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CLIMATE INFORMATION UNIT
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ASSESSMENT OF USAGE OF REAL-TIME CLIMATIC DATA AND INFORMATION

TO THE PUBLIC AND PRIVATE SECTOR

by

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1. INTRODUCTION

The Illinois Climate Assistance Service (CLASS) 1s a computer-based real-time weather and climate data and Information system receiving data from 36 Illinois sites (see Changnon et al., 1984). The system was developed by funds from the Climate Analysis Center (CAC), from the National Climate Program Office (NCPO), from the Illinois Department of Energy and Natural Resources, and the Water Survey. The system has been in a demonstration mode since January 1984 (development of the system completed), funded by the CAC, NCPO and Illinois. This report focuses on activities during 1985.

The prime objective of CLASS was to serve an a semi-automatic data collection, management, and dissemination system. Essentially, it first receives daily observations from 36 NWS Cooperative observers in Illinois; daily products from the Midwest Agricultural Weather Service Center; and information from the Climate Analysis Center. Quality control is applied to the data, and calculated secondary parameters, update tables and maps are completed. The resulting products available to (1) state and local governmental agencies, (2) federal offices in Illinois, (3) selected businesses, and certain private citizens. The products are prepared with current data each day, and users can obtain the products on demand by means of a terminal and modem. In addition, users were monitored, including the products requested, to determine usage Information to further guide system development and ultimate marketing strategies.

The project objectives have been met. CLASS has grown into a popular means to assess the current and recent state of the weather, climate and water resources. Most of the second year's activity has involved analysis of the

users, and the frequency with which various products were requested.

Specifically, the objectives of this 1-year proposal were:
1. to increase the number and diversity of users of CLASS;
2. to develop new products to meet the needs of users; and
3. to monitor product requests; and
4. to determine use patterns.

The accomplishment of each of these objectives 1s discussed in the following sections.

2. GROWTH IN THE CLASS USERS

CLASS has been 1n the second year of a demonstration mode, essentially with controlled access, as sa to test various user groups and because the system was too small to allow unlimited statewide usage. Over 690 users have accessed the system during the first 2 years of operation. Of those, 394 (57%) users accumulated at least 15 minutes of connect time since their first sign-on. After 2 months into the 3rd year of operation (1986), the total number of users increased to more than 850.

The distribution of CLASS users 1s shown in Table 1, sorted by user category. The percent of the total users 1n each of 16 arbitrary user categories has remained about the same (i.e., all changes are less than 3%, except for the private user category, which often served as the category for those where insufficient Information was available. Of the current regular users, 44% are agriculturally oriented, i.e., their income is largely dependent upon growing, trading, or providing information concerning corn and beans. Of those remaining, 17% were affiliated with governmental agencies.

The distribution of Illinois CLASS users will not necessarily predict user categories or frequencies 1n other states because of differences in

Table 1. Distribution of CLASS user affiliations (percent of total in parentheses), presented for all users, and for continuing users.

	PRIV USERS	FARMERS	STATE GOV	EXTEN	CHEM/FERT	PRIV BUS
ALL USERS	105 (27)	54 (14)	45 (11)	39 (9)	27 (7)	25 (6)
CONTINUING USERS	30 (19)	25 (15)	22 (14)	18 (11)	15 (9)	11 (7)

	UNIV RES	MEDIA	FED GOV	AG CONSUL	AG BUS	JR COLLEGE & HIGH SCH
ALL USERS	21 (5)	11 (3)	24 (6)	16 (4)	6 (2)	8 (2)
CONTINUING USERS	8 (5)	8 (5)	5 (3)	6 (4)	3 (2)	4 (2)

	SEED CO	NTL WEA SER	FARM MGRS	COMMOD DEALERS
ALL USERS	6 (2)	2 (1)	5 (1)	3 (1)
CONTINUING USERS	4 (2)	2 (1)	2 (1)	1 (1)

PRIV USERS: Private, individual users
FARMERS: Farmers
STATE GOV: State government staff
EXTEN: County Extension staff
CHEM/FERT: Chemical/Fertilizer dealer
PRIV BUS: Private business
UNIV RES: University researchers
MEDIA: Radio, television, newspaper staff
FED GOV: Federal government staff
AG CONSUL: Agricultural consultants
AG BUS: Agricultural business
JR COLLEGE & HIGH SCHOOL: Educators/students from junior college or high school
SEED CO: Seed company staff
NTL WEA SER: National Weather ervice staff
FRAM MGRS: Farm managers
COMMOD DEALERS: Commodity dealers

agricultural crops produced, agri-businesses, and other weather-sensitive industry. The Midwestern recreation industry, for example, has need of soil moisture conditions, temperature, temperature stress, and snowcover information. Federal government offices located in each state have need of more complete real-time data at a density greater than available from the NWS. For example, the NWS Minneapolis River Forecast Center routinely obtains data from CLASS in winter on the distribution of snowcover, and depth of ground frost, as well as recent temperatures over Illinois. These are used to prepare flood potential advisories and warnings. The Illinois Crop Reporting Service (combined effort of the Illinois Dept. of Agriculture and the U. S. Dept. of Agriculture) regularly uses 5 products of CLASS in the preparation of their weekly newsletter which 1s distributed to about 6,500 subscribers. Prior to CLASS, they retrieved that information from a score or more of phone calls, about 50 post card reports from farmers received (often late) each week, and a report prepared by the Chicago NWS Forecast Office.

Briefings concerning CLASS were held at the beginning of 1985 with a few newspapers and radio stations, and with information businesses which had a strong agricultural orientation. Responses strongly depended on the time their individuals were willing to take to obtain current, more dense data, and their capability to produce graphics. Interactions with a vice-president and farm editor of a large Chicago radio station resulted in only a few subsequent calls from that station to CLASS 1n 1985. Since they are a clear-channel station and are heard over much of the Midwest, their interest in weather and climate data is largely limited to the meso-and macro-scale. A local television station uses CLASS a few times each week to prepare special interest presentations concerning recent weather anomalies over their 25,000 square

mile broadcast area. In this case, they have personnel who are interested in developing such products, and who have the capability to produce graphics in a timely manner. It is apparent that increasing the use of CLASS, or other similar systems, by television staitons will require time working with each of them, illustrating the data available and how the tables and maps of CLASS could be used 1n programming.

During the last year, we also briefed a large Chicago newspaper and a local newspaper on CLASS products. Although they have called CLASS, neither has used the system extensively, although they both make frequent calls to the NWS office and the Illinois State Climatologist for "local" information. From discussions with them, they prefer to have an "expert" discuss the data and Information with them, information which may be quoted 1n the subsequent story, and information which need not be filtered from tabular or mapped raw data. The lesson here 1s that newspaper personnel prefer to quote profession-als 1n their stories, and therefore (if available) they seek and receive a verbal picture of the item of interest, as well as to receive a discussion as to the likely causes of conditions.

At this time, it does not appear that the news media would be a major user of a real-time system like CLASS. However, future distribution (and fre-quency) of CLASS users will change because we have improved communication of the system's capabilities to the general public, and to industry and business in Illinois.

3. NEW AND CONTINUING PRODUCTS AVAILABLE ON CLASS

Eight separate temperature- and precipitation-related parameters are presented on CLASS 1n tabular form for each of 20 districts of Illinois, for a

total of 160 pages of data. Each table presents the most recent 14 days of the given parameter, plus the same day's data from the previous year, and that of the 30-year mean.

Twenty-one pages of map displays (of Illinois) of various meteorologic and climatic parameters are given. Furthermore, CLASS provides. 22 pages of information regarding the migration and concentration of pests in the state, news stories concerning ag-weather related topics, and 5 pages of water resource information. In addition, meteorologic and climatic products including heating-, cooling-, and growing-degree days, soil moisture and temperature, frost and snow depth, and various predictions and outlooks are available in tabular and narrative format. This results in a total of 208 pages of information updated daily and available. The actual number changes with time, depending on the current pest status and the number of news stories available on any day.

During the past year, news releases from the Univ. of Illinois Agricultural Communications office were accommodated on CLASS to determine how effective such information could be provided to, and used by small newspapers in Illinois. Prior to initiating this test project, we set certain guidelines with the news service, stipulating that all stories must be weather- or climate-related, and that an analysis of the effectiveness of this program was to be made after one year's operation to determine how, or if, the program should continue. Entry to the news menu is blind, i.e., news oriented users are given a certain call, with which they gain entry. The system was advertised by letter to about 25 small newspapers in the state. The first stories were put on the system in May 1985. The system can accommodate up to 5 stories at once, and users first see a bulletin board, from which they choose

those stories they desire. The monthly total requests for news stories
changed dramatically, as shown by the data of Table 2.

Table 2. Number of news stories requested from CLASS by month, 1985 and 1986.

	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
NUMBER	7	13	40	23	15	103	5	85	129	123

The increase in usage after December was due to a concerted effort (by phone
and mail) by the Dept. of Agricultural Communications to entice newspapers in
the state to avail themselves of the available information.

4. ASSESSMENT OF PRODUCT REQUESTS

    User requests to the system were automatically monitored, so that product
use could be evaluated according the date of the request, the user, and the
user category. These data permit varied marketing analyses, e.g., which pro-
ducts, if any, are primarily requested by given user groups, changes in pro-
duct requests through a year, etc. The total number of monthly calls to the
system, and the total monthly connect time is show in Figure 1 from March
1984 through February 1986. Examination of this 2-year test reveals that use
was greatest during spring and late summer months, undoubtedly because most of
the users were agriculturally oriented. The request maxima during the mid
1984-85 winter are the result of environmental stress, discussed below. Dur-
ing the months with greatest use, more than 250 calls were received by the
system, and connect time averaged about 45 hours per month. The 2 parameters
closely parallelled each other.

    Table 3.shows monthly requests for each of 40 CLASS products from 1 April
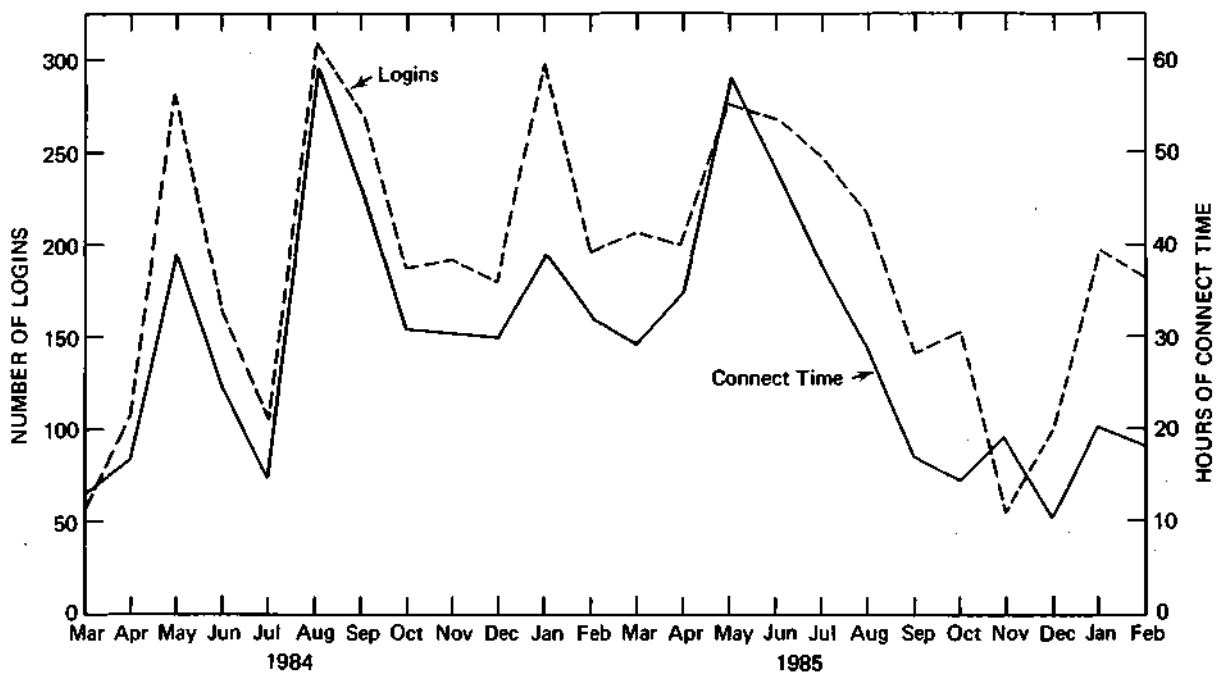1984 to 28 February 1986. Throughout the first two years of operation the

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Fig. 1. Monthly number of logins, and hours of connect time for CLASS.

Table 3. Monthly demand by product. CAC products so indicated. Remainder are products of Illinois State Water Survey.

	1984 APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1985 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	1986 JAN	FEB
FORECASTS																							
30 and 90 day forecasts (CAC)	22	30	30	28	51	51	24	33	28	28	20	21	24	20	21	17	14	2	7	1	7	3	16
weekly Forecasts	40	47	58	54	112	43	38	49	30	43	37	41	33	38	34	31	21	7	17	5	8	17	22
monthly/seasonal Forecasts	-	-	-	*	-	22	15	16	12	10	15	14	17	9	12	14	8	2	3	1	0	3	7
10 day (CAC)	*	*	*	-	*	-	.	-	*	-	-	*	-	23	35	32	32	24	20	15	3	17	9	22
Reviews																							
weekly temp review	-	-	-	*	*	16	16	29	7	12	16	10	16	18	16	20	16	10	10	1	6	6	7
weekly precip review	-	-	-	-	-	17	22	22	5	14	9	8	11	23	19	26	27	11	14	1	8	5	6
weekly review narrative	-	-	-	*	-	27	28	24	12	20	14	11	11	14	17	19	17	10	7	1	8	6	8
monthly narrative	*	*	*	*	*	-	-	*	-	*	-	5	9	9	10	11	2	0	0	1	2	2	7
Statewide Maps																							
current month temp	14	13	22	18	40	15	15	15	15	13	13	14	13	19	18	18	12	7	5	1	9	0	4
last month temp	6	10	3	14	13	12	3	6	4	4	8	3	6	15	10	7	6	8	5	0	4	2	7
yesterday's temp	29	10	28	22	50	20	13	23	21	18	24	13	12	6	12	13	3	11	12	5	4	15	6
last 7 day temp	13	27	22	10	30	26	19	37	20	26	14	21	21	21	25	25	20	13	11	6	10	21	19
snowfall & depth	-	-	-	-	-	6	0	1	9	22	24	3	2	2	1	0	0	1	1	0	7	12	19
current month precip	13	22	29	50	76	39	21	13	15	12	17	10	21	41	36	36	12	15	8	2	9	3	9
last month precip	5	8	10	21	25	18	7	9	7	10	9	7	8	15	12	9	12	12	4	0	9	5	2
yesterday's precip	14	22	28	46	70	42	31	19	16	10	16	6	20	27	27	33	25	7	5	6	1	3	17
last 7 days precip	14	30	31	50	62	35	22	24	20	26	19	13	22	26	40	45	38	8	14	10	10	16	27
cooling degree days	0	0	8	6	19	11	2	2	3	3	2	3	3	2	5	5	8	3	3	1	0	3	2
heating degree days	15	3	3	0	0	23	17	22	9	11	15	12	12	4	5	3	7	4	3	1	1	2	4
frost depth	-	-	-	-	-	-	-	-	3	15	19	7	7	3	6	4	0	1	1	1	3	14	18
Raw Data	14	41	36	12	57	41	33	34	20	44	41	34	57	37	42	14	54	46	13	8	16	55	30
Pest Advisory Requests	91	173	132	100	155	109	43	26	26	23	16	50	76	216	178	119	34	15	11	2	6	6	7
Help Requests	81	98	117	66	194	185	75	76	106	85	59	50	57	80	55	30	44	17	55	13	26	42	33
Station Info	17	10	14	20	42	30	23	22	9	25	14	24	12	15	15	7	11	11	9	3	10	11	13
Comments to System	13	28	17	11	40	30	25	26	27	25	23	24	13	29	24	14	9	8	5	2	12	22	14
Tabular Data																							
daily temperature summary	27	31	41	19	69	58	36	61	50	60	41	30	27	21	14	20	20	26	27	6	13	24	15
soil temperature	19	32	18	7	25	22	10	16	17	19	20	17	43	24	6	2	8	4	5	3	5	0	6
heating/cooling deg days	14	22	28	13	24	30	20	34	18	21	18	10	14	10	8	2	6	5	15	0	7	8	4
growing deg/days	13	111	19	16	30	22	5	5	10	2	5	6	1	19	16	10	14	5	6	2	5	2	3
daily precip summary	32	43	33	39	97	68	24	41	20	37	18	40	17	40	28	21	21	15	14	37	10	17	25
monthly/annual precipitation	12	10	15	17	90	48	19	17	19	11	2	20	12	32	49	25	12	14	11	26	8	7	9
soil moisture	26	14	18	20	46	32	15	7	14	8	14	6	15	18	19	12	2	4	4	1	6	8	4
Palmer Drought Index (CAC)	*	*	*	*	*	30	8	8	14	5	5	9	7	17	11	9	10	0	3	0	2	2	3
seasonal/annual precip	3	9	9	19	36	27	8	13	9	12	8	13	4	10	14	9	14	5	2	1	3	3	2
Water Resources																							
lake & reservoir summary	9	1	8	7	13	12	12	15	12	9	10	4	3	8	3	4	5	4	6	2	2	8	0
peak river stages	7	4	2	2	6	6	3	3	7	5	12	5	1	5	5	6	2	4	4	1	2	4	3
mean river flow	2	3	3	2	4	4	5	2	7	3	6	4	-	9	2	2	2	0	3	1	0	3	0
shallow groundwater levels	13	4	12	12	6	22	5	6	10	12	7	4	4	5	11	6	4	2	10	1	0	8	3
current river stage	13	3	6	1	9	12	12	9	11	17	28	33	12	14	6	9	10	3	5	2	2	14	4

items most often requested (Flg. 1) were: 7- and 10-day narrative forecasts,

and maps of Illinois showing the distribution of temperature and precipitation

of the last 7 days, those for the current month to date, and yesterday's pre-

cipitation and temperature.

The mean number of requests for all 40 products was 397 (2.5% of the

total) during the 23 months of operation ending 28 February 1986. During

those 23 months there were 13 products which were demanded more than the mean

(shown in Table 4).

Table 4.   Percent of all requests for each of the 13 most frequently
           requested categories of CLASS data, from the first 23 months
           of operation.

help requests	(10.4%)
raw weather data requests	(10.2%)
pest advisories	(10.2%)
weekly forecast	(5.3%)
14-day temperature table	(4.6%)
14-day precipitation table	(4.6%)
last 7 days precipitation	(3.7%)
current month's precipitation	(3.2%)
30- and 90-day outlook	(3.1%)
monthly/annual precip summary	(3.1%)
yesterday's precipitation	(3.0%)
last 7 days temperature	(2.9%)
comments to the system by users	(2.8%)

Requests for help for the system (i.e., how to find a product, or how the

product was calculated, or what was the source of the data or information)

decreased substantially after the first year of operation.   This indicates

that the user group stabilized and that they were more familiar with the pro-

duct selections. Requests for raw weather data, and for the 30- and 90-day

outlooks remainded about constant during the operational period of CLASS.

Demand for the remainder of the products listed 1n Table 4 were relatively

constant through the months.

Demand for CLASS products also varied according to events which occurred or did not occur. For example, the agricultural community exhibited greater demand for products around events in spring and late summer-early fall, times of planting and harvesting. During dry weeks and months, precipitation and short-term forecasts are primarily requested, as one might expect.

During times of flooding, the demand was also unique. For example, in late February 1985, when the Kankakee River flooded, the connect-time during the 7 days when the flooding occurred, increased 78% (to 16.67 hrs) over the mean weekly time (9.37 hrs with a std. dev. of 2.33 hrs) from the previous 7, and the 2 following weeks. During that week the following products were requested about 5 times more frequently than during the other weeks (in decreasing order of frequency): current river stage, snow depth, monthly and annual precipitation to date, last 7 days precipitation, 30- and 90- day outlook, and frost depth, indicating the concern over future runoff and flood-ing trends.

User categories changed during the 23 months of CLASS operation, because we expanded users as tests in 1985. During the early months, only 8 categories were used, as shown in Table 5. Experience in 1985 showed that this categorization scheme was too general. In addition, users were permitted to categorize themsilves, which resulted 1n non-systematic, arbitrary choices. Because of these problems, no product analysis by user category was attempted for this 17-month period.

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Table 5. CLASS user categories during the first 17 months of operation.

              CLASS/CAPS staff
              IL Dept. of Energy & Natural Resources staff
              Coop. Extension Service staff
              University/College research staff
              Other govenmental  staff
              Private business
              Private non-business
              Unknown
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Since September 1985, the number of categories was expanded to 12, and these are presented in Table 6.

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Table 6. CLASS user categories since 1 September 1985,  and total hours of connect
         time during the 6 months with data (Sep 85 - Feb 86).

              CATAGORY                                     HOURS

              Scientific Survey staff                       91.1
              IL Dept. of Energy & Natural Resources staff 145.7
              Cooperative Extension staff                   72.9
              University/College research staff            327.7
              Other governmental staff                     218.5
              Business                                     528.0
              Private non-business                         182.2
              Media                                        291.3
              Other than College Education                   0
              Agriculture                                   0.03
              Information suppliers                           0
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The user categories, in decreasing hours of connect-time include private businesses (528 hrs), state and federal govenmental agencies (including the IL Dept. of Energy and Natural Resources, with a total of 364 hrs), research (328 hrs), the media (291 hrs, private non-business (182 hrs), the staff of the 3 Illinois Scientific Surveys (91 hrs), and Cooperative Extension staff (73 hrs).   This use pattern will almost certainly not be representative of long term future use, since only 6 months were included in this sample, and those

were of fall and winter. The agricultural use will assuredly represent a greater component of total use during spring and summer.

5. DEMAND OF CLIMATE ANALYSIS CENTER PRODUCTS AVAILABLE ON CLASS

The following products of the Climate Analysis Center are regularly obtained by the Water Survey for inclusion on CLASS:

        1. 5-, and 10-day forecasts for Illinois
        2. 30-, and 90-day outlooks for Illinois
        3. Current Palmer Drought Index data for the crop reporting
           districts of Illinois

These data and information are received from the CAC on-line computer and input into the CLASS computer (where CLASS products are generated), and become available on demand by users. The 90-day forecasts represent 3.1% of the total demands to the system, whereas the 10-day forecast represents 2.0%, and the Palmer Drought Index is 1.3%.

6. SPECIFIC ADVANTAGES OF A REAL-TIME WEATHER/CLIMATE DATA DISSEMINATION SYS-TEM

Our experience, as well as that of operators of other systems, shows major benefits of a real-time weather and climate data/information dissemination system to such a variety of particular needs. For example, consider the Midwestern State Climatologist who receives intermittent requests from from state governmental agencies for evaluations of a particular weather parameter either for the present, for events in a period ending at present, or for conditions 1n the immediate future. Prior to CLASS or comparable real-time dissemination system, such requests essentially went unanswered, or poorly answered after completing phone calls to observers about the state. CLASS with daily updates permits such inquiries to be quickly answered, with no more

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effort than typing a few instructions on a computer terminal. Note the interesting examples which follow.

The Illinois Statistical Reporting Service prepares a weekly newsletter during the growing season which 1s distributed to about 6,500 recipients. Prior to CLASS, they obtained information on soil moisture conditions (based on the opinions of about 100 farmers throughout the state), via weekly postcards which were often 2-3 days late by the time they were received by the office. In addition, 7 day summaries of temperature and precipitation values over the state were obtained (by mail) from the Chicago NWS Forecast Office. In consultation with the staff at the Reporting Service, we developed several products which were tailor-made for their needs, but which are used by others as well. For example, the CLASS computer currently prepares 2 maps, 1 showing total precipitation received during the last 7 days, and 1 showing the mean temperature departure from normal for the 7 days. Two tables are prepared, showing temperature, growing degree days, and precipitation data, and differences from normal for about 20 locations in the state (see Fig. 2). We also prepare a 10-day forecast narrative based on information received from the CAC computer, specifically their 5- and 10-day forecasts, and the daily maximum and minimum temperatures forecast for the First Order stations in and around Illinois.

The Minneapolis NWS River Forecast Center requires snowcover and frost depth information prior to making flood potential outlooks. That information was recieved after numerous telephone calls and teletype prior to CLASS. At present, at least for data for Illinois, the River Forecast Center calls CLASS as necessary to obtain maps of daily current snowcover and frost depth (updated bi-weekly).

14.

About one-third of the Illinois County Cooperative Extension agents request CLASS products during the growing season. These are posted, published in newspapers, or broadcast in their counties. Prior to CLASS, most of these products were simply not available. Moreover, they could access via telephone calls, only 5 to 10 reporting sites per state.

7. COSTS OF OPERATING CLASS: WHO SHOULD BEAR THE COST

Support for the development and operation of CLASS has come from the Climate Analysis Center of NWS, the National Climate Program Office, and the State of Illinois. CAC provided a total of about $75,000 in 2 grants which have extended over 3 years. The Dept. of Energy and Natural Resources contributed about $60,000 during the same period, and the Water Survey about $80,000.

Currently there is no user fee for entering the sytem. The only cost incurred to the user now is the cost of a long distance phone call, a condition initiated 1n late 1984. Prior to that time, 800 phone numbers were available to all users. Interestingly, use of CLASS did not perceptibly changed when toll call access was initiated.

We estimate that maintenance of the existing system, and the ability to provide a few new products each year will cost about $35,000 annually. This does not include depreciation of the equipment, but does include equipment maintenance, part time services of a systems engineer, and the cost of 1 toll-free 800 number (for use of NWS Cooperative observers to report their obs).

The present financial environment suggests that users should bear the cost. However, users include a wide variety of people, from individual farmers to county extension agents, university researchers, consultants, grain traders, and agri-businesses. Some of these are governmental agencies, and some are private businesses. Clearly, a user fee must be initiated in the near future. Its structure is still uncertain, although we have drawn some conclusions from discussions held in 11 workshops in major Midwestern cities. The user fee probably should be scaled according to use, i.e., farmers should pay a minimal amount, whereas those who use CLASS data as input to models (value added), where the results are sold to other users, probably should pay a greater fee.

8. CLIMATE DATA AND INFORMATION NEEDS OF PRIVATE USERS IN THE MIDWEST

The North Central Regional Climate Center (NCRCC) organized and presented 11 workshops in cities of the Midwest to which people from the private sector who use climate data on a regular basis were invited. Over 115 individuals participated in the meetings. The focus of each workshop was to determine the (1) climate data and information needs of these private users, i.e., which data are desired in the operation of their business; (2) how timely those data need be to be useful; and (3) what was the perceived value of such data and Information. Answers to these questions were developed from discussions at the workshops and by means of questionnaires which were returned by those who attended. The complete findings of these workshops and questionnaires are presented in another publication (Wendland et al., 1986) and is available from the NCRCC.

9. CONCLUSIONS

16.

CLASS provided real-time climate Information to state governmental agencies, and to select (limited) individuals and agencies associated with agriculture, to help determine their need (perceived and real) of such data and information. Although the individual users changed during the 2 years of service, the distribution of users according to affiliation category has remained essentially constant. Most users of the Illinois CLASS system are agriculturally oriented, either directly or indirectly.

Seasonal changes in the products most requested during the first (1984) spring, summer, and autumn were duplicated during the second year of operation. The occurrence of extreme events at any time prompted unique product demands, which typically continued for several days after the event itself.

Much remains to be learned from the existing system. For example, the applications usage of the various user categories 1s only little known. This is an important piece of Information because it would enable new systems to be specifically designed for the potential users.

Another unknown is the cost which the current and future users of CLASS will pay to help to maintain its operation. Questionnaires have supported mean annual fees of a few hundred dollars, with actual fees scaled according to the category of the user, i.e., lowest rate for individuals, and highest rates for those who use these data and information to generate new products, which ar then resold to their subscribers. Subsequent user assessment in 1985 added new groups for testing. Only operating the system with established fees will determine whether CLASS can be supported by fees of its users. These and other unknowns should be defined.

10. REFERENCES

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TEMPERATURE SUMMARY FOR WEEK ENDING 860504 -- Illinois State Water Survey

		-- Temperature —			Est. Growing Degree Days;(50F)		
		Extrema		Depar-	Week	Est	Season	Depar-
Dist	Location	High	Low	ture	Total	days	Total	ture
01	Freeport	82	31	0	68	0	50	-2
02	Paw.Paw	77	32	-1	49	1	32	-29
03	Antloch	77	32	0	47	1	29	-21
04	Galesburg	81	38	0	89	0	52	-3
05	Ottawa	78	35	-5	61	0	43	-18
06	Mason.City	78	40	-2	86	1	51	-12
07	Princeville	83	31	-4	70	0	52	-3
08	Kankakee	83	31	-1	70	0	48	-8
09	Jacksonville	84	40	-1	82	0	58	-5
10	Pana	85	40	0	88	0	63	-3
11	Urbana.Illinois.	80	35	-1	80	1	46	-13
12	Carlinville	85	40	2	100	1	59	-9
13	Effingham	85	40	-2	75	0	55	-9
14	Lawrenceville	85	42	-2	84	0	61	-7
15	Bellville	89	39	0	85	1	44	-26
16	Carlyle	86	41	-1	83	0	59	-9
17	McLeansboro	84	40	-4	85	0	61	-15
18	Kaskaskia	88	40	-1	96	0	66	-6
19	Dixon.Springs.Il	85	36	4	104	0	65	-21

PRECIP SUMMARY FOR WEEK ENDING B60504 --- Illinois State Water Survey

		-- Precipitation —			Soil Moisture		
		Week	Since	Depar-	Station	Obsrv	Water
Dist	Location	Total	May 1	ture		Date	%PAM
01	Freeport	1.04	0.01	-0.40	Freeport	04/15	72.6
02	Paw.Paw	1.04	0.19	-0.25	De.Kalb	04/15	77.3
03	Antioch	0.58	0.00	-0.39	De.Kalb	04/15	77.3
04	Galesburg	0.63	0.61	0.24	Oak.Run	04/15	82.3
05	Ottawa	0.50	0.29	-0.15	De.Kalb	04/15	77.3
06	Mason.City	1.15	0.42	0.03	Monmouth	04/15	65.5
07	Princeville	0.75	0.69	0.36	Peoria	04/14	14.5
08	Kankakee	0.98	0.65	0.29	Peoria	04/14	14.5
09	Jacksonville	0.77	0.77	0.38	Perry	04/16	74.4
10	Pana	0.10	0.10	-0.35	Springfield	04/16	11.2
11	Urbana.Illinois.	1.74	0.00	-0.46	Bondville	04/25	78.3
12	Carlinville	0.06	0.02	-0.50	Perry	04/16	74.4
13	Effingham	0.09	0.09	-0.31	Brownstown	04/18	69.4
14	Lawrenceville	1.38	0.67	0.21	Brownstown	04/18	69.4
15	Bellville	0.15	0.15	-0.17	Belleville	04/18	25.7
16	Carlyle	0.08	0.08	-0.42	Ina	04/22	92.4
17	McLeansboro	0.08	0.03	-0.50	Olney	04/22	66.3
18	Kaskaskia	0.18	0.18	-0.35	Carbondale	04/23	78.3
19	Dixon.Springs.Il	0.49	0.49	-0.48	Dixon.Springs	04/21	78.0

Figure 2. Two products from CLASS, showing the distribution of certain temperature and precipitation parameters about the state of Illinois.