



# USMC Active and Reserve Force Structure and Mix Study

## Volume I: Summary

H. Dwight Lyons, Jr.  
William H. Sims  
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## **ABSTRACT**

This research memorandum summarizes CNA's analysis of Marine Corps forces for the Congressionally mandated Active and Reserve Force Structure and Mix Study. In it we address the historical use of the Marine Corps Reserve in the Korean and Persian Gulf Wars, legislation pertaining to Marine Corps force structure, the Marine Corps' implementation of Total Force Policy, development of alternative force structures, and preparation of reserve forces for war. We also discuss ten alternative force structures. Our analysis of alternative force structures considers the capability to respond to future contingencies, peacetime forward-presence/rotation capability, reserve force sustainability, total number of personnel in active forces and the Selected Marine Corps Reserve, transition costs, and steady-state costs.

## EXECUTIVE SUMMARY

The National Defense Authorization Act for FYs 1992 and 1993 requires the Secretary of Defense to submit an assessment of alternative force structures and mixes to the Congress. This study consists of two parts: (1) an analysis by a federally funded research and development center and (2) an assessment of that analytical information by the Secretary of Defense and Chairman of the Joint Chiefs of Staff to determine which alternative force mixes are acceptable for expected future missions.

Because of its knowledge of the Navy and Marine Corps, the Center for Naval Analyses (CNA) was contracted to perform the analysis of those services. We assessed four major areas: service implementation of the Total Force Policy, effectiveness of Total Force Policy in the Persian Gulf conflict, alternative active and reserve force structures, and associated costs. This volume summarizes the analysis of Marine Corps forces, including a historical overview of the uses of Marine Corps reserves in regional conflicts.

The major part of the analysis was the assessment of alternative force structures. We examined ten such alternatives (table I). These force structures are characterized by the number of active and reserve Marine expeditionary forces (MEFs) they contain. For example, the 2/1 alternative has enough Marines in the active-duty Fleet Marine Forces (FMF) for two war-strength MEFs, and enough Marines in the Selected Marine Corps Reserve (SMCR) for one war-strength MEF. The 2.2/0.8 alternative is the DOD Base Force.

Table I. Alternative Marine Corps force structures

4 MEFs	3.5 MEFs	3 MEFs	2.5 MEFs
2.5/1.5	2.5/1	2.5/0.5	2/0.5
2/2	2/1.5	2.2/0.8	1.5/1
		2/1	
		1.5/1.5	

We evaluated each of these alternatives based on the following seven criteria:

- Its ability to respond on time with enough forces to four future major regional contingency (MRC) scenarios from the Defense Planning Guidance.<sup>1</sup>
- The forces remaining after response to MRCs.
- Its peacetime forward-presence/rotation capability.
- Its reserve sustainability (i.e., its ability to recruit enough prior-service Marines for the SMCR).
- Its total number of active-duty and SMCR personnel.
- Its transition costs (one-time costs associated with changing force structure).
- Its steady-state (long-term annual) cost in comparison with that of the DOD Base Force.

Figure I provides a *Consumer Reports*-style qualitative summary of the results.<sup>2</sup> The best alternatives for each criterion are identified by a solid circle; reasonably good alternatives are identified by an open circle.

This figure does not list one of the seven criteria—total number of personnel—because it is directly related to the total force size. Instead, it includes a new category called “IRFs only.” Forces for the MRCs are divided into two major groups: initial response forces (IRFs), which respond quickly to contain the situation, and decisive forces (DFs), which arrive later. One could argue that deploying the IRF to contain the aggressor is more important; so a late-arriving DF carries less risk than a late-arriving IRF. The only exception to such an argument is MRC IV, which is a concurrent-contingencies scenario. Both groups of Marine forces for MRC IV are IRFs. The solid circles in the “IRFs only” column show which alternatives can meet the IRF time lines for all scenarios. The open circles show which alternatives can meet IRF time lines for all but MRC IV.

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1. We call these scenarios MRCs I, II, III, and IV. MRCs I through III are single-conflict scenarios in various parts of the world. MRC IV is a concurrent-conflicts scenario. In addition, MRC IV includes two options: option 1 requires one more Marine expeditionary brigade (MEB) than option 2.

2. See table 6 in the main text for quantitative results.

Alternative	Forces for MRCs plus	MRCs on time	IRFs only	Peacetime forward presence	Sustainability	Transition cost	Steady-state cost
2.5/1.5	●	●	●	●			
2/2	●		○				
2.5/1	○	●	●	●	○	○	
2/1.5	○		○				○
2.5/0.5		●	●	●	●	○	
2.2/0.8		○	○	○	○	●	○
2/1			○			○	○
1.5/1.5							●
2/0.5			○		●	●	●
1.5/1						○	●

● Meets all requirements      ○ Meets most requirements

Figure I. Summary

The columns in figure I address each criterion of the analysis separately. Deciding on a particular alternative will involve consideration of all criteria. This process is complex, but it ultimately boils down to a tug-of-war between steady-state cost and desired capabilities.

If minimum cost is the principal consideration, the 1.5/1 alternative is best. It saves over \$2 billion compared to the DOD Base Force. But its capability is commensurate with its cost. It cannot respond to any contingency on time, does not have enough forces for two MRCs, cannot meet the IRF time line for two, and has little ability to maintain peacetime forward-presence forces.

The 1.5/1.5 alternative provides the next level of capability for a slightly higher cost. This alternative has enough forces to respond to all contingencies except MRC IV option 1 and costs about \$1.6 billion less than the DOD Base Force. But again, this alternative has many of the same shortcomings as the 1.5/1 alternative: it cannot respond to any contingency on time, cannot meet even the IRF time lines for two MRCs, and has little ability to maintain peacetime forward-presence forces.

If the ability to meet only the IRF time lines is sufficient, the 2/1 alternative can do so for about \$0.6 billion less than the DOD Base Force. This alternative, however, cannot meet the IRF time line for the second contingency of MRC IV. It can support a level of peacetime forward presence about midway between that of the 1.5-active-MEF alternatives and the current levels.

If meeting all the time lines is important (including deploying the IRF for the second contingency of MRC IV on time), the 2.5/0.5 alternative is the lowest-cost alternative that can do so. This alternative costs about \$0.5 billion more than the DOD Base Force. It could maintain the current level of peacetime forward presence. It does not, however, have enough forces for MRC IV option 1.

If the ability to respond to contingencies plus have some forces left for other commitments or to meet unexpected crises is important, alternatives with 3.5 or 4 MEFs in the total force provide the best capability. Alternatives with 4 MEFs are generally the most expensive and the least likely to be able to sustain the desired level of prior-service Marines in the reserve forces. Alternatives with 3.5 MEFs provide a good compromise between total force size and capability. They can respond to an MRC and still have at least a MEB left for all contingencies except option 1 of MRC IV. But even for MRC IV, the 3.5-MEF alternatives provide a degree of flexibility. These alternatives can execute option 2 of MRC IV if the Marine Corps needs to retain a force in case some unforeseen crisis occurs. If being able to respond to such a crisis is less important than getting the largest force to the contingency, option 1 can be executed.

Of the 3.5-MEF alternatives, the 2.5/1 can meet all MRC time lines and can maintain the current levels of peacetime forward presence; the less expensive 2/1.5 alternative cannot do so. Furthermore, the 2.5/1 alternative is more likely to meet reserve force sustainability goals. It would cost about \$1 billion more than the DOD Base Force.

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## **INTRODUCTION**

### **BACKGROUND**

The National Defense Authorization Act for FYs 1992 and 1993 [1] requires the Secretary of Defense to submit to the Senate and House Armed Services Committees an "assessment of a wide range of alternatives relating to the structure and mix of active and reserve forces appropriate for carrying out assigned missions in the mid to late 1990s." The act further mandates that the assessment shall consist of two parts. The first part is to be conducted by a "federally funded research and development center that is independent of the military departments." The second part of the study is to be conducted by the Secretary of Defense and Chairman of the Joint Chiefs of Staff (JCS).

The National Defense Research Institute of RAND Corporation is the prime contractor for the first part of the study. Because of our knowledge of the Navy and Marine Corps, CNA was contracted to perform the required assessment of Navy and Marine Corps forces. CNA's study results will be provided to the Assistant Secretary of Defense for Force Management and Personnel, and the results will be incorporated in the final RAND report submitted to the Office of the Secretary of Defense (OSD).

The CNA study team was made up of two independent teams: one analyzing the Navy active/reserve structure and mix and the second analyzing the same for the Marine Corps. Each of the independent teams assessed the following:

- Existing policies and practices for implementing the Total Force Policy
- The effectiveness of Total Force Policy during the Persian Gulf conflict
- A range of possible mixes of active and reserve forces. For Selected Reserve forces, this assessment included (as a minimum) the levels provided for in the Authorization Act for FY 1993, and levels significantly higher and lower. This assessment also analyzed the ability of alternatives to prosecute a range of military operations, focusing on the time required to prepare forces for combat.
- The costs associated with alternative active and reserve force structures and mixes.

Although CNA provided an independent study, our tasks closely follow the general study plan designed by RAND. As shown in figure 1, CNA tasks support RAND tasks in all but one case: sustainability of reserves. Because RAND was better able to model the flow of active and reserve forces, it performed this task and evaluated the sustainability of reserves for all services.

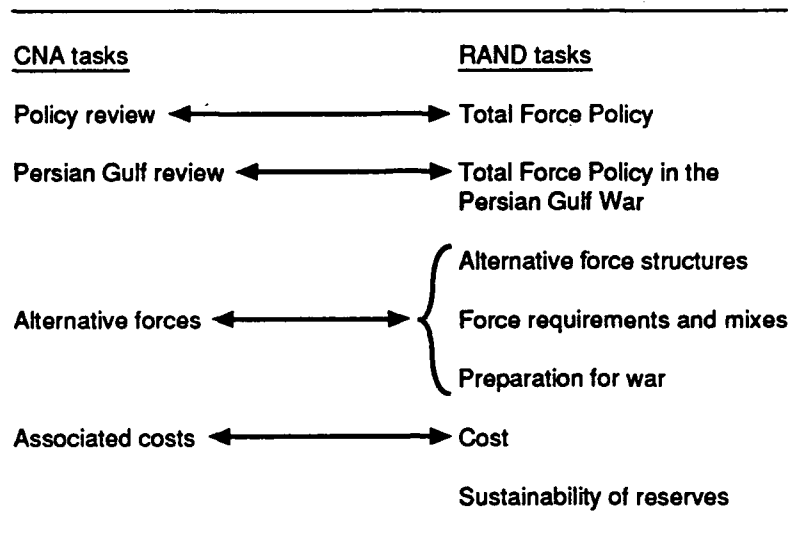
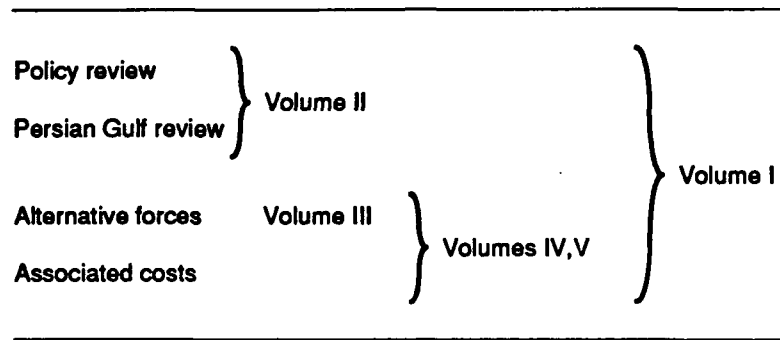


Figure 1. Relationship of tasks

## REPORT ORGANIZATION

The Marine Corps report consists of five volumes. This memorandum, volume I, summarizes volumes II, III, and IV. Volume II [2] addresses the historical use of reserve forces (including the Persian Gulf conflict assessment) and the Marine Corps interpretation of the Total Force Policy. Volume III [3] develops a wide range of possible alternatives and analyzes the requirements for preparing reserve forces for combat, and volume IV [4] contains the detailed analysis of alternative structures and mixes. The classified parts of the report are collected in volume V [5]. Figure 2 shows how the study tasks are broken up among the report volumes.



**Figure 2. Marine Corps report volumes matched to tasks**

## HISTORY AND POLICY

The Marine Corps Reserve was created with the passage of Public Law 64-241 on 29 August 1916 [6]. When Congress declared war on the Imperial German government in April 1917, the Marine Corps Reserve contained 3 officers and 32 enlisted men. Since World War I, the Marine Corps Reserve has fought in World War II, the Korean War, Vietnam (to a limited extent—the Reserve was not mobilized), and the recent Persian Gulf conflict. The Korean and Persian Gulf Wars provide two interesting and considerably different examples of reserve employment in regional conflict. This section reviews those differences, the legislation and policy that were (at least partly) responsible for them, and applicable lessons for the future.

### KOREAN WAR

A massive demobilization of military forces occurred after the allied victory in World War II. Within a year after V-J Day, the Marine Corps had been reduced to about one-third of its wartime strength [7]. By the time the North Koreans invaded South Korea on 25 June 1950, the active Marine Corps could not field a war-strength division. Faced with the immediate need for more forces in Korea and the lack of active forces in all the services, President Truman authorized the callup of reservists on 19 July.

The following points summarize the Marine Corps Reserve experience in the early stages of the Korean War [8, 9]:

- The active Marine Corps at the beginning of the war was a “hollow” force. Both of its active divisions had only one infantry regiment; regiments had two battalions; some battalions had only two companies; and some companies had only two platoons. The Reserve had to be called for the Marines to be able to field a full division/wing team.
- In contrast to the small active force, the Marine Corps Reserve had been built up to an all-time high. Its two largest components were the Organized Reserve (similar to today’s Selected Marine Corps Reserve (SMCR)) and the Volunteer Reserve (similar to today’s Individual Ready Reserve (IRR)).
- The Organized Reserve consisted primarily of battalion-, company-, and squadron-size units. Virtually the entire Organized Reserve was called up.

With the exception of two fighter squadrons, units were disbanded and the personnel were used as fillers in the Regulars or as replacements.

- Almost all Organized Reserve officers and about one-fourth of the enlisted men were World War II veterans. Their experience was pivotal to the Marines' ability to deploy a combat-ready division/wing team quickly.
- For early-deploying reservists, the time from mobilization to deployment was about one to one-and-a-half months. Little of this time was available for training.
- Members of the Volunteer Reserve were mobilized and used as fillers in nondeploying units and as replacements in Korea.

For the first time in history, Marine reservists played a major role in a regional conflict. When called, they showed up, deployed early, were used in large numbers, and served with distinction.

## **SHAPING THE FORCE BETWEEN THE KOREAN AND PERSIAN GULF WARS**

In a sense, *between the wars* is a misnomer for this section because the inter-service battle over roles and missions, and consequently force structure, started before and continued throughout the Korean War. The seeds of the debate were sown as early as 1943, but the battle began in earnest at the end of World War II when President Truman pressed for unification of the armed services.

### **The Battle for Legislative Protection**

The Marines feared that under the unification concept they would be absorbed by the Army and, at the very least, would lose their aviation units to the Air Force [9]. The Marines argued that the nation needed a Corps based on forces similar to those employed in World War II—that is, a division/wing structure. The Army questioned the idea that future ground operations would be part of a naval campaign and asserted that, if amphibious operations were necessary, they should be conducted by the Army and Air Force. The stage was set for the battle fought during Congressional hearings. The Marines, arguing that they were the nation's force in readiness, wanted their World War II missions written into law; their opponents wanted the Corps reduced to light infantry regiments without aviation.

After much political and bureaucratic maneuvering, the first stage of the battle ended in 1947 during the hearings on the unification bill. The Marines successfully argued that Congress, not the Defense Department, was responsible for assigning service roles and missions, and convinced the House committee that those roles and missions should be included in the National Security Act. The 1947 Unification Act stated that the Marine Corps:

... shall include land combat and service forces and such aviation as may be organic therein. The primary mission of the Marine Corps shall be to provide fleet marine forces of combined arms, together with supporting air components, for service with the fleet in the seizure or defense of advanced naval bases and for the conduct of such land operations as may be essential to the prosecution of a naval campaign... and shall perform such other duties as the President may direct [10, 11].

A battle was won, but the war was not over. Having roles and missions written into law is one thing; having the force structure to execute them is another. After World War II, Marine forces were steadily cut back to the point that the Fleet Marine Force (FMF) could not field a war-strength division/wing team at the beginning of the Korean War. One reason for this was that the Commandant of the Marine Corps was excluded from planning sessions in which the defense budgets were prepared. After 1947, Headquarters Marine Corps focused on legislation to make the Commandant a permanent member of the JCS. Although unsuccessful, the Marines were able to keep the issue alive until June 1950. Arguably, the Korean War averted the attempts to dismantle the FMF as a fighting force. As one historian put it, "little did Headquarters guess that the North Korean People's Army would save the FMF..." [12].

The most positive aspect of the post-World War II demobilization was the impetus it provided to expand the Reserve. As the active forces shrank, proponents began lobbying Headquarters to build a strong Marine Corps Reserve, asserting that it was the only way to fill out the two divisions and wings needed in the event of war. In 1946, the Division of Reserve was reactivated as a special staff section. Although training resources and opportunities for the Reserve were even more constrained than for the Regulars, almost all officer and many enlisted reservists were World War II veterans. The strategy worked: Marine reservists provided a vital contribution to the Korean War.

While the Korean War raged, the debate over Marine Corps force structure continued. The final legislative battle occurred during committee deliberations in

the 82nd Congress. During the deliberations, five major concerns about a legislated Marine Corps structure were addressed directly [13 through 15]:

- The first of these concerns was that the strength of the Marine Corps should be tied to that of the Navy. This idea was rejected on the grounds that Marine Corps functions are not limited to helping the Navy. Pointing out numerous examples of "other than Naval" duties (including their role in the Korean War), the committee concluded that one of the most important functions of the Marines was additional duties "as the President may direct."
- The second question was whether JCS or Congress should determine the Marine Corps force structure. The committee members pointed out that the Constitution gave Congress the authority to "provide for and support the military services." They interpreted this to mean that Congress should determine the size and composition of the armed forces.
- The third concern was that a large Marine Corps would duplicate the Army and Air Force. To answer this, the committee chose to focus not on the mix of weapons or similarities in organization of the services but on the purposes for which the forces were created. With that focus, the committee saw no duplication between a Marine Corps "force in readiness" designed to suppress or contain international disturbances and an Army and Air Force responsible for preparing forces to effectively prosecute war.
- The fourth issue was why the Marines needed legislative protection. The situation at the beginning of the Korean War was used to refute this question. The committee members pointed out that, despite the 1947 Unification Act's intent to make the Marine Corps the nation's force in readiness, the President, JCS, and Defense Department planned to reduce it to a "police force." They concluded that the structure of the Marine Corps needed to be established in law.
- The fifth concern dealt with Marine aviation, with Air Force proponents asserting that air power should be centrally controlled. Marines had long argued, and Congress agreed, that Marine Corps air power was primarily for close air support, and that a close working relationship between pilots and ground troops was necessary for this support to be effective.

The committee's report was approved by voice vote in the House and Senate on 20 June 1952. President Truman signed it on 28 June, and it was incorporated into

Title 10 of the United States Code (10 USC 5063). The law specified an active structure of not less than three divisions and wings plus support forces.

A month later, Public Law 82-476 provided for a Reserve with trained units and qualified individuals to meet requirements in excess of regular forces [6]. Although Marine reservists were assigned to what was still called the Organized Reserve, this law formed the basis for the units and individual mobilization augmentees of today's SMCR. Public Law 84-305 in August 1955 increased the annual training requirements for the Ready Reserve and set up special enlistment programs in the Marine Corps Reserve. In December 1967, Public Law 90-168 established the SMCR. Due in no small part to legislation pertaining to both active and reserve components, the Marine Corps was able to build a total force that fought effectively in Kuwait in 1991.

### **Total Force Policy in the Marine Corps**

Although legislation stipulates the structure of Marine Corps forces, it does not state how they will be employed. That is specified by the Total Force Policy, which was developed to fit the nation's responsibilities as a global power to fiscal and demographic realities [16]. Secretary of Defense Laird first articulated the Total Force Policy in 1970 and Secretary of Defense Schlesinger formally adopted it in 1973. Its objective is to maintain as small an active force as possible, integrating the capabilities and strengths of the active and reserve forces in a cost-effective manner. The policy has two basic tenets: reserve forces are relied on as the primary source of augmentation for the active forces, and all forces available (i.e., active, reserve, civilian, and allied forces) should be integrated to complete the mission at hand.

For the Total Force Policy to be effective, the Reserve must be mobilized in time to support military operations directed by the national command authority. Toward this end, federal laws, including several emergency authorities, authorize the federal government to expand the nation's armed forces under different circumstances. These emergency authorities are based on U.S. code and public law, executive orders, or federal regulations [17]. They include four types of mobilization: Presidential selective reserve callup (PSRC), partial, full, and total (table 1).

**Table 1. Authority for involuntary callup of the Reserve**

Type of mobilization	Type of unit	Duration	Maximum number
PSRC	SMCR	90 days + 90 days	200,000
Partial	SMCR, IRR	24 months	1,000,000
Full	All	Duration + 6 months	Unlimited
Total	All	Duration + 6 months	Unlimited <sup>a</sup>

a. Total mobilization allows growth beyond existing force structure.

### ***Implementing Total Force Policy: Reserve Roles and Missions***

Marine Corps active forces focus on the "force in readiness" role. As such, they maintain high readiness, support forward deployments, and prepare for quick response. They believe their most likely employment will be in low- to mid-intensity operations, or crisis and contingency response, but also retain the capability to satisfy the initial commitment to general war. The mission of the Reserve is to provide additional capability and depth for sustained operations during lengthy deployments or protracted combat. Its mobilization roles include the following [18]:

- ***Augmentation***, which is filling existing structure. For example, a reserve rifle company may be called to fill an active infantry battalion.
- ***Reinforcement***, which is adding capabilities to active Marine air-ground task forces (MAGTFs). For example, a MAGTF may be reinforced by a reserve artillery battalion.
- ***Reconstitution*** (formerly called force expansion), which is providing additional forces. It should be noted that existing reserve units expect to fill the augmentation and reinforcement roles. Reconstitution would likely involve building additional reserve units around nondeployed SMCR command structure (e.g., the division headquarters).

In addition to assigned mobilization roles, the Marine Corps implementation of the Total Force Policy has several notable characteristics:

- It uses a mirror-image concept to maintain the balance between active and reserve structure. The structure of the SMCR is similar to that of an active MEF, with a division, wing, and force service support group (FSSG). Many SMCR units have the same internal organization as their active counterparts.
- It has a substantial investment in the Reserve, both in terms of active-duty manpower and modernization strategy. Currently, about 7,400 active-duty Marines,<sup>1</sup> the equivalent of over seven infantry battalions, are dedicated to full-time SMCR support. In addition, the acquisition policy stipulates that active and reserve units should have the same equipment (due to budgetary constraints, this is not always possible).
- Current policy is for all commissioned officers in the SMCR to have prior active service. Many senior non-commissioned officers (SNCOs) also have prior-service experience.
- Active and reserve personnel attend the same entry-level and advanced schools.
- The same training standards are applied to active and reserve units (although they are not always applied as "vigorously" to reserve units).

From a functional viewpoint, the Marine Corps' implementation of Total Force Policy can be summarized in one sentence: SMCR units can perform the same functions as active FMF units, except for long-term peacetime forward presence. There do not appear to be any compelling reasons for major changes in the Marine Corps' interpretation of the policy on the SMCR. Any policy adjustments will depend on the eventual active/reserve mix.

## **DESERT SHIELD AND STORM: APPLYING THE TOTAL FORCE**

In contrast to the hollow forces, low readiness, and confusion that marked the initial response to the North Korean invasion of 1950, in August 1990 the nation possessed a sizeable, ready active force backed up by a potent Reserve. The

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1. This total includes both regulars and full-time support (FTS) reservists.

Marine Corps of August 1990 had three active Marine expeditionary forces (MEFs)<sup>1</sup> backed up by an SMCR designed primarily to augment and reinforce active forces, and an IRR/Retired Reserve to augment supporting establishment organizations and provide a pool of replacements.

### **Significant Events in the Reserve Callup**

U.S. involvement in the Persian Gulf crisis began on 2 August 1990 when the President declared a national emergency to deal with the threat posed by Iraq's invasion of Kuwait.<sup>2</sup> Twenty days later, the President authorized the involuntary callup of reserve units under 10 USC 673b. Callup authority was issued incrementally by service; the Marine Corps' initial ceiling was 3,000 personnel.

Although authorized, the Marines did not immediately start calling up reservists. On 24 August, the Commandant issued a message stating, in effect, that active forces would be used for the first 60 days of the contingency, but reserve units should stand by to be activated after that time [19]. During that first 60 days, however, preparations for reserve callup were under way. These preparations included:

- Using a small number of volunteers in the early stages of Desert Shield.<sup>3</sup>
- Using drill weekends to train some reserve units for desert operations and to prepare them for deployment to the Gulf.
- Conducting an "admin blitz" in September to prepare SMCR personnel and organizational records for the impending mobilization.
- Assigning active-duty elements of the supporting establishment to put together predeployment training packages and prepare for the arrival of large numbers of reserves.

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1. A MEF normally contains a division, wing, and FSSG.

2. C-Day, the day forces began to move, and D-Day, the beginning of Operation Desert Shield, were both set as 7 August.

3. We were unable to determine the exact number of volunteers during Desert Shield. There were a number of reserve activities ongoing during the first two months, and it was not possible to separate those who directly supported Desert Shield from those who did not. Based on discussions with staff officers at HQMC, MARRESFOR, and MCRSC, we estimate the total to be less than 200.

Once the 60-day "limit" had passed, the Marine Corps started calling up SMCR units. The first unit activated was Combat Service Support Detachment 40 (CSSD-40), which reported to its station of initial assignment (SIA) on 12 October [20]. Reserves started arriving in large numbers in mid November (around C+100).

By the end of Desert Storm, 24,324 SMCRs had reported for duty. In addition, 7,595 IRRs/retirees (the 538 retirees were all volunteers) were activated. The majority of SMCRs (58 percent) were deployed to Southwest Asia, but SMCRs were sent virtually everywhere there were active-duty Marines. Indeed, only the special-operations-capable Marine expeditionary units (MEUs(SOC)) that deploy to the Mediterranean and Western Pacific showed no evidence of reserve employment. MEUs undergo an intensive six-month predeployment training program followed by a six-month deployment, so it is not surprising that reservists would not be employed in them.<sup>1</sup>

### **Issues and Observations From Desert Shield/Storm**

There are a host of after-action reports, lessons-learned commentaries, reconstruction reports, analyses, periodical articles, and other writings about Desert Shield and Desert Storm. This section summarizes the most significant issues related to reserve activation, post-mobilization preparation, and performance.

#### ***Reserve Pay System***

The most-reported problem [21 through 25] from the reserve mobilization during Desert Shield/Storm was an administrative one—the transition from the Reserve Manpower and Management Pay System (REMMPS) to the Joint Uniform Military Pay System (JUMPS). This transition occurs when reservists are activated. Both REMMPS and JUMPS are automated, but they are incompatible with each other. Thus, reserve accessions had to be entered into JUMPS manually. The large number of reservists activated over a relatively short time, combined with normal data-entry errors, overwhelmed the system.

#### ***Callup as Detachments Instead of Units***

A number of reservists were dissatisfied with being called up and deployed as detachments instead of whole units [24, 25]. Although policy states that the SMCR

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1. One reserve infantry battalion (1st Battalion, 24th Marines), did receive special-operations training while assigned to Okinawa as part of the unit deployment program (UDP).

is to be mobilized as units, the operational definition of unit was "any group or detachment of two or more individuals organized to perform a particular function, whether or not such a group is part of a larger group" [26]. The Marine Corps called up a large number of such detachments (about one-fourth of the SMCRs were activated as detachments, teams, sections, or platoons). There was a dichotomy of views. The active force planners saw the SMCR as a pool of manpower that could be drawn from as needed; the reservists expected to be employed as intact units.

### ***Mobilization Timing***

Once units and individuals had been selected for activation, the notification, processing, and post-mobilization training process began. On average, the reservists arrived at their SIA about two weeks after being activated [20, 27].

Reserves received their post-mobilization (pre-deployment) training at the SIA. Reserve units planned to have 30 days there before deployment [21, 22]. According to [27], two-thirds of the reservists were at the SIA for this amount of time. Considering that the requirements to have units in theater forced some of them to deploy before the 30 days were up (e.g., units that joined 5th MEB had 10 days [24]), it is remarkable that the plan was followed this closely.

### ***Training Difficulties of Reserve Units***

The amount of time units had to train is important, but how much training they received and how well they performed are more important. Reserve units experienced a number of difficulties in their 30 or so days at the SIA. These difficulties [21 through 25] included the following:

- Training facilities were limited. The space needed to conduct battalion- or higher-level maneuver training is not available at some bases. When it is available, only a limited number of units can use it at one time. Competition for available facilities was more acute at Camp Lejeune (home base of II MEF forces) than at Camp Pendleton (home base of I MEF forces) because most of I MEF's forces had deployed by the time large numbers of reservists arrived.
- Equipment (major end items) was limited. Many reserve units did not bring their equipment to the SIA because they were scheduled to receive equipment from maritime prepositioning ships (MPS) in theater. Training ammunition was also in short supply because it was being conserved for the war.

- Base support was limited. At the time when the requirements were highest, bases were understrength because they had lost fleet assistance program (FAP) personnel<sup>1</sup> to deploying units. The preassigned Individual Ready Reservists (PIRRs) that mobilization planners assumed would replace FAPs and fill other wartime billets could not be involuntarily activated until the partial mobilization on 26 January. This problem was partially solved by using individual mobilization augmentees (IMAs) (that are subject to selective callup) and volunteers.
- With the limitations on facilities, equipment, and base support, some reserve units believed that, in the 30-day period, they received as little as 10 full days of training.
- SMCR units were required to complete few (if any) predetermined training programs. Generally, they were allowed to develop their own training plans based on what they thought they needed most in the time available. This limited time posed a dilemma for commanders and staff officers: either they could help organize and conduct training or be trained themselves. Almost invariably, they chose to train others and received little training themselves.<sup>2</sup>
- The effects of the modernization programs of the 1980s were felt in some reserve units that had recently received new equipment and had little time to train with it. Some active units had the same problem (e.g., the tank units that made the transition from M60s to M1s).

During the time between deployment and the beginning of the ground war, most units overcame these problems. Perhaps the most famous (certainly the most publicized) example is B Company, 4th Tank Battalion. This unit had only two-and-a-half weeks to become familiar with its new M1A1 tanks before going to war. During the ground assault, this company breached both mine belts and defeated two Iraqi counterattacks, destroying about 90 armored vehicles without losing a single tank.

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1. FAPs are personnel from a nondeployed FMF unit who fill billets in bases and stations. This system allows the Marine Corps to use fewer personnel during peacetime and to fill in billets during wartime with mobilized reservists.

2. Under current practices, reserve units are expected to be aware of their deficiencies and correct them during the post-mobilization. By all accounts, they did that during their stay at the SIA. The problem arises when training time is limited. Commanders and staffs did not have enough time to both train their subordinates and practice the complex tasks required to become fully capable staffs.

## ***Performance of Reserve Units***

With all the training obstacles to overcome, one might think the reserve units' combat performance would be substandard. As B Company's example shows, however, such was not the case—depending on the size of the unit. Virtually all post-war comments on reserve performance [24, 25, 28] were positive about the performance of small units.<sup>1</sup> The common denominator among the units receiving positive comments was that they drilled together: companies, batteries, aircraft squadrons, and smaller elements of those units (e.g., detachments). The fact that those units drilled together monthly, combined with strong active-duty support programs (such as instructor-inspectors (I&Is)), was often cited as the reason for their good performance. In other words, even though they could have received better post-mobilization training, they were able to overcome their deficiencies. Other factors cited were that many reservists were either college students or graduates and therefore easy to train and adaptable. Furthermore, many had civilian jobs similar to their MOS.

At the battalion level, the comments were mixed. Most commentators stated that battalions needed a longer time to get ready because they have fewer opportunities to train together. No doubt the fact that commanders and staff officers used the available time to train others exacerbated the problem. Two of the five maneuver battalions deployed to Southwest Asia, however, were employed in front-line combat.<sup>2</sup> The 8th Tank Battalion was employed with 2d MarDiv, and 3d Battalion, 23d Marines (an infantry battalion), was employed with 8th Marine Regiment. The I MEF commander specifically noted the creditable performance of 8th Tanks, but also pointed out that the division staff spent a lot of time and effort working to get them ready [28]. The general consensus of comments was that battalion staffs needed more time to "gain control" of their units, learn to work with adjacent and higher staffs, and practice the complex tasks (such as fire-support coordination) associated with battalion operations.

The reserve regimental headquarters deployed to Southwest Asia was assigned the mission of rear-area security. Regimental operations are even more complex

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1. The only negative comments on individual or small-unit performance were that some CSS reservists' MOS skills were not up to standards. Leaders in units to which those reservists were assigned tended to give them less-demanding tasks. The problem with this approach was that it did not solve the deficiency and created a morale problem for some reservists, who felt they were viewed as a "giant working party" [24].

2. Two SMCR battalions—2d Battalion, 24th Marines, and 3d Battalion, 24th Marines—were given rear-area security missions. The other battalion—1st Battalion, 25th Marines—was assigned the prisoner-of-war collection mission.

than battalion operations, and the comments about the regiment's performance were less favorable than those for the battalions. It should be noted that even unfavorable accounts of regimental (and battalion) headquarters' performance did not denigrate the performance or competence of individual reserve officers. Most blamed the performance on the fact that reserve battalions and regimental headquarters rarely have opportunities to train as such.

### ***Marine Corps Worldwide Commitments***

The Marine Corps not only responded to Desert Shield/Storm but also maintained its other commitments around the world. MEUs deployed to the Mediterranean and Western Pacific and forces continued to be stationed in Okinawa and Japan. In addition, Marines responded to crises in Liberia, Somalia, the Philippines, and, later, Bangladesh.

Table 2 summarizes Marine Corps deployments on 15 January 1991 [29], just before the start of Desert Storm. The table includes only forces either deployed or working up for deployment; it does not include air contingency forces<sup>1</sup> and forces that deployed for exercises. The table lists how many troops were committed, plus the numbers of infantry battalions and aircraft squadrons (shown as "pacing units" for ground and air forces) deployed. It also shows what forces were available in FY 1991 and what forces are planned in the DOD Base Force for FY 1997. Shown in parentheses after the available totals are the percentages of each type force included in the 15 January deployments.

Note that even the relatively large FY 1991 force was heavily tasked to support these worldwide commitments. Sixty-eight percent of the total FMF troops were deployed, and almost all (91 percent) of the infantry battalions were committed (if Air Contingency Forces (ACFs) were included in the table, all the infantry battalions would have been committed, even accounting for units that were double-hatted). Note also that, although in gross numbers the DOD FY 1997 Base Force would have enough troops (89 percent), it would not have enough infantry battalions<sup>2</sup> to support all the deployments.

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1. Each MEF maintains two reinforced infantry battalions on a short "tether" for rapid deployment to a crisis or for reinforcing other deployed forces.
  2. The DOD Base Force would not have enough of several other types of units (e.g., tank battalions) either.

**Table 2. Marine Corps deployments on 15 January 1991**

Location	Troops (in thousands)	Infantry battalions	Aircraft squadrons
Southwest Asia			
Ashore	67	18	30.3
Afloat <sup>a</sup>	17.7	6	10.5
Mediterranean			
MEU <sup>b</sup>	2.2	1	2.4
WestPac <sup>c</sup>	18.2	3	9
Workup MEUs	4.3	2	3.8
Total	109.4	30	56
Available in FY 1991 <sup>d</sup>	160 (68%)	33 (91%)	78 (72%)
DOD FY 1997 Base Force <sup>e</sup>	124 (89%)	24 <sup>f</sup> (125%)	69 (81%)

- a. The force that conducted the noncombatant evacuation operation (NEO) in Somalia was detached from afloat forces in the Persian Gulf.
- b. The force that was sent to Liberia was detached from this MEU.
- c. Includes forces stationed in Okinawa and Japan, plus the WestPac MAGTF that responded to the crisis in the Philippines.
- d. Includes both the active FMF and SMCR units.
- e. This force is described in detail in volume IV of this report.
- f. Both infantry and light armored infantry (LAI) battalions are counted to produce this total.

## COMPARISON OF RESERVES IN KOREA AND THE PERSIAN GULF

The Marine Corps Reserve was mobilized for two of the three major post-World War II conflicts involving the United States. In both cases, reservists made vital contributions toward winning the war. But there were significant differences in both the active forces and the way the reservists were used in the two wars.

The Korean War came shortly after the massive demobilization following the end of World War II. At that time, the active-duty Marine Corps had been reduced to the point that it could not field a war-strength division. The Reserve had to be

activated at the beginning of the conflict for the Marines to be able to field the division-wing team that deployed to Korea. Although there were units in the Organized Reserve, all but two were broken up to provide fillers for the active units. An important factor in the Marine Corps Reserve's quick response was that a significant number of reservists, particularly officers and NCOs, were World War II veterans. The Marines were able to pick combat-trained reservists to fill early-deploying units, and train the rest for later deployment.

Between the Korean and Persian Gulf Wars, active-force structure was built back up to counter the Soviets and other threats of the Cold War. Congress designated an active component of three Marine divisions and wings and enacted legislation improving the structure and training of reserve components. In addition, the Total Force Policy was adopted, strengthening the relationship and integration of active and reserve components. Although the Cold War was over by August 1990, the total force structure was largely intact. The Marine Corps that deployed to the Gulf was larger, better equipped, and better trained than the Marine Corps that deployed to Korea.

The Gulf War tested the Total Force Policy for the first time. Active forces were more numerous and better prepared for this war than for the Korean War, and were able to meet the requirements for early-deploying forces. Except for a few volunteers, the Reserve was not activated during the first 60 days of the Persian Gulf War. But once it became clear that additional forces were needed (initially for rotation and then for the buildup to offensive capability), reservists augmented and reinforced active forces both in the desert and other areas. Unlike Korea, the Marine Corps maintained its other commitments in addition to providing forces in the Gulf. The Marines could not have filled all their worldwide commitments without reserve activation.

There are two notable similarities between the Korean and Persian Gulf War mobilizations. First, the time between activation and deployment was about a month. In the Korean War, little of that time was available for training, but the Marines were able to draw from combat veterans in the Reserve. Relatively few combat veterans were in the Marine Corps Reserve at the start of Desert Shield. But active/reserve integration programs (such as I&Is), the large number of reservists with prior active service (particularly in leadership positions), and policies such as having the same training standards for active and reserve forces produced an SMCR that successfully responded when called. With those advantages, SMCR units were able to overcome the limited time, limited training opportunities, and other less-than-ideal conditions during the post-mobilization period.

The second similarity was the delay between the enemy invasion and reserve callup. In both cases, about three weeks elapsed before the President authorized the services to activate reserve forces. In assessing the viability of future force structures, the effects of a similar delay should be considered. The future contingency scenarios used in this study make a more optimistic assumption about callup authorization (see [5]).

In sum, it appears that the lessons from the Korean War were learned and instituted. Although the Cold War threat was partly responsible for the larger and more ready forces of 1990, the laws, policies, and practices enacted between the wars certainly shaped a better total force. There were problems, and there are lessons to be assimilated, but the Total Force Policy successfully passed its first major test.

## DEVELOPMENT OF ALTERNATIVE FORCE STRUCTURES

Developing alternative force structures was a two-stage process. In the first stage, we considered all "reasonable" variations in active and reserve forces. In the second stage, we eliminated alternatives that seemed unlikely.

Because the MEF is the Marine Corps' basic warfighting organization, we adopted it as the means of depicting alternative force structures. All alternatives are presented as number of active and reserve MEFs; for example, the 2/1 alternative contains 2 active and 1 reserve MEF. The "standard" MEF is the baseline MEF defined by the FPSG [30]. At its wartime table-of-organization strength, the standard MEF has about 40,500 Marines. For the alternative force structures, we list the number of *full, wartime-strength MEFs* they contain. That is, if an alternative has 2 active MEFs, the FMF has  $2 \times 40,500$  or 81,000 Marines. Similarly, if that alternative has 1 reserve MEF, the SMCR units contain about 40,500 Marines.

### DETERMINING ALTERNATIVES

In designing alternative force structures, our intent was to be comprehensive but keep the alternatives within a range that reflected historical reality and projected national needs. Volume III explains in detail how this was accomplished, but our method can be summarized as follows:

- First, we selected the range of total force. We set the upper bound at 4 MEFs, which was nominally the Marine Corps total force structure circa 1990. We set the lower bound at 2.5 MEFs, which is the size of force that deployed to the Persian Gulf during Desert Shield/Storm.
- Second, we limited the size of the active force. We set the upper bound at 3 MEFs, the nominal active structure circa 1990. We set the lower bound at 1 MEF, which is the size force that would be needed to maintain a rotation base for two MEUs.
- Third, we varied the active and reserve force structure in 0.5-MEF increments. We chose 0.5 MEF because it would make a real difference in warfighting capability. A 0.5-MEF change includes a full MEF plus an "overhead allowance" for other considerations such as administration and

geographic distribution of forces. (For discussion of the effects of these considerations, see the section on developing detailed force structures in [4].)

Applying this method resulted in 21 different alternative force structures. Table 3 lists these alternatives.

**Table 3. Original active/reserve MEF force mixes**

4 MEFs	3.5 MEFs	3 MEFs	2.5 MEFs
3/1	3/0.5	3/0	2.5/0
2.5/1.5	2.5/1	2.5/0.5	2/0.5
2/2	2/1.5	2.2/0.8	1.5/1
1.5/2.5	1.5/2	2.1/1	1/1.5
1/3	1/2.5	2/1	
		1.5/1.5	
		1/2	

## SELECTING ALTERNATIVES

To select alternatives for detailed analysis, we used the following three assumptions as rules-of-thumb to eliminate some alternatives from further consideration:

- There will be an SMCR. We saw no need in any aspect of our analysis to eliminate SMCR forces entirely. This rule eliminated two alternatives.
- Active forces will be no larger than the Marine Corps Force Structure Planning Group (FSPG) "buyback" (about 2.5 MEFs). The Marines feel that such a force, although constrained, could meet future commitments. This rule eliminated two more alternatives.
- The SMCR will be no larger than the active force. The Marine Corps is a force in readiness, not a force in reserve. Furthermore, no other service has more reserve than active forces. This rule eliminated six alternatives.

The study had to consider three alternative force structures. The first of these was the DOD Base Force. The FSPG [30] and Reserve FSPG (RFSPG) [31] have developed this force in detail. In our notation, the DOD Base Force has 2.2 active and 0.8 reserve MEFs. We called the second alternative the "Congressional Base

Case.” This alternative maintains the SMCR at the level authorized for the FY 1993 (i.e., 42,400 Marines) and compensates by reducing active structure so that the total cost is the same as that for the DOD Base Force. The Congressional Base Case has 2.1 active and 1 reserve MEFs. The third alternative was Congressman Aspin’s option C, which has 2 active and 1 reserve MEFs.

These three alternatives are similar: they all have about 2 active MEFs and a total force of about 3 MEFs. In fact, when we developed detailed structures for the Congressional Base Case and Mr. Aspin’s option C, they were so alike that we did not consider them separately. The Congressional Base Case had a slightly larger active force, but the additional active force provided no significant increase in capability over option C. The additional active force did not allow more rotation, did not affect response time to future contingencies, and did not affect our qualitative assessment of reserve force sustainability; all it did was cost the same as the DOD Base Force. For this reason, we adopted option C (the 2/1 alternative) as a “surrogate” Congressional Base Case, even though option C costs less than the DOD Base Force.<sup>1</sup>

Table 4 lists the ten remaining alternatives—two with 4 MEFs, two with 3.5 MEFs, four with 3 MEFs, and two with 2.5 MEFs in the total force. For each alternative, we developed a detailed force structure for analysis. These detailed force structures and the method we used to develop them are discussed in volume IV. The next section summarizes the results of the analysis.

**Table 4. Active/reserve force mix alternatives remaining for detailed analysis**

4 MEFs	3.5 MEFs	3 MEFs	2.5 MEFs
2.5/1.5	2.5/1	2.5/0.5	2/0.5
2/2	2/1.5	2.2/0.8	1.5/1
		2/1	
		1.5/1.5	

1. We retained the DOD Base Force. Although its structure is similar to option C, it differs enough to affect response times, rotation, and reserve sustainability.

## **ANALYSIS OF ALTERNATIVE FORCE STRUCTURES**

### **PREPARING RESERVE FORCES FOR WAR**

To determine the ability of alternative force structures to respond to MRCs, we need to know how long it takes to prepare forces for war. For this study, we assume that active forces are available immediately; that is, they will deploy when ordered to do so. Thus, reserve force preparation becomes a question of how long it takes for reserve forces to be as ready as active forces.

We used the following sources to answer this question:

- The responses of officers in both the active and reserve Marine Corps as to how long it would take to get reserve forces as ready as active forces.
- Answers to a survey sent by the Commanding General, Marine Reserve Forces (CG MARRESFOR) to SMCR units asking them how long it would take to be ready to deploy.
- The amount of post-mobilization time available during Desert Shield/Storm.
- Data from the Status of Resources and Training System (SORTS).
- The annual difference in battalion field-training days (BFTD) and flight hours between active and reserve units.
- The difference between reserve training and the amount of time active units in MEUs and the UDP spent in predeployment workups.

Volume III [3] explains in detail how we combined these sources, and how much credence we applied to each of them, to develop our best estimates of the time required for reserve forces to be as ready as active forces. Table 5 summarizes the results.

All except the GCE and a reserve MEF need about 30 days of post-mobilization training to be as ready as active units. Combat support and service support units' tasks generally require individual or small-unit technical skills. GCE units, particularly maneuver units, must execute larger-scale operations. Their staffs must be able to coordinate and control those operations. Individual skills can be learned and

practiced during drill periods as well as the two-week annual training duty. Opportunities for large-scale maneuvers are infrequent; even when they are available, a staff needs more than two weeks to learn and practice the tasks required to control such maneuvers.

**Table 5. Estimates of post-mobilization time needed by SMCR units**

Element/unit	Best estimate (days)
SRIG <sup>a</sup>	30
GCE <sup>b</sup> :	30
Company	30
Battalion	60-70
Regiment	90-120
ACE <sup>c</sup>	30
CSSE <sup>d</sup>	30
Reserve MEF	120-180

a. Surveillance, reconnaissance, and intelligence group.  
 b. Ground combat element.  
 c. Aviation combat element.  
 d. Combat service support element.

Thus, for GCE units, the post-mobilization training time depends on the size of the unit. Company-level tasks are more basic than battalion or regimental staff tasks. In addition, companies are relatively small units and have more opportunities to train together. Thus, their post-mobilization training requirement is similar to that for support and service support units—about 30 days. Battalions and regiments need progressively more time to learn and practice their staff functions. We estimate that battalions can be ready in 60 to 70 days, and regiments can be ready in 90 to 120 days.

MAGTF-level tasks are even more complex than regimental tasks. A MEF staff must control the actions of maneuver units, other combat support units, aviation assets, and combat service support units. The Marine Corps does not plan to deploy MEF-level forces made up entirely of reserve units, at least not during the early stages of a war. For this reason, no data are available on how long it would take a reserve MEF to prepare for war. Our estimate is speculative. We believe it would take a MEF at least as long as a regiment, so we set the lower limit at 120 days (the upper bound on regimental preparation time). For the upper limit, we used the standard 6-month period that other Marine Corps units spend preparing for deployment.

Only one scenario in this study would use a fully reserve MEF: the response of the 1.5/1.5 alternative to MRC IV.<sup>1</sup> Even with the minimum response time (120 days), this alternative falls far short of meeting the scenario's time line.

## ANALYSIS OF ALTERNATIVES

We examined five criteria for each alternative force structure:<sup>2</sup>

- Response to MRCs
- Forward-presence/rotation capability
- Qualitative aspects of sustaining<sup>3</sup> the reserve (quantitative aspects are addressed by RAND)
- Transition costs—the transient or one-time costs to convert from the current (FY 1993) force structure to the alternatives
- Long-term or steady-state annual cost differences between the DOD Base Force and other alternatives.

How we analyzed these criteria is briefly described below. Results of the analysis are presented later in table 6.

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1. MRC IV is a concurrent (near simultaneous) contingencies scenario. This scenario and the other MRC scenarios are discussed later in the text.

2. In the Executive Summary, we refer to seven criteria. The two additional criteria, which depend on forces other than the FMF, are considered later.

3. In this study, the term *sustainability* refers to the ability to recruit enough prior-service Marines for reserve forces, not logistical support.

## **MRC Response Capability**

Perhaps the most important aspect of all the alternative force structures is their ability to carry out their wartime missions. This ability depends on two main factors: how much force is required and how quickly it is needed. To measure the capability of the alternatives, we used four hypothetical scenarios from the Defense Planning Guidance (DPG). These scenarios are called MRCs. The detailed discussion of the locations, requirements, and means by which Marine forces would deploy for these scenarios is classified. It is contained in volume V of the report. For this study, the scenarios are labeled MRC I, MRC II, MRC III, and MRC IV. There are two interpretations of the forces required for MRC IV; the larger is labeled option 1, the smaller is option 2.

The DPG scenarios include lists of which forces are required and when they must arrive in theater. Forces for each scenario are divided into two main groups: the initial response force (IRF), which must be on scene quickly, and the decisive force (DF), which arrives later. (For further details on the purposes and capabilities of IRFs and DFs, see [5].) For this study, we converted the forces listed in the scenarios to "MEF equivalents," which we used to measure whether alternative force structures had enough forces and whether those forces could respond to the stated requirement in time. For MRC IV, the Marine forces are the IRFs for two contingencies.

Each alternative's response to the requirement is presented as a range between a minimum and maximum time to get into the theater. This range represents the uncertainty of transportation time and the uncertainty in the time needed for reservists to be as ready as active forces. By combining estimated training times with estimated mobilization and transportation times, we calculated the ranges of reaction times (how long before forces arrive in theater) for five different force mixes. These calculations were as follows:

- An all-active unit can be in theater in 2 to 4 weeks.
- A mixed active/reserve unit, with reservists integrated at the company level,<sup>1</sup> can be in theater in 8 to 11 weeks.
- A mixed active/reserve unit, with reservists integrated at the battalion level, can be in theater in 13 to 16 weeks.

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1. In this mix, we also allowed one battalion-size unit to be included.

- A mixed active/reserve unit, with reservists integrated at the regimental level, can be in theater in 17 to 23 weeks.
- An all-reserve MEF-size force can be in theater in 21 to 32 weeks.

### ***Forces Remaining After Response to Contingencies***

To determine an alternative force structure's ability to respond to Marine Corps commitments similar to those during the Persian Gulf War, we examined the forces remaining after deploying both the IRF and DF for each MRC. Although the units differ slightly between alternatives with the same total number of MEFs, supportability generally depends on total force size:

- Alternatives with a total of 2.5 MEFs (2/0.5 and 1.5/1) could not support any further commitments after responding to any of the MRCs. (These alternatives do not have enough forces for MRC III or IV.)
- Alternatives with a total of 3 MEFs (2.5/0.5, 2.2/0.8, 2/1, and 1.5/1.5) could support either 2 MEUs or a MEB(-)<sup>1</sup> after deploying forces for MRC I or II. They could not support further commitments after deploying forces to MRC III or option 2 of MRC IV. (These alternatives do not have enough forces for option 1 of MRC IV.)
- Alternatives with a total of 3.5 MEFs (2.5/1 and 2/1.5) could support 2 MEBs or 6 MEUs (or 1 MEB plus 3 MEUs) after deploying forces for MRC I or II. They could support 1 MEB or 3 MEUs after deploying forces for MRC III or option 2 of MRC IV. They could support no further commitments after deploying forces for option 1 of MRC IV.
- Alternatives with a total of 4 MEFs (2.5/1.5 and 2/2) could support 3 MEBs or 9 MEUs (or other combinations, "trading" 1 MEB for 3 MEUs) after deploying forces for MRC I or MRC II. They could support 2 MEBs or 6 MEUs (or other combinations) after deploying forces for MRC III or option 2 of MRC IV. They could support 1 MEB or 3 MEUs after deploying forces for option 1 of MRC IV.

These results are based strictly on counting units. We did not consider factors such as MAGTF headquarters availability, lift availability, and response time. In

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1. The (-) indicates the MEB would be short a medium-lift helicopter squadron.

practical terms, the availability of MAGTF headquarters probably would not be a problem. Even if enough forces for 9 MEUs were available, we cannot conceive of any reasonable scenario requiring response to an MRC plus the deployment of 9 MEUs.

Lift and response time could be a problem, however, depending on when and where the additional forces were required. Force arrival times in all the MRC scenarios strain the available lift; additional forces might have to wait for "turn-around" shipping<sup>1</sup> or airlift. Response time would be subject to similar constraints—training resources would be dedicated to forces deploying for the actual contingency. Additional forces might have to wait until contingency forces deployed to get access to ranges and maneuver areas.

### **Forward-Presence/Rotation Capability**

The Marine Corps maintains forward-deployed forces supporting the peacetime forward-presence mission. Units that deploy in the MEUs(SOC) or to Okinawa in the UDP are away from their families for at least six months at a time. Units also deploy on major JCS-directed and other exercises, decreasing the amount of time they spend at home. Experience has taught the Marine Corps that if a Marine spends too much time away from home, morale suffers, readiness declines, and manpower retention decreases. Having a rotation base allows deployed time to be kept within what the Marine Corps believes are reasonable bounds.

We used three different methods to measure the range of rotation capability in each alternative. For each method, the unit of measurement is the number of forward-deployed infantry battalions that can be maintained. We found that alternatives ran out of infantry battalions before other types of units, so they are the limiting factor.

The first method is the one currently used by the Marines. Units are deployed in a ratio of one forward for every four in the force. This method does not explicitly consider other commitments, such as exercises. The assumption is that, with this ratio, other requirements can be met. The advantage of this method is that it is known to work successfully.

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1. For example, once an MPS squadron is offloaded, it can be "turned around," returning to CONUS to load additional supplies and equipment.

The second method is similar to the first, but the rotation ratio is 3.3 units for every one deployed. Under this method, a unit is deployed 6 months out of every 20. Although the Navy uses this ratio to plan deployment schedules, we consider it to be the minimum<sup>1</sup> acceptable because, on average, Marines are assigned to deploying billets more often than sailors.

The third method is based on operating tempo (optempo). The FSPG buyback [30] indicates that an overall optempo of 45 percent is acceptable. A 45-percent optempo means a unit is away from its home station for either deployment or major exercises 45 percent of the time.

### **Reserve Force Sustainability**

The Marine Corps recruits large numbers of prior-service Marines for the SMCR. It believes that, to have a quality force, at least 30 percent of enlisted personnel and all of the officers should have prior-service experience [22]. Currently, about 40 percent of the enlisted and virtually all of the officers in SMCR units have prior-service experience.

RAND has the models needed to assess the sustainability of reserve forces quantitatively. We did, however, discuss recruiting with *Marine Corps prior-service recruiters* [32]. From the discussion, we developed the following qualitative rules-of-thumb to assess reserve force sustainability:

- An active/reserve force mix of 3-to-1 or better is similar to the current situation in which prior-service Marines are being turned away. This mix can maintain the desired ratio.
- An active/reserve force mix between 2.5-to-1 and 3-to-1 probably will be able to maintain the desired ratio.
- An active/reserve force mix between 1.5-to-1 and 2.5-to-1 may be able to maintain the desired ratio.
- An active/reserve force mix of less than 1.5-to-1 is unlikely to be able to maintain the desired ratio.

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1. The Marines have used a 3-to-1 ratio in the past. Because morale suffered, retention decreased, and unit readiness declined, the practice was abandoned [30].

These results are labeled later, in table 6, as undoubtedly, probably, maybe, and unlikely, respectively.

### **Transition Costs**

When force structure is changed, activating and deactivating units incurs one-time costs (i.e., transition costs). In the short term, transition costs may erase the expected savings from reducing force structure. Unfortunately, these costs are difficult to compute, particularly for large structure changes. Major changes may include costs associated with base closings, such as environmental cleanup, as well as savings associated with the sale of property. Furthermore, there may be one-time separation pay if there are major personnel reductions, and other costs associated with disposing of or decommissioning equipment.

The end result is that computing transition costs accurately is difficult unless a specific plan is available. The only data we have on transition costs are from a CNA study that computed the transition costs of transferring two specific types of active units to the reserve: an infantry battalion and a helicopter squadron [33].

We used these costs as models for ground battalions and aviation squadrons, respectively, to develop estimates of the transition costs of the alternative force structures (we converted the cost data to FY 1993 dollars). Computed transition costs are based on the differences between the current (FY 1993) structure and the various alternatives. The costs in [33] assume only small changes in the overall force structure; major costs such as those associated with base closings and separation pay are not included. Because of the uncertainties, the transition costs in table 6 should be considered only order-of-magnitude estimates.

### **OTHER FACTORS**

To this point, we have focused on the FMF and SMCR, the principal combat organizations of the Marine Corps. In this section, we add non-FMF components, which include the supporting establishment (e.g., management headquarters, bases and stations, and training commands) and other operating forces such as Marine security guards, and compute the total number of Marines in each alternative force structure. We then compute annual long-term or steady-state costs. This section closes with a discussion of the Individual Ready Reserve.

## **Non-FMF Structure**

Using the FSPG results [30] as a starting point, we estimated the future non-FMF manning to be 43,200 Marines for all alternatives except those with 1.5 active MEFs. For the 1.5-active-MEF alternatives, we assumed that bases in Okinawa and Japan would be closed because the active force would not be able to support MEU deployments plus rotation to Okinawa. This assumption reduced the non-FMF starting point to 41,900. To this, we added the active-duty support for each alternative's SMCR component and a 15-percent "overhead" consisting of prisoners, patients, transients, and trainees (P2T2).<sup>1</sup>

We made two adjustments to the SMCR components of the alternatives. First, we added 2,600 individual mobilization augmentees (IMAs) to each SMCR alternative. The RFSPG [31] planned for this number of IMAs for all alternatives considered; thus, we assumed it to be a constant regardless of other SMCR structure. Second, we computed the number of full-time support (FTS) personnel in the SMCR. Although the FTS is a component of SMCR structure, we do not add it to the SMCR unit structures. Instead, we compute it separately for costing purposes (because an FTS reservist costs more than a drilling reservist).

## **Steady-State Costs**

Force structure costs can be categorized in four groups: direct unit costs, direct support costs, infrastructure costs, and transition costs. We have already examined transition costs. In computing annual long-term or steady-state costs, we address direct unit costs and part of the support and infrastructure costs.<sup>2</sup>

We have no direct data on support or infrastructure costs other than the number of personnel that are not in FMF or SMCR units. Thus, we do not include part of the total cost of the Marine Corps in our cost computations. Support and infrastructure costs other than those for personnel should be about the same because the alternatives do not change the support structure, however. For this reason, we show cost differences rather than overall service cost.

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1. The actual P2T2 percentage varies, but 15 percent is a reasonable average.

2. Because we have computed the differences in non-FMF personnel and SMCR personnel that are not in units, we use those numbers of personnel to determine a part of the support and infrastructure costs.

This holds true for all alternatives except those with 1.5 active MEFs. For those two alternatives, closing bases and stations in Okinawa and Japan would result in additional savings beyond our computed cost differences. Those two alternatives are the least expensive, so the additional savings would not change their standing relative to the other alternatives.

To compute direct unit steady-state costs, we used a procedure similar to the one used to compute transition costs. We converted the ground units (including ground units in the ACE, such as air defense battalions) to battalion equivalents and listed flying units in squadron equivalents. Cost factors for representative ground and flying units were multiplied by numbers of battalion/squadron equivalents to determine direct unit costs for each alternative. To those costs, we added the cost of active-duty non-FMF, reserve IMA, and reserve FTS personnel not assigned to units.<sup>1</sup>

### **Role of the Individual Ready Reserve (IRR)**

The IRR has two main roles: to provide pre-assigned personnel (PIRR) to augment nondeploying units, and to provide individual replacements to units that have suffered casualties. PIRRs fill "holes" in base and station personnel rosters when FAP personnel return to deploying units, and provide the additional personnel needed by non-FMF units during wartime. Retirees also fill requirements for pre-trained individual manpower (PIM) in non-FMF units.

Under current law, PIRRs cannot be activated involuntarily until partial mobilization occurs. Before Desert Shield and Storm, mobilization planners assumed that, for a major contingency, partial mobilization would follow shortly after a selective callup. This did not happen until five months after the first increment of the selective callup, however. To increase the usefulness of pre-assignees, some mechanism allowing them to be involuntarily activated earlier should be considered. One way would be through a legislative change allowing them to be activated as part of a selective callup.

The other role of the IRR is to provide replacements. In a protracted conflict, they would be the "band-aid bridge" until additional personnel could be either recruited or drafted and trained.

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1. Currently, about 30 percent of FTS reservists are not assigned to SMCR units [31]. We assumed this percentage would apply to all alternatives. Thus, we add 30 percent of the FTS personnel cost to each alternative.

## INTERPRETATION OF RESULTS

Table 6 summarizes the results of this analysis. Each alternative force structure is identified by the number of war-strength active/reserve MEFs it can support. This number is followed by the total number of active and SMCR personnel. Response to MRCs is listed as the number of weeks early (positive value) or late (negative value) an alternative can deploy the required force.<sup>1</sup> The table gives a range of values, representing the minimum and maximum response times. Footnotes explain particular aspects of the response times; for example, if the alternative cannot get the initial response force deployed in time or if it does not have the total forces needed for a contingency.

The table also addresses the computed rotation capability for the three methods used. It gives two values for each method: the first is based on infantry only; the second assumes both infantry and light armored infantry battalions are included in the rotation scheme. The sustainability column addresses our qualitative assessment of each alternative's ability to maintain the goal of 30 percent prior-service Marines in the SMCR.

Lastly, the table provides two sets of costs. The first is the one-time transition cost associated with changing the force structure. The second is the annual long-term cost differences between the DOD Base Force and the alternative. All costs are in FY 1993 dollars.

We can make a number of observations based on table 6. The total numbers of active and SMCR personnel are almost constant within groups of alternatives having the same total number of MEFs. Slight variations within a group are due to differences in active-duty support to the SMCR and in P2T2.

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1. The times shown are based on when the forces could be ready; availability of lift is not considered. We examine lift in [5]. There is enough lift to meet, but not necessarily exceed, the time lines. Early response times indicate the degree of flexibility in activating reserves. For example, if an alternative could respond three weeks early (+3 in table 6), the President could wait for three weeks before activating the reserves.

**Table 6. Summary of alternative force structure analysis**

Alternative	Personnel (1,000s)			Response to MRCs (weeks early (+)/late (-)) <sup>a</sup>				
	Active	SMCR	Total	I	II	III	IV option 1	IV option 2
<b>4 MEFs</b>								
2.5/1.5	180	63	243	+5 to +8	+3 to +6	+6 to +9	-3 to -9 <sup>b</sup>	+3 to +6
2/2	159	82	241	-1 to -7 <sup>c</sup>	-3 to -9	0 to -6	-3 to -9 <sup>d</sup>	-3 to -9 <sup>e</sup>
<b>3.5 MEFs</b>								
2.5/1	176	42	218	+5 to +8	+3 to +6	+6 to +9	-3 to -9 <sup>b</sup>	+3 to +6
2/1.5	156	62	218	+1 to -7	-3 to -9	0 to -6	-3 to -9 <sup>d</sup>	-3 to -9 <sup>e</sup>
<b>3 MEFs</b>								
2.5/0.5	173	23	196	+5 to +8	+3 to +6	+6 to +9	N/A	+3 to +6
2.2/0.8	159	35	194	+3 to 0	+1 to -2 <sup>f</sup>	+1 to +4	N/A	-3 to -9 <sup>g</sup>
2/1	152	42	194	-1 to -7	-3 to -9	0 to -6	N/A	-3 to -9 <sup>e</sup>
1.5/1.5	131	63	194	-1 to -7 <sup>c</sup>	-3 to -9 <sup>h</sup>	0 to -6 <sup>h</sup>	N/A	-7 to -18
<b>2.5 MEFs</b>								
2/0.5	149	23	172	-1 to -7	-3 to -9	0 to -6 <sup>i</sup>	N/A	-3 to -9 <sup>d, i</sup>
1.5/1	128	43	171	-1 to -7 <sup>c</sup>	-3 to -9 <sup>h</sup>	0 to -6 <sup>h, i</sup>	N/A	-3 to -9 <sup>i</sup>

- a. Unless otherwise noted, alternatives can deploy the IRF on time. Time-early or -late refers to the DF for MRCs I, II and III, and to the IRF for the second contingency for MRC IV. The range of arrival times provided represents the difference in minimum and maximum time required to deploy the force.
- b. Three-quarters of the IRF for the second contingency arrives on time.
- c. Half of the DF arrives on time.
- d. A quarter of the IRF for the second contingency arrives on time.
- e. A third of the IRF for the second contingency arrives on time.
- f. Two-thirds of the DF arrives on time.
- g. Two-thirds of the IRF for the second contingency arrives on time.
- h. In this alternative, the IRF cannot arrive on time.
- i. This alternative falls short of the force required by a MEB or more.

*(Continued on next page)*

Table 6. (Continued)

Alternative	Rotation capability (battalions) <sup>j</sup>			30-percent SMCR prior-service sustainability	Transition costs <sup>k</sup> (\$ millions)		Long-term cost difference from DOD base force (\$ millions)
	4 to 1	3.3 to 1	45 percent optempo		Net	Difference from DOD base force	
<b>4 MEFs</b>							
2.5/1.5	5/6	6/7	5/7	Maybe	890	530	1,700
2/2	3/4	3/4	2/3	Unlikely	1,310	950	600
<b>3.5 MEFs</b>							
2.5/1	5/6	6/7	5/7	Probably	460	100	1,000
2/1.5	3/4	3/4	2/3	Unlikely	850	490	100
<b>3 MEFs</b>							
2.5/0.5	5/6	6/7	5/7	Undoubtedly	440	80	500
2.2/0.8	4/5	4/6	3/5	Probably	360	0	0
2/1	3/4	3/4	2/3	Maybe	450	90	-600 <sup>m</sup>
1.5/1.5 <sup>l</sup>	2	2	2	Unlikely	890	530	-1,600
<b>2.5 MEFs</b>							
2/0.5	3/4	3/4	2/3	Undoubtedly	320	-40 <sup>m</sup>	-1,100
1.5/1 <sup>l</sup>	2	2	2	Maybe	450	90	-2,300

j. The two values represent rotation capability with infantry battalions only/infantry plus LAI battalions. Infantry plus LAI would involve LAI battalions in the UDP program, which would require purchase of an additional battalion set of equipment for Okinawa (except for the alternatives with 1.5 active MEFs, for which we assume that Okinawa is closed).

k. Order-of-magnitude estimates.

l. Rotation capability is for infantry battalions only. We assume that Okinawa is closed for these alternatives, so including LAI battalions in the rotation base is irrelevant.

m. Negative value indicates transition cost would be lower than for the DOD Base Force.

## MRC RESPONSE

Perhaps the most important aspect of the alternatives is response to the MRCs. Only the 4-MEF and 3.5-MEF alternatives can respond fully to option 1 of MRC IV, which requires 3.4 MEFs. None of the alternatives can fully meet the time lines for that option, but the 2.5-active-MEF alternatives come closest.

For option 2 of MRC IV and the other MRCs, the alternatives with 2.5 active MEFs exceed the timing requirements by 3 to 9 weeks. These alternatives have enough active forces to meet the IRF requirements and allow reserve forces to be

integrated at company or battalion level for following forces. Thus, they provide a degree of flexibility to the National Command Authority in terms of when reserve forces have to be activated to meet the time lines. In addition, alternatives with 2.5 active MEFs support current Marine Corps plans to integrate reserves at company or battalion level.

The 2.2/0.8 alternative (the DOD Base Force) meets the timing requirements for all contingencies except MRC IV (and, in the worst case, this alternative is two weeks late getting the DF to MRC II). This option provides little flexibility, however. At best, this alternative provides four weeks of flexibility for MRC III (considered by many to be the least likely contingency). For other contingencies, reserves would need to be activated early.

None of the alternatives with 2 or fewer active MEFs meet all the timing requirements for the decisive force in MRCs I, II, and III, or for initial response to the second contingency in MRC IV. All alternatives with 2 active MEFs do, however, meet the IRF requirements. Alternatives with 1.5 active MEFs cannot meet the IRF requirement for MRCs II and III.

Alternatives with a total force of 2.5 MEFs do not have sufficient forces to respond to MRCs III and IV.<sup>1</sup> These alternatives would have no ability to meet other commitments once their forces are deployed to any MRC.

## **PEACETIME PRESENCE**

Peacetime forward-presence and rotation capability are a function of active forces. The more active MEFs there are in an alternative, the more rotation capability that alternative has. All alternatives are capable of maintaining two forward-deployed MEUs. Then, as active force size increases, the ability to maintain additional forward-presence forces elsewhere increases proportionately.

## **SUSTAINABILITY**

Sustainability of reserve forces is defined as the predicted ability to maintain 30 percent prior service in the SMCR (for enlisted; under current Marine Corps

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1. These alternatives are 0.1 MEF short for MRC II, but we do not consider this a true shortage. We assumed that MEUs would not be absorbed in following MEBs for all MRCs except MRC IV; simply changing that assumption allows the 2.5-MEF alternatives to meet the requirements for MRC II.

policy, all officers are prior service). According to our qualitative estimates, the 2.5/1, 2.5/0.5, 2.2/0.8, and 2/0.5 alternatives should be able to maintain the desired level of prior-service Marines in the SMCR. Other alternatives may not be able to do so; if not, Marine Corps policy, particularly for officers, may have to be changed.

## **COSTS**

Transition costs depend on how large a difference exists between the current (FY 1993) force and the alternatives. Obviously, deactivating units is less expensive than activating them, so the alternatives with fewer forces generally have lower transition costs. This is not true in all cases, however. Alternatives with 1.5 MEFs in the SMCR require a large number of units to be activated in the reserves. Thus, even when large numbers of active forces are being deactivated (as in the 1.5/1.5 case), transferring many of those forces to the reserves results in large transition costs.

Steady-state costs depend on total force size and the active-reserve split. Alternative force structures with a higher proportion of reserve forces are generally the least expensive. In some cases, alternatives with more total forces cost less than smaller alternatives with a higher proportion of active-duty forces. For example, the 2/1.5 alternative has 0.5 MEF more in the total force than the 2.5/0.5 alternative, but the 2/1.5 alternative costs less because of its higher proportion of reserve forces.

## **CHOOSING AN ALTERNATIVE**

Which alternative force structure is best depends on the relative importance of these factors to the decision-maker. If the ability to respond to contingencies and have some forces left over for other commitments or to meet unexpected crises is important, the alternatives with 3.5 or 4 MEFs in the total force provide the best capability. Alternatives with 4 MEFs are generally the most expensive, and they are also the most risky in terms of reserve force sustainability. Alternatives with 3.5 MEFs provide a good compromise. They can respond to an MRC and still have at least a MEB left for all contingencies except option 1 of MRC IV. But even for MRC IV, the 3.5-MEF alternatives provide a degree of flexibility—to retain a Marine force to respond to some unforeseen crisis, option 2 of MRC IV can be executed. If responding to a crisis is less important than getting the largest force to the contingency, option 1 can be executed. Of the 3.5-MEF alternatives, 2.5/1 provides the fastest response capability and is the least risky in terms of reserve force sustainability.

If the ability to meet contingency requirements on time is important, the alternatives with 2.5 active MEFs are best. The 2.5/0.5 alternative is the least expensive of these, but it cannot execute option 1 of MRC IV. Also, after deploying forces to MRC III or IV, it has no forces to respond to other commitments. The 2.5/1 alternative has the same response times as the 2.5/0.5, and would have forces to meet other commitments after MRC response. The 2.2/0.8 option is next closest to meeting the timing requirements, but it provides less flexibility than the 2.5 active-MEF alternatives, and it cannot meet the timing requirements of MRC IV. If reserve activation is delayed even for a short time (the delay was about three weeks after the invasion in both the Korean and Persian Gulf Wars), the 2.2/0.8 alternative might not be able to respond on time to the other MRCs.

If meeting the IRF requirement is more important than delivering the DF on time, alternatives with 2 active MEFs can do so at less cost than alternatives with 2.5 or 2.2 active MEFs. For MRC IV, however, Marine forces are the IRFs to two concurrent contingencies. Alternatives with 2 active MEFs cannot deliver the IRF to the second contingency in time.

If the ability to maintain peacetime forward presence is important, which alternative is best depends on how much forward presence is needed in the future. Alternatives with 2.5 active MEFs can maintain the current levels. If a smaller presence is acceptable, alternatives with 2 active MEFs can maintain 2 or 3 MEUs plus limited presence elsewhere. If the future requirement is reduced to just 2 MEUs, alternatives with 1.5 active MEFs can do so.

If short-term transition costs are important, alternatives that are either close to the current structure or reduce both active and reserve forces are least expensive. The 2.5/0.5 alternative has the lowest transition cost, followed by the 2.2/0.8, 2.5/0.5, 2/1, 1.5/1, and 2.5/1 alternatives.

If long-term annual costs are important, alternatives with a larger proportion of reserve forces or smaller total force are least expensive. This is not surprising; generally, more capability costs more. The alternatives with a total of 2.5 MEFs are the least expensive, but they also have the least capability. They could only respond to MRC I or MRC II (but not on time), either of which would require the entire force.

Alternatives with a total of 3 MEFs have enough forces to respond to all MRCs except option 1 of MRC IV, at a price commensurate with their capability. The 1.5/1.5 alternative, which costs about \$1.6 billion less than the DOD Base Force, is the least expensive. This alternative is also the least capable of the 3-MEF

alternatives—it cannot meet the time lines for any MRC, and cannot meet even the IRF requirements for MRCs II and III. For about \$0.6 billion less than the Base Force, the 2/1 alternative can at least meet the IRF requirements (except that for the second contingency in MRC IV), but this alternative cannot meet the time lines for delivering the DF for any contingency except MRC III, and then only in the best case. The only 3-MEF alternative that can meet the time lines for all MRCs is the 2.5/0.5, which is the most expensive of the 3-MEF alternatives at about \$0.5 billion more than the Base Force.

For almost the same cost as the DOD Base Force (\$0.1 billion more), the 2/1.5 alternative offers a larger total force.<sup>1</sup> This alternative has the same shortfalls in meeting the DF time lines as the 2/1 alternative, however. Also, it is unlikely that this force could sustain the prior-service goal for the SMCR. The 2.5/1 alternative offers the same total force size, ability to respond to all MRCs on time (except option 1 of MRC IV), sustainability, and additional forces for crises or other commitments after deployment to an MRC. This additional capability costs about \$1 billion more than the Base Force.

The 4-MEF alternatives offer the largest total force of all. The 2/2 alternative is the least expensive of these, at \$0.6 billion more than the DOD Base Force. This alternative is basically a more unwieldy version of the 2/1.5 alternative—it costs more, it cannot meet DF force time lines, and it is even less likely to be able to sustain the 30 percent prior-service goal. The 2.5/1.5 alternative solves the DF timing shortfalls, may be able to sustain the prior-service goal, and has additional forces even after responding to option 1 of MRC IV. This alternative, however, is the most expensive of all, at \$1.7 billion more than the Base Force.

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1. Many Marines question the feasibility of building a 1.5-MEF SMCR, regardless of other considerations. They assert that it would be extremely difficult to recruit either the number of prior-service or non-prior-service personnel for such a force.

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