Hi Deep Springs,

Over the last week it's occurred to me that I probably spent too much time telling you *what* I've taught, in lots of schools to lots of different types of students, but not what I'd want to teach *you*, were I to be selected as your natural sciences chair. I'm especially mindful that DS is a very different school than, well, anyplace else, so it especially makes sense to talk through a few ideas I've had about what I thought might work best with you.

The list isn't intended to be exhaustive (I left several on the cutting room floor), but it is intended to give a sense of where my expertise tends to be (water, landscapes, and Earth history), and a sense that I try hard to provide at least one certifiable skill in each class (or at least make each class part of a larger arc leading to a professional certification).

Many of these classes require samples or instruments not likely to be available at Deep Springs. In those cases, I've tried to explain where the equipment would come from without too much additional cost to Deep Springs (e.g. EarthScope, NSF's equipment pool. I'm certified to request equipment from EarthScope for teaching use, so Deep Springs would pay only shipping for the instruments and not a rental fee).

I would look forward immensely to the chance to talk through these classes, or any suggestions you'd have for different classes and skills, if you'd find the conversation valuable to your search. Thanks for putting up with an addendum, and for your work in selecting a new colleague.

Andy

Entry-point classes

These classes are important both for people thinking about science, and for people who might bump up against science in their daily lives. Combined with classes from others, I'd like to figure a way to offer California Master Naturalist certification or at least put students well on their way to that certification.

> **Natural History of California**
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> California is an incredibly diverse landscape supporting highly varied ecosystems. We'll start locally, working out not only the plants and animals of the Deep Springs Valley, but also the geologic forces that created the valley and the types of geologic materials found there. We'll expand from there to the Owens Valley, the Sierra Nevada, and eventually all of California, focusing on the benefits and challenges

associated with each ecosystem and how natural forces like wildfire and earthquakes shape the landscape.

Skills: Keeping a nature journal, identifying and describing rocks

Materials/equipment: Field books, DS rock samples amended by personal collections

John Muir the Geologist

John Muir is inextricably tied both to California and to the environmental movement. His fight to preserve Yosemite (successfully) and Hetch Hetchy Valley (unsuccessfully) have served as a model for grass-roots environmental protection for 150 years. How strange, then, that John Muir considered himself neither an environmentalist nor a Californian! We'll examine the path Muir took from his birthplace in Scotland through much of the American Midwest to his final landing in California, but we'll also examine why it is that Muir described himself simply as a geologist.

Skills: Persuasive writing, reading landscapes, Qualitative Habitat Evaluation Index (QHEI) of rivers

Materials/equipment: Field books, DS rock samples amended by personal collections

Certifications: Unusually, California's aquatic habitat data collection is not as highly developed as Midwestern versions. We'll become familiar with both Midwestern (through QHEI, which is used pretty much everywhere from the Appalachians to the Great Plains) and Californian measures of stream health, though no specific certifications are available.

Geologic Hazards and Emergency Management

California is unusually risky—all but 2 of its 58 counties rank above the national average for natural hazards risk. We'll use California as a laboratory to understand the geologic underpinnings of natural hazards, learn how to estimate risk, and where to go to find out more about recent geologic events. Later in the class, we'll see how societies address risk, with particular emphasis on the US, which uses an emergency management framework called the Incident Command System

developed in the last century by wildlands firefighters in California and now considered a model globally for how disasters should be approached.

Skills: Keeping a field book, ICS

Materials/equipment: Field book

Certification—Students can sit for ICS exam, a basic certification required for most emergency workers, through FEMA

Skills development classes

These courses are designed to help students demonstrate tangible, certifiable, skills to help with finding jobs of service to humanity after graduation. In each case I've tried to show the kinds of people who use the certification in their working lives.

Landscapes, Soils, and Human Habitation

Paul Harvey once said "Despite all our accomplishments, we owe our existence to a six-inch layer of topsoil and the fact that it rains". It makes sense, then, to know something about both rain and topsoil. In this class we'll study how soils form, make predictions about soil from landscapes and landforms around us, and learn how to measure the surface of the Earth. We'll pay special attention to reading soil surveys (available online and as paper) and to how to organize observations of both surfaces and soils in a standardized format.

Skills: Surveying, wetland delineation

Materials/equipment: Surveying instruments (e.g. autolevel, total station, GNSS, UAV; combination of personal equipment, Earlham College loan equipment, and EarthScope request)

Certifications: Students can sit for Part 107 licensure (drone pilot) through the FAA. A Part 107 license is required to operate UAVs in most instances, with UAV work becoming an increasing part of emergency work, mapping, and agriculture.

Water in the American West

As stated above, Paul Harvey once said "Despite all our accomplishments, we owe our existence to a six-inch layer of topsoil and the fact that it rains". It makes sense,

then, to know something about both rain and topsoil. In this class we'll study how water moves through natural landscapes and study how we attempt to quantify that movement. Importantly, we'll shift to how water is apportioned by societies, and what laws govern this increasingly scarce resource in the US.

Skills: GIS, hydraulic measurement

Materials/equipment: QGIS (freeware), loan equipment

Certifications: Students can sit for QGIS certification. GIS is geodatabase software widely used by commercial firms and government agencies not only to make maps, but to explain scientific data to others in a persuasive way. While ESRI products are probably more widely used, QGIS has the advantage of being locally hosted (i.e. it's on your laptop and not in the cloud), and of being freeware (ESRI requires an annual fee).

The world beneath—geophysics and land-use planning

Virtually everything we know about the land underneath our feet comes from inference—humans rarely dig deeper than 2 meters, yet much of our ability to drink water, to grow crops, and even to choose suitable places to live, hinges on knowing something about the deeper earth. In this class we'll use specialized instruments to study and interpret the ground underneath our feet. We'll then turn our attention to explaining how to use that data not only to interpret the history of the earth, but also to help society understand the geologic rationale for environmental protection or resource use.

Skills: Geophysical interpretation

Materials/equipment: EarthScope loan equipment

Certifications: Third-party certification offered for GPR, though it's expensive. GPR, in particular, is used widely by environmentalists and developers alike to determine what's under the surface of the earth, and skilled GPR operators are in demand nearly everywhere.