ASSESSMENT REPORT 2015-16

ENVIRONMENTAL SCIENCE B.S.

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Environmental Science B.S.

Contents

Program Learning Outcomes
Environmental Science B.S.

1. demonstrate practical skills and theoretical knowledge of the biology, chemistry, geology, and physics relevant to the Earth system, in both laboratory and field settings *(physical and life science)*
2. collect, analyze, and interpret quantitative and qualitative data, individually and in groups, in order to characterize and address environmental issues *(data and analysis)*
3. critically consider scientific findings within the context of the social, cultural, economic, ethical, and human dimensions of contentious environmental issues *(socioeconomic context)*
4.

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CSUEB Environmental Science B.S. Program Learning Outcome Evaluation

Course evaluated: ENSC 4800 Seminar in Environmental Science, Winter 2016

Assignment evaluated: Brief essay on the socioeconomic, cultural, ethical, political, and cultural context of environmental science

PLO evaluated: critically consider scientific findings within the context of the social, cultural, economic, ethical, and human dimensions of contentious environmental issues (socioeconomic context).

Rubric(s) used: EES BS/BA Critical Thinking Rubric, slightly modified (see above).

“Socioeconomic Context” objective evaluation (ENSC 4800 Seminar in Environmental Science)

14 students evaluated, 17 students in class

Class total average: (6.93 out of 15, 5 is meeting PLO), class total standard deviation: 2.43

Student	Competencies	Problem Articulation	Embracing Contradictions	Innovative Thinking	Connecting, Synthesizing	Total
01	1	1	1	1	1	5
02	1	1	1	2	2	7
03	2	2	1	1	2	8
04	1	1	1	1	1	5
05	2	3	2	1	2	10
06	1	1	1	1	1	5
07	1	1	1	2	1	6
08	1	1	1	1	1	5
09	2	2	2	1	2	9
10	2	2	1	2	2	9
11	3	2	2	2	2	11
12	0					

Interpretation: Students scored most consistently high on the “connecting and synthesizing” portion of the rubric, which aligns with the nature of the environmental science major (an applied science, requiring synthesis of broad interdisciplinary knowledge and skills). Students scored low in the area of embracing contradictions, an area that is very important for environmental science since “real world” scenarios deal

STREAM DISCHARGE in SAN LORENZO CREEK

PURPOSE

The purpose of this lab is for you to get hands-on experience with stream gauging by calculating the discharge of San Lorenzo Creek. You will also make and record stream characterization observations.

BACKGROUND

The process of measuring stream flow (volume rate of flow), or discharge, is called stream gauging. There are numerous methods of stream gauging, including direct methods, such as volumetric gauging, and dilution methods, as well as indirect methods involving stage-discharge relations, or rating curves. Since the velocity of a stream varies with depth and width, it is important to understand what it is you want to measure when choosing a stream gauging method. If you are interested in stream surface velocity, the float method would work well. This method involves throwing some buoyant, highly visible (biodegradable) object into the stream and measuring the time it takes to float a known distance. If you are interested in obtaining a more accurate stream discharge measurement, the velocity-area method is the method of choice.

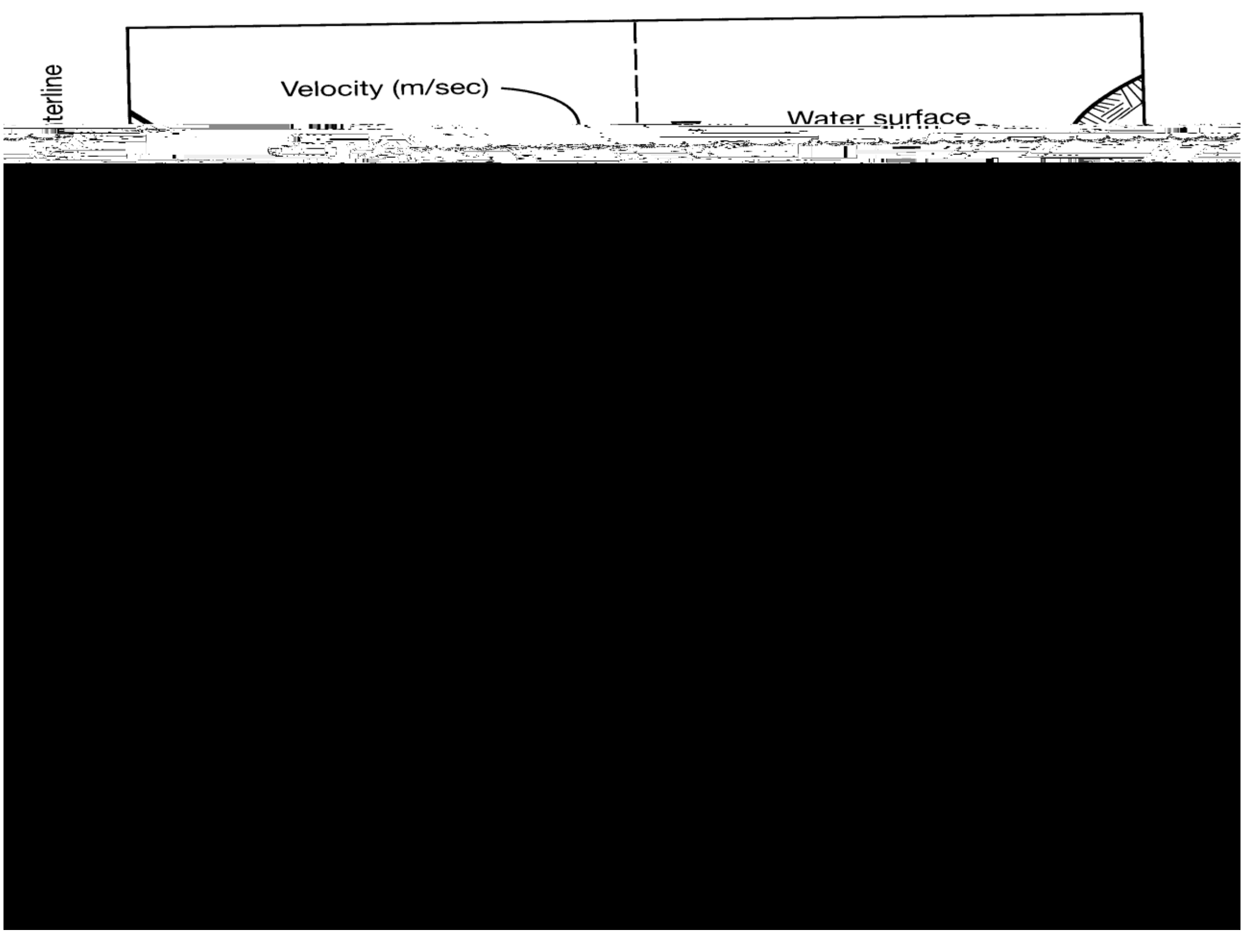

Figure 1a and 1b showing stream velocity distribution. Figure 1a is a cross -sectional view with

Equation1 To calculate the discharge of each section, where q is the discharge of each section, w is the width of the section, y is the depth of each vertical, and v is the velocity at each vertical.

Equation 2 To calculate the stream discharge (Q) of Ward Creek you need to sum all the section discharge (q).

CHOOSING A SITE

Before getting started making velocity measurements, you need to choose a location for your stream gauging effort. To the extent possible, the site you choose should fit the following criteria:

No eddies (or few eddies).

A smooth cross section with minimal flow obstruction.

Converging flow, or a location where the channel is not getting wider immediately down stream of your gauging location.

MEASURING VELOCITY: THE FLOAT METHOD

You need:

- marking tape
- tape measure
- stop-watch
- a highly visible, biodegradable, buoyant object such as a large orange peel
- at least three people; one at the top of your reach, one at the bottom, and someone to record data

Experiment:

For the float method, measure out some convenient distance along the stream bank (try at least 15 meters, i.e., a 15m "reach"). Station one person at the upstream end of your selected reach and one at the downstream end. The person at the upstream end has the stop-watch and the oranges. The person at the top releases an orange and starts the clock when the orange floats over the top boundary of your reach. When the orange passes the bottom boundary of your reach, the person at the bottom signals to the top person to stop the clock.

- o Use EXCEL to make a table similar to your handout that allows you to calculate discharge.

4. **COMPARE THE TWO METHODS**
   - o Which discharge value is higher?
   - o Why?
   - o Look up the discharge recorded at the nearby USGS stream gage. Find data for Jan. 17 at: http://waterdata.usgs.gov/nwis/rt. (This site is San Lorenzo Creek above Don Castro Res)

5. **Record other important features of your chosen reach**
   - o Describe the stream as meandering, braided, or straight (low sinuosity).

   - o Characterize the bed material by estimating the percentages of silt/clay, fine/medium/coarse sand, fine/medium/coarse 2mm-40mm) gravel, small/medium/large cobble (60 mm-180mm), and boulders (200 mm and up)

6. Use the Thermo water quality meter to record basic water quality parameters: pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential. (We will compare these to the same parameters measured in well water later this quarter.)

Year 1: 2013-2014

1. Which PLO(s) to assess	PLO 4 *(synthesis)*, PLO 5 *(communication)*
2. Assessment indicators	*Brownfield Remediation Capstone Report, Hazardous 21.521 6604*

Year 4: 2016-2017

1. Which PLO(s) to assess	PLO 2 *(data and analysis)*
2. Assessment indicators	Course assignments and projects, with department rubric
3. Sample (cou	