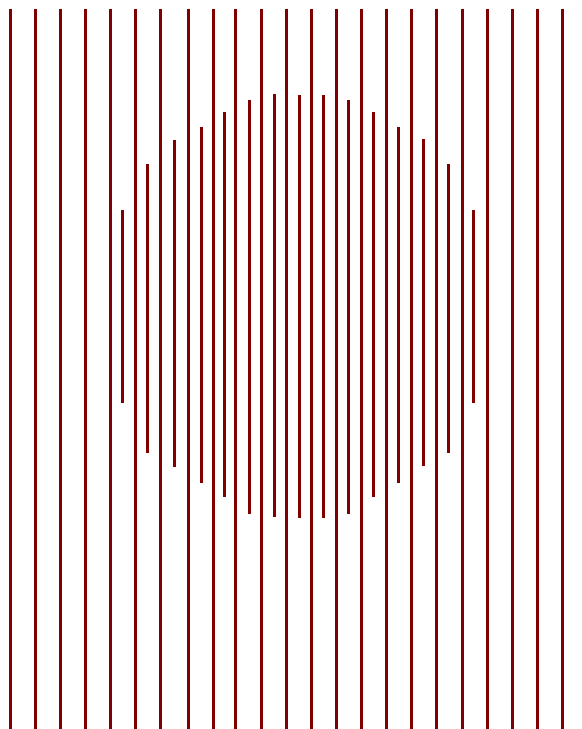


CBO PAPERS

**TRENDS IN SELECTED INDICATORS
OF MILITARY READINESS,
1980 THROUGH 1993**

March 1994



CONGRESSIONAL BUDGET OFFICE

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**CONGRESSIONAL BUDGET OFFICE
SECOND AND D STREETS, S.W.
WASHINGTON, D.C. 20515**

NOTE

Unless otherwise indicated, all years referred to in this paper are fiscal years.

PREFACE

As the drawdown in defense spending continues, the ability of the Department of Defense to maintain the readiness of its military forces is the subject of growing debate. Although the department cites readiness as its highest priority, some military leaders and Members of Congress have suggested that U.S. forces are on the "ragged edge" of readiness. This Congressional Budget Office (CBO) analysis, performed at the request of the Chairman of the House Committee on the Budget, attempts to provide a historical context for the debate about military readiness by examining trends in selected indicators of readiness and in resources related to readiness from 1980 through 1993.

Deborah Clay-Mendez, Richard L. Fernandez, and Amy Belasco of CBO's National Security Division prepared this paper under the general supervision of Robert F. Hale, Neil M. Singer, and R. William Thomas. The authors gratefully acknowledge the useful comments provided by Michael A. Miller of CBO's Budget Analysis Division. Jon Berg, Geoff Cohen, and Karen Watkins provided valuable analytical assistance. Christian Spoor edited the paper, and Cynthia Cleveland prepared it for publication.

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Director

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SUMMARY

The term readiness refers to the ability of a military force to deploy quickly and perform initially in wartime the way it was designed to. Readiness is a key aspect of military capability, particularly in a period when conflicts can commence with little warning.

As the drawdown in defense spending continues, however, the ability of the Department of Defense (DoD) to ensure that its forces are ready is increasingly subject to debate. Initial reductions in defense spending came disproportionately from the procurement accounts, which pay for new weapons. Future reductions may have to come primarily from the military personnel and operation and maintenance (O&M) accounts, which fund military pay and activities related to readiness such as training and equipment maintenance.

The need to protect readiness is widely accepted within DoD. Many of today's senior military leaders were company commanders during the 1970s. They dealt firsthand with the problems of a military that, largely because of problems related to readiness, was dubbed the "hollow force." There is disagreement, however, about whether DoD's plans will ensure an adequate level of readiness in the future. Indeed, some observers have suggested that U.S. forces are already on the "razor's edge of readiness."¹ In response to these concerns, DoD has created several groups, including one composed of former senior military officers, to review the readiness of U.S. forces. Readiness also appears likely to be the subject of considerable debate in the Congress.

This Congressional Budget Office (CBO) paper examines trends in two of DoD's most widely used and longest-established indicators of unit readiness--C-ratings and mission-capable rates--from 1980 through 1993. The paper also examines DoD's performance in five resource areas that are at the heart of the debate about future readiness levels: personnel quality, the total level of funding for the O&M accounts, depot maintenance, the supply of spare parts, and maintenance of real property. C-ratings and mission-capable rates indicate the current level of readiness among units, while shortfalls in

1. Letter from Gen. Gordon Sullivan, Army Chief of Staff, to Sen. John McCain, reproduced in Sen. John McCain, "Going Hollow: The Warnings of Our Chiefs of Staff" (July 1993).

the five resource areas could provide an early warning of future readiness problems.

This paper does not attempt to discuss all of the resources that contribute to readiness. In particular, it does not examine trends in unit operating tempos (steaming days, flying hours, or tank miles) or other training activities (use of simulators, the number of battalions visiting the Army's National Training Center, the number and types of units involved in joint exercises). Because training makes an important and visible contribution to readiness in the short term, DoD and the Congress have tried to protect resources for training. Although there have been some shortfalls--such as in the Army, where actual tank miles have been significantly below planned levels in 1993 and 1994--the high overall C-ratings reported in this paper suggest that for the most part this effort to protect readiness in the short term is succeeding. Accordingly, this paper, like much of the readiness debate, focuses on resource areas such as depot maintenance that contribute more to future than to current readiness and that might be expected to provide the earliest warning of potential readiness problems.

TRENDS IN UNIT READINESS

CBO's analysis suggests that, overall, the readiness of deployable units is high now relative to historical levels. This conclusion is supported by overall trends in aggregate C-ratings (readiness indicators based on comparing the resources that units have with the levels prescribed for wartime) and in mission-capable rates (measures of the condition of the equipment held by units). This high level of readiness appears to hold true for both the active and reserve components, to the extent that separate data are available. Although for some components and some types of equipment these indicators have fallen below the peak levels seen in the late 1980s, for others they are now at record levels. For example, the total mission-capable rate for Air Force aircraft (active and reserve) was at a record high of 87 percent in 1993, and the total mission-capable rate for Navy and Marine Corps aircraft (active and reserve) was 71 percent, just 2 percentage points below its 1987 peak. Both mission-capable rates are well above the levels seen during the late 1970s. In 1980, for example, the Air Force rate was 66 percent and the Navy rate was 59 percent. Based on the available public data, U.S. forces today are far from hollow.

In some areas, however, declines in indicators relative to their peak levels are large enough to raise the question, how much readiness is enough? For example, in 1993, active Navy surface ships were free of critical mission-

degrading equipment failures (C-3 or C-4 casualty reports) 68 percent of the time. On the one hand, this is 24 percentage points above the level reported in 1981 and just above the average for 1980 through 1992; on the other hand, it is 13 percentage points below the peak reported in 1987.

CBO's analysis reaffirms a discovery made by DoD analysts in the mid-1980s: namely, that the readiness indicators used within DoD are not well suited to identifying trends in readiness over time. Although it appears possible to identify broad trends in readiness by looking at C-ratings and mission-capable rates across DoD, trends in individual indicators can be misleading. For example, the percentage of active Marine Corps units reporting C-1 or C-2 overall (the best C-ratings) is lower now than it was in 1980, even though senior military leaders widely agree that readiness has increased substantially since then. DoD may need to develop more objective and consistent readiness indicators--perhaps based on evaluations of unit performance by experts from outside the unit--to ensure that any change in readiness levels during the 1990s is accurately and fully identified.

TRENDS IN RESOURCES THAT SUPPORT FUTURE READINESS

Although C-ratings and mission-capable rates suggest that U.S. forces are far from hollow now, much of the debate about readiness focuses on DoD's ability to provide the resources that will support unit readiness in the future. Each of the five resource areas that CBO examined--personnel quality, total funding for the O&M accounts, depot maintenance, the supply system, and real-property maintenance--yields a somewhat different picture of possible future trends in readiness.

Personnel

The trends in military personnel described in this paper appear consistent with a high-quality and ready force in the future. The quality of new recruits in 1993 was near a record level: two-thirds were high school graduates who scored above the average for the general youth population on a military aptitude test. The only two years in which recruit quality was higher, 1991 and 1992, were years in which a sudden drop in the number of recruits required by DoD contributed to an increase in quality. Moreover, the experience level of the force, measured by the percentage of personnel with more than four years of service, is at a historical high. Because of the drawdown, however, it is difficult to know whether military compensation will be adequate to maintain a highly experienced force in the long run. Current

reenlistment rates reflect DoD policies aimed at reducing the number of military personnel and do not provide a reliable guide to the morale or satisfaction of service members.

Operation and Maintenance

With the exception of military personnel costs, DoD pays for most readiness-related resources out of appropriations for O&M. To date, trends in total spending on operation and maintenance, like trends in military personnel, appear consistent with DoD's commitment to ensuring readiness. In 1994, for example, DoD's total spending on O&M divided by the number of active-duty personnel will be approximately \$48,000. Even after adjusting for inflation, this is above the peak levels reached in the 1980s.

The level of O&M spending per active-duty member also remains high by historical standards after adjusting for recent increases in costs not directly related to readiness (such as the health care costs of military retirees and the costs of helping to convert defense facilities to civilian production). That does not necessarily mean, however, that current spending is enough to fund fully those O&M activities that are linked to current and future readiness. Until DoD reduces its infrastructure of bases and depots, the department will face fixed costs that could significantly increase the level of O&M spending per capita that is needed to maintain readiness.

Depot Maintenance

Depot maintenance involves the overhaul or major repair of weapons and equipment, including airframes, engines, ships, and tanks. The conventional indicator of resource shortfalls in this area is the backlog of unfunded maintenance requirements. This indicator can be very misleading, however, during a period in which DoD is reducing its force structure. To the extent that the military reduces force structure more rapidly than equipment inventories, it raises the level of maintenance backlog that can be borne without causing readiness problems within operational units. As a result, even though maintenance backlogs are at record-high levels in each service, this may not mean that future readiness will fall below current levels. Particularly in the case of the Army--where some of the equipment that is freed up because of the reduced number of active units is being sent to depots for reconditioning--a growing backlog is not a reliable early-warning indicator of future readiness problems.

Other measures of depot maintenance may be more revealing. One such measure, depot maintenance funding relative to the size of the force structure, suggests that current depot maintenance funding for DoD as a whole is comparable with the levels seen in the late 1980s. Moreover, given the historical relationship between depot maintenance funding and the size of the force structure, the current level of funding is greater than what would appear to be required to support the 1999 force structure.

This does not necessarily mean, however, that depot maintenance funding is adequate for current or future needs. Changes in the composition of the force structure, together with the short-term costs associated with maintaining excess depot capacity, could raise the required level of funding above the historical level. In addition, significant differences exist among the services in funding levels. In both the Navy and the Marine Corps, depot maintenance relative to force structure appears to be underfunded compared with historical levels, although in the Air Force and the Army, funding relative to force structure is above historical levels.

Supply System

The ability of the supply system to provide the parts needed by military units and DoD depots is another factor that contributes to current and future readiness. The supply system appears, on the whole, to be supporting the peacetime operating requirements of DoD units. Department inventories of secondary items (spare parts and other supplies) remain at a high level relative to both the size of the force structure and stated requirements. The percentage of requisitions that the wholesale supply system can fill out of stocks on hand (the supply availability rate) remains stable overall, although the supply availability rate for spare parts that support Navy aircraft has declined somewhat. Another indicator of the effectiveness of the supply system--the extent to which aircraft are cannibalized to provide parts for other aircraft--suggests that the system is working very well for the Air Force.

There may, however, be problems on the horizon for the supply system. The extent to which the DoD wholesale supply system can replace the inventories that it distributes is currently limited by law. Although there is no evidence of a widespread supply problem now, this legal limitation cannot be maintained indefinitely without causing readiness problems.

Maintenance of Real Property

In the Department of Defense, real property runs the gamut from runways to dormitories. Although defense analysts disagree about whether DoD's spending to maintain real property should be categorized as readiness-related, that may be irrelevant for practical decisionmaking. Even if DoD could maintain highly ready forces at poorly maintained installations, that approach could lead to low morale and reduced productivity and might not prove cost-effective in the long run. Moreover, the fact that real-property maintenance is less directly tied to readiness than activities such as training or equipment maintenance may make it particularly useful as an early-warning indicator. When O&M funding for DoD as a whole is not adequate, real-property maintenance is likely to be among the first resource areas to suffer.

Based on some of the standard indicators used within DoD, current funding for real-property maintenance does not appear to be adequate. Backlogs of unfunded requirements for maintaining real property are at record levels. Spending per square foot also suggests a problem: in 1994, it will be approximately 25 percent below the average for 1980 through 1993. The current low level of funding could reflect a desire not to invest in maintaining buildings that might be taken out of DoD inventories as the result of future base closures or realignments. Alternatively, it could be the first sign of a general shortfall in O&M funding relative to requirements.

Over the long run, DoD may be able to eliminate much of the shortfall in real-property maintenance by closing buildings rather than increasing funding. Even after the effects of all announced base closures and realignments are considered, the number of square feet per active-duty member is 10 percent above its historical average. If DoD were able to restore the historical relationship between number of personnel and square feet of buildings, the current level of funding for real-property maintenance might be appropriate for the size of the force in 1999 (although still too low relative to the current size of the force). Realistically, however, delays in closing bases, together with the potential benefits to DoD from continuing to use existing buildings on bases that will not be closed, suggest that a higher ratio of facilities to personnel may persist well into the next century. Thus, if funding for real-property maintenance is to be adequate in 1999, it may have to be increased somewhat from the 1994 level.

INTERPRETATIONS OF CURRENT TRENDS

Trends in indicators of current readiness and in readiness-related resources must be interpreted cautiously. For example, indicators of unit readiness such as C-ratings and mission-capable rates suggest that readiness is high. Based on the publicly available data, U.S. forces are not on the "razor's edge" of a hollow force. (Indeed, since most of the historical data suggest that readiness levels change gradually rather than abruptly over time, the notion of a razor's edge could itself be misleading.) Some observers might interpret this as a sign that further reductions in readiness-related resources are not as risky as would otherwise be the case. That interpretation, however, is subject to some important limits. Significant declines in readiness indicators have been seen in selected areas, including Navy surface ships. Moreover, the measures of readiness used in this paper may not be sensitive enough to identify fully and accurately changes in readiness levels.

CBO's survey of resource areas that contribute to future readiness reinforces the argument that better indicators of current readiness are needed. DoD, however, is unlikely to find reliable early-warning indicators of future readiness problems during a major drawdown in the force structure, because many of its usual indicators are likely to be distorted. Retention rates among career personnel may be determined by DoD policies instead of reflecting the morale of the force or the attractiveness of military compensation. Rising backlogs of unfunded depot maintenance may not foretell a decline in unit readiness. Total inventories of secondary items may increase even as the availability of spare parts needed to support the most modern systems declines. Rising backlogs of real-property maintenance and inadequate maintenance spending per square foot may be a signal that DoD has more property than it needs.

The turbulence associated with a major force drawdown makes it very difficult to determine whether funding in these support areas is adequate or not. Even for those areas in which CBO identified potential problems, such as real-property maintenance and Navy depot maintenance, current levels of funding for DoD as a whole appear to be in line with what might be required to support the 1999 force structure. Although this suggests that further cuts in those resource areas may not be appropriate, it does not provide a clear guide to whether funding should be increased over the near term. During a drawdown, an increase in funding might lead to higher readiness levels, or it might permit DoD to put off necessary reductions in the number of depots, the number of square feet of facilities that are being maintained, and the size of supply system inventories.

Another reason for caution in interpretation is that CBO's survey included only those resource areas that the ongoing debate has singled out as likely problem areas. Although the potential shortfalls in funding identified in this paper might appear manageable within DoD's current plans, there could be hidden problems in important areas, such as unit training, that are not examined in this paper. Alternatively, of course, there could be unrecognized opportunities for savings.

Last, and perhaps most important, this paper does not look beyond readiness to address the general question of military capability. Even if DoD will be able to maintain the readiness of its planned force structure, it may be unable to provide a force that is large enough, that has the resources needed for sustained combat, and that has modern, technologically superior weapon systems. In a period when defense budgets are limited, the benefits of increased funding for readiness must be carefully weighed against the potentially adverse effects on funding for the other components of military capability.

CHAPTER I

READINESS AND THE HOLLOW FORCE

As the U.S. military continues to face cuts in funding and personnel, some policymakers are raising concerns about its future readiness. A review of the concept of military readiness, and of the problems with readiness that the Defense Department encountered during the 1970s (the so-called hollow force), may help to explain why so much of the current defense debate is focused on this issue.

DEFINING READINESS

Readiness, as defined by the Joint Chiefs of Staff (JCS), is the ability of forces to deploy quickly and perform initially in wartime as they were designed to.¹ The readiness of a military unit depends heavily on its personnel, training, and equipment. A ready unit possesses the equipment and supplies needed for initial deployment as well as sufficient numbers of experienced people with the right skills. Through realistic and comprehensive unit training, these people have been forged into a cohesive unit that can perform its wartime tasks even under extreme conditions.

Readiness contributes to military capability--that is, to the ability to achieve specified wartime objectives. Yet, according to the JCS definition, readiness is only one of four pillars on which military capability rests. The others are force structure (the number, size, and composition of military units); modernization (the technical sophistication of the forces, weapon systems, and equipment); and sustainability (the "staying power" of the forces, often measured in number of days). Readiness is therefore not the same as military capability. A force consisting of 10 ships might have high readiness, provided that each ship was fully manned with a well-trained crew and provided with equipment in good condition, but a force that small would have little capability to achieve wartime objectives.

Even though readiness is only one element of military capability, it is the subject of much of the current debate about plans by the Department of Defense (DoD) to reduce force structure and defense spending. In 1993, the Secretary of Defense established the Defense Science Board Readiness Task Force, a panel of eight retired flag officers whose task is to provide the

1. Joint Chiefs of Staff, *The Dictionary of Military and Associated Terms*, JCS Publication 1 (January 1986).

Secretary with independent, expert advice on readiness issues. More recently, DoD formed an internal group, the Senior Readiness Council, whose members include the Chiefs of Staff of the military services.

Readiness is also of considerable interest to the Congress. Last year, for example, Senator John McCain asked each of the service chiefs to respond to an extensive series of questions about readiness issues. In addition, the 1994 defense authorization bill asks the Joint Chiefs of Staff to provide the Congress with an annual assessment (in 1994, 1995, and 1996) of the readiness and capability of the armed forces.

Why does so much of the defense debate focus on readiness? One answer is that DoD must carefully balance readiness, force structure, modernization, and sustainability in order to achieve the maximum level of military capability within a limited defense budget. A large force structure with sophisticated weapon systems is of little value unless the systems are in working order and operated by trained personnel. Moreover, the appropriate balance has not always been achieved. During the late 1970s, for example, DoD may have underemphasized readiness and sustainability while over-emphasizing force structure and modernization.

THE HOLLOW FORCE OF THE 1970s

In 1980, General Edward C. Meyer, then Army Chief of Staff, used the term hollow army in Congressional testimony to describe the imbalance that existed at that time between the number of Army divisions and the number of combat personnel available to fill those divisions.² Soon after his testimony, the term hollow force was being widely used to characterize not only the shortages of experienced personnel but also the shortages of training, weapons, and equipment that undermined military readiness during the mid- and late 1970s. Today, much of what is known about the hollow force of that period is based on anecdotal evidence. Press reports written in 1980, after the military's failed effort to rescue U.S. citizens held hostage in Iran, sometimes sensationalized the impact of readiness problems on U.S. military capabilities. Nonetheless, there is persuasive evidence that many units were not well prepared to fight.

In 1980, according to reports published at the time, less than 40 percent of all divisions, air squadrons, and ships were rated by their own

2. Testimony of General Edward C. Meyer before the Subcommittee on Investigations, House Committee on Armed Services, May 29, 1980, p. 18.

commanders as fully or substantially combat ready.³ (The remainder were rated as marginally combat ready or not combat ready.) The problem was even more severe in some of the reserve components: in 1977, 43 percent of Army National Guard and 54 percent of Army Reserve units were rated as not combat ready.⁴

Personnel problems played a major role. DoD instituted the All-Volunteer Force in 1973 on the premise that military pay would be competitive with pay in the private sector. Yet by the late 1970s, military compensation was not adequate to attract and retain high-quality personnel. As the quality of new recruits declined, discipline, morale, and training suffered. In addition, low retention rates among noncommissioned officers (NCOs) led to shortages of experienced personnel, particularly among NCOs with technical skills that could be used in the private sector. The Navy suffered from a reported shortage of 20,000 petty officers. The impact of such shortages on readiness was publicly, and perhaps intentionally, highlighted in 1980 when the commander of the U.S.S. Canisteo, a Navy supply ship, reported that he was unable to deploy because of a lack of experienced personnel in the engine room.⁵

These personnel problems were aggravated by shortages of fuel, spare parts, and ammunition that restricted training opportunities. Without sufficient skilled maintenance personnel and spare parts, the ability of even the most modern ships and aircraft to perform their missions was reduced. In 1980, the Air Force's First Tactical Fighter Wing, with 66 F-15 fighters, failed a mobilization test; because of a shortage of parts, only 23 of the aircraft were capable of performing their mission.⁶

How did these problems develop? Between 1969 and 1975, public disillusionment with the nation's role in Vietnam encouraged rapid reductions in defense spending. Expenditures on national defense, adjusted for inflation, fell by 31 percent. Limited budgets, together with rising oil prices and increased personnel costs resulting from the elimination of the draft, meant that the acquisition of modern weapons by the military, which had been

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3. Heritage Foundation, "Shortchanging Military Readiness," Backgrounder No. 267 (Washington, D.C., May 17, 1983), p. 1.
 4. Richard K. Betts, "Conventional Forces: What Price Readiness?" *Survival* (January/February 1983), p. 30.
 5. Bernard Weinraub, "Nation's Military Anxiety Grows as Russians Gain," *The New York Times*, September 21, 1980, p. A-1.
 6. Bernard Weinraub, "Losses of Skilled Air Force People Prompt Concern Over Its Readiness," *The New York Times*, September 23, 1980, p. A-1.

delayed by the Vietnam War, was delayed still further. Thus, when the defense budget did start to rise slowly between 1976 and 1981, DoD emphasized the procurement of new weapon systems. According to General John Chain, Director of Air Force Operations and Readiness in 1980, "Our aircraft at the end of the Vietnam War were tired and were facing a new generation of Soviet equipment. We had a choice: We could have either bought a new airplane or we could have bought spare parts for our old ones. We couldn't buy both."⁷

In the eyes of some critics, the decision to emphasize modernization over readiness was an error in judgment that left existing units unable to operate. Yet the underlying problem, as General Chain's comment suggests, may have been an imbalance between defense resources and national security commitments that made it impossible for DoD to buy both readiness and modernization.

The readiness problems of the late 1970s, however, might not reappear in the current drawdown, for a number of reasons. Because of substantial funding during the 1980s, DoD does not face the same backlog of modernization requirements that it faced in the mid-1970s. With the collapse of the Soviet threat, reduced commitments may balance with reduced resources. Public attitudes have also changed: the desirability of having forces that are ready to fight may be more apparent today, in the wake of Operation Desert Shield/Desert Storm, than it was in the aftermath of the Vietnam War. The All-Volunteer Force is well established, and DoD has extensive experience with the types of recruiting incentives and retention bonuses needed to provide experienced, high-quality personnel for the armed forces. Finally, since 1982, the Congress has required that funding for operation and maintenance be authorized in addition to being appropriated. The subcommittees responsible for reviewing those authorizations provide a forum in which readiness concerns are highlighted rather than neglected.

The Department of Defense may also have learned a lesson from the 1970s. The newly created Defense Science Board Readiness Task Force and the Senior Readiness Council are both public symbols of DoD's commitment to avoiding a hollow force in the 1990s. Former Defense Secretary Les Aspin tried to make readiness the department's highest priority, and William Perry, the current Secretary, has continued that effort.⁸ To the extent that the

7. Cited by Lt. Gen. Hans H. Driessnack, "The Key to Readiness: O&M," *Air Force Magazine* (October 1980), p. 57.

8. Office of the Assistant Secretary of Defense (Public Affairs), news briefing by Secretary of Defense Les Aspin, May 19, 1993.

department's plans reflect this priority, it is possible that any imbalance between defense resources and commitments during the current drawdown will take the form of a force structure that is too small, not sufficiently modern, or not sustainable, rather than one that is not ready. Some critics who warn that the readiness problems of the 1970s could reappear are, on closer examination, actually concerned that needed modernization is not being undertaken or that the planned force structure is too small to satisfy peacetime commitments and still be prepared to deal with two major regional contingencies simultaneously.

Nonetheless, the experience of the 1970s provides a strong rationale for carefully reviewing trends in readiness. Although some factors that contributed to the readiness problems of that period have been resolved, new factors--increased costs for environmental cleanup and compliance, rising costs for health care and family support, and the cost of maintaining aging DoD facilities--are now competing for funding that might otherwise be available to purchase the fuel, spare parts, and depot maintenance that more directly support unit training and readiness.

CHAPTER II

INDICATORS OF UNIT READINESS AND THEIR TRENDS

Senior military leaders evaluate current readiness based on a combination of commanders' judgments, quantitative measures of the resources that units possess, analytic models that attempt to relate those unit resources to performance, and assessments of how units actually perform in exercises or operational tests. Efforts to track trends in readiness consistently over a number of years, however, rely primarily on measures of units' resources. Although the Department of Defense uses a variety of resource measures to indicate changes in the readiness of units, this paper focuses on two of the most widely used and longest established: overall C-ratings, as reported in the Joint Chiefs of Staff Status of Resources and Training System (SORTS), and mission-capable rates for weapon systems.

THE STATUS OF RESOURCES AND TRAINING SYSTEM

SORTS, the most comprehensive indicator of unit readiness, is maintained by each service in accordance with broad JCS guidance.¹ Under this system, each commander rates his or her unit's resource status overall and in four areas: personnel, training, quantity of equipment and supplies, and equipment condition. Ratings in each resource area range from C-1 (the unit has the resources that would be prescribed for it in wartime) to C-4 (the unit needs additional resources or training before it can undertake its wartime mission). For example, a unit possessing at least 90 percent of the combat-essential equipment and supplies that are prescribed for it in wartime might be rated C-1 in terms of the quantity of equipment and supplies, while a unit with less than 90 percent but more than 80 percent of its wartime requirement would be rated C-2 in that resource area. Units that are not ready as the result of planned actions--ships being overhauled, new units in the process of being formed, and units being removed from the force--are categorized as C-5.

Although higher-echelon units also report, the Navy provides reports for individual ships and squadrons and major combat service support units; the Air Force provides reports for squadrons and deployable detachments;

1. See Joint Chiefs of Staff, "Joint Reporting Structure Status of Resources and Training System (SORTS)," JCS Publication 1-03.3 (August 10, 1993).

and the Army provides individual reports for units of company size or larger.² Both active and reserve units are required to report under SORTS, although support activities that would not deploy in wartime—such as maintenance depots and management headquarters—are not covered.

The extent to which a unit commander's judgment can influence C-ratings varies by service and by resource area. For example, ratings in the personnel area tend to be relatively objective, since the number, grade, and individual skill qualifications of the people assigned to a unit can be compared directly with the unit's wartime requirements. Ratings in the training area, however, which can depend on how many additional days of training the commander thinks the unit would need before meeting service standards, tend to be much more subjective.

Although practices differ among the services, the overall C-rating for a unit generally reflects the unit's lowest resource rating. Thus, a unit that is C-3 in personnel would be rated C-3 overall even if it was C-2 in each of the other resource areas. Some upward or downward adjustment in the overall rating, however, is possible based solely on the commander's judgment. Although each service has made an effort to spell out objective criteria for different ratings, overall readiness depends on many factors, at least some of which are intangible.

MEASURES OF THE OPERATIONAL AVAILABILITY OF WEAPON SYSTEMS

DoD also uses measures of the operating condition of equipment held in combat and combat-support units to track trends in readiness over time. Although these measures refer specifically to equipment condition, they provide an indication of overall readiness. Ships and aircraft that cannot perform their mission because of equipment failures are not ready, regardless of the quality of their personnel or training. Moreover, good equipment condition depends on personnel and supplies: it requires adequate depot maintenance, a sufficient number of trained maintenance personnel in the unit, and a supply system that can provide the spare parts needed to keep the system operating.

2. See S. Craig Moore and others, "Measuring Military Readiness and Sustainability" (RAND, Santa Monica, California, 1991), p. 11. The size of these reporting units varies. A tactical Air Force squadron would have from 18 to 24 aircraft, and a mechanized infantry company in the Army might have 150 personnel.

Mission-capable rates are one frequently used measure of equipment condition. They measure the percentage of time, on average, that equipment held by units is capable of performing its wartime tasks. The Air Force, Navy, and Army each calculate mission-capable rates for aircraft, and the Army and Marine Corps also calculate rates for ground equipment. Ground equipment is usually categorized as either fully mission capable or not mission capable, but aircraft can be categorized as fully mission capable, mission capable, or non-mission capable. Although definitions vary somewhat by service, an aircraft is generally considered fully mission capable if all mission-essential subsystems are operating as intended, and mission capable if it is safely usable and can perform at least one (and possibly more, but not necessarily all) of its assigned missions. Unlike the C-ratings for equipment condition, mission-capable rates measure the momentary condition of the equipment (regardless of whether it could be made ready before deployment) and are not affected by shortages or surpluses of equipment relative to required levels.³

The Navy does not report mission-capable rates for its ships, but it does maintain information on the operational availability of each piece of equipment aboard Navy ships through its equipment casualty reporting (CASREP) system. Commanders are required to report equipment malfunctions that cannot be corrected within 48 hours and that reduce the ship's ability to perform its mission. CASREPs are rated on a scale of two to four, similar to the scale used for C-ratings. The percentage of time that a ship is free of equipment problems that critically degrade its ability to perform its mission (that is, it does not have a C-3 or C-4 CASREP) is akin, in some respects, to a mission-capable rate.

THE USES AND LIMITATIONS OF C-RATINGS AND MISSION-CAPABLE RATES

Within each service, commanders directly responsible for military readiness and operations use C-ratings, mission-capable rates, and CASREP data at a very detailed level. For example, the C-ratings for an individual unit or for units of a specific type might signal a potential readiness problem. Even more detailed information from outside the C-ratings system might then be brought to bear to verify that a readiness problem exists, to determine its cause, and to identify a possible solution. Similarly, mission-capable rates for each

3. In the past, mission-capable rates for ground equipment in the Marine Corps and C-ratings for equipment condition in each service have reflected shortages and surpluses of equipment relative to wartime authorizations. Beginning in 1994, however, both mission-capable rates for Marine Corps equipment and C-ratings for equipment condition in each service will be calculated relative to actual equipment inventories rather than wartime authorizations.

specific type of aircraft and detailed CASREP data for each type of shipboard equipment are used by military commanders to help identify equipment readiness problems and, if necessary, to gain the assistance or resources needed to solve them.

Highly aggregated data on C-ratings, mission-capable rates, and CASREPs are used primarily in efforts by DoD and outside analysts to summarize the overall readiness level within the active or reserve components of a service or to describe trends in readiness over time. In addition, the services are developing models that attempt to predict future values of these indicators based on changes in inputs (such as funding for operations, depot maintenance, and spare parts). Both the Navy and Air Force project mission-capable rates for aircraft, the Navy projects future values for time free of C-3 and C-4 CASREPs, and the Army projects overall C-ratings.

Experience, however, suggests that mission-capable rates and C-ratings are at best general indicators of readiness levels and should be interpreted with caution. During the early 1980s, DoD analysts found that these indicators did not improve as much as senior commanders' subjective judgments about readiness or increases in defense spending might have warranted. Part of the explanation may be the time it takes for increases in funding for training, purchases of spare parts, and depot maintenance to translate into higher levels of readiness. Another factor cited by DoD was the introduction of more modern, capable weapon systems during the 1980s that led to declines in mission-capable rates and C-ratings until crews were fully trained on the new systems and the necessary support base was established. These lower readiness levels did not reflect a lack of funding.

Intangible factors--changes in reporting philosophies for C-ratings and in the emphasis given to having equipment mission capable at all times--can also distort trends in these indicators over time and mask underlying changes in readiness. For example, some Navy officials attribute a sharp downturn in both mission-capable rates and C-ratings in the early 1980s to a policy change that encouraged commanders to report, rather than downplay, their readiness problems. Similarly, some of the increase in mission-capable rates for Air Force bombers in the mid-1980s results not from a fundamental change in readiness but from a change in philosophy that placed a higher premium on keeping all aircraft mission capable--even aircraft that the unit might otherwise have an opportunity to repair before deployment.

The failure of these key readiness indicators to register the gains that many people expected to see during the early 1980s led to a demand within

the Congress and DoD for better measures of readiness.⁴ The Joint Chiefs of Staff responded in 1986 by changing the terminology used to describe C-ratings in a way that emphasized their dependence on resource levels and de-emphasized their potential as an indicator of military readiness. Units that were C-1, C-2, C-3, and C-4 were no longer to be designated, respectively, as fully combat ready, substantially combat ready, marginally combat ready, and not combat ready. Instead, C-ratings would be interpreted only as a measure of the extent to which the unit's resources matched those prescribed for wartime. There was little change, however, in the actual procedures and criteria used to report C-ratings.

Clearly, mission-capable rates and C-ratings suffer from serious limitations. Yet they remain among the few indicators that are available to assess overall readiness levels and trends. What do these indicators--to the extent that they are available in an unclassified form--say about the current readiness of U.S. forces?

HISTORICAL TRENDS IN C-RATINGS AND MISSION-CAPABLE RATES

Taken as a whole, the available unclassified data on mission-capable rates and aggregate C-ratings suggest that military readiness is now high. Some of the indicators examined in this paper are at record-high levels. This finding is consistent with then Secretary of Defense Les Aspin's assessment in 1993 that "right now, we've got the best, most ready force in the world."⁵ Based on this evidence, it is misleading to describe U.S. forces as on the brink of a hollow force or on the razor's edge of readiness. Nonetheless, some mission-capable rates and C-ratings have fallen below the peak levels seen in the late 1980s, and in a few cases the declines appear to be significant. At least in these areas, now might be an appropriate time to ask, how much readiness is enough?

Trends in Overall C-Ratings

One useful way to summarize data on C-ratings is to consider the percentage of units reporting an overall resource status of C-1 or C-2. Before the change

4. Congressional concern was reflected in a 1987 requirement for DoD to report on progress in measuring readiness.

5. Office of the Assistant Secretary of Defense (Public Affairs), news briefing by Secretary of Defense Les Aspin, May 19, 1993.

in terminology that DoD adopted in 1986, such units would have been described as either fully or substantially combat ready.

In both the Navy and the Air Force, the percentage of active-component units rated C-1 or C-2 in overall readiness rose appreciably during the 1980s. This increase occurred even though the standards used in the C-rating system were tightened during the early 1980s. In 1993, 93 percent of active Air Force units were rated C-1 or C-2 overall (see Figure 1). This exceeds the level seen throughout most of the 1980s, and it is only 2 percentage points below the record level reached in 1989. The percentage of Navy aviation units reporting C-1 or C-2 is also comparable with the levels seen in the late 1980s, although somewhat below the peak seen during Operation Desert Storm/Desert Shield (see Figure 2). The percentage of active Navy surface ships reporting C-1 or C-2 overall, however, declined sharply in 1990 because of a Navy-wide problem with a specific electronic warfare system (the SLQ-32). Although that readiness indicator has recovered somewhat, it remains 22 percent below its 1987 peak.⁶

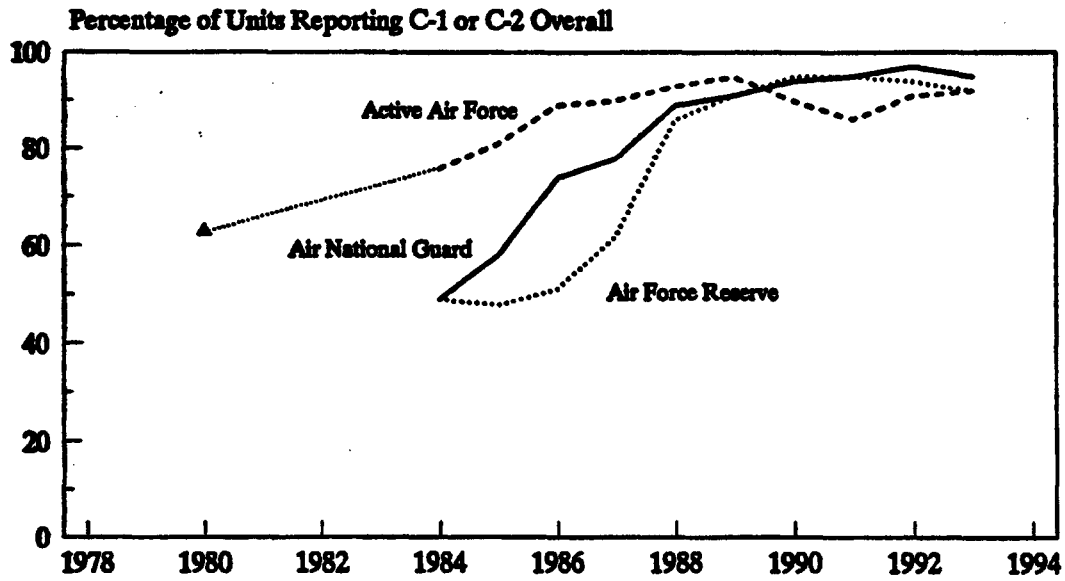
Overall C-ratings for Air National Guard, Air Force Reserve, and Marine Corps Reserve units (the only reserve components for which unclassified aggregate data are available) show a strong upward trend from 1984 to 1990. The sharp decline in ratings for Marine Corps Reserve units in 1992 reflects an effort on the part of the Corps to put the reporting procedures used by reserve-component units on a par with those used by the active component (see Figure 3).⁷

The large downturn in the Navy data seen in 1980 and 1981 illustrates the subjective nature of C-ratings and some of the difficulties encountered in using these data to show trends over time. According to some Navy officers familiar with the data, the downturn reflected a desire on the part of the senior Navy leadership--expressed in a message to the fleet--to ensure that commanders submitted C-ratings that accurately reflected the readiness problems that their units faced at that time.⁸ Similarly, the historical stability of overall C-ratings for the active Marine Corps--a service that has been

6. The actual percentage of units reporting C-1 or C-2 in the Navy is classified. These estimates are based on an unclassified index that shows trends over time.

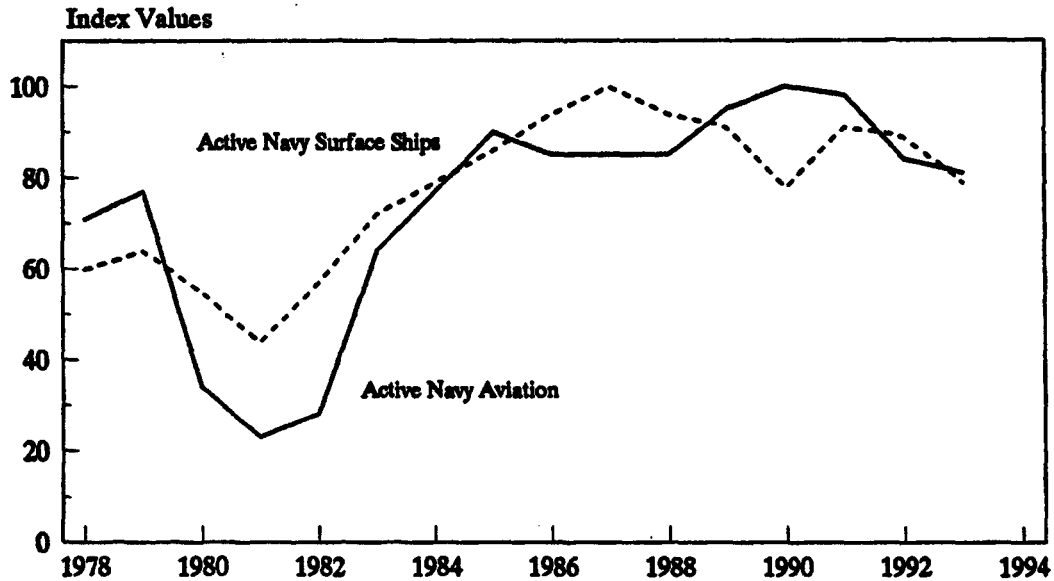
7. Reserve-component equipment that was previously put in a "nonreporting" status will now be included when reserve units determine their C-ratings for equipment condition.

8. Reported to the Congressional Budget Office in a briefing by the Assessment Division, Office of the Chief of Naval Operations, November 23, 1993.

FIGURE 1. C-RATINGS FOR AIR FORCE UNITS

SOURCE: Congressional Budget Office. Air Force data for 1980 are from Melvin Laird, *The Problems of Military Readiness* (Washington, D.C.: American Enterprise Institute, 1980). All other data are from the Department of Defense.

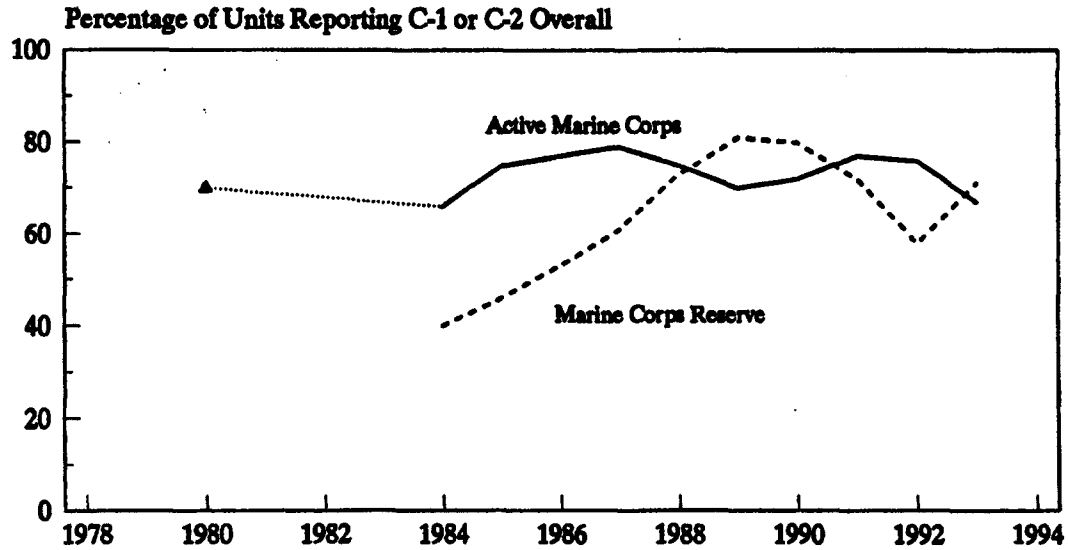
FIGURE 2. INDEXES OF C-RATINGS FOR NAVY UNITS



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: These indexes show changes in the percentage of units reporting C-1 or C-2 relative to their peak values; they do not show the actual percentage of units that are C-1 or C-2. The peak value for aviation units was in 1990, so the aviation index in that year has a value of 100. The peak value for surface ships was in 1987, so the surface ship index has a value of 100 in that year. An index value of 50 for a given year means that the percentage of units reporting C-1 or C-2 was half of its peak value.

FIGURE 3. C-RATINGS FOR MARINE CORPS UNITS



SOURCE: Congressional Budget Office. Marine Corps data for 1980 are from Melvin Laird, *The Problems of Military Readiness* (Washington, D.C.: American Enterprise Institute, 1980). All other data are from the Department of Defense.

"ready for 200 years"--may reflect not only that service's commitment to readiness but also an unwillingness on the part of unit commanders to report that their units are not ready.⁹

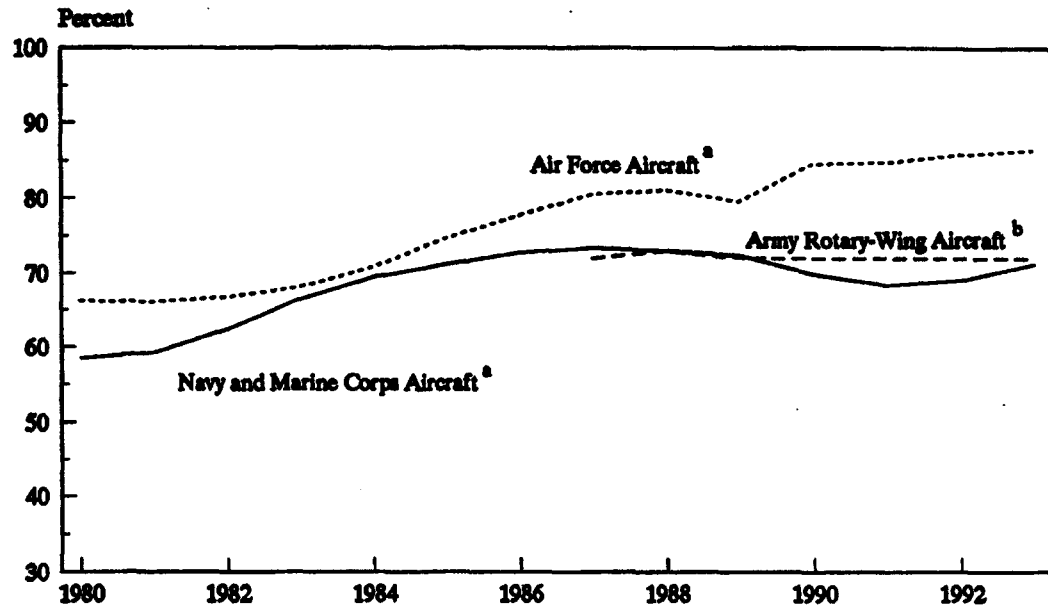
Both the actual percentage of Army units reporting C-1 or C-2 during the 1980s and trends in that data are classified, although it is widely believed that the readiness of both active- and reserve-component units has increased substantially since 1980. According to the Army, "General policy has been to maintain as SECRET any information display or trend which would depict the overall readiness of the ARMY or any component (Active, National Guard, or Army Reserve). Historical readiness trends could prove too revealing in theorizing current readiness status if extrapolated over the near-future horizon. Thus, declassifying (not downgrading) past readiness information allows dangerous speculation which might violate overall security."¹⁰

Trends in Mission-Capable Rates

Today, mission-capable rates for aircraft remain at high levels. The rate for Air Force aircraft (a figure that includes all aircraft in active and reserve units) was at a record level of 87 percent in 1993, although the rates for fighter aircraft and for bombers have fallen from the peak levels achieved during Operation Desert Shield/Desert Storm (see Figure 4 and Table A-2 in the appendix). The mission-capable rate for Navy aircraft (a total that includes all Marine Corps and Navy aircraft, both active and reserve) peaked at 73 percent in 1987. By 1993, however, it was 71 percent and rising.¹¹ Looking at the Marine Corps separately, the rate for fixed-wing aircraft in 1993 was at a historical high, while the rate for Marine Corps rotary-wing aircraft was 3 percentage points below its historical record and rising (see Table A-2). The data for Army rotary-wing aircraft, which that service provided only for the 1987-1993 period, show no trend.

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9. In 1977, the Commandant of the Marine Corps asserted that, "Within the Corps, readiness is the watchword at all levels. . . . I am pleased to report that the morale and esprit of the Marines are at their traditional best"; General Louis Wilson, "CMC Report to Congress: 'We Are Ready. Spirit Is High.' *Marine Corps Gazette* (April 1977), p. 10. Available data suggest that in 1980 almost no Marine Corps commanders reported that their units were C-4 in overall readiness.
 10. Reply by the Department of the Army, dated January 26, 1994, to a Congressional Budget Office request to provide information on aggregate (componentwide) trends in overall C-ratings. The Army is the only service that classifies aggregate readiness trends. Both current and historical C-ratings at the componentwide level are unclassified in the Air Force and the Marine Corps. Navy C-ratings are classified, but the service provided CBO with unclassified indexes showing trends in those ratings.
 11. Although this figure is below the Navy's goal of 73 percent, comparisons between goals and mission-capable rates are difficult to interpret. The goal, set in part to challenge unit commanders, has risen since the mid-1980s.

FIGURE 4. MISSION-CAPABLE RATES FOR AIRCRAFT



SOURCE: Congressional Budget Office based on Department of Defense data.

a. Active and reserve components.

b. Active component only.

The percentage of time that active Navy surface ships are free of equipment failures that critically degrade mission capability (C-3 or C-4 CASREPs) has changed substantially over time. Between 1981 and 1987, it rose from 50 percent to 81 percent (see Figure 5). Between 1988 and 1990, however, it fell sharply. Although the speed of this decline reflects Navy-wide problems with a specific type of equipment, the percentage of time that Navy ships are free of critical equipment failures remains 13 percentage points below the 1987 peak. These data may not justify alarm, but—like the Navy's C-ratings for surface ships—they raise the question of how much readiness is appropriate.

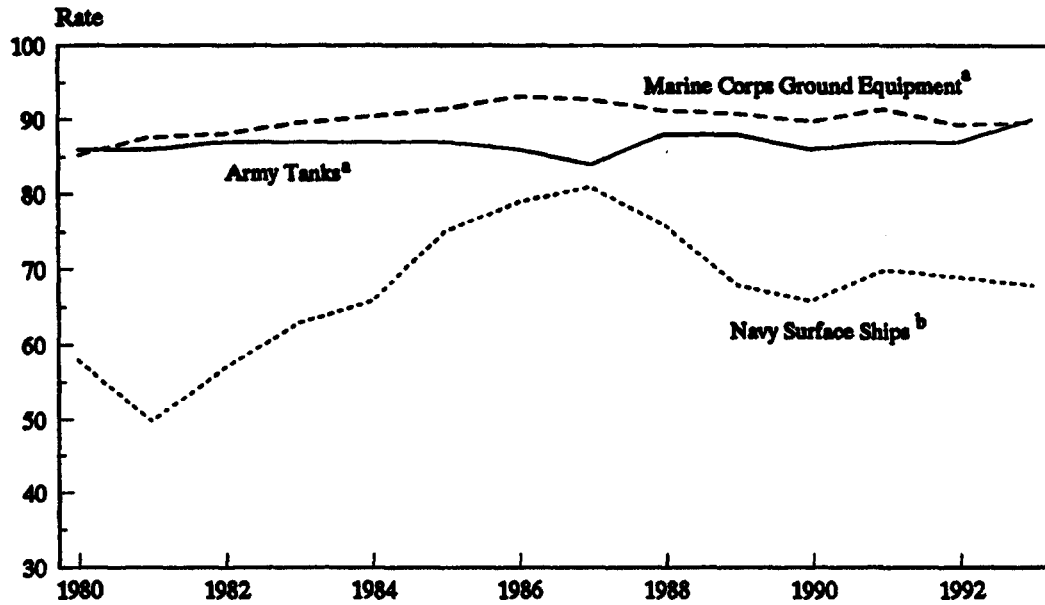
Mission-capable rates for ground equipment may, in general, be less meaningful indicators of overall readiness for ground units than aircraft rates are for aviation units. Although the rate for Army tanks reached a historical high in 1993, it varied relatively little between 1980 and 1993 (see Figure 5). Rates for artillery, Army missile systems, and combat vehicles also varied little over time (see Table A-2). Rapid modernization during the 1980s may have forestalled increases in mission-capable rates. Nonetheless, the failure of rates for ground units to increase significantly during the 1980s—a period in which many officers believe that readiness increased dramatically—casts some doubt on the ability of such rates to identify any future decline in overall readiness.

Aggregate mission-capable rates for Marine Corps ground equipment have also changed little over time and may tend to understate changes in readiness levels. General C.E. Mundy, Commandant of the Marine Corps, recently testified that, "for the first time in 10 years the Marine Corps equipment readiness level is below 90 percent."¹² Yet that mission-capable rate, 89.6 percent, was less than 2 percentage points below the 10-year average. By itself, that might not appear to be a meaningful change, particularly since the non-mission-capable rate for ground equipment in the Marine Corps was also at a low level in 1993.¹³ But a readiness problem could still exist even if it is not reflected in mission-capable rates: General Mundy attributed the lower rate to a lack of funding for depot maintenance, a lack that is supported by funding profiles (see the section on depot maintenance in Chapter III).

12. General Mundy provided this statement in response to a question asked at a May 19, 1993, hearing by the Senate Committee on Armed Services on the Department of the Navy's 1993 Posture Statement.

13. This simultaneous decline in the mission-capable and non-mission-capable rate was possible because the Marine Corps calculated the rates for ground equipment based on the quantity of equipment units were authorized to have rather than equipment they actually had.

FIGURE 5. CONDITION OF SHIPS AND GROUND EQUIPMENT



SOURCE: Congressional Budget Office based on Department of Defense data.

a. Mission-capable rate. Active component only.

b. Percentage of operating time free of C-3 or C-4 equipment casualty reports (CASREPs). Active component only.

Although the picture is by no means uniform, the available data on C-ratings and mission-capable rates suggest that, for DoD as a whole, unit readiness is at a high level by historical standards. These data, however, indicate only that current readiness is high; they do not indicate whether current levels of military compensation will ensure a high-quality force in the future, nor whether DoD is allocating enough resources to activities (such as depot maintenance, facilities maintenance, and supply system inventories) that contribute to future readiness levels. Can DoD maintain its current level of readiness in the future? The review of readiness indicators in Chapter III, which covers some specific functional areas that contribute to future readiness, may provide insight into this question.

CHAPTER III

RESOURCE AREAS OF SPECIAL CONCERN

AND POTENTIAL EARLY-WARNING INDICATORS

A wide variety of Department of Defense resources contribute to future military readiness. In examining indicators of future readiness, the Congressional Budget Office focused on five resource areas that the ongoing defense debate has identified as being of particular concern. The first is personnel quality, which affects both current and future readiness. Personnel problems were perhaps the defining characteristic of the hollow force of the 1970s, and some senior military officers have expressed concern that the turbulence associated with the current drawdown, together with limited pay raises, could lead to problems once again.

The second area of concern is the adequacy of total funding for the operation and maintenance accounts; together with appropriations for military personnel, these accounts are the principal source of funding for a wide range of activities that support both current and future readiness. The final three areas that CBO examined--depot maintenance, wholesale purchases of spare parts, and real-property maintenance--are for the most part funded (directly or indirectly) out of the operation and maintenance accounts. Because these three activities support military operations from behind the scenes and are more closely tied to future than to current readiness, they could provide early-warning indicators of future readiness problems.

INDICATORS OF PERSONNEL READINESS

Measures that describe the people in the military--a key input to readiness--present a very different picture today than they did during the hollow-force years of the late 1970s. Incoming recruits are better educated and more capable of taking on the complex tasks of a modern military; high reenlistment rates have given the services a solid core of experienced enlisted personnel; and the imbalance between force structure and available personnel that was most evident in the reserve components has disappeared. In short, the available personnel measures reinforce the generally favorable impression of readiness trends given by C-ratings and mission-capable rates.

Despite the indications that today's personnel are much more capable of contributing to a ready military than was the case in 1980, all four services

cite personnel readiness as an area of concern.¹ The Administration's plans to limit military pay raises, they say, will increase the gap between military and civilian pay that supposedly arose during the 1980s, making both recruiting and the retention of experienced personnel more difficult. The services also point to survey results that show young people expressing less interest in joining the military than was true a few years ago, and they worry that experienced people will leave the services because of uncertainty about their career prospects and a lowered quality of life resulting from budget cuts and overseas military commitments.

To give some perspective to these conflicting views of personnel readiness, CBO examined the available objective indicators. Recruit quality (as measured by education and test scores) indicates how readily new personnel can be trained and how well they will perform once trained, providing a leading indicator of future problems with personnel readiness. Measures of experience tell more about current readiness; a very experienced force may be able to maintain high readiness despite lower recruit quality, but eventually the experienced personnel will retire. (Reenlistment rates might serve a similar function of indicating current readiness, and also help to predict future readiness, but the exit bonuses and other separation programs of the last three years cloud the interpretation of recent data on reenlistments.) CBO also looked at the extent to which people are serving in jobs for which they have not been trained, since the speed of recent personnel cutbacks, and the turbulence surrounding them, might be making it difficult for the services to retain the right people and to keep them in the units where they are most needed. Finally, CBO looked at overall staffing levels, a key concern in the late 1970s. General Meyer, in citing the failings of the "hollow army" in 1980, complained of units so understaffed that whole platoons and companies existed only on paper.²

With the exception of recruit quality, the measures examined in this chapter have counterparts in the personnel component of the C-ratings from the Status of Resources and Training System. The data shown here, however, are drawn largely from the services' automated personnel records, which provide both a longer time span and a more consistent measurement of the underlying factors.

1. See the statements of the Chiefs of Staff in Sen. John McCain, "Going Hollow: The Warnings of Our Chiefs of Staff" (July 1993).

2. House Committee on Armed Services, Subcommittee on Investigations, "National Defense Funding Levels for Fiscal Year 1981," H.A.S.C. No. 96-41 (May 29, 1980), p. 18.

Recruit Quality

The hollow force of the late 1970s generally attracted a sufficient number of recruits, but many of them were ill suited to serve in the complex world of a modern military. Since that time, the services have viewed recruit quality as a prime measure of the volunteer system's ability to provide the people required for a ready force. Given that perception, it may be understandable that press reports of poor recruiting results early in 1993 raised concerns about a new hollowness. Perhaps a military undergoing personnel cutbacks, with its focus dimmed by the end of the Cold War, could not attract well-qualified recruits.

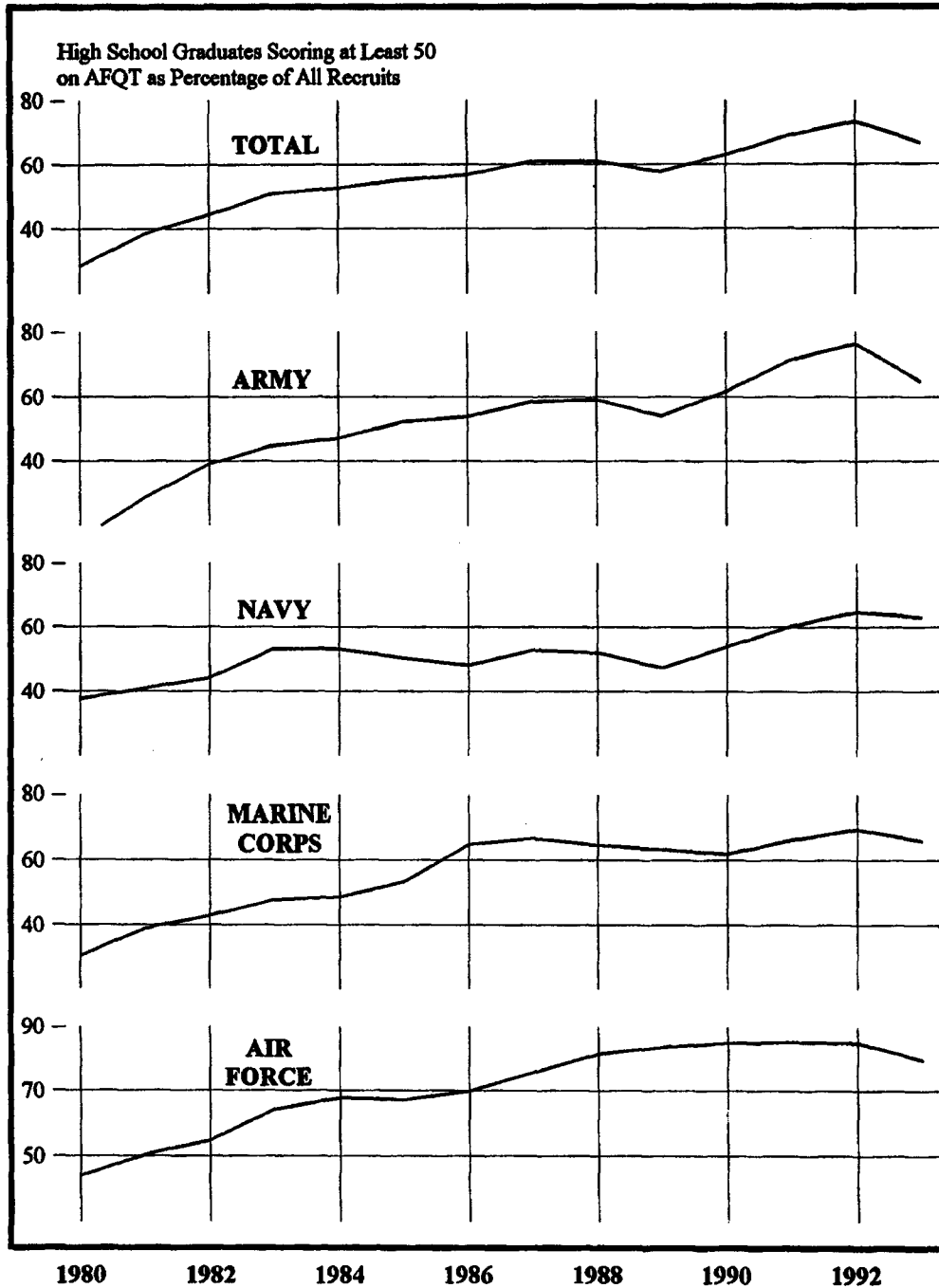
Recruiting may indeed be a problem area in the future, but the 1993 results can hardly be taken as a sign of trouble. For the Army, whose poor recruiting early in the year had been the cause of concern, 1993 would prove to be the third-best recruiting year ever. The same was true for DoD as a whole.

The services quantify the quality of new enlistees in terms of their level of education and how well they score on the Armed Forces Qualification Test (AFQT), a general-aptitude test given to applicants for military service. These two factors measure different traits. High school graduates are more likely to complete their initial enlistment term than are nongraduates. Thus, a military with more nongraduates among its recruits will tend to have more people undergoing training, or serving ineffectively in their initial assignments, than will a military of equal size with more graduate recruits. People with high scores on the AFQT can be trained in their military occupations more readily than lower-scoring recruits, and once on the job, they tend to perform better. Test scores, then, measure a component of military capability as well as being an indicator of readiness.

A simple summary measure of recruit quality combines the two factors: the percentage of recruits who both possess a high school diploma and score at least 50 on the AFQT. AFQT scores, which range from 1 to 99, correspond roughly to percentiles for the general youth population. Recruits who satisfy both these criteria are commonly referred to as "high quality." For the reserve components, data on test scores from the early 1980s are not as detailed as for the active services, so the quality measure for the reserve components discussed below includes AFQT scores of 31 and above.

The percentage of high-quality recruits in 1993 was impressive by virtually any standard (see Figure 6). More than twice as great a percentage

FIGURE 6. QUALITY OF ENLISTED RECRUITS TO THE ACTIVE-DUTY MILITARY



SOURCE: Congressional Budget Office based on data from the Defense Manpower Data Center.
 NOTES: Excludes recruits with prior military service. High school graduates excludes people with GED or other equivalency certificates. Recruits with unknown education or test scores are excluded from the total. AFQT = Armed Forces Qualification Test.

were high quality in 1993 as in 1980, the nadir for recruit quality; for the Army the ratio was more than four times. Poor quality in 1980 reflected both the services' recruiting difficulties and problems with the scoring of the AFQT that led to many recruits' being given higher scores than they deserved. Less than 40 percent of recruits actually scored above 50 on the test in 1980 (compared with more than 60 percent every year since 1985), less than 70 percent were high school graduates (compared with more than 90 percent since 1983), and only about 30 percent of recruits would be classed as high quality. Recruit quality improved steadily through the 1980s and into the 1990s, in part because of large pay raises in 1981 and 1982, more generous education benefits (the Army College Fund, as it came to be called), and improved recruiting practices. In 1993, two-thirds of recruits were high quality.

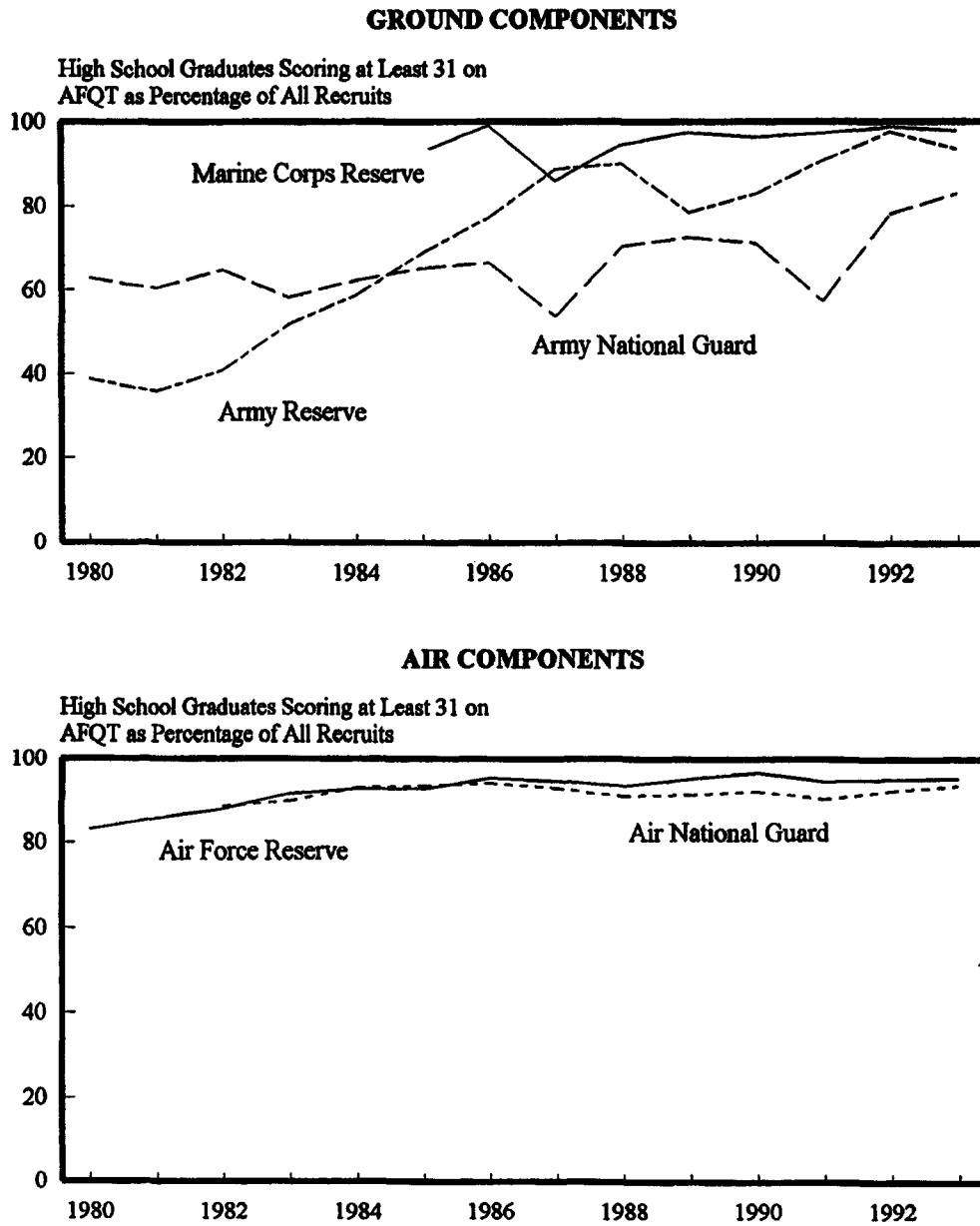
The 1993 recruiting results look poor in comparison with the two preceding years, but recruit quality in those years was artificially inflated. The need for new recruits fell sharply in 1990 and 1991, particularly for the Army and the Navy, as a result of overall personnel cutbacks. The level of resources devoted to recruiting, however, did not fall as quickly. Combined with other factors, this temporarily improved recruit quality in the early 1990s.

The picture for the reserve components is similar to that for the active forces. For both the Army and Air Force reserve components, recruit quality in 1993 was at or near record levels (see Figure 7). (The data that CBO obtained for the Naval Reserve did not include AFQT scores for most recruits in recent years.) Army Reserve recruiting improved dramatically in the early to mid-1980s, in concert with improvement in recruiting for the active Army, after the active Army's Recruiting Command took over recruiting for the Army Reserve in 1980. Army Guard recruiting did not show similar improvement, but recruit quality headed generally upward through the 1980s and into the 1990s.

If 1993 was such an excellent recruiting year, why do the services express concern about the future? Certainly, the Administration's plan to limit military pay raises and the reported decline in young people's interest in military service could make recruiting more difficult, but how much more difficult?

On pay, the crucial question is whether the planned raises will actually put the services in a worse position in competing for young workers than they have been for the past few years. In 1995 through 1997, the Administration plans to offer annual pay raises to military personnel that will be 1.5

FIGURE 7. QUALITY OF ENLISTED RECRUITS TO THE SELECTED RESERVES



SOURCE: Congressional Budget Office based on data from the Defense Manpower Data Center.

NOTES: Excludes recruits with prior military service. High school graduates excludes people with GED or other equivalency certificates. Recruits with unknown education or test scores are excluded from the total. AFQT = Armed Forces Qualification Test. Data for the Naval Reserve included too many people with unknown AFQT scores to be reliable.

percentage points below the rise in the standard measure of civilian pay; a widening pay gap would seem the obvious result. Yet that same measure showed a gap developing through the 1980s, when recruit quality--and the retention of experienced personnel--rose to record levels. Recent research indicates that the problem lies in the standard measure of civilian pay, the component of the Bureau of Labor Statistics' employment cost index that covers wages and salaries of private-industry workers--often called simply, if not entirely correctly, "the" ECI. This index, however, was never intended to track the pay of the young, high-school-only workers on whom the military relies for its enlisted personnel.³ The Administration's plan for military pay raises may or may not worsen the competitive position of the services; because that plan is defined relative to the ECI, the true outcome is hard to predict. But projecting the future relationship between the ECI and a measure of civilian wages that is more appropriate for comparing with military pay is far from straightforward.

Reduced interest in the military on the part of young people--enlistment propensity, as the services call it--would certainly present a problem if the military continued to recruit 300,000 young people each year, as it did in the 1980s. A smaller military, however, needs fewer recruits: under 200,000 in 1994. Is the reported decline in propensity, then, great enough to cause problems? Once again, the answer is unclear. Although research has charted the relationship between propensity measures and subsequent enlistments, no one has used that work to estimate how large a decline in high-quality enlistments should be expected. Moreover, the last reported survey on propensity dates from 1992; since then, the trend could be in either direction.

Perhaps the greatest cause for concern about recruiting involves the willingness to devote adequate resources to it. Recruiting resources include the recruiters themselves--military personnel who might otherwise be assigned to operational units--and other military and civilian personnel in support positions; operation and maintenance expenditures to pay for recruiting stations, typewriters, gas for recruiters' cars, and so forth; advertising to build public awareness of the military as an attractive employment option; and postservice education benefits and other incentives to attract qualified applicants. Facing limited overall funding, the services may be tempted to slight recruiting. Indeed, even during the 1980s, when defense funding was more generous, the Navy tried to recruit for what are arguably the most technically complex jobs of the four services with average recruiting costs well

3. James R. Hosek and others, *A Civilian Wage Index for Defense Manpower*, R-4190-FMP (Santa Monica, Calif.: RAND, 1992).

below those of the Army; since 1985, it has lagged behind the other services in all measures of recruit quality.

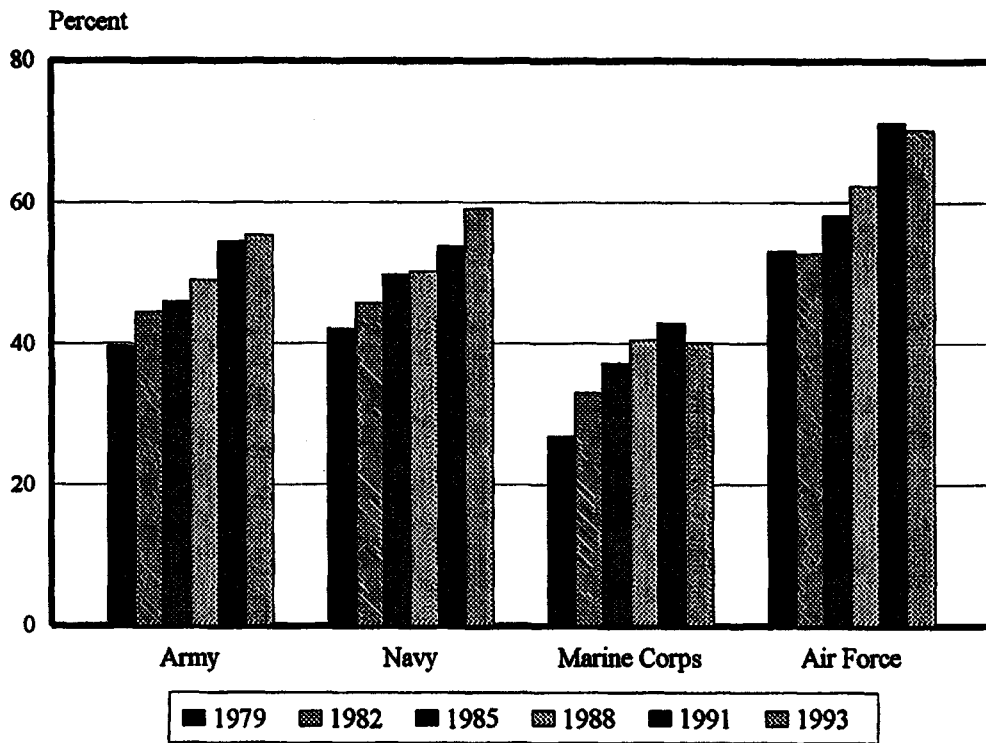
Over the next few years, the services can economize by sizing their recruiting establishments and resources for the smaller numbers of recruits that will be required while personnel cuts are under way. Eventually, however, they will have to reverse some of the cuts if they wish to maintain recruit quality. The end of personnel reductions will mean a rise in the need for new recruits. If the services do not adequately anticipate this rise--with more trained recruiters, larger budgets for recruiter support, and greater advertising expenditures--quality could suffer. Maintaining constant quality might require additional spending on the order of \$100 million (in 1994 dollars) for the four services combined, including the pay of the additional military personnel assigned to recruiting--a fairly small increment to total readiness-related spending.

Experience

Intuition suggests that personnel with more experience in their jobs will perform better than those with less experience, and evidence in the military workplace supports this presumption. Thus, longer average work experience among military personnel would seem to imply more capable, and more ready, military forces. As noted in Chapter I, a shortage of experienced non-commissioned officers was cited as one aspect of the hollow force of the late 1970s. Experience also plays a part in a unit's C-rating, which includes a measure of the unit's personnel in the senior enlisted pay grades. Because the services promote to fill vacancies, however, the number of people in each pay grade may be a less useful measure of readiness than more direct measures of experience.

Average experience levels rose in all four services throughout the 1980s and into the 1990s. One measure of this rise is the percentage of enlisted personnel who have completed four or more years of service (roughly corresponding to the percentage who have completed their initial service obligations). In the Army, for example, this fraction rose from 40 percent in 1979 to 55 percent at the end of 1993 (see Figure 8). In the Air Force, it increased from 53 percent to 70 percent over the same period. The rise tends to be more marked in recent years, reflecting the services' use of reduced recruiting, rather than separation of career personnel, as the primary means of achieving personnel cuts.

FIGURE 8. ACTIVE-DUTY ENLISTED PERSONNEL WITH MORE THAN FOUR YEARS OF SERVICE



SOURCE: Congressional Budget Office based on data from the Defense Manpower Data Center.

The rise in overall experience levels has not, in general, been accompanied by a rise within pay grades (except in the midcareer grades of E-5 and E-6). Rather, the services have promoted more people into the NCO ranks. This increase in the proportion of NCOs has coincided generally with the introduction of technically more sophisticated equipment.

The current high levels of experience among military personnel will help dampen the effects of personnel cuts on readiness, but the services have argued that voluntary retention rates eventually will fall--or may already be falling--as a result of budget cutbacks, longer or more frequent overseas deployments, and other factors. Recent retention data, however, shed little light on this crucial question; all four services have been encouraging midcareer personnel to leave with offers of cash payments and implied threats of involuntary separation. When the cutbacks end, reenlistment rates may indeed be lower than they were in the 1980s, or they may be higher--today's recruits should face unusually good promotion prospects as the current bulge of senior personnel reaches retirement.

Years of service may not be the best measure of experience; an individual's experience in his or her current military specialty is probably more relevant. Experience in a particular job, however, is much more difficult to measure, so total experience is used as a proxy. The only situation in which it might not be an adequate proxy is when large numbers of personnel are forced to change jobs. Job changes in the military do seem to be more common in recent years than in the early 1980s, but average experience too is so much higher now than in the hollow-force years that accounting for job experience probably would not markedly change the impression given by Figure 8.

Skill Mismatches

When commanders are forced to fill key positions with people untrained in the requirements of the job, readiness suffers. In contrast to measures of recruit quality and experience, which showed steady rises during the 1980s, measures of skill mismatches present a mixed picture.

Various measures of skill mismatches exist. Personnel C-ratings measure it in terms of available personnel in "critical skills." During the mid-1980s, DoD's annual *Manpower Requirements Report* detailed the number of overstrength and understrength skills and the number of people in each category. CBO examined the problem of skill mismatch by comparing the

military occupations in which individual service members have been certified as qualified with the occupations in which they are serving.

Comparing specialties is not the straightforward exercise it might appear to be. The Army lists more than 300 distinct specialty titles, the Navy more than 1,000. Some substitutions among these titles are not only permitted but common; Army infantry personnel trained for service in the Bradley Fighting Vehicle (specialty code 11M), for example, can serve as ordinary infantry personnel (code 11B). Deciding which apparent mismatches are actually acceptable requires a group of experts or a stack of service personnel manuals. Producing a fully consistent history of mismatches may be impossible.

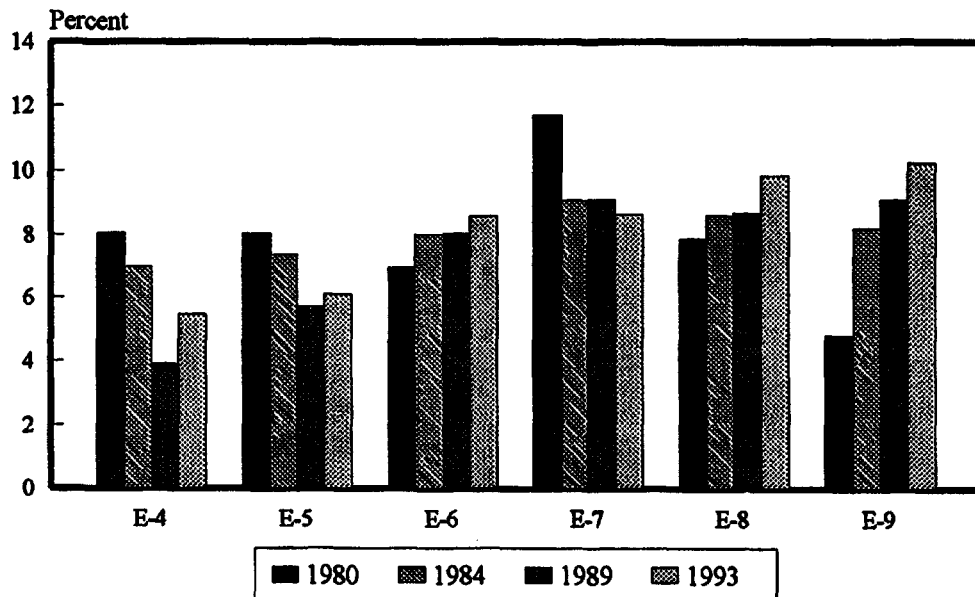
CBO estimated the percentage of enlisted personnel, by pay grade, who were serving outside their primary or secondary specialties at the end of 1980, 1984, 1989, and 1993. (Aggregation across pay grades is not appropriate, in part because many of the problems in correctly identifying mismatches are specific to certain grades.) The picture for the Army is not entirely typical of all four services, but it is typical in revealing a mixed bag of trends (see Figure 9). Some of the changes apparent in Figure 9 can be explained: reduced rates of mismatch in grades E-4 and E-5, for example, may have been caused by Army efforts to restrict reenlistments of personnel in overstrength specialties. For other changes, such as the apparent rise in mismatches in grades E-8 and E-9, the explanation is less obvious.

Two generalizations about readiness seem justified by the data for the Army and the other three services (which are not shown). First, comparing 1993 with 1989, both decreases and increases in rates of mismatch are evident. This suggests either that the supposed turbulence in personnel assignments caused by the cutbacks is not adversely affecting job assignments or that the services' efforts to focus separation incentives on overstrength specialties and pay grades have been effective. Second, comparing 1993 with 1980, a hollow-force year, reductions in mismatch rates seem more common than increases. Most of the changes are rather small, however, compared with the overall mismatch rates, and other changes between the two years--consolidations of specialties, for example--could obscure any real changes.

Staffing Levels

Perhaps the most obvious sign of a hollow force would be an inadequate number of military personnel to staff the existing force structure. By this

FIGURE 9. ARMY ENLISTED PERSONNEL SERVING IN POSITIONS FOR WHICH THEY ARE NOT QUALIFIED, BY PAY GRADE



SOURCE: Congressional Budget Office based on data from the Defense Manpower Data Center.

NOTES: Personnel are treated as qualified if their duty military occupational specialty (MOS) matches either their primary MOS or their secondary MOS, based on the first three characters of the MOS. Figures include adjustments for some of the more common permitted substitutions (for example, 11M for 11B) and for personnel qualified as supervisors who are serving in lower-level positions.

measure, the personnel cuts to date do not appear to have affected readiness; staffing levels in recent years have generally been comparable with levels before the cuts began. Apparently, the services have matched their personnel reductions to their cuts in force structure.

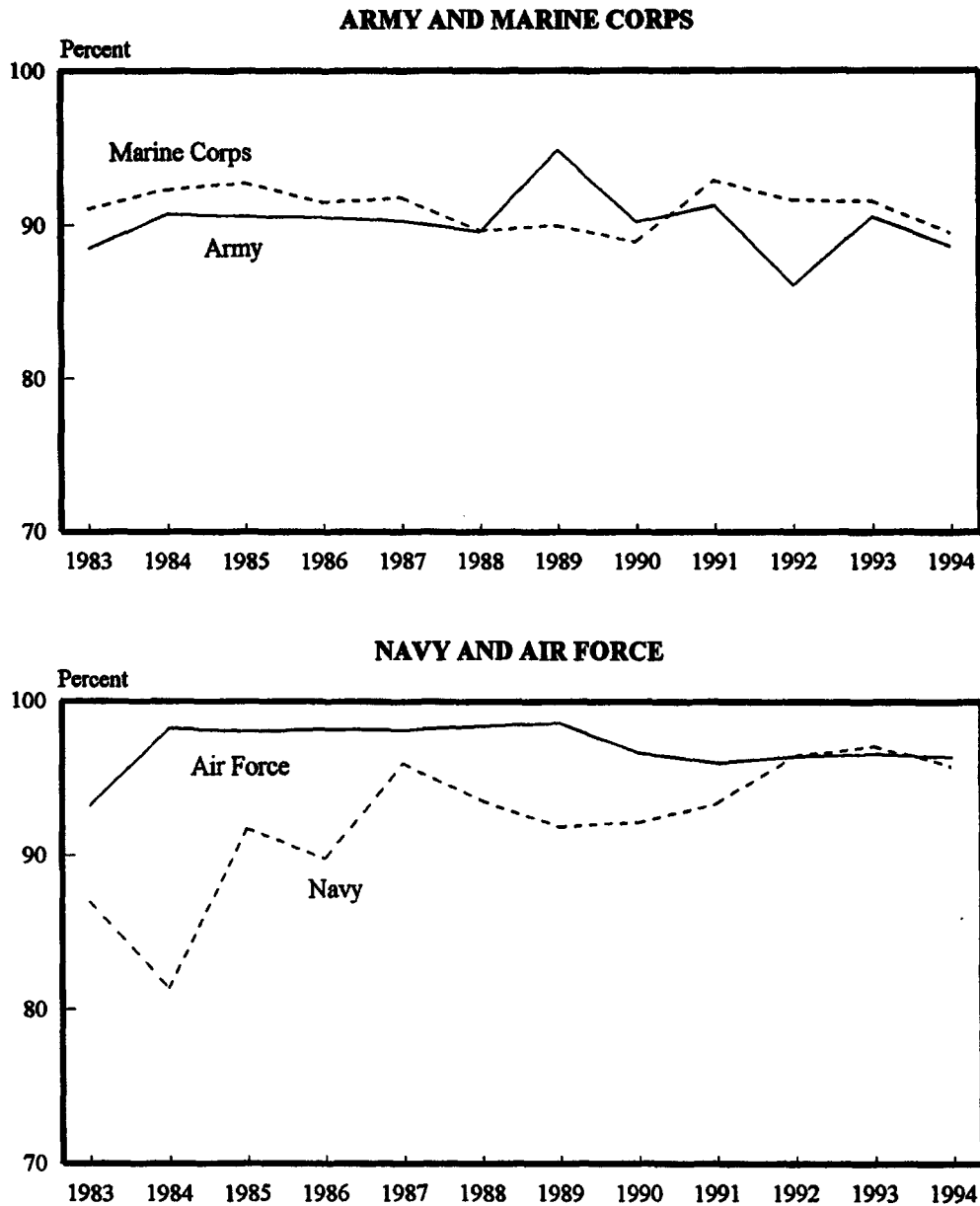
Of course, not one of the services staffs all of its units at 100 percent of their wartime requirements. In the mid-1980s, overall staffing (programmed authorization) averaged about 97 percent of programmed requirement in the Air Force, and about 90 percent in the other three active services (see Figure 10). In the reserve components, trained in-unit strength (a better measure than programmed authorization for the reserve components) ranged from 98 percent for the Air Force Reserve to 84 percent for the Army Reserve (see Figure 11).

Among the active components, only the Air Force shows a lower staffing level in 1993 than the average over 1986 to 1988 (immediately before the current personnel reductions began). The Air Force began cutting personnel in 1989 and has maintained a lower staffing level since 1990, though staffing remains higher than in the early 1980s. In 1994, three of the four services show slightly lower staffing than the 1986-1988 average, but the 1994 figures represent projections made in 1993 and may be revised in the next *Manpower Requirements Report*.

For the reserve components, the picture is more mixed. For all but two components, staffing levels in 1993 and 1994 are roughly the same as over the 1986-1988 period. The Army National Guard, however, increased staffing substantially during the early 1990s and plans to maintain the higher level through 1994. The Naval Reserve, in contrast, began cutting its staffing level in 1992 and projects a further decline. Total personnel in the Naval Reserve will fall 25 percent by the end of 1994, compared with 1991, with little corresponding reduction in the force structure requirement. Apparently, the Navy has decided that it no longer needs many of the reserve units that had been slated to augment active units, but it has not yet reflected this in its official requirements.

Continued high overall staffing levels suggest that readiness is being maintained, but this suggestion would be stronger if complete data were available to show a substantial change from the hollow-force years. The reserve components sharply increased their staffing in the early 1980s, and the level of staffing remains higher than in 1980 for every component except the Naval Reserve (assuming that the 1994 figures are not revised upward). Of

FIGURE 10. ACTUAL STAFFING IN THE ACTIVE FORCES AS A PERCENTAGE OF STAFFING REQUIREMENT

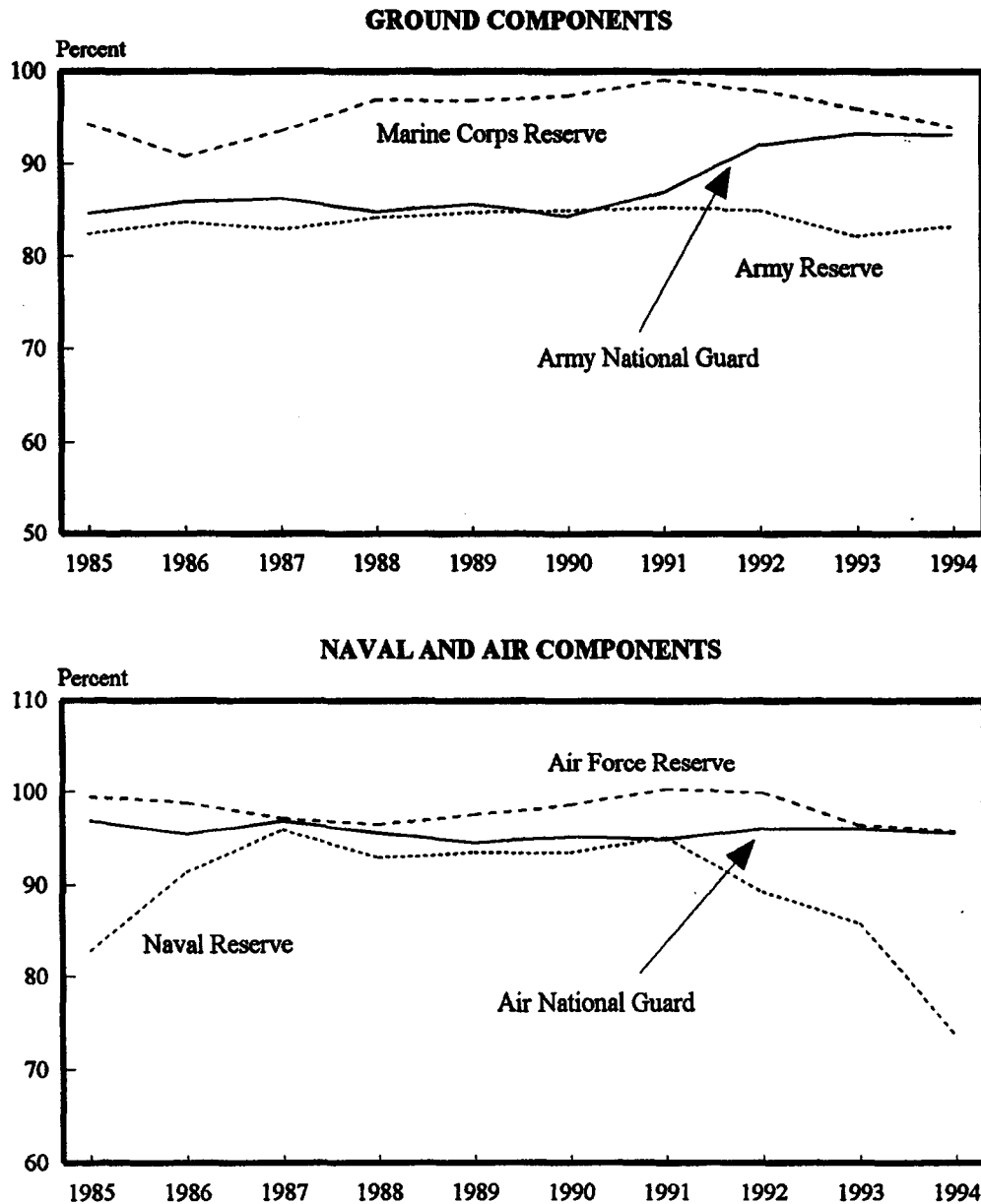


SOURCE: Department of Defense, *Manpower Requirements Report*, various years.

NOTES: Actual staffing refers to programmed authorization; staffing requirement refers to programmed manpower requirement.

The report for fiscal year 1987 (published in February 1986) showed a large reduction in the Navy's programmed manpower requirement for 1986, compared with the previous year's report, and a revised estimate for 1985.

FIGURE 11. ACTUAL STAFFING IN THE SELECTED RESERVE COMPONENTS AS A PERCENTAGE OF STAFFING REQUIREMENT



SOURCE: Department of Defense, *Manpower Requirements Report*, various years.
 NOTE: Actual staffing refers to trained in-unit strength; staffing requirement refers to wartime requirement.

the active components, 1980 data could be located only for the Army and Marine Corps.⁴ General Meyer's statement notwithstanding, Army staffing in 1980 (and that of the Marine Corps) was comparable with staffing later in the 1980s. This may reflect changes in the way the Army determined staffing requirements, or it may be that the hollowness referred to by Meyer was confined to certain Army specialties--namely, the combat arms specialties. Since 1981, the Army has successfully used generous education benefits and other incentives to attract well-qualified recruits to the combat arms.

Personnel make a highly visible contribution to current and future operational readiness, and DoD's commitment to protecting its military personnel resources is correspondingly strong. Some experts believe, however, that readiness-related activities funded through the operation and maintenance accounts are more vulnerable to shortfalls. How does the current level of funding for operation and maintenance compare with the levels seen during the 1980s?

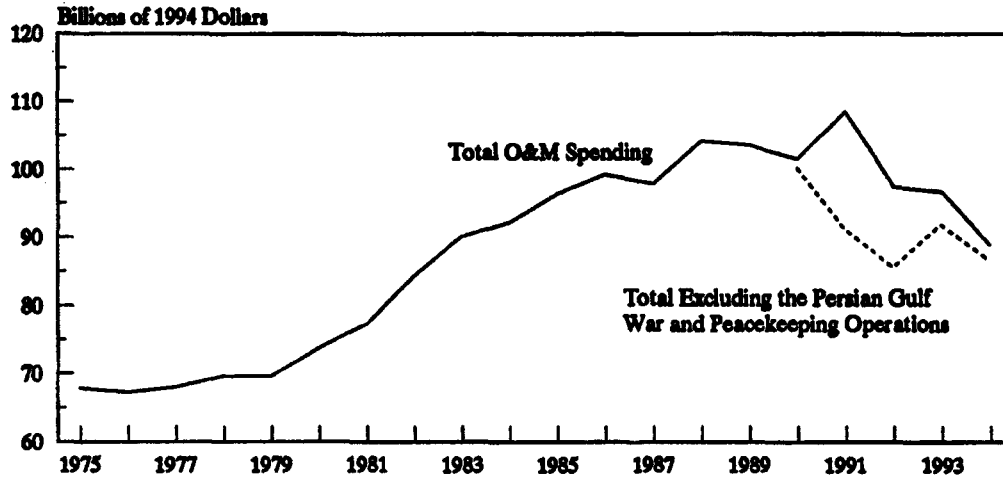
TRENDS IN OPERATION AND MAINTENANCE SPENDING

The operation and maintenance appropriations pay for a broad range of goods and services within DoD. Some of them, such as health care benefits for military retirees and pollution prevention programs, have a tenuous link to current or future military readiness. Yet many of the goods and services funded from O&M accounts, including overhauls of weapon systems and the fuel and spare parts that military units use in training, make a critical contribution to both current and future readiness. Although the relationship between future readiness and total O&M spending is by no means direct, shortfalls in funding could presage readiness problems.

The current level of O&M spending appears, overall, to be consistent with DoD's commitment to ensuring current and future readiness. In 1994, spending will total \$87 billion for operation and maintenance, excluding spending on peacekeeping operations and additional weapons repair associated with the Persian Gulf War (see Figure 12). (Unless otherwise indicated, all funding is expressed in 1994 dollars.) Although O&M spending in 1994 is 17 percent below the pre-Desert Shield/Desert Storm high point achieved in 1988, it remains 25 percent above the level seen in 1979, a year frequently cited as the low point in readiness.

4. A 1984 DoD study of readiness, "Improvements in U.S. Warfighting Capability, FY 1980-84" (May 1984), reported that Navy and Air Force data for 1980 were unavailable.

FIGURE 12. SPENDING ON OPERATION AND MAINTENANCE



SOURCE: Congressional Budget Office using data provided by the Department of Defense.

NOTE: Operation and maintenance spending provides a variety of support services to military forces and military personnel. Spending is measured in outlays.

The decline in O&M spending from its 1988 peak reflects decreases in the size of military forces. Indeed, O&M spending has fallen at a slower rate than has the size of the military. Using changes in the number of military personnel as a proxy for changes in force structure, CBO found that the \$48,000 being spent on O&M to support each active-duty service member in 1994 is above the peak level achieved in the 1980s (see Figure 13). This figure excludes funding for the Persian Gulf War and for peacekeeping operations, which are exceptional expenses funded with supplemental appropriations. The level of spending in 1994 is over 50 percent higher than in 1979, adjusting for inflation. At least by historical standards, the current level of O&M funding relative to force structure appears to be very high.

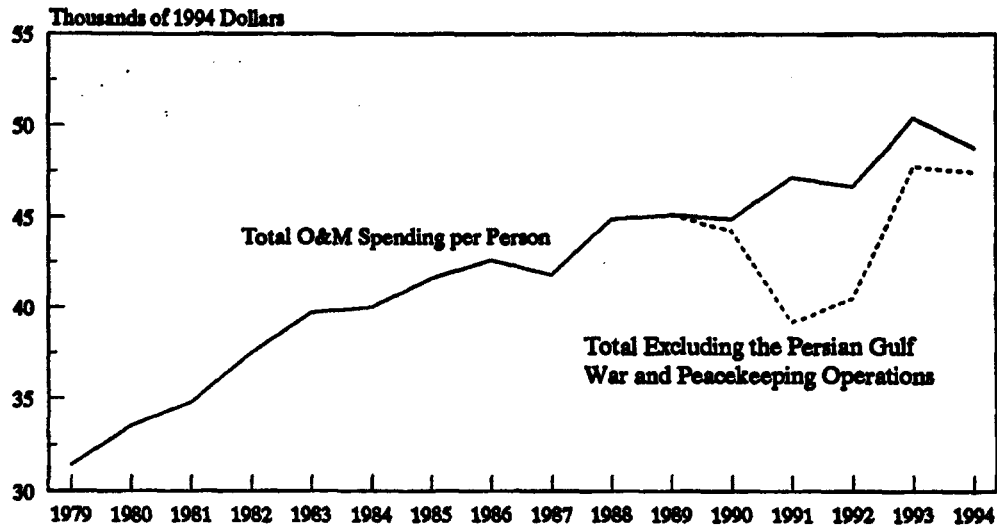
Not all O&M spending, however, contributes directly to military readiness. Even though total spending is high, some Members of Congress have recently suggested that this fails to take into account either the rapid growth in some areas of O&M that have only a limited effect on military readiness (such as health care) or the recent inclusion in O&M of activities that have not traditionally been part of DoD's budget (such as economic conversion).⁵ In addition, some DoD activities that were formerly funded in other appropriation categories have been transferred to O&M. For example, responsibility for funding about \$2.9 billion of purchases of major repair parts (such as aircraft engines) was transferred into the O&M accounts from the procurement accounts. As a result of these changes, growth in O&M spending per member of the active-duty military may overstate the extent to which O&M is in fact supporting military readiness.

CBO estimates that these three factors--growth in O&M spending for medical care and for nontraditional activities, plus additions in O&M funding responsibility--boost operation and maintenance spending by about \$4 billion in 1994 compared with 1988. That figure reflects growth in O&M spending since 1988 for health care for all eligible individuals, environmental cleanup and compliance, economic conversion and transition programs, assistance for the disarmament efforts of former Soviet states, and net transfers to O&M from other appropriation categories.

Without these additions, O&M spending in 1994 would have been roughly \$39,000 per active-duty member rather than \$48,000. Adjusted in this way, per capita spending on O&M in 1994 roughly equals the peak levels of

5. Senate Committee on Appropriations, "Department of Defense Appropriations Bill, 1994," Report 103-153 (October 4, 1993), pp. 32-33.

**FIGURE 13. OPERATION AND MAINTENANCE
SPENDING FOR EACH ACTIVE-DUTY
SERVICE MEMBER**



SOURCE: Congressional Budget Office using data provided by the Department of Defense.

the late 1980s. Thus, even after adjusting for growth in O&M spending not related to readiness, O&M spending per active-duty member remains close to its historical high.

Some DoD officials believe that these types of spending will grow in the future and threaten to crowd out O&M activities considered more crucial to ensuring readiness. Although some of these costs (such as environmental compliance) may increase with the tightening of state and local standards, others (such as economic adjustment or demilitarization costs) are likely to decline in future years as the military drawdown is completed.

The fact that per capita spending on activities related to readiness is high by historical standards does not necessarily mean those activities are being fully supported. Changes in the composition of forces, in the cost of supporting weapon systems, and in the mix of military and civilian personnel can all affect the level of O&M that is required to support forces at a high level of readiness. In addition, the drawdown process itself imposes certain short-run costs, such as the expense of bringing equipment back from Europe. Moreover, until DoD finishes consolidating and reducing its infrastructure of bases, supply depots, and maintenance depots, it will face fixed overhead costs that could significantly increase the level of per capita spending needed to maintain a ready force. A look at some of the specific activities that contribute to future readiness--depot maintenance, the supply system, and real-property maintenance--may provide greater insight into whether DoD is in fact adequately funding those support activities.

DEPOT MAINTENANCE

Depot-level maintenance refers to those maintenance tasks--such as rebuilding engines or overhauling ships--that can be done most efficiently in specialized industrial facilities, either shipyards or depots. Shortfalls in depot maintenance are a potential early-warning indicator of readiness problems, since resources devoted to depot maintenance contribute to equipment condition in the future. According to DoD estimates, it usually takes a year for shortfalls in depot maintenance to become apparent as readiness problems in operational units.

DoD uses two closely related measures to indicate the adequacy of total funding for depot maintenance: the depot maintenance backlog and the percentage of requirements that are funded. Each service constructs a total requirement for depot maintenance from the bottom up based on its equipment inventories and on specific maintenance practices for each type of

equipment. The depot maintenance backlog identifies the dollar value of those requirements that are not funded. The percentage of requirements that are funded looks at the ratio of funded requirements to total requirements (defined as funded requirements plus the unfunded backlog).

Viewed in isolation, both of these measures seem to indicate a serious potential readiness problem. In 1994, the maintenance backlog, adjusted for inflation, is at a record-high level of roughly \$2 billion--more than three times the average level for the 1980-1993 period (see Figure 14). At the same time, the percentage of requirements that are funded, which averaged 94 percent between 1980 and 1993, is at a record low of 75 percent (see Figure 15). In order to achieve a 94 percent funding rate in 1994, DoD would have to spend an additional \$1.5 billion.⁶

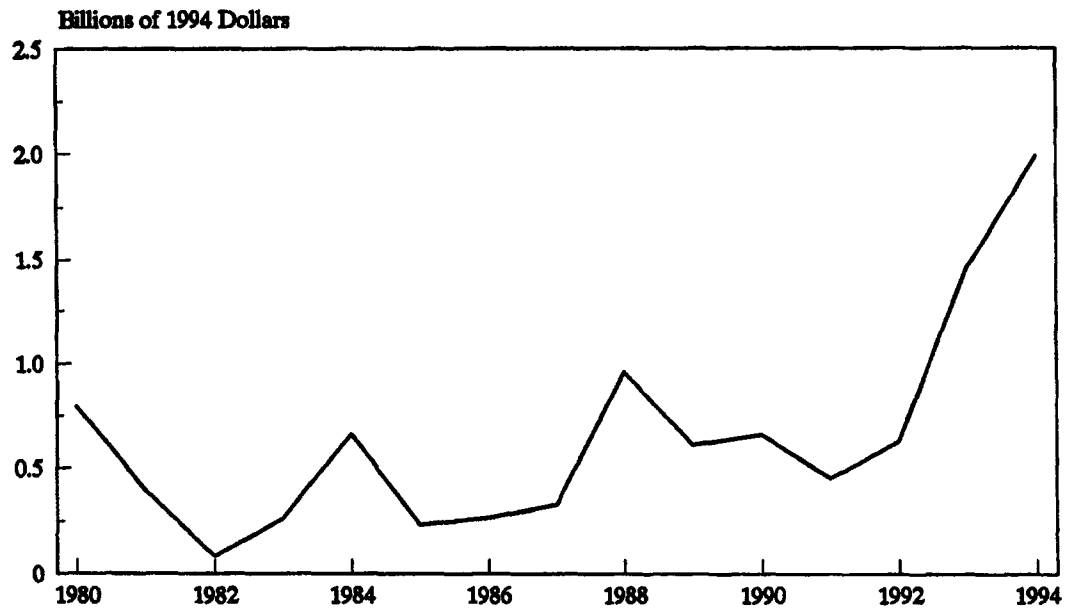
But DoD may not need to fund its stated depot maintenance requirement in order to maintain a high degree of readiness. Depot maintenance requirements and backlogs reflect the total quantity of equipment in need of maintenance; as a result, these indicators may be very misleading during a force drawdown. As units are taken out of the force structure, some equipment is freed up that could be left in the backlog without creating a significant risk to the operational readiness of the units that remain. During a significant drawdown in military forces, a different definition of depot maintenance requirements may be needed--one that excludes items that are part of an acceptable level of backlog and focuses only on assets that must be repaired promptly in order to ensure that essential war reserves are maintained and that the demands of operational units are met.⁷ Without such a definition, it may be difficult to distinguish between the funding that DoD requires to maintain current levels of readiness and sustainability and funding that would enhance those levels.

Current depot maintenance requirements may be particularly misleading in the case of the Army. In that service, many of the assets freed by reductions in the size of the active component are being sent to depots for reconditioning before being redistributed to modernize reserve units or fill previously existing equipment shortages. The Army is funding only 64 percent of its maintenance requirement in 1994. Yet General Gordon Sullivan, Army Chief of Staff, indicates that the principal impact of the resulting backlogs will

6. These estimates are based on the President's 1994 budget adjusted for Congressional action.

7. To the extent that the readiness of units that will remain in the force structure is the primary concern, it may also be appropriate to exclude at least part of the customary maintenance requirement for equipment that will soon be retired.

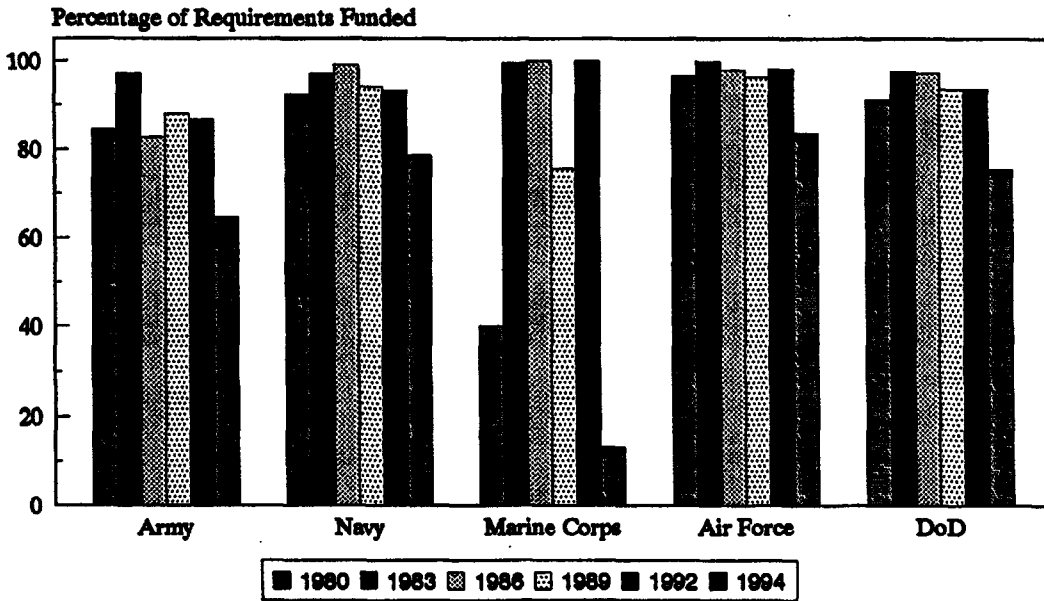
FIGURE 14. TOTAL DEPOT MAINTENANCE BACKLOG



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: Figures represent the backlog of depot maintenance for active-component equipment funded through the operation and maintenance appropriations. Historical data are adjusted to exclude depot-level reparables.

FIGURE 15. DEPOT MAINTENANCE FUNDING RELATIVE TO REQUIREMENTS



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: Figures reflect operation and maintenance funding and requirements for active-component depot maintenance. Depot-level reparables are excluded in all years.

be to slow the redistribution of modern weapon systems from active to reserve units rather than to degrade current readiness levels.⁸ The Marine Corps's depot maintenance requirement may also include assets that are not required to ensure the operational readiness of existing units. Tight budgets notwithstanding, there is no other obvious explanation of the fact that the Marine Corps's 1994 budget request included funding for only 13 percent of its depot maintenance requirement.

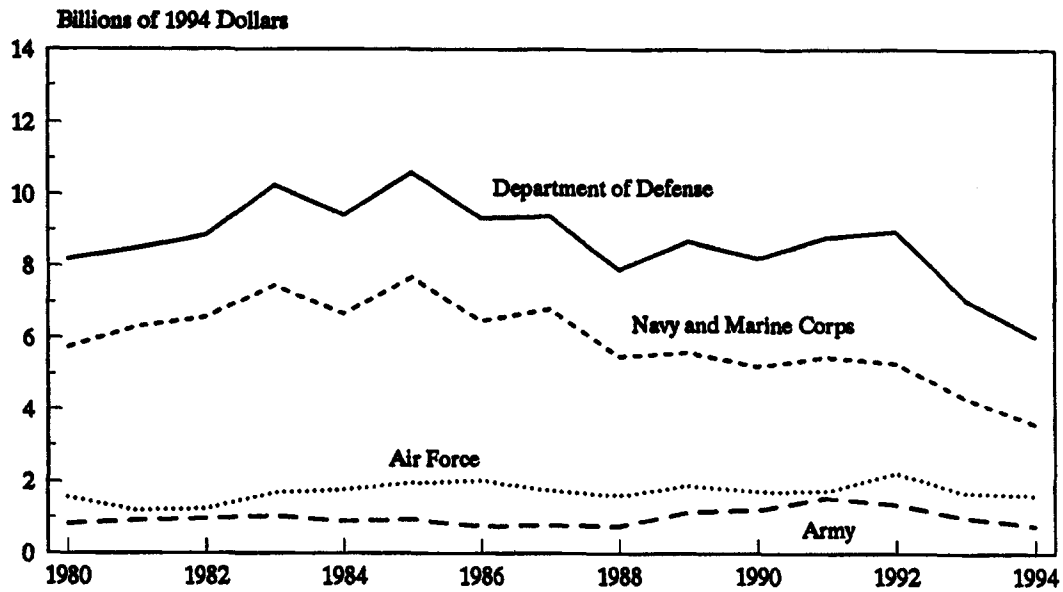
Another reason that depot maintenance requirements can be misleading in a drawdown is that--as uncertainty about the nature and timing of reductions in the force structure is resolved--some of the stated requirement for current and future years may not materialize. For example, the O&M overview that accompanied the President's 1994 budget request indicates that even if the Navy allocated \$7.5 billion to depot maintenance over the two-year period of 1993 and 1994, its depot maintenance backlog would still rise to \$1.1 billion by 1994. Although the overview that corresponds to the 1995 budget request has not yet been published, preliminary data suggest that the Navy actually allocated \$6.9 billion to depot maintenance in 1993 and 1994 but that the resulting 1994 backlog will be only \$0.7 billion. Although this is partly explained by a transfer that moved some software maintenance out of the depot maintenance category, reductions in force structure that eliminated requirements also played a role.

Given that stated requirements can be misleading, how can current levels of funding for depot maintenance be evaluated? One approach is to compare the current ratio of depot maintenance funding to force structure with what prevailed in the past. That simple comparison could also be misleading, however, because of changes in the mix of the force structure, in maintenance practices, and in the way DoD sets the prices that its maintenance depots charge. Nevertheless, during a period of declining forces, that approach could be more useful than DoD's current measures of backlog or funded requirements.

CBO examined the ratio of depot maintenance funding to force structure, using the number of active-duty military personnel in the strategic and tactical Defense Planning and Programming Categories as a proxy for force structure. As the measure of funding, CBO used operation and maintenance funding for the depot-level maintenance of active-component equipment, adjusted for the rate of inflation in the U.S. economy as a whole (see Figure 16).

8. Comment made by General Sullivan in an insert for the record of a May 19, 1993, hearing of the Senate Committee on Appropriations.

FIGURE 16. DEPOT MAINTENANCE FUNDING



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: Funding reflects operation and maintenance appropriations for depot maintenance of active-component equipment. Funding for depot-level repairables is excluded in all years.

The estimates that this approach generates suggest that for DoD as a whole, the ratio of depot maintenance funding to force structure in 1994 was equal to the 1988-1989 (pre-Desert Shield/Desert Storm) average (see Figure 17). From this overall perspective, depot maintenance appears to be funded at a level that could support future readiness. Indeed, there could be some room for further reductions in depot maintenance funding as the force structure declines. The ratio of DoD's 1994 depot maintenance funding to the 1999 force structure is 9 percent above the average before Desert Shield/Desert Storm. (Unless otherwise specified, all of the depot maintenance figures are consistent with the President's 1994 budget, adjusted for Congressional action.)

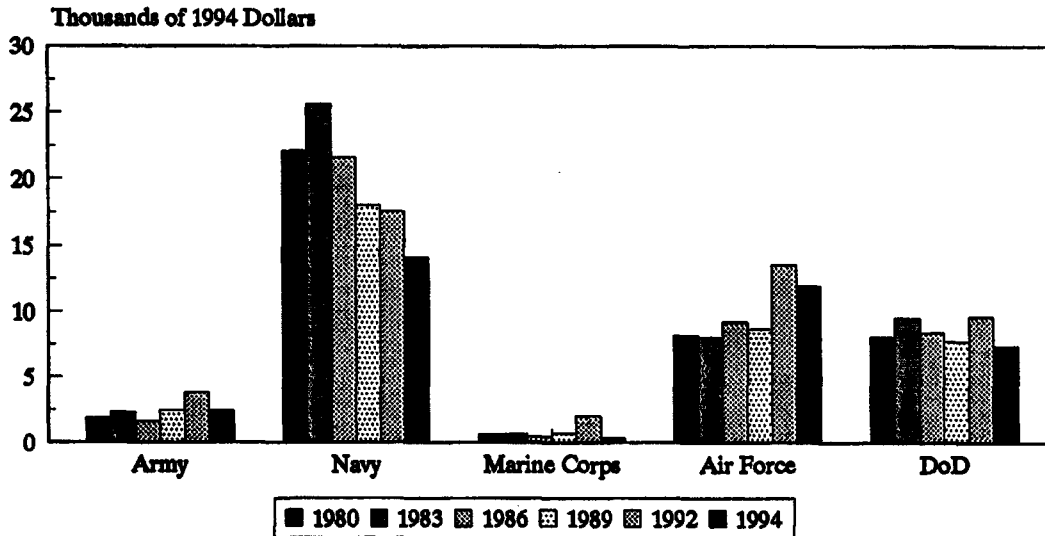
The figure for DoD as a whole masks some apparent shortfalls within the services, however. In the Navy, depot maintenance funding relative to force structure is now about 21 percent below the 1988-1989 average; in the Marine Corps, it is 43 percent below the 1988-1989 average. Because there may be little sense in overhauling a ship that is scheduled to be retired, it might be more appropriate to compare today's funding level with future force levels. Yet even if the Navy and Marine Corps were at their planned 1999 force levels, current depot maintenance funding relative to force structure would be 3 percent below the 1988-1989 average for the Navy and 42 percent below the 1988-1989 average for the Marine Corps.

Provided that equipment is in good condition now, one or two years of funding that is below the historical standard may not pose a serious threat to readiness. This is particularly true in the Navy, whose requirements for ship overhauls typically fluctuate from year to year. Moreover, the cost of bringing current funding up to the level that might be required to support the planned 1999 force structure does not appear very great: an additional \$100 million for the Navy and \$16 million for the Marine Corps. Again, these estimates are uncertain because of changes in the composition of the force structure and changes in the prices that DoD depots charge. If the overhead costs associated with excess capacity in DoD depots result in price increases that exceed the general rate of inflation in the economy, the actual shortfall in depot maintenance could be greater than these figures suggest.

In the Army and Air Force, by contrast, funding for depot maintenance in 1994 is high relative to force structure: 20 percent and 50 percent, respectively, above the 1988-1989 levels.⁹ As noted earlier, part of the reason

9. These estimates are adjusted to take into account both changes in the way in which depot-level repairable items and interim contractor support are funded and shifts of Air Force work from intermediate maintenance facilities to depots.

FIGURE 17. DEPOT MAINTENANCE FUNDING RELATIVE TO FORCE STRUCTURE



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTES: Figures were calculated using the number of active-duty personnel in the strategic and tactical Defense Planning and Programming Categories as a proxy for force structure.

Funding reflects operation and maintenance appropriations for depot maintenance of active-component equipment. Funding for depot-level repairables is excluded in all years.

could be that equipment inventories have not necessarily fallen as rapidly as force structure. To the extent that this explains the high ratio, it would be possible to reduce depot maintenance funding for these services without reducing readiness from its current level. (The impact would instead be to delay increases in readiness in units that do not now have their full complement of equipment, to delay increases in sustainability associated with having larger reserves of serviceable assets that are held outside units, or to delay increases in capability in units that would receive more modern equipment.) A number of other factors, however, may contribute to high depot maintenance costs relative to force structure. In particular, the fixed costs associated with DoD's depot maintenance facilities are likely to play a role. To the extent they are a factor, requirements for depot maintenance funding will remain high relative to force structure until consolidation and base closures eliminate any excess capacity.

THE SUPPLY OF SECONDARY ITEMS

Virtually all of the supplies DoD purchases that are not complete weapon systems or platforms are referred to as secondary items. They include the spare parts and assemblies that support weapon systems as well as consumable items such as food, fuel, and medical supplies. The readiness of military units depends on the ability of the DoD supply system to order the right secondary items, to maintain appropriate inventories, and to respond to requisitions. Indeed, the availability of spare parts was an important factor limiting the readiness of Air Force and Navy units during the late 1970s and early 1980s. Recently, senior military leaders have expressed concern about whether DoD will be able to purchase enough spare parts to ensure future readiness.

Supply readiness appears to be high today. Three frequently used indicators--the percentage of requisitions that DoD's wholesale system can fill from stocks on hand, the extent to which non-mission-capable aircraft are cannibalized to provide spare parts for other aircraft, and the percentage of equipment that is non-mission capable because of supply problems--all suggest that the DoD supply system is satisfying current requirements for peacetime operations. Moreover, despite Congressional restrictions on purchases by DoD, the total dollar value of its inventories of secondary items remains high.

Some caution is warranted, however, since these data do not indicate whether DoD's current inventories of parts in stock and on order are sufficient to meet the future needs of the department's newest weapon systems. The inventories of secondary items that are being released from war-

reserve stocks and from the downsizing of the force are unlikely to include the materiel that DoD needs for its most modern units.

Nonfinancial Indicators of Supply System Adequacy

The supply availability rate--the percentage of requisitions that the wholesale system can fill from stocks on hand--is one indicator of how well the wholesale supply system is functioning. In 1993, overall supply availability rates were 82 percent for the Navy's wholesale system, 86 percent for the Army's system, and 87 percent for the Defense Logistics Agency (see Figure 18).¹⁰ These figures compare with a goal of 85 percent. A negative trend is apparent, however, in the rate for Navy aviation reparable: that rate fell from 81 percent in 1988 to 73 percent in 1993.¹¹

Indicators of the supply problems encountered by operational units or maintenance depots reflect the adequacy of the entire supply system, both wholesale and retail. The cannibalization rate for aircraft is one such indicator, since cannibalization--the practice of using one aircraft as a source of spare parts for another--is only resorted to when the supply system is unable to provide the needed parts. In 1993, cannibalization rates were at a record low in the Air Force and at a relatively low--albeit increasing--level in the Navy (see Figure 19). Two other indicators of supply problems at the unit level, the percentage of time aircraft or ground equipment is non-mission capable because of supply problems and the number of days that ships experience C-3 or C-4 CASREPs because of supply delays, also indicate that the supply system is currently supporting a high level of readiness (see Figures 20 and 21). One exception to this conclusion is the non-mission-capable rate resulting from supply delays for Navy aircraft; although now stable, that rate appears relatively high by historical standards.

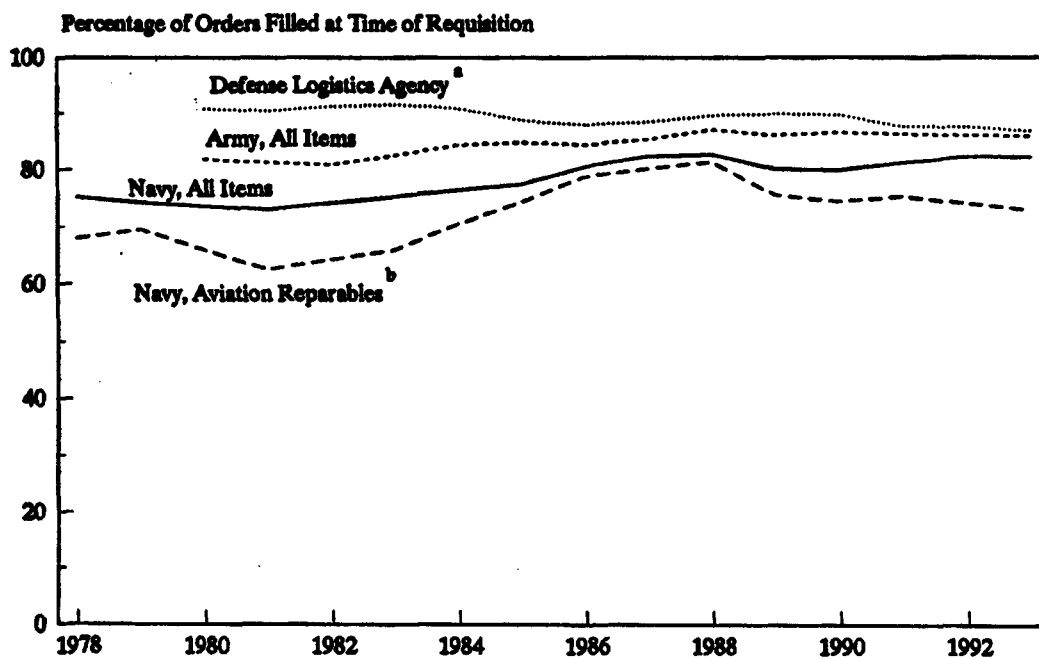
Financial Indicators of Supply System Adequacy

Supply system availability remains high for a variety of reasons unrelated to DoD's current purchases of spare parts. Reductions in the size of the force

10. Although the Air Force also reports a high rate (over 90 percent in 1993), the Air Force considers its data invalid and no meaningful historical trend can be traced.

11. Repairable secondary items are those spare parts or assemblies that are routinely repaired rather than discarded when damaged. Repairable spare parts are generally more expensive and complex than nonreparable ones.

FIGURE 18. WHOLESALE SUPPLY AVAILABILITY

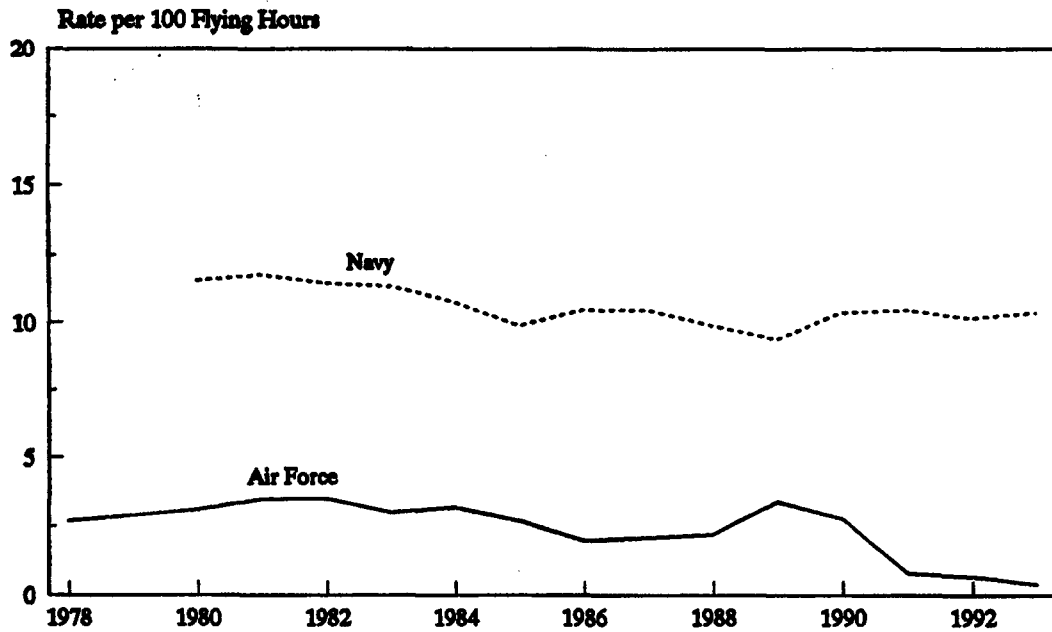


SOURCE: Congressional Budget Office based on Department of Defense data.

a. Fuel and food not included.

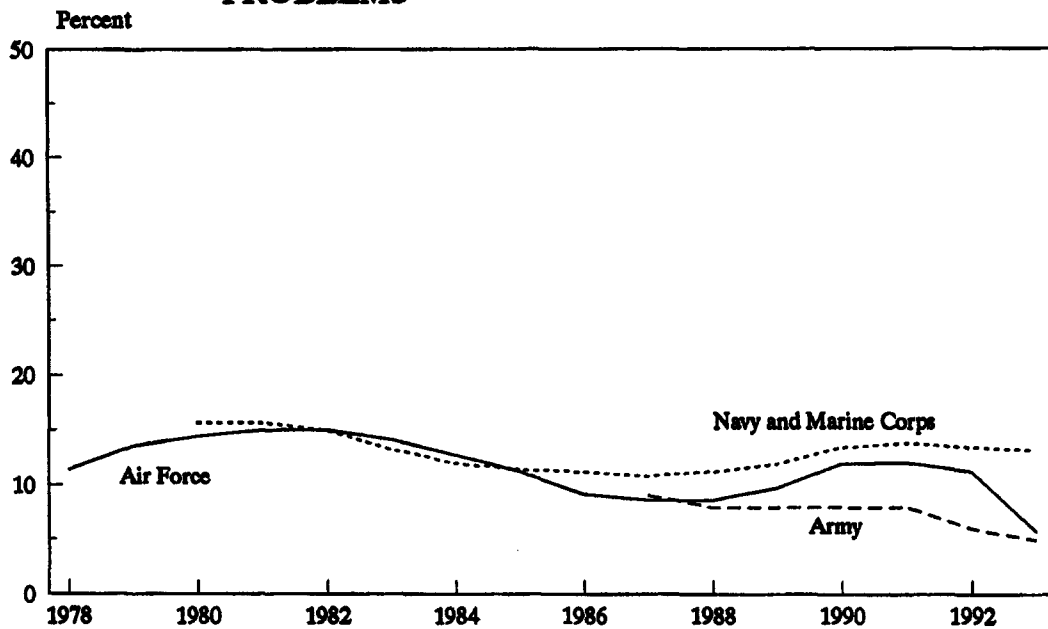
b. Includes Marine Corps aviation reparables.

FIGURE 19. AIRCRAFT CANNIBALIZATION ACTIONS



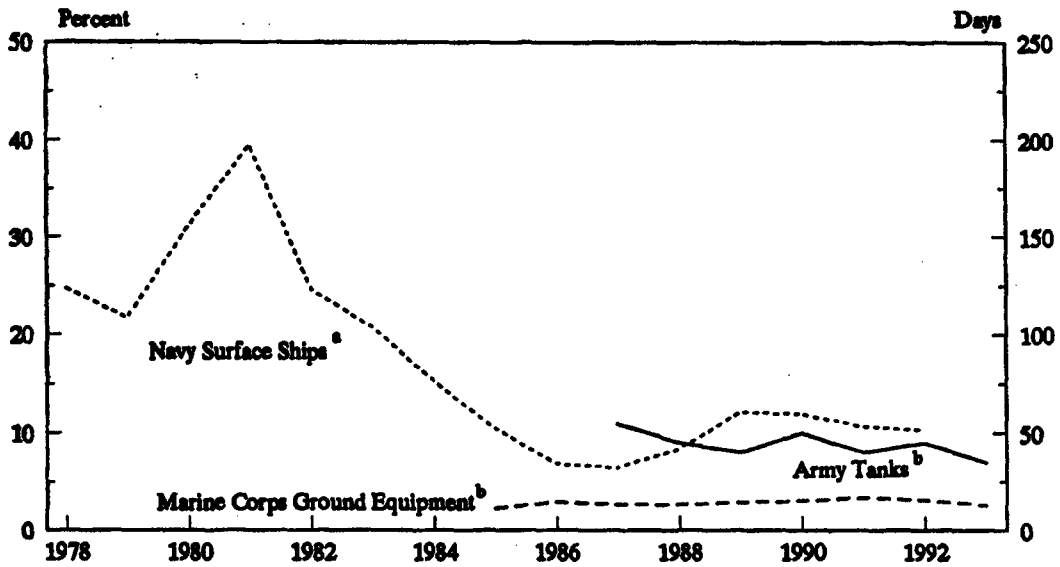
SOURCE: Congressional Budget Office based on Department of Defense data.

FIGURE 20. PERCENTAGE OF TIME AIRCRAFT ARE NON-MISSION CAPABLE BECAUSE OF SUPPLY PROBLEMS



SOURCE: Congressional Budget Office based on Department of Defense data.

FIGURE 21. DEGRADATION OF GROUND EQUIPMENT AND SHIPS BECAUSE OF SUPPLY PROBLEMS



SOURCE: Congressional Budget Office based on Department of Defense data.

- a. Number of days down time (C-3 or C-4 CASREPs resulting from supply delays) per ship operating period (right axis).
- b. Percentage of equipment non-mission capable because of supply problems (left axis).

have reduced demands on the supply system and caused materiel previously held by units to flow back into the system. Reductions in required war-reserve stocks have also freed up assets for distribution to units. Finally, DoD entered the drawdown from a strong inventory position. Adjusted for inflation and changes in the valuation methods used by DoD, the Defense Department's inventories of secondary items increased by 74 percent, or \$52 billion, between 1981 and 1989. This growth--and DoD's apparent lack of control over its inventories, the subject of several reports by the General Accounting Office--led many people within DoD and the Congress to conclude that inventories could be reduced substantially even before the magnitude of the current drawdown in force structure became apparent.

The supply system is a revolving fund; it sells assets to the final consumers within DoD and then relies on receipts from those sales, rather than on direct appropriations, to replace its inventory. In each year since 1989, however, the ability of the wholesale supply system to use receipts to purchase replacement inventory has been restricted. Initially, the restriction was a matter of DoD policy and applied only to the Defense Logistics Agency (DLA). More recently, it has been enforced by legislation and applied throughout the Defense Department. In 1993 and 1994, the wholesale systems managed by the services and DLA were legally limited--albeit with a growing list of exceptions--to replacing no more than 65 percent of the inventory sold in the previous year.

In response to this and other initiatives, DoD's inventories of secondary items have declined from their 1989 peak. Assets purchased for Operation Desert Shield/Desert Storm, and flows of materiel back into the supply system as units are eliminated or as the services seek to minimize assets held outside the supply system, may have retarded this decline. Nonetheless, inventories of secondary items--adjusted for changes in reporting practices--fell by approximately \$28 billion between 1989 and 1992 to a level of roughly \$93 billion (in 1994 dollars). Active inventories (that is, inventories that can expect to be consumed within two years or that have been purchased to meet war-reserve requirements) declined by approximately \$19 billion, or 21 percent. Inactive inventory, portions of which have been sold to customers outside DoD at scrap value, fell by approximately \$9 billion, or 31 percent.

Yet DoD's total active inventory of secondary items, viewed relative to force structure, has not changed significantly since 1989. Active-duty manpower in the tactical and strategic Defense Planning and Programming Categories, a crude proxy for force structure, fell by 18 percent between 1989 and 1992. The 21 percent reduction in active inventories over the same period appears to be commensurate with the change in the force structure,

although an even greater decline in inventories might have been appropriate given that part of the decline results from accounting changes and that 1992 inventories are meant to satisfy the requirements of an even smaller force structure in the future.¹² Between 1989 and 1992, active inventories rose from 108 percent to 110 percent of DoD's approved acquisition objective, defined as the cost of those assets approved to meet peacetime and wartime requirements.

Problems could loom on the horizon, however, if external constraints on the supply system continue. Even without external constraints, DoD may have a strong incentive to restrict supply system purchases: in recent years, the department has come to depend on the excess cash that the supply system generates when it sells more than it buys to help pay for the flying hours, steaming days, and tank miles that support current readiness. If in fact DoD does have adequate incentives to pursue inventory reductions on its own, any externally imposed rule that limits its decisions is likely either to yield little savings (because DoD would have imposed similar internal limits in the absence of the rule) or to yield savings at the cost of readiness (because DoD would have chosen to purchase more, but only in order to meet its legitimate needs). In the view of some DoD officials, the 65 percent rule has not yet seriously affected readiness only because (taking into account purchases of goods for Operation Desert Shield/Desert Storm and the growing list of exceptions to the rule) the department would not have chosen to purchase much more in the absence of the limit.

REAL-PROPERTY MAINTENANCE

Declines in the quality of DoD's real property during the late 1970s--deteriorating buildings, airfields, utilities, and roads--are frequently cited as a characteristic of the hollow force. Because of efforts to maintain combat equipment and training, real-property maintenance was, according to some reports, particularly hard hit by shortfalls in operation and maintenance appropriations. According to Lt. Gen. Hans Driessnack, Comptroller of the Air Force in 1980, "The O&M problem probably had its greatest impact on real property maintenance. . . . The continued deterioration of facilities has a serious impact on readiness. In addition to affecting the morale of personnel, inadequate facilities create hazards and can damage or destroy

12. DoD changed the way it values its inventories between 1989 and 1992. The estimates presented here are adjusted to account for changes in its valuation of assets needing repair and potential reutilization/disposal stocks. They are not adjusted to account for DoD's shift to valuations based on latest acquisition costs rather than standard prices. As a result, the estimates may overstate the extent to which DoD reduced its inventories.

equipment. We cannot allow high-performance aircraft to operate on broken runways and rain to leak on operating electronic equipment."¹³ Although the Congress directed DoD not to allow backlogs of real-property maintenance projects to rise above their 1978 level, the services found it hard to comply.

Defense analysts disagree about whether spending on real-property maintenance should be viewed as spending on readiness. Runway maintenance, for example, might be classified as an expenditure on readiness even if dormitory maintenance is not. Yet it may not matter for practical decisionmaking how these expenditures are categorized. Even if DoD could maintain highly ready forces at poorly maintained installations (an uncertain proposition), doing so would not prove cost-effective in the long run. Maintenance problems can snowball if not dealt with promptly; according to DoD estimates, the typical cost of a delayed project increases by 3 percent a year, even after adjusting for inflation. Moreover, morale and worker productivity depend in part on the physical working environment. Even in the competitive private sector, producers find that maintenance of their plant is a worthwhile investment. And although comparisons are difficult, DoD has historically appeared to spend a smaller percentage of its plant replacement value on maintenance than do firms in the private sector.¹⁴

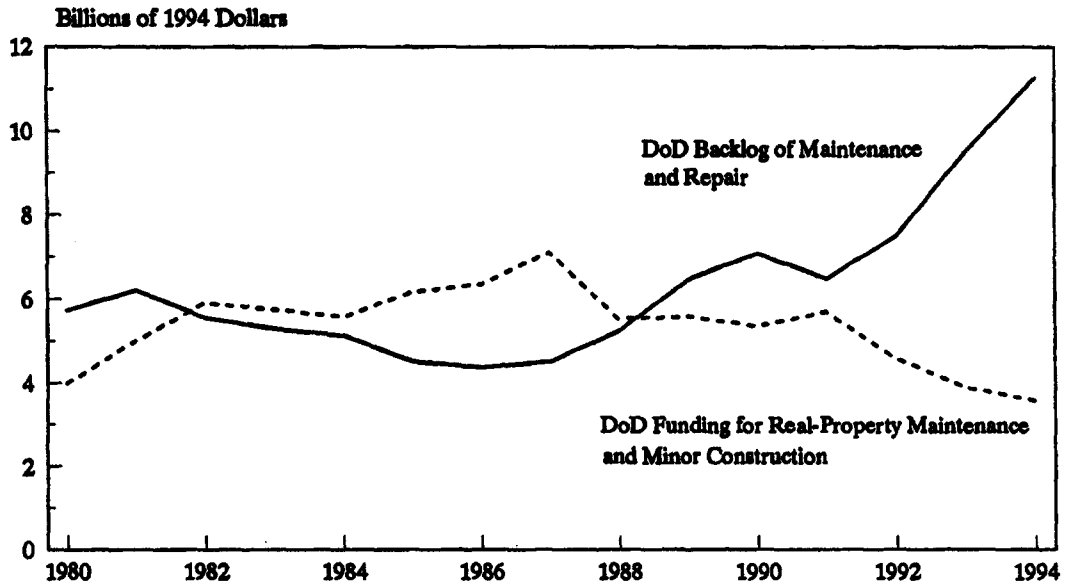
Is DoD's current funding for real-property maintenance adequate? The growing backlog of unfunded projects since the late 1980s seems to suggest that it is not. The backlog of unfunded real-property maintenance projects, measured in inflation-adjusted dollars, will increase from \$5.4 billion in 1988 to a projected \$11.8 billion in 1994 (see Figure 22). In 1994, the DoD backlog will be roughly twice the size of the average backlog seen since 1980.

Measures of maintenance backlogs are notoriously imperfect. Yet trends in total expenditures and expenditures per square foot of buildings also suggest that current funding levels, adjusted for inflation, may be inadequate. In 1994, funding for real-property maintenance and minor construction will be roughly \$3.6 billion--two-thirds of the average level since 1980. Funding per square foot is also well below the 1980-1994 average (see Figure 23). An increase in funding of 25 percent, or \$900 million, would be required in 1994 to bring funding per square foot up to its historical average. (This estimate excludes the square feet of buildings that will eventually be taken out of DoD inventories in response to the base closures and realignments announced in 1991 and 1993.)

13. Lt. Gen. Hans H. Driessnack, "The Key to Readiness: O&M," *Air Force Magazine* (October 1980).

14. See Department of Defense, "Renewing the Built Environment," a report to the Congress (March 1989), p. 16.

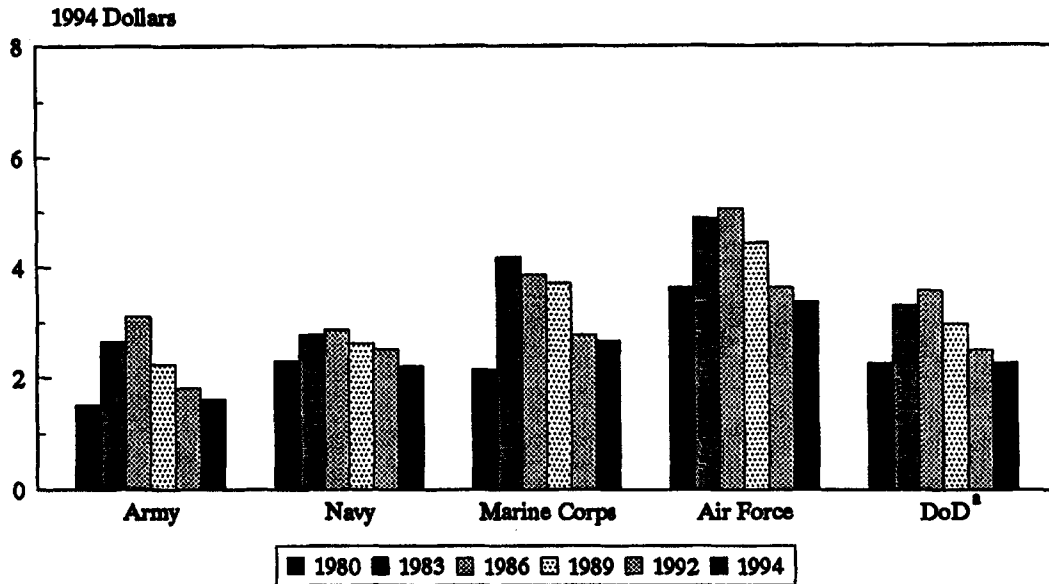
FIGURE 22. DOD FUNDING FOR REAL-PROPERTY MAINTENANCE AND BACKLOG OF UNFUNDED MAINTENANCE PROJECTS



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: Includes active and reserve components in each service; excludes Defense agencies.

FIGURE 23. FUNDING FOR REAL-PROPERTY MAINTENANCE AND MINOR CONSTRUCTION PER SQUARE FOOT



SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: Data for each service include both active and reserve components.

a. Includes active and reserve components in each service; excludes Defense agencies.

The underlying problem might not be a shortage of funding, however, but an excess of facilities relative to current and projected numbers of personnel. Even if all buildings that will be affected by previously announced base closures and realignments were excluded from DoD's 1994 inventories, the number of square feet per active-duty service member would be 10 percent greater in 1994 than the average for 1980 through 1994. In the future, the number of square feet per active-duty member could increase even more, since DoD plans to reduce the number of active-duty personnel by 11 percent between 1994 and 1999. Thus, in order to recapture the historical relationship between square feet of buildings and number of military personnel, future base closures and realignments or other actions would have to reduce the number of square feet by roughly 21 percent by 1999. (Again, this figure is in addition to the reductions anticipated from closures that have already been announced.)

If such a reduction in facilities could be achieved, the current level of funding for real-property maintenance would be fairly close to what might be required to support the force in 1999 (although still 7 percent too low, based on the historical average of funding per square foot). It may be more realistic, however, to assume that DoD will not reduce its facilities to that extent. At bases that are downsized rather than closed, existing buildings represent a sunk cost. Even though DoD will not replace many existing buildings when they reach the end of their service lives, the department may find it worthwhile to continue to maintain and use buildings until that time. (Rather than reduce the square feet of troop housing, for example, the space allotted to each individual could increase.) Unless such increases are offset by reductions in maintenance costs per square foot as older buildings are removed from DoD's inventories, expenditures on real-property maintenance and minor construction will most likely have to rise in order to provide for future readiness.

CHAPTER IV

POSSIBLE IMPLICATIONS OF THE ANALYSIS

The Congressional Budget Office's analysis of current unit readiness indicators (C-ratings and mission-capable rates) and of resource indicators that are linked to future readiness provides some information about the current level of military readiness and possible future trends. At the same time, it gives information about the potential limitations of early-warning indicators and the need for measures of unit readiness that can be tracked consistently over time. Both kinds of information have important implications.

THE LIMITATIONS OF EARLY-WARNING INDICATORS AND THE NEED FOR BETTER MEASURES OF CURRENT READINESS

CBO examined trends in five resource areas that might provide early-warning signals of future readiness problems. That examination leads to the somewhat discouraging conclusion that--at least during a period in which force structure is declining rapidly--the Department of Defense's search for reliable early-warning indicators of readiness problems is unlikely to be very successful. Retention rates among career military personnel are being driven by DoD policy and may not reflect the level of morale among personnel or the attractiveness of military compensation. Rising depot maintenance backlogs do not necessarily signal a decline in future unit readiness. Total inventories of secondary items might conceivably increase even as the availability of spare parts required to support the most modern systems declines. Inadequate expenditures per square foot on real-property maintenance may be a signal that DoD has more property than it needs.

Formal quantitative models that attempt to predict mission-capable rates or C-ratings based on the relationship between funding levels and readiness that prevailed during the 1980s, when force structure was relatively stable, may prove similarly misleading. Although the impact of funding only 13 percent of depot requirements during a period of stable force structure may be clear, the impact today is uncertain. Moreover, because major drawdowns in the force structure are relatively rare, little information exists about the relationship between funding levels and readiness during such a period. These problems should not stop analysts from monitoring current resource trends and examining their implications for future readiness; they simply mean that the results of such efforts--including CBO's--are uncertain.

In the absence of reliable early-warning indicators, prudence might appear to dictate that any further cuts in the resources that support readiness be made gradually and cautiously. Yet the indicators of current unit readiness examined by CBO--C-ratings and mission-capable rates--are for the most part at high levels. To the extent that readiness is not a cliff but more of a slope, errors need not immediately result in a hollow force. It might be possible to monitor trends in current indicators, identify emerging problems, and respond before those problems become severe.

As DoD discovered during the early 1980s, however, and as CBO's survey confirms, the aggregate indicators of unit readiness used within DoD are not well suited to tracking changes in readiness over a number of years. Just as many indicators failed to fully reflect improvements in readiness during the 1980s, they may also fail to reflect declines during the 1990s. Alternatively, readiness indicators might show a spurious downward trend if greater emphasis on measuring readiness during the drawdown leads to more rigorous evaluation procedures. A strong case can be made that DoD should focus on developing better indicators of current unit readiness before attempting to identify early-warning indicators.

Efforts to improve the measurement of readiness could focus on better measures of the resources that units possess, improved models that use reported unit assets to attempt to predict intermediate measures of performance, or more comprehensive functional testing of units to see how well they can perform specific tasks.¹ Each of these approaches meets different needs. The C-rating system, for example, is based primarily on resource reporting. It is effective at providing the Joint Chiefs of Staff with up-to-the-minute information about how each unit commander perceives the resource status of his or her unit--essential information in the event that units must be deployed in a contingency.

More recently, the services have developed models that relate the level of resources held by units to intermediate outputs--such as the number of sorties a unit can generate or the number of artillery rounds it can deliver. These models provide insight into alternative resource levels and mixes that might enhance unit performance. Because they can consider resources held outside units, such models have the potential to look simultaneously at readiness and sustainability. Moreover, they can provide a more meaningful assessment of overall unit readiness than the Status of Resources and Training System, which relies on the resource area with the lowest C-rating. But these

1. For a discussion of these alternatives and ones that look at force readiness rather than unit readiness, see S. Craig Moore and others, "Measuring Military Readiness and Sustainability" (RAND, Santa Monica, California, 1991).

models are being continually modified as efforts are made to improve both the underlying structure of the models and assumptions about important parameters. As a result, they may be even less useful than C-ratings data for tracking trends in readiness over time.

During the current drawdown, both the Congress and the senior civilian leadership within DoD need access to measures of readiness that are objective, consistent over time, easily understood, and not dependent on assumptions that might be subject to even inadvertent manipulation. Officials concerned with setting broad resource constraints, rather than planning military operations, may find readiness measures that are credible and simple more useful than ones that are more realistic but also more complex.

Readiness measures based on how well units perform on tests that require them to carry out portions of their wartime tasks might appear to have the greatest potential for satisfying these needs. The use of a team of skilled evaluators from outside the unit (and including representatives from outside the service or component) could help to ensure consistency and objectivity in the readiness measures.² Such evaluations could be unscheduled and either be unannounced or allow the unit only as much time as it might expect to have to prepare for deployment in a contingency. Although performance testing is more expensive than resource reporting, only a random sample of each type of unit would need to be tested in order to obtain statistically reliable estimates of average readiness levels. Even a biennial sample would provide sufficient data to identify trends over time.

Each of the services already conducts some assessments of unit performance using evaluators from outside the individual unit, although advance notice is usually given. The Army Training Evaluation Program provides for evaluations of active units by nonunit personnel about every 18 months. The Marine Corps Combat Readiness Evaluation System provides for similar evaluations of both ground and air units. In the Air Force, Operational Readiness Inspections of air wings are conducted by outside evaluators who test both the ability of the unit to deploy and its ability to perform combat-related activities over roughly a four-day period.³

A system that provides for unscheduled and unannounced tests of a random sample of units--and that summarizes the results in a central DoD data base designed to track overall trends in readiness--is technically feasible.

2. Apart from the problem of possible bias, company commanders have many responsibilities other than SORTS reporting and may not be well informed about reporting rules.

3. Moore and others, "Measuring Military Readiness and Sustainability," p. 41.

Among the most critical analytic requirements would be selecting the wartime activities to be tested and weighting them to develop aggregate measures. Another important issue would be the need to preserve the anonymity of the individual commanders whose units were being tested. Even with this safeguard, however, such an approach could face major obstacles. Information about unit performance in operational tests has historically been guarded within each service and frequently within individual major commands. The services could be expected to resist the loss of control over information that a central DoD data base would imply, although that very lack of control might add to the credibility of the data.

Much of the information derived from such a data base would be highly classified and thus of limited usefulness in the public debate over readiness trends. Regardless of which measures DoD uses to assess readiness, however, it appears that the department needs to clarify its policies about classifying information on readiness and apply those policies consistently among the services. One approach--similar to that now followed in the Marine Corps and Air Force--might be to allow public access to information on readiness trends when that information is presented for an active or reserve component as a whole. (Information about aggregations of greater interest to potential adversaries--such as those units forward-deployed in any particular region--would remain classified.)

THE IMPLICATIONS OF TRENDS IN UNIT READINESS AND RESOURCES LINKED TO READINESS

Despite the limitations of DoD's measures of unit readiness, CBO's analysis concludes that readiness is now at a high level. U.S. forces are not, as some have suggested, on the ragged edge of readiness. One interpretation is that the risks associated with further cuts in readiness-related spending are not as great as they would otherwise be. That interpretation, however, is subject to a number of limitations. Some readiness indicators--including C-ratings for Navy surface ships--have declined from their peaks in the late 1980s. Moreover, CBO examined only those data that are publicly available; operational tests or models that predict unit performance based on inputs might provide additional useful information.

In addition to looking at trends in overall unit readiness, this paper surveys a number of resource areas that contribute to both current and future readiness and that have been of concern in the ongoing defense debate. That survey yields mixed results. The review of personnel quality, aggregate levels of spending for operation and maintenance, total DoD depot maintenance

funding, and inventories of secondary items all suggest that DoD may in fact be providing adequate support for future readiness. Yet there are indications of weaknesses in at least two activities--depot maintenance in the Navy and real-property maintenance for DoD as a whole--that are funded out of the operation and maintenance accounts.

Based on historical standards, the current level of funding for depot maintenance in the Navy and real-property maintenance in DoD as a whole appears to be too low for today's force structure. Instead, it is commensurate with what will be required to support the force structure that the Defense Department plans for 1999. As a result, even if DoD succeeds in eliminating excess facilities, it may not be able to reduce spending in these areas below the current level. Indeed, an increase in funding for real-property maintenance might be needed to ensure that DoD facilities can be adequately maintained in the future. During a drawdown in the force structure, however, providing additional resources in these areas might not contribute to readiness but simply encourage DoD to maintain an inefficient infrastructure, with too many square feet of buildings and too many shipyards and maintenance depots.

Even if this survey of resource areas did not yield mixed results, its implications for total readiness funding would still be uncertain. CBO looked at resource areas that are being singled out in the ongoing debate as being of special concern. It did not attempt to examine other activities that could contribute to current and future readiness, such as unit operating tempos (steaming days, flying hours, and tank miles) or the adequacy of unit training in general. Although the resource areas surveyed in this paper could account for much of any possible requirement for additional readiness funding, there may be as yet unrecognized problems in other resource areas.

Even more important, this paper, like much of the ongoing defense debate, focuses on readiness and on providing an early warning of the kinds of problems that plagued the force in the 1970s. The problems that DoD faced after the Vietnam drawdown, however, are not necessarily the same ones that it might face as a result of the current drawdown. Because readiness is now the Department of Defense's highest priority, if any imbalance in military capability were to appear during the 1990s, it might well take the form of a force that was too small, not sufficiently modern, or not sustainable, rather than one that was not ready.

APPENDIX

NUMERICAL DATA FOR SELECTED READINESS INDICATORS

The tables in this appendix present numerical data on C-ratings and mission-capable rates. They include all of the data used to prepare Figures 1 through 5 of this paper as well as some more detailed data series. This historical information, which is not available in any single data base in the Department of Defense, may be of use to analysts outside the Congressional Budget Office.

TABLE A-1. PERCENTAGE OF UNITS REPORTING C-1 OR C-2 RATINGS OVERALL

Type of Unit	1978	1979	1980	1981	1982	1983	1984	1985
Active Component								
Air Force	n.a.	n.a.	63	n.a.	n.a.	n.a.	76	81
Navy aviation index ^a	71	77	34	23	29	64	77	90
Navy surface ships index ^a	60	64	55	44	57	72	79	86
Marine Corps	n.a.	n.a.	70	n.a.	n.a.	n.a.	66	75
Army ^b	n.a.	n.a.	37	n.a.	n.a.	n.a.	n.a.	n.a.
Reserve Component^c								
Air Force Reserve	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	49	48
Air Force Guard	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	49	58
Marine Corps Reserve	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	16	25

(Continued)

SOURCE: Congressional Budget Office. Data for 1980 are from Melvin Laird, *The Problems of Military Readiness* (Washington, D.C.: American Enterprise Institute, 1980). All other data are from the Department of Defense.

NOTE: n.a. = not available.

TABLE A-1. CONTINUED

Type of Unit	1986	1987	1988	1989	1990	1991	1992	1993
Active Component								
Air Force	89	90	93	95	90	86	91	92
Navy aviation index ^a	85	85	85	95	100	98	84	81
Navy surface ships index ^a	94	100	94	91	78	91	89	79
Marine Corps	77	79	75	70	72	76	76	67
Army ^b	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Reserve Component^c								
Air Force Reserve	51	62	86	91	95	95	94	92
Air Force Guard	74	78	89	92	94	95	96	95
Marine Corps Reserve	27	34	46	51	51	45	29	37

- a. These unclassified indexes show changes in the percentage of units reporting C-1 or C-2 relative to their peak values; they do not show the actual percentage of units that are C-1 or C-2. The peak value for aviation units was in 1990, so the aviation index in that year has a value of 100. The peak value for surface ships was in 1987, so the surface ship index has a value of 100 in that year. An index value of 50 means that in that year the percentage of units reporting C-1 or C-2 was half of its peak value.
- b. Army data for 1981 through 1993 are classified.
- c. Data for the Army Guard, Army Reserve, and Naval Reserve are not available in an unclassified form.

TABLE A-2. INDICATORS OF WEAPON SYSTEM AVAILABILITY

Type of Unit	1980	1981	1982	1983	1984	1985	1986
Mission-Capable Rates for Aircraft							
Air Force^a							
All aircraft	66.3	66.1	66.8	68.2	70.9	74.7	77.8
Fighters	65.0	64.4	66.3	68.5	72.6	76.1	77.0
Bombers	51.6	50.1	44.1	42.7	40.9	45.5	69.1
Tanker/airlift	67.5	67.0	65.3	65.0	65.5	68.9	72.6
Other	69.1	70.0	71.2	73.0	75.1	79.7	83.9
All Navy and Marine Corps Aircraft^a	58.5	59.2	62.4	66.5	69.5	71.2	72.7
Marine Corps^a							
Fixed-wing aircraft	58.5	58.0	65.2	68.9	67.7	72.0	76.6
Rotary-wing aircraft	63.3	65.7	72.6	75.4	78.9	78.5	80.1
Army Rotary-Wing Aircraft^b	n.a	n.a	n.a	n.a	n.a	n.a	n.a.
Fully-Mission-Capable Rates for Aircraft							
All Navy and Marine Corps Aircraft^a	37.1	37.2	41.7	48.0	52.9	56.2	59.7
Marine Corps^a							
Fixed-wing aircraft	34.8	33.6	43.9	50.2	57.0	57.5	65.5
Rotary-wing aircraft	41.9	44.3	57.6	65.1	69.8	71.2	73.1
Mission-Capable Rates for Ground Equipment							
Army Systems^b							
Tanks	86	n.a.	87	n.a.	87	n.a.	86
Fire-support artillery	88	n.a.	90	n.a.	89	n.a.	93
Fire-support missile systems	91	n.a.	96	n.a.	94	n.a.	92
Combat and combat-support vehicles	88	n.a.	85	n.a.	88	n.a.	91
Marine Corps Ground Equipment^b	85.2	87.8	88.2	89.7	90.6	91.5	93.2
Percentage of Time Ships Are Free of Significant Equipment Failures^c							
Navy^b							
All surface ships	58.0	50.0	57.0	63.0	66.0	75.0	79.0
Surface combatants	51.0	43.0	50.0	57.0	62.0	71.0	77.0

(Continued)

SOURCE: Congressional Budget Office based on Department of Defense data.

NOTE: This table reflects those aggregate measures of weapon system availability that CBO was able to obtain before the publication of this paper. It does not include all of the measures used within DoD.

TABLE A-2. CONTINUED

Type of Unit	1987	1988	1989	1990	1991	1992	1993
Mission-Capable Rates for Aircraft							
Air Force^a							
All aircraft	80.6	81.2	79.6	84.6	84.8	85.9	86.5
Fighters	80.2	81.0	85.1	88.1	85.1	83.8	82.0
Bombers	72.1	71.4	86.6	88.1	76.6	84.8	80.3
Tanker/airlift	78.8	79.6	84.2	82.5	76.6	74.6	82.3
Other	83.8	84.3	84.4	85.7	84.6	84.3	85.4
All Navy and Marine Corps Aircraft^a	73.3	73.0	72.4	69.9	68.4	69.0	71.2
Marine Corps^a							
Fixed-wing aircraft	79.0	72.7	76.1	74.4	75.9	74.2	81.2
Rotary-wing aircraft	81.2	73.6	72.4	65.9	67.4	69.4	78.0
Army Rotary-Wing Aircraft^b	72.0	73.0	72.0	72.0	72.0	72.0	72.0
Fully-Mission-Capable Rates for Aircraft							
All Navy and Marine Corps Aircraft^a	61.9	62.0	61.8	60.1	58.5	59.0	61.1
Marine Corps^a							
Fixed-wing aircraft	69.8	61.7	68.3	67.4	68.4	67.2	73.6
Rotary-wing aircraft	75.1	64.9	63.1	55.4	56.3	58.7	70.3
Mission-Capable Rates for Ground Equipment							
Army Systems^b							
Tanks	84	88	86	87	87	87	90
Fire-support artillery	92	93	93	93	93	95	95
Fire-support missile systems	91	92	92	92	90	92	95
Combat and combat-support vehicles	91	92	91	91	88	88	88
Marine Corps Ground Equipment^b	92.8	91.4	90.9	89.9	91.5	89.4	89.6
Percentage of Time Ships Are Free of Significant Equipment Failures^c							
Navy^b							
All surface ships	81.0	76.0	68.0	66.0	70.0	69.0	68.0
Surface combatants	79.0	75.0	66.0	63.0	68.0	69.0	67.0

a. Active and reserve components.

b. Active component only.

c. Percentage of time free of critical mission-degrading (C-3 or C-4) casualty reports (CASREPs).

