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U.S. Army Research Institute  
for the Behavioral and Social Sciences

Research Report 1606

# Physical Performance Predictors of Success in Special Forces Assessment and Selection

Martha L. Teplitzky  
U.S. Army Research Institute

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November 1991

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This research examines the relationship between scores on two physical performance measures--the Army Physical Fitness Test (APFT) and a Ruckmarch administered early in the Special Forces Assessment and Selection (SFAS) program. The sample consisted of candidates from the 25 SFAS classes conducted in FY89 (n=2059), FY90 (n=2074), and FY91 (first 8 classes only, n=1863). Only candidates who met all SFAS prerequisites and were present for the first SFAS event were included in the analysis sample. Results indicated that APFT scores had an average correlation of r=.25 with success in the program, and the Ruckmarch had an average correlation of r=.43. Analyses designed to assess the utility of various APFT and Ruckmarch cut-off scores suggested that increasing minimum Ruckmarch scores would be an efficient way to raise success rates without eliminating potentially successful candidates.			
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**Research Report 1606**

# **Physical Performance Predictors of Success in Special Forces Assessment and Selection**

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FOREWORD

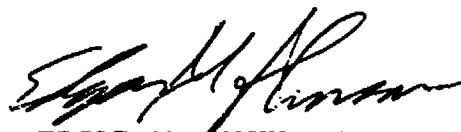
The research described in this report is the result of a collaborative effort by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) and the John F. Kennedy Special Warfare Center and School at Fort Bragg, North Carolina. The work was completed as part of the Personnel Utilization Technical Area's work directive that covers research designed to assist in the identification, recruitment, assessment, selection, and utilization of Special Forces personnel.

The complexity of Special Forces missions throughout the world and the increasing need for highly qualified personnel to meet Special Forces manpower requirements mandate a heightened research focus on the assessment and selection of personnel. ARI's commitment to provide this kind of research support is documented in a June 1991 Memorandum of Agreement between the U.S. Army Special Operations Command (USASOC) and ARI.

This research focuses on the relationship between early indicators of physical fitness and endurance in the Special Forces Assessment and Selection (SFAS) program and ultimate success in SFAS. Results indicate that performance on a Ruckmarch test administered early in the program is a strong predictor of overall success in the program. The report discusses the implications of the findings for efforts to enhance the quality of Special Forces volunteers and increase the percentage of successful candidates.

The results of this research have been briefed to the Special Warfare Center and School and have been used as the basis for a new initiative (a pre-SFAS Physical Training Handbook) to attract highly motivated, physically fit volunteers to Special Forces. Research to evaluate the utility of the Physical Training Handbook will be part of ARI's Special Forces research program for FY92.

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# PHYSICAL PERFORMANCE PREDICTORS OF SUCCESS IN SPECIAL FORCES ASSESSMENT AND SELECTION

## EXECUTIVE SUMMARY

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### Requirement:

The John F. Kennedy Special Warfare Center and School (SWCS) at Fort Bragg, North Carolina, conducts the Special Forces Assessment and Selection (SFAS) program and Special Forces training. The staff at the Special Warfare Center requires data on factors associated with success in SFAS to make decisions about screening criteria and potential changes in assessment procedures and standards. The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) conducted this research to address specific questions raised by SWCS staff about physical performance in SFAS.

### Procedure:

The Special Warfare Center maintains a personnel and performance database on SFAS candidates. Data from the 25 SFAS classes conducted between October 1988 and June 1991 were provided to ARI for this research. Correlational analyses were supplemented by analyses examining SFAS success rates within categories defined by scores on the Army Physical Fitness Test (APFT) administered at Fort Bragg and scores on the first Ruckmarch event in SFAS.

### Findings:

The Ruckmarch was a better predictor of success in SFAS than the APFT, with an average correlation across 3 fiscal years of .42. The select rate and cut-off analyses also suggested that select rates could be improved with a minimal loss of potentially successful candidates if the 10 percent of the candidates in the poorest Ruckmarch performance category could be eliminated from SFAS. In contrast, stricter screening standards on the APFT would increase the overall select rate only slightly and eliminate a greater proportion of candidates who would probably succeed in SFAS.

Utilization of Findings:

The results suggest that effort to raise the minimum or average Ruckmarch performance level of incoming SFAS candidates would lower assessment costs and increase select rates. Preliminary findings from this research prompted the Special Warfare Center, Special Forces recruiters, and ARI to design a pre-SFAS Physical Training Handbook. The utility of this handbook for increasing the fitness level of SFAS candidates will be evaluated by SWCS and ARI in FY92.



**PHYSICAL PERFORMANCE PREDICTORS OF SUCCESS IN SPECIAL FORCES  
ASSESSMENT AND SELECTION**

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# PHYSICAL PERFORMANCE PREDICTORS OF SUCCESS IN SPECIAL FORCES ASSESSMENT AND SELECTION

## Introduction

### Background

Special Forces (SF) soldiers are distinguished by many characteristics, among them, their physical endurance and ever-present rucksacks. Deploying without the logistical support available to conventional forces, Special Forces soldiers carry on their backs what they need to survive and fight. A fully loaded operational rucksack can easily weigh up to 100 pounds, and for many missions this load must be carried long distances over difficult terrain. Physiological research suggests that Special Forces soldiers are the most physically fit in the Army, particularly with respect to lean body mass and aerobic fitness (Muza et al., 1987). Yet, even for this highly conditioned group of soldiers, Ruckmarches are reported to be the most physically demanding tasks performed on the job (Army Occupational Survey Program, 1988).

Any program to select Special Forces soldiers needs to take into account the strength and endurance requirements of the job. The ability to meet Army physical fitness standards does not, alone, indicate that a soldier is fit to perform physically demanding tasks over a long period of time (Dewulf, 1987). Light infantry soldiers, for example, experienced difficulty bearing 42 pound (average) loads during a five day continuous operations scenario that began with a 10-mile road march (Army Physical Fitness Research Institute, 1984). The types of injuries sustained (lower back pain, muscle spasms) and field observations indicated that soldiers were not adequately conditioned for walking long distances while bearing a basic combat load. This is typical of the Army at large, where loads required in combat typically exceed both recommended standards and what soldiers have been trained to carry (Buckalew, 1990).

Physical conditioning is clearly an important determinant of a soldier's ability to carry heavy loads. Upper and lower body strength and endurance, leg strength and endurance, balance, and aerobic fitness are all physical components of load bearing performance (Buckalew, 1990). Psychological factors, however, particularly motivation, are equally important (Buckalew, 1990). Motivation determines whether or not a soldier quits or carries on when he is reaching his physical limits. Motivation, combined with self-discipline, is also likely to determine the extent to which a soldier trains to build the strength and endurance required to carry heavy loads.

From an assessment perspective, the challenge faced by the U.S. Army John F. Kennedy Special Warfare Center and School (USAJFKSWCS) is to design tests or events that measure both the physical and the psychological attributes required for successful

performance. In order to meet this challenge, the 21-day Special Forces Assessment and Selection (SFAS) program includes a variety of events, requiring a variety of physical, intellectual and psychological capabilities. The focus of the present research, however, is limited to two physical performance indicators, the Army Physical Fitness Test (APFT) and a ruckmarch conducted early in the program.

### Purpose

One purpose of this report is to examine the fitness level of candidates reporting for SFAS over the past three years. The SFAS application packet warns candidates that they will be required to "climb obstacles 20-30 feet high, swim while in uniform, and travel great distances cross country while carrying a rucksack with a MINIMUM of 45 pounds." Applicants are also strongly encouraged to complete a 5-week physical training program that emphasizes long rucksack marches and sets a goal of 240 on the Army Physical Fitness Test (APFT). In earlier classes, a disappointingly small percentage of candidates appeared to have followed a rigorous pre-SFAS conditioning program.

A second purpose is to explore the relationship of these two physical performance measures to success in SFAS. These analyses provide information on the degree to which the fitness and motivation levels reflected in the APFT and ruckmarch tests predict overall performance in SFAS.

A third objective is to provide information on the likely consequences of changing the distribution of APFT and ruckmarch scores through pre-screening or pre-training. From a selection perspective, a critical challenge is to identify optimal standards for both pre-requisites and course events. The cut-off analyses provide estimates of the costs and benefits associated with different and more stringent pre-requisites.

### Method

#### Sample

The total sample consists of candidates from the 25 SFAS classes conducted in fiscal years (FY) 1989, 1990 and 1991 (October 1989 through June 1991). The analysis sample is limited to candidates who met all SFAS pre-requisites (swim test, APFT, medical, administrative) and were present for the first SFAS graded event at Camp Mackall on the fourth day of the program.

In FY89, a total of 2354 candidates reported to Ft. Bragg for nine SFAS classes. Out of this group, 2059 (87%) were present for the first graded event at Camp Mackall; the other 13% were dropped during in-processing at Ft. Bragg mainly because

they failed the swim test (a published pre-requisite), had incomplete records or were medically disqualified.

In FY90, 2386 candidates reported for the eight SFAS classes and 2074 (87%) were dropped prior to the first graded event. In FY90 the APFT pre-requisite was enforced for the first time, so candidates dropped during in-processing include those who failed the APFT test, as well as those who failed to meet the other (swim, administrative and medical) pre-requisites. On the APFT, candidates are required to have a minimum total score of 206, and minimum component scores (sit-ups, push-ups, run) of 60 based on 17-21 year old standards. Eleven percent (11%) of the candidates reporting for SFAS after the new policy went into effect were dropped prior to assessment for failing to meet these published (in the application packet) standards.

In FY91, 2236 candidates reported to Camp Mackall and 1863 (83%) were present for the first event. Ten percent (10%) of the candidates reporting for the course were dismissed for failing the APFT.

Across all three fiscal years, 88% to 89% of the SFAS candidates were enlisted, the majority in pay grades E-4 and E-5. In FY89 and FY90, 78% and 80% of the sample, respectively, were active duty soldiers. The remainder were from the National Guard (8% in FY89, 10% in FY90) and the U.S. Army Reserve (14% in FY89, 10% in FY90). The percent on active duty dropped to 67% in FY91, primarily because of the new policy allowing prior service candidates to re-enter the Army for Special Forces training. Ten percent (10%) of the FY91 sample consisted of these prior service candidates, 16% were National Guardsmen and 7% were Reservists.

### Measures

The physical performance predictors examined in this report include total scores on the standard Army Physical Fitness Test (APFT) administered during SFAS in-processing and times for the Ruckmarch event.

The APFT consists of three components: sit-ups, push-ups, and a 2-mile run. A score is derived for each component based on standards established for 17 to 21 year olds, and the total score is the sum of the three component scores. A higher score indicates better performance. Entering candidates in FY90 and FY91 who failed to meet these standards when they were tested at Ft. Bragg were dropped during in-processing and are not included in the analyses. APFT failures in FY89 and the first FY90 class were allowed to continue, and thus are included in the analysis sample if they were present for the first graded event.

The Ruckmarch is administered the morning of the fifth day of SFAS. The conditions and standards for the Ruckmarch are

considered sensitive and will not be reported. Lower Ruckmarch scores indicate faster times, and thus better performance. The slightly smaller sample sizes for the Ruckmarch analyses reflect the fact that some candidates voluntarily withdraw at the end of day 4 (prior to the event) or are dropped because of injuries.

The criterion variable was the candidate's final status in SFAS. The "Grads" category (coded "1") includes those who successfully completed SFAS and were selected for the Special Forces Qualification Course (SFQC). "Non-grads" (coded "0") include those who voluntarily withdrew from SFAS, were dropped for medical reasons (or rarely, administrative reasons) or were deemed unsuitable by one of the two SFAS selection review boards. The physical performance scores and final SFAS outcomes were obtained from a database provided to ARI by the JFK Special Warfare Center and School. Final outcomes for candidates in the analysis sample are displayed in Figure 1.

## Results

### Descriptive Statistics and Correlational Analyses

Descriptive statistics and intercorrelations among the variables are shown in Table 1. As is the case with all the analysis reported here, statistics are based only on "viable" candidates - those who met all pre-requisites and participated in the first SFAS event on Day 4.

The lower mean APFT score in FY89 reflects the fact that candidates with APFT scores below 206 were allowed to continue in SFAS that year. Otherwise, performance scores are quite stable across years. The grad/non-grad means reflect the percentage of successful candidates each year. There was a marked drop in the select rate from FY90 (53%) to FY91 (47%).

The correlations in Table 1 indicate that the Ruckmarch is a better predictor of success in SFAS than the APFT. The average correlation across years between the Ruckmarch and Grad/Non-grad status is .43, compared to an average correlation of .25 for the APFT. The two physical performance measures are modestly related (average  $r=.34$ ), displaying the weakest relationship in FY90.

Table 2 shows the mean APFT and Ruckmarch scores for successful and unsuccessful candidates. Graduates scored 9 to 15 points higher on the APFT and were about 5 minutes faster on the Ruckmarch than non-graduates.

**SFAS FY89 - FY91**  
**FINAL OUTCOMES FOR CANDIDATES PRESENT**  
**FOR FIRST SFAS EVENT (DAY 4)**

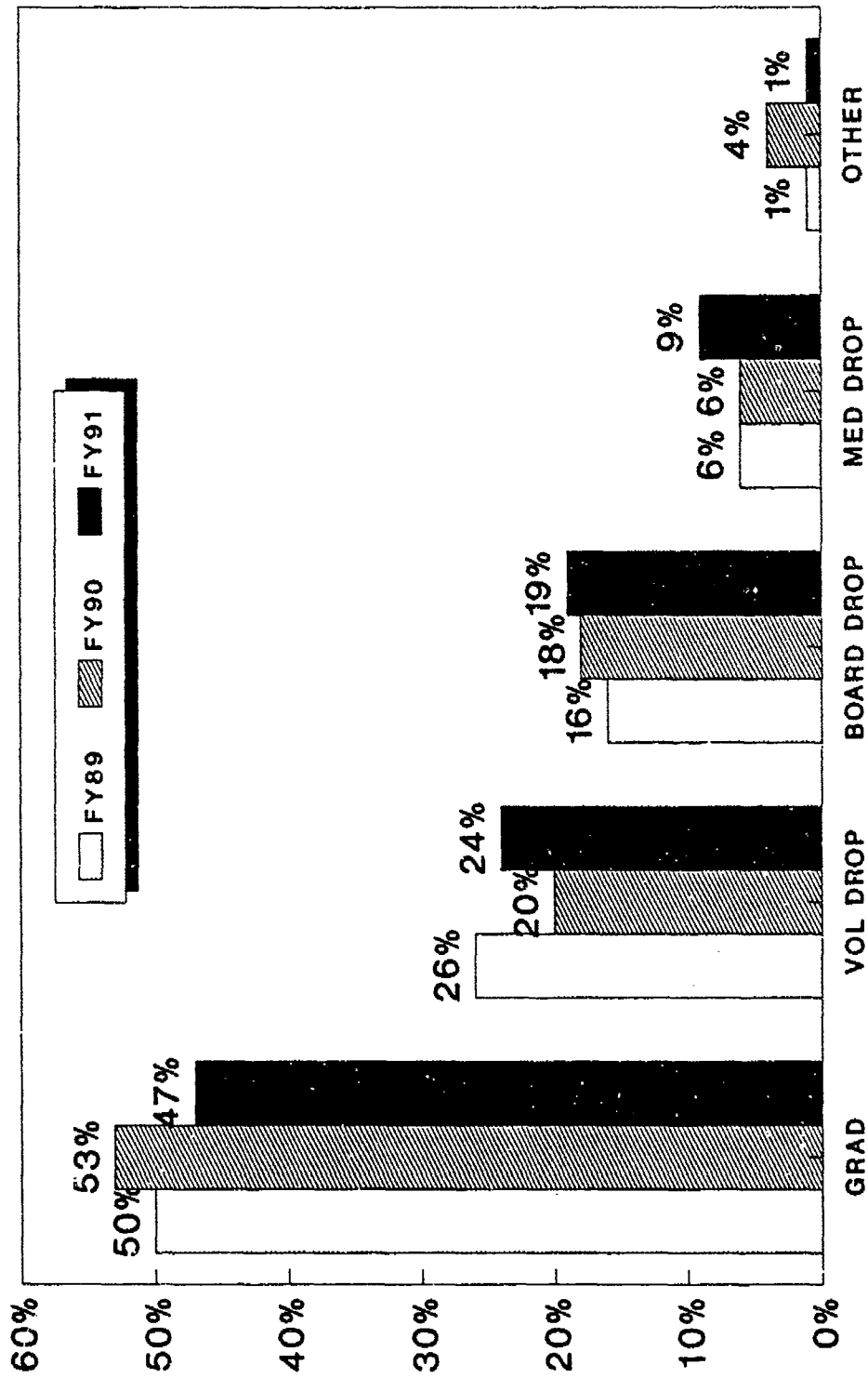


Figure 1

Table 1

Descriptive Statistics and Correlations by Fiscal Year for  
Candidates with APFT Scores of 206 or More

FY89	N	Mean	SD	Correlations	
				APFT	Ruck
APFT	2051	234	26		
Ruckmarch	1978	56.1	6.1	-.40	
Grad/non-grad	2059	.50	.50	.28	-.41
FY90	N	Mean	SD	Correlations	
				APFT	Ruck
APFT	1941	239	21		
Ruckmarch	2012	57.0	6.1	-.28	
Grad/non-grad	2074	.53	.50	.24	-.42
FY91	N	Mean	SD	Correlations	
				APFT	Ruck
APFT	1863	237	20		
Ruckmarch	1843	57.4	5.8	-.35	
Grad/non-grad	1863	.47	.50	.23	-.43

Note. APFT scores were not available for SFAS class 2-90. All correlations are significant at  $p < .05$ .

Table 2

Grad and Non-Grad Means on Physical Performance Variables

	FY89		FY90		FY91	
	Grad	Non-grad	Grad	Non-Grad	Grad	Non-Grad
APFT	242	227	244	234	242	233
Ruckmarch	53.6	58.7	54.7	59.8	55.0	60.0

Note. Differences between all Grad vs. Non-grad means are significant at  $p < .05$ .



## Score Distributions and Select Rate Analyses

For the analyses in this section, APFT and Ruckmarch scores are collapsed into eight categories in order to better illustrate score distributions and predictor/criterion relationships. Most categories contain an equivalent range of scores (10 points for the APFT and 2 minutes for the Ruckmarch). Groups at the tails of the distribution, however, include a smaller or larger range of scores to avoid disproportionately large or small groups for the select rate analyses.

Army Physical Fitness Test (APFT) Scores. Figure 2 shows the distribution of APFT scores for each fiscal year. In order to facilitate comparisons across years, the distribution is based only on candidates who met the APFT minimum of 206. This criterion excludes the 13% (n=259) of the total FY89 candidates who made it to Day 4 but scored below 206 on the APFT (22% of whom were Grads). Also excluded are the 2% (n=36) of the FY90 candidates (all from 1-90) who were allowed to continue with failing APFT scores (8% of whom graduated). The chart thus shows how FY89 and FY90 APFT scores would compare to FY91 scores if APFT failures from all three years had been dismissed from SFAS.

The slight shift to the left in the curve for FY91 indicates that fewer candidates excelled in the APFT in FY91 relative to earlier years. Only 26% scored at or above 250 in FY91 compared to 31% in FY90 and 33% in FY89.

The relationship between APFT scores and likelihood of being selected for the SFQC ("Grad" status) is graphed in Figure 3. There is a clear linear relationship between APFT scores and probability of success in SFAS. Yet, as one would expect given the low correlation, select rates increase only gradually as performance improves. Averaging across the three years, the probability (62%) that a candidate in a moderately high performance category (250 to 259) will be selected is only 20% greater than the probability (42%) that a candidate in a moderately low performance category (220-229) will be selected.

A comparison of select rates across years indicates that the trend is quite stable, although in FY91, candidates in the lowest categories (under 220) and the very highest category (270-300) were slightly less likely to be successful than they were in earlier years.

Ruckmarch Scores. The distribution of Ruckmarch scores for each fiscal year is illustrated in Figure 4. In FY90 and FY91, the distributions are very similar and relatively flat, with no fewer than 7% and no more than 19% in any category. The FY89 distribution, on the other hand, is distinguished by the peak at the positive end of the distribution. More candidates excelled at the Ruckmarch in FY89.

# SFAS FY89 - FY91 DISTRIBUTION OF APFT SCORES

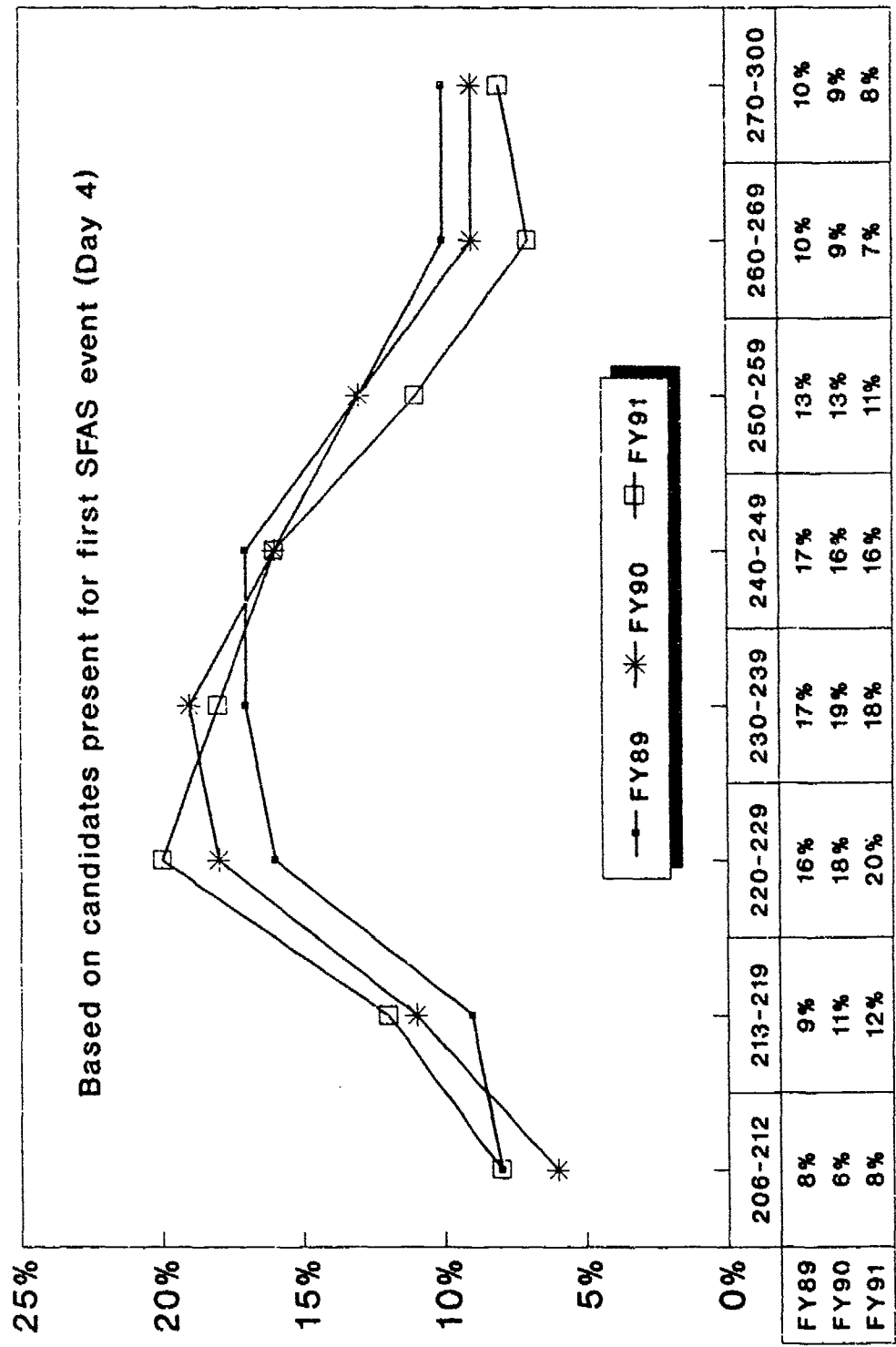


Figure 2

# SFAS FY89 - FY91 SELECT RATES WITHIN APFT GROUPS

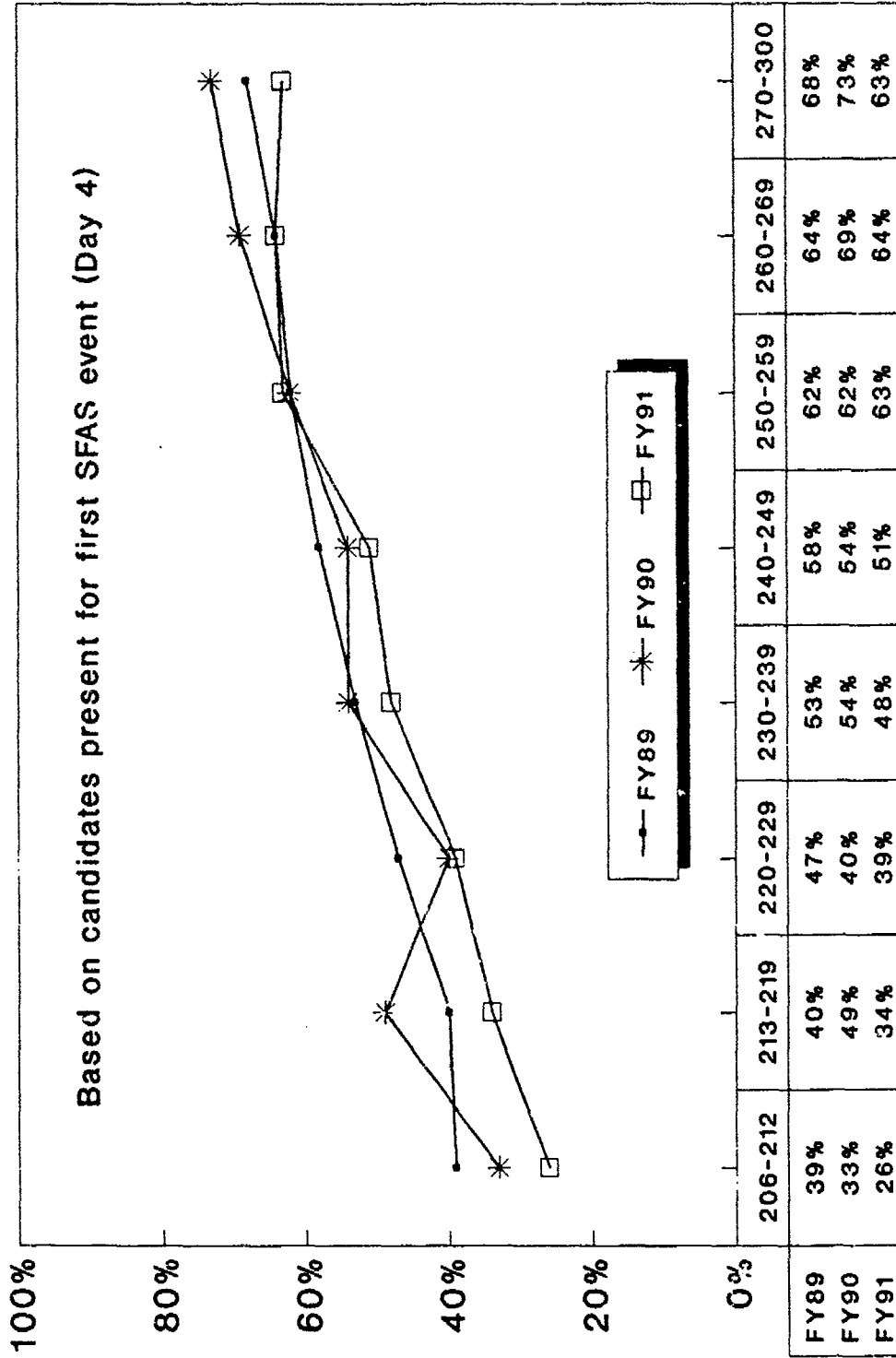


Figure 3

# SFAS FY89 - FY91 DISTRIBUTION OF RUCKMARCH SCORES

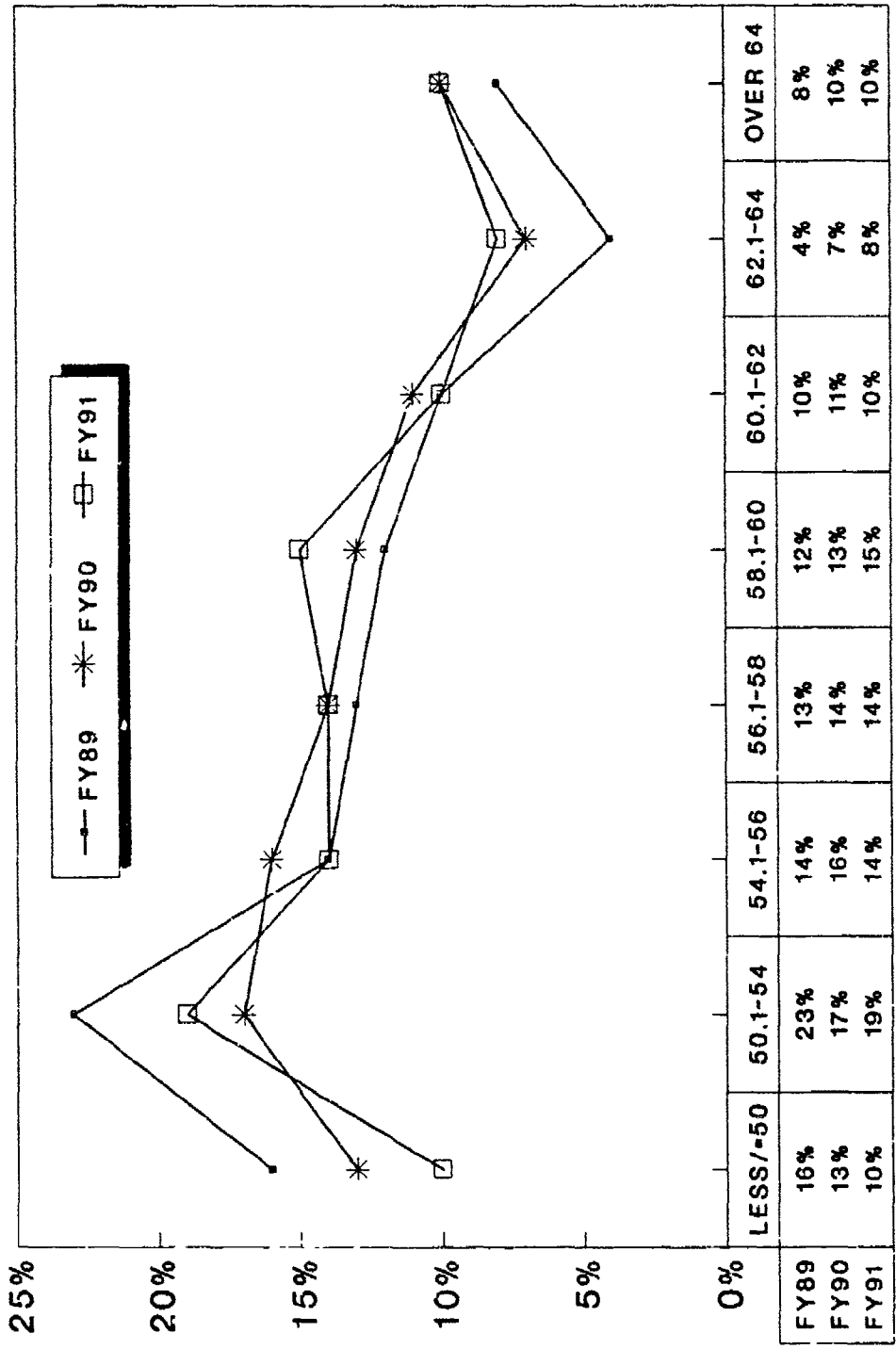


Figure 4

The distribution of Ruckmarch scores in SFAS is important because of the strong relationship between Ruckmarch times and selection for the SFQC. As noted above, the average correlation between Ruckmarch times and Grad/Non-grad status was  $r=.42$ . This relationship is depicted graphically in Figure 5.

Overall, there is a fairly sharp, consistent decline in select rates going from the high performance (faster times) to the low performance (slower times) categories. In FY91, for example, the select rate (60%) for candidates in a moderately high performance category (54-56) is 32% higher than the select rate (28%) for candidates in a moderately low performance category (60-62). The difference is not as large in FY89 and FY90 (about 27%), but it is still substantial.

The most noticeable difference in the trend lines for the three years is the slightly higher select rate for FY90 candidates across all except the extreme categories.

#### Hypothetical Cut-off Analyses

Analyses based on hypothetical cut-off scores provide a different perspective on the data. For these analyses, candidates were assigned to groups based on whether or not their scores met or fell below a hypothetical cut-off score. This way of grouping candidates allows the potential implications of different pre-requisites, or screening criteria, to be examined, both in terms of resulting select rates and the number of potentially successful candidates eliminated.

APFT cut-off analyses. Results of the APFT cut-off analyses for FY91 are presented in Table 3. The hypothetical cut-off scores selected for the APFT were 215, 220, 225 and 230. The first column in the table shows the number and percent of candidates present for the first event who met ("Above" row) and failed to meet ("Below" row) the cut-off.

The percentage of candidates with scores below a cut-off provides a basis for estimating how many currently eligible volunteers would not be admitted if the hypothetical cut-off were used to pre-screen candidates. If the APFT cut-off were raised to 220, for example, the FY91 results indicate that 20% fewer candidates would have been admitted. The number of excluded candidates ( $n=318$ ) exceeds the size of an average SFAS class.

The next two columns show the number and percent of Non-Grads and Grads among those who would have been eliminated (below the cut-off) and admitted (at or above the cut-off) with a particular cut-off score. The percentage of Grads in the admitted group is an estimate of the select rate the cut-off would produce.

# SFAS FY89 - FY91 SELECT RATES WITHIN RUCKMARCH GROUPS

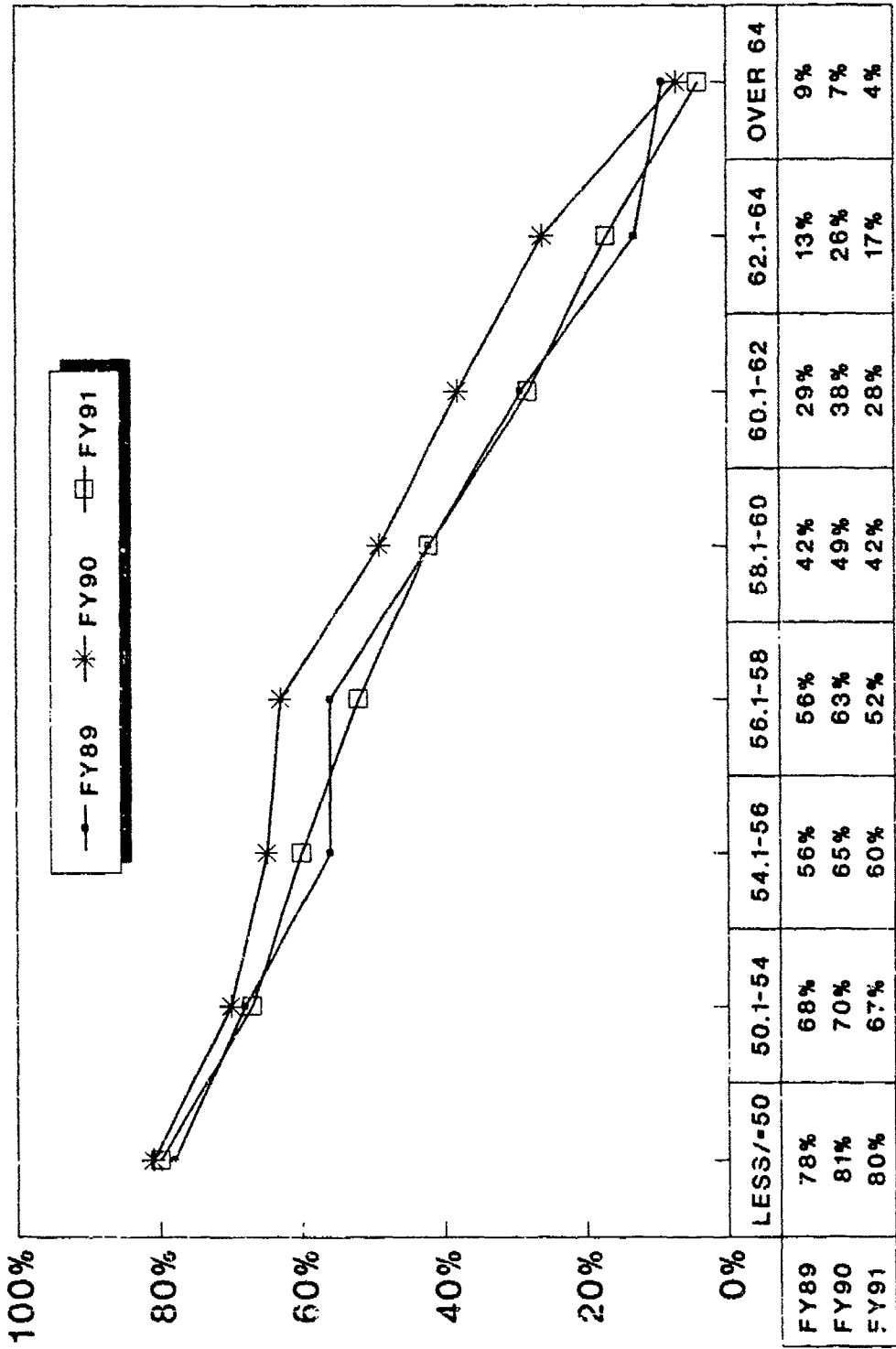


Figure 5

Table 3

<b>SFAS FY 91</b>						
<b>Projected Results with Different APFT Cut-off Scores</b>						
	<b>Total in Cut-off Groups</b>		<b>Non-Grads</b>		<b>Grads</b>	
<b>APFT Scores</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b><u>Cut-off: 215</u></b>						
Below (206-214)	228	12%	174	76%	54	24%
Above (215-300)	1635	88%	816	50%	819	50%
<b><u>Cut-off: 220</u></b>						
Below (206-219)	381	20%	264	69%	117	31%
Above (220-300)	1482	79%	726	49%	756	51%
<b><u>Cut-off: 225</u></b>						
Below (206-224)	568	31%	384	68%	184	32%
Above (225-300)	1295	69%	606	47%	689	53%
<b><u>Cut-off: 230</u></b>						
Below (206-229)	758	41%	495	65%	263	35%
Above (230-300)	1105	59%	495	45%	610	55%

Note. Analysis sample (N=1863) includes only candidates who met all pre-requisites and were present for first SFAS event (Day 4). Overall 47% (N= 873) of this group were Grads, 53% (N=990) were Non-Grads.

Although the projected select rate is important, the number of graduates among the excluded candidates may be more important when manpower requirements have not been met. A higher cut-off might allow fewer or smaller classes and a higher select rate, but exclude too many potentially successful candidates.

Table 4 shows a way of summarizing the results of the cut-off analysis tables in terms of personnel costs and benefits. With an APFT cut-off of 220, for example, there is only a slight increase in the select rate (51%), and almost one third (31%) of the eliminated candidates would have been successful. This translates into a loss of 13% (n=117) of the graduates produced with the current cut-off (206), and this cost is likely to outweigh the benefits of a slightly higher select rate and fewer candidates to assess. With a cut-off of 230, there is still only a small increase in the select rate, and a considerably higher reduction in the number of graduates produced.

Tables A-1 and A-2 in the Appendices show the results of the same APFT cut-off analyses for FY90 and FY91. These tables are provided for comparison purposes. It is also possible that results of the FY89 or FY90 analyses might provide better outcome projections for the future. Because of Operation Desert Shield, for example, FY91 candidates may not be representative of the types of volunteers expected in the future. Thus, FY90 data may provide better estimates of the consequences of establishing different cut-offs. Similarly, if certain policies (e.g., accepting prior service candidates) in effect in FY91 are not expected to continue, analyses from earlier years may provide more accurate projections.

Ruckmarch cut-off analyses. Similar cut-off analyses were conducted for the Ruckmarch, with hypothetical cut-off times of 58, 60, 62, and 64 minutes. The stronger relationship between Ruckmarch scores and SFAS success suggests that Ruckmarch cut-offs should be more efficient than higher APFT cut-offs in terms of increasing the select rate and minimizing the number of successful candidates excluded.

Results for FY91 are displayed in Table 5 (FY89 and FY90 cut-off tables are in the Appendix). Table 6 summarizes costs and benefits for cut-offs of 54 and 60 minutes.

The least stringent cut-off, 64 minutes, would only eliminate 10% of the currently admitted candidates, and very few (8%) of the excluded candidates would be likely to successfully complete SFAS. The very small reduction in the number of graduates produced (1%) would be offset by a 5% increase in the SFAS select rate (52% vs. 47% without a cut-off).



Table 4

SFAS FY 91

Projected Outcomes with Higher APFT Cut-off Scores

I. Accept only candidates with APFT scores of 220 or more:

Costs

- 31% (N = 117) of those excluded would have been successful
- SFAS produces 13% fewer graduates (117/873)

Benefits

- 51% (N = 756) of those assessed would be successful
- SFAS assesses 20% fewer candidates (381/1863)

II. Accept only candidates with APFT Scores of 230 or more:

Costs

- 35% (N = 263) of those excluded would have been successful
- SFAS produces 30% fewer graduates (263/873)

Benefits

- 55% (N = 610) of those assessed would be successful
- SFAS assesses 41% fewer candidates (758/1863)

Table 5

<b>SFAS FY 91</b> <b>Projected Results with Different Ruckmarch Cut-off Scores</b>						
	<b>Total in Cut-off Groups</b>		<b>Non-Grads</b>		<b>Grads</b>	
<b>Ruckmarch Scores</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b><u>Cut-off: 58</u></b>						
<b>Over 58</b>	<b>791</b>	<b>43%</b>	<b>587</b>	<b>74%</b>	<b>204</b>	<b>26%</b>
<b>58 or below</b>	<b>1052</b>	<b>57%</b>	<b>383</b>	<b>36%</b>	<b>669</b>	<b>64%</b>
<b><u>Cut-off: 60</u></b>						
<b>Over 60</b>	<b>510</b>	<b>28%</b>	<b>424</b>	<b>83%</b>	<b>86</b>	<b>17%</b>
<b>60 or below</b>	<b>1333</b>	<b>72%</b>	<b>546</b>	<b>41%</b>	<b>787</b>	<b>59%</b>
<b><u>Cut-off: 62</u></b>						
<b>Over 62</b>	<b>319</b>	<b>17%</b>	<b>287</b>	<b>90%</b>	<b>32</b>	<b>10%</b>
<b>62 or below</b>	<b>1524</b>	<b>83%</b>	<b>683</b>	<b>45%</b>	<b>841</b>	<b>55%</b>
<b><u>Cut-off: 64</u></b>						
<b>Over 64</b>	<b>180</b>	<b>10%</b>	<b>172</b>	<b>96%</b>	<b>8</b>	<b>4%</b>
<b>64 or below</b>	<b>1663</b>	<b>90%</b>	<b>798</b>	<b>48%</b>	<b>865</b>	<b>52%</b>

Note. Analysis sample (N=1843) includes only candidates with valid (non-missing) Ruckmarch scores. Overall 47% (N=873) were Grads, 53% (N=970) were Non Grads.

Table 6

**SFAS FY 91**  
**Projected Outcomes with Ruckmarch Cut-Off Scores**

**I. Accept only candidates with Ruckmarch scores of 64 minutes or less:**

Costs

- 4% (N=8) of those excluded would have been successful
- SFAS produces 1% fewer graduates (8/873)

Benefits

- 52% (N=865) of those assessed would be successful
- SFAS assesses 10% fewer candidates (160/1843)

**II. Accept only candidates with Ruckmarch Scores of 60 minutes or less:**

Costs

- 17% (N=86) of those excluded would have been successful
- SFAS produces 10% fewer graduates (86/873)

Benefits

- 59% (N=787) of those assessed would be successful
- SFAS assesses 28% fewer candidates (510/1843)

The stricter 60 minute cut-off would reduce by 28% the number of candidates assessed, most likely allowing two of the eight or nine scheduled classes each year to be eliminated. The select rate for those admitted would be 59%. Whether or not this increase in efficiency would be worth the cost - producing about 10% fewer candidates over the course of the year, would have to be weighed against the need to fill the SF Qualification Course.

### Discussion

The results presented here indicate that many of the volunteers for SFAS over the past three years are not capable of meeting the arduous physical demands of SFAS. Despite published APFT pre-requisites, dissemination of a recommended physical training program in the application packet, and warnings to candidates that they will have to carry a rucksack for long distances in SFAS, physical endurance is still a problem. True to the description of SFAS provided to students, the program is physically demanding, and early indicators of fitness are clearly related to the likelihood of success.

As Buckalew (1990) notes, however, psychological factors may be as important as physical condition when it comes to the performance of physically demanding tasks over a long period of time. From this perspective, performance on the ruckmarch early in SFAS may reflect a candidate's motivation to become a Special Forces soldier, as well as his physical condition. It is likely that soldiers who truly want to be in SF were motivated to train with a rucksack prior to SFAS and will push themselves well beyond their physical comfort level once they are in SFAS.

The correlations and cut-off analyses suggest that the current APFT pre-requisite is probably adequate to screen out candidates whose lack of speed and upper body strength make it very unlikely that they will succeed. Candidates do not necessarily need to excel on the APFT, simply demonstrate a moderate level of fitness. Initial performance on the ruckmarch, on the other hand, is quite strongly related to success in SFAS. The results suggest that candidates who arrive at SFAS with the leg strength, back strength, and aerobic capacity to perform at the level suggested in the application packet are very likely to do well in SFAS. It must be noted, however, that the relationship between the ruckmarch and success in SFAS is at least partly attributable to the fact that performance on this event is one of several factors the board considers in their decision to drop a small number of candidates at the end of the first phase (the first 10 days) of SFAS.

The analyses based on hypothetical ruckmarch cut-offs suggested that the Special Warfare Center could increase select rates with minimal losses in the number of graduates by simply

eliminating the 10% of each class who cannot complete the ruckmarch in less than 64 minutes. One way to do this is to establish procedures for pre-screening volunteers on the basis of a ruckmarch test prior to their reporting to Ft. Bragg. Pre-screening on the ruckmarch may be impractical, however, because of the difficulties inherent in creating and administering standardized field tests across numerous, widely dispersed posts.

Another way to increase the select rate without losing graduates is to reduce the physical demands in SFAS or lower standards. Experts in the SF community are wary of this approach, however, because a willingness and ability to perform difficult physical tasks for an extended period of time is clearly required in Special Forces.

Another approach would be to try to more clearly communicate physical endurance and ruckmarch requirements to prospective SFAS candidates. This could motivate those who truly want to be in SF to complete a conditioning program on their own, and encourage those who lack the will or ability to perform to these standards to withdraw their applications. A test of the effectiveness of a new pre-SFAS Physical Training Handbook will begin in FY92 and should provide data on the effectiveness of this approach.

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**APPENDIX**

**PROJECTED RESULTS WITH DIFFERENT APFT AND RUCKMARCH  
CUT-OFF SCORES FOR FY89 AND FY90**

Table A-1

<b>SFAS FY 89</b>						
<b>Projected Results with Different APFT Cut-off Scores</b>						
	<b>Total in Cut-off Groups</b>		<b>Non-Grads</b>		<b>Grads</b>	
<b>APFT Scores</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b><u>Cut-off: 215</u></b>						
<b>Below (206-214)</b>	<b>177</b>	<b>10%</b>	<b>112</b>	<b>63%</b>	<b>65</b>	<b>37%</b>
<b>Above (215-300)</b>	<b>1615</b>	<b>90%</b>	<b>704</b>	<b>44%</b>	<b>911</b>	<b>56%</b>
<b><u>Cut-off: 220</u></b>						
<b>Below (206-219)</b>	<b>304</b>	<b>17%</b>	<b>184</b>	<b>61%</b>	<b>120</b>	<b>39%</b>
<b>Above (220-300)</b>	<b>1488</b>	<b>83%</b>	<b>632</b>	<b>42%</b>	<b>856</b>	<b>58%</b>
<b><u>Cut-off: 225</u></b>						
<b>Below (206-224)</b>	<b>441</b>	<b>25%</b>	<b>263</b>	<b>60%</b>	<b>178</b>	<b>40%</b>
<b>Above (225-300)</b>	<b>1351</b>	<b>75%</b>	<b>553</b>	<b>41%</b>	<b>798</b>	<b>59%</b>
<b><u>Cut-off: 230</u></b>						
<b>Below (206-229)</b>	<b>593</b>	<b>33%</b>	<b>336</b>	<b>57%</b>	<b>257</b>	<b>43%</b>
<b>Above (230-300)</b>	<b>1199</b>	<b>67%</b>	<b>480</b>	<b>40%</b>	<b>719</b>	<b>60%</b>

Note. Analysis sample (N=1792) includes only candidates who met FY 89 pre-requisites (APFT pre-requisite not enforced) and were present for first SFAS event (Day 4). Overall, 54.5% (N=976) of this group were Grads, 45.5% (N=816) were Non-Grads.



Table A-2

<b>SFAS FY 90</b>						
<b>Projected Results with Different APFT Cut-off Scores</b>						
	<b>Total in Cut-off Groups</b>		<b>Non-Grads</b>		<b>Grads</b>	
<b>APFT Scores</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b><u>Cut-off: 215</u></b>						
Below (206-214)	173	9%	109	63%	64	37%
Above (215-300)	1732	91%	774	45%	958	55%
<b><u>Cut-off: 220</u></b>						
Below (206-219)	314	17%	179	57%	135	43%
Above (220-300)	1591	83%	704	44%	887	56%
<b><u>Cut-off: 225</u></b>						
Below (206-224)	463	24%	271	59%	192	41%
Above (225-300)	1442	76%	612	44%	830	58%
<b><u>Cut-off: 230</u></b>						
Below (206-229)	653	34%	383	59%	270	41%
Above (230-300)	1252	66%	500	40%	752	60%

Note. Analysis sample (N=1905) includes only candidates who met all pre-requisites and were present for first SFAS event (Day 4). Overall 53% (N=1094) of this group were Grads, 47% (N=980) were Non-Grads.

Table A-3

<b>SFAS FY 89</b>						
<b>Projected Results with Different Ruckmarch Cut-off Scores</b>						
	<b>Total</b>		<b>Non-Grads</b>		<b>Grads</b>	
<b>Ruckmarch Scores</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b><u>Cut-off: 58</u></b>						
Over 58	668	34%	491	73%	177	27%
58 or below	1310	66%	450	34%	861	66%
<b><u>Cut-off: 60</u></b>						
Over 60	436	22%	357	82%	79	18%
60 or below	1543	78%	584	38%	959	62%
<b><u>Cut-off: 62</u></b>						
Over 62	247	12%	222	90%	25	10%
62 or below	1732	88%	719	41%	1013	59%
<b><u>Cut-off: 64</u></b>						
Over 64	160	8%	146	91%	14	9%
64 or below	1819	92%	795	44%	1024	56%

Note. Analysis sample (N=1978) includes only candidates with valid (non-missing) Ruckmarch scores. Overall 52.5% (N=1038) were Grads, 47.5% (N=940) were Non-Grads.

Table A-4

<b>SFAS FY 90</b>						
<b>Projected Results with Different Ruckmarch Cut-off Scores</b>						
	<b>Total</b>		<b>Non-Grads</b>		<b>Grads</b>	
<b>Ruckmarch Scores</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b><u>Cut-off: 58</u></b>						
Over 58	813	40%	553	68%	260	32%
58 or below	1199	60%	367	31%	832	69%
<b><u>Cut-off: 60</u></b>						
Over 60	550	27%	418	76%	132	24%
60 or below	1462	73%	502	34%	960	66%
<b><u>Cut-off: 62</u></b>						
Over 62	336	17%	286	85%	50	15%
62 or below	1676	83%	634	38%	1042	62%
<b><u>Cut-off: 64</u></b>						
Over 64	199	10%	185	93%	14	7%
64 or below	1818	90%	735	40%	1078	60%

Note. Analysis sample (N=2012) includes only candidates with valid (non-missing) Ruckmarch scores. Overall 54% (N=1092) were Grads, 46% (N=920) were Non-Grads.