1995 Project Abstract
For the Period Ending June 30, 1997
This project was supported by the Environmental and Natural Resources Trust Fund (MS 116P.04)

TITLE:	BASE MAPS FOR THE 1990s - FINAL PHASE CONTINUATION 7(e)
PROJECT MANAGER:	DON YAEGER (don.yaeger@mnplan.state.mn.us)
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WEB SITE ADDRESS:	http://www.lmic.state.mn.us/bmap90/bmap90.htm
LEGAL CITATION:	ML95, Chp 220, Sec. 19, Subd. 7(e).
APPROPRIATION AMOUNT:	$ 600,000

Statement of Objectives: A major cost of building any Geographic Information System (GIS) is collecting and digitizing data. Having current, accurate, digital base maps for GIS data collectors will greatly enhance data exchange and reduce the need to recompile data on other maps at a later date. In addition to GIS applications largely done by government agencies, products from this project can also be used by the general public with an interest in the state's land resources and use. This effort is the final phase of an 8-year project which produced five different paper and digital GIS mapping products and fostered another two products developed beyond the original project plan.

Overall Project Results: Of the five original components of the proposal, three have been completed and the remaining two will be completed by the early 1998, or before.
* **Statewide Air Photos.** Key to the entire effort was the completion of an air photo flight in 1991-2. This effort was part of the National Aerial Photography Program (NAPP). More than 10,000 air photos are now available to provided a recent 'snapshot' of Minnesota for mapping and data collection programs.
* **Revised Topographic maps**. Many of the state's most obsolete 1:24,000-scale topographic maps covered our urban areas. Since 1991, the Basemaps cooperative program with the USGS has produced 138 revised maps.
* **Digital Orthophoto Quads**. The largest effort of the Basemaps program was to produce statewide coverage of Digital Orthophoto Quads (DOQs). DOQs are computer-readable air photos that have been processed to minimize distortions found on traditional photos. For GIS applications, they can serve as both a primary image for traditional air photo interpretation and as a backdrop to view and register other data sets. DOQs are available for more than 82 percent of the state and the remaining 18% will be available by late 1997. Most users will likely use DOQs packaged by county on CD-ROMs, discussed next.
* **Digital Orthophotos on county CD-ROMs.** Because of considerable data handling and storage issues with uncompressed DOQs, USGS is producing compressed data on county-formatted CD-ROMs. CDs are now available for 60 Minnesota counties, mostly in the southeastern half of the state. The remaining 27 counties will all be available before the spring of 1998.
* **Digital elevation models.** These files are available for more than 85% of the state and the remainder will be done, or revised, by mid-1998. Digital elevation models are particularly useful for applications that are influenced by topography, such as drainage and flood potential, sizeable facility site analysis, and solar or wind exposure issues.

Because of interest generated during the Basemaps effort, two projects were started with other sources of funding:

* **Digital Raster Graphics.** DRGs are scanned full-color images of the published USGS maps. They can be used in GIS applications to collect, review, revise or register digital data.
* **NAPP Reflight.** Because 1991-2 photos have been used extensively, Minnesota was selected to be included in the national plans for a summer 1996 reflight. About 60% of the state was flown in 1996; the remainder will be attempted in 1997.

Project Results Use and Dissemination: Paper products (air photos and maps) have been available to public agencies and private citizens for several years. They have traditionally been sold by federal distribution centers and private map sellers. Digital data is sold on CD-ROMs by the US Geological Survey, and for some data, LMIC. These CDs, covering large areas such as counties or geographic blocks, are sold for the modest price of $32. Many land managing agencies, from federal to local level, are using the digital maps as part of their daily operations. GIS data collectors are using the digital basemaps to more precisely register both old and new geographical data sets to enhanced usefulness and data sharing potential.

July 1, 1997
LCMR Final Work Program Update Report

I. Project Title and Project Number: BASE MAPS FOR THE 1990s - FINAL PHASE
CONTINUATION 7(e)

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I.A. Legal Citation: ML95, Chp 220, Sec. 19, Subd. 7(e).

Total Biennial LCMR Appropriation: $ 600,000
Spent: $ 600,000
Balance: $ 0

Appropriation Language: This appropriation is from the trust fund to the director of office of strategic and long-range planning to provide the third biennium of a three-biennium state match for a federal program to complete statewide coverage of orthophoto maps and complete update mapping for the state's most obsolete topographic maps. Data compatibility requirements in subdivision 14 apply to this appropriation.

I.B. Status of Match Requirements:
Match Required: $ 600,000 from U.S. Geological Survey
Amount Committed: $ 600,000

II. Project Summary: A major cost of building any Geographic Information System (GIS) is collecting and digitizing data. Having more current digital base maps for GIS data collectors of all types will greatly enhance data exchange and reduce the need to recompile data on other maps at a later date. In addition to GIS applications, products from this project will be used by the general public, such as hunters, hikers, fishermen, boat owners, cabin owners, and private land managers who require current information.

The original biennial project was to (A) complete the last 20% of the state with digital orthophoto coverage and (B) produce updated maps for one of the state's most heavily used recreational resources - the Mille Lacs Lake-Bay Lake area. The project is being completed in the same manner as the first two phases of the project. The State signed a 50-50 joint funding work agreement with the U.S. Geological Survey. USGS was in charge of all phases of production for both the digital orthophotos and the revised, printed topographic maps. To complete this project, USGS used the production equipment in their offices, plus a number of private sub-contractors. No equipment was purchased by the State. Attached maps show the current status and plans for this project.

A digital orthophoto quad (DOQ) is a computer readable image of an air photo in which distortions caused by the camera and terrain differences on the earth's surface have been removed. The two basic inputs to making a DOQ are a high resolution scanned air photo and a Digital Elevation Model (DEM). DOQs combine the image characteristics of an air photo with the locational and scale accuracies of a map. Any camera, even the highly precise cameras used for aerial photography, distorts the recorded image with distance of a feature from the exact center of the photo. Air photos also have inherent distortion and scale variations because of (1) changes in terrain below the camera, (2) the orientation of the camera at the instant of exposure, and (3) scale variations caused by minor changes in altitude of the plane during exposure. By processing the air photo into a DOQ, the distortions are eliminated. For these DOQs, the scan resolutions is 1 meter on ground and the mapping scale is 1:12,000.

The DEM is a digital file of the terrain that meets National Map Accuracy Standards. DOQs are built by "rubber-sheeting", or stretching the scanned air photo image over the positionally correct DEM. That is, each pixel of the scanned photo is put its correct location on the DEM "map". This new corrected photo image is captured as a digital ortho file which can be displayed in a GIS. In a GIS, the DOQ can be used as a backdrop of other data layers. Any previously collected geographic data can be displayed over the DOQ and adjusted to fit. Since the DOQ is probably a newer image than the old data set, it can be used to updated the data as needed. Use of these DOQ base maps in the future will insure that data sets from various sources will overlay more precisely.

Final products for public distribution at the end of the project will be (A - DOQs) county format CD-ROM digital ortho images for each county in the state and (B - traditional maps) approximately 12 more printed revised topographic maps. The CDS can be purchased from USGS at $32.00 per disk and the maps can be purchased from USGS, the Minnesota Geological Survey, or private maps sellers.

III. Six Month Work Program Update Summary:

Contracts for the production of the two products listed above are on hold for two reasons (one positive and one negative). The basic input data source for both products in aerial photography from the National Aerial Photography Program (NAPP). On the positive side, in late 1995, we discovered that Minnesota has been scheduled for a 1996 reflight of the state. The negative is that the federal government shut-down has stopped work on any contracts between the state and federal government and well as between the federal government and private aerial photography vendors. If the 1996 flight occurs, we will have a much more current product for the remainder of the state, but production will be delayed. More details are provided under each objective below. In the mean time, delivery of products from previous contracts was greatly accelerating until the government shut-down; current status maps are attached.

On March 22, 1996, LMIC learned that the proposed spring NAPP flight had been canceled. After about a month of investigation of the future plans for this flight, LMIC decided to contract with USGS to produce the remaining digital orthophoto from existing photographs. At that time, there was no way of knowing if a summer flight would occur, or if it did, if all of the needed photographs in northwestern Minnesota would be obtained. Therefore, at this reporting date, digital orthophotos have been completed for 72% of the state, and the rest is in progress and will be completed by the end of calendar year 1997. (see attached status maps)

As of January 1, 1997, production continues toward completion of statewide DOQ coverage. 80% of the state has been completed the remainder is on schedule to be completed by the end of calendar year 1997.

With the January 1, 1997 status report on this project, LMIC requested that this work program be amended to change the deliverable products for the remaining $67,325 of unencumbered funds. This request, preceded by explanatory background information, is outlined in Appendix A, which follows on page 9 of this final report. This request was approved by LCMR and the remaining funding ($67,325) was allocated to the production of revised DEMs for portions of the state. A joint funding agreement with the US Geological Survey was not immediately initiated by LMIC because of potential addition funding being available from MnDNR. In May, 1997, LMIC received $17,725 from DNR to augment the LCMR funds. LMIC has since signed a joint funding agreement with USGS for $85,050 to produce 378 new DEMs (see attached map). Approximately 139 old technology DEMs, with likely data problems, still remain to be funded. LMIC will continue to work with state agencies to secure the maximum of $31,275 needed to complete this data set to uniform standards.

Outside of this LCMR program, a related digital "base map" program is also in progress. This new program to produce digital files of the existing USGS topographic maps is well underway in Minnesota. These files, called digital raster graphs (DRGs), where completed statewide in early 1997. DRGs will be used primarily as a "backdrop" GIS data layer. They are especially useful as a mapping referencing tools because so many policy makers and the general public are familiar with the maps.

This effort is possible because of LCMR funding of both the current "Base Maps for the 1990s" program and the accelerated topographic mapping program from the mid-1960s though the early 1980's. The program coordinated by LMIC has combined funds from MnDOT, DNR Minerals, DNR Forestry and the Natural Resource Conservation Service (NRCS - formerly SCS). In April, 1997, this multi agency effort received a 1997 Governor's Commendations from Partnership Minnesota. Partnership Minnesota annually recognizes outstanding examples of innovative, cooperative efforts by federal, state and local governments.

IV. Statement of Objectives: This project will (A) complete state-wide coverage of orthophoto maps and (B) complete update mapping for the state's most obsolete topographic maps.

Timeline for Completion of Objectives:

	7/95	1/96	7/96	1/97	6/97
(A) Complete State-wide Orthophoto maps	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx				
(B) Revised Topographic maps	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx				

V. Objectives/Outcomes:

V.A. Title of Objective: Completion State-wide Orthophoto maps

V.A.1. Activity: Previous LCMR and federal matching funds have completed about 80% of the state. This objective will complete production on the remaining 20% of the state.

V.A.1.a. Context within the project: The two objectives of this project will proceed at the same time. Neither is dependent on the other. This objective will complete the production of digital orthophotos for final 20% of the state, completing a six-year effort to achieve state-wide coverage.

V.A.1.b. Methods: As in the previous two bienniums, the state wrote a joint funding agreement with the U.S. Geological Survey. USGS will do all production work, using its equipment and sub-contractors to complete the project. Two products will be produced from this objective: Digital Elevation Model (DEM) data which will be housed at LMIC, and county-based CD-ROMs of the ortho photo images. LMIC will archive a copy of this data, but anyone will be available to buy the disks for $32.00 per disk from the USGS.

V.A.1.c. Materials: No materials or equipment will be purchased by the state for this project.

V.A.1.d. Budget:

Total Biennial LCMR Budget:	$560,000
LCMR Revised Budget	$532,675
Balance:	$ 27,325 reallocated by project amendment (see p. 3)
Match from USGS:	$560,000

V.A.1.e. Timeline:

	7/95	1/96	7/96	1/96	6/97
Joint Agreement signed	xxx				
Orthophoto Production	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx				
CD-ROM Production				xxxxxxxxxxxxxx	

V.A.1.f. Workprogram Update:

Through the fall of 1995, negations were finalized to determine the exact number of DOQs left to complete the state, the need for DEM production, scheduling priorities, and final costs. About the time we were going to sign the joint funding agreement with USGS, we heard that Minnesota was being considered for a 1996 reflight as part of the National Aerial Photography Program (NAPP). Over the past two years, LMIC had scheduled many meetings to determine

interest within the state for supporting such a reflight. In summary, there was a great deal of interest, but no funding commitment. Since we have always said we would use 1996 images to complete the DOQ program if they became available, we decided to wait for confirmation of the reflight. In early December, we were able to confirm that Minnesota was on the final bid list. Just before Christmas, we heard that a local contractor (the same one as for the 1991-2 flight) had been selected for the reflight. We heard from the contractor that the agreement between the USGS and the contractor were to be signed by mid-January, 1996. However, the federal shut-down means no work can proceed on the air photo contract nor our DOQ contract. As soon as federal employees return, we will push to accelerate both efforts. This delay will means the delivery of some DOQs will likely occur after the end of this biennium. The resulting product, however, will be current rather than being 6-7 year old imagery.

Until the federal shut-down, delivery of products from the previous contracts was accelerating. At present, 60% of the raw DOQs have been completed and 46 of the 87 county CD-ROMs have been delivered. Current status maps are attached.

As stated in section III above, all of the remaining portions of the state are now under contract. As of this report, 72% of the raw DOQs have been delivered and CD-ROMs for 54 of the 87 counties have been delivered. (see status maps).

As of January 1, 1997, all remaining portions of the state where under contract for DOQ production. Because of additional federal contributions to this statewide effort coordinated by LMIC, this objective will be completed for $27,325 less than original estimate. These remaining funds where reallotted to the production of DEM's, as described in section V.B.1.f. below.

V.B. Title of Objective: Revised Topographic Maps

V.B.1. Activity: Previous LCMR and federal matching funds have completed 138 topographic map revisions in the state's urban areas and a few growing rural areas. ~~This objective will complete map revision in the Mille Lacs Lake-Bay Lake area of central Minnesota.~~

V.B.1.a. Context within the project: The two objectives in this project will be in progress at the same time. Neither is dependent on the other. This objective will complete the final phase of a six-year effort to remap the state's most obsolete topographic maps. Many other obsolete maps still remain in other portions of the state.

V.B.1.b. Methods: As in the previous two bienniums, the state will write a joint funding agreement with the U.S. Geological Survey. USGS will do all production work, using their equipment to complete the project.

V.B.1.c. Materials: No materials or equipment will be purchased by the state for this project.

V.B.1.d. Budget:

)tal Biennial LCMR Budget: $40,000
Balance: $ 40,000 reallocated by project amendment (see p. 3)
Match from USGS: $40,000

V.B.1.e. Timeline:

7/95 1/96 7/96 1/96 6/97

Joint Agreement signed
xxx
Map Revision Production
xxxxxxxxxxxxxxxxxxxxxxxxxxxx
Delivery of Printed Revised Maps xxxxxxxxxxxx

V.B.1.f. Workprogram Update:

The joint funding agreement for the production of revised topographic is on hold for two reasons. The first is the combination of the proposed 1996 NAPP flight and government shut-down detailed above. The second reason is a change in federal map production. Since last biennium's contract, USGS has converted to totally digital map revision. This is good in that revised digital maps can be obtained as well as the traditional paper maps. The bad news is that the revision price per quad is considerably higher. We have argued that our MnDOT has already digitized the old maps and we can deliver these files are part of the state contribution to the program. Thus we would ask that the federal contribution be to update the maps. We have sent a formal proposal to high level officials in USGS national headquarters. We are waiting for the reply before deciding how to proceed.

This issue is still in discussion. LMIC staff plans to attend a state's mapping meeting in Rolla, Mo, the first week of September, 1996. The issue will be resolved during that session.

As outlined above, considerable thought has gone into deciding the best course of action for expenditure of these funds. Because USGS will now produce only digital updates of topographic maps, and because several efforts to produce digital maps via state efforts are already on-going, LMIC feels there is only marginal benefit to the state to pursue the original objective B products. Therefore, a work program amendment is being sought.

As mentioned above, the first step in producing DOQs for the state is to produce a digital elevation model (DEMs) of each 1:24,000 topographic map. Because this project has been in progress for nearly six years, USGS has made several technology changes in DEM production. New techniques produce better and less expensive DEMs. Unfortunately, some data problems have been discovered in the earliest DEMs. This does not effect DOQs produced with them, but it does limit use for other GIS activities such as watershed modeling, other terrain analysis (such as viewsheds), and ecosystem studies.

LMIC has assembled a group of DEM experts and users in the state to estimate the magnitude of the problem and seeking funding sources to redo the problem DEMs. A map of known problem DEMs is posted on the project web site. The oldest and most troublesome DEMs are

in southeastern Minnesota, Otter Tail county, and a few small areas in the north. To produce DEMs compatible with the rest of the state costs $225 per topographic map. By combining the remaining $27,325 from objective A with the $40,000 from Objective B, nearly 40% of the problem DEMs can be redone. LMIC has already ask interested state agencies to seek funds to complete the project. Several potential sources have been identified.

With the January 1, 1997 project status report, LMIC requested that this work program be amendment to change the deliverable products for the remaining $67,325 of unencumbered funds. This request is outlined in Appendix A, which follows on page 9 of this status report.

VI. Evaluation: Success for this project will be achieved with the completion of both objectives and receipt of all deliverables by the end of the biennium.

VII. Context with field: Digital orthophotos are a vital piece of basic information which will serve the GIS community for years. The Program Manager and his office have spent several decades providing traditional map and air photo products to the GIS community and the general public. This effort will provide a technological advance by making this information available in a computer readable form for the first time.

VIII. Budget context: As mentioned above, FY92-3 and FY94-5 funds from both LCMR and USGS have gotten this project close to completion. These FY96-7 will complete the six-year effort. No supplemental funding sources have been identified at this time, but we will continue the search.

IX. Dissemination: Digital orthophotos will be archived and made available at LMIC, however most major GIS users will simply buy their own data disks for $32.00 each from USGS. This latter approach is by far the least expensive way to distribute the data. Printed copies of revised topographic maps will be sold by USGS, the Minnesota Geological Survey, and private map sellers around the state.

X. Time: This project should be completed within the two-year timeframe.

XI. Cooperation: No cooperators have been identified for this project. However, staff from LMIC and other state and federal agencies will be consulted as the need arises.

XII. Reporting Requirements: Semiannual six-month workprogram update reports will be submitted not later than January 1, 1996, July 1, 1997, January 1, 1997, and a final six-month workprogram update and final report by June 30, 1997.

XIII. Required Attachments:

1. Qualifications: unchanged from previous attachment.

2. Project Staffing Report: no staff.

APPENDIX A:
Basemaps for the 1990s
1991-1997 Status Report
Prepared by LMIC, 1/8/97

In 1990, the State of Minnesota embarked on a multi-year project to produce a series of modern, digital basemaps for statewide GIS applications. The project, called Basemaps for the 1990s, was funded equally by the State Legislature based on the recommendation of the Legislative Commission on Minnesota Resources (LCMR) and the US Geological Survey. As of January 1, 1997, all phases of the project are completed or in final production. The original proposal contained three major efforts, but a by-product of one effort and a newly added product, have been included in the overall project concept.

1. National Aerial Photography Program (NAPP). Key to starting the entire project was participation in a statewide air photo flight scheduled for the spring 1991. The flight was 75% completed in 1991 and the remainder finished in the spring of 1992. These photographs were used as the base data for all future mapping in the project.

Expenditures to date: $336,272 from the state and $488,510 from USGS.
Status: Completed and available.

2. Topographic Map Update. When the Basemaps project began in the early 1990s, the average 1:24,000-scale USGS topographic map was 20 years old. The most obsolete maps were in the state's urban areas where rapid land use change had occurred. For the first four years of the project, USGS was producing "limited photo-revision" updates. This very cost-effective map update process simply used the new NAPP photography to identify land use change. Almost no costly field work was used in this process. New features, identified on the air photos, were printed as a purple update overlay on the old maps. 138 maps covering all of the state's major urban areas have been completed, printed and distributed for public use.

In 1996, USGS converted to an all digital revision program with greatly increased production costs. In other states, with little digital mapping, this process produces a digital product needed for GIS applications. But in Minnesota, several state agencies are already producing similar types of digital maps. It is now felt that participation in this USGS digital update program is no longer a wise use of state money. For example, with the remaining $40,000, we could produce less than a handful of revised quad maps. With that same funding, we can revise more than 175 DEMs, as will be proposed below.

Expenditures to date: $360,000 from state; matched by USGS
Unexpended LCMR funds remaining: $40,000; matchable by USGS.
Status: 138 revised maps completed and available

3. Digital Orthophoto Quads (DOQs). One of the earliest problems discovered when attempting to work with various datasets by overlaying themes was that data collected on different basemaps often did not register correctly. Data collected on the USGS 1:24000-scale topographic maps usually was

satisfactory, but many people collected data on a photographic base. The problem with all aerial photography is that all photos have some distortion and scale variation. In the 1980s, USGS developed a non-digital product called an orthophotograph minimized image distortion by adjusting the photographic image to fit the terrain below the image. By the late 1980s, USGS had developed a process to produce orthophotos in digital format which could be used directly on computer screens.
To make an orthophoto, two input products are needed: a high quality aerial photograph and a model of the terrain. Because of the 1991-2 NAPP flight, Minnesota had a great start for producing statewide digital orthophotos. Production began in southeastern Minnesota. Digital Elevation Models (DEMs) were produced by USGS using a 1980s technology that involved considerable field checking and intensive staff manipulation of 3-D stereo models. This process did produce DEMs suitable for DOQ production, but was very costly and did produce some data problems which limit the DEMs usefulness for some GIS applications. As production moved into southwestern and northeastern Minnesota, a new process to build DEMs based on scanning the contour lines on existing 1:24,000-scale topographic maps was developed by USGS and the US Forest Service. This new process produces DEMs suitable for both DOQ production and other GIS applications. This newer process is being used to produce DEMs for the rest of the state. Several state agencies have expressed support for revising the old technology DEMs (called level 1 DEMs) to the modern standard (called level 2).

Expenditures to date: $2,602,600 from state; matched by USGS.
Unexpended LCMR funds remaining: $27,325; matchable by USGS.
Status of 1:12,000-scale DOQs: 80% available; the remainder in production
Status of 1:12,000-scale DOQs on county CD-ROMs: 54 counties available; the remainder in production.
Status of DEMs: 85% available; the remainder in production. However, 535 old level 1 DEMs should be redone. Estimated state share cost: $125,000.

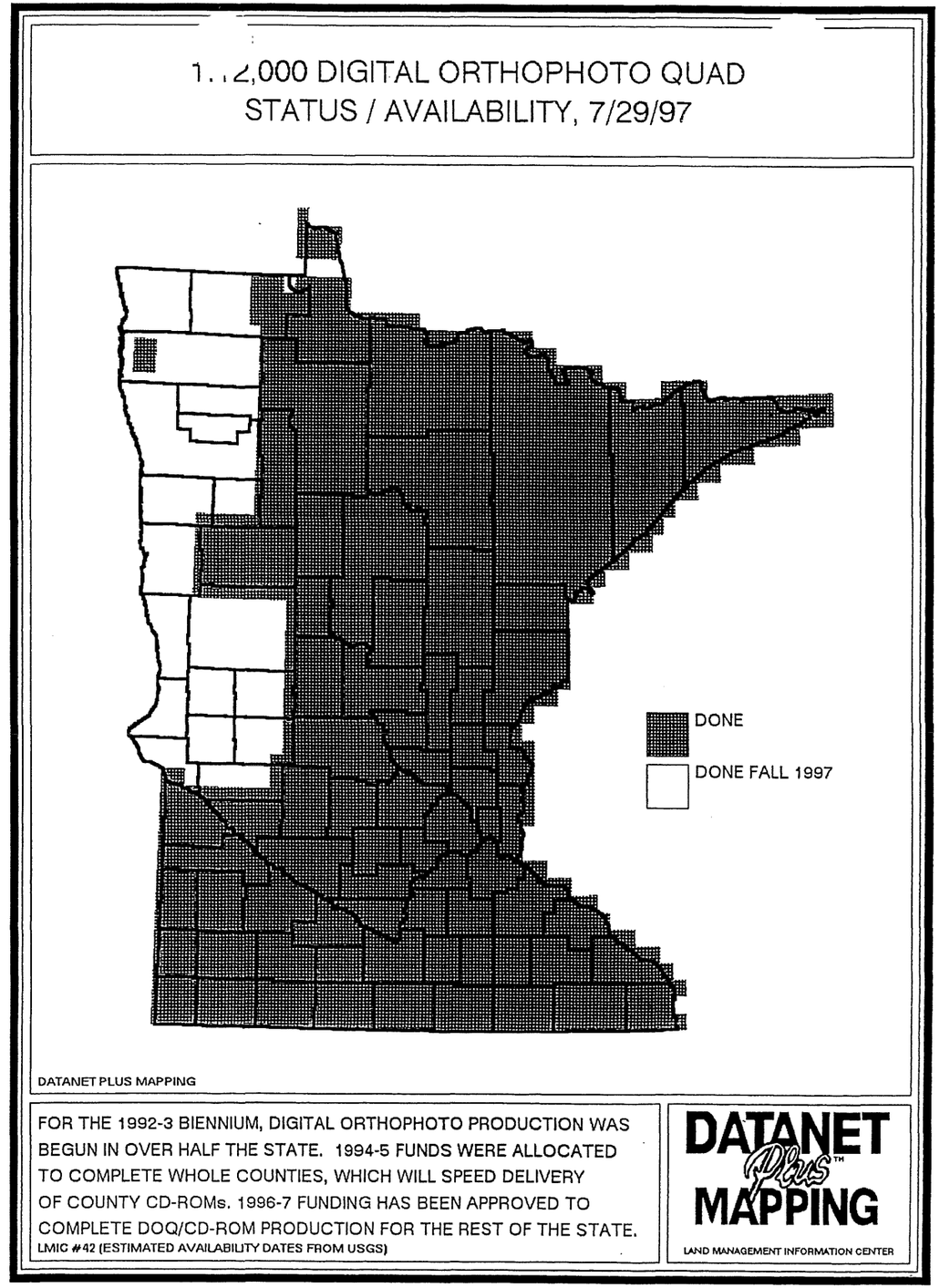
4. Digital Raster Graphics (DRGs). Because of the need for digital basemaps to feed the rapid growth of GIS technology, USGS developed a digital version of their traditional, printed topographic maps. While not part of the original Basemaps project, this product was more feasible to produce because of Basemaps products being available. Funding was pooled from Mn DOT, DNR, NRCS and the Corps of Engineers. This effort was organized by LMIC to produce statewide coverage of this new digital product.

Expenditures to date: $56,557.50 from state agency funds; matched by USGS
Status: 20 of 47 mapping blocks have been completed; the remainder is in progress.

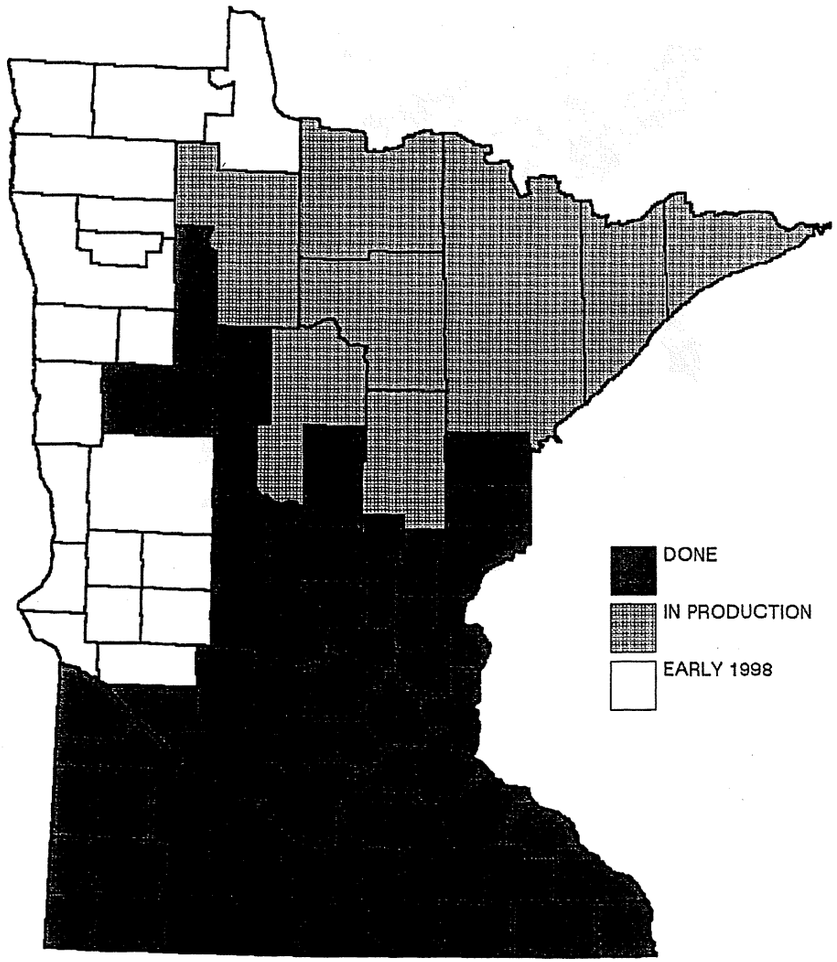
Basemaps for the 1990s homepage: To keep users informed of the current availability of Basemap products, LMIC continually updates a homepage with product information and status maps. It can be found at: **http://www.lmic.state.mn.us/bmap90/bmap90.htm**

Summary for Project Amendment to the existing LCMR Work Program: As mentioned above, the first step in producing DOQs for the state is to produce a digital elevation model (DEMs) of each 1:24,000-scale topographic map. Because this project has been in progress for nearly six years, USGS has made several technology changes in DEM production. New techniques produce better and less expensive DEMs. Unfortunately, some data problems have been discovered in the earliest DEMs. This does not affect DOQs produced with them, but it does limit use for other activities such as watershed modeling, terrain analysis (such as viewsheds), and ecosystem studies.

In December 1996, LMIC assembled a group of DEM experts and users in the state to estimate the magnitude of the problem and to seek funding sources for replacement of the problem DEMs. A map of known problem DEMs is posted on the project web site. The oldest and most troublesome DEMs are in southeastern Minnesota, Otter Tail County, and a few small areas in the northeast. To produce DEMs compatible with the rest of the state costs $225 per topographic map (state share, which would be matched by USGS). By combining the remaining $27,325 from objective A with the $40,000 from Objective B, about one-half of the problem DEMs can be redone. LMIC has already asked interested state agencies to seek funds to complete the project. The Metropolitan Council is preparing a contract to revise 84 maps in the 7-county Twin Cities area. Both DNR and PCA have potential funding sources available to complete the revision.



STATUS OF COUNTY CD-ROM DIGITAL ORTHOPHOTOGRAPHY, 6/25/97



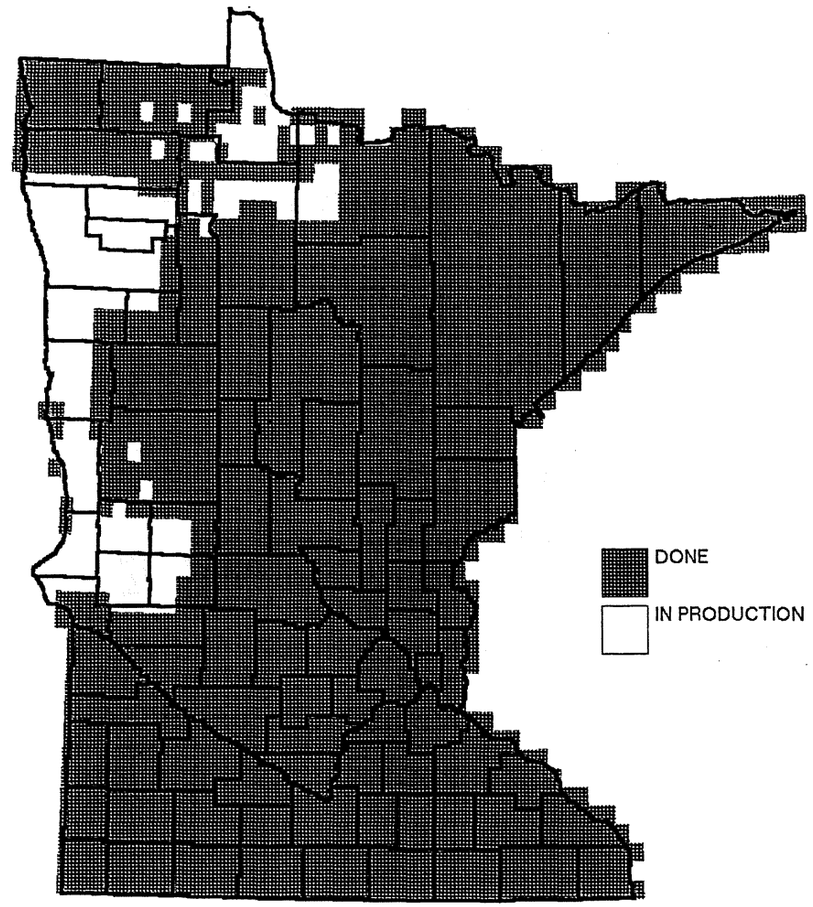
DATANET PLUS MAPPING

CD-ROM AVAILABLE MEANS A CD-ROM FOR THAT COUNTY CAN BE PURCHASED FOR $32.00. TO ORDER, CALL (303) 202-4200.
DOQ DONE MEANS DIGITAL ORTHO QUAD (DOQ) PRODUCTION IS COMPLETE. [illegible]OM PRODUCTION WILL FOLLOW SHORTLY.
FOR STATUS, [illegible]LMIC OR USGS AT 1-800-USA-MAPS.

LMIC #9

DATANET Plus™ MAPPING
LAND MANAGEMENT INFORMATION CENTER

1:24,000 DIGITAL ELEVATION MODEL STATUS / AVAILABLITY, 6/1/97



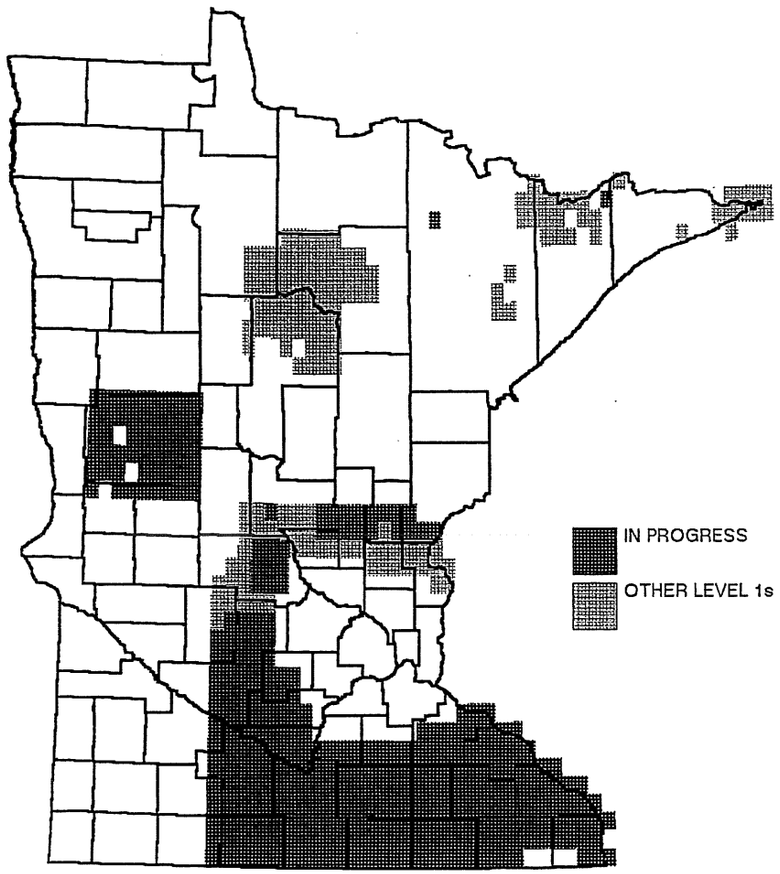
DATANET PLUS MAPPING

DIGITAL ELEVATION MODELS (DEMs) ARE PRODUCED AS PART OF THE PROCESS TO MAKE DIGITAL ORTHOPHOTO QUADS (DOQs), DEMs WILL BE PRODUCED FOR THE ENTIRE STATE. DEM PRODUCTION HAS GONE THROUGH [illegible]VERAL TECHNOLOGIES IN MINNESOTA. THE USER MUST LOOK [illegible]H FILE'S HEADER RECORD FOR DETAILS.

LMIC #41

DATANET Plus™ MAPPING
LAND MANAGEMENT [illegible]TION CENTER

STATUS OF LEVEL 1 DEMs UPDATES AS OF 6/20/97

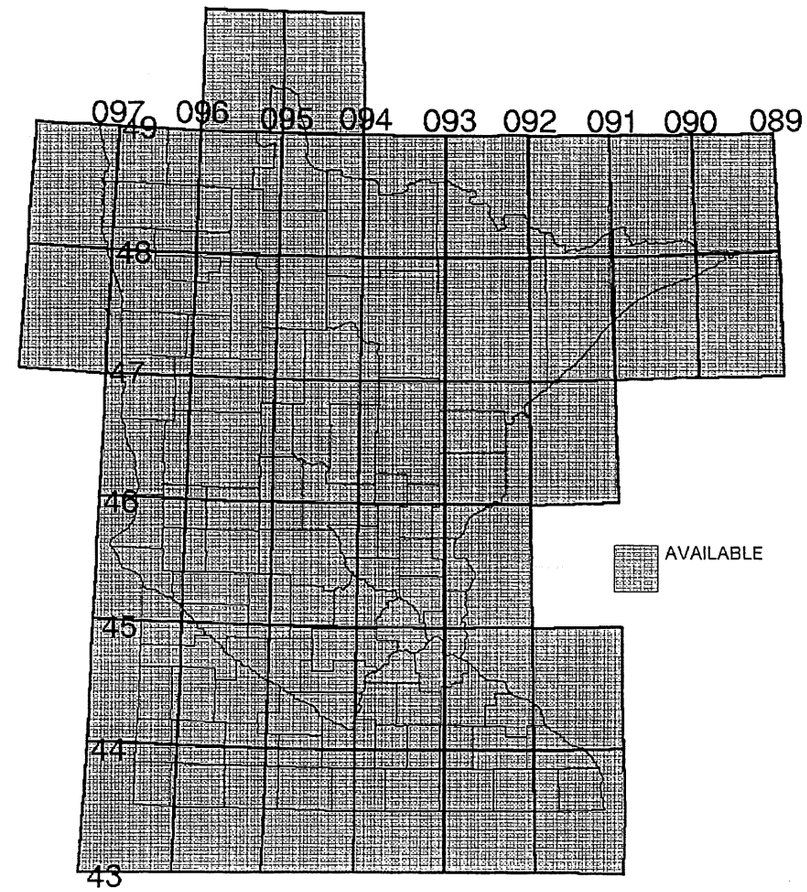


DATANET PLUS MAPPING

334 LEVEL 1 DEMs ARE IN THE PROCESS OF BEING REVISED. THEY SHOULD BE AVAILABLE DURING THE SUMMER OF 1998.
139 LEVEL 1 DEMs, OR OTHER DEMs THAT MIGHT HAVE DATA PROBLEMS, REMAIN. AT THE PRODUCTION COST OF $225 PER QUAD, A MAXIMUM OF $31,275 IS STILL NEEDED TO FINISH THE STATE.

DATANET Plus™ MAPPING
LAND MANAGEMENT INFORMATION CENTER

DIGITAL RASTER GRAPHIC (DRG) STATUS OF 1-DEGREE BLOCKS, 5/19



DATANET PLUS MAPPING

MnDOT, MnDNR, NRCS AND COE FUNDS, MATCHED BY USGS, ARE BEING USED TO PRODUCE STATEWIDE DRGs. THE FILES ARE RELEASED ON CD-ROMs COVERING 1-DEGREE BLOCKS, NAMED BY THE LAT/LONG OF THE SOUTHEAST CORNER OF THE BLOCK. THE PROJECT IS NOW DONE. 38 CD-ROMs ARE NEEDED FOR STATEWIDE COVERAGE.
LMIC

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