National Mapping Program
User Evaluation of Selected Current Products

By Gregory I. Snyder

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EXECUTIVE SUMMARY

The U.S. Geological Survey (USGS) produces a variety of base cartographic data and derivative products to fulfill its National Mapping Program responsibilities. Although product characteristics have traditionally been determined by user needs, these needs have often been evaluated in response to specific issues. The objective of the User Evaluation of Selected Current Products is to provide the USGS with a broad baseline of product characteristic priorities, within core user populations, for use in modernizing and simplifying USGS base cartographic products.

The USGS sent questionnaires to approximately 18,500 professional users from three spatial data communities. Using the 20-page questionnaires, respondents evaluated the accuracy, content, and use of USGS digital line graphs (DLG), digital orthophoto quadrangles (DOQ), digital elevation models (DEM), and printed quadrangle maps.

Results showed satisfaction with vertical and horizontal data accuracy, a need to increase product currentness, a need for more attributes on specific DLG features, a group of low priority features, and a strong preference for 1:24,000-scale versus 1:100,000-scale data. Response rates were 52.5 percent for USGS cooperators, 44.2 percent for professional association members, and 7.7 percent for a third group that included subscribers to *GIS World* magazine and user lists donated by Intergraph Corporation and the Environmental Systems Research Institute, Inc.

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

METHODOLOGY AND RESULTS

This report provides a summary of the methodology and results, followed by tabulated answers expressed in counts and percents. Small adjustments to the data will be made to reflect ongoing quality control testing and questionnaires received after the initial tabulation of the data base. The adjustments should not preclude any practical applications of the current data. This report supersedes the previous internal report dated September 23, 1994.

Methodology

Three spatial data communities were selected to cover a wide mix of data producers and users within the public and private sectors:

- An "A-16" group consisted of individuals from Federal, State, and local government agencies who are periodically contacted by the USGS regarding their requirements, defined by geographic area, for standard USGS base cartographic data and maps. The USGS gathers these requirements and coordinates mapping activities under the Office of Management and Budget (OMB) Circular A-16 (revised 1990).

- An "Association" group consisted of 1,000 randomly sampled individuals from a total of approximately 12,000 names from the merged membership lists of the American Congress on Surveying and Mapping, the American Society for Photogrammetry and Remote Sensing, AM/FM International, the Association of American Geographers, and the Urban and Regional Information Systems Association, and the mailing list of the Federal Geographic Data Committee.

- An "Other" group consisted of approximately 14,000 *GIS World* magazine subscribers, 1,300 randomly sampled GIS users whose names were donated by Intergraph Corporation, 1,000 randomly sampled GIS users whose names were donated by Environmental Systems Research Institute, Inc., and approximately 200 names including the State Board list of the U.S. Board of Geographic Names.

A questionnaire was developed based on issues identified in 11 interactive meetings held across the United States with spatial data users from the public and private sectors, responses to questions posted via Internet on the GIS-L and LIS-L bulletin board discussion lists, and specific USGS information needs. The National Agriculture Statistical Service, Department of Agriculture, assisted in the preparation of the final questionnaire, its distribution, and the processing of responses.

Questionnaire testing was performed using 19 individuals from various Federal and State agencies and private industry. Each participant completed a draft questionnaire, commenting on clarity, content, difficulty, length, and overall satisfaction. The participants were generally satisfied with questionnaire content and length, and reported an average completion time of 30 minutes.

In table 1, the column titled "Mailed" is based on questionnaires mailed minus (1) undeliverable questionnaires, such as retired persons and bad addresses, and (2) respondents that stated that they are not USGS product users. The "Usable responses" column excludes the same undeliverable questionnaires and non-USGS product users.

Table 1. Response rate

Group	Mailed	Usable responses	Response rate (percent)
A-16	853	448	52.5
Association	889	393	44.2
Other	16,300	1,260	7.7

Summary of the Tabulated Answers

The answers for most questions did not differ significantly between the A-16, Association, and Other groups, so the three groups were combined in the tabulations. The following statements summarize the tabulated answers by product type. The source question for each statement is indicated.

Printed Quadrangle Maps

- Sixty percent of users frequently use the 1:24,000-scale maps and 16 percent of users frequently use the 1:100,000-scale maps (question 8).
- Horizontal map accuracy often or always satisfies 76 percent of the 1:24,000-scale users and 51 percent of the 1:100,000-scale users (question 13).
- Vertical map accuracy often or always satisfies 69 percent of the 1:24,000-scale users and 41 percent of the 1:100,000-scale users (question 12).
- For each of three ground coordinate systems, by a ratio of approximately 2:1, coordinate system portrayal by ticks and internal intersections is preferred to either full-line grid only or tick only options (question 21).
- Eighty percent of the users must have or prefer a flat map versus a folded map (question 26).

DLG's

- Frequency of use is slightly higher for the 1:24,000-scale DLG's than for the 1:100,000-scale DLG's (question 8).
- Horizontal DLG accuracy often or always satisfies 76 percent of the 1:24,000-scale users and 51 percent of the 1:100,000-scale users (question 13).
- Edgematching is of substantial or great importance to nearly 74 percent of the DLG users (question 16).

- Concerning the 1:24,000-scale DLG coordinates, 27 percent of the users prefer Universal Transverse Mercator, 18 percent prefer geographic, 44 percent prefer State plane, and 11 percent have no preference (question 20).
- For most DLG data categories, data 10 years old or older no longer meet the needs of a majority of the users (question 31).
- Revision dates for each DLG feature are of substantial or very great importance to 53 percent of the users; source information for each DLG feature is of substantial or very great importance to 45 percent of the users (question 32).
- DLG categories are routinely combined into one topologically structured file by 32 percent of the users (question 49).
- DLG feature names are needed by 90 percent of the users (question 48).
- Flow direction in hydrography DLG's is of moderate to great importance to 70 percent of the users, and flow direction in transportation DLG's is of moderate to great importance to 44 percent of the users (question 51).

DEM's

- 7.5-minute DEM's are used more frequently than 30-minute or 1-degree DEM's (question 8).
- The vertical accuracy of 7.5-minute DEM's often or always satisfies 48 percent of the users, which is about twice the rate of satisfaction compared with 30-minute or 1-degree DEM's (question 12).
- DEM formats other than the current USGS options are needed by only 6 percent of the users (question 28).
- If 30-minute DEM's were available, more than 80 percent of the users would not need a 1-degree DEM (question 29).

DOQ's

- DOQ horizontal accuracy often or always satisfies 76 percent of the users (question 13).
- DOQ products meet user needs as follows: 1-meter DOQ's from 1:40,000-scale photography, 28 percent; 2-meter DOQ's from 1:80,000-scale photography, 7.7 percent; either product depending on area, 22.3 percent; do not use product, 42.2 percent (question 30).
- DOQ data older than 4 years do not meet the needs of a majority of the users (question 31).

DRG's

- Of the 85 percent of respondents that do not use DRG's, 74 percent would find a digital raster graphic product useful if it were available (question 29).

Feature Density and Classification (Maps and DLG's)

- For all feature characteristics (accuracy, kinds and number, and attribution), the vast majority of the users need 1:24,000-scale versus 1:100,000-scale data (question 24).
- Contour density is considered "just right" by about 75 percent of 1:24,000-scale and 1:100,000-scale data users (question 25). A majority of the users are also satisfied with drainage density (question 40).
- Expanded use of high-density building tint does not negatively effect 69 percent of the respondents. In tint areas, most buildings are not individually mapped (question 44).
- The USGS highway and road classification scheme meets the needs of 71 percent of the users (question 36).
- Perennial and intermittent drainage classification satisfies 81 percent of the users (question 38).
- Portraying dense groups of discrete features using area delineation is slightly more popular than delineating all features, and greatly more popular than selection and thinning or showing a representative pattern (question 35).

Units and Media

- Data distribution via CD-ROM is preferred by 68 percent of the users; followed by Internet, 14 percent; 8-mm tape, 12 percent; and 9-track tape, 2 percent (question 11).
- Conversion of USGS elevation data to the North American Vertical Datum of 1988 (NAVD88) is not considered important to 60 percent of the users. For the 40 percent that need data on NAVD88, 68 percent would be satisfied if the USGS provided the parameters for shifting the data (question 18).
- Elevation data in feet meet the needs of 82 percent of the users (question 22).

Feature Lists (Questions 52-61), and User Profile (Questions 1-7)

- Questions 1-7 were used to determine the respondent's employer, position, specialization, application, geographic project area, and product usage. The typical respondent was a nonmanagerial professional or a manager. Eighteen percent of the population identified themselves as senior managers; 8 percent identified themselves as technicians. The most common specialties were GIS, natural resource and environmental management, and engineering. USGS data were commonly used for reference or in GIS modeling and analysis. USGS data were needed in all U.S. States and territories.
- Questions 52-61 determined the most needed features from a list of approximately 200 features within 10 DLG categories. The features were ranked based on the number of times the feature was selected. Respondents were asked to select features that they would hypothetically collect if their own funds were being expended. Highlighted features are those that have been interpreted to be framework features based on the Federal Geographic Data Committee's Framework Working Group report. Framework features represent a basic multipurpose set of geographic data, which provides a foundation for further enhancement with additional features and attributes.

TABULATED ANSWERS

The remainder of the report consists of tabulated answers to each of the 63 questions. Some of the questions evaluate multiple products or product characteristics. Of the 2,292 respondents, 191 indicated that they were not USGS product users. The remaining 2,101 responses were used in the following tabulations. The data are presented in counts and percents. The numerical difference between the sum of answers and the 2,101 is because some respondents did not answer all questions. Nonresponse is excluded in the percentage computations. Highlighted percentage values reflect the highest frequency answer to each question.

Small numerical adjustments will be made to the data base from which these tabulations were produced, to reflect ongoing quality control analysis and questionnaires received after these tabulations were generated. These adjustments should not preclude any practical applications of the current data. For additional information contact Greg Snyder, telephone 703-648-4133, or Internet GSNYDER@USGS.GOV.

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Tabulated Answers for Questions 1-63

1. Who do you work for?

	Count	Pct
FEDERAL GOVERNMENT	423	20.3
STATE GOVERNMENT	354	17.0
COUNTY/REGIONAL GOVT	215	10.3
CITY/TOWN/LOCAL GOVT	139	6.7
ACADEMIC INSTITUTION	188	9.0
UTILITY (PUBLIC&PRIVATE)	111	5.3
PRIVATE INDUSTRY	541	26.0
NONPROFIT ORGANIZATION	38	1.8
OTHER	74	3.6

2. What is your position?

	Count	Pct
SENIOR MANAGER	378	18.2
MIDDLE MANAGER	395	19.0
FIRST-LINE MANAGER	351	16.9
NON-MANAGING PROFESSIONAL	574	27.7
TECHNICIAN	156	7.5
OTHER	220	10.6

3. Do you currently hold membership in any of the following professional societies?

	Count	Pct
ASPRS	468	22.8
ACSM	377	18.4
URISA	468	22.8
AM/FM	138	6.7
AAG	196	9.6
NONE OF THE ABOVE	912	44.5

4. What is your primary specialization?

	Count	Pct
SOFTWARE DEVELOPMENT	65	3.1
SALES/MARKETING	24	1.2
GEOGRAPHIC INFORMATION SYSTEMS	723	34.8
GLOBAL POSITIONING SYSTEMS	12	0.6
URBAN/REGIONAL PLANNING	86	4.1
ENGINEERING	233	11.2
RESEARCH	89	4.3
EDUCATION	56	2.7
PHOTOGRAMMETRY	71	3.4
REMOTE SENSING	50	2.4
NATURAL RESOURCES/ENVIRONMENTAL MGT	209	10.1
SURVEYING	176	8.5
CARTOGRAPHY	136	6.5
OTHER	147	7.1

5. What is your primary application for USGS cartographic products?

	Count	Pct
REFERENCE	1059	51.1
GIS MODELING/ANALYSIS	818	39.5
REPACKAGING/RESALE	11	0.5
REPACKAGING/NEW DATA ADDED	101	4.9
OTHER USES	84	4.1

6. During the next 5 to 10 years, in which States, territories, outlying areas, and associated areas of the United States will you have a need for USGS cartographic products?

States	Count	Pct	States	Count	Pct
ALL STATES	423	20.4	MISSISSIPPI	111	5.3
NO STATES	2	0.1	MISSOURI	126	6.1
ALABAMA	121	5.8	MONTANA	141	6.8
ALASKA	96	4.6	NEBRASKA	85	4.1
ARIZONA	176	8.5	NEVADA	164	7.9
ARKANSAS	126	6.1	NEW HAMPSHIRE	66	3.2
CALIFORNIA	303	14.6	NEW JERSEY	84	4.0
COLORADO	217	10.4	NEW MEXICO	168	8.1
CONNECTICUT	68	3.3	NEW YORK	142	6.8
DISTRICT OF COL	43	2.1	NORTH CAROLINA	144	6.9
DELAWARE	55	2.6	NORTH DAKOTA	75	3.6
FLORIDA	179	8.6	OHIO	126	6.1
GEORGIA	149	7.2	OKLAHOMA	118	5.7
HAWAII	57	2.7	OREGON	194	9.3
IDAHO	161	7.8	PENNSYLVANIA	137	6.6
ILLINOIS	159	7.7	RHODE ISLAND	48	2.3
INDIANA	128	6.2	SOUTH CAROLINA	108	5.2
IOWA	106	5.1	SOUTH DAKOTA	82	3.9
KANSAS	93	4.5	TENNESSEE	126	6.1
KENTUCKY	129	6.2	TEXAS	223	10.7
LOUISIANA	132	6.4	UTAH	176	8.5
MAINE	69	3.3	VERMONT	61	2.9
MARYLAND	79	3.8	VIRGINIA	139	6.7
MASSACHUSETTS	87	4.2	WASHINGTON	183	8.8
MICHIGAN	139	6.7	WEST VIRGINIA	94	4.5
MINNESOTA	107	5.2	WISCONSIN	137	6.6
			WYOMING	146	7.0

6. Continued.

Territories:	Count	Pct
ALL TERRITORIES	149	7.2
PALAU	14	0.7
GUAM	23	1.1
PUERTO RICO	91	4.4
VIRGIN ISLANDS	50	2.4
MARSHALL ISLANDS	14	0.7
AMERICAN SAMOA	14	0.7
MICRONESIA	16	0.8
OUTLYING ISLANDS	9	0.4
NORTH MARIANA ISLANDS	12	0.6

7. Where are your project areas predominantly located?

	Count	Pct
URBAN/SUBURBAN	369	17.8
RURAL	595	28.7
EQUAL MIX	1107	53.5

8. Please indicate how often you use the following USGS products for your applications.

	NEVER		OCCASIONALLY		SOMETIMES		OFTEN		FREQUENTLY	
	Count	pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
1:24K MAP	65	3.2	93	4.6	319	15.8	326	16.2	1214	60.2
1:100K MAP	280	15.7	380	21.3	601	33.6	243	13.6	284	15.9
1:24K DLG	516	30.7	254	15.1	334	19.8	239	14.2	340	20.2
1:100K DLG	629	38.3	285	17.3	291	17.7	186	11.3	252	15.3
7.5-MIN DEM	598	35.3	240	14.2	335	19.8	192	11.3	327	19.3
30-MIN DEM	907	58.3	283	18.2	211	13.6	90	5.8	66	4.2
1-DEG DEM	994	64.7	240	15.6	169	11.0	67	4.4	66	4.3
DOQ	821	52.3	261	16.6	249	15.9	105	6.7	134	8.5

9. What non-USGS products or data do you regularly use to satisfy your application requirements? (Note: Written answer only, no tabulations)

10. Are you currently using a raster-scanned quadrangle map?

	Count	Pct
YES	301	14.8
NO	1730	85.2

10a. If no, would a raster-scanned quadrangle map be useful?

	Count	Pct
YES	1221	74.2
NO	424	25.8

11. For USGS digital products, which medium would you prefer?

	Count	Pct
CD-ROM	1359	67.8
9-TRACK TAPE	39	1.9
8 MM TAPE	232	11.6
INTERNET VIA FTP	289	14.4
OTHER	84	4.2

12. How satisfied are you with the vertical accuracy of USGS products?

	SELDOM		OCCASIONALLY		SOMETIMES		OFTEN		ALWAYS	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
1:24K MAP	50	2.8	57	3.2	444	24.7	829	46.1	417	23.2
1:100K MAP	158	12.5	177	14.0	417	32.9	333	26.3	183	14.4
1:24K DLG	83	9.0	66	7.1	302	32.6	348	37.6	126	13.6
1:100K DLG	156	20.1	141	18.2	253	32.6	157	20.2	69	8.9
7.5-MIN DEM	86	8.8	92	9.4	329	33.7	351	36.0	118	12.1
30-MIN DEM	162	25.2	125	19.4	204	31.7	107	16.6	46	7.1
1-DEG DEM	207	32.2	144	22.4	154	24.0	95	14.8	42	6.5

13. How satisfied are you with the horizontal accuracy of USGS products?

	SELDOM		OCCASIONALLY		SOMETIMES		OFTEN		ALWAYS	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
1:24K MAP	29	1.5	41	2.2	376	19.9	950	50.4	490	26.0
1:100K MAP	85	6.4	152	11.4	423	31.7	446	33.4	229	17.2
1:24K DLG	56	5.4	64	6.2	286	27.8	468	45.5	155	15.1
1:100K DLG	101	11.5	123	14.0	304	34.6	250	28.5	100	11.4
DOQ	79	13.2	51	8.5	134	22.4	215	36.0	118	19.8

14. If you check the positional accuracy of USGS cartographic data by comparing it against other sources, please indicate each source used.

	Count	Pct
SATELLITE IMAGERY	435	28.5
DOQ	260	17.1
UNRECTIFIED PHOTOGRAPHY	455	29.9
RECTIFIED PHOTOGRAPHY	639	41.9
GPS	766	50.3
OTHER VECTOR DATA	511	33.5
MAPS	839	55.1
OTHER	162	10.6

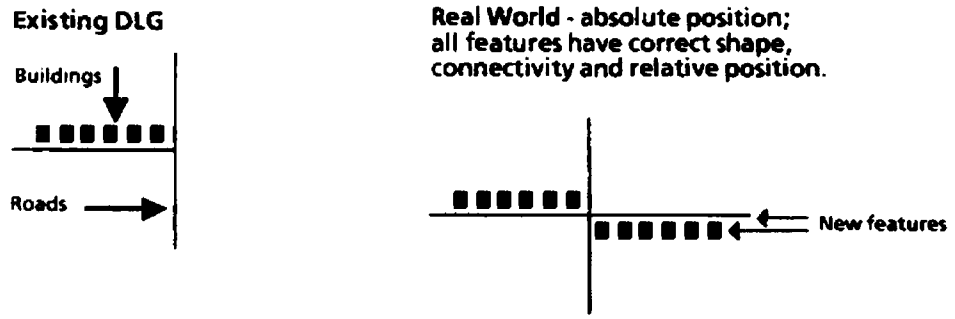
15. Do you modify the position of features found within DLG's to increase the accuracy?

	Count	Pct
YES	571	31.4
NO	1245	68.6

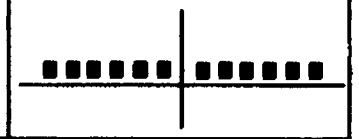
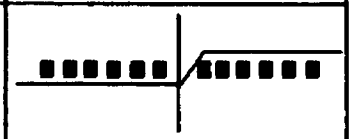
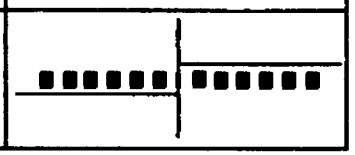
16. Is having edgematched DLG data (geometric fit and attribute match between discrete tiles) important to you?

	Count	Pct
LITTLE	139	7.4
SOME	69	3.7
MODERATE	280	14.9
SUBSTANTIAL	428	22.8
GREAT	963	51.3

17. DLG's need to be revised to show new features:



However, it is difficult and costly to maintain correct connectivity, shape, and relative position of all DLG features. The following are examples of typical trade-off options and the results in terms of cost and product availability.

OPTIONS	TRADE-OFFS		RESULTS OF TRADE-OFFS		Example
	Correct for	Loss of	Cost	Products Available	
1	Connectivity & Shape	Relative Position	High	Few	
2	Connectivity & Relative Position	Shape	Moderate	More	
3	Shape & Relative Position	Connectivity	Low	Most	

Please rank the trade-off options from best to worst according to your applications.

	BEST		COMPROMISE		WORST	
	Count	Pct	Count	Pct	Count	pct
CONNECTIVITY/SHAPE	667	37.8	749	42.5	347	19.7
CONNECTIVITY/RELATIVE POSITION	360	20.4	834	47.3	569	32.3
SHAPE/RELATIVE POSITION	736	41.7	180	10.2	847	48.0

18. Is it important to you that USGS modify its data to reflect the North American Vertical Datum of 1988 (NAVD88)? (Note: USGS is converting to the North American Datum of 1983)

	Count	Pct
YES	798	40.4
NO	1179	59.6

19. If question 18 is yes, which USGS actions would satisfy your needs?: (1) recompile all contours and elevation data from National Geodetic Vertical Datum of 1929 (NGVD29) to NAVD88 (large program cost), or (2) supply the shift (algorithms or parameters) to allow you to shift the data (small program cost).

	Count	Pct
RECOMPILE CONTOURS	253	31.8
SUPPLY SHIFT PARAMETERS	542	68.2

20. Which ground coordinate systems would you find most useful in each digital product? Select one system per product

	GEOGRAPHIC		UTM		STATE PLANE		NO PREFERENCE	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct
1:24K DLG	343	17.8	516	26.8	844	43.9	220	11.4
1:100K DLG	354	20.3	508	29.2	534	30.7	345	19.8
7.5-MIN DEM	265	15.6	478	28.2	633	37.3	319	18.8
30-MIN DEM	279	17.7	424	26.9	425	27.0	448	28.4
1-DEG DEM	296	19.0	411	26.3	382	24.5	473	30.3
DOQ	249	15.8	414	26.2	515	32.6	400	25.3

21. For each of the ground coordinate systems below, pick one map portrayal that best meets your needs. (Select one portrayal per system)

	FULL-LINE GRID		TICKS		TICKS & INTERSECTIONS		NO PREFERENCE	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct
GEOGRAPHIC	463	24.9	298	16.0	847	45.5	253	13.6
UTM	412	22.5	353	19.3	781	42.7	284	15.5
STATE PLANE	442	23.2	308	16.2	891	46.8	262	13.8

22. Elevation data on the majority of USGS 1:24,000-scale maps and in corresponding DLG's is measured in feet. Does this meet your needs?

	Count	Pct
YES	1656	81.5
NO	264	13.0
DO NOT USE	112	5.5

23. If question 22 if NO, which of the following USGS actions would satisfy your needs: (1) provide the conversion factors to allow individual users to convert the data from feet to meters (small program cost), (2) recompile all 1:24,000-scale data so that it is in meters (large program cost), (3) other.

	Count	Pct
PROVIDE CONVERSION FACTOR	138	53.3
RECOMPILE IN METERS	106	40.9
OTHER	15	5.8

24. USGS produces and maintains maps and DLG's at two principal scales, 1:24,000 and 1:100,000. For each data characteristic select the scale that is sufficient to meet your needs.

	1:24,000-SCALE		1:100,000-SCALE		NEITHER	
	Count	Pct	Count	Pct	Count	Pct
POSITIONAL ACCURACY	1695	87.0	102	5.2	152	7.8
KINDS OF FEATURES	1580	82.2	269	14.0	72	3.7
NUMBER OF FEATURES	1578	82.1	246	12.8	97	5.0
LEVEL OF ATTRIBUTION	1493	79.2	245	13.0	146	7.7

25. Is the contour density for the following products sufficient to meet your needs?

	TOO FEW		LIGHT		JUST RIGHT		HEAVY		TOO MANY	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
24K MAPS&DLG'S	159	8.1	276	14.1	1481	75.5	41	2.1	5	0.3
100K MAPS&DLG'S	167	9.7	243	14.1	1265	73.6	38	2.2	6	0.3

26. 1:24,000-scale maps are distributed as flat sheets. More marginal information, including an extensive symbol legend, could be shown on a redesigned, folded sheet. Which one do you prefer?

	Count	Pct
MUST HAVE FLAT	656	32.5
PREFER FLAT	960	47.6
NO PREFERENCE	310	15.3
PREFER FOLDED	90	4.5
MUST HAVE FOLDED	4	0.2

27. USGS currently produces five DEM products. Which of these products meet your needs?

	SELDOM		SOMETIMES		ALWAYS	
	Count	Pct	Count	Pct	Count	Pct
7.5-MIN DEM	45	4.4	613	59.7	368	35.9
30-MIN DEM	151	25.1	374	62.1	77	12.8
1-DEG DEM	243	40.5	281	46.8	76	12.7
7.5-MIN AK DEM	115	41.1	113	40.4	52	18.6
15-MIN AK DEM	137	49.8	101	36.7	37	13.5

28. If you need a different product format than any of the above, what are its characteristics? (Note: Written answer only, no tabulations)

29. If 30-minute DEM coverage was available, would you still need 1-degree DEM's?

	Count	Pct
YES	200	16.0
NO	1053	84.0

30. Which of the following DOQ products best suits your needs?

	Count	Pct
40K-SCALE, 1 METER, 3.75-MIN	485	27.9
80K-SCALE, 2 METER, 7.5-MIN	133	7.7
EITHER DEPENDING ON AREA	387	22.3
DO NOT USE DOQ'S	733	42.2

31. How many years could pass before the information contained in DLG or DOQ files would no longer meet your needs?

	<1		1-2		3-4		5-9		10-14		15-19		20+	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
24K BOUNDARIES	190	10.6	280	15.7	344	19.3	488	27.3	303	17.0	39	2.2	142	8.0
24K BUILT-UP	145	8.3	368	21.0	488	27.9	521	29.8	178	10.2	12	0.7	38	2.2
24K HYDROGRAPHY	46	2.6	152	8.7	262	14.9	528	30.1	470	26.8	89	5.1	208	11.9
24K HYPSOGRAPHY	29	1.8	96	5.9	213	13.1	409	25.1	454	27.9	119	7.3	308	18.9
24K PLSS	76	4.5	161	9.6	220	13.1	386	22.9	383	22.8	88	5.2	369	21.9
24K NON-VEG COVER	55	3.2	235	13.8	381	22.3	515	30.2	326	19.1	60	3.5	135	7.9
24K TRANSPORTATION	209	11.8	373	21.1	497	28.1	468	26.5	171	9.7	17	1.0	31	1.8
24K VEG SURFACE CVR	68	4.0	221	12.9	403	23.5	512	29.9	335	19.5	51	3.0	124	7.2
100K BOUNDARIES	120	8.3	188	12.9	237	16.3	382	26.3	315	21.7	59	4.1	151	10.4
100K BUILT-UP	79	5.6	221	15.5	327	23.0	446	31.3	247	17.4	39	2.7	64	4.5
100K HYDROGRAPHY	36	2.5	103	7.2	191	13.3	384	26.8	394	27.5	113	7.9	210	14.7
100K HYPSOGRAPHY	21	1.5	68	5.0	147	10.8	322	23.6	379	27.8	129	9.5	298	21.8
100K PLSS	49	3.5	106	7.7	148	10.7	310	22.4	336	24.3	109	7.9	327	23.6
100K NON-VEG COVER	27	1.9	151	10.7	263	18.7	404	28.7	330	23.4	81	5.7	154	10.9
100K TRANSPORTATION	131	9.1	251	17.4	344	23.8	402	27.8	213	14.8	37	2.6	66	4.6
100K VEG SURFACE CVR	46	3.3	151	10.8	251	17.9	408	29.1	328	23.4	75	5.4	141	10.1
DOQ	57	4.6	220	17.9	370	30.0	375	30.4	145	11.8	9	0.7	56	4.5

32. How important is it to know when each feature in a DLG was last updated?

	Count	Pct
LITTLE	91	4.9
SOME	129	7.0
MODERATE	645	34.8
SUBSTANTIAL	514	27.7
VERY GREAT	475	25.6

33. How important is it to know from what source each feature in a DLG was last updated?

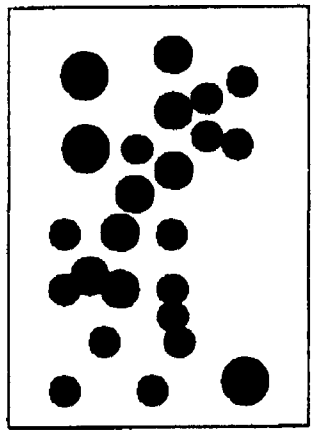
	Count	Pct
LITTLE	168	9.1
SOME	232	12.6
MODERATE	626	33.9
SUBSTANTIAL	444	24.1
VERY GREAT	376	20.4

34. Adjustment of position and deletion of some features are required when producing a map to allow for symbol separation and legibility. DLG's digitized from maps inherit these cartographic adjustments. What magnitude of problems do these adjustments create in the usefulness of the DLG's you receive from USGS?

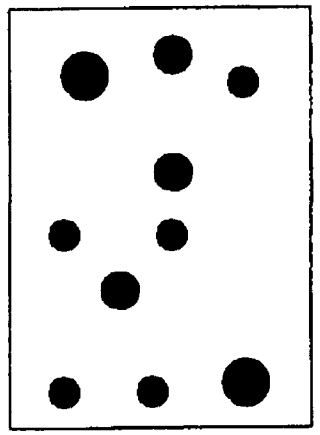
	Count	Pct
NONE	180	10.6
SOME	488	28.6
MODERATE	825	48.4
SUBSTANTIAL	163	9.6
MAJOR	49	2.9

35. In dealing with dense groups of discrete features, which of the following alternatives would be sufficient to meet your needs?

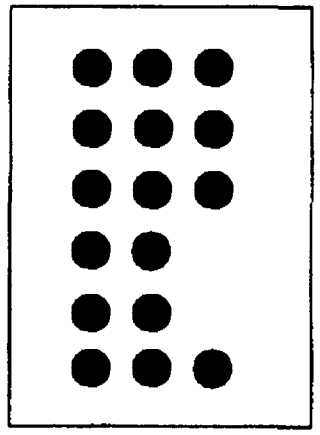
All Features



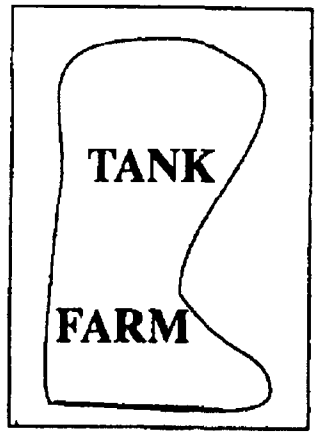
Selection & Thinning



Representative Pattern



Area



	Count	Pct
ALL FEATURES	670	36.0
SELECTION AND THINNING	273	14.7
REPRESENTATIVE PATTERN	207	11.1
AREA DELINEATION	711	38.2

36. Does the road classification currently portrayed on USGS maps and in DLG's meet your needs?

	Count	Pct
YES	1402	71.2
NO	457	23.2
NO NOT USE	111	5.6

37. If question 36 is no, which of the following road classification better meets your needs?

	Count	Pct
FUNCTIONAL CLASSES	148	34.6
CONSTRUCTION MATERIAL	105	24.5
ADMINISTRATION	100	23.4
OTHER	75	17.5

38. Does the drainage classification "perennial vs. intermittent" on USGS maps and in DLG's meet your needs?

	Count	Pct
YES	1588	81.1
NO	151	7.7
DO NOT USE	219	11.2

39. If question 38 is no, what classification scheme would meet your needs? (Note: Written answer only, no tabulations)

40. Is the detail included in the drainage network shown on USGS maps and in DLG's sufficient to meet your needs?

	TOO LIGHT		LIGHT		ENOUGH		HEAVY		TOO MANY	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
24K MAPS/DLG	94	5.2	241	13.3	1101	60.6	292	16.1	89	4.9
100K MAPS/DLG	155	10.1	262	17.0	910	59.1	150	9.7	64	4.2

41. Most DLG revisions do not include contour revision, even when contours conflict with an updated or new feature. Does this preclude you from using the DLG contour file?

	Count	Pct
YES	379	20.3
NO	993	53.1
DO NOT USE	499	26.7

42. If question 41 is YES, would you buy the USGS contour data and expend your own resources to edit the contour information, or not purchase the USGS contour data?

	Count	Pct
BUY CONTOUR DATA AND EDIT IT	195	51.7
NOT PURCHASE THE DATA	182	48.3

43. Which of the following public use building types do you require to be individually mapped and identified?

	NO NEED		NEED SOME		NEED ALL	
	Count	Pct	Count	Pct	Count	Pct
ARENA	584	31.6	1044	56.5	221	12.0
ARMORY	670	36.2	945	51.1	236	12.7
BUS TERMINAL	724	39.4	864	47.0	250	13.6
CAPITOL	397	21.3	1032	55.5	431	23.2
CITY HALL	423	22.4	1036	54.9	427	22.6
COMMUNITY CENTER	640	34.5	950	51.3	263	14.2
COURTHOUSE	456	24.4	1040	55.6	375	20.0
FIREHOUSE	406	21.5	957	50.8	521	27.7
HOSPITAL	321	16.9	967	50.9	613	32.2
HOUSE OF WORSHIP	659	35.4	945	50.8	257	13.8
LIBRARY	636	34.4	946	51.1	269	14.5
MEDICAL CENTER	410	21.8	969	51.4	505	26.8
MEMORIAL	765	41.4	905	49.0	178	9.6
MUSEUM	731	39.4	929	50.1	194	10.5
POST OFFICE	499	26.7	1009	54.1	358	19.2
RAILROAD STATION	438	23.2	1035	54.9	412	21.9
SCHOOL	314	16.5	1020	53.6	569	29.9
STADIUM	529	28.5	1050	56.5	279	15.0
TOWN HALL	508	27.3	975	52.5	375	20.2

44. Using tint is the most efficient way to portray built-up areas that are completely covered with structures. Individual buildings, except for certain "public" facilities, are not shown in the tint area. Would the use of this tint in other areas that are heavily but not completely covered with structures have a negative impact on your use of DLG's or map products?

	Count	Pct
YES	417	20.9
NO	1381	69.1
DO NOT USE	201	10.1

45. Do the vegetation classes portrayed on USGS maps or in DLG's meet your needs?

	Count	Pct
YES	1309	65.0
NO	347	17.2
DO NOT USE	358	17.8

46. If question 45 is no, what vegetation classes would meet your needs? (Note: Written answer only, no tabulations)

47. USGS maps and DLG's include political and administrative boundaries such as minor civil units (township, town, district, precinct or barrio) and incorporated city boundaries. If minor civil units and incorporated city boundaries were no longer portrayed on USGS products, would this have a negative impact on your applications?

	Count	Pct
YES	1355	67.1
NO	584	28.9
DO NOT USE	80	4.0

48. Should USGS include feature names in DLG's (example, Smith River)?

	Count	Pct
YES	1807	90.1
NO	58	2.9
DO NOT USE	141	7.0

49. USGS collects each DLG data category as a separate file. Does this meet your needs?

	Count	Pct
YES	1559	79.1
NO	55	2.8
DO NOT USE	357	18.1

50. Do you routinely combine two or more DLG data categories into one topologically structured file?

	Count	Pct
YES	621	31.6
NO	818	41.6
DO NOT USE	526	26.8

51. For network features like roads and streams, how important is it that flow direction is provided on USGS maps and in DLG's?

	LITTLE		SOME		MODERATE		SUBSTANTIAL		GREAT	
	Count	Pct	Count	Pct	Count	Pct	Count	Pct	Count	Pct
TRANSPORTATION	718	36.5	376	19.1	480	24.4	213	10.8	180	9.2
DRAINAGE	388	19.7	246	12.5	543	27.6	374	19.0	419	21.3

[Note: For questions 52-61, respondents were asked to select features that they would collect if their own funds were being expended. Highlighted features are those that have been interpreted to be framework features based on the Federal Geographic Data Committee's Framework Working Group report dated November 1, 1994. There are no Framework features in questions 55, 57, 58, 60, or 61.]

52. Would you collect hydrography features?

	Count	Pct
YES	1864	91.9
NO	164	8.1

Which feature would you collect?

	Count	Pct		Count	Pct
STREAM/RIVER	1752	86.4	MILE MARKER	601	29.6
LAKE/POND	1714	84.5	SUBMERGED STREAM	585	28.8
WATERCOURSE	1588	78.3	RAPIDS	546	26.9
RESERVOIR	1562	77.0	SPECIAL USE ZONE	546	26.9
SWAMP/MARSH	1462	72.1	GATE	516	25.4
BRIDGE	1436	70.8	ROCK	504	24.9
CANAL/DITCH	1409	69.5	WASH	504	24.9
DAM/WEIR	1406	69.3	REEF	479	23.6
SHORELINE	1402	69.1	AREA TO BE SUBMERGED	475	23.4
PIPELINE	1265	62.4	NON-EARTHEN SHORE	417	20.6
WELL	1035	51.0	FISH LADDER	416	20.5
BAY/INLET	1016	50.1	FLUME	402	19.8
SEA/OCEAN	968	47.7	SINK/RISE	351	17.3
SPRING/SEEP	906	44.7	FLAT	325	16.0
GAGING STATION	898	44.3	GEYSER	316	15.6
TUNNEL	894	44.1	WRECK	268	13.2
SPILLWAY	872	43.0	ICE MASS	266	13.1
WATERFALL	858	42.3	ANCHORAGE	252	12.4
ESTUARY	826	40.7	FORESHORE	190	9.4
WATER INTAKE/OUTFLOW	787	38.8	CREVASSE FIELD	177	8.7
LOCK	768	37.9	MUD POT	173	8.5
INUNDATION AREA	654	32.2	SNAG/STUMP	146	7.2
			FUMAROLE	121	6.0

53. Would you collect transportation features?

	Count	Pct
YES	1891	93.6
NO	129	6.4

Which feature would you collect?

	Count	Pct
ROAD	1823	90.2
RAILWAY	1731	85.7
ROUTE	1687	83.5
BRIDGE	1593	78.9
INTERCHANGE	1435	71.0
AIRCRAFT FACILITY	1368	67.7
RUNWAY	1236	61.2
TUNNEL	1196	59.2
TRAIL	1169	57.9
RAILWAY YARD	1141	56.5
LANE	1017	50.3
CUL-DE-SAC	962	47.6
APRON/TAXIWAY	820	40.6
MONORAIL	754	37.3
HELIPAD	734	36.3
TUNNEL ENTRANCE	690	34.2
REST SITE	619	30.6
DRAW SPAN	507	25.1
FORD	503	24.9
GATE	483	23.9
TURNTABLE	335	16.6
TRAFFIC INSPECTION FACILITY	312	15.4

54. Would you collect boundary features?

	Count	Pct
YES	1914	95.0
NO	101	5.0

Which features would you collect?

	Count	Pct
COUNTY	1763	87.5
CITY	1734	86.1
BOUNDARY LINE	1615	80.1
STATE/TERRITORY	1529	75.9
RESERVATION	1232	61.1
NATION	1029	51.1
POINT MONUMENT	933	46.3
MINOR CIVIL DIVISION	926	46.0
LAND PARCEL	901	44.7
BOUNDARY POINT	858	42.6

55. Would you collect any built-up features?

	Count	Pct
YES	1924	94.5
NO	113	5.5

Which features would you collect?

	Count	Pct		Count	Pct
RESERVOIR	1628	79.9	MINE ENTRANCE	652	32.0
TRANSMISSION LINE	1508	74.0	PIPELINE REGULATION STATION	650	31.9
PIPELINE	1397	68.6	RACETRACK	633	31.1
PARK	1375	67.5	LAUNCH FACILITY	619	30.4
SEWAGE DISPOSAL PLANT	1320	64.8	LAUNCHING RAMP	597	29.3
CEMETERY	1290	63.3	SPORTS SITE	554	27.2
BUILDING	1289	63.3	WHARF	512	25.1
HIGH DENSITY BUILDING AREA	1243	61.0	CABLEWAY	511	25.1
POPULATED PLACE	1177	57.8	DISTURBED SURFACE	492	24.2
TANK FARM	1127	55.3	WALL	446	21.9
DISPOSAL SITE	1103	54.1	GRAVE	434	21.3
MINE	1103	54.1	OFFSHORE PLATFORM	423	20.8
CABLE/PIPELINE SITE	1093	53.7	WINDMILL	412	20.2
LOCALE	1066	52.3	FLUME	336	16.5
POWER SITE	1019	50.0	OUTDOOR THEATER	336	16.5
WELL	1008	49.5	EXHIBITION GROUND	334	16.4
TOWER	988	48.5	AQUACULTURE SITE	333	16.3
CAMPGROUND	966	47.4	PROVING GROUND	322	15.8
ARCHEOLOGICAL SITE/RUIN	918	45.1	RECREATIONAL SLIDE	286	14.0
WELL FIELD	912	44.8	DRYDOCK	279	13.7
TANK	911	44.7	DRIVE-IN THEATER SCREEN	262	12.9
HISTORICAL MONUMENT	899	44.1	EMBANKMENT	262	12.9
SHOPPING CENTER	888	43.6	SKI JUMP	252	12.4
MARINA	883	43.3	BOARDWALK	223	10.9
FENCE LINE	875	43.0	CHIMNEY	205	10.1
INSTITUTIONAL SITE	875	43.0	KILN	197	9.7
SUBSTATION	825	40.5	HOLDING PEN	187	9.2
MOBILE HOME PARK	748	36.7	PROSPECT	186	9.1
FILTRATION PLANT	705	34.6	CONVEYOR	181	8.9
PIER/BREAKWATER/JETTY	697	34.2	DISH	136	6.7
ATHLETIC FIELD	681	33.4			

56. Would you collect public land survey system features?

	Count	Pct
YES	1459	74.3
NO	504	25.7

Which features would you collect?

	Count	Pct
SURVEY CORNER	1028	52.4
PRINCIPAL MERIDIAN	952	48.5
POINT MONUMENT	910	46.4
SURVEY LINE	904	46.1
SURVEY POINT	884	45.0
RECTANGULAR SURVEY AREA	820	41.8
LAND GRANT	642	32.7
SPECIAL SURVEY AREA	592	30.2
OFFSHORE LEASE BLOCK	218	11.1

57. Would you collect nonvegetative surface cover features?

	Count	Pct
YES	1106	56.5
NO	853	43.5

Which features would you collect?

	Count	Pct
BEACH	806	41.1
DUNES	785	40.1
BARREN LAND	737	37.6
FIREBREAK	523	26.7
MORAINE	507	25.9

58. Would you collect vegetative surface cover features?

	Count	Pct
YES	1565	78.9
NO	419	21.1

Which features would you collect?

	Count	Pct
TREES	1505	75.9
CULTIVATED CROPLAND	1232	62.1
SHRUBLAND	1107	55.8
TREE	761	38.4

59. Would you collect survey control features?

	Count	Pct
YES	1513	77.0
NO	452	23.0

Which features would you collect?

	Count	Pct
POINT MONUMENT	1382	70.3
CONTROL STATION	1338	68.1

60. Would you collect any of the hypsography features?

	Count	Pct
YES	1704	85.5
NO	290	14.5

Which features would you collect?

	Count	Pct
CONTOUR (LAND)	1612	80.8
SPOT ELEVATION	1484	74.4

61. Would you collect landform names?

	Count	Pct
YES	1341	68.4
NO	620	31.6

Which feature would you collect?

	Count	Pct
ISLAND	1022	52.1
VALLEY	896	45.7
RIDGE	835	42.6
MOUNT	788	40.2
RANGE	738	37.6
DESERT	693	35.3
PLATEAU	676	34.5
BASIN	663	33.8
DIVIDE	578	29.5
CLIFF	577	29.4
CAPE	534	27.2
ISTHMUS	501	25.5
CAVE ENTRANCE	490	25.0
LOCALE	481	24.5
PINNACLE	456	23.3
GAP	406	20.7
TERRACE	401	20.4
BAR	339	17.3
BEND	304	15.5
FRACTURE	295	15.0
INCL1NE/FLOW	259	13.2
ARCH	240	12.2
ICEBERG	186	9.5
ICEBERG TONGUE	120	6.1
SASTRUGI	91	4.6

62. Do you add other features or attributes to DLG's?

	Count	Pct
YES	376	22.4
NO	1306	77.6

63. This survey requested your input on selected current products of the USGS. We realize that you may have other needs and insights on USGS cartographic products. Please take a little more time to provide additional suggestions, insights, or application needs. (Note: Written answer only, no tabulations)