

Appendix O

COMMUNITY SELECTION PROCESS

Initially fourteen communities were selected for possible study in accordance with the selection procedures described below. Ultimately, for budgetary, scheduling, and operational reasons, eight communities were selected for study.

Communities to be considered for study by the project team were selected using non-probabilistic sampling procedures, specifically quota and purposive sampling procedures. Generally, non-probability sampling is used when the researcher is unable to describe the population from which a sample is to be drawn and, hence, cannot describe the “probability” with which a person, community or some other unit of analysis within the population will be selected for the sample. Non-probabilistic quota samples are sometimes considered roughly analogous to probabilistic stratified samples in that certain variables thought to be important in describing the population are identified and efforts are made to insure that people or communities are selected so that they represent the range or diversity of values or types on those variables.

The following ordered criteria or variables were used in selecting the communities for study: (1) the combination of hazards for which communities had received FEMA awards; (2) validation according to available hazard maps that a community was at high risk of at least one of the three hazards (wind, flood, earthquake) being studied⁷⁶; (3) community size defined as small (10,000-49,999), medium (50,000-499,999) and large ($\geq 500,000$)^{77 78}; and (4) the geographic distribution of communities. The geographic distribution of communities was largely established once the pattern of awards received and the level of hazard risk were applied, since the distribution of floods, wind and earthquake hazards is not constant across the United States. To further insure geographic distribution the project team examined the distribution of awards across the ten FEMA regions. While noted, demographic characteristics of communities and whether they had or had not received a Project Impact award were not used in selecting communities.

Ultimately, however, the last stage in the selection of any non-probability sample, including a quota sample, is a judgment made by the person or group selecting the sample. Purposive sampling is the application of expert judgment to the selection of who is in the sample. Unusual in the selection of the communities to be studied is the fact that, unlike most non-probability samples, the population of communities from which the sample was drawn can be described. As a result, this sample is somewhat analogous to the multi-stage sampling procedures used in the Gallup Poll where the first stages of selection are probabilistic and the final stages of selection involve, first, *quota sampling* and, second, *purposive sampling* where the interviewer

⁷⁶ The community selection procedures are described in the *Community Studies Scoping Study Report* of September 22, 2003, and represent one of multiple procedures explored by the Project team.

⁷⁷ Proposed by E. Mittler and C. Taylor in July 2003; approved by the MMC Project Management Committee (PMC) on August 6, 2003.

⁷⁸ The PMC recommended the inclusion of at least one county in July 2003.

(in a Gallup Poll) selects the actual persons interviewed. Judgment was used to establish the quotas and in deciding how to structure the actual selection of communities.

The sample that is reflected in this appendix was selected in three stages based on several factors: (1) the project team would sample six communities as a minimum; (2) if additional funds were provided, the project team would include as many as four additional communities, bringing the total number of communities to ten; and (3) a third set of four communities was selected to serve as replacement communities in the event that a community in one of the first set of six communities or second set of four communities was unavailable.

O.1 The Population

The National Emergency Management Information System (NEMIS) data file that ATC received on July 23 2003 was used to identify the population from which the project team selected the additional communities for study. This data set is a transactional database that includes one record for each award. It includes 8,030 awards that had been completed or closed. To be eligible for consideration, communities had to: (1) have received awards whose objective was to mitigate damage from earthquakes, flood, or wind (coastal storm, hurricane, severe storm, tornado, typhoon); (2) be at high or medium risk of earthquakes, flood, or wind hazard(s) as identified on hazard maps as described in the Community Studies Scoping Study of September 22, 2003; (3) be a single jurisdiction identified with a legal title as a city, town, borough, village or county within one of the 50 states; (4) have both project and process (includes Project Impact) activities funded; (5) have received project and process grant awards that total \geq \$500,000; and (6) have received a total of \leq 15 awards. One hundred thirteen (113) communities met all six criteria.

O.2 Database Considerations

It should be noted that the combination of awards assigned to communities that were used to make the selection of communities for further study may be unavoidably incorrect. There are several reasons for this judgment. First, there are errors in the NEMIS database. One of the findings in the Community Studies Pilot Study was that the NEMIS database for Tulsa, Oklahoma, did not contain any reference to some grants the project team found in Tulsa, and misidentified others. Second, when the description of the grant did not clearly identify what hazard the grant activity referred to, the project team labeled the grant the same as the proximate cause of the Presidential disaster declaration, i.e., flood grant for a flood, earthquake grant for an earthquake. In some cases, these will not be correct because in recent years FEMA has awarded mitigation grants for all hazards following a disaster declaration such that, for example, flood and wind grants can be awarded after an earthquake. Limitations of time and other resources prevented the project team from identifying possible errors, which the team believes were minimal and did not significantly affect choices.

In recognition of problems in the NEMIS data set, once the sample of communities is selected data available in the NEMIS data set for each community was again examined. The objective here was to insure that each community jurisdiction selected had received no more than 15 awards, process and project combined, that totaled at least \$500,000, and that the awards had, in fact, been made to the jurisdiction selected. Of particular concern were situations, such as

Atlantic City and Atlantic County, New Jersey, where both a city and a county have the same name. Many grants listed in the NEMIS data set do not clearly indicate which of the two same-name jurisdictions received the award. Information that is not in the data set must be available to determine the awardee.

O.3 Setting and Applying Criteria and Quotas for the Sample

Available funding and other considerations specified that a sample of fourteen communities would be selected iteratively in groups of six, four and four. The last set of four communities selected would be studied *only if* one or more communities within the first ten selected were unavailable for study. One possible reason for a dropout is that the community was severely impacted by a disaster during the conduct of this study, thus limiting possible access to key individuals, organizations, etc. Five criteria were used to determine which communities were selected for inclusion. They were: (1) the combination of awards received; (2) the hazard risk as determined by the maps available in August 2003 (see Community Studies Scoping Study of September 22, 2003); (3) the size of the community; (4) the FEMA region in which communities were located; and (5) a post-selection check of the awards received by each community against the NEMIS data base.

Step 1: Combination of Awards Received. In the first step, communities were sorted according to the combination of awards they had received from FEMA: earthquakes only (N = 10; 8.8%); wind only (N = 8; 7.1%); flood only (N = 38; 33.6%); earthquake and flood (N = 4; 3.5%); wind and flood (N = 50; 44.2%); and earthquake, wind and flood (N = 3; 2.7%), and quota limits were established for the selection of the sample. In Table O-1⁷⁹, Column 4 shows constraints placed on each category in terms of the maximum number of communities that could be selected with that combination of FEMA awards. These were set to be roughly proportionate to how the patterns were represented in the population of 113 communities⁸⁰.

Fourteen communities were selected for study in sets of six, four and four. For purposes of this evaluation it was important to allow each combination of awards in the sample to be potentially represented by at least one community. It was also important to insure that all the communities were not selected from only one or two award patterns. If maximum limits were not set in advance of the draw, it was possible, although unlikely, that all of the communities selected for the sample would represent only one or two combinations of awards. For example, the first 14 communities drawn could be the 10 communities with only earthquake awards and the four communities with flood and earthquake awards.

⁷⁹ Ninety-five (85%) of the 113 communities in this population received at least one FEMA award for floods; hence, given criteria 2, communities with flood awards are necessarily underrepresented in this sample.

⁸⁰ Fourteen communities were to be selected distributed as FEMA awards were distributed in column 1 of Table O-1. The expected number of communities in each category was: 1.23 for earthquake only; 4.7 for flood only; 0.99 for wind only; 0.49 for flood and earthquake only; 6.19 for flood and wind; and 0.378 for flood, quake and wind. Obviously fractions of communities cannot be studied so a lower boundary of one community was set for each award combination. Thus, at least one community had to be selected for the two smallest categories, flood and earthquake, and flood, earthquake, and wind; up to two communities were allowed for the next two smallest categories, earthquake only and wind only. Since no more than 14 communities would be selected in all, this restricted the largest two categories, flood only and flood and wind, to a maximum of four communities.

Table O-1 Distribution of communities and quota limits set for the sample by the pattern of FEMA awards received by a community (N =113)

Awards Received	Population		Sample Limits for Category	Communities Selected in the Sample Draw (Set) ¹
	N	%		
Earthquake Only	10	8.8	≤ 2	Hayward (1) Orange (2)
Flood Only	38	33.6	≤ 4	Jamestown, ND (1) Mandeville, LA (2) East Haven, CT (3) Des Moines, IA (3) Multnomah County, OR (3)
Wind Only	8	7.1	≤ 2	Virginia Beach (3)
Flood and Earthquake	4	3.5	≤ 1	Los Angeles (2)
Flood and Wind	50	44.2	≤ 4	Freeport, NY (1) Tuscola County, MI (1) Jefferson County, AL (1) Ft. Walton Beach, FL (2)
Flood, Quake & Wind	3	2.7	≤ 1	Horry County, SC (1)

¹This column shows how the 14 communities drawn when the sample was selected (see Table O-6) match with the criteria set for the pattern of FEMA awards received. “Set” refers to whether the community was selected to be in the first set of six communities, the second set of four communities, or the third set of four communities.

In determining how to set upper limits for the combination of awards received, the proportion of awards received was stratified as follows. Award combinations with less than 5% of the communities in the population were limited to no more than one community in the total sample. Thus, no more than one community could be drawn from the four communities with awards for flood and earthquake and the three communities with awards for flood, quake and wind. Two award combinations included more than 30% of the awards, namely flood only and flood and wind. An upper limit of four communities was set for each of these categories. The remaining two award combinations included, respectively, 8.8% of awards (earthquake only) and 7.1% of awards (wind only). Maximum limits for these two groups were set at no more than two communities.

For the first set of six communities drawn, one community (16.7%) was drawn for earthquake only, one (16.7%) was drawn for flood only, none (0.0%) was drawn for wind only, none (0.0%) was drawn for flood and earthquake, three (50.0%) were drawn for flood and wind, and one (16.7%) was drawn for flood, quake and wind. This demonstrates the difficulties associated with drawing a “representative” sample when both the sample and the population are small.

Step 2: High Risk of Wind, Flood and/or Earthquake. In the *second step*, communities were sorted according to high risk of hazards with 26.5% (N = 30) being at high risk from earthquakes, 56.7% (N = 64) at high risk from floods, and 25.7% (N = 29) at high risk from wind. These are not mutually exclusive categories since communities could be at high risk from more than one hazard. This means that any of the 113 communities can appear in Table O-2 more than once; therefore the total may be greater than 113. Since such a large proportion (67.3%) of communities were at *high risk* of at least one of the three hazards (earthquake, flood, wind) according to the hazard maps available in August 2003, the 37 communities that were not at high risk of at least one hazard were deleted from further consideration. Since it was only important that every community in the sample was judged to be at high risk from at least one

hazard and because the experts available to the community studies team were having difficulty establishing hazard levels for floods, in setting the limits for these criteria, rough limits rather than absolute maximums were set. Column five of Table O-2, shows that the approximations were exceeded in each hazard category. This is because many communities in the population are at high risk from multiple hazards.

Table O-2 Distribution of communities and quota limits set for the sample by being at high risk of earthquake, flood or wind hazard (N =113).

Hazard for Which Community is at High Risk	Population		Sample Limits for Criteria	Communities Selected in the Sample Draw (Set) ¹
	N	%		
Earthquake	30	26.5	≈ 4	Hayward (1) Horry County, SC (1) Orange, CA (2) Los Angeles (2)
Flood	64	56.7	≈ 7	Freeport, NY (1) Horry County, SC (1) Jefferson County, AL (1) Jamestown, ND (1) Tuscola County, MI (1) Ft. Walton Beach (2) Los Angeles (2) Des Moines (3) East Haven, CT (3) Multnomah County, OR (3)
Wind	29	25.7	≈ 4	Freeport, NY (1) Horry County, SC (1) Mandeville, LA (2) Virginia Beach (3) East Haven, CT (3)

¹Shows how the 14 communities drawn when the sample was selected (see Table O-6) match with the criteria set for being at high risk of at least one hazard. "Set" refers to whether the community was selected to be in the first set of six communities, the second set of four communities, or the third set of four communities.

Step 3: Community Size. In the *third step*, criteria were set for *community size* (Table O-3). Within the population, 40.7% (N = 46) were small communities, 49.6% (N = 56) were medium communities, and 9.7% (N = 11) were large communities. In July 2003² it was decided that one large community and at least one small community would be included in each set of communities selected for study. This decision reflected a concern that large communities, even if drawn, might be skipped over because it was anticipated that it would be more difficult to study them. Absolute limits were set here for each draw with the *first draw* of 6 communities being two small communities (10,000-49,999), three medium communities (50,000-499,999), and one large community (≥ 500,000). Note that this set of six communities roughly represents the size of communities as represented in the population: 33% small communities; 50% medium communities; and 16.7% large communities. The *second draw* was set at two small communities, one medium community, and one large community, and the *third draw* was set at one small community, two medium communities and one large community. If all 14 communities were studied, the second and third draws result in small communities (35.7%) and medium communities (42.8%) being slightly underrepresented and large communities (21.4%) being substantially overrepresented. If the first two sets of communities were studied, which was the

expectation, small communities were correctly represented (40%), medium communities were underrepresented (40%) and large communities were overrepresented (20%).

Table O-3 Distribution of communities and quota limits set for the sample by population Size (N = 113)

Community Size	Population		Sample Limits for Criteria			Communities Selected in the Sample Draw ¹		
	N	%	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
Small (10,000-49,999)	46	40.7	2	2	1	Jamestown, Freeport	Mandeville, Ft. Walton Beach	East Haven
Medium (50,000-499,999)	56	49.6	3	1	2	Hayward, Tuscola County, Horry County	Orange, CA	Des Moines, Virginia Beach
Large (≥ 500,000)	11	9.7	1	1	1	Jefferson County	Los Angeles	Multnomah County

¹Shows how the 14 communities drawn when the sample was selected (see Table O-6) match with the criteria set for community size. “Set” refers to whether the community was selected to be in the first set of six communities, the second set of four communities, or the third set of four communities

Step 4: FEMA Region. In the fourth step, communities were sorted by the FEMA region where they were located, and criteria were established. As expected, the largest number of communities are in Region IV and Region IX. The distribution of communities across regions is somewhat similar to the distribution of communities across award patterns in that each of four regions have less than 7% of the awards, four regions have between 7% and 12% of the awards, one region has 10.6% of awards, and one region has 26.5% of awards. These four groupings were identified as strata for purposes of setting limits, while simultaneously attempting to obtain at least one community in each of the ten regions. Regions that contained no more than 6.2% of communities were limited to no more than one community in the sample. These include Regions I, II, VII and VIII. Regions with approximately 10% of communities were limited to no more than two communities in the sample; these were Regions III, V and X. Up to three communities could be selected from Region IX and up to four communities could be selected from Region IV. As can be seen in Table O-4, these limits were exceeded for Region IX.

Step 5: Post-Selection Against NEMIS In recognition of some of the limitations in the NEMIS data base noted earlier under *Data Base Considerations*, after the 14 communities were selected, information available in the NEMIS data base was again examined in detail for each community.

O.4 Drawing the Communities for the Sample.

Once limits for the four criteria were set, information about each of the 76 communities that were at high risk from at least one hazard was written on pieces of paper. The 76 pieces of paper

Table O-4 Distribution of communities and quota limits set for the sample by FEMA region (N = 113)

FEMA Region	Population		Sample Limits for Criteria	Communities Selected in the Sample Draw (Set) ¹
	N	%		
Region I	7	6.2	≤ 1	East Haven, CT (3)
Region II	4	3.5	≤ 1	Freeport, NY (1)
Region III	11	9.7	≤ 2	Virginia Beach (3)
Region IV	30	26.5	≤ 4	Jefferson County, AL (1) Horry County, SC (1) Ft. Walton Beach, FL (2)
Region V	8	7.1	≤ 2	Tuscola County, MI (1)
Region VI	12	10.6	≤ 2	Mandeville, LA (2)
Region VII	7	6.2	≤ 1	Des Moines (3)
Region VIII	7	6.2	≤ 1	Jamestown, ND (1)
Region IX	18	15.9	≤ 3	Hayward (1) Orange (2) Los Angeles (2)
Region X	9	8.0	≤ 2	Multnomah County (3)

¹Shows how the 14 communities drawn when the sample was selected (see Table O-6) match with the criteria set for the distribution across the ten FEMA regions. “Set” refers to whether the community was selected to be in the first set of six communities, the second set of four communities, or the third set of four communities.

were placed in an egg basket, shaken up, and the first community was drawn for the first set of six communities. The process was repeated until all fourteen communities were drawn. The papers were shuffled between each draw. Once a community was drawn and either accepted or rejected for inclusion in the sample, it was permanently removed from the pool of eligible communities.

Table O-5 shows the communities that were drawn and rejected, in order, for each of the three sets of selections. As can be seen, the first four communities, Freeport, Jefferson County, Horry County, and Jamestown, were easily drawn and represented the first four communities drawn. At that point, there were two small communities, one medium-sized community, and one large community for the first set of six communities. Given the criteria established for community size, only medium-sized communities could then be selected for the sample. Colusa County was drawn and rejected because it is a small community. Then Tuscola County was drawn, which met the need for a medium-sized community. Then Houma was selected, which again was rejected because it is a small community, and finally Hayward was selected to complete the first set of six communities. Eight communities, the six selected and Colusa County and Houma—the two rejected communities—were now eliminated from the pool of 76 leaving 68 in the pool.

In the second set, the first community drawn was “4 Tampa Bay Counties.” After consultation, it was decided that this community did not meet the criteria for a single jurisdiction and it was rejected. The next community in the second set, Mandeville, was the 10th community drawn; it was accepted. The 11th community drawn, Hawaii County, was rejected because it duplicated

Table O-5 Communities that were accepted for the sample and communities that were rejected because one or more limit had been reached by stage of the draw (N = 76)

Stage of the Draw	Accepted	Rejected	
		Community	Reason
First Set of 6 Communities	Freeport, NY Jefferson County, AL Horry County, SC Jamestown, ND Tuscola County, MI Hayward, CA	Colusa County, CA	Needed a Medium Sized Community
		Houma, LA	Needed a Medium Sized Community
Second Set of 4 Communities	Mandeville, LA Orange, CA Ft. Walton Beach, FL Los Angeles, CA	4 Tampa Bay Counties	Rejected as not meeting the jurisdictional criteria.
		Hawaii County	Rejected; had all 3 awards
		Oakland, CA Pittsburgh, PA	Rejected because either a small community or a large community had to be drawn
		Ouachita Parish, LA Ft Payne, AL Gadsden, AL Salem, NH Carteret County, NC Wauwatosa, WI Craven County, NC Westport, CO Ft. Collins, CO Colerain, OH Saco, ME Clermont City, OH Cape Girardeau, MS	All communities rejected because only a large community could be selected
		Seattle	Rejected; have earthquake only

Table O-5 Communities that were accepted for the sample and communities that were rejected because one or more limit had been reached by stage of the draw (N = 76)(continued)

Stage of the Draw	Accepted	Rejected	
		Community	Reason
Third Set of 4 Communities	Des Moines, IA East Haven, CT Virginia Beach, VA Multnomah County, OR	Terrebonne Parish, LA	Had 4 communities with awards for flood and wind
		Berkeley, CA	Had 3 communities in Region IX
		Darby Borough, DE	Had 4 communities with awards for flood and wind
		Benton County, OR	Needed a small or large community or one with wind awards
		Honolulu	Next large community drawn; poor jurisdiction and overdraws for Region IX
			Overdraws for flood only communities

Horry County in having received wind, flood and quake awards. Orange, California, was the 12th community drawn; it was accepted. At that point, the project team could only accept a large community or a small community for inclusion in the second set of four. Two communities—Oakland, and Pittsburgh—were drawn and rejected because they were medium-sized communities. Next, Fort Walton Beach, Florida, was selected, which was accepted. Then, thirteen communities were drawn and rejected because only a large community could be selected. Seattle was drawn and rejected because it would be the third community with awards only for quakes. Los Angeles was selected next and accepted; the set was completed.

Des Moines was drawn next and accepted for the third set of four communities. Terrebonne Parish was selected next and rejected because the sample already included four communities with FEMA awards for both floods and wind. Then Berkeley was drawn and rejected because the sample already included three communities from Region IX. East Haven was selected next and accepted for the sample. Darby Borough and Benton County were drawn and rejected both because the quota for communities with both flood and wind awards was filled and because it would be helpful to have a community that was simultaneously large or medium and had received FEMA awards only for wind. Virginia Beach, Virginia, was the next community drawn; it was selected.

Unfortunately, the last community selected for the third set of communities had to be large. The next large community drawn was Honolulu. Although included as the 14th community in the sample, it presents problems in that (1) it is not a regular jurisdiction, and (2) it is the fourth

community selected in Region IX. The other two large communities still in the pool were Multnomah County, Oregon, in Region X at high risk of quakes, with two flood grants, and San Bernardino County, California, in Region IX, at high risk of quake and flood, with one quake award. Replacing Honolulu with Multnomah County would have resulted in five rather than four communities with flood awards only (over the quota) but would have reduced the overrepresentation of Region IX communities and would have meant the selection of a community in Region X.

After consultation, the project team selected Multnomah County, Oregon as the last community in the third set.

O.5 Post-Selection Check against NEMIS.

Once the 14 communities were selected the NEMIS data set was again examined. When combined with information about the organization of Los Angeles County and City, which was available to the researchers but not available in the NEMIS data set, this revealed that awards attributed to the County of Los Angeles actually were awarded to the city of Los Angeles. Thus, Los Angeles actually had received over 30 FEMA grants, thereby exceeding the eligibility limit of 15 grants or less. Los Angeles in set 2 was replaced with Multnomah County from set 3. If a third large community was needed, San Bernardino, California, would have been selected.

O.6 Final Sample.

The final sample of communities as distributed by community size and pattern of FEMA awards is shown in Table O-6.

Table O-6 Communities selected for the sample by community size, pattern of FEMA awards received, and whether they were selected to be in the first, second or third set of communities (N = 13)

Pattern of FEMA Awards	Small Communities (10,000-49,999)	Medium Communities (50,000-499,999)	Large Communities (≥ 500,000)
Earthquake Only ≤ 2		Hayward, CA (1), Orange, CA (2)	
Flood Only ≤ 4	Jamestown, ND (1), Mandeville, LA (2), East Haven, CT (3)	Des Moines (3)	Multnomah County, OR (3)
Wind Only ≤ 2		Virginia Beach (3)	
Flood and Quake ≤ 1			
Flood and Wind ≤ 4	Freeport, NY (1), Fort Walton Beach, FL (2)	Tuscola County, MI (1)	Jefferson County, AL (1)
Flood, Earthquake, and Wind ≤ 1		Horry County, SC (1)	

- (1) Selected in the first set of 6 communities for study.
- (2) Selected in the second set of 4 communities for study.
- (3) Selected in the third set of 3 communities for study.