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THESIS

OPERATIONAL RESERVE: COSTS AND CONSIDERATIONS

by

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December 2017

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OPERATIONAL RESERVE: COSTS AND CONSIDERATIONS

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ABSTRACT

This research examines the costs and other considerations associated with the 2016 activation of approximately 200 U.S. Marine Corps Reserve personnel under 10 U.S. Code § 12304b. The goal of this research is to determine whether cost savings were generated by employing a Reserve Corps (RC) unit. This unit supported Special Purpose Marine Air Ground Task Force–South and was the first incidence of the Marine Corps’ use of the 12304b authority in a material way.

Findings include relevant RC costs at approximately 132% of those of a hypothetical equivalent AC unit. The primary contributor to increased RC costs was the approximately \$4.9M in pay and allowances required for RC members who were activated but not deployed. Secondary contributors of increased RC costs were \$2.9M in operations and maintenance travel costs, followed by \$364K in incremental RC costs.

This research provides three recommendations. First, the Deputy Commandant for Plans, Programs, and Operations (PP&O), as the 12304b program manager, should include all categories of RC-relevant costs during the operating forces program review, program evaluation board, and Program Objective Memorandum working group. Second, the Deputy Commandant for Manpower and Reserve Affairs (DC, M&RA), should monitor the totality of relevant monetary and non-monetary costs for any future RC units activated under 10 U.S. Code § 12304b and communicate these findings to key stakeholders such as Programs and Resources, PP&O, Marine Forces Command, and U.S. Marine Corps Forces Reserve. Finally, DC, M&RA should assess the benefits generated from RC units activated under 12304b authority and weigh these potential benefits against any additional RC unit costs.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	PURPOSE STATEMENT.....	2
B.	RESEARCH QUESTIONS.....	3
C.	METHODOLOGY	4
D.	THESIS OUTLINE.....	4
E.	CHALLENGES OF THE FUTURE	4
1.	Increasing and Rapidly Evolving Requirements	5
2.	Fiscal Constraints.....	6
F.	GLOBAL FORCE MANAGEMENT PROCESS.....	9
1.	Overview of the Global Force Management Process.....	9
2.	RC Sourcing Considerations.....	11
G.	SOURCES OF MANPOWER	16
1.	Active Component.....	16
2.	Reserve Component	18
H.	SCOPE OF RESEARCH	20
I.	SUMMARY	21
 II.	 LITERATURE REVIEW	 23
A.	INTRODUCTION.....	23
B.	HISTORY OF THE OPERATIONAL RESERVE CONCEPT	23
C.	COSTS: ELEMENTS AND METHODS.....	37
D.	SUMMARY	43
 III.	 RESEARCH METHOD	 47
A.	RESEARCH DESIGN	47
B.	DATA REQUEST AND PREPARATION	48
1.	Sources of Data.....	48
2.	Elements of Primary Data Sets.....	49
3.	Data Cleansing	50
C.	SUMMARY	51
 IV.	 DATA ANALYSIS	 53
A.	MILPERS UNIT DEPLOYMENT COSTS.....	53
B.	MILPERS UNIT ACTIVATION COSTS	54
C.	OMMC COSTS.....	55
D.	DWELL COSTS.....	58
E.	INCREMENTAL RC COSTS	60

F.	UNIT LIFE-CYCLE COST	61
G.	COMPARISON OF COSTS	62
1.	Total Relevant Costs Comparison	62
2.	BOG Costs Comparison	65
H.	SUMMARY	67
V.	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	69
A.	SUMMARY	69
B.	CONCLUSIONS AND RECOMMENDATIONS.....	71
1.	Research Question 1	72
2.	Research Question 2	73
3.	Research Question 3	76
C.	AREAS FOR FURTHER RESEARCH.....	77
APPENDIX A. MARINE CORPS RESERVE		79
APPENDIX B. 4TH MARDIV TABLE OF ORGANIZATION		81
APPENDIX C. COST COMPARISON APPROACHES.....		83
APPENDIX D. RUC NAMES.....		85
LIST OF REFERENCES		87
INITIAL DISTRIBUTION LIST		91

LIST OF FIGURES

Figure 1.	National Defense Outlays as a Percentage of GDP. Sources: Office of Management and Budget Historical, Table 8.4, and Congressional Budget Office (2017).	7
Figure 2.	Budget Uncertainty over Time; Department of Defense (DOD) Base Budget in Then-Year Billions of Dollars. Source: National Commission on the Future of the Army (2016).	8
Figure 3.	SECDEF Force Allocation Process. Source: U.S. Joint Forces Command (2010).	10
Figure 4.	Optimal RC Activation Timeline. Source: U.S. Marine Corps (2015b).	11
Figure 5.	Funding Associated with the RC Activation Timeline. Adapted from MARFORCOM (2014).	16
Figure 6.	Notional Structure of Marine Forces Reserve. Adapted from Marine Corps Reference Publication (MCRP) 5-12D (2016).	19
Figure 7.	Reserve Component Contributions, Fiscal Years 1986–2007. Source: Winkler et al. (2008).	25
Figure 8.	Cost Elements. Source: Shanck et al. (2011).	38
Figure 9.	Marine Corps Reserve. Source: S. J. Norton, personal communication, September 27, 2017.	79
Figure 10.	Notional Structure of 4th Marine Division. Adapted from MCRP 5-12D (2016).	81
Figure 11.	Overall Cost of the Reserve Components, FY 2005. Source: Winkler and Bicksler, 2008, p. 177.	83
Figure 12.	RC Costs Including Supplemental Funding, FY 2005. Source: Winkler & Bicksler, 2008, p. 177.	83
Figure 13.	Individual Member Cost Comparison—Active versus Reserve Components. Source: Winkler & Bicksler, 2008, p. 179.	84
Figure 14.	Cost of RC Members Per Day of Duty. Source: Winkler & Bicksler, 2008, p. 181.	84
Figure 15.	RUC Names.	85

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LIST OF TABLES

Table 1.	BCA Limits on National Defense Discretionary Budget Authority. Source: Williams (2017).....	7
Table 2.	RC Mobilization Authorities and Their Uses. Source: Department of Defense (2016).....	12
Table 3.	Cost Models. Source: Cox (2013).....	41
Table 4.	Summary of Cost Elements. Source: Horowitz et al. (2015).....	43
Table 5.	MILPERS Unit Deployment Costs.....	54
Table 6.	MILPERS Unit Activation Costs.....	55
Table 7.	OMMC Costs	56
Table 8.	Adjusted OMMC Costs.....	57
Table 9.	RUC States.....	58
Table 10.	Dwell Drill Costs	59
Table 11.	Dwell AT Costs.....	59
Table 12.	Incremental RC Costs	61
Table 13.	Unit Life-Cycle Cost.....	62
Table 14.	Estimated Pay and Allowance Cost of Theoretical AC Unit Supporting SPMAGTF-S 16.2.....	64
Table 15.	RC and AC Cost Comparison	65
Table 16.	RC and AC Cost per Day Comparison	66

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LIST OF ACRONYMS AND ABBREVIATIONS

AC	active component
ADOS	active duty operational support
ADTC	active duty type code
AOR	area of responsibility
ASD (RA)	Assistant Secretary of Defense for Reserve Affairs
AT	annual training
BCA	budget control act
BOG	boots on ground
CAC	cost accounting code
CAPE	Cost Assessment and Program Evaluation
CBO	Congressional Budget Office
CCDR	Combatant Commanders
CD/CNT	counter drug/counter narcotics training
CMC	Commandant of the Marine Corps
CNGR	Commission on the National Guard and Reserves
COCOM	combatant command
COMMARFORCOM	Commander, Marine Forces Command
COMMARFORRES	Commander, Marine Forces Reserve
CONUS	continental United States
D2D	deployment-to-dwell
DC	Deputy Commandant
DFAS	Defense Finance and Accounting Service
DOD	Department of Defense
DON	Department of Navy
DTC	document type code
FY	fiscal year
GDP	gross domestic product
GFC	gaining force command
GFM	global force management process
HTC	home training center

ILOC	intermediate location
M&RA	Manpower and Reserve Affairs
MARDIV	Marine Division
MARFORCOM	Marine Forces Command
MCRP	Marine Corps reference publication
MILPERS	military personnel
MPMC	Military Personnel, Marine Corps
MROWS	Marine Reserve Order Writing System
NDAA	National Defense Authorization Act
O&M	Operations and Maintenance
PME	professional military education
POE	point of embarkation
PP&O	Plans, Policies, and Operations
PTP	pre-deployment training program
QDR	Quadrennial Defense Review
RA	Reserve Affairs
RC	Reserve Component
RPA	retirement pay accrual
RPMC	Reserve Personnel, Marine Corps
RUC	reserve unit code
SC	security cooperation
SDN	standard document number
SDOB	SECDEF orders book
SECDEF	Secretary of Defense
SELRES	selected reserve
SIC	special identification code
SMARTS	SABRS Management Analysis Retrieval Tools System
SMCR	Selected Marine Corps Reserve
SPMAGTF-S	Special Purpose Marine Air-Ground Task Force-South
TFDW	Total Force Data Warehouse
UDP	unit deployment program
USD (P&R)	Under Secretary for Defense for Personnel Readiness

USD (P)	Under Secretary for Defense for Policy
USMCR	United States Marine Corps Reserve
VCJCS	Vice Chairman of the Joint Chiefs of Staff
VMGR	Marine aerial refueler transport squadron

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I. INTRODUCTION

Since 9/11, the U.S. military services have increasingly utilized the Reserve Component (RC) in operational roles (Wormuth, Flournoy, Henry, & Murdock, 2006). Initially, Congressional authority to mobilize an RC unit was limited to war, national emergency, or disaster response. However, in 2012, the National Defense Authorization Act (NDAA) authorized service secretaries to involuntarily activate Selected Reserve (SELRES) units other than during times of war or national emergency to support “preplanned missions” in support of Combatant Commanders (COCOM) (National Defense Authorization Act (NDAA), 2012). In 2016, four years following the addition of § 12304b into 10 U.S. Code, the Marine Corps budgeted military personnel (MILPERS) and operations and maintenance (O&M) resources to fund RC units supporting preplanned missions in Southern Command (SOUTHCOM) (Department of the Navy [DON], 2015a, 2015b). Specifically, these RC units supported a Special Purpose Marine Air Ground Task Force (SPMAGTF), henceforth referred to as SPMAGTF-S 16.2. This RC mobilization was the first incidence of the Marine Corps using RC units in an operational role to support a preplanned COCOM mission in a material¹ way.²

The intent of our research is to analyze the empirical data generated from the RC units activated in support of SPMAGTF-S 16.2 and compare these values against a hypothetical equivalent active component (AC) unit consisting of the same grade and military occupational specialty (MOS) mix of the RC units that supported SPMAGTF-S 16.2. We intend to quantify the cost savings generated, if any, and to discuss the implications our findings may have on the future of the Operational Reserve concept. Ultimately, we seek to determine whether empirical data supports future utilization of the RC for operational requirements based upon cost savings generated.

¹ The U.S. Marine Corps (USMC) used 12304b authority for the first time in fiscal year (FY) 2015; however, it was only for a few Marines (22 personnel) supporting counter-drug/counter-narcotics training (CD/CNT) requirements (DON, 2015a). Thus, 2016 was the first year in which this authority was used to activate a “material” amount of USMCR personnel to support preplanned missions in support of COCOMs.

² Previous to this event, RC units were used in operational roles; however, those roles were a result of requirements generated by war, national emergency, or disaster response, rather than preplanned missions in support of COCOMs.

Our hypothesis is that, while cost savings may be realized, these savings may not be as significant as one might first assume. Travel costs associated with transporting the RC unit from their home station to an Intermediate Location (ILOC) and gaining force command (GFC), travel back to home station after mobilization, additional training requirements that were undertaken to prepare the unit for mobilization, and a more senior RC force, are just some of the areas that may contribute to fewer cost savings than initially expected.

This chapter also examines the two major challenges the Marine Corps faces that highlight the need for continued research into optimizing the capacity and capabilities of the Total Force (active and reserve component forces) for greater cost-effectiveness. Part of this discussion focuses on the effect of how global security requirements, as identified by Combatant Commanders (CCDRs), are sourced with manpower from the Total Force. This process is referred to as the Global Force Management (GFM) process. Within this GFM section, we also provide a brief overview on how RC manpower is resourced, should it be allocated to support a CCDR requirement. In section G, we provide details of the manpower capacity resident within the active and reserve components of the Marine Corps. We discuss end strength levels, briefly address organizational structure, and highlight policy constraints that limit the availability of manpower for allocation against CCDR requirements. Lastly, we discuss the scope of our research.

A. PURPOSE STATEMENT

The purpose of our research is to contribute to the ongoing effort at determining how to optimize the value of the Total Force. While optimizing the value of the Total Force requires weighing of the costs and benefits of AC/RC employment, our research focuses solely upon comparing the costs of RC employment in support of SPMAGTF-S 16.2 with those of a hypothetical equivalent AC unit. We seek to determine whether using the RC for this COCOM requirement generated cost savings for the service. Furthermore, we intend to explore the implications that our findings might have upon future RC employment in operational roles.

While our research is limited to a cost analysis, it is clear that any effort at optimizing the Total Force would also require a quantitative comparison of the benefits generated by any given AC/RC force mix. Our research considers only one aspect (costs) of the AC/RC force mix decision. Any decision regarding future RC employment for operational requirements should also be informed by a thorough understanding of the benefits generated from any given force mix. It is possible, if not likely, that there may be cases where a costlier force³ will provide greater overall value to national defense. The limits of our research prevent us from making any ultimate recommendations regarding optimal AC/RC utilization.

B. RESEARCH QUESTIONS

Our research addresses the following questions:

1. When RC units were operationalized in FY16 for an SPMAGTF in SOUTHCOM, were cost savings generated when compared to using a hypothetical AC unit for the same mission?
2. What incremental RC costs (beyond the requirement of 48 drills and two weeks of annual training (AT) requirements) were incurred and what appropriations funded these incremental costs, e.g., reserve personnel, Marine Corps (RPMC) for additional drills, extended or additional AT days, additional days of active duty training, operations and maintenance, Marine Corps (OMMC) for travel to and from the home training center (HTC) to the ILOC, etc.?
3. Based upon the cost savings generated, if any, what implications does this have for the USMCR serving in an operational role in the future? Is using the RC in an operational role a viable alternative to sourcing COCOM requirements?

By answering these questions, we assess any cost savings that might be realized from expanding the role of RC units used for preplanned operational requirements, provide a detailed empirical analysis of the relevant costs between AC and RC units used operationally, and assess the implications that the results might have on the future role of RC units used for preplanned COCOM requirements.

³ As compared to an equivalent AC or RC counterpart

C. METHODOLOGY

We conduct a literature review to gain an understanding of the evolution of the Operational Reserve concept, and the resource factors and cost elements that are relevant in activating an RC unit to support preplanned COCOM missions. Once we have a general understanding of the evolution of the Operational Reserve concept and associated relevant costs, we gather quantitative data from Reserve Affairs (RA). This data includes relevant costs for the RC unit that supported SPMAGT-S 16.2. This data also includes costs of a hypothetical equivalent AC unit assigned the same mission. We compare the costs of the RC and AC units, and generate the results. We then explore additional non-cost related considerations of employing the RC in an operational role and discuss the implications that our findings might have upon the future of the Operational Reserve concept.

D. THESIS OUTLINE

Chapter I highlights the purpose of our study, includes our research questions, our methodology, provides background to our research, and concludes with a brief summary. Chapter II presents a review of literature related to the Operational Reserve concept. This chapter consists of a section that discusses the history of the Operational Reserve concept and a section that discusses the elements and methods related to comparing costs of AC and RC units. Chapter III discusses our research design and data collection methodology. Chapter IV is a detailed analysis of the data we collected. This chapter also includes a comparison of RC and AC costs. Chapter V summarizes, concludes, and makes recommendations.

E. CHALLENGES OF THE FUTURE

Although the future global security environment remains uncertain, research suggests that the Marine Corps will likely be faced with sourcing greater future CCDR requirements that change with an ever-increasing frequency, all while operating under fiscal constraints. As of February 2016, “the DoN remained challenged to meet CCDR demands for forces and associated higher-than-planned operational tempo over the last

decade while dealing with constrained funding levels” (Office of the Under Secretary of Defense (Comptroller) [OUSD(C)], 2016, pp. 8–13).

In 2016 testimony to the Senate Armed Services Committee, the Commandant of the Marine Corps (CMC), Gen. Robert B. Neller, highlighted how the combination of multi-dimensional threats and constrained resources has forced the Marine Corps to make tough choices regarding resource allocation. He stated:

Multi-dimensional security threats challenge all aspects of our national power and security. The evolution and expansion of the information domain, advanced robotics, and improved weapons technologies are causing threats to emerge with increased speed and lethality. While your Marines and Sailors have been and remain operationally committed in the current fight, our enemies and potential adversaries have not stood idle. They have developed new capabilities which now equal, or in some cases exceed, our own. This unstable and increasingly dangerous world situation is further complicated by a constrained resource environment from which we must continue current operations, reset our equipment, maintain our warfighting readiness, and modernize the force. We continue to make tough choices and balance our available resources to meet current operational commitments and, at the same time, achieve tomorrow’s readiness. (*Readiness and Modernization challenges*, 2016)

To successfully limit the risk associated with these two challenges, our research explores RC manpower sourcing as a possible option to address these challenges.

1. Increasing and Rapidly Evolving Requirements

Schehl (2016) highlights that, despite the curtailing of operations in Iraq and Afghanistan, the operational tempo for the Marine Corps has not decreased. In recent testimony to the Senate Armed Services Committee, CMC confirmed this by stating that the Marine Corps was as committed in 2016 as they were during the height of operations in Iraq and Afghanistan (*Readiness and Modernization challenges*, 2016). Russian and Chinese advances, the continued threat of the Islamic State of Iraq and Syria (ISIS), CCDR demand for crisis response forces, theater security requirements, and other challenges all continue to consume much of the Marine Corps’ manpower capacity.

“The United States continues to face a rapidly changing security environment, as warfare evolves across all domains” (OUSD(C), 2016, p. 2-2). Many of these threats

require different unit and individual capabilities than have historically been maintained within the manpower inventory. Schehl (2016) highlights drone operators, cyber and electronic warfare specialists, and other high-tech specialties as capabilities that will be needed to address future threats. As technological advancement grows at an ever-increasing rate, and the threats evolve in response, it is likely that the unit and individual capabilities required to address these threats will need to be rapidly adjusted.

2. Fiscal Constraints

The Budget Control Act (BCA) of 2011, enacted on August 2, 2011, was an effort to reduce the budget deficit by \$2.1 trillion over the period of fiscal years (FY) 2012–2021. Of the \$2.1 trillion, the BCA established limits on discretionary spending (including defense) to achieve \$1.0 trillion in savings during that period. The mechanism used to enforce these limits is known as sequestration. Sequestration “provides for the automatic cancellation of previously enacted spending to reduce discretionary spending to the limits specified in the BCA” (Williams, 2017, p. 1). As a result of the BCA, Federal outlays devoted to defense programs as a percent of Gross Domestic Product (GDP) have fallen each year since the BCA was enacted (Williams, 2017). Figure 1 highlights this decline.

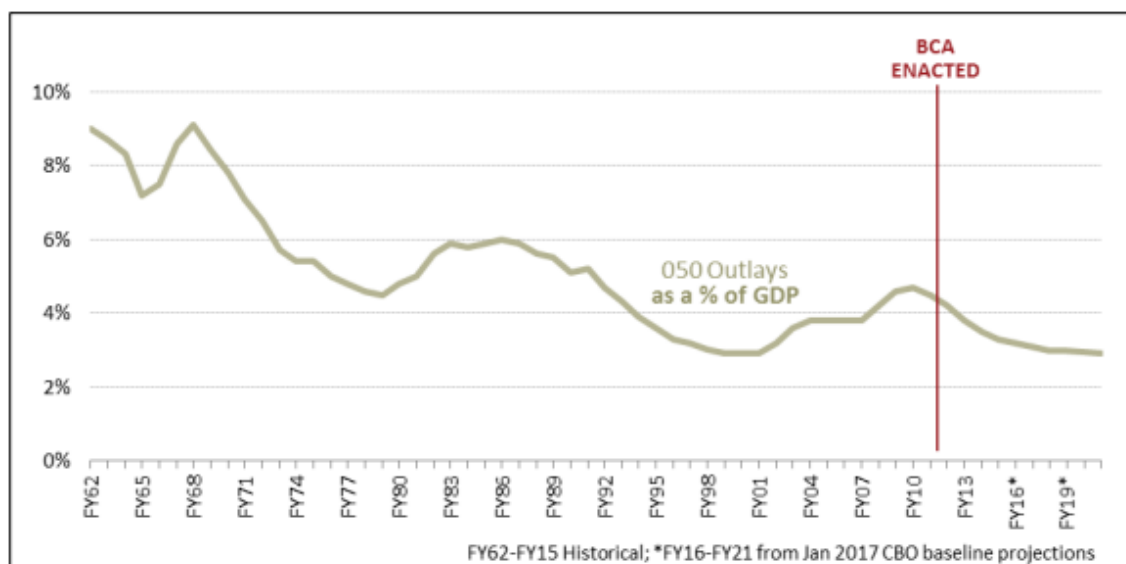


Figure 1. National Defense Outlays as a Percentage of GDP. Sources: Office of Management and Budget Historical, Table 8.4, and Congressional Budget Office (2017).

The BCA has been amended numerous times since enactment in 2011. Table 1 depicts the limits on National Defense Budget Authority following each amendment.

Table 1. BCA Limits on National Defense Discretionary Budget Authority.
Source: Williams (2017).

	billions of then-year dollars									
National Defense (050)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Budget Control Act of 2011	555	546	556	566	577	590	603	616	630	644
Budget Control Act of 2011 after revision (sequestration)	555	492	502	512	523	536	549	562	576	590
American Taxpayer Relief Act of 2012	555	518*	498*	512	523	536	549	562	576	590
Bipartisan Budget Act of 2013	555	518	520*	521*	523	536	549	562	576	590
Bipartisan Budget Act of 2015	555	518	520	521	548*	551*	549	562	576	590

***[Bold-italics]** indicates a statutory change was made to the original BCA limits.

As is evident in Table 1, there appears to be clear downward pressure on defense spending. This downward pressure has created a significant gap in previous estimates of future defense spending (estimates made prior to the BCA), and the limits established by the BCA and subsequent amendments. The gaps are highlighted in Figure 2.

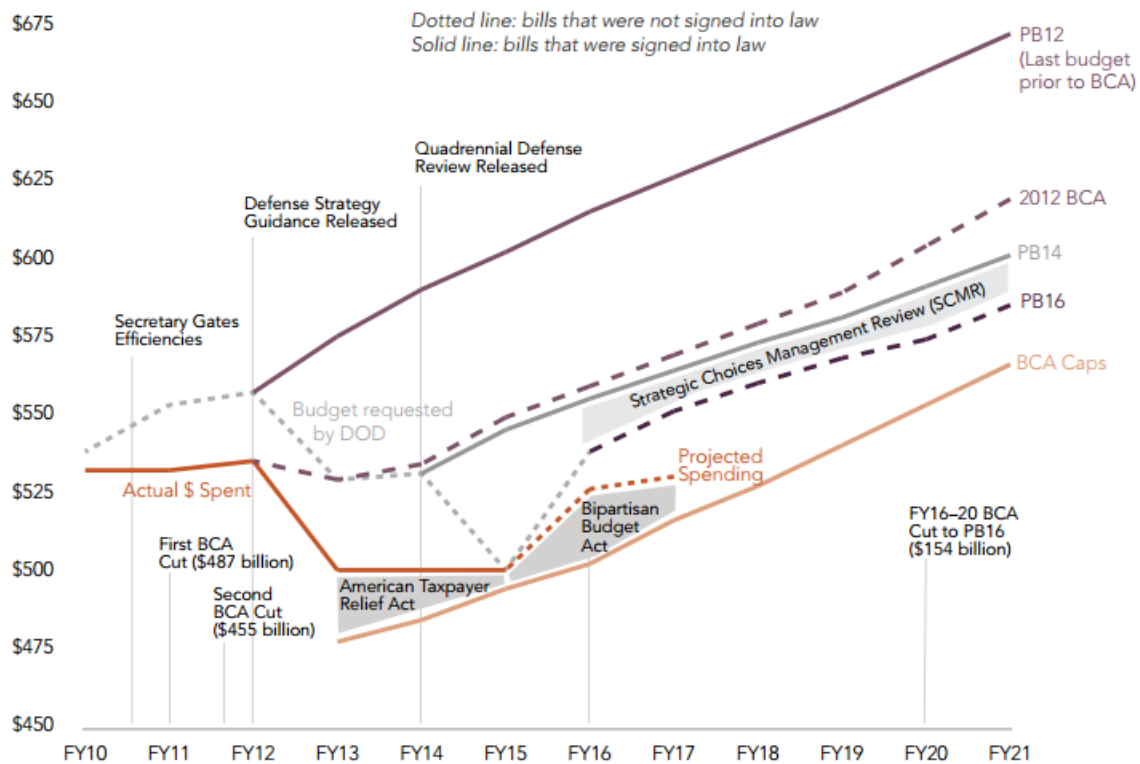


Figure 2. Budget Uncertainty over Time; Department of Defense (DOD) Base Budget in Then-Year Billions of Dollars. Source: National Commission on the Future of the Army (2016).

Looking beyond FY 2021, continued fiscal constraints appear likely. The Congressional Budget Office (CBO) projects that “discretionary spending (including defense) will drop from 6.3 percent of GDP in 2017 to 5.3 percent in 2027—a smaller percentage relative to the size of the economy than in any year since 1962” (CBO, 2017, p. 3). Without a substantive shift in the fiscal outlook for U.S. defense spending, it is likely the armed services, including the Marine Corps, will either be forced to find new and inventive ways to find cost efficiencies or face difficult resource priority decisions

regarding end strength, readiness, and investments. Our research explores whether using the RC for operational missions generates cost efficiencies.

F. GLOBAL FORCE MANAGEMENT PROCESS

This section provides a brief overview of the process used by the Marine Corps to allocate manpower to CCDR requirements. We highlight unique, RC-specific manpower sourcing considerations and discuss how certain aspects of RC manpower are resourced.

1. Overview of the Global Force Management Process

The Global Force Management Process (GFM) process, employed by the Secretary of Defense (SECDEF), is a process that is designed to align DOD forces with CCDR requirements. “Under the authority of the Secretary of the Navy (SECNAV), the Commandant of the Marine Corps (CMC) supports GFM by nominating available Marine Corps units, personnel, equipment, and other resources for employment via respective CCDRs” (U.S. Marine Corps, 2015b, p. 2). This process of analyzing CCDR requirements and subsequently assigning Marine forces to these requirements occurs quarterly at the Marine Corps Force Synchronization Conference held at Marine Forces Command (MARFORCOM). The conference facilitates “Service-wide coordination and alignment of force generation actions” (U.S. Marine Corps, 2015b, p. 2). Ultimately, once MARFORCOM develops the recommending sourcing solutions, these solutions are forwarded to Plans, Policies, and Operations (PP&O), who approve final recommendations on behalf of CMC. PP&O then submits these sourcing solutions to the Joint Staff for ultimate SECDEF approval (U.S. Marine Corps, 2015b, p. 8).

Sourcing a CCDR requirement involves four phases: requirement identification, requirement submission and validation, sourcing solution development, and sourcing solution approval and implementation (U.S. Marine Corps, 2015b, p. 5). The first phase of the process “involves determining the forces/capabilities required to carry out the mission or task” (U.S. Marine Corps, 2015b, p. 3-3). A critical step in the second phase involves “analyzing operating force capacity to source and sustain validated requirements while capturing institutional risks (i.e., readiness, BOG to dwell limitations, as well as

any manning or equipment considerations”⁴; U.S. Marine Corps, 2015b, p. 3-3). The third phase identifies the right force to meet a given requirement. The fourth phase involves securing approval of sourcing solutions at Service HQ and SECDEF level, and the subsequent release of orders/directives to these forces. Figure 3 depicts the Force Allocation Process.

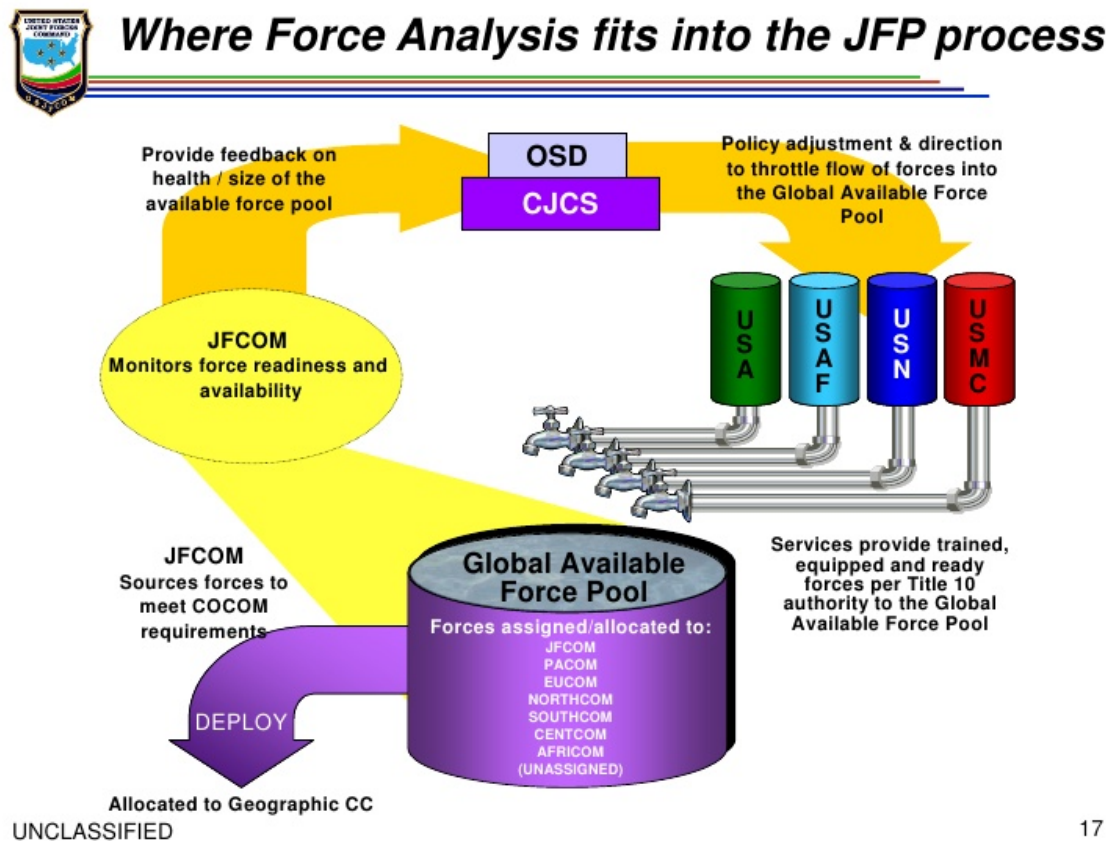


Figure 3. SECDEF Force Allocation Process. Source: U.S. Joint Forces Command (2010).

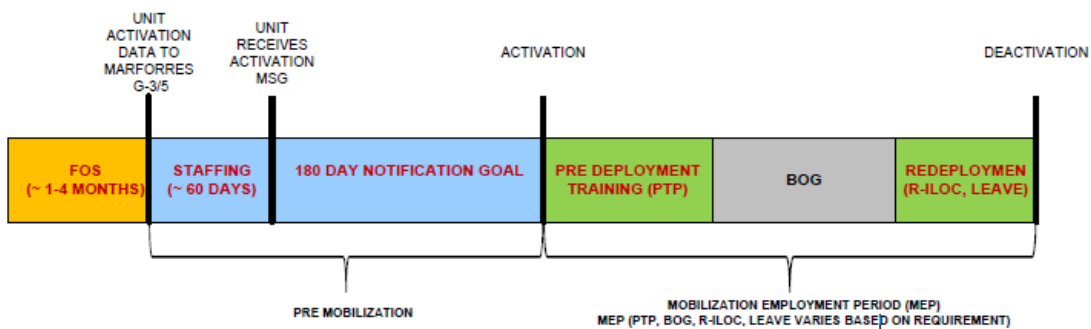
⁴ Boots-on-ground (BOG) to dwell limitations are limitations generated by the goal of keeping units in a dwell period following a deployment. For example, if an AC unit (1:2 D2D requirement) conducted a six-month deployment, it would essentially not be available for allocation to COCOM requirements for another year. This dwell requirement limits the number of available units available for allocation to a COCOM at a given time.

2. RC Sourcing Considerations

The RC has additional constraints and considerations when used to source CCDR requirements. In the following sections we discuss these elements and also provide background on RC funding.

a. RC Sourcing

Should RC units or individuals be identified as the “right force” during the aforementioned sourcing solution development phase, they are then activated and mobilized prior to deployment. Mobilization is defined as the process by which units or individuals are brought to a state of readiness. Part of this mobilization process includes activation; an order to active duty other than training. The optimal RC activation timeline is shown in Figure 4.



FOS = Feasibility of support, PTP = pre-deployment training program, BOG = boots on the ground, & R-ILOC = redeployment – intermediate location.

Figure 4. Optimal RC Activation Timeline. Source: U.S. Marine Corps (2015b).

This activation process varies based upon the type of reserve unit being used, the mobilization authority used, and resource availability. Table 2 captures the elements of different mobilization authorities. The column titled “Limits” highlights how mobilization authorities might impact an RC activation timeline.

Table 2. RC Mobilization Authorities and Their Uses. Source: Department of Defense (2016).

Statute	Utilization Process	Intended Use	Requirements
Involuntary			
Section 12301(a) of Reference (d) Full Mobilization	Congressional Declaration of War or National Emergency	Rapid expansion of Military Services to meet an external threat to national security	-No personnel limitation -Duration of war or national emergency plus 6 months -Applicable to all reservists (including inactive and retired)
Section 12302 of Reference (d) Partial Mobilization	Presidential Declaration of National Emergency	Manpower required to meet external threat to national security or domestic emergency	-Maximum 1,000,000 Ready Reservists on active duty -Not more than 24 consecutive months
Section 12304 of Reference (d) Presidential Selected Reserve Call-Up	President determines RC augmentation is required other than during war or national emergency	Augment the active forces for any named operational mission, or to provide assistance for responding to an emergency involving the use or threatened use of a weapon of mass destruction, or a terrorist attack or threatened terrorist attack in the United States that could result in significant loss of life or property	-Maximum 200,000 members of Selected Reserve/Individual Ready Reserve on active duty -May include up to 30,000 Individual Ready Reserve -Limited to 365 consecutive days active duty -Prohibited for support of federal government or a State during a domestic serious natural or man-made disaster, accident or catastrophe -Prohibited for use in repelling invasions; suppressing insurrections, rebellions, domestic violence, unlawful combinations, or conspiracies; or executing U.S. laws
Section 12304a of Reference (d) Reserve Emergency Call-Up	Secretary of Defense authority in response to Governor's request for federal assistance in accordance with section 5121 <i>et seq.</i> of Title 42, U.S.C. (Reference ~~42~~ (aa)); Presidential determination of major disaster or emergency required	Manpower required for response to a major disaster or emergency in the United States and its territories	-No personnel limitation -Limited to continuous period of not more than 120 days -Does not apply to National Guard or Coast Guard Reserve - Secretaries of the Military Departments may approve 12304a activations provided the orders are 30 days or less in duration
Section 12304b of Reference (d) Reserve Preplanned Call-Up	Secretary of Military Department authority to order any unit of the Selected Reserve to active duty for pre-planned and pre-budgeted missions	Augment AC for any preplanned missions in support of CCMD requirements	-Maximum 60,000 on active duty at any one time -Limited to 365 consecutive days -Manpower and costs are specifically included and identified in the submitted defense budget for anticipated demand -Budget information includes description of the mission and the anticipated length of time for involuntary order to active duty -Secretary invoking section 12304b of Reference (d) must submit to Congress a written report detailing circumstances of the call-up
Section 12301(b) of Reference (d) 15-Day Statute	Service Secretary authority to order to active duty without consent of persons affected	Annual training or operational mission	-15 days active duty once per year; Governor's consent required for National Guard
Voluntary			
Section 12301(d) of Reference (d)	An authority designated by a Service Secretary may order a RC member to active duty with consent of the member	Active duty in excess of annual training requirements. May be used for training, special work, operational support, etc.	-No set duration -Consent of the governor or other appropriate authority of the State concerned required for members of the National Guard

Our research focuses solely upon RC units that are mobilized under 10 U.S.C. § 12304b, referred to in Table 2 as the “Assured Access Authority.” This authority states, “When the Secretary of a military department determines that it is necessary to augment

active forces for a preplanned mission in support of a combatant command, the Secretary may, subject to subsection (b), order any unit of the Selected Reserve, without the consent of the members, to active duty for not more than 365 days” (NDAA, 2012, p. 99). Key limitations of this authority are:

(b) Limitations—

(1) Units may be ordered to active duty under this section only if—

(A) the manpower and associated costs of such active duty are specifically included and identified in the defense budget materials for the fiscal year or years in which such units are anticipated to be ordered to active duty; and

(B) the budget information on such costs includes a description of the mission for which such units are anticipated to be ordered to active duty and the anticipated length of time of the order of such units to active duty on an involuntary basis.

(2) Not more than 60,000 members of the reserve components of the armed forces may be on active duty under this section at any one time (NDAA, 2012).

As described by the U.S. Marine Corps (2015b), RC units activated under 12304b authority generally transition through six phases:

1. Pre-Activation. “Begins upon notification of a pending contingency operation other requirement in support of a CCDR. COMMARFORCOM [Commander, Marine Forces Command], as the coordinating authority for service GFM, consults with activities, and HQMC to provide the CMC with Total Force allocation recommendations. CMC directs allocated Selected Marine Corps Reserve (SMCR) units to activate. COMMARFORRES [Commander, Marine Forces Reserve] prepares SMCR units for activation. This phase ends when SMCR units report for activation at the Home Training Center (HTC)” (U.S. Marine Corps, 2015b, p. 6-5).
2. Activation and Movement. “Begins when SMCR unit reports for activation at the HTC. COMMARFORRES, in coordination with COMMARFORCOM, plans and directs the activation and movement of activated SMCR units to the ILOC. This phase ends when the SMCR unit(s) arrives at ILOC and COMMARFORRES relinquishes command, and COMMARFORCOM assumes command of activated SMCR units” (U.S. Marine Corps, 2015b, p. 6-5).

3. Force Integration and Pre-Deployment. “Begins when COMMARFORCOM assumes command of activated SMCR units. COMMARFORCOM will delegate or transfer responsibility for pre-deployment integration and training to a gaining force commander. When required, SMCR units integrate with GFC for training and/or deployment. This phase ends when units arrive at the POE [point of embarkation] integrated, organized, trained, equipped, and certified to accomplish their assigned mission” (U.S. Marine Corps, 2015b, p. 6-5).
4. Deployment and Employment. “This phase begins when units deploy from the POE to the supported CCDR’s AOR [area of responsibility] for employment. The supported CCDR assumes operational control (OPCON) of the activated SMCR unit. This phase ends when the activated SMCR unit redeploys” (U.S. Marine Corps, 2015b, p. 6-5).
5. Redeployment. “This phase begins when activated SMCR units departs an in-theater POE. The supported MARFOR is responsible for redeployment scheduling and movement coordination until the unit arrives at the Point of Debarkation. Upon return to CONUS [continental United States], the gaining force commander ensures processing and movement of the activated SMCR unit back to a Redeployment ILOC (R-ILOC), as required, and back to the HTC. This phase ends when the activated SMCR unit arrives at the HTC for deactivation” (U.S. Marine Corps, 2015b, p. 6-6).
6. Deactivation. “This phase begins when the activated SMCR unit returns to HTC. COMMARFORCOM relinquishes command and COMMARFORRES assumes command. COMMARFORRES conducts actions necessary to deactivate the unit and return them to a reserve duty status. This phase ends when units are returned to reserve duty status per published activation/deactivation orders” (U.S. Marine Corps, 2015b, p. 6-6).

b. RC Funding

Throughout this activation timeline, RC units are funded by different appropriations, and in some cases, different categories of funding within a specific appropriation. For example, the MILPERS funding for RC members within the pre-mobilization period (see Figure 4) is typically provided via the Reserve Personnel, Marine Corps (RPMC) appropriation. RPMC funds “pay, allowances, clothing, subsistence, gratuities, travel and related expenses for personnel” of the U.S. Marine Corps Reserve (USMCR) for events such as drills, annual training, and other reserve related training requirements (Department of Navy [DON], 2016c). Depending upon the

training requirements scheduled within a pre-mobilization period, RC members might be funded with drill pay, AT pay (to include extended or additional AT), or Active Duty Operational Support (ADOS) pay. Additionally, any MILPERS pay following post-mobilization is typically funded by the RPMC appropriation as well.

As an example, if a RC unit returned to the HTC following mobilization and was no longer on mobilization orders, yet still had requirements that needed to be completed as a result of the previous mobilization, these requirements would be funded with drill pay, AT pay, or ADOS pay. It is important to note that, regardless of the activity performed during these periods within the unit life cycle, the MILPERS cost is funded via the RPMC appropriation.

As the RC unit concludes the pre-mobilization period, there are costs associated with moving the unit to the ILOC and any follow-on location required to integrate the RC unit with the forces owned by the gaining force commander. These costs, as well as any costs associated with moving a unit back to the HTC post mobilization are funded via the Operations and Maintenance, Marine Corps (OMMC) budget. OMMC funding “supports travel and per diem costs associated with mobilization in support of the Marine Corps’ Future Force Posture Plan” (DON, 2015b).

While units are mobilized, their associated MILPERS costs are funded via the Military Personnel, Marine Corps (MPMC) appropriation. MPMC funds “pay, allowances, individual clothing, subsistence, interest on deposits, gratuities, permanent change of station travel, and expenses of temporary duty travel between permanent duty stations, for members of the Marine Corps on active duty (except members of the Reserve provided for elsewhere)” (DON, 2015a, p. 3). The activation timeline, along with the associated appropriations that fund MILPERS and travel costs is shown in Figure 5.

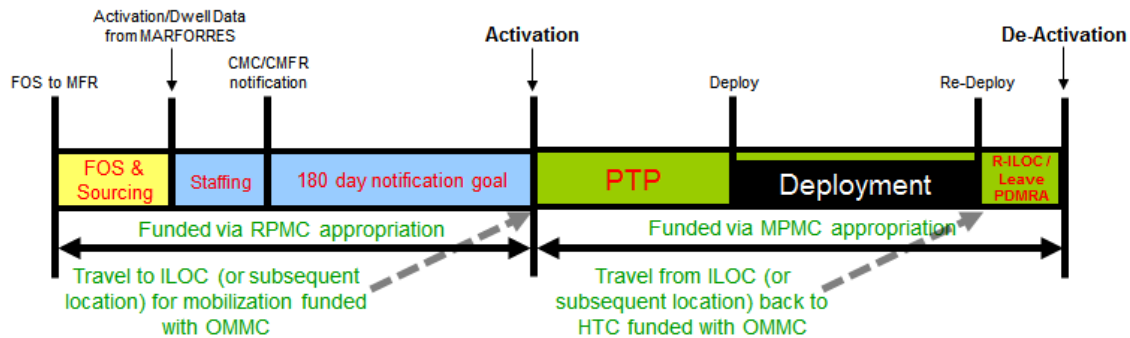


Figure 5. Funding Associated with the RC Activation Timeline. Adapted from MARFORCOM (2014).

G. SOURCES OF MANPOWER

This section discusses Marine Corps manpower capacity available for use against CCDR requirements. We first discuss active component capacity and constraints and then follow with a discussion of RC capacity and constraints.

1. Active Component

This section discusses the manpower capacity of the active component Marine Corps and highlights additional policy constraints that limit the availability of active component personnel to CCDRs.

a. AC Capacity

The 2016 NDAA authorized active duty Marine Corps end strength up to 184,000 personnel. In accordance with this authorization, the Marine Corps maintained an active component force of approximately 184,000 personnel, organized into units across a broad range of capabilities (i.e., combat arms, aviation, combat service support, or headquarters and support elements). While the size of the active component force changes based upon many factors, such as congressional authorization, funding availability, security threats, etc., it remains relatively fixed from year to year. Additionally, the structure of the active component force also remains relatively fixed from year to year. Although there are initiatives such as the Force Optimization Review Group that seek to adjust the structure

of the Marine Corps, these initiatives happen only infrequently. In general, the active component is a fixed source of manpower. Any given CCDR who requires USMC manpower to conduct a mission with active component forces is limited to the manpower availability within the 184,000 personnel force.

b. AC Constraints

Although active Marine manpower capacity available for use against CCDR requirements is approximately 184,000 Marines, CCDR's are constrained by the relatively finite availability of specific types of units. Not all 184,000 active Marines have the right skills to support a given CCDR requirement. Another capacity constraint is a result of policy that requires active units to reside in a non-deployed status for a specified period of time following a deployment. This constraint is referred to as the deployment-to-dwell constraint (D2D).

According to U.S. Marine Corps (2014), SECDEF's goal for active component units D2D is 1:2 or greater, while the threshold is 1:1. A 1:2 D2D ratio means that for every month a unit spends operationally deployed, the unit is required to have twice the amount of months in dwell. According to U.S. Marine Corps (2014), dwell is defined as "the period of time a unit or individual is not on an operational deployment...." As an example, a unit operationally deployed for six months would require 12 months in dwell to meet SECDEF's goal. This policy constraint limits the availability of forces available to a CCDR.

Cox (2013) discusses the boots-on-ground (BOG) calculation that is used to estimate the number of AC units required to maintain one AC unit in a deployed status. The calculation is as follows:

AC units required to maintain one unit forward = Cycle length (time deployed + time in dwell) / time deployed. (Cox, 2013, p. 26)

For example, using Cox's formula, if an active Marine unit deployed for six months and spent 12 months in dwell, the Marine Corps would have to have a rotation base of three units to maintain one unit availability for deployment ($3 = (6 + 12)/6$).

2. Reserve Component

This section discusses the manpower capacity of the reserve component Marine Corps and highlights additional policy constraints that limit the availability of RC personnel for employment by CCDRs. We also provide a primer on the “Operational Reserve” concept.

a. RC Capacity

In FY 2016, the USMC maintained an SMCR capacity of approximately 31,409 (DON, 2015c, p. 13). The SMCR is defined as “SelRes organized units consisting of drilling Reservists under MARFORRES belonging to the 4th Marine Division (4th MarDiv), 4th Marine Logistics Group (4th MLG), 4th Marine Aircraft Wing (4th MAW), and Force level units of MARFORRES” (U.S. Marine Corps Forces Reserve [MARFORRES], n.d.). Other members of the SELRES, e.g., individuals in the accessions pipeline, full-time support personnel, or members of the Individual Mobilization Augmentee program, would not be activated as units under the aforementioned 10 U.S. Code § 12304b authority. Although the 2016 NDAA authorized the Marine Corps a SELRES strength of 38,900, the capacity of the SMCR is the only capacity applicable to our research. Appendix A depicts the capacity of the Marine Corps Reserve.

b. RC Constraints

Like the manpower capacity constraints of the active component, the RC is similarly constrained by the relatively finite number of specific types of units. Figure 6 depicts the major types of units available within the RC. Further detail of a notional subordinate unit is depicted in Figure 10 within Appendix B.



Figure 6. Notional Structure of Marine Forces Reserve. Adapted from Marine Corps Reference Publication (MCRP) 5-12D (2016).

RC manpower capacity is also further constrained by mobilization-to-dwell requirements. According to U.S. Marine Corps (2014), SECDEF's goal for reserve component units' mobilization-to-dwell is 1:5 or greater, while the threshold is 1:4. A 1:5 mobilization-dwell ratio means for every month a unit spends mobilized the unit is required to have five times the number of months in dwell. As an example, an RC unit mobilized for one year would require five years in dwell to meet SECDEF's goal. This policy constraint limits the availability of RC forces available to a CCDR.

To estimate the number of RC units required to maintain one RC unit mobilized, we apply a modified version of Cox's reserve component BOG calculation. The resulting formula is:

$$\text{RC units required to maintain one mobilized RC unit} = \frac{\text{Cycle length (time mobilized + time in dwell)}}{\text{time mobilized}}$$

Applying this adjusted formula, the Marine Corps would have to have an RC unit rotation base of five units to support one unit mobilized ($5 = (12 + 48) / 12$).

c. Primer on the “Operational Reserve” Concept

Historically, the RC was considered a strategic asset and was typically not utilized for any type of routine operational requirements. In most cases, the RC was only operationalized during times of war. Wormuth et al. (2006) highlighted how this “strategic reserve” paradigm began to shift during peacekeeping missions of the 1990s, ultimately leading to steady reliance on the RC to source manpower requirements for operations in Iraq and Afghanistan. Our literature review in Chapter II discusses the evolution of this “operational reserve” concept in detail from 2007 until 2017.

H. SCOPE OF RESEARCH

Our research is limited to an analysis of the costs and considerations of RC units that were employed in an operational role in support of Special Purpose Marine Air Ground Task Force–South (SPMAGTF-S) 16.2 and comparing those costs and considerations to those of a hypothetical unit AC unit used for the same mission, of the same duration. It is pertinent to note that the Marine Corps first utilized the U.S. Code § 12304b authority in a material way in 2016 when it activated RC units in support of SPMAGTF-S 16.2.⁵ Although USMCR units were used in operational roles during previous operations in Iraq and Afghanistan, these missions were neither considered routine, preplanned CCDR missions, nor were they funded with baseline resources. These RC units were typically mobilized under U.S. Code § 12301 or 12302 authorities and funded with Overseas Contingency Operations funds.

Our research does not address considerations of increasing manpower beyond the aforementioned authorized end strengths of 184,000 for the active component Marine Corps and 38,900 for the SELRES; rather, we conduct our research within the scope of a fixed force composition (i.e., AC and RC end strength and structure are fixed). Any

⁵ The USMC used 12304b authority for the first time in FY15, however, it was only for a few Marines supporting CD/CNT requirements (DON, 2015, p. 12). 2016 was the first year in which this authority was used to activate a “material” amount of USMCR personnel.

decision to increase or decrease end strength levels, or adjust structure, would change the elements of relevant costs used in our analysis. For example, expanding manpower could result in increased cost of facilities, equipment, etc. Additionally, we do not address any missions other than SPMAGTF-S 16.2, as these missions would likely require different unit capabilities, have different RC mobilization periods, or require different levels of training requirements during the pre-mobilization and post-mobilization periods. Many of these aspects are cost drivers.

Lastly, the scope of our research is limited to an analysis of costs. We do not address the performance of the unit performing the mission. Although an analysis of unit performance is an important factor in decisions regarding sourcing CCCR requirements, we do not address this element due to time constraints and lack of availability of quantitative, standardized performance metrics for the mission.

I. SUMMARY

Research suggests that the United States will face a future security environment in which capability requirements change with ever-increasing frequency. It is also likely that the United States will be forced to meet the threats of this environment while operating under increasing fiscal constraints. To best prepare to meet these challenges, it is imperative that the services optimize the use of Total Force. Force utilization decisions that maximize benefits while minimizing costs is a way in which the nation might better prepare for these coming challenges.

As the services begin to expand the operational role of the RC within the Total Force through the congressional authorization provided in 10 U.S. Code § 12304b, it is important to analyze the data generated by the Marine Corps' first "material" use of this authority to determine the implications that this might ultimately have upon future use of the RC in operational roles, force mix decisions, or other areas tied to Total Force optimization. Our research analyzes the empirical data generated from the Marine Corps' first "material" use of RC units activated under 10 U.S. Code § 12304b and seeks to understand any implications of these findings for the RC and for the Total Force.

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II. LITERATURE REVIEW

A. INTRODUCTION

This literature review consists of three sections. The first section examines the evolution of the operational reserve concept. The intent of this section is to provide the reader with a historical context of the operational reserve concept, highlighting some of the key developments along the way. The second section discusses elements of cost and costing methods that have been used to conduct cost comparisons between AC and RC units. The intent of this section is to introduce the reader to the magnitude of different costs that could be considered in analysis, as well as to introduce the complexity generated through the use of different models that, in certain cases, produce conflicting and counterintuitive results.

In the first section, we begin with the Beyond Goldwater-Nichols Phase III report, titled “The Future of the National Guard and Reserves,” a report that highlights findings and recommendations that would facilitate RC transition into increasing operational roles. We conclude the first section with elements of the FY 2016 and FY 2017 Marine Corps’ Military Personnel, Marine Corps (MPMC) budget justification book, which briefly describes USMC operational reserve missions. It also provides subsequent estimates of MILPERS funding required to support these missions. Our second section examines cost factors. We examine cost elements as well as different models used to compare the costs of AC and RC elements. Lastly, for our third section, we conclude our literature review with highlights and major themes, we suggest why our research is needed, and we explain how our study will contribute to the ongoing operational reserve discussion.

B. HISTORY OF THE OPERATIONAL RESERVE CONCEPT

Wormuth et al. (2006) highlighted the evolution of the Reserves from a “strategic reserve” during World War II, to an increasingly utilized “operational reserve” that began during peacekeeping missions of the 1990s, growing exponentially following the attacks of 9/11. The purpose of the study was to provide recommendations to the Department of

Defense to help shape the future RC—a future where an “operational reserve” was required. The study made more than 40 findings and recommendations. Key findings and recommendations by Wormuth et al. (2006) were:

- “Demand for U.S. military forces in the future will remain high” (p. 8).
- “Employing the RC as part of an operational force is mandatory, not a choice” (p. 9).
- DOD needs more flexibility to bring members on active duty and to access RC members more easily. To do this requires more flexible mobilization authorities.
- The U.S. military is facing resource pressures from cost growth in numerous areas. Rising costs of non-discretionary programs, natural disasters, operations in Iraq and Afghanistan, heightened security measures at home, and personnel are all key contributors.
- The study team did not have the resources or access to determine which set of forces (AC or RC) is most cost effective; however, they suggested that this type of information might help in ensuring the DOD derived the most value from the Total Force.
- “The D[O]D needs to propose a new set of mobilization authorities to Congress that would enable use of the RC as part of an operational force” (p. 63).

Winkler and Bicksler (2008) recognized the challenges and opportunities that arose as the RC shifted to a more operational role. They touched on a wide range of issues related to this transition. These issues can be categorized into three primary themes:

1. The RC must be structured so that it continues to attract and retain the nation’s best and brightest.
2. The RC must receive comparable training, equipment, and compensation to that of the AC.
3. The manpower management system must be flexible enough to “assign force components and individual personnel where they will perform best” (Winkler & Bicksler, 2008, p. ix).

Winkler and Bicksler (2008) highlighted the increasing reliance on the RC beginning in the mid-1980s. Figure 7 depicts the number of RC duty days per year from 1985 to 2007.

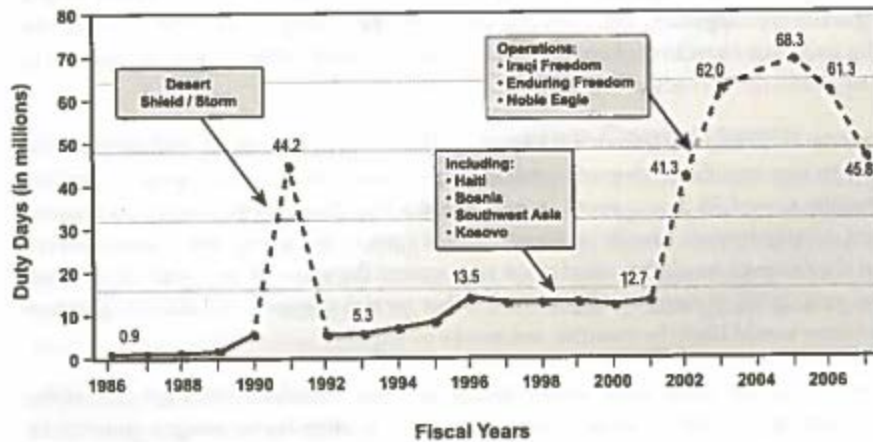


Figure 7. Reserve Component Contributions, Fiscal Years 1986–2007. Source: Winkler et al. (2008).

Winkler and Bicksler (2008) claimed that RC capabilities would continue to be needed in the future, even after the global war on terror was won. These authors highlighted that while changes have been made to force management procedures to better align with the RC operational evolution, those changes did not represent the fundamental change that was needed to transition to an RC force with both strategic and operational roles.

Other key conclusions from Winkler and Bicksler about use of the RC include the following:

- The military can improve total manpower utilization through use of the RC.
- Since 9/11, manpower requirements have changed with increasing frequency and have typically required personnel with occupational specialties that were not previously anticipated.
- “Statutes, policies, force design, and support infrastructure have not kept up with the transition of the RC from a strategic to an operational force. If the reserves are to sustain their new role and responsibility over the long term, reforms must continue” (Winkler and Bicksler, 2008, p. 25).
- Two actions are central in ensuring the services develop a sustainable framework to supply required manpower:

- Anticipating future operational demands will be elusive, requiring the services to maintain the capability to adjust their forces rapidly in response to the threat.
- Managers need more tools to conduct cost benefit analyses of force structures.

In its third and final report, titled *Transforming the National Guard and Reserves into a 21st-Century Operational Force*, the Commission on the National Guard and Reserves (CNGR) found that there was “indisputable and overwhelming evidence of the need for change” if the nation expects to continue employing the RC in an operational role. The CNGR provided six major conclusions and 95 recommendations for reform needed to transform the RC into a truly operational force. Pertinent elements of the six major conclusions were as follows:

- “The nation requires an operational reserve force.” Thus far, “Congress and DOD have not reformed the laws and policies governing the reserve components in ways that will sustain an operational force” (CNGR, 2008, p. 11).
- Current law and policy “do not adequately support an operational force. A new personnel management structure is needed” (CNGR, 2008, p. 18).
- Transforming the RC into a truly operational force will require further service integration, additional resources, new constructs for employing the RC, and new techniques for assessing readiness (CNGR, 2008, p. 27).
- To sustain an operational reserve over the long term, significant improvements are needed in programs that support service members, family members, and employers. Programs discussed involved service member compensation, service member protections, health care, family support, and compacts with employers (CNGR, 2008).
- “Major changes in DOD organization, RC categories, and culture are needed to ensure that management of RC and AC capabilities are integrated to maximize the effectiveness of the total force for both operational and strategic purposes” (CNGR, 2008, p. 45).

In October 2008, the DOD issued directive 1200.17, a directive that established an “overarching set of principles and policies to promote and support the management of the Reserve Component (RCs) as an operational force” (DOD, 2008, p. 1). The directive highlighted that the RC would provide both operational capabilities as well as strategic

depth to U.S. defense. It also directed AC and RC integration as a total force and directed that that utilization rules were implemented to govern frequency and duration of RC activations. Furthermore, the directive encouraged voluntary duty to meet mission requirements, rather than involuntary activation.

As part of the directive, responsibilities were assigned to DOD organizations. Key responsibilities assigned were the following:

- Under Secretary of Defense for Personnel Readiness (USD(P&R)) was directed to
 - “Ensure D[O]D policies support the planning, organization, and utilization of the RCs to provide operational capabilities and strategic depth across the full spectrum of conflict” (DOD, 2008, p. 3).
 - “Ensure that total force policies encourage optimum integration of AC and RC personnel to provide the most efficient training opportunities to all personnel, allow for shared use of resources, and provide the most operational benefits and mission capability” (DOD, 2008, p. 3).
- Assistant Secretary of Defense for Reserve Affairs (ASD(RA)) was directed to “develop policies for managing the RCs as an operational force, which is a necessity in an era of persistent conflict and global engagement” (DOD, 2008, p. 3).
- Under Secretary of Defense for Policy (USD(P)) was directed to “establish policies and to develop procedures to ensure that RCs have operational capabilities and strategic depth to meet U.S. defense requirements across the full spectrum of conflict” (DOD, 2008, p. 4).
- Secretaries of the military departments were directed to:
 - “Manage their respective RCs as an operational force such that the RCs provide operational capabilities while maintaining strategic depth to meet U.S. military requirements across the full spectrum of conflict” (DOD, 2008, p. 5).
 - “Ensure that the RCs participate across the full spectrum of missions at home and abroad in providing operational capabilities according to the national defense strategy, their Service force management plans, and operational requirements. To the extent practicable and consistent with the Services’ organizational constructs, ensure unit integrity is maintained, to include unit

leadership positions when RC units are utilized to fulfill operational requirements” (DOD, 2008, p. 5).

- “Ensure RC forces meet operational readiness requirements as identified by the President and the Secretary of Defense” (DOD, 2008, p. 5).
- “Ensure sufficient depth of RC unit and individual capabilities to meet established DOD force utilization goals” (DOD, 2008, p. 5).
- “Ensure force rebalancing is conducted on a continuing basis to adjust force structure and individual skill inventories to meet full spectrum operations while moderating excessive utilization of the total force. Such rebalancing shall result in a force mix that takes into account AC and RC capabilities and capacities” (DOD, 2008, p. 6).
- “Integrate AC and RC organizations to the greatest extent practicable, including the use of cross-component assignments, both AC to RC and RC to AC. Such assignments should be considered as career enhancing and not detrimental to a Service member’s career progression” (DOD, 2008, p. 6).
- “Align, to the extent practicable, force structure with established DOD goals for frequency and duration of utilization for unit and individuals” (DOD, 2008, p. 6).
- “Implement the continuum of service construct in ways that sustain the all-volunteer force and the willingness of individuals to serve” (DOD, 2008, p. 6).
- “Program and execute resources where required to support a ‘train-mobilize-deploy’ construct. Funds for training and equipment must be provided to coincide with the Services’ force planning cycle and enable an effective pre- and post-mobilization training and deployment process” (DOD, 2008, p. 7).
- “Accelerate modernization while balancing the need for restoring immediate readiness through recapitalization with the imperative to prepare for future conflicts with more advanced adversaries” (DOD, 2008, p. 7).
- “Ensure RC forces have been considered for sourcing Combatant Commands’ requests for forces” (DOD, 2008, p. 7).

Klerman (2008) examined how a changed threat environment, resulting in a subsequent increase in utilization of the RC, warranted rethinking many aspects of the

RC. He examined the “RC concept,” the level of commitment expected of its members, roles assigned, and compensation. While no specific recommendations were provided, some key observations applicable to our research are those given here:

- A critical component when comparing AC versus RC costs is frequency of use and rotation policy. Any cost computation should consider both “peacetime” and “wartime” costs (Klerman, 2008, p. XIV).
- Relative costs increase significantly when RC use involves operational rotation, thus decreasing the cost advantages realized when using the RC only in a strategic role.
- “Because reservists are part-time, they may be less capable than the AC” (Klerman, 2008, p. 14). However, in cases where a reservist's civilian skills are the same skills required within his or her respective military organization (i.e., law enforcement and military police, reservists may be more capable than their AC counterpart).
- Some evidence suggests that reservists perceive they are worse off when mobilized. To combat this, an alternative might be to increase mobilization compensation for reservists.
- Alternative RC models, e.g., Extended Reserves and Cadre, might be viable organizational changes that would generate cost savings.

Winkler (2010) discussed the evolution of the operational reserve, highlighting that recognition and acceptance of this new operational role did not come easily. He highlighted key developments in policy and practice that enabled the transition to an operational reserve, assessed the state of transition to an operational reserve as of 2010, and highlighted key areas where further improvement was needed.

Winkler (2010) highlighted eight key developments that enabled transition to an operational reserve. Four of the most pertinent key developments he identified are the following:

1. Recognition that the nation had entered a period of extended conflict that required operational contributions from the RC .
2. Promotion of integration between AC and RC forces to meet future missions.
3. Development of utilization rules that established deployment-to-dwell constraints.

4. Publication of DOD 1200.17, which established policy principles for managing the RC as an operational force. (Winkler, 2010)

Winkler highlighted that important steps remain to be taken to realize the vision of the operational reserve. He highlighted three key areas that should receive priority of effort.

1. Strategic planning should include considerations of RC operational employment. Incorporation of the operational reserve into strategic planning should facilitate RC reform.
2. Allocating adequate resources is needed to sustain the operational reserve.
3. Establishment of a framework that would allow service members to easily transition in and out of RC and AC units with limited constraints or restrictions is essential.

Nagl and Sharp (2010) suggested that the most significant issue hindering the transition of the RC component toward an integrated, operational force was a lack of clearly defined roles and missions for the RC. Without these clearly defined roles and missions, key decision makers lack the information needed to make resource allocation decisions for an operational RC. This lack of information minimized the chances that a stable operational reserve budget would be incorporated into future base budgets. Nagl and Sharp highlighted that many other nations throughout the world “now increasingly rely on their reserves as complementary, integral, and operational portions of their ‘total’ military force” (Nagl and Sharp, 2010, p. 23). Nagl and Sharp reviewed the 2010 Quadrennial Defense Review (QDR) estimates of future missions where RC capabilities would likely be applied operationally. They suggested that many of the required capabilities to conduct these missions were already resident within the RC. While the suggested missions were significant in number, particularly suitable missions for the operational RC involved irregular warfare, stabilization operations, building security capacity, and space and cyber missions. Nagl and Sharp stated that the RC “contains some of the best qualified people the United States has to offer” and that the RC must be part of the solution to complex threats of the future (Nagl and Sharp, 2010, p. 25). These authors went on to discuss some of the funding challenges associated with the operational reserve transition. They discuss how increased RC funding since 2001 has improved the

readiness of the RC, but they highlighted inadequate resources for unit-specific equipment as a significant shortfall that still needed to be addressed. A larger budgetary challenge addressed was the need for the services to ensure resources for the operational reserve were incorporated into the base budget, rather than Overseas Contingency Operations supplements. They summarized their research by highlighting three ways in which the DOD could best advance the Total Force objective:

1. Complete and disseminate a new RC roles and missions report that the QDR pledged to conduct.
2. Strengthen the commitment to the continuum of service concept.
3. Obtain an updated and independent analysis that compares cost and value of the AC and RC. (Nagl and Sharp, 2010)

In their report titled *Comprehensive Review of the Future Role of the Reserves*, The Office of the Vice Chairman of the Joint Chiefs of Staff (VCJCS) and the Office of Assistant Secretary of Defense for Reserve Affairs (ASD(RA)) (2011) explored ways to incorporate the 2010 QDR's RC objectives into the National Military Strategy. The report generated findings and recommendations in the areas of costs, RC use, RC roles, standards, Force rebalancing, and changes to law, policy, and doctrine. Some of the key findings and recommendations pertinent to our research were the following:

- Additional resources may be required to enhance the operational readiness of the RC.
- DOD needs to program use of the operational RC into base budgets.
- RC units used in an operational role are best suited for missions that follow a "predictable, operational schedule." "The RC is best employed for missions and tasks that are predictable, relatively consistent over time, and whose success can be substantially enabled by long-term personal and geographic relationships" (p. 33). The report highlighted that DOD's Global Force Management Process should consider RC forces for Theater Security Cooperation, building partner capacity activities, and any specialty missions that might require unique skills.
- Costing methodologies have typically given less consideration to overhead cost and life cycle costs. Refinement to these methodologies is necessary to incorporate long term costs, generate values that provide for comparison between services as well as between full-time and part-time personnel, and to better identify and allocate overhead costs equitably.

- RC units should be assigned recurring operational missions if they provide a cost-effective replacement for AC forces.
- Examples reviewed during the group's research suggested that rebalancing efforts between AC/RC mix could be expected to reduce costs of meeting operational and support needs of the services.
- To better provide for a trained and equipped RC, the DOD should consider providing RC units with the equipment and systems used during their operational assignment far in advance of the deployment. Early access to this equipment and systems is critical to unit and individual proficiency.
- A necessary revision to law would be to "revise Title 10, U.S. Code 12304 to enable responsive access to, and mobilization of, the Reserve Component to support force requirements in response to the national Security strategy to include activities such as Theater Security Cooperation Building Partner Capacity, and training and exercises." (p. 10)

Mann (2011) highlighted areas of improvement that were required to improve the effectiveness of USMCR infantry units used in an operational role. He further explored the types of missions that he considered to be well-suited USMCR infantry units used in an operational role.

Mann highlighted significant problems that were hindering the ability to employ RC units in an operational role. He suggested that the primary problems were inadequate RC infantry unit officer manning, inadequate training resources, and funding gaps. He stated that to ensure that Reserve units were Blocks 1 and 2 complete prior to mobilization, a significant increase in funding and training support would be required up to two years out from mobilization. Furthermore, he argued that early mobilization must be authorized for RC members who must attend training schools prior to mobilization. He also argued that more funding is needed for mobile training teams and contractor-provided training for those units within the operational pipeline. He proposed capturing these costs and programming them into a standard pre-mobilization PTP schedule to promote a predictable expectation of requirements, time commitments, and funding.

Mann proposed that the USMC should commit the resources to continue mobilizing at least one infantry battalion per year in support of operational commitments. This commitment would maintain the relevancy of the RC, inject recent operational

experience into the RC units, and ensure that regiments and division remain proficient at preparing and mobilizing battalions.

From an ideal mission aspect, he suggested that security cooperation missions or unit deployment programs might be the types of missions best suited for RC infantry battalions. He argued that these missions would either leverage the inherent strengths of these RC units or would best provide training opportunities to increase unit readiness.

Mason (2012) highlighted that the U.S. Marine Corps, being the full spectrum balanced force, provides a credible fighting capability in all application modes to offset any threats inland or abroad. He discussed how the USMCR is being employed as operational reserves instead of being used in a traditional, strategic role. In this study, Col. Mason briefly discussed the various risks and rewards associated with RC's transition to an operational role.

Risks:

- Unit Cohesiveness. Current standard training arrangements (four-year cycle) of RC only impart two weeks of annual training, coupled with a one weekend per month drilling requirement. This training does not prepare a Marine to take over the operational tasks required in a combat zone. Therefore, in order to minimize the risks associated with standard training, the RC unit and companies should be intermixed with AC units at lower levels, e.g., RC platoons assigned to AC companies. This arrangement puts the battalion headquarters of these distributed RC echelons in effective and whole effort in terms of time, and resources get wasted.
- Extended Period of Training. The extended training periods will definitely have severe effects on employer's commitment to hold the job until training periods ends. To enable an RC member to succeed in an operational reserve environment, a balanced and comprehensive doctrine has to be developed to protect RC Marine's employment in the civil sector.
- Compatible Professional Military Education (PME). At large, officers of RC have optional education milestones as compared to officers from AC who undergo progressive training and PME compatible with their rank and responsibility. This is a risk associated with RC transitioning into more pronounced and demanding operational role. Moreover, RC senior leadership that has been exposed and trained to only the Cold War Strategic Reserve concept are another risk in retooling and leading the operational reserve assignments without requisite formalized training.

- Degree of Authoritarian Leadership. Tactical level requires a fair degree of authoritarian leadership, which has to be displayed by senior leadership in time compressed situations, whereas, in an operational role it may be beyond the scope and capacity of RC leadership. Therefore, AC has to take a more definitive role to ensure appropriate preparedness and subsequent deployment of RC as operational reserve in the combat zone.

Additional Requirements. RC marines confront multiple challenges as compared to AC Marines. Time for annual training requirements, family issues coupled with civilian employment and deployment are a few of the factors that have direct impact on the RC Marine's ability to meet the operational reserve demand requirements.

1. Rewards. Optimal balance can be achieved through employment of the RC segment by augmenting and supplementing the AC forces throughout the period, regardless of engagement or duration of employment. RC forces can be utilized for Theater Security Cooperation, support, and enhancement missions in line with Unit Deployment Program (UDP). The reward of an operation reserve can be capitalized through a focused approach to change the doctrinal aspects as well as the change in legislative in order to protect the RC Marine's civilian employment.

Riggs (2012) suggested the organizational structure of MARFORRES and subordinate organizations, such as the reserve division and wing, only serve as impediments to truly realizing an operational reserve concept. He proposed eliminating command structure above the regimental/group level, placing all subordinate units under control of active Marine Expeditionary Forces and active Divisions, as a step towards realizing a truly operational force. He also recommended further research into Title 10 requirements and administrative requirements. He suggested organizational changes, coupled with changes to Title 10 and administrative requirements, might improve active component leadership's understanding of RC employment. AC leadership's understanding would improve because of improved AC/RC command relationships, increased integrated training, and stronger AC/RC working relationships.

Hill (2012) suggested that establishing any future role of the RC would require the DOD's full understanding of the long-term implications of maintaining an operational reserve. To accomplish this, he suggested the DOD undertake three tasks. First, he argued the DOD must clearly define the operational reserve because "the danger of directing an operational reserve without fully understanding what it means to be operational will lead

to unforeseen” negative consequences over the long term (Hill, 2012, p. 7). Second, he suggested the DOD needs to comprehend the true character of the RC. He states that the true nature of the RC is the part-time nature of service. This part-time nature includes three considerations: the RC is composed of citizen-soldiers, “reserves are generally more expensive than AC forces when mobilized, and reserves have limited opportunities for training” (Hill, 2012, p. 14). Third, he argued that compensation reform will likely be needed to sustain the operational reserve over the long term. Hill suggested that because many members of the RC perceived the conflicts in Iraq and Afghanistan as “just cause” efforts, there was a willingness to join the RC as well as a willingness for RC members to endure multiple mobilizations. In future operational reserve missions that might lack “just cause,” patriotism and willingness to serve may be lessened, and the DOD will be forced to increase compensation to maintain an adequate operational RC force. Of additional note pertinent to our research, Hill highlighted that the authority established under 10 U.S. Code § 12304b, and established in the 2012 NDAA, authorized the service secretaries to involuntarily activate SELRES for preplanned missions in support of COCOM requirements, but also specified that “not more than 60,000 members of the RC of the armed forces may be on active duty under this section at any one time.” The significance of the 60,000 member ceiling is that it “allows for nearly the same operational tempo that existed for the RC during the previous decade” (Hill, 2012, p. 11).

The 2014 QDR states, “Given the planned reductions to the uniformed force, changes to our force structure, and the Department’s strategic direction under fiscal constraints, the Department must continue to find efficiencies in its total force of active and reserve military, civilian personnel, and contracted support” (United States, 2014, p. 47).

Price (2014) highlighted that the services will likely face a future of increasing fiscal pressure. In response to this pressure, the services will likely be forced to explore ways to judiciously use their funding. He proposes, as part of this effort, the services examine organizational changes that more efficiently produce operational capacity. He explores a Hybrid Operational Reserve Concept as a means to increase operational capacity at reduced costs. His research estimated that this Hybrid Operational Reserve

Concept could generate potential annual Marine Corps manpower savings of \$262 million. As part of this concept, Reserve companies and squadron Individual Mobilization Augmentees would be involuntarily activated during peacetime under 10 U.S. Code 12304b.

The Marine Corps Operating Concept highlighted that future security challenges will impact how the Marine Corps (2016) organizes its force. The concept discusses steps that the Marine Corps will take to “design, develop, and field a future force.” Pertinent elements of this concept included the following:

- The Marine Corps “must be a tailorable, flexible, and versatile force capable of responding to any crisis across the full range of military operations (ROMO)” (p. 4).
- “The Marine Corps is willing to consider alternative methods for realizing necessary capabilities and capacities” (p. 10).
- The changes required in how the Marine Corps organizes, trains, equips, and sustains itself will require the Marine Corps to “come to terms with new missions, acquire, and master new capabilities, and evolve or create new organizations” (p. 10).
- The Marine Corps needs to better utilize the Total Force when sourcing requirements. As part of this effort, RC civilian skills should be considered when assigning RC forces to requirements.
- “We are in a fight for the best and brightest talent” (p. 9).

In FY 2016, the Marine Corp budgeted \$18.6M for activation of RC units that would support preplanned missions identified by Combatant Commanders (DON, 2015a). This funding was estimated to support 306 man-years. The preplanned missions identified within the MPMC budget book were an SPMAGTF and a Marine aerial refueler transport squadron (VMGR) detachment in support of Southern Command (SOUTHCOM), a VMGR and Intelligence (INTEL) detachment in support of Central Command (CENTCOM), and two civil affairs detachments.

In FY 2017, the Marine Corps budgeted \$17.1M for activation of RC units in support of preplanned COCOM missions. This funding was estimated to support 270 man-years. Missions identified were an SPMAGTF and a Security Cooperation Team in

support of SOUTHCOM, an Assault Amphibian Platoon for Unit Deployment Program (UDP), and a Civil Affairs Team (DON, 2016a).

C. COSTS: ELEMENTS AND METHODS

Schank, Bodilly, and Shanley (1990) developed a reference handbook that analysts could use to ensure adequate consideration for all appropriate categories of cost when considering changes to the AC/RC mix. The handbook was also an effort at ensuring analysts methods were “transparent, reproducible, and consistent across the Services...” (Schank et al., 1990, p. V). The authors highlighted six primary resource factors pertinent to active/reserve force mix decisions:

1. Changes in manning quantity
2. Changes in manning type
3. Changes in equipment quantity
4. Changes in equipment type
5. Changes in unit basing
6. Changes in unit operating tempo

Schank et al. provided a table that served as a useful planning tool for cost analysts. The table included pertinent elements of costs and depicted the interrelation of cost drivers and cost elements. The table is reproduced in Figure 8.

MAPPING RESOURCE CHANGES INTO THE COST ELEMENT STRUCTURE

Cost Element	Cost Driving (Resource) Factors ^a					
	Operating Tempo	Manning		Equipment		Basing
		Amount	Type	Amount	Type	
Nonrecurring costs						
Personnel acquisition		X	X			X
Personnel training ^b		X	X			X
Equipment procurement ^b				X	X	+
Construction ^b		+	+	+	+	+
Operating and Support costs						
Personnel						
Military pay and allowances ^b	+	X	X			+
Civilian pay and allowances ^b	+	X	X			+
Replacement acquisition and training ^b		X	X			X
Support-related costs	+	X	+	+	+	+
Equipment costs						
Air Force and Navy aviation units						
Petroleum, oil, lubricants (POL)	X		+	X	X	
Training munitions		X	X	X	X	
Maintenance material	X			X	X	
Replenishment spares	X			X	X	
Depot maintenance	X			X	X	
Replacement support equipment				X	X	
Modifications				X	X	
Other		+	+	+	+	
Navy ship units						
Petroleum, oil, lubricants (POL)	X		+		X	
Training munitions					X	
Repair parts					X	
Supplies		X	X		X	
Intermediate level maintenance			X		X	
Depot maintenance					X	
Utilities	X		+		X	
Army units						
Petroleum, oil, lubricants (POL)	X			X	X	
Training munitions		X	X	X	X	
Maintenance material	+			X	X	
Replenishment spares	+			X	X	
Depot maintenance	+			X	X	
Higher level maintenance	+		+	X	X	
Other	+	+	+	+	+	+

SOURCE: Data sheets in Secs. III & IV of this report.

NOTES:

X: Major cost driver required for the estimation of the cost element.

+: Potentially important cost driver, required for the estimation of the cost element in some cases.

Figure 8. Cost Elements. Source: Shanck et al. (2011).

Shanley (1993) filled a gap in previously developed AC/RC costing processes by “presenting a set of guidelines for fully defining force structure changes and for planning the execution of cost analyses involving force structure change” (Shanley, 1993, p. V). Shanley provided guidelines via a list of questions that were designed to extract critical information typically “missing from a vaguely worded force structure alternative” (Shanley, 1993, p. V). Shanley’s report provided a framework for thinking about different elements of costs that are applicable to force mix decisions. He argued that answering the aforementioned list of questions would assist analysts in establishing a fully defined problem.

Winkler and Bicksler (2008) highlighted various approaches that could be used to estimate the costs of the RC as compared to the AC. Appendix C includes the results of these different approaches. The authors noted that comparing the approaches is difficult because of the different variables and assumptions involved (Winkler and Bicksler, 2008, p. 184). They also highlighted that a simplistic view of the costs of reserves, i.e., looking at gross budget share, was longer applicable. Winkler and Bicksler stated “there is a direct relationship between the costs of reserves and how much they are used, and the intensity or tempo of their training” (Winkler and Bicksler, 2008, p. 184).

Cox (2013) highlighted the complexity involved in making AC/RC force allocation decisions. He examined different costing methodologies that were historically utilized to inform the AC/RC force mix allocation process. He also explored whether there were best practices for identifying the roles and missions to which the active and reserve components are best suited. Cox grouped costing methods into three primary “buckets”:

Strategic Reserve Model - This model is a simple approach that estimates costs of forces that act only as a strategic reserve. By strategic reserve, we mean that the force is not expected to contribute to operational activities. This method focused on the expenses of maintaining AC and RC billets, but did not consider the costs required to mobilize, train, deploy, and redeploy reserve forces (Cox, 2013). The strategic reserve model, used in numerous previous studies, suggests that the cost of a drilling RC strategic reserve unit is typically one-fourth to one-third that of a non-deployed AC unit.

Purely Operational Reserve Model - Three operational reserve costing models were developed between 2004 and 2008. The first model focused on lifetime costs of AC and RC members, while the second model was capable of comparing the costs of using the AC and RC on an operational basis. This second model is typically referred to as the “boots on ground” approach and is central to how some of the services calculate relative costs of AC/RC employment on an operational basis (Cox, 2013). The third model, developed by the Air Force and termed the “Total Force Enterprise Analytic Framework,” compares the costs of different levels of AC/RC blending at different deployment-to-dwell ratios. The limitations of the three models were that they focused

solely on the operational use of forces and ignored the value of the ongoing strategic capability that these forces provide.

Joint Modeling of the Strategic and Operational - Two models were developed that jointly estimated the net costs of the AC and RC in both operational and strategic contexts. The Institute for Defense Analysis (IDA) model, developed by Horowitz, was a significant improvement over the BOG model, as it allowed one to see the trade-space of budget, number of deployable units, size of forces, and proportion of AC in the force (Cox, 2013). The second model, developed by Cox, explored the application of dwell-time costs to strategic and operational capabilities. This model attempted to incorporate the strategic value of an RC unit that was also used in operational deployments. When viewed from this perspective, Cox highlighted that RC units may have a significant net cost advantage over AC units (Cox, 2013). He went further by claiming that under a wide range of circumstances, the RC provides a cost advantage when operational and strategic values are simultaneously incorporated. Table 3 identifies the most widely used cost models. The table also highlights the limitations of each costing model.

Table 3. Cost Models. Source: Cox (2013).

Type	Name	Application	Model complexity	Level of aggregation	Limitations	What data can be used?	Examples of use
Strategic	Traditional simple method	Comparison of costs: RC dwell and AC non-deployed	Simple	Highly aggregated, component level	Does not account for any costs associated with deployments (phased or full-surge deployments). Obscures variation in relative costs between capabilities, units. Using incomplete or inappropriate cost elements will bias estimates.	Any costs associated with maintenance of a nondeployed force (accrual, recurring short-term, or nonrecurring)	Occasionally used in theoretical discussions of component costs. Because estimates are made at a high level of aggregation, they are not of practical use in determining AC/RC force mix.
Strategic	Cost of Guard and Reserve approach	Comparison of costs: RC unit (e.g., BCT) in dwell vs. nondeployed AC unit	Complex: assumes detailed analysis of cost elements	Unit level	Does not account for costs associated with deployments (phased or full-surge deployments). Using incomplete or inappropriate cost elements will bias estimates.	Same as above	Widely used and effective in comparing the costs of AC and RC when used in strategic reserve
Operational	Cost of individual members	Comparison of costs per deployment: RC individual vs. AC individual	Simple	Individual	Does not account for strategic value of RC, for cost of larger rotational base required when RC supports sustained operations, or for variation across units in O&M and equipment costs	Any costs associated with maintenance of units in dwell and on deployment. May be accrual, recurring short-term, or nonrecurring.	Notable as an early attempt to capture costs of using RC in operations. Superseded by Boots-on-Ground model.
Operational	Boots-on-Ground (BoG) model	Comparison of costs of RC rotation base vs. AC rotation base	Simple to complex: readiness & capacity can be represented	Rotation base (no. of units needed to sustain one unit BoG)	Does not account for strategic value of RC	Same as directly above	Widely used and effective in comparing the costs of AC and RC when used on a purely operational footing. Army, OSD, and NECC all use variations of this model.
Operational	Air Force's Total Force Enterprise Analytic Framework	Comparison of costs of different levels of AC/RC blending at various deploy-to-dwell ratios	Very complex	Force package: a grouping of manpower/ equipment that provides a specific war-time capability	Does not account for strategic value of RC. Model considers various deploy-to-dwell ratios when RC is used operationally but does not account for strategic contribution of RC. Because of its complexity, model requires significant manpower to maintain.	Same as directly above	Principal force-shaping tool used by the Air Force
Joint Strategic and Operational	IDA model: Horowitz (2012)	Determining trade-space of budget, no. of deployable units, size of force, and proportion of AC in force	Complex	Rotation base (no. of units needed to sustain one unit BoG)	By necessity, model's trade-space output is complex, and users face a significant learning curve to understand full implications of model's findings.	Same as directly above	Being developed for OSD CAPE

Cox identified three general situations where the RC would likely have a cost advantage over the AC in providing phased deployments of operational units. These situations would be

1. When the service needs to maintain a strategic force that is significantly larger than its operational force;
2. When the mission requires labor intensive capabilities (as compared to equipment intensive capabilities); and
3. When the missions require less complex training workups.

The Cost Assessment and Program Evaluation (CAPE) report to Congress (2013), titled *Unit Cost and Readiness for the Active and Reserve Components of the Armed Forces*, concluded that timing, duration, and skills required for missions were all important factors in AC/RC mix decisions. The report highlighted that while cost was important to the force mix decision, it was only a single factor among many. It also highlighted the complexity of performing a full cost analysis. It cited personnel costs, unit costs, and utilization rates as contributing elements to the complexity. The report also highlighted that when RC units were mobilized, the unit personnel costs were about 80 percent to 100 percent of the AC. Differences in costs were attributed to differences in seniority of unit manning between the AC and RC (CAPE, 2013).

Horowitz, McGee, Roark, and Wahedi (2015) developed a methodology and set of computer-based tools to facilitate comparison of alternative AC/RC force mixes. The methodology and set of tools considered cost, strategic capacity, and operational capacity. One key aspect of their approach was the focus on analysis at the community level, the level at which force mix decisions are made (Horowitz et al., 2015). The set of tools also considered activity and related costs over multiple years. This was important because it provided a “truer picture” of costs by incorporating factors that vary from year to year, e.g., deployments, rotations, etc. Service-specific tools were provided that included as many cost factors as possible. Reflected in Table 4, we have reproduced their table of Summary of Cost Elements.

Table 4. Summary of Cost Elements. Source: Horowitz et al. (2015).

Summary of Cost Elements	
Personnel	Basic Pay and Allowances/Drill Pay Retired Pay Accrual Housing Allowances Cost of Living Allowance (COLA) Special Incentive/Hazardous Duty Pay Permanent Change of Station (PCS) Travel: Military & Dependents
Equipment Operations and Maintenance	Energy Transportation Depot Maintenance Depot Level Repairables Consumables and Repair Parts
Procurement	Procurement of Equipment Replacement of Training Munitions and Expendable Stores
Indirect	Personnel Benefits Personnel Administration Education and Individual Training Installation Support Medical
Deployment (may include any incremental cost from the first four categories)	Incremental Pay and Allowances for Activation and Deployment Personnel Support Incremental Operations and Maintenance Transportation

D. SUMMARY

There are four primary themes that we derived from our review of operational reserve literature. First, the research seems to suggest that continuing to use the RC in an operational role is not optional. The growing demand for forces, an ever-changing security environment, and increasing fiscal pressures, will all likely force the services to maximize the value generated from the Total Force. As part of this effort, RC forces will continue to be used in operational roles because they provide additional manpower capacity, relieve rotation-induced stress on the AC force, and in some cases provide unique capabilities and skills that are not inherent within the AC.

Second, research suggests that for the operational reserve concept to become reality, continued refinement in law, policies, and regulations is needed. These changes

should facilitate easier access to the RC and better support the continuum of service concept, among other improvements. Such changes might also include compensation reform to ensure that the operational reserve concept is sustainable over the long-term.

Third, previous research suggests there may be a subset of missions for which the RC is ideally suited. Given the part-time nature of their service, reservists' primary effort is usually focused on meeting the demands of their civilian employer; thus, infrequent, yet standardized type missions such as security cooperation (SC) or unit deployment program (UDP), are likely to be better suited for RC use. Additionally, any missions that might frequently require skills that reservists practice often in their civilian jobs (e.g., law enforcement, cyber, mechanical work) are likely better suited for the RC.

Lastly, conducting cost comparisons of the AC/RC mix is complicated. Length of mobilizations, deployment-to-dwell constraints, types of units mobilized, variable pre-deployment training costs, etc. are just a fraction of the factors that contribute to varying cost estimates.

The NDAA of 2012 created new flexibility in mobilizing National Guardsmen and Reservists involuntarily. While previous mobilization authorities were tied to war or national emergencies, this “new” authority (10 U.S. Code § 12304b) allowed the services to mobilize RC personnel for routine “peacetime” missions for the first time. Four years later, in FY 2016, the Marine Corps included \$18.4M in military personnel costs, providing an estimated 306 man-years, into their baseline budget for operational reserve missions (DON, 2015a). The Marine Corps also included ~\$2M in their O&M budget (DON, 2015b). In 2016, four years after the NDAA provided the authority to activate units for “peacetime” missions, the Marine Corps marked the first instance it had both the authority and the material baseline budgetary resources to involuntarily activate RC units in support of preplanned CDR missions.⁶

While much of the previous research provides estimates of costs differences between AC and RC units when supporting operational requirements, we were unsuccessful in finding any empirical evidence of the costs differences between an AC

⁶ See Footnote 5 on page 20.

capability and an RC capability actually used in an operational role. As the operational reserve concept continues to evolve, it is vital to analyze how the services are using the operational reserve. It is also vital to future decisions to identify elements of cost. This continued analysis will help shape future decisions regarding the efficient use of limited resources to provide operational capacity. Our research seeks to examine the costs of using involuntarily activated USMCR units for preplanned COCOM missions. Furthermore, we intend analyze how these USMCR operational missions actually align with previously suggested missions that were best suited for RC use. Our study intends to provide empirical data that might contribute to the ongoing discussion regarding use of the RC in an operational role.

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III. RESEARCH METHOD

Our study of the costs and considerations associated with using an RC unit in an operational role for preplanned CCDR missions focuses on the approximately 200 RC personnel that were activated under 10 U.S. Code § 12304b to support SPMAGT-S 16.2. For our literature review, we analyzed the chronological evolution of the “Operational Reserve” concept from 2007 until 2017 to gain an understanding of the initial concept, and to better understand how it evolved to its current form. We then explored different costing methods and elements that were used to compare costs between AC and RC units. Once we had a thorough understanding of the evolution of the operational reserve concept, as well as a sound understanding of the different costing methods and elements, we requested quantitative data from Reserve Affairs (RA). We analyze this data in Chapter IV, incorporating different aspects of the aforementioned costing methods and elements, to help address our primary research questions. Based upon this data analysis, we develop conclusions and recommendations, which are presented in Chapter V.

A. RESEARCH DESIGN

Given our primary research questions, we determined that quantitative research design was most applicable to our research. Obtaining the data to conduct our quantitative research required institutional review board (IRB) approval. Although additional qualitative research that addressed the performance levels of RC and AC units supporting SPMAGTF-S 16.2 would clearly be useful when allocating capabilities in support of COCOMs, our efforts were limited to quantitative research only, given time and capacity constraints. The primary type of quantitative design we used was descriptive research. “Descriptive research projects are designed to provide systematic information about a phenomenon. The analysis and synthesis of the data provide the test of the hypothesis” (Baltimore County Public Schools, 2017).

The basic procedure for quantitative design is as follows:

1. Make your observations about something that is unknown, unexplained or new. Investigate current theory surrounding your problem or issue.

2. Hypothesize an explanation for those observations.
3. Make a prediction of outcomes based on your hypothesis. Formulate a plan to test your prediction.
4. Collect and process your data. If your prediction was correct, go to step 5. If not, the hypothesis has been proven false. Return to step 2 to form a new hypothesis based on your new knowledge.
5. Verify your findings. Make your final conclusions. Present your findings in an appropriate form for your audience. (BCPS, 2017)

B. DATA REQUEST AND PREPARATION

As there is no single Marine Corps database that includes the detailed elements of costs associated with activating RC Marines under 10 U.S. Code § 12304b, we were forced to request multiple reports from multiple databases. We requested data from RA that was derived from Marine Reserve Order Writing System (MROWS), Total Force Data Warehouse (TFDW), and SABRS Management Analysis Retrieval Tools System (SMARTS). We then cleansed the data to ensure that the elements included were an accurate representation of the costs associated with RC units that were operationalized in FY 2016 to support SPMAGTF 16.2. In the following three subsections, we discuss details regarding sources of data, elements of the primary data sets, and the data cleansing process.

1. Sources of Data

As RA provides much of the financial oversight of RC Marines activated under 12304b authority, and has access to MROWS, we requested an MROWS obligation report for the 198 RC personnel that were activated under 10 U.S. Code § 12304b to support SPMAGT-S 16.2. As MROWS interacts daily with the Marine Corps Total Force System (MCTFS), “the single, integrated personnel and pay system supporting both Active Duty and Reserve components of the Marine Corps” (MARFORRES, 2017), the MROWS obligation report provided data synonymous with that of the Total Force system, and therefore served as an accurate representation of RC activation costs. This MROWS obligation report only covered the RC member period of activation under 12304b authority. This report did not include any additional periods of duty such as drills,

AT, ADOS, additional drills, etc. The cost of these periods of duty was estimated using two different approaches. First, we used Defense Finance Accounting Service (DFAS) military pay charts to estimate the MILPERS costs of maintaining an RC member in dwell long enough to meet the SECDEF goal of 1:5 D2D for RC members.⁷ Second, we used data from TFDW that captured any drills performed by the 198 personnel that were in excess of 48, or any AT days in excess of 15, or any periods of ADOS outside of the 12304b orders. We term this report, “Incremental RC costs.” We address this report in the following paragraph.

This Incremental RC costs report, derived from TFDW, was used to identify any excess costs of additional periods of duty by RC members. By excess costs, we mean any costs incurred from activities that exceed “typical” participation of an SMCR member (U.S. Marine Corps, 2015, p. 4-1). By typical, we mean an SMCR member who conducts no more than 48 drills and 15 days of AT per year. This Incremental RC costs report was generated from TFDW.

Lastly, we requested a SMARTS report from RA that identified the travel costs of RC Marines activated under 10 U.S. Code § 12304b to support SPMAGT-S 16.2.

2. Elements of Primary Data Sets

The MROWS elements of the RA provided data set that covered the period of activation were as follows:

- Grade
- Active Duty Type Code (ADTC)
- Pay Group
- Pay and Allowance Costs
- Pay and Allowance Variance

⁷ When we conducted an analysis of the costs for a hypothetical equivalent AC unit that would have supported SPMAGTF-S 16.2 we included all relevant costs during the period the unit was “allocated” ISO of the mission. This allocation period included deployment as well as dwell requirements. To accurately compare these costs to those of the RC unit that supported SPMAGTF-S 16.2, it was imperative we also analyze RC unit’s relevant costs during their entire “allocation” ISO SPMAGTF-S 16.2. Just as we incorporated deployment and dwell requirements for the AC, we also included deployment and dwell requirements for the RC unit.

The TFDW elements within the Incremental RC costs report provided by RA were as follows:

- FY 2016 Drills
- FY 2017 Drills
- Quantity of FY 2016 AT days
- Costs of FY 2016 AT days
- Quantity of FY 2017 AT days
- Costs of FY 2017 AT days

The SMARTS elements of the RA provided data set were as follows:

- Cost Account Code (CAC)
- Special Identification Code (SIC)
- SIC Description
- Obligation Amounts
- Standard Document Number (SDN)
- Fiscal Year (FY) Full
- Document Type Code (DTC)

3. Data Cleansing

After gathering the three separate reports from RA, we analyzed the data to ensure that all elements within the data set could be attributed to RC unit activation in support of SPMAGTF-S 16.2. Within the MROWS report, we removed any elements that did not include an Activity Code of SPMAGTF-S 16.2. Within the SMARTS report, we removed any records that did not include a SIC of SO0 and a FY of 2016. Once all reports were clearly attributable to SPMAGTF-S 16.2, we consolidated the three reports into a single Excel spreadsheet that included all data elements pertinent to our research. We then examined the data elements for any significant outliers in activation days, pay and allowance costs, travel costs, AT days in excess of 15, drills in excess of 48, etc. No significant outliers were identified.

Because the data derived from RA included retirement pay accrual costs (RPA), we adjusted the drill and AT costs for the RC member dwell period to include RPA costs.⁸ This adjustment was necessary to normalize RC dwell cost to compare against our hypothetical AC costs that included RPA.

⁸ We used the FY 2016 RPMC RPA rate of 22% (DON, 2015c).

C. SUMMARY

Given our research questions, quantitative research was most applicable. We conducted descriptive research of data provided by RA from multiple databases such as MROWS, TFDW, SMARTS, etc. We also used data from DFAS to estimate dwell costs. We collected data required to answer our research questions, cleansed the data by removing any elements not applicable to our research, and made adjustments to incorporate RPA costs. We consolidated this data for detailed analysis, which is presented in the next chapter.

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IV. DATA ANALYSIS

Our analysis of costs of RC activation in support of SPMAGTF 16.2 focused on five primary elements of costs that we deemed pertinent to our research questions: MILPERS costs associated with RC unit deployment; MILPERS costs associated with an RC unit while activated (but not in a deployed status); OMMC costs associated with transport of personnel, dwell costs, and what we term incremental RC costs; any costs in excess of the costs of 48 drills or 15 days of AT. Once we analyze these RC costs, we then proceed to compare these costs to the costs of a hypothetical AC unit that would have been assigned the same mission. The results inform our primary research questions.

A. MILPERS UNIT DEPLOYMENT COSTS

MILPERS unit deployment costs are the pay and allowance costs incurred when the RC unit is deployed. These costs are funded from the MPMC appropriation, an appropriation for “pay, allowances, individual clothing, subsistence, interests on deposits, gratuities, permanent change of station travel, and expenses of temporary travel between permanent duty stations, for members of the Marine Corps on active duty ... and to the Department of Defense Military Retirement Fund” (DON, 2016a). Table 5 reflects the by-grade, MPMC costs of 198 RC members that we assumed were deployed for 180 days to support SPMAGTF-S 16.2.⁹

⁹ RC members were activated for an average of 322 days to support SPMAGTF-S 16.2. To accurately compare costs between this RC unit and a hypothetical equivalent AC unit it was pertinent for us to separate deployment costs from overall activation costs. For our analysis, we assumed a six month, or 180-day deployment for both RC and AC units as this is the “typical” length of most Marine Corps deployments.

Table 5. MILPERS Unit Deployment Costs

Grade	Grade Count	MILPERS Unit Dep Costs
O5	3	\$187,690
O4	11	\$622,108
O3E	1	\$51,300
O3	11	\$496,698
O2E	1	\$43,185
O2	3	\$116,232
O1	2	\$59,276
W4	1	\$40,288
W2	3	\$108,122
E9	1	\$54,409
E8	2	\$82,774
E7	11	\$394,738
E6	26	\$779,732
E5	44	\$1,037,988
E4	36	\$753,251
E3	42	\$771,886
Grand Total	198	\$5,599,679

B. MILPERS UNIT ACTIVATION COSTS

These MILPERS unit activation costs are the pay and allowance costs incurred when the RC unit was activated but not in a deployed status. These costs are also funded from the MPMC appropriation. Table 6 reflects the by-grade, MPMC costs of 198 RC members that were activated, but not deployed, for 142 days.¹⁰

¹⁰ Given the RC unit was activated for 322 days, and assuming a six-month deployment (180 days), the total activation time while not deployed equates to 142 days.

Table 6. MILPERS Unit Activation Costs

Grade	Grade Count	MILPERS Costs
O5	3	\$148,066
O4	11	\$490,774
O3E	1	\$40,470
O3	11	\$391,839
O2E	1	\$34,068
O2	3	\$91,694
O1	2	\$46,762
W4	1	\$31,783
W2	3	\$85,297
E9	1	\$42,923
E8	2	\$65,300
E7	11	\$311,405
E6	26	\$615,122
E5	44	\$818,857
E4	36	\$594,231
E3	42	\$608,933
Grand Total	198	\$4,417,525

C. OMMC COSTS

OMMC costs are the costs associated with travel by the RC unit to the ILOC (or subsequent location) for mobilization, as well as RC unit travel from the ILOC (or subsequent location) back to the HTC following mobilization. See Figure 5 for a visual depiction of these movements. These costs are funded from the OMMC appropriation, an appropriation for “expenses, not otherwise provided for, necessary for the operation and maintenance of the Marine Corps” (DON, 2016b, p. 3). More specifically, these OMMC resources fund the “travel and per diem associated with mobilization in support of the Marine Corps’ Future Force Posture Plan” (DON, 2016b, p. 3). The 198 RC personnel that support SPMAGTF 16.2 were an element of mobilizations in support of the Marine Corps’ Future Force Posture Plan. Table 7 reflects the OMMC costs of 198 RC members that were activated in support of SPMAGTF-S 16.2.

Table 7. OMMC Costs

SDN Elements	OMMC Costs	% of OMMC Costs
TOE	\$1,543,736	53.9%
TOO	\$712,311	24.9%
TOT	\$165,385	5.8%
TOV	\$91,654	3.2%
TOW	\$102,185	3.6%
TOU	\$242,657	8.5%
TOX	\$4,129	0.1%
Grand Total	\$2,862,056	

Due to data field limits within our data set, we were unable to discern significant details of OMMC costs for RC units activated in support of SPMAGTF-S 16.2. The SDN elements within Table 7 include a DTC and an additional character that is useful in properly allocating these OMMC costs to officer or enlisted travel. An SDN is an alphanumeric code used for financial transactions. Within a 15-position SDN lies a DTC, a two-digit code used in the construction of an SDN (U.S. Marine Corps, 2015c). The travel order DTCs listed in Table 7, confirm that each SDN was created for a travel order. The third character of the SDN element depicted in Table 7 identifies officer and enlisted travel, in some cases. However, in other cases, the third character is a systematically generated value that provides no detail into officer or enlisted travel. As reflected in Table 7, \$1,543,736, or about 54% of OMMC costs, was a result of enlisted travel. \$712,311, or about 25% of OMMC costs, was a result of officer travel. Due to limitations arising from the systematic creation of an SDN, we were unable to accurately assign the remaining \$600,000, or 21% of OMMC costs, to officer or enlisted personnel. Given these limitations, we assumed that approximately 70% of the remaining OMMC costs should be assigned to enlisted travel, while 30% should be assigned to officer travel. Table 8 reflects a simplified OMMC costs table that incorporates these assumptions.

Table 8. Adjusted OMMC Costs

Officer / Enlisted	Grade Count	Adjusted OMMC Costs	OMMC Cost / Grade
Enlisted	162	\$1,967,942	\$12,148
Officer	36	\$894,114	\$24,836
Grand Total	198	\$2,862,056	

Further analysis of MROWS data highlights that the 198 RC personnel activated in support of SPMAGTF 16.2 had Reserve Unit Codes (RUC) from 22 different states. Table 9 lists these states along with the corresponding quantity of personnel assigned to a RUC from each respective state. While much of the personnel traveled from California, Oregon, or New Jersey, many traveled from numerous other states within the country. Additionally, given the correlation between travel distance and travel costs, travel costs to transport personnel from the western United States (i.e., California and Oregon) to the ILOC, located, in this case, in the eastern United States, would clearly be costlier than had the RC units been in closer proximity to the ILOC.

Table 9. RUC States

State	Grade Count	% of Personnel
CA	81	41%
OR	35	18%
NJ	28	14%
IL	9	5%
FL	6	3%
LA	5	3%
TX	5	3%
WA	5	3%
MI	3	2%
UT	3	2%
AZ	2	1%
CO	2	1%
MO	2	1%
NC	2	1%
OH	2	1%
VA	2	1%
AL	1	1%
DC	1	1%
GA	1	1%
IN	1	1%
KS	1	1%
NY	1	1%
Total	198	

D. DWELL COSTS

Although the 198 RC personnel were only activated for an average of 322 days to support SPMAGTF-S 16.2, the allocation of these personnel to the SPMAGTF-S 16.2 mission, in theory, removes this RC capability from the “pool” of allocable RC units because this unit will be in dwell for approximately 4.5 years,¹¹ assuming there is service intent to meet the SECDEF’s goal of 1:5 D2D for RC members. Given this, we generated cost estimates for 198 RC personnel who we assumed to be “typical” RC members, i.e., conduct 48 drills and 15 days of AT per year, for five years of dwell.¹² Estimates of these dwell costs are depicted in Table 10 and Table 11.

¹¹ Meeting the 1:5 D2D goal for RC units would require five times the number of days in dwell as those spent activated. In this case, 322 days of activation * 5 days would equate to a 1,610 day dwell requirement. Converting this value to years results in 1,610 days / 365 days, or approximately 4.5 years in dwell.

¹² Although our dwell calculation resulted in a dwell requirement of 4.5 years, we assumed that all members would likely still perform 48 drills and 15 days of AT during the last six months spent in dwell.

Table 10. Dwell Drill Costs

Grade	Grade Count	Cost per Drill	No of Drills	Dwell	Dwell Drill Costs
O5	3	\$272	48	5	\$195,804
O4	11	\$236	48	5	\$623,172
O3E	1	\$210	48	5	\$50,350
O3	11	\$194	48	5	\$512,054
O2E	1	\$163	48	5	\$39,122
O2	3	\$155	48	5	\$111,449
O1	2	\$125	48	5	\$59,842
W4	1	\$220	48	5	\$52,870
W2	3	\$178	48	5	\$127,822
E9	1	\$193	48	5	\$46,438
E8	2	\$154	48	5	\$73,891
E7	11	\$133	48	5	\$352,414
E6	26	\$110	48	5	\$687,086
E5	44	\$87	48	5	\$920,198
E4	36	\$76	48	5	\$652,925
E3	42	\$62	48	5	\$620,626
Total	198				\$5,126,062

Table 11. Dwell AT Costs

Grade	Grade Count	Avg RC P&A Cost Per AT Day	AT Days	Dwell	Dwell AT Costs
O5	3	\$335	15	5	\$75,469.50
O4	11	\$307	15	5	\$253,209.00
O3	12	\$246	15	5	\$221,787.00
O2	4	\$209	15	5	\$62,814.00
O1	2	\$155	15	5	\$23,220.00
W4	1	\$255	15	5	\$19,100.25
W2	3	\$213	15	5	\$47,823.75
E9	1	\$281	15	5	\$21,037.50
E8	2	\$217	15	5	\$32,616.00
E7	11	\$194	15	5	\$159,695.25
E6	26	\$167	15	5	\$326,020.50
E5	44	\$133	15	5	\$439,131.00
E4	36	\$115	15	5	\$311,553.00
E3	42	\$103	15	5	\$323,757.00
Total	198				\$2,317,234

In summary, we estimate that maintaining these 198 personnel in dwell for a period of approximately 4.5 years will cost approximately \$7,443,296 in basic pay. Adjusting this value to include the cost of RPA, this RC dwell cost estimate comes to \$9,080,821.¹³

E. INCREMENTAL RC COSTS

We used the term incremental RC costs to identify the cost of any additional periods of duty incurred from activities that are in excess of 48 drills and 15 days of AT (including travel) per year. SELRES Marines typically conduct 48 drills and 14 days of AT within a one-year period (U.S. Marine Corps, 2015a). For our research, we assumed that any RC member who conducted drills in excess of 48, AT in excess of 15 days, or any other additional periods of active duty outside the 12304b activation, i.e., ADOS, to be incremental RC costs or additional costs required to ensure unit/individual readiness prior to 12304b activation or following 12304b activation. Although our data limited our ability to discern what type of training occurred during these “additional” periods of duty, we assumed that, in most cases, 48 drills and 15 days of AT would likely be insufficient to adequately prepare an RC unit for activation, and that additional periods of duty would be needed to ensure adequate readiness. Given this, we assumed that all “additional” periods of duty were in preparation for mobilization or were needed during the post mobilization period.

An analysis of the incremental RC costs highlights annual training days in excess of 15 days per person as the primary contributor to incremental RC costs. Excess drills were immaterial, and there were no additional periods of active duty outside the 12304b activation. As depicted in Table 12, 502 days of annual training occurred that were in excess of the typical 15 AT days (including travel) performed by SELRES members. These 502 days resulted in \$363,839 in RPMC costs. RPMC funds “pay, allowances, clothing, subsistence, gratuities, travel and related expenses for personnel” (DON, 2016c)

¹³ The data elements we used to identify the cost of RC unit activation in support of SPMAGTF-S 16.2 included pay, allowances, and RPA costs. Thus, when we generated estimates for the hypothetical AC unit, these RPA costs were included as well. To accurately compare costs between AC and RC units, it was imperative that we included RPA in our RC dwell cost estimate.

of the USMCR for events such as drills, annual training, and other reserve related training requirements.

Table 12. Incremental RC Costs

Grade	Grade Count	Ex. FY17 Drills	Ex. FY16 Drills	Ex. FY16 AT Days	Ex. FY16 AT Cost	Ex. FY17 AT Days	Ex. FY17 AT Cost	Tot. Ex. AT Days	Tot Ex. AT Cost
O5	3	28	0	51	\$77,369	6	\$14,702	57	\$92,071
O4	11	0	7	15	\$15,383	1	\$1,692	16	\$17,075
O3	12	0	0	29	\$20,933	0		29	\$20,933
O2	4	0	4	13	\$2,431	1	\$1,736	14	\$4,168
O1	2	0	0	0				0	\$0
W4	1	0	0	0		0		0	\$0
W2	3	0	0	0				0	\$0
E9	1	0	0	9	\$1,131	0		9	\$1,131
E8	2	0	0	0				0	\$0
E7	11	0	0	28	\$27,336			28	\$27,336
E6	26	5	0	49	\$23,174	26	\$52,355	75	\$75,529
E5	44	0	0	115	\$52,906	5	\$1,828	120	\$54,735
E4	36	0	0	48	\$14,364	8	\$3,037	56	\$17,401
E3	42	10	0	78	\$26,096	20	\$27,365	98	\$53,461
Total	198	43	11	435	\$261,123	67	\$102,716	502	\$363,839

F. UNIT LIFE-CYCLE COST

Unit life cycle cost refers to the totality of costs incurred for RC unit activation in support of SPMAGTF-S 16.2. It includes the five primary cost elements previously discussed: MILPERS unit deployment costs, MILPERS unit activation costs, OMMC travel costs, dwell costs, and incremental RC costs. Table 13 depicts this unit life cycle cost. Unit life cycle cost for 198 RC personnel activated for an average activation period of 322 days was \$22,323,920, or about \$350 per RC member, per day of activation.

Table 13. Unit Life-Cycle Cost

Cost Type	Cost
MILPERS Unit Deployment Costs	\$5,599,679
MILPERS Unit Activation Costs	\$4,417,525
OMMC Travel Costs	\$2,862,056
Dwell Costs	\$9,080,821
Incremental RC Costs	\$363,839
Unit Life Cycle Cost	\$22,323,920

G. COMPARISON OF COSTS

Determining how to best compare costs between the RC unit and a theoretical equivalent AC unit supporting SPMAGTF-S 16.2 led us to two different approaches. Our first approach involves comparing total relevant costs to support the SPMAGTF-S 16.2 mission, while our second approach involves a comparison of the estimated cost per day deployed for each respective service member. Our second approach is similar to the BOG method previously discussed in our literature review (see section C of Chapter II).

1. Total Relevant Costs Comparison

Adequately comparing costs between a theoretically equivalent AC unit supporting SPMAGTF 16.2 required us to generate assumptions regarding the MILPERS costs of each individual member as well as the duration in which the theoretical AC force would be allocated to support this COCOM requirement. Furthermore, to accurately compare costs, we converted MILPERS costs to a cost per day value.

Although some variation exists in MILPERS costs within each respective grade, i.e., an O4 with 12 years of service earns about 5% more than an O4 with 10 years of service, there are only marginal differences within grades. Given this fact, we assumed that, on average, an AC member would receive the same pay and allowances per period of time on duty as would an activated RC member. While there may be some cases where RC member pay and allowances would be higher than those of AC members, such as an RC aviation unit whose members had years of service that were well in excess of AC aviator counterparts, we did not take this into consideration given the RC units that were activated in support of SPMAGTF-S 16.2 were generally ground based units. Respective

RUC names of RC members that supported SPMAGTF-S 16.2 are depicted in Appendix D.

Given the assumption that MILPERS costs between AC and RC members performing an equivalent period of active duty would generally be the same, our next step was to assume how many days of active duty an AC unit would perform while allocated in support of SPMAGTF 16.2 requirements. By allocated to SPMAGTF 16.2, we mean the PTP, BOG, redeployment, and subsequent period of dwell that would have been required to meet SECDEF's goal of AC D2D of 1:2, i.e., for every month deployed, two months are required in dwell. Assuming the RC unit in support of SPMAGTF 16.2 was BOG for six months (or 180 days), a theoretical AC equivalent unit would also have conducted a six-month deployment in support of this COCOM mission. As a result of the AC unit having been six months deployed, they would be in a dwell status for an additional 12 months to achieve a goal of 1:2 D2D. Six months deployed plus an additional 12 months in dwell would result in an AC unit being "allocated" in support of SPMAGTF-S 16.2 for 18 months, or approximately 545 days. Thus, 545 days was our assumed duration in which a theoretical force would be allocated to support this COCOM requirement.

To estimate the cost of this theoretical AC unit we first converted the RC unit cost into cost per grade, per day. Given our aforementioned assumption that, on average, an RC member's pay and allowances while on active duty are nearly identical to those of an AC member, we multiplied this by grade cost times personnel count and 180 days to determine relevant deployments costs. We then multiplied the aforementioned grade costs times personnel count and 365 days to compute the relevant AC dwell costs. The estimated AC pay and allowance costs are depicted in Table 14.

Table 14. Estimated Pay and Allowance Cost of Theoretical AC Unit Supporting SPMAGTF-S 16.2

Grade	Avg RC P&A Cost Per Day	Pers Count	AC Days Deployed	Est AC Deployment Cost	AC Days in Dwell	Est AC Dwell Cost
O5	\$335	3	180	\$181,127	365	\$367,285
O4	\$307	11	180	\$607,702	365	\$1,232,284
O3	\$246	12	180	\$532,289	365	\$1,079,363
O2	\$209	4	180	\$150,754	365	\$305,695
O1	\$155	2	180	\$55,728	365	\$113,004
W4	\$255	1	180	\$45,841	365	\$92,955
W2	\$213	3	180	\$114,777	365	\$232,742
E9	\$281	1	180	\$50,490	365	\$102,383
E8	\$217	2	180	\$78,278	365	\$158,731
E7	\$194	11	180	\$383,269	365	\$777,184
E6	\$167	26	180	\$782,449	365	\$1,586,633
E5	\$133	44	180	\$1,053,914	365	\$2,137,104
E4	\$115	36	180	\$747,727	365	\$1,516,225
E3	\$103	42	180	\$777,017	365	\$1,575,617
Total		198		\$5,561,361		\$11,277,204

When estimating AC costs, we did not include OMMC costs, nor did we include any type of costs that we previously referred to as incremental. Although there would have certainly been OMMC costs associated with the AC unit in support of SPMAGTF-S 16.2, these costs were not relevant to our research. We assumed that from the period of time between when the 198 personnel were activated (see Figure 5) until the unit redeployed to the HTC, the OMMC costs that were incurred would be the same costs for that of an AC unit conducting the same mission. Given this, the only incremental RC OMMC costs incurred would be driven by travel requirements to move to and from the HTC to the ILOC (or subsequent location) and to return to the HTC (or subsequent location). Lastly, as the AC unit would have been in an active duty status for the 545 days, there would be no additional incremental costs such as drill pay, AT pay, etc. Given these assumptions, our comparison of the relevant costs of an RC and an AC unit supporting SPMAGTF-S 16.2 are depicted in Table 15.

Table 15. RC and AC Cost Comparison

Cost Type	RC Unit Cost	Est AC Unit Cost	RC Savings Generated	RC Cost / AC Cost
Deployment Pay & Allowances (P&A)	\$5,599,679	\$5,561,361	-\$38,318	-
Activated but not deployed P&A	\$4,417,525	\$0	-\$4,417,525	-
Dwell Time Pay & Allowances	\$9,080,821	\$11,277,204	\$2,196,383	-
OMMC Travel Costs	\$2,862,056	0	-\$2,862,056	-
Incremental RC Costs	\$363,839	0	-\$363,839	-
Unit Life Cycle Cost	\$22,323,920	\$16,838,565	-\$5,485,354	132.58%

The table depicts a deployment pay and allowances cost difference between RC and AC units. This is due to a rounding error.

As depicted in Table 15, using the RC unit to support SPMAGTF-S 16.2 did not generate savings when compared to using an AC unit for the same mission. Allocating the RC unit to this mission cost approximately \$5.5M more than allocating the AC unit, assuming that each unit would meet its D2D goals of 1:2 for the AC unit and 1:5 for the RC unit. Employing the RC unit was approximately 133% of the cost of employing an AC unit. The primary contributor to increased RC costs was the pay and allowances required for RC members while activated but not deployed. Secondary contributors of increased RC costs were OMMC travel costs followed by incremental RC costs. The RC did generate cost savings from dwell time pay and allowances that were less than that of their AC counterpart. Deployment pay and allowances across the two types of units were essentially the same.

2. BOG Costs Comparison

We further analyzed the data from an average cost per day deployed, per member, aspect. The results of this analysis are depicted in Table 16.

Table 16. RC and AC Cost per Day Comparison

	Qty of Pers	Est Days Deployed	Tot Days Deployed	Total Cost	Avg Cost Per Day	RC Cost / AC Cost
AC Unit	198	180	35640	\$16,838,565	\$472	-
RC Unit	198	180	35640	\$22,323,920	\$626	133%

A cost per day deployed analysis reflected an average cost per day of an AC member at \$472 per day while a RC member cost \$626 per day. The primary driver of increased cost per day for the RC member was OMMC travel costs, while RC pay during longer dwell periods and incremental RC costs served as secondary contributors. RC members supporting SPMAGTF-S 16.2 cost approximately 33% more per day deployed than would a comparable AC unit that would have deployed for the same time period.

Given this, we further solved for the number of days an AC unit would have been able to support the SPMAGTF-S 16.2 mission given a cost cap of \$22,323,920. The formula we used to solve for number of days was as follows:

$$\text{AC cost per day} * \text{number of days supportable (x)} = \$22,323,920$$

$$\$472x = \$22,323,920$$

$$x = 47,296 \text{ days}$$

To convert 47,296 days into an average number of days the AC unit would have been able to support a SPMAGTF-S 16.2 mission under the ~\$22.3M cap, we divided 47,296 days by the quantity of personnel. The equation is as follows:

$$\text{Average No. of Deployed Days supportable} = 47,296 \text{ days} / 198 \text{ personnel}$$

$$\text{Average No. of Deployed Days supportable} = 239 \text{ days}$$

Based upon these results, a 198 personnel AC unit would have been able to support an additional 59 days deployed, or an additional two months deployed, than the RC unit that supported SPMAGTF-S 16.2. These additional days were possible because

the AC unit has less total pay and allowance costs and does not incur any relevant travel costs or incremental RC costs.¹⁴

H. SUMMARY

Our analysis focused on MILPERS deployment costs, MILPERS activation costs (not including the time period deployed), OMMC costs, dwell costs, and what we termed incremental costs. We analyzed RC costs within these five areas and then generated cost estimates for a hypothetical equivalent AC unit in these same five areas, as applicable. We compared costs between RC and AC units from a total relevant costs perspective and a BOG perspective. Ultimately, RC costs incurred were approximately 132% of costs incurred by a hypothetical equivalent AC unit.

¹⁴ The AC ultimately has less pay and allowance costs because, unlike the RC, there are no pay and allowance costs associated with an AC unit activation period. Although the RC and AC units likely perform the same type of PTP and post-deployment training, this occurs when the AC unit is in a dwell status. An RC unit would not be conducting this same type of training during their dwell period, but would rather conduct this type of training during the period in which the unit was activated but not deployed.

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V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter begins with a brief summary of our research efforts described throughout the previous chapters. Following a summary of this research, we then revisit our research questions and provide conclusions and recommendations based upon these questions. Lastly, we propose areas for further research.

A. SUMMARY

A review of previous research suggests that the U.S. Marine Corps will continue to face tough resource allocation choices in a fiscally constrained environment into the foreseeable future. This fiscally constrained environment, coupled with the need to “balance resources to meet operational commitments and achieve tomorrow’s readiness,” (“Readiness and modernization challenges,” 2016) will likely compel the Marine Corps to find new and inventive ways to generate greater capacity and capability at reduced costs. Manpower allocation is just one of the many lines of effort the Marine Corps could examine to generate cost efficiencies. Optimizing the Total Force concept may ultimately be required to meet the changing security environment in a fiscally constrained environment.

Previous literature has suggested that relying on the RC to serve in routine operational roles in the future would not be optional. Some of the primary benefits of the RC discussed were their ability to provide additional manpower capacity, their ability to relieve rotation-induced stress, and their ability to provide unique capabilities not inherent in the AC. Portions of the literature went on to suggest that, although much legislative and regulatory reform had already occurred that reduced the burdens of accessing the RC for operational requirements, additional reforms were needed. Further compensation reform was highlighted as one of the areas where additional reform was needed. Increasing compensation was suggested as one of the ways to support a sustainable operational reserve force. A common thread within the published literature highlighted that the RC, when used operationally, was likely ideally suited for a specific

subset of missions, such as those where the RC unit would be particularly well suited,¹⁵ or for a routine, standardized type mission.¹⁶ Lastly, prior literature regarding cost comparisons between the AC and RC highlighted the multitude of factors that create complexity and challenges in objectively comparing the costs of AC and RC units used operationally.

After reaching a conclusion about the costs we deemed relevant to our comparison between an AC unit and a RC unit used in an operational role and then acquiring the appropriate data sets to inform our research, we then conducted a detailed analysis of this data in an effort to generate conclusions and recommendations regarding future operational employment of the RC. Our analysis of the RC capability used to support SPMAGTF-S 16.2, in some ways, seems to align with previous research findings, yet in other ways, our research seems to conflict with other findings.

First and foremost, our research is aligned with Cox's research regarding the complexity associated with comparing costs of the AC and RC. Numerous constraints, uncertainty regarding activation lengths or deployment lengths, types of units required to support the COCOM, location of RC units throughout the nation, accurately identifying relevant costs, and numerous other facets all contribute to a great deal of complexity when attempting to objectively compare costs between the AC and RC.

This says nothing of the challenge associated with quantifying the value provided by an RC unit and equivalent AC unit. Ultimately, an analysis of costs is just part of the overall assessment of how the Marine Corps can optimize the value of the Total Force. In cases where one type of unit might be more expensive than another type of unit, the more expensive unit might ultimately provide greater value when one considers both their strategic and operational value to the Nation.

It is possible that, in some ways, our research might be aligned with the previous literature that recommends the need for additional compensation reform to sustain an

¹⁵ An example discussed previously was that of a military police reserve unit that was made up of numerous members whose civilian career was in law enforcement.

¹⁶ The unit deployment program is an example of such a mission.

operational reserve force.¹⁷ Because our research was conducted at the unclassified level, we were unable to gather details of the capability, grade, and rank requirement generated by the COCOM. Although it may be possible that the RC was forced to activate 198 RC personnel from 22 different states to accurately source the COCOM requirement, we suspect this was unlikely. The need to reach across 22 different states to source the requirement could suggest a limited pool of RC members¹⁸ willing to activate in support of preplanned COCOM missions. Further research is needed to verify this assumption; however, if further research were to highlight less than robust willingness of RC members to activate in support of these preplanned COCOM missions, this might support the suggestion that additional compensation reform is needed.

To our surprise, and counter to our initial hypothesis, our findings on the ability of the RC to generate cost savings¹⁹ conflicted with our initial assumptions²⁰ regarding the RC's ability to provide capabilities at reduced costs. RC activation costs, travel costs, and what we termed incremental costs all contributed to RC costs that were approximately 33% more than the costs of a hypothetical AC unit that would have been deployed for the same time period supporting the SPMAGTF-S 16.2 mission. In the following section, we respond to our research questions in greater detail and discuss the implications our findings might have on the RC's future operational role.

B. CONCLUSIONS AND RECOMMENDATIONS

This section addresses the research questions proposed in our introduction, provides conclusions to these questions based upon our data analysis, and proposes recommendations based upon these conclusions.

¹⁷ Winkler and Bicksler, CNGR, Klerman, and Hill all discuss aspects of compensation reform.

¹⁸ Within the population of those RC members deemed qualified to fill the requirement

¹⁹ As compared to a hypothetical equivalent AC unit

²⁰ Our research also conflicted with some elements within the field of research that suggested cost savings generated from using RC in operational roles.

1. Research Question 1

When RC units were operationalized in FY 2016 for a SPMAGTF in SOUTHCOM, were cost savings generated when compared to using a hypothetical AC unit for the same mission?

a. Conclusion

The 198 RC personnel used to support SPMAGTF-S 16.2 did not generate cost savings when compared to using a hypothetical AC unit for the same mission. When we incorporated the MPMC costs associated with this RC capabilities activation period, RC unit travel costs associated with movement to and from the HTC and ILOC, and what we termed incremental costs²¹, this RC capability cost approximately 33%²² more than would an equivalent hypothetical AC unit.

If one assumes that future operational roles of RC units activated under 10 U.S. Code § 12304b will be similar to the mission conducted in support of SPMAGTF-S 16.2, and assuming no material changes in D2D goals, activation periods, or HTC proximity to the ILOC, using the RC for operational requirements does not appear to be a viable way to generate cost savings for the service. Nevertheless, it may still provide an avenue toward optimizing the value of the Total Force.

Although there do not appear to be cost savings generated, the overall value generated by using the RC in operational role could well outweigh the additional costs. Strategic value, the value of maintaining a Reserve with frequent, rotational operational employments, the additional flexibility²³ provided by 10 U.S. Code § 12304b, the value

²¹ The costs of additional drills, extended or additional AT periods, or periods of ADOS that we assumed were additional training days required to ensure the RC members activated in support of SPMAGTF-S 16.2 were adequately prepared for the activation period or properly recovered at the HTC following the activation period.

²² The RC unit cost approximately \$5.5M more than would an equivalent hypothetical AC unit.

²³ 10 U.S. Code § 12304b ultimately allows the service to access any RC unit for any operational requirement as long as the requirement is identified in budget materials. If the service needed additional manpower capacity, it could use this authority to access different types of RC capabilities every year to match the sourcing shortfalls. Alternatively, if the service chose to expand manpower capacity in response to this shortfall via the AC, this is generally a long-term decision. If the sourcing demand changed, the AC capability would still remain fixed. Thus, use of the 12304b authority provides greater sourcing flexibility, at least on the margins.

of civilian work experiences, and the value of citizen-soldiers involved in preplanned operational missions are just a few of the areas in which the RC provides unique value that could well outweigh their additional costs.

b. Recommendations

We recommend that DC, PP&O, as the 12304b program manager, include all categories of RC relevant costs during the operating forces (OPFOR) program review, program evaluation board, and Program Objective Memorandum (POM) working group. Including the totality of these relevant costs throughout this process will ensure Marine Corps senior leaders are best informed to make resource allocation decisions regarding AC/RC manpower mix.

2. Research Question 2

What incremental RC costs (beyond the requirement of 48 drills and two weeks of AT requirements) were incurred and what appropriations funded these incremental costs, e.g., RPMC for additional drills, extended or additional AT days, additional days of active duty training, OMMC for travel to and from the HTC to the ILOC, etc.?

a. Conclusion

The most significant contributor to incremental RC costs was OMMC funded travel costs required to move the RC members to and from the HTC to and from the ILOC. These costs contributed approximately \$2.8M in additional RC costs. The secondary contributor of incremental cost difference was RPMC incremental costs of approximately \$364K. These were costs incurred for more than 48 drills and AT periods in excess of 15 days.

Generating AC/RC cost parity, or envisioning a scenario where the RC might generate cost savings, appears challenging based upon the findings of our research. As approximately \$2.8M of incremental costs was incurred from RC travel requirements, clearly efforts at minimizing travel distance could generate additional savings. Given the COCOM requirement could be filled by multiple qualified RC units, activating a qualified unit within closest proximity to the ILOC would result in less cost. However, if

the requirement was a routine operational requirement sourced by the RC and the number of available qualified RC units was limited, this would not be a viable option to improving AC/RC cost parity over the long term. Ultimately, due to limited capacity of specific units, the RC would be forced to source the requirement with a qualified unit, regardless of proximity to the ILOC.

Thoroughly reviewing the pre-deployment training requirements and timelines, with the goal of minimizing the length of the activation period for the RC unit could also generate additional savings. Not only would savings be generated by a shorter activation period, but there would also be dwell savings. Unlike the AC, whose dwell period is based upon days deployed, the RC dwell period is based upon days activated. In our example, if the RC unit had been activated for 285 days, or 9.5 months, one could generate just over a month's worth of pay and allowance savings, and a full year in dwell cost savings. This would equate to approximately \$3M in reduced RC cost, \$1.8M less in pay and allowances during activation, and \$1.2M less in dwell costs.

Another avenue to find cost savings, assuming that pre-deployment training requirements and timelines remain unchanged, would be to reduce RC dwell requirements. In our analysis of the RC unit that supported SPMAGTF-S 16.2, for every year of reduced dwell requirement, relevant RC costs decline by approximately \$1.8M. Holding all other variables fixed (activation, OMMC, and incremental costs), the RC unit that supported SPMAGTF-S 16.2 would reach AC cost parity if their dwell period was reduced by three years. This three-year reduction would result in a RC D2D period of 1:2, a D2D period equivalent to that of the AC. The equations we used to derive these values were as follows:

$$\begin{aligned}\text{Dwell Time Costs per Year} &= \text{Total Dwell Time Costs} / \text{Number of Years in Dwell} \\ \text{Dwell Time Costs per Year} &= \$9,080,821 / 5 = \$1,816,164\end{aligned}$$

$$\begin{aligned}\text{Dwell reduct. req. to reach AC cost parity} &= \text{Cost Difference} / \text{Dwell Time Costs per Year} \\ \text{Dwell reduction required to reach AC cost parity} &= \$5,485,354 / \$1,816,164 \\ \text{Dwell reduction required to reach AC cost parity} &= 3.02 \text{ or } \sim 3 \text{ years}\end{aligned}$$

The costs of any reduction to RC dwell periods, much less a reduction of three years, would likely generate significant additional costs that would need to be considered prior to making any adjustments to RC dwell periods. Ultimately, the benefits of a reduced dwell period for the RC would have to be weighed against the costs, to quantify any remaining savings generated.

Lastly, efforts could also be made to minimize what we termed incremental RC costs, although the savings generated would be minimal compared to the opportunities for savings by reducing the activation period. Reducing activation lengths would provide a benefit in the form of reduced RC costs, but as previously discussed, the benefits of such a reduction would have to be weighed against the costs. The impact on unit readiness, willingness of RC members to activate for a shorter activation period, and retention are just a few areas that might be impacted by a shorter activation period.

b. Recommendations

We recommend DC, M&RA monitor the totality of relevant monetary and non-monetary costs for any future RC units activated under 10 U.S. Code § 12304b and communicate these findings to key stakeholders such as P&R, PP&O, MARFORCOM, and MARFORRES. First, given the resources to fund RC unit activation under 12304b are derived from multiple appropriations, an M&RA budget analyst responsible for consolidating, monitoring, and communicating the totality of these RC unit activation costs would ensure that key stakeholders²⁴ in the process were working in coordination to minimize RC costs where possible, or working to find alternative sourcing methods that provided the same capability at reduced costs. Second, by having manpower personnel at M&RA gather and analyze data on RC units supporting 12304b requirements, non-monetary costs could be more fully understood and incorporated into any future decisions regarding RC unit activation under 12304b authority.

²⁴ Such stakeholders might include P&R, PP&O, MARFORCOM, MARFORRES, among others.

3. Research Question 3

Based upon the cost savings generated, if any, what implications does this have for the USMCR serving in an operational role in the future? Is using the RC in an operational role a viable alternative to sourcing COCOM requirements?

a. Conclusion

Without quantifying the benefits derived from using the RC in an operational role, it is difficult to accurately assess how the service might optimize the use of the Total Force by using RC units in operational roles. Cost is just a single factor in a multitude of factors that drive complexity into the discussion regarding Total Force optimization. Our research seems to suggest that, given the current construct, and given how the RC was employed in support of SPMAGTF-S 16.2, no cost savings were generated. For a six-month deployment for this requirement, the AC would have been a cheaper option.

While much of the discussion in today's fiscally constrained environment is focused on cost savings, there are many who are focused on the more important questions regarding value. These questions are:

1. How can the services extract the most value from the Total Force?
2. Based upon our assumptions regarding future threats, what should this optimized Total Force look like, and what steps are required to move the force closer to this goal?

Although no cost savings were generated when the RC units were used in support of SPMAGTF-S 16.2, it is probable that the benefits²⁵ of using these units in an operational role well outweighed the additional costs. If this were the case, then clearly using the RC in operational roles in the future would be a viable alternative to sourcing COCOM requirements. Furthermore, expanding roles and missions of the operational reserve up until the point of Total Force optimization would be prudent in an effort to extract the most value from the Total Force.

²⁵ As discussed earlier, strategic value, the value of maintaining a Reserve with frequent, rotational operational employments, the additional flexibility provided by 10 U.S. Code § 12304b, the value of civilian work experiences, the value of citizen-soldiers involved in preplanned operational missions, etc. are just a few of the areas in which the RC provides unique value that could well outweigh their additional costs.

b. Recommendations

We recommend DC, M&RA assess the benefits generated from RC units activated under 12304b authority and weigh these potential benefits against any additional RC unit costs. Should this assessment result in benefits that are deemed to outweigh any additional costs of RC unit activation, this would clearly provide further support to the viability of sourcing preplanned COCOM requirements with RC units into the foreseeable future.

C. AREAS FOR FURTHER RESEARCH

As stated previously, further research to quantitatively compare the benefits of the AC and RC is recommended prior to any significant expansion of operational reserve requirements. Additionally, follow-on research of RC units activated under 10 U.S. Code § 12304b in FY 2017, FY 2018, and subsequent years could serve as a valuable contribution to the ongoing discussion regarding Total Force optimization. As of the writing of this thesis, the Marine Corps budgeted for 281 work-years, or \$13M, in MPMC funds for 12304b requirements in FY 2017, and requested 601 work-years, or \$35M in FY 2018 (DON, 2017, p. 12).

We provide a summary of research questions whose answers would further contribute to the ongoing discussing regarding the future of the operational reserve:

1. What monetary and non-monetary values do the AC and RC provide the Total Force? What quantitative metrics might be useful in weighing the benefits of each respective element?
2. How does one measure the performance of the RC units used in operational roles and compare this performance to AC units that performed the same types of missions? What metrics are most useful in this comparison?
3. Are reduced activation periods an option to generate improved AC/RC cost parity? If so, what are the costs of such reduced activation periods?
4. Why were the 198-man RC units that supported SPMAGTF-S 16.2 drawn from 22 different states? What are the implications of RC member willingness to activate in support of preplanned COCOM missions? What is the effect on the sustainability of the Operational Reserve concept, recruitment, and retention within the RC, etc.?

5. Would a cost analysis of RC units activated under 10 U.S. Code § 12304b in FY 2017 and FY 2018 produce similar results to this research?

APPENDIX A. MARINE CORPS RESERVE

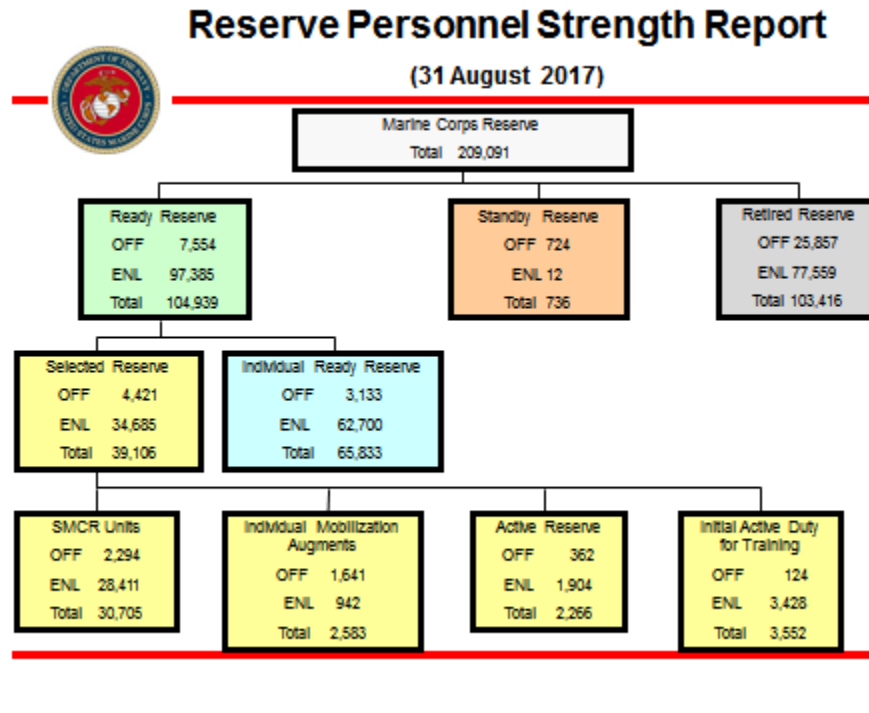


Figure 9. Marine Corps Reserve. Source: S. J. Norton, personal communication, September 27, 2017.

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APPENDIX B. 4TH MARDIV TABLE OF ORGANIZATION

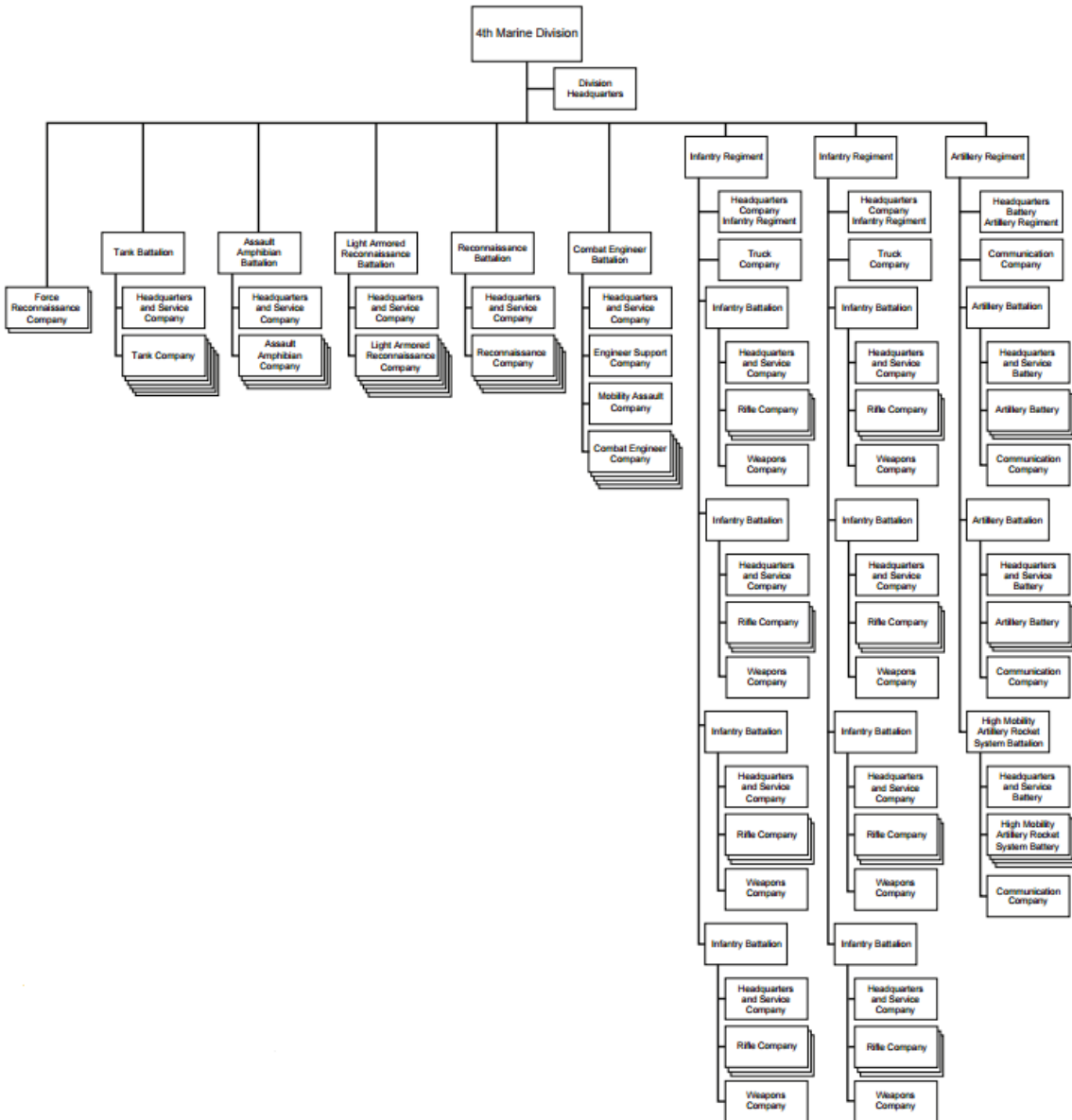


Figure 10. Notional Structure of 4th Marine Division. Adapted from MCRP 5-12D (2016).

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APPENDIX C. COST COMPARISON APPROACHES

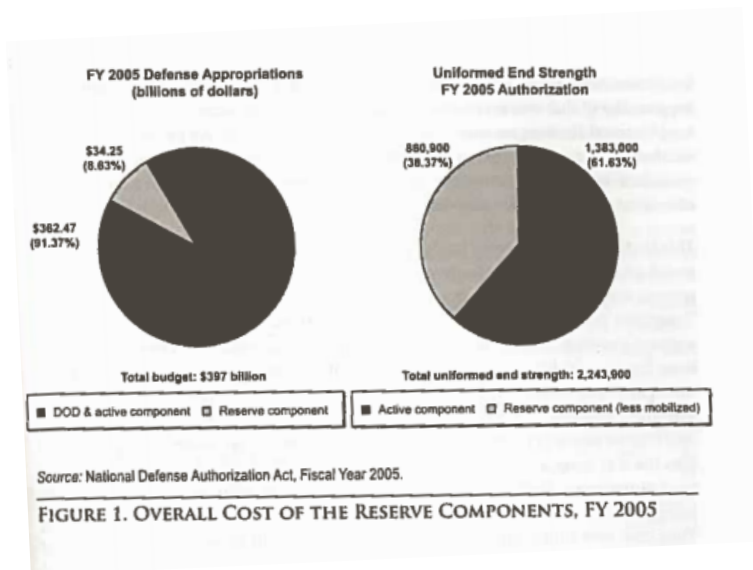


Figure 11. Overall Cost of the Reserve Components, FY 2005. Source: Winkler and Bicksler, 2008, p. 177.

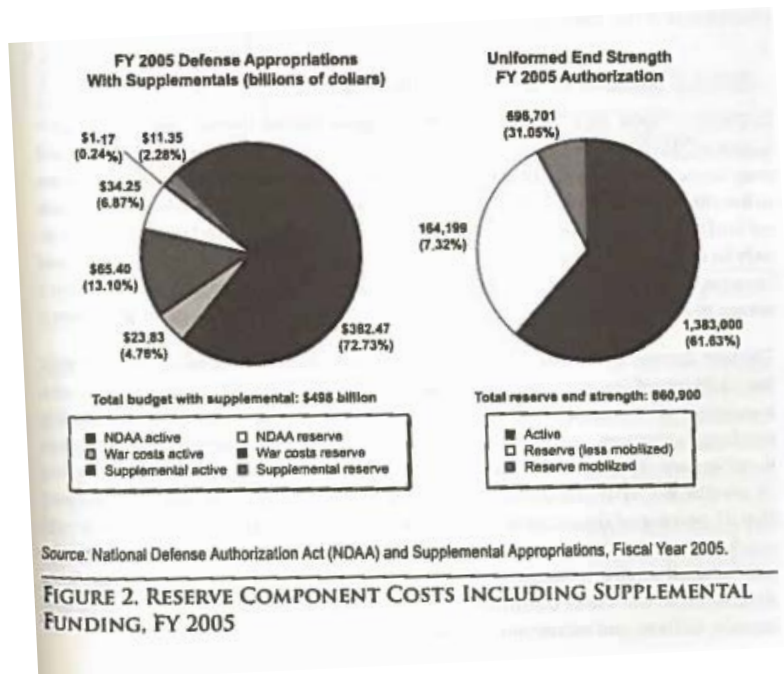


Figure 12. RC Costs Including Supplemental Funding, FY 2005. Source: Winkler & Bicksler, 2008, p. 177.

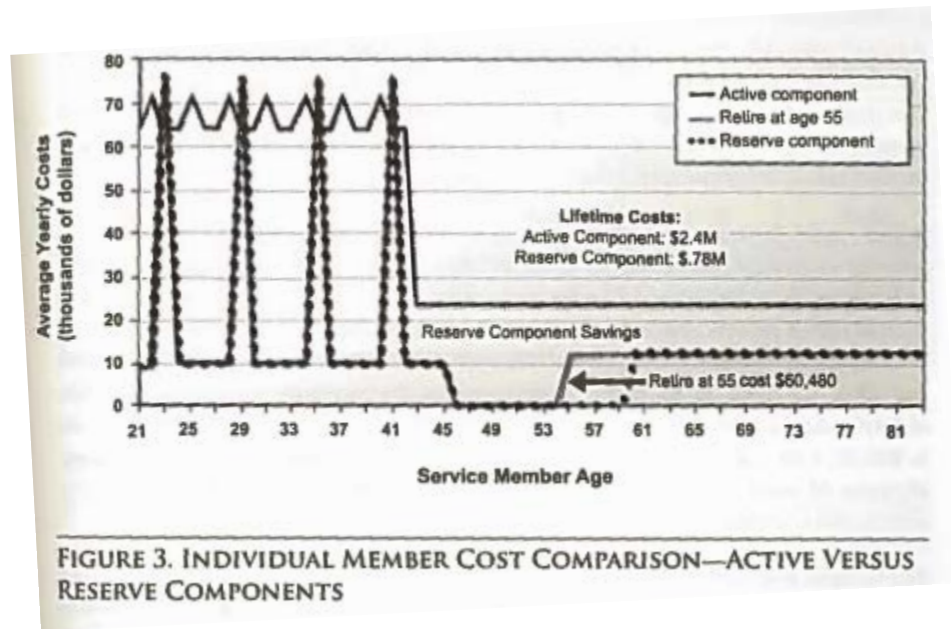


Figure 13. Individual Member Cost Comparison—Active versus Reserve Components. Source: Winkler & Bicksler, 2008, p. 179.

TABLE 1. COST OF RESERVE COMPONENT MEMBERS PER DAY OF DUTY

	Active Component	Statutory Reservist	"Busy" Reservist
FY 2004 costs per duty day while serving	\$186.66	\$164.97	\$147.92
Retired pay accrual	28.77	19.11	31.66
Health care accrual (after age 65)	16.67	47.69	15.63
Estimated post-retirement health care (pre-Medicare)	15.87	11.18	3.66
Total	\$247.97	\$242.95	198.87
FY 2005 costs per duty day while serving	\$195.83	\$173.19	\$155.32
Retired pay accrual	30.36	19.78	32.78
Health care accrual (after age 65)	19.46	80.20	25.63
Estimated post-retirement health care (pre-Medicare)	15.87	11.18	3.57
Total	\$261.52	\$284.35	\$237.30

Note: FY 2004 "busy" reservist based on 119 duty days per year; FY 2005 based on 122 duty days per year.

Figure 14. Cost of RC Members Per Day of Duty. Source: Winkler & Bicksler, 2008, p. 181.

APPENDIX D. RUC NAMES

RUC Name
3D FORECON CO 4TH MARDIV
DET 1 CI/HUMINT CO A DET 2 (0417-0418)
3D ANGLICO DET N (1215-1216)
CO E DET 6 2DBN 23DMAR (1115-1116)
DET 1 TRANS SVC CO CLB 23 CLR 4 (0316-0317)
DET 3 PROD & ANALYSIS CO ISB FHG MARFORRES
DET 4 PROD & ANALYSIS CO ISB FHG MARFORRES
DET R HQ CO 23D MAR (0317-0318)
H&S CO 2DBN 23DMAR 4TH MARDIV
HMLAT-303 SAU
HQ BTRY 5TH BN 14TH MAR DET 5 (201701-201801)
MAINT SVCS CO CLB 23 CLR 4 4TH MLG
RFL CO G 2DBN 23DMAR 4TH MARDIV
SUP CO CLB 453 CLR 4 4TH MLG
WPNS CO 2DBN 23DMAR 4TH MARDIV
DET 4 P&A CO (-) (0316-0317)
H&S CO CLB 453 CLR 4 4TH MLG
DET PERS RET & PROC CO CLR 45 (0316-0317)
4TH CAG DET 2 (0117-0118)
DET 3 CI/HUMINT CO B ISB FHG MARFORRES
DET 2 SUP CO CLB 453 CLR 4 4TH MLG
3D CAG FHG DET 1 (201710-201810)
DET 11 MWCS-48(-) MACG-48 4TH MAW (0817-18)
DET 5 ENGR SPT CO 6TH ESB 4TH MLG
DET A MWCS-48 (REAR) MACG-48 4TH MAW
H&S CO 2DBN 24THMAR 4TH MARDIV
DET COMM CO 14TH MAR (1017-1018)
DET 1 SUP CO CLB 453 CLR 4 4TH MLG
1ST/2D PLT TRUCK CO 23DMAR 4TH MARDIV
4TH MLG HQ DET K (201702-201808)
DIV HQTRS 4TH MARDIV
HQ 4TH MAW
DET 1 H&S CO 6TH ESB 4TH MLG
DET 2 H&S CO 3DBN 23DMAR (0316-0317)
DET 2 HQTRS CO CLR 4 4TH MLG (0216-0217)
COMM CO CLR 45 4TH MLG
DET 1 H&S CO CLB 541 4TH MLG (0816-0817)
DET 2 HMM-772 (-) MAG-49 (0216-0217)
DET 6 MAG-49 (201702-201808)
DET A H&S CO CLB CLR 45 (0317-0318)
MALS-49 MAG-49 4TH MAW
DET 7 H&S CO 3D BN 25TH MAR (0317-0318)
DET 1 ENGR SPT CO 6TH ESB 4TH MLG
DET 1 ENGR SVCS CO CLB 23 CLR 4 (0216-0217)
DET 1 MT CO CLB 453 CLR 4 4TH MLG
MT CO CLB 453 CLR 4 4TH MLG
RCKT BTRY D 2DBN 14THMAR 4TH MARDIV
WPNS CO 1STBN 23DMAR 4TH MARDIV
WPNS/RFL PLT CO C 1/23 DET 1 (1017-1018)
DET 6 CO F (-) 2DBN 23DMAR (0316-0317)
CI/HUMINT CO B ISB DET 1 (0116-0117)
DET 1 CI/HUMINT CO B ISB DET A (0916-0917)
DET A H&S CO CLB 23 CLR 4 (0316-0317)

Figure 15. RUC Names.

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