Examination of Alignment Efficiencies for Shore Organizational Hierarchy

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Executive summary

The overall goal of this study is to determine if there are areas in the Navy's shore manpower that have seen increases relative to the overall decrease in Navy shore manpower, and to develop an understanding of those relative increases. From 1993 to a 2012 projection, the Navy's shore manpower (military and civilian combined) has decreased by 37.5 percent. There are categories of shore manpower that have increased relative to this 37.5 percent drop. In some cases these increases can be justified by increases in the workload drivers for the category of shore manpower; in other cases they cannot.

In this study we go through the following sequence of steps:

- First, we divide Navy shore manpower into different categories of work, based on Inherently Governmental and Commercial Activity (IGCA) codes, and determine whether any observed growth in these categories is real or an artifact of the data. By "artifact," we mean that there are likely errors in the data, and those errors could cause trends in the data that actually don't exist. In this step, we worked to build a data set that did not have any such artifacts.

- Second, we look at what is driving Navy shore manpower growth in these different categories of shore work. We compare growth in these drivers with growth in Navy shore manpower to determine whether the manpower growth can be justified.

- Third, we determine the extent to which manpower growth, even if justified, contributes to the Navy's core missions. Manpower growth can be justified based on increases in demand, but this manpower can still be reduced at low risk if the manpower category is in a low-priority area for the Navy.

Our findings are as follows:

- First, we found that IGCA codes on many Navy billets were not accurate or consistent. Therefore, we developed our own algorithm to divide shore billets into categories.

- We find that Navy procurement has doubled (controlling for inflation) from 1993 to 2009, but shore manpower in categories relating to procurement have stagnated. This includes S&T and R&D, T&E and Engineering, Systems Acquisition, and Procurement and Contracting.

- Instructor manpower has declined more than workload. We are unsure whether this manpower decrease derives from efficiencies generated by the Revolution in Training or whether the Navy needs to add instructors.

- Five other categories had manpower increases that were not explained by workload or drivers: (1) Audit Operations, (2) Response to Hazardous Material Mishaps, (3) Force Protection, (4) Operation, Planning, and Control, and (5) Civilian Personnel.

These lead to the following recommendations:

- Evaluate the balance between planned/programmed acquisition manpower and procurement funding.

- Assess the Revolution in Training to verify the achievement of efficiencies that support the reduction in instructor billets.

- Consider initiating action on shore manpower categories that have not reduced manpower relative to workload or drivers.

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Outline

- Study Goals and Data

- Manpower Growth Compared with Outputs and Drivers

- Manpower Growth and Core Mission Contribution

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This annotated briefing has three parts. In the first part, we give the goals of this study and discuss the data we used. In the second part, we look at the largest contributors to relative Navy shore manpower growth and compare them with what we think is driving this growth. In the last part, we try to understand whether manpower growth is related to the Navy's core missions.

Study Tasking

1. Determine whether observed growth in shore manpower in different categories of work is real or an artifact of the data

2. Determine whether growth in shore manpower categories is justified and what is driving that growth

3. Determine the extent to which justified manpower growth contributes to the Navy's core missions

4. Document results, incorporate sponsor comments, and disseminate

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This slide details the four tasks within this study.

In the first task, we divide Navy shore manpower into different categories of work, based on Inherently Governmental and Commercial Activity (IGCA) codes, and determine whether any observed growth in these categories is real or an artifact of the data. By "artifact," we mean that there are likely errors in the data, and those errors could cause trends in the data that actually don't exist. In this step, we worked to build a data set that did not have any such artifacts.

In the second task, we look at what is driving Navy shore manpower growth in these different categories of shore work. We compare growth in these drivers with growth in Navy shore manpower to determine whether the manpower growth can be justified.

In the third task, we determine the extent to which manpower growth, even if justified, contributes to the Navy's core missions. Manpower growth can be justified based on increases in demand, but this manpower can still be reduced at low risk if the manpower category is in a low-priority area for the Navy.

This annotated briefing fulfills the fourth and final task of this study.

Data Collection Plan

- Divide shore establishment into 62 categories drawn from Streicher et al. (2007, CNA)
  - Streicher's categories based on IGCA codes

- Generate Navy shore manpower and output/driver data in each category

- Focus on categories with significant increases
  - Absolute
  - Relative to overall decline in Navy's shore establishment

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This study begins with data collection. We collect data in two categories, manpower and output/driver data. We collect manpower data from 1993 to 2012. We collect both Navy shore civilian and military manpower data, and divide manpower into 62 categories based on the categories of Streicher et al. (2007),[1] which were based on IGCA codes.

Most of these 62 categories have identifiable outputs or drivers. We collected these drivers for every year we could, in most cases from 1994 to 2009. If there were no obvious outputs or drivers, we used the overall number of non-IA (Individuals Account) billets.

We collect manpower output/driver data in order to focus on the categories with the largest increases, both absolute and relative to the rest of the Navy's shore manpower infrastructure.

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[1] Burt L. Streicher et al. *Navy Military, Government Civilians, and Contract Support by Missions and Tasks: A Corporate Production Sensitivity Analysis,* May 2007 (CNA Research Memorandum D0015814.A2).

Navy Manpower Data and Data Imputation

- Billets used:
  - Military billets (1993-2012)
  - Civilian billets (2006-2012)
  - Civilian personnel (with billet information) (1993-2005)
  - Limited to non-IA shore billets

- Methodology designed to provide consistent categorization across all years

- Algorithms based on billet information
  - Billet title
  - Activity
  - Rank, rate, and NEC of those required to fill billet (or civilian equivalent)

- Same methodology used to assign codes to civilian and military billets

For this study, we used military billets from 1993 to 2012. We used civilian billets for 2006 to 2012 and civilian personnel data (with billet information attached) from 1993 to 2005. The information in the Navy's files includes military and Navy shore civilians (not contractors).

We included only non-IA shore billets in this study. We did this because IA billets are overhead allocations, both for students and other overhead (Transients, Patients, Prisoners, and Holdees (TPPH)). Also, the Navy has a long record of overexecuting the IA accounts,[2] so the billets allocated for IA are not a reliable indicator for IA costs, which means that they cannot be connected to measures of output and/or drivers in the same way as other shore billets. Also, IA billets are not necessarily part of the shore infrastructure. For example, one use of IA billets is to provide an allocation when Sailors are moving from one billet to another, including sea billets. Therefore, we did not include IA billets as part of the shore infrastructure.

We used the information in the 1993-2012 billet and personnel files to categorize every billet. We used billet title, activity, and the rank, rate, and NEC required to fill the billet as guides for categorizing the work of each billet. Unlike Striecher et al., we did **not** use IGCA codings. IGCA codes were available only for the latter years of the sample and were applied inconsistently. Therefore, we ignored the actual IGCA codes on billets and instead developed an algorithm to categorize billets between categories using the other information that was on the billet. We then checked and rechecked samples of billets to make sure our algorithm was consistent.

Our algorithm is only as good as the information in the Navy's billet files. Even a perfect algorithm will have some error. Also, due to the large number of shore billets in this study (more than 7 million over 20 years), there are likely some errors in our categorization algorithm. However, our algorithm is consistent across years and across military and civilian billets.

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[2] Martha E. Koopman and Henry S. Griffis. *Balancing the Student Account,* Apr 2004 (CNA Research Memorandum D0009996.A2).

Data Collection (Outputs and Drivers)

- Outputs and drivers from several sources
  - President's Budget Submission
  - Aviation maintenance database
  - Base Structure Report
  - Naval Safety Center
  - Naval Exchange Annual Report
  - Navy Education and Training Command

- Examples of outputs
  - Security clearance determinations
  - Total criminal investigations

- Examples of drivers
  - Total military personnel
  - Number of ships
  - Planned procurement

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Most outputs were available for 1994 through 2009. This is in contrast to our manpower data, which is available from 1993 to 2012. For most categories, we were able to determine one or two drivers or outputs from the work of that category. We understand that many of these categories have several drivers/outputs, and that one or two pieces of data across 16 to 20 years may not be enough to summarize all of the work done in a particular manpower category. However, comparing manpower changes with the major driver or output in each category may be enough to determine whether changes in manpower are justified by changes in outputs or drivers.

Our outputs and drivers were taken from several different sources. A majority of the measures were taken from the President's Budget Submission, but others came from the aviation maintenance (AV3M) database, the Base Structure Report, the Naval Safety Center, the Naval Exchange Annual Report, and the Navy Education and Training Command. Examples of outputs used are security clearance determinations and total criminal investigations. Examples of drivers are Navy endstrength, number of ships, and planned procurement.

Availability of Outputs and Drivers Varies

- 62 total categories

- No obvious driver for Operation, Planning, and Control

- 16 essentially constant

- Most available from 1994 to 2009

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Overall, there are 62 categories in this study. We were able to find outputs and drivers for most of these categories for at least 1994 through 2009, the years for which we have data from the President's Budget Submission. Six categories had no clear output or driver, and we compared the manpower in these categories with changes in overall non-IA Navy shore manpower.

Most notably, there is no obvious driver or output for Operation, Planning, and Control, which includes the Navy's staff.

Data Validation

- We found that IGCA codes weren't accurately categorizing billets

- We resolved this data validity issue by creating an algorithm based on
  - Billet title
  - Activity
  - Rank, rate, and NEC

- New algorithm overrode IGCA codes in some cases

- We applied equivalent methodology to civilian and military billets

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In the course of this study, we found that IGCA codes weren't accurately categorizing billets. Billets that were very similar based on billet title, activity, rank, rate, and NEC were categorized differently. Also, it is clear that some billets were categorized based on activity rather than the actual work of the billet. For example, an administrative billet at a shore command would be incorrectly coded as the main thrust of the activity, rather than as an administrative billet.

We resolved this problem by creating an algorithm based on billet title, activity, rank, rate, and NEC. This algorithm overrode IGCA codes in some cases. We applied an equivalent methodology to both civilian and military billets, using the civilian equivalents to rank, rate, and NEC.

Largest Navy Shore Manpower Increases by Category, 1993-2012

Code	Function	Total Shore Billets (1993)	Total Shore Billets (2012)	Increase	% Increase
24e	Response to Hazardous Material Mishaps	177	591	414	233.90
13	Systems Acquisition	6,114	6,365	251	4.1
9a	Audit Operations	988	1,164	176	17.81
24a	Environmental Security and Natural Resource Services	846	982	136	16.1
33d	Flight Training	1,131	1,205	74	6.5
32h	Military Bands	618	687	69	11.2
32b	Family Center Services	298	354	56	18.79
32j	Casualty and Mortuary Affairs	39	66	27	69.23
32l	Other Social Services	184	197	13	7.1
3	Support External to DoD	637	647	10	1.6

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Only 10 of the 62 manpower categories had total manpower increases of 10 billets or more during the 1993-2012 period. These are led by Response to Hazardous Material Mishaps (increase of 414 billets) and Systems Acquisition (increase of 251 billets). Since these increases are so small, it makes much more sense to look at the largest relative increases (compared with the overall 37.5-percent decrease) from 1993 to 2012.
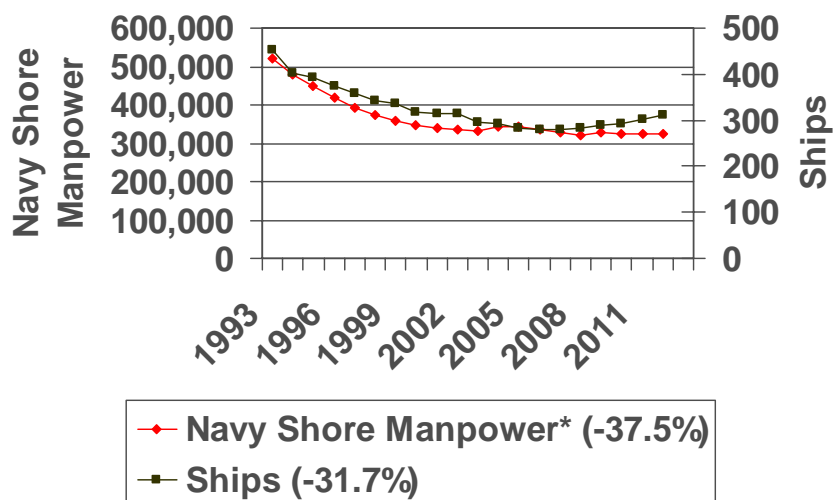
Outline

- Study Goals and Data

- Manpower Growth Compared with Outputs and Drivers

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In this section, we compare relative manpower growth with outputs and drivers.

Navy Shore Manpower versus Ships

Navy Shore Manpower*(-37.5%)
Ships (-31.7%)

*Excludes Individuals Account

The Navy's shore infrastructure has decreased greatly over time. This graph shows the effects of the military drawdown in the early and mid-1990s. The Navy's shore infrastructure was reduced from over 500,000 billets in 1993 to just under 350,000 in 2003. The number of shore billets has remained relatively stable since then, so it is reasonable to assume that the number of all types of shore manpower should have decreased from 1993 to 2012. Those categories that did not decrease would be remarkable. Therefore, we are going to focus on the categories with the greatest relative increases compared with the 37.5-percent decrease of the overall shore infrastructure since 1993. We will concentrate our analysis on the greatest relative increases so that we can better understand why the Navy's shore infrastructure is the size it currently is.

The size of the Navy's shore infrastructure has been relatively proportionate to the total number of ships. Actually, Navy shore manpower has decreased more quickly than the number of ships in the Navy's arsenal. Some Navy shore functions could still be relatively too large. But, overall, the Navy's shore manpower is about what we would expect it to be compared with the Navy of 1993.

Largest Relative Shore Manpower Increases, 1993-2012 (Relative to Overall 37.5% Decrease)

| Code	Function	Expected Billets (2012)	Actual Billets (2012)	Increase	% Increase
36	Health Services	20,384	26,951	6,567	32.22
23	Force Protection	8,548	13,611	5,063	59.2
1	Operations, Planning, and Control	16,720	20,710	3,990	23.86
14	T&E and Enginering	27,464	31,169	3,705	13.5
12	S&T and R&D	7,599	11,052	3,453	45.4
17	Intermediate Maintenance	45,152	48,196	3,044	6.7
13	Systems Acquisiton	3,822	6,365	2,543	66.54
15	Procurement and Contracting	6,078	7,200	1,122	18.46
33c	Specialized Skill Training	14,813	15,819	1,006	6.8
27	Civilian Personnel	1,799	2,574	775	43.1
4	Legal Services	1,494	2,170	676	45.25
9a	Audit Operations	618	1,164	546	88.3
9c	Criminal and Administrative Investigative Services	962	1,506	544	56.5
33d	Flight Training	707	1,205	498	70.4
24e	Response to Hazardous Material Mishaps	111	591	480	432.4

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Above are the top 15 categories (out of 62 total) with the largest relative increase (in billets) compared with the expected number of billets had all categories remained in the same proportion to each other since 1993. At the top of this list is Health Services, with 6,567 more billets than would have been predicted back in 1993. Following this is Force Protection, with 5,063 more billets, and Operation, Planning, and Control, with 3,990 more billets. The four categories that overlap with the last list are Response to Hazardous Material Mishaps, Systems Acquisition, Audit Operations, and Flight Training.

Health Services Manpower vs. Navy and Marine Active-Duty Military Personnel
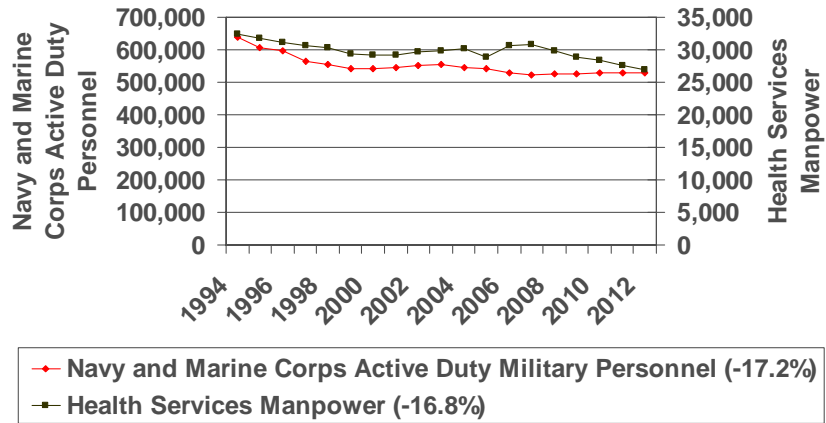
In this slide, we compare Health Services manpower with Navy and Marine Corps active-duty military personnel. We use both Marine Corps and Navy military personnel because those in Navy Heath Services serve both the Navy and Marine Corps. Information on military personnel comes from the Navy and Marine Corps budget documents. For this category, we note that Health Services manpower has decreased less than Navy and Marine Corps military personnel. However, the Navy has already programmed reductions in manpower through 2012 that would bring Health Services manpower into line with total Navy and Marine Corps active-duty military personnel. This is even more true if the Marine Corps increases in size, as President Obama has proposed.

Force Protection Manpower vs. Navy Endstrength
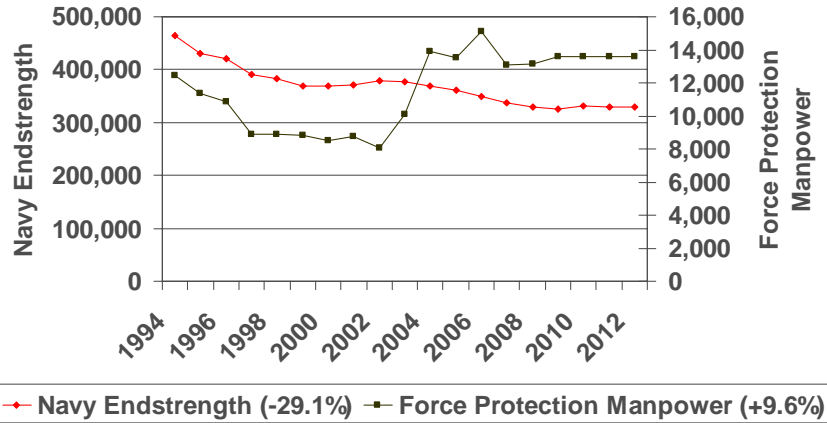
As we can see in the graph above, Force Protection manpower rose greatly after 9/11/2001 and has remained high ever since, even though Navy endstrength has continued to decrease. While the growth in Force Protection after 9/11/2001 is understandable and defensible, it is less clear why manpower on Force Protection has remained high, even while the number of military personnel decreases. The Navy needs to get a clearer idea of what is driving spending on Force Protection and make sure that such spending is based on actual needs. It is not clear what is currently driving high spending in this category. While Navy endstrength has fallen 29.1 percent from 1994 to 2012, Force Protection manpower has increased by 9.6 percent.

Operation, Planning, and Control Manpower vs. Navy Shore Manpower
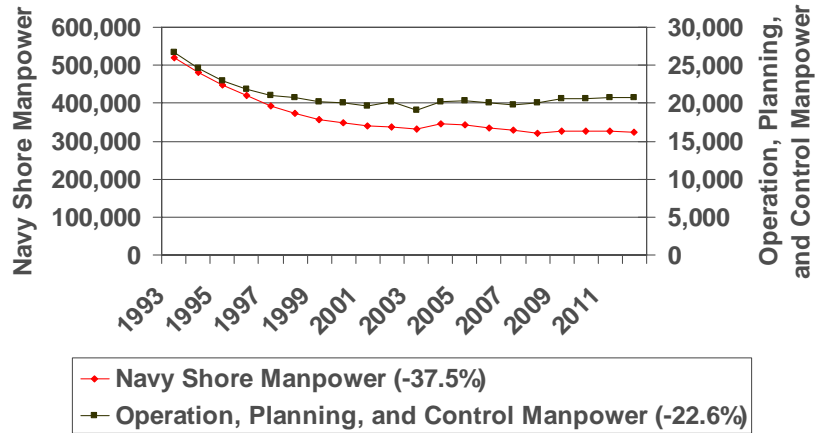
There is no obvious driver of Operation, Planning, and Control manpower. In this slide, we use total Navy shore manpower to show how Operation, Planning, and Control manpower has not come down with the rest of the Navy's shore infrastructure. At the beginning of the drawdown, Operation, Planning, and Control manpower came down with the rest of the Navy's shore infrastructure. In the late 1990s, however, these measures began to diverge and continue to diverge today. The lack of an obvious driver of Operation, Planning, and Control manpower makes it hard to determine whether manpower in this category should be reduced.

Procurement and Contracting Manpower vs. Five-Year Average Procurement
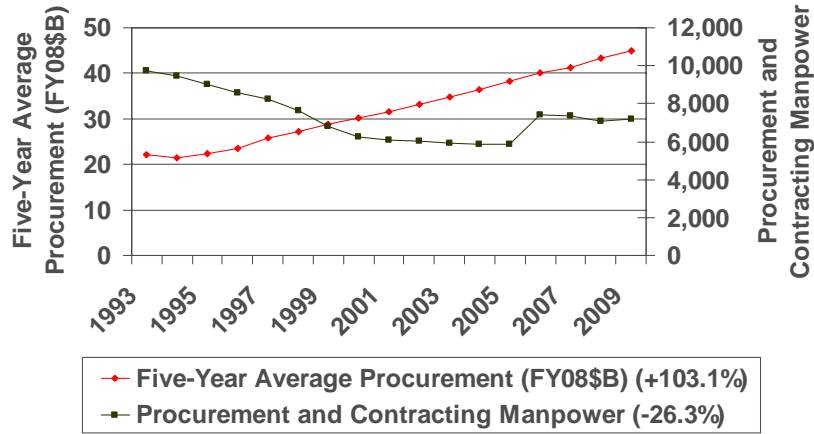
Here we took an average of the planned procurement for the current year and the four succeeding years. This was done using the National Defense Budget Estimates for 2008 ("Green Book") and constant 2008 dollars, meaning that total Navy planned procurement has increased considerably over time. This slide compares Procurement and Contracting manpower with five-year average procurement spending. As we can see, Procurement and Contracting manpower has not kept up with planned procurement. It is not clear, however, that Procurement and Contracting manpower is driven by total procurement. It may be driven by other characteristics, such as the total number of contracts or the difficulty of particular contracts. In those cases, five-year average procurement spending may not be the correct driver for Procurement and Contracting manpower. In any case, procurement spending has doubled since 1993, while procurement and contracting manpower has decreased by more than one-quarter.
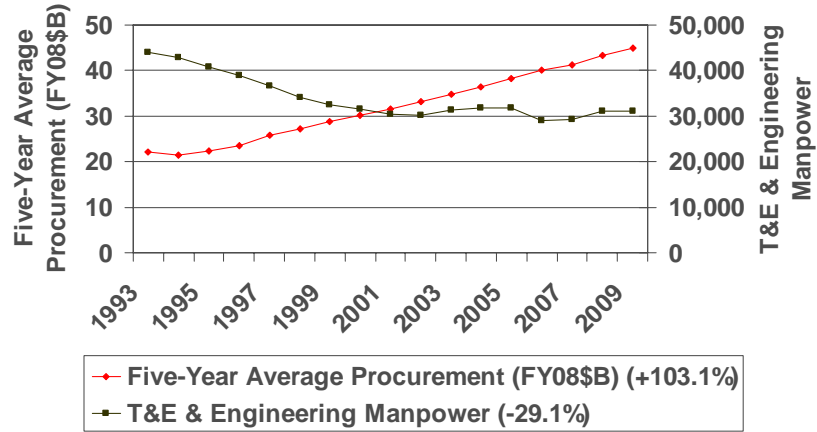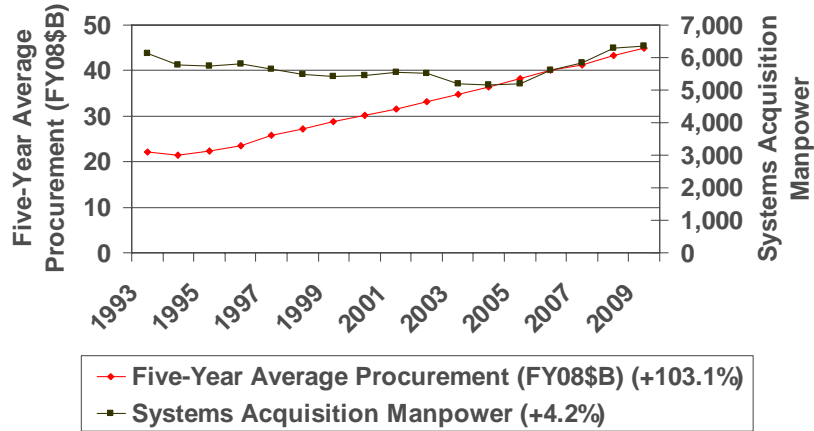
T&E and Engineering manpower has not kept pace with the increase in procurement since 1993. Total T&E and Engineering manpower has decreased almost 30 percent since 1993.

S&T and R&D Manpower vs. Five-Year Future Average Procurement
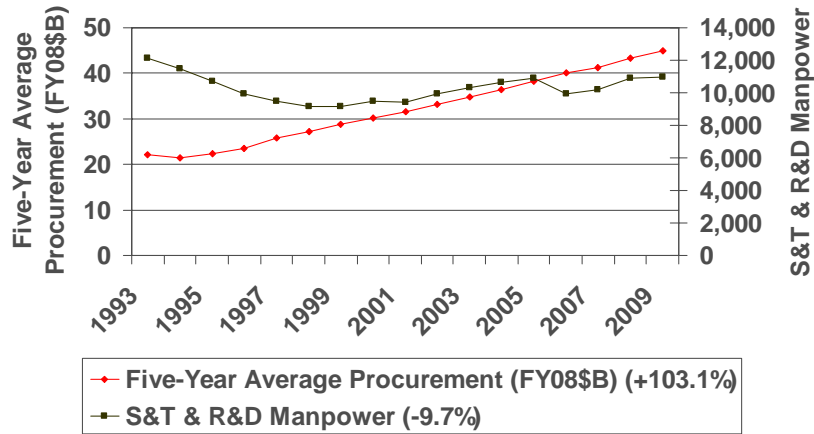
Similar to the last slide, S&T and R&D manpower has not kept up with the increases in planned procurement. Overall, S&T and R&D manpower is only slightly less than it was in 1993, while overall procurement has increased considerably.

Systems Acquisition Manpower vs. Five-Year Future Average Procurement

Similar to S&T & R&D manpower, as well as T&E and Engineering manpower, Systems Acquisition manpower has not kept up with the considerable increase in planned procurement spending since 1993, having stagnated with only a 4.2-percent increase.

Instructor Manpower* vs. Training Graduate Output
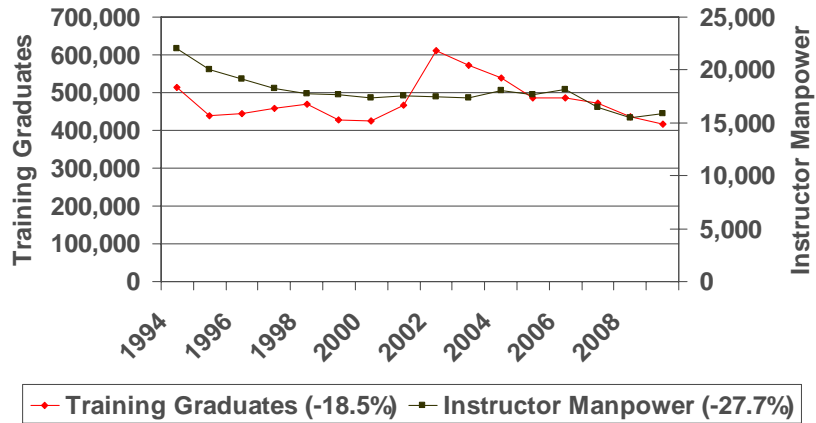
*Instructor Manpower refers to Specialized Skill Training Manpower

The number of training graduates has fluctuated greatly over time, but, overall, instructor (Specialized Skill Training) manpower has fallen relative to the total number of graduates.

Civilian Personnel HR Manpower vs. Total Navy Civilian Personnel
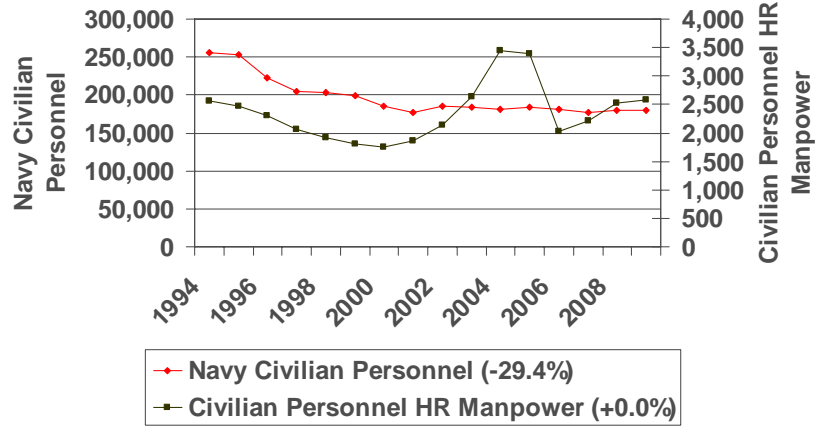
The category of Civilian Personnel Manpower contains people who perform human resources (HR) functions for the Navy's civilian personnel. Civilian Personnel Manpower has risen greatly compared with the Navy civilian personnel that these billets serve. The graph suggests that a reduction of several hundred personnel would be required to return the ratio of Civilian Personnel manpower to civilian personnel to the levels of the 1990s.

Legal Services Manpower vs. Navy Endstrength
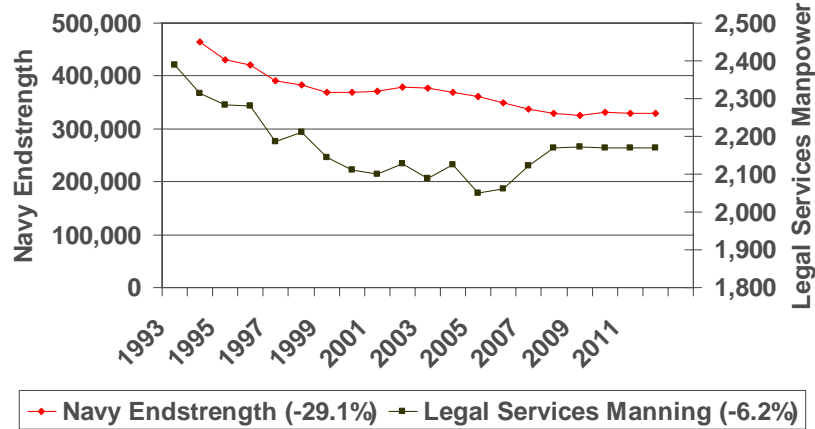
Legal Services manpower has fallen less than that of overall military personnel, falling only 6.2 percent from 1993 to 2012.

However, the demands on the legal community have changed greatly in the last few years. In fact, past CNA studies done specifically on the Navy's legal communities suggest that those communities are undermanned.[3,4]

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[3] Neil B. Carey. *An Analysis of Navy JAG Corps Future Manpower Requirements, Part 1: RLSOs AND NLSOs*, Jun 2008 (CNA Research Memorandum D0017095.A4/1REV).

[4] Neil B. Carey. *An Analysis of Navy JAG Corps Future Manpower Requirements, Part 2: OJAG, Embedded SJAS, NJS, and Reservists*, Apr 2008 (CNA Research Memorandum D0017792.A2/Final).

Audit Operations Manpower vs. Total Navy Budget
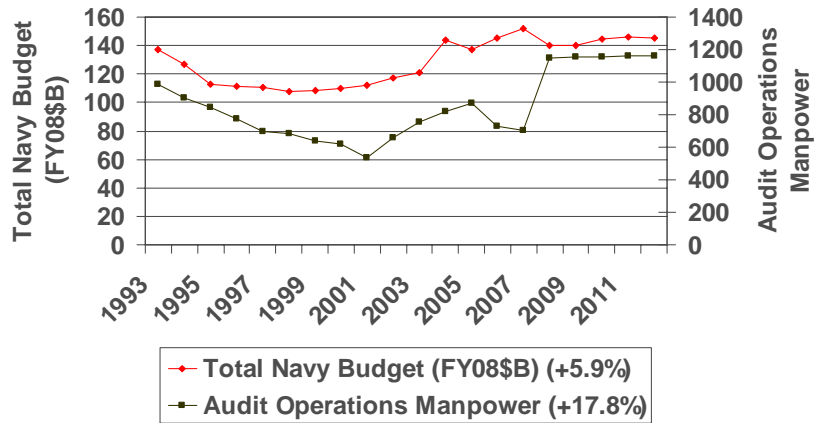
In this slide, we propose that Audit Operations manpower should be proportional to the total Navy budget. Audit Operations seemed to get a large increase in manpower in 2008. The nature of this increase deserves explanation since the reasons for such increases (and their validity) determine whether Audit Operations is too large relative to the size of the Navy.

Response to Hazardous Material Mishaps Manpower vs. Navy Shore Manpower
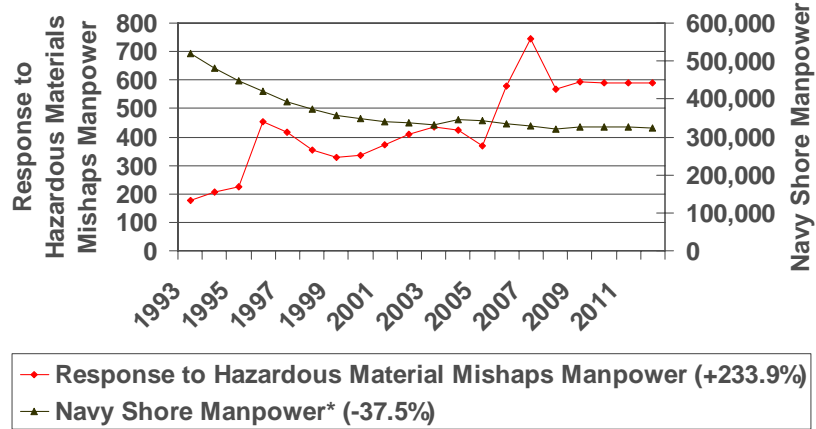
Because there is no obvious driver or output of Response to Hazardous Material Mishaps manpower, it is difficult to tell whether the large increases in manpower are appropriate. The Navy needs to study this category more closely to better understand why manpower in this category has increased.
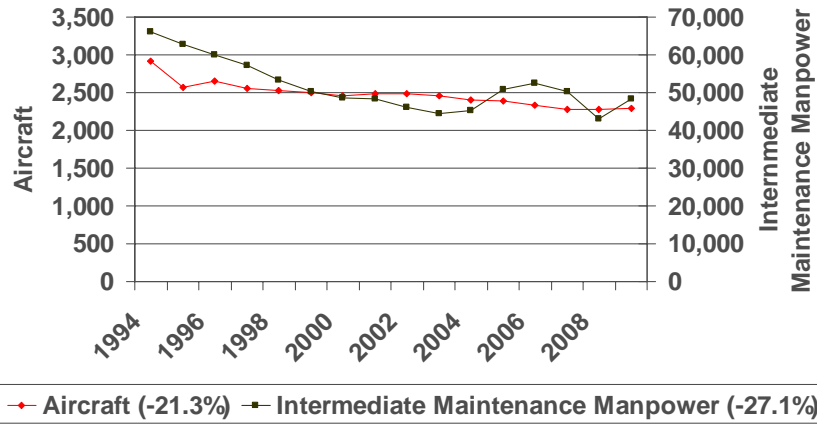
Since 1994, Intermediate Maintenance manpower has actually decreased faster (down 27.1 percent) than the number of primary aircraft (down 21.3 percent).
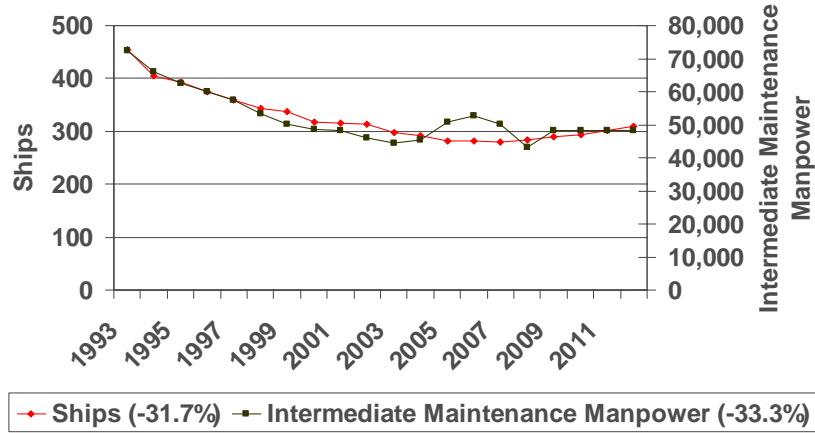
Intermediate Maintenance manpower has decreased at approximately the same rate as the number of Navy ships from 1993 to 2012.

Criminal and Administrative Investigative Services Manpower vs. Total Criminal Investigations
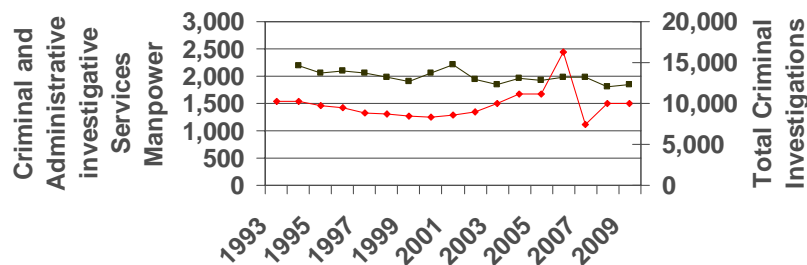
In this slide, we compare total criminal investigations with Criminal and Administrative Investigative Services manpower. Over time, it seems that total criminal investigations have decreased over time (16.2 percent), whereas Criminal and Administrative Investigative Services manpower has fallen only slightly (1.9 percent). Some anomalies in the manpower data remain for two years in the mid-2000s.

Flight Training Manpower vs. Flight Training Load
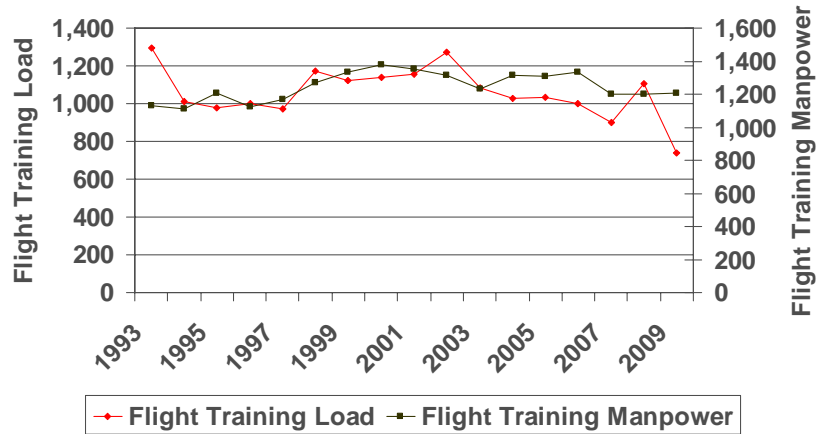
This slide compares flight training load with Flight Training manpower. Flight training load fluctuates greatly from year to year. If we look at 1994 to 2008, we find that flight training load and manpower remain proportional. Certain years, however, show large increases and decreases, making it difficult to know whether the two are proportional.

Outline

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- Study Goals and Data

- Manpower Growth Compared with Output and Drivers

- Manpower Growth and Core Mission Contribution

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This section will discuss how relative manpower growth is related to the Navy's core missions.

Manpower Growth and Core Mission Contribution

- We needed a method of determining which shore functions contribute most to the Navy's core missions

- We selected Mission Criticality Assessment Process (MCAP) rating, developed by N1
  - Panel of subject matter experts
  - Looks at relative importance of different types of shore billets

- We use MCAP to determine relative importance of different types of Navy shore billets

In order to connect manpower growth and the Navy's core missions, we need to be able to determine the Navy's core missions. To do this for shore missions, the Navy's OPNAV N1 developed the Mission Criticality Assessment Process (MCAP). MCAP was developed by a panel of subject matter experts and summarizes their knowledge to look at the relative importance of different types of shore billets. We use MCAP to determine the relative importance of different types of shore billets.

Mission Criticality of Manpower Categories With Highest Relative Increases

Code	Function	Expected Shore Billets (2012)	Actual Shore Billets (2012)	Relative Increase	Mission Criticality
33c	Specialized Skill Training	14,813	15,819	1,006	99.0
17	Intermediate Maintenance	45,152	48,196	3,044	95.0
36	Health Services	20,384	26,951	6,567	82.50
14	T&E and Enginering	27,464	31,169	3,705	65.0
27	Civilian Personnel	1,799	2,574	775	64.7
33d	Flight Training	707	1,205	498	62.4
1	Operations, Planning, and Control	16,720	20,710	3,990	61.10
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13	Systems Acquisiton	3,822	6,365	2,543	45.20
9c	Criminal and Administrative Investigative Services	962	1,506	544	36.0
23	Force Protection	8,548	13,611	5,063	35.3
4	Legal Services	1,494	2,170	676	34.30
9a	Audit Operations	618	1,164	546	0.0
24e	Response to Hazardous Material Mishaps	111	591	480	0.0

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The slide above gives the normalized MCAP rating. Navy subject matter experts developed this rating to determine the categories of shore manpower that are most important to the Navy. The rating is normalized on a scale of 0 to 100, where 100 is most critical. Manpower categories with mission criticality scores closer to 0 are better candidates for manpower reductions than categories with higher mission criticality scores. Here, we note that the categories with the lowest mission criticality scores are Audit Operations (0), Response to Hazardous Material Mishaps (0), Legal Services (34.3), Force Protection (35.3), and Criminal and Administrative Investigative Services (36.0). The categories with the highest mission criticality scores are Specialized Skill Training (99.0), Intermediate Maintenance (95.0), and Health Services (82.50). The other categories have mission criticality scores between 45 and 65.

Manpower Categories With Increasing Manpower Compared With Drivers and Outputs

- Low mission criticality (less than 45)
  – Audit Operations (0)
  – Response to Hazardous Material Mishaps (0)
  – Legal Services (34.3)
  – Force Protection (35.3)
  – Criminal and Administrative Investigation Services (36.0)

- Medium mission criticality (between 45 and 65)
  – Operation, Planning, and Control (61.1)
  – Civilian Personnel (64.7)

CNA

Five categories have both increasing manpower (compared with drivers) and low mission criticality: Audit Operations, Response to Hazardous Material Mishaps, Legal Services, Force Protection, and Criminal and Administrative Investigative Services. Of the 15 categories studied here, these are the best candidates for manpower reductions. Legal services may be an exception as other detailed work suggests that the drivers of Legal Services manpower have changed greatly in recent years, leaving Legal Services undersized relative to the demand. Categories with increasing manpower compared with drivers (such as Operation, Planning, and Control; and Civilian Personnel) are also good candidates for manpower reductions, but more care is needed to make sure that the reductions are appropriate.

Manpower Categories With Stable or Unclear
Manpower Compared With Drivers and Outputs

- Medium mission criticality (between 45 and 65)
  - Flight Training (62.4)

- High mission criticality (more than 65)
  - Health Services (82.5)
  - Intermediate Maintenance (95.0)

CNA

Manpower categories with low or medium mission criticality and stable or unclear manpower compared with drivers and outputs might be good categories for manpower reductions, although the Navy would have to carefully evaluate how these reductions would affect capabilities. These categories include Flight Training. In contrast, manpower categories with high mission criticality and stable or unclear manpower compared with drivers and outputs are less likely candidates for manpower reductions. As shown here, those categories are Health Services and Intermediate Maintenance.

Manpower Categories With Decreasing Manpower Compared With Drivers and Outputs

- Medium mission criticality (between 45 and 65)
    - T&E and Engineering (65.0)
    - S&T and R&D (55.1)
    - Systems Acquisition (45.2)
    - Procurement and Contracting (55.1)

- High mission criticality (more than 65)
    - Specialized Skill Training (99.0)

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Manpower categories with decreasing manpower compared with drivers and outputs can be candidates for manpower increases or decreases, depending on the readiness needs of the Navy and the other demands on the Navy's budget. Manpower categories with medium or high mission criticality and decreasing manpower compared with drivers and outputs are candidates for manpower increases. These increases would clearly depend on contracting resources and the specifics of that manpower category, but the following appear to be strong candidates for manpower increases: Specialized Skill Training and the entire procurement infrastructure (S&T and R&D, T&E and Engineering, Systems Acquisition, and Procurement and Contracting).

Findings

- IGCA codes on many billets are not accurate

- Procurement has doubled since 1993, but acquisition-related manpower has stagnated or declined
  - S&T and R&D
  - T&E and Engineering
  - Systems Acquisition
  - Procurement and Contracting

- Instructor manpower has declined more than workload
  - Is this from the Revolution in Training?
  - Does the Navy need to add instructors?

- Other shore manpower categories have relative increases not explained by workload or drivers
  - Audit Operations
  - Response to Hazardous Material Mishaps
  - Force Protection
  - Operation, Planning, and Control
  - Civilian Personnel

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First, we found that IGCA codes on many Navy billets were not accurate or consistent. Therefore, we developed our own algorithm to divide shore billets into categories.

We find that Navy procurement has doubled (controlling for inflation) from 1993 to 2009, but shore manpower in categories relating to procurement have stagnated. This includes S&T and R&D, T&E and Engineering, Systems Acquisition, and Procurement and Contracting.

Instructor manpower has declined more than workload. We are unsure whether this manpower decrease derives from efficiencies generated by the Revolution in Training or whether the Navy needs to add instructors.

Five other categories had manpower increases that were not explained by workload or drivers: (1) Audit Operations, (2) Response to Hazardous Material Mishaps, (3) Force Protection, (4) Operation, Planning, and Control, and (5) Civilian Personnel.

Recommendations

- Evaluate the balance between planned/programmed acquisition manpower and procurement funding

- Assess the Revolution in Training to verify the achievement of efficiencies that support the reduction in instructor billets

- Consider initiating action on shore manpower categories that have not reduced manpower relative to workload or drivers

CNA

We close this study with three recommendations.

First, the Navy needs to revisit its manpower requirements for its entire procurement infrastructure. Since 1993, procurement has doubled, while procurement manpower has declined. Procurement is so important for the Navy that a shortage of personnel could greatly affect future readiness.

Second, the Navy should closely study the Revolution in Training to make sure that it has achieved its aims. Specialized Skill Training is one of the most important shore functions; without properly trained Sailors, the Navy can't achieve the readiness it desires. In this study, we see that instructor manpower has declined relative to workload. Has instructor productivity increased due to the Revolution in Training, or is the Navy shortchanging its training infrastructure? This is one of the most important questions facing the Navy today.

Lastly, the Navy should study other shore manpower categories that have not reduced manpower proportionately to workload or drivers. In some cases (such as for Legal Services), there are several drivers, some of which justify current manpower. However, this may not be the case for other categories where there has been a relative increase in manpower (i.e., where manpower has not decreased proportionately to its primary driver).

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Backup Slides

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Navy Military, Government Civilians, and Contract Support by Missions and Tasks

- Streicher et al. (2007, CNA)

- Explored methods to determine how to reduce shore manpower
  - Quality of Navy outputs
  - Input-output models

- Used total force inventory from FY02 to FY05
  - Military
  - Civilians
  - Contractors

- Suggested 16 functions for possible manpower reductions

CNA

In 2007, Streicher et al. wrote *Navy Military, Government Civilians, and Contract Support by Missions and Tasks.* In that document, they explore methods to determine how to reduce shore manpower. They looked closely at the quality of Navy outputs and input-output models. In general, they found that the quality of the outputs was poor and that the data were insufficient for input-output models to evaluate Navy productivity. They used four years of data (FY02-FY05) because for those years they had complete contracting data as well as data on Navy military and civilian billets.

This study resulted in 16 functions being suggested for possible manpower reductions.

Areas Suggested for Possible Reductions (Streicher et al., 2007)

Code	Function Name	Total Effort (WY)	Share %	Low MOI	Low Productivity (%)	High Military Growth	High Civilian Growth	High Contactor Growth	High Total Growth (%)
17f	Intermediate Maintenance - Communications gear	11,170	1.44		-84	332		7,663	258
33g	Military Educations - Development and Support	11,618	1.5		-49	3,915	2,507		123
17a	Intermediate Maintenance - Aircraft	15,642	2.34		-48	2,082		2,253	37
3	Support External to DOD	862	0.12	26.5	-19	246			33
11	Communications, Computing, and Other IS	34,912	5.3	26.5		325		7,070	
25	Real Property Project Management, Maintenance, and Construction	45,315	7.31	26.4	-15			1,771	
19	Supply Operations	27,587	4.3			218	637	3,552	
8	Administrative Support	17,690	2.49	22.8			787	3,227	
18d	Depot Maintenance - Vessels	44,964	7.16		-16	924	2,121		
17b	Intermediate Maintenance - Aircraft Engines	977	0.14		-79			685	212
33h	Military Education - Other	4,650	0.56		-27			2,303	46
23	Force Protection	19,254	3.17	30			1,000	307	
32l	Other Social Services	1,995	0.26	11.2				1,585	375
32k	Temporary Lodging Services	905	0.09	28.9		4,530			87
24a	Environmental Security - Natural Resources	2,262	0.35	28.8	-31			276	
17j	Intermediate Maintenance - Support Equipment	739	0.08		-66			383	117

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