Environmental Data Essential for Natural Resource Operations (Newsletter)*

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Environmental data are the foundation for all natural resource operations. They are the scientific basis for environmental impact analyses by public lands management agencies. Mining, energy generation and transmission, and livestock grazing all depend on the environmental impact assessment being based on appropriately collected, analyzed, and interpreted data. Point source water discharges require permits: a National Pollution Discharge Elimination System (NPDES) permit for discharge directly to any surface water or a Water Pollution Control Facility (WPCF) permit for discharge to the ground and not directly to surface or ground waters. Any operation with a water discharge permit must monitor their discharges and report results to the regulator.

Every business from the largest mine to the smallest dairy farm has environmental data monitoring requirements and most do only the minimum required by their permit. This works well unless the operation is challenged by a regulator, resource agency, or environmental group for adversely impacting water quality, fish, or wildlife.

Every environmental regulatory concern and lawsuit is based on data. A common complaint by natural resource operators is that they lack sufficient information and knowledge to address charges of adverse impacts or to effectively speaking with policy makers and regulators. Operators, trade associations, and attorneys also need to understand which environmental changes are due to natural variability and which changes are caused by their operations. This knowledge is crucial to better manage their operations and defending allegations of adversely impacting water quality, fish, and wildlife.

Obtaining environmental data usually does not require a research program as abundant data are available from federal and state agency web sites. These provide for robust large scale analyses but are rarely sufficient for individual operations. A proactive, appropriate monitoring program including physical, chemical, and biological data produces a high return on investment (ROI) for natural resource operations.

Environmental data have characteristics different from business or financial data. Chemical concentrations cannot have values less than zero, have a

limit on the lowest measurable values, and frequently have a few very high values that skew the distribution to the right. Biological data consist of counts, proportions, or presence/absence rather than continuous data such as water temperatures. All environmental data vary spatially and temporally and are collected less frequently than they change, often at unequal intervals. Toxic chemicals might not be biologically available because they are tightly bound to a substrate or the animals move from undesired areas and are not exposed. Analytical methods used for business or financial data will produce wrong information about environmental data.

One of the more important reasons to collect environmental data beyond what a permit requires is the value of separating natural variability from anthropogenic effects. Documenting how chemical concentrations or fish presence varies seasonally can allow discharges from natural resource operations to be seen in perspective, particularly as these are nonpoint source discharges. Careful design of environmental monitoring programs, data analyses using the appropriate statistical and spatial models, and interpretation using accepted ecological theory can be used to develop and justify environmental statutes and regulations that are technically sound and legally defensible, and address allegations of harm to natural ecosystems.

Environmental data investment has the highest ROI with projects involving pesticides and toxic metals where the potential of CERCLA (Superfund) or expensive fines and remedial actions are possible, and benefits even the smallest family operation.

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