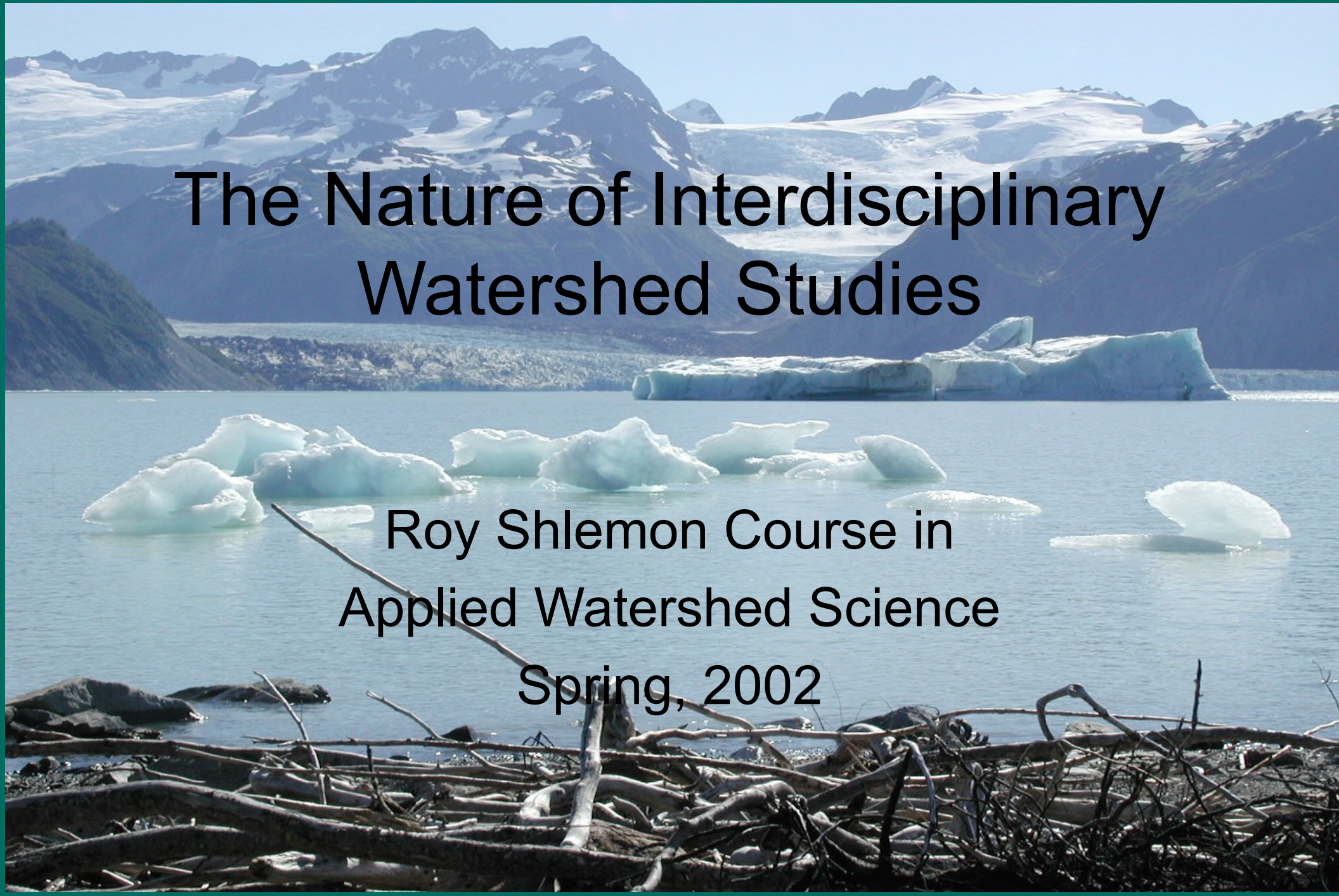


The Nature of Interdisciplinary Watershed Studies

Roy Shlemon Course in
Applied Watershed Science
Spring, 2002

“Watershed Science”

Definition from Webster:

Watershed: The region draining into a river, river system or body of water. (translated from German *Wasserscheide*)

Science: 1) The observation, identification, description, experimental investigation, and theoretical explanation of natural phenomena. 2) Any methodological activity, discipline, or study.

“Watershed Science”

Definitions from folks you know:

- Science done at a watershed scale usually focused on processes that would impact the river.
- An umbrella term covering those physical and biological scientific efforts focused on riparian systems from reach to catchment scales.
- A team-oriented discipline focused on quantifying the physical, chemical, biological and cultural watershed characteristics and processes.

“Interdisciplinary” vs. “Multidisciplinary”

Definitions from Webster:

- **Multidisciplinary** = more than one branch of knowledge or teaching
- **Inte*r*disciplinary** = between or among branches of knowledge or teaching
- **Intr*a*disciplinary** = within a branch of knowledge or teaching

“Interdisciplinary” vs. “Multidisciplinary”

Definitions from folks you know:

“Interdisciplinary implies some fusion of disciplines where the sum is greater than the simple addition of the parts.”

“Multidisciplinary suggests many disciplines working together on a larger project where traditional tools are used and data is incorporated together only at the end.”

“Interdisciplinary” vs. “Multidisciplinary”

In relation to scientific projects:

“Multidisciplinary projects have a central goal but are composed of a researchers from different disciplines.

Interdisciplinary projects focus on 1 specific question that requires input from a variety of disciplines to answer.”

The Watershed Scientist…..

As a student -

Focus is on study of traditional disciplines

In government and consulting -

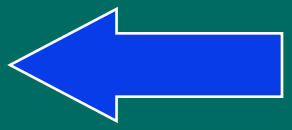
Focus is on land management with some input from traditional disciplines. Recently multidisciplinary.

In academia and research -

Focus is on scientific study of watershed-related questions. Often multidisciplinary, moving towards interdisciplinary.

What watershed scientists must have...

- Extensive vocabulary and communication skills
  - Translation: ‘thalweg’ = ‘maximum channel depth’
  - Interpretation: ‘high shear stress reaches’ mean ‘poor habitat for aquatic bugs’
- Broad-scoped or ‘Big picture’ analytical skills
  - Understanding of scale (time and space)
  - Ability to link processes across disciplines



Project Example

Goal - to understand the development of braid bars and the associated plant community succession

How should the study questions be phrased?

Project Example - questions

Multidisciplinary -

- How does the disturbance regime of mid-channel bars effect vegetative succession?
- How do glaciers effect downstream fining of gravel bars?

Interdisciplinary -

- How does downstream fining effect plant community distribution?

Project Example - data needs

Biologist -

- disturbance regime (timing of floods, age of bars)
  - timing and frequency of floods
  - age of bars
- species composition and distribution

Hydrogeomorpholoist -

- Flow regime (magnitude, duration, intensity, timing)
- Local hydraulics (shear stress)
- Grain size distribution

Project Example - data collection - multidisciplinary

Biologist **-**

- **Flow information - general**
- **Survey several bars - location random**

⇨ ***local scale***

Hydrogeomorpholoist **-**

- **Flow information - detailed**
- **Quantitative hydraulic and sediment measurements**
- **Survey many bars - location targeted**

⇨ ***watershed scale***

Project Example - data collection - interdisciplinary

Biologist and Hydrogeomorpholoist -

- Survey many bars - targeted locations
- Detailed flow information
- quantitative hydraulic and sediment information

Surveys focused at watershed scale

Discussion

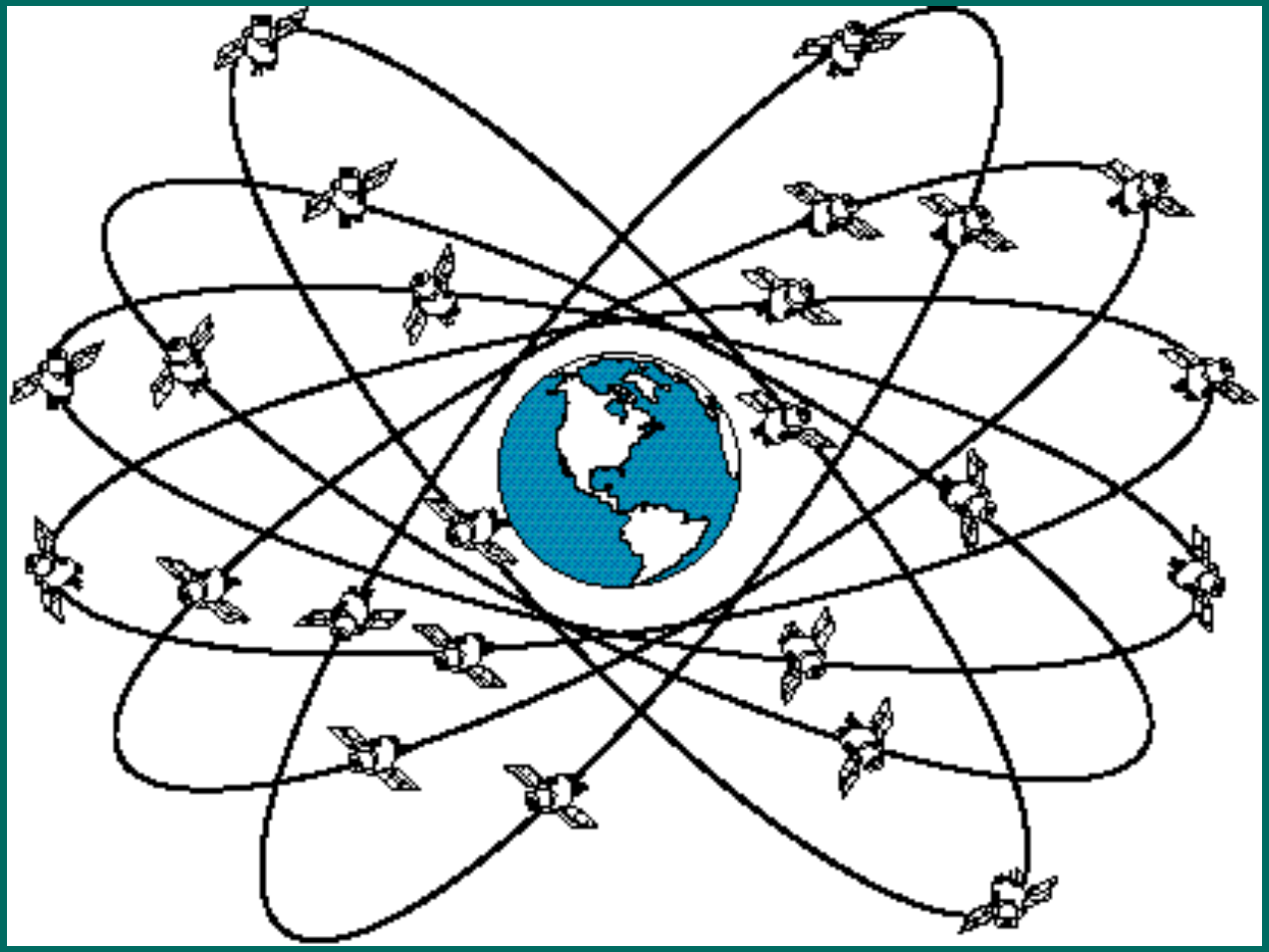
General data collection guidelines

- Keep It Simple
- Field Conditions -
  - big/wide/fast river (limit sample sites)
  - stopping points unpredictable (no specific sampling sites, focus on types of sites)
  - freezing cold water (limited immersion - edges only)
  - rain/wind likely (water-sensitive equip)
  - bears, camps are good sample spots

General guidelines

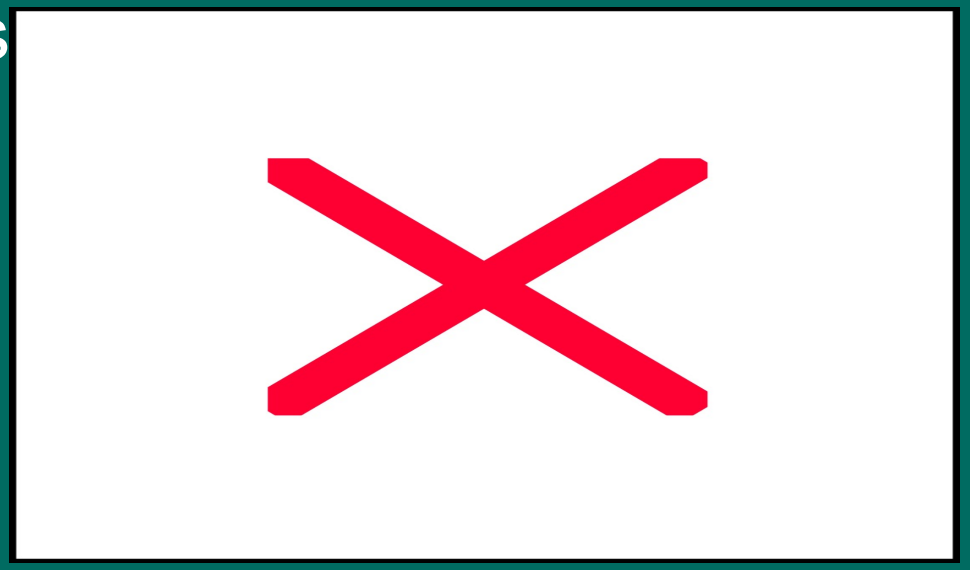
- Stay adaptable - description based stuff is best.
- Make data collection as overlapping as possible (multiple groups using same data)

Available Data Sources
GIS and GPS

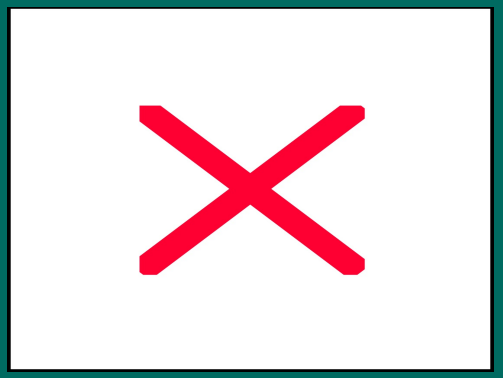


Available GIS Data

- Rivers
- Digital Elevation Model (available soon)
- Scanned Quads – not all of them
- Watershed boundaries
- Soils
- Glaciers
- Roads



GIS data requests



- If you have ArcView
  - Email kekeller@ucdavis.edu with your data request
- If you are not a GIS user but need a map for your paper or a field map
  - Email kekeller@ucdavis.edu please include the size of the map, the data you want included and when you need it by.

Map Requests Cont.

- Please limit your map requests to maps needed for your final project or the field.
- If you just want to take a look at the data, please make an appointment and you can check out the data before making a map request.
- If I am back logged on map requests I may show you how to make them and you can use the copy of ArcView in my office.

GPS

- What is GPS?
  - Global Positioning Systems
  - Allows users to collect location data
- Why do you care?
  - We will have at least one Garmin 12XL available in the field.
  - You will be able to collect coordinates for your sampling sites.
  - The collected coordinates can be used to create maps when we return to Davis.

Things to remember about GPS

- The Garmin 12XL has ~15meter accuracy
  - Elevation is much worse (~3X horizontal error)
- GPS does not work well in steep canyons or under heavy tree canopy
  - This should not be a problem for us
- Site – ID numbers will be important
- Let us know what your ID numbers will be for your GPSed sample points

Data Tables and Field Notes

Unique ID's

- If you are planning on using the GPS unit please come up with a unique alpha numeric site id
  - I suggest using the beginning or end of the alphabet
  - For example a1, a2, a3 or z1, z2, z3
  - GPS units force you to scroll through the alphabet and numbers to create ID's – having an id of M1, would take forever to enter.

Recommendations

- Rite-in-rain
  - notebooks/loose-leaf paper (datasheets preprinted)
- Test datasheets on Putah Creek beforehand
  - Does it make sense?
  - is it quick ?
  - Is it easily transferred to Excel or Access?

Recommendations cont.

- Bring along a filled out example and ‘instructions’ for your field helpers
- Talk to classmates for examples/ideas

Recommendations

- Test your equipment before going to Alaska

Shlemon Course Web Site

How to get your project on-line

The web site

- **Will** be located at:
  watershed.ucdavis.edu/shlemon.html
- **Is currently at**
  watershed.ucdavis.edu/arc/copper_draft/copper4.html
- Will be moved as soon as it is populated with papers.

First Document

- Information To Include
  - List of Authors
    - Please indicate who is 1st, 2nd ….
  - Title
  - Abstract
- **This can be a plain text file or a word document**

Second Document

- Convert your paper / report into PDF format
  - If you have any questions about doing this just email Kaylene

Final Product

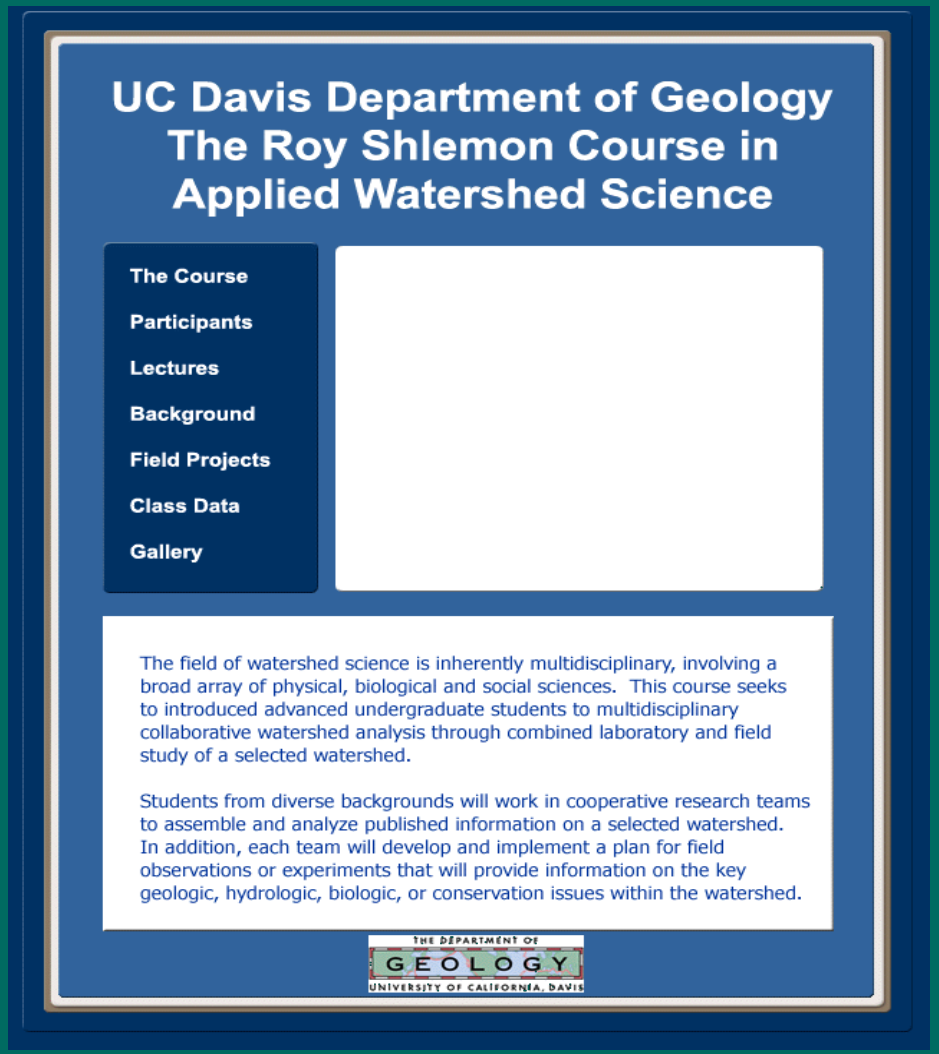
- Email the 2 documents to Kaylene at :

kekeller@ucdavis.edu

- If the paper/project is very large please zip the file

- If it is still to large to email contact Kaylene to make other arrangements.

Web Site Demo



DISCUSSION