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Newsletter

"Advancing the Art and Science of Watershed Management"

Watershed Analysis... Whatever That Is

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"Cumulative watershed effects," (derisively) "...whatever that is." "Ecosystem management, ...whatever that is." "Watershed analysis, ...whatever that is." "Democracy, ...whatever that is."

Each of these terms is a coded label given to a very simple idea. Democracy we know the best: "government of the people, by the people, and for the people." Note that the concept carries no information about how this is actually to be carried out, and that there are roughly 300 million differing prescriptions for how to do it in the United States alone. The idea is simple and revolutionary, but the doing is complicated.

The same is true with cumulative watershed effects, ecosystem management, and watershed analysis. They are all exquisitely simple and profoundly revolutionary ideas, but the doing is hard. The confusion about the terms arises when people don't believe that the ideas are as simple as they seem and try to make them complicated enough to live up to their confusion. In the case of cumulative watershed effects, this took the form of trying to restrict the definition to particular types of combined effects, thereby avoiding the simple concept that if something is impacted, an impact has occurred.

Restricting the definition is like insisting that if a government isn't made up of Democrats and Republicans, it's not a democracy—the concept is lost in a quibble over details.

In the case of ecosystem management, confusion has taken the form of trying to insist that the idea doesn't exist unless there's a method attached to it. Democracy was a good idea, and we've been stumbling toward it ever since the Greeks invented the word. Just because we haven't quite gotten there yet doesn't mean that the concept is bankrupt or that it just stands for business as usual. What does ecosystem management mean? Simply that because the whole sustains the parts, we'll take the

Introduction To Watershed Analysis: a Retrospective

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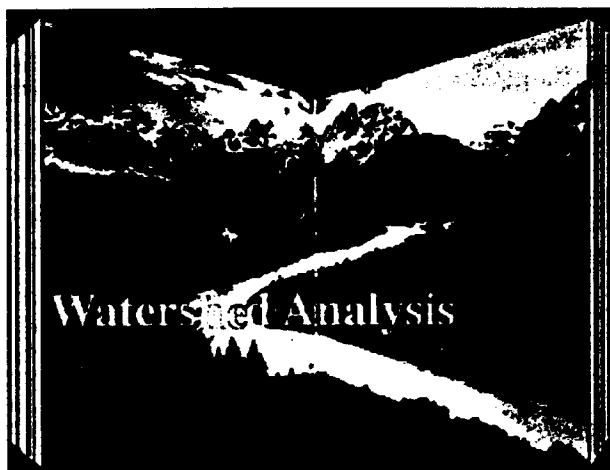
To begin, watershed analysis is not an original idea. The notion that we ought to know something about landscapes before we start changing them reaches back at least as far as the ancient Chinese art of geomancy — siting buildings so that the gods smile propitiously on them and they don't fall down.

More recently, the roots of watershed analysis can be found in the writings of certain conservationists — John Powell, Clarence King, Gifford Pinchot — who expressed the notion that the landscape is to be understood and human actions should be designed with that understanding in mind.

From these writings grew the concept that a watershed represents a reasonable and relevant demarcation on the landscape for land-use planning. The Tennessee Valley Authority and other early river basin planning strategies provide experience as important as more recent examples. If we look at the TVA, we see an

important idea opposed by those who viewed it as unwarranted government interventionism in private affairs. We need to consider that experience when we consider the brave new world of watershed planning and management in which we are now engaged.

The concept of watershed analysis is closely related to the issue of cumulative effects. For several decades, we have grappled with how land use activities on federal, state, and private lands interact to affect hydrologic and ecologic processes. Many of our current problems — endangered species, declining salmon populations, forest fragmentation



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whole picture into consideration before making management decisions. How to do ecosystem management? The details will probably be perfected about the same time that the perfect democracy is designed.

The confusion over watershed analysis comes about for the same reasons. Again, the concept is simple: you cannot understand a problem without looking at its context. Again, we've been deflected by details: "Watersheds aren't appropriate for understanding birds", "Watershed' implies that the geo-hydro analysis is the most important", "FACA keeps us from talking to people", "We don't know enough yet about the riparian fungi", "It has to be done exactly the same everywhere." All of these are red herrings that trick us into ignoring the basic truth: we simply must understand how the parts of an ecoscape interact before we can sensibly manage that ecoscape. Or as a worst case, we must identify the things we'll need to understand before we make irreversible decisions.


Most problems in watershed analysis can be solved simply by referring to the underlying concept. Watersheds aren't appropriate for birds? Of course not, and they're not ideal for anything else, either. But each discipline can take what they know and apply it to any arbitrary area. Watersheds are useful because they don't change, you can see their boundaries in the field, and they would have to be considered anyway to understand aquatic, riparian, and terrestrial ecosystems along rivers. So the trick is to take the information available about wildlife, vegetation, socio-economic history, hydrology or whatever in the area and to see how that might affect the bird community there. The appropriate scale for evaluating a problem depends on the nature of the problem. Once the issue is identified and the interactions evaluated, then results can be "cookie-cut" to apply to the watershed in question.

'Watershed' implies that the geo-hydro analysis is most important? No way. A watershed is a patch of land, not a prescription. Besides, an understanding of the geomorphology and hydrology of an area can come about only by understanding the ecosystems and socio-economic processes. For that matter, an understanding of the ecosystems and socio-economic processes can only come about by understanding the geomorphology and hydrology—each component is so thoroughly entangled with the rest that none can be understood in isolation. It may be best to think of watershed analysis as "ecosystem analysis at a watershed scale".

FACA [the Federal Advisory Committee Act] prevents us from talking with people? Not for the type of work that is needed for interagency watershed analysis. The interagency version of a watershed analysis is not a decision document, but is a purely objective report of conditions and process interactions in an area. Interviewing individuals to obtain information about an area does not violate FACA. FACA has not been an issue for the Washington State approach to watershed analysis because that is not a federal effort.

There isn't enough known yet about riparian fungi? Of course not. There isn't enough known yet about anything. The analysis is intended to 1) figure out what is known, 2) use what is known to identify potential interactions with other components of the environment, 3) use this information to figure out what else needs to be known.

It has to be done the same everywhere? Only one thing is certain: if analysis is done the same everywhere, it is wrong everywhere. Every watershed has a distinct suite of potential problems, ecoscape characteristics, and process interactions. No one set of methods will be appropriate for every site. Two things tend to happen when an accepted concept is not widely understood. First, people grasp onto cookbooks that allow them to get to the finish line without confronting the concept. Thus it becomes possible to vote a Democratic or Republican slate, or to "evaluate" cumulative watershed effects by "doing" Equivalent Roaded Area calculations. The cookbook makes that uncomfortable step called "thinking" unnecessary. Second, the goals themselves become displaced. Elected officials drop the objective of doing democracy for that of getting reelected, and watershed analysts are judged by acres analyzed and adherence to deadlines. Acres are countable, understanding is not.

So you want a cookbook for watershed analysis? A uniform protocol that will allow you to turn out top-flight analyses? Sure, no problem, it already exists: think. 

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— are evidence of our inability to deal effectively with cumulative effects. In a sense, watershed analysis has evolved as a kind of pro-active analysis of cumulative effects, conducted prior to developing management plans rather than in response to predetermined action.

Historians talk about ideas emerging simultaneously in different places. A document of our current phase of history would note that the idea to use watersheds as units of planning and analysis has evolved in many government and private agencies seemingly independently. The process may not have been truly independent, but rather, in a Biblical paraphrasing, a story of begats: first there was PACFISH; PACFISH begat SAT; SAT begat FEMAT; FEMAT begat WA (or at least prescribed it).

Ideas have evolved through the process. However, the basic concept remains that watershed analysis is a mechanism to address inconsistencies between the current scales of planning and the direction to implement ecosystem management. These inconsistencies arise on Forest Service lands, for example, as Congress sets both the commodity output levels, through specified timber targets, and environmental direction, through legislation such as NEPA and NFMA. Forest Plans attempt to implement these targets and direction. As we know, the courts have found that the commodity outputs and environmental direction are fundamentally incompatible, and Forest Plans have been challenged as inadequate.

Attempts at regional scale conservation of owls, salmon, old-growth and various species, required that landscape planning and management be more spatially explicit at scales such as physiographic provinces, river basins, and watersheds. Regional scale conservation strategies, such as PACFISH or FEMAT, called for landscape or watershed analysis as a way of focusing conservation strategies to specific landscapes.

So watershed analysis presents a very simple idea, that a comprehensive and systematic analysis of a landscape can

and should inform landscape management. Originally conceived as a method to tailor riparian management, WA has quickly broadened (theoretically, at least) to address a full range of terrestrial and social objectives as well. The current expectation for watershed analysis is that it will do more than develop effective riparian reserves; it will provide the analytical framework to accomplish landscape design.

As many of you who participated in FEMAT and some of the other regional conservation strategies know, the integration of terrestrial and riparian issues, as well as social expectations, has proven difficult. In addition to its technical application, WA is expected to be an interagency process and forum. It is expected to involve the public in some way not yet fully understood. Management activities will be placed in the context of variability of historical disturbance regimes. And there is a great deal of uncertainty as to how planning is going to proceed in the face of what looks like a reconstituted planning universe.

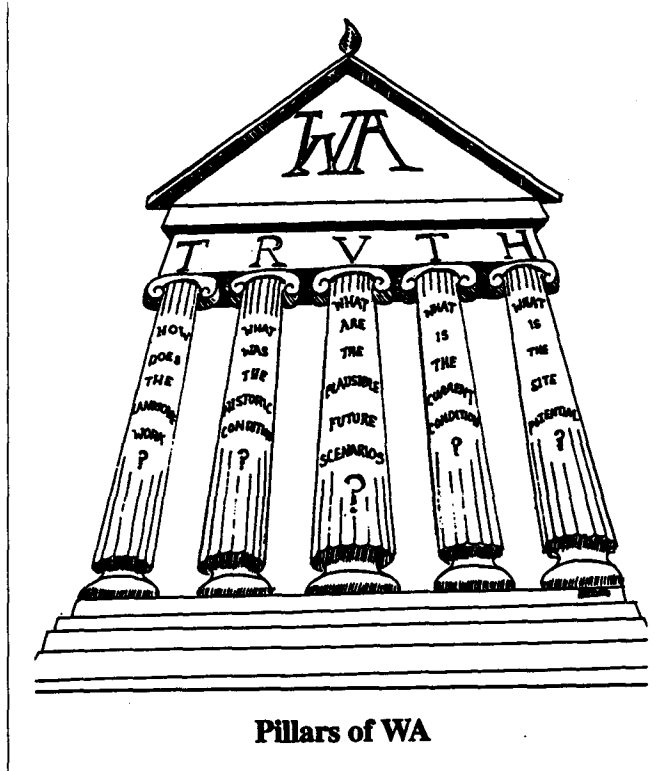
Beyond all these expectations for WA is the big question: how do we use the information from watershed analysis to make better land—use decisions? WA was developed to meet a specific set of objectives that reflects many of the dominant issues that we face in the months and years ahead. The political context in which watershed analysis has emerged establishes new benchmarks against which watershed analysis will be judged, rightly or wrongly. There is not only the legal mandate to analyze cumulative effects, an issue that watershed analysis intrinsically addresses, there are also legal requirements imposed by the Endangered Species Act and other legislation to design protection schemes for riparian and other organisms. Unless we can reach agreement about how we, as a community of scientists, managers, and the larger public, use WA to design effective environmental protection, then WA will never achieve its potential.

Some of the most challenging objectives of WA are also the most exciting. Watershed analysis could provide a common framework for evaluating, planning, and managing watersheds. It could carry us beyond defining protection schemes to designing landscapes to meet varying objectives. Perhaps the most ambitious goal of WA is to serve as a basis for interagency and multi—user interactions and agreements regarding land—use decisions.

How do we do watershed analysis? What is the technical framework, sequence of tasks, relationship with planning? The examples presented at the workshop represent a number of different approaches emphasizing different objectives driving land—use/landscape planning. Most stratify the landscape into analysis units, and then examine how watershed and ecosystem processes are distributed through these units. Most of the examples follow the analysis with a synthesis of individual components that connects the landscape units into a blueprint to guide management activities.

How will we evaluate these examples? One reference point may be to ask how well each addressed a set of key questions — the pillars of WA (above, right). A fundamental product of WA is an analysis of landscape process, condition, structure, and change that allows us to determine what human activities are fundamentally incompatible with the landscape.

In conclusion, we see there are some salient historical issues that brought us to this juncture. These case studies represent different fledgling approaches to a complex problem. They come from different landscapes with



different objectives, they had different players involved, they were funded to different degrees, they have different institutional investments behind them, and they have different outcomes and products attached to them. It will be interesting to see how well we can compare, contrast, and glean useful information from them. Along the way, we may learn something equally important: how to learn from each other.

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Sound of Mountain Water

I gave my heart to the mountains the minute I stood beside this river with its spray in my face and watched it thunder into foam, smooth to green glass over sunken rocks, shatter to foam again...

It was rare and comforting to waken late and hear the undiminished shouting of the water in the night. And at sunup it was still there, powerful and incessant, with the slant sun tangled in its rainbow spray, the grass blue with wetness, and the air heady as ether and scented with campfire smoke.

By such a river it is impossible to believe that one will ever be tired or old. Every sense applauds it. Taste it, feel its chill on the teeth: it is purity absolute. Watch its racing current, its steady renewal of force: it is transient and eternal. And listen again to its sounds: get far enough away so that the noise of falling tons of water does not stun the ears, and hear how much is going on underneath — a whole symphony of smaller sounds, hiss and splash and gurgle, the small talk of side channels, the whisper of blown and scattered spray gathering itself and beginning to flow again, secret and irresistible, among the wet rocks.

-Wallace Stegner