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Engineer Institute for
Water Resources

***Developing Permit
Application Data Bases
for the Corps of Engineers
Regulatory Program***

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**DEVELOPING PERMIT APPLICATION
DATA BASES FOR THE CORPS OF ENGINEERS
REGULATORY PROGRAM**

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1. INTRODUCTION

This report contains the results of a study of data base needs for cumulative impact analysis within the U. S. Army Corps of Engineer's Regulatory program. This work was conducted at the San Francisco District (SFD) as part of a broader cumulative impact research program directed by the U. S. Army Corps of Engineers' Institute for Water Resources (IWR). The San Francisco District data base compilation is described in this report and builds on a similar study conducted in the Baltimore District also under the sponsorship of IWR. The intent of this work was, therefore, to broaden the understanding of the diversity of information needs of the regulatory program and to further test the findings of the Baltimore study at a different location.

Hence, this report will first describe the background of this study including a summary of the Baltimore District findings and the rationale for selecting the SF District as another test case. Secondly, the designed capabilities of the data base will be addressed with a full description of the data base system developed for the SF District. In order to assess the utility of the data base system and its contents, a sample of permit applications was placed in the data base. Methods for sampling and encoding these data are detailed in the third section of this report. Fourth, the several major research areas will be proposed and the results of this report which address these research areas will be presented. Finally, conclusions will be drawn on the SF District data base's utility in the regulatory program along with suggestions for future data base work.

2. BACKGROUND

Work performed at the San Francisco District was a direct offshoot of initial efforts at the Baltimore District. A data base was established there to: (1) describe the performance of the regulatory program; (2) provide a series of historical data for use in forecasting "hot spots" of development; and, (3) provide management information for permit monitoring. This data base was developed with data compiled from permit records and set up as a data set for analysis with standard statistical packages.

Some of the significant findings of this study (Dunning, 1982, p. 2) were that the "permit program functions admirably as a vehicle for reaching accommodation between private demands on natural resources and the continued management and protection of the resource." Significant modifications were found between the requested and approved activities in many permit categories, with an overall rate of permit modification of 27.4% (with an additional 4% withdrawn or denied). Additionally, a five-year time series view of some permit activity categories showed not only this modification rate but also a marked decline in the level of demand for many activities for which permits are necessary (dredging, filling, etc.).

Use of the extensive Baltimore data base allowed the forecasting of "leading indicators" of hot spots of permit activity. A number of indicators and methods were suggested for further development. Both the permit modification information described above and this forecasting capability are essential to cumulative impact analysis. A relatively

simple structure of permit information can provide this type of information readily.

Finally, the permit data base can be very useful for the administrative, managerial and monitoring information needs of each District Regulatory Branch. For example, permit applications classified as controversial or non-controversial may be tracked with regard to their processing time, review, impact assessment and other administrative information. With this information on past actions, planning budgets and resources for future years could better anticipate the location, number and cost of the permits processed in the program. In addition, comments received from non-governmental groups during the public interest review process were categorized and described. Dunning contends (1982, p. 7) that the ability to recognize applications which are likely to receive public comment can provide useful information in anticipating the added time and expense for the involvement of supervisory personnel in these permit reviews.

Thus, the data base system developed for the Baltimore District revealed additional combinations of information on performance and management of the permit program. However, the diversity among Corps districts requires that data bases be developed and tailored to meet the specific sets of information and reporting needs of each of those districts. The San Francisco District was found to have many of the same data needs as Baltimore, but with enough of a variation of local conditions, resource problems and reporting needs to warrant a restructured data base. San Francisco District Regulatory Branch personnel cooper-

ated in this study because of the clear advantages offered to the District by a permit data base capable of allowing cumulative impact and administrative analyses.

The data base system was organized and structured in approximately three months of effort. During this time, the existing data base was examined, changes were made to it, permit files were studied and encoded, and analyses performed on the newly obtained data. The examination of existing sources of information at the SF District lead to two direct lines of inquiry: (1) an assessment of the information needs of the District; and, (2) the provision of examples of the type of information which could be obtained from a well-designed data base. Therefore, this study not only complements the findings of the Baltimore study but also incorporates additional recommendations relating to the structure and style of data bases for other districts or for continued use at the SF District.

3. DATA BASE DEVELOPMENT

3.1 DATA BASE INFORMATION NEEDS

To accomplish the first objective of this study, identifying information needs, the activities of various actors (within the SF District Office) involved in the program were monitored to determine the types of data base capabilities that would be of value to them. With this information, the design, contents and use of the data base can be established based on the needs of the participants in the process.

From the initial surveys of the regulatory branch personnel, three general classifications of information needs were identified: performance monitoring, forecasting, and permit management and monitoring. These classifications are, indeed, the same groups found during the Baltimore District study. It was also found that the needs of the processors, supervisors and the branch chief are all somewhat different. For example, to process permits more efficiently and effectively, processors need information primarily in the area of permit management and monitoring. Included in this information is general information on a permit (application number, applicant, etc.) and the dates corresponding to various parts of the process (receipt of application, public notice, comment period end, etc.). Often, this information is needed as the result of outside inquiries on the status of active permit applications in the processing procedures. Permit monitoring in the form of status reports detailing the extent of processing and reasons for delays could save processor effort and allow better response time to requests for

information. In addition, permit processors could use management information for their own workload planning. For example, target dates for public notices, processing time, etc. could be obtained from a data base to remind processors of upcoming requirements and deadlines. Hence, a data base should be designed to provide this useful day-to-day management and monitoring information on permit processing for the processors.

Supervisors in charge of processing sections are also interested in permit management and monitoring information. They, too, need access to status-type information on permit applications to respond to inquiries on applications. This information can be used to allocate processing workload among the various processors and to monitor the performance of those "target" date activities such as public notices, comment period closure, etc. Supervisors need this class of information in a data base, and are also interested in making forecasts on activities occurring in areas within the Districts which are susceptible to cumulative impacts or under extreme developmental pressures. With information on both the extent of permit activities in various areas within the District over a period of time and records of comments received on earlier permits, supervisors can identify problem areas or "hot spots" of development for which additional processing procedures may be required. Finally, supervisors also hope to monitor the performance of the regulatory program with regard to resource and wetland protection. Hence, project scale and location information would be necessary in a data base designed to meet these needs.

Lastly, the branch chief's needs include those of the processors and supervisors and some additional areas of concern. Although not principally involved in the processing of permit applications, regulatory chiefs often become involved in the processing of those applications which are deemed "controversial." Status reports prepared from a data base could allow easy access to processing information for the branch chief on these permit applications. Other permit management information could be contained in a data base to provide the data necessary to produce routine quarterly and annual reports to the Division Office. Forecasting information is also of interest to the chief in that permit applications with cumulative impacts or in "hot spot" areas normally require supervisory time and effort because of their controversial nature. Therefore, this ability to forecast important characteristics about permit applications can help the chief in making better budget and resource projections for the future and allocate workload among his or her staff. Finally for the branch chief, performance monitoring information is constantly needed for responding to division or headquarters requests on the regulatory program. In addition, information contained in a data base can help the chief assess the District's achievement of its own regulatory goals and document the effects of the regulatory process in protecting valuable resources.

To summarize the information needs of the various actors in the regulatory process, Table 3.1 contains a listing of classifications and some of the specific information requirements of a data base designed to meet the needs of its potential users.

TABLE 3.1
INFORMATION NEEDS OF THE REGULATORY ACTORS

<u>ACTOR</u>	<u>CLASSIFICATION OF NEED</u>	<u>INFORMATION REQUIREMENT</u>
Processor	Permit Management and Monitoring	Status Reports Workload Planning
Supervisor	Permit Management and Monitoring	Status Reports Workload Allocation Processing Target Dates
	Forecasting	"Hot Spot" Identification Cumulative Impact Identification
	Performance Monitoring	Monitor Resource Protection
Chief	Permit Management and Monitoring	Quarterly/Annual Reports Workload Management Budgeting Regulatory Goal Achievement (Timing)
	Forecasting	"Hot Spot" Identification Cumulative Impact Identification Budgeting
	Performance Monitoring	Regulatory Goal Achievement (Resource)

Throughout the rest of this section of this report, the specific design of the data base and its contents are addressed in terms of their response to the needs of the regulatory staff.

3. 2. DESIGN OF COMPLETE DATA BASE

Following the results of the information needs assessment, the SF District data base was developed with three capabilities in mind. Information must be stored to provide measures used for performance monitoring, forecasting, and permit management and monitoring. In order to accomplish this objective, five typical types of data were stored:

APPLICATION GENERAL:	name, location, number, authority, category, etc.
IN-HOUSE ROUTING/REPORTING:	processor, environmental assessor, microfilm codes, reviews, etc.
DATES:	received, complete, public notice, comment received, final action, etc.
ACTIVITY:	requested types and amounts, approved types and amounts, modifications, mitigation, etc.
COMMENT CONTENT:	Fish & Wildlife, EPA, special interest groups, public, etc.

These categories correspond directly to the three classifications of information needed by the regulatory program. Table 3.2 indicates the information needs and the corresponding data categories for the SF District.

TABLE 3.2

INFORMATION NEEDS AND DATA REQUIREMENTS

<u>Classification</u>	<u>Data Category</u>
Permit Management and Monitoring	Application General In-House Routing/Reporting Dates
Forecasting	Application General Dates Activity Comment Contents
Performance Monitoring	Application General Activity

Existing data for permits in the SF District are stored on the FOCUS data base system through TYMSHARE, Inc. FOCUS contains primarily information concerning dates of the various benchmarks throughout the permit process. It, however, contains space for a great deal of other information that is not pertinent or impossible to collect at the SF District. For the purposes of this study, the FOCUS system was analyzed to determine its existing capabilities and its weaknesses.

As a result, new fields were established for FOCUS which would reflect the additional information necessary to respond to the needs of the regulatory program. Table 3.3 provides a general description of the newly redesigned data base and whether the information was already present or was added to the FOCUS data base. A detailed description of the new data base with old and newly-added fields is contained in Appendix 1. It should be noted that although this data base was designed with the FOCUS system in mind, the structure of the data base and the contents are highly transferrable and could be used on almost any data management system or analysis subroutine and any one of numerous small "personal computers."

With the new data base, it is possible to store all the information necessary to perform the types of analyses seen as essential to the Regulatory Branch's needs.

TABLE 3.3
GENERAL DESCRIPTION OF COMPLETE DATA BASE

<u>Component</u>	<u>Existing</u>	<u>Additional</u>
Application General		
- Name, Location, etc.	X	
- Ownership, Industrial Categories		X
In-House Routing/Reporting	X	
Dates	X	
Activity		X
Comment Content		X

3.3 DATA BASE USED IN THIS STUDY

Data collected as part of this study to provide examples of the usefulness of the data base system were taken directly from the permit files for the years 1973 to 1980. Additionally, it was decided, during the time of the study, that the necessity of having only a sample of past permit data complete did not warrant the added expense and coordination of additions to the FOCUS system. Hence, a smaller version of the data base described above would be sufficient to provide adequate illustrations of the use of the system under the constraints of this study.

This new data set (of approximately 20% of total permit files from 1973 to 1980) was established on a DEC-2060 system to be used in conjunction with a standard statistical package (SPSS) for analysis. A detailed description of the structure of this data base is shown in Appendix 2. The information contained in this data set is a subset of the information described in Appendix 1. Its contents are patterned after those of the Baltimore District and therefore are limited in nature. If complete, however, the data base would contain even more information useful for permit management and monitoring.

3.4 UPDATING THE DATA BASE

An additional issue that was addressed in this study concerned the method of data input and updating used in the computerized data base. Hence, a final task in the development of the data base for this study was to design an "update sheet" for use by the SF District personnel to add new applications to the existing (FOCUS) data base; include the additional information recommended in this study; and incorporate information gained during permit processing.

To accomplish this task, an update sheet (see Appendix 3) is filled out monthly by the permit processor. Initially, an assigned application number, application type and other general information is recorded in the data base, but as more activity occurs on a permit application, more information is recorded and added to the data base. If incorrect or inaccurate information is currently stored in the system, changes are noted on the update sheet and indicated with an asterisk.

The recommended procedure for updating is that a blank update sheet be included in the permit application file when it arrives in the office. Initial information is indicated on that form and a copy is made. The copy is kept by the processor and the original goes to the data base operator. Monthly additions are made to the update sheet (in a pen color other than black so that new information is readily seen) in the same manner (new copies kept by processors; "originals" sent to the data base operator) for input into the system.

As a result of the data base development efforts described in this report: (1) additions were made to the FOCUS system such that all the requisite data for analyses on future permits could be stored; (2) a separate data structure, similar to that of Baltimore was established for the analysis purposes of this study; and, (3) updating procedures and forms were developed to keep the system current. The data used to perform these analyses will be described next.

4. DATA FOR STUDY

The San Francisco District encompasses the northern and central California coast and the tributaries feeding into this part of the coastline. Included in this area is Humboldt Bay, San Francisco Bay, and Monterey Bay. Approximately 300 permit applications are received per year for activities in these areas. The District's jurisdiction has been further divided geographically into sub-areas called waterways. With the appropriate waterway designation, the approximate location of the permit application can be found.

For this study, approximately 450 to 500 permit application files from the years 1973 to 1980, inclusive, were investigated and included in the new prototype data base system. All types of permits were included in the total population from which a sample was drawn. For sampling, no differentiation was made between government, business, individual or community applications. Enforcement actions were not included in this population of permit applications even though they are now presently in the existing FOCUS data base.

Sampling for the new data set was done systematically. Every fourth application number (excluding enforcement actions) was recorded. This method of sampling, although systematic, should produce a random sample of permit applications since the applications were assumed to arrive in a random manner and are then assigned numbers in their order of arrival.

Sampling produced the numbers of approximately 550 permit application files. About ten percent of these applications were not located in the

files or on microfilm and were presumed "lost" for the purposes of this study. As a result, the sample of files investigated was reduced to 492. Of these permits, 23 were found to not require a permit of any action by the Corps. Hence, the final sample size was 469.

Information from these files was transferred onto a data sheet (see Appendix 4) which was later used as input to the computer for the data set. Appendix 5 contains copies of the computer input lines for three cases in the data file as examples of the physical appearance of the data set.

During the final investigation stage of this study, some problems with the structure of the new data base and with the data itself were found. Among these were the fact that in many comments, multiple issues were addressed. The newly designed data base allowed for the inclusion of only one issue. An additional problem was that not all information necessary for the new data base was available from all permit files. Hence, this missing information was not available for analysis on all cases. A final major problem that was encountered during this stage of the study was the tradeoff between completeness of the data base and cost of storage. This is not an uncommon nor unusual finding in data base development. In order to provide exhaustive categories of response for all variables included in the data base or possible combinations of events, a much larger data base would be necessary. However, the occurrence of these unique cases requiring a much larger data base is rare so that the added information gained by the complete data base is far out-weighted by the cost of computer storage for typically empty data cells.

5. RESULTS OF DATA BASE INVESTIGATIONS

With the previous description of the data base structure and the data itself, results of the analyses performed during this study can be discussed. These results are presented primarily as examples of the utility of the data base structure and are not intended to be exhaustive in the sense of analyzing the effectiveness of the Regulatory Process. It is for this reason, too, that not all of the resultant tables of analyses have been presented. The resultant numbers are SF District specific and do not contribute to the argument for the general utility of a data base system for the Regulatory Program. However, in a secondary sense, the numbers and statistics presented in this section do provide some interesting material for discussion about the Regulatory Program in the Corps. It should be remembered, also, that these results are for a sample of permit applications during 1973 to 1980 and are therefore not complete in their scope.

Study results will be presented in this section in the following order: (1) a general description of the data; (2) performance monitoring measures; (3) forecasting and "hot spot" indicators; and, (4) permit management and monitoring information.

5.1 GENERAL DATA DESCRIPTION

In order to provide a context to discuss the SF data base results, some general characteristics of the sample population are presented. Of the 469 permit files included in the data set, 51% are for Section 10

and/or 404 permits. An additional 35% of the sample are requests for letters of permission (LOP's) with the remainder of the sample composed of after-the-fact permit applications (6%), nationwide permits (5%), after-the-fact LOP's (2%), and general permits (1%). Of all these applications, 87% were issued, 13% withdrawn and less than one percent denied. These numbers and percentages are shown more completely in Table 5.1.

TABLE 5.1
SUMMARY OF AUTHORIZATION TYPES AND FINAL DISPOSITIONS, 1973-1980

<u>Authorization Type</u>	<u>Issued</u>	<u>Disposition Denied</u>	<u>Withdrawn</u>
Section 10 & 404 Permits	196 (41.8%)	1 (0.2%)	44 (9.4%)
LOP	155 (33.0%)	0	7 (1.5%)
After-the-Fact Permit	20 (4.3%)	0	10 (2.1%)
Nationwide	24 (5.1%)	0	0
After-the-Fact LOP	7 (1.5%)	0	0
General Permit	5 (1.1%)	0	0
TOTAL	407 (86.8%)	1 (0.2%)	61 (13.0%)

Of these applications, 71% were given an environmental assessment of "minor" while 17% received a "not minor" determination. Only three percent of the permit applications in the sample were assessed as having "major" environmental effects.

For each of the permit files investigated, ownership category and type of proposed development was encoded in the data base. These results are indicated in Tables 5.2 and 5.3, respectively.

TABLE 5.2

OWNERSHIP CATEGORIES OF PERMIT APPLICATIONS

Category	N	%
Government	212	45.2
Business	180	38.4
Individual	68	14.5
Community Assoc- iation/Unknown	9	1.9
Total	469	100.0

TABLE 5.3

TYPE OF PROPOSED DEVELOPMENT OF PERMIT APPLICATIONS

<u>Development Type</u>	<u>N</u>	<u>%</u>
Public Facilities	102	21.7
Utility Structures	76	16.7
Real Estate	22	4.7
Manufacturing	19	4.1
Private Development	63	13.4
Port Development	62	13.2
Marina	47	10.0
Other Commerical Development	76	16.2
Unknown	2	0.4
Total	469	100.0

Finally, to give an idea of the frequency, amount and scale of the various activities undertaken in the SF District, Table 5.4 contains a listing of the major alterations requiring permits in the District's jurisdiction. Two comments are made here as explanatory notes. First, the total number of applications for all activities exceeds 469 since one application could contain numerous activities. These multiple activities are all included in the data base. Secondly, although the average amount requested is reported in the table, it may be misleading since one or two very large projects can significantly change an activity's average and overstate the true characteristics of that activity. As a result, medians for project activity amounts are reported also.

TABLE 5.4

MAJOR REQUESTED ALTERATIONS TO SF DISTRICT WATERS

Activity	N	Percent of Permit Applications for Activity*	Average Amount Requested	Median Amount Requested
Fill:				
Volume (yd3)	75	16	90,600	4,000
Area (acres)	71	15	7.6	0.4
Dredging:				
Land Disp. (yd3)	97	21	54,200	6,500
Water Disp. (yd3)	36	8	163,600	27,000
Outfall (#)	18	4	2	1
Pipe (ft)	41	9	1,900	400
Cable (ft)	18	4	550	250
Dam (yd3)	4	1	191,000	2,300
Riprap, Bulkhead (ft)	66	14	730	340
Pier (ft2)	61	13	14,400	875
Dock (ft2)	80	17	22,000	360
Pilings (#)	87	19	120	12
Buoys (#)	21	4	7	2
Breakwater (ft)	8	2	320	105
Catwalks (ft)	51	11	36	24

* Computed with a base of 469, the total number of permit applications in the sample.

5.2 PERFORMANCE MONITORING

Two key indicators borrowed from the Baltimore District study were used to assess the performance of the regulatory program in protecting/managing the resource base. A third indicator was developed specifically at the SF District and will also be described.

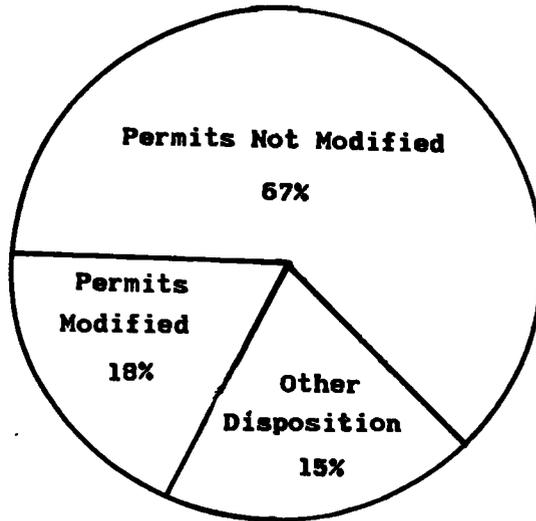
5.2.1 Overall Modification Rate

During permit processing, conflicting demands on the resource base may be expressed by the developer, on the one hand, and an agency or private individual, on the other. Accommodating these conflicting demands has become a major part of some permit reviews. One mechanism for this accommodation is through the deletion or modification of environmentally objectionable, harmful, or unnecessary parts of the requested activity. Sometimes, alternative construction practices are recommended which alleviate this problem. It is this modification rate or change in scale, location, or construction practices that can often lead to the satisfaction of the demands of both the developer and the objecting party. Table 5.5 illustrates this modification rate in numbers while Figure 5.1 shows the results pictorially.

TABLE 5.5

RATE OF MODIFICATION TO PERMIT APPLICATIONS

<u>Permit Change</u>	<u>N</u>	<u>%</u>
Permit Not Modified	313	66.7
Permit Modified	83	17.7
Other Disposition (Withdrawn/Denied)	73	15.6
Total	469	100.0



MODIFICATION RATES TO PERMIT APPLICATIONS

FIGURE 5.1

When one combines the "permits modified" with "other dispositions" which includes those activities which were requested but never approved, almost 33% of the permit activities requested at the SF District were changed from their original requests.

5.2.2. Extent of Modification

By comparing what was requested to what was eventually approved through the permit process, a measure of the extent of modification can be obtained. This measure directly assesses the amount of a resource that was not used but was originally requested for use. For example, Table 5.6 compares the requested and approved amounts and percentage differences for various project types. Again, a cautionary note is appropriate here. Not all of the credit for protection of a resource can be assigned directly to the Corps. Changes (beyond the Corps' control) in economic conditions, for example, can force an applicant to reduce the scale of a project or withdraw it completely. Many permit conditions are prescribed by state, local, and other federal public interest review agencies. Whatever the cause of modification, the Corps has the ultimate responsibility for approving activities and that much of the resource mitigation (prevention, avoidance, minimization) is effectively accomplished through permit conditioning.

Table 5.6 shows that the quantity and percentage of fill volume eliminated, and areas preserved is quite large. Protection of wetlands in the Bay Area is a primary objective of many agencies and private groups and their efforts seem productive. Secondly, other categories are not as significant as fill but do indicate in some cases, a modest effort at protecting some resources. For example, buoys and piers both showed substantial decreases. Other increases in granted amounts from requested amounts could be the result of changing construction practices to provide better shoreline protection (riprap) or switches from one type of project to another (dredging).

TABLE 5.6

**EXTENT OF MODIFICATION FOR SELECTED
PERMIT ACTIVITIES, 1973-1980**

Activity	Requested Amount	Approved Amount	Percent of Applied Eliminated
Fill:			
Volume (yd3)	6,794,000	1,880,000	72.3
Area (acres)	540.2	262.9	51.3
Dredging:			
Land disp. (yd3)	5,254,000	4,985,000	5.1
Water disp. (yd3)	5,889,000	6,048,000	- 2.7
Outfalls (#)	30	29	3.3
Pipe (ft)	78,210	75,780	3.1
Cable (ft)	9,850	9,380	4.8
Riprap, bulk- head (ft)	48,300	53,000	- 9.7
Pier (ft2)	877,600	810,400	7.7
Dock (ft2)	1,765,400	1,761,600	0.2
Pilings (#)	10,340	10,170	1.6
Buoys (#)	140	117	16.4

Specifically, in the case of water disposal of dredge materials, this increase is primarily due to switching projects from land disposal to water disposal at dedicated disposal sites. For some activities involving increases, it is possible that the applicants are able to take advantage of the free expertise of the Corps staff in order to construct facilities which are designed more appropriately for the local conditions.

From a somewhat different perspective, Figures 6A.1 through 6A.9 in Appendix 6 show time series views of the changes that have taken place during the permit review process. Unlike the Baltimore District results, there does not seem to be a steady decline in the amount of

activity requested in the SF District over this time period. Requested activity amounts appear to be quite random. Also indicated in the figures in Appendix 6 are the number of applications associated with the activity types.

5. 2. 3. Extent of Mitigation

A third measure of performance, developed at SF District, is the extent of mitigation. This measure addresses the trade of land/wetland at the project site for other land (onsite or offsite) to be restored to comparable value. Although mitigation has occurred in only three percent of the permits; sampled, it has resulted in the net protection of 189.29 acres of wetland. Table 5.7 indicates the frequency and amounts of various policies of mitigation.

TABLE 5.7

MITIGATION TYPES AND AMOUNTS

<u>Mitigation Type</u>	<u>N</u>	<u>Amount Mitigated</u>
"Restore" onsite land	9	48.89 acres
"Restore" offsite land	5	140.40 acres
Provide cash for fund	1	unknown

The above statistics have illustrated, in a quantitative fashion, that there have been significant impacts of the Corps regulatory program in protecting against potentially adverse environmental impacts. The ability of the SF District data base to display these example results indicates its potential value in monitoring the performance of the regulatory process in conserving resources.

5.3 FORECASTING CAPABILITIES

An additional area of concern in the regulatory process is the problem of identifying cumulative impacts of permitting actions. Although one permitted action may have little environmental or socioeconomic effect in an area, numerous such permits in the same area may have major effects. These "cumulative effects" have been recognized by many state, local and federal agencies. As a result, the Corps' regulations require the assessment of the cumulative impacts of a permitting action. However, little guidance is available on the method for this assessment.

Hence, a useful contribution of the data base would be to provide information pertaining to the cumulative effects of permitting actions.

One ability of the data base in dealing with cumulative impacts is to provide forecasts of "hot spot" areas where either a great deal of development is or has been taking place or areas which are especially sensitive, environmentally or socioeconomically. To do this, a series of "leading indicators" can be created which enable the District to identify potential hot spots of permit activity in advance. Two such indicators were created for this data base. Both will be described and the results of one will be presented, for illustrative purposes.

5. 3. 1. Quantity of Applications by Waterway

The first such indicator is the number of permit applications by year in each waterway. Studying the results from this analysis, the Corps can identify which waterways are undergoing for development and which waterways are exhibiting an increasing rate of permit applications. It is in these waterways (which are active or becoming increasingly more active) where cumulative impacts are most likely to be a significant factor in the public interest review.

5. 3. 2. Significant Comments by Waterway

A second indicator of hot spot areas is dependent on the comments received in past permitting activities. If an agency or public group responds to the public notice with a comment of substantive nature (i.e. other than no objective/no comment), that permit application can be classified as having a significant comment. When permit applications

with significant comments account for greater than a specified percentage of the comments in that waterway, it is evident that there may be something environmentally sensitive or socioeconomic costly in that region. To further study this "significant" waterway, the content of the comments can be retrieved from the data base to indicate what specific factors are critical. To illustrate this process, a list of waterways with greater than 25% significant agency and public comments was generated from the data base. From this list, one waterway was selected and comments were tabulated for the permits in that waterway. Table 5.8 shows the comments received from public agencies; private interest groups or the general public in this waterway.

TABLE 5.8

COMMENT CONTENTS IN "SIGNIFICANT" WATERWAY
(North San Francisco Bay, WW = 47)

Comment	N	% (1)
Wildlife Habitat	4	29
Navigation Hazards	2	14
Wetland Protection	2	14
Additional Permits Necessary	2	14
Water Quality	1	7
Filling of Water Area	1	7
Aesthetics/View	1	7
Cumulative Effects	1	7

(1) Computed with base = 14

From this analysis, it is evident that, to many commenting agencies, wildlife habitat and wetland protection are significant problems in this specific waterway along with navigational hazards. In addition, numerous other indicators can be established to monitor hot spots of development. These measures include modification, mitigation, and project amounts in various waterways. These can indicate which waterways are already under pressure for project changes. With the information from these analyses, further detailed studies can be made to anticipate the extent of cumulative impacts in various areas of the District.

5.4 PERMIT MANAGEMENT AND MONITORING

Not only can a data base provide useful information on resource management, but also for program management. Data base information can be accessed regularly for status reports on permit applications by the processors and supervisors, or can be viewed over time by management for long-term planning and budgeting. Status reports were not designed for this study due to the limited nature of the data base described earlier. However, information on the time of processing and the character of permit applications received was available and can aid in planning and scheduling budgets and staff resources. To provide examples of this long-term capability of the data base in SF, three indicators for permit management were developed. Each will be described and selected analyses are included.

5.4.1. Time of Processing

With the present data base, it is possible to determine the mean processing time for the various application types and environmental determinations. By knowing the frequency of application types and severity of environmental impacts, processing time estimates can be made for incoming permit applications. This information can lead to better workload distribution and budgeting processes.

5.4.2. Controversial Cases

Another use of the data base for permit management and monitoring can be to provide information for anticipating "controversial" cases. These applications tend to require longer processing times which include greater staff and resource commitments. It is clear that the data base, itself, cannot eliminate controversial permits but the ability to characterize the frequency and types of activities involved in these controversial cases, can lead to more informed planning and budgeting.

For the purposes of this study, "controversial" cases were defined as those permits which: (1) require longer than 365 calendar days for processing; or, (2) receive significant comments from the US Fish and Wildlife Service. Table 5.9 details the frequency by year of controversial permit applications in the SF District.

TABLE 5. 9
CONTROVERSIAL CASES
1973 - 1980

Year	Controversial Cases In Sample		Total Cases in Sample
	N	%	
1973	24	53.3	45
1974	20	44.4	45
1975	17	32.7	52
1976	21	26.6	79
1977	22	31.4	70
1978	17	25.4	67
1979	18	28.6	63
1980	7	17.1	41
TOTAL	146	31.6	462

From this information, it appears that controversial applications have been decreasing over time with a total of approximately 32% of all permit applications being classified "controversial" under this definition.

In addition, Table 5.10 contains the number and percentages of controversial cases for various activity types in the District. When the quantity of permit applications for a specific activity is controlled, there are some activity types which are more likely to become controversial. These include filling, docks and piers. Other factors not associated with activity type no doubt influence the probability of a permit being controversial (e.g., location, size and design characteristics) but these have not been included in this indicator. The database, however, could generate such information.

TABLE 5.10

CONTROVERSIAL APPLICATIONS AND TYPES OF ACTIVITIES

Activity Type	Controversial Cases	% of Total Controversial Cases (n=146)	% of Applications for Actions which were Controversial
Fill	38	26.0	50.7
Dredging			
Land disp.	40	27.4	42.1
Water disp.	15	10.3	41.7
Pipe	14	9.6	34.1
Riprap	24	16.4	36.4
Piers	28	19.2	45.9
Docks	43	29.5	54.4
Pilings	34	23.3	40.0

5.4.3. Comment Content

A final area of permit management involves the anticipation of comments from groups other than government agencies. Responding to these comments requires added time and often the participation of supervisory staff. Knowing the likelihood of various comments before the comment period allows for these factors to be addressed directly in the public notice, not afterwards. Table 5.1.1 includes the frequency of comments by content received from non-governmental groups during the public interest review. Content analysis was used to specify the issues addressed in the comment letters.

Issues frequently raised during processing include wildlife habitat protection and the concern for navigational hazards resulting from the proposed project. If these factors are considered early in the processing by the applicant and the Corps, delays later in the process might be avoided.

TABLE 5.11

COMMENTS FROM NON-GOVERNMENTAL GROUPS
DURING THE PUBLIC INTEREST REVIEW PROCESS

Comment Content	Number of Times Issue Raised (1)
Wildlife Habitat	15
Navigation Hazards	12
Water Quality	10
Filling Water Area	9
Wetland Protection	5
Historic/Cultural Resources	3
Cumulative Impacts	1
Others (2)	15
TOTAL	70
Total Cases in Which These Issues were Raised	61
Total Cases in Sample	469

(1) For each case, public comments and special interest group comments were clustered into two groups. The content of the majority of the comments was coded for each group. Since each group could raise an issue on a case, there are more than 61 issues raised.

(2) Includes aesthetics, land use change, needs additional permits, more reviews requested, public access

6. CONCLUSIONS

From the analyses performed in this report, some conclusions about the structure, implementation and use of the data base system in SF can be made. These conclusions are intended to both highlight the findings of this study and summarize the analysis results.

First, the results indicate that some significant changes in permit applications happened during processing. These changes are best documented by the data base's ability to quantify the extent of resource protection through the comparison of requested and approved amounts for various activities. Although many factors other than the Corps regulatory policies may contribute to these changes (ranging from economics, local concerns, etc.), there is still substantial quantitative evidence from the data base that the regulatory process is providing environmental and resource protection.

In addition, the results from SF, although similar in general nature to the Baltimore District study (Dunning, 1982), do show some interesting differences with regard to the occurrence and extent of modifications. Modification rates were quite similar for the two districts but, for some activity types, some very different amounts of modification were found. Other differences are in evidence but due to the variance in local concerns and involvement in the permit process between groups in Baltimore and SF, the differences are expected. Therefore, the findings of the Baltimore study were generally corroborated for both the effects of the regulatory program and the effectiveness of a data base system.

Additions were made to the previously designed Baltimore data base to meet the specific needs of the SF District. Many of these new factors concerned permit management and monitoring information (e.g., dates, routing/reporting). Additionally, fields for area of fill and type of area filled were created to monitor this important resource in the Bay Area.

A more general conclusion from this data base study is that the usefulness of the data base seemed substantiated. As designed for the SF District, the data base allows for the measurement of resource management performance in addition to the gross productivity measures. This ability to measure the Corps' performance on environmental and resource standards in addition to the traditional performance standards of time and manpower adds a new dimension to measuring the costs and benefits of the regulatory program.

As part of the initial investigation into the structure and contents of the data base, the information needs of the various participants in the Corps office were established. When one tries to design a system to meet all of these needs, a problem is quickly identified. On one hand, the performance monitoring and forecasting needs require a computer system with substantial storage capabilities. On the other hand, the permit management and monitoring information can best be handled on a smaller, "personal" scale computer that is easily accessible and flexible but with little permanent storage. Although these needs for permit monitoring could be met on a larger system, the cost, availability and permanence of this larger system must be weighed against the smaller self-contained system.

Therefore, in order to resolve these conflicting demands on a data base system, it appears that many of the districts, specifically, the SF District, could pursue other alternatives than the present large data base structure. If it became feasible, districts could purchase small "personal" computers with enough storage to monitor all permit applications that are in action at the same time. After permits reach their final disposition, they can be written (at regular intervals) onto a tape for storage of archival information. This tape can then be mounted on a larger system for analysis of performance monitoring and forecasting measures as warranted.

One distinct advantage of this smaller scale system is that it could be designed primarily to meet the needs of the permit processors in addition to management's reporting requirements. In general, processors are responsible for inputting information into the computerized data base. If the system is designed to meet their needs, specifically, they would be more likely to keep the data base current and accurate. Thus, the needs of all the participants in the regulatory program could be met to a greater extent by this type of data base system.

Finally, it should be noted that while the work performed at the San Francisco District was designed principally to meet the needs of the SF Regulatory Functions Branch, the data base which was developed could easily be transferred to other districts. Since, however, all Corps' districts are unique in their needs and capabilities, further effort is likely to be necessary to tailor the data base to the specific requirements of other locations. It is felt that, based on the San Francisco

District's results, the regulatory program in other districts can gain a substantial amount of information from such efforts.

7. REFERENCE

Dunning, C. Mark. 1982. Permit Application Data Bases for the Regulatory Functions Program. Working Paper 82-W1, Ft. Belvoir, Va.: Army Corps of Engineers, Institute for Water Resources, March.

APPENDICES

APPENDIX 1

COMPLETE DATA CONTENTS

<u>Variable</u>	<u>Comments</u>
General Information	
Applicaton Number	
Waterway	Code number for geographical areas
Application Type	Coded: 1 - LOP, 2 - Appl., 3 - AF Appl., 4 - AF LOP, 5 - GP, 6 - Nat. Perm.
Authority	Coded: 1 - Section 10, 2 - Section 404, 3 - Section 10 and 404, 4 - Section 103.
Fee	Coded: 1 - None, 2 - 10, 3 - 100
Owner Category	Coded: 1 - Business, 2 - Individual, 3 - Government, 4 - Community Assoc. 5 - Other/Unknown
Type of Industry	Coded: 1 - Real Estate, 2 - Marina, 3 - Manufacturing, 4 - Other Commercial, 7 - Port Development, 8 - Government Facilities, 9 - Unknown/Other
EIS Required?	Coded: 1 - No, 2 - Yes
Environmental Determination	Coded: 1 - Minor, 2 - Not minor, 3 - Major
Public Hrg Requested?	Coded: 1 - No, 2 - Yes
Public Hrg Held?	Coded: 1 - No, 2 - Yes
Final Action	Coded: 1 - Issued, 2 - Denied, 3 - Withdrawn, 4 - Needs no permit
Remarks	
Routing/Reporting	
Processor	Code number for each processor
Environ. Assessor	Code number envir. assessor
Org for Review	Code number of org where permit sent for review
Cartridge	Microfilm cartridge number

<u>Variable</u>	<u>Comments</u>
Frame Start	Number of frame at start of permit
Frame End	Number of frame at end of permit
Dates:	
Application Received	** All dates are Day-Month-
Application Complete	Year
Final Environ Assessment	
Public Notice	
Revised Public Notice	
Review Sent to Org.	
First Transmittal of Permit	
Fee Received	
Final Action	
Activity Information:	
Project Type	Word for activity type entered (1) (2)
Project Requested	Quantity requested in permit appl.
Project Approved	Quantity approved for permit
Type of Fill	Coded for fill area approved: 1 - Riparian Areas, 2 - Behind dikes, 3 - Wetland, 4 - Open water, 5 - Beach restoration, 6 - Intertidal Shoreline, 7 - Unknown, 8 - On dikes, 9 - Upland
Modification	Coded: 1 - No change, 2 - Revision in scale/scope, 3 - Conditioned, 4 - Non- quantifiable change.
Mitigation	Coded: 1 - Onsite land, 2 - Offsite land, 3 - Dollars
Mitigation Amount	Amount of land or dollars mitigated
Comment Information:	
Commenting Group Name	Word for group name (1)
Date Comment Received	
Comment Content	Coded: 1 - No objection, 2 - No comment, 3 - No action, 4 - No response, 5 - Water quality, 6 - Wildlife habitat (inc. aquatic), 7 - Filling water area, 8 - Infringement on adjacent

VariableComments

access, 9 - Aesthetics - view, 10 - Land use change, 11 - Value for development assumes precedence over environ., access, 14 - Navigation hazards, 15 - Wetland protection, 16 - Vectors, 17 - Avoid existing structures/permits needed, 19 - Historical/ cultural resources, 20 - Awaiting more review, 21 - Air quality.

- (1) The next two segments are keyed to this entry. Multiple entries are possible for this variable (relational data).
- (2) See attached sheet for activity types and units for amounts.

(2) Project Types and Units

<u>Code</u>	<u>Units</u>	<u>Comments</u>
FILLV	yd ³	Volume of fill
FILLA	acres	Area of fill
DREDGL	yd ³	Dredge amount with land disposal
DREDGW	yd ³	Dredge amount with water disp.
OUTFAL	#	Outfall pipes, discharge structure
PIPE	ft	Submarine pipeline, tunnel
CABLE	ft	Overhead cable or power cross
DAM	yd ³	Volume of dam material
RIPBUL	ft	Riprap of bulkhead
PIER	ft ²	Pier, wharf, walkway, or other fixed over-water structure
DOCK	ft ²	Floating over-water structure
PILING	#	Piles and mooring piles
BUOYS	#	Mooring buoys, dolphins
BREAKW	ft	Jetties, groins, breakwater
CATWAL	ft	Finger piers, catwalks

APPENDIX 2

DETAILED STRUCTURE OF NEW DATA SET (1)

<u>Column No.</u>	<u>Variable Code</u>	<u>Variable Name</u>
Record 1:		
1-5	APPL	Application Number
6-7	WW	Waterway
8-9	DOA	Day Application Received
10-11	MOA	Month Application Received
12-13	YOA	Year Application Received
14	OWN	Owner Category
15	TYPE	Type of Industry
16	ENVIR	Environmental Determination
17	FILL	Type of Fill
18	MOD	Modification
19	MIT	Mitigation
20-27	MITAM	Mitigation Amount
28-29	DFA	Day of First Transmittal
30-31	MFA	Month of First Transmittal
32-33	YFA	Year of First Transmittal
34-35	CFWS	Comment of US F&WS
36-37	CEPA	Comment of EPA
38-39	CNOAA	Comment of NOAA
40-41	CSRA	Comment of State Resources Agy.
42-43	CCG	Comment of Coast Guard
44-45	CPUB	Comment of Public - Individual
46-47	NPUB	Number of Public Comments
48-49	CSIG	Comment of Sepcial Interest Groups
50-51	NSIG	Number of Spec. Int. Grps. Comments
52-53	CLG	Comment of Local Government
54-55	CBAL	Comment of Businesses & Adjacent Landowners
58-59	DPN	Day of Public Notice
60-61	MPN	Month of Public Notice
62-63	YPN	Year of Public Notice
64-65	PROJ	Non-quantifiable project code
66-73	NAME	Applicant Name
Record 2:		
1-8	IFILLV	Requested Fill Volume
9-13	IFILLA	" Fill Area

(1) See Appendix 1 for complete coding for these entries.

<u>Column No.</u>	<u>Variable Code</u>	<u>Variable Name</u>
14-21	IDREGL	Requested Dredge Volume-Land Disp.
22-29	IDEGW	" Dredge Volume- Water Dis.
30-31	IOUTGL	" Outfalls
32-36	IPIPE	" Pipe Length
37-41	ICABLE	" Cable Length
42-47	IDAM	" Dam Volume
48-51	IRIPBUL	" Riprap Length
52-57	IPIER	" Pier Area
58-63	IDOCK	" Dock Area
64-67	IPILES	" Pilings
68-69	BUOY	" Buoys
70-72	IBREAK	" Breakwater Length
73-74	ICATW	" Catwalk Length

Record 3:

1-8	OFILLV	Approved Fill Volume
9-13	OFILLA	" Fill Area
14-21	ODREGL	" Dredge Volume-Land Disp.
22-29	ODREGW	" Dredge Volume-Water Dis.
30-31	OOUTFL	" Outfalls
32-36	OPIPE	" Pipe Length
37-41	OCABLE	" Cable Length
42-47	ODAM	" Dam Volume
48-51	ORIPBUL	" Riprap Length
52-57	OPIER	" Pier Area
58-63	ODOCK	" Dock Area
64-67	OPILES	" Pilings
68-69	OBUOY	" Buoys
70-72	OBREAK	" Breakwater Length
73-74	OCATW	" Catwalk Length

APPENDIX 3

UPDATE SHEET

GENERAL INFORMATION:

Appl Num _____ WW _____ Appl Name _____
Appl Type _____ Authority _____ Fee _____ Owner Cat _____
Type Ind _____ EIS Req'd? _____ Envir Det _____
Pub Hrg Req? _____ Pub Hrg Held _____ Final Action _____
Remarks _____

ROUTING:

Processor _____ Envir. Assessor _____ Org for Rev _____
Microfilm: Cartridge _____ Frame Start _____ Frame End _____

DATES:

Appl Received _____ Appl Complete _____
Final Env. Assess _____ Public Notice _____
Revised PN _____ Review Sent _____
First Transmittal _____ Fee Received _____
Final Action _____

ACTIVITY:

<u>Type</u>	<u>Requested</u>	<u>Approved</u>	Type of Fill _____
			Modification _____
			Mitigation _____
			Mitigation Amount _____

COMMENTS:

<u>Group Name</u>	<u>Date Received</u>	<u>Content</u>
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APPENDIX 4

IWR DATA SHEET

Applicant _____ Permit Application # _____

Date Application Received _____

Ownership Category: _____ Business _____ Individual _____ Government
_____ Community Association _____ Other _____ Not available/Unknown

Type of Industry: _____ Real Estate Development _____ Marine _____ Manufacturing
_____ Other Commercial _____ Utilities _____ Private Development
_____ Port Facilities _____ Govt. Facilities
_____ Unknown/Not Available

Applied Activity:

Environmental Determination: _____ Minor _____ Not Minor _____ Major

Approved Activity:

Type of fill: _____ Riparian Areas _____ Behind dikes _____ Wetland
_____ Open Water _____ Beach restoration _____ Intertidal Shoreline
_____ Unknown _____ Upland

Modification: _____ No change _____ Revision in applied activity
_____ Conditioned _____ Non-quantifiable change

Mitigation Required: _____ Onsite land _____ Offsite land _____ Dollars
Amount: _____ (in \$ or acres)

Date of First Transmittal of Permit _____

Comments (by agency)

Group	Code
USFWS	_____
EPA	_____
NOAA	_____
SRA	_____
CG	_____
Public	_____
Special Interest Gp.	_____
Local Govt.	_____
Businesses or Adj. Landowners	_____

Final Disposition _____ Issued _____ Denied _____ Withdrawn

Type of Application: _____ LOP _____ Appl. _____ A-F _____ GP _____ NP

Date of Public Notice _____

APPENDIX 5

SAMPLE COMPUTER INPUT

1276850260479111	210180	32	960	HARBOR BAY ISLE BO
1275150120479151 1	02107901010102 750 750	11		PAC TEL & TEL
126975012037912291 90000 90000	0712790101010101	12270779		ALUL JAN YACHT
1251250171078112121 2000 0.5 1200 0.32	0.2824118015151515	19	12231178	PONDENUSA HOM

Appendix 6

**Time Series of Permit
Activities**

FIGURE 6A.1

VOLUME OF FILL
1973 - 1980

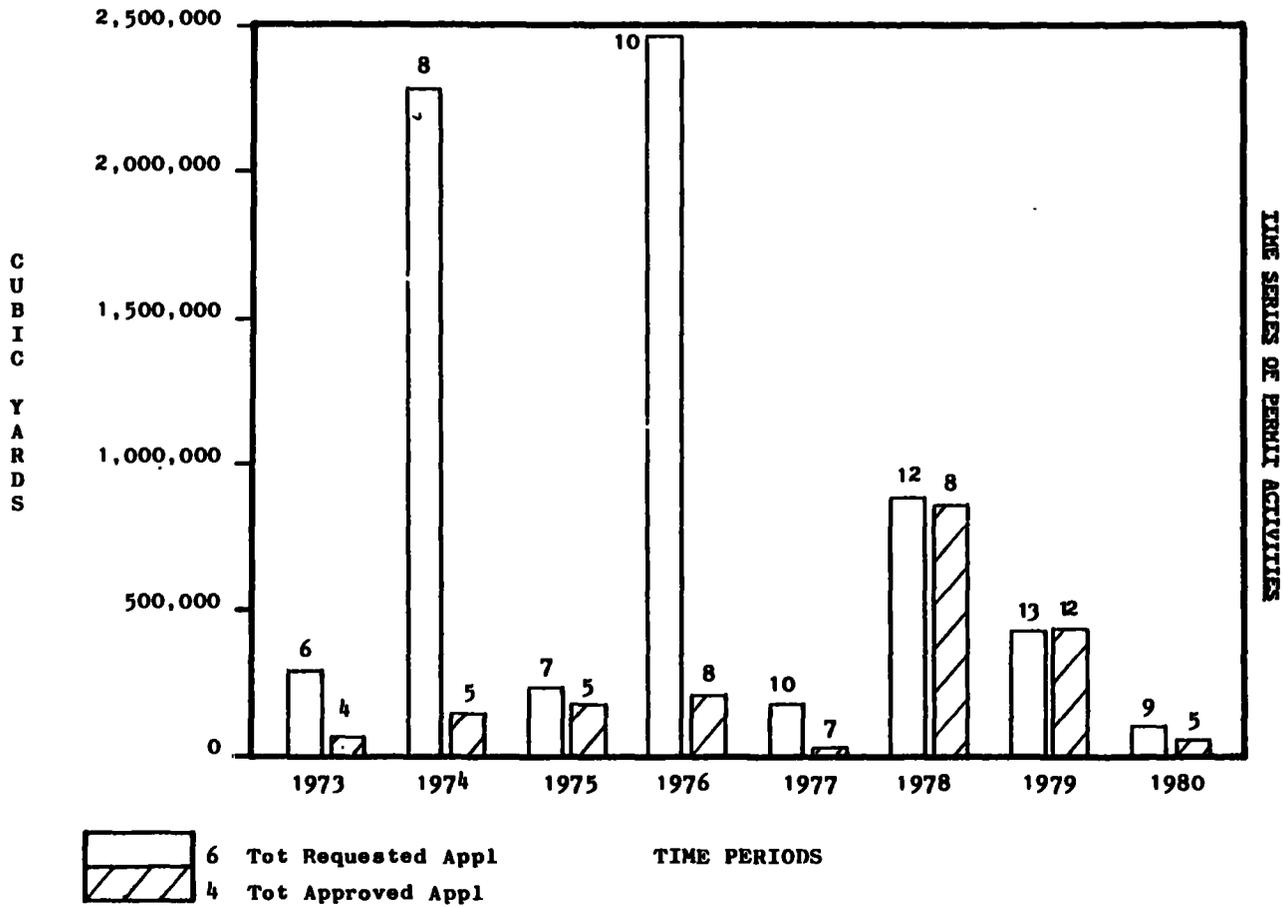


FIGURE 6A.2

AREA OF FILL.
1973 - 1980

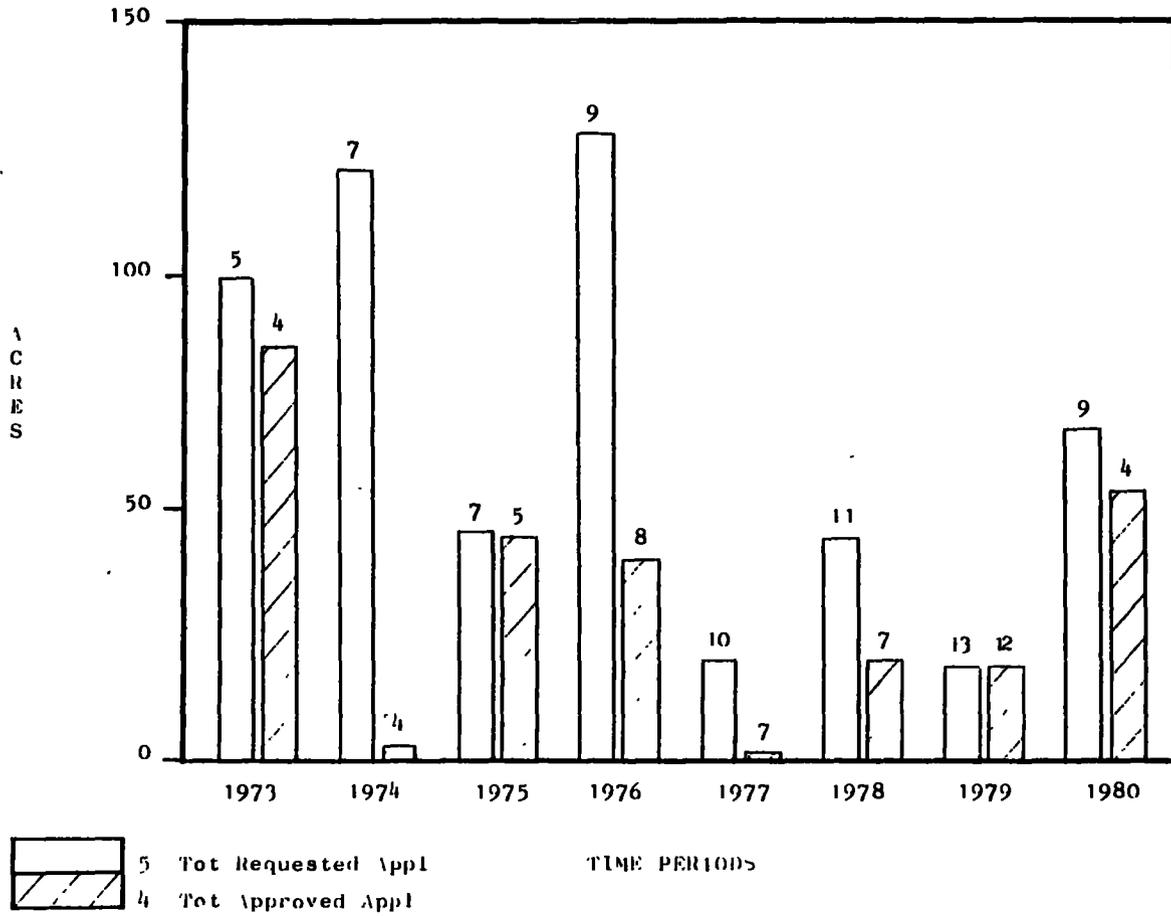
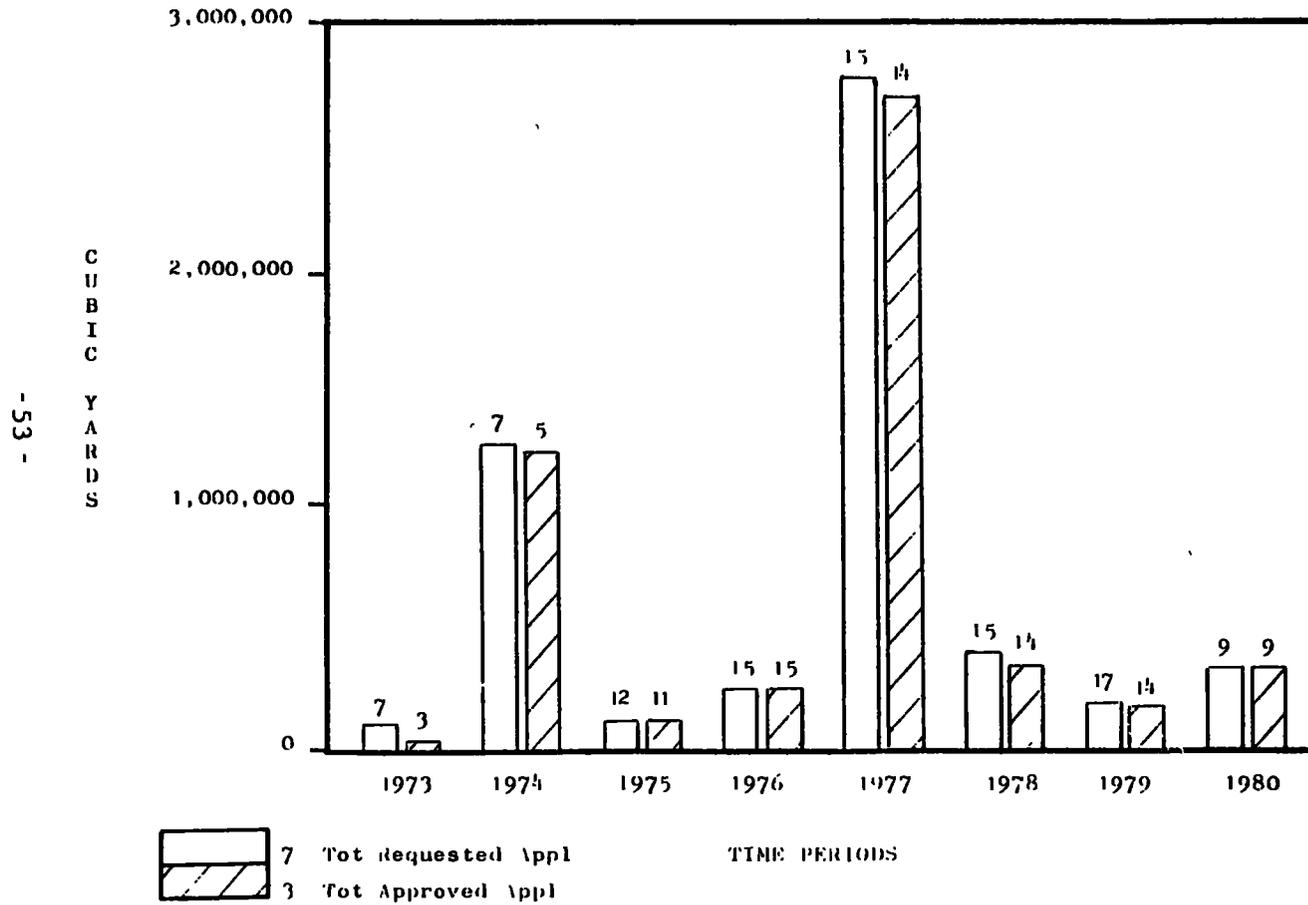


FIGURE 6A.3

VOLUME OF DREDGING - LAND DISPOSAL.
1973 - 1980



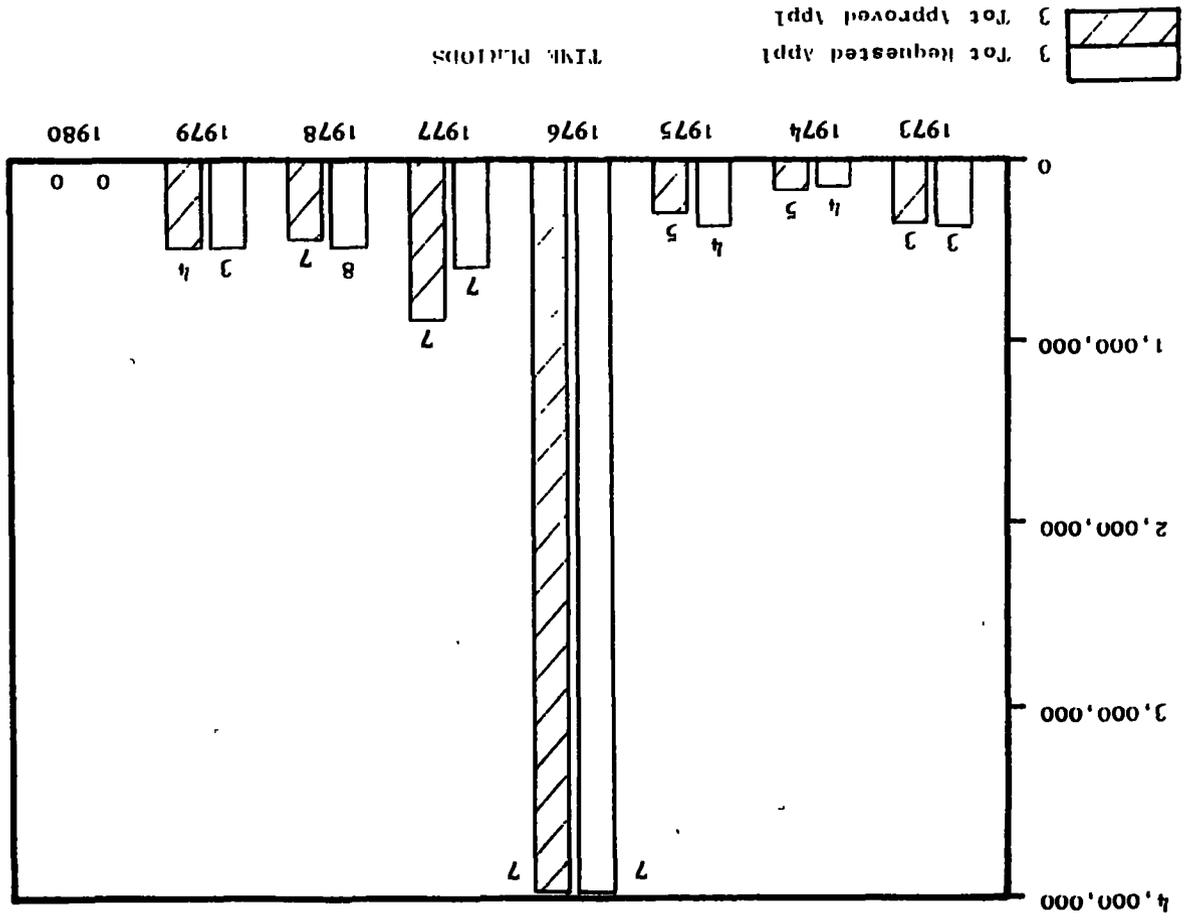


FIGURE 6A.4
VOLUME OF DRINKING - WATER DISPOSAL
1973 - 1980

TIME PLOTS

Total Requested Appl
Total Approved Appl

FIGURE 6A.5

LENGTH OF PIPE
1973 - 1980

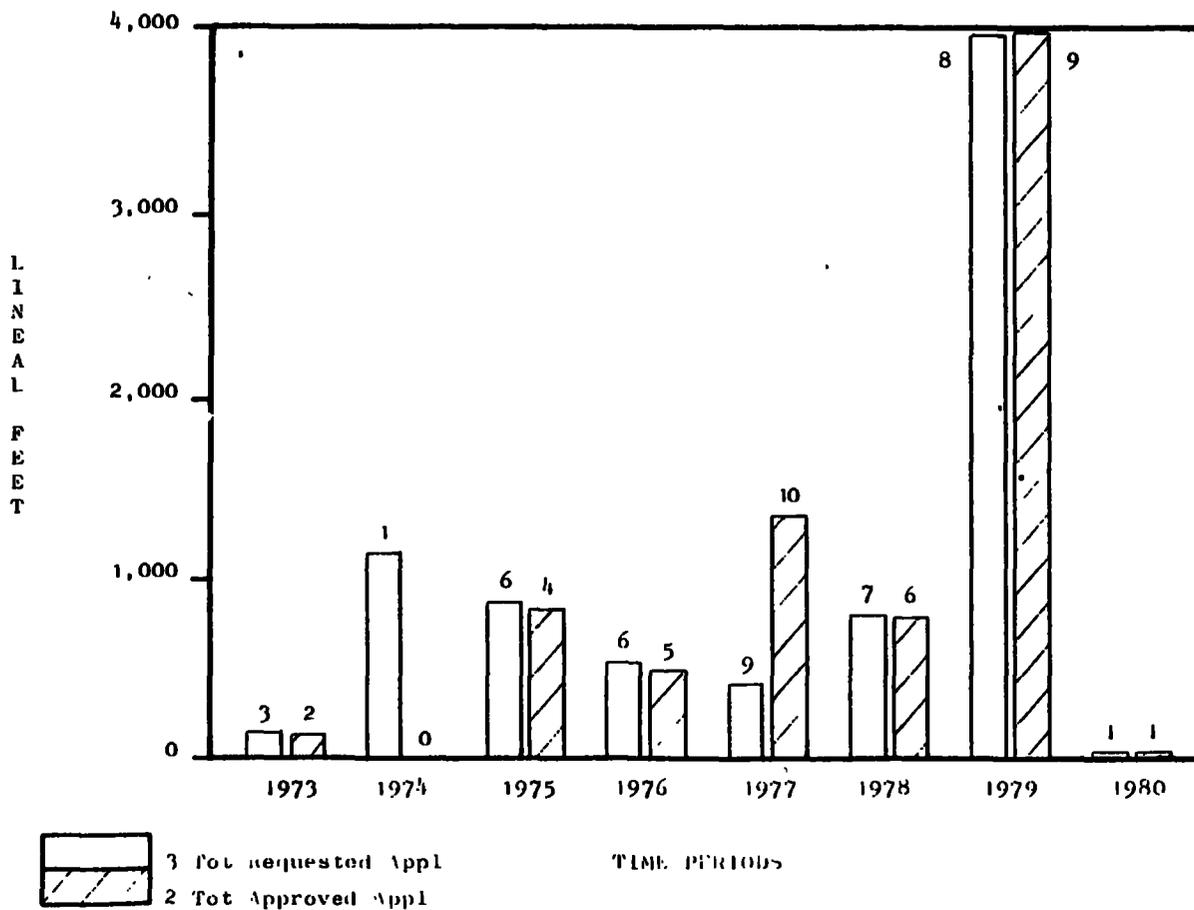
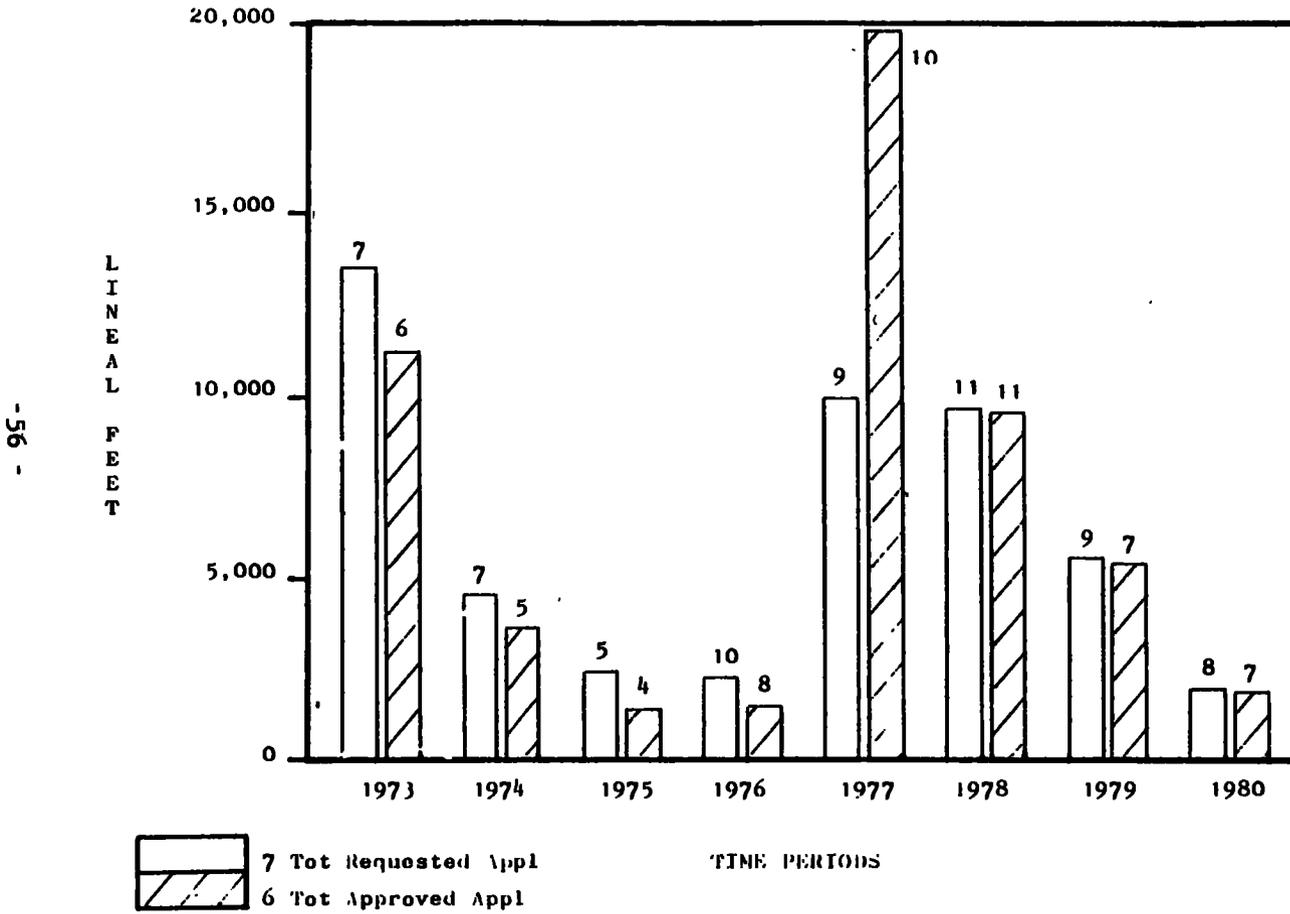


FIGURE 6A.6

LENGTH OF RIPRAP, BULKHEAD
1973 - 1980



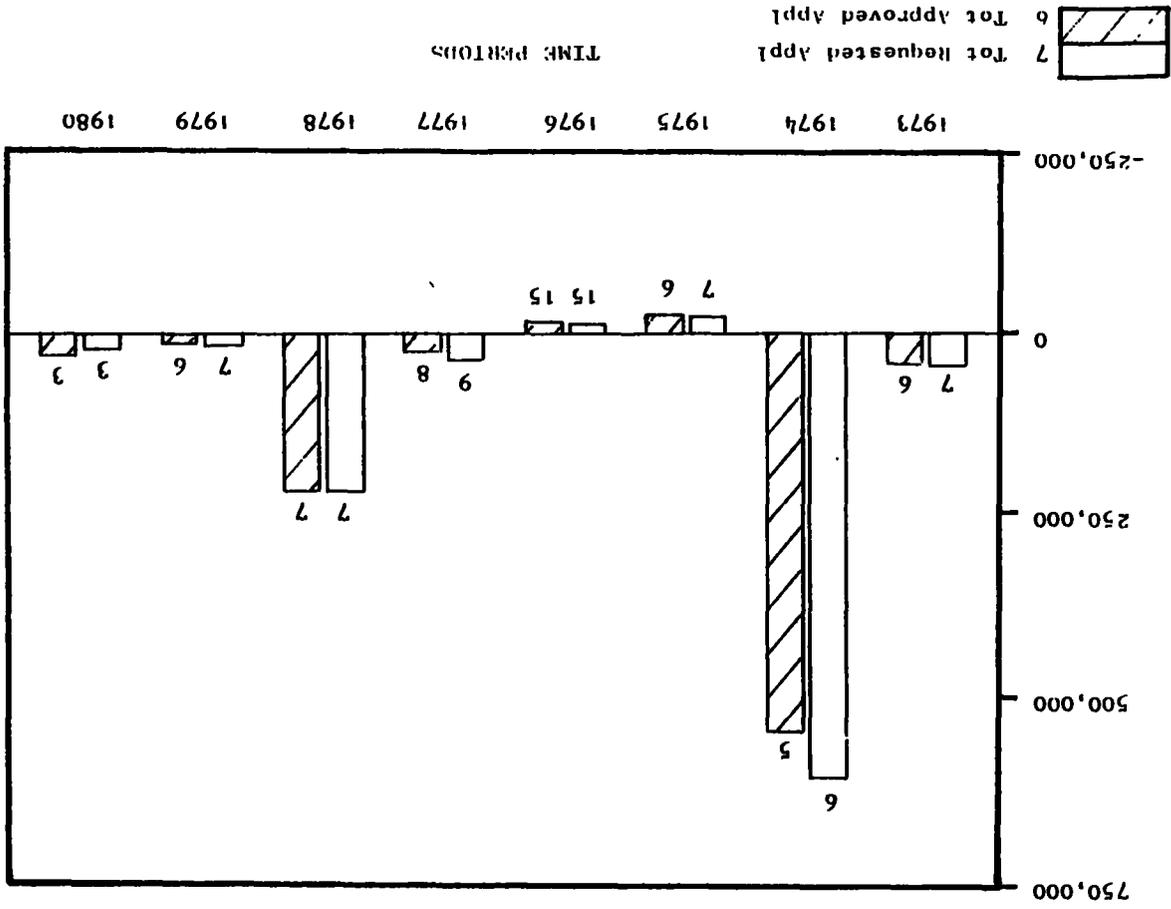


FIGURE 6A.7
AREA OF PIERS
1973 - 1980

AREA OF PIERS

FIGURE 6A.8

AREA OF DOCKS
1973 - 1980

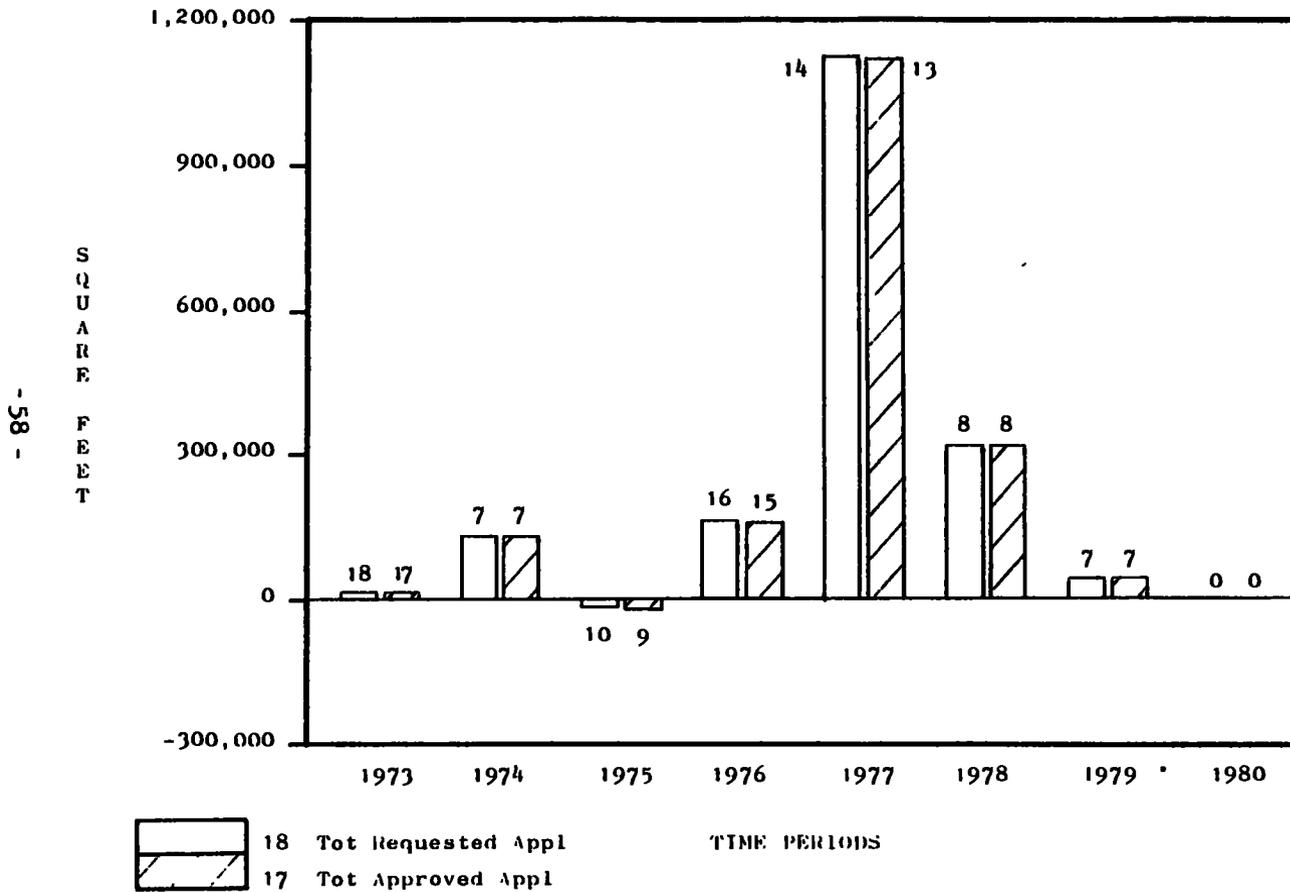


FIGURE 6A.9

NUMBER OF PILINGS
1973 - 1980

