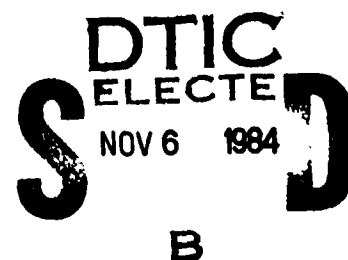# RETENTION SEVERITY INDEX (RSI) FOR NAVY RATINGS

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This report describes the retention severity index (RSI) developed to rank Navy ratings by the relative severity of the loss of experienced members at three reenlistment points. RSI was developed using a multiattribute utility function incorporating five personnel components: size, shortage, growth, cost, and priority.

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FOREWORD

This research and development was conducted under a work order with the Naval Postgraduate School within project Z1178-PN.03 (Retention of Career Personnel in Critical Ratings). The objective of this effort was to develop an index to measure the severity of personnel loss by rating for each selective reenlistment bonus zone. The index development was part of a project to develop and evaluate retention incentive packages.

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SUMMARY

Problems

Navy personnel managers do not have a systematic method of assessing the relative severity of the loss, by occupation, of experienced enlisted personnel. Such a method is needed in selecting targets for reenlistment incentives such as reenlistment bonuses. It could also be used in other activities requiring rating prioritization (e.g., recruiting, lateral entry, lateral moves).

Objective

The objective of this research was to develop a retention severity index (RSI) that will rank Navy ratings (occupations) by the relative severity of the loss of experienced personnel.

RSI Development

A total of 85 ratings were selected to be included in the RSI. A subset of demand and supply factors (components) were identified as having a significant impact on retention severity among Navy ratings: size, shortage, growth, cost, and priority. The five RSI components were measured to be compatible with selective reenlistment bonus (SRB) zones A, B, and C.

Each rating was ranked in terms of each component and then the rankings were intercorrelated. This analysis indicated that all five components were required for developing an RSI, with the size, cost, and priority component having the highest degree of intercomponent correlation.

The five RSI components comprised an additive multiattribute model. Each component was weighted by a factor developed to measure the relative importance of each RSI component to retention severity among Navy ratings. The multiattribute RSI model yielded three sets of RSI values for the 85 ratings—one set for each SRB zone. The intercorrelation of RSI values by reenlistment zone indicated a need for separate zone-specific RSIs.

Actual SRB bonus multiple assignments for FY83 were correlated with the computed RSI values. A moderate correlation of the RSI values from all zones with the FY83 zone specific bonus multiples resulted. Individual component analysis indicated that cost was the most important component for each zone in determining actual SRB multiples.

Recommendations

1. The RSI should be expanded to include more components affecting the assessment of reenlistment bonus (e.g., relative utility of experienced personnel within occupations, the substitutability among occupations, future shortfall, and the relative elasticity of bonuses across ratings).

2. The RSI method can be contrasted and compared with demand/supply models for reenlistment bonuses. Computer models containing relevant RSI components should be developed specifically for use by the Chief of Naval Operations (OP-132C and OP-136).

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INTRODUCTION

Problem

Since the inception of the all-volunteer force in 1973, the military services have had to compete actively in the civilian labor market to meet their essential manpower requirements--not only to recruit new accessions but also to retain experienced personnel. Historically, the Navy has relied on cash reenlistment incentives to aid recruitment and retention efforts. In 1791, all enlisted personnel who reenlisted received a bounty for reenlistment of $6. Today, those who reenlist may receive a selective reenlistment bonus (SRB), the amount of which (up to $20,000) is determined by the total length of service (LOS), the length of additional obligated service, and whether or not the member possesses a skill designated as "critical."

Three SRB zones--called A, B, and C--were established to define first, second, and third reenlistment windows. The LOS boundaries for these three zones are as follows:

1.   A = 21 months to 6 years.
2.   B = 6 years to 10 years.
3.   C = 10 years to 14 years.

All ratings (occupational skills) are assigned a level of bonus award for each SRB zone, called the SRB bonus multiple, that ranges from 0 to 6 at one-half multiple increments.[1] Under current SRB policy, the maximum payment is $16,000 for those in nonnuclear fields and $20,000 for those in nuclear fields.

Throughout the numerous modifications to the SRB Program, SRB policy has always required that a member be in a "critical" rating to be eligible for a reenlistment bonus. The procedure for determining a rating's degree of criticality has not been officially quantified. Nevertheless, in the past, ratings that need reenlistment bonuses to maintain sufficient manning levels have been identified through a series of negotiations primarily involving personnel in two branches of the Chief of Naval Operations' Military Personnel Policy Division (OP-13): (1) the SRB Manager in the Career Programs Branch (OP-136), and (2) the enlisted community managers (ECMs) in the Enlisted Community Management Branch (OP-132C) (see Butler, Neches, Zulli, Padon, & Opstad, 1980). This negotiation process involves computer models that forecast the total strength requirements, manpower goals, and feasible retention goals for the Navy, the current retention history, fiscal constraints, and the individual personality and experience of the SRB manager and the ECMs.

Objective

The objective of this research was to develop a prototype retention severity index (RSI) for assessing the retention severity of each rating. This index is not intended to replace the interaction between the SRB manager and the ECMs but, rather, to provide a consistent and flexible method to assist in this interactive process.

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[1]Bonus payments are computed as follows: (The SRB bonus multiple) x (member's monthly basic pay) x (years of additional obligated service), to the maximum allowable SRB.

Background

Butler et al. (1980), in their detailed study of the SRB Program, found that the majority of the models used by the SRB manager in OP-136 were inappropriate, outdated, or too complex. As a result, Butler et al. developed a model to provide the manpower data necessary to assign an appropriate bonus multiple for those ratings that were subjectively classified as "critical." Although this model, called B/REFT, was designed as a temporary means of budget forecasting for OP-136, it has evolved as one of the primary tools for determining the SRB multiples each fiscal year.

In 1982, OP-136C addressed the overall effectiveness of the SRB Program using data from FY81 and FY82.[2] The marginal cost of reenlistment for each rating at LOS cells 6, 10, and 14 was compared on three cost measures:

1. Training costs: An estimated rating-specific cost of training derived from CNET average costs adjusted by historical continuation rates.

2. BCM costs: A replacement cost measure derived from the Navy enlisted billet cost model (BCM) (Butler & Frankel, 1983a, 1983b) and historical continuation rates.[3]

3. CNA costs: A first-term replacement cost estimated by the Center for Naval Analyses (CNA) and adjusted by historical continuation rates. For servicemen in their first term (LOS 4), these costs, which include recruiting, recruit training, and "A" school training costs, are categorized by quality measures and then adjusted for attrition. For servicemen in LOS 5, they include the LOS 4 costs plus the SRB costs.

Balis and Driscoll (1983) estimated the optimum SRB award levels for first termers by using the Navy comprehensive compensation and supply study (NACCS) model, which was developed by CNA to predict the minimum cost mix between recruitment and reenlistment. Their results indicated the need for increased retention. Their estimates would raise the multiple used to determine the maximum bonus level from the present 6 to as high as 20 for 4YOs and 19 for 6YOs. They recommended expanding the SRB program as much as Congressional policy would permit to achieve the minimum cost balance between first-term enlistees and careerists.

Brazie (1982) developed a critical rating scale that would index Navy ratings based on two factors:

1. Mission criticality. The classification of ratings by primary mission categories, type of command, and operational platform unit.[4]

2. Replacement costs. An average cost estimation of replacing an individual in a particular rating at a specified LOS.

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[2]OP-136C memorandum Ser: 693823, 17 September 1982. For Assistant Deputy Chief of Naval Operations (Manpower, Personnel, and Training), subj: SRB Effectiveness.

[3]A replacement cost is an estimate of the training costs associated with replacing a service member in a particular rating and LOS cell. This cost estimate accounts for attrition by specifying the number of new accessions required to yield the desired petty officer.

[4]CNO (OP-64) letter 643C3/C000694 Ser: 789562, 26 September 1980, subj: UNITREP Mission Critial Ratings; and CINCPACFLT message R271722Z, October 1980, subj: Combat Readiness Assessment and Reporting.

Brazie's analysis yielded five separate rankings of rating criticality, none of which covered all Navy ratings.

Hearold (in press) studied models that either predict, measure, rank, or index Navy ratings by some measure of "criticality." She found that: (1) common definitions, for both rating criticality and priority, were needed, (2) some of the existing models, but not necessarily all, needed to be consolidated, (3) a rating index should be reproducible, acceptable to all users, and validated based on the purpose of the index, and (4) a rating index should augment human judgment and intuition, not replace it.

A parallel development of an attrition severity index was recently completed using the multiattribute utility method (Thomas, Elster, Euske, & Griffin, in press). The index used retention rates, replacement costs, rating size, rating requirement, and rating priority aggregated by a multiplicative model. It is used to determine assignment utility in the Classification and Assignment Within PRIDE (CLASP) system, which is used by Navy classifiers to place applicants in "A" schools.

RSI DEVELOPMENT

A total of 101 ratings were identified (see Appendix A) and 85 were selected to be included in the RSI. Of the 101 ratings, 4 (AS, ASE, ASH, and ASM) were deleted, as they are not authorized for all reenlistment zones. Also, 12 senior ratings (AB, AF, AM, AV, CT, CU, EQ, FT, GM, GS, PI, and SI) were deleted, as their LOS requirements are beyond the SRB program. Apprentice ratings were not considered.

RSI Components

An analysis of all the supply and demand factors determining SRB multiples for Navy ratings would be beyond the scope of the current effort. Thus, the RSI was derived based on five components identified as having a significant impact on retention severity among Navy ratings:

1. Size--The size of each rating's current inventory.

2. Shortage--The percent shortage (excess) of current manpower levels in each rating.

3. Growth--The percent growth in estimated future billet authorizations in each rating.

4. Cost--Replacement cost of a person for each rating.

5. Priority--Importance of each rating to the Navy.

Methods used to calculate these components are described below.

Size

The Navy enlisted master record (EMR) file for fiscal year 1982 (FY82), which includes all personnel on active duty during the period from 30 September 1981 to 30 September 1982, was used to develop manpower requirements data. So that the RSI would fit the LOS constraints in each SRB zone, the EMR data base was separated into three

LOS categories. The LOS boundaries for these categories correspond to those for the SRB zones: 21 months, 6 years, 10 years, and 14 years.

These boundaries were applied to the FY82 manpower inventories from the FY82 Navy EMR file to determine rating size by SRB zones. The FY82 inventories for the 85 ratings are listed in Appendix B. Within each zone, ratings are ranked from 1 for the rating with the smallest inventory to 85 for the rating with the largest inventory.

Shortage

In this effort, enlisted programmed authorizations (EPAs) were used to calculate current shortages and the objective force model (OFM), to measure future requirements. Since EPAs are given by rating and pay grade only, a method of expressing billet authorizations to parallel the current manpower inventories for each SRB zone had to be developed.

As shown in Table 1, the average current inventory for each SRB zone was dominated by two pay grades. The current inventory for pay grades E-4 and E-5 were used to represent SRB Zone A. Likewise, pay grades E-5 and E-6 represented SRB Zone B and pay grades E-6 and E-7, Zone C. The current inventory was computed separately for each rating within each SRB zone.

Table 1

Dominant Pay Grades for SRB Zones

SRB Zone	Dominant Pay Grades	Percent of Zone Inventory
A	E-4 & E-5	86
B	E-5 & E-6	80
C	E-6 & E-7	84

To identify the percent shortage (excess) of a rating's current inventory compared to that rating's billet authorizations, an equation was developed to compute the ratio of current inventory to billets authorized.

$$S_{kj} = \frac{\left[\left[\begin{array}{c}\text{Dominant pay grades} \\ \text{billets authorized}\end{array}\right]_{kj} - \left[\begin{array}{c}\text{Dominant pay grades} \\ \text{current inventory}\end{array}\right]_{kj}\right] \times 100}{\begin{array}{c}\text{Dominant pay grades} \\ \text{billets authorized}\end{array}_{kj}} \qquad (1)$$

4

where:

j = rating/ABE,...,UT,YN
k = zone/A,B,C

Rating specific shortages calculated for SRB zones A, B, and C using equation 1 are shown in Appendix B. A positive value for S_{kj} indicates a shortage of current inventory compared to billets authorized, and a negative value, an excess in manning. Within each zone, ratings are ranked from 1 for the rating with the smallest percentage of manpower shortage to 85 for the rating with the largest percentage.

Growth

OFM was used to assess the growth (future manpower demands) for Navy ratings. This computer model uses as its input the billets authorized in a given fiscal year for all Navy ratings. It applies both historical and projected continuation rates to the input data for estimating future billet authorizations. The OFM-derived future manpower demands are further adjusted by managerial and economic policies (i.e., expansion, reduction, or elimination of a rating).

Billets authorized for FY82 were compared with those projected for FY86, and the percent growth, G_j, was computed for each rating. The computed values for G_j are listed in Appendix B. Identical percentage growth values are used for each SRB zone. Within each zone, ratings are ranked from 1 for the rating with the smallest projected percentage growth to 85 for the rating with the largest projected growth .

Costs

The enlisted billet cost model (BCM) (Butler & Frankel, 1983a, 1983b) was selected as the data source for manpower costs because it is compatible with the RSI structure, provides a more thorough cost estimation of billet costs than do other available cost models, and is widely accepted by SRB policy makers. To the extent that BCM captures the correct relative costs across ratings, it is not necessary that BCM cost measures identify the real cost of a billet.

BCM was developed as a means of estimating real (economic) billet costs for Navy ratings. BCM cost data are calculated separately for each rating and the costs for each rating are further separated into costs for the top six pay grades (E-4 through E-9) broken down under 14 "cost elements," which are listed in Table 2. These elements were derived by Butler and Frankel as marginal costs, such that the Navy billet cost approximates the marginal cost of having a billet filled for a year.

The Navy billet costs were adjusted to subtract the SRB payments cost element. Further modification was required to make the cost data compatible with the three SRB zones. Since billet costs were identified only by rating and pay grade, they were modified to fit the SRB zones' LOS constraints using the current manpower inventories, X_{ijk}, for pay grade (i) of rating (j) in zone (k). The billet costs for each pay grade in each rating in each SRB zone, BC_{ijk}, were multiplied by the percent current inventory, Y_{ijk}, and summed over pay grades resulting in a single cost, C_{jk}, for the jth rating in the kth zone. The procedure weights the cost for each pay grade/rating/SRB zone by the proportion in that pay grade.

Table 2

BCM Cost Elements

Cost Element	Definition
Basic pay	An enlisted service member's annual salary, excluding any additional benefits.
SRB payments	An estimate of current costs of the SRB program as awarded to each rating.
Proficiency pay	A per capita average of all proficiency pay allowed for each rating. Examples include payments to the nuclear community and to saturation divers.
Hazard pay	The per capita average of all hazard pay allowed for each rating. Hazard pays include payments for hostile fire, flight deck duty, flight pay, etc.
Sea pay	A per capita average of career sea duty payments for each rating in recognition of the arduous nature of duty aboard ship.
Variable housing allowance (VHA)	The pay grade-specific per capita average of VHA payments made to each rating.
Allowances	Payments such as basic allowance for quarters (BAQ) and basic allowance for subsistence (BAS). This cost element accounts for both the actual payments made and the costs of "in-kind" substitutes (i.e., service members receive no BAQ when residing in government furnished quarters).
Retirement	The distribution to each rating and pay grade of the costs associated with retirement, disability retirement, and death.
Separation	A cost projection for enlisted personnel leaving the military during the fiscal year for which billet costs are being computed. Estimate of separation costs include moving expenses, separation pay, and unemployment benefits.
Accession	An amortization over the initial term of enlistment of all recruiting costs, initial clothing allowances, and recruit training costs. These costs are apportioned almost entirely to pay grades E-5 and below.
"A" school	The value of "A" school (initial technical skill training) as amortized over the number of years remaining until retirement after completion of training.
"C" school	The amortized value of "C" school (advanced technical training).
Undistributed costs	The value of costs not specifically identifiable by rating or pay grade. Examples include CHAMPUS, commissary, Navy exchange, and permanent change of station (PCS) costs.
Unproductive time	The cost associated with "downtime" or the opportunity cost of lost productivity when someone is not working. Exclusive of on-the-job time lost during training, examples of unproductive time include individuals in a rating that spent time in transit between permanent duty stations, in a prisoner status, or as medical patients.

Note. Definitions based on work by Butler and Frankel, 1983a, 1983b.

$$Y_{ijk} = X_{ijk} / \sum_{i=E-4}^{E-9} X_{ijk} \tag{2}$$

and

$$C_{jk} = \sum_{i=E-4}^{E-9} (BC_{ijk})(Y_{ijk}) \tag{3}$$

where

i = pay grade/E-4, E-5,...,E-9,

j = rating/ABE,...,YN,

k = zone/A,B,C.

The computed cost values for C_{jk} from equation 3 are listed in Appendix B. Within each zone, ratings are ranked from 1 for the rating with the smallest cost to 85 for the rating with the largest cost.

Priority

In determining the priority of a rating (i.e., its relative importance to the Navy), consideration is given to the extent to which the rating contributes to the Navy's combat readiness and to the Navy's role in deterring the national threat. The process of prioritizing Navy ratings is subjective, regardless of the methodology employed. In this effort, the 85 ratings were prioritized using a Delphi procedure (Pill, 1971). Since the RSI is intended to augment the SRB-related interactions of OP-132, OP-135, and OP-136, the panel of Delphi subject matter experts (SMEs) should ideally have included Navy officers from these departments. However, since time and operational constraints precluded their participation, a panel of six SMEs was chosen from Navy officers on the faculty and staff of the U.S. Naval Postgraduate School.

Each expert was asked to assign a numerical "scale value" of importance to each of the 85 ratings, using a rating scale anchored at 10 for the musician (MU) rating and 90 for the machinist's mate (MM) rating. The range of the numerical scale was restricted to between 0 and 100.

In round one of the Delphi method, the six experts scored 83 ratings (all but the MU and MM ratings). The scale values from each expert were compared to see if they agreed. If the scale values expected by the experts for a rating were evenly distributed across the scale range, those values could be seen as a sample from a uniform distribution with a mean of 50 and a variance of 833. This distribution describes complete disagreement among the raters. To test for agreement, the uniform distribution variance was compared to the sample variance. First, the sample variance (S_j^2) was calculated for the jth rating by using:

$$S_j^2 = \sum_{k=1}^{6} \left[(X_{jk} - \bar{X}_j)^2 \right] / 5 \tag{4}$$

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where:

$\bar{X}_j$ = the mean scale value for the jth rating,

X_{jk} = the kth expert's scale value for the jth rating.

Next, the test statistic (A_j) was computed for the jth rating:

$$A_j = 5S_j^2 / 833. \tag{5}$$

For each rating, its test statistic was evaluated for agreement using a chi-square distribution with 5 degrees of freedom and a .01 alpha level.

In the second round, the ratings found to be in agreement after the first round were assigned their respective mean scale values. Each expert was then asked to assign new scale values only to those ratings not in agreement after round one. These new scale values were evaluated for agreement using the same procedures used in round one. The iterative process as detailed for round two was repeated for each rating until either agreement was achieved for each rating or the fourth iteration was reached. The ratings not in agreement after the fourth round were assigned their respective mean scale values ($\bar{X}_j$). At the end of round four, only two ratings were not in agreement.

The final scale values (priority values) are listed in Appendix B. Within each zone, ratings are ranked from 1 for the rating with the lowest priority value to 85 for the rating with the highest priority value. Identical priority scale values and rankings were used for each reenlistment zone.

Composite Index

The five RSI components were rank correlated to determine if all five components were required to develop the RSI. Results, presented in Table 3, show that the highest correlations were between priority and cost for all zones. Since all correlation coefficients are .50 or less, no component could be dropped from the analysis without loss of information.

As indicated previously, the purpose of this effort was to provide a single index for each rating's retention status, relative to all other ratings, that captures the information on multiple factors important to retaining experienced personnel. The Kendall correlation values in Table 3 indicate that information on all five components is required to determine retention severity. The model selected for the composite index was an additive multiattribute utility model (Van Gigch, 1978). The components were combined into a composite RSI for each rating j and zone k, RSI_{kj}. Each component was weighted by its respective coefficient of importance w_m:

$$RSI_{kj} = \sum_{m=1}^{5} w_m z_{kmj} \tag{6}$$

Table 3

Kendall Rank Correlations for RSI Components

Component	Shortage	Growth	Cost	Priority
Zone A				
Growth	-.10	--	--	--
Cost	-.04	.20	--	--
Priority	-.12	.06	.29	--
Size	-.14	-.09	-.05	.41
Zone B				
Growth	.13	--	--	--
Cost	-.06	.21	--	--
Priority	-.13	.06	.40	--
Size	-.21	-.11	.01	.39
Zone C				
Growth	-.002	--	--	--
Cost	.25	.19	--	--
Priority	.16	.06	.47	--
Size	-.06	-.08	.006	.30

where:

m = component/$1,\ldots,5$,

w_m = relative weight of importance for component m,

z_{kmj} = standardized value for rating j of component m in zone k; mean of 50, SD of 10.

The technique employed to derive the weight for assessing the relative importance of each component was adapted from the work of Edwards (1977). A panel of ten M.S. degree students in the Manpower, Personnel, and Training Analysis program at the U.S. Naval Postgraduate School were given a list of the five components. Each expert was asked to assign an importance value to each component, using a numerical scale ranging from 1 (lowest importance) to 10 (highest importance). The experts' scale values for each component were summed. Then the relative weight for each component was computed as a proportion of the sum of the five component scale values.

$$W_m = \frac{C_m}{\sum_1^5 C_m} \tag{7}$$

where:

        m = components/1,...,5,

        C_m = the sum of 10 experts' scale values for the mth component,

        W_m = relative weight for each component m.

As shown in Table 4, which provides the standardized component weights, the priority, cost, and growth weights are almost identical, the size weight is somewhat smaller, and the shortage weight is about one-half that of the priority, cost, and growth weights.

Table 4

Weighting Factors of RSI Components

RSI Component	Standardized Weight (w_m)
Size	.178
Shortage	.117
Growth	.229
Cost	.241
Priority	.235

Appendix C provides the RSI values and quintile rankings resulting from the application of equation 6. Quintile rankings range from 1 for lowest retention severity to 5 for highest retention severity. Table 5 lists the ten ratings with the highest retention severity and the ten ratings with the lowest retention severity for each SRB zone. The results in Table 5 seem reasonable.

An equally weighted RSI was calculated and compared with the index, based on the weights in Table 4. The Kendall rank correlation coefficient for the two indices was greater than .85 for all three SRB zones. Applying the weights in Table 4 to the components alters the final rankings somewhat from what would be obtained by simply assigning equal relative importance to the components. The consistency in rankings with an equally weighted index is not surprising, considering the previously discussed similarity in values of each weight in Table 4. Also, this result is consistent with observations in the literature concerning the properties of <u>linear</u> multiattribute utility functions in the absence of strong negative correlation among the components (e.g., Newman, 1977; Wainer, 1976).

Table 6 shows the Kendall rank correlations for the RSI indices by zone. Since two of the components, priority and growth, do not vary by zone, high interzone correlation is expected. Indeed, the RSI values by zone are strongly correlated. However, these correlations and the need for zone specification of the priority and growth measures indicate that separate RSI values for each reenlistment zone should be retained.

Table 5

Ten Most and Least Retention Severe Ratings by Reenlistment Zones--FY82

	Most Retention Severe Ratings		Least Retention Severe Ratings
	Zone A		
AT	Aviation electronics technician	DM	Illustrator draftsman
AW	Aviation antisubmarine warfare operator	DT	Dental technician
BM	Boatswain's mate	EA	Engineering aid
CTM	Cryptologic technician (maintenance)	JO	Journalist
ET	Electronics technician	LI	Lithographer
FTM	Fire control technician (surface missile fire control)	MA	Master-at-arms
		MU	Musician
GSE	Gas turbine systems technician (electrical)	NC	Navy counselor
GSM	Gas turbine systems technician (mechanical)	PC	Postal clerk
MM	Machinist's mate	PH	Photographer's mate
STS	Sonar technician (submarine)		
	Zone B		
AW	Aviation antisubmarine warfare operator	ABF	Aviation boatswain's mate (fuels)
CTT	Cryptologic technician (technical)		
DS	Data systems technician	DM	Illustrator draftsman
ET	Electronics technician	DT	Dental technician
FTB	Fire control technician (ballistic missile fire control)	JO	Journalist
		LI	Lithographer
FTM	Fire control technician (surface missile fire control)	LN	Legalman
		MN	Mineman
GSE	Gas turbine systems technician (electrical)	MU	Musician
GSM	Gas turbine systems technician (mechanical)	PC	Postal clerk
MM	Machinist's mate	PH	Photographer's mate
STS	Sonar technician (submarine)		
	Zone C		
CTT	Cryptologic technician (technical)	DT	Dental technician
DS	Data systems technician	EA	Engineering aid
ET	Electronics technician	DM	Illustrator draftsman
EW	Electronic warfare technician	JO	Journalist
FTG	Fire control technician (gun fire control)	LI	Lithographer
FTM	Fire control technician (surface missile fire control)	LN	Legalman
		MN	Mineman
GSE	Gas turbine systems technician (electrical)	MU	Musician
GSM	Gas turbine systems technician (mechanical)	PC	Postal clerk
MM	Machinist's mate	PH	Photographer's mate
STS	Sonar technician (submarine)		

Table 6

Kendall Rank Correlations for RSI Values
by Reenlistment Zone

	RSI_B	RSI_C
RSI_C	.84	--
RSI_A	.82	.76

Application of FY82 RSI Results

Typically, a manpower model such as the RSI would use input data from the current fiscal year to help select SRB multiples for the following fiscal year. For example, FY82 input data used in the RSI would generate output for assisting in the FY83 SRB bonus multiple assignment negotiations. The current RSI may be thought of as reflecting a composition of some of the elements that enter into the SRB multiple determination. However, since the SRB multiple determination includes other elements, such as cost effectiveness concepts like bonus elasticities, it would be unwarranted to expect a high degree of correlation of the computed RSI values with bonus multiple assignments at this stage of development.

The Kendall rank correlation coefficients between RSI quintiles and SRB bonus multiples for zones A, B, and C in FY83 are .668, .663, and .484 respectively. As was expected, the correlations are fairly strong, especially those for zones A and B. It appears that one or more of the RSI components was influential during the negotiation process for bonus multiple assignments.

Pearson correlation coefficients were calculated for the five RSI components and the bonus multiple assignments to determine how important each RSI component was to actual SRB multiples. Results, provided in Table 7, show that, for all zones, the FY83 bonus multiples were most strongly correlated with the cost component.

Table 7

Pearson Correlations of SRB Bonus Multiples with RSI Components

	Size	Shortage	Growth	Cost	Priority
SRB^A(83)	.253	.118	.131	.508	.456
SRB^B(83)	.147	-.043	.136	.638	.544
SRB^C(83)	-.081	.390	.134	.690	.355

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RECOMMENDATIONS AND CONCLUSIONS

The present RSI can be improved as follows:

1. The priority component could be improved by asking a panel of subject matter experts from OP-136 and OP-132 to assess the relative importance of Navy occupations by reenlistment zone.

2. Separate zone-specific estimates should be developed both for future manpower requirements (growth) and priority.

3. A representative panel of interested parties (e.g., OP-01, NMPC, CINCPAC, CINCLANT) should determine the relative component weights for the multiattribute model.

4. The RSI should be expanded to include more components affecting the determination of reenlistment bonuses (e.g., relative utility of experienced personnel within occupations, future shortages, and the substitutability among occupations).

5. A reliable cost effectiveness measure of reenlistment incentives, particularly reenlistment elasticities with respect to reenlistment bonuses, should be incorporated. Without cost-effectiveness data, the RSI is incomplete for assigning bonus targets. Work by the Center of Naval Analyses (CNA) (Quester & Thomason, 1983; Marcus, 1984) may be appropriate.

The RSI method should be contrasted and compared with a demand/supply model for assessing the distribution of reenlistment bonuses. A traditional economic model may be more efficacious for handling issues of the shape of demand for personnel curve(s), the shape of supply of personnel curve(s), reenlistment elasticities, and cross-elasticities of demand (substitutability among and between ratings).

RSI is a useful tool for the SRB manager (OP-136) and the ECMs (OP-132) to the extent that it expresses the relative impact of the Navy's retention requirements on each of the 85 ratings. Future applications of the RSI necessitate component refinement and expansion and model updating.

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GLOSSARY OF MANPOWER TERMS

Apprenticeship Rating: A term used to encompass enlisted personnel who do not possess a rating (i.e., personnel in pay grades E-1, E-2, and E-3).

Billets Authorized: Enlisted billets (occupations) for which funding has been provided and for which the quality (pay grade) mix has been authorized by the Chief of Naval Operations as a requirement to perform the billet functions.

Current Manpower Inventory: The total number of enlisted personnel in the Navy performing active duty regardless of their reimbursable status or chargeability to strength ceilings. Naval reserve personnel performing active duty for training and retired naval personnel recalled for special projects are excluded from this count.

Enlisted Programmed Authorizations (EPA): Total Navy billets that are presently forecast to be written for each end-fiscal year.

Objective Force Model (OFM): A manpower model used to size and shape the career force to meet projected requirements. OFM uses long-range hardware requirements to project mid and long-range manpower demands. OFM produces an inventory distribution of billets authorized by pay grade and length of service for each rating. The model's principal input is the EPA. OFM forecasts 3 years in the future to provide stepping stones toward Objective Force manning of the 15 battle group Navy of the 1990s.

Rate: Identifies enlisted personnel occupationally by pay grade. Within a rating, a rate reflects levels of aptitude, training, experience, knowledge, skills, and responsibilities. For example, the boatswain's mate (BM) rating is translated from pay grades E-4 through E-9 as boatswain's mate third class (BM3), boatswain's mate second class (BM2), boatswain's mate first class (BM1), chief boatswain's mate (BMC), senior chief boatswain's mate (BMCS), and master chief boatswain's mate (BMCM). Additionally, pay grades E-1, E-2, and E-3 are rates: airman recruit (AR), airman apprentice (AA), and airman (AN).

Rating: The occupation of a petty officer that requires job related aptitudes, knowledge, training, and skill. Examples of ratings are boatswain's mate (BM), disbursing clerk (DK), and aviation ordnancemen (AO). Navy ratings are comprised of only the top six pay grades (E-4, E-5, E-6, E-7, E-8, and E-9).

Striker: Enlisted personnel in the apprenticeship ratings who have received training at naval schools or aboard ship in the duties of a particular rating and who are authorized to be specifically designated for advancement to that rating.

APPENDIX A

ENLISTED RATINGS CONSIDERED IN DEVELOPING RSI

LISTING BY ABBREVIATION

Abbreviation	Rating Title
AB[a]	aviation boatswain's mate
ABE	aviation boatswain's mate (launching and recovery equipment)
ABF	aviation boatswain's mate (fuels)
ABH	aviation boatswain's mate (aircraft handling)
AC	air traffic controller
AD	aviation machinist's mate
AE	aviation electrician's mate
AF[a]	aircraft maintenanceman (E-9 only)
AG	aerographer's mate
AK	aviation storekeeper
AM[a]	aviation structural mechanic
AME	aviation structural mechanic (safety equipment)
AMH	aviation structural mechanic (hydraulics)
AMS	aviation structural mechanic (structures)
AO	aviation ordnanceman
AQ	aviation fire control technician
AS[b]	aviation support equipment technician
ASH[b]	aviation support technician (hydraulics and structures)
ASE[b]	aviation support equipment technician (electrical)
ASM[b]	aviation support equipment technician (mechanical)
AT	aviation electronics technician
AV[a]	avionics technician (E-9 only)
AW	aviation antisubmarine warfare operator
AX	aviation antisubmarine warfare technician
AZ	aviation maintenance administrationman
BM	boatswain's mate
BT	boiler technician
BU	builder
CE	construction electrician
CM	construction mechanic
CT[a]	cryptologic technician
CTA	cryptologic technician (administration branch)
CTI	cryptologic technician (interpretive branch)
CTM	cryptologic technician (maintenance branch)
CTO	cryptologic technician (communications branch)
CTR	cryptologic technician (collection branch)
CTT	cryptologic technician (technical branch)
CU[a]	constructionman (E-9 only)
DK	disbursing clerk
DM	illustrator draftsman
DP	data processing technician
DS	data systems technician

[a]Rating not included in RSI development, as the minimum LOS requirement is beyond the 14 year maximum for the SRB program.

[b]AS ratings not included in RSI development, as they are not authorized for all reenlistment zones.

Abbreviation	Rating Title
DT	dental technician
EA	engineering aid
EM	electrician's mate
EN	engineman
EO	equipment operator
EQ[a]	equipmentman (E-9 only)
ET	electronics technician
EW	electronics warfare technician
FT[a]	fire control technician
FTB	fire control technician (ballistic missile fire control)
FTG	fire control technician (gun fire control)
FTM	fire control technician (surface missile fire control)
GM[a]	gunner's mate
GMG	gunner's mate (guns)
GMM	gunner's mate (missiles)
GMT	gunner's mate (technician)
GS[a]	gas turbine system technician (E-8 and E-9 only)
GSE	gas turbine system technician (electrical)
GSM	gas turbine system technician (mechanical)
HM	hospital corpsman
HT	hull maintenance technician
IC	interior communications electrician
IM	instrumentman
IS	intelligence specialist
JO	journalist
LI	lithographer
LN	legalman
MA	master-at-arms
ML	molder
MM	machinist's mate
MN	mineman
MR	machinery repairman
MS	mess management specialist
MT	missile technician
MU	musician
NC	Navy counselor
OM	opticalman
OS	operations specialist
OT	ocean systems technician

[a]Rating not included in RSI development, as the minimum LOS requirement is beyond the 14 year maximum for the SRB program.

Abbreviation	Rating Title
PC	postal clerk
PH	photographer's mate
PI[a]	precision instrumentman (E-9 only)
PM	patternmaker (includes MLCM)
PN	personnelman
PR	aircrew survival equipmentman
QM	quartermaster
RM	radioman
RP	religious program specialist
SH	ship's serviceman
SK	storekeeper
SM	signalman
ST[a]	sonar technician
STG	sonar technician (surface)
STS	sonar technician (submarine)
SW	steelworker
TD	training development man (now being phased out)
TM	torpedoman's mate
UT	utilitiesman
YN	yeoman

[a]Rating not included in RSI development, as the minimum LOS requirement is beyond the 14 year maximum for the SRB program.

APPENDIX B

FY82 RSI COMPONENTS AND RANKINGS

FY82 RSI COMPONENTS AND RANKINGS

Rating	Size[a]	Percent Shortage	Percent Growth	Cost ($K)	Priority[b]
		Zone A			
ABE	683 (36)*	38 (49)*	6 (11)*	20.9 (36)*	79 (53)*
ABF	574 (29)	38 (49)	5 (7)	20.0 (11)	75 (40)
ABH	1161 (54)	28 (27)	7 (18)	19.8 (8)	75 (40)
AC	1022 (49)	38 (49)	6 (11)	23.4 (63)	90 (81)
AD	3860 (76)	21 (12)	16 (61)	21.0 (37)	81 (67)
AE	2788 (70)	30 (30)	16 (61)	21.8 (43)	81 (67)
AG	704 (37)	14 (8)	3 (6)	20.6 (27)	73 (36)
AK	1618 (61)	39 (53)	8 (24)	19.8 (8)	68 (29)
AME	897 (42)	27 (20)	19 (75)	21.8 (43)	76 (46)
AMH	1666 (63)	32 (33)	19 (75)	20.4 (20)	76 (46)
AMS	2849 (73)	23 (15)	11 (41)	20.6 (27)	76 (46)
AO	1988 (66)	34 (42)	9 (29)	20.8 (35)	79 (53)
AQ	1111 (53)	23 (15)	14 (49)	26.9 (80)	87 (78)
AT	3930 (79)	33 (37)	14 (49)	24.4 (70)	84 (76)
AW	1056 (51)	32 (33)	53 (84)	23.2 (57)	90 (81)
AX	614 (31)	49 (71)	14 (49)	25.9 (77)	83 (74)
AZ	995 (48)	50 (74)	5 (7)	19.4 (2)	71 (33)
BM	3063 (74)	45 (66)	10 (35)	19.9 (10)	69 (30)
BT	3885 (77)	33 (37)	0 (4)	21.5 (40)	80 (61)
BU	981 (47)	22 (14)	18 (69)	20.5 (24)	62 (21)
CE	421 (21)	37 (47)	12 (44)	22.0 (46)	62 (21)
CM	526 (26)	27 (20)	18 (69)	21.4 (39)	62 (21)
CTA	349 (17)	39 (53)	10 (35)	22.5 (53)	65 (27)
CTI	315 (15)	36 (46)	5 (7)	21.9 (45)	76 (46)
CTM	935 (44)	43 (63)	11 (41)	32.7 (85)	74 (37)
CTO	584 (30)	39 (53)	7 (18)	22.7 (54)	74 (37)
CTR	498 (25)	45 (66)	15 (55)	24.0 (64)	75 (40)
CTT	627 (32)	35 (43)	26 (81)	31.3 (84)	75 (40)
DK	842 (41)	32 (33)	10 (35)	20.2 (14)	76 (46)
DM	133 (8)	42 (61)	-1 (2)	19.5 (3)	53 (14)
DP	1658 (62)	10 (6)	17 (67)	20.4 (20)	75 (40)
DS	1499 (59)	21 (12)	17 (67)	26.2 (78)	79 (53)
DT	1041 (50)	27 (20)	7 (18)	19.5 (3)	54 (16)
EA	132 (7)	25 (18)	5 (7)	20.3 (17)	58 (18)
EM	5310 (82)	29 (29)	10 (35)	23.3 (59)	79 (53)
EN	2814 (71)	28 (27)	11 (41)	20.1 (13)	80 (61)
EO	679 (35)	27 (20)	15 (55)	20.7 (32)	53 (14)
ET	8373 (84)	27 (20)	10 (35)	25.0 (73)	86 (77)
EW	946 (46)	20 (10)	9 (29)	28.3 (82)	90 (81)
FTB	477 (24)	7 (4)	14 (49)	25.4 (79)	92 (85)
FTG	1527 (60)	30 (30)	19 (75)	26.4 (79)	80 (61)
FTM	1384 (58)	47 (69)	18 (69)	27.6 (81)	87 (78)

*Within each zone, each component is ranked from 1 for least severe impact on retention to 85 for most severe. Ties received the middle rank. The ranks appear in parentheses.

[a]Rating inventory computed from the EMR for 1982.

[b]Subjective scale values between 0 and 100 with 100 the most important rating.

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Rating	Size[a]	Percent Shortage	Percent Growth	Cost ($K)	Priority[b]
		Zone A (Continued)			
GMG	1059 (52)*	51 (75)*	10 (35)*	21.0 (37)*	77 (51)*
GMM	469 (23)	44 (64)	18 (69)	22.9 (56)	82 (71)
GMT	644 (33)	35 (43)	-7 (1)	22.3 (50)	81 (67)
GSE	195 (12)	49 (71)	40 (83)	24.7 (72)	80 (61)
GSM	551 (28)	35 (43)	38 (82)	24.3 (67)	80 (61)
HM	6951 (83)	33 (37)	16 (61)	19.6 (6)	79 (53)
HT	3778 (75)	39 (53)	14 (49)	20.5 (24)	80 (61)
IC	2441 (68)	39 (53)	8 (24)	22.0 (46)	79 (53)
IM	138 (9)	58 (82)	15 (55)	22.2 (49)	70 (32)
IS	426 (22)	25 (18)	19 (75)	23.3 (59)	69 (30)
JO	320 (16)	32 (33)	8 (24)	19.7 (7)	29 (4)
LI	203 (13)	20 (10)	12 (44)	19.3 (1)	39 (6)
LN	90 (6)	53 (79)	8 (24)	23.4 (59)	34 (5)
MA	48 (4)	00 (1)	23 (80)	24.5 (71)	24 (3)
ML	40 (2)	60 (83)	15 (61)	20.6 (27)	44 (8)
MM	11308 (85)	27 (20)	6 (11)	22.0 (46)	90 (81)
MN	160 (11)	52 (77)	6 (11)	25.6 (76)	50 (12)
MR	718 (38)	55 (80)	15 (55)	20.5 (24)	77 (51)
MS	3892 (78)	56 (81)	6 (11)	20.6 (27)	65 (27)
MT	941 (45)	23 (15)	9 (29)	24.2 (65)	83 (74)
MU	144 (10)	72 (85)	-1 (2)	25.3 (74)	10 (1)
NC	3 (1)	00 (1)	15 (55)	24.2 (65)	39 (6)
OM	79 (5)	60 (83)	21 (79)	22.3 (50)	49 (10)
OS	2842 (72)	44 (64)	12 (44)	22.7 (54)	79 (53)
OT	542 (27)	33 (37)	16 (61)	24.3 (67)	75 (40)
PC	361 (18)	49 (71)	7 (18)	19.5 (3)	49 (10)
PH	921 (43)	10 (6)	6 (11)	21.6 (41)	51 (13)
PM	47 (3)	39 (53)	12 (44)	20.7 (32)	47 (9)
PN	2686 (69)	16 (9)	6 (11)	20.3 (17)	63 (24)
PR	650 (34)	38 (49)	14 (49)	21.6 (41)	71 (33)
QM	1195 (55)	42 (61)	13 (48)	20.3 (17)	82 (71)
RM	4960 (81)	45 (66)	9 (29)	22.3 (50)	87 (78)
RP	219 (14)	39 (53)	56 (85)	20.0 (11)	15 (2)
SH	1326 (57)	51 (75)	2 (5)	20.4 (20)	64 (26)
SK	2396 (67)	48 (70)	7 (18)	20.2 (14)	72 (35)
SM	812 (40)	52 (77)	8 (24)	20.7 (32)	74 (37)
STG	1877 (64)	27 (20)	9 (29)	23.2 (57)	81 (67)
STS	1950 (65)	6 (3)	15 (55)	29.2 (83)	82 (71)
SW	362 (19)	9 (5)	18 (69)	20.4 (20)	63 (24)
TD	751 (39)	37 (47)	16 (61)	24.3 (67)	60 (19)
TM	1294 (56)	33 (37)	9 (29)	23.3 (59)	79 (53)
UT	405 (20)	40 (60)	18 (69)	20.6 (27)	55 (17)
YN	4128 (30)	30 (30)	7 (18)	20.2 (14)	60 (19)

*Within each zone, each component is ranked from 1 for least severe impact on retention to 85 for most severe. Ties received the middle rank. The ranks appear in parentheses.

[a]Rating inventory computed from the EMR for 1982.

[b]Subjective scale values between 0 and 100 with 100 the most important rating.

Rating	Size[a]	Percent Shortage	Percent Growth	Cost ($K)	Priority[b]
		Zone B			
ABE	318 (36)*	63 (14)*	6 (11)*	25.0 (40)*	79 (53)*
ABF	294 (34)	63 (14)	5 (7)	23.3 (13)	75 (40)
ABH	542 (55)	63 (14)	7 (18)	22.9 (7)	75 (40)
AC	552 (56)	67 (29)	6 (11)	26.5 (59)	90 (81)
AD	1644 (74)	72 (53)	16 (61)	24.5 (32)	81 (67)
AE	1091 (69)	71 (48)	16 (61)	25.8 (52)	81 (67)
AG	243 (26)	69 (37)	3 (6)	24.3 (27)	73 (36)
AK	832 (64)	69 (37)	8 (24)	22.4 (3)	68 (29)
AME	388 (41)	71 (48)	19 (75)	25.2 (43)	76 (46)
AMH	976 (67)	64 (18)	19 (75)	23.8 (17)	76 (46)
AMS	1176 (70)	70 (44)	11 (41)	24.1 (21)	76 (46)
AO	909 (66)	69 (37)	9 (29)	24.6 (36)	79 (53)
AQ	424 (44)	71 (48)	14 (49)	29.4 (78)	87 (78)
AT	2003 (78)	65 (22)	14 (49)	27.4 (66)	84 (76)
AW	676 (61)	33 (1)	53 (84)	27.3 (65)	90 (81)
AX	298 (35)	75 (64)	14 (49)	28.3 (72)	83 (74)
AZ	513 (51)	77 (73)	5 (7)	22.0 (1)	77 (33)
BM	2010 (79)	63 (14)	10 (35)	23.7 (15)	69 (30)
BT	1846 (76)	60 (7)	0 (4)	25.1 (42)	80 (61)
BU	288 (33)	76 (70)	18 (69)	23.9 (19)	62 (21)
CE	142 (14)	80 (79)	12 (44)	25.3 (44)	62 (21)
CM	148 (15)	80 (79)	18 (69)	24.0 (20)	62 (21)
CTA	239 (25)	58 (5)	10 (35)	25.0 (40)	65 (27)
CTI	220 (23)	66 (26)	11 (7)	33.4 (47)	74 (46)
CTM	528 (53)	60 (7)	11 (41)	33.4 (85)	74 (37)
CTO	365 (40)	62 (11)	7 (18)	25.4 (46)	74 (37)
CTR	286 (32)	66 (26)	15 (55)	26.2 (54)	75 (40)
CTT	339 (37)	68 (31)	26 (81)	32.7 (83)	75 (40)
DK	419 (43)	71 (48)	10 (35)	24.5 (32)	76 (46)
DM	84 (8)	69 (37)	-1 (2)	22.9 (7)	53 (14)
DP	565 (57)	67 (29)	17 (67)	23.8 (17)	75 (40)
DS	615 (58)	64 (18)	17 (67)	32.7 (83)	79 (53)
DT	453 (46)	62 (11)	7 (18)	22.1 (2)	54 (16)
EA	28 (3)	84 (84)	5 (7)	24.3 (27)	58 (18)
EM	1924 (77)	68 (31)	10 (35)	27.5 (67)	79 (53)
EN	1068 (68)	72 (53)	11 (41)	24.5 (32)	80 (61)
EO	195 (21)	78 (74)	15 (55)	24.3 (27)	53 (14)
ET	2830 (83)	71 (48)	10 (35)	28.4 (74)	86 (77)
EW	264 (30)	78 (74)	9 (29)	31.2 (81)	90 (81)
FTB	221 (24)	59 (6)	14 (49)	28.5 (75)	92 (85)
FTG	437 (45)	79 (76)	19 (75)	29.8 (79)	80 (61)
FTM	663 (60)	69 (37)	18 (69)	30.9 (80)	87 (78)

*Within each zone, each component is ranked from 1 for least severe impact on retention to 85 for most severe. Ties received the middle rank. The ranks appear in parentheses.

[a]Rating inventory computed from the EMR for 1982.

[b]Subjective scale values between 0 and 100 with 100 the most important rating.

Rating	Size[a]	Percent Shortage	Percent Growth	Cost ($K)	Priority[b]
		Zone B (Continued)			
GMG	618 (59)*	73 (58)*	10 (35)*	25.5 (47)*	77 (51)*
GMM	272 (31)	65 (22)	18 (69)	27.7 (68)	82 (71)
GMT	344 (39)	69 (37)	-7 (1)	26.7 (60)	81 (67)
GSE	149 (16)	57 (4)	40 (83)	29.0 (77)	80 (61)
GSM	200 (22)	70 (44)	38 (82)	28.3 (72)	80 (61)
HM	3167 (84)	64 (18)	16 (61)	22.6 (5)	79 (53)
HT	1527 (73)	73 (58)	14 (49)	24.9 (38)	80 (61)
IC	803 (63)	75 (64)	8 (24)	26.4 (56)	79 (53)
IM	66 (5)	80 (79)	15 (55)	26.2 (54)	70 (32)
IS	156 (18)	75 (64)	19 (75)	26.1 (53)	69 (30)
JO	140 (13)	66 (26)	8 (24)	23.2 (11)	29 (4)
LI	85 (9)	68 (31)	12 (44)	22.8 (6)	39 (6)
LN	102 (10)	70 (44)	8 (24)	24.3 (27)	34 (5)
MA	250 (27)	72 (53)	23 (80)	25.3 (44)	24 (3)
ML	25 (2)	75 (64)	16 (61)	24.7 (37)	44 (8)
MM	4278 (85)	69 (37)	6 (11)	25.5 (47)	90 (81)
MN	104 (11)	56 (2)	6 (11)	28.6 (76)	50 (12)
MR	414 (42)	73 (58)	15 (55)	25.6 (51)	77 (51)
MS	2207 (81)	79 (76)	6 (11)	23.1 (10)	65 (27)
MT	453 (46)	56 (2)	9 (29)	27.7 (68)	83 (74)
MU	121 (12)	73 (58)	-1 (2)	26.4 (56)	10 (1)
NC	154 (17)	83 (83)	15 (55)	27.8 (70)	39 (6)
OM	51 (4)	75 (64)	21 (79)	26.4 (56)	49 (10)
OS	1246 (71)	73 (58)	12 (44)	26.9 (61)	79 (53)
OT	251 (29)	72 (53)	16 (61)	27.8 (70)	75 (40)
PC	159 (19)	70 (44)	7 (18)	22.5 (4)	49 (10)
PH	250 (27)	76 (70)	6 (11)	23.2 (11)	51 (13)
PM	11 (1)	88 (85)	12 (44)	23.3 (13)	47 (9)
PN	1431 (72)	60 (7)	6 (11)	24.2 (23)	63 (24)
PR	342 (38)	68 (31)	14 (49)	24.2 (23)	71 (33)
QM	541 (54)	73 (58)	13 (48)	24.9 (38)	82 (71)
RM	2224 (82)	72 (53)	9 (29)	25.5 (47)	87 (78)
RP	83 (7)	76 (70)	56 (85)	23.0 (9)	15 (2)
SH	847 (65)	68 (31)	2 (5)	24.2 (23)	64 (26)
SK	1805 (75)	62 (11)	7 (18)	24.2 (23)	72 (35)
SM	472 (48)	68 (31)	8 (24)	24.4 (31)	74 (37)
STG	505 (50)	80 (79)	9 (29)	27.2 (62)	81 (67)
STS	527 (52)	65 (22)	15 (55)	32.4 (82)	82 (71)
SW	81 (6)	79 (76)	18 (69)	24.5 (32)	63 (24)
TD	495 (49)	60 (7)	16 (61)	27.2 (62)	60 (19)
TM	690 (62)	64 (18)	9 (29)	27.2 (62)	79 (53)
UT	170 (20)	75 (64)	18 (69)	24.1 (21)	55 (17)
YN	2165 (80)	65 (22)	7 (18)	23.7 (15)	60 (19)

*Within each zone, each component is ranked from 1 for least severe impact on retention to 85 for most severe. Ties received the middle rank. The ranks appear in parentheses.

[a]Rating inventory computed from the EMR for 1982.

[b]Subjective scale values between 0 and 100 with 100 the most important rating.

Rating	Size[a]	Percent Shortage	Percent Growth	Cost ($K)	Priority[b]
		Zone C			
ABE	185 (32)*	66 (24)*	5 (11)*	28.5 (48)*	79 (53)*
ABF	189 (34)	61 (10)	5 (7)	27.6 (30)	75 (40)
ABH	318 (52)	65 (19)	7 (18)	26.2 (10)	75 (40)
AC	328 (53)	68 (35)	6 (11)	28.8 (53)	90 (81)
AD	1528 (81)	63 (13)	16 (61)	27.7 (32)	81 (67)
AE	1048 (75)	54 (5)	16 (61)	28.4 (46)	81 (67)
AG	55 (6)	92 (85)	3 (6)	27.5 (28)	73 (36)
AK	518 (63)	68 (35)	8 (24)	25.7 (3)	68 (29)
AME	280 (50)	64 (14)	19 (75)	27.6 (30)	76 (46)
AMH	835 (71)	51 (3)	19 (75)	27.2 (22)	76 (46)
AMS	849 (72)	67 (27)	11 (41)	27.1 (20)	76 (46)
AO	639 (65)	66 (24)	9 (29)	27.4 (26)	79 (53)
AQ	371 (56)	62 (11)	14 (49)	31.2 (75)	87 (78)
AT	1176 (77)	67 (27)	14 (49)	29.3 (60)	84 (76)
AW	337 (54)	17 (1)	53 (84)	30.0 (64)	90 (81)
AX	218 (41)	68 (35)	14 (49)	30.4 (68)	83 (74)
AZ	394 (58)	70 (44)	5 (7)	25.8 (5)	71 (33)
BM	1349 (79)	66 (24)	10 (35)	27.2 (22)	69 (30)
BT	810 (70)	72 (51)	0 (4)	28.7 (52)	80 (61)
BU	274 (48)	65 (19)	18 (69)	27.7 (32)	62 (21)
CE	133 (21)	74 (58)	12 (44)	27.2 (22)	62 (21)
CM	132 (20)	75 (62)	18 (69)	27.5 (28)	62 (21)
CTA	147 (28)	59 (6)	10 (35)	28.1 (41)	65 (27)
CTI	115 (17)	75 (62)	5 (7)	27.7 (32)	76 (46)
CTM	135 (22)	80 (76)	11 (41)	33.6 (83)	74 (37)
CTO	196 (37)	65 (19)	7 (18)	28.2 (42)	74 (37)
CTR	197 (38)	69 (41)	15 (55)	28.3 (45)	75 (40)
CTT	172 (30)	77 (69)	26 (81)	32.8 (80)	75 (40)
DK	210 (39)	78 (72)	10 (35)	27.7 (32)	76 (46)
DM	50 (5)	67 (27)	-1 (2)	25.9 (9)	53 (14)
DP	304 (51)	73 (57)	17 (67)	27.2 (22)	75 (40)
DS	215 (40)	80 (76)	17 (67)	35.9 (85)	79 (53)
DT	253 (46)	64 (14)	7 (18)	25.8 (5)	54 (16)
EA	38 (3)	64 (14)	5 (7)	28.0 (40)	58 (18)
EM	939 (73)	77 (69)	10 (35)	31.6 (76)	79 (53)
EN	668 (66)	76 (68)	11 (41)	27.9 (37)	80 (61)
EO	127 (18)	85 (83)	15 (55)	25.4 (13)	53 (14)
ET	1209 (78)	79 (74)	10 (35)	31.0 (73)	86 (77)
EW	145 (27)	84 (80)	9 (29)	33.2 (82)	90 (81)
FTB	78 (8)	78 (72)	14 (49)	31.8 (77)	92 (85)
FTG	274 (48)	83 (79)	19 (75)	32.4 (79)	80 (61)
FTM	191 (35)	88 (84)	18 (69)	32.9 (81)	87 (78)

*Within each zone, each component is ranked from 1 for least severe impact on retention to 85 for most severe. Ties received the middle rank. The ranks appear in parentheses.

[a]Rating inventory computed from the EMR for 1982.

[b]Subjective scale values between 0 and 100 with 100 the most important rating.

Rating	Size[a]	Percent Shortage	Percent Growth	Cost ($K)	Priority[b]
		Zone C (Continued)			
GMG	504 (62)*	68 (35)*	10 (35)*	29.0 (58)*	77 (51)*
GMM	136 (23)	79 (74)	18 (69)	30.9 (71)	82 (71)
GMT	185 (32)	75 (62)	-7 (1)	28.8 (53)	81 (67)
GSE	87 (11)	72 (51)	40 (83)	32.3 (78)	80 (61)
GSM	110 (16)	75 (62)	38 (82)	31.1 (74)	80 (61)
HM	2149 (85)	62 (11)	16 (61)	26.2 (10)	79 (53)
HT	1112 (76)	72 (51)	14 (49)	28.2 (42)	80 (61)
IC	522 (64)	74 (58)	8 (24)	30.1 (65)	79 (53)
IM	78 (8)	60 (7)	15 (55)	28.8 (53)	70 (32)
IS	136 (23)	67 (27)	19 (75)	28.5 (48)	69 (30)
JO	100 (15)	67 (27)	8 (24)	25.8 (5)	29 (4)
LI	56 (7)	65 (19)	12 (44)	25.8 (5)	39 (60)
LN	79 (10)	72 (51)	8 (24)	26.5 (14)	34 (5)
MA	394 (58)	72 (51)	23 (80)	27.9 (37)	24 (3)
ML	25 (2)	70 (44)	16 (61)	26.9 (17)	44 (8)
MM	2098 (84)	75 (62)	6 (11)	30.9 (71)	90 (81)
MN	94 (13)	48 (2)	6 (11)	30.2 (66)	50 (12)
MR	268 (47)	69 (41)	15 (55)	28.2 (42)	77 (51)
MS	1518 (80)	84 (80)	6 (11)	26.3 (12)	65 (27)
MT	234 (44)	60 (7)	9 (29)	30.7 (70)	83 (74)
MU	137 (25)	68 (35)	-1 (2)	28.4 (46)	10 (1)
NC	381 (57)	71 (49)	15 (55)	29.3 (60)	39 (6)
OM	42 (4)	70 (44)	21 (79)	28.8 (53)	49 (10)
OS	687 (67)	75 (62)	12 (44)	30.5 (69)	79 (53)
OT	173 (31)	70 (44)	16 (61)	29.7 (63)	75 (40)
PC	131 (19)	67 (27)	7 (18)	25.6 (2)	49 (10)
PH	163 (29)	70 (44)	5 (11)	25.4 (1)	51 (13)
PM	22 (1)	71 (49)	12 (44)	27.4 (26)	47 (9)
PN	773 (69)	72 (51)	5 (11)	27.7 (32)	63 (24)
PR	225 (42)	64 (14)	14 (49)	26.7 (15)	71 (33)
QM	416 (61)	77 (69)	13 (48)	28.9 (57)	82 (71)
RM	1662 (83)	67 (27)	9 (29)	28.5 (48)	87 (78)
RP	95 (14)	60 (7)	56 (85)	25.7 (3)	15 (2)
SH	737 (68)	64 (14)	2 (5)	26.9 (17)	64 (26
SK	1009 (74)	74 (58)	7 (18)	27.1 (20)	72 (35)
SM	250 (45)	74 (58)	8 (24)	27.9 (37)	74 (37)
STG	228 (43)	84 (80)	9 (29)	30.3 (67)	81 (67)
STS	195 (36)	81 (78)	15 (55)	35.2 (84)	82 (71)
SW	88 (12)	67 (27)	18 (69)	28.5 (48)	63 (24)
TD	337 (54)	52 (4)	16 (61)	29.2 (59)	60 (19)
TM	415 (60)	69 (41)	9 (29)	29.5 (62)	79 (53)
UT	142 (26)	68 (35)	18 (69)	26.8 (16)	55 (17)
YN	1578 (82)	65 (19)	7 (18)	27.0 (19)	60 (19)

*Within each zone, each component is ranked from 1 for least severe impact on retention to 85 for most severe. Ties received the middle rank. The ranks appear in parentheses.

[a]Rating inventory computed from the EMR for 1982.

[b]Subjective scale values between 0 and 100 with 100 the most important rating.

APPENDIX C

FY82 RSI VALUES AND QUINTILE
RANKINGS BY REENLISTMENT ZONES

FY82 RSI VALUES AND QUINTILE RANKINGS BY REENLISTMENT ZONES

Rating	Zone A		Zone B		Zone C	
	RSI Value	Quintile[a]	RSI Value	Quintile[a]	RSI Value	Quintile[a]
ABE	47.8	2	47.1	2	48.2	2
ABF	46.1	2	44.7	1	45.8	2
ABH	46.2	2	45.4	1	45.7	1
AC	51.9	4	51.2	4	50.8	4
AD	52.1	4	53.7	4	54.5	4
AE	52.6	4	53.5	4	52.4	4
AG	44.0	1	45.7	2	48.2	2
AK	46.8	2	45.7	2	45.6	1
AME	50.6	3	51.4	4	50.0	3
AMH	50.5	3	50.3	3	50.0	3
AMS	49.1	3	50.0	3	50.0	3
AO	49.3	3	49.7	3	49.4	3
AQ	55.3	5	55.7	5	54.3	4
AT	56.1	5	56.1	5	55.4	5
AW	62.4	5	58.3	5	57.2	5
AX	55.6	5	54.4	5	53.0	4
AZ	46.5	2	45.5	1	45.2	1
BM	49.3	3	49.3	3	50.6	3
BT	49.7	3	48.9	3	50.1	3
BU	46.9	2	48.5	2	48.0	2
CE	47.6	2	48.7	2	46.6	2
CM	47.7	2	48.9	3	48.5	3
CTA	48.1	2	45.2	1	45.8	2
CTI	47.6	2	47.2	2	47.5	2
CTM	59.5	5	55.6	5	55.6	5
CTO	49.0	3	47.0	2	47.3	2
CTR	52.6	4	50.2	3	49.9	3
CTT	61.0	5	59.4	5	58.2	5
DK	47.4	2	48.6	2	49.4	3
DM	41.2	1	40.3	1	39.8	1
DP	48.0	2	49.2	3	50.1	3
DS	54.5	4	57.8	5	60.5	5
DT	42.8	1	41.4	1	42.1	1
EA	42.6	1	45.9	2	43.7	1
EM	54.5	5	54.8	5	56.5	5
EN	49.6	3	51.0	4	51.8	4
EO	45.3	1	47.0	2	46.5	2
ET	59.6	5	59.1	5	58.1	5
EW	55.4	5	57.3	5	57.4	5

[a] A scale ranging from 1 for lowest retention severity to 5 for highest retention severity.

Rating	Zone A		Zone B		Zone C	
	RSI Value	Quintile[a]	RSI Value	Quintile[a]	RSI Value	Quintile[a]
FTB	52.7	4	53.3	4	56.4	5
FTG	56.1	5	57.5	5	57.9	5
FTM	59.1	5	58.3	5	59.5	5
GMG	50.0	3	50.5	3	50.8	4
GMM	53.2	4	53.1	4	55.4	5
GMT	46.0	1	46.9	2	46.7	2
GSE	59.9	5	57.8	5	60.8	5
GSM	58.2	5	58.8	5	59.5	5
HM	54.5	5	53.8	4	54.8	4
HT	52.5	4	53.3	4	54.0	4
IC	51.0	4	51.8	4	52.5	4
IM	51.1	4	51.2	4	48.3	3
IS	50.3	3	51.3	4	49.8	3
JO	39.5	1	39.1	1	38.7	1
LI	40.4	1	41.2	1	40.6	1
LN	45.0	1	41.3	1	40.6	1
MA	43.7	1	45.1	1	45.5	1
ML	46.4	2	45.6	1	43.9	1
MN	48.7	2	45.0	1	43.5	1
MM	59.3	5	58.9	5	60.4	5
MR	50.8	4	51.3	4	50.4	3
MS	50.2	3	50.1	3	50.9	4
MT	51.0	4	50.2	3	51.2	4
MU	42.9	1	38.4	1	37.0	1
NC	43.6	1	49.1	3	47.0	2
OM	49.8	3	49.1	3	47.9	2
OS	53.4	4	53.9	4	54.6	4
OT	52.1	4	52.8	4	51.7	4
PC	43.3	1	41.6	1	41.1	1
PH	42.5	1	43.4	1	41.4	1
PM	44.2	1	45.6	1	44.0	1
PN	45.1	1	46.2	2	48.0	2
PR	49.2	3	48.0	2	46.9	2
QM	50.2	3	51.1	4	52.8	4
RM	55.5	5	55.1	5	55.5	5
RP	49.8	3	49.8	3	47.2	2
SH	46.1	2	45.3	1	45.2	1
SK	48.9	3	48.9	2	49.9	3
SM	48.7	3	47.5	2	48.5	3
STG	51.1	4	53.2	4	53.4	4
STS	56.2	5	57.4	5	59.7	5
SW	45.3	1	49.2	3	48.6	3
TD	50.6	4	48.9	3	47.6	2
TM	50.8	4	50.9	3	51.1	4
UT	47.0	2	47.3	2	46.0	2
YM	47.4	2	48.0	2	49.2	3

[a]A scale ranging from 1 for lowest retention severity to 5 for highest retention severity.

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