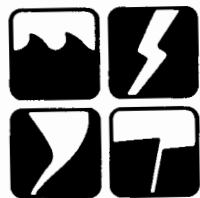


Natural Hazard Research

EMERGENCY PLANNING IMPLICATIONS OF
LOCAL GOVERNMENTS' RESPONSES TO
MOUNT ST. HELENS

Jack D. Kartez
Environmental Research Center
Washington State University

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SUMMARY*

The May 18, 1980, eruption of Mount St. Helens deposited as much as five inches of volcanic ash within a 20,000 square mile area. While national attention focused on the destruction at the mountain, dozens of communities in the plume path were responding to severe problems caused by the ash. This was compounded by the virtual isolation of communities as transportation ground to a halt in choking clouds of ash. A rapid response research investigation was initiated one month after the May 18 eruption.

This research analyzed the operational experience of local governments responding to the emergency created by the ash fallout. Information was collected on the actual strategies local governments adopted to organize their resources, seek outside assistance, and work with their citizens. It was believed these data might prove useful in the future evaluation of response plans for hazards affecting large areas, such as major earthquakes and radiological emergencies. This investigation did not arise out of ongoing disaster research. As policy planners, the researchers were motivated by very recent work on the subject of "research-based community emergency planning" conducted by sociologists.

Our first objective was to collect information on the direct operational experience of local governments responding to the ashfall. How did it compare with our normative expectations about how response and

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recovery ought to be implemented? A second objective was to assess the potential usefulness of the concept of adaptive, behavior-based strategies suggested by social scientists. Thirdly, we wished to identify the institutional and situational constraints faced by local officials.

The local response to Mount St. Helens' ash fallout provided evidence that responsible officials under stress adaptively learned their way into action techniques much like those prescribed by academic researchers in postdisaster studies. More effort is needed to discover how public officials can be led into such cognitive learning and planning *before* disasters strike.

ACKNOWLEDGEMENTS

A number of individuals deserve thanks for their assistance during the research project which the following paper summarizes. William A. Anderson of the National Science Foundation greatly aided with information, responsive program management and, most important, an open mind and patience with researchers outside the social science hazards research community. Ronald W. Perry of Battelle also deserves special thanks for the advice he freely gave us from the earliest stages of the research. Both individuals have done a great deal to encourage new hazards researchers to overcome the many obstacles to interdisciplinary work.

All of the municipal, county and special district officials who participated in the project also deserve thanks. They were all extremely cooperative in finding time to participate during a difficult period. That cooperation bodes well for further collaboration between hazards researchers and local government.

PREFACE

This paper is one in a series on research in progress in the field of human adjustments to natural hazards. It is intended that these papers be used as working documents by those directly involved in hazard research, as well as inform a larger circle of interested persons. The series was started with funds from the National Science Foundation to the University of Colorado and Clark University, but it is now on a self-supporting basis. Authorship of the papers is not necessarily confined to those working at these institutions.

Further information about the research program is available from the following:

Gilbert F. White
Institute of Behavioral Science #6
University of Colorado
Boulder, Colorado 80309

Robert W. Kates
Graduate School of Geography
Clark University
Worcester, Massachusetts 01610

Iam Burton
Institute for Environmental Studies
University of Toronto
Toronto, Canada M5S 1A4

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DISASTER RESEARCH & PLANNING THEORY

Social scientists studying disasters have argued that population behavior in emergencies has a regular pattern. They believe public authorities must recognize these behavior patterns when designing response and recovery plans:

Too often emergency plans which are administratively devised turn out to be based on misconceptions of how people react and, therefore, potentially create more problems than they solve (Perry, 1979).

Social scientists argue that research insights can enhance the effectiveness of response if they are incorporated into plans by the authorities. They have suggested specific strategies to overcome such problems in disaster response as unwillingness to evacuate ("warning confirmation behavior") and jammed telephone lines ("convergence behavior"). These strategies are built around known reaction patterns and provide incentives for them to comply with an organized response plan. For example, several researchers suggest making positive use of the telephone to combat confirmation and convergence by establishing central hazard confirmation phone centers. One strategy involves people-oriented grapevines or phone trees wherein authorities first contact selected residents who pass on information in their immediate areas (Perry, 1979; Lindell *et al.*, 1980).

Such concepts can make a good deal of sense to policy planners. The history of planning is filled with ineffective programs and policies which disregarded the behavioral basis for community needs. Many downtown urban renewal projects are good examples; for example, Perin (1970, p. 40) observes that:

The historical European reasons for the plaza--as the sole source of water, as the marshaling yard for baroque ceremonials--do not exist within urbanized society. Yet designers and critics will demand a plaza in order to create a sense of community--and so we make large commitments of public funds to perpetuate yet another pathetic fallacy in design.

Planners also agree with criticisms researchers have raised about the tendency to treat disaster planning as a product--a report on a shelf--rather than a process (Wenger *et al.*, 1980). That issue cuts through most planning, but there is also a tendency on the part of disaster researchers to treat implementing agents, or public officials, as a kind of "black box." Emergency planning offices, general purpose local government, state and federal agencies all tend to be lumped into categorical definitions like "planners" or "authorities."

This obscures the operational dynamics of planning and implementing the public emergency response. More attention needs to be given to the complexities of the emergency planning process itself and the unique qualities of the different public institutions involved. Knowledge about disaster planning needs has to be translated into practice *through* these institutions. John Friedmann (1979) calls this linking of knowledge to action both the "essential meaning of planning" and its central problem. The field of planning is dominated by arguments over this gap between ideal objectives and what it is actually possible to implement.

The planning and community development profession is learning that more attention has to be paid to the institutional problems of implementing policies or strategies of any kind. Even the best of ideas requires facilitation that's sensitive to what Larry Susskind of MIT calls the "situational potentials, institutional constraints and client needs" in

each case (1974). The key problem addressed in this investigation was why emergency response planning should be any different.

METHODS OF THE STUDY

This research examined the responses of local governments to the ashfall from the May 18, 1980, eruption of Mount St. Helens. Data were gathered on the strategies used by the local governments to organize their resources, seek outside assistance, and work with citizens. Figure 1 shows the locales in which surveys were made.

This paper presents the highlights of 40 tables of survey results, 12 on-site case studies, and some suggestions of possible implications for emergency planning. Three types of activities dominated most jurisdictions' responses to the May 18th eruption: organizing local government resources; finding outside assistance, especially heavy equipment; and communicating with citizens, asking them to follow various locally defined strategies. Data were collected through a written, mail-out survey of 26 jurisdictions, and through detailed, on-site follow-up interviews in 12 of those jurisdictions. This included a sample of jurisdictions also affected by both the May 28th and June 12th eruptions. Thirty-eight percent of the respondents were city managers; 43% public works directors; and 19% elected officials, mainly mayors and county commissioners in more rural jurisdictions.

ORGANIZATION OF THE LOCAL RESPONSE

In their immediate responses, local governments utilized existing functional lines of organization, such as those that public works, safety and management staff use on a day-to-day basis. No more than one-third of the 26 jurisdictions reported using an existing countywide emergency

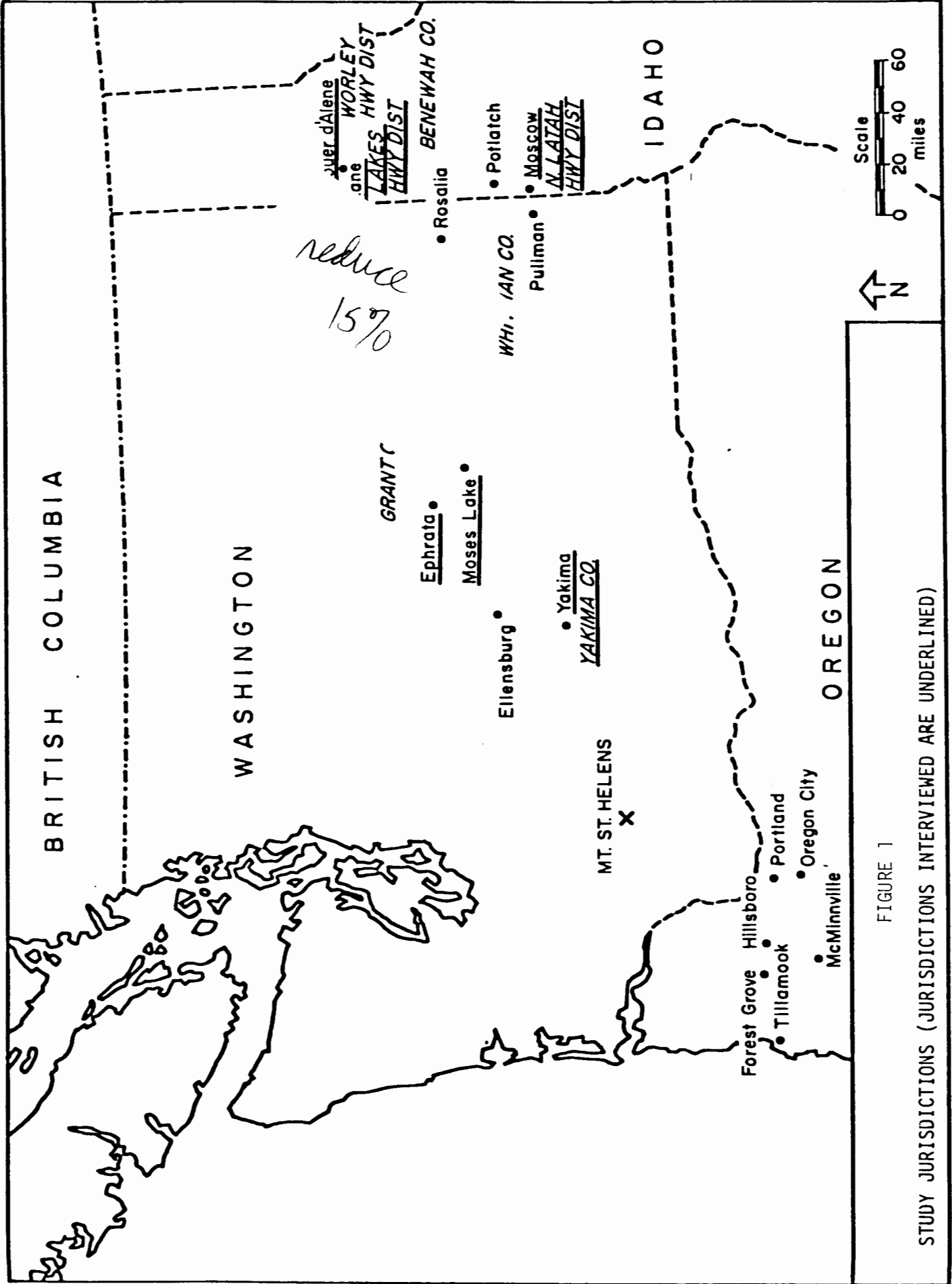


FIGURE 1

STUDY JURISDICTIONS (JURISDICTIONS INTERVIEWED ARE UNDERLINED)

preparedness plan as the source of any one of four types of information needed to organize local efforts to control thousands of tons of the fine ash. About half reported no use at all of a countywide plan, which is the usual centerpiece for state and federally funded general preparedness planning (Table 1).

Jurisdictions were asked to rank the perceived effectiveness of both the internal and external forms of assistance they received during the first week after ashfall. Local governments ranked their "own judgment" and the private news media as the most useful tools during the immediate response period. Law enforcement communications systems ranked closely behind. Assistance from other cities and counties also ranked highly. State government ranked last (Table 2).

Eighty-five percent of the jurisdictions found it necessary to seek equipment resources from an outside source. The major sources were private contractors and other local governments outside the impact area (Table 3). Citizen volunteers were also a source of emergency assistance; seven jurisdictions reported requesting citizen volunteers, while another 15 reported some form of spontaneous citizen assistance.

Efforts to communicate with citizens were very central to the local response. Ninety-six percent reported using communications methods and procedures established by the jurisdiction itself, after ashfall. Only one jurisdiction reported complete reliance on a countywide civil defense emergency broadcast system to relay specific instructions and warnings to citizens. Local radio stations were the predominant communications vehicle for 75% of the jurisdictions, with non-local radio stations a close second. However, there was significant use of locally tailored or

TABLE 1
 REPORTED USE OF "COUNTYWIDE EMERGENCY PLANS" TO
 FIND INFORMATION FOR THE EMERGENCY RESPONSE

<u>Type of Information</u>	n = 27					
	<u>Plan Used</u>		<u>Plan not Used</u>		<u>No Response</u>	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
1. "Where to Get Information on Health Hazards of Ash"	10	37%	17	63%	0	0
2. "Which State Agency to Contact for Assistance"	7	26%	19	71%	1	4%
3. "Where to Get More Equipment"	8	30%	18	67%	1	4%
4. "How to Use Radio or TV Media to Send Messages to Citizens"	5	19%	21	77%	1	4%
Mean Response		28%		69%		3%

TABLE 2
 PERCEIVED EFFECTIVENESS OF EXTERNAL AND INTERNAL
 ASSISTANCE RECEIVED DURING THE FIRST WEEK AFTER ASHFALL

Assistance Source	Mean Weighted* Effectiveness Rating	Rank	% of n=27 Respondents
1. "Our own observa- tion and judgment"	8.96	1	100%
2. News Media (radio, television, etc.)	6.71	2	78%
3. County Sheriff or Municipal Police Teletype Net	5.00	3	82%
4. Other Cities	4.96	4	85%
5. Other Counties	4.71	5	78%
6. National Guard	3.78	6	70%
7. Local University	3.70	7	74%
8. State Emergency or Civil Defense Agency	3.09	8	82%
9. State Executive Office	1.90	9	82%

* 10 = most effective; 1 = least effective

TABLE 3
SOURCES OF EQUIPMENT ACQUIRED BY LOCAL GOVERNMENTS

n = 23

	<u>N</u>	<u>%</u> ^{**}
Other Units of Local Government [*]	12	52%
State Agencies	4	17%
National Guard	7	30%
Private Contractors	16	70%
Farmers	7	30%
Local University	2	9%
Sales or Rental Dealers	6	25%

* Includes cities; counties; sub-county highway, fire and school districts.

** Percentage of n = 23 jurisdictions receiving equipment.

adaptive communication strategies. Local information phone centers ranked third in use, by half the jurisdictions. Publicly organized citizen "grapevines" were used by 40% (Table 4).

However, a different pattern emerged when jurisdictions were asked to rank the perceived *effectiveness* of these different communications methods. While local radio stations also ranked first in effectiveness, local information phones and "grapevines" ranked second and third, respectively, with non-local radio stations dropping to fourth. One other adaptive strategy--door-to-door distribution of instructions--which had ranked eighth in use, rose to fifth rank in effectiveness. Non-local radio and all television media consistently ranked lower in effectiveness than in use (Table 5).

The reasons for this pattern were further revealed by the survey question probing jurisdictions' perceptions of problems reducing media effectiveness as a communications and control tool. Sixty percent (16) of the jurisdictions reported problems due to overlapping radio and television messages from larger jurisdictions (Figure 2). This means that communities surrounding larger cities like Spokane encountered difficulty in delivering specific instructions to their citizens who were hearing conflicting messages from powerful regional stations. Some jurisdictions also reported other media communications problems such as incorrect messages (44%), infrequent broadcasting of vital public instructions (41%), and editing of instructions by media personnel (26%). Many of these communities turned to locally controlled adaptive communication techniques such as phone centers and grapevines to overcome these problems (Table 6).

The written survey indicated that local government did not rely on countywide emergency coordination systems or state government for

TABLE 4
COMMUNICATIONS METHODS USED

n = 27

<u>Type of Method</u>	<u>Rank by Number of Jurisdictions Using Method (% of total in Parentheses)</u>
Local Radio Station	1 (74%)
Non-Local Radio Station	2 (59%)
Information Phones Set Up Locally	3 (48%)
"Grapevines"	4 (41%)
Public Address Systems on Vehicles	5 (41%)
Non-Local TV Station	6 (37%)
Local TV Station	7 (33%)
Written Leaflet Distributed to Residents	8 (26%)
Citizens Band Radio	9 (26%)

TABLE 5
COMMUNICATIONS METHODS AND THEIR PERCEIVED EFFECTIVENESS

<u>Type of Method</u>	<u>Rank by Frequency of Jurisdictions Using Method (% of Total in Parentheses)</u>	<u>Rank by Weighted Mean Effectiveness Score (Rating Shown in Par.)</u>
Local Radio Station	1 (74%)	1 (8.4)
Non-Local Radio Station	2 (59%)	4 (6.6)
Information Phones Set Up Locally	3 (48%)	2 (7.3)
"Grapevines"	4 (41%)	3 (6.72)
Public Address Systems on Vehicles	5 (41%)	8 (4.18)
Non-Local TV Station	6 (37%)	7 (5.27)
Local TV Station	7 (33%)	6 (5.55)
Written Leaflet Distribution to Residents	8 (26%)	5 (6.14)
Citizens Band Radio	9 (26%)	9 (2.71)

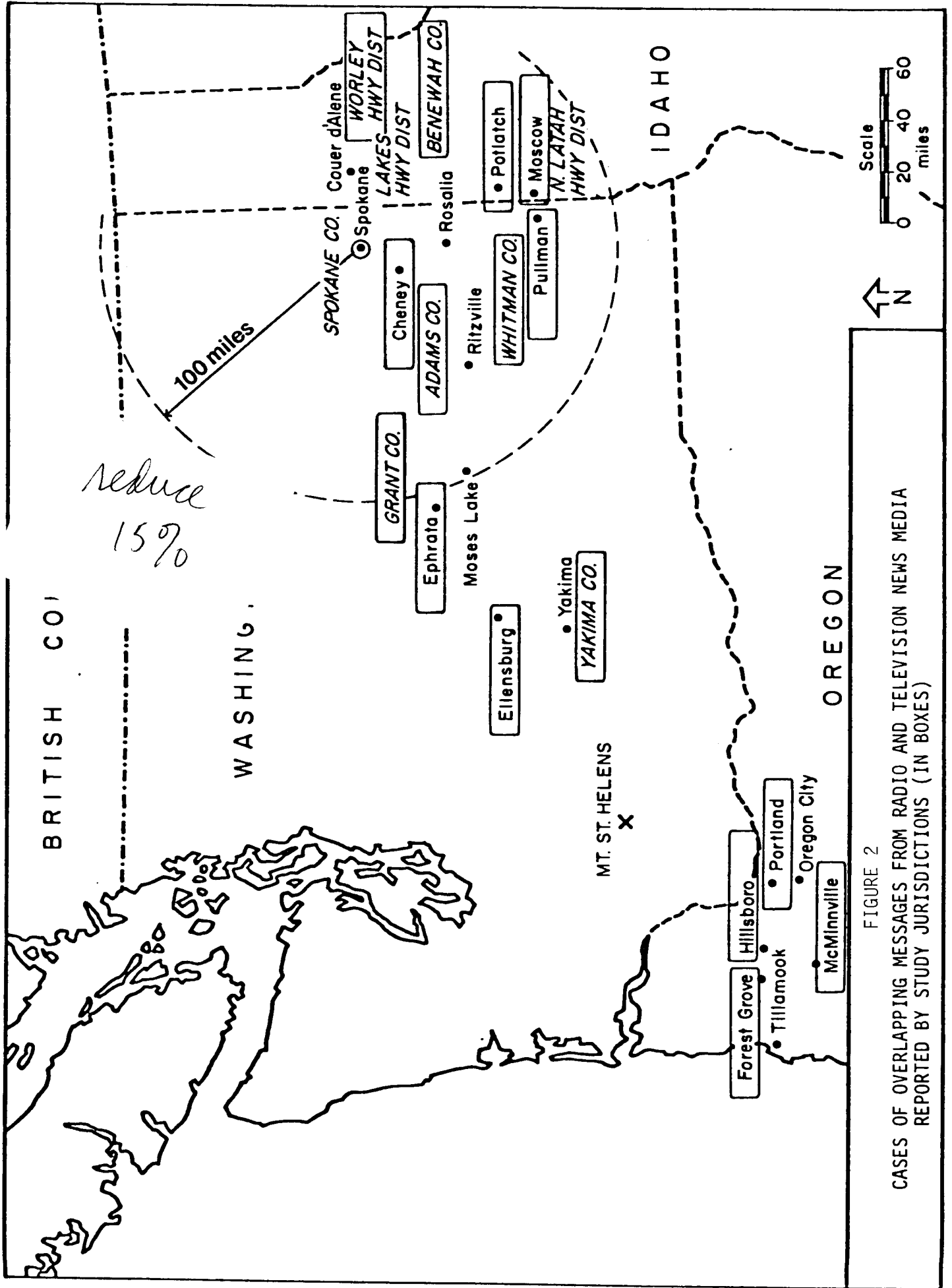


FIGURE 2

CASES OF OVERLAPPING MESSAGES FROM RADIO AND TELEVISION NEWS MEDIA REPORTED BY STUDY JURISDICTIONS (IN BOXES)

TABLE 6
COMMUNICATIONS BARRIERS THROUGH RADIO AND TELEVISION

n = 27

<u>Factor *</u>	<u>A Reason for Ineffectiveness</u>	<u>Not a Reason for Ineffectiveness</u>	<u>No ** Response</u>	<u>Total</u>
1. Message Delayed	9 (33%)	4 (15%)	14 (52%)	27 (100%)
2. Media Edited the Message	7 (26%)	6 (22%)	15 (52%)	27 (100%)
3. Message Overlapped with Those from Elsewhere	16 (60%)	2 (7%)	9 (33%)	27 (100%)
4. Message Given Incorrectly	12 (44%)	4 (15%)	11 (41%)	27 (100%)
5. Message Given Too Infrequently	11 (41%)	4 (15%)	12 (44%)	27 (100%)
6. Our Message Made Secondary to Others	6 (23%)	4 (15%)	17 (62%)	27 (100%)

*Additional ad-hoc answers included "official notices confused with interviews conducted with private citizens," "message given reflected media's own judgment," "message was not heeded by the public."

** A variable number of responding jurisdictions answered each of the six items in this question. Jurisdictions which did not respond to a particular category are included under "No Response." It is assumed these jurisdictions found media to be effective.

organization and resources. Without the interview data from the 12 on-site case studies, however, the actual meaning of these general patterns would have been obscure. Although case studies have been subjected to a good deal of criticism in social science disaster research for such violations of scientific method as subjectivity and non-replicability, their importance cannot be dismissed (see, for example, the debate between Griffin and Griffin, 1975; and Mileti *et al.*, 1975).

These case studies illuminated how and why local officials engaged in adaptive learning and action planning that was sensitive to the behaviors not only of individual citizens, but also of governmental institutions under stress (an area that has received less attention in disaster planning research). A few examples presented here illustrate how local governments found equipment through surprising methods, why jurisdictions experienced problems with communications, and how the organization of citizens in a prolonged emergency is related to a much broader set of issues concerning ongoing community planning and problem solving.

Finding Equipment

The importance of finding heavy equipment necessary to remove the ash cannot be over-emphasized. The need for water tankers, dump trucks, industrial vacuums, backhoes and blades outstripped the resources of individual jurisdictions. Private contractors and other local governments were the major sources of this equipment. Although seven of the surveyed jurisdictions were refused equipment by private contractors they normally rely on, the case studies revealed this was a minor problem compared to the hours and days spent negotiating standard rental rates with many

separate contractors. Many local governments provided equipment to those in need, but this was rarely the result of planned arrangements. Assistance from other jurisdictions did not evolve logically out of geographic closeness or statewide resource allocation; instead, it arose from existing professional ties between public officials, cultural ties between communities, media attention, and the ingenuity of local officials.

Assistance came from some distance in many cases, including across state and national boundaries (see Figure 3). For example, Yakima received equipment from both Seattle and Portland partly because of its association with these larger cities in many statewide, professional and regional affairs. Ritzville and rural Adams County, which received both the greatest ashfall and most national media attention, were inundated with high-priced offers of assistance from private sources. However, the most useful assistance was the result of the ties between rural counties in Washington. On the fourth day after the eruption, a rural Kitsap County Commissioner called his counterpart on the Adams County Commission (a long-time friend) to ask if help was needed. As a result, several of the more rural coastal counties 300 miles away sent both equipment and public employees to the beleaguered Ritzville area.

State agencies ranked low as equipment sources, although several jurisdictions reported contacting them for assistance. The state agencies had a problem with simple resource scarcity--state government itself faced an awesome task in clearing hundreds of miles of highways. In one case, an Idaho community found itself competing with its district office of the Idaho Transportation Department for the same rental equipment. How-

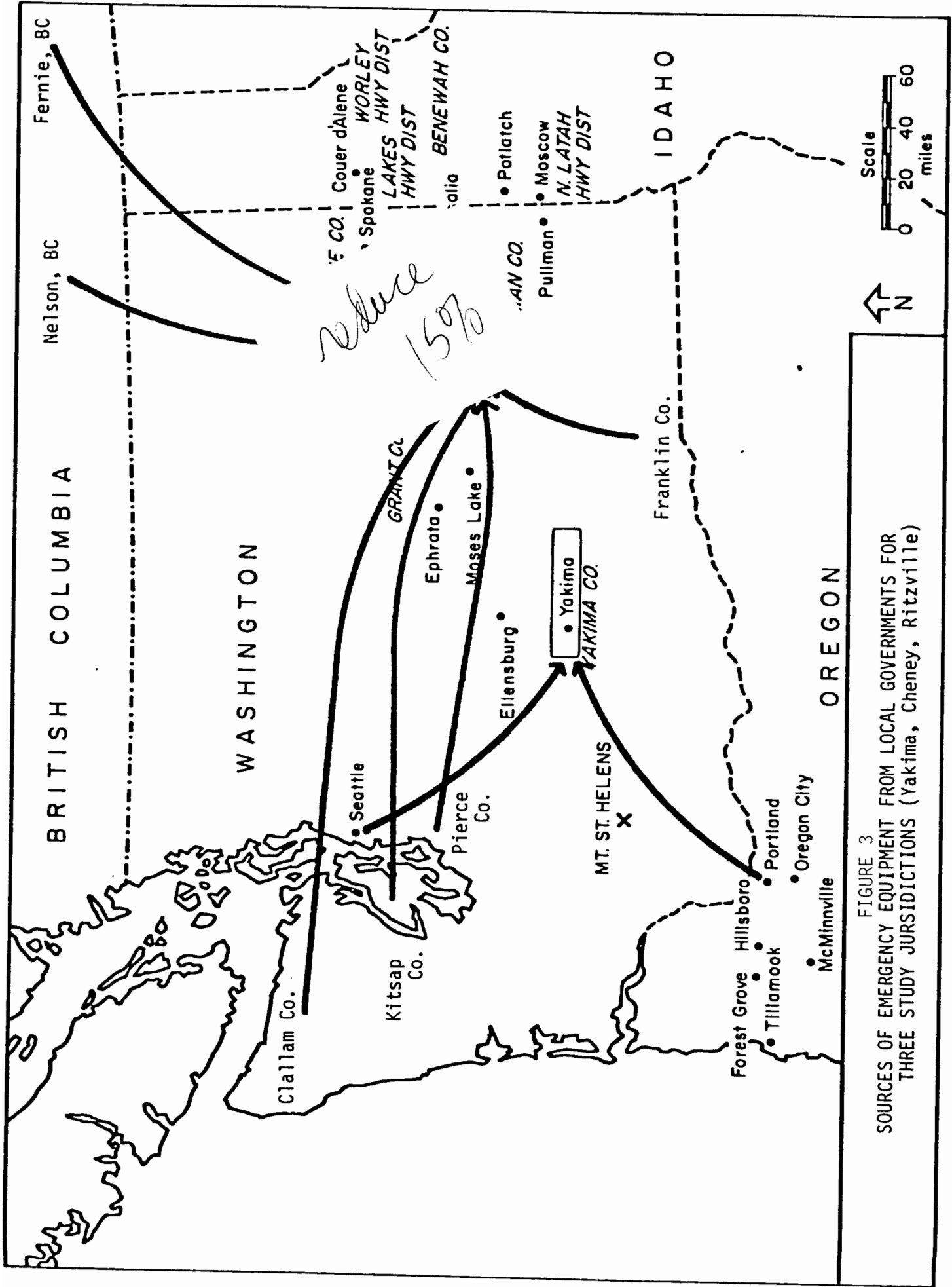


FIGURE 3
 SOURCES OF EMERGENCY EQUIPMENT FROM LOCAL GOVERNMENTS FOR
 THREE STUDY JURISDICTIONS (Yakima, Cheney, Ritzville)

ever, case studies revealed that the problem was due also to lack of a coordinative mechanism for allocating statewide aid. Where state agency assistance was gained, it was most often through direct contact with district or sub-state offices with which local government works daily, rather than through centralized statewide coordination.

The frustration felt by local governments searching for equipment is well-illustrated by the case of the City of Cheney, only an hour's drive from Ritzville. In the words of Cheney's City Manager:

We needed water trucks and we couldn't get them. Tuesday morning we started asking DES (State Emergency Agency) for water trucks, and we got nothing. Then we put out telexes to all points in the country to send us water trucks and we'd get responses back like '\$100.00 AN HOUR F.O.B. PHOENIX,' or '\$125.00 AN HOUR F.O.B. REDDING, CALIFORNIA.' We're not going to pay those rates!

So we sat back and thought about it [as] we put our 10,000th call on the telex, and somebody called British Columbia. The way that evolved is we're trying to be logical about this. Nobody in Idaho is going to give up anything. I called one city manager who made me realize...that the mountain was going to blow again and he wasn't going to let his equipment go. Nor was anybody over on the west side (of Washington).

Two days later I realized that help was not going to come from within the state. Every available water truck is going to be sucked up by (larger jurisdictions) able to pay those outrageous prices. The nearest people I know that I could 'put the arm on' for a water truck are in the Midwest because that's where all my professional acquaintances are. I said, it's so simple...British Columbia (Canada). Just go up there north of the border. We got a map of British Columbia and started calling the RCMP stations up there (to get phone numbers of local mayors, managers and city engineers). We made four phone calls. Trail said, 'We can only give the truck up for a week.' Nelson said, 'How can we get it down to you?' Ferny said, 'You bet.'

Cheney's "foreign aid" resulted from on-the-spot adaptive learning, and the horizontal, situation-dependent relationships among communities, instead of the top-down, vertical lines of "administrative" assistance many jurisdictions initially tried to rely on.

Communications and the Media

Disaster researchers have argued that more attention needs to be paid to the role of the mass media in emergency planning and response (Wenger *et al.*, 1980, p. 146). The recovery from ashfall confirmed that belief, as radio stations played a major role. The case studies, however, revealed a host of operational problems and questions of institutional behavior in implementing the response. Overlapping messages ought to be anticipated in any multi-jurisdictional setting. But that depends on how the setting is defined and who defines it. For example, the city of Spokane and Spokane County, encompassing 330,000 people, avoided conflicting messages due to an agreement established a year earlier to designate one spokesperson for a joint council of city and county officials in any metropolitan emergency. However, their messages overwhelmed and directly conflicted with specific instructions being given to residents of numerous outlying communities within a 100-mile radius!

Many of these smaller communities turned to adaptive communication strategies like the grapevine to overcome the confusion caused by radio and T.V. overlap, but only after a painful learning experience sometimes lasting several days. Even larger communities moved to establish special communication systems only after learning the limits of mass media and the Emergency Broadcast Systems for giving details or changing local instructions. It is exactly these detailed instructions--in this case on how to control the ash, organize public volunteer efforts and control auto use--which social scientists have told us are essential to gaining effective cooperation from citizens (Perry *et al.*, 1980).

The case studies also revealed some reasons why local radio and television stations were more effective than non-local ones. The accuracy

of messages to citizens was much greater wherever jurisdictions were able to meet directly with media personnel on a daily basis, or arrange for regularly scheduled news briefings. This was most easily achieved in working with local stations. Large regional stations, particularly television, tended to treat official messages only as news and to edit it. This editing of public instructions frustrated some public officials.

Countywide emergency plans simply did not anticipate these problems. The most common communications tool in these plans was a list of phone numbers for radio and T.V. stations, and these were frequently outdated. What was needed, and subsequently developed, was an ongoing understanding with media personnel that cannot be actualized by a list in a document.

Organizing the Public

The role of process was also brought out in case study information on how local government organized citizens to clean up the ash. We have probably all focused too much on evacuation as the primary citizen activity in emergencies, but people do not always have somewhere to go. In this case they couldn't go anywhere and they were needed to help overwhelmed public employees clean up the ash. However, local governments had to organize that effort, because the citizens did not have their own fire hoses for washing down streets and heavy equipment for hauling ash away. More importantly, individual citizens are not used to working in teams under stress. Jurisdictions had to organize citizens to deal with such problems as losing fire hydrants ruptured by persons inexperienced in their use, and losing fire-fighting water supplies when thousands of people tried to clean their own property at once.

The challenge of organizing citizens is probably the most thought-provoking phenomenon from the St. Helens emergency. It can be illustrated by contrasting the experience of two of the larger cities in eastern Washington as perceived by key public officials. The first city, Yakima, organized a massive neighborhood cleanup program several days after the eruption; however, this was only after a private effort sponsored by the Chamber of Commerce had its resources outstripped by the demand from neighborhoods. One administrator responsible for that effort was deeply impressed by what happened in certain neighborhoods:

One of the areas I was really concerned about was the lower-income areas because of the Block Grant (a federally funded neighborhood assistance program). What I found, and I physically went out and checked it, is that those lower-income people had their areas cleaned up quicker and were more organized than anybody else in the community. It was interesting, the citizen participation approach that the people in the Block Grant areas took. We've gone through that area (in the planning process) so that everybody knows everybody else on their block--have their own little crime watch thing going and those kinds of things down in that area--and they *know* each other. The people who we'd been working with, that's who we called and identified as their block leaders and coordinators (in the emergency).

An administrator in Moses Lake, which did not have a cleanup effort using citizen labor, echoed these same concerns from another point of view:

You've got a problem of, really, organization and supervision there. There were a lot of questions like that. 'Why don't you get into the neighborhoods and give 'em a coil of firehose and let them hook up to a hydrant?' That sounds great when you talk about it, but it's going to take us days just to set up that sort of a plan, and we're busy doing other things. I would say that if we had time to set up that sort of plan and neighborhoods were already organized, that would be a great way to do it. But, on the other hand, I think it would take a long time to put something like that together, and that it would fall apart if you didn't use it. In other words, if we were able to set it up next week, and used it next week, that's great. If we set it up next week and never used it for a year's time, by that time it would be useless.

The suggestion here is that ongoing community development and problem-solving processes may be a tremendously important investment for implementing emergency response effectively when citizens must be active rather than passive participants. We can't expect to turn effective organization of citizens on and off with an administrative switch.

IMPLICATIONS FOR EMERGENCY PLANNING

There were many potential lessons found here concerning specific operational techniques like maintaining contractor lists and standard equipment rate agreements, extra phone jacks in the community's emergency command center, and understandings with the private media. There are also broader process-related insights into how we perceive planning needs in light of the actual problems of a widespread emergency response.

The evidence supports social scientists' arguments that we need to be more sensitive to people's needs and behaviors in planning emergency response measures. Clearly, local officials adopted many strategies reflecting this sensitivity on their own part. Some of them were very similar to strategies suggested in normative prescriptions by researchers. However, local officials learned their way into these strategies in the heat of emergency. The question facing us is how to promote such creative, situation-dependent cognitive learning before a hazard strikes.

One method of internalizing the lessons of this and other emergencies may be to focus more on local learning and capacity-building which is sensitive to each area's setting, institutions and practices. One approach to this is the development of simulation and people-oriented training techniques for developing actual emergency plans with--not for--the actors who will have to use them. Such an approach has been developed by the

Academy for State and Local Government for FEMA and is to be field-tested in the Atlanta federal region. It is the opposite of the top-down approach taken in the civil defense preparedness system and the current generation of "crisis relocation planning."

The St. Helens recovery also implies that social scientists and public policy administrators need to give more attention to the institutional context in which the short-term response is *implemented*. There is a somewhat flawed assumption about the role of the civil defense-oriented countywide emergency coordination system in operations which require large amounts of material, public works expertise and citizen involvement. This role clearly fell to general purpose local government after St. Helens. There is a definite need to bring the operational officials of local government more closely into defining the scope and objectives of emergency planning. Indeed, this was a major conclusion of the first year's work by the Academy for State and Local Government (Rubin, 1981).

However, that project deals with the problems and institutional dynamics of long-term disaster recovery with a focus on federal financial assistance programs for local government. Less attention has been paid to the immediate response and short-term recovery, during which local government must be most self-reliant. Furthermore, the effects of administrative mandates for local emergency planning may deserve a good deal more scrutiny by those interested in how local government views its own capacity.

For example, the observations in this study suggest that current intergovernmental funding of preparedness planning is encouraging a two-tiered system of plans. On the first tier are the federally mandated

nuclear response plans embodied in the countywide coordination model. The second tier consists of local procedures which develop out of adaptation to each jurisdiction's experience, potentials and constraints (or disaster subculture). The chilling implications of this organizational dissonance are suggested by the attitude of one city manager in the ashfall zone towards the massive urban to rural crisis relocation plans currently being institutionalized through federal administrative directive. He said, "The civil defense training a year ago was useful organizationally, but it'll never work operationally."

We need to look beyond what *we* think should work for local officials in an emergency to what *they* think will work in their own functional settings. Social-psychologist and policy planner Donald Michael suggests that we need "...to use crises for discovering new options...in post-disaster periods" (1974). He argues that we need to develop organizations that are open to the new and unexpected instead of the "familiar and reliable," or what he calls "organizations that can adaptively *learn how to plan.*" The practical experience with Mount St. Helens supports this argument well.

How to go about this process of planned change and local capacity-building is, however, a subject on which there is little agreement. One impediment to further research contributions is the belief that researchers should not be involved in the planning process itself. This conflicts with the thrust of contemporary planning theory, as well as with investigations of how to improve local capacity in general public management (see Fisher, 1975a; 1975b). To paraphrase Fisher's comment on the OMB/NSF study of capacity-building in local government in 1975, "training *is* research."

To help public officials learn and plan before disaster strikes may require some breaking down of the distinction between researcher and research subject through more of the same process of mutual learning which became the foundation for advances in planning process techniques in the last ten years (see Friedmann, 1973). In specific terms, researchers should continue to test the usefulness of research-based prescriptions *and discover new ones* through a direct process of predisaster training and evaluation in partnership with public officials.

REFERENCES

- Friedmann, J.
 1979 "Innovation, Flexible Response and Social Learning: A Problem in the Theory of Meta-Planning." In Burchell and Sternlieb, eds. Planning Theory in the 1980's: A Search for Future Directions. New Brunswick, NJ: Rutgers University, The Center for Urban Policy Research.
- 1973 Retracking America: A Theory of Transactive Planning. Garden City, NY: Anchor Press.
- Fisher, Fred
 1975a "The Role of Training and Development in Building the Capacity of State & Local Governments." In Report of the OMB Study Committee on Policy Management Assistance, Vol. III. Washington: National Science Foundation.
- 1975b "Psst! Training & Development Is Capacity Building. Pass It On." An issue paper prepared for the National Science Foundation. Washington.
- Griffin, C. T. and Griffin, B. S.
 1975 "System Stress and the Persistence of Emergent Organizations: A Comment." Sociological Inquiry 45(4), p. 71.
- Lindell, M. K., W. L. Rankin, and R. W. Perry
 1980 "Warning Mechanisms in Emergency Response Systems." Seattle: Battelle Human Affairs Research Centers.
- Michael, D. N.
 1973 On Learning to Plan--and Planning to Learn. San Francisco: Jossey-Bass.
- 1974 "Speculations on Future Planning Process Theory." In Godschalk, ed. Planning in America: Learning from Turbulence. Washington: American Institute of Planners.
- Mileti, D. S., R. W. Perry, and D. F. Gillespie
 1975 "The Analytic Use of Case Study Materials: A Rejoinder to Griffin and Griffin." Sociological Inquiry 45(4), pp. 72 & 50.
- Perin, C.
 1970 With Man in Mind: An Interdisciplinary Prospectus for Environmental Design. Cambridge, MA: The MIT Press.
- Perry, R. W.
 1979 "Incentives for Evacuation in Natural Disaster." Journal of the American Planning Association 45(4), pp. 440-447.

- Perry, R. W., M. K. Lindell, and M. R. Green
1980 "Evacuation Decision-Making and Emergency Planning."
Seattle: Battelle Memorial Institute.
- Rubin, Claire B.
1981 "Planning Long-Term Recovery From Natural Disasters: A
Training Program on Decisionmaking for Local Officials."
Mimeo. Washington: Academy for State and Local Government.
- Susskind, L. E.
1974 "The Future of the Planning Profession." In Godschalk,
ed. Planning in America: Learning from Turbulence.
Washington: American Institute of Planners.
- Wenger, D. E., C. E. Faupel, and T. F. James
1980 "Disaster Beliefs and Emergency Planning." Newark:
University of Delaware.

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