Investment Boards, and prisons. Other methods may be considered including employment of high school students to conduct surveys, internships, booths at conferences and job fairs.

Real World Examples

It is recommended to more frequently integrate water problems in teaching, especially in math. There may be pre-developed curricula through professional associations such as the Water Environment Federation. In addition, programs in public administration and management may benefit with more coursework examples related to water/city/utilities (i.e. billing, water units, accounting, tax revenue, and operating vs. capital budget). If instructors are not adjunct faculty who work in the water sector, bringing in agency representatives to give presentations to classes in a community college course would address the need for practical math and science problems. This would also allow students to hear directly from those working in the field.

Internships

Further development of structured internship programs for craft positions is recommended. The Santiago Canyon College internship program may serve as a model. It would be advantageous the work closely with water agencies to gain interest and buy-in for such a program, and alleviate concerns. This could be administered through individual schools or through a lead organization.

Input by Stakeholders

It is recommended that the lead organization facilitate regional forums between water agencies and schools to understand, on an on-going basis, the current and future skill needs.

This would include working with local agencies on basic needs for job families.

For any program success, it is important to engage stakeholders (customers). Santiago Canyon College holds meetings one to two times per year to serve as forums to ensure the program is meeting the needs of the water sector. This may serve as a model to provide a holistic view of current needs.

In addition to regular meetings with water agencies to understand necessary skills, it is also recommended that regular market surveys be conducted to understand the current trends and future shifts in market needs. It is unknown how much will be contracted out in the coming years if agencies do consider downsizing as positions are vacated. The operation and maintenance functions will need to continue regardless of the possibility of decreased staffing.

While holding periodic meetings between water agencies and colleges with water programs, regulatory agencies should also be engaged, including the California Department of Public Health, California Department of Water Resources, California Regional Water Quality Control Board, California State Water Resources Control Board, Pasadena Health Department, and Los Angeles Department of Public Health. In addition, the engagement of the California Water Environment Association and the local Los Angeles section may also provide value.

The California Department of Public Health, the State Water Resource Control Board, and the California Water Environment Association conduct testing and issue certifications. Representatives from these organizations would provide insight on coming changes to exams or requirements. Regulatory agencies may drive change that would impact operation or maintenance of water systems. All of this input will be valuable information for training students and to understand the future industry drivers. As mentioned by one of the water representatives, new technology is providing the ability to detect particles in water at lower concentrations, which leads to new regulations. Changes such as this could create jobs and those seeking certification may find related questions on their certification exams. Therefore, maintaining open dialogue with regulators will be valuable.

Funding

If a new organization is formed, consider other funding sources. It was noted during the meeting with the Department of Labor, that Workforce Investment Boards may be a resources for the region and a source of funding. During several Education Coalition meeting, grants were discussed as possible means to obtain funding, including the Department of Commerce for incubators on green initiatives, and other organizations that provide funding for education in Science, Technology, Engineering, and Math (STEM).

Questions to Answer for the Next Step

To determine the practicality of these recommendations and better inform the path forward, questions are provided for discussion, potentially at the September 7 Education Coalition meeting.

- 1) What are the obstacles to forming or selecting a Lead Organization? Is there a likely candidate?
- 2) Are the Rio Hondo and Citrus College Water programs at capacity?
- 3) What are the barriers for students (time options, travel/commute, and availability of classes)?
- 4) What obstacles are there for students wanting to units/credits from multiple community colleges for an Associate degree? Use units/credits from multiple community colleges to transfer to a four-year institution? Enrolling in two schools at one time?
- 5) What paths led to careers as machinists, mechanics, and operators?
- 6) Could a user-friendly program fact sheet be developed so students know what courses will transfer?
- 7) What agencies and what positions need training and education in advance?
- 8) What agencies and what positions do employers fully train the employee and just desire aptitude?
- 9) What, if any, are the specific gaps in craft labor needs compared with programs at San Gabriel Valley schools.

Acknowledgements

The University of La Verne contributed to the work of this report through research on area academic programs related to water in the San Gabriel Valley. In addition, they provided educational backgrounds of water sector executives. Dr. Marcia Godwin directed the ULV research with the assistance of doctoral student Lisa Henkle.

Appendix A
Research Organizations and Water Centers

Organization	Association	Mission/Focus	Services
American Water Works Association	Independent non-profit	International nonprofit educational association dedicated to safe water. AWWA is the authoritative resource for knowledge, information, and advocacy for improving the quality and supply of water in North America and beyond.	Conferences and education Bookstore AWWA Standards Journal & publications Advocacy Public affairs Utility quality programs Career Center
Water Environment Federation and Water Environment Research Foundation	Independent non-profit	Independent scientific research organization dedicated to wastewater and stormwater issues including wastewater collection, treatment, reuse, and operations; residuals and utility management, sustainability, and emerging water quality issues such as micro-constituents.	Section for college students (membership, job bank, career resources, student programs) Educational programs for k-12 Non profit technical educational organization Research and publish latest information Provide technical expertise and training Sponsor conferences and other special events Review, testify, and comment on environmental regulations and legislation Publications Continuing education Awards
WateReuse/Foundation, Washington DC	Independent non-profit	The mission of the WateReuse Research Foundation is to conduct and promote applied research on the reclamation, recycling, reuse, and desalination of water.	Paid subscribers List available of member agencies Annual symposium, annual conference, webcasts, co-sponsored conferences Advocacy for federal funding, tracks legislation, supports bills, have close contact with congress and federal agencies Resources on regulations Awards

Organization	Association	Mission/Focus	Services
National Water Research Institute (NWRI)	On campus of OCWD and MWDOC	Create new sources of water through research and technology and to protect the freshwater and marine environments.	Fund research Hold symposiums Publications and newsletters Give awards Conduct outreach Commission advisory/expert panels Water utility branding
The Caltech Center for Sustainable Energy Research (CCSER)	Caltech	Goal to transform the industrialized world from one powered by fossil fuels to one that is powered by sunlight.	Research focus
Engineering Research Center (ERC) for Re-inventing the Nation's Urban Water Infrastructure (ReNUWIt).	Stanford, UC Berkeley, Colorado School of Mines, NM State University	Interdisciplinary, multi-institution research center whose goal is to change the ways in which we manage urban water. Every member of the research team, from the Director to the first year graduate students, participates in education and outreach activities. We work with students at every level from kindergarten through post-doctoral graduates, as well as with teachers, professionals, decision-makers, and the public at large.	Industrial/Practitioner (I/P) members and innovation partners help translate ideas from university research into professional practice Each of our research institutions has partnered with a local school, and works with teachers and administrators to create programs and activities that best suit their students' interests and needs Research Experience for Teachers (RET) Summer Community College Opportunity for Research Experience Water Technicians Training (WTT) Tribal Colleges
Luskin Center for innovation	School of Public Affairs at UCLA	Address environmental sustainability in Los Angeles through a mixture of scholarship, research, and community engagement. Focus is energy, water, and the environment.	Portal/Links Reports for policymakers Research water resources and treatment
PUCWater Institute (PWI)	Purdue University Calumet	Conduct research and offer educational programs in water resources, and assist local, regional and state agencies, as well as the private sector in economic development and in resolving water-related issues. The PWI can provide an interdisciplinary approach to complex issues dealing with water efficiency, water quality, economy, and water security.	Awards Community briefings

Organization	Association	Mission/Focus	Services
UCLA Water Resources Group	UCLA Institute of the Environment and Sustainability	To bring together for the first time all the water resource expertise from across the UCLA campus and water resources researchers, managers and policy makers from beyond the campus. The goal is to foster communication and collaboration between these diverse groups, develop new research synergies, quickly and effectively inform policy makers about the latest in science, technology and policy options, and communicate and work with the private sector and the public to develop sustainable water resources in southern California. We believe that UCLA and southern California can serve as a model and source of water resource solutions nationally and internationally.	Research focus
Water Diplomacy Initiative	USC, Center on public diplomacy at the Annenberg School	1) achieve a greater understanding of the impact of water diplomacy on the recipients of extant or future programs; 2) assess best practices in the field; 3) develop technological and policy recommendations for water diplomacy.	Academic publications on water diplomacy, conversations in public diplomacy roundtables A major conference on the topic in the spring of 2012 A briefing on the topic in Washington, D.C. Continuing research activity addressing a range of water diplomacy issues
Water Resources Institute	Cal State San Bernardino	Supports, coordinates and conducts regional and state wide policy analysis and research in all water-related areas. It has an extensive collection of current Geographic Information System-based data and historical records related to water, including aspects such as water rights, quantity, quality, treatment, and management.	Federally-funded education programs Workshops Courses Certificates Degree programs in water resources.

Organization	Association	Mission/Focus	Services
Water Resources Research Center	The University of Arizona	Promotes understanding of critical state and regional water management and policy issues through research, community outreach and public education.	<p>Publically available reports</p> <p>Guides – pamphlets to educate the public on water, conservation, landscaping, regulations, wells, CD</p> <p>Project WET for K-12 teachers</p> <p>Also water festivals throughout the year</p> <p>Newsletter with info on legislation and public policy</p> <p>Brown bag lunches with guest speakers</p> <p>Annual conference</p> <p>Webinar series</p> <p>Cooperative project between UofA, WRRRC, AZ Dept of Environmental Quality</p> <p>Transboundary aquifer assessment AZ-Mex.</p> <p>Grants for research</p> <p>Awards to students studying water</p>
Water Technology Research (WaTeR) Center	UCLA	Membrane and analysis specialty: Water Production: Desalination, Purification, and Reclamation	<p>Diagnostic evaluations of desalination and water purification processes</p> <p>Evaluation and ranking of anti-scalant effectiveness</p> <p>Membrane RO process analysis</p> <p>Advanced numerical process modeling and analysis of pilot-studies</p> <p>Evaluation of residuals minimization, treatment, and disposal strategies</p> <p>Membrane characterization and selection for targeted applications</p> <p>Diagnostic testing of scaling and fouling and development of mitigation processes</p>
Urban Water Research Center	UCI	Promote excellence in urban water research, education and outreach. The UWRC facilitates research in basic and applied sciences, engineering, and social sciences to create new knowledge, inform policymakers, and educate the public in order to foster urban water sustainability in Orange County, California, the United States, and beyond.	<p>Free newsletter</p> <p>Post research results/papers</p> <p>Periodic seminars/conferences</p> <p>Mass Spectrometry Facility</p> <p>Educational partnerships</p>

Appendix B: Reports from Individuals in the Water Sector on Needs and Gaps

Debra Man, Assistant General Manager and COO, **Metropolitan Water District**

[Excerpt from Partnership meeting minutes.] Ms. Mann talked about the research underway at the Metropolitan Water District's (MWD) Weymouth Treatment Plant in La Verne. Innovation in instrumentation is making it possible to detect particles in water at lower concentrations than just a few years ago. This leads to new regulations and the need to find methods to implement more stringent requirements.

She also talked about the need for programs to train new MWD field employees including mechanics, pump specialists, and hydropower staff as 1/3 of the employees in these positions will be eligible to retire within the next few years. These positions are critical because they are responsible for maintaining the water system infrastructure; conveyance of the water from its source to the user, and treatment of the water to meet standards. MWD needs a pipeline of replacement employees in training today. Not only must the new employees replace the retiring employees but they need to be trained to rethink the very systems they are hired to maintain. MWD wants employees who will ask, "Is there a better method of coating or treating or something that makes the system work better?"

Ken Manning, General Manager of the **San Gabriel Basin Water Quality Authority**

[Excerpt from Partnership meeting minutes.] Ken has a background in both water and education and is very interested in promoting training and jobs in the water industry.

He talked about the positive aspects of water caress. Most notably it is a stable industry that doesn't react dramatically to economic cycles. Skill levels vary depending on a variety of factors. For many positions, college degrees are not necessary. Certifications are required but are transferable between agencies. Ken is expecting a turnover rate from retirements in the 25 - 30 percent range over the next few years.

There has been a need for a significant investment in water infrastructure which will also create good construction jobs.

College degrees and certifications are required for some of the higher skilled positions among them positions in the sanitation agencies because of the use of chemical.

Ken recommends the committee talk to people in the American Water Works Association (AWWA) about jobs and job training.

Today's water industry employees don't match the demographics of their customer which hinders communication. The future employees need to be much more diverse.

In summary Ken said there are job opportunities at all levels within the industry: maintenance and operations; research and development and management.

Shane Chapman, General Manager, **Upper San Gabriel Valley Municipal Water District**

[Excerpt from Partnership meeting minutes.] Mr. Chapman told the group that qualified applicants for skilled craft positions are difficult to find. Upper District has reached out for training partners and is currently working with Rio Hondo Community College on training skilled craft workers. Labor unions have also been good partners in finding applicants for this work. Managing waste water and water reuse are also growing sectors for future water supplies and need specially trained employees.

The way young employees learn and how they do their work is different than that of current employees. Younger generations grew up in the information age and are use to having whatever information they want immediately available. They expect to have systems available to find data instantaneously. This also leads them to be more proactive in the way they approach their work.

Upper District has targeted High School students as a source of employees for completing energy and water audits. Almost all the water jobs of the future will require some science training and finding a way to get high school students excited about these careers and ready to take the STEM classes that are necessary is a challenge.

Rick Hansen, General Manager, **Three Valley Municipal Water District**

[Excerpt from Partnership meeting minutes.] Mr. Hansen emphasized that in addition to the retiring trade employees, a number of seasoned water managers are close to retirement age and there isn't a strong pool of trained managers available to take their places.

He agrees that high schools are the place to start in attracting new talent into water fields. Students aren't aware of the variety of careers that the water industry offers and the opportunities available that requires training but not always college degrees.

He also talked about the opportunities for increasing local water supply in the San Gabriel Valley. Today the SGV is not taking full advantage of storm water, reclaimed water, ground water clean up and better water use efficiency. 70% of the water use is for irrigation of landscaping. Cities are beginning to look at allowing native plant gardens but much change is still needed. New landscaping regulation also offers new opportunities for training and jobs creation.

Ben Lewis, Media Communications and Technology Administrator, **Golden State Water Company**

[Excerpt from Partnership meeting minutes.] Mr. Lewis spoke from the perspective of investor owned water companies. They are having many of the same employee retirement challenges as the public water agencies. Additionally, east coast companies are "stealing" good employees. Water agencies need to get out the message about the benefits of water careers. Careers in water aren't all in the sciences. Water companies need business majors and accountants as well.

Additionally, water companies aren't always communicating well with their customers. They need to have professional staff that can communicate well with the public and tell the water story.

In conclusion he questioned whether baby boomers would keep the Gen Y employees from being productive. It is not necessary to just train new employees but to train the managers who will oversee them so they are ready to allow them to do things differently. He isn't sure employers are ready for the new generation of employees.

Jim McDaniel, Assistant General Manager, **LA Department of Water and Power**

- Real gap is with the craft level positions (operators, welders, mechanics).
- Pool of candidates for professional staff has been sufficient, but there is concern with recent cutbacks at Cal States, which has been a feeder school.
- LADWP trains new employees, but they must have basic math (grasp fractions) and reading skills.
- Having a hard time getting interest; high attrition rates for new employees.
- Recommends better integration of real water problems in teaching math so students see the value and need.

- Suggest promoting the 2-year associate program that would also allow easy transfer for those wanting to pursue 4 year degree.
- For Distribution Operators, a certification is now required, which was not previously. These employees must be able to calculate flows and volumes.
- Almost exclusively promote from within. Need math skills to move up.
- DWP partners with unions for a joint training institute for line workers on the power side of the organization. This is a skill needed throughout the country. Skills for this work include one formal course in basic electrical knowledge and training in pole climbing. After obtaining this, candidates are able to go to the union hall.

Patricia Flores, Sr. Manager, **Southern California Edison**

- Currently looking to stabilize workforce, as it is in a transformational state.
- Skill-set of meter reading is obsolete so trying to retrain those employees.
- SCE provides the training for pole/line climbing, but this requires being physically fit, and able to carry ~80 lbs.
- Have worked on internships with Mt. SAC, Rio Hondo and Everest colleges in the past, but have scaled back. They continue to work with universities.

Corine Doughty, Dean, Business and Career Technical Education, **Santiago Canyon College**

- All instructors work in the water sector so they bring real-life applications to the classroom. All are part-time adjunct faculty.
- Students can obtain an associate of science degree.
- Meet periodically with water agencies to make sure that needs are met. Internships were identified as an area to expand. This past year, an internship program was successfully implemented.
- Students come from Los Angeles, Riverside, and Orange Counties.
- The courses are always full
- Starting in Fall 2013, they will begin on-line courses – tele-presence. The aim is to have very interactive courses.
- No formal coordination with other schools.
- They do have a need for equipment and tele-presence devices.

Angie Mendoza, Program Representative, **Office of Water Programs, Cal State Sacramento**

- This is a completely self-funded program.
- The Office of Water Programs may, through individual contracts, provide training or research for agencies or other organizations.
- Individuals/students may purchase certification prep books on-line
- Individuals/students may enroll in on-line courses

Mark Holstad, Manager, **Albuquerque Bernalillo County Water Utility Authority**

- With the recession, the pool of qualified candidates has improved.
- They want individuals with aptitude and the agency provides all training for operators/mechanics.
- They have worked with junior colleges to set up classes.
- They have decreased the number of joint projects with Universities.

Vick Kyotani, Principal Engineer, **Sacramento area Sewer District**

- No gaps in pool of professional employees.

Glenn Bielefelt, **Sacramento area Sewer District**

Waiting to hear on operator training/gaps and succession planning

Shane Towns, Supervisor, **Orange County Sanitation District**

- Have had difficulty finding qualified welders.
- Typically seek trained/mid-career employees. With other industries leaving Southern California, there are fewer candidates seeking employment.

Simon Watson/Chuck Forman, Managers, **Orange County Sanitation District**

- The internship program with Santiago Canyon College worked well.
- The students were in a one-year program that rotated through fleet services, operations, mechanical maintenance.
- Only downside was that the interns were hired by OCSD before the completion of the internship.

New Zealand, Multiple Wastewater Treatment Plants Representatives

- The country previously had certifications, but eliminated them. Now new employees attend a 1 week training course held at various locations throughout the country.
- Not having any issues with sufficient number of qualified candidates.
- Tried to overlap a near-to-retirement employee for succession training, but did not work well, employee decided not to retire.

Appendix C: College Programs Related to Water/Environmental Issues

Prepared by Lisa Henkle, DPA Student, University of La Verne; research directed by Marcia Godwin, Ph.D., Associate Professor of Public Administration

College/Universit	Program	Certificate/Degree	Contact
Citrus College	Water Technology	Certificate of Achievement; Associate of Science	Advisory Committee
Mt. San Antonio College	Air Conditioning and Water Technology	Certificate of Achievement; Associate of Science	Richard Anderson- randerson@mtsac.edu Lanny Richardson- lrichardson@mtsac.edu Darrow Soares- dsoares@mtsac.edu
Rio Hondo College	Environmental Technology; Environmental Sciences	Certificate of Achievement; Associate of Science- Environmental Technology, with specialization in Water and Water Waste Management	Steve Katnik- (562)463-7501 skatnik@riohondo.edu Gary Duran- (909)573-5252 gary.duran@riohondo.edu
Pasadena City College	Environmental science courses	No degree or certificate. Transfer program only.	
San Bernardino Valley College	Environmental Science; Water Supply Technology Program	Associate of Science degree- Environmental Science; Water supply Technology Certificate	None listed
Imperial Valley College	Water Treatment Technology	Associate's of Science; Certificate	None Listed Main Campus- (760) 352-8320
Palomar Community College	Wastewater Program	Associate Degree; Certificate	None Listed Main Campus- (760) 744-1150, ext. 2284
Santiago Canyon College	Wastewater/ Environmental Sanitation Program	Associate's Degree; Certificate	Program facilitator, Dr. James Gates (714) 628-4836 Gates_jim@sccolege.edu
Ventura College	Water Science program	Associate's Degree; Certificate	None Listed Main Campus- (805) 654- 6400
Chaffey College	Vocational GIS; Geography	Certificate; AS degree	Geography department
San Diego City College	Sustainability	Certificate; AS Degree	None Listed
Santa Ana College	Wastewater- Environmental Sanitation	Certificate; AA Degree	None Listed

California State University, Northridge	Public Health; Health Administration; Environmental and Occupational Health; GIS	MPH MS- Health Administration BA, MS- Environmental and Occupational Health; GIS Certificate	Health Sciences Dept- Anita Slechta, Chair- (818) 677-3101 Environmental Health Dept- Ron Norton, Director (818) 677-2401 GIS- Dr. Shawna Dark (818) 677-3530 Shawna.dark@csun.edu
California State Polytechnic University, Pomona	Environmental Resources	Baccalaureate of Science, concentration Master of Science, concentration	College of Science, Dean, Brian Jersky (as of 6/11/12)
California State University, Los Angeles	Health Science	Baccalaureate of Science, with an option in community health	Walter Zelman, Chair (323) 343-4635 wzelman@calstatela.edu
California State University, Sacramento, online program	Wastewater Treatment Plant Operation Specialist; Water Treatment Plant Operations Specialist	Certificate Home study and video series program.	(916) 278-4433 (800) 858-7743
California State University, San Bernardino	Geology; Earth and Environmental Studies; Environmental Health Science; Public Health Education	Baccalaureate; Master of Science; Master of Public Health	Dr. Alan Smith, Chair Geology (909) 537-5409 Dr. Ted Coleman, Health Science and Human Ecology (909) 537-5537
Claremont McKenna College	Environmental, Economic, and Politics; Environmental Analysis*	Baccalaureate	None listed W.M. Keck Science Center (909) 621-8588
Pitzer College	Environmental, Economic, and Politics; Environmental Analysis*	Baccalaureate	None listed W.M. Keck Science Center (909) 621-8588
Pomona College	Environmental Analysis*	Baccalaureate	None listed W.M. Keck Science Center (909) 621-8588
Scripps College	Environmental, Economic, and Politics; Environmental Analysis*	Baccalaureate	None listed W.M. Keck Science Center (909) 621-8588

Harvey Mudd College	Environmental Analysis*	Baccalaureate	None listed W.M. Keck Science Center (909) 621-8588
Whittier College	Environmental Sciences	Baccalaureate	Cheryl Swift, Program Coordinator (562) 907-4451
American Public University	Environmental Science; Environmental Technology	Online Baccalaureate of Science; Undergraduate Certification	Admissions Office 877-777-9081
University of California, Riverside; Water Science and Policy Center (research facility)	Environmental Sciences; Industrial Wastewater Technology	Baccalaureate degree; Extension Program	Michael Anderson, Chair (951) 827-3757 michael.anderson@ucr.edu Center- Ariel Dinar, Director (951) 827-2875 ariel.dinar@ucr.edu
University of California, Los Angeles	Geology; Environmental Health; Epidemiology; Bioengineering; Public Policy	Baccalaureate; MPH; DrPH; MS; Ph.D.	
University of California, Irvine	Urban Studies; Urban and Regional Planning; Public Policy; Planning, Policy & Design	BA, MPP, Ph.D.	
UCI: Urban Water Research Center	Social Ecology; Planning and Design; Toxicology; Environmental Health; Ecology and Evolutionary Biology; Civil and Environmental Engineering		William J. Cooper, Ph.D., Director (949) 824-3442 wcooper@uci.edu
University of Southern California	Environmental Studies; Water Diplomacy Initiative	BA, BS, MA; Center on Public Diplomacy offers graduate degrees in Public Diplomacy	(213) 740-7770 environ@dornsife.usc.edu Center- Nicholas Cull, Director Master of Public Diplomacy Program, (213) 821-4080 cull@usc.edu

Claremont Graduate University	Public Health; Health Promotion	MPH; Ph.D.	Darlene Peterson, Director, MPH Darleen.peterson@cgu.edu (909) 607-6729 Kim Reynolds, Director, Ph.D. kim.reynolds@cgu.edu (909) 607-7300
Keck Graduate Institute	Bioscience Management	Certificate; Master of Bioscience	None listed
Art Center College of Design	Environmental Design	Baccalaureate and Masters degrees	David Mocarski, Chair David.mocarski@artcenter.edu
California Institute of Technology	Environmental Science and Engineering	Program of study	None listed
Los Angeles Trade-Technical Community College	Water Systems Technology	Associate Degree	None listed
Association of Boards of Certifications		Certification	(515) 232-3623 abc@abccert.org
California Water Environment Association	Collection System Maintenance; Analyst; Compliance Inspector; Plant Maintenance; Industrial Waste Treatment Plant Operator; Biosolids Land Application Management	Certification	(510) 382- 7800 tcp@cwea.org
California Nevada American Water Works Association	Water College	Certification	None Listed
California Rural Water Association		Certifications	(916) 553-4900 info@calruralwater.org

*This program is a five college collaboration that allows students to take advantage of a broad range of courses.

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Appendix D: Education Backgrounds of Water Managers

Prepared by Lisa Henkle, DPA Student, University of La Verne; research directed by Marcia Godwin, Ph.D.,
Associate Professor of Public Administration

District	Executive	Education	Contact
San Gabriel Valley Municipal Water District	Darin Kasamoto, General Manager	BS, Purdue University, Civil Engineering MS, California State University, Long beach, Civil Engineering	(626) 969-7911
Upper San Gabriel Valley Municipal Water District	Shane Chapman, General Manager	Does not list education	(626) 443- 2297
Three Valleys Municipal Water District	None listed		(909) 621-5568
Rowland Water District	None listed		(562) 697-1726
La Puente Valley Water District	Greg Galindo, General Manager	None listed	(626) 330-2126
Crescenta Valley Water District	None listed		(818) 248- 1659
Metropolitan Water District	Jeffrey Kightlinger, General Manager	BA, History, University of California, Berkeley J.D., Santa Clara University Law School	(213) 217-6000
Western Municipal Water District	John Rossi, General Manager	None listed	(951) 571-7100
Western Municipal Water District	Jeffrey Sims, Assistant General Manager, Chief Operating Officer	BS, Engineering, California Polytechnic University, Pomona MPA, California State University, San Bernardino	(951) 571-7100
Western Municipal Water District	Paul Ruge, Assistant General Manager, Chief Administrative Officer	AS, Physical Science BS, Public Administration, University of La Verne, MS, Human Resources, Chapman University	(951) 571-7100
Western Municipal Water District	Roy LeMond, Assistant General Manager, Chief Financial Officer	BA, Business Administration, concentration in Accounting, California State University, Fullerton, MBA, Finance, California State University, San Bernardino	(951) 571-7100
Cucamonga Valley Water District	Martin Zvirbulis, General Manager	None Listed	(909) 987-2591
Cucamonga Valley Water District	Todd Corbin, Assistant General Manager	BS, Accounting, Indiana University MPA, California State University, San Bernardino	

District	Executive	Education	Contact
Cucamonga Valley Water District	Jo Lynne Russo-Pereyra, Assistant General Manager for External Affairs	BA, Political Science and Sociology, University of California, Santa Barbara MA, Public Policy and Administration, Columbia University	
Monte Vista Water District	Mark Kinsey, General Manager	None listed	(909) 624-0035
East Valley Water District	None Listed		(909) 889-9501
Eastern Municipal Water District	Paul Jones, II, General Manager	None listed	800-426-3693
Inland Empire Utilities Agency			(909) 993-1600

Appendix E: Task Status/Results

Task 1: Project Contribution from ULV

Explore alignment with the University of La Verne class to contribute to this study. Discuss with Dr. Marcia Godwin the possible contribution from students in a winter 2012 ULV class.

Dr. Marcia Godwin and doctoral student Lisa Henkle, both from the University of La Verne, agreed to conduct the academic program review.

Task 2: Stakeholder Input on Project Scope

Based upon input from the San Gabriel Valley Economic Partnership, add or delete the organizations, institutions, programs, and representatives to interview/research. This will ensure that this project work includes the desired scope and stakeholders for water agencies, academic and research institutions.

On March 23, 2012 The Coalition accepted the proposal with no questions and changes.

Task 3: Water Agency Needs

Agency representatives will attend the San Gabriel Valley Economic Partnership meetings for the subcommittee members to identify current gaps in skills and qualified/available candidates and anticipated future needs. If needed, follow-up may be conducted by proposer.

LA City Dept of Sanitation	San Gabriel Valley Water Company
Los Angeles Department of Water and Power	Sanitation District of L.A. County
Metropolitan Water District	Southern California Edison
San Gabriel Basin Water Quality Authority	Three Valleys Municipal Water District
San Gabriel Valley Municipal Water District	Upper San Gabriel Valley Municipal Water District

This task was conducted by inviting guests to speak at the partnership meetings, reviewing existing reports on the subject, and conducting follow-up interviews.

Task 4: Academic Program Review - Within the Region (to be completed by University of La Verne students)

Meet with and interview representatives from academia on current and future educational programs related to water. In addition, review publicly available information about existing programs.

Art Center College of Design	Pasadena City College
Azusa Pacific University	Pitzer College
California Institute of Technology	Rio Hondo College
California State Polytechnic University, Pomona	Rose Institute
Chaffee College	Scripps College
Citrus College	University of La Verne
Claremont Graduate University	University of Southern California
Glendale Community College	University of the West
Harvey Mudd College	Western University of Health Sciences
Keck Graduate Institute	Whittier College
Mt. San Antonio College	

Dr. Marcia Godwin and doctoral student Lisa Henkle, both from the University of La Verne, conducted this portion. Results are tabulated in Appendix C.

Task 5: Research Center Program Review

Investigate water-related research programs (including policy). Meet with and interview representatives from research centers to understand current and future goals. In addition, review publicly available information about mission and focus of the research program/institution.

Arizona Water Institute	Engineering Research Center for Re-inventing the
Arizona Water Resources Research Center	Nation’s Urban Water Infrastructure (Stanford, UC
California Institute of Technology	Berkeley, Colorado School of Mines, NM State
University of Southern California	University)
University of CA, Los Angeles	Urban Water Research Center, UCI
National Water Research Institute	WaterReuse Foundation
	Water Environment Research Foundation

Dr. Carla Dillon completed this review and presented the findings to the Education Coalition on March 23, 2012. The table summary is included in Appendix A.

Task 6: Review - Outside the Region

Conduct review of academic programs outside the San Gabriel Valley to serve as possible models.

California State University, Sacramento	Santa Ana College
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Conduct review of employer needs outside the San Gabriel Valley.

East Bay Municipal Utility District	Sacramento Regional County Sanitation District
San Diego, Public Utilities Department	Orange County Sanitation District
Wastewater Branch	

Dr. Carla Dillon completed this review and results are included in this report. Although East Bay Municipal Utility District and San Diego, Public Utilities were not contacted, other agencies outside the region were contacted and the results are included.

Task 7: Initial Draft Gap Analysis Report

Issue initial gap report without recommendations to members of the San Gabriel Valley Economic Partnership Water subcommittee

Submitted electronically to the Partnership on August 28, 2012.

Task 8: Facilitated Workshop with the San Gabriel Valley Economic Partnership Stakeholders

This task will consist of a facilitated workshop with key San Gabriel Valley Economic Partnership stakeholders to consider options for academic program development within the San Gabriel Valley and/or the Water Research and Technology Center in development. The gap analysis report would be distributed to the key stakeholders prior to the workshop to allow time to read and develop ideas to meet the gaps. The workshop would allow a forum for key stakeholders to collectively contribute to the recommendations to fill the gap.

To be held September 7, 2012 at the Education Coalition meeting.

Task 9: Draft Report

Following input on the Gap Analysis Report, a Draft Report will be produced. This will include recommendations to fill the gap, and input from the optional workshop. **October 2012**

Task 10: Finalize Report

Finalize report based upon input and comments from stakeholders. **December 2012**

	<p>As in Public Works, it is still a male-dominated program with a wide-range age bracket A previous recommendation was to advertise and market to increase the numbers of female students. We must further discuss ideas on how to appeal to the female population. The most important information is in student outcomes which are monitored closely by the state. The focus is on completers which are only measured through certificates and degrees earned because there is not a way to track those Water Technology students that only take a couple of courses for the state exam or job enhancement.</p> <p>An increase in 2010-11 years certificates was due in part to the math requirement being removed as a certificate requirement since the Math Department no longer offered the course. The question is what math skills are necessary for the students' success.</p> <p>Gary Gramling began giving his own certificate that was created in the CTE office so his students can qualify to take the state exam. The other instructors would like the same certificate which helps students to qualify in taking the required exam. Students must earn a C grade or above. We would like to find a method to track those students that pass the exam which would demonstrate student success. To date there is not a student transcript from the state that can be used to measure.</p> <p>The group reviewed all required courses for the certificates and degree. Jim asked their opinion on what the counselors should advise in the Student Educational Plan that shows a better understanding on industry needs (various exams), and which courses that must be included.</p> <p>There are water certifications that do not require college course work (D1, T1,) but to advance there are course requirements that are necessary. After the introductory course students may take the D2, T2 exams. That is the highest anyone can go without employment (hands on experience).</p> <p>With the Citrus College Certificate plus experience will allow those that are employed to go through D5, T5. The certificate is a valued selling point to those that are already employed in the industry.</p> <p>Mike Maestas will send Jim Lancaster the website that shows the requirements for the industry certifications which Jim will forward to the counselors.</p>	<p>Recommendation is to discuss new ways to help increase the female student.</p> <p>Continue to create a certificate that states completed hours which enables students to take the state exam.</p> <p>Create a system to track students who successfully pass the certification exam.</p> <p>Mike will send Jim the Water Technology website that lists required licensing for positions.</p>
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	<p>Coursework was reviewed for revamping.</p> <p>The Degree and Certificate mirror each other in required course work.</p> <p>Water Conservation 162 must be a requirement and mandatory for Urban Water Conservation Council in applying for any grant funding.</p> <p>Water Conservation discipline attracts a female interest in Water Technology.</p> <p>Public Works courses will not be needed for the certificate.</p> <p>Citrus does not have any dedicated lab space to be able to offer backflow courses.</p> <p>There was an extensive discussion on if a Water Mathematics course or the placement test for Math 150 should be a prerequisite to other courses.</p> <p>Currently, math is incorporated into the courses, however it hinders the time necessary to complete all the material required for each course.</p> <p>The math requirement detours many students from enrolling in the Water Technology Program and eliminates the ability to finish the program in one year.</p> <p>Jim suggested that we schedule short-courses which might solve the sequencing, and the one-year completion will remain.</p> <p>Or rewrite the Water 150 course to incorporate more math which will be the pre-requisite to the other courses.</p> <p>In conclusion the Advisory recommended that we do not create a separate math class but rewrite Water 150 to incorporate more math and will become a pre-requisite or co-requisite.</p> <p>Jim and the Advisory will review the sequencing which will coincide with certification testing dates. As a result, some courses must be offered in the summer and winter terms.</p> <p>The pre-requisites for Water 151 is Water 150 and/or D1 & D2 certification.</p> <p>Water 153 with the pre-requisite of Water 151 or D3 certification.</p> <p>To assist in course sequencing and scheduling, Jim will poll the students to see how many are taking more than one course.</p> <p>The group recommends that to meet demand and certification a one-year certificate is attainable for students.</p> <p>The same pre-requisites for Water 150, etc. is T1 or T3 certifications.</p> <p>By these advisory recommendations it will assist in increasing the</p>	<p>Water Conservation 162 must be a requirement for the Certificate. The Public Works requirement will be eliminated.</p> <p>Biology 145 removed.</p> <p>18 units of all Water courses should be required for the Certificate.</p> <p>The course content for Water 150 must be modified and include SLO's.</p> <p>It will be then decided if the course will be offered as an 8 week or 16 week class.</p> <p>Pre-requisites determined</p> <p>Jim will poll the students to see how many are taking more than one course.</p> <p>One-Year Certificate is attainable for students through proper scheduling and sequencing of classes.</p>
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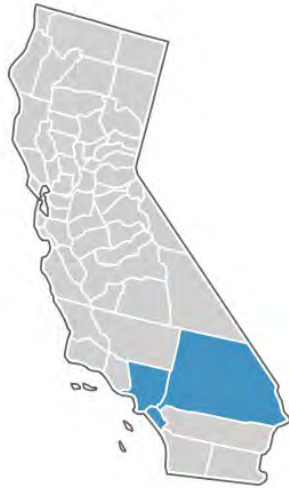
<p>Student Learning Outcomes</p>	<p>number of completers.</p> <p>The advisory reviewed the current Student Learning Outcomes.</p> <p>Add or rework an outcome that includes the ability to calculate in both treatment and distribution in order to pass the certification exams.</p> <p>Add or rework an outcome that includes resource and conservation.</p> <p>Modify Student Outcome number one.</p>	<p>Outcomes will include a demonstration that students have the ability to calculate in treatment and distribution.</p> <p>Include an outcome for resource and conservation.</p> <p>Modify outcome number one.</p>
<p>Program Review</p>	<p>Jim will write the program review and will send it to the Advisory group for review. He will include their recommendations.</p>	<p>The Advisory will send Jim their recommendations for the program review.</p>
<p>Internships</p>	<p>Internships will be discussed in more detail at the next Advisory meeting. Without a full-time faculty it is difficult to monitor an internship program. There is a possibility of creating a class and have an adjunct faculty manage. A pilot program with one city will be created to assess the feasibility of an internship.</p> <p>Water Awareness Day was cancelled and those in the industry believe it is important and would like to see it reinstated. Jim explained that with the lack of support staff it was impossible to continue with it. However, if someone in the industry would like to head the workshop, Citrus will host it during spring break.</p>	<p>A pilot program to assess the feasibility of an internship.</p> <p>The Advisory will research and determine if a Water Awareness Day can be planned and Citrus will host the conference.</p>
<p>Submitted by: Lois Bottari</p>	<p>Meeting Adjourned</p>	

Attachment E:

**1000 West Foothill Boulevard
Glendora, California 91741-1899**

Occupation Report

LA/OC/SB



Report Info

Dataset Version	2013.1
Timeframe	2011 - 2017
Region Name	LA/OC/SB
Counties	Los Angeles, CA (6037) Orange, CA (6059) San Bernardino, CA (6071)



Water and Wastewater Treatment Plant and System Operators

SOC 51-8031: Operate or control an entire process or system of machines, often through the use of control boards, to transfer or treat water or wastewater.

Related O*NET Occupations:

Water and Wastewater Treatment Plant and System Operators (51-8031.00)

Job Distribution



Overview

Annual Openings Estimate (2012)	76
Related Completions (2011)	179
Current Job Postings	0

Gender

Male	96%	<div style="width: 96%;"></div>
Female	4%	<div style="width: 4%;"></div>

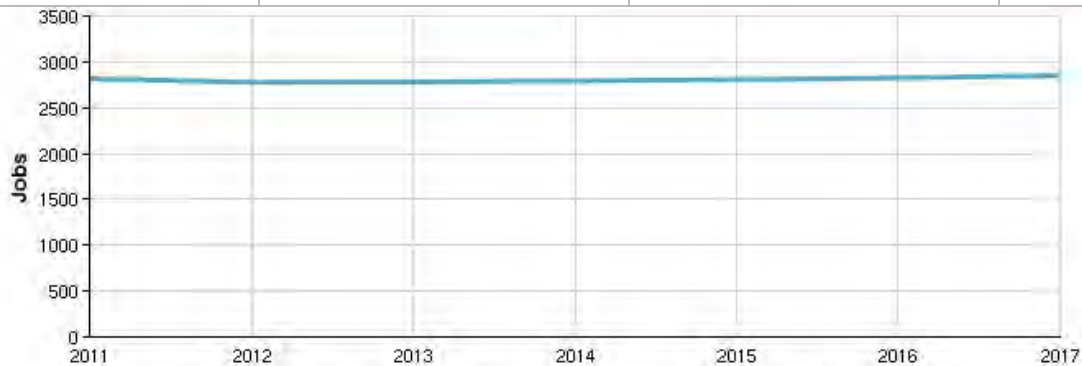
Age

14-18	0%	<div style="width: 0%;"></div>
19-24	2%	<div style="width: 2%;"></div>
25-44	36%	<div style="width: 36%;"></div>
45-64	60%	<div style="width: 60%;"></div>
65+	3%	<div style="width: 3%;"></div>

2,777 Jobs (2012) National Location Quotient: 0.55	1.2% % Change (2011-2017) Nation: 6.1%	\$33.08/hr Median Earnings Nation: \$20.09/hr
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LA/OC/SB | Growth for Target Occupation Water and Wastewater Treatment Plant and System Operators (51-8031)

2,817 2011 Jobs	2,851 2017 Jobs	34 Change (2011-2017)	1.2% % Change (2011-2017)
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LA/OC/SB | Percentile Earnings for Water and Wastewater Treatment Plant and System Operators (51-8031)

\$22.34/hr

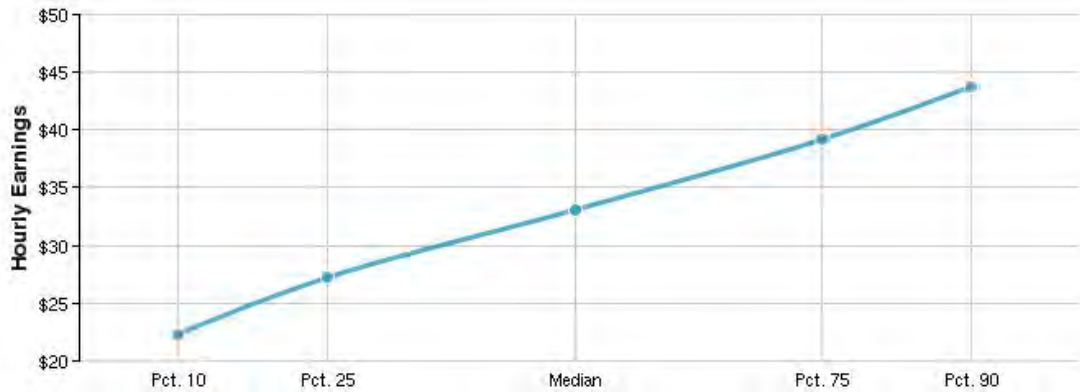
10th Percentile Earnings

\$33.08/hr

Median Earnings

\$43.75/hr

90th Percentile Earnings



Educational Attainment (National)

Doctoral or professional degree	0%	
Master's degree	1%	
Bachelor's degree	8%	■
Associate's degree	11%	■
Some college, no degree	32%	■
High school diploma or equivalent	43%	■
Less than high school diploma	4%	■

Regional Trends



Region	Jobs	2017 Jobs	201% Change
A LA/OC/SB	2,817	2,851	1.2%

Educational Programs

1 Programs (2011)	179 Completions (2011)				
Program	2007	2008	2009	2010	2011
Water Quality and Wastewater Treatment Management and Recycling Technology/Technician (15.0506)	121	104	129	151	179

Inverse Staffing Patterns

Industry	Occupation Jobs in Industry (2012)	% of Occupation in Industry (2012)	% of Total Jobs in Industry (2012)
Local Government, Excluding Education and Hospitals (903999)	2,308	83.1%	0.9%
Water Supply and Irrigation Systems (221310)	233	8.4%	13.7% Private
Households (814110)	19	0.7%	0.0% Solid Waste
Landfill (562212)	15	0.5%	1.1% Other
Nonhazardous Waste Treatment and Disposal (562219)	15	0.5%	1.1%

Data Sources and Calculations

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department

Institution Data

The institution data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Completers Data

The completers data in this report is taken directly from the national IPEDS database published by the U.S. Department of Education's National Center for Education Statistics.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Staffing Patterns Data

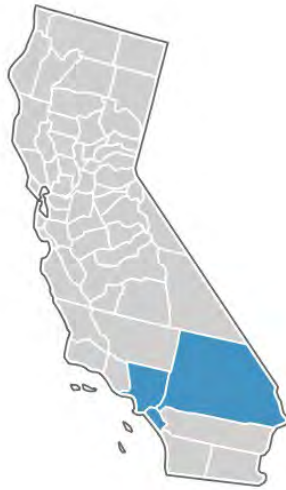
The staffing patterns data in this report is compiled from several sources using a specialized process. Sources include Occupational Employment Statistics, and the National Occupation Matrix. EMSI uses ratios from the national matrix and inputs regional jobs by industry, converting these to jobs by occupation. The ratios derived from this are adjusted to equal actual regional data, resulting in a unique regional staffing pattern.

Attachment F: Occupation Regional Comparison

1000 West Foothill Boulevard
Glendora, California 91741-1899

Occupation Regional Comparison

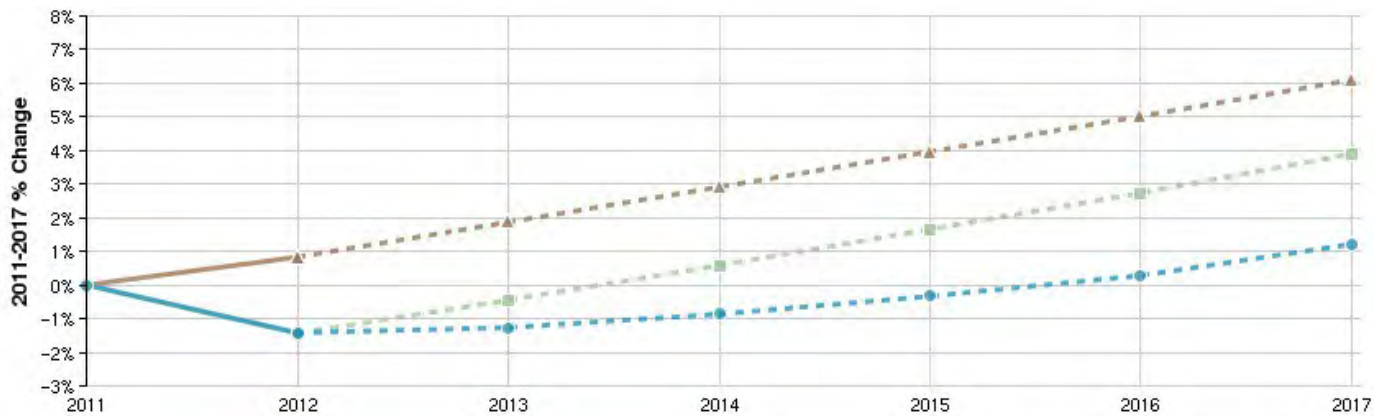
LA/OC/SB



Report Info

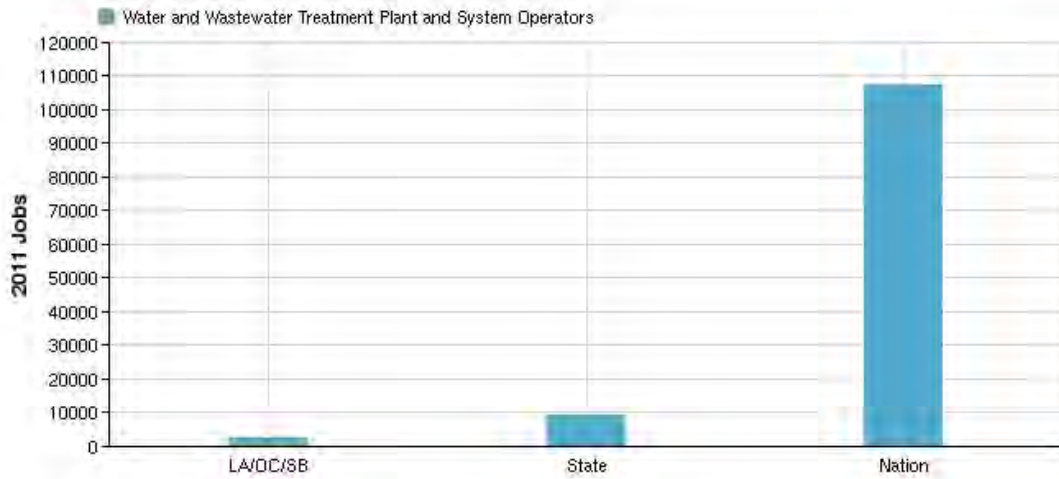
Dataset Version	2013.1
Timeframe	2011 - 2017
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	Orange, CA (6059)
	San Bernardino, CA (6071)

Occupation Change Summary



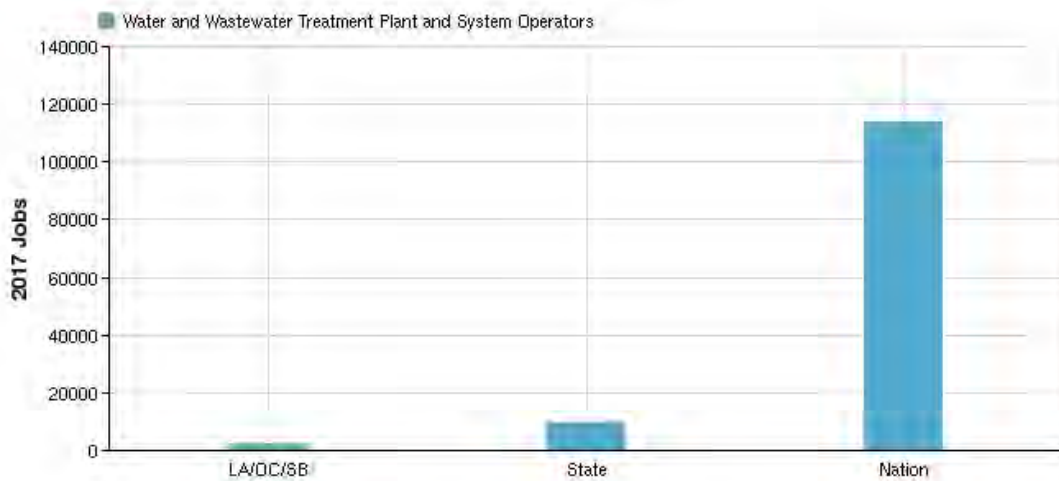
Region	2011 Jobs	2017 Jobs	Change	% Change	Median Hourly Earnings
A LA/OC/SB	2,817	2,851	34	1%	\$33.08
B State	9,934	10,321	387	4%	\$29.89
C Nation	107,575	114,139	6,564	6%	\$20.09

Occupation Breakdown - 2011 Jobs



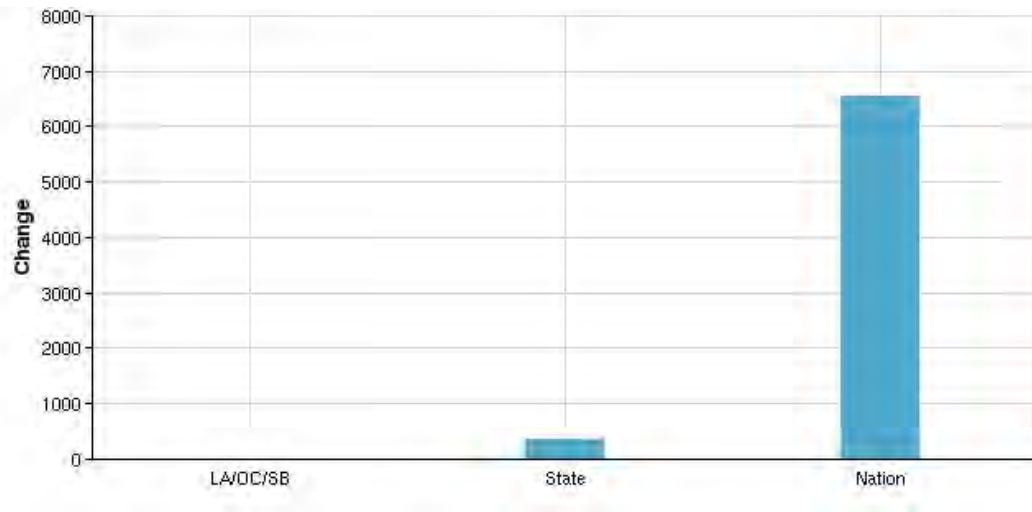
Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	2,817	9,934	107,575
	Total	2,817	9,934	107,575

Occupation Breakdown - 2017 Jobs



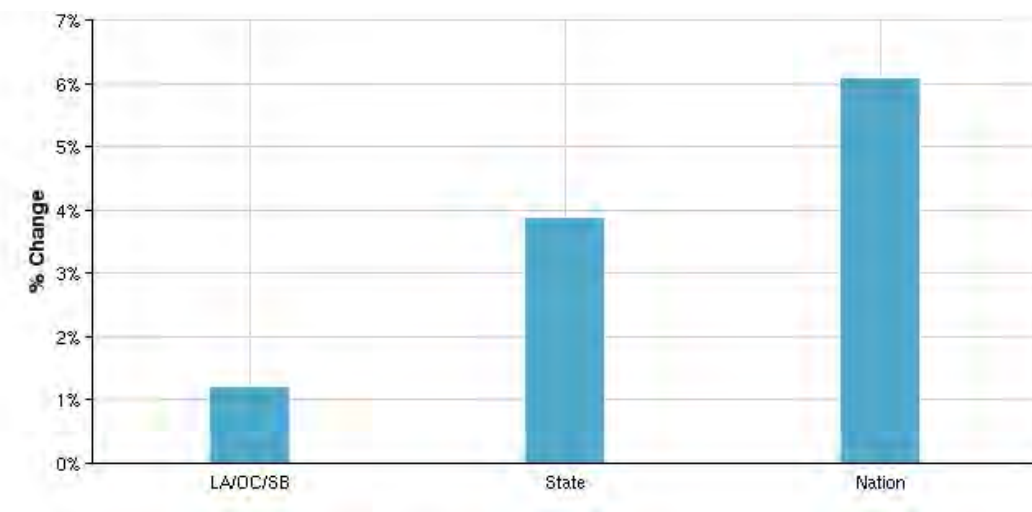
Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	2,851	10,321	114,139
	Total	2,851	10,321	114,139

Occupation Breakdown - Change



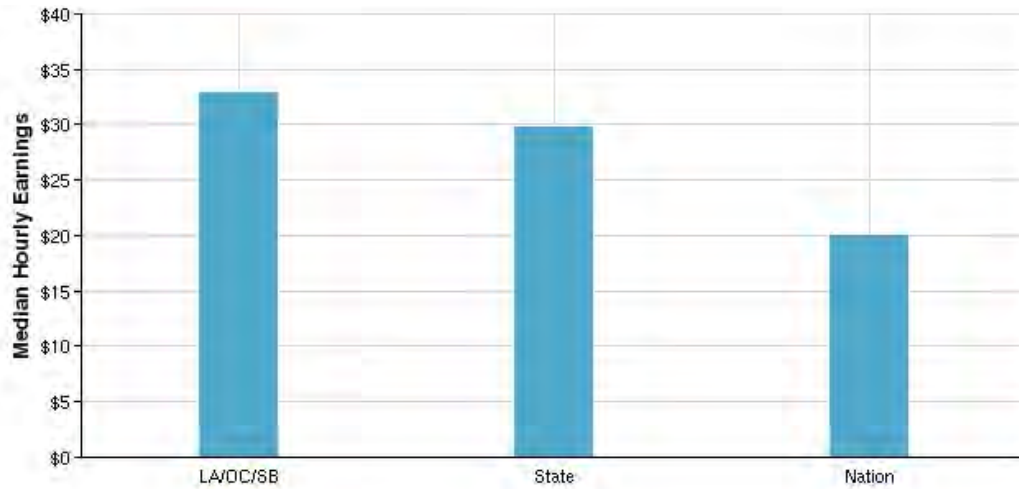
Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	34	387	6,564
Total		34	387	6,564

Occupation Breakdown - % Change



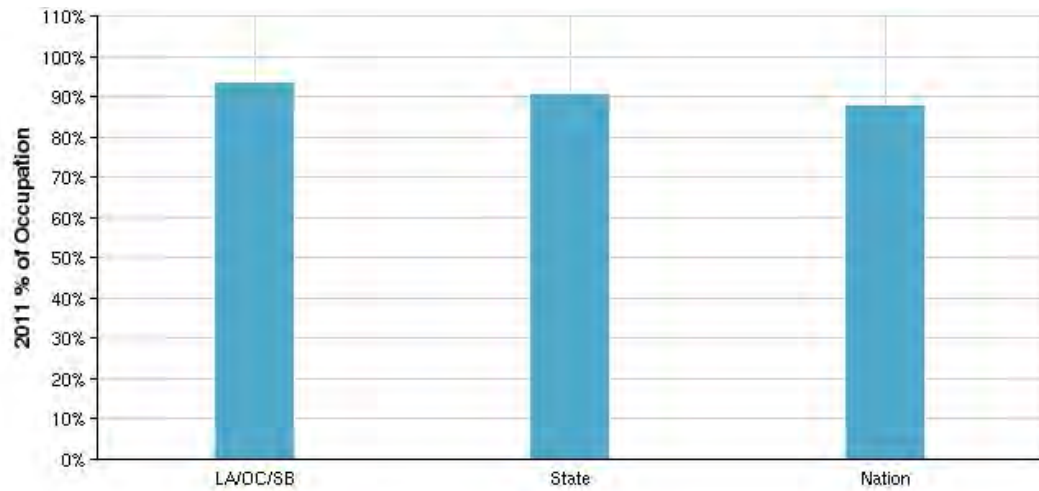
Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	1%	4%	6%
Total		1%	4%	6%

Occupation Breakdown - Median Hourly Earnings



Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	\$33.08	\$29.89	\$20.09
	Total	\$33.08	\$29.89	\$20.09

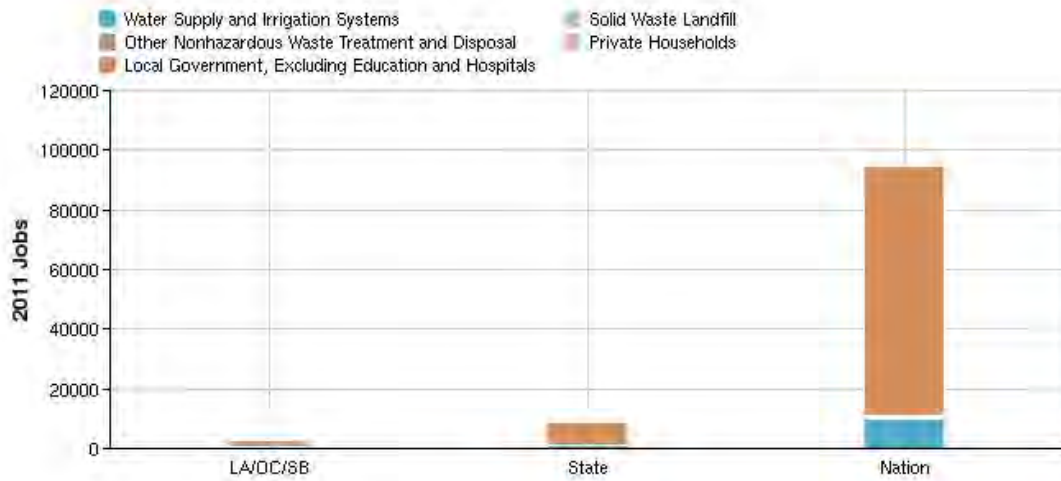
Top Industries - 2011 % of Occupation



NAICS Code	Description	LA/OC/SB	State	Nation
903999	Local Government, Excluding Education and Hospitals	83%	80%	78%
221310	Water Supply and Irrigation Systems	9%	9%	9%
814110	Private Households	1%	0%	0%
562219	Other Nonhazardous Waste Treatment and Disposal	1%	0%	0%
562212	Solid Waste Landfill	1%	1%	1%
Total		94%	91%	88%

Source: EMSI Complete Employment - 2013.1

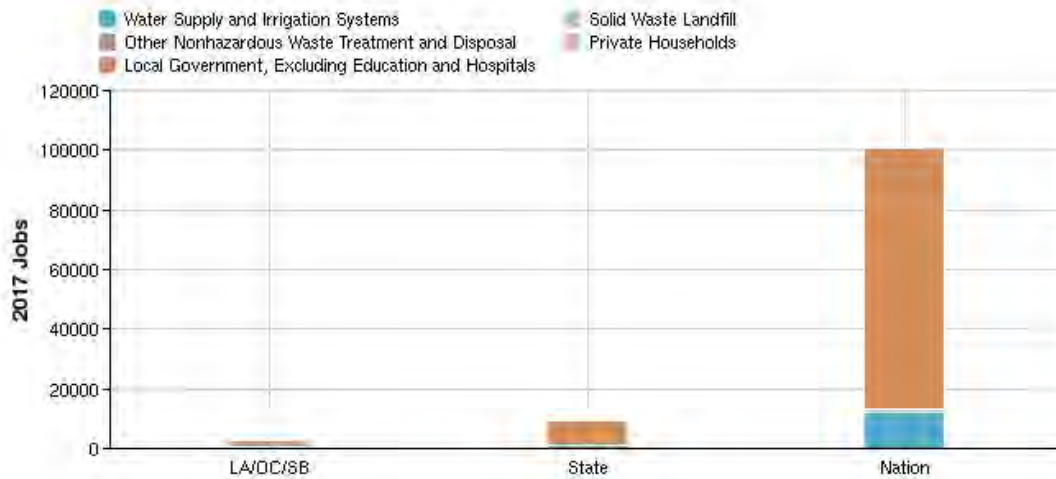
Top Industries - 2011 Jobs



NAICS Code	Description	LA/OC/SB	State	Nation
903999	Local Government, Excluding Education and Hospitals	2,333	7,948	84,041
221310	Water Supply and Irrigation Systems	252	914	9,730
814110	Private Households	19	39	72
562219	Other Nonhazardous Waste Treatment and Disposal	16	34	276
562212	Solid Waste Landfill	16	82	756
Total		2,635	9,017	94,875

Source: EMSI Complete Employment - 2013.1

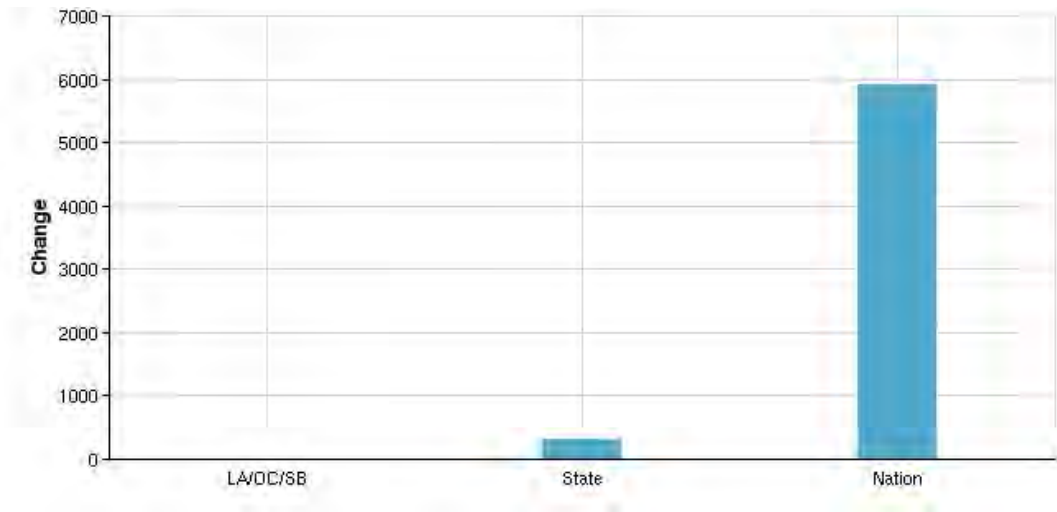
Top Industries - 2017 Jobs



NAICS Code	Description	LA/OC/SB	State	Nation
903999	Local Government, Excluding Education and Hospitals	2,365	8,270	87,339
221310	Water Supply and Irrigation Systems	232	902	12,381
814110	Private Households	23	47	83
562219	Other Nonhazardous Waste Treatment and Disposal	17	38	286
562212	Solid Waste Landfill	16	88	719
Total		2,653	9,345	100,807

Source: EMSI Complete Employment - 2013.1

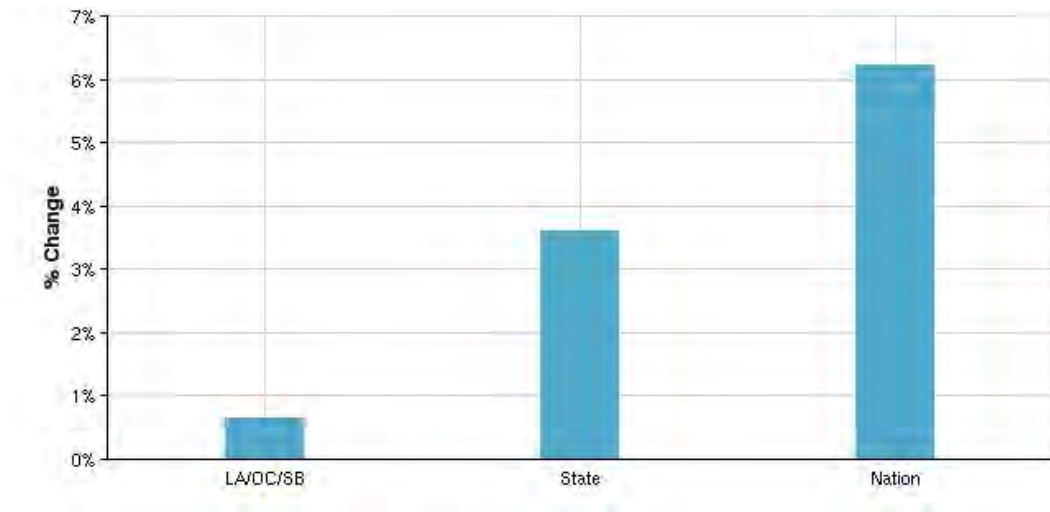
Top Industries - Change



NAICS Code	Description	LA/OC/SB	State	Nation
903999	Local Government, Excluding Education and Hospitals	32	322	3,298
814110	Private Households	4	8	11
562219	Other Nonhazardous Waste Treatment and Disposal	1	4	10
562212	Solid Waste Landfill	0	6	-37
221310	Water Supply and Irrigation Systems	-20	-12	2,651
Total		18	328	5,932

Source: EMSI Complete Employment - 2013.1

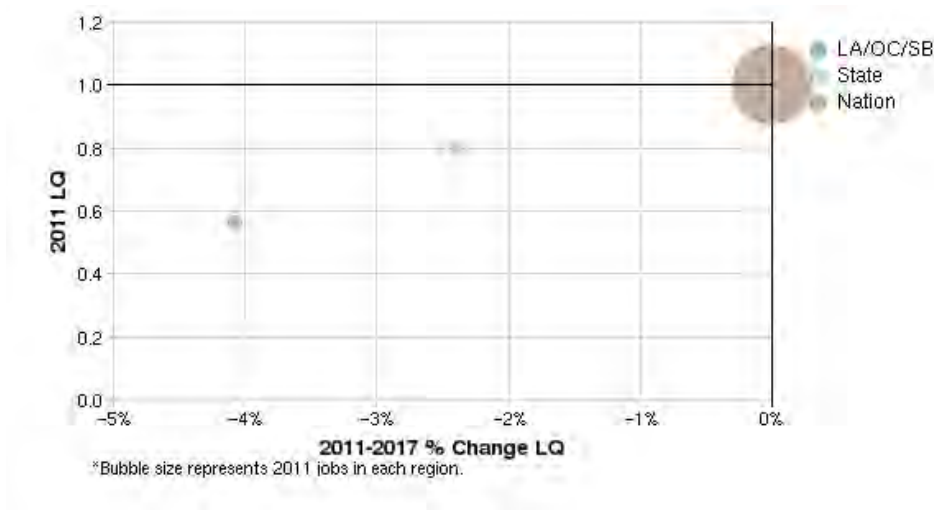
Top Industries - % Change



NAICS Code	Description	LA/OC/SB	State	Nation
814110	Private Households	21%	21%	15%
562219	Other Nonhazardous Waste Treatment and Disposal	6%	12%	4%
903999	Local Government, Excluding Education and Hospitals	1%	4%	4%
562212	Solid Waste Landfill	0%	7%	-5%
221310	Water Supply and Irrigation Systems	-8%	-1%	27%
Total		1%	4%	6%

Source: EMSI Complete Employment - 2013.1

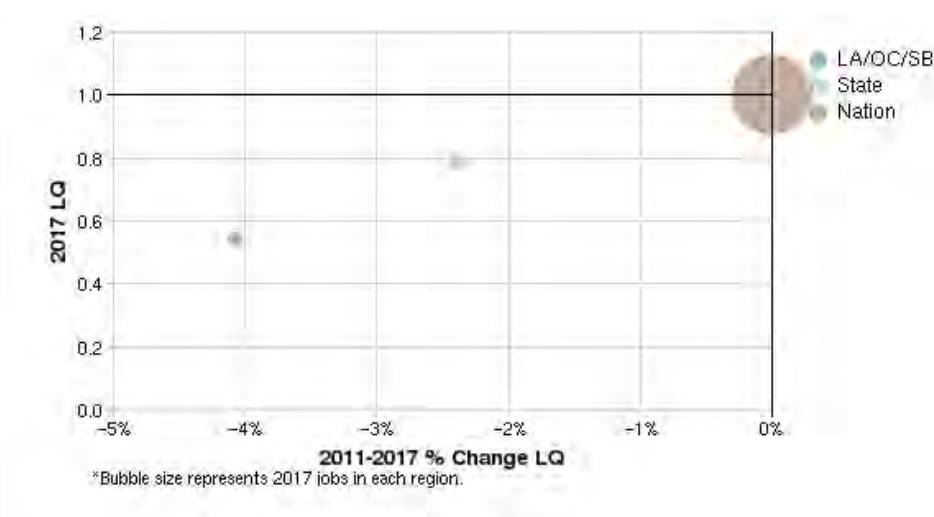
Location Quotient Breakdown - 2011 National LQ



Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	0.56	0.80	1.00
Total		0.56	0.80	1.00

Source: EMSI Complete Employment - 2013.1

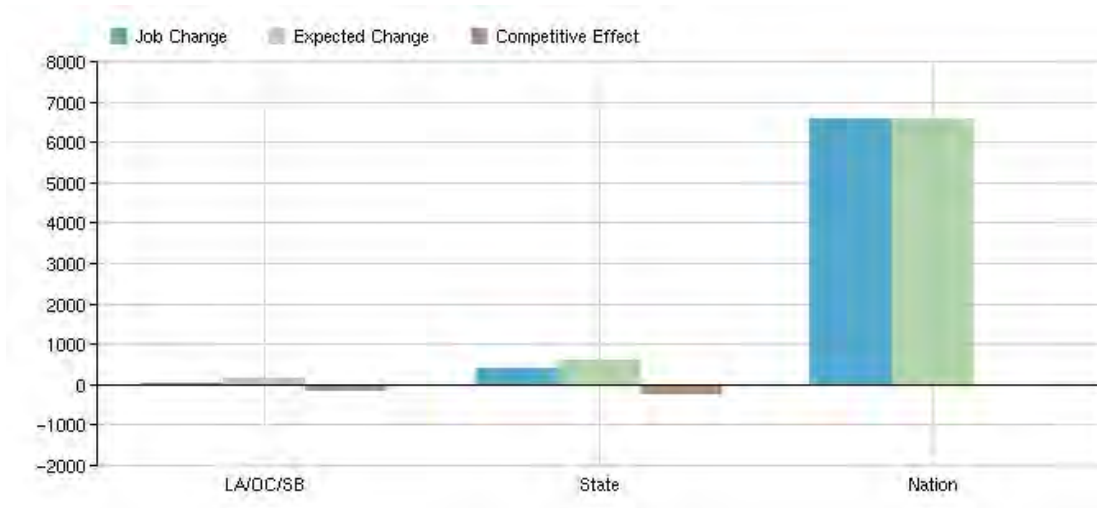
Location Quotient Breakdown - 2017 National LQ



Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	0.54	0.79	1.00
Total		0.54	0.79	1.00

Source: EMSI Complete Employment - 2013.1

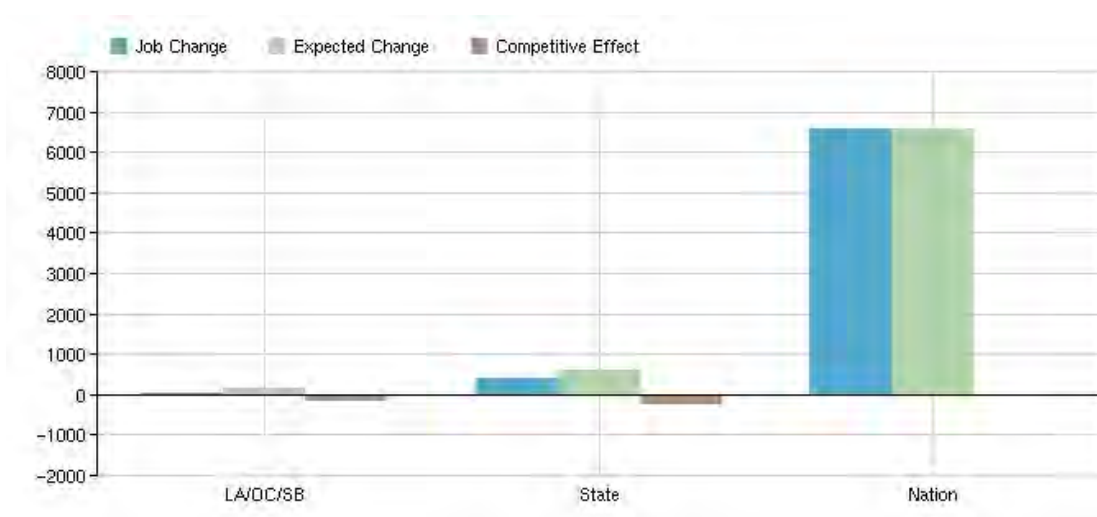
Shift Share Breakdown - Job Change



Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	34	388	6,564
Total		34	388	6,564

Source: EMSI Complete Employment - 2013.1

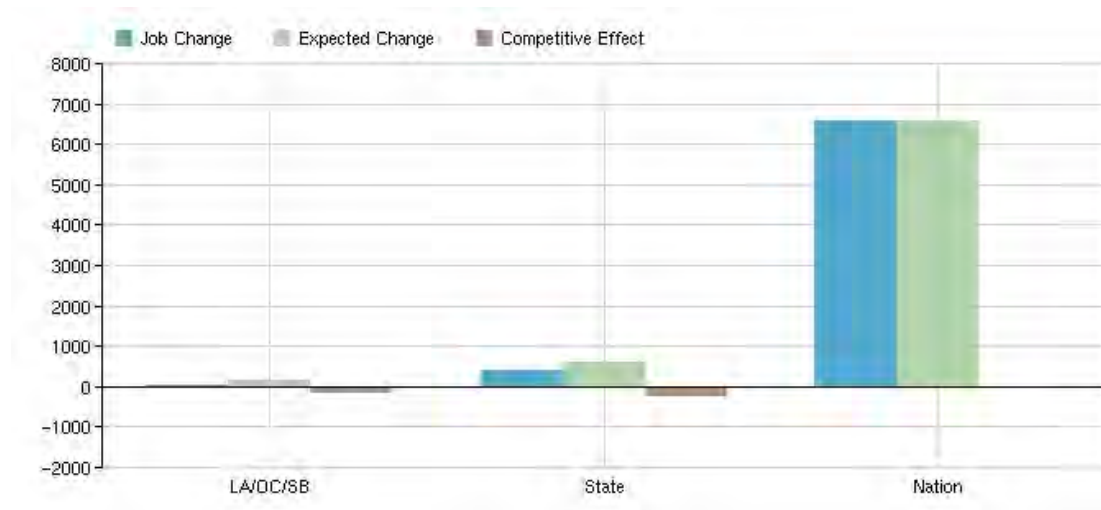
Shift Share Breakdown - Expected Change



Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	172	606	6,564
Total		172	606	6,564

Source: EMSI Complete Employment - 2013.1

Shift Share Breakdown - Competitive Effect



Occupation	Description	LA/OC/SB	State	Nation
51-8031	Water and Wastewater Treatment Plant and System Operators	-138	-219	0
	Total	-138	-219	0

Source: EMSI Complete Employment - 2013.1

Data Sources and Calculations

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department

Staffing Patterns Data

The staffing patterns data in this report is compiled from several sources using a specialized process. Sources include Occupational Employment Statistics, and the National Occupation Matrix. EMSI uses ratios from the national matrix and inputs regional jobs by industry, converting these to jobs by occupation. The ratios derived from this are adjusted to equal actual regional data, resulting in a unique regional staffing pattern.

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Shift Share

Shift share is a standard regional analysis method that attempts to determine how much of regional job growth can be attributed to national trends and how much is due to unique regional factors.