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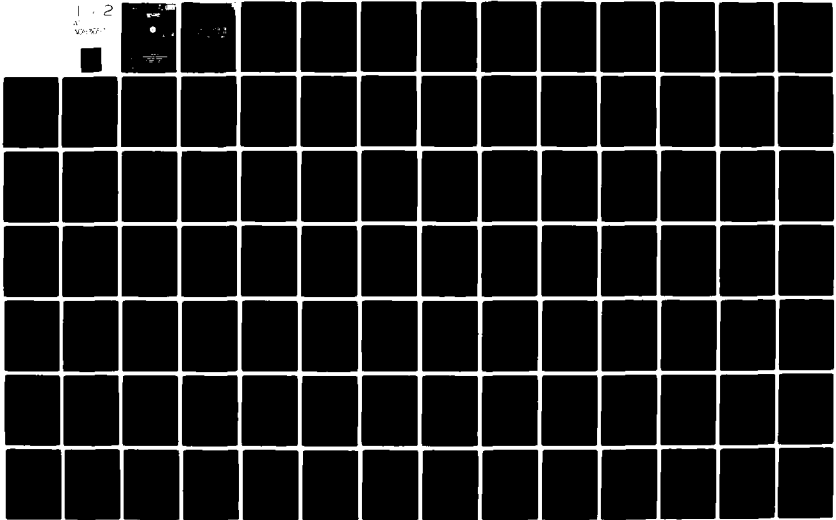
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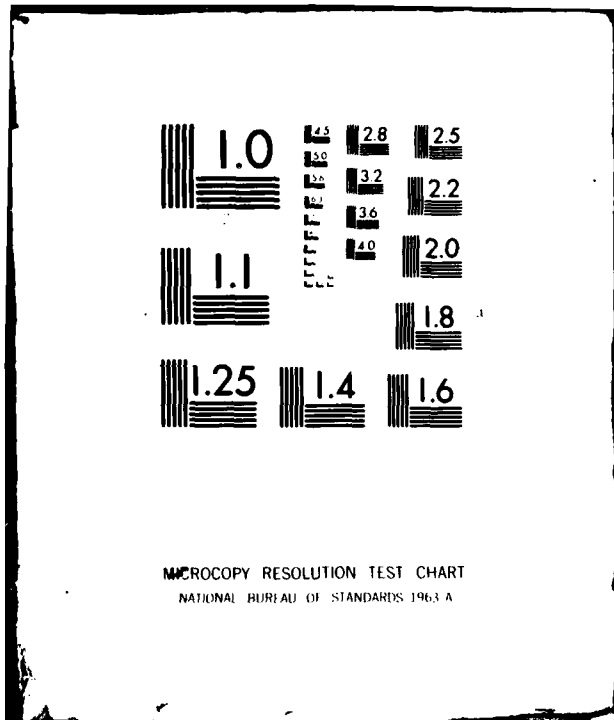
USCG-D-14-80-VOL-1

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1. Report No. USCG D-14-80-VOL-1		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle AN ASSESSMENT OF THE INFLUENCE OF EMERGING SOCIAL AND ECONOMIC TRENDS ON THE PEOPLE AND MANAGEMENT OF THE COAST GUARD • Volume 1				5. Report Date December 1979	
7. Author(s) M. J. Cetron, E. F. Bishop, C. F. McFadden, S. E. Sugarek				6. Performing Organization Code	
9. Performing Organization Name and Address Forecasting International, Ltd. 1001 North Highland Street, P. O. Box 1650 Arlington, Virginia 22210				8. Performing Organization Report No. 12 121	
12. Sponsoring Agency Name and Address Commandant (G-DMT-3/TP54) U. S. Coast Guard Washington, D. C. 20590				10. Work Unit No. (TRAIS)	
15. Supplementary Notes				11. Contractor Grant No. DOT-CG-82724-A	
16. Abstract <p>The objective of this project is to explore the impacts of the emerging social and economic trends and events that are most likely to affect the people and management of the United States Coast Guard during the time period 1979 to 2004. The study utilizes two computerized models, KSIM and Cross-Impact, to develop projections of fifteen representative trends and 22 events. Cross-relevance and cross-support analyses are then utilized to assess the impact of these forecasts on critical components of the four major Coast Guard resource management areas: manpower, funds, material and information. The critical elements represent those points at which a change in the external environment or an internal policy, procedure or system could alter the resource flow pattern. Areas appropriate for policy action, either to take advantage of an opportunity or to address a potential problem, are identified and the appropriate action option formulated for each.</p> <p>Volume I presents the basic report. Volume II provides relevant appendices.</p>				13. Type of Report Period Covered Final Report September 1978 - December 1979	
17. Key Words Planning Management Funds Management Manpower Management Material Management Information Resources Management				14. Sponsoring Agency Code G-DMT-3	
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages VOL I - 120 VOL II - 107	
				22. Price	

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures		Symbol	To Find	Symbol
When You Have	Multiply by			
LENGTH				
inches	2.5	cm	centimeters	cm
feet	30	m	centimeters	cm
yards	0.9	m	meters	m
miles	1.6	km	kilometers	km
AREA				
square inches	6.5	cm ²	square centimeters	cm ²
square feet	0.09	m ²	square meters	m ²
square yards	0.8	m ²	square meters	m ²
square miles	2.6	km ²	square kilometers	km ²
acres	0.4	ha	hectares	ha
MASS (weight)				
ounces	28	g	grams	g
pounds	4.5	kg	kilograms	kg
short tons	900	kg	kilograms	kg
gross wt				
VOLUME				
gallons	4	l	liters	l
quartons	1	l	liters	l
fluid ounces	30	ml	milliliters	ml
cup	0.24	l	liters	l
peck	0.07	hl	hectoliters	hl
quarts	0.95	l	liters	l
gallons	3.8	l	liters	l
cubic feet	0.03	m ³	cubic meters	m ³
cubic yards	0.76	m ³	cubic meters	m ³
TEMPERATURE (degrees)				
Fahrenheit temperature	5/9 (after subtracting 32)	°C	Celsius temperature	°C

*1 in = 2.54 centimeters. For other exact conversions and more detailed tables, see 1955 Metric, Pub. 265, Guide to English and Metric Units, Pages 12, 13, 19. Catalog No. C51,1025A.

Approximate Conversions from Metric Measures		Symbol	To Find	Symbol
When You Have	Multiply by			
LENGTH				
millimeters	0.04	in	inches	in
centimeters	0.4	in	inches	in
meters	3.3	ft	feet	ft
meters	1.1	yd	yards	yd
kilometers	0.6	mi	miles	mi
AREA				
square centimeters	0.16	sq in	square inches	sq in
square meters	1.2	sq ft	square feet	sq ft
square kilometers	0.4	sq mi	square miles	sq mi
hectares (10,000 m ²)	2.5	ac	acres	ac
MASS (weight)				
grams	0.035	oz	ounces	oz
kilograms	2.2	lb	pounds	lb
tonnes (1000 kg)	1.1	short ton	short tons	short ton
VOLUME				
milliliters	0.03	fluid oz	fluid ounces	fluid oz
liters	1.1	quart	quarts	quart
liters	1.06	gallon	gallons	gallon
cubic meters	35	cubic ft	cubic feet	cubic ft
cubic meters	1.3	cubic yd	cubic yards	cubic yd
TEMPERATURE (degrees)				
°C	9/5 (then add 32)	Fahrenheit temperature	Fahrenheit temperature	°F



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CHAPTER 1
INTRODUCTION

1.1 Problem Statement

The purpose of this project has been to explore the influence of the emerging social and economic trends that are most likely to affect the people and management of the United States Coast Guard (USCG) in the time period 1979 to 2004. By understanding relevant trends and events and the nature of the impacts that they are most likely to have on lifestyles, work styles, and resource management systems, the Coast Guard will have the information and insights necessary to take full advantage of policy action opportunities and to address potential problem areas. Our assumption has been that a thorough understanding of possible responses will enable the Coast Guard to function most effectively in a changing environment.

1.2 Project Overview

The study began with extensive interviews at Headquarters and in the field. The findings of this phase were used to establish the critical components within four Coast Guard resource management areas: manpower, funds, material and information. The individual, social and technological aspects of the future were then explored in terms of trends and events which would most probably impact the critical elements of the resource areas of concern. It rapidly became apparent that the large number of items of interest would make it necessary to choose those which would typify or "represent" related individual, social and/or technological aspects of the future. These "representative trends and events" were thoroughly analyzed in terms of their own characteristics and their interrelationships. Following

this definition phase, the behavior of the trends and events was forecast to the year 2004 using a series of computerized structural modeling techniques. The forecasts resulting from the modeling exercise were then linked to the critical elements of the areas of concern during the impact analysis phase of the project. Finally, the findings of the impact analysis were synthesized in order to define the policy problem and opportunity areas and their respective responsive Coast Guard action options.

1.3 Structure of This Report

This report is divided into eight sections describing in detail the study and its findings. Chapter 2 discusses the methodology more fully, elucidating the analytical approach and defining the "representative" trends and events selected. Because this report is designed to deal primarily with findings, the methodology section has been limited to the facts needed to understand the conclusions. Those readers interested in the inner workings of the models used will find descriptions at that level of detail in Appendix A.

Chapter 3 develops a general forecast of individual (behavioral), social (societal) and technological aspects of the Coast Guard's changing environment from 1979 to 2004. These forecasts lay the groundwork for the following sections which present detailed forecasts of the impacts on the four areas of Coast Guard management concern: manpower, funding, material and information. Section 4 deals with manpower resources by describing the present situation internal and external to the Coast Guard, forecasting the impacts of environmental changes to the year 2004 and identifying Coast Guard policy option areas. Sections 5, 6 and 7 repeat these analysis steps for the resource management areas of funds, material, and information. Chapter 8 concludes the report with a brief summary of the study.

The appendices to the report provide several items of interest developed during the course of the study. As mentioned above, Appendix A provides a detailed description

of the methodology employed. The organizational diagrams contained in Appendix B are of special note. These represent abbreviated versions of the much longer Resource Flow Diagrams developed to describe the current Coast Guard management system and to compare the realities of the system with the verbal descriptions supplied by various documents. Appendix C provides a complete bibliography of all references utilized during the study.

CHAPTER 2

ANALYTICAL APPROACH

2.1 Introduction

This chapter provides an overview of the analytical approach utilized, and defines the variables considered in this study. It is intended to provide a background for understanding the findings discussed in the following chapters. Appendix A contains a more detailed technical discussion of methodology.

2.2 Overview of the Analytical Approach

In order to assess the influence of emerging social and economic trends on the people and management of the Coast Guard, the project team performed five major tasks. These were:

- Trend selection and analysis
- Event selection and analysis
- Identification and analysis of areas of concern
- Assessment of impact of projected trends on areas of concern
- Development of policy options and recommendations

Table 2-1 displays the techniques applied to each major task plus the initial background information survey. Each technique is discussed below. It should be noted that while the listing of tasks implies a sequence of events, the analytical process was iterative, supported by a continual information gathering process and reevaluation of the output.

TABLE 2-1. ANALYTICAL TECHNIQUES EMPLOYED

<u>Work Done</u>	<u>Technique Used</u>
Identify and collect relevant information	Questionnaire Interviews Literature Search
Analyze Key Trends	RSIM (computer simulation model)
Analyze Key Events	Cross-Impact (computer simulation model)
Analyze Areas of Concern	Cross-Support Analysis
Determine Impacts of Trends and Events on Areas of Concern	Cross-Relevance Analysis
Develop Policy Options	Discussion

2.3 Trend Selection and Analysis

Definition and redefinition of trends continued throughout the data gathering and analysis phases of the study in order to develop the most relevant and comprehensive set possible. The initial set of trends was derived from a literature survey and a questionnaire distributed throughout Coast Guard Headquarters. Because of the large number of trends of interest at varying levels of detail, it was necessary to combine appropriate detailed trends into broad representative trends. This scoping and defining exercise was undertaken by the members of the study team in consultation with other members of the Forecasting International, Ltd. (FI) staff. In this process, the team based its assessments on the results of previous FI studies and on the results of an extensive literature search and interviews of Coast Guard personnel. The final list of trends selected for analysis appears in Table 2-2. Chapter 3 discusses the definition of these trends in detail.

The goal of the trend analysis was to develop a projection of the value of each trend over the next 25 years, considering the dynamic interactions among trends in the set. To enhance the study team's analysis, an advanced KSIM computer model was utilized. KSIM, Kane's Simulation (named after its originator, Julius Kane), is a deterministic, dynamic structural model which can accommodate quantitative and judgmental data.

Several items of input data were generated in order to utilize KSIM. These were:

- Maximum and minimum values for each trend over the time period of concern
- Starting value of trend (i.e. value in 1977)
- Interaction matrix

All of these inputs were developed by the study team. Where historical quantitative data were available, as in the case of Gross National Product and Unemployment Rates, calculated starting values and maximum and minimum values were

TABLE 2-2. TRENDS ANALYZED IN ESIM EXERCISE

<u>Trend #</u>	<u>Trend Name</u>	<u>ESIM Abbreviation</u>
1	Veteran's Compensation and Pension Benefits	VET\$
2	Military Annual Pay Rate (Basic pay plus allowances)	MPAY
3	Total U.S. Population Ages 18-24 Years	YPOP
4	Gross National Product (In constant 1978 dollars)	GNP
5	Defense Spending (In constant 1978 dollars)	DEF\$
6	Unemployment Rate	UERT
7	Reputation of the Coast Guard	RPTA
8	U.S. Public's Attitude Toward the Military	AMIL
9	Demand for USCG Services	DMND
10	Workers Expectations for More Rewarding Work	WRK
11	Quality of Education in the U.S.	EDUC
12	Reliability of the U.S. Workforce	RELI
13	Attitude of the U.S. Public Toward Formal Authority	AUTH
14	U.S. Public's Expectations of Higher Living Standards	LSTD
15	Evolution from Authoritarian Management to Group Decision-making in U.S.	GRPD

developed. Maximums, minimums and the starting values were estimated on a 0 to 1 scale. The ability to include subjective and qualitative data is one of the unique features of KSIM.

The interactions among trends were judged by knowledgeable individuals, utilizing a matrix format. The range of values employed in this study was +3 to -3. The question answered by the analysts was: To what extent does Trend i affect Trend j? This question was addressed for $i = 1, 2, \dots, n$, $j = 1, 2, \dots, n$.

Following development of all required input information, the KSIM model was run on the computer. The outputs of the KSIM exercise were projections of trend values over time in tabular and graphic form based on the interactions among the trends.

2.4 Event Selection and Analysis

Concurrent with the development of trends, the study team compiled a candidate list of events. These events were identified initially by the Coast Guard questionnaire and through the literature search. The list was continually reviewed and evaluated throughout the study.

In developing the final list of events to be included in the study, several criteria were employed. To be selected, an event had to have either a high probability of occurrence or a high potential impact value. The probability of occurrence of each event was judged by Coast Guard participants through the questionnaire and/or by the FI study team. Since the characteristic computerized model made examination of a relatively small number of events, (e.g. 20-30) highly desirable, the study team combined events or identified representative events. That is, several events which were similar in character or in overall impact on the trends on Coast Guard were combined to produce a general event or represented by one event in the set. The final list of events included in the model was developed in several iterations of this process. Table 2-3 contains the final list

TABLE 2-3. REPRESENTATIVE EVENTS USED IN MODELING

Technological

15% of the Technical, Professional and Management Community Routinely Put in 30% of Their Working Hours in an Office in Their Home

25% of Secretarial and Clerical Community Routinely Put in 50% of Their Working Hours at Home

Ship Maintenance is Predominantly Performed by Shore Facilities Rather Than Crew

Utilization of More Sophisticated Electronics Permits Reduction of Cutter Operating Personnel by 25% Over 1977 Levels

Home Computers are Found in Almost Every Home and Provide Access to "Super Computers"

At Least 50% of all Currently Duplicated Business Communications are Replaced by Soft Transmission

Non-Technological

Establishment of a 200-Mile Economic Zone

Consolidation of U.S. Ocean-Related Agencies

USCG Takes Over NOAA Ship Operating Activities

States Take Over Boating Safety Programs

Demand for Coast Guard Services on Inland Waterways Doubles Over 1977 Level

Re-Introduction of Draft for Men

Introduction of Draft for Women

Combat Duty Opened to Women

Civilians Employed on USCG Cutters

Civilianization of 25% the Jobs in the USCG

Operation of USCG Maintenance Installations Taken Over by Contractors

The Military/Uniformed Services are Unionized

50% of Shore-Based Services Work Under Flextime

25% of Workers Elect to Remain in Workforce Past Age 65

Job Security and Salary are the Main Requirements for Job Satisfaction

Workers Place a High Premium on Interesting Work

of technological and non-technological events utilized.

The focus of the event analysis was an assessment of the effects of the occurrence of events on the trends. To do this, cross-impact analysis was utilized. The "Cross-Impact Model" is a computer simulation model designed especially to accommodate events. The projected trend values developed in the KSIM exercise reflected only trend-trend interactions but provided the baseline for the cross-impact analysis. The final trend projections produced by the cross-impact analysis reflected trend-trend interactions taking into consideration the impacts of events.

2.5 Identification and Analysis of Areas of Concern

In order to determine the impact of projected trends and events on USCG manpower and management in the future it was necessary to identify and describe the critical components of Coast Guard resource management systems.

The selection of critical components of the resource management areas of concern was based on a combination of literature search and interviews with Coast Guard personnel at Headquarters and in the field. The actual organization and resource flows within the Coast Guard organization, described during these interviews, were compared with the description of the organization as it appears in the Coast Guard Organization Manual and other written directives. The initial findings were that, in reality, the duties and responsibilities of the various Coast Guard offices conform closely to their written descriptions.

Initially, the organization was analyzed in terms of the flow of three resources; manpower, funds and material. The interview data made it clear that information systems deserved to be considered as a fifth resource. Detailed flow diagrams were developed for the four resources to trace their management within the Coast Guard's Headquarters and field organization. Summarized versions of these charts are shown in Appendix B. There are, of course, many interpersonal relationships which affect resource flow, change as the

occupants of offices change, and are, therefore, not appropriate for charting.

The resource flow charts indicated the points at which each resource is affected by the various facets of the management system. It is at these points or phases that a change in the external environment or an internal policy, procedure or system can potentially alter the resource flow pattern. These critical elements of the areas of concern are listed in Table 2-4 and defined below.

2.5.1 Manpower Management

The Manpower Management Area of Concern is composed of six major elements, each discussed below. The reader should note that this area of concern is complex because the human resources of the Coast Guard include many sub-groups: active military (commissioned, warrant and enlisted), civilians (Civil Service and Wage Board), reserve military, and auxiliary. Because trends and events may impact each of these sub-groups in a different manner, each must be considered in the analytical phases.

The first element of this area of concern, Long-Range Planning and Programming, includes the issues involved in forecasting the long-range and mid-term availability and use of human resources. The long and mid-range processes were combined because they deal with resource allocation in the future based on projections of demands and available resources.

The second element of this area of concern, Manning, deals with near-term manpower distribution and utilization. Manning decisions require a balancing of resources in the context of day-to-day demands that must be managed within the constraints of established personnel ceilings.

Recruiting and Re-enlistment of manpower is the third critical element in the management of manpower resources. This element covers the spectrum of issues involved in obtaining and retaining human resources.

Initial and Continuing Training are two elements of

TABLE 2-4. USCG MANAGEMENT AREAS OF CONCERN STUDIED

Area of Concern "P" - Manpower Management

- P1 Long-Range Planning and Programming**
 - Planning (long-range)
 - Programming (mid-range)
- P2 Manning**
Distribution and utilization of resources in the short-term, geographical assignments
- P3 Recruiting and Re-enlistment**
Recruiting and procuring human resources and retaining those resources
- P4 Training - Initial**
Boot, OCS, Academy
- P5 Training - Continuing**
Specialty schools, on-the-job, advanced service schools
- P6 Command and Supervision**
Leadership and management styles

Area of Concern "F" - Funds Management

- F1 Long-Range Planning and Programming**
 - Planning (long-term)
 - Programming (mid-term)
- F2 Short-Term Budgeting**
Short-term, day-to-day operations

Area of Concern "M" - Material Management

- M1 Long-Range Planning and Programming**
 - Planning (long-range)
 - Programming (mid-range)
- M2 Design**
Includes R&D
- M3 Acquisition**
- M4 Deployment**
- M5 Repair and Maintenance**

Area of Concern "I" - Information System Management

- I1 Long-Range Planning and Programming**
 - Planning (long-range)
 - Programming (mid-range)
- I2 Systems Acquisition**
- I3 Processing and Storage**
- I4 Dissemination**

critical importance to Coast Guard manpower management. These components include all aspects of Coast Guard training. They are under continuing review and may be significantly impacted by technology and lifestyle changes.

The Command and Supervision component of manpower management deals with the leadership and management styles of commanders and supervisors.

2.5.2 Funding Management

The funding resource area of concern was divided into two components based on the time frame of the process in much the same way the first two elements of human resources management were segmented. Long-Range Planning and Programming deals with the long-term considerations of allocating funding resources while Short-term Budgeting considers day-to-day operational funding decisions. Short-term Budgeting also includes accounting for the use of operational funds.

2.5.3 Material Management

Material Management deals with the management of all Coast Guard facilities including cutters, boats, aircraft, aids to navigation, shore stations, and all electronics equipments except computers and peripherals directly related to information systems.

Long-Range Planning and Programming, as in the previous areas of concern, deals with the long and mid-range aspects of allocating the material resource. Design and Acquisition consider two especially significant aspects of management in the procurement of material while Deployment covers the day-to-day operational use of the resource. The component of Repair and Maintenance singles out a critical management process in the control of material resources. Issues to be explored in the material management area include designs for future technologies and human resource situations, improvement and consolidation of facilities in the shore plant and the role of Research and Development (R&D) in Coast Guard material management.

2.5.4 Information Management

The unique role and growing importance of information systems in management dictate that they should be considered as a resource separate from the material resource of cutters, shore stations, and command and control electronics. The Long-Range Planning and Programming component deals with the long and mid-range management of the information system resource while Systems Acquisition considers the process of obtaining the information systems. The Processing and Storage component covers all input and storage issues, and Dissemination considers patterns for the distribution of data.

2.5.5 Analysis of Areas of Concern

Management areas of concern do not function in isolation from each other. Instead, there is a great deal of interaction among the elements within an area of concern and between areas of concern themselves. The complete set of interrelationships describes the management system of the Coast Guard. Based on Coast Guard interview data and documentation, the project team constructed a "cross-support" matrix to identify and quantify these interrelationships. This analysis centered on the answers to a series of questions of the form "to what extent does this element contribute to/affect that element?" For example, "To what extent does Recruitment and Re-enlistment affect Manpower Planning and Programming?", or more generally, "what support does the element Material Design give to Information Systems Acquisition?"

The data collected in the matrix were used to compute a "supportiveness" measure or weight for each area of concern component. This weight provided a measure of the value of that component in view of its contribution to the other management components. In addition, the study team determined which elements of the areas of concern were most supported by the others. The support value was later used to weight the areas of concern elements in the analysis of the impact of

trends on the management system, discussed below.

2.6 Assessment of the Impact of Projected Trends on Areas of Concern

This step of the analysis represents a linking of the major elements of the future environment and the Coast Guard management system. Here, the focus was on determining the impact of projected future trends on the Coast Guard management system. The task was to relate the trend projections derived from the cross-impact analysis described above and the weighted areas of concern components.

In order to perform this assessment, the study team utilized a cross-relevance matrix. The cross-relevance matrix is a structured technique which facilitates the quantitative assessment of the effects of elements in one set on the elements in another set. The question is posed "To what extent does Trend A affect area of concern component 1?" For example, in this study one question would be: "To what extent does the expected trend in the Unemployment Rate affect Manpower Recruitment and Re-enlistment?" The assessment is done for each cell in the matrix.

The analysis provided three kinds of information. First, the most influential trends can be identified as they are the ones with the highest weights. A determination can also be made as to which components of the areas of concern are most sensitive to the trends. Finally, the cells which contain the highest scores indicate the most critical areas of impact or potential problem areas. Identification of these specific critical potential future problem areas forms the basis for policy analysis. The general information on the most influential trends provides insights into areas to be monitored by Coast Guard.

2.7 Development of Policy Options and Recommendations

Through group discussions and consultation with other members of the FI staff, the study team developed policy action options for each critical problem area identified by the analysis described above. Recommended actions were then

selected. The remainder of this report describes the findings of this process in detail.

CHAPTER 3

GENERAL PROJECTIONS TO THE YEAR 2004

3.1 Introduction

This chapter presents a narrative and graphic description of the next 25 years in terms of the trends forecast during the study. As explained in Chapter 2, the model which produced these predictions utilized the tabular output of a KSIM simulation together with additional data on the relationships among variables as input to a computerized Cross-Impact exercise.

The model projects each trend by three year steps or "scenes". A trend value remains constant throughout a scene but may change at the beginning of the next scene. The model does not deal with short-term fluctuations of trend behavior within a scene. Nine scenes are considered beginning with 1977, the most recent year for which all quantitative data was available. Each scene is named for its opening date (e.g., 1977 for the scene 1977-1980).

In order to provide the graphic presentations of the trends, the step-wise projections of the model are appended to the historical graphs of the quantitative trends. Qualitative trends have no historical data and, therefore, their forecasts begin at the baseline year, 1977.

3.2 General Assumptions of the State of the World

Certain assumptions were made for the time period under study. These assumptions were that:

- A general war will not occur.
- An economic collapse of the West will not occur.
- The Coast Guard will remain a component of the Armed Forces of the United States.

- The Coast Guard will continue as a single organizational entity.
- The Coast Guard's primary functions will continue to be centered around marine and maritime matters.
- The Coast Guard's humanitarian role will remain at the heart of its character.
- The Coast Guard will remain an "operational" organization in that operational facilities will be utilized in the performance of many of its responsibilities.
- The essential character of Coast Guard operating forces and organization will remain multi-mission oriented.

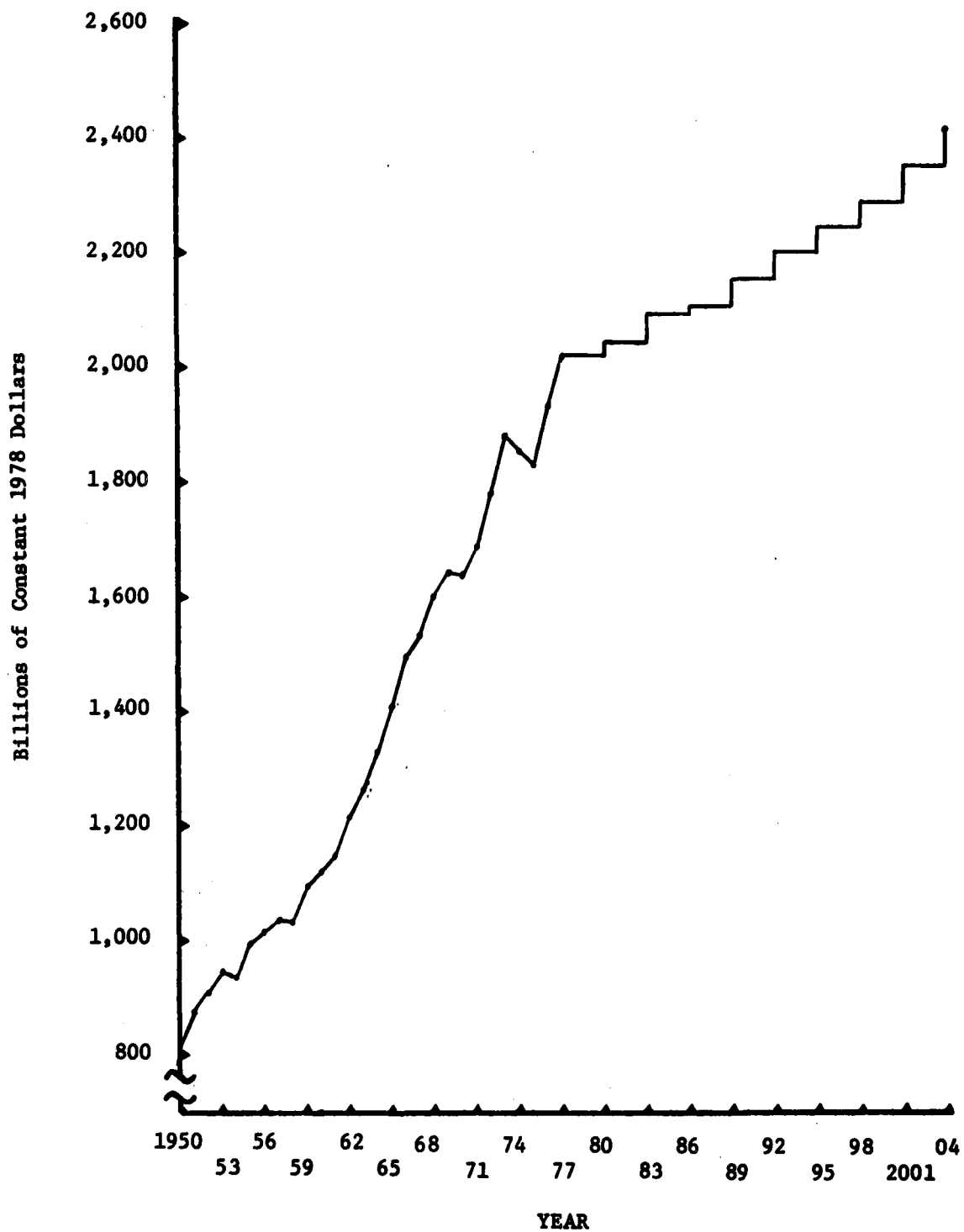
3.3 Forecasts for Representative Trends

The following descriptions of the six quantitative and nine qualitative trends are based on the integrated projections of the cross-impact model. The factors considered by this model included the effects of events on trends and the interaction among trends.

3.3.1 U.S. Gross National Product

The model considered quantitative trends in order to describe the economy and the availability of scarce resources during the time period in question. The chief measure of the economy as a whole, Gross National Product (GNP), was set to follow a pattern forecast in current analyses of the U.S., a moderate growth of 3.9% per year.¹ This rate of increase, although optimistic, still indicates a period of continued scarce resources and the need for informed economic decision-making. Real income will continue to grow along with the economy, signalling continuing competition between civilian and military salaries. The trend of GNP directly affects all critical planning and programming components of the Coast Guard management system. In addition, it has a significant direct impact on Manning, Recruiting and Re-enlistment, and Budgeting components. Figure 3-1 shows the forecast pattern of GNP.

FIGURE 3-1. U.S. GROSS NATIONAL PRODUCT



3.3.2 Total U.S. Population Ages 18-24 Years Old

A second trend with implications especially strong for Manpower Planning, Manning, and Recruiting and Re-enlistment is the total U.S. Population Ages 18-24 Years Old. After two decades of growth in the 1960s and 1970s, the population in this prime recruiting age group is projected to level off through 1983 and then decline till 1989 when it will once again level off. The size of the young adult population, projected in agreement with Bureau of Census projections as closely as the model allows, indicates a growing scarcity of manpower in the primary recruiting pool. Competition among the services for recruits will grow and the need to retain trained personnel will be strengthened. Figure 3-2 pictures the historical and projected behavior of this trend.

3.3.3 U.S. Unemployment Rate

A third trend corroborating the increased competition is the United States Unemployment Rate (Figure 3-3) which is projected to follow a downward course, reaching 3.62% in 2004. With a decreased pool of the unemployed from which to recruit, private industry will be vying for both skilled and unskilled workers. Workers skilled in electronics and other technical areas will draw a particularly high premium in private industry as more sophisticated technologies are introduced into the day-to-day working and living environments of the private economy.

3.3.4 Military Annual Pay Rate and Veterans Compensation and Pension

The model's projections of two trends, Military Annual Pay Rates and Veteran's Compensation and Pension, reflect a probable response to the increased competition for manpower. Figures 3-4 and 3-5 show the forecast growth of these means of compensation and indicate that the military will choose to compete aggressively for the scarce manpower available. Veteran's Compensation and Pension Benefits rise quickly to counteract adverse effects of the public's attitude toward the military and to appease that same public's expectations

FIGURE 3-2. TOTAL U.S. POPULATION AGES 18-24 YEARS OLD

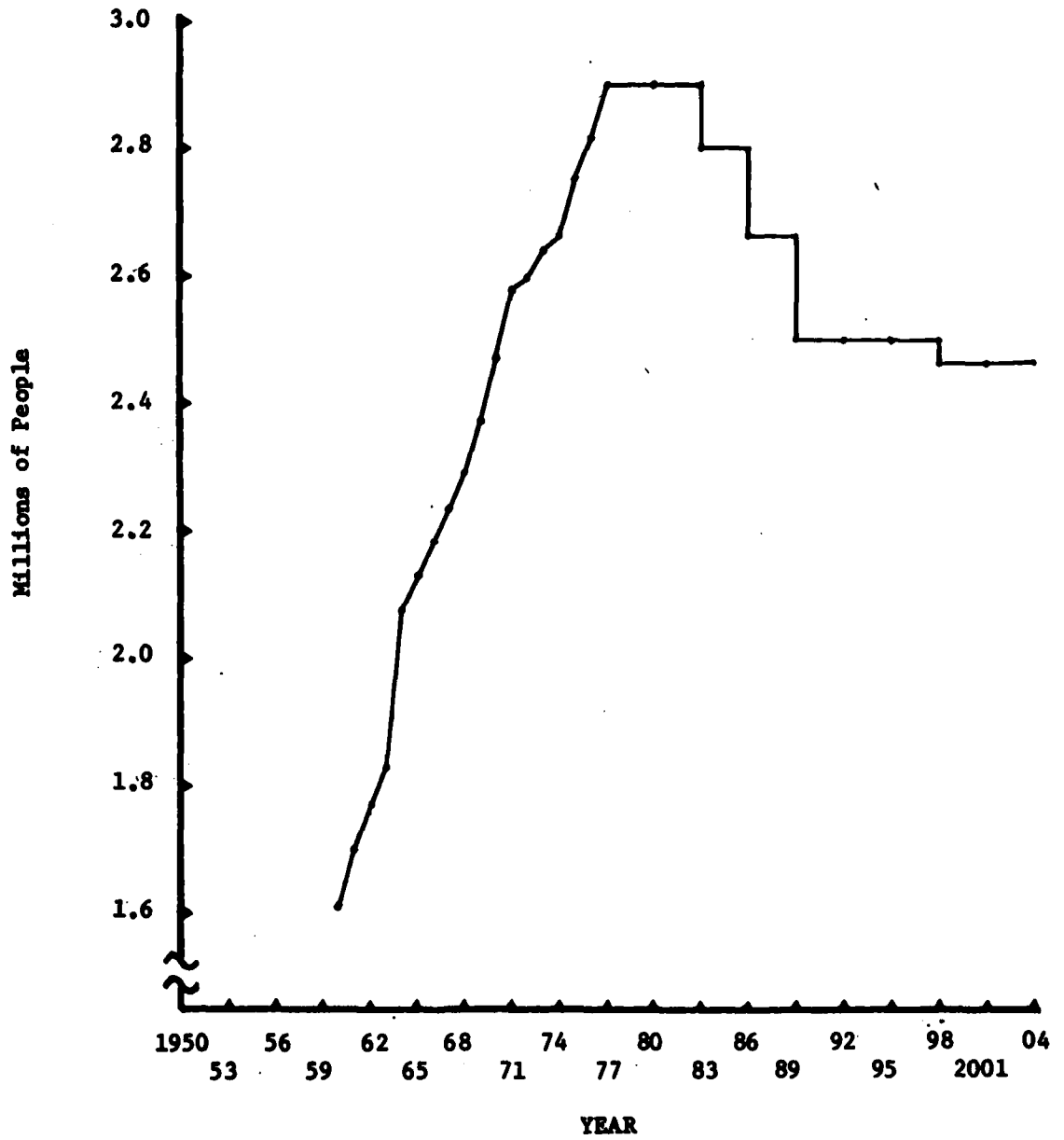


FIGURE 3-3. U.S. UNEMPLOYMENT RATE

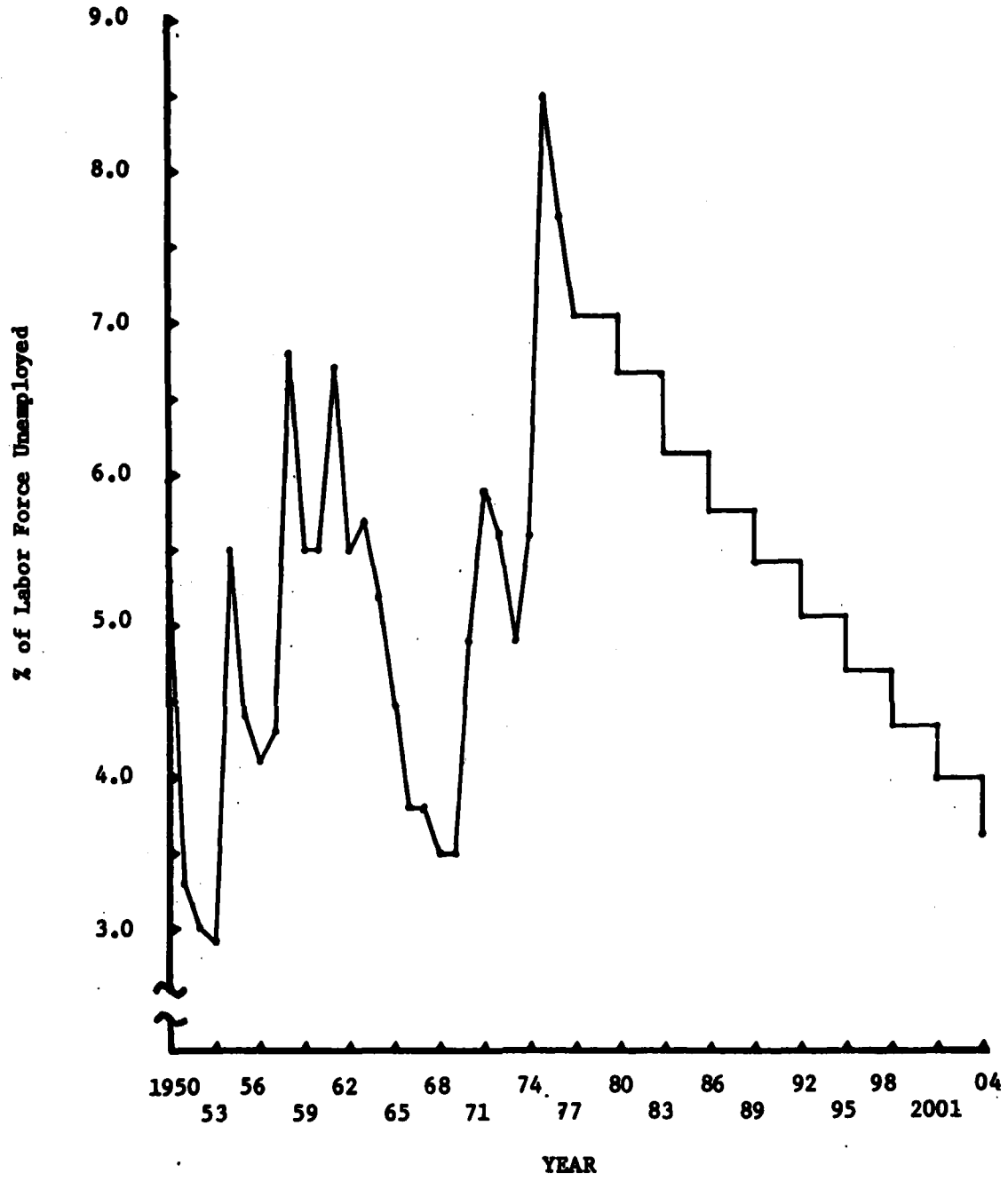


FIGURE 3-4. MILITARY ANNUAL PAY RATE

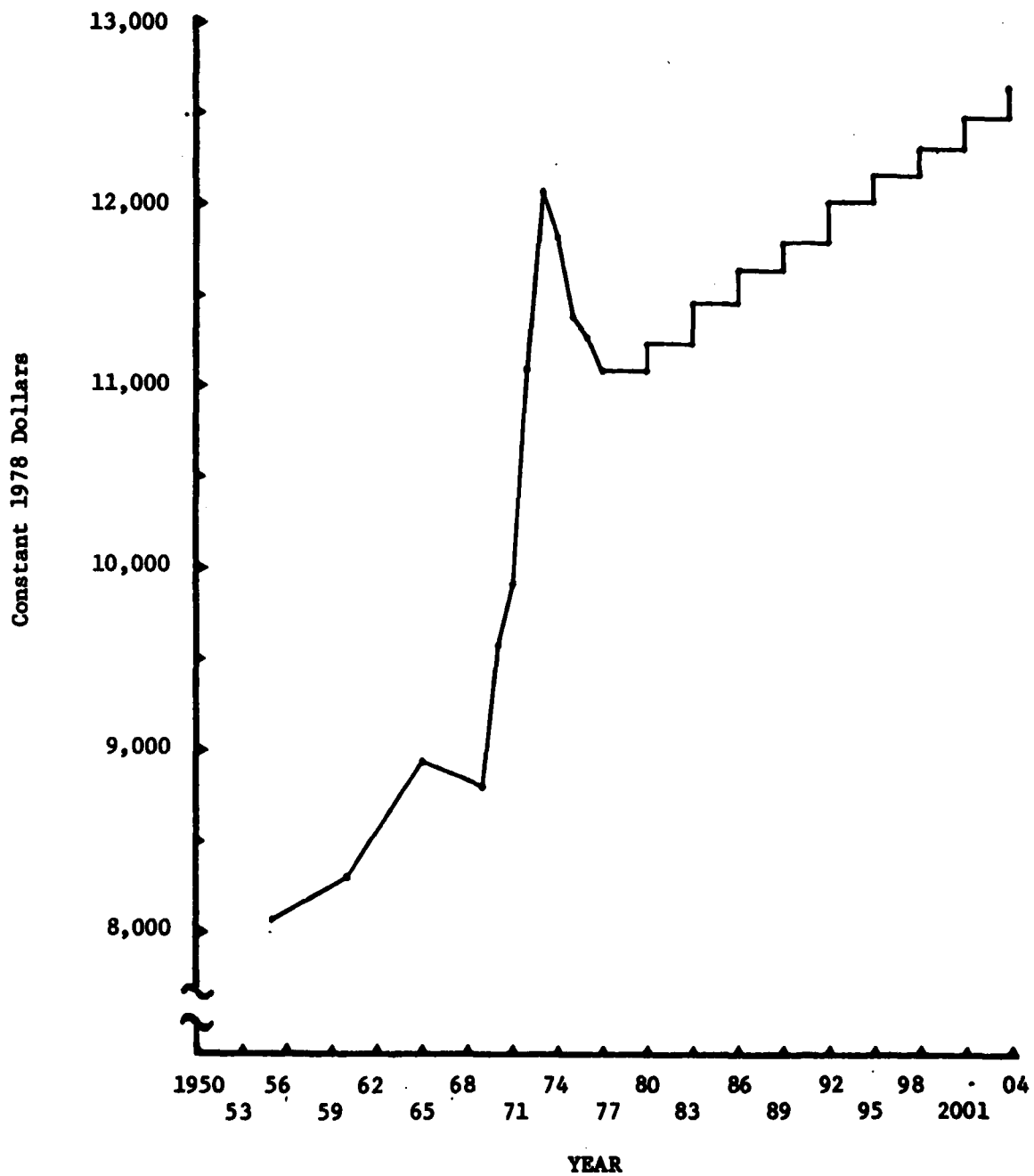
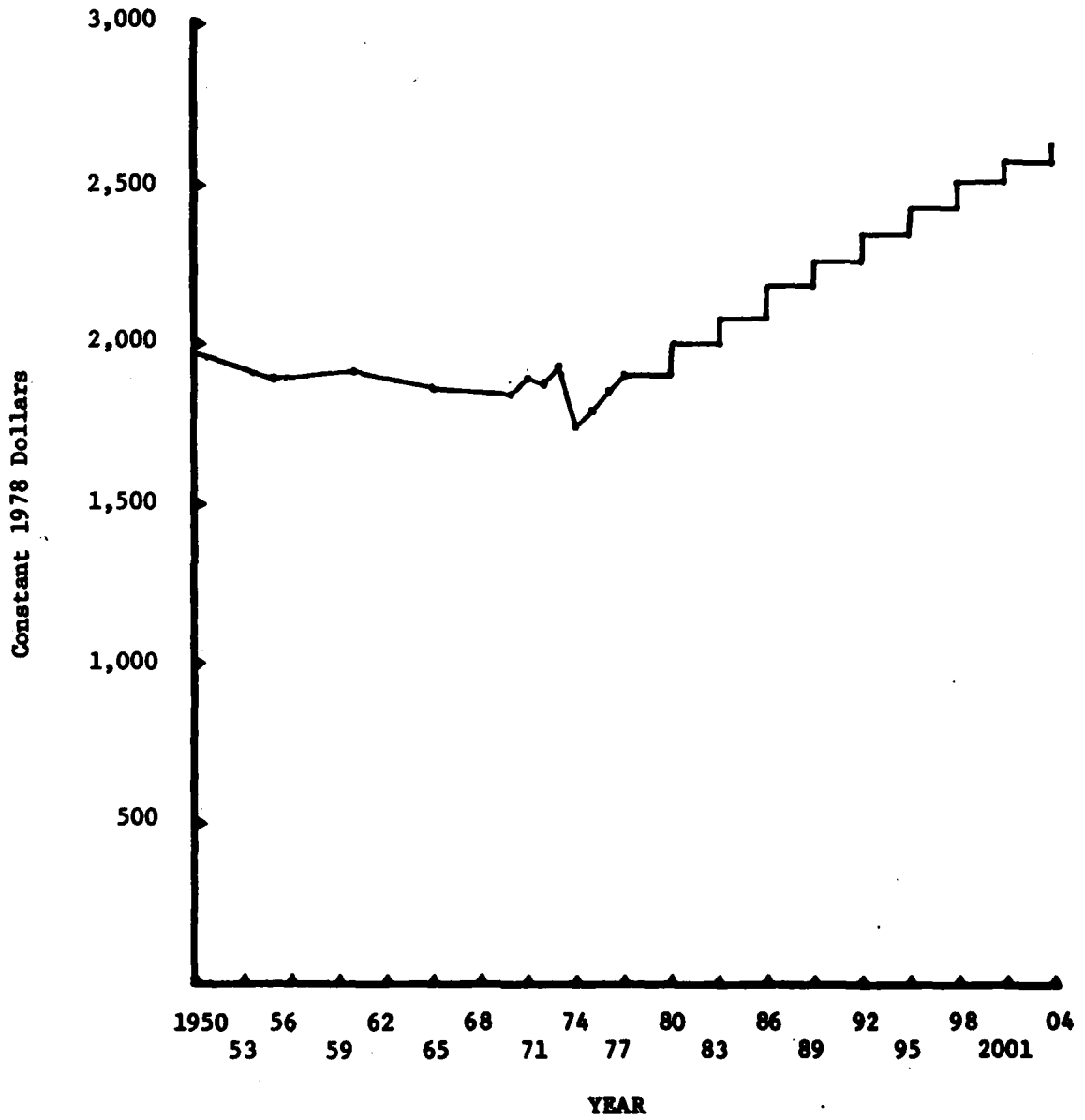


FIGURE 3-5. VETERAN'S COMPENSATION AND PENSION BENEFITS
(Average Annual Payment)



for higher living standards. This same trend makes joining or staying in the Coast Guard more attractive. The Military Annual Pay Rate increases at almost the same rapid rate as Veteran's Compensation for many of the same reasons: the need to compete with private industry, to counteract adverse attitudes toward the military, and to meet increased expectations for improved living standards and rewarding work. The Military Pay Rates may be significantly impacted by events, especially the possibility of unionization.

3.3.5 U.S. Defense Spending

The final quantitative trend, U.S. Defense Spending, represents an overall measure of government economic support for military and quasi-military agencies. More specifically, it provides an indicator, albeit a very general one, of the amount of support that the Navy will provide the Coast Guard in readiness missions or, alternatively, the extent to which Navy will seek cost-effective support from the Coast Guard. The model projected Defense Spending as increasing at a very slow rate (Figure 3-6) after the extreme fluctuations of the 1960s and 1970s. This indicates that defense funding will not become much more plentiful during the period under study and that the Coast Guard should continue to expect to be called upon by the Navy to perform readiness duties in those cases where USCG is the more cost effective service.

3.3.6 U.S. Public's Attitude Toward the Military

Defense Spending is affected by the U.S. Public's Attitude Toward the Military which the model predicts will fall precipitously as shown in Figure 3-7. The public as a whole will view the armed forces in an increasingly negative manner. Individual sections of the populace, particularly the young, may still view the military as a good place to get an education through ROTC or initial training. However, many of these ROTC officers and enlistees then leave as soon as their obligation is completed. This phenomena is illustrated by the fact that out of the 16,000 cadets enrolled in United States colleges and universities, only 4,000-5,000 will be

FIGURE 3-6. DEFENSE SPENDING

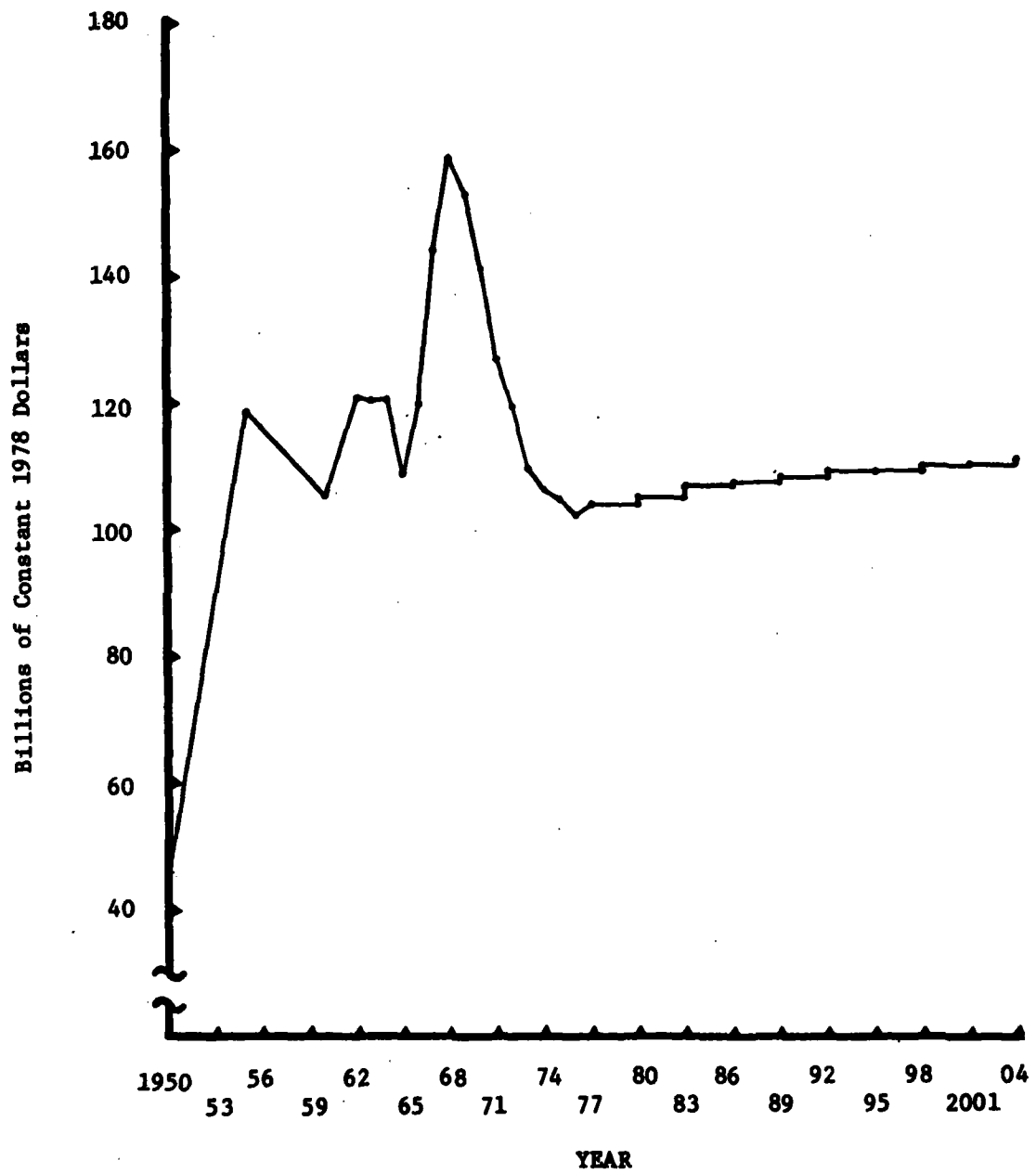
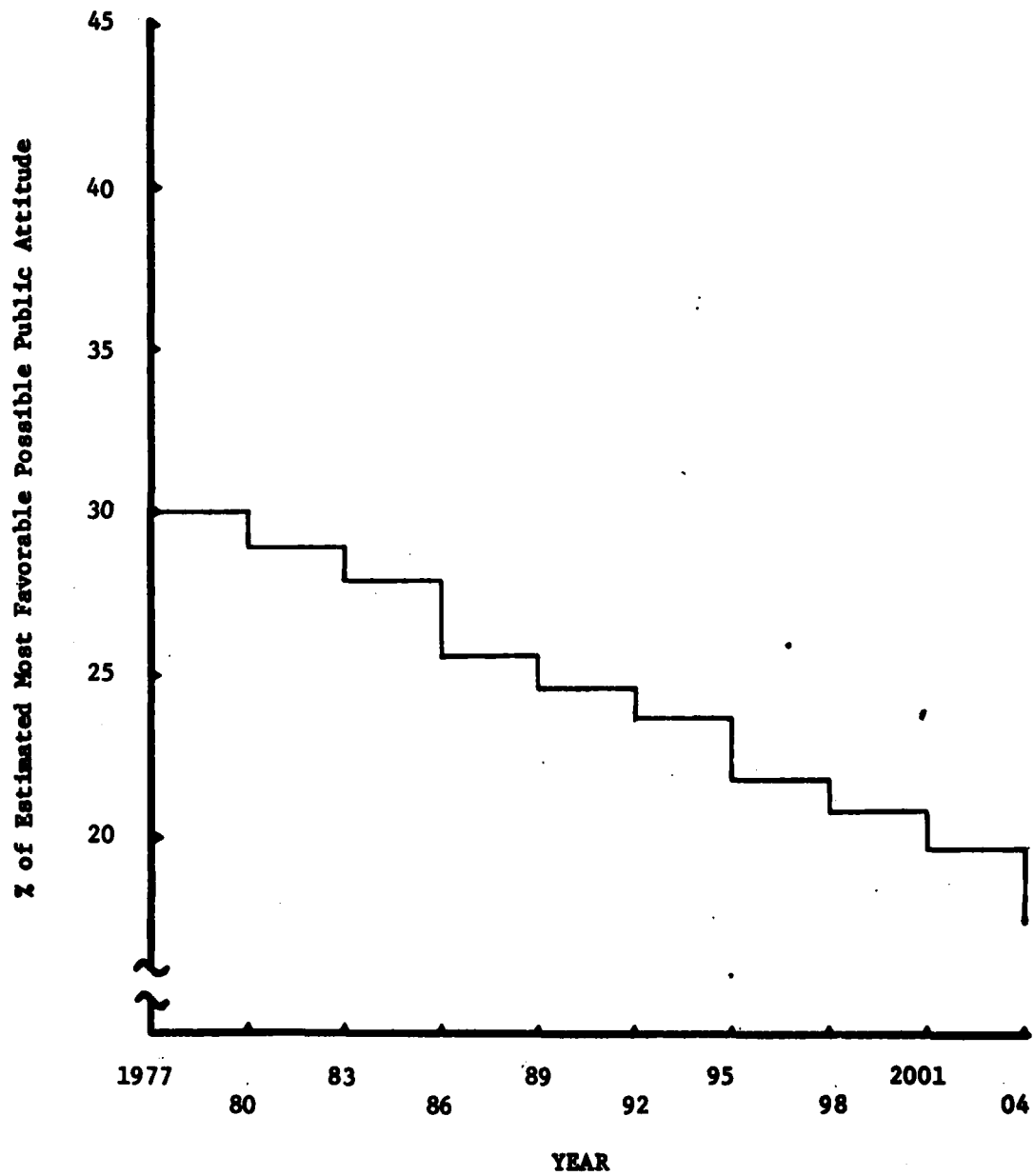


FIGURE 3-7. U.S. PUBLIC'S ATTITUDE TOWARD THE MILITARY



commissioned.² The Coast Guard benefits at least slightly from the other services' woes since they gain in competitive position with new recruits looking for the "best" or most acceptable service in which to enlist.

The overall negative attitude toward the military has been developing over the last 20 years. In the 1960s, a strong anti-militarist attitude appeared during the Vietnam war. In the 1970s this was replaced by an attitude of indifference toward the military and the gradual emergence of ideals of a "worker democracy" (see discussion of "Expectations for Rewarding Work"). Many of those involved in or influenced by the period of the youth revolution now constitute a large part of the work force and available personnel pool.

In addition, the idea of professional commitment to military service may be changing. Increasingly, high technology equipment is being used in the military. These technological advances demand a higher degree of specialization and skill among military personnel, necessitating a change in the philosophy behind personnel management. Many believe that the day of the military generalist is past; military personnel management should seek to increase professional competence, improve productive competition, and provide greater satisfaction by encouraging officers to focus their careers according to individual talents and interest. As one author states:

Increasingly, organizational goals command allegiance only to the extent that they coincide with personal career goals and self-fulfillment.³

Many of the other current problems and attitudes towards the military are reflected in the current debate over the all volunteer force (AVF). The following lists some criticisms of the present all volunteer force.

- The AVF increasingly has become a force of the poor and black because they have trouble finding jobs elsewhere. (One in four enlisted men in the Army is black.)
- The military services are not getting their quota of people scoring in the upper ranges of their intelligence tests. They are considering lowering their standards and concentrating on simplifying weaponry (repair, operation, etc.).
- Active reservists have dropped 12% since 1973. Reserves are considered the bulwark of emergency mobilization until other forces can be recruited and trained. Before the AVF, reservists joined as a means of avoiding the draft. Now they do not have to.⁴
- The number of 18 year old males in 1985 will be 15% below what it is today, resulting in manpower shortages for the AVF.
- In case of emergency, the military services do not have a list of prospects. It would take 65 days to deliver first recruits.
- Desertion rates are very high.
- The dropout rate is high. 40% of those who enlisted in the Army in 1974 failed to complete three years.

3.3.7 Reputation of the Coast Guard

The forecast of the status of the reputation of the Coast Guard differs markedly from that of the public's attitude toward the military as a whole. The Coast Guard has traditionally enjoyed a good public reputation as a humanitarian service. In recent years, this favorable image has expanded to include such missions as environmental protection and marine law enforcement aspects. As a result of trying to adapt resources to sufficiently cover the new operations, the Service has undergone some strains on resource usage. The model forecasts that these stresses and setbacks will be overcome and the Coast Guard's reputation will be enhanced over time. Coast Guard's multi-mission image and consequent public accountability for diverse areas may

have short-term fluctuations based on specific incidents (e.g. Cuyahoga) but, overall, the Coast Guard will continue as a leading service and spokesperson in domestic and international forums. Figure 3-8 shows the forecast of this stepwise continued improvement of the Coast Guard reputation.

3.3.8 Demand for USCG Services

Of the modeled trends, Demand for Coast Guard Services has, by far, the greatest effect on the critical components of the areas of concern. Demand is predicted to hold steady during the 1980s and then to increase at a rate varying from scene to scene through 2004 (Figure 3-9). Considering the continued slow growth of the economy and negligible increase in defense spending forecast for the period, this continued increase in demand for services is another signal of possible strains in stretching scarce resources to meet increased pressures.

Increased demand for Coast Guard services significantly and directly impacts Planning and Programming of all four areas of concern. It also directly affects Manning, Continuing Training, Budgeting, Material Design and Deployment. In addition, all other critical components are indirectly affected by this demand.

3.3.9 Quality of U.S. Education

The trend of Quality of Education in the U.S. starts at a low basepoint. There is a general consensus that public education in this country has been deteriorating over the past 10-15 years. From the 1920s to the mid-1960s, education made continuous gains. Test scores went up, the high school drop out rate went down, the median number of school years increased. However, national Scholastic Aptitude Test (SAT) scores have been dropping since 1963. Early on, educators thought this drop was attributed to the widening of educational opportunities in the 1960s (i.e. a greater percentage of high school graduates were entering college). However, the scores continued to decline in the 1970s. For example, by 1977, only 44 percent of those taking the SAT

FIGURE 3-8. REPUTATION OF THE COAST GUARD

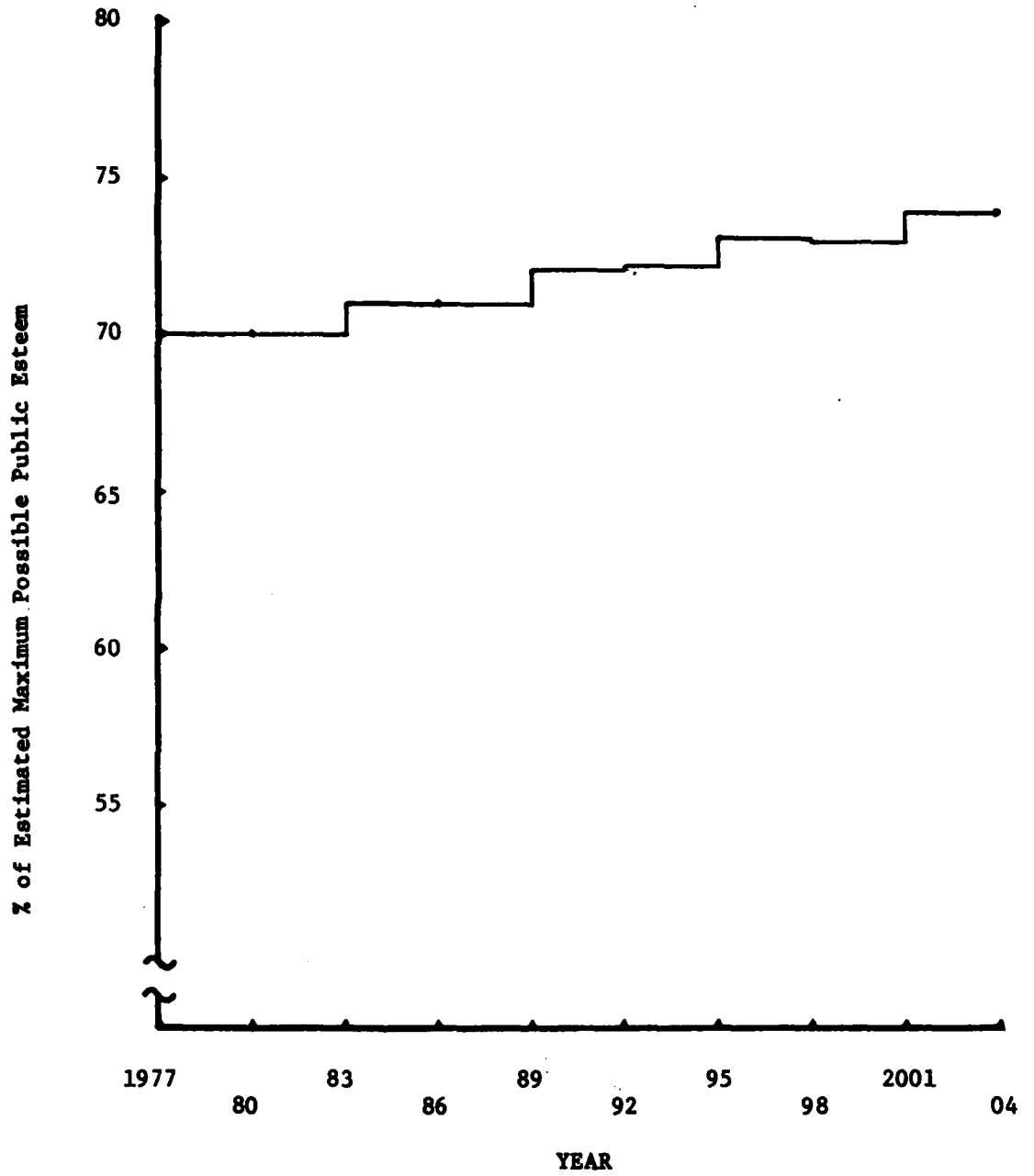
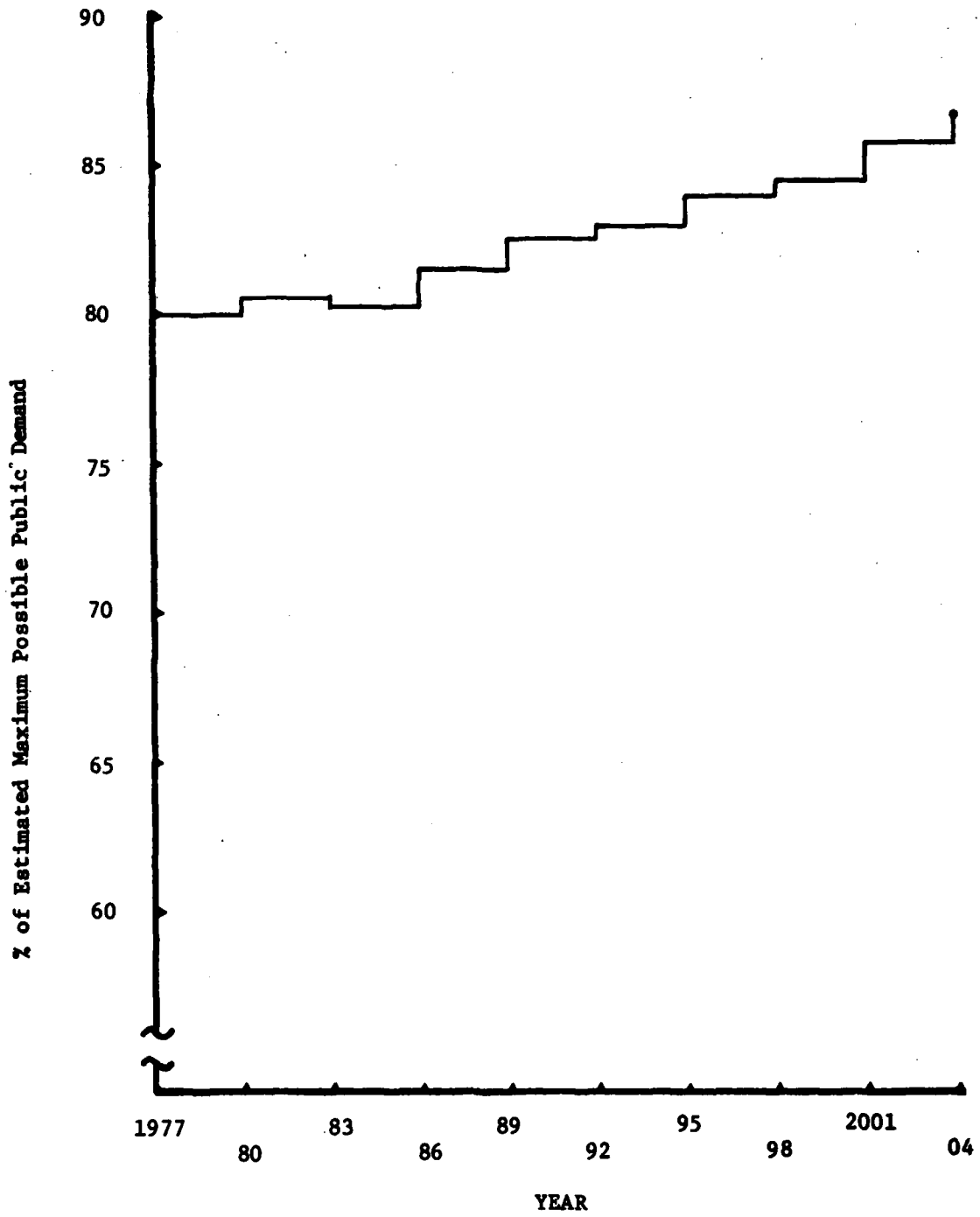


FIGURE 3-9. DEMAND FOR USCG SERVICES



reached the 1970 median level on mathematical questions and 39% on verbal questions. In addition, McGraw Hill tests showed a nationwide decline in reading, language and math skills between 1968 and 1973 for students in grades six through ten.⁵

The cross-impact model predicts that the quality of education will begin to improve, although slowly, during the next 25 years (Figure 3-10). There is independent evidence to support this turnaround. Today's students are already doing as well as their predecessors on tests of truly basic skills. Indeed, according to the National Association for Education Progress, 9 year olds improved in both reading and writing between 1970 and 1974.⁶

However, there is doubt that the rate of improvement in education can catch up with the speed of change in society and the increased sophistication of technology. The great majority of Americans may well remain "functional illiterates" unable to catch-up with the changes around them. The implications of this pattern are great for Personnel Planning, Initial Training, and Command and Supervision. Quality of education undoubtedly impacts Continuing Training, Planning and Programming and Design of Material, and Planning and Programming, and Dissemination of information. It also has some effect on Manning, and on Recruiting and Re-enlistment.

3.3.10 Reliability of the U.S. Workforce

A second trend predicted to show marked improvement is the reliability of the workforce. This trend represents a group of attitudes and subtrends which basically profile the moral and ethical state of society. The trend includes consideration of life style changes, drug abuse and the role of religion in society. The trend's projection (Figure 3-11) shows a marked improvement in reliability through the 1980s followed by a six year plateau. Reliability then resumes its rise. Because this trend reflects the total attitude of society, it is influenced by most of the other economic and

FIGURE 3-10. QUALITY OF U.S. EDUCATION

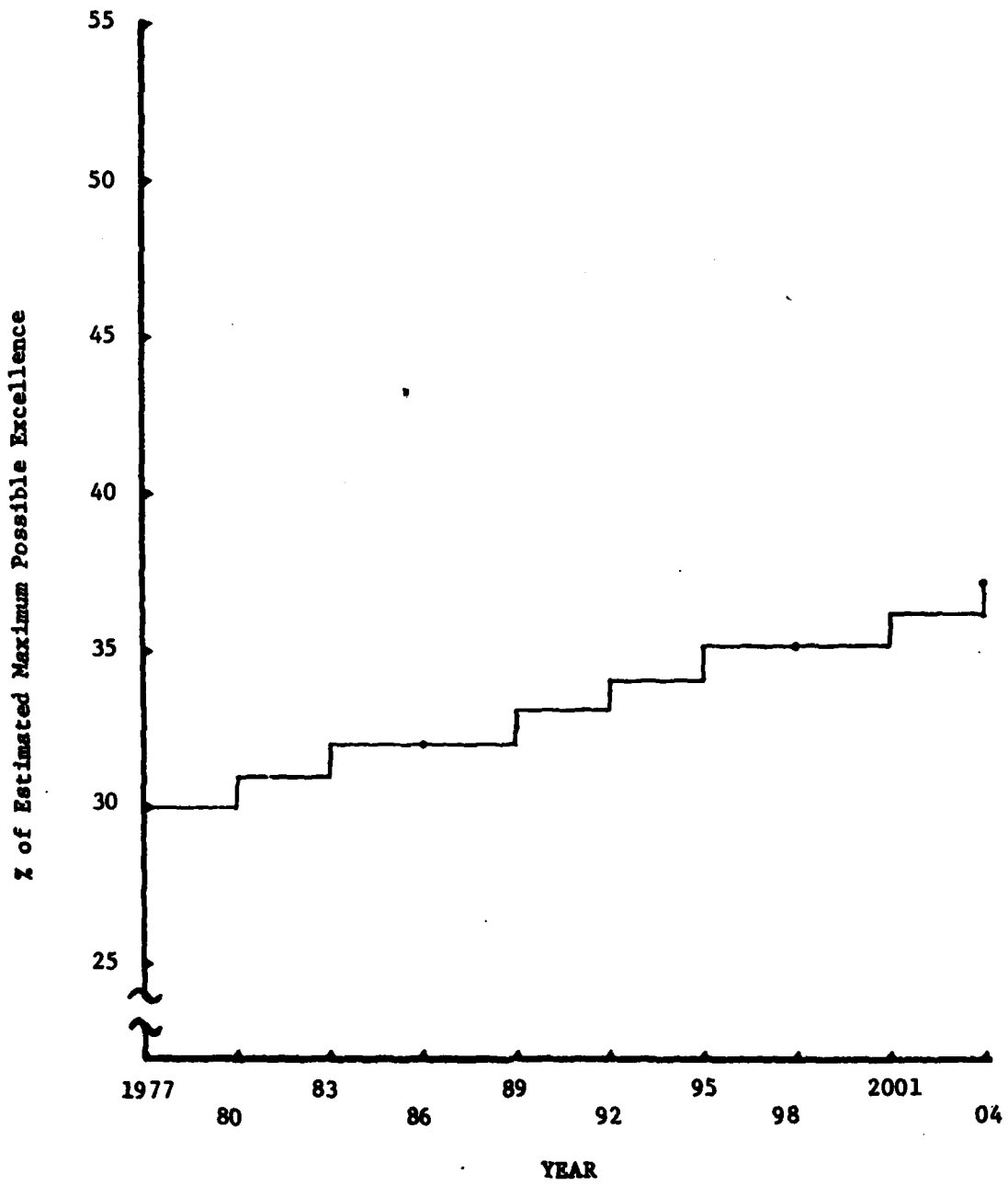
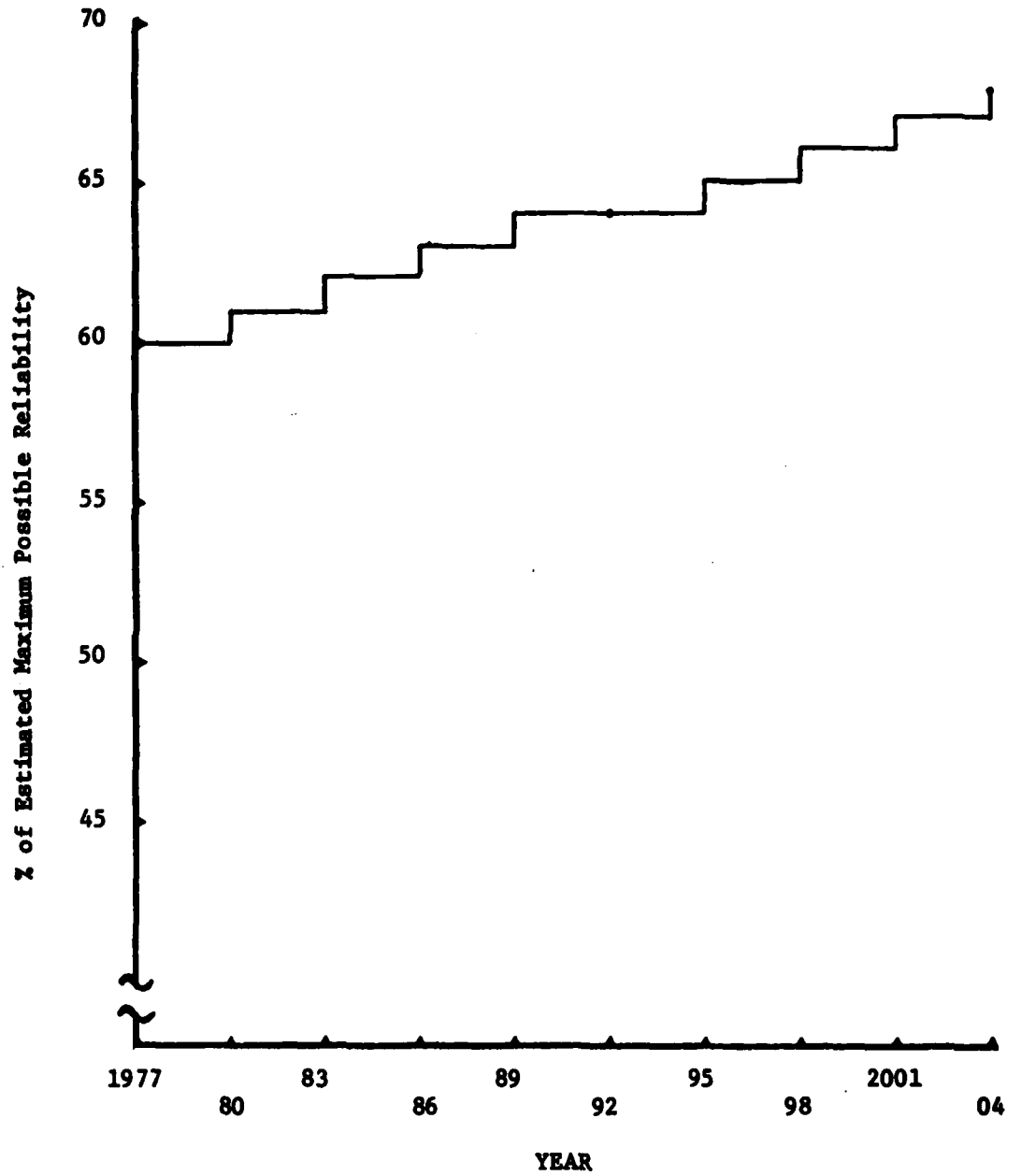


FIGURE 3-11. RELIABILITY OF THE WORKFORCE



societal trends including Gross National Product, Military Pay Rates, Unemployment Rates, Expectations for More Rewarding Work, Attitudes Toward Authority, and the Evolution from Authoritarian Management to Group Decision-making. Reliability of the workforce most strongly affects the Planning and Programming of Manpower, and the style of Command and Supervision utilized to deal with the workers. Manning decisions and Continuing Training components are affected to a moderate extent while Recruiting and Re-enlistment, and Initial Training are slightly influenced by reliability.

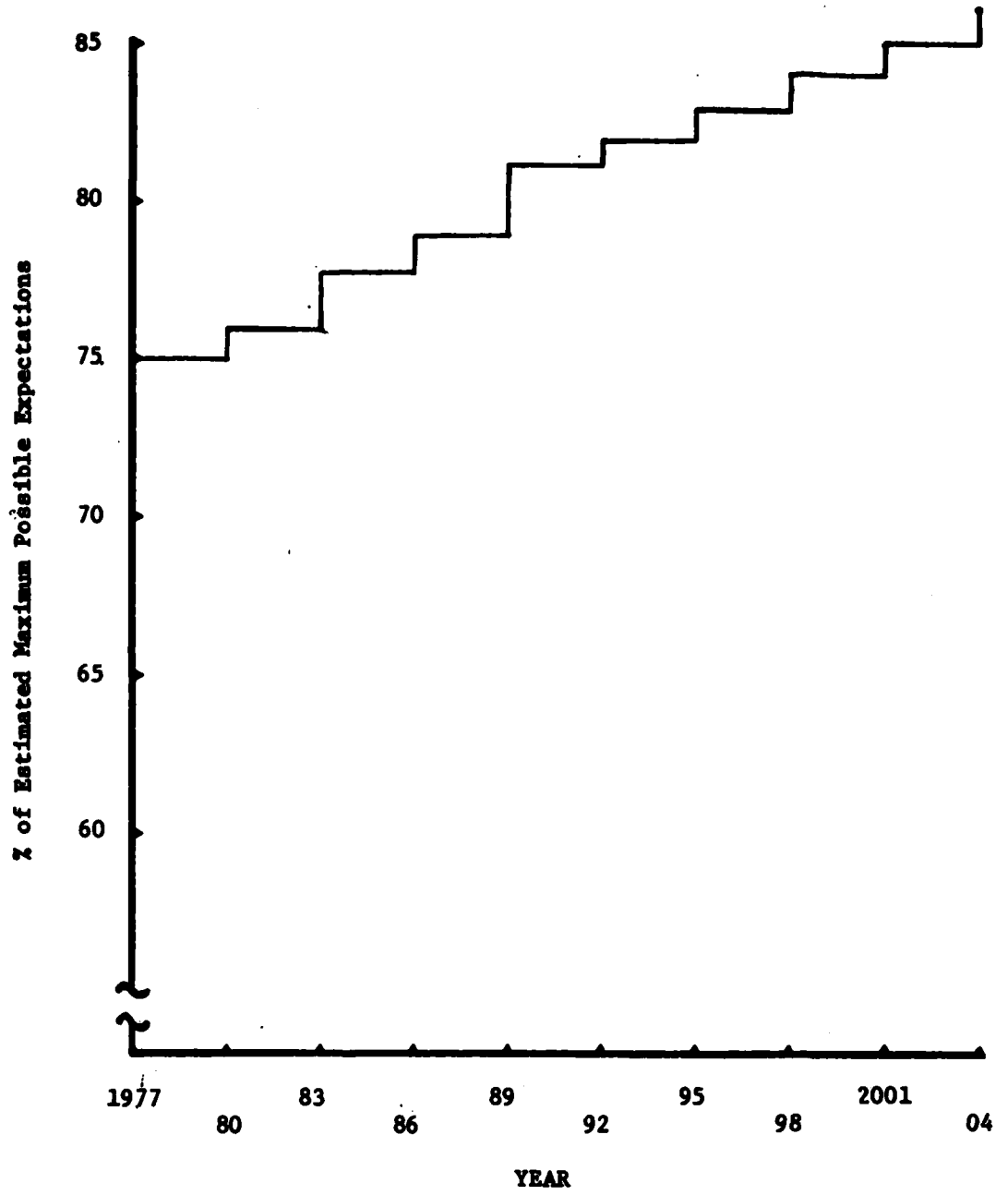
3.3.11 Expectations for Rewarding Work

The growing expectations of the workforce for rewarding work is another trend with which the Coast Guard must cope if it is to meet the challenges of the next 25 years. Figure 3-12 illustrates the projection of the future direction and rate of change of this trend.

Dissatisfaction with work has been increasing in recent years despite higher pay and improved physical conditions. The major reason for this has been rising expectations as to the amount of gratification or psychological satisfaction a person should get from his job. In other words, the expectations for rewarding work have been increasing.

College graduates, especially, have grown increasingly dissatisfied with their work. Colleges are turning out graduates faster than the marketplace can create jobs that match their training and skills. These graduates are becoming increasingly frustrated when their levels of pay and responsibility do not meet their expectations. This problem is expected to increase in the 1980s and 1990s. As the baby boom population moves into the 25-44 age bracket, there will be greater competition for high level jobs. Highly qualified people will be forced to enter less interesting mid-level jobs. Pollster Daniel Yankelovich talks about a new breed of workers that demand "full enjoyment as well as full employment."⁷ Young people consider enjoyable work to be one

FIGURE 3-12. WORKERS' EXPECTATIONS FOR MORE REWARDING WORK



of their rights.

Dissatisfaction among hourly factory workers has already been highly publicized. Again, workers are not dissatisfied with their pay but rather with the actual work they do and the lack of full utilization of their potential. The dullness of the factory spreads into their everyday life. The distinction between blue collar and white collar clerical workers has become blurred. One major study by the Opinion Research Corporation which has been underway since 1960 shows pay satisfaction has increased, satisfaction with job security has remained steady, and satisfaction with a host of other factors have decreased since 1960. Included in these are work enjoyment, general opinion of the company, and satisfaction with the companies' treatment of worker problems and complaints.⁸

These generally rising expectations have implications for the structure of jobs in the future. More participatory decision-making, greater automation of menial tasks, flexible hours, and more vacation time are some possibilities. In the future, it will be harder to get people to do menial, unrewarding work. This is true not only because of changing attitudes, but because of the changing demographics described earlier. Historically, menial jobs such as restaurant work and cleaning have been filled by youths and women. But, by 1990, the proportion of youth available to fill these jobs will diminish significantly.

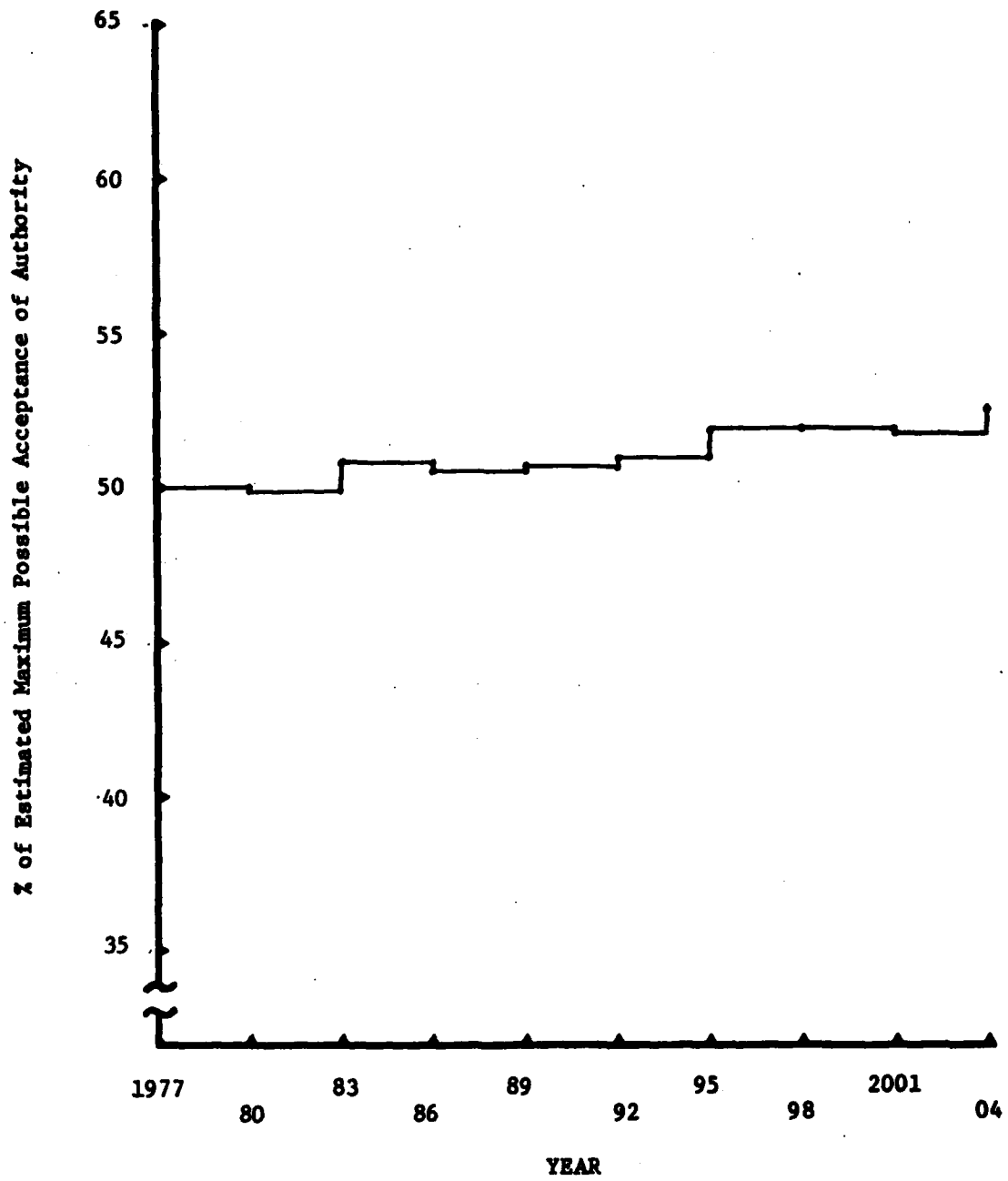
Thus, we will have a tighter labor market at the younger end of the spectrum (with a higher average level of pay and, on average, better job opportunities) and an abundance of workers in the 25-44 category. This will result in a lower average pay scale for the older group. High level prestigious positions will be heavily competed for. Both white collar and blue collar workers will demand a restructuring of jobs to make them more enjoyable and challenging. They will also demand more rights in the workplace.

The characteristics that make work rewarding will change from one scene in the model to the next. Tradeoffs will occur between salary and benefits, and job satisfaction and self-actualization. As the economy improves and jobs are plentiful, making ends meet becomes less important and the amount of psychological satisfaction or gratification a person receives increases in importance. This relationship is reflected in the impacts of Gross National Product, the Unemployment Rate, the Quality of Education in the United States, Expectations of Higher Living Standards and the evolution from Authoritarian Management to Group Decision-making. In turn Expectations for More Rewarding Work affect all critical components in the Coast Guard's Manpower Management Area of Concern; planning and Programming, and Design of Material; and Planning and Programming, and Dissemination of Information.

3.3.12 Attitude Toward Formal Authority of U.S. Public and Evolution from Authoritarian Management to Group Decision-making

The future demand of the worker for more rights and greater participation in the management of his workplace are evident in the trends representing the Attitude of the U.S. Public Toward Formal Authority and the Evolution from Authoritarian Management to Group Decision-making. The 1977 starting point for attitude toward authority is what might be characterized as "so-so," that is, Americans accept a certain amount of formal authority in their everyday lives only because of the need to keep order. The model's projection suggests that these attitudes will become only slightly more favorable in the mid-1980s and again in the mid-1990s. A third increase will occur at the end of the time period (Figure 3-13). However, these three increases do not signal much change in this attitude. The predicted improvement in quality of education and evolution of decision-making toward a group process will impact the attitude toward authority. In turn the Attitude Toward Formal Authority has a significant effect on styles of Command and Supervision. An improvement

FIGURE 3-13. ATTITUDE OF THE U.S. PUBLIC TOWARD FORMAL AUTHORITY.



in this trend may imply development of the interpersonal command skills of officers and Chief Petty Officers (CPO's) which would change relationships and attitudes along the chain of command.

The Evolution from Authoritarian Management to Group Decision-Making indicates the growth of the movement toward greater participation of workers in the management of their workplace. The expansion of this movement will affect the Coast Guard throughout the next 25 years. As shown in Figure 3-14, the change will take place in a stepwise fashion, sometimes holding steady for two scenes before the next increase. The evolution to more group decision-making in a military organization would necessitate complex changes in the structure and style of command. Recruiting and Re-enlistment could benefit if the Coast Guard adopted a progressive attitude toward realigning interpersonal relations within the command structure. However, if the old forms of authority are kept rigid, more recruits and skilled workers could be lost to private industry.

These changes would be most heavily felt in the Planning and Programming of Manpower, in the Command and Supervision of personnel and in the Dissemination of Information. Manning, Training, and Planning and Programming of Information would be moderately affected, while Recruiting and Re-enlistment would be only slightly impacted.

3.3.13 American Public's Expectation of Higher Living Standards

The final trend projected by the model was the Expectation of Higher Living Standards. This trend, which has been gaining momentum over the last two decades, is forecast to rise almost steadily for the next twenty-five years except for a short pause in the mid-1990's (Figure 3-15). Expectations for living standards significantly impact Recruiting and Re-enlistment of personnel, and moderately affect Planning and Programming for Manpower and Material, and the Design and Acquisition of Material.

FIGURE 3-14. EVOLUTION FROM AUTHORITARIAN MANAGEMENT TO GROUP DECISION-MAKING

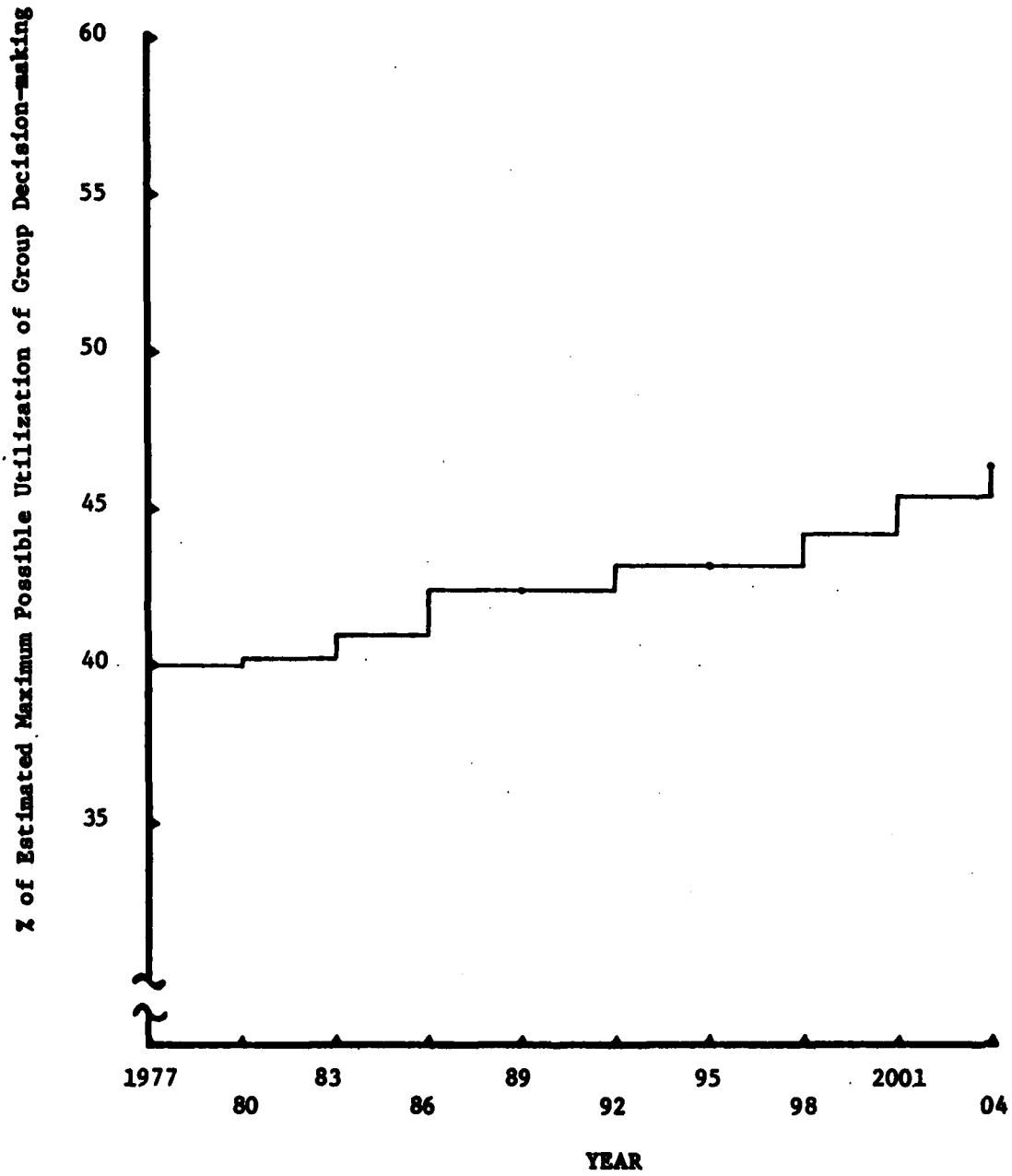
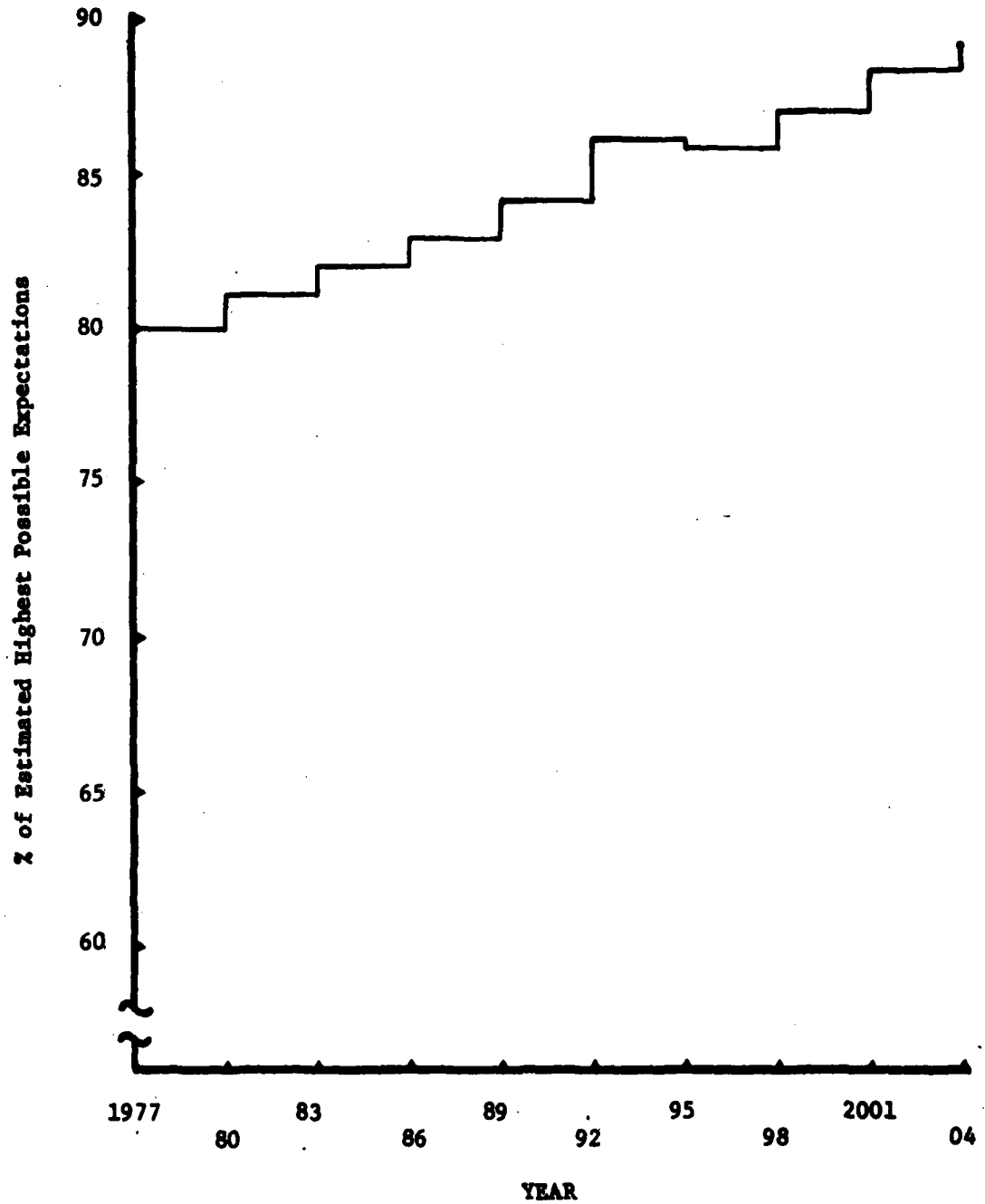


FIGURE 3-15. EXPECTATIONS OF HIGHER LIVING STANDARDS



3.4 Chapter Summary

This chapter has presented a narrative and graphic description of the next 25 years in terms of the social and economic trend modeled during the study. This discussion provides an overview of the influence of these forecasts on the Coast Guard. The following chapters provide a detailed examination of the predicted impacts of specific trends and events on the Coast Guard resource management system.

CHAPTER 3 FOOTNOTES

1. "The World Economy is Happily Out of Sync," Fortune (August 13, 1979), p. 113.
2. Phone conversation with Col. Edward Kelley, TRADOC, September 26, 1979.
3. Taylor, William J., Jr., "Military Professionals in Changing Times." Public Administration Review (November/December 1977), p. 633-640.
4. Rogers, Warren, "The All-Volunteer Army's Bleak Future," The Washington Post (August 8, 1978), pp. D1 and D5.
5. Jencks, Christopher, "What's Behind the Drop in Test Scores," Working Papers (July/August 1978), pp.29-30.
6. Ibid.
7. Kanter, Rosabeth Moss, "A Good Job is Hard to Find," Working Papers (May/June 1979), p.47.
8. Cooper, M. R. et al, "Changing Employee Values: Deepening Discontent?," Harvard Business Review (January/February 1979), pp. 117-125.

CHAPTER 4

MANPOWER MANAGEMENT

4.1 Introduction

This chapter explores the influence of predicted trends and events on the management of Coast Guard manpower resources. It first describes the USCG's manpower management system as a baseline for projection. The discussion of the baseline system illuminates some significant current issues which may intensify within the time period under study. The next section forecasts the impacts of trends and events on USCG manpower management to 2004, highlighting projected problem and opportunity areas. The final section summarizes significant findings for each component of the manpower area of concern.

4.2 The Coast Guard's 1979 Manpower Management System

The status of the Coast Guard's Manpower Management System is graphically presented in Table 4-1 which provides a profile of the cross-support relationships among the components of the manpower management area and those of other areas of concern. The components of the manpower management system have a complex set of cross-support linkages, indicative of the fact that the management of people is involved in handling every other resource area.

4.2.1 Need for Stronger Support Among Areas of Concern

The cross-support linkages shown in the exhibits are those effective today. Specific linkages can be expected to change over time. For example, the information management area will support manpower activities more strongly as user-responsive information systems are implemented. The Coast Guard should carefully consider manpower, funding and

TABLE 4-1. CROSS-SUPPORT RELATIONSHIPS OF MANPOWER MANAGEMENT CRITICAL COMPONENTS

	Manpower							Funds							Material							Information					
	Long-Range Planning and programming	Manning	Recruiting and Re-enlistment	Training - Initial	Training - Continuing	Command and Supervision	Long-Range Planning and programming	Short-Term Budgeting	Long-Range Planning and programming	Design	Acquisition	Deployment	Repair and Maintenance	Long-Range Planning and programming	Design	Acquisition	Deployment	Repair and Maintenance	Long-Range Planning and programming	Design	Acquisition	Deployment	Repair and Maintenance	Long-Range Planning and programming	Processing and Storage	Systems Acquisition	Dissemination
Manpower	0	0	0	M	M	M	M	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	O	O	O
Funds	L	H	H	H	H	H	M	M	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L
Material	M	H	H	L	L	L	M	M	H	H	H	H	H	H	M	M	M	M	M	M	M	M	M	M	M	M	M
Information	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Dissemination	M	O	L	L	L	M	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Key
 H - High Impact
 M - Medium Impact
 L - Low Impact
 O - No Impact

material needs for support as it develops its information systems so that each system will have a positive impact on the appropriate user groups of each area of concern.

A second area in which stronger cross-support linkages should be formulated for the future is that of material management. Specifically, personnel decisions should be more strongly supported by material planning and, conversely, the life cycle needs of a piece of equipment should be calculated and taken into consideration during material planning and programming. Personnel planning should at least be coordinated to equipments and, ideally, tied to their acquisition.

4.2.2 Need for a Future-Oriented Planning Process

A second critical problem area in the planning and programming component of manpower management focuses on the short-term horizon which is often applied to planning. The quality of planning for manpower and in all of the other areas of concern could be greatly improved by adoption of a more long-range, future-oriented view.

A second opportunity for improvement in planning is in strengthening the linkage between planning and programming, and between programming and manning. Many of the Coast Guard personnel interviewed for this study characterized planning as being an interesting look into the future but as not being really tied to resource decisions. Programming was considered to be the first linking of actual operations to out-years. An integrated system which directly links planning to resource allocation would permit the Coast Guard to prepare to meet the demands of the next 25 years.

A final issue in planning for manpower needs is how to measure productivity. Interviewees generally agreed that current measures of effectiveness are insufficient for assessing productivity. It is difficult to assess productivity without a common denominator of measurement, and with the multi-mission structure some concepts may not be comparable: Readiness, Operations and Engineering deal with

hardware; Personnel and Reserve with people; etc. There is a tendency to measure performance based on paperwork workload when actual measures should be in lives and property saved. A seat-of-the-pants judgment may be adequate without deriving the huge data base needed to determine risk, or a "least effectiveness" measure could be used. Each task should be looked at for effectiveness and use. Missions must be examined regularly during budgeting and decisions made as to where to spend money to do the most good.

4.2.3 Major Issues in Manpower Planning

Three major issues in current manpower planning came to the fore during the study of the Coast Guard's baseline management system: roles of civilians, women and minorities in the Coast Guard.

4.2.3.1 Military/Civilian Balance

Overall, the military/civilian balance in the Coast Guard was considered acceptable by interviewees although they felt there might be room for some adjustment at Headquarters. There are both advantages and disadvantages to changing the civilian level at Coast Guard. As the situation now stands, civilians are used in facilitation areas. Merchant Marine Safety has a large block of civilians in its documentation section doing paralegal and admeasurement work. Clerical is 90% civilian. In the Information Systems Division, 66 out of 76 employees are civilian. All of the top-level positions, however, are military. The Deputy Chief Counsel is one of the few civilians at Deputy Division Chief level. The lack of promotion opportunities for civilians in the Coast Guard appears to be a major force behind rapid civilian turnover. While a few holdouts insist that the Coast Guard would be more efficient without civilians, on the basis that it is difficult to determine how to handle them and hard to transfer them, most interviewees call for more civilians or at least a restructuring of the civilian contingent. More civilians are wanted in R&D, as accounting area heads, and at HQ where it is felt that the more "permanent" civilians would

be more cost effective than training and retraining the current number of officers performing civilian duties. Civilians could be used where ships command experience is not needed, as they were for lighthouse service. It would also be easier to hire more civilian lawyers than to form a Coast Guard Judge Advocate General (JAG) Corps. The purpose of the uniformed Coast Guard is to perform operational missions. For expertise, utilizing a civilian trained in the area may be more cost-effective than sending an officer to post-graduate school. Overall, there seems to already be some small movement toward this expanded utilization of civilians.

4.2.3.2 The Role of Women in the Coast Guard

The Coast Guard has been a leader in the integration of women into the academy and command positions. However, problems have arisen in recruiting women and in providing the experience for women to be promoted. It is expected that the proportion of women will grow and that recruiting efforts should be strengthened to attract more women. In addition, the support links between personnel and material planning should be utilized to plan facilities in which both men and women can live with proper attention to personal hygiene and privacy.

4.2.3.3 Minorities in the Coast Guard

The current questions of minorities in the service center around the design of the organizational structure of the offices that attend to their affairs. Does there exist a need for command enlisted advisors, human relations teams or the many "people program" offices? These offices could either be combined in a more logical fashion or the functions could be integrated into the operating divisions of the services together with instilling a "human relations orientation" in the officer corps through special training programs.

4.2.4 Issues in the Manning Process

The critical component of manning, the short-range assignment of Coast Guardsmen to do a job, faces several

issues of current concern which could greatly affect the way in which the Coast Guard deals with the future.

4.2.4.1 The Question of Generalists

The Coast Guard has prided itself on being a service composed of "generalists." However, it is becoming more and more difficult to train generalists when equipments are becoming ever more complex, demanding specialist levels of knowledge. A possible solution to this problem is to have the generalist possess an in-depth specialty along with a general technical background.

The organization for assigning personnel could also be improved. There are currently some problems caused by centralization of the enlisted assignment function. District Commanders can no longer determine the location of the tours of enlisted personnel and lose some control over their people since they are unable to use future assignments as rewards.

4.2.4.2 Needs for Different Skill Levels

In addition, technology has already gotten ahead of the ability of the Coast Guard to respond to the requirements for advanced skill levels. The Coast Guard must identify and eliminate duplication and determine how many people are involved in the same type of work. The new technology has had an effect on the type of person needed. The traditional pyramidal structure of personnel requirements with a broad base of low-skilled workers and a few highly-skilled people is reversing. The great need is for the trained, skilled petty officer but there are few positions available in which to train people for this position. The problem is exacerbated by the fact that this is the skilled worker that everyone in the technological society is looking for, greatly increasing competition. It is no surprise that these are the workers that Coast Guard is having the most difficulty retaining. Everyone wants a trained man in mid-career whether officer or enlisted.

4.2.4.3 Sea Duty for All?

The question of whether sea duty should be mandatory for all Coast Guardsmen or made into a specialty has been much debated. On the one hand, assignments are overbilled out to sea. This reduces meaningfulness. By sending a young officer on sea tour and assigning him to be a laundry officer, his ambition may be stifled. If there were a specialized track for seagoing officers, while aviators, engineers and the like were sent to their own specialty school and not out to sea to be generalists, billets would open up for seagoing officers. Many feel it is simply not necessary or even desirable for all Coast Guard officers to be qualified as seamen.

On the other hand, there are those who feel that all career officers should be so qualified; that the experience is essential to obtain the proper Coast Guard point of view. They also feel that sea duty provides them to know how to later deal with the problems of those at sea, and that it is a dis-service if officers are not prepared to be sent back to sea. These interviewees believe that advantages of sea duty outweigh disadvantages even when overbilleting occurs. They reason that putting people on vessels for only a few weeks or months has a good payoff in experience, especially for those in regulatory specialties or vessel traffic. Those holding this viewpoint would also argue that the small size and multi-mission structure of the Coast Guard would make it impractical to set up a structure of Specialty Corps. Small corps limit opportunities for advancement for an officer. In addition, breaking the Coast Guard into smaller pieces would increase the possibility of having those pieces picked up by other organizations.

Several compromise positions have been advanced, shared among them is the opinion that all officers should be qualified as seamen but do not need sea duty leading to command, and that all Coast Guardsmen should go to sea but do not need to become seamen. Another possibility would be to

send officers to sea early in their careers, to acquaint them with sea duty, but let them stay ashore as their careers progress.

4.2.5 Issues in Initial and Continuing Training

Training, both initial and continuing, is an area which everyone agrees should be strengthened today and in the future. There is a need for more training of all types to take up the slack where experience ends or to replace experience where it is impractical or not cost effective to acquire knowledge through experience. More sophisticated equipment and technologies and increased regulatory functions require more highly trained people. The Coast Guard's multi-mission concept may also put unrealistic demands on the Coast Guard for training. For example, it is a great burden to require the same level of military preparedness as the Navy in addition to other USCG missions. At the same time, because of the multi-mission orientation, it seems as though it is no longer necessary to use valuable resources to train all Coast Guardsmen to run a ship. Aviators and engineers benefit from attending specialty schools rather than spending multiple tours at sea.

The interviews also revealed a need for more training in the arts of leadership, command and management. It was suggested that training be repeated every four years during an officer or CPO's career to train officers and petty officers to take responsibility and to lead their people.

4.2.6 Status of Recruiting and Re-enlistment

In the critical component of recruiting and re-enlistment, recruiting is on schedule although there is a need to continue emphasis on the recruitment of women. Re-enlistment difficulties reflect many current problems. The most serious losses occur at the end of the first enlistment period. There are many theories to explain the drop in re-enlistments including the loss of a sense of accomplishment in the work, erosion of benefits, and need for greater control at the District Level. There are also the

strong influences of higher salaries in private industry and the influences of attitudes in society.

4.2.7 Command and Supervision Issues in 1979

Finally, in the Command and Supervision component, there is a need, already evident, for better training in leadership in management to help officers and CPO's to motivate their people and delegate their authority.

4.3 Impacts of Trends and Events on Manpower Management to 2004

Table 4-2 lists the overall impacts of trends on Manpower Management as projected by the cross-impact model while Table 4-3 shows the relative strength of the impacts on the critical components within Manpower Management. The trends will be discussed in order of decreasing impact.

4.3.1 Demand for Coast Guard Services

Demand for Coast Guard Services is the trend with the greatest impact on this area of concern. It directly and heavily affects Long-Range Planning and Programming, Manning and Continued Training. Since demand is projected to increase from an already high level towards saturation and the economic climate is expected to remain tight, Long-Range Planning and Programming must effectively handle an increasing demand on scarce resources. Similarly, manning will be affected by demand in the short-range sense that scarce resources must be allocated to handle near-term demand. Continued training will come into play as more of the current Coast Guard manpower must be reprogrammed through retraining to meet both short and long term needs.

Demand also affects the critical impact areas of Recruiting and Re-enlistment, and Initial Training. Efforts in Recruiting and Re-enlistment will focus on filling the needs for both advanced and basic skill levels required by increased demand. Heightened demand for services will also increase the demand for retention of trained personnel. Demands for a variety of services will affect the structure and content of initial training.

TABLE 4-2. TREND IMPACTS ON MANPOWER MANAGEMENT

	<u>Trend Title</u>	<u>Relative Impact*</u>
1.	Demand for USCG Services	.12
2.	Quality of Education	.10
2.	Evolution from Authoritarian Management to Group Decision-making	.10
3.	Reliability of the U.S. Workforce	.09
4.	Workers Expectations for More Rewarding Work	.08
4.	Total U.S. Population Ages 18-24 Years	.08
5.	Unemployment Rate	.07
6.	Military Annual Pay Rate	.06
6.	Attitude of the U.S. Public Toward Formal Authority	.06
6.	U.S. Public's Attitude Toward the Military	.06
7.	Defense Spending	.05
7.	Reputation of the Coast Guard	.05
8.	U.S. Public's Expectations of Higher Living Standards	.04
8.	Gross National Product	.04
9.	Veteran's Compensation and Pension Benefits	.01

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

TABLE 4-3. DIRECT IMPACTS OF TRENDS ON CRITICAL COMPONENTS OF MANPOWER MANAGEMENT

	Demand for USCG Services	Evolution of Education in the U.S.	Reliability of Workforce	U.S. Population 18-24 Years Old	Military Annual Pay Rates	U.S. Public's Attitude Toward Formal Authority	Defense Spending	Reputation of the Coast Guard	Expectation of Higher Pay Rates	Gross National Product	Veterans Compensation and Pension Benefits
Long-Range Planning and Programming	H	H	M	H	M	L	M	L	M	M	O
Manning	H	L	M	L	O	O	L	O	L	O	O
Recruiting and Re-enlistment	M	M	M	H	L	H	M	H	H	M	M
Training - Initial	M	L	M	O	M	L	L	L	O	O	O
Training - Continuing	H	M	M	O	M	O	M	L	O	O	O
Command and Supervision	O	H	M	O	L	M	O	L	O	O	O

Key
H = High Impact
M = Medium Impact
L = Low Impact
O = No Impact

4.3.2 Quality of Education in the United States

The Quality of Education in the United States has the second greatest impact on the manpower management area of concern. This trend, which starts at a very low point but improves slowly throughout the next 25 years, necessitates planning for the general level of education of the American public. Considering the need for improved education to begin to catch up with the technically sophisticated equipments of the time period under study, there will be a great need for the Coast Guard to plan and program accordingly. The depth and breadth of Initial Training will also be significantly affected since the less educated the workforce, the more need for career-oriented extended education. Command and Supervision will also have to be designed to meet the needs of a public which is functionally illiterate, that is, which cannot keep up with the technological sophistication of society.

4.3.3 Evolution from Authoritarian Management to Group Decision-making

The trend with the third greatest impact, and one which should be of particular interest to managers preparing for the manpower needs of the future, is the Evolution from Authoritarian Management to Group Decision-making. This trend, which actually measures the quality of worklife overall and relates specifically to the demand of workers to have greater participation in the management and decision-making processes of their organization, is predicted to grow at an accelerating rate during the period under study. Some of the consequences of this growth will be the institution of such "quality of work life" programs as flexible working hours, a voice in organization policy and other privileges.

These demands reflect the transformation of the American workforce in the last two decades by the rapid influx of millions of young workers, post World War II babies who have always known prosperity. These workers, who will

soon form a majority of the American workforce, may be characterized as educated and ambitious but skeptical, often arrogant and demanding. Contemporary workers do not view their jobs as a simple contract: a day's work for a day's pay. "They want nothing less than 8 hours of meaningful, skillfully guided, personally satisfying work for 8 hours' pay," according to labor-relations analyst John R. Browning.¹ Frequent clashes between old-line management and this new breed of workers have shown that today's workers cannot be simply ordered around.

Obviously, these developments have significant implications for the styles of Command and Supervision adopted by Officers and Chief Petty Officers if the Coast Guard is to attract and retain the quality personnel it needs. Officers cannot treat their juniors as second-class citizens. Instead, new channels of communication with the enlisted ranks and junior officers should be developed. This does not imply a basic change in the military structure which already has the flexibility and responsiveness needed for the type of tasks the Coast Guard performs. However, the trend strongly suggests that any unnecessary rigidity of military discipline should be eased. Carefully designed, imaginative training at both the initial and continuing level could do much to set the stage for meaningful work.

4.3.4 Reliability of the Workforce and Expectations for More Rewarding Work

Closely related to the quality of worklife trend are the trends dealing with Reliability of the Workforce and Expectations for More Rewarding Work. Reliability of the Workforce, as a representative trend, includes the many changing attitudes and life styles that have signalled unrest in society over the past two decades. Looking at the overall trend, the reliability of the workforce will improve over the next 25 years. This improvement reflects the complex interaction of many trends and events, some reinforcing, others off-setting.

The Coast Guard should plan and program for the increased reliability and the improvements should make Command and Supervision easier. Reliability will also have moderate influences on Manning and Continuing Training and some influence on Recruiting and Re-enlistment, and Initial Training.

The rapid rise of Expectations for More Rewarding Work directly reflects the quality of worklife movement in which workers demand greater satisfaction from their work rather than just money or benefits. This search for meaningfulness in the workplace can be attributed to the decline of the values that once provided meaningfulness to the worker: the family, the church and the small community. These expectations for more meaningfulness in work could survive even a recession since the new breed of worker, conditioned by boom times, has what many experts call a "psychology of entitlement" to satisfactory pay and benefits. These heightened expectations will impact all of the critical components of the Manpower Management area of concern equally and at a moderate level.

4.3.5 Effect of Other Trends

The total number of persons in the age bracket 18-24 will have significant implications for Manpower Long-Range Planning and Programming for Recruiting and Re-enlistment. This trend, which is expected to decrease and then level off from the mid-eighties to 2004, signals keen competition for members of a decreased recruiting pool. Considering the continued, moderate increase in GNP, decreasing unemployment, and the austere defense spending climate forecast, the Coast Guard will need all the help possible from the increased military salaries and veteran's benefits predicted in order to compete with private industry for recruits and skilled technicians. The continued high reputation of the Coast Guard in the eyes of the American public will provide strength for the Coast Guard's recruiting position. If the draft is re-instituted, the Coast Guard will be known as one of the

best services to join. Such a reputation will be particularly helpful in counteracting the negative attitude toward the military which will continue through the period. Finally, the continued rise in expectations for higher living standards re-emphasizes the need for the Coast Guard to improve the habitability and comfort of its facilities. Edward Cornish, editor of The Futurist, attributes these expectations for greater affluence to television.

"Television exposed millions of people in modest or poor circumstances to a highly affluent life-style, which came to be regarded as the 'normal' life-style to which everyone is entitled."²

4.3.6 Significant Impacts of Events

Events considered during the study could affect the Coast Guard either through impacts on the trends within the model or independently through direct impacts on critical components of each area of concern.

4.3.6.1 Affects of High Probability Events

Table 4-4 relates the high probability events to the components which they impact in these ways. Several of the independent effects of these events deserve separate discussion. The technological events which affect Manpower Management are, overall, concerned with the utilization of more sophisticated electronics and the changing work patterns associated with the use of such equipment. The incidence of computers in every home and the replacement of hard copy business documents with soft transmissions will make it possible for a workforce to be distributed over a wide area while being linked by electronic communications. In the office of the future, much of the work will be done at distributed locations and, particularly, at the worker's home. This growth of work outside the office is as important as the change already occurring in demand for leisure time and flexible work schedules. Development of more modular shipboard equipment should permit ship maintenance to be performed on shore rather than by the crew at sea. This will

TABLE 4-4. IMPACTS OF HIGH PROBABILITY EVENTS ON MANPOWER MANAGEMENT COMPONENTS

TECHNOLOGICAL	CURL PROB 2004	Long-Range Planning and Programming Manning Recruiting and Re-enlistment Training - Initial Training - Continuing Command and Supervision						
15% of the Technical, Professional and Management Community Routinely Put In 30% of Their Working Hours in an Office in Their Home	0.70	X	X	X	X	X	X	X
25% of Secretarial and Clerical Community Routinely Put in 50% of Their Working Hours at Home	0.70	X	X	X	X	X	X	X
Ship Maintenance is Predominantly Performed by Shore Facilities Rather Than Crew	0.70	X	X		X	X		
Utilization of More Sophisticated Electronics Permits Reduction of Cutter Operating Personnel by 25% Over 1977 Levels	0.75	X	X	X	X	X	X	X
Home Computers are Found in Almost Every Home and Provide Access to "Super Computers"	0.80	X	X	X	X	X	X	X
At Least 50% of all Currently Duplicated Business Communications are Replaced by Soft Transmission	0.90				X	X		
NON-TECHNOLOGICAL								
Establishment of a 200-Mile Economic Zone	0.95	X	X	X	X	X		
Consolidation of U.S. Ocean-Related Agencies	0.50	X	X	X	X	X	X	X
USCG Takes Over NOAA Ship Operating Activities	0.50	X	X	X	X	X	X	X
States Take Over Boating Safety Programs	0.99	X	X	X	X	X	X	X
Demand for Coast Guard Services on Inland Waterways Doubles Over 1977 Level	0.70	X	X	X	X	X	X	X
Re-introduction of Draft for Men	0.60	X	X	X	X	X	X	X
Civilianization of 25% the Jobs in the USCG	0.50	X	X	X	X	X	X	X
Operation of USCG Maintenance Installations Taken Over by Contractors	0.70	X	X		X	X		
The Military/Uniformed Services are Unionized	0.30	X	X	X	X	X	X	X
50% of Shore-Based Services Work Under Flextime	0.90	X	X	X	X	X	X	X
25% of Workers Elect to Remain in Workforce Past Age 65	0.50	X	X	X		X	X	X
Job Security and Salary are the Main Requirements for Job Satisfaction	0.75	X	X	X	X	X	X	X
Workers Place a High Premium on Interesting Work	0.50	X	X	X	X	X	X	X

relieve the crew of most of its maintenance responsibilities, freeing up time for use in actual operations. The change will also free up training time for multi-mission responsibilities in place of maintenance training. Technological advances in shipboard electronics and communications should also permit the reduction of crew size and, consequently, the cost-effective use of manpower.

4.3.6.2 Low Probability Events of Special Interest to Manpower Management

Table 4-5 presents the impacts of three additional events on Manpower Management. Although these events were incorporated in the model at low, 10% probabilities, there was such concern among study participants that the impacts of the events are included in this report.³ Introduction of the draft for women would significantly impact Long-Range Planning and Programming for manpower and Recruiting and Re-enlistment. The opening of combat duty to women and the employment of civilians on Coast Guard cutters would have far-reaching implications for every component of Manpower Management.

4.4 Summary of Significant Findings by Critical Component of Manpower Management

The relative impacts of the modeled trends on the critical components of Manpower Management are shown in Table 4-6. This summary is taken from the cross-relevance analysis and is weighted by cross-support values computed for the entire Coast Guard Management System.

Manpower Long-Range Planning and Programming is the most heavily influenced component. The dynamics and complexity of trends and events over the time period of concern indicate the need for an integrated, future-oriented Long-Range Planning and Programming System. In this system, more direct and effective links should be developed between planning and programming, and between programming and manning. Long-Range Planning and Programming of Manpower should also be more closely integrated with the Planning and

TABLE 4-5. IMPACTS OF THREE LOW PROBABILITY EVENTS OF SPECIAL INTEREST TO MANPOWER MANAGEMENT

	Cumulative Probability 2004	Long-Range Planning and Programming	Manning	Recruiting and Re-enlistment	Training - Initial	Training - Continuing	Command and Supervision
Introduction of Draft for Women	.10	X		X			
Combat Duty Opened to Women	.10	X	X	X	X	X	X
Civilians Employed on USCG Cutters	.10	X	X	X	X	X	X

TABLE 4-6. IMPACTED COMPONENTS WITHIN MANPOWER MANAGEMENT

	<u>Component Title</u>	<u>Relative Impact*</u>
1.	Long-Range Planning and Programming	.32
2.	Recruiting and Re-enlistment	.25
3.	Manning	.14
3.	Training - Continuing	.14
4.	Training - Initial	.08
5.	Command and Supervision	.07

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

Programming of other resources.

Recruiting and Re-enlistment is the second most heavily impacted component. Opportunities for improvement include the possibility of recruiting at advanced skill levels to meet the technological challenges of the next 25 years. The current emphasis on joining a service to gain experience is considered detrimental to retention since it does not emphasize the service as a career and encourages recruits and ROTC candidates to leave as soon as they have gotten enough experience to move on to a more lucrative job.

Manning policies must provide for the rotation of personnel to meet demand and to satisfy work reward expectations. The modification of the "generalist" concept to mean skill in several areas rather than proficiency in all provides an opportunity to deal with advanced technologies while preserving flexibility. Concepts of manning will also change as more work is done in the home through teleconferencing and other electronic means.

More emphasis on Continuing Training will be required over the next 25 years to keep pace with technology, to provide more job satisfaction for retention, and to provide the management training necessary for human resources development.

Initial Training will require restructuring based on the skill levels being recruited. In addition, although the forecast is for an improving quality of education, there will still be a need for remedial education for the basic recruit in order to make him or her "functionally literate" within the Coast Guard's sophisticated technological environment.

Policy options within the component of Command and Supervision deserve special mention. Overall, this component is the least influenced by trends within the Manpower Management area of concern. However, there are several very important facets of the trends which will affect Command and Supervision which the Coast Guard should carefully consider. First, the nature of the enlisted person and junior officer

will be changing over the next 25 years. The reliability of the workforce will improve but along with this reliability will come the "new breed of worker" who requires a better quality of worklife and participation in the decision-making process. The effective supervision of these workers requires that the Coast Guard take a hard look at its command style and structure and integrate appropriate measures for human resources development.

CHAPTER 4 FOOTNOTES

1. "New Breed of Workers," U.S. News and World Report, September 3, 1979, p. 35.
2. Edward Cornish, "The Future of the Family: Intimacy in an Age of Loneliness," The Futurist, Vol. XIII, No. 2 (February 1979), p. 47.
3. There was also a very significant division of opinion on whether these events were of high or low probability.

CHAPTER 5

FUNDS MANAGEMENT

5.1 Introduction

The management of funds is central to the Coast Guard management system and is significantly related to almost every other facet of resource management. This chapter considers the future of the management of funding by describing significant issues of the baseline 1979 funds management, exploring the relationship of predicted trends and events to the critical components of this area of concern, and drawing conclusions for viable policy options for the Coast Guard to follow in constructing its future funds management system components.

5.2 Coast Guard's 1979 Funds Management System

The support relationships between the two critical impact areas of funds management and the components of the other three areas of concern are shown in Table 5-1. This analysis indicates the centrality of funds management to the entire Coast Guard management system. Particularly noteworthy are funds management's major contributions to the planning and programming of other resources and, in turn, the affect of planning for other resources on funds management.

Both budgeting and longer range financial planning are major influences on material management critical components. This relationship has important implications for future facilities policy decisions to replace cutters and shore facilities and to update equipments to more sophisticated technologies.

TABLE 5-1. CROSS-SUPPORT RELATIONSHIPS OF FUNDS MANAGEMENT CRITICAL COMPONENTS

	Manpower						Funds						Material						Information													
	Long-Range Planning and Programming	Manning	Recruiting and Re-enlistment	Training - Initial	Training - Continuing	Command and Supervision	Long-Range Planning and Programming	Short-Term Budgeting	Long-Range Planning and Programming	Design	Acquisition	Deployment	Maintenance	Repair and	Long-Range Planning and Programming	Systems Acquisition	Processing and Storage	Dissemination	Long-Range Planning and Programming	Short-Term Budgeting	Long-Range Planning and Programming	Design	Acquisition	Deployment	Maintenance	Repair and	Long-Range Planning and Programming	Systems Acquisition	Processing and Storage	Dissemination		
Manpower																																
Funds																																
Material																																
Information																																

Key
H - High Impact
M - Medium Impact
L - Low Impact
O - No Impact

5.2.1 Long-term Planning and Programming of Funds

The mid and long-term aspects of financial planning and programming suffer from the same problems as planning and programming in the other three resource areas. That is, financial planning and programming, but particularly planning, is affected by the overall short-range viewpoint taken by most personnel toward future-oriented processes. Short-range firefighting and quick-fix development often receive priority over long-term issues.

5.2.2 Short-term Budgeting Issues

Two more important immediate issues affect budgeting. According to project interview data, budgeting is cost accounting driven. However, the manner in which costs are recorded differs from the format in which the budget is drawn to the degree that conversion, where possible, is inefficient and time consuming. In many cases, there is no way to connect actual programs with the dollar numbers; facility-based accounting system does not seem to provide the necessary data to deal with the scarce resources future forecast.

Also, headquarters does not have a great deal of control over money once the budgets are set; this control is at the District level. There is debate over whether greater centralization may be appropriate in the future.

These issues present immediate policy opportunities for the Coast Guard to put emphasis on the development of better, more responsive cost accounting tools.

5.3 Impacts of Trends and Events on Funds Management to 2004

Tables 5-2 and 5-3 summarize the impacts of trends on this area of concern as shown by the cross-impact analysis. The increased pressure of the rising costs to do business over the next 25 years is signalled, in part, by the upward trends of Military Annual Pay Rate and of Veterans Compensation and Pension Benefits. This increased cost of doing business will be coupled with the continually increasing Demand for Coast Guard Services to present a

TABLE 5-2. TREND IMPACTS ON FUNDING MANAGEMENT

	<u>Trend Title</u>	<u>Relative Impact</u> *
1.	Military Annual Pay Rate	.30
2.	Demand for Coast Guard Services	.22
3.	Veterans Compensation and Pension Benefits	.15
3.	Gross National Product	.15
3.	Defense Spending	.15
4.	U.S. Public's Attitude Toward the Military	.04

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

TABLE 5-3. DIRECT IMPACTS OF TRENDS ON CRITICAL COMPONENTS OF FUNDS MANAGEMENT

	<i>Military Annual Pay Rate</i>	<i>Demand for USCG Services</i>	<i>Veterans Compensation and Pension Benefits</i>	<i>Gross National Product</i>	<i>Defense Spending</i>	<i>U.S. Public's Attitude Toward Military</i>
Long-Range Planning and Programming	H	H	M	M	M	L
Short-term Budgeting	H	M	M	M	M	O

Key

- H = High Impact
- M = Medium Impact
- L = Low Impact
- O = No Impact

critical policy problem in planning for the allocation of scarce funds. In addition, the continued moderate growth in the economy throughout the next twenty years shown by the moderate rise of GNP reinforces the predictions of a continued heavy emphasis on economic considerations in determination of policies and planning of operations.

The negative trend in the public's Attitude Toward the Military strongly suggests that the taxpayers' resistance to funding government programs (especially military) will continue to grow. This possibility is supported by the forecast lack of growth in Defense Spending.

The public's hostile attitude also suggests that there will be a dramatic increase in the need to publicly account for funding decisions. Budget justification will be ever more carefully scanned. Questioning of the Non-appropriated Fund Activities (NAFA) and Special Services program will recur with every budget submission.

Several indirect trend effects are worthy of mention. The increasing expectations of workers for better living standards will be felt through the need to budget more funds for improvement of the habitability of Coast Guard facilities and the replacement of obsolete structures. There will also be continuing pressure to plan funding for better quality training, both initial and continuing.

5.4 Impact of Events on Funds Management

A number of events will directly impact Funds Management either through the modeled trends or independently as shown in Table 5-4. Especially important impacts would include the operating economics produced by the performance of ship maintenance by shore facilities rather than crews and the reduction of crew sizes permitted by the utilization of more sophisticated electronics. The consolidation of U.S. ocean-related programs would cause a fundamental change to the entire funds resource management system. The operation of USCG maintenance installations by contractors would modify the focus of accounting procedures.

TABLE 5-4. IMPACTS OF HIGH PROBABILITY EVENTS
ON FUNDS MANAGEMENT COMPONENTS

	CUM. PROB 2004	Long-Range Planning and Programming	Short-term Budgeting
TECHNOLOGICAL			
15% of the Technical, Professional and Management Community Routinely Put in 30% of Their Working Hours in an Office in Their Home	0.70		
25% of Secretarial and Clerical Community Routinely Put in 50% of Their Working Hours at Home	0.70		
Ship Maintenance is Predominantly Performed by Shore Facilities Rather Than Crew	0.70	X	
Utilization of More Sophisticated Electronics Permits Reduction of Cutter Operating Personnel by 25% Over 1977 Levels	0.75	X	
Home Computers are Found in Almost Every Home and Provide Access to "Super Computers"	0.80		
At Least 50% of all Currently Duplicated Business Communications are Replaced by Soft Transmission	0.90		
NON-TECHNOLOGICAL			
Establishment of a 200-Mile Economic Zone	0.95	X	X
Consolidation of U.S. Ocean-Related Agencies	0.50	X	X
USCG Takes Over NOAA Ship Operating Activities	0.50	X	X
States Take Over Boating Safety Programs	0.99	X	X
Demand for Coast Guard Services on Inland Waterways Doubles Over 1977 Level	0.70	X	X
Re-Introduction of Draft for Men	0.60		
Civilianization of 25% the Jobs in the USCG	0.50	X	X
Operation of USCG Maintenance Installations Taken Over by Contractors	0.70	X	X
The Military/Uniformed Services are Unionized	0.30	X	X
50% of Shore-Based Services Work Under Flextime	0.90		
25% of Workers Elect to Remain in Workforce Past Age 65	0.50		
Job Security and Salary are the Main Requirements for Job Satisfaction	0.75	X	X
Workers Place a High Premium on Interesting Work	0.50	X	

5.5 Summary of Significant Findings by Component of Funds Management

Table 5-5 shows that the two components of Funds Management, Long-Range Planning and Programming and Short-term Budgeting, will be equally impacted by the set of modeled trends when they are considered within the total Coast Guard Resource Management System.

In the next 25 years, as the Coast Guard takes on more duties with the same funding resources, the service must procure additional resources, eliminate some work now being done or delegate specific mission performance. The need to procure additional resources from a reluctant Congress and to justify budget decisions to a hostile public indicate that the Coast Guard set a policy of developing, through management training and the use of experts, the most sophisticated tools available for financial management. These tools would include life-cycle costing and present value analysis. Their use would permit the Coast Guard to develop powerful arguments for the cost effectiveness of their programs and strengthen its case for increased funding.

The forecast impacts on financial areas of concern also support the Commandant's findings concerning the management of the NAFA/Special Services programs. These conclusions as expressed in the Long-range View were that:

The magnitude, complexity and continued growth of NAFA/Special Services programs within the Coast Guard in terms of dollars, workforce, number and types of activities, financial systems, worldwide applications and a need for sound business practices will require increased headquarters level involvement in overall management and control. In order to improve the efficiency by which these activities operate, affirmative management action is required in the areas of organization and management, planning and programming, fiscal and human resource management, and consistency in operation and performance. It is apparent, however, that development will be a gradual process over a number of years.¹

TABLE 5-5. IMPACTED COMPONENTS WITHIN FUNDS MANAGEMENT

<u>Component Title</u>	<u>Relative Impact*</u>
1. Long-Range Planning and Programming	.50
1. Short-term Budgeting	.50

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

Finally, the problems involved in funding management provide an area in which the Coast Guard can emphasize the need for a future-oriented program view.

CHAPTER 5 FOOTNOTE

1. U.S. Coast Guard, Commandant's Long-Range View, COMDTINST 5000.2C (August 21, 1978), pp. 48-49.

CHAPTER 6

MATERIAL MANAGEMENT

6.1 Introduction

This chapter considers the effects of the future on the management of material resources. First, some significant issues are raised concerning the Coast Guard's current process for material management. Then the impact of future trends and events are related to Material Management. Finally, findings of areas appropriate for policy action are defined and policy options recommended within each component of Material Management.

6.2 The Coast Guard's 1979 Material Management System

Table 6-1 describes the support relationships among the critical impact components of the material resources management area. In the present management system, the components of the material management area contribute substantial support to Manpower Management, Funds Planning and Programming, and Information Planning and Programming. In turn, the Funds Management components substantially influence critical components of Material Management. Information Management components also support Material Management to a moderate extent since the two areas are intertwined.

It is significant that, in the present management system, the Manpower Management area is not perceived as contributing heavily to the support of the Material Management system. This reflects a problem shared among the military services: very little long-range forecasting is tied into the life-cycle personnel needs of a piece of equipment or a facility. If the Coast Guard is to meet the challenges of the more sophisticated equipments of the future, it must more fully integrate personnel planning with equipment

TABLE 6-1. CROSS-SUPPORT RELATIONSHIPS OF MATERIAL MANAGEMENT CRITICAL COMPONENTS

	Manpower				Funds				Material				Information			
	Long-Range Planning and Programming	Manning	Recruiting and Re-enlistment	Training - Initial	Command and Supervision	Long-Range Planning and Programming	Short-Term Budgeting	Long-Range Planning and Programming	Design	Acquisition	Deployment	Repair and Maintenance	Systems Acquisition	Processing and Storage	Dissemination	
Manpower	Long-Range Planning and Programming	H	O	O	M	M	O	L	H	L	L	L	L	L	O	
	Manning	H	O	O	M	M	O	L	H	L	L	L	L	L	O	
	Recruiting and Re-enlistment	M	H	L	H	H	M	O	L	H	M	H	L	L	L	
	Training - Initial	M	H	O	O	O	M	M	H	O	M	H	M	M	O	
	Training - Continuing	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Command and Supervision	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Short-Term Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
Funds	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Short-Term Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Short-Term Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Short-Term Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Short-Term Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Short-Term Budgeting	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
Material	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Design	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Acquisition	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Deployment	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Repair and Maintenance	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Long-Range Planning and Programming	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Systems Acquisition	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Processing and Storage	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Dissemination	L	H	L	O	L	L	L	L	L	O	M	L	L	O	
	Information	L	H	L	O	L	L	L	L	L	O	M	L	L	O	

Key
 H - High Impact
 M - Medium Impact
 L - Low Impact
 O - No Impact

life-cycle planning.

The interviews revealed few problems in the resources management relationships between the Coast Guard Areas and the District structures. The intricate set of support and operational relationships seems to be understood by all the participants.

6.2.1 Long-Range Planning and Programming for Material

Loopholes in the planning process sometimes allow one part of the organization to plan for and procure equipments without parallel planning for the maintenance and support of those equipments. The material planning process suffers from the same short sighted viewpoint as planning processes in other resource areas. Long-range planners have little to do with actual resource decisions. There are few hard and fast decisions in long-range planning. Instead, programming is the decision point.

Prior to the advent of program packages, control in the Coast Guard was by facility. The pendulum then swung in the other direction and people became so program oriented that no one paid any attention to facilities. Recent Commandants have begun to bring the picture into balance by renewing, first, the capital equipment of the USCG and, now, the shore facilities.

6.2.2 Material Design

Design of these shore facilities is beginning to emphasize habitability, especially for bachelors. On-board living conditions, material condition, and appearance of the ships are receiving increased attention.

The present Commandant has stated that Research and Development (R&D) will play an increased role in future ship design, aircraft acquisition and use of shore facilities and boats.¹ However the overall role of R&D appears to be a problem area within the Coast Guard. One of the biggest problems is the question of control: although it seems to be generally believed that the control should not be from the Office of R&D, there is a controversy about just where it

should be located. Thus, one interviewee stated that too much R&D is being done from HQ and not enough out of R&D Center. Another Coast Guardsman suggested that R&D Center be co-located with HQ, which is viewed as the real seat of power. Yet another interviewee believes that R&D must be close to program managers and their needs; that putting the flag at R&D Center would just increase logistics.

R&D has little control over core areas in which money is spent, and none at all over its own manpower. For example, the Office of Engineering (OE) has control over the assignment of electronic engineers in R&D billets. However, OE is working more closely with R&D than before and the traditional resentment is largely gone. R&D's cooperation with all other elements of the Coast Guard is also improving.

The nature of R&D in the Coast Guard is also under debate. It is generally agreed that Coast Guard R&D will never be pure research. Instead, it will consist of practical applications of new schemes and inventions and a substantial amount of test and evaluation and short-term R&D.

R&D's major problems are as follows: a problem in converting the R&D item into the item to be produced, difficulties between the procurers and the maintainers, a short-term viewpoint, and the need for a more effective and efficient method of monitoring R&D developments in other services. There is also the need for an improved measure of effectiveness for R&D. The R&D type of function should be judged, not quantitatively, but by how well the program manager's needs are satisfied.

6.2.3 Material Acquisition

The acquisition process for material also covers several issues in the current management system. Managers complain of a lack of responsiveness due to overcentralization and excessive layering of the contracting function. These problems cause a lack of communication with the contracting officers. A possible solution to this problem would be to decentralize contracting and locate a smaller

contracting office in each area; for example, in the Office of Research and Development or in the Office of Engineering.

6.2.4 Material Deployment

The study of the baseline management system did not reveal any immediate issues in the area of deployment except for the "fact of life" of the scarcity resources available to perform increasing duties.

6.2.5 Repair and Maintenance

The critical impact area of repair and maintenance presented several issues of interest. First, there is the problem mentioned earlier of the loophole that allows one office to procure a system without a plan for maintenance. Secondly, there is a need for a standardized maintenance procedure whether commercial or not. According to interviewees the current material acquisition system lacks a standard maintenance process that applies to all hardware. The complexity of equipment is leading to more maintenance modules. And, finally, there is the need for a better inter-relationship with personnel; repair and maintenance duties might be helped by repeat assignments on cutters of the same type and size.

Each of these problems provides a policy action area for the Coast Guard in which near-term action could produce significant benefits in the future.

6.3 Impacts of Trends and Events on Material Management to 2004

Table 6-2 compares the summed impacts of modeled trends on material management. Table 6-3 details the impacts of the eight trends on the critical components of this area of concern.

Demand for Coast Guard services affects all critical material management components. This trend, whose long-term direction most heavily impacts Material Planning and Programming, and Design, also significantly affects Deployment in its short-term day-to-day operations focus. Since demand is forecast to remain near its present high

TABLE 6-2. TREND IMPACTS ON MATERIAL RESOURCES MANAGEMENT

	<u>Trend Title</u>	<u>Relative Impact</u> *
1.	Demand for USCG Services	.38
2.	Defense Spending	.17
2.	U.S. Public's Expectations of Higher Living Standards	.17
3.	Workers Expectations for More Rewarding Work	.10
4.	Quality of Education	.06
4.	Gross National Product	.06
5.	Reputation of the Coast Guard	.03
5.	U.S. Public's Attitude Toward the Military	.03

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

TABLE 6-3. DIRECT IMPACTS OF TRENDS ON CRITICAL COMPONENTS OF MATERIAL MANAGEMENT

	Demand for USCG Services	Defense Spending	Expectations for Higher Living Standards	Expectations for Rewarding Work	Quality of Education in the U.S.	Gross National Product	Reputation of the Coast Guard	U.S. Public's Attitude Toward Military
Long-Range Planning and Programming	H	M	M	L	L	M	L	L
Design	H	M	M	M	L	O	O	O
Acquisition	M	L	M	O	O	O	O	O
Deployment	H	M	O	O	O	O	O	O
Repair and Maintenance	M	O	O	O	O	O	O	O

Key
H = High Impact
M = Medium Impact
L = Low Impact
O = No Impact

level through the late 1980s and then climb precipitously, the Coast Guard can expect continued and increasing pressure in the efficient utilization of its facilities.

The sluggish character of Defense Spending forecast suggests that the Navy will have less money available to finance readiness equipments for Coast Guard ships. On the other hand, in a tight money situation the Navy may put more support behind Coast Guard armament programs realizing them to be a "best buy". This trend will moderately impact Material Long-Range Planning and Programming, Design and Deployment.

Continued growth in Expectations for Higher Living Standards over the next 25 years indicates that the Coast Guard's current initiatives in upgrading the habitability and living standards both afloat and ashore constitute a sound, future-oriented policy. This policy area provides an opportunity for the Coast Guard to improve its long term competitive position for manpower resources and to enhance its overall reputation through an aggressive program of material management. Much of this upgrading could be done as part of the consolidation of facilities forecast in the long-range view.² The economic picture forecast by our model supports the need for such consolidation of facilities and development of multi-mission bases and stations in order to conserve resources while optimizing effectiveness. Life-cycle costing can be used to weigh alternatives of rehabilitation against replacement.

The U.S. employee's rapidly rising Expectations for Rewarding Work also have significant implications for the Design of new facilities and equipments to provide the most satisfying conditions possible. These improvements in design are especially important in the integration of advanced technology on Coast Guard cutters and in Coast Guard offices. As more and more electronic equipments are installed on the bridges and in word processing centers, the man-machine interface will become ever more important. The design of new

types of administrative logistics systems will be necessary as clerical and managerial personnel do more of their work at home.

In designing and planning material in the next 25 years, the Coast Guard must also keep in mind the slow growth of the Quality of Education from its present low point. As the complex demands of the United States technological society continue to grow, the skills once considered good enough for an American to function adequately within society will no longer be sufficient.³ Material design must attempt to compensate for deficiencies in education by building in features and instructions which make it possible for a less skilled person to operate a complex piece of equipment.

The moderate growth of the economy as indicated by the pattern of GNP increase and the continued scarcity of resources must be taken into account in structuring an integrated Long-Range Planning and Programming process. The planning and programming of all resources should be linked.

Finally, the decline of the overall attitude toward the military may adversely affect the availability of material. However, the continued improvement of the Coast Guard's reputation will probably offset the more negative trend.

6.4 Impact of Events on Material Management

The impacts of high probability events on Material Management components are shown in Table 6-4. These events may affect the area of concern either through impacts on a modeled trend or independently.

Three high probability events which do not directly impact the modeled trends would independently impact the Repair and Maintenance of material and, therefore, the planning and programming of this resource. There is a 70% likelihood that ship maintenance will be performed predominantly by shore facilities rather than crew by 2004. There is also a 70% chance that in the later years of the period, maintenance will be performed by contractors and a 75% possibility that utilization of more sophisticated

TABLE 6-4. IMPACTS OF HIGH PROBABILITY EVENTS ON MATERIAL MANAGEMENT COMPONENTS

	CUM. PROB 2004	Long-Range Planning and Programming	Design	Acquisition	Deployment	Repair and Maintenance
TECHNOLOGICAL						
15% of the Technical, Professional and Management Community Routinely Put In 30% of Their Working Hours in an Office in Their Home	0.70	X	X	X	X	
25% of Secretarial and Clerical Community Routinely Put in 50% of Their Working Hours at Home	0.70	X	X	X	X	
Ship Maintenance is Predominantly Performed by Shore Facilities Rather Than Crew	0.70	X	X	X	X	X
Utilization of More Sophisticated Electronics Permits Reduction of Cutter Operating Personnel by 25% Over 1977 Levels	0.75	X	X			
Home Computers are Found in Almost Every Home and Provide Access to "Super Computers"	0.80	X	X	X		
At Least 50% of all Currently Duplicated Business Communications are Replaced by Soft Transmission	0.90					
NON-TECHNOLOGICAL						
Establishment of a 200-Mile Economic Zone	0.95	X	X	X	X	X
Consolidation of U.S. Ocean-Related Agencies	0.50	X	X	X	X	X
USCG Takes Over NOAA Ship Operating Activities	0.50	X	X	X	X	X
States Take Over Boating Safety Programs	0.99	X	X	X	X	X
Demand for Coast Guard Services on Inland Waterways Doubles Over 1977 Level	0.70	X	X	X	X	X
Re-Introduction of Draft for Men	0.60	X	X	X		
Civilianization of 25% the Jobs in the USCG	0.50					
Operation of USCG Maintenance Installations Taken Over by Contractors	0.70	X				X
The Military/Uniformed Services are Unionized	0.30	X	X	X	X	
50% of Shore-Based Services Work Under Flextime	0.90	X	X			
25% of Workers Elect to Remain in Workforce Past Age 65	0.50	X	X	X		
Job Security and Salary are the Main Requirements for Job Satisfaction	0.75	X	X	X	X	
Workers Place a High Premium on Interesting Work	0.50	X	X			

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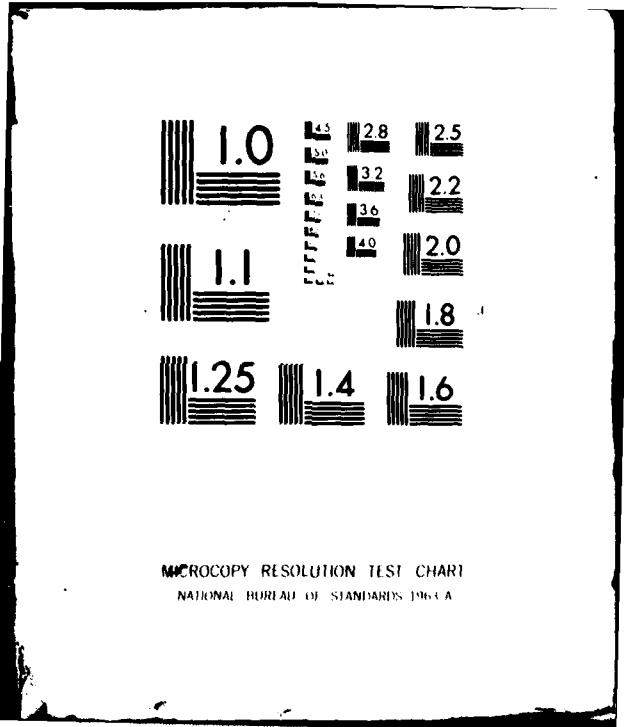
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electronics will permit reduction of cutter operating personnel by 25% over 1977 levels.

The occurrence of these three events would add up to a centralized, shore-based, contractor operated support system with standardized repair procedures. It is likely that the use of modular devices would predominate so that a defective module could be removed from the equipment by either the crew member or a member of a mobile maintenance unit and flown to shore for repair.

6.5 Summary of Findings by Component of Material Management

Significant policy action opportunities exist in each component of material maintenance. Table 6-5 compares the overall impact of modeled trends on the components of Material Management measured within the total USCG resources management system. In the critical impact area of Long-Range Planning and Programming, the Coast Guard has an opportunity to gain a foothold in the future by solving the difficulties caused by the traditional short-range approach and the lack of integration of planning and programming. The planning process needs to be improved so that the acquisition of equipments and systems and the repair and maintenance facilities are planned in parallel. A second important opportunity for improvement in material maintenance planning is the coupling of manpower planning with the life-cycle of equipments during the procurement process. The development of life cycle manpower information is essential to a truly complete effective planning system for the 1980's and 1990's.

Policy questions in the critical impact area of Design include determining the role and organization of research and development in the Coast Guard, satisfaction of increased expectations for improved living standards and rewarding work; and alleviating the problems caused by the continuing inability of the educational system to train students to function in a society of growing complexity and technological sophistication.

Looking specifically at the question of R&D in the

TABLE 6-5. IMPACTED COMPONENTS WITHIN MATERIAL MANAGEMENT

<u>Component Title</u>	<u>Relative Impact*</u>
1. Long-Range Planning and Programming	.42
2. Design	.36
3. Acquisition	.12
4. Deployment	.08
5. Repair and Maintenance	.03

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

Coast Guard, because of the size and needs of the service, it is unlikely that R&D will ever involve pure research. Instead, it will encompass the practical application of new schemes and inventions. However, there is much room for improvement during the timeframe in which these applications are considered. Many technologies which can benefit the Coast Guard in meeting its various surveillance requirements have been or are being investigated (to a depth greater than is possible within the Coast Guard) by the U.S. Navy, NASA, and other segments of the U.S. Government. By carefully monitoring and soliciting information from other sources, the Coast Guard can acquire necessary knowledge of basic research in a timely and useful fashion. The Coast Guard can borrow the research it needs wherever feasible, except in core areas, i.e., where requirements are unique to the Coast Guard and R&D efforts by agencies outside the Coast Guard are insufficient. A technology transfer mechanism should be established to facilitate acquisition of needed research results in all other areas.

It is recommended that the USCG set up an R&D liaison office within the physical facilities of the Office of Naval Research (ONR) in Arlington, Virginia. This office should be provided with adequate manpower such that all areas of current research within the Navy can be closely monitored and any results which can be applied to the Coast Guard should be considered. Further, any results that become available should be transmitted to the Coast Guard RDT&E community for immediate assessment. The potential benefits of establishing such an office at ONR, to the whole Coast Guard R&D effort, are so broad that funding at the highest R&D level within the Coast Guard is recommended.⁴

Impacts to the Material Acquisition component suggest that the Coast Guard should consider decentralizing the procurement function by placing a contracting section in each major office of the Coast Guard Headquarters. These "local" procurement offices might provide better responsiveness to

Coast Guard needs and eliminate some of the excessive layering which is currently crippling support functions within the USCG. The possibilities of ever more complex contracting procedures caused by environmental and other issues over the next 25 years make the need for responsiveness even more acute.

The need for policy actions to initiate standardized processes is an over-riding issue in the area of Material Repair and Maintenance. The Coast Guard should consider the benefits of moving to a centralized shore-based maintenance approach. The probable decrease in crew size indicates the cost-effectiveness of moving to modular components which can be easily replaced by spares aboard ship and taken ashore for repair. The possibilities of contractor maintenance should be carefully investigated from a cost-effectiveness point of view and, also, from that of providing specialized services by an external agency while allowing the Coast Guard personnel to retain at least a partially "generalist" character in an increasingly complex multi-mission environment.

CHAPTER 6 FOOTNOTES

1. Hayes, John B., "State of the Coast Guard", January 16, 1979.
2. U.S. Coast Guard, Commandant's Long-Range View, COMDTINST 5000.2C (August 21, 1978), p. 7.
3. Hunter, Carmen St. John and David Harman, Adult Illiteracy in the United States: A Report to the Ford Foundation (New York: Ford Foundation, 1979).
4. Cetron, M. J. et al., A Study of the USCG Surveillance Requirements Over the Next 25 Years and Development of a Surveillance R&D Program: Final Report, (Washington, D.C.: Forecasting International, 1979), pp.98-99.

CHAPTER 7

INFORMATION MANAGEMENT

7.1 Introduction

At the outset of the study, information management in general and information systems management in particular were to be considered as part of material management. However, it soon became apparent that information management deserved individual attention as an area of concern. Not only is information one of the most valuable of resources and one whose management is least understood, it is the resource whose management is most likely to be radically affected by the new technologies foreseen in the next 25 years. In addition, Information Management provides important links among the other areas of concern. In summary, Information Management will be an area of growing importance in the time period under study.

7.2 The Coast Guard's 1979 Information Management System

The cross-support matrix shown in Table 7-1 presents a profile of information management in the current Coast Guard resource management system. At this point in time, information management has only small to moderate impacts on the other areas of concern since information systems are just being established in those areas. It is expected that, as these information systems develop, the cross-support contributions of information systems management will also grow. For example, Information Management would be more impacted by Manpower Long-Range Planning and Programming if the planning system were fully integrated and took into account the personnel implications of various material and information purchase alternatives. Information management is heavily impacted by Funds Long-Range Planning and

TABLE 7-1. CROSS-SUPPORT RELATIONSHIPS OF INFORMATION MANAGEMENT CRITICAL COMPONENTS

Key
 H - High Impact
 M - Medium Impact
 L - Low Impact
 O - No Impact

	Manpower	Funds	Material	Information
Long-Range Planning and Programming	Long-Range Planning and Programming	Long-Range Planning and Programming	Long-Range Planning and Programming	Long-Range Planning and Programming
Manning	Manning			
Recruiting and Re-enlistment	Recruiting and Re-enlistment			
Training - Initial	Training - Initial			
Training - Continuing	Training - Continuing			
Command and Supervision	Command and Supervision			
Long-Range Planning and Programming	Long-Range Planning and Programming			
Short-Term Budgeting	Short-Term Budgeting			
Long-Range Planning and Programming	Long-Range Planning and Programming			
Design	Design			
Acquisition	Acquisition			
Deployment	Deployment			
Repair and Maintenance	Repair and Maintenance			
Long-Range Planning and Programming	Long-Range Planning and Programming			
Systems Acquisition	Systems Acquisition			
Processing and Storage	Processing and Storage			
Dissemination	Dissemination			

Programming, and Budgeting, and by Material Planning and Programming. This heavy dependence on funding activities is reflected by the location of the Information Systems Division (G-FIS) in the Office of the Comptroller.

7.2.1 History of USCG Information Systems Management

The present management of information and its future direction are very dependent on the history of information processing in the Department of Transportation (DOT). In 1974, DOT took control of all computers in the department and assigned the Federal Highway Administration as facilities manager. Coast Guard's Information Systems Division (G-FIS) acts as liaison between program managers and the computer center. According to the Coast Guardsmen interviewed during this project, this arrangement has been neither efficient nor cost effective. The price of operating information systems has doubled since the consolidation and there are more logistic problems. Also, the centralization has operationally impaired the Coast Guard when time-critical information systems have had queue-up with long delays in processing.

DOT has acknowledged these problems and the Coast Guard has been allowed to remove time critical activities from the DOT computers to a new USCG computer facility at Riverdale, MD. as of October, 1979. Initially this system will consist of the SARP and CASP systems. Later, the Marine Science Information System for pollution control information system and the hazardous materials information system will be added. Next, a merchant marine tracking system for tracking ship movements will be implemented. Finally, a Command and Control system for controlling USCG ship and aircraft movements will be made operational. This system will interact with the DoD command and control systems. The first Coast Guard integrated Management Information System will be the JUMPS pay and personnel information system.

7.2.2 Long-Range Planning and Programming for Information

Planning for Coast Guard information systems suffers from some of the same problems as the material planning and

acquisition activities. G-FIS attempts to keep the proliferation of computers in the Coast Guard down through review of proposed applications but other offices are able to establish a system without review or forward planning. Even those systems that are reviewed present problems when the acquiring office does not plan for the maintenance of the system once it is operational. The development personnel attached to G-FIS have been slowly siphoned off to maintain the systems as they are completed. Maintenance must be programmed into ADP planning if development is to continue and meet future needs. Presumably an operating unit would take over maintenance of the system once it was installed, however, operating units are reluctant to dedicate their scarce billets to maintenance programming.

7.2.3 Information Systems Acquisition Issues

According to the interviewees, the Coast Guard has outgrown its computer systems. The information system problem is one of hardware rather than program management. This information system shortage weighs against the development of an integrated management information system in the immediate future. If an integrated Management Information system were given priority, it would stop development of other information systems that are vitally needed for operations.

7.2.4 Information Processing and Storage Questions

Another problem stems from a scattering of responsibilities for the many related areas of information technology including the following:

- Data Processing
- Word Processing
- Forms, Reports Control
- Records Management
- Data Entry and Collection
- Computer Operations
- Physical Security
- Data Communications

These responsibilities were vested in organizational elements

scattered throughout the Coast Guard.

This organization of functions has "gotten by" in these early years of information system development but will not hold up in the era of sophisticated information technology to come in the next 25 years.

7.3 Impacts of Trends and Events on Information Management to 2004.

Table 7-2 presents a comparison of the summarized impacts of trends on Information Management while Table 7-3 details the impacts on components of this area of concern.

7.3.1 Effect of Demand for Coast Guard Services on Information Management

The Demand for Coast Guard services is the trend with the greatest impact. The significant increase in this demand signals the need for enlarged and improved communications both within the Coast Guard and with its external "publics". Internal to the Service, complex command and control requirements will proliferate and the overall communications workload will grow. The new, very sophisticated computer and communications technologies of the next 25 years will provide the opportunities for meeting these demands in a cost-effective manner.

The continuing increase in demand particularly affects the Information Management Long-Range Planning and Programming component, emphasizing the need to plan now for the integration of "soft" transmissions, sophisticated word processing systems and ultra-high speed communications in the organization of the Coast Guard. Developments in communications will make possible the consolidation of functions in port areas, the prompt dissemination of marine information, and refinement of computerized hazards assessment and response information systems. These developments have significant implications for Information Systems Acquisition, and Processing and Storage patterns. It is anticipated that, during the mid-1980's, the overall information system will take the form described in the

TABLE 7-2. TREND IMPACTS ON INFORMATION MANAGEMENT

<u>Trend Title</u>	<u>Relative Impact*</u>
1. Demand for USCG Services	.33
2. Evolution from Authoritarian Management to Group Decision-making	.25
3. Workers Expectations for More Rewarding Work	.16
3. Quality of Education	.16
4. Gross National Product	.07
5. Reputation of the Coast Guard	.04

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

TABLE 7-3. DIRECT IMPACTS OF TRENDS ON CRITICAL COMPONENTS OF INFORMATION MANAGEMENT

	Demand for USCG Services	Evolution from Authoritarian to Humanitarian Management	Expectations for Rewarding Work	Quality of Education in the U.S.	Gross National Product	USCG's Reputation
Long-Range Planning and Programming	H	M	M	M	M	L
Systems Acquisition	M	O	O	O	O	O
Processing and Storage	L	O	O	O	O	O
Dissemination	M	H	M	M	O	O

Key
H - High Impact
M - Medium Impact
L - Low Impact
O - No Impact

current Long Range View. That is

Management Information and Command and Control Systems for routine field use and enhanced readiness capability, will be developed using standard data elements and a standard Data Base Management System (DBMS). As a result, data which has been and is being collected will be retrievable and usable in the field as well as in Headquarters. The advent of low cost minicomputers and microprocessors will permit a hierarchy of data processing equipment to be distributed throughout the Coast Guard based on the power needed by individual users. A sophisticated data communications network will interconnect this equipment to allow dissemination and transfer of data throughout the network. This type system will speed information processing, increase data availability and reduce manual reporting requirements. Close coordination between computer technology and communications technology will be necessary.¹

Toward the end of the 1990's, the development of ultra-large storage banks and real-time transmissions, coupled with the experience and familiarity of the population with the use of computers and advanced communications in their everyday lives, will make possible and desirable the upgrading of this network to an overall Management Information System (MIS) linking all of the Coast Guard data bases and operating facilities. This evolved system will have a distributed network of data bases. The chief operating difference from today's systems will be in the utilization of the system to make decisions and to perform actual operations as well as to transfer information throughout the USCG. A second extremely significant difference will be in the direct connections of the system to data bases and information systems outside the Coast Guard. The integrated MIS of the 1990's and early 2000's will have real time access to the systems of its clientele and cooperating agencies. In turn, the computers of Coast Guard's clientele will have direct access to appropriate information in the Coast Guard's data banks. The man-machine interfaces will be at the input and output points; information transfer between systems will be

done by machine-machine interface among the systems themselves.

7.3.2 Impacts of the Evolution from Authoritarian Management to Group Decision-making

The Evolution from Authoritarian Management to Group Decision-making is the trend which has the second greatest impact on the Coast Guard's Information Management. The demand for improved quality of worklife and increased participation of workers in the management of their employing agencies will produce the need for changes in the distribution of information within these organizations, especially in patterns of information dissemination and, consequently, in the design of information systems. More information will be distributed to more of the workforce based on the evolution of new styles of command and supervision. These factors will have to be integrated into planning and programming for the systems.

7.3.3 Effects of Expectations for More Rewarding Work

The already high and continuously increasing expectations for more rewarding work will reinforce the impacts of redistribution of information caused by changes in formal authority relationships. The average worker will demand to know much more about the results of his work in order to feel rewarded by his efforts. In addition, information management will be affected by the changing location of where work is done as more professional and clerical workers spend more of their on-the-job time at home utilizing sophisticated electronics to communicate with their offices. These changes will have their greatest impact on the Coast Guard at its Headquarters and District operations.

7.3.4 Impacts of Changes in the Quality of Education

The slow growth in the quality of education over the next 25 years signals the need for information easily understandable and usable by a workforce and a public whose education has not prepared it to interpret more sophisticated data. The effective utilization of the real time interactive

systems forecast is dependent on careful forward planning and a use of orientation in the design of these systems. Both systems and patterns of dissemination must be carefully arranged to get all the necessary background information to the people involved. One event will facilitate this process: the increased utilization of computers in the home. This very likely event (80% probability by 2004) will educate the public to the use of the machine itself.

7.3.5 Effects of Changes in the Gross National Product

The continued tight economic climate affects the information management area as it does all of the other areas of concern, indicating the need to make the most effective use of scarce resources. The trend directly impacts the planning function, indirectly impacting all other components of information management.

7.3.6 Impacts of the Improvement of the Coast Guard's Reputation

The continued enhancement of the Coast Guard's reputation over the time period of concern has several impacts on information management based on the Service's relationship with external agencies. Increased planning and programming for the functions of public affairs and international affairs is indicated as the Coast Guard takes the lead in coordinating interagency efforts representing U.S. interests in the international arena. At the same time, the American public will increase its interest in the activities of the Coast Guard and of all other public agencies. Planning for the smooth coordination within the public affairs function will be of great importance.

7.4 Impacts of Events on Information Management

Table 7-4 indicates the critical components of Information Management which are impacted by the high probability events either through a trend or independently. Information management is heavily impacted by all of the technological events considered.

In addition, the occurrence of such events as

TABLE 7-4. IMPACT OF HIGH PROBABILITY EVENTS
ON INFORMATION MANAGEMENT COMPONENTS

TECHNOLOGICAL	GUM. PROB 2004	Long-Range Planning and Programming			
		Systems Acquisition	Processing and Storage	Dissemination	
15% of the Technical, Professional and Management Community Routinely Put In 30% of Their Working Hours in an Office in Their Home	0.70	X	X		X
25% of Secretarial and Clerical Community Routinely Put in 50% of Their Working Hours at Home	0.70	X	X		X
Ship Maintenance is Predominantly Performed by Shore Facilities Rather Than Crew	0.70	X	X	X	X
Utilization of More Sophisticated Electronics Permits Reduction of Cutter Operating Personnel by 25% Over 1977 Levels	0.75	X			X
Home Computers are Found in Almost Every Home and Provide Access to "Super Computers"	0.80	X			X
At Least 50% of all Currently Duplicated Business Communications are Replaced by Soft Transmission	0.90	X	X	X	X
NON-TECHNOLOGICAL					
Establishment of a 200-Mile Economic Zone	0.95	X	X	X	X
Consolidation of U.S. Ocean-Related Agencies	0.50	X	X	X	X
USCG Takes Over NOAA Ship Operating Activities	0.50	X	X	X	X
States Take Over Boating Safety Programs	0.99	X	X	X	X
Demand for Coast Guard Services on Inland Waterways Doubles Over 1977 Level	0.70	X	X	X	X
Re-introduction of Draft for Men	0.60	X			X
Civilianization of 25% the Jobs in the USCG	0.50	X			X
Operation of USCG Maintenance Installations Taken Over by Contractors	0.70	X			
The Military/Uniformed Services are Unionized	0.30	X			X
50% of Shore-Based Services Work Under Flextime	0.90	X			X
25% of Workers Elect to Remain in Workforce Past Age 65	0.50				
Job Security and Salary are the Main Requirements for Job Satisfaction	0.75	X			X
Workers Place a High Premium on Interesting Work	0.50	X			X

establishment of a 200 mile economic zone or the consolidation of U.S. ocean-related agencies would significantly change the pattern of information control and communication.

7.5 Summary of Significant Findings by Component of Information Management

Table 7-5 compares the summed impact of all modeled trends on the Information Management components. The following discussion summarizes study findings for each. The human and technological consequences of a paperless society and the integration of information functions through the use of sophisticated equipments must be integrated into the Coast Guard's Long-Range Planning and Programming component. The information resources area of concern is one in which the Coast Guard has considerable opportunities for current policy action which will have significant future consequences.

In the short-term, the Coast Guard should consider bringing together all information-related Headquarters offices into one "information resources office." This office would deal with data processing, word processing, reports/forms control, records management, data entry and collection, computer operations, physical security, and data communications.

The Coast Guard should also consider how the new technologies will change the Information Dissemination relationships among Headquarters, Areas and Districts. With the instantaneous transfer of information and network of data bases, alternative organizational structures combining Districts or District and Area responsibilities will be possible technologically. However, the practical implications of such changes may make them untenable.

A second policy option in the Information Dissemination component is the restructuring of information flows to keep the enlisted man and junior officer better informed and to permit more participation in decision making. Two more policy areas dealing with Information Acquisition and Processing and

TABLE 7-5. IMPACTED COMPONENTS WITHIN INFORMATION MANAGEMENT

	<u>Component Title</u>	<u>Relative Impact*</u>
1.	Long-Range Planning and Programming	.48
2.	Dissemination	.43
3.	Systems Acquisition	.07
4.	Processing and Storage	.02

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

Storage when properly dealt with, will impact the future design of Coast Guard information flow. The current systems "crunch" caused by the escalating demand for information systems must be brought under control. A central office, with power to bring a stop to the distributed planning of information systems without regard to future maintenance and manpower needs, would help solve this problem. Centralization of the information system planning function coupled with the use of life cycle planning for manpower needs would also help to meet this need.

Finally, a future-oriented planning system which takes into account the expected patterns of information system distribution would give the Coast Guard a head-start on coping with information environment of the twenty-first century.

CHAPTER 7 FOOTNOTE

1. U.S. Coast Guard, Commandant's Long-Range View, COMDTINST 5000.2C (August 21, 1978), p.44.

CHAPTER 8
SUMMARY AND CONCLUSION

8.1 Introduction

The purpose of this report has been to explore the influence of emerging social and economic trends and events on the people and management of the U.S. Coast Guard in the time period 1979 to 2004. Each of the trend projections has been described and implications drawn for management of the four Coast Guard resource management areas: manpower, funds, material and information. Policy actions have been recommended in the chapter pertaining to the appropriate resource management area. In concluding this report, this chapter presents a brief summary of the impacts on the overall Coast Guard management system.

8.2 Overall Impacts of Trends on Coast Guard Management

Table 8-1 charts the relative impact of trends on the total Coast Guard management system and hence on its people and other resources. Table 8-2 shows the order in which critical components are impacted by trends.

The normalized values in Table 8-1 show that by far the greatest impact on the system will be caused by Demand for Coast Guard Services. This trend is expected to continue to increase and indicates that there will be increased need for improved/integrated planning and programming. The sluggish behavior of Defense Spending also indicates the need for careful apportionment of scarce resources.

The third ranking quantitative trend, Military Pay, is expected to increase dramatically over the time period of concern in order to improve competition with private industry for the personnel with the scarce skills needed in the ever more sophisticated technological environment of the next

TABLE 8-1. TRENDS IMPACTING USCG MANAGEMENT SYSTEM

<u>Trend Title</u>	<u>Relative Impact*</u>
1. Demand for USCG Services	.23
2. Defense Spending	.09
3. Military Annual Pay Rate	.08
3. Quality of Education in the U.S.	.08
3. Workers Expectations for More Rewarding Work	.08
4. Evolution from Authoritarian Management to Group Decision-making in U.S.	.07
4. Gross National Product	.07
5. Expectations of Higher Living Standards	.06
6. Reliability of the U.S. Workforce	.04
7. U.S. Public's Attitude Toward the Military	.03
7. Reputation of the Coast Guard	.03
7. Total U.S. Population Ages 18-24 Years Old	.03
7. Veteran's Compensation and Pension Benefits	.03
7. Unemployment Rate	.03
8. Attitude of the U.S. Public Toward Formal Authority	.02

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

TABLE 8-2. AREA OF CONCERN CRITICAL COMPONENTS IMPACTED BY TRENDS

<u>Component Title</u>	<u>Relative Impact*</u>
1. Manpower Long-Range Planning and Programming	.14
2. Recruiting and Re-enlistment	.11
2. Funds Long-Range Planning and Programming	.11
3. Material Long-Range Planning and Programming	.09
4. Short-Term Budgeting	.08
4. Material Design	.08
5. Manning	.06
5. Training - Continuing	.06
5. Information Long-Range Planning and Programming	.05
6. Information Dissemination	.05
7. Training - Initial	.04
8. Command and Supervision	.03
8. Material Acquisition	.03
9. Material Deployment	.02
10. Information Systems Acquisition	.01
10. Repair and Maintenance	.01
11. Information Processing and Storage	.00

*Impact measures are normalized to be in the range (0,1) and to sum to unity.

twenty-five years.

Quality of Education and Worker's Expectations for More Rewarding Work are the most influential of the qualitative trends affecting the total management system. Although educational quality is expected to begin to improve from its current poor quality, it is doubtful that it will be able to catch up with the increasing sophistication of society. Therefore, there will be a continuing need to accommodate for "functional illiteracy" through improved training and material design.

The increasing Expectations of Workers for More Rewarding Work must also be addressed. The "new breed" of worker is already entering the service. This worker feels entitled to fair pay, hours and benefits and expects that the actual work be meaningful and rewarding in itself. The workers of the next twenty-five years will also insist on a greater role in decision-making and more information on what is taking place in the workplace. These trends indicate the need for the Coast Guard to take a hard look at work structure and its styles of leadership and command. The behavior of the trend representing the Evolution from Authoritarian Management to Group Decision-making supports this conclusion.

The moderate increase in Gross National Product indicates continued competition from private industry for recruits and trained personnel. This trend and the continuing rise in Expectations for Higher Living Standards adds strength to the requirement for aggressive recruitment and re-enlistment programs.

The remaining trends have a relatively low impact on the system as a whole although they each significantly influence individual resource management areas. Reliability of the Workforce is expected to increase as society deals with social problems such as drug addiction and the decline of the family. The U.S. Public's Attitude Toward the Military will plummet but this will only slightly affect the Coast

Guard. Indeed, the Reputation of the Coast Guard will improve during the next twenty-five years. The total U.S. Population Ages 18-24 will decrease, underscoring the tight recruitment situation. Veteran's Compensation and Pension Benefits will improve and the Unemployment Rate will drop precipitously. These trends all add momentum to the competition among the services and between the services and private industry for recruits. Finally, the Attitude of the U.S. Public Toward Formal Authority will remain about the same, an attitude of tolerance.

8.3 Conclusion

By understanding the projected behavior of relevant trends and events and the nature of the impacts that they are most likely to have on lifestyles, work styles and management systems, the Coast Guard will have the information and insights necessary to take full advantage of policy action opportunities and to address potential problem areas. This knowledge will enable the Coast Guard to function more effectively in the changing environment of the next twenty-five years.