

Aedes aegypti Handbook Series No. 3

HANDBOOK OF SOURCE REDUCTION PROCEDURES

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HANDBOOK OF SOURCE REDUCTION PROCEDURES

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INTRODUCTION

The yellow fever mosquito, *Aedes aegypti*, was once widely distributed in the Western Hemisphere. This vector is considered the most domestic of all mosquitoes because it relies primarily upon man as a source of blood meals and to provide the water-holding containers in which its larvae and pupae develop. Because *Aedes aegypti* lays its eggs principally in these artificial containers, it has been possible to eradicate this mosquito from most Latin American countries through a campaign combining insecticidal treatment and source reduction.

Eradication of *Ae. aegypti* from the United States began in 1964, and operations will proceed until all areas can be declared free of infestation. The program is being accomplished by local, state, and federal health workers engaged in the following tasks:

1. Entomological inspections to discover all premises infested by *Ae. aegypti* mosquitoes, and to verify the areas that are not infested or have been made negative.
2. Application of insecticides to containers in which *Ae. aegypti* larvae may develop, and residual or space treatments to kill mosquito adults.
3. Cooperation with local health department personnel to locate accumulations of mosquito-breeding containers and to motivate the citizens to eliminate them.
4. Improvement of local solid waste storage, collection, and disposal practices.

This handbook serves as a reference for use in training project personnel and health department workers in planning and implementing source reduction activities in connection with the *Aedes aegypti* Eradication Program. Matters of policy are discussed in the "Operations Manual," Operational Letter No. 4.3 dated March 24, 1967.

THE ROLE OF SOURCE REDUCTION IN AEDES AEGYPTI ERADICATION

Source reduction is an important element in all *Aedes aegypti* Eradication Programs. Because of recent increases in the numbers of single-use containers, discarded tires, vehicles, and appliances and in the volume of other solid wastes as well, the need for source reduction is greater than ever before. The problem is compounded by deterioration in the attitudes and behavioral practices of citizens toward premises sanitation, roadside dumping, and littering. For each unwanted container removed, there is a significant saving in the man-hours required for inspection and treatment, and in the quantity of insecticide expended. Source reduction is essential in highly insanitary residential and business premises, and in overgrown vacant properties that are difficult to inspect or treat.

Source reduction activities enhance property values, promote conditions favorable for healthful recreation, create a more pleasant living atmosphere, and stir people to recognize and react against the unwholesome factors that are destroying and corrupting their physical environment. Furthermore, each individual develops an increased awareness of his opportunities to contribute to the health and happiness of his family and that of his neighbors (Figure 1). These factors will help to build and perpetuate a better community.

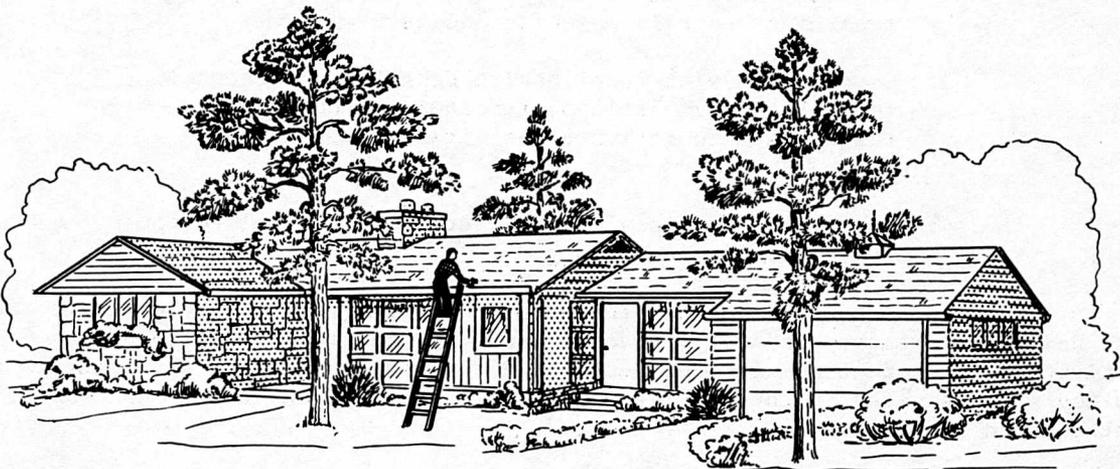


Figure 1. Individual Source Reduction

OBJECTIVES OF SOURCE REDUCTION

Reduction of *Ae. aegypti* breeding can be achieved by stimulating community and individual activities that will:

1. Eliminate unwanted water containers that serve as production sites for *Ae. aegypti*,
2. Obtain removal of other insanitary solid wastes from the human environment,
3. Encourage better premises sanitation practices by citizens of a community,
4. Enhance block, neighborhood, and community beauty, and consequently, citizen pride, leading to the greater enjoyment of leisure and work in a clean environment, and
5. Increase acceptance of the overall Aedes aegypti Eradication Program by local governments and citizens.

MEANS FOR IMPLEMENTING SOURCE REDUCTION

It is important to plan all source reduction activities carefully and thoroughly prior to the commitment of program resources.

INITIAL CONTACTS

Participation of the health officer, his staff, and other public officials is essential early in the program. The nature and extent of program activities should be discussed in the initial planning sessions with local officials. The potential for local participation should be explored as the work loads of sanitarians and waste collection personnel may already be excessive. No source reduction program to stimulate cleanup of a city should be initiated until the local health department has been consulted, and until arrangements have been made with the public works or sanitation department to handle the increased volume of solid wastes resulting from the program.

While container removal is a major component in *Ae. aegypti* eradication, health officers and sanitarians are concerned with many other sanitation problems. Most sanitarians spend much time in answering complaints. If source reduction operations can reduce the number of complaints, for example, reports on deficiencies in refuse handling, these contributions will support the entire local sanitation program.

SOLID WASTE MANAGEMENT APPRAISAL

Form PHS 2.44 (NCDC) 3-67, "Solid Waste Management Appraisal," will be completed according to the instructions in Operational Letter No. 5.3. A sample of a completed form and a definition of refuse terms is included in Appendix "A."

BLOCK RECONNAISSANCE SURVEYS

In planning block reconnaissance surveys, careful attention should be given to paragraph 4.342, Operational Letter No. 4.3, dated March 24, 1967.

Work Loads

Estimates of the amount of time required for the field inspection activities of a source reduction survey will vary according to local conditions of the community. An estimate of the number of man-days required for surveying towns of various sizes, based on 20 premises per block and 400 premises per man-day is shown in Figure 2.

Figure 2. Man-day requirements for the reconnaissance survey*

Population**	200	1000	10,000	50,000
No. Premises	63	313	3,125	15,626
Man-Days	$\frac{1}{2}$	1	8	39

* Figures rounded, and additional time allowed in towns of 200 and 1000.

** Estimate of 3.2 persons per property.

A survey that is reasonably accurate requires well-trained and capable inspectors who are able to make decisions on judgmental factors, such as the identification of premises and the adequacy of refuse storage. In most surveys it will be necessary to re-survey the blocks inspected during the first two days. Prior to the re-survey, the field problems should be discussed in a group meeting with the area supervisor. After two or three weeks, the quotas suggested in Figure 2 should be exceeded, except in blocks with small lots, with board fences, or much vegetation.

Field Survey Instructions

The reconnaissance survey will yield reasonably accurate data which can be useful in conducting a successful source reduction program. It should be pointed out that a detailed walking survey may result in somewhat higher percentages of deficiencies, but would require about ten times more survey man-hours. This survey requires a two-man team, one man to drive and the second to observe and record sanitation deficiencies on the Form 2.22 (Figure 3).

Figure 3.

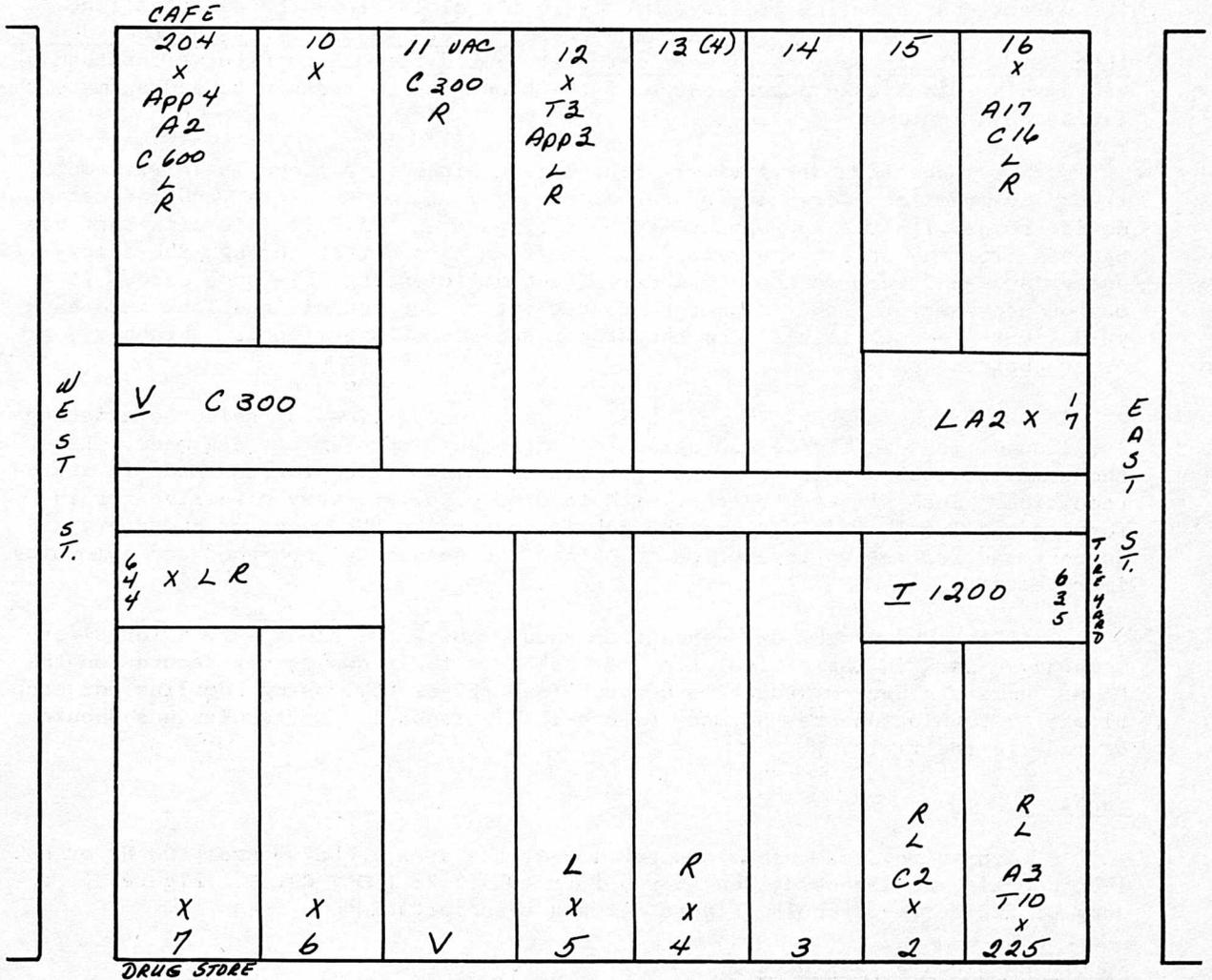
BLOCK SURVEY RECORD

Zone 6
 Block 60
 R (RW) W
 (Circle one)

State OLYMPIA
 County TILLER
 City DIXON

Date 4-6-67
 Surveyors DBK+BCC

North Avenue



South Avenue

Remarks: Fire yard 635 East St.; 24 junk autos on block; large pile of beer cans at 204 North Ave.

The findings are recorded precisely and legibly in order that they may be posted accurately in the office. Before a man starts around the block, he fills in the top part of the Form 2.22. It is most important that the Zone and Block Number be recorded correctly. The code letters R, RW, and W refer to a riding survey (R), a riding and walking survey (RW), and a walking survey (W). The appropriate letter or letters should be circled.

The name of the street bounding a block on the north is written at the top of the block diagram, the west street at the left, the east street at the right, and the south street at the bottom. If the property lots face predominantly in two directions, one line is drawn midway in the block along the easement line. If an alley exists, a double line is used. The data should always be recorded so that the sheet can be read without turning. For different configurations than a rectangular block, the actual shape of the block may be redrawn to approximate the field conditions.

The inspectors drive slowly around each block in a clockwise direction, recording premises addresses (or serial numbers) and vacant lots, and indicating deficiencies with the appropriate symbols (Figure 4). All deficiencies that can be seen from the street are recorded. The team then drives through the alley--if one exists--and records the remainder of the deficiencies. In some cases, it may be necessary for the inspectors to get out of the vehicle and look into backyards that are not visible from the street because of high fences, shrubbery, or other obstruction.

During the survey, 2" x 2" color transparency slides of selected existing local conditions should be photographed before any improvements are made. Later the same premises should be rephotographed to demonstrate progress made in source reduction. Such slides, together with colored maps, are very effective for informing the local officials and the public concerning the need for budgetary support and for motivating action to obtain the needed neighborhood and community improvements.

At the end of the day, each team should check the block survey forms for accuracy. Back in the office, they may tabulate their own survey records on the "Zone Summary - Source Reduction Survey" form (Figure 5), using one line for each block; or tabulations may be made by clerical personnel. No tabulations should be made in the field.

Supplies

Each survey team needs a block map of the area to be worked, two HB or No. 2 lead pencils, a clipboard, the survey form (PHS 2.22 (CDC) Rev.), (Figure 3), a copy of the survey symbols (Figure 4), and transportation.

Recording Block Survey Data

Residential and business - Using PHS Form 2.22, premises numbers may be listed serially (1, 2, 3, etc.) with one street address given on each of the four streets delimiting the block, or all street numbers may be recorded. Add "VAC" if a building is vacant and dilapidated. The type of business (Example: cafe) is

Figure 4.

SOURCE REDUCTION SURVEY SYMBOLS

Major Items

1,2,3, etc. or 1765	Premises with residential or business structure numbered serially, or street number used. Write type of business in street (Example: cafe)
V	Vacant lot
X	Unapproved refuse storage
T	Record tires by symbol "T" followed by estimated number of tires (Example T 16)
App	Abandoned appliance such as refrigerator, stove, washing machine, or plumbing fixture. Record the number (App 2)
A	Abandoned automobile. If more than one is observed place number after A (A 3)
C	Other temporary containers (C 50 or <u>C</u>)
L	Unstacked lumber
R	Rubble, including bricks, concrete, parts of structures, tree limbs, timbers, etc.

Optional Items

Horse	Animals. Write name of animal and number observed (Cow 6)
F	Fish pond
BB	Bird bath
Cis	Cistern
Bt	Boat
	Ditch or pool with water
S	Liquid organic wastes, such as drainage from kitchen or from septic tank
*	Privy
	Dilapidated shed or other outbuilding
Rs	Rat signs, such as burrows, runs, tracks, gnawing, and rub marks

written in the street near the premises address. The number of dwelling units at a premises is indicated after the address (Example: 13(4) is a four-family dwelling). Street numbers should be recorded for very unsatisfactory premises where special action may be required by the Program or by the health department.

The grading of structures according to degree of deterioration is an optional addition to the source reduction survey. It is quite time consuming, however, and should be included by area supervisors only when requested by the local health officer and other authorities, and their representatives are assisting in making the survey. (See Appendix E for criteria used for grading structures, and Appendix C for the map-coloring code).

Vacant Lots

These are indicated by a V. Vacant lots are itemized separately but are also to be counted in the total premises column on the "Zone Summary." Vacant lots can be graded if desired as follows:

V - vacant lot without containers

V - vacant lot with containers

Note: Underline the following symbols if the deficiency at a premises requires special attention.

Major Items or Removable *Ae. aegypti*-Related Deficiencies

Note: Never change the criteria for major items of deficiencies in order to attempt to compensate for optional items not included in the survey. For example, boats are not recorded as other temporary containers.

Unapproved refuse storage - The letter X indicates unapproved refuse storage on residential or business property. This symbol is used for each premises where there are (a) drums, boxes, or other unapproved containers used for storage of refuse; (b) container lids or doors that are open or are not tight-fitting, (When the lids of refuse cans are off at most properties in a neighborhood, this is not a deficiency if the cans have just been emptied by the refuse collector.); (c) much refuse is strewn on the ground or there is evidence of refuse burning, even though approved containers are provided; (d) both satisfactory and unsatisfactory containers are in use; or (e) containers are rusted out at bottom or have rims so badly damaged that lids will not fit tightly.

Note: The X will not be used to mark premises where approved refuse cans are provided but a few scattered temporary water containers are also present. These containers are indicated by C.

In determining unapproved refuse storage deficiencies, public health standards, and not local ordinance requirements, will be utilized. Public health standards require the use of 20- to 32-gallon garbage cans with tight-fitting lids or the use of approved bulk containers which exclude insects and rodents. They prohibit the use of 55-gallon drums, bins, and outside burning. Approved bulk containers are those which are constructed of heavy gauge metal and which can be emptied mechanically.

Tires - Used tires are indicated by a T, followed by the estimated number of tires (T10 for 10 tires). List all the tire yards and any large accumulation of tires under "Remarks" at the bottom of the form.

Appliances - Abandoned appliances, indicated as App, include refrigerators, stoves, washing machines, bathtubs, and other large plumbing fixtures. Estimate the number of appliances; App. 3, for example, refers to 3 abandoned appliances.

Junk vehicles - Abandoned vehicles at a premises are recorded by an A and a number, for example, by A 3 if there are 3 cars that obviously are no longer used because they do not have current license plates, vital parts of the car are missing, or vegetation has grown around them.

Other temporary containers - The symbol C will be used to indicate temporary containers other than tires, junk automobiles, and discarded appliances. Examples are: a fender, hubcap, or bumper from a car; parts of junk appliances; old toys; and discarded paint cans. If the number of containers is to be estimated, use the C and the number, for example, C 400, to indicate 400 containers. Otherwise, the C indicates many containers.

Unstacked lumber - An L is entered if enough lumber is piled on the ground to constitute container or rat harborage. Properly stacked lumber is not reported.

Rubble - Rubble, which is indicated by R, should not be used to indicate deficiencies that can be recorded by other symbols. Rubble ordinarily consists of parts of old masonry, discarded doors, yard debris, and other items that are too large or heavy to be stored in refuse containers, and that are present in an amount and distribution that would constitute container or rat harborage. These items usually must be placed at the curb for collection, along with appliances, tires, and other large rubbish. Rubble is not an important breeding site for *Ae. aegypti*.

Optional Items

Ae. aegypti-Related Deficiencies

Fish Ponds - Fish ponds are indicated by an F.

Bird Baths - Bird baths are indicated by a BB.

Cisterns - The symbol Cis indicates the presence of a cistern.

Boats - The symbol Bt indicates the presence of an improperly managed boat (See section on Further Criteria for Assessing Deficiencies).

Non-*Ae. aegypti*-Related Deficiencies

Animals - The names and estimated number of animals (cattle, dogs, rabbits, pigs, chickens, ducks, etc.) are recorded by writing the name of the animal and the approximate number present, such as Horses 6. Animals are very important in public health since improper management procedures frequently create mosquito, fly, and rat problems. Certain animals, such as pigs, cattle, and fowl can be eliminated from cities by restrictive ordinances. Leash laws and stray dog pick-up programs have frequently resulted from block surveys.

Ditches or Pools - These ( or ) are reported only if they will contain water for periods of a week or more and thus could breed mosquitoes.

Liquid Wastes - Liquid wastes, S, are usually the effluent from unsatisfactory septic tanks, open kitchen drains, or commercial wastes.

Privy - A privy is indicated by an asterisk (*) whether used or unused.

Dilapidated Shed - Sheds, indicated by , are reported if they are in poor repair and the roof is not rain-tight. This is a penalty type of survey and good sheds are not recorded.

Further Criteria For Assessing Deficiencies

1. All removable deficiency items which must later be inspected or treated, will be charged as deficiencies whether or not they are upside down, under a house, in a carport, or in a shed. However, piles of these items placed at the curb for collection are not recorded.
2. Similarly, all non-removable deficiency items which must later be inspected or treated, will be charged as deficiencies except where:
 - a. Lumber and similar materials are stacked 12" - 18" above ground in such a manner that it will not hide containers or constitute a rodent harborage.
 - b. Boats are inverted or covered with an adequate tarpaulin peaked properly in the middle.
 - c. Washing machines or other appliances are located in carports, back porches, or other roof-protected structures and are presumably in use.
 - d. The item is being improperly managed in accordance with information, education, and motivation programs being conducted.

Posting to Zone Summary, Form PHS 2.37 (NCDC)3-67

1. This form (Figure 5) is used with the reconnaissance surveys for tabulating conditions on individual blocks in a zone. A separate line is used for each Block Survey Record (Form 2.22). Several forms may be required for a zone, and the final total is the zone total used for reporting purposes.
2. It is essential that the zone number and block numbers be correct for posting, filing, and later reference.
3. The total premises must include all occupied and vacant premises with buildings, and also the vacant lots.
4. All entries, except the number of premises, and vacant lots, represent actual deficiencies.
5. The figures recorded on the Zone Summary under the heading "Number of Premises with Deficiencies" are not the numbers of junk cars or tires, but are the numbers of premises with these deficiencies.
6. The last four columns on the right side of the zone summary are for recording (if desired) total numbers per block of four major items: abandoned vehicles, abandoned appliances, tires, and other temporary containers. These tabulations could be of help in assessing the quantity and distribution of specific items, such as abandoned vehicles, for which a special removal program is being conducted.
7. If other environmental deficiencies are included in the block surveys, some of the blank columns on the right side can be used for tabulation.
8. A map showing inadequate refuse storage or other temporary containers, posted daily, will indicate the blocks that have been surveyed (See Appendix C for the mapping code).

Door-to-Door Interviews

The door-to-door interviewing of citizens in neighborhoods with problem conditions is considered to be a portion of the remedial program even though data on premises conditions is collected as a part of the procedure. In the above type of procedure, it is desirable to:

1. Use a form that can be left with the occupant which will communicate what is wrong and what should be done (see Figure 6).
2. Provide a carbon copy to the local health department where special action is indicated.
3. Record the information on the standard block survey form for Project use in collecting data on block conditions.

Figure 6.

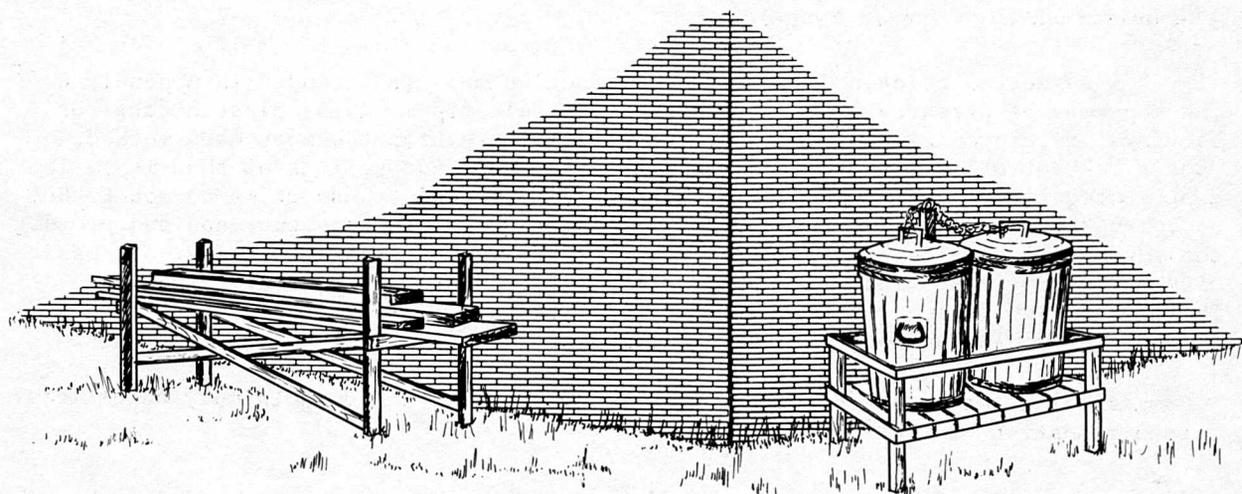
SUGGESTED PREMISES CHECK SHEET

_____ LOCAL HEALTH DEPARTMENT

NOTICE TO PREMISES OCCUPANTS

Please Help Improve the Health and Appearance
of Your Neighborhood and Block by
Taking Action on the Items Checked

Remove from Your Premises	Improve the Management of Your Premises
1. 55-gallon drums or other illegal refuse containers _____	1. Purchase adequate number of 20- to 32-gal. garbage cans _____
2. Tires _____	2. Build racks for garbage cans _____
3. Old appliances _____	3. Place scattered refuse and litter in the garbage cans _____
4. Abandoned vehicle _____	4. Stack lumber and other useful items on racks 18" above ground _____
5. Other temporary water-holding containers _____	5. Other _____
6. Old lumber _____	_____
7. Other rubble as follows _____ _____	_____
8. Other _____	_____



Signed _____

Tel. No. _____

PREPARATION AND USE OF MOTIVATIONAL AIDS

Maps, photographs, slides, written reports, charts, overhead projectuals, and exhibits will support promotional activities in the source reduction program. Colored maps, supplemented by color slides, are probably the most effective tools for presenting information on premises deficiencies to individuals or groups. These aids may be used in conferences and meetings with the health department, city government, and other civic groups or leaders to promote an understanding of the community solid waste problem, and to motivate activities for a clean city and county.

Colored Maps

Mapping should begin during the survey and be finished as soon as possible. Mapping adds interest to the field survey operation and will give indications of the conditions to be expected at the completion of the survey.

A neat 3' x 4' map mounted on cardboard may be carried in automobiles, and is large enough for meetings of small groups such as officials of the city and county, and the civic groups. If the available maps are too large or too small, they should be reproduced at the proper scale. When the program is presented to large public groups, both maps and color slides of the maps may be used.

The following maps are necessary to present the major source reduction deficiencies:

1. Refuse storage
 2. Tires
 3. Abandoned appliances
 4. Abandoned vehicles
 5. Other temporary containers
 6. Unstacked lumber
 7. Rubble
- (These are the only items that can be combined on one map.)

Colored maps should be neatly drawn and colored, and have a simple design so that the message is quickly and readily apparent. Lettering should be done so that it is legible to a group of at least 25 people. Capital letters at least one-half inch high should be used.

A suggested color code for source reduction maps is included in Appendix C. The maps may be prepared with colored pencils, felt-tip markers, plastic dots, or overlays of colored Zip-A-Tone.* Colored pencils have been the most used method. "Chart Pak"* or other plastic tapes may be used for boundary lines of the city. The most successful method of preparing maps for display and transport is to mount them on corrugated cardboard, using masking or grocery tape to frame the maps and protect the edges. As an alternate procedure to the preparation of several maps, one basic city map may be used with a plastic overlay for each of the major deficiencies. These maps should always be supported by tabular data, just in case city officials and others should want more exact statistics.

* Commercial names are used for identification purposes and do not imply an official recommendation of these products.

Written Reports

Brief and concise written reports, which summarize available data on premises deficiencies and describe the recommended remedial program, can be very helpful in motivating officials and key citizens. Such a report should be prepared immediately after the completion of any initial block survey. For most written reports, 10 to 15 single-spaced pages, well-illustrated, should be sufficient to cover the major deficiencies of interest to the eradication program. Liberal use should be made of graphs, tables, drawings, and sketches which can be easily handled on the available reproduction facilities, whether ditto, mimeograph, or photo offset. When feasible, the addition of several black-and-white photographs, illustrating good and bad local conditions, can significantly augment the impact of the written report. Colored maps should not ordinarily be reproduced in written reports. Usually about 50 to 300 copies of the report will assure distribution of a copy to each key official and citizen. Written reports for small towns should be simpler than those prepared for the larger cities.

Distribution and use of written reports may normally be of interest to officials and cooperating groups in the following order:

- a. Local health officer and staff
- b. Board of Health
- c. City or county manager
- d. Chief elected official, such as the mayor
- e. City council or county commission
- f. City or county planning commission
- g. School officials
- h. Chamber of Commerce
- i. Newspaper, television, and radio stations
- j. PTA and civic clubs

Local Color Slide Series

It is desirable to prepare a local series of about fifty color slides suitable for showing to city councils, civic clubs, PTA's, school children, and other groups that might participate in a source reduction program. This series might include:

1. An opening group showing community assets such as a city hall, restaurants, schools, recreational facilities, and tourist attractions.
2. A group showing good and bad conditions on residential and business premises, with special emphasis on *Ae. aegypti* breeding containers and solid waste practices.
3. Slides showing a typical neighborhood clean-up program, including before and after pictures.

Use of Promotional Aids

Meetings must be planned well in advance, making certain that projection equipment and screens are in good condition and that slides, maps, and other materials are adequate and in order. Spare bulbs and extension cords must be available for projectors. Care should be taken in planning the verbal presentation, making certain that it is adapted to the group concerned, that it does not in any way offend or insult the audience, and that the talk is closely related to the aids used. Although a formal talk may be prepared, it must never be read. It is essential that the speaker provide himself with sufficient information to participate in an interesting discussion that will promote activities of the program. Prior to a large meeting, it is necessary to arrange for an adequate public address system.

Both maps and slides can be used by television stations, although some stations do not telecast in color. These materials should at all times be available to health department personnel and others who participate in the program, as these community leaders will have the greatest influence upon the citizens of the community.

IMPLEMENTING THE SOURCE REDUCTION PROGRAM

In beginning source reduction activities, every attempt should be made to secure the formation of a local committee or other action group to sponsor and conduct remedial programs. The organization of local speaker groups may be very helpful in some cities.

COOPERATIVE RELATIONSHIPS

Ae. aegypti workers should support efforts of local health departments and other agencies to: (1) bring about the removal of auto tires, junk automobiles, appliances, cans, bottles, and other discarded water-holding containers from private and public property, and their disposal by approved methods; and (2) persuade citizens to modify or manage permanent artificial water-holding containers such as boats, wells, bird baths, cisterns, fish ponds, and natural water-holding containers such as tree holes and plants, in such a way as to prevent *Ae. aegypti* breeding.

Source reduction is not possible without widespread community interest and cooperation. Enthusiastic support of state and local health departments, public works departments, and other official agencies is essential in all phases of the program. These departments function in: (1) coordinating the program with other agencies; (2) handling much of the public information program; (3) consulting with officials, individuals, and businessmen concerning correction of deficiencies; (4) enforcing pertinent ordinances and regulations; and (5) collecting and disposing of solid wastes that serve as production sites for *Ae. aegypti*.

Program field personnel reinforce the sanitation activities of the local health department and a surprising amount of progress will result from their individual contacts (Figure 7).

IMPROVEMENT OF SOLID WASTE MANAGEMENT PRACTICES

Early in the program, needed improvements in local ordinances and regulations governing refuse, used tires, abandoned appliances, abandoned vehicles, and other unwanted material should be sought. In some cases, existing ordinances are adequate but are simply not enforced. Every attempt should be made to promote the adoption of adequate enforceable ordinances and regulations and to encourage their enforcement.



Figure 7. Inspector contacting householder



Figure 8. Proper handling of refuse

Refuse container tags (Appendix B) can be used by health department or sanitation department personnel to stimulate the purchase and use of suitable refuse containers to store household garbage and rubbish. Examples of good residential refuse storage practices are shown in Figures 8 and 9.

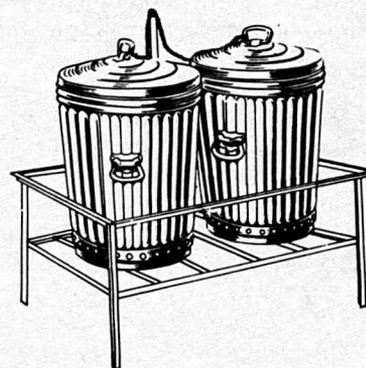


Figure 9. Good refuse storage

The promotion of uniform twice-weekly collection of refuse in all residential areas and daily collection in all business areas is of great importance. It is difficult to motivate citizens to have good refuse storage practices if collection services are inadequate. One type of approved refuse collection vehicle in common use is shown in Figure 10.

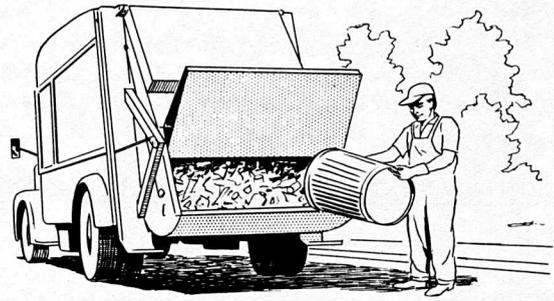


Figure 10. Refuse collection vehicle for residential areas

The promotion of once-weekly large rubbish or bulk items from all residential and business premises is of prime importance. Many cities pick up these items every Wednesday, thus meshing operationally with twice-weekly refuse collection on Mondays and Thursdays, or Tuesdays and Fridays. The cost of once-weekly large rubbish service for residential areas is about 25% of the cost of twice-weekly refuse collection service. Large, open-bodied, mechanically-emptying vehicles should be used. Mechanized methods of loading are desirable.

Major improvements in refuse and large-rubbish collection service may require considerable increases in the budgets of local governments, which may already be financially limited. In many cases, a compulsory-fee system has provided a feasible solution to economic problems, since Americans can afford, and are willing to pay, a reasonable fee for adequate refuse and large-rubbish collection service. Including fees for solid-waste collection and disposal along with charges for water and sewer services on a single bill has great merit.

In other cases, refuse collection and disposal practices may be inadequate due to the lack of adequate supervision rather than lack of adequate financing.

The promotion of a program for the prompt and continuous removal of abandoned vehicles should be initiated following the passage of an adequate ordinance. The presence of many abandoned vehicles in a community leads to accelerated block and neighborhood deterioration and depreciation.

The provision of disposal facilities which are conveniently located, operated in a sanitary manner, and of adequate capacity is of equal importance to good storage and collection practices. There must be adequate disposal practices for junk appliances, used tires, old lumber, unsalvageable parts of abandoned vehicles, and rubble, as well as for garbage and rubbish. Suggestions for adequate sanitary landfill disposal of all the above items is given in Appendix D. In larger cities, incineration is commonly used for the disposal of combustible refuse (Figure 11).

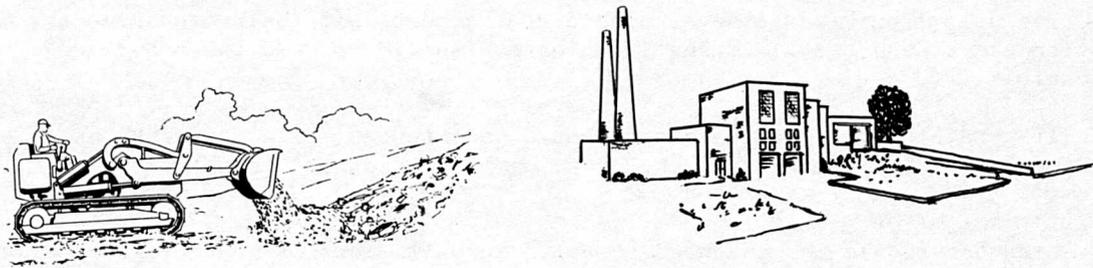


Figure 11. Sanitary landfill and incinerator

CLEANUP DRIVES

Cleanup campaigns are often a primary means of stimulating source reduction improvements. One method is to promote and organize one annual community cleanup of short duration. This type of cleanup requires extensive community organization and involvement, and workers and equipment far in excess of those normally available. Small town cleanups are usually done on a city-wide basis. In larger cities, the cleanup is usually conducted in one zone or neighborhood at a time, such as a blighted area comprised of twenty to fifty blocks. Careful planning must be done with the director of public works, who provides collection personnel and equipment. Efforts should be made to supplement city resources with equipment and manpower from local business firms, military installations, county and state highway departments, etc. An elementary school neighborhood is one of the best units to select. Cooperation of an active neighborhood improvement group will increase the effectiveness of the cleanup. The citizens are encouraged to collect scattered containers and other rubbish, and to place these materials at the curb (Figure 12). If properly planned and coordinated, a cleanup can be accomplished without overtaxing available manpower and equipment of cooperating groups.

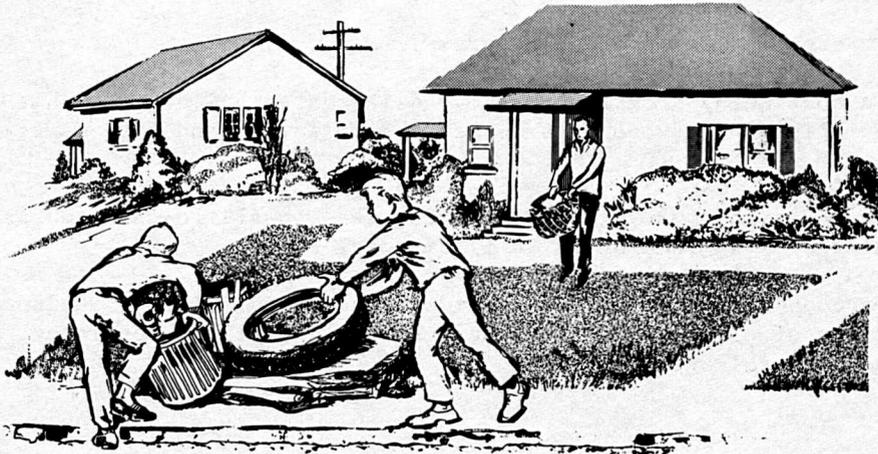


Figure 12. Neighborhood cleanup

The use of bulk containers, placed at the curb, will help mechanize the operation and reduce costs. Mechanized loaders should be used, when available and feasible.

If possible, the pickup period should be extended for a few weeks as this will usually result in more citizens deciding to participate in the cleanup program.

Cleanups should be scheduled to avoid known periods of heavy refuse collection, for example, when the volume of yard trimmings or of fall leaves is heavy. Spring and early summer months are usually the optimum periods for the successful results, from a psychological viewpoint.

Cleanup motivation should begin about two weeks before the scheduled visit of the collection vehicles. This will allow time for householders to clear yards and homes of solid wastes. The early motivation should be by means of mass-media if the cleanup is to be citywide in a small community. If the cleanup is to be on a neighborhood basis in a larger community, it is best to use mass approaches which will reach only the target area. Examples would include handouts taken home by school children, or distributed by local grocery stores and boy scouts, and church announcements. Then, several days before the pickup begins, door-to-door follow-up is required in the hard-core problem areas where citizens do not readily respond to other approaches. Assistance in these door-to-door contacts should be sought from the following:

1. Community groups.
2. Local health department sanitarians.
3. Subprofessional aides employed in the local health or city public works department who devote full time to individual visits.
4. Poverty program personnel.
5. *Ae. aegypti* project staff, if available.

OTHER ACTION PROGRAMS

1. Promote vacant lot improvement programs.
2. Promote a continuing program to remove dilapidated buildings. This is best accomplished by a cooperative health, building, and fire department program.
3. Promote a one-time countywide program to clean up all roadside dumps following the establishment of rural disposal sites.
4. Promote a cooperative countywide solid wastes association to include representatives of city and county government, and of tire, appliance, junkyard, and auto-salvage industries.

5. Promote the organization of permanent "neighborhood improvement" associations down to block captains, especially in the lower socioeconomic areas. These associations require considerable guidance, which is best furnished in large cities by full-time paid employees in the mayor's office in order to get effective interdepartmental participation.
6. Encourage all local beautification and anti-litter programs such as those sponsored by HANDS, garden clubs, and the National Clean-Up Paint-Up Fix-Up Bureau.

Persuasive Activities

The continuous good will, motivation, and support of citizens can best be obtained by the effective use of all avenues of communication. Some people respond to the approach through newspapers, radio, and television, but others must be approached individually or in such groups as the PTA, a school, or a club (Figure 13).

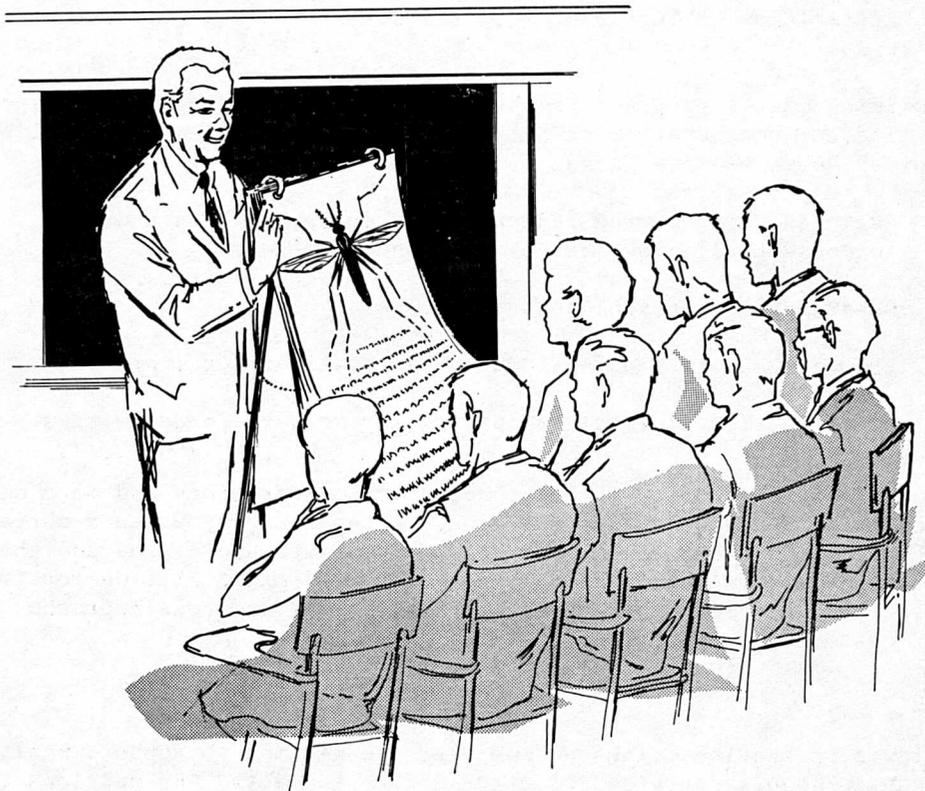


Figure 13. Group meeting

MASS-MEDIA USAGE

All programs should make effective use of mass-media, such as newspapers, radio, and television, but should exercise caution by securing adequate prior clearance. The following actions are recommended:

1. Clear the proposed usage with the local health officer and such other local authorities as he may designate.
2. Determine the geographical area covered by the newspaper, radio, or television.
3. When adjacent states are involved, coordinate the activity with the appropriate state Project Officer and area supervisors.

Newspaper

A series of articles in the newspaper is usually very beneficial to the program. Material may be furnished for: (1) straight news, (2) feature articles, or (3) editorials.

Something must happen before there is news, and the editor or reporter is best qualified to judge whether or not an item has news value. The following activities may serve as news items:

1. Beginning of a source reduction operation, such as a drive to collect all old tires or abandoned appliances.
2. Description of neighborhood programs.
3. Premises survey findings and recommendations for improvement.
4. Participation of local groups and key leaders in activities.

Feature articles often include photographs or drawings and more detailed information than is used for straight news. A reporter may write a series on the Program, dramatizing the early history of yellow fever and dengue and the program for eradication of the urban vector. Another series might crusade for improved refuse collection and disposal. Some reporters use a humorous approach, including the use of cartoons to support editorials.

Television

Television stations, like newspapers, are willing to support health programs and will donate "public service" time for health subjects. Suggestions for program materials and ideas are:

1. Short 20- to 60-second "TV Spots" which are 16 mm motion-picture films in black and white or color.

2. News releases prepared for this purpose, including visual materials such as lantern slides, charts, and maps. These should not require more than one minute of station time.
3. "Enemy in Your Home," a 16 mm, color, sound, 13½-minute motion picture produced to interest the public in *Ae. aegypti* eradication and to explain the operations of the Program.
4. "It Must be the Neighbors," a 16 mm, color, sound, 13½-minute motion picture for showing to the public to promote mosquito and other vector control through improved premises and community sanitation.
5. "Let's Finish the Job," a 16 mm, color, sound, 9-minute motion picture for use on television and in meetings with community leaders, clubs, and other agencies, to stimulate interest in the Program.
6. Interviews or panel discussions with Program and local personnel, dealing with certain phases of *Ae. aegypti* eradication.
7. Feature programs of longer duration usually of the interview type, utilizing films, slides, charts, and maps.

Radio

Radio stations have more time than TV for "public service" programs, as they use fewer network programs than television stations. News releases, magnetic tapes, and personal interviews may be used (Figure 14). It is desirable to furnish materials to more than one radio station to reach various age and ethnic groups. It is necessary to keep program directors, news directors, and disc jockeys informed to obtain their assistance.



Figure 14. Radio release

Other Channels of Communication

Promotional material, including exhibits or posters for display in schools, store windows, theaters, and other public and near-public places, is especially effective in promoting interest in program activity. Also, leaflets may be given out in schools and fairs, and at such places as supermarkets, where many people come and go. Announcements and news releases from the office of the mayor, city

manager, and other governmental officials reach many people. Some commercial organizations have their own employee newspapers or circulars that could well carry the program message. Churches, clubs, unions, technical societies, and other groups are effective agencies for communication.

The School - Motivation of school children is essential in source reduction, for children play an important part in home activities and have considerable influence on improving the home environment. School authorities are interested in the home environment of their students and will cooperate in the program if it becomes a part of the educational process. A most effective way to obtain school participation in our program is by furnishing information, teaching aids, films, hand-outs, and other materials for use by elementary school teachers and science teachers in the junior and senior high schools.

The schools are the largest organizations in a community and affect the greatest number of people. Places for publicizing the program are:

1. Hallways or rooms - exhibits and posters.
2. Home rooms - announcements through public address system or by teachers; preparation of themes and posters by students.
3. School assemblies - illustrated talks or announcements.
4. PTA meetings - illustrated talks or announcements.
5. Bulletin boards - posters, leaflets, or announcements.
6. School publications - announcements.
7. School contests - posters.

Motion pictures, slides, overhead transparencies, flip charts, leaflets, specimens, and exhibits vitalize an educational program, arousing interest and stimulating the learning process. The 13½-minute, 16 mm color film "It Must be the Neighbors" will be valuable to show the problem, arouse interest, and stimulate action. A series of slides showing local conditions, supplemented by slides from the Aedes aegypti Eradication Program's series, may be used to stimulate interest in the program. Home health survey projects may be used in several of the grades to give each student an opportunity to evaluate conditions in and around his home and to correct deficiencies. This activity must be handled with tact and discretion in order not to affect the Program adversely. Suggested forms for use in school programs are illustrated in Appendix B.

The Individual Citizen - The average citizen is subjected to ceaseless and clamorous demands for his attention by skillful advertising talent, making him resistant to mass appeals. Therefore, should all other communication means prove inadequate, the personal appeal remains the ultimate method of communication. To a degree, a person may be reached as a member of a group, but he is reached most effectively at his home, where he is the master, and has interest in any fact, good or bad, relating to the home environment. Thus, every visit, whether it be for inspection, treatment, or source reduction, offers a unique opportunity for persuasive efforts leading to improvement of the home environs. Considerable care must be taken to establish a friendly relationship, or much harm will result. As a bonus to the Program, some individuals will discuss the Program with friends and associates, adding further impetus to *Ae. aegypti* eradication.

APPENDIX A

Aedes aegypti Eradication Program

SOLID WASTE MANAGEMENT APPRAISAL

State OLYMPIA
 County TILLER
 City DIXON

Date 3-30-67
 Appraisers Simmons & Davis

NO to YES	Estimated
Since	Percent
Last	Last This
Appraisal	Year Appraisal

- | | NO | YES | | |
|--|----------|----------|----------|-----------|
| 1. Does the community have ordinance and/or Regulations? | <u>—</u> | <u>✓</u> | <u>—</u> | |
| Do they include: Storage? | <u>—</u> | <u>✓</u> | <u>—</u> | |
| Collection? | <u>—</u> | <u>✓</u> | <u>—</u> | |
| Disposal? | <u>✓</u> | <u>—</u> | <u>—</u> | |
| Do they prohibit: 55-Gal. drums? | <u>✓</u> | <u>—</u> | <u>—</u> | |
| Outside burning? | <u>✓</u> | <u>—</u> | <u>—</u> | |
| Bins? | <u>✓</u> | <u>—</u> | <u>—</u> | |
| Are the other provisions adequate? | <u>—</u> | <u>✓</u> | <u>—</u> | |
| Is the enforcement adequate? | <u>✓</u> | <u>—</u> | <u>—</u> | |
| 2. Collection of refuse in containers | | | | |
| a. Premises in residential areas | | | | |
| % receiving adequate twice-weekly service | | | <u>—</u> | <u>70</u> |
| % having approved containers | | | <u>—</u> | <u>10</u> |
| % having adequate container capacity | | | <u>—</u> | <u>60</u> |
| b. Premises in business areas | | | | |
| % receiving adequate daily service | | | <u>—</u> | <u>95</u> |
| % having approved bulk containers | | | <u>—</u> | <u>25</u> |
| % having adequate container capacity | | | <u>—</u> | <u>50</u> |
| 3. Collection of large rubbish placed at curb | | | | |
| a. % of residences receiving adequate once-weekly service | | | <u>—</u> | <u>25</u> |
| b. % of businesses receiving adequate once-weekly service | | | <u>—</u> | <u>0</u> |
| c. Do these services include: | | | | |
| a. Tires? | <u>—</u> | <u>✓</u> | <u>—</u> | |
| b. Appliances? | <u>✓</u> | <u>—</u> | <u>—</u> | |
| 4. Is there an adequate vehicle ordinance and/or regulations? | | | | |
| a. Is the enforcement adequate? | <u>—</u> | <u>—</u> | <u>—</u> | |
| b. % adequacy of removal program | <u>—</u> | <u>—</u> | <u>—</u> | <u>10</u> |
| 5. In regard to disposal facilities, are they: | | | | |
| a. Well located | <u>—</u> | <u>✓</u> | <u>—</u> | |
| b. Operated in a sanitary manner | <u>✓</u> | <u>—</u> | <u>—</u> | |
| c. Adequate in capacity | <u>—</u> | <u>✓</u> | <u>—</u> | |
| 6. Where % figures are shown, indicate in this space the source of data or sample size used. | | | | |

A selected 5% sample of blocks was made.

DEFINITION OF REFUSE TERMS

SOLID WASTES - All types of solid materials which are unwanted or useless including garbage, offal, rubbish, and abandoned vehicles.

REFUSE - This term is considered to be synonymous with "solid wastes." However, when the term is used in a phrase such as "twice-weekly refuse collection service," the phrase means the collection of those items of refuse which are placed in approved garbage cans or bulk containers. In this sense "refuse" refers to garbage and small rubbish items.

GARBAGE - The animal and vegetable wastes from the preparation, cooking, and serving of food, and from the marketing, handling, and sale of produce.

OFFAL - Anything discarded in the processing of animals, birds, or fish such as entrails and feet.

RUBBISH - Miscellaneous worn-out, used-up, broken, rejected, or worthless materials or things, including household and business waste, that are not classified as garbage or ashes. It includes paper, rags, wood, glass, crockery, rubber, plastics, and metal items. Rubbish is commonly called "trash" by many people. Rubbish items are divided into "small" and "large" on the basis of whether or not it is practicable to place them in refuse containers for collection.

SMALL RUBBISH - Types of rubbish ordinarily placed in the 20- to 32-gallon refuse can at the home or in bulk containers at business establishments and include such items as paper, cardboard, glass, metal, or plastic containers of one gallon or less in content, small metal items, small cartons, small toys, and other discarded items. Grass clippings, leaves, and small yard trimmings are being containerized to an increasing extent.

LARGE RUBBISH - Bulky wastes ordinarily placed at the curb for collection because they are too large or heavy to containerize. This includes tires, abandoned appliances, large cartons, boxes, drums, barrels, and crates, large auto parts, large water containers, waste lumber, and rubble.

TRASH - This term refers to unwanted materials which are placed at the curb for collection rather than placing them in approved containers. Since the term is not officially recognized by the American Public Works Association, it is not used in the text of this handbook. In many communities, however, the term is used in a manner similar to "large rubbish."

RUBBLE - Broken fragments of stone, brick, concrete, and similar materials resulting from the construction or wrecking of buildings, pavements, etc. In this Program, the term refers specifically to those items of large rubbish which cannot hold water or breed mosquitoes.

ABANDONED VEHICLES - Discarded cars, trucks, buses, and other similar vehicles. Vehicles are considered abandoned when:

1. They are located some place other than in an authorized junk-vehicle business place AND one or more of the following conditions also prevails:
2. The license tag is outdated; major parts are missing; the state of disrepair precludes further use; or the vehicle is overgrown with vegetation.

APPENDIX B - PROMOTIONAL BROCHURES

SUGGESTED REFUSE CONTAINER TAG

NOTICE TO HOUSEHOLDER

In accordance with local ordinances, you are hereby notified of the following improper practices:

- 1 Refuse containers need replacement.
- 2 Unapproved refuse containers in use.
- 3 More refuse containers needed.
- 4 Refuse on ground - place in containers.
- 5 Illegal refuse burning.
- 6 Place large rubbish at curb for collection.

_____, 19__

Local Health Department

Front

- a. Information on available collection services for refuse and large rubbish.
- b. Description of approved containers, and racks, if required.
- c. Information on preparation and placement of large rubbish for collection.
- d. Other pertinent information on ordinances or regulations.

Back

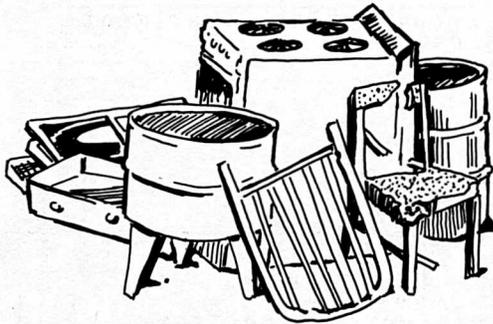
FREE TRASH PICKUP

Don't
BREED
OR
FEED



RATS, FLIES, MOSQUITOES

Place All Trash, Tin Cans, Old Tires and Junk
at the Curb



Appliances, Furniture and Large Items should be
Separated from Other Trash

FREE PICKUP DURING WEEK OF

_____ COUNTY HEALTH DEPARTMENT

in cooperation with

_____ DEPARTMENT OF PUBLIC HEALTH

Source reduction pickup notice

B3

DON'T BE A LITTERBUG

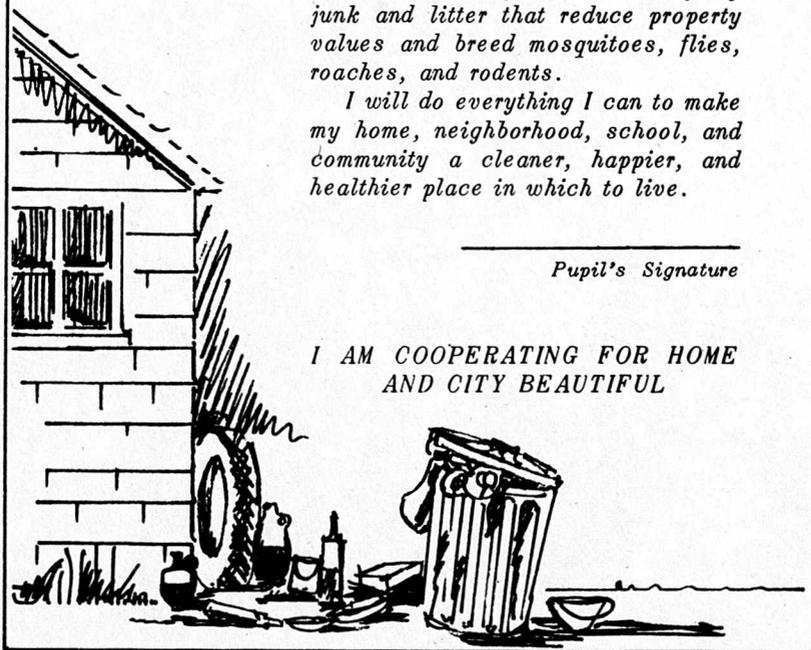
PLEDGE

I pledge that I will help my parents, neighbors, teachers, and city officials keep my home, neighborhood, school, and city free of unsightly junk and litter that reduce property values and breed mosquitoes, flies, roaches, and rodents.

I will do everything I can to make my home, neighborhood, school, and community a cleaner, happier, and healthier place in which to live.

Pupil's Signature

**I AM COOPERATING FOR HOME
AND CITY BEAUTIFUL**



(Front of card)

rm for school children

*This certifies that _____
has helped clean up our yard of all old tin cans, bottles,
tires, junk, litter, weeds, and rubbish and that we have
placed them in containers and/or at the curb for collection.*

Parent's Signature

*Cooperative effort will make our city cleaner and help
keep it free of mosquitoes, flies, roaches, and rodents.*



CLEAN

- HOMES
- SCHOOLS
- CITY
- NEIGHBORHOODS
- BUSINESS PLACES
- RECREATION AREAS

Health Department



(Back of card)

APPENDIX C

PREPARATION OF SOURCE REDUCTION MAPS

This color code for source reduction maps is provided as a guide for general use to assure some uniformity. These maps should quickly and graphically show the prevalence and distribution of each deficiency. The maps of major deficiencies are of the greatest importance to the Program. In some cases, it may be desirable to modify mapping techniques in order to make the maps of optimum usefulness. It is preferable not to use more than the three basic colors of blue, yellow, and red.

MAPS OF MAJOR DEFICIENCIES

- | | |
|---|--------|
| 1. Map of Unapproved Refuse Storage | |
| a. Less than 10% of premises deficient in block | Blue |
| b. 10 to 49% of premises deficient in block | Yellow |
| c. 50 to 100% of premises deficient in block | Red |
| 2. Map of Tire Distribution | |
| a. None in block | Blue |
| b. Less than 10% of premises with tires | Yellow |
| c. 10% or more of premises with tires | Red |
| 3. Map of Abandoned Appliances | |
| a. None in block | Blue |
| b. Less than 10% of premises with abandoned appliances | Yellow |
| c. 10% or more of premises with abandoned appliances | Red |
| 4. Map of Abandoned Automobiles | |
| a. None in block | Blue |
| b. Less than 10% of premises with abandoned automobiles | Yellow |
| c. 10% or more of premises with abandoned automobiles | Red |
| 5. Map of Other Temporary Containers | |
| a. Less than 10% of premises deficient in block | Blue |
| b. 10 to 49% of premises deficient in block | Yellow |
| c. 50 to 100% of premises deficient in block | Red |
| 6. Map of Rubble and/or Unstacked Lumber | |
| a. Less than 10% of premises deficient in block | Blue |
| b. 10 to 49% of premises deficient in block | Yellow |
| c. 50 to 100% of premises deficient in block | Red |

OPTIONAL MAPS

1. Map of Domestic Animals
Use different colored plastic or colored pencil dots to indicate the presence of farm animals, fowl, or dogs in blocks.
2. Map of Privies and Septic Tanks
Use round red dots for privies and square red dots for unsatisfactory septic systems. Draw in existing sewers to indicate areas where connections may be made.

3. Map of Dilapidated Sheds
 - a. Less than 10% of premises containing dilapidated sheds Blue
 - b. 10 to 49% of premises containing dilapidated sheds Yellow
 - c. 50 to 100% of premises containing dilapidated sheds Red

4. Map of Condition of Housing

<u>Classification</u>	<u>Condition</u>	<u>Color</u>
Good	All houses in block are good	Blue
Fair	Good and fair, or more good than poor	Yellow
Poor	More poor than good	Red

5. Map of Vacant Lots

<u>Classification</u>	<u>Condition</u>	<u>Color</u>
Good	No vacant lots in block have containers	Blue
Fair	1 to 49% of lots in block with containers	Yellow
Poor	50% or more lots in block with containers	Red
-	No vacant lots in block	No Color

The maps are prepared from data shown on the zone summary forms. The steps are as follows:

1. Divide the total number of premises (which includes vacant lots) into the number of premises with each deficiency to calculate the deficiency percentage.
2. Determine the correct color for the block, for each deficiency using the color code.

3. On the Zone Summary Form, using a colored pencil, indicate the correct color in the appropriate block column by the figure. For example, in a block having 30 premises, 5 of them have junk cars. A red dot is placed in the block column containing the figure 5, as more than 10 percent of the premises in that block have junk automobiles.
4. On the form, complete color coding of this deficiency for all other blocks.
5. Then proceed in a similar manner to color code the form for other deficiencies that are to be mapped.
6. Using the indicated colors on the Zone Summary form, place the appropriate colors of the blocks on maps.

APPENDIX D

DISPOSAL OF TIRES, AUTOMOBILES, AND MAJOR APPLIANCES

Accumulations of used tires in all operational cities is a major problem in the *Aedes aegypti* program, as well as a disposal problem for the community. In some cases, tires are being buried in landfills, whereas in others too many tires accumulate for disposal in incinerators, and large piles of tires accumulate unless they are placed in landfills.

It is difficult to bury tires in landfills using the "moving trench" or "moving slope" techniques, where only crawler tractor equipment is available. It is recommended that a separate trench be provided for burying difficult items such as tires, old appliances, rolls of wire, and large rubble. The separate trench can be excavated, using crawling tractors, or by using a dragline for a few days, which is easier and may be more economical.

The following type of landfill is recommended:

1. A dragline is used to excavate a deep and wide trench about 1 to 3 blocks long, piling the spoil on both sides of the ditch. This is accomplished by operating the dragline up one side of the trench and back on the other side. This work usually requires only the occasional use of a dragline which can therefore be used for other purposes.
2. All items of refuse and solid waste are placed in one end of the trench, with operations then progressing toward the other end. The supervision of dumping, placement of refuse, compaction, and placing of a final earth cover can be accomplished by one crawler tractor and one operator. Tires, old appliances, stumps, logs, and car bodies, are incorporated into the layers of refuse. This prevents littering the disposal site and the need for more than one type of disposal site.

When possible, it is advantageous to crush old refrigerators and other appliances and junk cars in order to reduce their volume before burial. This produces better compaction of the completed landfill. In some cities these items are crushed by the bulldozers being used at disposal sites. In one large city, the appliance or car body is placed on a thick steel plate on the ground and then crushed by a crane equipped with a heavy metal weight.

APPENDIX E

EVALUATION OF RESIDENTIAL AND BUSINESS STRUCTURES

The evaluation of structures is difficult and time-consuming. It should not be undertaken without the interest and participation of health departments or other local agencies.

Surveyors can grade all structures, whether business or residential, by overlining the street number for "Fair" or "Deteriorating," and overlining the street number twice for "Poor" or "Dilapidated." The following definitions and terms should be used in determining the grade of houses:

1. Good House - A "Good" house(1765) is one that is in good repair and appears to meet health and safety standards.
2. Fair House - A house that has started to deteriorate (1765) is placed in the "Fair" classification. It is also placed in this category through obsolescence, extensive neglect, substandard construction, etc. A "Fair" house is one that could still be remodeled at reasonable cost to bring it up to the standards of a "Good" house.
3. Poor House - A house is classified as "Poor" (1765) once it has deteriorated to such a degree that improvement is unfeasible. Such a house will be so dilapidated, or of such poor construction, that it would be less expensive to replace it with a new house than to bring it up to minimum standards.

Business structures may be graded in a similar manner.

