Case Study 4
for February 19

A Ph.D. chemist brings you the following case: She has a river A with superfund sites on it, and another river B that doesn't have any. She wants to use B as a reference site for A to determine what effects the superfund sites have had on the health of river A.

In your conversation with her, you learn that a superfund site is a toxic waste site that needs to be cleaned up, and a reference site is an "undisturbed" site that can be used as a basis for comparison when studying a disturbed site, like one with a superfund waste dump.

She has measurements on approximately 20 chemical and hydrological characteristics of the river, as well as approximately 20 characteristics that may reflect superfund effects, like phosphorus level. These measurements have been made at several sites on each river, and taken over time for at least a few years. Some of the measurements were made at the same time on each river, and some were not.

She tells you that some of the measurements can be combined into Indices of Biological Integrity (IBIs). These are numerical scales that combine various features of a location or ecosystem into an overall score of how well the ecosystem is functioning. She says that several IBIs exist; one to measure how diverse the animal life is, another to measure the productivity of the plants, and so on.

The client is familiar with simple statistics, but not statistical theory or advanced methods. She is hopeful that regression or paired t-tests will be appropriate for her analysis.

Prepare a presentation for the client outlining potential methods for testing for effects of the superfund sites on the health of river A. This presentation should be able to be understood by someone familiar with simple statistics but not statistical theory or advanced methods.

In your presentation, briefly describe the question and discuss potential methods for answering it. As always, this is open-ended, but you might consider some or all of these questions: Are regression or paired t-tests appropriate? If both, which do you prefer? How do you handle the multiple measurements made on each river? Are these IBIs appropriate ways for combining the data? How might you test if they are? Are there other methods she should consider, including ways of visualizing the data?

And as always, if there are questions you'd like to ask the client, what are they?

Groups are on the reverse side...

Group 1:

Name	Email
Lingzhou Xue	xuexx041
Ka Young Park	parkx748
Ran Song	songx162
Pamela Sweeney	swee0003
Wei Qian	qianx029
Yi Yang	yang1138
Chun Pu Song	songx183

Group 2:

Name	Email
Yi Wang	wangx857
Shanshan Ding	dingx056
Craig Rolling	roll0204
Shu Ding	dingx099
Changqing Ye	yexxx058
Cindy Houser	house109
Eric Graalum	graal002

Group 3:

Name	Email
Andy Wang	wang1074
Qing Mai	maixx034
Jing Yang	yang1387
Xiao Zhong	zhong072
David Zepeda	zepe0003
Teng Zhang	zhang620
Heng Zhang	zhang440

The chair for this week is John Zobel.

Students with a "bye" week are: Gang Cheng, Ying Lu, Danning Li.