The Source Validity of Statistical Data

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No other agency, public or private in nature, is as dependent upon data from as many diversified sources as is the Corps of Engineers in its consideration of a proposed project in the Coastal Zone.

There was a time when the majority of data utilized on such projects was primarily of an engineering nature. The majority of data which is now reviewed by the public is primarily the environmental considerations of the project. It is the environmental aspects with which the public is most familiar, and appears to be the most concerned.

As a result, the Corps of Engineers has found that the investigations and conclusions relative to total and comprehensive environmental data must be treated with intensive and objective scrutiny. Such considerations must include the environmental effects on the populations involved, and in broad perspective, the effect of the project upon the entire life style of the people even remotely affected by the project.

The U.S. Army Corps of Engineers has made an honest and concerted effort to develop its program of environmental considerations in as total and objective a manner as possible. The results of these efforts are in the thousands of environmental impact statements developed and presented to appropriate authority for consideration. If one considers the detailed subject matter included in one of these statements, the volume of data accumulated from various sources can start to be appreciated. It is from this mass of data that the corps must develop its final environmental conclusions. It is not reasonable for any one agency to assume total staffing responsibility to obtain valid data related to the entire spectrum of interests in only one project. Duplication of large all-inclusive staff organizations is a condition that no one can afford.

The Corps of Engineers, within its various echelons and within its operational organizations, has developed staff resources capable of recognizing the environmental demands for any particular project, and eventually utilize the specific data into the proper environmental structure of a project. Without this in-house knowledge, the presentation of such specialized data could be rather confusing and perhaps even disastrous. Such staff availability is consistent at the district office, they develop the data into an organized statement, the division office which reviews such statements and coordinates the division-wide activities, and at the office of the chief of engineers, which of course has the final authority as to the statements' acceptability as a viable document and in conformity with the policies of the Corps. This in itself constitutes rather a formidable process of in-house review. In addition, the review efforts of the private sector, associated agencies, and various levels of local and state-wide government organizations

make it less likely that invalid data of non-specific information will be presented in the document.

Errors appear in a number of forms. Clerical errors can be anticipated to a degree, and in most cases are of little consequence. Miscalculations often are a result of miscopy of factors by personnel in the process of reproduction. A telephone call or detailed analysis will quickly clear up the problem. These are minor errors and present minor, although sometimes vexing problems. Typical of this was the listing of *Hop Hornbeam* under toads and frogs in the amphibia to be found in a project area by an agency specializing in the wildlife and fisheries resources.

The second problem source is of a more serious nature. This situation occurs when a data source finds itself behind schedule and in desperation resorts to "desk topping" a study. Although the project contract calls for field investigations, the investigator will assume that the conditions, circumstances and situations in one area are similar to those found in an adjacent or similar area, and they are not.

Typical of this situation was a contract to develop field data for five or six small projects in a rather remote area. One of the small harbor projects received detailed consideration of the spartina marsh that was present. Only by accident did this problem description cross the desk of a reviewer who kept his sailboat in that harbor. The reviewer knew for a fact that there was not spartina marsh present. Spartina was found on areas both north and south of this particular area, but not in the study location.

The third situation relative to validity of data acquired during environmental investigations of a project, is not so much invalid material as it is immaterial results. Under certain conditions a project may be contracted to an institution, consultant or agency, and the results as reported will in no way represent the information desired. An example is the report received relative to the effects of offshore borrow areas on in-shore fish populations. With the most generous of attitudes, the only objective that the final report was able to present was the fact that fifteen of its students experienced an excellent orientation course in the use of scuba gear. The entire project had to be repeated, this time at the institution's expense, but this did not compensate for the loss of time involved.

When the situation arises that special material is required relative to a project, the Corps has three routes to follow to obtain the required information: (1) Data already available within an associated State or Federal agency, (2) Data on file within the Corps of Engineers itself, or (3) By appropriate investigations and research.

When an agency or organization has data readily available, and this data lies directly in the field of that organization's sphere of responsibility, there is seldom a question raised about its validity. If, on the other hand, this data pertains to a subject outside that agency's particular field of responsibility the validity thereof is open to question regardless of its content. The justification for such an attitude may or may not be reasonable but this is a fact of life and is a significant factor in data acceptability.

The problem that arises when the subject matter is considered by two separate agencies holding similar responsibilities and these agencies do not agree

in their analysis is one that would take too long to decipher. Needless to say, sometimes two experts disagree on the same subject and under such circumstances the agency requesting such information finds itself in the position of a ping pong ball.

Should data be available within the in-house capacity of the Corps, and yet not be within the area of specific responsibility of the Corps primary-interest, such as problems relative to wildlife management or socio-economic impacts, the Corps will reexamine the information and will in some cases ask for confirmation from specialized agencies or consultants. Only when it is believed this specific data is on a firm foundation will it be accepted as reliable.

The area of data attainment involving most questions and difficulties is that area in which there does not exist data specifically oriented to a project under consideration. This is a round-about way to say the Corps must get the data through original research or investigations.

In many instances, depending upon the subject matter involved, the Corps of Engineers does not have the available manpower nor the equipment to undertake the sophisticated investigations needed to develop the required information. Where the investigations are of national concern, or of a long range and long time duration, the Corps has the ability to undertake such project investigations through its system of laboratories such as the Waterways Experiment Station in Vicksburg, Mississippi, the Cold Region Research and Engineering Laboratory at New Hanover, Vermont, and other such installations. These installations are specifically utilized for investigations of a major national importance and not the project-oriented problems that the field offices must consider on a day to day basis. This circumstance leads the investigation and developing office to enter into the field of contract investigations.

When the contracting of environmental investigations arises, the choice of the investigator is perhaps the single most significant step in the entire program. The Corps of Engineers does not want to find itself in the position of the astronaut whose last thought before blast off was that everything beneath him was obtained from the lowest bidder. The paramount requirement is that the investigator is of such a character that the results will be significant to the project questions, will be done in an objective and scientific manner, and will be able to withstand the critical analysis that they will and should receive by associated individuals, agencies and from within the Corps' own staff of reviewers. Unless results can withstand such critiques, the entire effort will be of little use to anyone.

Naturally the Corps wishes to obtain the results of the investigation in as economical a manner as possible. It must be emphasized, however, that the comparative costs of a project presented by one investigator as opposed to the costs presented by another investigator must be fully subject to, and subordinated to, the reputation for totally valid data that each may present. Unacceptable data, regardless of how cheap it might have been, is the most expensive effort that can be made.

The choice of the investigator for a specific research effort is usually limited to those individuals or organizations with recognized expertise in the particular

field of the investigative effort. This is an age of specialists and it is towards this group the Corps gravitates in consideration of investigating contractors.

Although the organizations specializing in coastal or marine research have multiplied many times within the past fifteen years, the professional roster is still relatively small. Because of this, an individual's reputation for professional integrity is widely distributed among professional associates. So also is his competence. There are certain individuals with whom the Corps of Engineers would have complete faith in their investigative efforts. Unfortunately, there are those individuals who, although they are technically qualified, would not be considered because of their personal reputations as investigators.

There are three sources in the field of consulting investigators: associated agencies, university systems and private consultants. Each of these sources have advantages and disadvantages relative to their effectiveness and the validity of their findings and results.

Associated agencies should have the greatest number of experts in their own particular field of responsibility. In most cases the costs involved are lower than the costs of the university systems or the private consultants. Certainly the validity of their findings is acceptable if one keeps in mind that these agency investigators are not always totally objective in their conclusions. It is only natural that agency investigators will tend to be biased towards the welfare of the particular interests for which they have assigned responsibility. In most cases this is an honest and understandable position, but oftentimes does not result in a totally objective point of view.

The second difficulty with agency contracts is the same problem that prevents in-house investigations: lack of personnel, lack of specific equipment, and lack of time. The expertise is present, but this expertise is not readily available without serious interference with their normal course of duties. Such organizations cannot, or would hesitate, to employ additional personnel for such short term programs.

When one ventures into contracting with educational institutions there are pros and cons wherever you might wish to look. The biggest advantage in such institutions is the multitude of specialists in a menage of disciplines which may be called upon in the course of the investigations. No private consultant, or agency for that matter, could afford to have this plentitude of associated disciplines available within their own staff, and at times this consideration is of great importance.

The one problem that appears to surface with educational institution contracts is the close inspection and supervision required to keep such investigators on the appropriate track of the investigation. The personal nature of the institutional investigator is such that he or she has a tendency to wander afield when some particularly interesting spinoff develops. Uncontrolled intellectual curiosity, a primary requirement for any institutional scientist, can be an expensive characteristic when applied to practical investigations or limited research programs.

The single most advantageous consideration of the institutional contract is the institutional reputation for objective and valid data. Without such a

reputation any institution would soon find itself vainly searching for research grants which are the life blood of its graduate program. They cannot afford to be otherwise.

The one characteristic that all methods have in common, whether it be agency, institutional or consultant contracting, is the natural desire for adequate remuneration for their effort. Secondary to this is the universal conclusion of every final report that the subject should be further studied and usually this recommendation is accompanied by another research proposal. This proposal has become as dependable as the title page of the report and if one or the other were to be omitted, no doubt it would be the title page.

Regardless of the contractual method used, the contracting agency must invest time in supervisory and inspection activities. It may be stated that the possibility of an effective contract is in direct proportion to the time spent by the initiating agency in on-the-job supervision, or if not supervision, at least interested inspection. Such activities can be carried to the extreme, of course, where most of the investigator's time is spent with his sponsoring agency, leaving little time for actual field work. But when considering supervision, most improper supervisory activities are in the form of inadequate supervision, rather than too much supervision. In order that a comprehensive knowledge of the project be attained by the contracting agency, it is mandatory that some time be spent with the contractor during the progress of the project. Without such knowledge, an effective review cannot be given, the validity of the data will always be in doubt, and the defense of the resulting data in face of intensive review will be seriously impaired. At least ten percent of the initiating agency's contract representatives' time must be spent in on-site inspection of the project while it is in operation. This is a cost often overlooked in the estimation of a total project cost.

As with other human endeavor, the effectiveness of a project investigation is essentially based upon the effectiveness and the professional integrity of the principal investigator, whether it be in the form of a compilation of existing data, or the development of such data through the process of field investigations.

Often the conclusions resulting from environmental investigations will be in the form of intangible values. This circumstance has long been one of the difficult problems of environmental appreciation, the "what is the value of a sunset" concept. It is relative to this consideration that the reputation of the institution, agency or consultant is so important. It is inevitable that certain presumptive conclusions will have to be drawn, and the known professional reputation of the individual involved is often the only entity upon which you will be able to base your conclusions.

There are some circumstances of data gathering that will lead the investigators into an absolute void of information. This is especially true in the field of marine resources. Population dynamics, which is now becoming such an important consideration in some fields, is based to a large degree upon catch records and catch analysis, often provided by industry. There are some areas of our coastal waters about which we have no such information, or such information as is available is too sparse to support concrete conclusions. Under such circumstances only the educated guess of the investigator can be used, and as valid data

this can become very difficult to support at times, much less to prove. There have been instances where opinion will differ within the agency responsible for such information. In one such circumstance the Corps of Engineers used an opinion from an agency investigator, only to have his own agency tell us that the data was wrong and the conclusions were incorrect.

In one state the Corps was investigating a request to consider the digging of a long canal that would connect a large bay to a bayou that supported the majority of the oyster processing factories of the area. During the investigation, the Corps went to the processing houses to determine benefits to be gained. Information was obtained from the industry that this canal would save hundreds of ton-miles for the oyster freight boats running loaded from the major reef in the bay to the processing houses. These were apparently valid statements by an industry which should know the circumstances better than anyone else concerned. These statements eventually reached the desk of a reviewer who knew for a fact that the last oyster freight boat used in the area had ceased operations about fifteen years before, and the last commercial oyster removed from that reef had been removed about ten years ago. There were no oyster freight boats, there were no commercial oysters on the reef, and there was about a 99 percent chance that there never would be in the future. So much for the data from an apparently reliable and valid source.

The greatest incentive for accurate and valid information is the concern of public agencies as well as private sectors for the environment and resources of a project area.

Although private interests undertaking such developments have an image to maintain, public agencies can only reflect the desire of the people which is expressed in their concern for reliable and effective environmental consideration. In the process of review of an average environmental statement, there are at least 35 agencies involved, and this does not include the many individuals who have been amateur experts in such fields. It is next to impossible to build a strong environmental statement on the shifting sands of unreliable data. As a result, those organizations and individuals responsible for such data must not have the accusing finger of public opinion pointing in their direction. This public concern has become the best possible insurance for reliable methodology and data that can and will stand an intensive review, and as time passes this system will continue to improve.