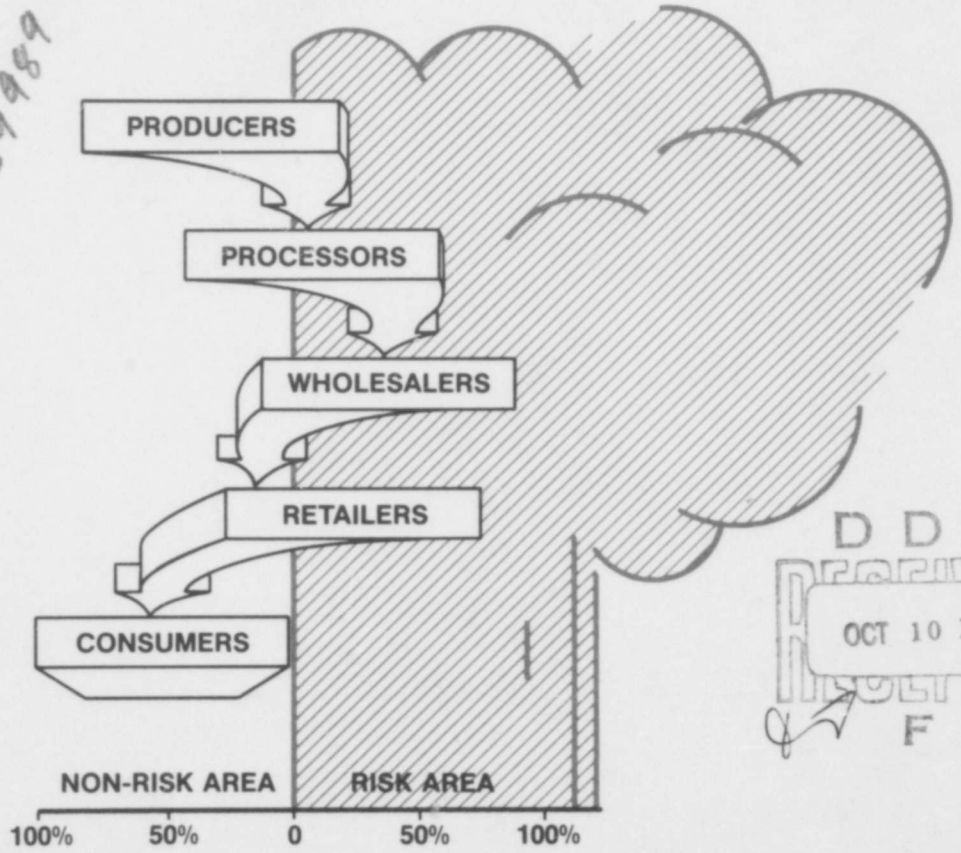
FINAL REPORT

LEVEL II

12

Effects of Attack on Food Distribution to the Relocated Population

VOLUME II: REVISED PLANNING GUIDELINES



Contract DCPA01-76-C-0312
Work Unit 2312F

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EFFECTS OF ATTACK ON FOOD DISTRIBUTION TO THE RELOCATED POPULATION

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Volume II. Revised Planning Guidelines,

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20 ABSTRACT (Continue on reverse side if necessary and identify by block number)

This study extends previous research into food distribution under crisis relocation conditions by (1) investigating the effects of a nuclear attack on the reconfigured food distribution system and the relocated population, (2) identifying and evaluating alternative means of providing food to the relocated population following such an attack, and (3) reviewing existing crisis

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relocation guidance in the light of the probable postattack consequences.

Under a crisis relocation strategy, the percentage of population surviving a nuclear attack is likely to exceed both the percentage of surviving agricultural resources and the surviving food processing and distribution capability. A case study of Colorado Springs, Colorado indicates that two of the most serious food distribution problems following an attack are likely to be (1) transportation system strain resulting from geographic supply/demand imbalances; and (2) local distribution breakdowns resulting from damage to vulnerable wholesale warehouses. Each of these problems will be exacerbated by a strategy of crisis relocation.

In the long run, both the national food distribution system and its local Colorado extension appear to be sufficiently flexible to adapt to a wide range of postattack conditions. However, neither the national nor the local system as currently constituted can be altered as quickly as immediate postattack conditions might warrant. Critical shortages of most commodities can be anticipated immediately following an attack, with shortages of meat and dairy products being particularly severe.

On the basis of the case study, prototype crisis relocation plans for the State of Colorado, the Colorado Springs area, and a representative reception area (Fremont County, Colorado) have been revised and updated to reflect postattack concerns. Guidelines for state and local relocation planners in other areas have been similarly updated.

PREFACE

This report was prepared as part of a series of concurrent studies undertaken by the Defense Civil Preparedness Agency to investigate the potential planning and implementation problems associated with a crisis relocation strategy designed to transfer populations from high-risk areas during periods of severe international crisis. The report was prepared under Contract DCPA01-76-C-0312, and addresses the problems incurred in distributing food to survivors of an attack preceded by a crisis relocation. The research described in the report was accomplished over a one-year period in the Los Altos, California offices of SYSTAN, Inc. under the direction of Dr. John W. Billheimer, with assistance from Mr. Arthur Simpson. Mr. Simpson was responsible for tracing the flow of individual commodities from producer to consumer, and assessing nuclear attack damage at national and local levels. Ms. Gail Fondahl helped to assemble and interpret data on food distribution and developed simplified procedures for computing transportation stress, while Ms. Carole Parker organized and edited the final report.

In serving as technical monitor on the project, Mr. George Van den Berghe of DCPA provided technical guidance throughout the investigation, and helped to establish convenient avenues of liaison with concurrent crisis relocation studies. At the national level, Mr. Steve Birmingham and Mr. Hanford Edsall of DCPA also supplied useful guidance, while Mr. Frank Mollner of DCPA Region VI provided valuable background information on the Colorado Springs Study Area.

This report has been prepared in three volumes:

Volume I: Analysis and Case Study

Volume II: Revised Planning Guidelines

Volume III: Prototype Plans (limited distribution)

SUMMARY

INTRODUCTION

Past research into food distribution under emergency conditions has traced the existing food supply network, investigated postattack food availability and accessibility under a strategy of in-place protection, suggested promising means of reconfiguring the existing distribution network to meet the needs of populations evacuated from central cities under a crisis relocation strategy, and developed and documented guidelines for food distribution under crisis relocation conditions. The current study extends the previous research by (1) investigating the effects of a nuclear attack on the reconfigured food distribution system and the relocated population, (2) identifying and evaluating alternative means of providing food to the relocated population following such an attack, and (3) reviewing existing crisis relocation guidance in the light of the probable postattack consequences.

APPROACH

To assess the impacts of nuclear attack on a reconfigured distribution network under a crisis relocation strategy, the current investigation has developed a quantitative picture of food distribution networks serving a sample study area: Colorado Springs, Colorado. Supplies in the food distribution network have been traced from producer to consumer, and the location and size of inventories in each stage of the distribution network have been plotted on a commodity-by-commodity basis for the eight food groups of meat, milk, eggs, cereals and cereal products, fruits and vegetables, food fats and oils, potatoes, and sugar. To provide a basis for assessing the probable postattack adequacy of the reconfigured food distribution system in the sample city, a hypothetical nuclear attack was postulated, and each element of the distribution system from producer to consumer underwent a damage assessment analysis. The results of this damage assessment were applied to the preattack commodity-flow model to predict the probable postattack flow of the selected food groups to host-area survivors. The surviving distribution system was examined for bottlenecks that might be caused by losses in production capability, labor productivity, supply availability, warehousing space, and transportation accessibility. The postattack inventories derived in this manner were compared with the U.S. Department of Agriculture's National Emergency Food Consumption standards to determine the degree to which supplies of the selected commodities could be expected to meet the requirements of survivors. Alternative postattack

distribution strategies capable of meeting these requirements were postulated and evaluated, and promising strategies were examined for components which could be incorporated into the preattack guidance for the relocation effort.

RESULTS OF DAMAGE ASSESSMENT

General Nationwide Picture

In previous postattack studies based on assumptions of in-place protection in available shelters, the aggregate survival of the nation's agricultural resources exceeded population survival. Under a crisis relocation strategy, however, the percentage of population surviving a nuclear attack is likely to exceed both the percentage of surviving agricultural resources and the surviving food processing capability. Nationwide estimates indicate that 90 percent of the U.S. population could be expected to survive a nuclear attack following a successfully executed crisis relocation strategy. By way of contrast, the most optimistic current estimate for the survival of the nation's agricultural crops sets an 82 percent survival rate, while the survival of livestock and poultry ranges from 54 to 63 percent of the current supply. Only 45 percent of the nation's current food processing capability is expected to survive an attack of the magnitude considered in this research. Exhibit 1 summarizes the projected attack damage for eight primary commodity groups and identifies cases in which shortages can be anticipated in the short and long term following an attack. In the short term, nationwide shortages of most commodities can be anticipated immediately following an attack, with shortages of meat and dairy products being particularly severe.

Two of the most serious food distribution problems likely to emerge following an attack will be:

1. Strain on the transportation network resulting from geographic supply/demand imbalances; and

2. Local distribution breakdowns resulting from damage to vulnerable wholesale warehouses.

Each of these problems will be exacerbated by a strategy of crisis relocation. The survival of additional people in areas removed from traditional distribution centers can be expected to intensify the stress imposed on the damaged transportation system by the geographic separation between remaining food stocks and the surviving population. Furthermore, the guidelines for food distribution under crisis relocation conditions rely heavily on the continued operation of the most vulnerable element of the local distribution system, the risk-area wholesale warehouse. The loss of these warehouses in an attack will remove both important food inventories and a crucial staging element in the distribution system.

EXHIBIT S.1

RELATIVE NATIONWIDE VULNERABILITY OF CRITICAL FOOD COMMODITIES

Commodity	Projected Attack Damage			Likely Postattack Availability and Accessibility	
	Production Capability	Processing Capability	Stockpiles	Short-Term	Long-Term
Meat	Moderate	Moderate-Heavy	No Significant Stockpiles	Severe Shortage	Shortage
Milk	Moderate	Moderate-Heavy	No Significant Stockpiles	Severe Shortage	Shortage
Eggs	Moderate	Moderate	No Significant Stockpiles	Shortage	Slight Shortage
Cereals	Light*	Moderate-Heavy	Light-Moderate	Severe shortages of processed stocks; ample supplies of raw grain, which will require transportation.	Sufficient Stock
Fruits and Vegetables	Light-Moderate	Light-Moderate	No Significant Stockpiles	Slight Shortages	Sufficient Stock
Food Fats and Oils	Light	Moderate-Heavy	Moderate	Slight Shortages	Sufficient Stock
Potatoes	Light*	Light-Moderate	Light	Slight Shortages	Sufficient Stock
Sugar	Light*	Moderate-Heavy	Moderate	Slight Shortages	Sufficient Stock

*Damage is light if attack occurs any time other than the early growth and reproductive stages following planting. If an attack occurs when the crop is in this vulnerable stage (around early June), damage will be moderate to heavy. Heaviest damage to soybeans will be in August.

LEGEND

Damage	Percent Surviving	Damage	Percent Surviving
Light	80-100%	Moderate-Heavy	40-50%
Light-Moderate	70-50%	Heavy	0-40%
Moderate	50-70%		

(Percentage figures are for D+30)

Colorado Springs Findings

Under a crisis relocation strategy, approximately 98 percent of the Colorado Springs risk and host area population is expected to survive the postulated attack. At some time during the first month following an attack, these survivors can expect to experience severe shortages of every commodity except potatoes and raw grain. Although supplies of refined sugar are likely to drop, requirements for sugar will drop even further, so that critical shortages of this commodity are not anticipated. The survival of Colorado's crop and livestock resources approximate nationwide survival rates. However, the Colorado food processing industry is heavily concentrated in Denver and suffers far heavier damage than is experienced nationwide. The survival rate for all Colorado food processors except sugar refiners and fruit and vegetable canners averaged 15 percent of preattack processing capability. Although most major meat packers will be heavily damaged, the capacity of the remaining plants can be expanded considerably by eliminating certain processing steps, and within six weeks after the attack these plants could fill about 85 percent of the Colorado Springs host-area emergency consumption requirements for meat.

As in other areas, the single commodity in shortest supply following the postulated attack will be fluid milk. Heavy damage to local milk processors will cause severe shortages of milk to persist for several months following an attack. However, since most of the dairy herd will still continue to be productive, production of evaporated milk could be increased and fresh milk could be shipped out of the state for drying and returned for use within Colorado. Milk could also be purchased directly from host-area dairy farmers. Even taking into account these and other alternative courses of action, however, it is unlikely that preattack consumption levels of fluid milk would be attained at any time during the first postattack year.

Heavy damage to Colorado flour mills and bakeries will cause shortages of baked products during the first year following an attack. Overall U.S. milling and baking capacity survival is much greater than that for Colorado, and local shortages could be alleviated somewhat by shipments of flour products from outside the state. In addition, the cereal shortage during the immediate postattack period can be offset by releasing a portion of Colorado's grain reserves to mass-feeding facilities.

Colorado storage facilities for such raw products as wheat and potatoes are generally located outside the major risk areas, and will survive with little damage. Major wholesale distribution facilities, on the other hand, which are located mainly in Denver, will be very heavily damaged by blast and fire. Only an estimated 5 percent of Colorado's wholesale food distribution warehouse capacity would survive the postulated attack. The throughput of these surviving wholesalers might be increased 50 percent within ten days following the attack. Warehouse space equivalent to an additional 12% of preattack capacity is available in buildings located in Larimer County. The remaining distribution capacity required to support the flow of food to Colorado Springs survivors will have to come from commandeered space or the construction of emergency warehouses.

POSTATTACK SYSTEM FLEXIBILITY

In the long run, both the national food distribution system and its local Colorado extension appear to be sufficiently flexible to adapt to a wide range of postattack conditions. However, neither the national nor the local system as currently constituted can be altered as quickly as immediate postattack conditions might warrant.

Supply

At the supply end of the distribution system, aggregate production during the first postattack year is likely to fall short of demand if the attack has been preceded by a successful evacuation. However, surviving stockpiles of grain may be substituted for less plentiful products. Even so, geographic supply/demand imbalances are almost certain to exist, so that stockpiles of non-perishable commodities in each low-risk host area appear to offer the only practical insurance against a loss of supply at the local level during the immediate postattack period.

Processing

The overall survival rate of the food processing industry is roughly half that of the national population under a strategy of crisis relocation. Local dairies and bakeries are particularly vulnerable to population-based attacks. Postattack food-processing capacity will be enhanced by the ability of many surviving plants (dairies and bakeries included) to expand their output beyond preattack levels by simplifying processing methods, by increasing employment or the number of shifts worked, or by relaxing quality control tolerances. Under certain circumstances, abandoned facilities or closely-related technologies may be converted to food processing following an attack. For instance, feed mills could be converted to whole-wheat flour production. For any food that can be distributed in its raw form -- and most foods can -- food processing capability should never be allowed to become a serious distribution bottleneck following an attack.

Distribution

At the local level, postattack distribution problems pose the most serious potential constriction in the food supply channel. Host-area retailers will need to be resupplied within 14 days after the attack, and mass feeding centers will need to be resupplied almost immediately. However, the primary preattack source of supply for these outlets, the risk-area wholesaler, will suffer heavy attack damage. After roughly ten days, surviving wholesale warehouses could increase their throughput by about 50 percent. A similar delay could be incurred before unused commercial space could be converted effectively to postattack warehousing. At least four to eight weeks will be required before emergency warehouses can be constructed to support any demand not met by warehouse expansion and space conversion. During this period, substantial supplies of food will have to be channeled through mass-feeding centers or emergency supply depots.

Although the need for mass-feeding programs may not extend more than one month beyond the attack date, there seems to be a significant probability that such programs will be needed and that the need will be critical from the standpoint of both morale and nourishment. If this need is to be met effectively in the immediate postattack period, a corresponding need for training recruits and planning mass-feeding operations must be met well in advance of any attack.

IMPLICATIONS OF POSTATTACK RESEARCH ON CRISIS RELOCATION GUIDANCE

The results of the postattack research in the Colorado Springs study area have been reviewed in light of the current guidance for crisis relocation planning. As a result of this review it appeared that the basic strategy proposed for food distribution under crisis relocation conditions was sound, even though the continued use of risk-area warehouses left this element of the distribution system vulnerable to attack. However, the analysis accompanying the damage assessment and evaluation procedures brought to light several elements which should be included in the crisis relocation guidance issued by the federal government and in the crisis relocation plans for a specific area. These elements include:

1. Provision for identifying critical stockpiles of food held outside the normal distribution channels within the risk area and moving these stockpiles to the host area;

2. Provision for identifying host-area buildings which might be converted to food warehouses under emergency conditions and estimating the utility of such converted space;

3. Guidelines for expanding the capacity of existing food processing plants and converting the capacity of other plants to expand the production of critical commodities under crisis relocation conditions; and

4. Guidelines for anticipating postattack shortages of specific commodities and adjusting priorities for shipments during the crisis relocation period accordingly.

These elements, along with general postattack guidance for food decontamination and distribution, have been incorporated in prototype crisis relocation plans for the State of Colorado, the risk area of El Paso County, and a sample host area, Fremont County. Guidelines for state and local relocation planners have been updated to reflect these elements, as well as other concerns identified in extensive interviews with planners and industry personnel.

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VOLUME II: REVISED PLANNING GUIDELINES

VOLUME II

REVISED PLANNING GUIDELINES

Original prepared September 1975
Updated August 1978

I. INTRODUCTION

A previous investigation of food distribution under crisis relocation conditions[1] led to the preparation of guidelines for planners and officials charged with the responsibility of developing relocation plans at the regional, state, and local levels. The results of the postattack research described in Volume I of this report, coupled with subsequent discussions with planners and USDA officials, have suggested the need for revising and updating the original guidelines to reflect a number of factors, including:

- Postattack guidance for food decontamination and distribution;
- Provisions for identifying critical stockpiles of food held outside normal distribution channels in risk areas, and moving these stockpiles to host areas;
- Guidelines for expanding the capacity of existing food processing plants;
- Provision for allowing smaller risk area food processors and wholesalers to continue operations throughout the crisis period if they so desire;
- Clarification of the liaison role to be played by the U. S. Department of Agriculture under crisis relocation conditions;
- Guidelines for anticipating postattack shortages of specific commodities and adjusting priorities for shipments during the crisis relocation period accordingly.

In this Volume, past guidelines have been updated to reflect these factors as well as other concerns identified in extensive interviews with planners and industry personnel.

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[1] Billheimer, et al. "Food System Support of the Relocation Strategy" SYSTAN Report D123 prepared for the Defense Civil Preparedness Agency under contract DCPA01-74-C0267, Washington, D.C., September, 1975.

A. Summary of General Food Distribution Procedures

Figure I-1 summarizes the general guidelines for food distribution under crisis relocation conditions that have evolved from past research efforts. These guidelines identify activities at the state and regional level as well as activities in the risk area being evacuated and the host area receiving evacuees. The regional nature of the nation's food distribution system makes it imperative that plans for redirecting this system in times of emergency be prepared at the state or regional level. Planning efforts undertaken at this level should include the redirection of normal supply channels to the host areas and the reallocation of transportation drivers and equipment needed to support this redirection. State officials should also rescind all state regulatory restrictions (e.g., highway weight limitations) which might inhibit the redirection of supplies under emergency conditions.

Figure I-1 also summarizes the suggested activities to be undertaken by risk area and host area food producers, processors, wholesalers, retailers, preparers, servers and consumers during a crisis relocation. For all elements of the food distribution at the wholesale level and above, these activities have been designed to parallel normal distribution activities as closely as possible. A conceptual view of the flow of food under crisis relocation conditions appears in Figure I-2. Extensive research and discussions with food industry personnel have led to the conclusion that the most effective strategy for food distributuion under crisis relocation conditions is to allow agricultural production and the output of major processing plants to follow normal channels and to continue using risk area wholesale facilities to serve the evacuated population. These wholesale facilities would provide a highly increased level of service to those retail stores located in outlying host areas.

The proposed distribution adjustments outlined in the guidelines of Figure I-1 and depicted conceptually in Figure I-2 have many attractive features: The altered system is conceptually simple, and builds intelligently on the existing system without creating new operating entities. Corporate chains are preserved as distribution units, and most host area retail stores will continue to be supplied by their pre-evacuation sources. Strain on the national distribution system is minimized and supplies on the road from national processors to regional and local wholesalers at the time of evacuation need not be rerouted.

Although the proposed adjustments would not substantially change the national channels of distribution supplying the risk and host areas, the local distribution system would be drastically altered. Certain points of stress in the adjusted local distribution system are immediately apparent. In addition to placing a heavy load on retail stores in the outlying host areas, the adjusted system greatly increases local transportation requirements. The distance traveled by local delivery trucks will be substantially increased by massive population movements. In order to ensure that the increased transportation requirements imposed by a crisis relocation can be met, and that the revamped distribution system will function efficiently following the evacuation of risk areas, careful advance planning is required.

B. Three Planning Questions

A necessary component of any plan for food distribution under crisis relocation conditions is a compilation of detailed information regarding the food sources normally supplying the affected area, typical transportation modes, and the location and magnitude of food supplies in the distribution pipeline from producer to consumer.

FIGURE I-1: RECOMMENDED GENERAL GUIDELINES FOR PROVIDING FOOD SUPPORT FOR THE CRISIS RELOCATION STRATEGY

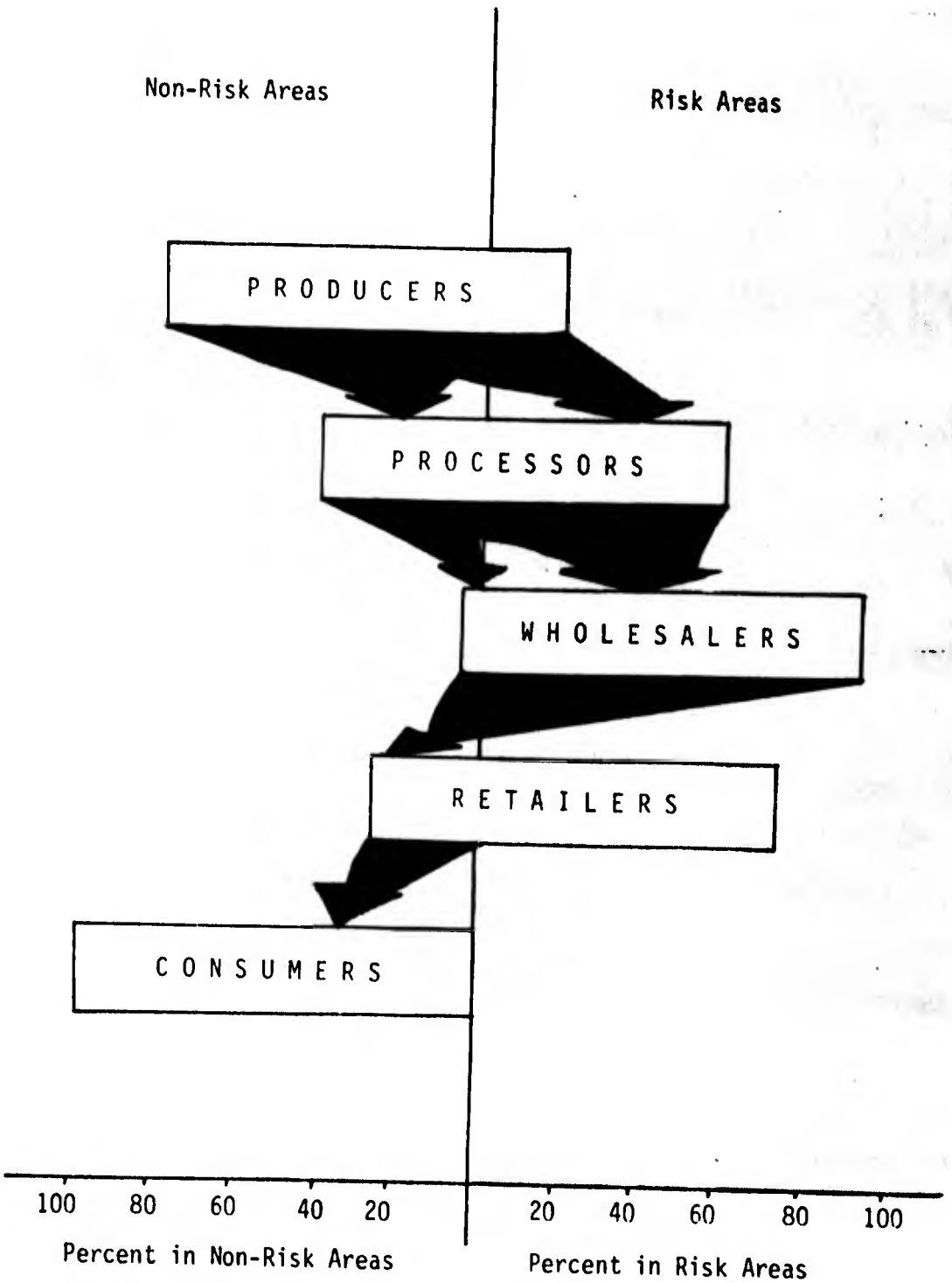
STATE AND REGIONAL ACTIVITIES

- Define distribution patterns for chain and independent wholesalers.
- Arrange for any additional drivers and equipment made necessary by revised distribution patterns through NDTA.
- Waive vehicle highway weight restrictions.
- Publicize waiving of DOT Driver Restrictions.

	RISK AREA ACTIVITIES	HOST AREA ACTIVITIES
PRODUCERS	° Continue any agricultural activity of national, regional, or local significance. (Little significant agricultural production currently occurs in risk areas.)	° Continue all agricultural activity.
PROCESSORS	° Continue only those processing activities that lead to production of commodities included in emergency standards and that either are national or regional in scope or command a significant share of the local market. ° Encourage workers in discontinued processing activities to transfer their skills to similar host area processing facilities.	° Continue all food processing activity, expanding operations where possible through the use of relocated workers and unused capacity.
WHOLESALERS	° Continue to operate all chain and independent wholesale operations that command a significant share of the local market, or that prefer to remain open, following revised distribution patterns specified at state and regional level. ° Empty remaining small warehouses as quickly as possible, transferring goods to host area commissaries and warehouses. Encourage workers in discontinued operations to seek employment in host area warehouses. ° Augment transportation fleet and driver pool as required, following guidelines and procedures established by NDTA for obtaining personnel and equipment from other sectors. ° Increase vehicle and driver productivity by taking advantage of waived driver restrictions and weight limitations; minimizing down-time; relaxing maintenance requirements; increasing vehicle loads; loading only full-pallet quantities; and shipping only necessary commodities.	° Continue all food warehousing and distribution activities, expanding operations where possible through the use of commandeered space, worker overtime, and relocated workers. ° Augment transportation fleet and driver pool as required, following guidelines and procedures established by NDTA for obtaining personnel and new equipment from other sectors. ° Increase vehicle and driver productivity by taking advantage of waived driver restrictions and weight limitations; minimizing down time; relaxing maintenance requirements; increasing vehicle loads; loading only-full pallet quantities; and shipping only necessary commodities.
RETAILERS	° Observe any price controls & single-purchase limitations established nationally during pre-crisis period and evacuation period. ° As inventories & personnel permit, remain open during evacuation period. Then close operations for duration of crisis relocation period & report on remaining inventories. ° Chain stores arrange for employees to transfer to chain's host area outlets for duration of emergency. Employees of independent stores should be encouraged to seek employment in host area retail outlets.	° Observe any price controls, single-purchase limitations, rationing plans, & coupon redemption policies established nationally during pre-crisis period & for duration of crisis relocation period. ° Continue all retail food operations, expanding as required by using added personnel relocated from risk area; extending business hours; authorizing overtime work; stocking at night; and identifying and using expedient nearby storage space.
PREPARERS AND SERVERS	° Chain restaurants with host area outlets should transport inventories to these outlets & reassign workers to host area operations. ° Fast food operations should prepare as many meals as possible during evacuation period & make them available at evacuation staging area. ° Caterers should relocate all mobile food preparation equipment & as much of their inventories as possible to host area. ° Institutions & stores with equipment for large-scale food preparation should transport inventories & equipment to host area.	° Restaurants & kitchen-equipped institutions should expand operations by using additional personnel relocated from risk area; enlarging seating capacity; & identifying & using expedient nearby storage space (garages, etc ° Large-scale mass feeding operations in kitchen-equipped institutions will be supervised by disaster agencies such as Red Cross ° Distribute food preparation equipment & incoming inventories as needed among institutions, restaurants, congregate care facilities, & private residences with hosting capacity.
CONSUMERS	° Avoid hoarding in pre-crisis period. ° Transport as much non-perishable food to host area as is permitted by home stocks and mode of transportation. A one- to two-week supply should suffice.	° Avoid hoarding in pre-crisis period. ° Encourage host area residents to provide shelter and food to members of relocated population.
CONTROLS	° Price regulation & liberal single-purchase limitations at retail outlets during pre-crisis and evacuation periods.	° Price regulation & conservative single-purchase limitations at retail outlets during pre-crisis period. ° Price regulation & coupon rationing at retail outlets, restaurants, & mass feeding facilities during crisis relocation.

FIGURE I-2

FOOD DISTRIBUTION UNDER CRISIS RELOCATION STRATEGY



The required information may be characterized as the answers to three questions:

1. Where does the food come from?
2. How does it come?
3. Who has the food now?

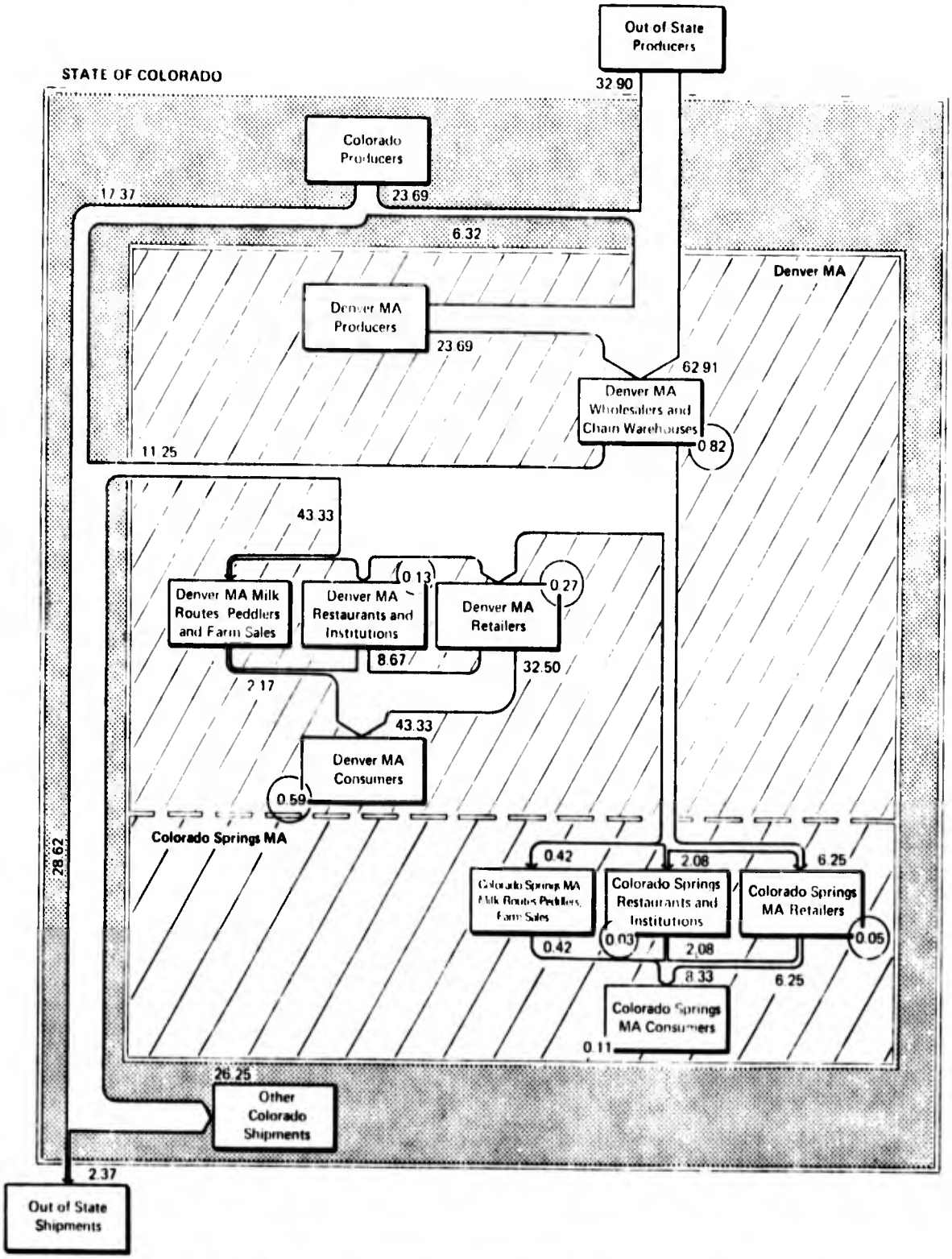
Graphic illustrations of potential answers to questions (1) and (3) appear in Figures I-3 and I-4. Figure I-3 details the flow of shell eggs into Denver and Colorado Springs, while Figure I-4 identifies the grocery chains responsible for food distribution in the risk and host areas of Colorado Springs, Colorado. Questions involving food sources and national transportation capability are particularly important in postattack planning. Given the relatively short projected duration of a crisis relocation posture, questions regarding the immediate locations and identity of local food distributors are particularly important in crisis relocation planning. A comprehensive planning effort, however, must address all three of the above questions.

C. Two Planning Approaches

There are at least two diverse strategies for answering the three planning questions posed above and identifying patterns of food movement in a community. These two strategies can be characterized as the "top down" and "bottom up" approaches. Planners using the "top down" approach rely heavily on published statistics (census data, USDA statistics, trade profiles, etc.) to provide a picture of commodity movement patterns. Those using the "bottom up" approach attempt to identify patterns of commodity movement by undertaking extensive interviews with those food industry personnel actually responsible for that movement in a community. These two

FIGURE 1-3

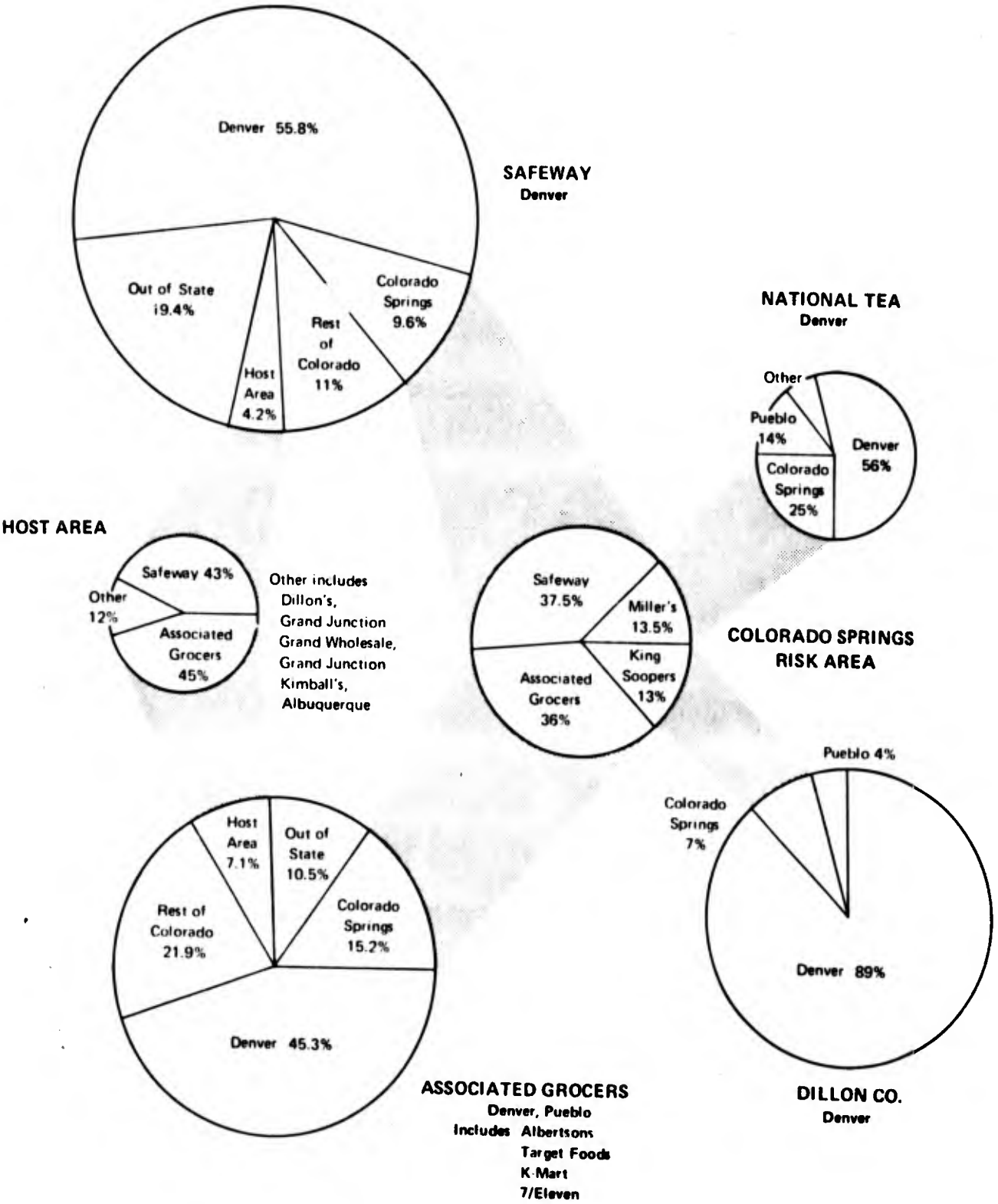
DISTRIBUTION OF SHELL EGGS IN THE DENVER AND COLORADO SPRINGS METROPOLITAN AREAS



Figures outside rectangles represent throughput in millions of pounds annually.
Figures inside circles represent inventory in millions of pounds.

FIGURE I-4

SOURCES OF SUPPLY, COLORADO SPRINGS RISK AND HOST AREAS



(Source: Reference 2)

approaches are not mutually exclusive, and both should be applied in order to obtain a comprehensive picture of a community's food movement. In developing a crisis relocation plan, however, the importance of local food industry personnel to the successful reallocation of supplies under crisis relocation conditions makes it imperative that the "bottom up" approach be used extensively. One of the most important features of a community's crisis relocation plan is the identification of those local industry leaders who control existing food supply channels and who have a preliminary understanding of the ways in which those channels must be diverted to meet crisis relocation requirements. The identification and briefing of these industry leaders will be at least as important to the successful implementation of a crisis relocation plan as the identification of inventory locations and sizes.

E. Organization of the Guidelines

Planning guidelines presented in Section II of this report are orgainzed under the following headings:

A. Production

B. Processing

C. Distribution

1. Warehousing
2. Transportation
3. Retailing
4. Restaurants and Institutions

D. Preparation and Serving

1. Equipment
2. Manpower
3. Menus

E. Consumption

F. Postattack Considerations

Within these headings, four general topics are addressed in Section II:

- Published data sources for the "top down" approach
- Information sources and data for the "bottom up" approach
- Planning guidelines, including
  - (i) Rules of Thumb and Distilled Conventional Wisdom
  - (ii) Promising Analytical Approaches
  - (iii) Summaries of Required Information

Detailed tabular data supporting the planning guidelines and providing additional planning information have been included in five appendices corresponding to Categories A through E. These additional appendices have been added dealing with the following topics:

Appendix F: Simplified Calculation of Distribution Stress Factors

Appendix G: USDA Crisis Relocation Guidance

Appendix H: USDA National Emergency Food Distribution Allowance

The Planning Bibliography* presented in Section III of this report is also organized in the above categories A through E. The Bibliography also contains two additional headings:

F. Emergency Distribution Studies and Guides

G. Overview of the Food Distribution System

H. Postattack Considerations

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*References throughout Part Three are listed in terms of their position in the Section III Bibliography. Thus, the reference C1-1 refers to the first bibliographical reference under the category C1 -- Distribution Warehousing.

F. Specific Changes in Guidelines

Much of the material in the original guidelines[1] remains unchanged by the Volume I analysis of the effects of an attack on food distribution under CRP conditions. However, this analysis has resulted in certain changes and additions to the planning guidance. These changes and additions are outlined in this subsection.

If changes were related to preattack planning or actions, the existing Guidelines sections were amended as required. If changes were related to postattack planning or actions, they were incorporated into a new section, "Postattack Considerations" (Section F).

F.1 Preattack Changes

The sections on preattack production (Section A), processing (Section B), and distribution and warehousing (Section C) required changes resulting from the study of the postattack situation.

Production (Section A). This section was amended to include data on additional sources of information and guidance in determining quantities and locations of CCC commodities held by USDA/ASCS in storage (e.g., dried milk). Such commodities should be removed from the high-risk area during the crisis relocation period.

Processing (Section B). Sources of information on food-processing capacity expansion and conversion were added to this section. Expansion of production capacity or conversion of production to another product (such as from white to whole-wheat flour) and storage of the output within the host area are alternatives considered in order to increase the quantity of food available during the period of emergency.

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[1] Billheimer et al., op. cit.

Distribution (Section C). Several additions to the warehousing guidelines included in the Distribution section were made to (1) provide additional information on warehousing throughout, (2) locate potential warehouse space in host-area structures, and (3) provide for moving USDA-donated commodities out of risk-area warehouses to the host area during the crisis relocation period.

In addition, in response to USDA concerns, the general procedural guidance (see Figure I-1) was amended to permit smaller risk area wholesalers to continue operations during the evacuation if they and their staff chose to do so. That is, no food wholesaler would be forced to shut down or relocate. However, the stocks of small risk-area wholesalers electing to shut down would be transferred as quickly as possible to the host area.

F.2 Postattack Additions

Under the heading of Postattack Considerations, new data were provided on food processing, transportation, food consumption and fallout protection.

Food Processing. Information was provided to guide the planner in identifying and using excess capacity in the surviving food-processing industry. Guidance is also provided to indicate instances in which postattack food-processing capabilities might be increased by converting to other products.

Transportation. Additional guidance is given in the analysis of postattack transportation alternatives.

Postattack Food Consumption and Fallout. This section provides the planner with suggested sources of information on handling food contaminated by radioactive fallout.

F.3 Computation Aids

Simplified Calculation of Distribution Stress Factors. In response to indications that the previously-prescribed formulae for calculating transportation stress factors proved difficult to understand, Appendix F offers a simplified explanation and step-by-step procedure for solving stress factor equations.

F.4 Other Concerns

Since the publication of the initial guidelines, the USDA has issued several documents clarifying its liaison role in crisis relocation. These documents have been included in Appendix G.

F.5 Bibliographic Information

Bibliographic references have been updated to reflect recent publications and postattack studies.

II. PLANNING GUIDELINES AND APPROACHES

This section discusses crisis relocation planning guidelines and approaches for each element of the food marketing process from production through consumption.* Primary attention is focused on those elements of the distribution system within the control of State and local planners under crisis relocation conditions -- wholesale distribution through food preparation and delivery. These elements are generally designated as secondary food resources. Resources designated as primary are those in the early stages of the marketing chain -- largely in the hands of food producers and processors.

A. Production

A.1. The "Top Down" Approach

The USDA and the various State agriculture departments publish a variety of timely statistics describing agricultural production patterns throughout the country. In addition to the voluminous Census of Agriculture (A-3) published every five years, the USDA publishes an annual compendium of food production statistics on a state-by-state basis (Agricultural Statistics, A - 2). More timely data on key crops appears in the various commodity

*Several publications may be consulted for a "top down" overview of the total marketing process. These include the National Food Situation (G- 9), published quarterly by the USDA; two other USDA reports, "Agricultural Markets in Change" (G- 11) and "Market Structure of the Food Industries (G-12); a series of studies of marketing channels for various commodities prepared by the National Commission on Food Marketing (G-4 through G-8); and various textbooks (G-6, G-2).

situation reports appearing throughout the year (e.g., The Wheat Situation, A-10). Most State Agricultural Departments publish annual statistics breaking the production of critical agricultural products down on a county-by-county basis.

A.2. The "Bottom Up" Approach

Just as the USDA is the primary source of published statistics useful in a "top-down" approach to specifying area food production, so local USDA representatives are the chief sources of the production information needed to support a "bottom-up" approach. One function of the local USDA representative of the Agricultural Stabilization and Conservation Service is to maintain an up-to-date listing of county food facilities that includes identification of food processing plants and major farm product storage warehouses (Appendix Tables A-2, A-3).* Separate listings show the quantities and location of stockpiled commodities (such as dried milk) previously purchased and held for use by ASCS in times of emergency. Title to these commodities is held by the Commodity Credit Corporation (CCC). These stockpiles, especially those expected to be in short supply, would be moved from the risk to the host area during relocation (Appendix Table A-4, A-6). Trade associations in many states publish data on agricultural product storage capacity by city and county. Also, the USDA County Extension Agent is invariably a useful information source regarding the the relative importance of a county's agricultural production and the identity of the major producers.

A.3. Planning Guidelines

The crisis relocation planner should identify the annual production levels of key agricultural commodities in both risk and host areas and ascertain the

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*Due to the confidential nature of some of the information contained in the USDA County Food Facility listings, planners desiring to use these listings must submit a written request to the state ASCS representative, who may make unclassified portions available to persons outside the USDA.

relative proportion of this production destined for local, regional and national markets. A useful figure of merit is the annual production per capita in the study area, which may be compared on a commodity-by-commodity basis with similar state and national production figures and with nationwide per capita consumption statistics. Such a comparison readily identifies significant surplus and deficit positions with respect to the remainder of the country. The location and capacity of any significant agricultural storage facilities in the study area should be identified, and the seasonal fluctuations in commodity storage levels should be recorded. To aid the analyst in comparing agricultural production levels with storage and consumption levels, Appendix A contains a compendium of conversion factors relating processed and fresh weight and volume units for common commodities.

B. Processing

B.1. The "Top-Down" Approach

The most comprehensive source of nationwide and statewide data on processing practices across commodity groups is the Census of Manufacturers (B-16). This census contains statistics on manufacturing value added, industry employment and year-end inventory values broken down at the four-digit SIC (Standard Industrial Classification) code level of each state. (This level represents the most detailed breakdown available.) Although employment data constitutes the only information available in four-digit SIC code categories below the state level, four-digit estimating techniques have been developed for extending the value-added and inventory statistics to the county level on the basis of employment figures (Billheimer and Dixon, F-8). Appendix B contains examples of food processing statistics culled from the Census of Manufacturers.

The annual USDA volume of Agriculture Statistics (A-2) contains product disposition data showing the amount of each major agricultural product processed each year, and various USDA Market Research Reports (B-15, G-12) contain processing data for specific commodities. Various trade publications (B-1, B-7) also provide an overview of specific food-processing activities in the United States.

The option of expanding the output of various food-processing industries during the crisis relocation period is discussed in the Analysis and Case Study section of this report. Various other reports provide data on expansion of output (F-7, F-45). Useful data on capacity can also be obtained from the Commodity Economic Research Service, U.S. Department of Agriculture.

B.2. The "Bottom-Up" Approach

Leads to key processors who might be expected to contribute to a "bottom-up" approach to developing a quantitative picture of food processing in the risk and host areas may be found in the USDA County Food Facility Listings. in the yellow pages of the telephone book, and in State manufacturing directories. Each of these sources should be used as a cross-check on the others, but the most useful source for the planner is usually the state directory, which generally lists manufacturers by both location and SIC code classification. A typical entry from the 1975 Colorado Directory of Manufacturers appears below:

Marketing Range

Sinton Dairy Co
3801 N Sinton Rd 80907 633-3821
Corp Est-1880 State 100 to 249 ——— Number of Employees
F James Lynch
Sinton Food Companies Denver Co
Box 5265 TA Denver 80217
2024 Ice Cream and Frozen Desserts
2026 Fluid Milk

SIC Code

Note that this source provides several key items of information not readily available in other references, including the marketing range of the processor (in this case statewide), an estimate of the number of employees, and the identify of a corporate officer. Information on marketing range and employment helps to establish the relative importance of the firm in the local marketplace, while the identity of the corporate officer provides a contact point for those cases in which a personal interview is desirable. Interviews with industry personnel should be undertaken in the case of each processor commanding a significant share of the risk- or host-area market for critical food products. Interviews with local industry personnel can be especially helpful in determining potential output expansion under emergency conditions. Also, industry officials are knowledgeable about the specific characteristics of their materials and equipment, and can furnish specific information on capacity conversion potential. Local USDA personnel may also be of assistance in identifying important processors and appropriate industry contacts.

B.3. Planning Guidelines

The following information should be sought from each local food processor interviews:

Designated CRP Representative Within the Company:
- Name and Title
- Home and Business Phone

Plant Capacity:
- Normal Production Levels
- Peak Production Levels
- Capacity Conversion Potential

Inventory Levels:	Average Levels	Peak Capacity
Raw Product		
Finished Goods		

Personnel Requirements:	Normal Operations	CRP Operations
Production Workers		
Distribution Workers		

Supply Sources:

Major Sources of Raw Product

Transportation Mode (% Truck, Rail, and Air)

Transportation Equipment:

Number Vehicles by Type

Vehicle Capacity by Type

Current Vehicle Utilization

Marketing Information:

Distribution Range

Estimated Market Share

In addition to the quantitative information specified above, accounts of past operating experiences under conditions of stress (strikes, disaster relief, etc.) provide insights into potentially effective operating procedures under crisis relocation conditions.

While risk area processors with insignificant market shares or with non-essential products need not be identified in the crisis relocation plan, all host area processors should be identified regardless of size, even if they are not interviewed directly. A comprehensive listing will make it easier to assess the possibility of capacity expansion or conversion of small host-area food processing activities under crisis relocation conditions.

C. Distribution

As viewed in this study, the food distribution process encompasses the functions of warehousing, transportation, and retail sales through grocery

stores, restaurants, and institutions. Each of these functions is addressed separately in this section. An economic overview of the food distribution process may be found in the Marketing and Transportation Situation (C-8), published quarterly by the USDA's Economic Research Service.

C.1. Warehousing

The general term "warehousing" encompasses the activities carried on by independent food wholesalers, brokers, and the distribution centers of major grocery chains. These activities are the first in the distribution chain to be significantly altered by a crisis relocation strategy.

C.1.-1 The "Top-Down" Approach

Relatively few up-to-date information sources exist to support a "top-down" approach to the study of the food warehousing function. The Census of Business (C.1-11) and County Business Patterns (C.1-12) summarize total wholesale food sales by county, but these figures do not reflect the activity of the most important participant in the food distribution process, the major grocery chain.

The principal source of data on food inventories held at wholesale is a now-dated study performed by the USDA in 1963 (C.1-6 , C.1-8). Data developed in this study were included in a broader study in which comprehensive county-by-county estimates of food stocks were made at all positions of the distribution system. These estimates, which were based on sampling procedures and assume a gross consumption level of 2,000 calories

per day, appear in the 1964 USDA Agricultural Economic Report Number 57, "Food Supplies Available by Counties in Case of a Naticnal Emergency" (C-9).

Although certain of the estimates appearing in Agricultural Economic Report Number 57 may have remained valid over time,* the estimates of wholesale food stocks on hand are particularly difficult to accept currently. The substantial increases in interest costs since 1963 have caused food distributors to cut their wholesale inventory levels to conserve investment capital. Moreover, the sampling procedure used to allocate wholesale stocks on a county-by-county basis were somewhat questionable even in 1963. The report admits that the figures for wholesale stocks in any given county are synthetic, since they were based on a nationwide sample of 5,000 wholesale establishments of different types. This sample was extended to the county level on the basis of local population data. Whereas population statistics provide a suitable surrogate for allocating retail stocks, they tend to be poor indicators of food wholesaling activity. The inadequacy of this approach has been noted in several past studies of emergency food availability** (F-5 , F-34).

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* The USDA is currently undertaking a research effort to update much of the basic information appearing in this study.

** In the case of the Colorado Springs case study described in Part One of this report, the USDA estimate in Agricultural Economic Report #57 ascribes enough wholesale food stocks to Fremont County to last local citizens 11 days. Most of the wholesale food destined for Fremont County is stored in Denver, however, and the county itself houses only two small institutional food wholesalers with far lower inventories than are implied by an 11-day supply.

Although the estimate of wholesale food stocks included in Agricultural Economic Report 57 are suspect at the county level, certain of the nationwide summaries assembled in preparing this report provide useful indicators of wholesale food distribution activity. A supplemental report issued by the USDA at the same time (C.1- 8) estimates the relative level and mix of commodities held in wholesale warehouses throughout the United States.

Although no recent data have been published showing the amount of dry groceries held in food distribution warehouses, the USDA statistical reporting services publishes monthly reports of the total amount of stocks held in cold storage throughout the country (C.1-9). Data for these reports are collected from refrigerated storage centers, public or private, where food products are normally stored for thirty days or more.

C.1-2 The "Bottom-Up" Approach

The "Bottom-Up" approach can prove particularly fruitful in identifying the sources, location, and relative importance of the major food distribution centers serving a specific area, since the number of such centers is generally sufficiently small so that 90% of a city's food supply may be pinpointed with a limited number of personal interviews. Attempts to apply this approach should begin with the Supermarket News Study of Grocery Store Sales (C.3-5). This study annually publishes a breakdown of the retail grocery outlets serving 287 cities throughout the country. This breakdown

contains statistics showing the number of stores, market share and principal supplier of each chain and group of independent retailers. Once the major suppliers in a study area have been identified through the use of this reference, trade directories such as the Chain Store Guide (C.1- 2) and Thomas Wholesale Register (C.1- 13) may be used to determine the market territory covered by individual distribution centers and identify individual representatives to be contacted for personal interviews. A guide to the market coverage of each food chain in the United States showing the number and location of stores served by each of the distribution warehouses operated by the chain is published annually by Media General, Inc. (C.1- 1).

The County food facility listings maintained by the USDA ASCS show the location and size of major wholesale food warehouses in each county in the United States. In addition, the USDA Food Distribution Research Laboratory has undertaken exhaustive studies of the independent wholesale food distribution facilities in over 65 major United States cities. (These cities are mapped in Appendix C.) The USDA studies typically trace food flow, identify relevant distribution costs, and suggest means for improving a city's wholesale distribution facilities. USDA studies of distribution facilities in Denver (C.1- 5) and Detroit (C.1- 7) have provided useful information for current and past investigations of the crisis relocation strategy.

C.1-3 Planning Guidelines

C.1-3.1 Required Information.

o Wholesalers. The following information should be sought from each major wholesale food distributor serving a community:

Designated CRP Representative

- Name and Title
- Home and Business Phone

Inventory Levels

- Days at Wholesale
- Days at Retail (Chains only)

Warehouse Information

- Size (square feet)
- Number of Loading Docks
- Estimated Time to Empty with Present Equipment and Personnel

Transportation Equipment

- Number of Tractors
- Number of Trailers and Capacities
- Miles per Gallon (Loaded)
- Vehicle Range (miles per tank of gas)
- Vehicle Down Time (hours per day)
- Average Loading Time (hours per truck)

Personnel

- Number of Warehouse Personnel
- Number of Drivers
- Required Emergency Personnel

Marketing Information

- Annual Throughput (million pounds/year or dollar volume)
- Number of Stores Served
- Location of Stores Served

Sources of Supply

In-Transit Inventory (days)

Incoming Transportation Modes (% truck, rail, etc.)

In addition to the quantitative information specified above, accounts of past operating experiences under conditions of stress (strikes, disaster relief, etc.) should be sought to provide insights into potential emergency operating procedures.

The gross volume of food products handled through wholesale warehouses will depend partly on the ability to load and unload trucks. This in turn will depend on the availability of materials-handling equipment and transportation to spot trailers and railcars. Assuming adequate transportation equipment, the following loading and unloading rates can be used at existing truck and rail docks:

Manual	10,000 pounds per hour
Hand Truck	20,000 pounds per hour
Forklift	40,000 pounds per hour

o Commandeered and Converted Host-Area Space

An analysis of the implications of postattack strategy on crisis relocation planning indicates that additional host-area warehouse or "storage" space will be needed after an attack. Some data on host-area warehouses presently being used for food distribution or storage are provided in the ASCS Food Facility Listings. Information on other host-area warehouses or buildings suitable for food distribution and storage usage can be obtained from a county plants location directory, county assessors' office or real estate leasing agents. The list should include such information about each structure as:

1. Location;
2. Area (square feet by floor);
3. Loading dock data;
4. Inside ceiling clearance;
5. Temperature control; and
6. Type of material used in construction.

C.1-3.2 USDA Donated Commodities Warehousing

Although by far the largest volume of food distribution is carried out by the chains and independent wholesalers, there has recently been an increase in federal and state government food distribution operations. In recent years, the availability of USDA-donated foods from state and private warehouses has been on the decline due to the switch from donated foods to food stamps for needy people. This trend has been reversed in the very recent past, to the extent that the USDA Food and Nutrition Service is now purchasing more food commodities for school feeding programs than in previous years. USDA Food and Nutrition Service Food Distribution Division allocates the donated food product and distributes it to the various states; the food is then distributed to the schools for the School Lunch Program and to institutions. It appears that this type of assistance will continue to expand. A list of the School Lunch Program food is shown in Appendix Table C-14. A listing of Food and Nutrition Service regional offices is provided in Appendix Table C-15.

Within each state, an organization has been set up to handle USDA-donated commodities. This usually includes an office, a state warehouse for dry grocery storage, and possibly a private warehouse for cold storage. These state distribution offices can be helpful in supplying statistical data and other information on the various USDA-donated commodity programs under its auspices. The following information regarding donated commodities should be obtained or developed and included in the food annex:

- Location of each state and private warehouse;
- Average level of inventory at each warehouse (to be moved from the risk area);
- Authorized state or local personnel who must be contacted; and
- Transportation plan.

C.1-3.3 General Operating Guidelines. In past studies of wholesale warehouse operations, inventory levels ranging between 1-1/2 and 4 weeks of normal supplies have been encountered. The lower end of this range reflects the performance of a chain store operation serving a limited geographic area, while the upper limit of four weeks is more characteristic of an independent wholesaler serving many clients scattered over a wide area. Stocks of dry groceries are greatest, followed by frozen foods and dairy products. Few wholesale grocers maintain more than a four-day supply of meats and perishable goods.

Tables II-1 and II-2 present a compendium of operating statistics and conversion factors for a typical wholesale food distribution center. Appendix C contains guidelines developed in Part One of this report identifying items to be shipped from wholesale warehouses under crisis relocation conditions.

TABLE II-1

OPERATING STATISTICS FOR A TYPICAL WHOLESALE FOOD DISTRIBUTION CENTER

	Non-Foods	Dry Groceries	Meats	Produce	Frozen Foods	Bread	Milk	IceCream
Percent of Shipments by Weight	5.3	38.3	8.5	22.3	4.8	3.2	15.9	1.7
Percent of Shipments by Cubic Volume	6.2	29.6	8.7	21.0	4.0	14.8	13.0	2.7
Percent of Shipments by Retail Sales Volume	3.7	40.4	28.6	7.6	3.4	5.0	10.2	1.1
1000 #/Load	26.0	39.0	29.5	32.0	33.0	6.5	37.0	20.0
Effective Density #/Cubic Ft.	18.'	27.'	20.5	22.2	22.9	4.5	25.7	13.9

TABLE II-2

CONVERSION FACTORS FOR A TYPICAL WHOLESALE FOOD DISTRIBUTION CENTER

MARCH, 1975

	Dry Groceries	Meat	Frozen Foods	Produce
# Per Case	26	31	16	31
$ Per # at Wholesale	$0.33	$0.63	$1.13	$0.14

C.2. Transportation

Transportation questions addressed in this report are limited to those directly involved with the movement of food, particularly with the movement from risk area distribution centers to host area outlets. A more comprehensive view of the relationship of transportation and CRP planning will be addressed in a future SYSTAN study.

C.2-1 The "Top Down"Approach

Few statistics exist below the nationwide level to support a "top down" investigation of food transportation under crisis relocation conditions. The census of transportation reports nationwide estimates of commodity ton miles moved by move (C.2-2), and the ICC maintains a one percent waybill sample of commodity movement. The USDA regularly estimates the contribution of transportation to the nation's food marketing bill and publishes various nationwide statistics on transportation of farm products (G-12 , C-8). Estimates of the number of heavy trucks operating in a county may be obtained from the vehicle registration statistics kept by the county clerk's office.

C.2-2 The "Bottom Up" Approach

At the local level most food transportation is accomplished by private truck fleets owned and operated by grocery chains and independent wholesalers. Information regarding these fleets may be obtained in the course of personnel interviews with distribution center managers (see Section C.1-2, which describes the "bottom up" approach to the warehousing function). Many USDA studies of food distribution facilities in

various cities (see, for example, C.1-5 and C.1-7) discuss local food transportation problems in detail.

Estimates of the number and ownership of additional vehicles and drivers that might be pressed into moving food under crisis relocation conditions may usually be obtained by contacting the local representatives of the National Defense Transportation Association (NDTA).

C.2-3 Planning Guidelines

C.2-3.1 Required Information. As noted in Section C.1-3.1, the following information should be sought from each manager of a transportation fleet serving a wholesale distribution center:

Transportation Equipment Inventory --

- Number of Tractors
- Number of Trailers and Capacities
- Miles per Gallon (Loaded)
- Vehicle Range (miles per tank of gas)
- Vehicle Down Time (hours per day)
- Average Loading Time (hours per truck)

Driver Information --

- Number of Drivers
- Regulatory Constraints on Driver Time

The typical vehicle used in the distribution of dry groceries from wholesale distribution warehouses is a 40,000# tractor-trailer combination. This vehicle typically averages four miles per gallon of fuel and carries a 200-gallon fuel tank, giving it a cruising range of 800 miles.

C.2-3.2 Estimating Transportation Stress. To explore quantitatively the extent of the strain placed on the local delivery system by various preattack evacuation patterns, three different models of the local transportation system have been developed. The purpose of these models is to compute a transportation stress factor, defined as the ratio of post-evacuation ton-miles (or vehicle-hours) to pre-evacuation ton-miles (or vehicle-hours). These models, described in detail in earlier research (F-31) and summarized in Appendix F, vary in complexity and in the amount of detailed information needed to compute the desired stress factor. The three types of stress estimates described in earlier research may be characterized as follows:

(1) Network Models

(2) Population Surrogate Models

(3) Abstract City Models

(1) Network Models -- The most complex model of transportation stress is a network model patterned after the traffic assignment models currently used throughout the United States in local and statewide transportation planning. These traffic assignment models allocate given sets

of demand statistics to the links of a specific transportation network. Typically, this allocation is accomplished by assigning the total demand for transportation between any two network nodes to the shortest path separating these nodes. The purpose of the assignment process is usually to ascertain the loading of the various network links and to develop such overall measures of system performance as the number of vehicle-miles or vehicle-hours associated with a particular network configuration or demand pattern.

The network model was first used to determine the additional ton-miles and vehicle hours necessary to supply food to evacuees in a hypothetical crisis evacuation of the Detroit area (F-12). The model has been programmed for computer analysis and has also been applied in computing transportation stresses in the San Jose, California and Richmond, Virginia areas. It is this model that was used in Section 5.4 of Part One to estimate the transportation stress associated with the crisis relocation plan for Colorado Springs and the State of Colorado.

Necessary inputs to the computerized network model are the location and market share of each major wholesaler serving an area, the number of retail outlets of each wholesaler serving an area, the number of retail outlets of each wholesaler in each zone of the risk and host areas, and a node-link representation of the local highway network. Wholesaler and retailer locations are described as network nodes.

(2) Population Surrogate Models -- The second model of transportation system stress is similar to the network model in most respects. Instead of using actual retail store locations to dictate wholesaler delivery points, however, this model assumes that deliveries are correlated with population distribution. While the use of population surrogates appears to give a suitable estimate of regionwide stress when its results are compared with those of the more elaborate network model, the use of these surrogates obscures differences in the stress borne by individual wholesalers.

(3) Abstract City Models -- The third type of transportation stress model discussed in Appendix F represents an even greater level of abstraction than the population surrogate model. In this case, total risk and host area populations are combined with average distance measures to produce rough stress estimates. The need for detailed network models is bypassed entirely by a mathematical expression for transportation stress that recognizes two types of food distribution patterns:

- Distribution from a central point within the risk area; and
- Distribution from a remote point removed from both the risk and host areas. (Such a point might be a larger city in the vicinity of the study area.)

Appendix F provides sample calculations and worksheets to aid the planner in estimating transportation stress using this simplified approach.

C.2-3.3 Estimating Additional Equipment and Personnel Requirements. The models discussed in Appendix F produce estimates of the increases in vehicle-miles and -hours associated with food distribution under specific

crisis relocation conditions. For planning purposes, these estimates must be translated in terms of the additional transportation equipment and personnel required to distribute food under these conditions.

Since food distribution managers agree that existing transportation equipment is not used to capacity, it is necessary to estimate the additional usage that might be obtained from this equipment before additional drivers and equipment are obtained from other sectors of the economy. In Section 3.2.5.02 of Part One, a number of labor- and equipment-saving measures were proposed for increasing driver and vehicle productivity under crisis relocation conditions. Some of the measures proposed in Part One would have the effect of increasing vehicle productivity without increasing driver productivity (i.e., relaxing maintenance requirements), while other measures (i.e., relaxing union and DOT restrictions) would primarily increase driver productivity, and still others (i.e., relaxing weight limitations) would improve both driver and vehicle productivity. Table II-3 lists the estimated productivity increases associated with each of the proposed measures. This table, which also appears as Exhibit 3.9 in Part One and is repeated here for the reader's convenience, shows that the average potential increase in driver productivity is 51%, while the average increase in productivity possible for existing food transportation vehciles is 112.5%. This figure could range from 76% to 149%, depending primarily upon existing vehicle down time.

Figure II-3 (also duplicated in Part One) charts the rough results of Table II-3 as a function of different transportation stress factors.

TABLE II-3

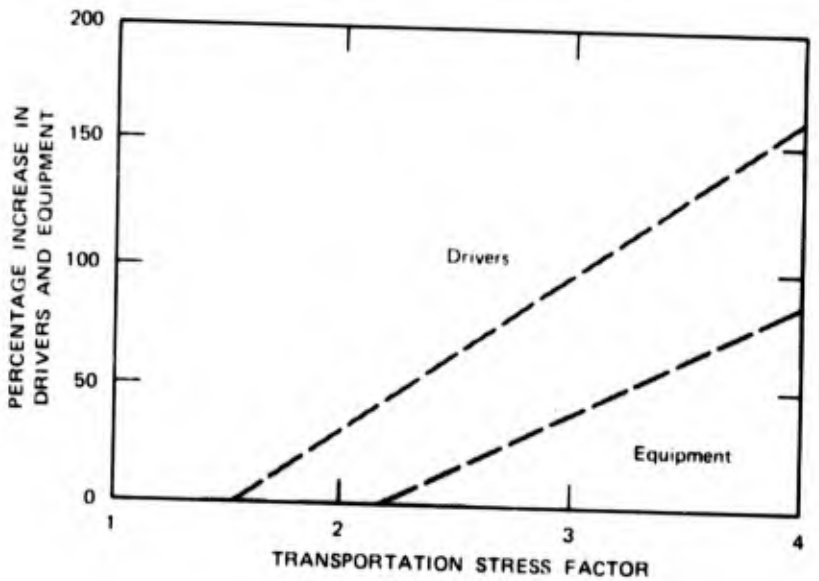
SUMMARY OF POTENTIAL PRODUCTIVITY INCREASES

EMERGENCY MEASURE	ESTIMATED PERCENT INCREASE IN EFFICIENCY					
	Vehicle Time			Driver Time		
	Lower	Mid-Range	Upper	Lower	Mid-Range	Upper
REGULATORY CONSTRAINTS						
Relaxing Driver Restrictions	--	--	--	18%	20%	22%
Relaxing Weight Limitations	4%	6%	8%	4%	6%	8%
EQUIPMENT USE						
Minimizing Down Time	37%	54%	71%	--	--	--
Relaxing Maintenance Requirements	15%	17.5%	20%	--	--	--
Eliminating Light Loads	5%	10%	15%	5%	10%	15%
Shipping Only Full-Pallet Loads	5%	10%	15%	--	--	--
Shipping Only Necessary Commodities	10%	15%	20%	10%	15%	20%
TOTAL	76%	112.5%	149%	37%	51%	65%

FIGURE II-3

RANGE OF ADDITIONAL DRIVERS AND EQUIPMENT

ASSOCIATED WITH TRANSPORTATION STRESS FACTORS



On the average, a transportation factor of 2.5 (i.e., a 150% increase in vehicle mileage) would require an influx of 18% more vehicles and 71% more drivers from other sectors of the economy. These estimates allow for no attrition in the existing driver force in the face of emergencies and assume that the length of the crisis relocation period will be relatively short (one to two weeks). Although Table II-3 was prepared from rough estimates of the likely impact of different measures for improving distribution system productivity, it confirms two of the major intuitive observations of distribution managers regarding emergency operations under crisis relocation conditions:

(1) Driver availability is likely to be more critical than vehicle availability. That is, more additional drivers than vehicles are required to meet a specified increase in vehicle mileage.

(2) The existing distribution system can support a doubling of vehicle miles for short periods of time without requiring additional transportation equipment.

Because of the rough nature of the estimates used in developing Figure II-3, care should be taken in applying this Figure in crisis relocation planning. Since the Figure was developed by accumulating relatively small increases in productivity, there is no guarantee that the estimates will be valid for relatively large increases in transportation stress. In particular, if stress factors are sufficiently great to give rise to vehicle or driver increases in excess of 100% on Figure II-3, such increases should be carefully checked for plausability by consulting directly with industry personnel and by comparing

total vehicle and driver requirements with those of other firms having similar loads and vehicle mileage requirements.

C.3 Food Retailing

C.3-1 The "Top Down" Approach

Statistics capable of supporting a "top down" approach to developing a picture of the characteristics of retail food distribution within a community are available from the Department of Commerce, the USDA, and various trade publications. The United States Department of Commerce, Census of Business (C1-11) and County Business Patterns (C1-12) contains county-by-county statistics on retail grocery sales throughout the United States. The trade magazine Progressive Grocer (C3-2) publishes an annual report on the grocery industry that outlines sales trends, consumer buying patterns, and operating profiles of chain supermarkets and independent stores. The Food Marketing Institute maintains a complete library of publications and reference material on the retail food industry.

Agriculture Economics Report 57 (C-9) contains estimates of the number of man-days of food held in retail outlets in each United States county. These estimates are based on surveys undertaken in 1960 by the USDA (C3-7 , C3-8) and assume a consumption rate of 2000 calories per day. At this consumption rate, food on hand in retail outlets was estimated to be capable of sustaining the United States population for 15.5 days in 1960. Although the results are dated, the estimated length of time retail supplies could be made to last is not far from the two-week estimate of on-hand inventory currently popular among food industry personnel.

A supplement to the survey publication presents useful data on the mix of commodities held on retail shelves (C3-8).

The retail store surveys were undertaken as part of the same series of studies that produced estimates of food on hand in wholesale warehouses (C1- 6 , C1- 8). Like the wholesale studies, the retail inventory estimates assumed that food stocks were directly correlated with population distributions. Since this assumption is far more valid in the case of retail stocks than in the case of wholesale stocks, the USDA study, although dated, remains one of the best sources of information on retail food inventory levels.

C3-2 The "Bottom-Up" Approach

The Supermarket News study of grocery store sales (C. 3-5) contains a breakdown showing the number of stores, market share, and principal suppliers of each chain and group of independent retailers serving most of the risk areas in the country. This information, coupled with inventory and employment statistics gleaned from distribution center interviews, trade profiles (C3-2), and USDA statistics (C3-8) should provide sufficient information on risk area retail operations for crisis relocation planning purposes. Information on host area retail sales is best obtained from interviews with retail outlet managers.

C3-3 Planning Guidelines

C.3-3.1 Required Information. Figure II-4 contains a sample questionnaire for use in interviewing retail food store personnel. This questionnaire was developed by DCPA and employed in interviewing store owners in the Colorado Springs host area (See Section 5.0 of Part One).

Survey By_____

(Use back of survey sheet, or separate sheet, if necessary)

FIGURE II-4

SAMPLE FOOD SURVEY QUESTIONNAIRE

NAME OF STORE OR PROCESSOR_____

PERSON CONTACTED_____TEL. NO._____

BUSINESS ADDRESS_____

CITY_____COUNTY_____

1. GROSS WEEKLY SALES $_____GROCERIES_____MEAT

_____PRODUCE OR_____TOTAL

2. NUMBER OF CUSTOMERS PER WEEK:

_____NORMAL_____AVG DURING TOURIST SEASON

3. AVERAGE AMOUNT SPENT BY EACH CUSTOMER $:

_____NORMAL_____AVG DURING TOURIST SEASON

4. GROSS INVENTORY IN $_____GROCERIES_____MEAT

_____PRODUCE OR_____TOTAL

% EDIBLE_____% NON-EDIBLE_____

5. NUMBER OF TIMES INVENTORY TURNS OVER AND TURNOVER PERIOD:

_____NUMBER_____TURNOVER PERIOD (IN WEEKS)

6. NAME OF SUPPLIERS OR WHOLESALERS AND THEIR ADDRESS:

7. METHOD OF DELIVERY BY WHOLESALES:

(a) ☐ TRUCK ☐ TRAIN _____OTHER

(b) DELIVERIES - HOW OFTEN?_____

(c) AVG GROSS POUNDS FOR EACH DELIVERY_____

PROCESSORS, PACKERS, POULTRY, EGG FARMS, LOCAL DAIRIES, FRESH PRODUCE, CANNING FACTORIES, MEAT PACKERS, ETC.

Gross pounds, tons, gallons or a measurement to give amount on hand and amount shipped. Some may be seasonal operations, so descriptions are necessary to give total amount available for a given period or periods of time.

8. NUMBER OF EMPLOYEES_____.

C.3-3.2 Supermarket Operating Statistics. In recent years the ever-increasing influence of chain stores and independent supermarkets has altered radically the traditional patterns of food retailing. During the fifteen year period preceding 1973, the number of grocery stores in the United States decreased regularly. At the same time the average value of sales in each individual store nearly quadrupled. By 1973, supermarkets accounted for 79 percent of all food sales in the United States, even though they represented only 20 percent of the total number of grocery stores.

The trend toward fewer and larger retail food markets is not expected to reverse itself in the foreseeable future. The trend appears to be stabilizing, however, and Progressive Grocer recently estimated that supermarket sales appear to be approaching their maximum potential at somewhere near 80 percent of total food sales (C3-2). Thus, chain-operated and independent supermarkets may expect to bear the brunt of any demand increases brought about by population shifts prior to a threatened nuclear attack.

In 1972, the average United States supermarket had an annual sales volume of $1.6 million dollars, which represents $78,889 per full-time employee. Table II-4 lists the number of employees and sales per full-time employee for a range of store sizes.

The size of the average market is 14,000 square feet, 75 percent of which is devoted to selling space. The remaining space is used for offices and storage. The relative area devoted to storage space has declined in recent years.

Table II-4

ANNUAL SALES AND FULL TIME EMPLOYEES FOR FOOD STORES

Sales Range	Average Annual Sales Per Store	No. of Employees Full-Time*	Annual Sales Per Full-Time Employee
$500,000 to $750,000	$ 601,000	9.8	$61,327
$750,000 to $1,000,000	$ 847,200	12.3	68,878
$1,000,000 to $2,000,000	$1,384,100	18.2	76,049
$2,000,000 and over	$3,272,100	40.0	81,803
TOTAL	$1,633,000	20.7	78,889

*Two part-time employees considered equivalent to one full-time employee.

Source: Reference (C3- 2)

Those supermarkets with their own parking areas provide an average parking lot of 50,000 to 60,000 square feet. This represents a ratio of parking area to store area of approximately 3 to 1.

The typical supermarket has five checkout counters. By far the busiest time of the week for these counters is the weekend. Statistics show that more than 75 percent of the nation's food purchases are made between Thursday and Saturday.

Additional statistics on typical retail food outlet operations appear in Appendix C.

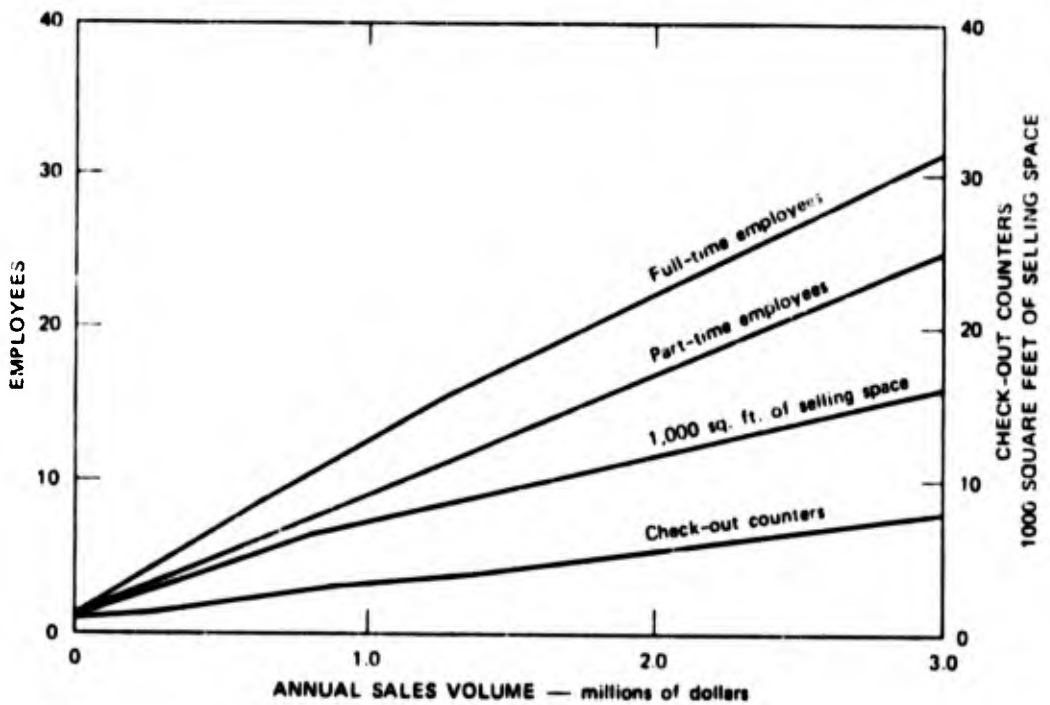
C.3-3.3 Emergency Operating Capability. The unbalanced distribution of supermarket sales which results from heavy weekend buying indicates that the modern supermarket rarely operates at peak capacity. In a

typical supermarket, the peak sales period is 6 p.m. to 9 p.m. on Friday, when nearly 14 percent of the week's volume is sold. If this rate were maintained uniformly for seven days, the average supermarket would handle nearly four times its present business. This measure of capability views the supermarket solely as an outlet and gives no consideration to resupply problems. The inference that business could be quadrupled also assumes, not unreasonably, that patrons would be willing to adjust their normal shopping patterns in time of emergency. Granting the over-simplification involved in using a supermarket's peak period as an indicator of outlet capacity, it seems clear that much unused capacity exists in the operation of the modern supermarket.

Supermarket managers take advantage of their business imbalances by assigning full-time personnel to stocking activities during lulls in daily store activity and making full use of part-time personnel during the weekend rush. Because of this work-balancing practice it is difficult to assess the need for additional personnel to handle the increased business brought about by an emergency evacuation. Under normal operating conditions the average relationship of personnel and other operating parameters to store volume is shown in Figure II-5. This graph shows that an average increase of $125,000 in a store's annual business normally requires the addition of one full-time and one part-time employee. In the face of demand shifts caused by population evacuations, it would be expected that the productivity of employees in host areas would be increased. Moreover, the data in Figure II-5 reflect long-term operating conditions rather than the short-term surges expected under crisis relocation conditions. Thus, the relationships shown in Figure II-5 may be considered to represent upper bounds on the increases in retail food

FIGURE II-5

AVERAGE VARIATION OF OPERATING PARAMETERS
WITH STORE VOLUME (1971 DATA)



(Source, Hall and Billheimer, op cit.)

personnel required in host area stores as a result of risk area evacuations.

Studies of supermarket operating data and interviews with food industry personnel indicate that host area retail outlets can accommodate a doubling of their business without appreciably altering their present mode of operation. Three- and four-fold increases may also be tolerated without major changes in work force or storage space. Increases of this magnitude would, however, strain existing staffs and storage space nearly to the breaking point. Accommodation of three- and four-fold increases would undoubtedly require maximum utilization of regular employees, the elimination of some nonfood items, night-time stocking, relaxation of union regulations, and extended business hours. System stress will be somewhat lessened by the limitation of brand choices, the smoothing of buying patterns, and an increase in the average value of each customer sale. The chief problem anticipated is the lack of adequate storage space for the perishable items.

Business increases of five-fold or greater will begin to require major additions in storage space and personnel. If guards can be made available, portions of supermarket parking lots might be pressed into service as temporary storage space. In the case of chain stores, temporary transfer of workers from risk area stores to host area stores should alleviate the personnel problem. In the case of independent retailers, experienced personnel from independent risk area retailers or from chain stores having no host area outlets might be used to augment existing staffs Should shortages of experienced personnel arise, inexperienced help may be pressed into service with little loss of operating efficiency. The

experience of many retailers during a recent strike of grocery clerks in Washington, D.C. indicates that inexperienced personnel may be trained quickly on the job and that operations may be continued with such temporary personnel for the likely duration of the crisis relocation period.

C.4. Restaurants and Institutions

C.4-1 The "Top Down" Approach

Nationwide statistics summarizing retail food sales in restaurants on a county-by-county basis appear in the Census of Business (C1-11), and County Business Patterns (C1-12). A survey undertaken by the USDA in 1944 (C4-2) provides county-by-county estimates of the number of days supply of food and beverages in establishments that serve food for on-premise consumption. Supplies are calculated on the basis of a 2000 calorie per day consumption rate. A supplement to this calorie-counting report provides nationwide estimates of the food and beverage poundage held in food service establishments by food groups (C4-3).

C.4-2 The "Bottom-Up" Approach

Information about restaurants from the "bottom up" can be obtained from operators of individual restaurants, restaurant associations, consulting and accounting firms which specialize in restaurants, government agencies involved in food service, and books, magazines, and journals about restaurants and institutions.

A reference which provides much operational information about restaurants and institutions and, in addition, a very detailed listing of magazines, journals, and newspapers pertaining to restaurants,

foodservice associations, governmental agencies with foodservice involvement, and foodservice consultants is The IFMA Encyclopedia of the Foodservice Industry by Julie Woodman (International Foodservice Manufacturers Association, 1 East Wader Drive, Chicago, Illinois, 60601, 1972). The major national association for restaurants is the National Restaurant Association (1 IBM Plaza, Chicago, Illinois, 312/787-2525). A magazine which is widely read by the foodservice industry is Institutions/Volume Feeding Management Magazine (Betsy Raskin, Senior Editor: 312/372-6880).

C.4-3 Planning Guidelines

C.4-3.1 Required Information. The following information should be sought from each local restaurant and institutional feeder interviewed. In general, detailed information need only be obtained on host area restaurants and institutions, since risk area establishments will be closed during the crisis relocation, and no organized attempt will be made to relocate food inventories held by these establishments.

Designated CRP Representative:
- Name and Title
- Home and Business Phone

Inventory Levels (in days):
- Canned Goods
- Frozen Goods
- Meat
- Produce

Sources of Inventory:
- Canned Goods
- Frozen Goods
- Meat
- Produce

Number of Shipments (per month):
- Canned Goods
- Frozen Goods
- Meat
- Produce

Kitchen Capacity:
- Area
- Number of Burners

Storage Capacity (Area)

Seating Capacity (number of people):
- Normal
- Maximum

Throughput (per hour):
- Normal
- Maximum

C.4-3.2 General Operating Guidelines. Appendix C.4 summarizes much of the specific data concerning the operations of restaurants and food-serving institutions. These data include information or inventories of restaurants and serving capacities of sit-down restaurants and cafeterias in relation to serving area, kitchen area, and storage area. Some of the data on food preparation and service specific to equipment, manpower, and menus are included in Appendices D-1, D-2, and D-3.

C.4.-3.2.01 Restaurant Planning Guidelines. The following rules of thumb were gleaned from interviews of larger caterers and restaurant consultants.

Industrial Cafeterias:

1. Table Turnover Times: Breakfast: 15-20 minutes
   Lunch: 30 minutes
   Dinner: 45 minutes

2. Area of Facility:
   12 ft^2 per chair
   6-8 ft^2 of kitchen area per chair
   10-12 ft^2 of total backroom space (kitchen, storage, washing area, etc.) per chair

3. Cashier is limiting factor in cafeteria line speed.

General Statistics:

1. Seating Space: Cafeteria: 12 ft^2 per chair
   Normal Dining Room: 20 ft^2 per chair
   Banquet Hall: 10 ft^2 per chair

2. Inventory Turnover of Restaurants: 2.5-3 times per month.

3. Non-perishables are 25% of total inventory; 75% consists of meat, produce and other perishables.

C.4-3.2.02 Mess Hall Planning Guidelines. The U. S. Department of the Army has extensive experience in feeding large populations in their mess halls. The following information was gleaned from interviews of Army personnel who specialize in feeding:

1. Serving Space:
   Old Rule of Thumb: 66ft^2 per four-man table
   New Rule of Thumb: 18 ft^2 per chair (Range is 10 ft^2 - 22 ft^2)

2. Time for Meal:
   Total Meal Time: 90 minutes
   Serving Time: 72 minutes
   Eating Time: 18 minutes
   Turnover: 4 per meal

3. Inventory: 4 days

4. Typical Cafeteria Throughputs:
   A Rations: 8 per minute
   Short Order: 5-6 per minute
   Scramble System: Approximately 6 per minute

5. Facility Specifications:
   Cafeteria for 1001-1500 men. (Specifications for other size cafeterias are in DoD Construction Criteria Manual, Department of Defense, Oct. 1, 1972.)

   Dimensions (All in ft^2):

Gross Area: 17,668	
Mechanical and Electrical	355
Platform and Canopy	305
Dining Areas - 2 - Each is (57'6" x 50') (each contains 208 chairs)	2875

Other	
Dishwashing	590
Cart Wash	51
Dry Storage	451
Receiving Platform	308
Serving Line, Self Service, Patron Toilets	6500
Kitchen	1620
Pot and Pan Wash	133
Office	132
Refrigerator	348
Walk-in Freezer	92

Total of 416 seats (2 x 208).

Turnover is 4 per meal.

Total Meals Served in Meal Period is 1664 (4 x 416).

D. Preparation and Serving

This section gives references to information about the preparation and serving of food. Section C.4 above on restaurants and institutions was primarily concerned with the preparation and serving of food under normal conditions. This section isolates for consideration the equipment, manpower, and menus necessary for preparing and serving food under both normal and emergency conditions.

The American Red Cross has extensive experience in preparing and serving food during natural disasters. Before the crisis relocation both the national organization and the local chapter of the American Red Cross should be contacted. The national contact is:

Mr. Michael B. Saxe, MSW
Chief, Disaster Family Assistance
American National Red Cross
10195 Corporate Square
St. Louis, MO 63132
314/997-3130

D.1 Equipment

D.1-1 Data Sources

There are several excellent publications which describe the type and quantity of equipment necessary for food preparation and serving. Among these are Commercial Kitchens (See Bibliography D-5) and Food Service in Industry and Institutions (See Bibliography E-3).

The United States Department of the Army has several publications giving information concerning the equipment needed to prepare and serve food based on their experience with Army mess halls and mobile feeding. The most complete guides of the necessary equipment relative to the number of men fed are: 1) Common Table of Allowances No. 50-911, Equipment for Food Service Facilities Serving Field Installations, Troop and Hospital Trains, and Army Vends, Headquarters, Department of the Army, April, 1970. 2) Equipment Authorization Policies and Criteria and Common Table of Allowances (AR310-34), Headquarters, Department of the Army, June, 1970.

D.1-2 Planning Guidelines

In most cases, kitchens and serving areas already equipped will be used for food preparation and service. When needed and available, supplementary equipment may be provided. If a new kitchen is to be equipped, the specifications indicated in Appendix D.1 should be followed.

In addition, if mobile feeding is necessary, a mobile field kitchen trailer has been developed by the United States Army Natick Laboratories, Natick, Massachusetts 01760 (Contact: John Perry--617/653-1000, X2736).

This trailer is designed to provide food service for approximately 200 personnel per meal, weighs less than 6,000 pounds, costs $5,600, can be set up or taken down by four personnel in 20 minutes, and can be transported by any vehicle capable of pulling a 1-1/2 ton trailer.

D.2 Manpower

D.2-1 Data Sources

Data have been developed on the manpower levels necessary for preparing food in both civilian and military establishments. Chapter 12 of Food Service in Industry and Institutions, cited in Section D1-1 is a convenient source of such data. Army manpower levels are given on Pages 4-3 to 4-4 of The Army Food Service Program (AR30-1), Headquarters, Department of the Army, April, 1971. A handbook by the American National Red Cross, Basic Course in Emergency Mass Feeding, (H-15-August 1966) covers all aspects of mass feeding. Pages 98-103 of this publication are particularly relevant to manpower needs.

D.2-2 Planning Guidelines

Under most preparation and serving programs, previously operating preparation and serivce facilities will be used. Their normal manpower will be available. However, additional personnel will be required from the host area or evacuee population to expand the volume of existing facilities in keeping with the greatly increased needs of the relocation program. Guidelines for the additional levels of manpower needed are given in Appendix D.2. To the maximum extent possible, already trained personnel should be used. Contacts made before the relocation period between host and risk area restaurants and institutions could assure the orderly transfer of chefs, cooks, servers and other types of help from the risk area to the host area.

D.3 Menus

D.3-1 Data Sources

Menus particularly suited for large-scale preparation have been

developed for several purposes, including feeding during disasters, school feeding, and other types of institutional feeding. Two references cited in Section D.2-1 contain such menus: 1) Basic Course in Emergency Mass Feeding by the American Red Cross; and 2) The Army Food Service Program by the Department of the Army. In addition, three publications by the United States Department of Agriculture are useful for menu planning:

1. Quantity Recipes for Type A School Lunches (Page 31), United States Department of Agriculture, August, 1971, is a very extensive source of menus for 100 serving preparations;
2. A Menu Planning Guide for Type A School Lunches (Program Aid No. 719), United States Department of Agriculture, May, 1974 demonstrates how large-scale menus should be planned;
3. Food Buying Guide for Type A School Lunches (PA-270), United States Department of Agriculture, discusses quantities of unprepared food needed for mass preparation.

D.3-2 Planning Guidelines

As discussed in Part One, Section 3, the use of appropriate menus is crucial to a mass feeding effort in several ways. First, proper menus assume a well-balanced meal. In addition, the use of menus particularly suited for mass feeding will ease the problems of food preparation and service by indicating the size of portions necessary for large preparations already calculated; menus which are consistent with one-dish meals will ease the strain of preparing and serving meals. A selection of mass feeding menus, such as Quantity Recipes for Type A School Lunches, should be distributed to host area family residences, restaurants, institutions, and commissaries at the beginning of the relocation period.

Meals for an evacuated population need not be fancy nor served with frills. They should be simple, suitable and speedily provided, and there should be adequate portions in each to satisfy each evacuee.

Whenever possible meals for evacuees should include foods from each of the 4 food groups that are the basis of an adequate diet: milk, meat, vegetable and fruit, and bread and cereals. Other foods such as butter, margarine, sugar and seasonings may be used to round out meals and to give taste appeal, but are not necessary to a balanced diet.

In addition, factors other than nutritional needs should be considered if the menus are to fit the facilities and groups to be fed. The means of transporting and distributing the food, storage facilities, kinds of available food supplies, available work space and food preparation equipment should also be kept in mind when menu planning.

Until food supplies and kitchen personnel are organized, a main course such as a thick soup or stew with a beverage, bread and butter would be easy and quick to prepare, nourishing, and reassuring to the displaced population. It is important to serve foods that are familiar to the cooks and acceptable to the group. Master menus should be planned and then modified, if necessary, to meet any special needs among members of the group to be fed (i.e., infants, expectant mothers, diabetics, etc.). Some small choice should be offered whenever possible, if only between breads, spreads, or other small items. Of course, this may not be possible under conditions of austerity and/or rationing.

To aid in menu planning, seasonal factors should be considered. Depending on the time of year, various fruits and vegetables may or may not be available. In hot weather, relocatees will welcome a cool salad and/or beverage, and in cold weather a warm drink and hot meal will add to menu appeal.

In a mass feeding situation, quantity-tested recipes are recommended because they eliminate guesswork and assure consistently good products. Merely multiplying a recipe many times affects proportions, preparations methods, cooking time, etc. If circumstances require use of a family size recipe for quantity cooking, it is best to follow the original recipe but to make it up in many individual batches. Food workers will find it helpful to memorize a few simple quantity recipes: for example, 1 pound of coffee to 2½ gallons water yields 50 cups of coffee: 1 cup dry milk to 4 cups water yields 1 quart of fluid milk, or 1 part dry milk (3 pounds) to 4 parts water (3 gallons) yields 50 cups of fluid milk.

During the early stages of the evacuation relocation, it may not be possible to serve a hot meal. Packaged, canned and fresh foods that can be served without cooking may have to be used, such as canned foods and sandwiches. As soon as a means of heating, cooking and serving food are available, serve hot soups, stews, or other one-dish meals, with bread, fruit and beverages. When mass feeding facilities are in full operation, follow a normal pattern of 2 or 3 meals a day.

E Consumption

E.1. Data Sources

The United States Department of Agriculture publishes annual statistics on the per capita consumption of various commodities throughout the United States (E-11). Appendix E contains a summary of the annual per capita consumption levels for various food groups. In 1963, the United States Department of Agriculture undertook a civil defense study designed to determine the amount of food on hand on the shelves of United States consumers (E-10). A survey of 11,368 households produced estimates of the amount of time food on hand could be made to last in cases of emergency. Consumers were stratified by household location, family income, dwelling type, and geographical region. A sample of the survey results appears in Figure II-6. More detailed results may be found in Appendix E. In spite of the fact that the survey results are somewhat dated, consultations with the United States Department of Agriculture personnel responsible for the original study have led to the conclusion that the results adequately reflect contemporary food purchasing and have storage practices. Naturally, certain of the results will need to be adjusted to reflect changes in income levels and living patterns.

E.2. Planning Guidelines

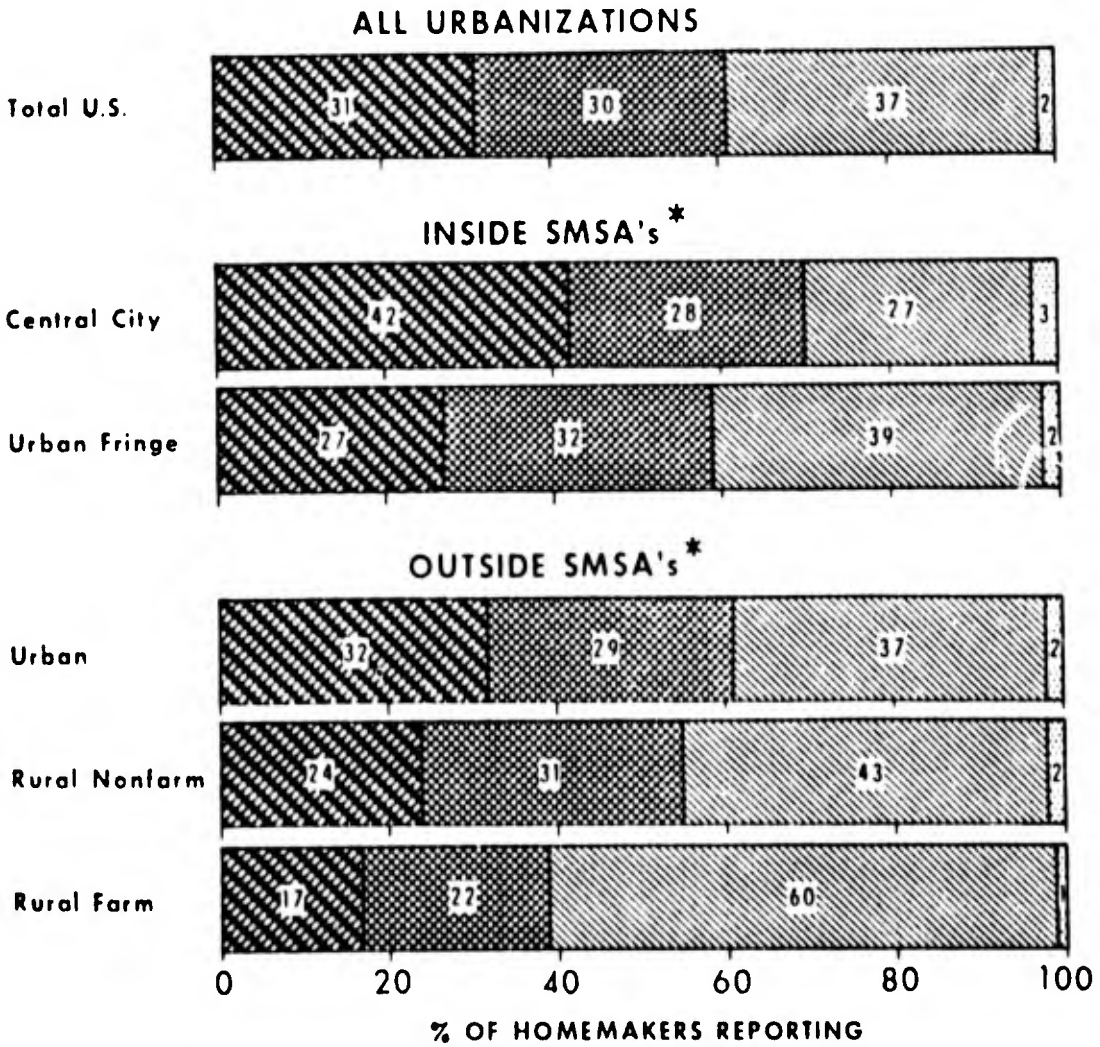
In early studies of emergency feeding requirements, consumption levels of 2000 calories per day per person were commonly cited as appropriate planning guidelines. These guidelines were subjected to much criticism, primarily for their lack of specificity regarding the nature of the calories consumed. Two thousand calories empty of nutritional content could provide a suboptimal diet, while 2000 well-chosen calories could sustain the population above minimum subsistence levels.

FIGURE II-6

11,368 HOMEMAKERS' ESTIMATES

HOW LONG FOOD ON HAND COULD BE MADE TO LAST

By Degree of Urbanization, June 1962



* STANDARD METROPOLITAN STATISTICAL AREAS.

U S DEPARTMENT OF AGRICULTURE

NEG. SRS 74-64 (4) STATISTICAL REPORTING SERVICE

Under crisis relocation conditions, the problem is not simply to subsist, but also to sustain morale in the fear of expected attack. It follows that food consumption patterns should be maintained as close to normal patterns as possible. Accordingly, the National Emergency Food Consumption standards established by the United States Department of Agriculture have been selected to be followed under relocation conditions.* Table II- 5 compares these standards with 1975 consumption levels. It can be seen that the emergency consumption standards closely approximate traditional consumption levels for many critical commodities. Attachment 1 of Appendix E contains more detail regarding the application of these standards and presents acceptable substitution rates among commodities listed in the standards.

*The designation National Emergency Consumption Standard was changed in 1976 to National Emergency Maximum Food Distribution Allowance (NEMFDA), presumably to emphasize the fact that these quantities reflect an upper limit on consumption in times of emergency rather than the bare minimum required for survival. (See Appendix H). The complete NEMFDA is a three-part table showing the amounts of basic and other commodities which may be substituted to provide a daily allowance of 2,000 or 2,500 calories.

TABLE II-5

COMPARISON OF NATIONAL EMERGENCY FOOD CONSUMPTION STANDARDS AND 1975 WEEKLY PER CAPITA CONSUMPTION LEVELS

Food Groups and Food Items	Amount Per Week	
	National Emergency Standards	1975 Consumption Levels
Meat and meat alternates (red meat, poultry, fish, shellfish, cheese, dry beans, peas, and nuts)	3 lbs.	4.5 lbs.
Eggs	6 (0.78 lbs.)	5.3 (0.69 lbs.)
Milk (fluid, whole)	7 pints (7.53 lbs.)	4.6 pints (4.97 lbs.)
Cereals and cereal products (flour including mixes, fresh bakery products, corn meal, rice, hominy, macaroni, and breakfast cereals)	4 lbs.	2.4 lbs.
Fruits and vegetables (fresh and frozen)	4 lbs.	5.7 lbs.
Food fats and oils (butter, margarine, lard, shortening, and salad and cooking oils)	0.5 lbs.	1.0 lbs.
Potatoes (white and sweet)	2 lbs.	2.4 lbs.
Sugars, syrups, honey, and other sweets	0.5 lbs.	2.3 lbs.
TOTAL (Equivalent Pounds Per Week)	22.31 lbs.	23.96 lbs.

F. Postattack Considerations

F.1 Food Processing Capacity Expansion and Conversion

One alternative method of increasing food processing output during the postattack period is that of utilizing unused capacity of surviving plants. Capacity expansion of various food-processing industries in the postattack period has been studied in several earlier works (F-1, F-45, H-3). Useful data on the capacities and expansion potential of the various food-processing industries may also be obtained from the Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. Manufacturing associations may also be helpful in this regard (Appendix Table B-6). Increasing postattack food processing capabilities by converting the production capacities of alternative technologies or abandoned facilities is analyzed in Bibliography-listed sources F-1, F-7 and F-45. A more detailed discussion of capacity expansion and conversion is provided in Chapters 4 and 5 of the Analysis and Case Study section of this report. In addition, a useful overall view of surviving agriculture, food processing and storage is given in the USDA publication "Analysis of U.S. Food Industry in a National Emergency" (H-7).

As noted above, interviews with local industry personnel can also be helpful in determining potential output expansion and conversion under emergency conditions. Data on capacity expansion and conversion can be obtained as part of the overall information from each local food processor, as outlined above in "B.3., Planning Guidelines."

F.2. Transportation

A considerable amount of work has been done on the postattack aspects of food transportation. The earlier work in this area provides useful information on rail and truck transportation of food at the national level (F-47, H-6). Later studies focused on local transportation needs in specific urban areas (F-21, F-29, F-30, H-5). The work in most of these studies is based on an in-place protection mode rather than on the crisis relocation situation, in which the population survival rate and vehicle survival is greater. Nevertheless, these studies provide valuable information on probable damage to transportation facilities, and some suggest food transportation alternatives which are applicable to the crisis relocation situation. An analysis of postattack food transportation alternatives under crisis relocation conditions is provided in Chapter 5 of the Analysis and Case Study section of this report. More detailed discussion of overall postattack transportation and possible alternatives is provided in Postattack Impacts of the Crisis Relocation Strategy on Transportation Systems (H-1).

F.3. Fallout and Postattack Food Consumption

Postattack food consumption concerns include the suitability of foods potentially contaminated by radioactive fallout. Two main food groups are threatened: dairy products (by grazing of dairy cows on contaminated pasture) and fruits and vegetables (by exposure to fallout). Milk, an especially important food in the postattack period, can be contaminated through ingestion of radioactive material by the dairy cow. This can be prevented by controlling the dairy herd's diet. To prevent ingestion, the cows should not be allowed to graze on contaminated pasture; stored food should be used until it is

ascertained that pasture has not received significant levels of fallout. If milk has been potentially contaminated (through grazing or exposure after milking), it should be diverted to uses allowing radioactive decay before consumption, or destroyed. Detailed information on protection of livestock and its food sources is given in H-2, H-4 and H-8.

Other food sources exposed to radioactive fallout must be decontaminated before consumption. Substitution of non-contaminated food (products not exposed to radiation) proves the safest policy. However, limited supplies may have to be supplemented by crops which have been exposed to fallout. Washing and peeling of fruits and vegetables provide the best means of decontamination. Underground vegetables (roots and tubers) absorb little radioactive contamination, and thus are safer to consume; peeling is usually adequate. Leafy vegetables should be avoided, as they tend to absorb more long-lived radioactive material than other vegetables. Detailed information on the suitability of different crops and cautionary measures in dealing with agricultural products is found in H-2, H-8 and H-9.

A copy of publications such as USDA reports Family Food Stockpiles for Survival (H-10) and Defense Against Radioactive Fallout on the Farm (H-2) should be distributed along with each set of these Guidelines.

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CHANGES TO PLANNING GUIDELINES APPENDICES

Revision to the Planning Guidelines Appendices, as of August 1978, are as follows:

Appendix A:	Tables A-2 through A-4 added
Appendix B:	Table B-6 added
Appendix C:	Tables C-14 and C-15 added
Appendix D:	No change
Appendix E:	No change
Appendix F:	Simplified and rewritten
Appendix G:	USDA Crisis Relocation Guidance added
Appendix H:	USDA National Emergency Food Distribution Allowance added

A P P E N D I X A

FOOD PRODUCTION

TABLE A-1

WEIGHTS, MEASURES, AND CONVERSION FACTORS

The following table of weights measures, and conversion factors covers the most important agricultural products, or the products for which such information is most frequently used of the U.S. Department of Agriculture. It does not cover all farm products nor all containers for any one product.

The information has been assembled from various sources within the Department and from state schedules of legal weights. For most products, particularly fruits and vegetables, there is a considerable variation in weight per unit of volume due to differences in variety or size of commodity, condition and tightness of pack, degree to which the container is heaped, etc. Effort has been made to select the most representative and fairest average for each product. For those commodities which develop considerable shrinkage, the point of origin weight or weight at harvest has been used.

The approximate or average weights as given in this table do not necessarily have official standing as a basis for packing or as grounds for settling disputes. Not all of them are recognized as legal weight. The table was prepared chiefly for use of workers in the U.S. Department of Agriculture who have need of conversion factors in statistical computations.

WEIGHTS, MEASURES, AND CONVERSION FACTORS
(See explanatory text just preceding this table)

WEIGHTS AND MEASURES

Commodity	Unit [1]	Approximate net weight
		Pounds
Alfalfa seed	Bushel	60
Apples	do	48
	Northwest box [2]	44
	Fiberboard box, cell pack	37–44
Apricots	Lug (Brentwood) [3]	24
Western	4-basket crate [4]	26
Artichokes:		
Globe	½ box	20
Jerusalem	Bushel	50
Asparagus	Crate	30
Avocados	Lug [5]	12–15
Bananas	Fiber folding box [6]	40
Barley	Bushel	48
Beans:		
Lima, dry	do	56
Others, dry	do	60
	Sack	100
Lima, unshelled	Bushel	28–32
Snap	do	28–32
Beets:		
Without tops	do	50
Bunched	Wirebound crate	45
Berries, frozen pack:		
Without sugar	30-gallon barrel	380
3+1	do	425
2+1	do	450
Blackberries	24-quart crate	36
Bluegrass seed	Bushel	14–30
Broccoli	Wirebound crate	20–25
Broomcorn (6 bales per ton)	Bale	333
Broomcorn seed	Bushel	44–50
Brussels sprouts	Drums	25
Buckwheat	Bushel	48
Butter	Box	64
	Open mesh bag	50
Cabbage	Wirebound crate [7]	50
	Western crate [8]	80
Cantaloups	Jumbo crate [9]	83
Carrots		
	Bushel	50
Without tops	Open mesh bag	50
Castor beans	Bushel	41
Castor oil	Gallon	[10] 8
	W. G. A. crate	50–60
	Fiberboard box	
Cauliflower	wrapper leaves removed, flat wrapped, 2 layers	23–35
	Crate [11]	60
Celery	Lug (Campbell) [12]	18
Cherries	Lug	20
Clover seed	Bushel	60
Corn		
Ear, husked	Bushel	[13] 70
Shelled	do	56
Meal	do	50
Oil	Gallon	[10] 7.7
Syrup	do	11.72
Sweet	Mesh or paper bag	45–50
	Wirebound crate	40–60
Cotton	Bale, gross	[14] 500
	Bale, net	[14] 480
Cottonseed	Bushel	[15] 32
Cottonseed oil	Gallon	[10] 7.7
Cowpeas	Bushel	60
Cream	Barrel	100
	⅛-barrel keg [16]	25

Commodity	Unit [1]	Approximate net weight
		Pounds
Cream, 40-percent butterfat	Gallon	8.36
Cucumbers	Bushel	48
Dewberries	24-quart crate	36
Eggplant	Bushel	33
Eggs, average size	Case, 30 dozen	47.0
Escarole	Bushel	25
Figs, fresh	Box, single layer [17]	6
Flaxseed	Bushel	56
Flour, various	Bag	100
Grapefruit:		
Florida and Texas	⅘-box mesh bag	40
Florida	1⅘-bushel box	85
Texas	1⅗-bushel box	80
California Desert Valleys and Arizona	Box [18]	[19] 64
	Carton [20]	32
California, other than Desert Valleys	Box [18]	67
	Carton [20]	33½
Grapes:		
Eastern	4-quart climax basket	6
	12-quart basket	18–20
Western	Lug [21]	28
	4-basket crate [22]	20
Hempseed	Bushel	44
Hickory nuts	do	50
Honey	Gallon	11.84
Honeydew melons	Jumbo crate [9]	44
Hops	Bale, gross	200
Horseradish roots	Bushel	35
	Barrel	160
Hungarian millet seed	Bushel	48 and 50
Kale	do	18
Kapok seed	do	35–40
Lard	Tierce	375
Lemons:		
California and Arizona	Box [24]	[19] 76
	Carton [20]	38
Lentils	Bushel	60
Lettuce	Fiberboard box, carton	38–55
	24-quart basket	10
Lettuce, hothouse	Box	80
Limes (Florida)	Gallon	[10] 7.7
Linseed oil	Bushel	34
Malt	Gallon	11.03
Maple sirup	Bushel	24
Meadow fescue seed	Gallon	[25] 6
Milk	Bushel	48–50
Millet	Gallon	11.72
Molasses, edible	do	11.74
Molasses, inedible	Bushel	58–60
Mustard seed	do	32
Oats	Lug [26]	25–30
Olives	Gallon	[10] 7.6
Olive oil	Sack	50
Onions, dry	Crate	60–65
Onions, green bunched	Bushel	28–32
Onion sets		
Oranges:		
Florida and Texas	⅘-box mesh bag	45
	Box [18]	90
California and Arizona	Box [18]	[19] 75
	Carton [20]	37½

(TABLE A-1, CONTINUED)

WEIGHTS AND MEASURES—Continued

Commodity	Unit[1]	Approximate net weight	Commodity	Unit[1]	Approximate net weight
		Pounds			*Pounds*
Orchardgrass seed	Bushel	14	Shallots	Crate (4-7 doz. bunches)	20-35
Palm oil	Gallon	[10] 7.7	Sorgo		
Parsnips	Bushel	50	Seed	Bushel	50
Peaches	do	48	Sirup	Gallon	11.55
	Lug box [11]	20	Sorghum grain [30]	Bushel	56
	California fruit box	[31] 18	Soybeans	do	60
Peanut oil	Gallon	[10] 7.7	Soybean oil	Gallon	[10] 7.7
Peanuts, unshelled:			Spelt	Bushel	40
Virginia type	Bushel	17	Spinach	do	18-20
Runners, southeastern	do	21	Strawberries	24-quart crate	36
Spanish:				12-pint crate	9-11
Southeastern	do	25	Sudangrass seed	Bushel	40
Southwestern	do	25	Sugarcane sirup (sulfured or unsulfured)	Gallon	11.45
Pears:			Sunflower seed	Bushel	24 and 32
California	do	48	Sweetpotatoes	do	[9] 55
Other	do	50		Crate	50
Western	Box [12]	46	Tangerines, Florida	⅘-bushel box	47½
Peas:			Timothy seed	Bushel	45
Green, unshelled	Bushel	28-30	Tobacco		
Dry	do	60	Maryland	Hogshead	775
Peppers, green	do	25-30	Flue-cured	do	950
	Fiberboard carton	30-34	Burley	do	975
Perilla seed	Bushel	37-40	Dark air-cured	do	1,150
Pineapples	Crate [32]	70	Virginia fire-cured	do	1,350
Plums and prunes:			Kentucky and Tennessee fire-cured	[13]	1,500
California	4-basket crate [19]	28-34	Cigar-leaf	Case	250-365
Other	½-bushel basket	28		Bale	150-175
Popcorn:			Tomatoes	Crate	60
On ear	Bushel	[11] 70		Lug box [11]	32
Shelled	do	56		2-layer flat	21
Poppy seed	do	46		12-quart basket	20
Potatoes	Bushel	60		Gallon	[10] 7.8
	Barrel	165	Tomatoes, hothouse	Mesh sack	50
	Bag	50	Tung oil	Crate [8]	70-80
	do	100	Turnips:	Gallon	7.24
Quinces	Bushel	48	Without tops	Bushel	60
Rapeseed	do	50 and 60	Bunched	do	60
Raspberries	24-quart crate	36	Turpentine	do	50
Redtop seed	Bushel	50 and 60	Velvetbeans (hulled)	Gallon	8.33
Refiners' sirup	Gallon	11.45	Vetch	Bushel	60
Rice:			Walnuts	do	50
Rough	Bushel	45	Water, 60° F	Gallon	8.33
	Bag	100	Watermelons	Melons of average or medium size	25
	Barrel	162	Wheat	Bushel	60
Milled	Pocket or bag	100	Various commodities	Short ton	2,000
Rosin	Drum, net	520		Long ton	2,240
Rutabagas	Bushel	56			
Rye	do	56			
Sesame seed	do	46			

(TABLE A-1, CONTINUED)

CONVERSION FACTORS

Commodity	Unit	Approximate equivalent
Apples	1 pound dried	7 pounds fresh; beginning 1943, 8 pounds fresh
Do	1 pound chops	5 pounds fresh
Do	1 case canned [12]	1.4 bushels fresh
Applesauce	do [12]	1.2 bushels fresh
Apricots	1 pound dried	6 pounds fresh
Barley	1 metric ton [13]	45.9296 bushels
Barley flour	100 pounds	4.59 bushels barley
Beans, lima	1 pound shelled	2 pounds unshelled
Beans, snap or wax	1 case canned [14]	0.008 ton fresh
Buckwheat flour	100 pounds	3.47 bushels buckwheat
Calves	1 pound live weight	0.557 pound dressed weight (1954-63 average)
Cattle	do	0.561 pound dressed weight (1954-63 average)
Cane sirup	1 gallon	5 pounds sugar
Cherries, tart	1 case canned [12]	0.023 ton fresh
Chickens	1 pound live weight	0.72 pound ready-to-cook weight
Corn	1 metric ton [13]	39.368 bushels
Corn, shelled	1 bushel (56 lbs.)	2 bushels (70 pounds) of husked ear corn
Corn, sweet	1 case canned [14]	0.030 ton fresh
Cornmeal:		
Degermed	100 pounds	3.16 bushels corn, beginning 1946
Nondegermed	do	2 bushels corn, beginning 1946
Cotton	1 pound ginned	3.26 pounds seed cotton, including trash [15]
Cottonseed meal	1 pound	2.10 pounds cottonseed
Cottonseed oil	do	5.88 pounds cottonseed
Dairy products:		
Butter	do	21.1 pounds milk
Cheese	do	10 pounds milk
Condensed milk, whole	do	2.3 pounds milk
Dry cream	do	19 pounds milk
Dry milk, whole	do	7.6 pounds milk
Evaporated milk, whole	do	2.14 pounds milk
Malted milk	do	2.6 pounds milk
Nonfat dry milk	do	11 pounds liquid skim milk
Ice cream [16]	1 gallon	15 pounds milk
Ice cream [16] (eliminating fat from butter and concentrated milk)	do	12 pounds milk
Eggs	1 case	47 pounds
Eggs, shell	do	39.5 pounds frozen or liquid whole eggs
Do	do	10.3 pounds dried whole eggs
Figs	1 pound dried	3 pounds fresh in California; 4 pounds fresh elsewhere
Flaxseed	1 bushel	About 2½ gallons oil
Grapefruit, Florida	1 case canned juice [14]	0.64 box fresh fruit
Hogs	1 pound live weight	0.579 pound dressed weight, excluding lard (1954-63 average)
Linseed meal	1 pound	1.51 pounds flaxseed
Linseed oil	do	2.77 pounds flaxseed
Malt	1 bushel (34 lbs.)	1 bushel barley (48 lbs.)
Maple sirup	1 gallon	8 pounds maple sugar
Nuts:		
Almonds, imported	1 pound shelled	3½ pounds unshelled
Almonds, California	do	2.22 pounds unshelled through 1949; 2 pounds thereafter
Brazil	do	2 pounds unshelled
Cashews	do	4.55 pounds unshelled
Chestnuts	do	1.19 pounds unshelled
Filberts	do	2.22 pounds unshelled through 1949; 2.5 pounds thereafter
Pecans:		
Seedling	do	2.78 pounds unshelled
Improved	do	2.50 pounds unshelled
Pignolias	do	1.3 pounds unshelled
Pistachios	do	2 pounds unshelled
Walnuts:		
Black	do	5.88 pounds unshelled
Persian (English)	do	2.67 pounds unshelled
Oats	1 metric ton [13]	68.8944 bushels
Oatmeal	100 pounds	7.6 bushels oats, beginning 1943
Oranges, Florida	1 case canned juice [14]	0.53 box fresh
Peaches, California, freestone	1 pound dried	5½ pounds fresh through 1918; 6 pounds fresh for 1919-28; and 6½ pounds fresh from 1929 to date
Peaches, California, clingstone	do	7½ pounds fresh
Peaches, clingstone	1 case canned [17]	1 bushel fresh
Do	do	0.0230 ton fresh
Peanuts	1 pound shelled	1½ pounds unshelled
Pears	1 pound dried	6½ pounds fresh
Pears, Bartlett	1 case canned [17]	1.1 bushels fresh
Do	do	0.026 ton fresh

CONVERSION FACTORS—Continued

Commodity	Unit	Approximate equivalent
Peas, green	1 pound shelled	2½ pounds unshelled
Do	1 case canned [14]	0.009 ton fresh (shelled)
Prunes	1 pound dried	2.7 pounds fresh in California; 3 to 4 pounds fresh elsewhere
Raisins	1 pound	4.3 pounds fresh grapes
Rice, milled (excluding brewers)	100 pounds	152 pounds rough or unhulled rice
Rye	1 metric ton [13]	39.368 bushels
Rye flour	100 pounds	2.23 bushels rye, beginning 1947
Sheep and lambs	1 pound live weight	0.482 pound dressed weight (1954-63 average)
Soybeans	1 metric ton [13]	36.7437 bushels
Soybean meal	1 pound	1.27 pounds soybeans
Soybean oil	do	5.49 pounds soybeans
Sugar	1 ton raw	0.9346 ton refined
Tobacco	1 pound farm-sales weight	Various weights of stemmed and unstemmed, according to aging and the type of tobacco. (See circular 435, U.S. Dept. of Agr.)
Tomatoes	1 case canned [14]	0.018 ton fresh
Turkeys	1 pound live weight	0.80 pound ready-to-cook weight
Wheat	1 metric ton [13]	36.7437 bushels
Wheat flour	100 pounds	2.30 bushels wheat [17]
Wool, domestic apparel shorn	1 pound greasy	0.48 pound scoured
Wool, domestic apparel pulled	do	0.73 pound scoured

[1] Standard bushel used in the United States contains 2,150.42 cubic inches; the gallon, 231 cubic inches; the cranberry barrel, 5,826 cubic inches; and the standard fruit and vegetable barrel, 7,056 cubic inches. Such large-sized products as apples and potatoes sometimes are sold on the basis of a heaped bushel, which would exceed somewhat the 2,150.42 cubic inches of a bushel basket level full. This also applies to such products as sweetpotatoes, peaches, green beans, green peas, spinach, etc.

[2] Approximate inside dimensions, 10⅜ by 11⅜ by 18 inches.

[3] Approximate inside dimensions, 4⅜ by 12⅜ by 18⅛ inches.

[4] Approximate inside dimensions, 4⅜ by 16 by 16⅛ inches.

[5] Approximate dimensions, 4⅜ by 13⅜ by 16⅛ inches.

[6] Approximate inside dimensions, 13 by 12 by 32.

[7] Inside dimensions vary. Common sizes are 13 by 13 by 22⅛ inches, and 13 by 15⅛ by 23 inches.

[8] Approximate inside dimensions, 13 by 18 by 21⅜ inches.

[9] Approximate inside dimensions, 13 by 13 by 22⅛ inches.

[10] This is the weight commonly used in trade practices, the actual weight varying according to temperature conditions.

[11] Approximate inside dimensions, 9¼ by 16 by 20 inches.

[12] Approximate inside dimensions, 4⅛ by 11⅜ by 14 inches.

[13] The standard weight of 70 pounds is usually recognized as being about 2 measured bushels of corn, husked, on the ear, because it requires 70 pounds to yield 1 bushel, or 56 pounds, of shelled corn.

[14] For statistical purposes the bale of cotton is 500 pounds or 480 pounds net weight. Prior to Aug. 1, 1946, the net weight was estimated at 478 pounds. Actual bale weights vary considerably, and the customary average weights of bales of foreign cotton differ from that of the American square bale.

[15] This is the average weight of cottonseed, although the legal weight in some States varies from this figure of 32 pounds.

[16] Approximate inside dimensions, 9¼ by 10⅜ by 15 inches.

[17] Approximate inside dimensions, 13¼ by 11 by 16⅛ inches.

[18] Approximate inside dimensions, 11⅜ by 11⅜ by 24 inches.

[19] In California and Arizona from 1942 through 1953, the net weights as used by this Department were 77 pounds for oranges, 79 pounds for lemons, and 65 pounds for Desert Valleys grapefruit. Grapefruit in California areas, other than the Desert Valleys, averaged 68 pounds. The new weights effective in 1954 reflect the shift from the "box" to the ⅗-box carton as the container used.

[20] Approximate inside dimensions, 10¼ by 10 1⁵⁄₁₆ by 16⅝ inches for oranges or lemons, and 9¾ by 10 1⁵⁄₁₆ by 16⅝ inches for grapefruit.

[21] Approximate inside dimensions, 5¾ by 13⅜ by 16⅛ inches.

[22] Approximate inside dimensions, 4¾ by 16 by 16⅛ inches.

[23] Approximate inside dimensions, 7¾ by 16 by 21⅞ inches.

[24] Approximate inside dimensions, 9⅝ by 13 by 25 inches.

[25] Approximate inside dimensions, 12 by 12 by 24 inches.

[26] Approximate inside dimensions vary. Common size is 4⅜ by 11⅜ by 16⅛ inches.

[27] Approximate inside dimensions, 8⅜ by 11⅜ by 18 inches.

[28] Approximate inside dimensions, 12 by 10⅜ by 33 inches.

[29] Inside dimensions vary. Ranges from 4 by 16 by 16⅛ inches to 6 by 16 by 16⅛ inches.

[30] Includes both sorghum grain (kafir, milo, hegari, etc.) and sweet sorghum varieties.

[31] This average of 55 pounds indicates the usual weight of sweetpotatoes when harvested. Much weight is lost in curing or drying and the net weight when sold in terminal markets may be below 55 pounds.

[32] Case of 24 No. 2½ cans.

[33] 1 metric ton is equivalent to 2,204.6 pounds.

[34] Case of 24 No. 303 cans.

[35] Varies widely by method of harvesting.

[36] The milk equivalent of ice cream per gallon is 15 pounds. Reports from plants indicate about 81 percent of the butterfat in ice cream is from milk and cream, the remainder being from butter and concentrated milk. Thus the milk equivalent of the milk and cream in a gallon of ice cream is about 12 pounds.

[37] This is equivalent to 4.51 bushels of wheat per barrel (196 pounds) of flour and has been used in conversions beginning July 1, 1957. Because of changes in milling processes, the following factors per barrel of flour have been used for earlier periods: 1790-1879, 5 bushels; 1880-1908, 4.75 bushels; 1909-17, 4.7 bushels; 1918 and 1919, 4.5 bushels; 1920, 4.6 bushels; 1921-44, 4.7 bushels; July 1944-Feb. 1946, 4.57 bushels; March 1946-Oct. 1946, average was about 4.31 bushels, and Nov. 1946-June 1957, 4.57 bushels.

(Source: U.S. Department of Agriculture, Agricultural Statistics, 1974, Washington, D.C.)

TABLE A-2

INTERPRETATION OF USDA/ASCS FOOD AND FEED FACILITY LISTINGS
(To be inserted at the beginning of each set of listings)

PART 1. CONTENTS OF FACILITY - SIC CODE 1/, CATEGORY CODE AND INDUSTRY IDENTIFICATION

SIC Code	Category Code	Industry Identification
Group 1.		**Meat and Meat Alternates**
2011	LSS	Meat packing plants - red meat slaughtering and packing.
2013	LSP	Sausages and other prepared meat products - processors of sausages; cured, smoked, canned, and frozen meats; and other meat specialties.
2016	POP	Poultry dressing plants - slaughtering, dressing, eviscerating, and packing poultry.
2017	POC	Poultry and egg processing - further processed poultry - includes cooking, smoking, raw boning, canning, freezing, dehydrating, and preparation of pies, dinners, and turkey rolls.
2091	FIP	Canned and cured fish and sea foods - cooking and canning fish, shrimp, oysters, clams, crabs and other sea foods; and smoking, salting, drying or otherwise curing fish.
2092	FIF	Fresh or frozen packaged fish and sea foods - preparing fresh and cooked or frozen packaged fish and other sea food; and shucking and packing fresh oysters.
2099	FPS	Food preparations, n.e.c. - shellers of peanuts and other nuts.
4221	FPW	Farm product warehousing and storage - nut and peanut storage warehouses only
4221	GRB	Farm product warehousing and storage - bean storage.
Group 2.		**Eggs (Shell Equivalent)**
2017	POD	Poultry and egg processing - processed egg products - liquid, frozen and dried eggs.
5144	POH	Poultry and poultry products - egg handlers - collection, cleaning, grading, packaging and shipping of shell eggs.
Group 3.		**Milk (Fluid Whole) and Dairy Products**
2021	DAB	Creamery butter - processing plants.
2022	DAC	Cheese, natural and processed - processing plants.
2023	DAD	Condensed and evaporated milk - dry milk - processing only.
2023	DAE	Condensed and evaporated milk - except dry milk - includes condensed and evaporated milk, processing plants.
2026	DAF	Fluid milk - plants engaged in pasteurizing, homogenizing, bottling and distributing fluid milk, cream, cottage cheese and related products.
Group 4.		**Cereal and Cereal Products**
2041	GPF	Flour and other grain mill products - flour milling - except corn and rice; includes processors of wheat, buckwheat and rye flour, doughs and other special grain mill products.
2041	GPP	Flour and other grain mill products - corn products only - includes corn meal, grits and hominy.
2043	GFA	Cereal breakfast foods - processors of cereal breakfast foods, oatmeal and cereal type infant foods.
2044	GPR	Rice milling - cleaning, polishing and milling rice.
2045	GPN	Blended and prepared flour - processors of blended flour and special mixes.
2046	GPC	Wet corn milling - except corn oil - processors of corn starch, dextrose and other corn products.
2051	GPB	Bread and other bakery products, except cookies and crackers - bakers of bread, cakes and other "perishable" bakery products.
2052	GXB	Cookies and crackers - bakers of dry biscuits, cookies, cones, pretzels and wafers.
2082	MBB	Malt beverages - producers of ale, beer, brewers grain, malt liquors and related products.
2085	MBA	Distilled, rectified and blended liquors - distillation, rectification and blending of alcoholic liquors from grain products.
2098	GPM	Macaroni, spaghetti, vermicelli and noodles - processors of dry macaroni, spaghetti, vermicelli and noodles.
Group 5.		**Fruits and Vegetables (Except Fresh Produce)**
2032	FVC	Canned specialties - canners of soups, dry beans, Chinese foods, spaghetti, baby foods and other specialty foods.
2033	FVA	Canned fruits, vegetables, preserves, jams and jellies - canners of fruits, vegetables, juices, tomato products, preserves, jams, jellies and hominy.
2034	FVD	Dried and dehydrated fruits, vegetables and soup mixes.
2035	FVR	Pickled fruits and vegetables, vegetable sauces and seasonings; salad dressings - processors of pickled and brined fruits and vegetables, salad dressings, vegetable relishes, sauces and seasonings.
2037	FVF	Frozen fruits, fruit juices, vegetables, and specialties - quick freezing and cold packing fruit, fruit juices, vegetables, baked goods, dinners, meals, pies, spaghetti, waffles, and other specialties.
2099	MIY	Food preparations, n.e.c. - processors of bakers yeast - compressed and dry.
Group 6.		**Food Fats and Oils**
2046	GPQ	Wet corn milling - corn oil mills only.
2074	FOC	Cottonseed oil mills - processors of cottonseed oil, by-product cake, meal and linters.
2075	FOS	Soybean oil mills - processors of soybean oil, by-product cake and meal.
2076	FOX	Vegetable oil mills - miscellaneous oilseed crushers - except corn, cottonseed, soybeans and peanuts.
2076	FPC	Vegetable oil mills - peanut crushers only - including peanut oil, and peanut by-product cake and meal.
2077	FOF	Animal and marine fats and oils - processors - fish and marine animal oils and by-product meal.
2079	FOM	Shortening, table oils, margarine and other edible fats and oils, (excluding butter) n.e.c. - refiners, manufacturers and packagers of edible products.
2099	FPP	Food preparations, n.e.c. - processors of peanuts and other nut products, including peanut butter and oil.
Group 7.		**Potatoes, White and Sweet**
2046	PTA	Wet corn milling - potato starch - processors only.
4221	PTS	Farm product warehousing and storage - potato storage warehouses only.
Group 8.		**Sugar, Syrups, Honey and Other Sweets**
2061	SUC	Cane sugar, except refining only - raw cane sugar mills processing raw sugar, syrup and clarified sugar from sugar cane.
2062	SUR	Cane sugar refining - refiners of purchased raw cane sugar and syrup into refined product.
2063	SUB	Beet sugar - processors of beet sugar, molasses, and pulp from sugar beets.
2066	SUA	Chocolate and cocoa products - grinders and processors of cocoa beans to produce chocolate liquor, solid bars and coatings; cocoa powder and cocoa butter.
Group 9.		**Combination of Food Groups**
4222	WAC	Refrigerated warehousing - except food lockers - public facilities where food is stored for 30 days or more.
4222	WAS	Refrigerated warehousing - except food lockers - commercial facilities where food is normally stored less than 30 days, with 3,000 or more cubic feet of usable space.
5422	WAF	Freezer and locker meat provisioners with food preparation facilities - meat processing facilities including processor - distributor warehouses.
5141	FDC	Groceries, general line - chain store distribution center only.
5141	FDW	Groceries, general line - wholesale distributors except chain store.
5142	FDI	Frozen foods - wholesale.
5149	FDP	Groceries and related products, n.e.c. - wholesale - distributors of groceries and related products.
Group 10.		**Other Agricultural Related Facilities**
2048	GRF	Prepared feeds and feed ingredients for animals and fowls, n.e.c. - manufacturers of prepared formula feeds.
2084	MBW	Wines, brandy and brandy spirits - processing, blending and storage of wines, brandy and brandy spirits.
4221	GRE	Farm product warehousing and storage - grain storage - commercial off-farm warehouses, includes both USSA and non-USSA capacity.
4221	GRR	Farm product warehousing and storage - rough rice storage

1/ Extracted from Standard Industrial Classification Manual 1972, Statical Policy Division, Office of Management and Budget, U.S. GPO, 445-987.

TABLE A-3

ESFD FOR OFFICIAL USE ONLY USDA/ASCS COUNTY FOOD AND FEED FACILITY LISTING AS OF 9-10-76 PAGE 1

COLORADO 08 REGION 8 EL PASO 041 7

LINE 1 FACILITY NAME / LINE 2 STREET ADDRESS / LINE 3 CITY	ST CODE ZIP	FACILITY NUMBER	RESP CONSTRUCTION CODE	FOOD GRP CODE	SIC PRIM SECO TERT	CATEGORY ALPH	CATEGORY NUMBER PRIMARY SECONDARY TERTIARY	CAPCITY 1000 PRIM SECO TERT	SPECIAL FIELD 1 PRIM SECO TERT	CATGORY FIELD 2 PRIM SECO TERT	POSTATTACK INVENTORY BEGINNING RPT PERIOD 1000 LBS	CAPABILITY PROCESSING OUTPUT PER WEEK 1000 LBS
G C C PACKING CO 740 SO 21ST ST COLORADO SPRI	CO 80904	080410386	1	1	2011	LSN						
LIBERTY PACKING CO 1600 E LAS VEGAS COLORADO SPRI	CO 80906	080410387	1	1	2011	LSS						
COLORADO SPRGS PKG CO 1204 N CASCADE AVE COL SPGS	CO 80907	080410388	1	1	2013	LSP						
LECKER & SON SAUSAGE CO 1500 ARCH ST COLORADO SPG	CO 80904	080410389	1	1	2013	LSP						
JOHNSON FOOD CO 205 LEE ST COLORADO SPRI	CO 80907	080410390	1	1	2013	LSP						
HIGH VALLEY FARM 14 ALSACE WAY COLORADO SPGS	CO 80906	080410391	1	1	2017	PDC						
SINTON DAIRY CO 3801 N SINTON RD COLO SPGS	CO 80907	080410392	2	3	2020	DAM						
RAINBO BAKERS INC 406 S NEVADA ST COLORADO SPRI	CO 80902	080410393	1	4	2051	GPB						
STAR BREAD SOUTH 122 S TEJON COLORADO SPRI	CO 80902	080410394	1	4	2051	GPR						
F & L FOOD PRODUCTS BOX 2139 MAIN STA COLORADO SPGS	CO 80901	080410395	1	5	2033	FVA						
SWISS CHALET PRODUCTS 437 S SIERRA MADRE COLORADO SPG	CO 80902	080410396	1	5	2035	FVB						
LAMARS SERVICE CO 331 E PIKES PEAK AV COLORADO SPRI	CO 80905	080410406	1	9	5141	FDW						

OFFICIAL USE ONLY-UNTIL DECEMBER 31,1977

TABLE A-4

CMU-3R SUMMARY OF PROCESSED COMMODITIES IN STORE AS OF 09-30-77 SUP-A PAGE 01

STATE	BULK BUTTER	PRINT BUTTER	BULK CHEESE	PROCESSED CHEESE	EGG MIX	EVAPORATED MILK	NONFAT DRY MILK	CANNED JUICE	PEANUT GRANULES
ARKANSAS							2,632,633		
CALIFORNIA	11,756,266	437,168		15,000	44,208	30,885	159,633,679	100,694	10,320
COLORADO							1,087,514		
CONNECTICUT							3,177,082		
DIST OF COLUM		345,708							
GEORGIA							282,626		
IDAHO							9,481,296		
ILLINOIS	20,190,008	2,067,107	179,230	1,150,290			46,019,770		
INDIANA							4,973,219		
IOWA	17,647,544	576,133	922,174	655,380			20,448,776		
KANSAS	17,933,753	6,220,167	24,268,257				21,880,071		
KENTUCKY	366,249		265,632						
LOUISIANA							11,277,773		
MARYLAND	3,684,802	1,574,166					560,000		
MASSACHUSETTS							6,903,878		
MICHIGAN	6,430,599	1,958,476		2,530,560			4,818,641		
MINNESOTA	22,983,682	2,381,005	8,166,405	56,100			44,854,606		
MISSISSIPPI							2,726,377		
MISSOURI	8,234,193	653,004	3,499,485	6,190,230	468,000		61,437,889		
NEBRASKA	1,091,388				468,000		2,595,696		
NEW JERSEY	4,129,820								
NEW YORK	5,390,770	1,639,448	671,959				30,962,472		
NORTH DAKOTA							63,152		
OHIO	5,248,384	3,377,966		1,509,150			19,788,806		

TABLE A-4, cont'd

CMO-3R SUMMARY OF PROCESSED COMMODITIES IN STORE AS OF 09-30-77 SUP-A PAGE 02

STATE	BULK BUTTER	PRINT BUTTER	BULK CHEESE	PROCESSED CHEESE	EGG MIX	EVAPORATED MILK	NONFAT DRY MILK	CANNED JUICE	PEANUT GRANULES
OKLAHOMA	1,105,970	268,800					2,713,355		
OREGON	1,645,936	117,920	618,771				19,451,495		
PENNSYLVANIA	336,725		3,518,040	134,400			12,206,377		
TENNESSEE	2,775,181	383,860	83,278	1,914,350			12,676,856		
TEXAS							850,029		
UTAH				665,940			12,438,727		
VERMONT	1,665,017						400,108		
VIRGINIA							2,681,159		
WASHINGTON							20,830,346		
WISCONSIN	6,472,215	8,064,348	15,140,645	1,008,000			57,249,978		
TOTAL	139,088,502	30,115,298	57,333,876	15,829,400	980,208	30,885	597,306,386	100,694	10,320

APPENDIX B

FOOD PROCESSING

TABLE B-1: FOOD MANUFACTURING INDUSTRIES: COMPANIES AND ESTABLISHMENTS, EMPLOYEES, VALUE OF SHIPMENTS, AND VALUE ADDED BY MANUFACTURER, 1958, 1963, AND 1967

Industry	Companies	Establishments	Employees	Value of shipments	Value added by manufacture
	Number	Number	Thousand	Mil. dol.	Mil. dol.
Food manufacturing, total:					
1958	N.A.	30,397	1,370	47,806	13,106
1963	N.A.	26,823	1,305	54,580	15,925
1967	N.A.	23,167	1,300	66,244	19,249
Percentage change, 1958-67		-24	-5	38	47
Meat products:					
1958	N.A.	5,537	312	15,927	2,502
1963	N.A.	5,300	300	16,807	2,883
1967	4,492	4,914	310	21,520	3,551
Percentage change, 1958-67		-11	-5	35	42
Dairy products:					
1958	N.A.	9,899	295	10,082	2,876
1963	N.A.	7,885	257	11,200	3,185
1967	5,141	6,188	232	12,815	3,466
Percentage change, 1958-67		-37	-21	27	20
Canned, cured, and frozen foods: 1/					
1958	N.A.	2,920	199	5,007	3,242
1963	N.A.	3,017	208	6,457	2,486
1967	N.A.	2,711	223	8,151	3,242
Percentage change, 1958-67		-7	12	63	85
Grain mill products: 2/					
1958	N.A.	1,105	62	3,651	1,057
1963	N.A.	965	58	4,281	1,287
1967	N.A.	847	58	5,098	1,655
Percentage change, 1958-67		-23	-6	40	56
Bakery products:					
1958	N.A.	6,319	302	5,081	2,642
1963	N.A.	5,366	280	5,656	3,031
1967	3,720	4,390	264	6,466	3,495
Percentage change, 1958-67		-30	-12	27	32
Sugar:					
1958	N.A.	170	33	1,568	383
1963	N.A.	164	32	2,414	591
1967	93	182	31	2,305	652
Percentage change, 1958-67		7	-6	47	70
Confectionery and related products:					
1958	N.A.	1,444	80	1,862	752
1963	N.A.	1,263	78	2,158	956
1967	1,128	1,240	83	2,694	1,248
Percentage change, 1958-67		-14	4	45	66
Fats and oils: 3/					
1958	N.A.	482	31	3,055	467
1963	N.A.	452	30	3,587	560
1967	N.A.	408	30	4,516	713
Percentage change, 1958-67		-15	-3	48	53
Miscellaneous foods: 4/					
1958	N.A.	2,521	56	1,573	672
1963	N.A.	2,411	62	2,020	946
1967	N.A.	2,287	69	2,679	1,227
Percentage change, 1958-67		-9	23	70	82

1/ Excludes canned and cured seafoods and fresh and frozen packaged fish.
2/ Excludes prepared animal feeds.
3/ Excludes animal and marine fats and oils.
4/ Macaroni and spaghetti manufacturers and establishments producing food preparations not elsewhere classified, such as potato chips, sweetening syrups, and peanut butter.

Note: NA = Not available.
Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce.

TABLE B-2 -- FOOD MANUFACTURING ESTABLISHMENTS, BY SIZE OF WORK FORCE, 1958, 1963, AND 1967

Industry and year	Total establishments	Establishments with average of--			
		1-19 employees	20-99 employees	100-499 employees	500 or more employees
	Number				
All industries:					
1958	30,371	19,182	8,014	2,879	296
1963	26,823	16,348	7,197	2,984	301
1967	23,167	13,383	6,371	3,081	332
Meat products:					
1958	5,537	3,470	1,430	550	87
1963	5,300	3,283	1,328	606	83
1967	4,914	2,884	1,284	657	89
Dairy products:					
1958	9,899	6,583	2,665	626	25
1963	7,885	4,999	2,248	619	19
1967	6,188	3,683	1,880	611	14
Canned, cured, and frozen foods:					
1958	2,920	1,405	998	474	43
1963	3,017	1,494	964	504	55
1967	2,711	1,271	835	531	74
Grain mill:					
1958	1,105	723	254	108	20
1963	965	588	249	109	19
1967	847	481	249	96	21
Bakery products:					
1958	6,319	3,967	1,556	726	70
1963	5,366	3,254	1,336	702	74
1967	4,390	2,582	1,029	704	75
Sugar:					
1958	144	9	52	68	15
1963	164	4	50	96	14
1967	182	20	57	91	14
Confectionery and related products:					
1958	1,444	983	302	129	30
1963	1,263	812	288	136	27
1967	1,240	778	278	153	31
Fats and oils:					
1958	482	136	266	75	5
1963	452	120	253	75	4
1967	408	108	214	81	5
Miscellaneous foods:					
1958	2,521	1,906	491	123	1
1963	2,411	1,794	474	137	6
1967	2,287	1,576	545	157	9

Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce.

TABLE B-3 -- LOCATION OF FOOD MANUFACTURING ESTABLISHMENTS, 1958 AND 1967

Industry and year	Location of establishment				
	Northeast	North Central	South	West	United States
	Number				
All industries:					
1958	8,117	10,660	6,953	4,612	30,342
1967	5,889	7,646	5,620	4,012	23,167
Meat products:					
1958	1,145	1,901	1,655	827	5,528
1967	901	1,633	1,623	757	4,914
Dairy products:					
1958	2,700	4,618	1,470	1,091	9,879
1967	1,624	2,807	957	800	6,188
Canned and frozen foods:					
1958	651	781	714	774	2,920
1967	581	713	622	795	2,711
Grain mill products:					
1958	142	307	518	138	1,105
1967	117	270	336	124	847
Bakery products:					
1958	2,276	1,864	1,323	856	6,319
1967	1,615	1,174	955	646	4,390
Sugar:					
1958	10	26	60	48	144
1967	16	26	72	68	182
Confectionery and related products:					
1958	542	391	289	222	1,444
1967	438	316	254	232	1,240
Fats and oils:					
1958	28	107	276	71	482
1967	32	103	212	61	408
Miscellaneous foods:					
1958 (estimated)	623	665	648	585	2,521
1967	565	604	589	529	2,287

Source: Bureau of the Census. Census of Manufactures, U.S. Dept. Commerce.

TABLE B-4 -- TYPE OF OPERATION OF FOOD MANUFACTURING ESTABLISHMENTS, 1958, 1963 AND 1967

Industry	Multiunit companies		Single-unit companies	
	Establishments	Value added by manufacture	Establishments	Value added by manufacture
	Number	Mil. dol.	Number	Mil. dol.
All industries:				
1958	6,348	8,955	23,994	4,038
1963	6,181	11,773	20,642	4,152
1967	5,862	14,707	17,305	4,543
Meat products:				
1958	742	1,436	4,786	1,063
1963	756	1,721	4,544	1,162
1967	791	2,116	4,123	1,435
Dairy products:				
1958	2,099	1,769	7,780	1,098
1963	1,889	2,141	5,996	1,044
1967	1,624	2,471	4,564	995
Canned, cured, and frozen foods:				
1958	847	1,283	2,073	428
1963	924	1,990	2,093	496
1967	939	2,636	1,772	606
Grain mill products:				
1958	288	945	817	112
1963	316	1,181	649	106
1967	315	1,537	532	118
Bakery products:				
1958	1,346	1,838	4,973	796
1963	1,228	2,307	4,138	724
1967	1,054	2,731	3,336	764
Sugar:				
1958	101	322	43	15
1963	124	549	40	42
1967	128	610	54	43
Confectionery and related products:				
1958	231	539	1,213	210
1963	250	723	1,013	233
1967	272	1,010	968	238
Fats and oils:				
1958	280	400	202	67
1963	266	478	186	82
1967	259	646	149	67
Miscellaneous foods:				
1958	414	423	2,107	249
1963	428	683	1,983	263
1967	480	950	1,807	277

Source: Bureau of the Census, Census of Manufactures, U.S. Dept. Commerce.

TABLE B-5 -- VALUE OF SHIPMENTS ACCOUNTED FOR BY THE FOUR, EIGHT, AND TWENTY LARGEST COMPANIES IN FOOD MANUFACTURING INDUSTRIES, 1963 AND 1967

Industry	Value of shipments accounted for by-- 1/					
	4 largest companies		8 largest companies		20 largest companies	
	1963	1967	1963	1967	1963	1967
	Percent					
Meatpacking 2/	31	26	42	38	54	50
Sausages and other prepared meats 2/	16	15	23	22	35	34
Poultry dressing	14	15	20	23	30	35
Creamery butter	11	15	19	22	31	36
Cheese	44	44	51	51	59	61
Concentrated milk	40	41	53	56	71	74
Ice cream and frozen desserts	37	33	48	43	64	60
Fluid milk	23	22	30	30	40	42
Canned specialties 3/	67	69	83	83	94	94
Canned fruits and vegetables 3/	24	22	34	34	50	52
Dehydrated foods	37	32	56	50	80	75
Pickles, sauces, and salad dressing 3/	36	33	46	44	64	62
Frozen fruits and vegetables 3/	24	24	37	36	54	55
Flour and other grain mill products	35	30	50	46	71	70
Cereal preparations	86	88	96	97	99	99
Rice milling	44	46	66	68	86	89
Blended and prepared flour	70	68	82	82	92	93
Wet-corn milling	71	68	93	89	99	99
Bread, cake, and related products	23	26	35	38	45	47
Cookies and crackers	59	59	68	70	80	82
Raw cane sugar	47	43	65	65	82	82
Cane sugar refining	63	59	83	82	100	99
Beet sugar	66	66	97	96	100	100
Confectionery products	15	25	25	35	45	52
Cottonseed oil	41	42	56	60	72	80
Soybean oil	50	55	70	76	88	94
Vegetable oil	58	56	83	78	99	99
Shortening and cooking oils	42	43	64	67	92	93
Macaroni and spaghetti	31	31	47	48	71	73
Other food preparations	24	24	33	35	48	51

1/ Percentages consist of the sum of value of shipments of largest four, eight, or 20 companies divided by total value of industry shipments. A compan is defined as all establishments under one ownership within an industry. Consequently, the same company may appear in several industries, if it has divers fied activities. 2/ Percentages are based on value added by manufacture becau value of shipments contains a substantial and unmeasurable amount of duplicati 3/ Percentages computed on value of production.

Source: Bureau of the Census, Concentration Ratios in Manufacturing, Specia report MC 67 (S)-2.1, Census of Manufactures, 1967, U.S. Dept. Commerce.

TABLE B-6

LOCATION OF PLANTS PACKING EVAPORATED MILK
(Case goods only)

Evaporated Milk Association
July 1976

Receiving stations are designated by - R.

ARKANSAS

Carnation Company
Harrison - R

Pet Incorporated
Siloam Springs - R

CALIFORNIA

Carnation Company
Gustine
Turlock - R

Safeway Stores, Inc.
Milk Department
Hanford

COLORADO

Carnation Company
Johnstown

IDAHO

Pet Incorporated
Buhl

ILLINOIS

Edwardsville Creamery Co.
Edwardsville

Milnot Company
Litchfield

Pet Incorporated
Greenville

INDIANA

Pet Incorporated
Angola - R

Milnot Company
Warsaw

KENTUCKY

Carnation Company
Campbellsville - R
Maysville
Somerset - R

MICHIGAN

Pet Incorporated
Charlotte - R

MISSOURI

Carnation Company
Ava - R
El Dorado Springs - R
Mt. Vernon
Seymour - R

Milnot Company
Seneca

Pet Incorporated
Neosho

NEW YORK

Carnation Company
South Dayton

O-At-Ka Milk Products
Cooperative, Inc.
Batavia

NORTH CAROLINA

Carnation Company
Statesville

OHIO

Defiance Milk Products Co
Defiance

Pet Incorporated
Bryan
Coldwater

United Dairy, Inc.
Barnesville

Westerville Creamery
Covington

PENNSYLVANIA

Carnation Company
Cambridge Springs
Corry - R

TENNESSEE

Pet Incorporated
Greeneville

TEXAS

Carnation Company
Sulphur Springs

VIRGINIA

Pet Incorporated
Abingdon - R

WASHINGTON

Consolidated Dairy Products Co.
Mt. Vernon

APPENDIX C

FOOD DISTRIBUTION

FIGURE C-1

CITIES WHERE MARKETING FACILITIES STUDIES HAVE BEEN MADE
BY TRANSPORTATION AND FACILITIES RESEARCH DIVISION

For additional information, contact:

Food Distribution Research Laboratory
Agricultural Marketing Research Institute
Agricultural Research Service
U.S. Department of Agriculture
Beltsville, Maryland 20705

TABLE C-1

SUGGESTED SHIPPING GUIDELINES FOR WHOLESALERS SUPPLYING HOST AREA RETAIL OUTLETS

CATEGORY	SHIP	RETAIN
Meat	All items	
Produce	All items	
Dairy products	All items	
Frozen foods	All items, as host area storage space permits	
Bakery goods	All items	
Dry groceries	Baby Foods; Baking Mixes; Baking Needs; Candy; Cereals; Cocoa; Condiments; Cookies; Crackers & Bread Products; Desserts; Diet Foods; Fish (Canned & Dried); Flour; Fruit (Canned & Dried); Household Cleaning Compounds; Jams, Jellies & Spreads; Juices & Juice Drinks; Laundry Supplies; Macaroni Products; Meat Products; Milk (Canned & Dried); Paper Products; Pet Foods; Prepared Foods; Salad Dressings; Salt, Seasonings; Shortenings & Oils; Soaps, Detergents & Disinfectants; Soup; Sugar; Syrups & Molasses; Vegetables (Canned & Dried).	Beer, Wine & Ale; Cigarettes; Coffee; Gum; Household Supplies (Furniture Polish, Shoe Polish, Air Fresheners, Floor Wax); Snacks; Soft Drinks; Tea. (Note: If vehicle availability is not critical, certain of the above items (i.e., coffee, tea, soft drinks) may be shipped as morale boosters.)
General Merchandise	Batteries; Flashlights; Light Bulbs; Anti-Freeze; Motor Oil; Twine; Sponges; Brushes; Candles; Charcoal & Charcoal Lighters; Outdoor Equipment.	Stationery & School Supplies; Lighter Fluid; Turpentine; Housewares; Lighting Accessories; Sunglasses; Toys; Grass Seed; Pet Supplies; Soft Goods (Hosiery, Gloves, Etc.).
Health & Beauty Aids	Aspirin; Baby Needs; First Aid Items; Oral Hygiene Products; Proprietary Remedies.	Cosmetics; Deodorants; Hair Care Needs; Shaving Needs; Skin Care Aids.

TABLE C-2

SUPERMARKETS
TRENDS IN OPERATING RESULTS 1967-1972

	1967	1968	1969	1970	1971	1972
Gross Profit With Warehouse (% of sales)	21.2%	21.2%	21.1%	20.8%	21.3%	21.3%
Gross Profit Without Warehouse (% of sales)	19.2%	19.7%	19.3%	19.4%	19.3%	19.4%
Sales Per Man Hour	$31.10	$33.63	$34.39	$36.37	$38.66	$40.24
Sales Per Square Foot	$ 3.65	$ 3.75	$ 4.15	$ 4.16	$ 4.55	$ 4.34
Sales Per Customer Transaction	$ 5.50	$ 5.61	$ 6.02	$ 6.29	$ 6.50	$ 6.58
Average Hourly Labor Cost*	$ 2.43	$ 2.59	$ 2.77	$ 2.87	$ 3.15	$ 3.29

**Excluding fringe benefits*

Source: Super Market Institute
(as published in Supermarket News' Distribution Study of Grocery Store Sales in 287 Cities, 1974 Edition)

TABLE C-3

ESTIMATED GROCERY STORE SALES BY MAJOR CATEGORY- 1972

	Per Cent	Sales Volume (in Millions)
Total	100.0%	$88.3
Meat	23.0	20.3
Dairy	10.0	8.8
Produce	8.0	7.1
Bakery	5.0	4.4
Canned Goods	8.5	7.5
Canned Vegetables	2.5	2.2
Canned Fruit	1.5	1.3
Canned Juice	1.0	0.9
Canned Soup	1.0	0.9
Canned Goods, Other	2.5	2.2
Frozen Foods	4.5	4.0
Prepared (dinners, etc.)	1.3	1.1
Juices, Mixes	0.75	0.7
Vegetables	0.75	0.7
Baked Goods	0.60	0.5
Other Frozen Foods	1.16	1.0
Special Appeal Foods	4.0	3.5
Breakfast Foods	1.8	1.6
Baby Foods	0.6	0.5
Diet & Low Calorie	0.5	0.4
Desserts & Toppings	0.5	0.4
Macaroni, Spaghetti, Pasta	0.6	0.5
Open & Eat	5.5	4.9
Cookies & Crackers	2.25	2.0
Candy & Gum	1.25	1.1
Snacks	1.0	0.9
Nuts, Dried Fruits, vegetables	1.0	0.9
Beverages	7.5	$ 6.6
Soft Drinks & Mixes	2.0	1.8
Coffee	2.5	2.2
Tea	0.5	0.4
Beer, etc.	2.5	2.2
Ingredients & Taste-Maker Prod.	5.5	4.9
Baking Mixes & Supplies	1.0	0.9
Sugar & Flour	1.0	0.9
Dressing, Oil & Shortening	1.0	0.9
Sauces, Spices, Extracts	1.0	0.9
Pickles, Olives, Vinegar	0.7	0.6
Jams, Jellies, Peanut Butter	0.6	0.5
Syrup & Molasses	0.2	0.2
Non-Foods	18.5	16.3
Cigarettes, Tobacco	4.5	4.0
Soaps, Detergents, Laundry Supplies, Cleaners	3.5	3.1
Health & Beauty Aids	3.0	2.6
Paper, Foil, etc.	2.5	2.2
General Merchandise (incl. housewares, household supplies, soft goods, etc.)	3.25	2.9
Pet Foods & Products	1.75	1.5

Source: Based on reports supplied by the Newspaper Advertising Bureau, Inc.

(as published in Supermarket News' Distribution Study of Grocery Store Sales in 287 Cities. 1974 Edition)

TABLE C-4

TYPICAL SUPER MARKET OPERATING RESULTS

Description	1964	1965	1968	1969	1970	1971	1972
Sales Trend vs.a Year Ago							
All Stores	+7.3%	+8.4%	+8.2%	+8.9%	+11.4%	+9.1%	+10.3%
Same, Identical Stores	+3.9%	+5.0%	+5.4%	+6.7%	+ 8.3%	+5.6%	+ 6.7%
Department Sales to Total Sales							
Grocery Department	67.4%	66.7%	67.7%	67.4%	67.7%	68.6%	67.0%
Produce Department	8.0	7.7	7.7	7.4	7.2	7.0	7.1
Meat Department	24.4	25.4	24.6	25.2	24.9	24.1	23.6
Store Expenses							
Store Labor (excluding fringe)	7.5%	7.6%	7.8%	8.0%	8.1%	8.1%	8.4%
Store Supply	0.8	0.9	0.8	0.9	0.9	0.8	0.8
Store Rent & Real Estate	1.5	1.4	1.4	1.4	1.4	1.3	1.4
Utilities	0.7	0.7	0.6	0.7	0.6	0.6	0.7
Operating Profit Before Taxes	2.1%	1.8%	1.7%	1.5%	1.7%	1.6%	1.3%
Store Labor Control Ratios							
Sales Per Manhour	28.51	30.08	33.63	34.69	36.37	38.66	40.24
Average Hourly Labor Cost	2.12	2.27	2.59	2.77	2.87	3.15	3.29
Grocery Inventory Turnover Rate							
Stores	18.9	19.5	19.8	19.4	19.8	20.1	19.4
Warehouse	15.0	15.8	15.2	15.6	15.6	16.2	17.8
Percentage of Companies With Sales Gain (vs. a Year Ago)							
Sales in All Stores	85%	86%	81%	85%	83%	84%	89%
Sales in Same, Identical Stores	71%	79%	79%	82%	83%	82%	84%
Percentage of Companies Reporting an Operating Profit	94%	93%	90%	86%	87%	90%	81%

Gross Profit

With own central warehouse 21.3%. Without own central warehouse 19.4%. Store door margin*18.0%.

*After warehouse, delivery and headquarters expense.

Long-term and current retail performance is quickly revealed by this table based on figures supplied by operators who participate in the Super Market Institute Figure Exchange. It differs from the Cornell-NAFC reports in that it represents a larger sample of both chain and independent operators. Typical operating results (medians) are summarized for the years 1964 to 1972. Also revealed is the percent of companies that reported sales gains and net profit. Figures do not balance precisely because of the nature of the median and because the "typical" ratio of each item was calculated independently. Complete quarterly reports including many additional ratios and breakdown by region, company size, department and other factors are available to SMI members solely.

TABLE C-5

RESTAURANT AND INSTITUTION ASSOCIATIONS AND CONSULTANTS

CONSULTING AND OTHER SERVICE GROUPS

One further group of associations of importance to the marketer is those organizations of consultants and similar groups serving the industry. Equipment manufacturers and, increasingly, convenience food processors, are particularly interested in the two societies of consultants. Annual sessions of the Institutional Food Editorial Council give food manufacturers and their publicists an excellent meeting ground with industry editors. Also in this list, CHRIE, (Council on Hotel, Restaurant & Institutional Education) the very active group of industry educators and their supporters.

AMERICAN ASSN. OF HOSPITAL CONSULTANTS, 1 Wyoming St., Dayton, Ohio 45409. Exec. Secy., John R. Tiffany.

COUNCIL ON RESTAURANT, HOTEL & INSTITUTIONAL EDUCATION, 1522 K St. NW, Suite 736, Washington, DC 20005, 202/659-1198. Dir., Richard Landmark

1000 members: HRI educators, training personnel, plus industry executives at all levels with an interest in industry education. Convention date: 1972, Aug. 6-9, Washington, DC. Services:

- HRI textbook collection
- Curriculum research
- Teacher & student recruitment
- Directory of HRI schools, $1

FOOD FACILITIES CONSULTANTS SOCIETY, 600 S. Michigan, Chicago 60605, 312/427-2487, Ellis Murphy, Assn. Mgr.

Professional association of independent and operating-company facilities engineers and consultants.

INTL. SOCIETY OF FOOD SERVICE CONSULTANTS. Pres., Wid Omar Neibert, 20 Salt Landing, Tiburon, Calif. 94920, 415/388-9305.

161 members from US and abroad. Food facilities and operations consultants. Convention date: 1972, Chicago, May 18-20. Directory available on request. Publication: Consultant (quarterly magazine).

INSTITUTIONAL FOOD EDITORIAL COUNCIL, 82 Osborne Lane, E. Hampton, NY 11937, 516/324-2880. Secty, Betty Bastion.

Foodservice magazine food editors and food publicists.

SOCIETY FOR THE ADVANCEMENT OF FOOD SERVICE RESEARCH (See section on R&D, page 98).

BASIC ASSOCIATION LISTS

There are two standard reference directories to national associations of all types which are useful in a major information search.

ENCYCLOPEDIA OF ASSOCIATIONS, Gale Research Co., Book Tower, Detroit, Mich.

In three volumes: Vol. I ($32.50) includes labor unions, agricultural, fraternal, governmental associations in addition to business & professional organizations. Vol. II ($20) is a repeat, on a geographic basis. Vol. III ($25) is a loose-leaf update service.

NATL. TRADE & PROFESSIONAL ASSOCIATIONS OF THE UNITED STATES, Columbia Books, Inc., 917 15th St. NW, Washington, DC 20005

Issued annually, covers some 4400 organizations, with data on membership, budget, publications, meeting dates. $12.50 prepaid.

REGIONAL ASSOCIATIONS

Because of space limitations, regional associations in the foodservice and allied industries are not listed in this directory. However, conventions and similar activities of state & local associations are listed in the 3-year Calendar of Industry Events (p. 81). Here are sources of lists:

State and Local Restaurant Associations: listed in Natl. Restaurant Assn. membership directory.

State & Regional Hotel Associations: listed in Hotel Red Book, published by Amer. Hotel & Motel Assn.

State & Regional Frozen Food Associations: listed in each issue of Quick Frozen Foods.

(Source: The IFMA Encyclopedia of the Food Service Industry)

TABLE C-6

ESTIMATED DAYS SUPPLY OF FOOD STOCKS IN AWAY-FROM-HOME EATING ESTABLISHMENTS IN CIVIL DEFENSE REGIONS, BY TYPE OF STORABILITY, UNITED STATES, 1964 1/

CIVIL DEFENSE REGION 2/	TOTAL	FRESH	FROZEN	CANNED AND BOTTLED	DRIED AND PACKAGED	NONCONCEN-TRATED FLUIDS
	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS
UNITED STATES, TOTAL	1.9	0.2	0.2	1.1	0.5	1.2
REGION I	2.3	0.2	0.2	1.5	0.5	2.4
REGION II	1.9	0.2	0.2	1.1	0.3	1.4
REGION III	1.9	0.3	0.2	1.0	0.4	0.6
REGION IV	2.0	0.2	0.1	1.1	0.5	1.1
REGION V	1.1	0.1	0.1	0.6	0.3	0.5
REGION VI	2.4	0.2	0.2	1.3	0.7	0.9
REGION VII	1.6	0.2	0.1	0.8	0.4	0.5
REGION VIII	2.6	0.2	0.1	1.7	0.6	2.2

TABLE C-7

ESTIMATED DAYS SUPPLY OF FOOD STOCKS IN AWAY-FROM-HOME EATING ESTABLISHMENTS IN CIVIL DEFENSE REGIONS, BY FOOD GROUP, UNITED STATES, 1964 1/

CIVIL DEFENSE REGION 2/	TOTAL	FOOD GROUPS							
		DAIRY GROUP 3/	MEAT AND MEAT SUB-STITUTES	FATS AND OILS	GRAIN PRODUCTS	FRUITS AND VEGETABLES	SUGAR AND SWEETS	OTHER BEVERAGES	MISCEL-LANEOUS
	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS	DAYS
UNITED STATES, TOTAL	1.9	0.1	0.1	0.4	0.2	0.3	0.4	0.3	0.1
REGION I	2.3	0.1	0.1	0.4	0.2	0.4	0.5	0.5	0.1
REGION II	1.9	0.1	0.2	0.3	0.1	0.4	0.3	0.3	0.1
REGION III	1.9	0.1	0.2	0.6	0.2	0.2	0.4	0.1	0.1
REGION IV	2.0	0.1	0.1	0.4	0.2	0.2	0.5	0.2	0.2
REGION V	1.1	0.1	0.1	0.4	0.1	0.1	0.3	0.1	0.0
REGION VI	2.4	0.1	0.2	0.6	0.4	0.3	0.6	0.2	0.1
REGION VII	1.6	0.1	0.1	0.4	0.1	0.1	0.4	0.2	0.1
REGION VIII	2.6	0.1	0.1	0.5	0.2	0.5	0.3	0.5	0.3

SEE FOOTNOTES AT END OF TABLE 7

NOTE - FIGURES MAY NOT ADD TO TOTALS DUE TO ROUNDING

(Source: U.S. Department of Agriculture, Marketing Research Report No. 707)

TABLE C-8

ESTIMATED CALORIC VALUES OF FOOD STOCKS IN AWAY-FROM-HOME EATING ESTABLISHMENTS IN CIVIL DEFENSE REGIONS, BY TYPE OF STORABILITY, UNITED STATES, 1964

CIVIL DEFENSE REGION 2/	TOTAL	FRESH	FROZEN	CANNED AND BOTTLED	DRIED AND PACKAGED
			CALORIC VALUE IN MILLIONS OF CALORIES		
TOTAL	694,805	71,942	56,461	400,190	166,211
REGION I	152,623	10,698	10,138	98,073	33,712
REGION II	128,856	14,122	12,841	78,614	23,277
REGION III	95,324	13,066	11,771	48,915	21,569
REGION IV	118,058	13,127	7,196	66,097	31,637
REGION V	39,564	4,241	3,371	20,196	11,753
REGION VI	67,748	6,713	4,951	35,344	20,738
REGION VII	60,026	6,951	4,669	32,005	16,401
REGION VIII	32,602	3,020	1,520	20,941	7,119
			PERCENTAGE DISTRIBUTION		
TOTAL	100.0	10.3	8.1	57.5	23.9
REGION I	100.0	7.0	6.6	64.3	22.1
REGION II	100.0	11.0	10.0	61.0	18.1
REGION III	100.0	13.7	12.3	51.3	22.6
REGION IV	100.0	11.1	6.1	56.0	26.8
REGION V	100.0	10.7	8.5	51.0	29.7
REGION VI	100.0	9.9	7.3	52.2	30.6
REGION VII	100.0	11.6	7.8	53.3	27.3
REGION VIII	100.0	9.3	4.7	64.2	21.8
			SAMPLING ERROR OF THE CALORIC VALUES /IN PERCENT/ 4/		
TOTAL	5.1	7.9	7.5	6.2	8.3
REGION I	10.9	8.3	15.9	15.6	13.1
REGION II	10.2	13.2	15.8	13.8	15.6
REGION III	19.7	32.8	22.6	20.6	33.6
REGION IV	10.6	19.3	18.2	11.5	20.3
REGION V	18.9	17.7	22.1	19.0	27.6
REGION VI	16.5	18.2	21.2	16.3	30.9
REGION VII	10.7	13.0	17.3	11.9	19.2
REGION VIII	21.5	15.8	25.7	29.9	26.2

NOTE: FIGURES MAY NOT ADD TO TOTALS DUE TO ROUNDING

(Source: U.S. Department of Agriculture, Marketing Research Report No. 707)

TABLE C-9

DINING ROOM SQUARE FEET PER PERSON AND TURNOVER CHARACTERISTICS OF VARIOUS SERVING METHODS

		Dining Room Sq. Ft. per Seat to be allotted	Turnover in Patrons per Seat per Hour
Cafeterias Not Including Serving Counter	Commercial	13-18	1½-2½
	Industrial	12-16	2-3
	School	10-15	2-3
Lunch Rooms and Coffee Shops	Counter service only. Area includes counter and serving aisle.	18-26	2-3½
	Counter and Table service	15-17	2-3
Waiter Service Restaurants	Deluxe	13-18	½-1¼
	Popular priced	11-15	1-2½
Banquet Service		9-12	X
Community Meals	Churches Lodges Social Centers	9-15	X

X — Not Applicable
[1]Not usually satisfactory for design. Much depends on room dimensions and luxuriousness of service

TABLE C-10

APPROXIMATE KITCHEN AREA ALLOCATION

Type of Service	Sq. Ft. of Kitchen Area Per Dining Area Seat	Total Back of House Area Per Dining Area Seat
Cafeteria, Commercial	6-8	10-12
Lunch Room and Coffee Shop	4-6	8-10
Table Service Dining Room	5-7	10-12

(Source: Commercial Kitchens)

TABLE C-11

AREA REQUIRED IN SQUARE FEET FOR FOOD SERVICE, EXCEPTING DINING AND SERVING AREA

	MEALS PER DAY				
Department	200	400	600	800	1000
Receiving[1]	25-45	40-60	55-75	65-85	80-100
Dry Storage[2]	150-250	250-350	350-450	450-550	550-650
Refrigerated Storage	25-35[3]	25-35	40-55	55-70	70-90
Main Kitchen[4]	400-500	700-900	1100-1300	1400-1700	1700-2100
Dishwashing	50-75	80-125	120-175	150-225	180-250
Trash & Garbage Storage[5]	35-50	60-75	90-110	115-135	140-165
Employee Lockers & Toilets	45-60	60-75	70-85	85-100	100-115
Total Kitchen and Related Areas	730-1015	1215-1620	1825-2250	2320-2865	2820-3470
Square Feet/Pupil	3.6-5.1	3.0-4.1	3.0-3.8	2.9-3.6	2.8-3.5

[1]Does not include exterior receiving dock area.

[2]Assumes an average supply of 3 weeks. This area may be adjusted proportionately for different purchasing policies.

[3]Reach-in refrigeration may be used instead of walk-in refrigeration. A 60 cubic foot box would be recommended for storage.

[4]Includes the various preparations and main cooking departments plus pot washing.

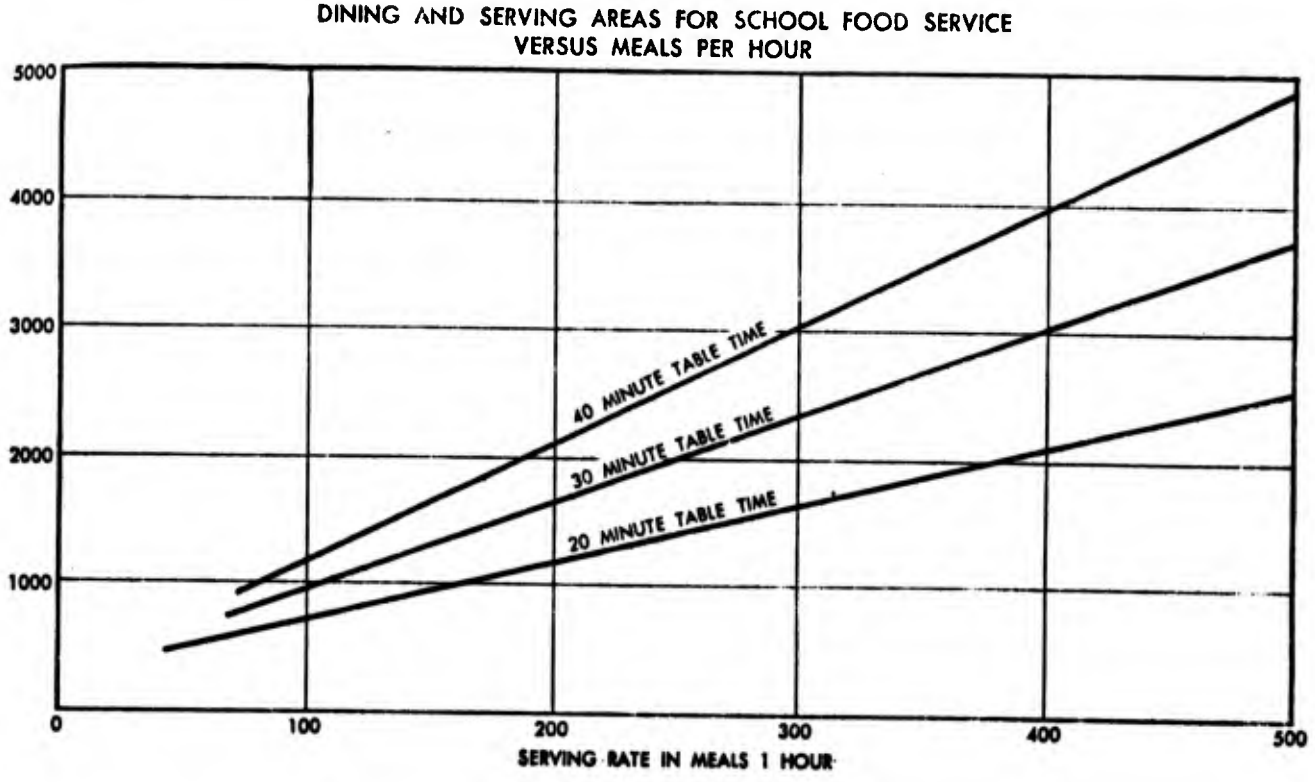
[5]Also includes can washing and storage area. It may be desirable to provide separate areas for each function.

(Source: Commercial Kitchens)

TABLE C-12

SCHOOL CAFETERIAS

COMMERCIAL KITCHENS



(Source: Commercial Kitchens)

TABLE C-13

CONVENTIONAL COUNTERS AND AREA REQUIRED IN SQUARE FEET FOR DIFFERENT SERVING RATES IN MEALS PER HOUR[1]

Meals Per Hour	Conventional Counters Required	Area Required in Square Feet
up to 420	1	500-700
420 to 840	2	1000-1300
840 to 1260	3	1600-2000
1260 to 1680	4	2100-2700

[1]Assumes an average service rate of 7 per minute. If another rate is justified suitable adjustment should be made.

(Source: Commercial Kitchens)

TABLE C-14

FOODS AVAILABLE FOR SCHOOL LUNCH AND BREAKFAST PROGRAMS - BY 1976

FINAL

	POUNDS	ESTIMATED VALUE
SECTION 6		
Beef, Frozen Ground	23,908,500	$ 17,817,129
Beef Patties, Frozen	5,587,500	4,485,696
Chicken, Frozen Cut-up	49,752,000	23,911,500
Orange Juice, Canned (P.R.)	2,238,000	350,400
Orange Juice, Frozen	23,462,630	9,100,000
Beans, Dry	5,665,000	2,109,047
French Fries, Frozen	50,160,000	11,500,000
Peas, Canned	7,480,000	1,470,000
Peas, Frozen	12,480,500	2,720,000
Sweetpotatoes, Canned	17,032,350	4,416,000
TOTAL	197,746,480	$ 79,879,772
SECTION 32		
Beef, Canned w/NJ	47,481,382	$ 41,042,910
Beef, Frozen Ground	59,453,955	43,960,255
Beef Patties, Frozen	5,845,740	4,572,540
Poultry, Canned Boned	18,195,123	15,195,585
Turkey, Frozen	13,368,120	10,584,995
Applesauce, Canned	59,000,805	19,177,640
Apricots, Canned	2,629,382	708,355
Cranberry Sauce, Canned	17,654,673	3,518,575
Peaches, Canned	33,744,000	7,508,380
Pears, Canned	30,944,720	7,380,005
Prunes, Dry Pitted	12,160,550	4,324,290
Raisins	15,220,620	4,419,610
Beans, Dry	14,971,750	4,014,375
Beans, Canned Green	18,886,032	2,652,355
Beans, Frozen Green	13,625,310	2,966,910
Corn, Canned	11,257,142	2,339,890
Corn, Frozen	17,684,640	4,038,690
Tomato Paste, Canned	16,927,347	5,252,050
Tomatoes, Canned	7,537,010	1,639,300
Peanut Butter	19,930,066	9,170,180
TOTAL	441,518,367	$ 185,566,890
SECTION 416		
Butter	36,754,312	$ 33,134,295
Cheese, Process/Natural	27,782,921	25,363,045
Milk, NFD	31,107,346	21,358,065
Margarine (Peanut Oil)	40,037,700	18,697,605
Salad Oil (Peanut)	44,252,259	21,563,930
Shortening (Peanut Oil)	42,976,997	21,513,920
Peanut Granules	4,134,900	2,808,840
Peanuts, Whole Roasted	13,807,200	9,297,770
Rice	19,087,650	2,909,425
TOTAL	259,941,287	$ 159,651,895
SECTION 14		
Flour	126,293,000	$ 12,369,460
GRAND TOTAL AS OF 7-28-1976.....		$ 433,468,017

(Source: USDA Food and Nutrition Service)

TABLE C-15: USDA FOOD AND NUTRITION SERVICE REGIONAL OFFICES

NEW ENGLAND

U. S. Department of Agricutlure
Food and Nutrition Service
34 Third Avenue
Burlington, Massachusetts 01803
Telephone: Area Code 617
272-0885

Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont

MID ATLANTIC

U. S. Department of Agriculture
Food and Nutrition Service
707 Alexander Road
Princeton, New Jersey 08540
Telephone: Area Code 609
452-1610

Delaware, District of Columbia, Maryland, New Jersey, New York, Pennsylvania, Puerto Rico, Virginia, Virgin Islands, West Virginia

SOUTHEAST

U. S. Department of Agriculture
Food and Nutrition Service
1100 Spring Street, N.W.
Atlanta, Georgia 30309
Telephone: Area Code 404
526-5131

Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee

SOUTHWEST

U.S. Department of Agriculture
Food and Nutrition Service
1100 Commerce Street
Dallas, Texas 25242
Telephone: 214/749-7106

New Mexico, Texas, Oklahoma, Arkansas, Louisiana

MIDWEST

U. S. Department of Agriculture
Food and Nutrition Service
536 South Clark Street
Chicago, Illinois 60605
Telephone: Area Code 312
353-6664

Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, Wisconsin

WEST CENTRAL

U. S. Department of Agriculture
Food and Nutrition Service
1360 So. Wadsworth
Denver, Colorado
Telephone: Area Code 303
234-4067

Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming

WESTERN

U. S. Department of AGriculture
Food and Nutriton Service
550 Kearny Street, Room 400
San Francisco, California 94108
Telephone: Area Code 415
556-4951

Alaska, American Samoa, Arizona, California Guam, Hawaii, Idaho, Nevada, Oregon, Trust Territory, Washington

A P P E N D I X D

FOOD PREPARATION AND SERVING

TABLE D.1-1

LIST OF UTENSILS FOR SCHOOL CAFETERIA

DESCRIPTION	Number to be served		
	150-250	250-350	350-500
Serving Trays -- plastic	14-22 Doz.	22-30 Doz.	30-42 Doz.
or			
Compartment serving tray	"	"	"
Soup Bowls, Plastic	"	"	"
Plates, 3 Partition, 10" Plastic	"	"	"
Salad Plates, 6"	"	"	"
Fruit Glasses, Plastic	"	"	"
Forks, Stainless Steel	"	"	"
Knives, " "	"	"	"
Teaspoons, " "	"	"	"
Soupspoons " "	"	"	"
Electric Mixer, Univex, 20 Qt.	1	1	1
Potato Peeler, Univex Model "D"	1	1	1
Coffee Maker, 40 cup Drip-O-Lator	1	1	1
Food Chopper, Universal No. 3	1	1	1
Butter Cutter	1	1	1
Greaser, Grater, Slicer, Shredder	1	1	1
Edlund Can-Opener, No. 2	1	2	2
Dial-A-Straw	2	3	4
Foley Food Mill 5 Qt. Size	1	2	2
Kurly Kate Metal Sponges	12	12	24
Menu Board w/letters	1	1	1
Kitchen Shears, Heavy Duty	2	4	6
S. S. Skimmer 4" Diam.	2	2	2
Aluminum Egg Slicer	1	1	1
1/4 to 1 Tablespoon, measuring spoons	2 sets	3 sets	3 sets
12" French Pastry Spoon, Maple	3	3	3
13" Serving Spoons, Solid	2	3	6
13" Serving Spoons, Slotted	2	2	3
17 1/2" Serving & Mixing Spoons, Solid	2	2	3
Tablespoons, Stainless	4	6	9
12" Wire Whip, Wooden Handle	1	1	1
#8-10-16-24 Disher Scoops	2 ea.	2 ea.	2 ea.
2 oz. Stainless Steel Ladles	2	2	4
8 oz. Stainless Steel Ladles	2	2	4
4 Compartment Silver Boxes (Metal)	3	4	6
9" Metal Tongs	2	3	3
10" French Knife	1	1	2
12" French Knife	1	1	1
10" Butcher	1	1	1
10" Meat Slicer	1	1	2
6" Boning Knife	2	2	2
12 1/2" Serving Fork	3	3	4
Breadknife, Serrated	1	1	2
Sandwich Spreader	2	4	6
12" Butcher's Steel	1	1	1
2 1/2" Paring Knives	3	6	12
Cleaver, Wooden Handle, 6" Blade	1	1	1
6" x 3" Dough Cutter	1	1	1
Large Rotary Beater, S. S. Blades	2	2	2
2" Maple Cutting Boards	2	2	2
Pastry Brush, Good Grade Bristle	2	2	4
Vegetable Brushes, White Fiber	6	6	12
Funnel Aluminum, 5 1/2"	1	1	1
Hand Grater	1	1	1
Can and Bottle Opener, Hand Type	2	3	3
Rolling Pin, Hard Wood	2	2	2

(TABLE D.1-1, CONTINUED)

LIST OF UTENSILS FOR SCHOOL CAFETERIA

DESCRIPTION	Number to be served		
	150-250	250-350	350-500
Kitchen Scales and Weights	1	1	1
Flour Sifter, Heavy Duty Double Screen	1	2	2
12 Qt. Double Boiler	1	1	1
20 Qt. Double Boiler	2	2	3
18-1/8 x 12 1/2 x 2 Bake Pan	12	12	18
23 x 12 1/2 x 2-3/4 Roast Pan	4	8	12
12 x 18 x 2 1/4 Utility Pan	12	18	24
20-3/8 x 17-3/8 x 7 Roaster	2	2	3
Cover of Above	1	2	3
1 Pint measures	2	2	3
1 Quart measures	2	2	3
2 Quart measures	2	2	3
4 Quart measures	1	1	1
4 Qt. Mixing Bowls	3	4	6
6 Qt. Mixing Bowls	3	4	6
11 Qt. Mixing Bowls	2	3	4
48 Qt. Mixing Bowls	1	1	1
18 x 26 x 1 Bun Pans	10	14	18
12 Cup Muffin Pans	18	24	36
Loaf Pans	12	12	18
9-3/4 x 1 1/2 Pie Pans	30	48	72
14" Fry Pan	1	1	1
1 Qt. Sauce Pan Household Wt.	2	2	3
2 Qt. Sauce Pan Household Wt.	2	2	
4 1/2 Qt. Sauce Pan Hotel Weights	1	1	2
7 Qt. Sauce Pan Hotel Weight	1	2	2
15 Qt. Brazier-Heavy Duty	1	2	
8 1/2 Qt. Sauce Pot-Heavy Duty	1	1	
26 Qt. Sauce Pot-Semi-Duty	1	2	2
3 Gal. Stock Pot-Semi-Heavy	2	2	3
5 Gal. Sauce Pot-Semi-Heavy	2	2	
6 Gal. Stock Pot-Semi-Heavy	2	2	3
10 Gal. Stock Pot-Semi-Heavy	1	1	2
15 Gal. Stock Pot-Semi-Heavy	1	1	1
10" Covers	2	2	2
12" Covers	4	4	4
14" Covers	1	1	2
5 Qt. China Cap	1	1	2
11 Qt. Colander	1	1	1
16 Qt. Colander	1	1	1
4 x 7 Flour Scoop	1	1	1
3 x 5 Sugar Scoop	1	1	2
3 1/4 Qt. Pitchers	3	3	
2-3/4" Diam. Salt-Pepper Shakers	12	12	18
12 x 16 1/4 Trays	15	20	25
Dishpan, 21 Qts.	2	2	2
16" Aluminum Sieve	1	1	2
5 Gal. Stock Pot, Semi-Heavy	2	3	4
3 x 5 Sugar Scoop	1	1	1
74 Qt. Mixing Bowl	1	1	1
Sauce Pot, Hotel Weight, 10 Qt.	1	1	1
18 Qt. Brazier	1	1	1
12 Qt. Sauce Pot	1	1	1
20 Qt. Sauce Pot	1	1	1
12" Covers	1	1	1
Refrigerator Containers w/cover	6	8	12
12 Qt. Water Pail	1	1	2

(Source: Food Service in Industry and Institutions)

TABLE D.2-1: STAFF REQUIREMENTS FOR FEEDING FACILITIES

a. Staff needs for either stationary or mobile emergency mass feeding facilities depend upon a number of factors such as the experience of available workers, the type and extent of disaster, the types of meals served, facilities available, and other variables.

b. The following table of staff organization for the various kinds of feeding facilities is intended only as a guide for estimating personnel requirements for one shift.

Food preparation and service staff for indoor (shelter) facilities

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisors	1	2
Food preparation:		
Cooks	3	4
Assistant cooks	4	8
Kitchen helpers	12	24
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Traffic directors	4	6
Cleanup:		
Dishwashers	2	3
Helpers (trash and garbage disposal)	2	3
Total	34	62

Food preparation staff for auxiliary kitchens

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisors	1	2
Cooks	3	4
Assistant cooks	4	8
Kitchen helpers	12	24
Total	20	38

Food service staff for feeding stations

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisors	1	2
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Traffic directors	2	4
Cleanup:		
Dishwashers	2	4
Helpers (trash and garbage disposal)	2	4
Total	13	26

Food preparation and service staff for a mobile convoy

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Drivers (per vehicle)	1	1
Supervisor—Chief of unit	1	2
Supply officer: Supplies and equipment	1	2
For each mobile kitchen (food preparation):		
Cooks	2	4
Assistants	2	4
Helpers	4	8
For each mobile canteen (serving only):		
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Traffic directors	2	4
Helpers (trash and garbage)	2	4
Total	21	41

(TABLE D.2-1, CONTINUED)

Food preparation and service staff for a mobile kitchen

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Drivers	1	1
Supervisor	1	2
Food preparation:		
Cooks	2	4
Assistants	2	4
Helpers	4	8
Servers:		
Main dish	2	4
Bread or sandwiches	2	4
Beverage	2	4
Cleanup:		
Cooking equipment	1	2
Helpers	2	4
Traffic directors	2	4
Total	21	41

Food service staff for a mobile canteen

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Drivers	1	1
Supervisor	1	2
Servers:		
Main dish	2	4
Bread	2	4
Beverage	2	4
Traffic directors	2	4
Helpers	2	4
Total	12	23

Food preparation and service staff for improvised outdoor kitchens

Workers	Suggested staff	
	500 persons per hour	1,000 persons per hour
Supervisor	1	1
Supply officer	1	1
Cooks	5	8
Cooks helpers	5	8
Water tender	1	2
Fire tender	1	3
Servers	8	12
Traffic directors	2	4
Cleaners	2	4
Total	26	43

(Source: Red Cross Emergency Mass Feeding Handbook)

TABLE D.2-2

STAFFING TABLE FOR KITCHEN

Jobs to be Filled	For 0-49 Patrons	For 50-99 Patrons	For 100-175 Patrons	For 175-plus Patrons
Chef	1	1	1	1
Cook	1	2	3	4
Salads -- Pantry	1	2	2	3
Dishwasher	1	2	3	3
Potwasher	1	1	1	1
Cleaner	0	1	1	1
Storeroom Man	0	1	1	1
Baker	0	1	1	1

TABLE D.2-3

STAFFING TABLE FOR DINING ROOM
(Based on number of patrons)

Jobs to be Filled	For 0-37	For 38-58	For 59-75	For 76-95	For 96-112	For 113-129	For 130-145	For 146-166	For 167-plus
Hostess	1	1	1	1	1	1	1	1	1
Waiter -- Waitress	2	3	4	5	6	7	8	9	10
Bus Boy	1	2	2	3	3	3	3	4	5
Bar Waitress	1	1 1/2	1 1/2	2	2	2 1/2	2 1/2	2 1/2	2 1/2

(Source: Food Service in Industry and Institutions)

TABLE D.3-1

CHART FOR ADJUSTING SIZE OF RECIPES

The amounts of ingredients needed for recipes to yield 15, 20, 25, 30, 35, 40, and 50 servings are given in this chart. All amounts have been rounded to measurable amounts.

When adjusting a recipe to make 35 servings, first look for the amount of each ingredient in the column headed "25 servings." If the recipe calls for 1½ cups of flour, for example, move down to the space marked "1 cup;" then move across to the column headed "35 servings," which shows "1½ cups." Next find "½ cup" under column headed "25 servings;" move across to the column headed "35 servings," which shows ¾ cup. Last, add 1½ cups and ¾ cup (total, 2¼ cups) to get quantity of flour needed in changing the recipe to 35 servings.

Do this for each ingredient in the basic recipe.

You may find it easier to add amounts of ingredients if you convert fractions of cups to whole tablespoons and fractions of quarts to whole cups. See table of equivalents, page 2.

15 servings	20 servings	25 servings	30 servings	35 servings	40 servings	50 servings
Volume Measures						
Dash	Dash	⅛ teaspoon	⅛ teaspoon	⅛ teaspoon	¼ teaspoon	¼ teaspoon
⅛ teaspoon	⅛ teaspoon	¼ teaspoon	¼ teaspoon	⅜ teaspoon	⅜ teaspoon	½ teaspoon
¼ teaspoon	⅜ teaspoon	½ teaspoon	½ teaspoon	½ teaspoon	½ teaspoon	1 teaspoon
½ teaspoon	½ teaspoon	¾ teaspoon	1 teaspoon	1 teaspoon	1¼ teaspoons	1½ teaspoons
1¼ teaspoons	¾ teaspoon	1 teaspoon	1¼ teaspoons	1½ teaspoons	1½ teaspoons	2 teaspoons
1¾ teaspoons	1½ teaspoons	2 teaspoons	2½ teaspoons	2¾ teaspoons	3¼ teaspoons	4 teaspoons
2½ teaspoons	2½ teaspoons	1 tablespoon	3½ teaspoons	4½ teaspoons	4¾ teaspoons	2 tablespoons
3½ teaspoons	3¼ teaspoons	4 teaspoons	4¾ teaspoons	5½ teaspoons	6½ teaspoons	8 teaspoons
5½ teaspoons	4¾ teaspoons	2 tablespoons	7¼ teaspoons	8½ teaspoons	3 tablespoons	4 tablespoons
7¼ teaspoons	7¼ teaspoons	3 tablespoons	11 teaspoons	4 tablespoons	5 tablespoons	6 tablespoons
3 tablespoons	3 tablespoons	¼ cup	⅓ cup	⅓ cup	6 tablespoons	½ cup
⅓ cup	¼ cup	⅓ cup	6 tablespoons	½ cup	½ cup	⅔ cup
6 tablespoons	6 tablespoons	½ cup	⅔ cup	¾ cup	¾ cup	1 cup
½ cup	½ cup	⅔ cup	¾ cup	1 cup	1 cup	1¼ cups
⅔ cup	⅔ cup	¾ cup	1 cup	1 cup	1¼ cups	1½ cups
1¼ cups	¾ cup	1 cup	1¼ cups	1½ cups	1⅓ cups	2 cups
1⅓ cups	1⅓ cups	2 cups	2½ cups	2⅔ cups	3¼ cups	1 quart
2⅓ cups	2⅔ cups	3 cups	3⅓ cups	4¼ cups	4¾ cups	1½ quarts
4¾ cups	3¼ cups	1 quart	4¾ cups	5½ cups	6½ cups	2 quarts
7¼ cups	6½ cups	2 quarts	9½ cups	2¾ quarts	3¼ quarts	4 quarts
9½ cups	9½ cups	3 quarts	14½ cups	4¼ quarts	4¾ quarts	6 quarts
3 quarts	3¼ quarts	4 quarts	4¾ quarts	5½ quarts	6½ quarts	8 quarts
14½ cups	4¾ quarts	5 quarts	6 quarts	7 quarts	8 quarts	10 quarts
		6 quarts	7¼ quarts	8½ quarts	9½ quarts	12 quarts
Weight Measures						
½ ounce	¾ ounce	1 ounce	1¼ ounces	1½ ounces	1½ ounces	2 ounces
1¼ ounces	1½ ounces	2 ounces	2½ ounces	2¾ ounces	3¼ ounces	4 ounces
1¾ ounces	2½ ounces	3 ounces	3½ ounces	4¼ ounces	4¾ ounces	6 ounces
2½ ounces	3¼ ounces	4 ounces	4¾ ounces	5½ ounces	6½ ounces	8 ounces
3½ ounces	4¾ ounces	6 ounces	7¼ ounces	8½ ounces	9½ ounces	12 ounces
4¾ ounces	6½ ounces	8 ounces	9½ ounces	11 ounces	13 ounces	1 pound or 16 ounces
7¼ ounces	9½ ounces	12 ounces	14½ ounces	17 ounces	19 ounces	1½ pounds or 24 ounces
9½ ounces	13 ounces	1 pound or 16 ounces	19 ounces	22½ ounces	25½ ounces	2 pounds or 32 ounces
12 ounces	1 pound or 16 ounces	1¼ pounds or 20 ounces	24 ounces	28 ounces	32 ounces	2½ pounds or 40 ounces
14½ ounces	19 ounces	1½ pounds or 24 ounces	29 ounces	33½ ounces	38½ ounces	3 pounds or 48 ounces
17 ounces	22½ ounces	1¾ pounds or 28 ounces	33½ ounces	39 ounces	45 ounces	3½ pounds or 56 ounces
19 ounces	25½ ounces	2 pounds or 32 ounces	38½ ounces	45 ounces	51 ounces	4 pounds or 64 ounces
29 ounces	38½ ounces	3 pounds or 48 ounces	58 ounces	67 ounces	77 ounces	6 pounds or 96 ounces
38½ ounces	51 ounces	4 pounds or 64 ounces	77 ounces	90 ounces	102 ounces	8 pounds or 128 ounces
48 ounces	64 ounces	5 pounds or 80 ounces	96 ounces	112 ounces	128 ounces	10 pounds or 160 ounces
58 ounces	77 ounces	6 pounds or 96 ounces	115 ounces	134 ounces	154 ounces	12 pounds or 192 ounces

(Source: Menu Planning Guide for Type A School Lunches)

TABLE D.3-2

WEIGHTS & MEASURES

TABLE 68

Liquid Measure

4 gills = 1 pint
2 cups = 1 pint
2 pints = 1 quart
4 quarts = 1 gallon
31½ gallons = 1 barrel = 126 quarts
2 barrels = 1 hogshead = 63 gallons = 252 quarts
1 gal. contains 231 cu. in.
½ gal. contains 115.5 cu. in.
1 qt. contains 57.75 cu. in.
1 pt. contains 28.875 cu. in.
1 gill contains 7.218 cu. in.

Fluid Measure

16 fluid ounces = 1 pint (liquid)
1 fluid ounce contains 1.804 cubic in.

Dry Measure

8 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel = 32 quarts
1 barrel = 105 quarts = 7,056 cu. in.
1 bushel contains 2,150.42 cu. in.
1 peck contains 537.6 cu. in.
1 quart contains 67.2 cu. in.
1 pint contains 33.6 cu. in.

Avoirdupois Weight

16 ounces = 1 pound
100 pounds = 1 hundredweight (cwt)
20 hundredweight = 1 ton = 2,000 pounds

Legal Weights per Bushel of Some Foods

Apples	48	pounds
Apples, dried	25	"
Beans	60	"
Carrots	50	"
Cornmeal	50	"
Oats	32	"
Onions	57	"
Potatoes	60	"
Sweet Potatoes	54	"
Wheat	60	"

(Source: Commercial Kitchens)

TABLE D.3-3

STANDARDIZED PORTIONS

TABLE 69

The following standardized portions have been compiled from lists furnished by several of the leading hotels of the country.

Teas, Coffees, Milk, Etc.

Cocoa or Chocolate ½ oz.
Coffee 1-1/16 oz.
Tea ½ oz.
Postum 1 oz.
Buttermilk ½ pint
Cream ½ pint
Milk, small bottle ½ pint

Stews, Hash, Etc.

Braised Beef Ends with Bone 12 oz.
Corned Beef Hash 6 oz.
Corned Beef Hash, with egg 5 oz. meat, 1 egg
Corned Beef Hash, with green peppers 5 oz. meat, 1 oz. peppers
Roast Beef Hash Same as Corned Beef Hash
Lamb Hash Same as Mutton Hash
Lamb Stew 8 ozs.
Mutton Hash 4 ozs. mutton, 1½ ozs. potatoes
Ox Tail, all styles 8 ozs.
Pork and Beans 2 ozs. pork, 4 ozs. beans
Smoked Beef in Cream 3½ ozs. beef
Tripe, all styles 5 ozs.

Boiled Dishes, Etc.

Boiled Corned Beef with Cabbage 6 oz. beef, 3 ozs. cabbage
Boiled Leg of Mutton, English Style 6 ozs. meat, 2 ozs. vegetables
Total weight, 8 ozs.
Boiled New England Dinner 2 ozs. salt pork
2 ozs. corned beef
2 ozs. boiled brisket beef and vegetables
Total weight, 8 ozs.
Boiled Ox Tongue with Spinach 5 ozs. tongue
5 ozs. spinach
Boiled Short Ribs of Beef with Bone 12 ozs.

Roasts, Meats

Beef, Roast Sirloin of 5 ozs.
Beef, Roast Larder Filet of 4 ozs.
Lamb, Roast 6 ozs.
Mutton, Roast 6 ozs.
Pork Loin, Roast 6 ozs.
Pork Leg, Roast 6 ozs.
Suckling Pig, Roast 6 ozs.

Soups

Chicken broth, hot or cold, in cup 1 cup
Chicken Gumbo ½ pint
Chicken Portugaise ½ pint
Chiffonade ½ pint
Clam Broth in Cup 1 cup
Colbert ½ pint
Consomme, hot or cold, in cup 1 cup
Croute au Pot ½ pint
Julienne ½ pint
2 ozs. vegetables
Mock Turtle ½ pint
Pate d'Italie ½ pint
Potage St. Germain ½ pint
Tortue Claire ½ pint

Pastries and Pastry Department Dishes

Coupes 5 ozs.
Ice Creams 4 ozs.
Meringue Glace 4 ozs. ice cream
2 meringues
Parfaits 4 ozs.
Sherbets 4 ozs.
Deep Pies 2½ ozs. pastry, 5½ ozs. fruit in 6 inch baker
Flat Pie 6 portions from 9 inch pie
Pudding, Frozen 4 ozs.
Pudding, Hot 5 ozs.

TABLE D.3-4

FOOD AND NUTRITION BOARD, NATIONAL ACADEMY OF SCIENCES—NATIONAL RESEARCH COUNCIL RECOMMENDED DAILY DIETARY ALLOWANCES,[1] Revised 1968

Designed for the maintenance of good nutrition of practically all healthy people in the U.S.A.

	Age[2] Years From	Up to	Weight Kg	(lbs)	Height cm	(in.)	Kcal	Protein gm	Fat Soluble Vitamins: Vitamin A Activity I.U.	Vitamin D I.U.	Vitamin E Activity I.U.	Water Soluble Vitamins: Ascorbic Acid mg	Folacin[3] mg	Niacin mg. equiv.[4]	Riboflavin mg	Thiamine mg	Vitamin B_6 mg	Vitamin B_{12} µg	Minerals: Calcium gm	Phosphorus gm	Iodine µg	Iron mg	Magnesium mg
Infants	0	1/6	4	9	55	22	kg x 120	kg x 2.2[5]	1500	400	5	35	0.05	5	0.4	0.2	0.2	1.0	0.4	0.2	25	6	40
	1/6	1/2	7	15	63	25	kg x 110	kg x 2.0[5]	1500	400	5	35	0.05	7	0.5	0.4	0.3	1.5	0.5	0.4	40	10	60
	1/2	1	9	20	72	28	kg x 100	kg x 1.8[5]	1500	400	5	35	0.1	8	0.6	0.5	0.4	2.0	0.6	0.5	45	15	70
Children	1	2	12	26	81	32	1100	25	2000	400	10	40	0.1	8	0.6	0.6	0.5	2.0	0.7	0.7	55	15	100
	2	3	14	31	91	36	1250	25	2000	400	10	40	0.2	8	0.7	0.6	0.6	2.5	0.8	0.8	60	15	150
	3	4	16	35	100	39	1400	30	2500	400	10	40	0.2	9	0.8	0.7	0.7	3	0.8	0.8	70	10	200
	4	6	19	42	110	43	1600	30	2500	400	10	40	0.2	11	0.9	0.8	0.9	4	0.8	0.8	80	10	200
	6	8	23	51	121	48	2000	35	3500	400	15	40	0.2	13	1.1	1.0	1.0	4	0.9	0.9	100	10	250
	8	10	28	62	131	52	2200	40	3500	400	15	40	0.3	15	1.2	1.1	1.2	5	1.0	1.0	110	10	250
Males	10	12	35	77	140	55	2500	45	4500	400	20	40	0.4	17	1.3	1.3	1.4	5	1.2	1.2	125	10	300
	12	14	43	95	151	59	2700	50	5000	400	20	45	0.4	18	1.4	1.4	1.6	5	1.4	1.4	135	18	350
	14	18	59	130	170	67	3000	60	5000	400	25	55	0.4	20	1.5	1.5	1.8	5	1.4	1.4	150	18	400
	18	22	67	147	175	69	2800	60	5000	400	30	60	0.4	18	1.6	1.4	2.0	5	0.8	0.8	140	10	400
	22	35	70	154	175	69	2800	65	5000	—	30	60	0.4	18	1.7	1.4	2.0	5	0.8	0.8	140	10	350
	35	55	70	154	173	68	2600	65	5000	—	30	60	0.4	17	1.7	1.3	2.0	5	0.8	0.8	125	10	350
	55	75+	70	154	171	67	2400	65	5000	—	30	60	0.4	14	1.7	1.2	2.0	6	0.8	0.8	110	10	350
Females	10	12	35	77	142	56	2250	50	4500	400	20	40	0.4	15	1.3	1.1	1.4	5	1.2	1.2	110	18	300
	12	14	44	97	154	61	2300	50	5000	400	20	45	0.4	15	1.4	1.2	1.6	5	1.3	1.3	115	18	350
	14	16	52	114	157	62	2400	55	5000	400	25	50	0.4	16	1.4	1.2	1.8	5	1.3	1.3	120	18	350
	16	18	54	119	160	63	2300	55	5000	400	25	50	0.4	15	1.5	1.2	2.0	5	1.3	1.3	115	18	350
	18	22	58	128	163	64	2000	55	5000	400	25	55	0.4	13	1.5	1.0	2.0	5	0.8	0.8	100	18	350
	22	35	58	128	163	64	2000	55	5000	—	25	55	0.4	13	1.5	1.0	2.0	5	0.8	0.8	100	18	300
	35	55	58	128	160	63	1850	55	5000	—	25	55	0.4	13	1.5	1.0	2.0	5	0.8	0.8	90	18	300
	55	75+	58	128	157	62	1700	55	5000	—	25	55	0.4	13	1.5	1.0	2.0	6	0.8	0.8	80	18	300
Pregnancy							+200	65	6000	400	30	60	0.8	15	1.8	+0.1	2.5	8	+0.4	+0.4	125	18	450
Lactation							+1000	75	8000	400	30	60	0.5	20	2.0	+0.5	2.5	6	+0.5	+0.5	150	18	450

1. The allowance levels are intended to cover individual variations among most normal persons as they live in the United States under usual environmental stresses. The recommended allowances can be attained with a variety of common foods, providing other nutrients for which human requirements have been less well defined. See text for more detailed discussion of allowances and of nutrients not tabulated.

2. Entries on lines for age range 22-35 years represent the reference man and woman at age 22. All other entries represent allowances for the midpoint of the specified age range.

3. The folacin allowances refer to dietary sources as determined by Lactobacillus casei assay. Pure forms of folacin may be effective in doses less than 1/4 of the RDA.

4. Niacin equivalents include dietary sources of the vitamin itself plus 1 mg equivalent for each 60 mg of dietary tryptophan.

5. Assumes protein equivalent to human milk. For proteins not 100 percent utilized factors shoud be increased proportionately.

Source: Recommended Dietary Allowances, Seventh Edition, 1968, publication 1694, 169 pages. Published by the National Academy of Sciences—National Research Council, Washington, D.C. 20418.

TABLE D.3-5

FOOD REQUISITION GUIDE

Food items	Unit serving	Approximate amounts to requisition			Remarks
		100 servings	500 servings	1,000 servings	
Apples, eating	1 medium	1 box	4 boxes	8 boxes	1 lb. equals 3 to 5 apples 1 box equals 44 lbs.
Applesauce, fresh	½ cup	40 lb.	200 lb.	400 lb.	
Applesauce, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	6 No. 10 cans to a case
Apricots, dried	½ cup cooked	12½ lb.	62½ lb.	125 lb.	1 lb. package or 25-lb. box
Baking soda	As needed				Packed in ½ or 1-lb. packages in 6, 10, or 24-lb. cases
Bananas	1	30-34 lb.	150-170 lb.	300-340 lb.	1 lb. equals 2 to 4 bananas
Beans, dried lima	½ cup cooked	11 lb. (dry)	50 lb. (dry)	100 lb. (dry)	
Beans, dried navy	½ cup cooked	10 lb. (dry)	45 lb. (dry)	90 lb. (dry)	
Beans, string	½ cup cooked	24 lb.	120 lb.	240 lb.	1 lb. equals 3 cups cooked
Beans, string, canned	½ cup	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Beef, with bone	Allow ½ lb. per serving as purchased				
Beef, ground	¼ cup	20 lb.	100 lb.	200 lb.	
Beef for stew	3 oz. cooked	25 lb.	125 lb.	250 lb.	
Beef stew, canned	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Beef stew and vegetables, canned	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Beets, fresh	½ cup cooked	28 lb.	140 lb.	280 lb.	1 lb. equals 4 medium 1 bu. equals 52 lb.
Beets, canned	½ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Bread, 1-lb. loaf	2 slices	13 loaves	63 loaves	125 loaves	1 loaf equals 16 slices
Bread, 2-lb. loaf	2 slices	8 loaves	38 loaves	72 loaves	1 loaf equals 28 slices
Butter and fortified margarine	1 large square	2-2½ lb.	10-11 lb.	24 lb.	32 1-lb. prints to case
Cabbage	½ cup cooked	25 lb.	125 lb.	250 lb.	
Cabbage, raw	½ cup shredded	16 lb.	80 lb.	160 lb.	50-lb. hamper equals 1½ bu.
Carrots, canned	½ cup	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Carrots, fresh	½ cup cooked	30 lb.	140 lb.	260 lb.	1 lb. equals 2 cups cooked
Carrots, raw	½ cup shredded	20 lb.	100 lb.	200 lb.	50-lb. equals 1 bu.
Cereal, granulated, farina type	½ cup cooked	4 24-oz. pkg.	20 24-oz. pkg.	40 24-oz. pkg.	
Cheese, American, cream	1 oz.	6¼ lb.	31½ lb.	62½ lb.	
Chili con carne	⅓ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Cocoa	1 cup	1½ lb.	7½ lb.	15 lb.	
Coffee	1 cup	2 lb.	10 lb.	20 lb.	1 lb. coffee to 2½ gal. water
Coffee dehydrated	1 cup	1 8-oz. jar + 1-oz. 4½ gal. water	5 8-oz. + 1 2-oz. jars 21 gal. water	5 16-oz. + 2 2-oz. jars 42 gal. water	2 oz. coffee to ea. gal. of water
Corn, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	
Corned beef, canned	3 oz.	3½ 6-lb. tins	15 6-lb. tins	30 6-lb. tins	
Corned beef, hash	⅓ to ⅔ cup	5½ No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Cornflakes	1 oz.	8-9 12-oz. pkg.	42 12-oz. pkg.	80 12-oz. pkg.	24 pkg. to case

(TABLE D.3-5, CONTINUED)

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition: 100 servings	500 servings	1,000 servings	Remarks
Cornmeal, coarse	½ cup cooked	4 lb.	20 lb.	40 lb.	
Cornmeal, fine	½ cup cooked	3 lb.	15 lb.	30 lb.	
Crackers, graham	2	3½ lb.	17½ lb.	35 lb.	1 lb. equals 58 crackers
Crackers, soda	2	3 lb.	15 lb.	30 lb.	
Cream for beverage	1 oz.	3 qt.	15 qt.	30 qt.	
Eggs, fresh	1	8⅓ doz.	41⅔ oz.	83⅓ doz.	30 doz. to case
Eggs, dry whole	2 tbsp. plus 2½ tbsp. water equal 1 egg	3 lb.	15 lb.	30 lb.	4 cups dried equals 1 lb.
Fish, fresh filet	3 oz. cooked	33 lb.	165 lb.	330 lb.	
Fowl	¾ to 1 lb. as purchased	75 lb.	375 lb.	750 lb.	5 lb. average is best size to buy
Frankfurters	1 or 2	12½ lb. or 25 lb.	62½ lb. or 125 lb.	125 lb. or 250 lb.	Approximately 8 frankfurters to 1 lb.
Gelatin, dry, flavored	½ cup dessert	4 lb.	20 lb.	40 lb.	1 lb. equals 3½ cups
Grapefruit, fresh	½	1 crate (54s)	4⅔ crates (54s)	9¼ crates (54s)	54-80 count per crate
Grapefruit sections, canned	½ cup	4 No. 10 cans	19 No. 10 cans	36 No. 10 cans	
Grapefruit juice	4 oz.	4 No. 10 cans plus 1 No. 2	21 No. 10 cans	42 No. 10 cans	
Hams, smoked, bone in	3 oz. cooked	55 lb.	275 lb.	550 lb.	
Hominy grits	½ cup cooked	4 lb.	20 lb.	40 lb.	
Ice Cream, brick	⅛ qt.	12½ qt.	62½ qt.	125 qt.	Bricks can be purchased cut in 7 or 8 slices per qt.

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition: 100 servings	500 servings	1,000 servings	Remarks
Jams and jellies	1 tbsp.	6 1-lb. jars or ½ No. 10 can	2½ No. 10 cans	5 No. 10 cans	
Lettuce salad	1/6 med. head	1⅓ doz. (16 lb.)	6⅔ doz.	13 doz.	
Liver	3 oz. cooked	25 lb.	125 lb.	250 lb.	
Luncheon meat	2 oz.	13 lb.	65 lb.	130 lb.	
Macaroni	½ cup cooked	5 lb.	25 lb.	50 lb.	
Meat spread, deviled and potted	1½ tbsp.	13 No. ½ cans	65 No. ½ cans	130 No. ½ cans	
Milk, fresh	1 cup (½ pt.)	100 ½ pt. or 25 qt. or 2½ 10-qt. cans	500 ½ pt. or 125 qt. or 12 10-qt. cans	62½ gallons or 25 10-qt. cans	
Milk, evaporated	⅓ cup evap. milk plus ½ cup water	31 14½ oz. cans or 3¾ 8-lb. cans	134 14½ oz. cans or 18¾ 8-lb. cans	308 14½ oz. cans or 37½ 8-lb. cans	48 14½-oz. cans to a case
Milk, dried whole	2½ tbsp. (dry-½ oz.)	3½ lb.	15½ lb.	31 lb.	
Milk, dried skim	3 tbsp.	6¼ lb.	31¼ lb.	62½ lb.	
Molasses	2 tbsp.	3 qt.	15 qt.	30 qt.	10-lb. can equals 3 qt.
Noodles	½ cup cooked	6 lb.	30 lb.	60 lb.	
Onions, fresh	½ cup cooked	30 lb.	140 lb.	270 lb.	
Oranges	1	⅔ crate (176s)	3 crates (176s)	6 crates (176s)	176 count per case
Orange juice	4 oz.	4 No. 10 cans plus 1 No. 2 can	21 No. 10 cans	42 No. 10 cans	

(TABLE D.3-5, CONTINUED)

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition: 100 servings	500 servings	1,000 servings	Remarks
Peaches, fresh	1 whole	25 lb.	125 lb.	250 lb.	4 med. peaches equal 1 lb.
	or ½ c. sliced	29 lb.	145 lb.	290 lb.	1 bu. equals 48 lb. approx.
Peaches, canned	2 halves	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Peanut butter	2 level tbsp. or 1 rounded tbsp.	7 lb.	35 lb.	70 lb.	
Pears, fresh	1	34 lb.	140 lb.	280 lb.	48–50 lbs. equal 1 bu.
Pears, canned	2 halves	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Peas, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	
Peas, dried	½ cup cooked	10 lb. (dry)	45 lb. (dry)	90 lb. (dry)	
Pineapple, canned	1 large or 2 small slices	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Pineapple juice	4 oz.	4 No. 10 cans & 1 No. 2 can	21 No. 10 cans	42 No. 10 cans	
Plums, canned	3 plums	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Pork loin for roasting	3 oz. cooked	Allow approximately ⅓ lb. per serving as purchased			
Potatoes	½ cup cooked	30 lb.	150 lb.	300 lb.	100 lb. per bag
	1 med. baked	37 lb.	185 lb.	370 lb.	60 lb. per bu.
Prunes, dried	4-5	12½ lb.	62½ lb.	125 lb.	Purchased in 1- or 2-lb. pkg. or 25-lb. boxes.
Puffed cereals	½ oz.	13 4-oz. pkg.	65 4-oz. pkg.	130 4-oz. pkg.	24 4-oz. pkg. to case
Rice	½ cup cooked	7 lb.	35 lb.	70 lb.	
Rolled oats	½ to ⅔ cup cooked	4 lb. or 6½ lb.	20 lb. or 31 lb.	40 lb. or 62 lb.	1 lb. equals 5½ cups uncooked

(Source: Red Cross Emergency Mass Feeding Handbook)

FOOD REQUISITION GUIDE—*Continued*

Food items	Unit serving	Approximate amounts to requisition: 100 servings	500 servings	1,000 servings	Remarks
Salad dressing, cooked	1 tbsp.	2 qt.	10 qt.	20 qt.	
Salmon	½ cup	25 (1-lb.) tall cans	125 (1-lb.) tall cans	250 (1-lb.) tall cans	
Shredded wheat	1 biscuit	8 or 9 12-oz. pkg.	42 12-oz. pkg.	84 12-oz. pkg.	24 pkg. to case
Soup, condensed	½ cup soup plus ½ cup liquid	4 No. 10 cans	20 No. 10 cans	40 No. 10 cans	
Soup, dehydrated	1 cup	12½ lb.	62½ lb.	125 lb.	Directions on pkg. for preparing
Soup, ready-to-serve	1 cup	8 No. 10 cans	40 No. 10 cans	75 No. 10 cans	
Spaghetti	½ cup	5½ lb.	27½ lb.	55 lb.	
Spaghetti in sauce	½ to ⅔ cup	5 No. 10 cans	25 No. 10 cans	50 No. 10 cans	
Spinach	½ cup cooked	34 lb.	170 lb.	340 lb.	18 lb. to bu.
Squash, summer	½ cup cooked	30 lb.	150 lb.	300 lb.	Approx. 40 lb. to bu.
Squash, winter	½ cup cooked	50 lb.	250 lb.	500 lb.	
Sugar, granulated	2 tbsp.	6 lb.	38 lb.	60 lb.	
Tapioca	½ cup cooked	2 lb.	10 lb.	20 lb.	
Tea	1 cup	⅓ lb.	1⅔ lb.	3⅓ lb.	1 lb. equals 6 cups (dry)
Tomato juice	4 oz.	4 No. 10 cans plus 1 12-oz. can	21 No. 10 cans	42 No. 10 cans	
Tomatoes, fresh	1 medium whole	25 lb.	125 lb.	250 lb.	Slightly less for sliced tomatoes
Tomatoes, canned	½ cup	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	
Tuna fish	½ cup	25 No. 1 cans	125 No. 1 cans	250 No. 1 cans	
Turnip greens	½ cup cooked	37 lb.	175 lb.	340 lb.	
Turnip greens, canned	½ cup heated	5 No. 10 cans	22 No. 10 cans	44 No. 10 cans	

TABLE D.3-6

SAMPLE MENUS USING MENU PLANNING WORKSHEET

WEEK OF ----------

Day of Week and Number of Lunches	MENU	Size of Serving	Plan the Kind and Amounts of Foods Needed for the Number to be Served								
			Meat and Meat Alternate	Vegetables and Fruits	Check Vitamin A	Check Vitamin C	Check Iron	Bread	Butter or Margarine	Milk	Other Foods
MONDAY **Planned:** 300 **Served:** **Children** **Adults** **Total**_____	Country Fried Steak D-26 /Brown Gravy Oven French Fried Potatoes Buttered Broccoli Sliced Peaches Buttered Cornmeal Yeast Roll B-8 Milk Food cost per lunch_____	2 oz 1/4 c 1/2 c 1/4 c 1/4 c 1 roll 1/2 pt	Ground Beef 17.5 lb×3=52-1/2 lb D-26 (3×recipe)	Potatoes, French Fries, Regular Crinkle cut 13.6 lb×3=41 lb Broccoli, Frozen Chopped 11.6 lb×3=35 lb Peaches, Canned Sliced 2.1/10×3=6-1/2/10	√	√	√ √ √	B-8 Cornmeal Yeast Roll (3×recipe)	Broccoli 1-3/4 lb Roll 1-1/2 lb 3-1/4 lb	300 1/2 pt	
TUESDAY **Planned:** 300 **Served:** **Children** **Adults** **Total**_____	Oven-Fried Chicken D-39 Parsley Rice B-2 Savory Peas J-18 Chilled Fruit Cup (1/4 c pineapple 1/8 c grapefruit 1/8 c banana) Roll B-12 Butter (on peas & roll) Milk Chocolate Chip Cookies C-25a Food cost per lunch_____	2 oz 1/3 c 1/4 c 1/2 c 1 roll 1 tsp 1/2 pt 1	Chicken, frying 41.75 lb×3=125-1/4 lb D-39 (3×recipe)	J-18 (1.5×recipe) Canned Green Peas 4.67/10×1.5=7/10 Onions 1.12 lb×1.5=1-3/4 lb Fruit Cup (1/2 c) Canned Pineapple Chunks 2.15/10×3=6-1/2/10 Grapefruit Sections 2.23/3 cyl.×3=7/3 cyl. Bananas 6.2×3=18-3/4 lb		√	√ √ √	B-12 Rolls (3×recipe)	J-18 Peas 3/4 lb Roll 2-1/2 lb 3-1/4 lb	300 1/2 pt	B-2 Rice 12-1/2 lb (72-1/3 c (#12 scoop) in 1-1/2 gal cooked rice 3 lb) C-25a (3×recipe)
WEDNESDAY **Planned:** 300 **Served:** **Children** **Adults** **Total** _____	Fish Sticks/Catsup Confetti Corn Glazed Carrots J-13a Tossed Salad/Tomatoes E-18b & French Dressing French Bread B-9 Butter (on corn & carrots) Milk Gingerbread C-14 Food cost per lunch_____	2.3 oz 1/4 c 1/4 c 1/4 c 1 serv. 1 tsp 1/2 pt 1 serv.	4 oz Breaded Fish Portions 25 lb×3=75 lb	Corn, Whole Kernel Wet Pack 2.25/10×3=7/10 Pimiento, Green Pepper (Garnish) J-13a (1.5×recipe) Carrots 27 lb×1.5=40-1/2 lb E-18b (1.5×recipe) Lettuce 5.5 lb×1.5=8-1/4 lb Spinach 1.4 lb×1.5=2-1/4 lb Onions .84 lb×1.5=1-1/4 lb Tomatoes 6.4 lb×1.5=9-3/4 lb Radishes 2.2 lb×1.5=3-1/2 lb	√	√	√ √	B-9 French Bread (1.5× recipe) 15 loaves 20 slices each	Corn 1 lb J-13a Carrots 2 1/4 lb 3 3/4 lb	300 1/2 pt	Catsup C-14 Gingerbread (3×recipe)

(TABLE D.3-6, CONTINUED)

THURSDAY **Planned:** **300** **Served:** **Children** **Adults** **Total** _____	**Lasagna** D-31 **Seasoned Green Beans** **Cabbage Green Pepper Slaw** E-7a **Apricot Crisp** C-3a **Wheat Bread** B-13c **Butter (on beans & crisp)** **Milk** **Food cost per lunch**_____	**2 oz** **1/4 c** **1/4 c** **1/4 c (fruit)** **1 slice** **1 tsp** **1/2 pt**	**D-31 (3×recipe)** **Ground Beef 8 lb×3=24 lb** **Cheese 7.5 lb×3=22-1/2 lb**	**Green Beans 2/10×3=6/10** **E-7a (1.5×recipe)** **Cabbage 15.25 lb×1.5=23 lb** **Green Peppers 1.62 lb×1.5=2-1/2 lb** **C-3a (3×recipe)** **Canned Apricot Halves 3.12/10×3=9-1/2/10** **Lemon Juice 3 oz×3=9 oz**	√	√	√ - √ √	**B-13c** **Wheat Bread (1 recipe) 10 loaves 30 slices each**	**Beans 3/4 lb** **C-3a** **Crisp 2.5 lb×3= 7-1/2 lb** **8-1/4 lb**	**300** **1/2 pt**	
FRIDAY **Planned:** **300** **Served:** **Children** **Adults** **Total** _____	**Toasted Cheese Sandwich** G-8 **Potato Salad on lettuce** E-14 **Tropical Apples** C-24 **Butter (on sandwich, in apples)** **Milk** **Cinnamon Crispies** C-11 **Food cost per lunch**_____	**2 oz (cheese)** **1/2 c** **1/8 c** **1/4 c** **1 tsp** **1/2 pt** **1**	**Cheese 12.5 lb×3=37-1/2 lb** **G-8 (3×recipe)**	**E-14 (3×recipe)** **Potatoes 18.25 lb×3=54-3/4 lb** **Celery 4 lb×3=12 lb** **Onions 1.12 lb×3=3-1/2 lb** **Lettuce 2.05 lb×3=6-1/4 lb** **C-24 (1.5×recipe)** **Apples, Canned 4/10×1.5=6/10** **Oranges 3 lb×1.5=4-1/2 lb** **Lemons 1.34 lb×1.5=2 lb** **Pineapple Juice .66/3 cyl.×1.5=one/3 cyl.**		√	√ √	**G-8** **Bread 17-2 lb loaves 600 slices**	**G-8** **Butter on Sandwich 5-1/4 lb** **C-24** **Apples 3 lb** **8-1/4 lb**	**300** **1/2 pt**	**C-11 Cinnamon Crispies (3×recipe)**

(Source: Menu Planning Guide for Type A School Lunches)

RECIPES

General

1. The recipes included in this appendix have been selected mainly because they are nourishing and require a minimum of ingredients, time and labor to prepare.
2. The recipes shown are for yields of 100 portions. Larger amounts, in some instances, may be prepared with satisfactory results by multiplying the ingredients in a recipe for 100 by the unit number desired.
3. The capacities of eating utensils generally used in serving liquid portions are as follows:

Coffee cup, standard	6 ounces
Paper hot drink cup	6 ounces
Paper bowl, small	8 ounces
Paper bowl, large	12 ounces

Recipes by Types

1. *Beverages*

a. Coffee in disaster

(1) In times of stress a cup of good coffee helps lift morale and gives comfort. Knowing how to brew good coffee in large quantities is an important skill for food workers because of its widespread use in emergency feeding operations.

Instant coffee is convenient, and no more expensive to use for serving large groups. If instant coffee is available, the ease of preparation and time saving favor its use. If urns, glass coffee makers or other standard equipment are availabie their use is also favored.

If none of these are available, coffee can be brewed the "old fashioned" way in a stock pot or kettle, with or without using a cloth sack.

(2) General rules for brewing good coffee

Use freshly drawn cold water.

Use fresh coffee.

Measure accurately.

Since freshly made coffee is best, make only the amount needed for immediate serving.

Keep coffee hot but just under boiling.

Keep equipment clean.

When a cloth sack or filter is used it should be thoroughly rinsed after each use (no soap), and kept immersed in cold water until used again.

(3) Rule-of-thumb formulas

(a) Brewed coffee

1 pound of coffee to 2½ gallons of water yields about 50 (6 ounce portion) cups of beverage.

(4) Kettle method with bag

(a) Unbleached muslin, layers of cheesecloth, coffee sacks, or sugar sacks are suitable for making bags. Never use burlap sacking or other material that has been sized or otherwise treated.

(b) Basic recipe for emergency coffee.

Container	Ingredients	Yield
10-gal. kettle	3 lb. coffee, regular grind 7½ gal. boiling water	7½ gal. coffee (30 qt.) (160 6-oz. portions)

(c) Directions

Place ground coffee in cloth bag large enough to permit circulation of water and expansion of coffee (allow for expansion of as much as 2 or 3 times the amount of coffee used). Fifteen pounds of coffee is the maximum per bag for best results and convenient handling.

Tie the bag securely near the top with strong cord or string long enough to fasten to the handle of the container for easy removal of the bag from the hot brew.

Pour water (freshly drawn if possible) into large kettle or stock pot and bring to a boil.

(TABLE D.3-7, CONTINUED)

2. *Soups*

a. Bean chowder

(Yield: 6¼ gallons, 100 1-up portions)

Ingredients	*Amounts*
Beans, dry, white	7 pounds (4½ quarts)
Water	4¼ gallons (17 quarts)
Pork, salt, diced (optional)	3 pounds (2 quarts)
Potatoes, diced	4 pounds (2½ quarts)
Onions, chopped	12 ounces (1½ pints)
or	
Onions, dehydrated	1 ounce (8 tablespoons)
Tomatoes	2 No. 10 cans
Sugar, granulated	3 ounces (6 tablespoons)
Salt	1 ounce (2 tablespoons)
Pepper	1 teaspoon

Directions

(1) Wash beans. Add enough water to cover beans; soak 6 to 8 hours or overnight.

(2) Add remaining water and one-half the salt pork. Cover and heat to boiling point; reduce heat and simmer about 2 hours or until skins of beans begin to burst.

(3) Add potatoes and continue simmering.

(4) Fry remaining salt pork until crisp; remove from fat and drain.

(5) Fry onions in pork fat until tender Add tomatoes, sugar, salt, and pepper; mix well.

(6) Cover and heat to boiling point; reduce heat and simmer about 20 minutes.

(7) Add crisp pork cubes just before serving.

(TABLE D.3-7, CONTINUED)

b. Corn chowder

(Yield: 6 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Stock (or water)	3½ gallons
Salt pork, cubed (optional)	2 pounds (1 quart)
Onions, chopped	1 pound (3½ cups)
Celery, chopped (optional)	½ pound (2 cups)
Potatoes, diced raw	2 pounds (1¼ quarts)
Green pepper, chopped (optional)	½ pound (2 cups)
Salt	4 ounces (½ cup)
Pepper	½ ounce (1¾ tablespoons)
Corn	13 pounds, 4 ounces (2 No. 10 cans)
Milk, evaporated	4 pounds, 7 ounces (2 quarts)

Directions

(1) Cut the salt pork in small cubes.
(2) Cook pork slowly with the chopped onions until the onion is tender but not browned.
(3) Add to stock.
(4) Add chopped vegetables to stock and simmer 20 minutes.
(5) Add salt, pepper, corn, and milk to stock and simmer until blended and all vegetables are tender.

c. Chicken noodle soup

(Yield: 7 gallons, 100 1-cup portions)

Ingredients	*Amounts*
Soup, chicken noodle (dehydrated)	4¾ pounds (1 No. 10 can)
Water, boiling	7 gallons

Directions

(1) Add soup mix to boiling water.
(2) Boil 7 minutes.

d. Corn and chicken noodle soup

(Yield: 7 gallons 100 1-cup portions)

Ingredients	*Amounts*
Soup, chicken noodle (dehydrated)	4¾ pounds (1 No. 10 can)
Water, boiling	20 quarts
Corn, cream style	12 No. 2 cans
Onions, chopped	1 pound (1 quart)
or	
Onions, dehydrated	1 ounce (8 tablespoons)
Salt	2½ ounces (5 tablespoons)
Milk, powdered	2¼ pounds (9 quarts)
or	
Milk, evaporated	9 No. 1 (14½-ounce) cans
Cold water, for milk	2 quarts

Directions

(1) Add soup mix, corn, onions, and salt to the boiling water.
(2) Bring to boiling point; cook 7 minutes.
(3) Reconstitute the powdered milk in the cold water.
(4) Add milk to mixture just prior to serving, and reheat.

(TABLE D.3-7, CONTINUED)

3. *Breads*

a. Biscuit mix with nonfat dry milk

(Yield: 6½ pounds mixture, 100 portions)

Ingredients	*Amounts*
Sifted flour	4 pounds (4 quarts)
Dry milk	¾ pound (3 cups)
Baking powder	½ cup
Salt	2 tablespoons
Fat	3 cups

Directions

(1) Sift dry ingredients together three times, if possible, or mix ingredients thoroughly.
(2) Rub or cut in the fat.
(3) Store in tightly covered container until ready to use.

For making drop biscuits

(4) Add enough water (about 1½ quarts) to the above dry mix to make a very soft dough.
(5) Drop by spoonfuls on ungreased baking sheet.
(6) Bake in hot oven (450 F.) for 12 to 15 minutes.

b. Cornbread

(Yield: 24¾ pounds mixture, 100 portions)

Ingredients	*Amounts*
Flour, sifted	5 pounds (1¼ gallons)
Sugar, granulated	2 pounds (1¼ quarts)
Cornmeal	4¾ pounds (3½ quarts)
Baking powder	9 ounces (1½ cups)
Salt	1 ounce (2 tablespoons)
Milk	9 pounds (1¼ gallons)
Eggs, beaten	1 pound 4 ounces (12 eggs)
or	
Eggs, powdered	4¾ ounces
and	and
Water	1¾ cups
Shortening, melted	2¼ pounds (1¼ quarts)

Directions

(1) Sift flour, sugar, cornmeal, baking powder, and salt together.
(2) Mix milk and water, add beaten eggs.
(3) Add milk and egg mixture to dry ingredients; partially mix. Add melted shortening, stir only until dry and liquid ingredients are combined. Avoid overmixing.
(4) Spread mixture in greased baking pans. Bake in hot oven (425° F.) about 25 to 30 minutes.

c. Cornbread (with dried whole egg)

(Yield: 100 portions)

Ingredients	*Amounts*
Water	1½ cups
Dried whole egg	5 ounces (1¼ cups firm-packed)
Sifted flour	3 pounds (3 quarts)
Baking powder	4½ ounces (2/3 cup)
Sugar	10 ounces
Salt	3 tablespoons
Cornmeal	2½ pounds (7½ cups)
Milk	2½ quarts
Melted fat (or oil)	2½ cups

Directions

(1) Add ¾ cup water to the dried egg; beat until smooth. Add remaining ¾ cup water and beat well.
(2) Sift flour, baking powder, sugar, and salt together twice. Add cornmeal and mix well.
(3) Combine milk and fat, or oil, with egg and add to dry ingredients.
(4) Pour into well-greased baking pans.
(5) Bake at 425° F. (hot) 30 to 40 minutes until brown.

(TABLE D.3-7, CONTINUED)

4. *Cereals*

Cereal	Approximate quantity		Salt[a]	Water[b]	Cooking Time		Serving size for 100 portions
	Weight	Amount			Steam jacketed kettle	Double boiler	
	Pounds	*Quarts*	*Tablespoons*	*Gallons*	*Minutes*	*Minutes*	*Cup*
Regular:							
Rolled oats	6	9	6	5	20	30–45	2/3
Wheat cereals	6	4½	6	5	20	30–45	2/3
Cornmeal	6	4½	6	6	20–30	60	3/4
Hominy grits	6	4	6	6	20–30	60	3/4
Quick cooking:							
Rolled oats	6	9	6	4¾	5	5–10	2/3
Wheat cereals and whole wheat cereals	6	4½	6	4¾	5	5–10	2/3

[a] It may be necessary to increase the amount of salt.
[b] The amount of water needed may vary according to the method of cooking, the type of utensil used, and the length of the cooking period.

Directions

a. Steam jacketed kettle
   (1) Add salt to water; heat to boiling. Amounts of salt and water may vary according to the method of cooking, the type of utensil used, and the length of cooking period.
   (2) Add cereal gradually, stirring to prevent lumping. Bring to a boil; reduce heat and simmer until thick, stirring occasionally to prevent lumping.

b Double boiler
   (1) Place water in top of double boiler. Add salt. Heat to boiling.
   (2) Stir in cereal gradually. Continue stirring until thickened.
   (3) Place top of double boiler over bottom, filled to two-thirds capacity with boiling water.
   (4) Cook without stirring until done.

Variations in serving cooked cereals
   (1) Hot cooked cereals may be served with milk and sugar. Raisins, chopped seeded dates, or chopped dried figs may be added to the cereal a few minutes before serving.
   (2) Cooked cornmeal, oatmeal, bulgur or hominy grits may be fried. Pour the cooked cereal into well-greased pans to a depth of about 1 inch. Cool, cut into squares, and fry. If the squares are moist, dip in flour before frying. Serve with syrup or jelly, or tomato or cheese sauce.

5. *Eggs*

a. Eggs are a protein food and must be cooked at low temperatures. High temperature toughens egg whites and darkens the yolks.

b. Soft and hard cooked eggs

(Yield: 100 portions.)

Ingredients	*Amounts*
Eggs	200
Water, boiling	To cover

Directions

   (1) Place 100 eggs at a time in a large wire basket or other similar utensil with long handle.
   (2) Lower basket into boiling water; reduce heat and simmer 3 to 5 minutes for soft cooked eggs and 12 to 15 minutes for hard cooked eggs.
   (3) Remove from water. Plunge hard cooked eggs into cold water. If hard cooked eggs are to be used in salads or other prepared dishes, remove shells immediately after plunging in cold water. Refrigerate.

(TABLE D.3-7, CONTINUED)

6. *Vegetables*

a. Buttered carrots

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Carrots, dehydrated	4 pounds (4½ quarts or 1½ No. 10 cans)
Water, cold (for carrots)	16 quarts (32 pounds)
Sugar, granulated	2 ounces (4 tablespoons)
Butter or margarine	1 pound (1 pint)
Salt	3 ounces (6 tablespoons)
Pepper	¼ ounce (1 tablespoon)

Directions

(1) Soak carrots in cold water for 45 to 60 minutes.
(2) Bring slowly to boil, then simmer until tender.
(3) Remove from the stove; add the sugar, fat, salt, and pepper, and stir until thoroughly mixed.

b. Buttered sweetpotatoes

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Sweetpotatoes, dehydrated	7½ pounds (10 quarts)
Water, cold	15 quarts
Salt	1 ounce (2 tablespoons)
Butter or margarine	2 pounds (1 quart)

7. *Main dishes*

a. Baked beans

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Navy beans	16 pounds
Boiling water	4 gallons
Salt pork, sliced (optional)	3 pounds
Pepper	1 teaspoon
Brown sugar	2 pounds (4-2/3 cups, well packed)
Dry mustard	¼ cup
Salt	4 ounces (½ cup)
Onion, chopped	1½ pounds (1 quart)
Molasses	1 quart

Directions

(1) Cover beans with water and boil 2 minutes. Remove from heat, cover, and let stand for 1 hour. (If more convenient, soak beans overnight.)
(2) Drain beans, and heat the drained liquid.
(3) Place half of beans in roasting pans.
(4) Cover beans with half of the slices of salt pork.
(5) Spread the rest of the beans over salt pork. Top with remaining slices of salt pork.
(6) Combine pepper, sugar, mustard, salt, onion, and molasses. Pour mixture over beans.
(7) Add the hot drained liquid. (Add water as needed to moisten the beans during baking.)
(8) Cover pans and bake at 300° F. (slow) for 7 to 8 hours.

c. Beef stew (using canned roast beef and gravy)

(Yield: 100 1-cup portions.)

Ingredients	*Amounts*
Onions, dehydrated	8 ounces (1 quart)
Carrots, dehydrated	14 ounces (1 quart)
Potatoes, dehydrated	4 pounds (6 quarts)
Water (for vegetables)	13 quarts
Tomatoes, canned	1 No. 10 can
Roast beef and gravy, canned	27½ pounds (13 34-ounce cans)
Salt	4½ ounces (tablespoons)
Pepper	¼ ounce (1 tablespoon)

Directions

(1) Soak carrots in water for 45 minutes. Bring slowly to the boiling point. Add potatoes. Combine with tomatoes and onions and simmer until vegetables are tender but not mushy.
(2) Add meat and seasoning and heat to a serving temperature. Avoid stirring vigorously after meat has been added as it breaks up readily.

(TABLE D.3-7, CONTINUED)

8. Desserts

a. Peach crisp

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Flour sifted	½ pound
Shortening	2 pounds
Sugar, brown, packed	3 pounds
Salt	1½ ounces
Cinnamon	1 tablespoon
Rolled oats	2 pounds
Peaches, canned, sliced, drained	1 No. 10 can

Directions

(1) Mix dry ingredients thoroughly.

(2) Place a 1-inch layer of drained sliced peaches in a greased pan and cover with a layer of the oatmeal mixture. Add another layer of peaches and top with a generous layer of oatmeal mixture.

(3) Bake (350° F.) 45 minutes.

(4) *Other fruits such as fresh and dried apples, cherries, or cooked dried apricots may be substituted for peaches.*

b. Applesauce (using dehydrated apple nuggets)

(Yield: 100 ½-cup portions.)

Ingredients	*Amounts*
Apple nuggets, dehydrated	4 pounds (2 gallons)
Water, hot	3 gallons
Sugar	2½ pounds (1¼ quarts)
Cinnamon	½ ounce (2 tablespoons)

Directions

(1) Mix together apple nuggets, water, and sugar. Cover.

(2) Heat slowly, to boiling temperature, stirring occasionally.

(3) Let simmer 1 hour, stirring occasionally. Stir in cinnamon.

(4) A better product is obtained by continuous stirring during the cooking period.

(5) Nutmeg may be used in place of cinnamon, or spices may be omitted.

(TABLE D.3-7, CONTINUED)

9. Cooking fresh vegetables
   a. Prepare vegetables according to the directions given in the following table.
   b. It is desirable to wash vegetables before cooking them. Leafy vegetables should be washed several times, lifting them out of the water each time.
   c. Cook in lots *no larger than 10 pounds* of prepared raw vegetable. Simmer vegetables until just tender—no longer than necessary. For a given vegetable, cooking time will differ with variety and age of the vegetable, its size, or the size pieces into which it is cut. See timetable for approximate cooking time.
   d. Drain and add 8 ounces (1 cup) of butter or margarine for each 10 pounds of vegetable.
   e. A 10-pound lot of prepared raw vegetable makes about 50 3-ounce portions when cooked, drained, and seasoned.

Timetable for Cooking Fresh Vegetables

Vegetable	Preparation	For 10-pound lots of vegetable		Approximate Cooking Time (minutes)
		Boiling Water	Salt	
Beans, lima	Shell. (If possible, scald pods to make shelling easier).	2½ qts.	1 tbsp.	20 to 25
Beans, snap or wax	Trim ends and remove strings. Cut or break beans into 1-inch pieces.	2½ qts.	1 tbsp.	30 to 40
Beets	Remove tops, leaving 2-inch stem on beets. Do not peel or remove root.	To cover	None	60 to 90
Broccoli	Cut off tough stalk ends. Soak in salted water for 30 minutes if insects are present. Drain. Peel stalks. Cut broccoli lengthwise, if thick, to speed cooking.	3 qts.	1 tbsp.	10 to 20

(Source: Red Cross Mass Feeding Handbook)

APPENDIX E

FOOD CONSUMPTION

APPENDIX E - ATTACHMENT 1

NATIONAL EMERGENCY FOOD CONSUMPTION STANDARD

The National Emergency Food Consumption Standard is promulgated for use by governmental authorities at all levels. It establishes a maximum level for consumer food rationing and mass feeding operations during the immediate post-attack period of between 2,000 and 2,500 calories per person per day, depending upon the foods selected.

The Standard provides sufficient food to maintain a reasonable degree of health and vigor for a limited time.

The Standard also would be the basic guide for establishing distribution levels for categories of various foods, for evaluating requests made upon USDA for food, and for making other food management decisions.

Food Consumption Tables

The Standard contains three tables. Table 1 shows the food allowance per person per week under emergency conditions. Table 2 prescribes acceptable substitutions which may be made among the foods in Table 1. Table 3 prescribes the substitution rates for canned, dry, and concentrated foods. However, those foods in Table 3 may be used only after maximum utilization had been made of nonstorable foods.

Special Provisions

In utilizing the National Emergency Food Consumption Standard the following must be observed:

1. Special dietary foods and other special foods may be released by local authorities as needed to provide diets for specific individuals as prescribed by recognized medical authorities.

2. Canned and packaged baby foods may be released for babies in accordance with special ration plans that may be developed by local civil authorities. (Since quantities available are likely to be limited, care should be exercised in development of such plans.)

3. Special military packaged rations would be released only to the military.

4. The Standard may be exceeded only after maximum substitutions had been made within the framework of the Standard and there still remained substantial quantities of food in danger of spoilage if not used immediately.

5. Canned meats (including fish and poultry), canned mixed foods containing meat, and canned cheese may be released only if the total quantity of available fresh, frozen, and cured items in the meat group fell below $1\frac{1}{2}$ pounds per person per week. In such a case, sufficient quantities of these items may be released to increase the total of the meat-group items to 2 pounds per person per week.

6. Dry and canned milk (including malted milk and all products containing 50 percent or more of dry milk) would be released only for use by (1) children under 6 years of age and (2) pregnant women and nursing mothers, and then only if the total supply of usable fresh milk available in the area were less than the amount necessary to supply these two groups with 7 pints per person per week. The amount of dry and canned items released should be only enough to make up the deficiency below 7 pints per woman or child in categories (1) and (2) above.

Table 1. - Food allowance per person per week

Food groups and food items	Amount per week
Meat and meat alternatives (fresh, frozen, and cured meat, poultry, fish, shellfish; cheese; and nuts).	3 lbs.
Eggs	6 eggs
Milk, (fluid, whole)	7 pints
Cereals and cereal products (flour including mixes, fresh bakery products, corn meal, rice, hominy, macaroni, and breakfast cereals).	4 lbs.
Fruits and vegetables (fresh and frozen)	4 lbs.
Food fats and oils (butter, margarine, lard, shortening, salad and cooking oils).	½ lb.
Potatoes (white and sweet)	2 lbs.
Sugars, syrups, honey, and other sweets	½ lb.

Table 2. - Acceptable substitutes (among foods in Table 1)

Food and food groups	Unit	Equivalent Unit	Substitute foods or food groups
Meat and meat alternatives	1 lb.	½ lbs.	Cereals & cereal products
		¼ lbs.	Food fats and oils
		12	Eggs
		2-3/4 lbs.	Potatoes
		2½ pints	Milk (fluid, whole)
Eggs	6 eggs	½ lbs.	Meat & meat alternatives
		¼ lbs.	Cereals & cereal products
		1 pint	Milk (fluid, whole)
Milk (fluid, whole)	1 pint	2/5 lb.	Meat & meat alternatives
		1/5 lb.	Cereals & cereal products
Cereals & cereal products	1 lb.	2 lbs.	Meat & meat alternatives
		5 lbs.	Potatoes (white & sweet)
Food fats and oils	1 lb.	4 lbs.	Meat & meat alternatives
		2 lbs.	Cereals & cereal products
Potatoes (white or sweet)	1 lb.	1/5 lb.	Cereals & cereal products
		2 lbs.	Fruits and vegetables

Table 3. - Substitution rates for canned and concentrated foods

Food and food groups	Unit	Equivalent Unit	Substitute foods or food groups
Meat and meat alternatives	1 lb.--	1 lb.----	Canned meats, poultry, and fish
		2 lbs.---	Canned pork and beans
		2 lbs.---	Canned meat mixtures such as hash, chili, stew, spaghetti and meatballs
		1 lb.----	Dry beans and peas
Milk (fluid, whole)-------	1 pint-	8 oz.----	Canned evaporated milk
		3 oz.----	Canned condensed milk
		2 oz.----	Dried milk, whole
		3 oz.----	Dried milk, nonfat solids
		3 oz.----	Malted milk, dry powder
Fruits, vegetables (fresh and frozen)----------	1 lb.--	2/3 lb.--	Canned fruits and vegetables
Food fats and oils-------	1 lb.--	1 lb.----	Canned food fats and oils

(Source: USDA Defense Food Order #2)

TABLE E-1

PER CAPITA CONSUMPTION OF MAJOR FOOD COMMODITIES

IN POUNDS

	1972	1971	Average 1957-59	Indicated 1973 as % of 1972
Meats(carcass wt.)	188.9	191.8	156.6	95%
Beef	116.0	113.0	82.1	97
Veal	2.2	2.7	7.1	91
Lamb, mutton	3.3	3.1	4.4	82
Pork	67.4	73.0	63.0	94
Fish (edible weight)	12.2	11.2	10.5	101
Poultry products:				
Eggs (number)	307	322	356	96
Chicken	42.9	41.4	27.5	97
Turkey	9.1	8.5	6.0	100
Dairy products:				
Cheese	13.2	12.2	7.9	105
Cond., evap. milk	6.4	6.8	14.8	92
Milk, cream	258	259	337	100
Ice cream	17.5	17.6	18.4	101
Fats and oils(fat cont.)	53.3	52.1	45.3	100
Butter	4.9	5.1	8.2	96
Margarine	11.3	11.1	8.9	100
Lard	3.8	4.3	9.3	82
Shortening	16.7	16.8	11.4	101
Other edible fats, oil	14.6	18.1	10.8	105
Fruits				
Fresh	76.8	80.1	95.5	104
Processed:				
Canned fruit	21.7	19.0	22.4	97
Canned juice	15.7	15.4	13.5	103
Frozen(incl. juices)	10.1	10.2	8.6	110
Dried	2.2	2.6	3.3	118

	1972	1971	Average 1957-59	Indicated 1973 as % of 1972
Vegetables				
Fresh	98.2	98.7	104.1	98%
Canned(excl. potatoes)	51.9	51.2	45.3	100
Frozen " "	10.0	9.7	6.6	106
Potatoes(fresh equivalent)	119.6	121.0	106.9	97
Grains:				
Cornmeal and flour	7.4	7.4	7.4	100
Corn syrup	18.2	16.2	9.4	100
Corn sugar	4.8	5.2	3.6	100
Wheat flour	109	110	120	100
Wheat cereals	2.9	2.9	2.8	100
Rice, milled	7.0	7.6	5.4	103
Other:				
Coffee (green beans)	13.9	13.2	15.7	99
Tea	.77	.77	.58	101
Cocoa Beans	4.4	4.0	3.5	93
Peanuts (shelled)	6.1	5.9	4.6	102
Dry edible beans	6.2	5.9	7.7	100
Melons	21.9	22.7	25.1	100
Sugar (refined)	103.0	102.4	96.1	100
Civilian population (mils)	206.5	204.3	171.5	--

Source: U.S. Dept. of Agriculture

* *Civilian*

Table E-2: Homemakers' estimates of length of time food on hand could be made to last in an emergency: Cumulative percentages of survey households whose food supplies would be depleted at selected time intervals, by degree of urbanization, June 1962.

Homemakers' estimates of how long food on hand could be made to last 1/	U.S. total	Households located -- Inside SMSA's			Outside SMSA's				
		Total	Central city	Urban fringe	Total	Urban	Rural Total	Rural Nonfarm	Rural Farm
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
1 day or less	2	3	4	1	2	2	1	2	1
2 days or less	5	5	8	3	4	5	3	4	2
3 days or less	8	9	12	6	6	7	6	7	4
4 days or less	12	13	17	9	9	11	8	9	5
5 days or less	16	18	23	12	13	16	11	12	8
About 1 week or less	31	35	42	27	26	32	22	24	17
Between 1 and 2 weeks or less	47	51	57	43	40	47	37	40	29
About 2 weeks or less	61	65	70	59	54	61	51	55	39
Between 2 and 3 weeks or less	66	70	75	65	60	67	56	60	44
About 3 weeks or less	76	80	83	77	71	77	67	72	56
About 1 month or less	86	89	90	87	81	86	79	82	70
Number of households	2/11,368	6,909	3,611	3,298	4,341	1,555	2,786	2,024	762

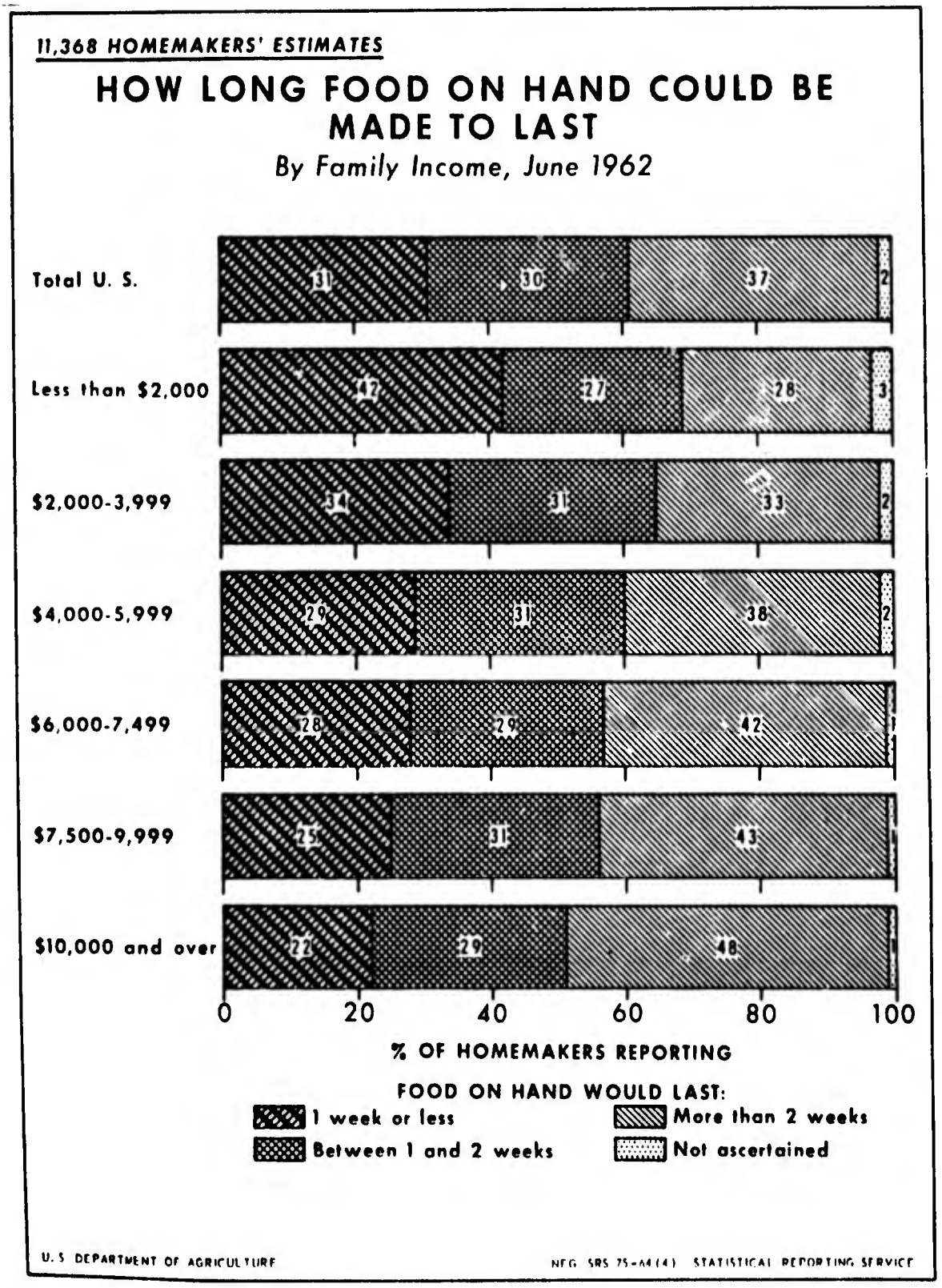
1/ "About 1 week or less" includes all estimates of 8 days or less; "between 1 and 2 weeks or less" includes all estimates of 12 days or less; "about 2 weeks or less" includes all estimates of 15 days or less; "between 2 and 3 weeks or less" includes all estimates of 19 days or less; "about 3 weeks or less" includes all estimates of 22 days or less; "about 1 month or less" includes all estimates of 31 days or less.

Reports of enough food to last more than 31 days were received from 12 percent of homemakers nationwide. No estimates were received from 2 percent of respondents.

2/ Includes 118 households for which degree of urbanization was not recorded.

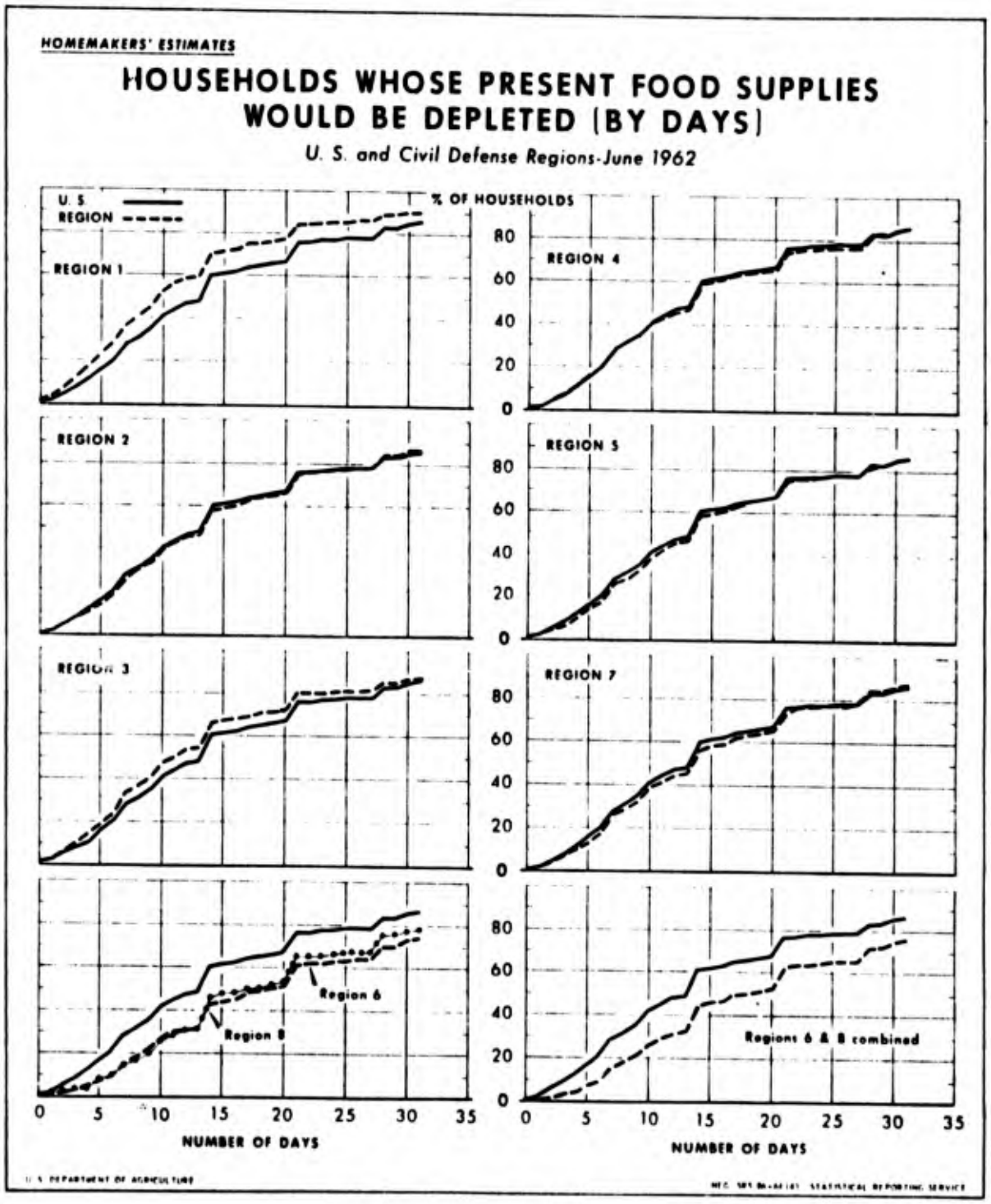
(Source: USDA, Marketing Research 669, 1964)

FIGURE E-1



(Source: USDA Marketing Research Report 669)

FIGURE E-2



(Source: USDA Marketing Research Report 669)

A P P E N D I X F

MODELING DISTRIBUTION STRESS FACTORS

APPENDIX F

SIMPLIFIED CALCULATION OF DISTRIBUTION STRESS FACTOR

Controlled evacuation of a large percent of the population from potential risk areas near urban centers to outlying host areas could severely strain the local food distribution system. Adjusting delivery to the newly-distributed population's needs will considerably increase the distance traveled by local delivery trucks, requiring more equipment and drivers for an adequate level of service. To analyze the ability of the local food distribution to accomodate such movements of population, mathematical models quantifying transportation system stress have been developed.* An estimate of this stress factor is provided by the ratio of the average distance traveled in distributing food to the population prior to relocation (i.e., under normal conditions) to the average post-relocation distance. Computing the stress factor of a study area will provide a measure of that area's susceptibility to increased stress, and suggest the extent to which further analysis of vulnerability of the food distribution system should be pursued.

Several approaches to determining the stress factor of a study area are available. Simple calculations based on an abstract city model (discussed below) are initially used to identify how severe the problem might be. More complex approaches may then be appropriate if stress is likely to be a significant problem or if distributors are likely to experience unequal degrees of stress.**

The abstract city analysis depicts an urban area as a number of concentric zones with varying population densities. In the simplest, two-zone model of the city, relocation would entail movement from the central risk area to the surrounding host area. Two possible food distribution patterns are considered:

- Distribution from a central point within the risk area; and
- Distribution from a remote point removed from both the risk and host areas. Such a point might be a larger city in the vicinity of the study area.

Central Point Distribution

Food normally distributed from a central point within a risk area will require greater travel distance after population relocation to the doughnut-shaped host area (see Figure F-1). The stress factor utilizes the ratio of average distance traveled in distributing food prior to relocation to the average distance after relocation. This ratio may be expressed analytically in terms of the risk-area radius D_r, the host-area radius, D_h, and the risk and host area populations, P and P_h. If the ratio of the host area radius to the risk area

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*See Billheimer et al., Food System Support of the Relocation Strategy, Final Report, Volume II, Appendix F (September 1975).

**Two such models discussed more fully in Billheimer et al., merit mention. The Network Model (a computer model) utilizes route-finding and traffic assignment to analyze stress. A formula for the Population Surrogate substitutes the population distribution for retail store distribution.

EXHIBIT F-1: CENTRAL POINT DISTRIBUTION

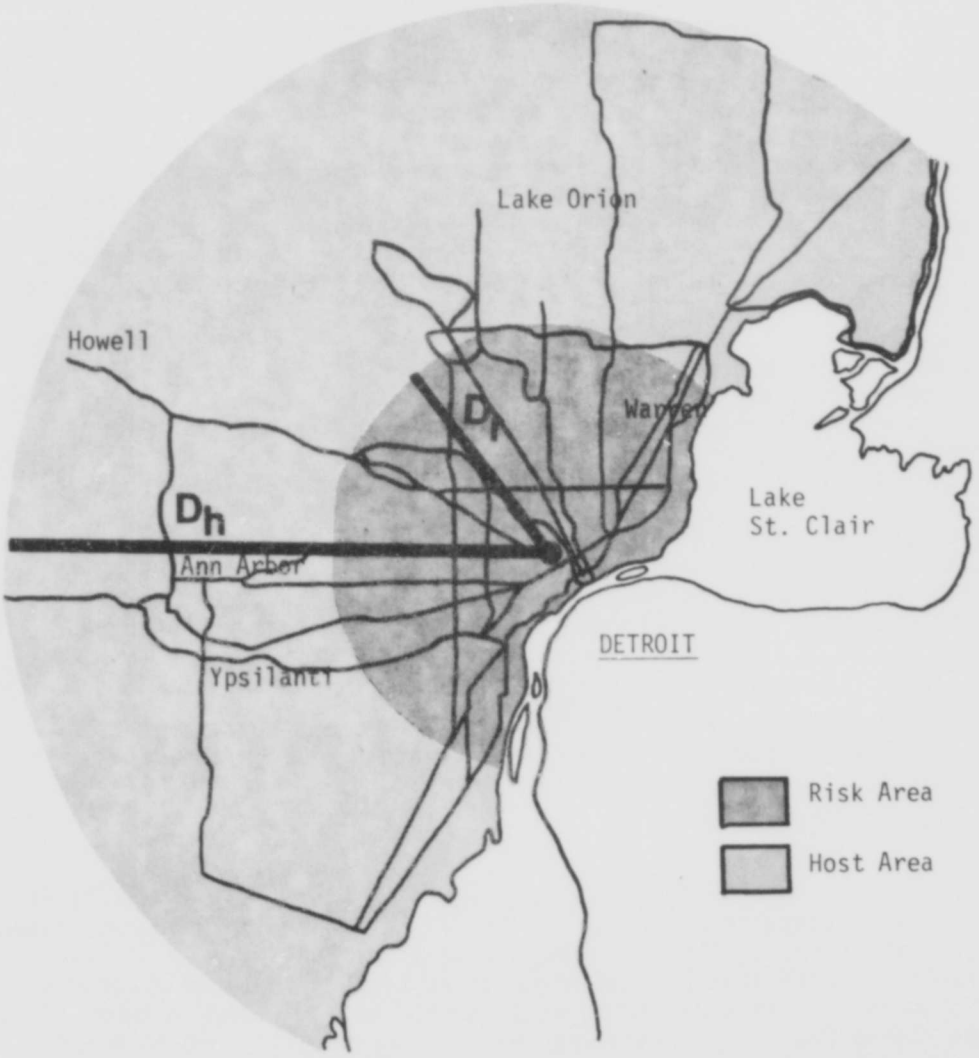
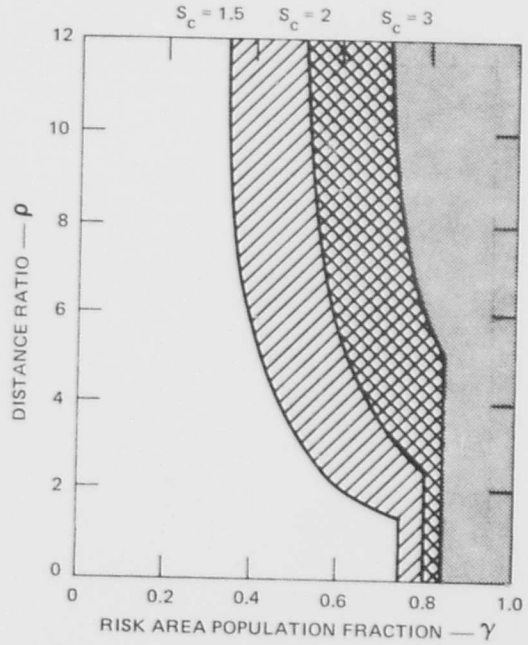


EXHIBIT F-2

STRESS CURVES FOR CENTRAL POINT DISTRIBUTION



No Stress

Slight Stress

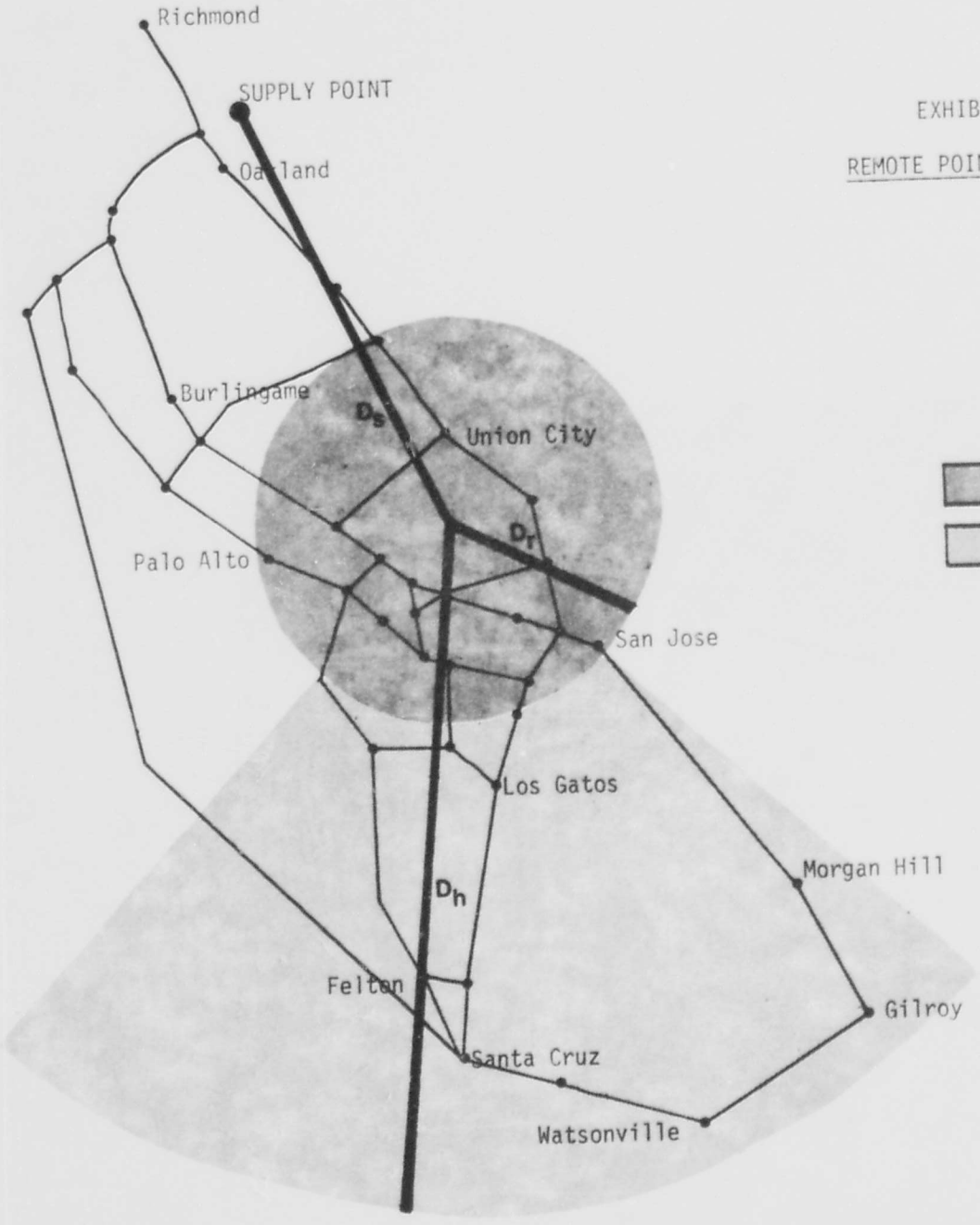
Medium Stress

Severe Stress

SOURCES: Hall & Billheimer, op cit.

EXHIBIT F-3

REMOTE POINT DISTRIBUTION



radius, D_b/D_r, is designated as , and the ratio of risk-area population to total population, P_r/P, is designated as γ, then the transportation stress factor, S_c, may be expressed as follows:

$$\text{Central Distribution Stress Factor} = \frac{(1+\rho)^2 - \rho}{(1+\rho)^2 - \rho - \gamma\rho^2} = S_c \qquad (1)$$

(For easier computation of the stress factor, Worksheet 1 has been provided.)

This stress factor assumes that the total risk-area population is evacuated to the host area (i.e., $\alpha = 1$). In the event that some fraction of the risk area population is not evacuated (i.e., $0<\alpha<1$), the stress factors may be expressed as the following linear function of:

$$S_c(\alpha) = 1 - \alpha + \alpha S_c; \quad 0 \leq \alpha \leq 1 \qquad (2)$$

This expression will be maximized, and the greatest stress will be placed on the transportation when $\alpha=1$. In such a case, Equation (1) applies, and it is possible to solve the equation for ratios ρ and γ associated with a given transportation stress factor, S_c.

Solutions to S_c have been graphed in Exhibit A-2, which may alternatively be used to determine the stress factor for a central point distribution system. By locating the risk-area population fraction (γ, as calculated above) along the x-axis, and the distance ratio (ρ) along the y-axis, one identifies from the intersection of these two figures, whether stress is non-existent, slight, medium or severe. From a transportation standpoint, an S_c factor between 1.5 and 2 can be expected to place a slight amount of stress on the distribution system (e.g., driver overtime) while an S factor in excess of 3 represents severe stress (e.g., commandeered trucks, additional personnel, disregarded union rules).

Remote Point Distribution

Similar guidelines may be developed for cities whose food supplies came from nearby market centers outside the immediate risk areas. Because such market centers are usually located in heavily-populated urban regions, it can be assumed that the market centers themselves will constitute risk areas. Consequently, the evacuation pattern for cities supplied by remote market centers is assumed to be directed away from the larger supply centers. This situation is diagrammed in Exhibit A-3. As in the case of centrally-distributed stocks, the ratio of average distance traveled in distributing food prior to relocation to the average distance following relocation provides an estimate of transportation stress imparted to the distribution system by the evacuation process. In expressing this factor mathematically, the distance D_s from the supply point to the center of the risk area must be added to the distance ratio ρ and the population ratio γ. If the distance D_s is expressed in terms of a ratio $\lambda = D_s/D_r$, the transportation stress factor S_r may be approximated by the equation:

WORKSHEET 1

Computing the Central Distribution Stress Factor (S_c):

$$\frac{(1+\rho)^2 - \rho}{(1+\rho)^2 - \rho - \gamma\rho^2} = S_c$$

$D_h/D_r = \rho =$ _____ (A) $1 + \rho =$ _____ (B)

$\rho^2 =$ _____ (C) $(1+\rho)^2 =$ (B) X (B) = _____ (D)

$(1+\rho)^2 - \rho =$ (D) - (A) = _____ (E)

$P_r/P = \gamma =$ _____ (F) $\gamma\rho^2 =$ (F) X (C) = _____ (G)

$(1+\rho)^2 - \rho - \gamma\rho^2 =$ (E) - (G) = _____ (H)

(E) ÷ (H) = _____ = S_c

$$\text{Remote Distribution Stress Factor:} = \frac{3\lambda(\rho+1) + 2(\rho^2+\rho+1)}{3\lambda(\rho+1)\gamma+(1-\gamma)\left\{3\lambda(\rho+1) +2(\rho^2+\rho+1)\right\}} = S_r \qquad (3)$$

(Worksheet 2 has been provided to simplify the step-by-step computation of S_r).

The factor of Equation (3) assumes a total evacuation of the risk area. In the event of partial evacuation, the stress factor may be expressed as a linear function of the evacuation fraction α:

$$S_r(\alpha) = 1 - \alpha + \alpha S_r; \quad 0 \leq \alpha \leq 1$$

As with the central distribution stress factor, S_c, the remote distribution factor is maximized when $\alpha = 1$. Exhibit A-4 contains a plot of three critical values of the remote stress factor S_r as a function of host-area distance ratio ρ and the remote point distance ratio λ for three different values of the host-area population fraction γ. By locating the distance ratio λ along the x-axis, and the distance ratio ρ along the y axis, and choosing the graph with the population stress factor γ closest to that calculated for the study area in question, relative stress of the transportation system can be determined.

Interpreting Transportation Stress

The calculated transportation stress factor can be used to roughly determine equipment or additional equipment and drivers needed for food distribution following relocation of the population. Exhibit A-5 charts the increased needs for vehicles and drivers corresponding to stress.* On the average, a transportation stress factor of 2.5 for food deliveries (i.e., a 150% increase in vehicle mileage) would require an influx of 18% more vehicles and 71% more drivers from other sectors of the economy. A doubling of local fuel truck mileage (i.e., a transportation stress factor of 2) would require, on the average, an 8% increase in vehicles in a 63% increase in drivers. These estimates do not allow for attrition in the existing driver force in the face of emergencies, and assume that the length of the crisis relocation period will be relatively short (one to two weeks).

As mentioned above, the abstract city analysis computations provide a quantitative measure of stress that suggests the need for further analysis. If calculation of central point distribution, or remote point distribution, stress factors shows medium or severe stress, more accurate techniques of analysis should be employed to identify the specific distributors who will require a large increase in drivers and equipment.

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* Ibid., p. F-17.

WORKSHEET 2

Computing the Remote Distribution Stress Factor (S_r):

$$\frac{3\,\lambda(\rho+1) + 2(\rho^2+\rho+1)}{3\,\lambda(\rho+1)^{\gamma} + (1-\gamma)\left\{3\lambda(\rho+1)+2(\rho^2+\rho+1)\right\}} = S_r$$

$D_h/D_r = \rho =$ _____ (A)

$\rho + 1 =$ _____ (B)

$\rho^2 =$ _____ (C)

$\rho^2 + \rho + 1 =$ (B) + (C) - _____ (D)

$2(\rho^2+\rho+1) = 2 \times$ (D) = _____ (E)

$D_s/D_r = \lambda =$ _____ (F)

$3\,\lambda(\rho+1) = 3 \times$ (F) $\times$ (B) = _____ (G)

$3\,\lambda(\rho+1) + 2(\rho^2+\rho+1) =$ (G) + (E) = _____ (H)

$P_r/P = \gamma =$ _____ (I)

$1 - \gamma =$ _____ (J)

$3\lambda(\rho+1)^{\gamma} =$ (G) $\times$ (I) = _____ (K)

$(1-\gamma)\left\{3\lambda(\rho+1) + 2(\rho^2+\rho+1)\right\} =$ (J) $\times$ (H) = _____ (L)

$3\lambda(\rho+1)^{\gamma} + (1-\gamma)\left\{3\lambda(\rho+1) + 2(\rho^2+\rho+1)\right\} =$ (K) + (L) = _____ (M)

(H) ÷ (M) = _____ = S_r

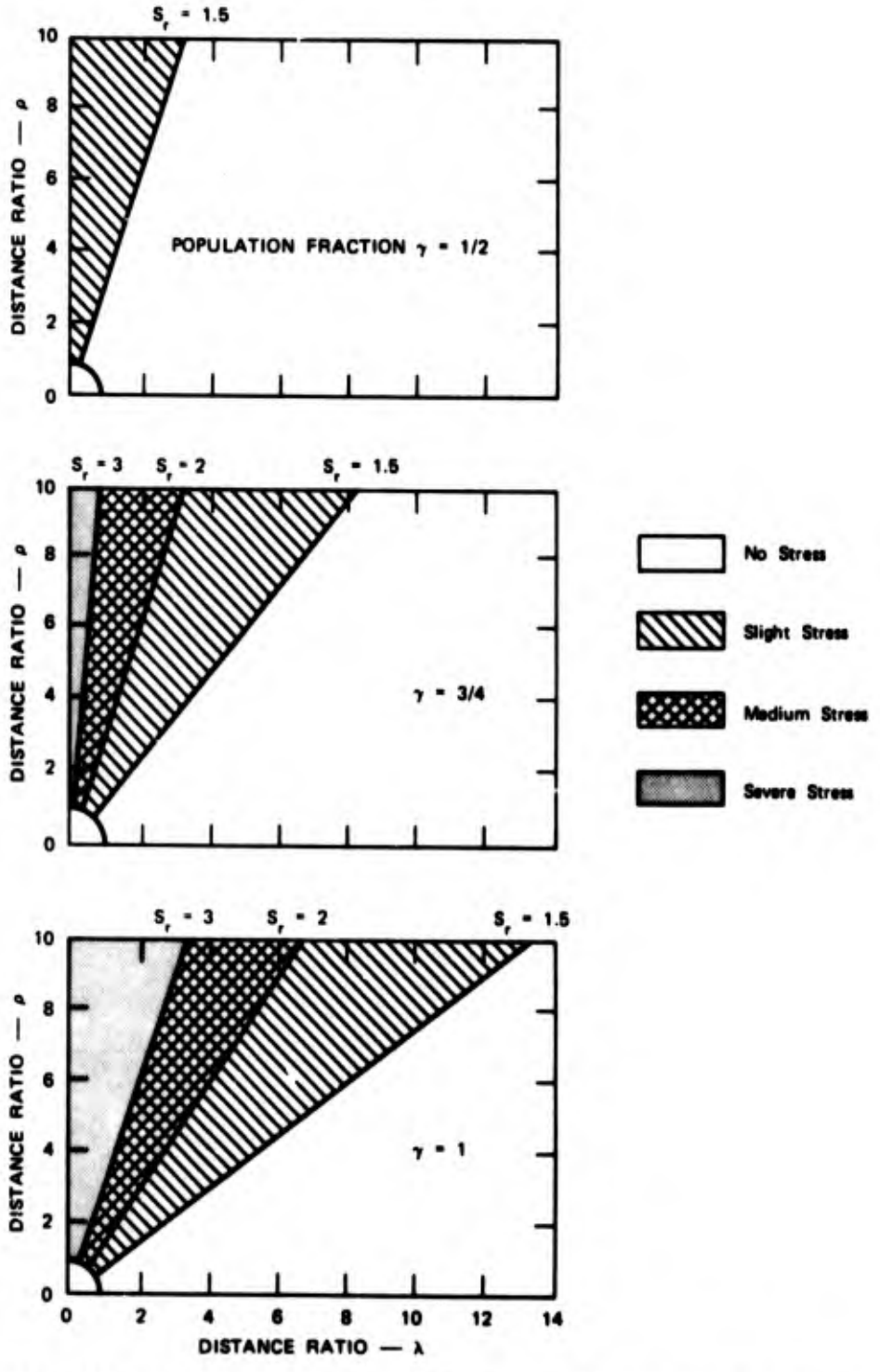
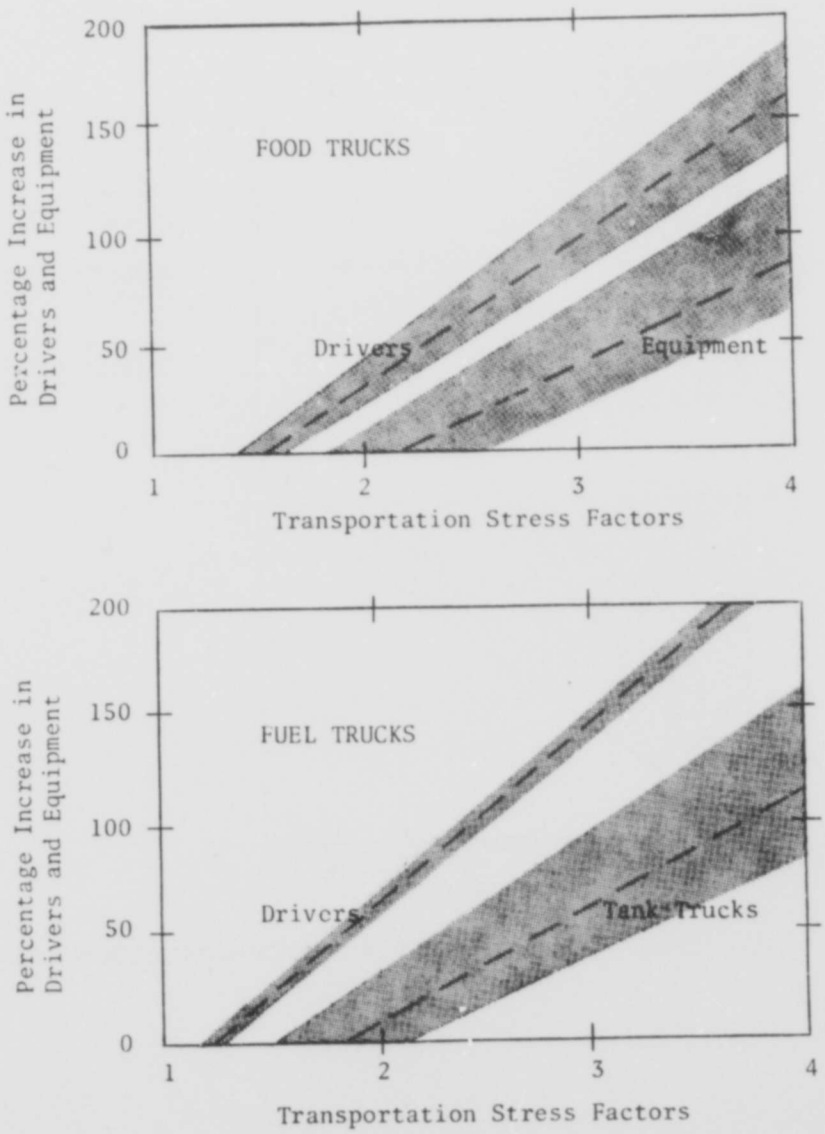


EXHIBIT F-4: STRESS CURVES FOR REMOTE POINT DISTRIBUTION

EXHIBIT F-5

RANGE OF ADDITIONAL DRIVERS AND EQUIPMENT
ASSOCIATED WITH TRANSPORTATION STRESS FACTORS



APPENDIX G

USDA CRISIS RELOCATION GUIDANCE

1. USDA State Emergency Memorandum No. 60

2. Questions and Answers for SEB's on Activities Relating to Crisis Relocation Planning

3. Food in a National Emergency

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

March 23, 1977

USDA STATE EMERGENCY MEMORANDUM NO. 60

Crisis Relocation Planning (CRP)

1 PURPOSE

To provide guidance to USDA State Emergency Boards when asked by State and local civil defense officials for assistance in developing plans for crisis relocation.

2 BACKGROUND

A DCPA has developed the concept of temporarily relocating people in time of an international crisis from those areas felt to be high risk areas, due to the possible direct effects of nuclear weapons, to host areas considered to be low risk.

B Some States have begun developing plans to provide the necessary food, water, medical supplies, protection against radioactive fallout, etc., which would be required in relocating to host low risk areas.

C The development of plans for crisis relocation will require the cooperation of State and local governments and various Federal agencies.

D USDA does not have operational responsibilities for CRP preattack. (See ASCS Handbook 1-DP, subparagraph 105-B, and the questions and answers attached to this memorandum.)

3 STATE ACTION

The Chairman of the USDA State Emergency Board shall:

A Act as the USDA contact for liaison purposes in helping State and local civil defense officials develop plans for crisis relocation.

B When requested by State and local civil defense officials, provide information for use in developing these plans.

C Use the food facility listings if required to identify major food processors and wholesalers. Follow instructions in ASCS Handbook 1-DP if copies of the facility listings are requested. Paragraph 157 covers restrictions on release of data, and paragraph 158 covers handling requests for facility listings. Exception: Do not waive payment of fees.

D Advise the Chairman of the USDA Regional Emergency Staff on CRP activities.

E Include CRP activities in the semiannual report.

4 MEMORANDUM DISPOSAL

When incorporated in EOH.

James S. Wood

JAMES S. WOOD, Acting
Assistant to the Secretary
Intergovernmental Affairs

Attachment

Questions and Answers for SEB's on Activities Relating to Crisis Relocation Planning

1. At what stage could (and would) USDA envision establishing interstate controls of food supplies to reasonably insure the continuation of normal flow?

   USDA will not establish any interstate controls over the movement of food supplies during the preemergency period. Understanding should be agreed upon between State civil defense and the food industry as to alternate delivery and distribution points.

2. If and when USDA would assume a supporting role (to the State Food Organization) what agencies would provide what support subfunction between ASCS, FNS, CES, AMS? Does the Commodity Credit Corporation have a role in emergency food support short of war?

   USDA would not assume any supporting role. The SED-ASCS, as Chairman of the SEB, would be the point of contact for liaison purposes during the preemergency planning for CRP. FNS could possibly lend some support in the area of food stamps if the current law would permit. However, States could use supplies in the school lunch system for mass feeding operations.

   The Commodity Credit Corporation does not have a role in food support pre-attack.

3. The USDA Emergency Operations Handbook for USDA State and County Emergency Boards indicates that the SEB's and CEB's function for emergency food support is now limited to natural disasters and attack/attack warning situations. If the S&CEB system does not function during the planning and preparation phase, what mechanism does USDA have, or could establish to carry out the preparation of plans and develop programs to fulfill the responsibilities assigned in Part 8, EO 11490, as amended, in a crisis relocation situation?

   The SEB's and CEB's carry out the preemergency plans and programs developed by national headquarters. They participate in exercises not only in the food area, but in the other responsibilities assigned to USDA by EO 11490. USDA plans (basically Defense Food Order No. 2 regarding food) are designed to permit the food industry (processors and wholesalers) to function with a minimum amount of restrictions. Food for natural disasters is not a board function. It is an agency function of FNS, and FNS is not a member of the board.

4. Has any planning and preparation been done by USDA for recordkeeping requirements at local and State levels if and when USDA established controls on food supplies? Recordkeeping envisioned for payment?, resupply?, inventory control?

   The only recordkeeping USDA has for emergency reporting is the capability of the primary facilities to operate. This does not include any inventory that the facilities may have. Guarantee of payment procedures only apply to limited situations in a postattack environment.

5. Will USDA establish any controls on food distribution transportation, particularly interstate, to insure reaction to redirection of the food distribution flow from out-of-state and from risk to host areas within the State? Are any food transportation policies established?

   Transportation policies have been established by the Department of Commerce and Department of Transportation as prescribed by the National Plan for Emergency Preparedness and EO 11490, as amended. USDA will not control any transportation. USDA is a claimant for transportation. Food does carry a high priority and DOT does not envision that movement would be restricted if equipment, operators, and fuel were available.

6. Will USDA provide for establishing rationing of food products? If so, what would be the criteria and policies for food rationing? Could and/or would this be done when CR option is implemented? If USDA is not going to plan and prepare for rationing, who will?

   According to the National Plan for Emergency Preparedness, State government is responsible for consumer rationing. USDA has not, and will not prepare any plans for rationing.

Excerpt from

ASCS HANDBOOK 1-DP (REV. 1)

Defense Programs and Services

for Field Offices

(Dated 9/22/76, Amend. 1, PART 4, Paragraph 105, pp. 46-47)

105 CRISIS RELOCATION PLANS

A Background.

1 Studies have been made by DCPA investigating the feasibility of relocating the population of areas of high risk in anticipation of a nuclear attack.

2 Prototype plans for food distribution under these circumstances indicate that normal distribution facilities would be used to serve the evacuated population.

3 Alleviating stress on transportation, food facilities, and the host areas resulting from relocation of population will require close cooperation of State and local officials and the USDA emergency boards.

B CEB and SEB Action.

1 None required before DFO No. 2 is put into effect. Adjustment of food distribution patterns would be made by the food industry and State and local officials. EXCEPTION: When called upon, assist State and local civil defense officials in DCPA's Crisis Relocation Planning (CRP) in high risk areas.

2 After DFO No. 2 is put into effect provide specific direction to food industry within the scope of the order.

PLAN TO SURVIVE

Survival of food facilities will be essential to providing a supply of food adequate to meet the needs of our country in a national emergency. Each element in the food industry chain is a key link in providing this food. Plan now for survival of your business.

Prepare general emergency plans.

Include clear instructions on shutdown procedures and emergency actions.

Establish emergency command patterns. Assign and train a principal and alternate person for each post.

Assign specific emergency duties to each employee and provide training in those duties.

To assure success in case of need, thoroughly test your emergency plan and schedule regular practice of the plan.

Use protective construction techniques on new construction.

Provide fallout protection for all personnel.

Where practical, use underground or partly underground construction.

Use windowless construction to reduce vulnerability to fire.

Reduce susceptibility to blast damage by channeling utilities through a reinforced concrete floor.

Upgrade the existing plant and reduce physical vulnerability through a normal program of plant improvement.

Modify buildings where practicable.

Improve grounding and shielding of electrical panels and controls.

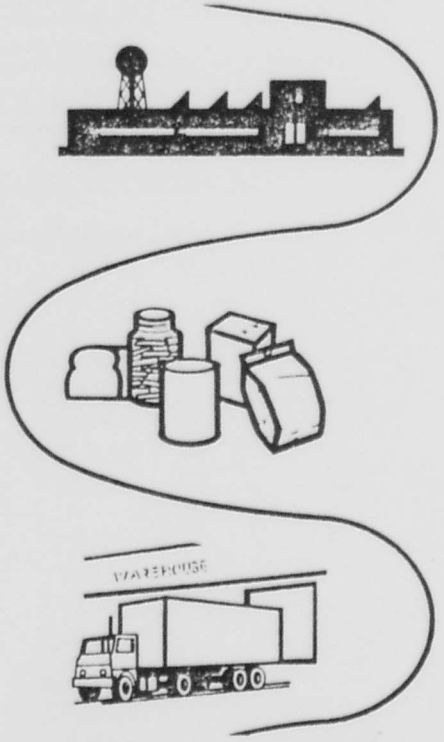
Improve protection of complex machinery and equipment against damage.

Improve fallout shelter capability of plant.

U.S. GOVERNMENT PRINTING OFFICE: 1977 751-491/2151

SEPTEMBER 1977

FOOD IN A NATIONAL EMERGENCY



AGRICULTURAL STABILIZATION AND CONSERVATION SERVICE

U.S. DEPARTMENT OF AGRICULTURE
PROGRAM AID NO. 1197

A guide to understanding Standby Defense Food Order No. 2 for food processors, wholesalers, chain store distribution centers, and operators of commercial food storage facilities in the United States, Puerto Rico, and the Virgin Islands.

The Nation must be prepared for prompt, effective action in case of a national emergency. Advance knowledge by the food industry about what to do will aid survival and recovery operations.

"National Emergency" is defined as an attack upon the United States or proclamation of a civil defense emergency by the President or by concurrent resolution by Congress because an attack is believed imminent.

This guide provides instructions to the food industry for handling raw and processed foods in its possession and for providing for their storage, conservation, efficient processing, and orderly and equitable distribution in the early period after a national emergency. The guidelines contained in this publication are subject to change as circumstances warrant. The United States Department of Agriculture (USDA) and State agencies will advise the food industry as changes are made.

The USDA is responsible for planning and carrying out the emergency program governing the processing and distribution of food from the farm to the local retail store. By agreement, part of these responsibilities will be shared with State governments in some States. State agencies are responsible for the emergency program relating to distribution of food to ultimate consumers at the local retail store level. These programs have been developed in consultation with other Federal agencies, State governments, and representatives of the food processing and distribution industries.

Standby Defense Food Order No. 2 and two suborders, incorporating the main program provisions, will be issued in a national emergency and will become the "Order Administrator's" principal instrument for the control of the processing and distribution of foods for civilian and military consumption. The Order Administrator is the Secretary of Agriculture, or the chairman of the USDA State Emergency Board. In the preemergency period—prior to a determination that a national emergency exists—the chairman is the State Executive Director of the Agricultural Stabilization and Conservation Service (ASCS).

The food industry, especially those involved in the processing, storage, and distribution of food, should become familiar with the contents of this guide and follow its instructions in case of national emergency. *This guide should be reviewed with key personnel and kept with important papers.*

WHAT TO DO IF YOU ARE:

The Operator of a Chain Store Food Distribution Center
The Operator of a Commercial Food Storage Facility
A Food Processor
A Food Wholesaler

Report the operating capability of your facility within 5 days after civil defense authorities permit access to it. Make the report directly to the Order Administrator in care of the USDA County Emergency Board in the county in which the facility is located.

During the preemergency period, the chairman of the County Emergency Board will be located in the county ASCS office. During the postemergency period (following a determination that a national emergency exists), the board will operate from the same location as other key county offices and officials.

Make every practicable effort to protect all food stocks that are within the confines of your facility.

Do not distribute food outside of normal trade channels nor directly to ultimate consumers, except when authorized by the Order Administrator to make deliveries to specified locations.

Establish normal business relationships with new customers regarding payment for goods and services, and continue these relationships with previous customers. Notify the USDA County Emergency Board if financial arrangements with new customers cannot be agreed upon.

Base distribution of food to consumer outlets on their written confirmation of the expected number of consumers to be served. Do not exceed the USDA National Emergency Maximum Food Allowance, or the local government ration level.

Fluid milk and fresh fruits and vegetables, except potatoes, are exempt from distribution restrictions.

Do not accumulate inventories of fresh or processed foods in excess of reasonable need for civilian distribution.

Meet all military requirements.

Hold sufficient quantities of food to satisfy undelivered portions of existing military contracts.

Do not distribute for civilian use any food owned by the military until released by the military.

USDA EMERGENCY ORGANIZATION

The boards and staffs described below are made up of representatives of USDA agencies which, in addition to their regular day-to-day program assignments, have been selected to assist in carrying out USDA defense responsibilities.

USDA COUNTY EMERGENCY BOARDS (CEB's) provide coverage for every county and would act as the initial contact point for members of the food industry in a national emergency or for guidance during preemergency. In most cases, the chairman is the County Executive Director of the ASCS.

USDA STATE EMERGENCY BOARDS (SEB's) have been set up in each State and Puerto Rico/Virgin Islands. The chairman is the ASCS State Executive Director.

USDA REGIONAL EMERGENCY STAFFS have been designated in each of the 10 Federal regions with headquarters in Boston, MA; New York, NY; Philadelphia, PA; Atlanta, GA; Chicago IL; Dallas, TX; Kansas City, KS; Denver, CO; San Francisco, CA; and Seattle, WA.

ADDITIONAL GUIDANCE

CHAIN DISTRIBUTION CENTERS

Assume the role of a wholesaler and distribute food stocks as equitably and continuously as possible to your chain's consumer outlets and to other consumer outlets who request food supplies even though they may not be part of the chain's operation.

Other consumer outlets may include independently owned chain stores, chain and independent food service operations, or other away from home eating places including emergency feeding centers designated by State and local governments.

Establish a normal wholesaler-retailer business relationship with new customers regarding payment for goods and services rendered.

Deliver food to consumer outlets at any interval of time which promotes orderly and efficient distribution.

Cases, boxes, bags, or other normal packaging units need not be broken to meet established maximum distribution rates.

FOOD WHOLESALERS

Distribute food stocks as equitably a continuously as possible to previo customers and to other establish consumer outlets who request fo supplies, even though they may not ha been previous customers.

Other consumer outlets may include cha stores, chain and independent food servi operations, or other away-from-hon eating places including emergen feeding centers designated by State a local governments.

Deliver food to consumer outlets at a interval of time which promotes orde and efficient distribution.

Cases, boxes, bags, or other norm packaging units need not be broken meet established maximum distributi rates.

If you have done business with t military during the immediate preced 12 months, set aside a portion of yo current inventory equal to the percent your total business with the military.

FOOD PROCESSORS

Continue your normal processing operation to the extent practicable.

Use raw foods and ingredients to provide the optimum output of end products.

Do not use sugar or other natural sweeteners as an ingredient in excess of 50 percent of recent or seasonal use.

Adjust formulas to obtain optimum product output.

Take all reasonable precautions to assure that the food processed or the end products obtained are fit for human consumption.

Distribute products on hand or subsequently processed through established trade channels as equitably and continuously as possible.

Make distribution to wholesalers a chain store distribution centers requesti food even though they may not have be a prior customer. Distribution directly consumer outlets (local retail stores a food service establishments) is permitte operators of outlets were previo customers or it is necessary to bypass omit steps.

Set aside a portion of your current ventory equal to the percent of your to business with the military if you have do business with the military during t immediate preceding 12 months.

Hold food already processed for a milit contract, but undelivered, for disposit by the military.

APPENDIX H

USDA NATIONAL EMERGENCY MAXIMUM FOOD DISTRIBUTION ALLOWANCE

APPENDIX 1

Defense Food Suborder No. 2A
of Defense Food Order No. 2

USDA NATIONAL EMERGENCY MAXIMUM FOOD DISTRIBUTION ALLOWANCE

This maximum food distribution allowance is for use by food processors and wholesalers to assure conservation and equitable distribution of the food supply in a defense emergency. This allowance is compatible with the food consumption standard to be used by State and local governments in establishing the civilian ration level of between 2,000 and 2,500 calories per person per day depending upon the foods available.

Fresh fluid milk and fresh fruits and vegetables are exempt from Defense Food Order No. 2, but are included in the standard to be used by State and local governments because these foods are to be considered by those governments in establishing the per person ration level. The ration level per person per week for milk is 7 pints and for fresh and frozen fruits and vegetables is 4 pounds. Thus, if local supplies permit a full allowance of 4 pounds of fresh fruits and vegetables, the frozen would be held for later distribution if proper refrigeration facilities are available.

This appendix contains three tables.

1. Table 1 shows the maximum food distribution allowance per person per week under emergency conditions.

2. Table 2 prescribes acceptable substitutions which may be made among foods in Table 1.

3. Table 3 prescribes the substitution rates for canned, dry, and concentrated foods when neither fresh and/or frozen is available for distribution.

USDA National Emergency Maximum Food Distribution Allowance

Table 1 - Food Allowance Per Person Per Week

Food Groups and Food Items	Amt. Per Week
Meat and Meat Alternates	
(Fresh, frozen, and cured meat, poultry, fish, shellfish; cheese; and nuts)	3 lbs. boneless 4 lbs. bone in
Eggs	6 eggs
Milk (Fresh Fluid)	
If fresh fluid milk is not available, see Tables 2 and 3 for acceptable substitutes.	(not limited by this suborder)
Cereals and Cereal Products	
(Flour including mixes, fresh bakery products, corn meal, rice, hominy, macaroni, and breakfast cereals)	4 lbs.
Fruits and Vegetables	
Frozen	2 lbs.
Food Fats and Oils	
(Butter, margarine, lard, shortening, salad and cooking oils)	1/2 lb.
Potatoes (white and sweet)	2 lbs.
Sugars, Syrups, Honey & Other Sweets	1/2 lb.

USDA National Emergency Maximum Food Distribution Allowance

Table 2 - Acceptable Substitutes
(Among Foods in Table 1)

Weekly Allowance	Equivalent Allowance	Substitute Foods or Food Groups
Meat and Meat Alternates 1 lb. boneless	1/2 lb. 1/4 lb. 12 2-3/4 lbs.	Cereals & Cereal Products Food Fats and Oils Eggs Potatoes
Eggs 6 eggs	1/2 lb. 1/4 lb. 10 oz.	Meat and meat alternates Cereal and cereal products Frozen whole eggs
Milk (Fresh Fluid) 1 pint	2/5 lb. 1/5 lb.	Meat and meat alternates Cereals and Cereal Products
Cereals and Cereal Products 1 lb.	2 lbs. 5 lbs.	Meat and meat alternates Potatoes (white and sweet)
Food Fats and Oils 1 lb.	4 lbs. 2 lbs.	Meat and Meat Alternates Cereal and Cereal Products
Potatoes 1 lb.	1/5 lb. 2 lbs.	Cereals and Cereal Products Fruits and vegetables

USDA National Emergency Maximum Food Distribution Allowance

Table 3 - Substitution Rates for Canned, Dry and Concentrated Foods

Weekly Allowance	Equivalent Allowance	Substitute Foods or Food Groups
Meat and Meat Alternates	1 lb.	Canned meats, poultry & fish
	2 lbs.	Canned pork and beans
1 lb. boneless	2 lbs.	Canned meat mixtures, such as hash, chili, stew, spaghetti and meatballs, etc.
	1 lb.	Dry beans and peas
Eggs		
6 eggs	3 oz.	Dried whole eggs
Milk		
(Fresh Fluid)	8 oz.	Canned evaporated milk
	3 oz.	Canned condensed milk
1 pint	2 oz.	Dried milk, whole
	3 oz.	Dried milk, nonfat solids
	3 oz.	Malted milk, dry powder
Fruits and Vegetables - frozen		
1 lb.	2/3 lb.	Canned fruits & vegetables
Food Fats and Oils		
1 lb.	1 lb.	Canned Food Fats and Oils
Potatoes		
1 lb.	3 oz.	Dried Potato Flakes