

Why Caspar Creek — Then and Now?¹

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Abstract: *The results of every watershed experiment are a unique combination of the site, the weather, the questions asked, the quality of the data produced, and the quality of the analysis made of those data. These results narrow the scope of the environmental debate, but they will not alter the value systems of the debaters. By availing themselves of the available scientific information, both sides can make their cases more persuasive to the courts, to the regulators, and perhaps to the public.*

Then

Before getting into what is important about Caspar Creek, I would like to inject a few ideas that consumers of watershed research should keep in mind. Sometimes when a study is completed we find that the weather did not cooperate, some of our ideas were not too bright, and some of our interpretations of the data were wrong. That is the first lesson to carry away from this discussion. The results of every watershed experiment are a unique combination of the site, the weather, the questions asked, the quality of the data produced, and the quality of the analysis made of those data. Those factors have to be kept in mind when using results from experimental watersheds—or any other research—to guide action. The second lesson is that, if these results are ever going to be applied, the products of watershed research have to fit with the objectives of potential users. This is one of the most difficult problems in watershed research. We need to forecast problems at least a decade in the future. Sometimes we will get it wrong. If we do, remember lesson three: hang on to old data. It may be useful later or somewhere else. In fact, some of the oldest Caspar Creek data are still being used in current studies.

Lesson number four is: do not worry about the “we don’t do it that way anymore” alibi. The first Caspar Creek experiment (Rice and others 1979) was completed just as forest practice rules were changing dramatically. The findings, that poor logging practices and Murphy’s Law were responsible for nearly a threefold increase in sediment, were rejected as inapplicable by a hydrologist working in the Navarro River watershed. At about the same time, Caspar Creek findings were being applied in the Panama Canal Zone. Lesson number four holds true because, like beauty, applicability is in the eye of the beholder.

All of the foregoing may make it appear that watershed research is a pretty marginal thing and that its practical application is a matter of chance. Before writing off experimental watershed studies, remember that other types of studies share most of the same limitations. Experimental watersheds have some distinct advantages not shared by other types of investigations. They are big—not big enough to suit many of us—but bigger than the competition. They are mini-ecosystems that permit the physical and biological interactions to be studied in a controlled environment. As a consequence, scientists conducting watershed experiments have a better chance of correctly identifying cause and effect. Another big advantage of watershed experiments is that they take a long time, yielding a video—not a snap shot—of whatever is being studied. Lastly, experimental watersheds, being dedicated to research, provide a secure and supportive environment that attracts other studies not even envisioned when they are established.

In spite of the benefits just enumerated, experimental watershed experiments are still, in essence, anecdotal regardless of the sophistication of their instrumentation or analyses. However, many of the studies are looking at physical processes, and physics does not change that much from place to place and from time to time. For example, consider the fears that logging will increase large floods. From the data in the first experiment in the South Fork of Caspar Creek, Bob Ziemer (1981) concluded that logging about half the timber volume did not have a significant effect on important peak flows. Later, Ken Wright (1985) looked at the South Fork data and seven additional studies that evaluated large winter peak flows from logged watersheds on the Pacific coast. He found that one study showed a decrease, two showed an increase, and five found no change in large peak flows associated with logging. It would appear that Ziemer had it right.

Now

Back in the Dark Ages—in the fall of 1959 when Bob Ziemer and I were students in Paul Zinke’s Forest Influences class at the University of California at Berkeley—I asked Dr. Zinke about the future of watershed management. He replied that it would not amount to anything until people started getting into trouble. I found that very disconcerting. There I was doing watershed management research—and nobody cared!

It turns out that Paul Zinke was, indeed, a prophet. In 1990, less than a year after my retirement, I found myself doing my first analysis for a timber company. Why was that company in trouble? Not because the company was doing a lousy job of logging. Quite the contrary, its practices were exemplary. But, it was operating in a semi-urban area, and the political and regulatory environment had

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changed. The environmental movement of the 1970's had produced a spate of laws and regulations that affected forest operations. I believe that my employment in 1990 was the result of environmentalists having discovered the utility of questioning the analysis of cumulative watershed effects (CWE's) in timber harvest plans. CWE's were a marvelous tool for questioning whether water quality was being protected. First of all, the term was not adequately defined in law or regulation. This left a lot of room for interpretation by the courts. Second, CWE's are hard to evaluate with any great certainty. This means that even well-qualified people can come to contrary views about how aquatic resources will be affected by a proposed action or have been affected by past activities.

Since my 1990 introduction to the watershed consulting business I have been involved in seven more analyses, all of which drew on Caspar Creek results to one degree or another. I have also ended up in court four times. Hopefully, the information coming out of the present study of CWE's in the North Fork of Caspar Creek will provide some definitive information about their nature in this particular environment. It will still be subject to my four "lessons" but it will be the best quality data that I know of on the subject. We will hear more about that as the day progresses. With luck, these North Fork findings will move some of the contention about CWE's from the legal arena to the scientific arena. From the foregoing it must be clear to you that I am sold on the desirability of past and future watershed studies. But, what can they do for you? It was my charge to discuss three arenas: the political, the regulatory, and the environmental.

The Political Arena

Sadly, I do not think that watershed research can help much in affecting the political aspects of forest management disputes. Political differences arise, I think, mainly from demographics. The nation is becoming more and more urbanized. City people miss the trees, streams, and lakes that they assume are part of their birthright. More than 100 years ago, the Adirondack Forest Preserve was established in upstate New York, mainly by the votes of New York City residents. Most of those voters would never visit the Preserve; they just wanted to know it was there. A few years ago I contrasted the forest practice regulations of California, Washington, Oregon, and Alaska (Rice 1992). As expected, the degree of governmental oversight of forest practices followed that order, as did the degree of urbanization of those states.

The results of watershed experiments may narrow the scope of debate, but they will not alter the value systems of the debaters. That reasonable people can have widely different views on what constitutes prudent stewardship of a forest is often overlooked by both sides of the debate. To oversimplify: industry views its land as a tree farm whose management should be as free of infringement on an owner's property rights as a wheat farmer's. Environmentalists—and to a large extent the general public—view the owners of forest land as custodians of natural resources who should be subjected to public oversight. Aggravating the conflict of world views is the reluctance of politicians to avail themselves of the science that there

is to quantify opposing values and strike a balance that is in the public's interest. That is what I call the "how many salmon eggs per board foot" problem.

The Regulatory Arena

The regulatory arena is where experimental watershed findings can have the most impact on forest management. This is especially true for Forest Practice Regulations. They are developed and administered by people familiar with forest industry and who often have scientific training. As a consequence, regulators are more receptive to quantitative data and statistical inferences from such data. Even so, rules and their enforcement are still often compromises between competing value systems. Nonetheless, this is the arena in which hard data have the best opportunity to affect forest management.

The courts are the other element in the regulatory arena. However, their ability to foster good forest management is limited by the extent to which good science has been incorporated into the laws at issue. In my limited experience I have found courts receptive to testimony based on research data. However, a trial is also a contest between lawyers; therefore, the outcome can hinge on the quality of the competing attorneys. The flip side of that is that it is unlikely that an attorney can rescue sloppy testimony or scientifically challengeable data or inferences.

The Environmental Arena

Watershed research plays two valuable roles in the environmental arena. First, by its findings, it can serve to guide forest practices by linking causes to effects. Such information can tell regulators and forest managers what should be changed to accomplish particular goals. Second, by measuring effects, it can put them in perspective (is the sky falling?). When studies measure the effect of different practices having similar objectives it is possible to weigh opposing practices quantitatively. We will see an example of this today as the results of the North Fork study are contrasted with those measured in the South Fork study more than 20 years ago.

Regrettably, much of what goes on in the environmental arena will remain a combat between the two value systems. Even here, both sides can benefit from findings from experimental watershed research. It does not help an environmentalist's case much to have his comfortable flood peak theory skewered by Ken Wright's review of the relevant data. And the forest industry's credibility is not improved by asserting that there is no erosion or sediment risk associated with logging. By availing themselves of the available scientific information, both sides can make their cases more persuasive to the courts, to the regulators, and *perhaps* to the public. To the extent that this occurs, the environment is improved because actions will be based more on reality and less on rhetoric. That is the importance of the Caspar Creek Experimental Watershed. It is needed to help ensure that forest management and environmental protection have the benefit of the best science available.

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