

DGGS offices are located:

3601 C St (10th fl.)  
Pouch 7-005  
Anchorage, 99510

P.O. Box 7438  
State Office Bldg.  
Ketchikan, 99901

794 University Ave.  
(Basement)  
Fairbanks, 99701

230 So. Franklin  
(4th fl.)  
Juneau, 99801

P.O. Box 772116  
Eagle River, 99577

Information Circular 21  
**GEOLOGIC-HAZARDS INFORMATION—  
SOURCES AND CONSULTANTS**

*Revised Jan. 15, 1984*



**DIVISION OF GEOLOGICAL AND  
GEOPHYSICAL SURVEYS**



**STATE OF ALASKA**

*Bill Sheffield, Governor*  
*Esther C. Wunnicke, Commissioner,*  
*Dept. of Natural Resources*  
*Ross G. Schaff, State Geologist*

 Alaska Department of  
**NATURAL  
RESOURCES**

STATE OF ALASKA  
Department of Natural Resources  
DIVISION OF GEOLOGICAL &  
GEOPHYSICAL SURVEYS

According to Alaska Statute 41, the Alaska Division of Geological and Geophysical Surveys is charged with conducting 'geological and geophysical surveys to determine the potential of Alaska lands for production of metals, minerals, fuels, and geothermal resources; the locations and supplies of ground waters and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct other surveys and investigations as will advance knowledge of the geology of Alaska.'

In addition, the Division shall collect, evaluate, and publish data on the underground, surface, and coastal waters of the state. It shall also acquire, process, and file data from well-drilling logs.

DGGS performs numerous functions, all under the direction of the State Geologist—resource investigations (including mineral, petroleum, geothermal, and water), geologic-hazard and geochemical investigations, and information services.

Administrative functions are performed under the direction of the State Geologist, who maintains his office in Anchorage (ph. 276-2653). Other DGGS offices are at:

.794 University Ave. (Basement) Fairbanks, 99701 (907) 474-7147	.3601 C St (10th fl.) Pouch 7-005 Anchorage, 99510 (907) 786-2205
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.230 So. Franklin (4th floor) Juneau, 99801 (907) 465-3400, Ext. 39	.P.O. Box 7438 State Office Bldg. Ketchikan, 99901 (907) 225-4181
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.P.O. Box 772116  
Eagle River, 99577  
(907) 688-3555

Cover: *Log home demolished by avalanche from 3,500-ft level of Mt. Magnificent, near Eagle River, Alaska, April 17, 1979. The avalanche continued down a creek and over a 45-ft berm, tearing another house off its foundation. (Photo by Mike Rodak, DNR Division of Parks, 4/17/79.)*

## GEOLOGIC-HAZARDS INFORMATION SOURCES AND CONSULTANTS

Geologic hazards, described as those conditions that endanger life or property, occur in many forms. Most hazards can be avoided or mitigated. Some, however—flooding, seismic instability, volcanic eruption, and the like—cannot be avoided or reduced in magnitude.

If you suspect that a geologic hazard is near you, the Alaska Division of Geological and Geophysical Surveys recommends that you acquaint yourself with the possible dangers involved.

The intent of this circular is to provide you with a directory to sources of geologic-hazards information. The circular is updated periodically. If you have suggestions or new information, please contact DGGs Publications, 794 University Avenue (Basement), Fairbanks, AK 99701.

### GEOLOGIC HAZARDS

There are many types and degrees of geologic hazards.

Some are slow and insidious (permafrost degradation, geochemical ground-water contamination), whereas others are sudden and spectacular, such as volcanic eruption or onshore encroachment of pack ice. Some are local (avalanche, for example) and some occur on a very large scale, such as a tsunami, which can affect the entire Pacific Rim.

The types and degrees of natural hazards that exist in Alaska are far too numerous to describe in detail here. Instead, we present:

- a) A list of some of the major geologic hazards operating in Alaska,
- b) A table of common geologic hazards and contacts for further information on each, and
- c) A directory of the individuals or agencies listed or cross-referenced in the table.

### MAJOR HAZARDS

Eolian hazards: Geologic effects induced by the action of wind—deflation, deposition, dune migration, sandblasting.

**Flooding:** Inundation caused by high precipitation rates, rapid snow melt, ice jams, damming and subsequent outburst due to slides, mudflows, and glaciers; glacier outburst (jokulhlaup); ice formation in road culverts.

**Fluvial hazards:** Bank erosion; rapid aggradation.

**Glacial-related hazards:** Includes hazards relating to glacial advances and retreats.

**Ground ice (active-layer phenomena):** Lens or massive ice forming below the ground surface, which results in frost heaving and jacking, frost boils, and tensional cracking.

**Ground ice (permafrost):** Interstitial or massive ice in ground that is normally perennially frozen and which, when thawed, can form thermokarst or thaw lakes; thermal degradation and subsidence from construction.

**Hazards related to ground water:** Ground-water depletion; naturally occurring toxic chemicals; settlement due to interstitial collapse following excessive pumping of reservoirs; artesian flooding and effects on permafrost; saltwater incursion in coastal aquifers.

**Other ice-related hazards:** Aufeis formation; road and slope icings; on-shore encroachment of pack ice; lake-ice impact and shove; well icings; rime icing (on ships).

**Mass-movement phenomena:** Landslides; debris flows; debris avalanches; mudflows; rockfalls; soil creep; solifluction; snow avalanches; slushflow avalanches; slide-induced waves; seiches.

**Marine coastal hazards:** Storm surges; coastal erosion; man-caused erosion; saltwater flooding of low-lying areas; tsunamis.

**Seismic hazards:** Earthquake ground shaking and cracking; cohesive failure in subsurface; tsunami generation; slope and building failure; thixotropic soil failure (liquefaction).

**Soil hazards:** Compaction settling; expanding clays; erosion by wind, gullying, and sheetwash.

**Submarine hazards:** Earthquake-induced submarine slumps; turbidity currents; scour by bottom currents and drifting sea ice; ice-pressure ridges; sand-ridge migration; high-velocity effects of geostrophic and tidal currents; gas-charged bottom sediments; submarine oil seeps.

**Volcanic hazards:** Ash falls; glowing tephra avalanches; lahars; base surges; lava flows; flash floods; ash in machinery; blast-induced wave generation; acid rain; rapid stream-bed aggradation.

## DIRECTORY

Alaska Division of Geological and Geophysical Surveys (see Combellick, R.A.; Davies, J.N.; Kline, J.T.; Long, W.E.; March, G.D.; Motyka, R.J.; Rawlinson, S.E.; Reger, R.D; Updike, R.G.).

Alaska Mountain Consultants (see Hackett, Steve).

Alaska State Parks (see Fesler, Doug).

Alaska Tsunami Warning Center (ATWC) P.O. Box Y, Palmer, AK 99645, (907)745-4512: Responsible for detecting seismic activity in the North Pacific region and providing tsunami (seismic sea wave) warning for Alaska and, in cooperation with the Pacific Tsunami Warning Center in Honolulu, for British Columbia, Washington, Oregon, and California. The ATWC issues earthquake information to the scientific community and advises the Alaska Division of Emergency Services, news media, military, industry, and others with tsunami or earthquake information. ATWC also cooperates with other agencies in the seismic or tsunami aspects of volcanic eruptions; landslides, seiches, and land-use planning. Direct inquiries to Thomas J. Sokalowski, geophysicist in charge.

Ashley, Gail M., Associate Professor, Dept. of Geology, Rutgers University, New Brunswick, NJ 08903, (201)932-2221. SUMMER: c/o David Ketscher,

Bettles Trading Post, Bettles, AK 99726: Involved in research on glaciers, lacustrine sedimentation, fluvial erosion and deposition, and coastal erosion and sedimentation. Expertise available in an advisory capacity or on a contractual basis.

Barnes, Peter, Geologist, U.S. Geological Survey, 345 Middlefield Road, Mail Stop 99, Menlo Park, CA 94025, (415)856-7008: Research involves permafrost, marine coastal and submarine hazards, and other ice-related hazards. Involved in defining geological processes producing these hazards. Expertise available to the public in an advisory capacity.

Bartsch-Winkler, Susan, Geologist, U.S. Geological Survey, Alaskan Geology Branch, 4200 University Drive, Anchorage, AK 99508-4667, (907)561-1181: Research involves marine coastal hazards, specifically in the region of Turnagain Arm and Knik Arm. Expertise available in an advisory capacity.

Benson, Carl S., Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7450: Involved in research on ice-related hazards with special attention to glacier-volcano problems. Expertise is available in a research or advisory capacity, or on a contractual or grant-supported basis.

Biswas, N.N., Associate Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7373: Involved in identifying hazards related to earthquakes, including slide-induced waves, glacier quakes, earthquake-induced submarine slumps, slope and building failure, tsunami generation, subsurface cohesive failure, and ground shaking and cracking. Information is available in an advisory capacity.

Brown, Allister, Vice President, Schultz International Ltd., 1155 W. Georgia St., Vancouver, B.C., Canada V6E 3H4, (604)684-7335: Experience in flooding, fluvial, marine-coastal, glacial, and ground-water related hazards. Available on a contractual basis.

Brown, Jerry, Chief, Earth Sciences Branch, U.S. Army Cold Regions Research and Engineering Lab, 72 Lyme Rd, Hanover, NH 03755, (603)643-3200: Conducting research on permafrost, specifically the impact and recovery of terrain containing ice-rich permafrost. CRREL Lab is prepared to respond to most types of geologic hazards.

Cavanaugh, Robert W., Jr., Emergency Services Coordinator, Fairbanks North Star Borough, P.O. Box 1267, Fairbanks, AK 99707, (907)452-1527, ext. 207: Deals with general disaster relief for all hazards identified within the borough. Information available in an advisory capacity to the public. In disasters, regulatory action may be taken.

Coleman, James, Director, Coastal Studies Institute, Louisiana State University, Baton Rouge, LA 70803, (504)388-2395: Conducts contract research for state and federal governments and industry concerning types and distribution of hazards, including mass-movement phenomena and fluvial, marine coastal, and submarine hazards.

Colonell, Joseph M., Ph.D., P.E., Woodward-Clyde Consultants, 701 Sesame St., Anchorage, AK 99503, (907)561-1020: Coastal engineering; coastal stability; shore structures; artificial islands; shore protection; oceanographic studies and modelling.

Combellick, Rodney A., DGGs, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-7147: Involved in surficial geologic mapping and identification of geologic hazards, particularly sediment instability.

Connolly, Joe, Engineering Geologist, R&M Consultants, P.O. Box 1786, Juneau, AK 99801, (907)789-0880: Involved with seismic-related potential for foundation soil liquefaction at site-specific locations.

Davies, John N., Seismologist, DGGs, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-6166: Involved with seismic, volcanic, and tsunami

hazards as a liaison between the seismology lab at the University of Alaska and DGGS. Available in an advisory capacity.

DenHartog, S.L., Geologist, U.S. Army CRREL, 72 Lyme Rd, Hanover, NH 03755, (603)643-3200: Research on ice jams and their attempted removal. Expertise is available in an advisory capacity, usually on a contractual basis.

Dronenburg, Ray, Resource Specialist, NSB FPO, P.O. Box 69, Barrow, AK 99723, (907)852-2611, ext. 240: Involved in ice-related hazards with expertise available under North Slope Borough.

Dygas, Joseph A., Geologist, Onshore Field Operations, U.S. Minerals and Energy Management, 800 A St., Anchorage, AK 99501, (907)271-4356: Involved in both identification and, under certain conditions, mitigation of geologic hazards. Expertise generally available to the public and other government officials.

Emery, Philip, Chief of Water Resources Division, U.S. Geological Survey, 1515 E. 13th Avenue, Anchorage, AK 99501, (907)271-4138: Supervises and directs professional and support personnel engaged in hydrologic research, including studies of surface water, sedimentation, glacial processes, quality of water, and hydrologic hazards. Requests for information will be directed to appropriate staff members.

Esch, David, Chief of Highway Research, State of Alaska Department of Transportation and Public Facilities, 2301 Peger Rd, Fairbanks, AK 99701, (907)479-2241: Responsible for research on causes or mechanisms of geologic hazards that affect roads.

Fairbanks North Star Borough Emergency Services (see Cavanaugh, Robert W., Jr.).

Fesler, Doug, Avalanche Specialist, Alaska Division of Parks, 619 Warehouse Dr., Anchorage, AK 99501, (907)264-2125: Involved in snow-avalanche investigation, forecasting, control, and public educa-

tion. Responsible for directing the statewide snow-avalanche safety program (i.e., Alaska Avalanche School) for the Alaskan Avalanche Forecast Center and for conducting historical research investigating the effect of avalanches on Alaskans. Expertise available in advisory or investigative capacity.

Forbes, Robert B., Consulting Geologist, Alaska Geological and Geophysical Consultants, Rt. 1, Box 2114, Lopez, WA 98261, (206)468-2453: Investigator and consultant on volcanic, seismic, and groundwater hazards.

Gedney, Larry, Associate Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7426: Seismologist at the Geophysical Institute, which operates an extensive seismograph net. Information available to the public on an advisory basis; general research into regional tectonics and seismic risks also available.

Geophysical Institute, University of Alaska, Fairbanks, AK 99701 (see Belon, Albert; Benson, Carl S.; Biswas, N.N.; Gedney, Larry; Gosink, Joan; Harrison, Will; Kienle, Juergen; Matthews, J.B.; Osterkamp, T.E.; Pulpan, Hans).

Gosink, Joan, Assistant Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-6220: Involved in research on the identification and prediction of flooding and ice-related hazards, including permafrost and active-layer ground ice.

Hackett, Steve, Geologist/Geophysical Engineer, Alaska Mountain Consultants, SR 10363B, Fairbanks, AK 99701; P.O. Box 590, Girdwood, AK 99587; State of Alaska License AA50: Natural hazard evaluations; snow, ice, and rock avalanches, earthquake, tsunami, and volcanic hazards, mass wasting, and aufeising.

Hamilton, Thomas D., Geologist, U.S. Geological Survey, Gould Hall, APU Campus, University Dr., Anchorage, AK 99504, (907)278-3571: Involved in identifying and mapping mass-movement phenom-

ena and other alpine hazards along valley systems of the central Brooks Range. Expertise available to the public through published maps and reports or by letter, phone, or personal visit.

Harper, John R., Ph.D., Woodward-Clyde Consultants, 100 Pringle Ave., Walnut Creek, CA 94596, (415)945-3000: Coastal erosion; coastal processes; periglacial mass-wasting processes, particularly as related to the coastal zone; sediment transport; ice-shore interaction, ice override; coastal and offshore structures; marine geology.

Harrison, Will, Associate Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7706: Involved in research of glacial surges, glacier-dammed lakes and outburst floods, and applications to engineering problems such as the Susitna hydroelectric project. Also involved in research on subsea permafrost, particularly problem definition and planning. Expertise available in a research, planning, and advisory capacity to the public or on a contractual basis as time allows.

Hawkins, Daniel, Professor, University of Alaska, Fairbanks, AK 99701, (907)474-7809: Research includes studies on natural ground-water pollution, particularly in the Fairbanks area. Expertise available in an advisory capacity to the public or on a contractual basis.

Hopkins, David M., Geologist, U.S. Geological Survey, 345 Middlefield Rd, Mail Stop 90-B, Menlo Park, CA 94025, (415)323-8111, ext. 4107: Projects in Alaska include research in permafrost, rapid coastal retreat, and volcanic hazards on the Bering Shelf and Seward Peninsula.

Kienle, Juergen, Associate Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7467: Research includes volcanic hazard studies and reports for volcanoes in the eastern Aleutian Arc from Mt. Redoubt to Mt. Peulik. Expertise available in an advisory capacity or on a contractual basis.

Table 1. Information sources, various categories of major geologic hazards (cont.).

Name	Eolian	Flooding	Fluvial	Glacial related	Ground ice (active)	Ground ice (therm)	Ground water	Other ice-related	Mass movement	Marine coastal	Seismic (earthquake)	Soil	Submarine	Volcanic
Alaska Tsunami Warning Ctr														
Ashley, Gail M.			X	X		X				X	X			
Barnes, Peter								X		X			X	
Barisch-Winkler, Susan				X				X		X				X
Benson, Carl S.										X				
Biswas, N.N.				X					X					
Brown, Allister		X		X			X			X			X	
Brown, Jerry		X		X		X			X	X			X	
Cavanaugh, Robert W., Jr.	X			X		X			X	X			X	
Coleman, James			X						X	X				
Colonell, Joseph M.										X				
Combellick, Rod														
Connolly, Joe											X	X		
Davis, John N.											X	X		
Deuflhartog, S.L.								X						X
Dronenburg, Ray														
Dygas, Joseph A.								X						
Emery, Philip		X		X			X							
Esch, David		X												X
Fester, Doug									X					

Table 1. Information sources, various categories of major geologic hazards (cont.).

Name	Eolian	Flooding	Fluvial	Glacial related	Ground ice (active)	Ground ice (perm)	Ground water	Other ice-related	Mass movement	Marine coastal	Seismic (earthquake)	Soil	Submarine	Volcanic
Forbes, Robert B.							X				X			X
Gedney, Larry											X			
Gosink, Joan		X			X	X		X	X	X	X			X
Hackett, Steve								X	X					
Hamilton, Thomas D.														
Harper, John R.				X				X		X			X	
Harrison, Will				X										
Hawkins, Daniel						X								
Hopkins, David M.						X								
Kienle, Juergen														
Kline, Jeff	X	X	X	X	X	X		X	X	X				X
Kovacs, Austin			X	X	X	X		X	X					X
Kravitz, Joseph	X	X	X	X	X	X	X	X	X	X	X		X	X
Kreig, Raymond A.		X	X	X	X	X		X	X	X				X
Lawson, Daniel														
Long, William E.	X		X	X	X	X	X							
Lunardini, Virgil														
Luscher, Ulrich											X			
March, Gail														
Martin, Seelye								X	X	X				
Matthews, J.B.														
Mayo, Larry		X		X					X	X	X		X	X
Miller, Christy L.		X					X	X	X	X	X			X
Miller, Thomas P.								X	X	X	X			X
Molina, Bruce F.	X	X	X											
Moraek, John L.					X									
Motyka, Roman J.				X			X		X	X				X
Naidu, A. Sathy	X		X	X								X		
Nelson, Gordon		X	X	X	X	X			X	X				
Nummedal, Dag														
Osterkamp, T.E.		X			X	X	X	X					X	
Pewe, Troy L.	X	X	X	X	X	X	X		X	X	X	X		
Phillips, Walter T.														
Powell, Sterling														
Prior, David B.		X												



Table 1. Information sources, various categories of major geologic hazards.

Name	Eolian	Flooding	Fluvial	Glacial related	Ground ice (active)	Ground ice (perm)	Ground water	Other ice-related	Mass movement	Marine coastal	Seismic (earthquake)	Soil	Submarine	Volcanic
Pulpan, Haas														
Rawlinson, Stuart	X		X	X	X	X		X	X	X	X	X		
Reger, Richard	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Reinitz, Erk					X	X		X	X	X	X	X	X	X
Riehle, Jim														
Rundquist, Lawrence			X											
Sesky, Julius					X	X	X			X	X	X	X	X
Shafer, Richard V.	X		X		X	X				X	X	X	X	X
Sharma, G.D.					X	X	X	X	X	X	X	X		
Smith, Gary	X	X		X	X	X	X	X	X	X	X	X		
Stringer, Bill		X						X						
Tart, Jr., Rupert G.					X	X			X			X		
Thompson, Robert							X		X	X	X	X	X	X
Toiland, Doug	X	X	X	X	X	X	X	X	X	X	X	X		
Trabant, Dennis														
Urdike, Randy									X		X			X
Ward, Peter R.B.							X		X	X	X			
Watts, Wally									X	X	X			
Weeks, W.F.								X	X	X	X			
Weller, Gunter								X	X	X	X			
Zeman, Alvin R.					X	X	X	X	X	X	X	X	X	X

Kline, Jeffrey T., Geologist, DGGS, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-7147: Involved in identifying and mapping geologic hazards.

Kovacs, Austin, Research Civil Engineer, U.S. Army CRREL, 72 Lyme Rd., Hanover, NH 03755, (603)643-3200: Involved in research on glaciers, ground ice, lacustrine and fluvial erosion, mass movement, sea-ice morphology, ice gouging, ice ride-up, and ice hazards.

Kravitz, Joseph, Ph.D., Geologist, NOAA, U.S. Dept. of Commerce, 6010 Executive Blvd., Rockville, MD 20852. Previously responsible for NOAA's geologic-hazard program. Expertise on seismic hazards available in an advisory capacity.

Kreig, Raymond A., President, R.A. Kreig & Associates, Inc., 1503 West 33rd Ave., Anchorage, AK 99503, (907)276-2025: Performs terrain analysis, photo-interpretation, and fieldwork for hazard assessment and identification. Advisory and remedial expertise available on a contractual basis.

Lawson, Daniel, Research Physical Scientist, USA/CRREL, 72 Lyme Rd., Hanover, NH 03755, (603)646-4344: Involved in research on glaciers, permafrost, ground-ice, sediment transport, and erosion. Determines environmental erosion effects in lakes and rivers and mass movement. Determines use of permafrost terrain. Expertise available to public through publications or direct contact; available to work contractually.

Long, William E., Chief, Water Resources Section, DGGS, P.O. Box 2116, Eagle River, AK 99577, (907)688-3555: Involved in identifying flood hazards, bank erosion, and glacial phenomena: collection of wind and hydrologic data, and stream-process evaluation. Expertise generally available to the public for site-specific problem analysis. General statewide data published in appropriate reports.

Lunardini, Virgil, Mechanical Engineer, USA CRREL, 72 Lyme Rd., Hanover, NH 03755, (603)643-3200:

Analysis of thermal effects during freezing and thawing of ground ice, both in the active layers and in permafrost.

Luscher, Ulrich, Ph.D., Woodward-Clyde Consultants, 100 Pringle Ave., Walnut Creek, CA 94596, (415)945-3000: Geotechnical and geological engineering; slope stability; permafrost engineering.

March, Gail D., Geologist, DGGS, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-7147: Maps surficial geology with emphasis on mapping and identifying avalanche paths along Alaska road systems. Also responsible for the identification of various hazards in Alaska's coastal zones. Expertise available to the public.

Martin, Seelye, Research Professor, School of Oceanography WB-10, University of Washington, Seattle, WA 98195, (206)543-6438: Research on ice movement and ice characteristics in the Beaufort, Chuckchi, and Bering Seas available in reports. Additional information can be obtained on a contractual basis.

Matthews, J.B., Professor, Institute of Marine Science, University of Alaska, Fairbanks, AK 99701, (907)474-7477: Research involves storm surge, tidal currents, and drifting sea ice using modeling and ground-truth experiments for prediction.

Mayo, Larry, Hydrologist (Glaciology), Water Resources Division, U.S. Geological Survey, Federal Building, 101 - 12th Avenue, Box 11, Fairbanks, AK 99701, (907)452-2823: Scientific identification and study of floods, glacier surges, activity of iceberg-producing glaciers, volcanic activity, earthquakes, landslides, and other geologic hazards.

Miller, Christy L., Senior Planner, Division of Community Planning, 225 Cordova Bldg., Suite 104, Anchorage, AK 99501, (907)264-2201: Offers assistance on National Flood Insurance Program, flood-plain-management program, and flood-hazard identification and mitigation alternatives. DCP concerned with all flood-related hazards (storm surge, bank, and coastal erosion; aufeis; tsunamis).

Following a flood disaster, DCP helps coordinate flood-hazard mitigation for the state. Direct formal written requests for assistance to Lawrence Kimbal, DCP; send inquiries on flood hazards to Miller or Ed Burch, DCP.

Miller, Thomas P., Chief, Branch of Alaska Geology, U.S. Geological Survey, Gould Hall, APU Campus, University Dr., Anchorage, AK 99504, (907)278-3571: Expertise in volcanic hazards and access to expertise in mass movement and seismic hazards. USGS calls attention to any geologic hazard encountered (potential landslides, volcanic hazards, etc.) in its operation. General inquiries will be directed to the appropriate staff members.

Molnia, Bruce F., Marine Geologist, Terra/Marine Consultants, 1066 Muir Way, Los Altos, CA 94022: Involved in research in Alaskan geologic hazards and can direct inquiries (regarding flooding or seismic, glacier-related, fluvial, marine coastal, submarine, or eolian hazards) to appropriate researchers.

Morack, John L., Professor, University of Alaska, Fairbanks, AK 99701, (907)474-7339: Studying remote techniques for determining presence of subsea permafrost, particularly in the Beaufort and Chuckchi Seas.

Motyka, Roman J., Geologist, DGGS, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-7147: Primarily a researcher on geothermal-energy sources involving the identification of various volcanic hazards, but also deals with mudflows, glacier outbursts, surges, and land subsidence due to excessive pumping of reservoirs. Expertise available in an advisory capacity.

Naidu, A. Sathy, Associate Professor, Institute of Marine Science, University of Alaska, Fairbanks, AK 99701, (907)474-7032: Research involves baseline studies and impact statements on sediment transport in coastal areas of arctic Alaska. Related hazards include bank erosion, rapid aggradation, coastal erosion, turbidity currents, scour by bottom currents, ridge migration, expanding clays, dune

migration, and heavy-metal-pollution studies. Expertise available contractually if considerable time is involved.

Nelson, Gordon, Hydrologist, U.S. Geological Survey Water Resources Division, 1515 E. 13th Ave., Anchorage, AK 99501, (907)271-4138: Ground-water Specialist for Alaska District, expertise in ground water, ground-water quality, and ground ice. Information available through published reports and by request.

Nummedal, Dag, Associate Professor, Dept. of Geology, Louisiana State University, Baton Rouge, LA 70803, (504)388-8328: Assesses marine coastal hazards, specifically coastal erosion, storm surges, and submarine sediments. Site-specific studies done contractually.

Osterkamp, T.E., Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7548: Interested in the scientific aspects of engineering and environmental problems that involve snow, river ice, lake ice, sea ice, frozen ground, permafrost, subsea permafrost, and glaciers. Expertise available on advisory or contractual basis.

Péwé, Troy L., Consulting Geologist, 538 E. Fairmont Dr., Phoenix, AZ 85282: Involved with identifying and finding solutions for almost all types of geologic hazards in Alaska, mainly eolian, flooding, fluvial, glacial-related, ground-ice, ground-water, mass movement, and soil hazards.

Phillips, Walter T., Engineering Geologist, QUADRA Engineering, 401 East Fireweed Lane; Anchorage, AK 99502, (907)276-3770: Involved in statewide foundation engineering studies, permafrost evaluations, and general slope-stability studies. Experienced with natural-hazards mitigation. Advisory and remedial expertise available on a contractual basis.

Powell, Sterling, Water Resource Specialist, U.S. Soil Conservation Service, 2221 E. Northern Lights Blvd., Suite 129, Anchorage, AK 99503, (907)276-4246: Assists in flood-plain management and performs soil surveys. Expertise in an advisory,

regulatory, and remedial capacity available to the public and to state and local governments on a cooperative basis and to federal agencies on a contractual basis.

Prior, David B., Professor, Coastal Studies Institute, Louisiana State University, Baton Rouge, LA 70803, (504)388-2395: Involved with mapping and analysis of mass movement on land, along coastlines, and as submarine hazards. Specialist in geologic-hazard site surveys for oil and gas platforms and pipelines, off deltas, in fjords, and on deep-water continental slopes to 2,000-m depths.

Pulpan, Hans, Associate Professor, University of Alaska, Geophysical Institute, Fairbanks, AK 99701, (907)474-7424: Involved in general seismological research with particular interest in strong ground-motion studies and seismic-risk analysis. Expertise in hazard assessment and research available, mainly contractually.

R&M Consultants (see Connolly, Joe; Smith, Gary).

Rawlinson, Stuart E., Geologist, DGGs, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-7147: Involved in surficial geologic mapping and identification and evaluation of geologic hazards.

Reger, Richard D., Chief, Geologic Mapping Section, DGGs, 794 University Ave., Basement, Fairbanks, AK 99701, (907)474-7147: Involved with identification and evaluation of all natural hazards in Alaska.

Reimitz, Erk, Marine Geologist, U.S. Geological Survey, 345 Middlefield Rd., Menlo Park, CA 94025, (415)856-7004: Research includes storm surges, gas-charged sediments, submarine slumping, ice gouging, strudel scour, ice override, permafrost, and coastal changes. Available to answer inquiries from the public or private sector and can work contractually with state or federal agencies.

Riehle, Jim, Geologist, U.S. Geological Survey, Gould Hall, APU Campus, Anchorage, AK 99504, (907)-

271-4150: Research deals mainly with the identification of volcanic hazards with secondary emphasis on earthquake-related hazards.

Rundquist, Lawrence, Ph.D., Woodward-Clyde Consultants, 701 Sesame St., Anchorage, AK 99503, (907)561-1020: Fluvial erosion and transport; river bank stability; hydraulic modeling; sediment transport.

Schultz International Ltd. (see Brown, Allister).

Sesky, Julius, Mineral Explorations, Box 30, Chitina, AK 99566: Extensive observation and experience dealing with natural geologic hazards in the Chitina area, including permafrost, road and area icings and overflows, active-layer ground ice, and soil-related engineering problems.

Shafer, Richard V., Manager, Environmental Affairs, Sohio Alaska Petroleum Co., Pouch 6-612, Anchorage, AK 99502, (907)263-5174: Reviews Sohio's plans and monitors operations to minimize environmental harm due to ground-ice, fluvial, marine-coastal, submarine, ground-water, soil, and eolian hazards. General information sometimes available.

Sharma, G.D., Professor, Institute of Marine Science, University of Alaska, Fairbanks, AK 99701, (907)-474-7743: Involved in identifying marine coastal and submarine hazards. Information available as public service and as consultant.

Smith, Gary, R&M Consultants, 5024 Cordova St., Anchorage, AK 99502, (907)279-0483: Involved in identifying and evaluating hazards and in recommending and designing remedial measures concerning rock-slope stability, erosion control, bed-rock-condition inspection, flooding, glacier- and ice-related hazards, active-layer phenomena, soil hazards, and eolian hazards.

Stringer, Bill, Associate Professor, Geophysical Institute, University of Alaska, Fairbanks, AK 99701, (907)474-7455: Research involves hazards such as flooding due to rapid snowmelt, aufeis flooding, and

onshore encroachment of sea ice. Brief responses available as public service, short (1 to 3 days) responses available as consultant, major responses available on contractual basis.

Tart, Rupert G., Jr., P.E., Woodward-Clyde Consultants, 701 Sesame St., Anchorage, AK 99503, (907)561-1020: Geotechnical engineering; surface borings; blast effects and explosives engineering; permafrost engineering.

Thompson, Robert, Meteorologist In Charge, Alaska Avalanche Forecast Center, 701 C St., Box 23, Anchorage, AK 99507, (907)271-5099: Involved in mountain weather and snow-stability forecasts.

Toland, Doug, Ecologist, Alaska Department of Environmental Conservation, 750 St. Anns Ave., Douglas, AK 99824, (907)364-2165: Responds to all natural events that could harm the ecosystem. Expertise of DEC available on advisory, conceptual, and remedial basis.

Trabant, Dennis, Glaciologist-hydrologist, Water Resources Division, Cold Region Hydrology Project Office, U.S. Geological Survey, 101 - 12th Ave., Box 11, Fairbanks, AK 99701, (907)456-0296: Identification and monitoring of hydrologic and glacier-related geologic hazards. Expertise available to the public or to government officials.

U.S. Army (see Brown, Jerry; DenHartog, S.L.; Kovacs, Austin; Lawson, Daniel; Lunardini, Virgil; Weeks, W.F.).

U.S. Department of Agriculture and Forest Service (see Watts, Wally).

U.S. Geological Survey (see Emery, Phil; Mayo, Larry; Miller, Thomas; Nelson, Gordon; Riehle, Jim; Trabant, Dennis).

Updike, Randy, Geologist, DGGs, P.O. Box 2116, Eagle River, AK 99577, (907)688-3555: Emphasis on

seismic hazards (including ground shaking, subsidence, liquefaction, sensitive-clay failure, and gravity slides), with some expertise in seismic landslides and volcanic hazards. Expertise and information available to public and government officials.

Ward, Peter R.B., Senior Hydrologist, Schultz International Ltd., 1155 W. Georgia St., Vancouver, B.C., Canada (604)684-7335: Deals with hydrology, specifically water-quality and slope-stability work, for mining and forestry companies. Related hazards include flooding, mass-movement phenomena, glacier-related, fluvial, and marine coastal hazards, highway-culvert design, and bed-load transport by rivers. Schultz Ltd. involved with impact studies of proposed mines in B.C. to water quality in Alaska rivers. Services available on a contractual basis or in an advisory capacity.

Watts, Wally, U.S.D.A. Forest Service, 2221 E. Northern Lights Blvd., Suite 104, Anchorage, AK 99508: Involved in snow-avalanche forecasting and control for ski areas and transportation corridors, particularly in the Seward Highway area.

Weeks, W.F., Glaciologist, U.S. Army CRREL, 72 Lyme Rd., Hanover, NH 03755, (603)646-4473: Experience with a wide variety of problems associated with the presence of natural snow and ice masses. Recent research on physical properties of sea-ice, nature of pressure ridges, statistics of ice-induced gouges in the sea floor, and remote sensing of sea and lake ice. Expertise contractually available to the public and to government organizations.

Weller, Gunter, Deputy Director, Geophysical Institute, University of Alaska, Fairbanks, AK 99701 (907) 474-7371: Contact Weller for inquiries to the Geophysical Institute, which has a senior research staff of 60 scientists, many of whom are involved with geologic hazards. This work includes an extensive Alaskan earthquake catalog, substantial data on volcanic hazards, sea ice, permafrost (both land and submarine), and arctic coastal hazards. The Geophysical Institute has an extensive hard-

copy file of Alaskan remote-sensing imagery that can be used to document the spatial and temporal extent of hazards such as sea ice, aufeis, river and lake ice, flooding, wild fires, and volcanic eruptions. Information is generally available to the public, but large projects must be performed contractually.

Woodward-Clyde Consultants (see Colonell, Joseph M.; Harper, John R.; Luscher, Ulrich; Rundquist, Lawrence; Tart, Rupert G., Jr.).

Zeman, Alvin R., P.E., President, Rittenhouse-Zeman and Associates, Inc., 715 L St., Suite 8, Anchorage, AK 99501, (907)279-3933: General geologic-hazard consulting, geotechnical engineering.