EIGHTH ANNUAL REPORT

OF THE STATE MAP ADVISORY COMMITTEE

FOR OREGON

1986

OPEN-FILE REPORT O-87-1

January 1, 1986 - December 31, 1986

John D. Beaulieu, Chairman
State Map Advisory Committee

State of Oregon
Department of Geology & Mineral Industries

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EXECUTIVE SUMMARY

The purposes of the State Map Advisory Committee (Executive Order EO-83-15) are: (1) to recognize and pursue traditional and digital mapping goals for Oregon, (2) to promote coordination of programs, policies, and resources with the intent of maximizing opportunities and minimizing duplication, and (3) to bring benfits of well directed traditional and digital mapping more effectively to the people of Oregon.

To accomplish these aims, the State Map Advisory Committee includes representation from Federal agencies, state agencies, universities, and private industry. Major accomplishments noted below are detailed in the body of this report.

1) Effective Coordination

The State Map Advisory Committee promoted effective coordination in hard copy and digital mapping through the planning and sponsorship of two full meetings of the Committee. One was a highly successful State/Federal Mapping Coordination Meeting in which Federal program direction was a major consideration:

a) The National Map Division (USGS) is the lead Federal agency for mapping, and in cooperation with the Interior Digital Cartography Coordinating Committee (IDCCC) is assuming a leadership role in digital mapping. Coordination considerations were emphasized at the April 27, 1986 meeting.

b) The National Map Division maintains a wide variety of mapping programs of interest to the public and of significance to state map agency planning. Mutual program direction was emphasized in the April 27, 1986 meeting.

c) Areas of major new attention as seen in the minutes as seen in the minutes include large scale mapping, map revision needs, and digital map coordination.

2) Progress on Base Maps

The State Map Advisory Committee pursued cooperative completion of fundamental map bases for the State through effective planning, prioritized goal setting, and consistent communication with the U.S. Geological Survey. Progress is tabulated below. In the 7½' series all maps are either complete (70%) or in progress (30%) at this time.

An area of increasing attention and concern is that of digital base maps in terms of standards, resources, requirements, cost, and deadlines.

3) Digital Mapping

Owing to volumes of new data, enhanced legislative awareness, and the need to communicate effectively with Federal data collection efforts, digital map formats were given increased attention by SMAC in terms of coordination and cooperation. Details are provided in the meeting summaries. State agencies now are coordinating individual geographic information system efforts through a staff level Subcommittee (Gary Waltenbaugh) of the Oregon Land Information Advisory Committee (Ken Dueker). Interest of the group includes digital maps. Members attend SMAC meetings and provide to SMAC information on their activities. The effort, however, is independent of SMAC.

4) State Resident Cartographer

The Oregon Department of Geology and Mineral Industries continued a cooperative agreement with the U.S. Geological Survey to support a Resident Cartographer to the State of Oregon whose major tasks now include: (1) the identification and linking of mapping capabilities and needs through cooperative agreements, (2) promotion of more effective product dissemination, (3) elimination of unnecessary duplication of effort, and (4) technical assistance in matters of mapping and coordination. His annual summary is included in this report. Significant progress is being made in digital and orthophoto cooperation. Interested agencies are on the mailing lists for the Federal Digital Cartography Newsletter and for periodic mailings of status index maps for various USGS map programs.

5) Priority General Purpose Digital Base Maps for GIS use

There is a crucial need to develop intermediate scale general purpose base maps in a digital format for geographic information system use. Key members of the State Map Advisory Committee (Federal and State agencies) met to define the most crucial map layers needed. These were identified as follows: 1:100,000 scale hydrography, 1:100,000 scale transportation, 1:100,000 Public Land Survey System (PLSS) and 1:100,000 Digital Elevation Model (DEM). Also identified as being a very high need are the various digital line graphs of the 1:24,000 scale topographic map series. Completion of these map layers will enable geographic information system capabilities to be utilized on a statewide basis in a consistent and coordinated fashion. Completion of these map layers would ideally involve cooperation of state, federal and local efforts with proper attention to local ongoing mapping efforts and to broadly recognized map standards.

6) Summary of Map Revision Needs

Federal mapping programs overseen by the U.S. Geological Survey are transitioning out of initial completion efforts and into revision cycles. To guide the revision cycles for Oregon an open-file report (0-86-15) was prepared by DOGAMI based upon interviews and questionnaires submitted to key state agencies. This open-file report will constitute the basis for Oregon's response to individual inquiries regarding revision needs. Availability of the report in general will enhance the coordination effort of mapping in Oregon.

7) Proper Attention to Map Requirements and Resources in Oregon

In the broad view major federal efforts relating to Oregon mapping include: Coordination of digital efforts in the IDCCC meetings, ongoing realignment of the National Map Division organization, ongoing response to budget realities and opportunities within the National Map Division, and ongoing response to the cooperative opportunities and requirements of states.

During the past year increased emphasis has been placed by Oregon on communicating a need to address requirements and resources of the states and of federal offices in the states, particularly in the west. Key communications in this regard include a trip to Washington D.C. by the Oregon SMAC chairman to visit with NMD managers and participation in the Ninth Regional Map Coordination Meeting with regional National Map Division staff in Menlo Park. A copy of the caucus report arising from that meeting is included in this annual report.

PRODUCT	Published 1979	Published 1980	Published 1981	Published 1982	Published 1983	Published 1984	Published 1985	Published 1986	Total Complete
7½' topographic maps (1911 total units)	10	46	76	50	88	46	123	130	1341
Orthophotoquads (unpublished) (1911 total units)									1824
1:100,000 Base Maps (78 total units)									78 planimetric 36 topographic
Land use/Land cover 1:100,000 (65 total) 1:250,000 (25 total)									 12 25
Digital Products (7½') Digital Elevation (1911)									409
Digital Line Graphs (1911)									
Land Lines (1911)									851
Boundaries (1911)									825
Transportation (1911)									108
Hydrography (1911)									150
Cultural(1911)									38

(Note: 7½' topographic maps are now officially counted when received from the printer rather than when sent to the printer. The Land Use/Land Cover and orthophotoquad programs are coop driven. Indexes of digital products are routinely distributed to key agencies. The printing of the 1:100,000 topo series is delayed while the Bureau of Census coop pursues completion of the nonurban U.S. 1:100,000 series for transportation and hydrography in a preprint format.

Membership and Selected
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(Note: State Resident
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August 29, 1986

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Thursday, April 17, 1986

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Dick Dodge	USDA-Forest Service
Scott Smith	Oregon Department of Energy
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Robert Wright	BLM/Oregon State Office
George Shore	Oregon Forestry
David Ringeisen	ODOT Mapping & Mileage Control
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Carl Grzybowski	Executive Department
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Thom Lanfear	Consultant
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Glenn Ireland	NMD-State Resident Cartographer
Dick Swinnerton	NMD-Menlo Park
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1) National Map Division (USGS) Highlights of Activities - The USGS program was described by Dick Witmer, Chief of Plans and Operation, Reston, Dick Swinnerton, Chief of National Map Division, Menlo Park, Bill Johnson, Head of Plans and Requirements, Menlo Park, and Glenn Ireland, State Resident Cartographer, stationed in Portland.

a) National perspective - The broad overview for National Map Division efforts is one of transition from map completion to revision and acquisition of new technology, with an agency view of looking towards highest priorities in times of budget cuts. In terms of 1985 budget pie, the overall revenue picture for the National Map Division is one of lagging revenues for product sales, projected decline in Federal Fund match, and a net decrease of General Fund appropriation. The decrease is $5 million from an original total of $88 million. This decrease is spread selectively over all programs. Advanced cartographic systems received a substantial increase to $12.2 million in Federal fiscal year 87. Significant cuts in discretionary and lower priority programs are contemplated and staff reductions are foreseen in the future during restructuring. Total staff reductions will be 300 of a total of 2,000 positions.

Federal fiscal year 86 priorities include - primary mapping, intermediate scale mapping, and digital mapping. Additional efforts are for EROS, Information and Data Services and other activities. The Information and Data Dissemination Services now occuring in Denver and in Reston will be consolidated in a cost saving move to the Denver Office.

Reductions in general appropriations will result nationwide in 100 less primary maps completed per year. This will result in a delay in the completion of the 7½' quadrangle series until fiscal year 1990. In Oregon, there will be three offices of the National Map Division working on these maps - the Rolla Center, Denver Center and Menlo Park Center. For the 1:100,000 planimetric series completion in digital form is scheduled for early 1987. It will be several years before those digital products are available in total for the general public in a format that is usable for general purposes.

Digital goals include - completion of the 7½' series in digital format nationwide to national map accuracy standards with no deficient categories with a 5 to 10 year revision cycle. Currently, 27,000 of the 57,000 hard copy 7½' quadrangle maps cannot meet specifications. In terms of completing the 7½' series, the national effort must complete 1,500 T-maps, must upgrade 5,000 substandard maps, must complete selected categories such as PLS for 6,000 maps and must convert numerous substandard maps. To maintain currancy of good maps currancy of good maps will in the year 2000 require revision of 5,600 maps per year on a ten year revision cycle.

Implementation of the revision cycles noted will require new technologies. These technologies come under the term "MARK 2". This is the program for enhancing equipment and technology to allow achievement of program goals and production summarizied above. Elements of "MARK 2" include - new capabilities, new equipment, new vertical integration of map programs, new production control, new quality control and new abilities to use non-National Map Division products.

Under questions and answers it is noted that 1) that 1:100,000 digital products will not be available for all areas on general public request for three to four years given reformating requirements. 2) Future policy may involve production of paper maps on demand rather as matter of routine. 3) A geographic information system of sorts will be required to index all of the available digital data that are available nationwide for various topics, from various areas for various regions of the nation. Such a system is already in place in rudimentary form in the U.S. Geological Survey and would be available to the public for public use in a year or two.

b) Regional Perspective - Dick Swinnerton summarized the priorities and major program directions of the Menlo Park office of the National Map Division. Major emphasis will be placed on completion of the 7½' series on digital line graphs, on orthophoto quads and on NCIC. There will be an effort to encourage and promote research and development. There will be need to complete 100 T-maps, to revise data on 160 quadrangle maps, to complete the public land survey for 575-7½' quadrangles and to upgrade 750 provisional maps.

Urban mapping is at a crossroad in the sense that the cost to upgrade is prohibitively high, whereas, the use of images rather than maps offers numerous savings. Considerations of cost effectiveness are leading the revision program in urban areas to strongly consider combining image products with selected line products to give upgraded maps that hopefully would be a use to the public. There probably will be a series of use and need definitions seminars in the state in the future to address this issue. A pilot project on urban mapping is underway in the Portland area.

The Economic Exclusion Zone atlas prepared by GLORIA Imagery by the USGS in cooperation with other agencies is complete and was presented to the group for observation. It includes seismic data along selected sections. In the area of "MARK 2", emphasis in Menlo Park will be placed on optical scanning development on dense data sets. As an example, contour intervals on the 7½' series will be scanned by optical devices as part of the digitizing effort.

Dick Swinnerton noted a cooperative agreement with the Idaho Department of Transportation, in which digital line graphs at the 7½' scale will be produced in cooperation with the USGS on work share, cost share basis. He noted, that negotiation of the contract was extremely protracted given all of the complex considerations. In the area of geographic information system development, Dick noted the need for standards and for usable data sets. He distributed the USGS policy and noted that emphasis within the Survey will be on interdisciplinary multi-agency pilot projects. On standards development and on development of general purpose data sets, the interdivisional digital cartographic lab planned for the Menlo Park office of the USGS will be attracting projects of this type. Among them will be future USGS efforts to continue to try to assist in the John Day GIS effort involving the State of Oregon.

A example of digitally produced ortho quad was displayed for the group. The digital image on the hard copy was prepared not photographically but through computer technology. Resolution is now the range of 25 microns. The accuracy of this capability is now adequate for most uses. The next area of emphasis will be on image quality. The capability will be operational within 5 years. If the market suggests the need for this type of product it will be programmed in future planning.

Dick summarized involvement of the USGS in digital activities within federal circles. He noted a need for a national data base with capabilities of being updated in a cost effective manner. He highlighted the IDCCC coordination efforts of the federal government chaired by the USGS. The interest of industry in some sort of standards by the Federal government and earlier reports by the General Accounting Office and the Office of Management and Budget would seem to be lending a leadership role to the National Map Division in federal circles.

Under questions and answers, the status of certain data layers were examined. For example, the public land survey continues to pose problems in terms of accuracy or even the quality of public land data on the ground which is needed for digitizing for a variety of purposes. The nature of coordination between the USGS and the US Forest Service and the production of large scale orthophoto quads was also examined. Dick noted two previous efforts at cooperation met with limited success and that a third effort is now timely. He also noted that the differences in the two agencies between standards and timing are fully legimate and are posing a problem in terms of coordination. An additional area of discussion was the fact that USGS maps under land use portray proclamation boundaries for federal categories of land, whereas, many GIS efforts require administrative boundaries as well.

c) Oregon - In summarizing activities in Oregon, Glenn Ireland, State Resident Cartographer, distributed copies of the GIS policy of the National Map Division and summarizied highlights of activities in Oregon. He noted the State Index of 7½' maps was available from the Oregon Department of Transportation. The Ohio state style index will be available this summer and will portray a wide variety of index data formally available from dozens of various index efforts. He described for the group again his information request form for those requiring general information from the Survey. In terms of indexing of digital cartographic products, he noted that telephone 800-USA-MAPS is a source of general information through NCIC from which one can gain index information on digitized data. It was noted that the data is not specific geographically within the state, but also at the end of this phone line is a person rather than a computer that one can speak to. Efforts of USGS field staff stationed in Vancouver, John Day and Grants Pass were summarized by representatives of those offices.

2) Questionnaire for Revision Cycle Guidance - Glenn Ireland, State Resident Cartographer, will soon be contacting agencies and distributing a questionnaire designed to solicit comments and priorities to be addressed in the revision of various map products by the USGS in Oregon. The questionnaire will address the 7½' series but also will address a number of other products including the intermediate series, land use/land cover series, and orthophotos. SMAC receives many requests for input of rather piecemeal fashion regarding revisions comments for future planning use by the Survey. It is hoped that a broad questionnaire involving all map products and all data layers of the type proposed will provide a unified statement of Oregon's needs and will also provide that data in a coordinated fashion so that our various concerns and recommendations are coordinated between each other. In this way we will not be sending contradictory signals to the Survey.

3) Offshore Mapping Activity - The GLORIA topographic mapping and imagery was displayed for the group as was noted earlier. The product is a joint venture by the USGS and NOAA using British technology. In it radar devices construct for the viewer images of the ocean floor, analogous to the Landsat data of the earth's surface taken from satellites. There was discussion of topographic and bathymetric map data. Dick suggested that it would be best if a state in need of bathymetric data made a specific request to the USGS for consideration. Earlier SMAC through the State Geologist's office forwarded to the USGS a general requirement and request that all map products of offshore areas involving the USGS contain bathymetric data. The earlier concern was that NOAA data was not being systematically delivered to the USGS for timely inclusion in map production.

Handouts were provided which described the role of NOAA in generating a variety of map products nationwide. Lewis MacArthur summarized the earlier discussions by the Oregon Names Board regarding offshore naming of geographic features. The role of the Oregon Board is advisory rather than final. The advice that they offer is that naming follow all standards applied in other naming exercises. The Oregon Names Board is concerned that without some standards in screening the proposed names there will be a proliferation of names for offshore data on a catch-as-catch-can basis rather than on a systematic deliberative basis. The net result in future years if this scenario were followed would be great confusion. The subject will be brought up again at the Tenth Western Conference.

4) Activities of Special Interest - The Earth Observation Satellite Company EOSAT was discussed briefly by Bill Ripple. He summarized the purchase agreement under which purchasing agencies of imagery from EOSAT are constrained in the distribution of the images to their public. He noted that the subject of concern is negotiable to some extent with EOSAT. For Federal agencies, the USGS has negotiated a master contract for purchases for Federal agencies. This will make it easier for Federal agencies to make purchases. Possibly State agencies that are cooperating with Federal agencies can negotiate their contracts to have federal agencies make EOSAT purchases. This could cut down paper work within the State agency.

The Mystic, Connecticut water oriented geographic information system developed cooperatively by the USGS and the State of Connecticut and displayed before the 1985 meeting of the Association of State Geologists, described and displayed in a series of slides. The technology is very similar that required or foreseen for the John Day effort. The scale of data input is that of the 7½' quadrangle rather than smaller scales used in Phase I for the State of Oregon. Although questions addressed in the John Day exercise undoubtly differ in many respects from those in the Mystic exercise, it is clear that the technology of the Mystic exercise could be beneficial to the John Day effort. The USGS currently is planning on assisting in training Connecticut staff and digitizing additional layers for that project.

5) Agency Highlights -

Energy - Scott Smith reported for the Oregon GIS working group. He noted that draft recommendations and mission statements were in progress and that emphasis is presently being placed on indexing available digital data in an effort to avoid duplication of effort. He noted that discussions of standards have begun and there will be a need to coordinate with Federal efforts in this area. His group sees itself as a facilitory group rather than a dictorial group. The group will also track technology and plans on communicating its findings to agency directors. The group is independent of SMAC, but shares in the membership in some areas given the common interest in digital map products.

Water Resources - Gary Williams discussed the GIS effort within the Oregon Water Resources Department. He noted that within 60 days the ESRI Arc Info system will be procured. He noted also that the John Day effort within the State will be coordinated with the USGS effort to continue to develop technology and data bases for the John Day Basin. Into the future a pilot project will be done on the McKenzie Basin and the next river basin for treatment in the GIS will be the Umatilla Basin. They are aiming at water use modeling, possibly with imagery as a basis. Gary Williams solicited comments from members of SMAC on ways of dealing with water use. He noted that water use is very difficult to estimate and to document and the Department would appreciate any advice that might be offered.

Department of Transportation - Efforts with the intergraph system are maturing. In addition, mapping of rural cities are becoming more accurate and many errors in previous maps are being noted. The county map series continues. The quadrangle map index has been updated and copies were distributed. A mini GIS for the Beverly Beach State Park will be developed in cooperation with the State Parks Division. Lyle Riggers, State Geodetist, with the Department of Transportation, described the Highway control services of his position and also his interest in the control stations and bench marks.

Forestry - the cooperative project in Columbia County with Fish & Wildlife and LCDC continues with emphasis on roads classification. For forestry activities the 1:100,000 base map for Oregon were described. The 1:500,000 PLS layer is now on line in Denver through BLM. It is short of cash and has obvious accuracy difficulties. The US Forest Service the State Forestry Department are cooping on reformating 1:24,000 orthophotoquad data to a 1:12,000 township centered imagery series.

Bureau of Land Management - Ted Albert described BLM mapping efforts. Their resource manamgement plan for the western side is moving ahead under tight time frames. The agency pursued orthoquad coops, but Ted notes that time frames were too tight and field personnel needs were highly detailed. Imagery will be pursued on 20 foot contours and the map scale will be 1 inch = 400 feet. Data layers will include - roads, hydrography, culture, vegetation types. Total area of study will be 10,000 square miles and will be in all five west Oregon districts. Cost of the data acquisition and GIS will be 30¢ an acre. GIS capabilities will be MOSS oriented.

U.S. Forest Service - Mapping activities in the U.S. Forest Service are hendered by financial constraints brought about by Gramm-Rudmann and the timber buy back. Discussions for ortho quad cooperatives with the USGS are under way. In terms of geographic information systems, the U.S. Forest Service according to Roger Crystal is in a watching and waiting mode. MOSS is installed in Oregon in the Umatilla and other regional offices. Peter Eberhardt, described for the group capabilities of plotting for general land use decision making that have been developed in the Willamette National Forest. This capability has been exported to 10 other forests in Region 6, many in Oregon. The maps produced with Peter's process are coarse forest level maps not intended for engineering purposes. They are very useful for planning purposes.

ERSAL - Bill Ripple described recent activities for the ERSAL Lab at Oregon State University. The spectral reflectance of vegetation type project in cooperation with the University of Wisconsin and Weyerhaeuser is nearing completion. A final report will be issued shortly. Dennis Shetty, a graduate student in research has been using remote sensing to study the ranges of cattle, elk, and deer. In terms of forage competition, he noted that elk and cattle do not compete much for forage. On the Warm Springs Reservation digital spectral classifications are available for or are being completed on a 7½' quadrangle basis. Spectral reflectance studies of water stress of vegetation also has been a recent effort of the ERSAL Lab. A capability to identify water stress can be important in assessing fire potential in forested or range lands and also for crop monitoring. Such a capability might also have an application to water basin and management activities by the Water Resources Department.

Oregon State University - Geography - For the Department of Geography at Oregon State University, Steve Pitts summarized their view of where they fit into the geographic information system effort in the State of Oregon. He noted that their role (based on many surveys of many agencies and people in the state) is primarily one of education. Emphasis of their education efforts will be on small scale systems and new technology. They should be contacted for specialized needs. In the autumn, a GIS course emphasizing personal computers will be given. It was noted that CCAD gives access to the Department of Transportation mainframe capabilities for the time being. In developing their own individual microcomputer capabilities, agencies are advised to keep an eye on capabilities with mainframes within the State.

GNIS - University of Oregon - The effort to produce a state gazeteer of names is nearing completion of its Phase II stage. Phase I involved 32,000 names taken from the USGS map products. Under Phase II, Bill Loy and students at the University of Oregon, have added an additional 6,000 or 7,000 names taken from other sources. Subsidary tapes treat prioritary data. Data for Phase II came primarily from Water Resources Department, Department of Transportation, the Historical Society and the Board of Geographic Names. A key link in full use of Phase II data is to find a way to access the data base with geographic indicators such as the public lands survey system.

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Meeting Summary
State Map Advisory Committee
Tuesday, October 7, 1986

Glenn Ireland	USGS/State Cartographer
Carl Pearson	BLM/Oregon State Office/Carto
Richard Kepler	DEQ/Oregon
Robert A. Mead	Dept. of Revenue-Manager-UR Mapping
Irv Iverson	Dept. of Revenue-Project Manager-UR Mapping
Barry Schrumpf	ERSAL, Oregon State University-Corvallis
Robert W. Klaver	BIA/Portland Area GIS Coordinator
Alan Holsted	Metropolitan Service District
Marie Willis	Biologist/Planner Oregon State Parks, Salem
Vivienne Torgeson	Oregon Water Resources Department
Peter Stark	Map Library - University of Oregon
Allen F. Agnew	Oregon State University - Geology
Lyle Riggers	National Geodetic Survey
Keith Walrath	Pacific Power & Light Co.
Don C. Shores	Pacific Power & Light Co.
Kermit Duncan	Pacific Power & Light Co.
Paul Staub	Oregon Department of Geology & Mineral Industries
Mark Neuhaus	Oregon Department of Geology & Mineral Industries
Doug Crook	Oregon Economic Development Department
Ron Edson	City of Portland-Trans. Engr/Mapping Sect.
Gary Waltenbaugh	Oregon Department of Energy
George Shore	Oregon Forestry
Len Gaydos	US Geological Survey-Menlo Park
Carl Grzybowski	Executive Department
Pete McDowell	Benton County Public Works
Dick Swinnerton	US Geological Survey-Menlo Park
Lewis MacArthur	Oregon Geographic Names Board
Chuck Pearson	Washington County
Ed Sipp	AMIS NW
Tom Allender	Portland General Electric
Ray Haag	Pacific Power & Light Co.
R.L. Barbee	Pacific Power & Light Co.
Maggie Hower	US Geological Survey-Grants Pass
Bob Olson	US Geological Survey-Grants Pass
Terry Felkerson	USGS-MCMC-John Day
Shirley George	State Library
Miles Takayesu	BLM-Public Assistance & Records Section-Portland
Vic Myev	Intergraph Corp-Portland
John Beaulieu	Dept St Geol-Chairman SMAC

1) Large Scale Mapping & Emergency Services in California

Firefighting Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) is an effort to coordinate emergency response in California for hazardous waste, fire, earthquakes, nuclear events, and others. The field response is coordinated in part through a common map approach. Growth of the program has proceeded through the stages of design, implementation, and improved effectiveness. The effort is multi-agency and relies on common elements of data, maps, technology, communication, and monitoring. The goal is to have a real time response to disaster. The orthophoto quad is the common map element for the effort.

In the slide show the common map element (orthophotograph) was discussed in greater detail. Orthophotos are paired with topographic maps and response books. Various scales are utilized for various purposes. For wild lands 1:24,000 is appropriate. For urban areas 1:12,000 is used, and for detailed urban response 1:6,000 is used. Specialized thematic maps are also utilized where appropriate. San Bernadino County has evolved its efforts into a GIS application of the various data layers. This GIS application is keyed also to landownership data.

The various maps are related to each other in a reference manual called "GEOLOC". In this system a grid laid over the entire United States on the 7½' grid cell basis. With a string of seven digits one can locate his position anywhere in the United States to within 100 acres. This system of location is of value because it offers a common language, it is not subject to change, it is easily stored in computers, and it is computer friendly and flexible. It responds to add ons and it can be interrelated to the global positioning satellite system operational in 1989. It also relates to the present systems of location (LORAN C & OMEGA). A system of gridded locations such as this one has definite advantages and is different from other systems such as striving for revised address systems.

Several of the map products available through the Department of Emergency Services in California were displayed by Bob Gerber. Included were ozalid orthophotographs, GEOLOC grids (useful where there are few landmarks), orthophotographs with topography, high resolution orthophotographs, 1:40,000 scale photography, false color orthos, acetate topography on orthos and GEOLOC acetate grids. All of these products have various utilities that demonstrate the manner in which systematic mapping can assist emergency response.

2) Panel Discussion on Large Scale Mapping

A panel discussion on large scale mapping from Oregon was conducted. Participants gave emphasis to matching scale to task (Ken Dueker-Emergency Services and Dave Yandell). The GIS perspective (Gary Waltenbaugh) field applications (Carl Pearson) and technology (Len Gaydos). Large scale mapping is one of the areas of greatest growing activity in the State of Oregon. It has many applications and many areas of potential resources. The discussion was designed to begin to bring these resources and problems together. It is anticipated that the large scale map discussion in Oregon will continue for several years both within SMAC and within the Oregon Land Information Advisry Committee recently established by the Governor.

Ken Dueker spoke in general terms of the relationship of map scale to application. For any given set of problems there could be visualized three scales (one for planning, one for management, and one for facilities). The overall family of scales and the accuracy requirements vary with the project. At the local government level of large scale mapping a coherent family of interrelated maps does not yet exist.

Gary Waltenbaugh spoke about GIS applications and added to the scale perspective presented by Ken Dueker. He would like to see large scale mapping answer "what if" questions. He emphasized the need for cooperation. Desires for the future include access to the best scanning devices available, attention to standards, a blending of imagery with other GIS layers, and local givernment access to state capabilities. The 1:12,000 scale was presented as very useful.

Dave Yandell of Emergency Services spoke about the common mapping needs of the Emergency Services units and of a desire for a common addressing system. He views the role of SMAC as facilitary and educational and noted that the Gerber presentation was a great help. Emergency Services is still gaining familiarity in the large scale mapping area and is still looking for the "right way" to recommend to go. Glenn Ireland will meet with Dave Yandell to provide further background of this aspect of mapping.

Carl Pearson of BLM spoke about large scale map needs in rural areas. He noted that a 1:4,800 scale with 20 foot contour lines as most appropriate for their (BLM) needs. He noted that the BLM planning cycle is ten years in duration and that the maps being produced by BLM are not formally published. He also noted that they need extreme detail for the work in which they are involved. This includes landslide management and logging management.

Len Gaydos presented an overview from the technological point of view. He noted that the USGS is in a "coalesing stage" in terms of determining the direction of that agency, assisting in this broader effort. He described alternative treatments that are being considered in urban areas and discussed digital trends within the Survey. The land ownership layers is seen as critical to urban applications. Large orthophotos are available on a cooperative basis. The Survey wants to be user sensitive in developing test demonstration products. The digital ortho which is now being tested by the Survey is rectified by pixel for elevation and derived from 1:80,000 photography with one meter pixels both black and white and color imagery are used. The USGS's researching, scanning and support computers and looking to scan aerials at 12.5 to 25 micron resolution range. Different scales of mapping are appropriate for different uses. The 1:5,000 or 1:10,000 scale seem most appropriate for urban areas. Emphasis will probably end up on the image base with some line work. The goal is to provide a multi-purpose common base for others to build on for their specialized needs.

3) Map Revision Survey

Glenn Ireland summarized the results of his recent map revision survey for the State of Oregon. The survey is published as Oregon Department of Geology and Mineral Industries Open-File Report O-86-17. In the survey Glenn interviewed and evaluated the needs of 14 state agencies, in terms of all the major map series within the USGS. The results are formatted to give presentation by map series and also by agency. A series of matrices cross referencing the data. The document will be a base reference for any agencies wishing to participate in Cooperative Agreements with any other agencies. It also will be a major document for the state in communicating priority needs to the USGS.

4) Oregon Land Information Advisory Committee

Ken Dueker traced the evolution of factors leading to the development and formulation of the group. The committee was formed by letter request from Governor Atiyeh to various chairmen and subcommittee chairmen. Ken Dueker is the chairman. Subcommittees include: Landownership (also chaired by Ken Dueker), GIS and technology chaired by Gary Waltenbaugh and Base Maps and Standards chaired by John Beaulieu. The activities of the State Map Advisory Committee with its similar responsibilities will be a great aid to the Oregon Land Information Advisory Committee. A draft mission statement is out for the review by the subcommittee chairman and will be discussed at the first meeting of the committee. Emphasis is on facilitating communication rather than erecting bureaucratic structures.

The Lands Records Committee will focus on urban and state agency coordination and interraction. Control densification, Global Position Satellite, work and other activities related to large scale maps. The Coordination and Technical Issues Committee will keep going forward on the good prior work of the GIS working group and will also focus additional attention on generation and maintenance of a digital index effort within the state. The Maps and Standards Committee will focus on completion of statewide digital base maps of need to a wide variety of users and also to standards. Handouts were provided on the Mitre Corporation review of federal digital coordination, statement of statewide needs or statewide base maps (elevation, transportation, hydrography, PLSS and others), and the results of an August 21, 1986 scoping meetings for future actions.

5) U.S. Geological Survey Activities

Dick Swinnerton speaking on behalf of the US Geological Survey reflected on the growth and the scope of the influence of the State Map Advisory Committees in general and presented general budgetary information trends for the National Map Division. In general, for the period 84-87 the budget is flat reflecting a decrease in small scale mapping but increased expenditures for digital and technology. The goal is to totally automate mapping by the year 2000. This signals an increase in equipment and probably a decrease in personnel. Also from the period 1987 to 2000 there will be a decrease in primary mapping expenditures matched with increases in digital and product generation from the digital.

Program activities more specifically include a delay in P-map completion to 1990 and probably of T-map completion in 1991. Orthophoto quads are completed on a cooperative basis. The 1:100K planimetric series for the state is complete but the topographic version will not be complete until the mid-1990's. In terms of digital the 1:100K transportation and hydrography layers will be done soon. Also under way are the 1:24,000 layers and other 1:100,000 layers. Other digital products such as DLG's do not sell as well because the costs from the USGS relate poorly to relative ease of production by other agencies.

For revision there is a project underway now on 1:24,000 scale in Portland. Other areas for future attention include North Bend, Chemult, Gaston, and Baker. In defining these priority needs, the State Resident Cartographer played a key role for the State of Oregon.

A variety of entities are inovled in the preparation of large scale maps. The USGS recognizes the need for general guidelines for these groups to make their mapping most effective. To this end, they have published open file report 86-005. This document describes guidelines and is for general use by any individual preparing large scale maps.

MARK II (The technology to get the USGS to the year 2000) is underway. It includes data production (editing, Scitex, DLG processing), base components (FGEF format), product generation (DEM's from hypsography and hydrography) and production management (prototype digital orthos, and Dorran implementation). GIS was also discussed including work on Water Resources, the EROS Data Center evaluation projects, and the GIS funds (which is funding John Day Phase II within the federal government). The Digital Data Research Labs are governed by steering committees of the various USGS divisions at key locations. At Menlo Park Water Resources Division, the Geology Division, and the National Map Division co-locate their equipment and manage the lab cooperatively.

For the 1:100,000 transportation layer in the John Day Basin, Doug Niebert of the Water Resources Division succeeded in edge matching the various 7½' quadrangle modular units and also the 1:100,000 scale map blocks. These efforts are costly for a single agency. Good digital sellers for the Survey include the 1:250,000 DEM's, the 1:2,000,000 base maps and the 1:24,000 DEM's. Land nets of various qualities are prepared piecemeal by various agencies. Other line work is easy for others to make at lesser costs than appears to be charged by the USGS.

Coops still are a good idea, however, when one views digitizing from the standpoint of total cost savings to agencies in general rather than in terms of costs to just one agency as it moves quickly ahead on its own. Within Oregon the State Map Advisory Committee has completed an assessment of necessary statewide digital base maps. In future months emphasis will be placed on pulling together cooperative agreements for various state agencies and federal agencies to complete statewide digital maps on intermediate scales. It is hoped that the time frame of cooperative delivery is favorable and that agencies will approach this process in cooperative fashion. The payoff will be more timely completion of the state as a whole and commonality of base map usage within the state. With completion of these maps the real benefit of mapping (more effective management on land resources) be more feasible on a statewide basis.

6) Agency Presentations

Glenn Ireland discussed the local activity of the US Geological Survey and provided handouts for the 1:100,000 DLG's of the USGS, the 1:100,000 data users guide, 1:100,000 index of whats available, and the FDC newsletter. He also discussed Bulletin 1583 (Digital Products Applications) and Open-File Report 86-005, (Guidelines for Large Scale Maps). Bob Olson discussed the activities of the Grants Pass contingent and Terry Felkerson discussed progress in central and eastern Oregon mapping effort. In addition to the Ohio style map index, which has been discussed over the years, the USGS will produce a single sheet index for 7½' quadrangles. In the meantime, Oregon Department of Transportation in cooperation with the SRC have completed a digital file of 7½' sheet coverage for Oregon. It is updated continuously.

For the Oregon Geographic Names Board Lew MacArthur discussed an evolving posture towards offshore names. In the EEZ, California and Washington have been asked to join into a joint policy in which the full board will request the Domestic Names Subcommittee to have jurisdiction over offshore names. He also noted a growing emphasis to preserve native American names and to formally designate the limits of Hells Canyon. If you have input contact Lew MacArthur.

Bill Loy stated that GNIS-2 has been completed by the University of Oregon. Keying is being done in Reston and publication is slated for the spring of 1987. Look for Professional PP 1200 OR. It also will be available on tape with additional data.

Dave Rigeisen summarized the work of DOT. They have digitized the location of the 7½' quadrangles for Oregon and maintained the index. The Columbia County project in cooperation with the State Forestry Department is nearing completion. The Fire Districts are working with the Forestry Department. Their CCAD system is capable of taking Intergraph data and putting it on microcomputers. DOT is working with cities using auto-CCAD. In this process they are sending data back and forth to local government. Progress continues on the mile marker road file. DOT intends to map the roads of all cities within one and one half years. For this process they use 7½' quadrangles and photographs.

Gary Williams reports that the Water Resources Department has installed Arc Info. Future basin work includes - Umatilla, Summer and Goose Lake, and the Willamette Basin. Water Resources is actively soliciting data from other agencies owing to their constraints of budget and the demands of the time frame for the next basin studies. Arc Info reads USGS DLG's well according to Gary Williams. Arco also will read Intergraph. There may be a way to help DOT with their difficulties dealing with Intergraph and USGS DLG's.

State Forestry reported on the Columbia County project in cooperation with DOT and noted that they are attempting to get involved with an orthophoto coop with the USGS. George Shore requested an update on this cooperative agreement.

Peter Stark summarized some of the activities of the University of Oregon. Irv Iverson noted that Intergraph has been purchased by the State Department of Revenue. He also noted that their older CALMA computer is up for a negotiable price. Old data is being converted to the new system. DEQ was reported on by Rick Keppler. He described briefly the cooperative agreements between the USGS, EPA, and DEQ for map products involving land use geology and water.

Carl Pearson summarized additional activities by BLM. He summarized the use of USGS bench mark data, US Forest Service imagery and other products in their aggressive attempts to complete imagery and mapping in concert with the five-year cyclic imagery program. He also displayed a variety of map products and booklets including an archeology of Oregon booklet which are available for bargain prices from the BLM.

Bob Klaver summarized the activites of the BIA on Indian lands. He offered to provide data to the Water Resources Department for appropriate parts of the Umatilla Basin. BIA utilizes MOSS but is going to Prime at the present time. He noted a possible technical glich in USGS DLG coding (zonation).

Meeting Summary
Spatial Data Applications Work Session
State Map Advisory Committee
Thursday, August 21, 1986
Salem, Oregon

Attendees

Gary Williams - Oregon Water Resources
Carl Gryzbowski - Executive Department
Scott Smith - Oregon Department of Transportation
Rudy Wellbrock - Oregon Department of Transportation
David Rigeisen - Oregon Department of Transportation
Rick Keppler - Oregon Department of Environmental Quality
Paul Staub - DOGAMI
Glenn Ireland - U.S. Geological Survey/NMD
Doug Niebert - U.S. Geological Survey/WRD
Bob Klaver - BIA
John Beaulieu - DOGAMI

Not In Attendance

State Forestry
U.S. Forest Service
BPA
BLM

Progress in the state to complete 7 1/2' topographic series on a cooperative basis was reviewed. A shifting of SMAC emphasis in the future to digital standards, statewide digital data bases for GIS, large scale mapping, cadastral needs, and continuing coordination was stated. There was much discussion on standards. There is a need for the group to look beyond daily brush fires and to maintain a vision for broader future goals, if needs are to be met and in an effective manner. There seems to be a broad appreciation for communicating the relation of computer data to the original material from which it was derived. If the original material is of low quality or is dated then this must be communicated to the user of the digital data. Field checking is the only way to really get a feel for the resolution or accuracy of the data.

A summary of SMAC accomplishments for the past eight years was distributed along with results of the digital needs survey conducted in 1984.

Federal efforts in digital mapping were briefly reviewed. Handouts included a summary written in May of 1986 by the State Resident Cartographer and tabular data depicting hardware and software in the possession of various

federal agencies. An overview comparison of major GIS software packages was also distributed. These summaries were taken from the Mitre Report. Coordination efforts and efforts towards defining agency identities with relation to GIS, cadastral mapping, general mapping, and lab research for digital maps were reviewed with regard to U.S. Geological Survey. The IDCCC concept was discussed. Glenn Ireland will distribute minutes to the last IDCCC regional meeting.

Focusing on standards, copies of the draft Federal Geographic Exchange format were distributed. The item was distributed to allow members of the committee to offer criticisms and comments which might ultimately be forwarded to a IDCCC regional committee meeting. The information was also distributed for the sake of general information so that state standards discussions would be more cognizant of federal direction for coordinating data exchange. This is particularly significant in states like Oregon where the great majority of digital data is being developed by federal agencies. In addition, since data exchange will undoubtedly become more and more a national pastime it is important for individual states to recognize that arbitrary digressions from the federal effort to meet local needs will in a sense isolate the local effort from opportunities available at the national level.

Discussion addressed the need for digital mappers to be as aware as possible of innovations in equipment and indexing. One area of rapidly expanding innovation in terms of equipment is that of scanning devices. The BLM scanning device modified from micro-science equipment was discussed. Standards and quality control with regard to scanning equipment and other equipment was also discussed.

General information on the Earth Science Data Directory was distributed and individual agency participation was invited. The form for ESDD input might be very useful to the state in developing its own index of more local data bases. Indexing effort for equipment, software, data bases, and hints for how to get things done was discussed. At the first meeting of the chairs of the geographic information system advisory group the need for an index effort (probably coordinated through the State Library) will be raised.

Considerable discussion occurred related to water oriented work. The USGS Water Resources Department is developing several statewide data bases for Oregon including soils, land use, and DLGs at regional scales. GNIS is being used by USGS/WRD to log streams in river range work for BPA at a scale of 1:100,000. The entire coordination effort regarding USGS Water Resources, EPA data files, Bonneville Power river work and State Water Resources river work is a

subject that will need further elaboration in later meetings by an appropriate committee.

For the sake of discussion a matrix summary of agencies and major statewide general purpose map layers was distributed. Again for the sake of discussion it depicted possible modes of cooperation including workshare, shelf capability, coordination, and professional assistance. Evident were a number of cooperative opportunities between the agencies, many of which are already being pursued in some manner of completeness. Editorial comments and corrections were solicited from the group.

In addition to water above another area of considerable activity is that of large scale mapping. An effort is needed to maximize the resources available and to address the concerns of many agencies. Included are: interest of the USGS in urban mapping, the need for multipurpose cadastre for local use, the need for Emergency Services people and fire district people to be able to coordinate their efforts, and the plans of Oregon DOT to map all urban areas in digital fashion within five years. A recently developed technology within the USGS is capable of digitizing orthophotos. Thus, aerial imagery is now may lend itself to GIS use.

It was noted that for digital mappers to maintain timely working knowledge of other people's activities require numerous parallel efforts including development of an index, continued use of a newsletter, attendance at meetings such as SMAC, talking to each other, pursuit of topical or timely issues by means of committees, and other activities. A meaningful portion of each person's workload planning must be aimed at coordination and ongoing communication for effectiveness to be maintained.

Scheduling of an informal meeting of digital and GIS users in northern Oregon and southern Washington within the next two months was requested. This item will be brought to the attention of Gary Waltenbaugh, chairman of the subcommittee (Oregon Land Information Advisory Committee) on GIS coordination.

Agencies then shared their needs for digital data. The Department of Transportation is in need of a 1:100,000 scale transportation data for eastern Oregon, 1:24,000 data is more appropriate for western Oregon. Glenn Ireland will assist DOT in further pursing the use of USGS developed DLGs in the DOT computer system. DOT does not require rigorous treatment of topologic structures.

USGS/WRD is rapidly digitizing a variety of layers for GIS use in Oregon. They did indicate a need for more

rigorous treatment of precipitation data for proper modeling.

Most agencies have very real needs for a public land survey layer at a scale of 1:100,000. This layer should depict sections as well as township and range. The land net is the reference system for oil and gas and geothermal drilling data maintained by DOGAMI. It is the reference system for land ownership and a variety of other legal considerations in the regulatory agencies including the Water Rights Information System. To date a good layer of this scale is not available. Restatement of the need here reinforces earlier statements of the same need in other forms.

DEQ, Water Resources of the State of Oregon and USGS Water Resources have a general need for a good up-to-date land use/land cover layer at a scale of about 1:100,000. Such a layer should include accurate treatment of agricultural land both irrigated and non-irrigated.

With regard to elevation digital data now available on a statewide basis is at a scale of 1:250,00. For the types of questions being asked in Oregon, this resolution is not adequate. What is needed is 1:100,000 scale digital data derived from maps other than the DMA from which the existing data was derived. The existing data is of some value, but the resolution of questions now being asked requires more accuracy. The scanning devices now being developed should be capable of soon capturing this data at a scale of 1:24,000. Copies of a newsletter noting the status of this technology in the USGS were distributed to the group.

Bonneville Power Administration submitted a written statement of need for a public land survey system layer at a scale of 1:100,000 complete with sections.

The U.S. Forest Service utilizes MOSS on the forests. For the Suislaw a variety of data layers are being derived at a scale of 1:24,000, at level 2 DLG quality. Included are hydrography, topography, culture and land status. Other layers are transportation, and land ownership. Future forests to be treated this way in order will be the Willamette, Rogue, and Winema.

The BLM prefers 1:24,000 coverage for all layers. For minerals a 1:100,000 layer of the land net is required.

In discussing agency needs it was clear that many considerations were lumped together in the presentations: inventory data, project data, specialized data and planning data were intermingled in the testimony. Upon reflection it is clear that much of the operational day to day data used by agencies simply must be developed and maintained by the

lead agencies in the respective areas. The same can be said of specialized inventory data such as water rights or road condition by road mile. The major service of SMAC committee in these areas is one of communication and coordination and surfacing of opportune data sharing as appropriate.

For general planning in GIS's on a statewide basis a few major needs surface. These include: completion of transportation and hydrography at a scale of 1:100,000, development and completion of land use/land cover at 1:100,000 complete treatment of irrigated and non-irrigated land, standard base map digital data at a scale of 1:24,000 wherever possible, and completion of the public land service system at a scale of 1:100,000 for the entire state. Another area of interest and need of future discussion is that of all water activities going on involving BPA, USGS Water Resources, USGS National Map Division, State Water Resources and others. Finally, the land use and cadastral aspects of large scale mapping are expanding that discussion considerably.

These will be areas of major concerns by SMAC in future years as stated in earlier correspondence. In response to questions from the group future activities specifically will include: 1) Formulation of a list of necessary statewide digital layers for the State of oregon as mentioned above. 2) Ongoing attention to standards in digital work both in SMAC and in the Oregon Land Information Advisory Committee recently established by the Governor. 3) Scheduling of topical meetings of interest of considerable activity such as water. These meeting swill be designed to further the cooperation and coordination that has already begun. A fourth area of activity will be continued attention to standards and cooperation between local, private, federal and state digital mappers in Oregon as a matter of ongoing emphasis.

Attendees were asked to correct the Agency/Map layer matrix, review the standards document, and to clarify agency general purpose digital map layer needs, if appropriate. In advance of coordination and cooperation meetings they are asked to consider the kinds of cooperation that might be most effective in meeting their needs.

VICTOR ATIYEH
GOVERNOR

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MEETING SUMMARY
SUBCOMMITTEE ON MAPS AND STANDARDS
(OREGON LAND INFORMATION ADVISORY COMMITTEE)

SPATIAL DATA APPLICATIONS WORK GROUP
(SMAC)

Friday, November 21, 1986
Room S-326, State Capitol

Attendees

Name	Affiliation
Paul Staub	Department of Geology & Mineral Industries
Vivian Torgeson	Department of Water Resources
Lyle Riggers	Department of Transportation
Glenn Ireland	U.S. Geological Survey
Ted Albert	Bureau of Land Management
Tom Jackson	Bonnville Power Administration
Roger Crystal	U.S. Forest Service
John Beaulieu	Department of Geology & Mineral Industries
George Shore	Department of Forestry
Jim Carlson	Lane County
David Ringeisen	Department of Transportation
Richard Keppler	Department of Environmental Quality
Scott Smith	Department of Energy

The major areas of responsibility of the subcommittee are coming into focus. These include involvement in - 1) large scale mapping, 2) map standards, 3) completion of high priority statewide data bases, 4) selected technology (Global Position Satellite), and 5) local/federal cooperation. For each of these areas of activity the committee may formulate a strategy for action. At the present time a strategy has been formulated for statewide map coverage and a strategy is being researched for local/federal cooperation. Progress is summarized in this report. It is possible that for each of the five categories a survey will need to be made to identify these resources and needs of state and federal agencies. If such work is conducted it will be coordinated with other similar efforts. In developing long range strategies realism will have to be used in scoping what a committee format is capable of accomplishing.

1) Overview of recent communications - Recent communications between the chairman and the US Geological Survey were summarized. Within the National Map Division realignment can pose some concern with regard to ongoing effective linkage of local resources and meeting

of local map needs particularly in the west. The recent trip of John Beaulieu to Reston to discuss this matter with National Map Division administrators was reviewed. In addition, the recent Regional Map Coordination meeting in Menlo Park again with the National Map Division was summarized. A summary of the caucus statements of the Western States will be distributed to the members of this Subcommittee on Maps and Standards as part of the annual report of the State Map Advisory Committee when it is released at the end of the year.

2) Digital Map Standards - It was agreed that there are several elements to be addressed is approaching standards. These are - 1) keeping well informed on the standards activities of other working groups and agencies. 2) Documenting standards used by individual agencies in pursuing their own digital mapping activities. 3) Properly recording broad standards concepts as they emerge in general discussion. 4) Developing an understanding of state needs. In developing thematic layers, individual agencies should keep a plain record of the sources of data used in the thematic layer and in the base map being used in compiling the data. For specific data layers, reference should be made back to the latitude and longitude system. It is not necessary that all thematic layers be input with latitude and longitude. It is only necessary that a referencing mechanism be provided whereby the data can be referenced to a latitude and longitude system.

In keeping with the need to be aware of other standards discussions, the subcommittee was provided with a set of - 1) large scale generic map standards issued by the US Geological Survey, 2) a set of standards and standards concepts developed by the GIS working group. Earlier, copies of the Federal Geographic Exchange Format were distributed.

With regard to uniform location coding, a general perspective was developed whereby most data in standard GIS systems can be encoded in a variety of location codes which all are interrelated within the standard GIS package. This issue then is not a broad concern. However, the examples of specialized thematic data being referenced back to its source and also to a latitude and longitude is a new insight that should be conformed to by digitizers.

3) Global Position Satellite Technology - This system of precise location utilizing satellites and receiver stations was discussed at length. It signals the beginning of a revolution in high quality ground location activities. The reduction in costs associated with GPS come at the same time that the National Geodetic Survey is phasing back its Mark Maintenance Program. One can envisage many agencies doing first order, second order and third order locating, whereas, formally one agency was primarily responsible. There is a need to examine the proper role of coordination of the state in efforts like this. Conceivably, the state can take over the Survey Information Network now maintained by NGS. For purposes of quality control, the state could either route the data through the National Geodetic Bluebook specs or could maintain quality on its own. Virginia is implementing a law to do the work on their own. The state (by taking over this function) can bring the data closer to home and can have more control over the prioritized development of data and coordination of map activities. In Oregon, major actors in the area of GPS might include the US Forest Service, the USGS on large scale mapping, BLM, local government, and the Department of Transportation (on matters such as right of way).

4) Future Discussions of the Committee - The Committee might address the issue of translators as they relate to the exchange of data between various GIS systems and various pieces of equipment. It was agreed that meeting on a quarterly basis probably would be adequate for the subcommittee. These quarterly meetings might include inclusion of Maps and Standards agenda items on the regular agenda of the State Map Advisory Committee.

STATUS OF
COOPERATION IN DIGITAL BASE MAPS AND STANDARDS
September 26, 1986

It is desirable in Oregon to develop cooperative projects for the development of high priority general purpose digital maps. Payoffs include avoidance of duplication and greater efficiency. Most importantly, however, certain multi-purpose data bases simply must be completed on a statewide basis soon or various geographic information system applications simply will not be possible on a statewide basis.

In December of 1984, the State Map Advisory Committee through the Oregon Department of Geology and Mineral Industries released a survey of digital map needs for State and Federal agencies in Oregon. Emphasis was on types of map data needs by agency. Map scale and specific map programs were not emphasized.

On August 21, 1986, selected State and Federal agencies met in Salem to further crystalize ideas regarding priority base map needs on a statewide basis. Cooperative opportunities were emphasized.

Most recent activities have included follow-up research by the State Resident Cartographer to further define specifc map needs and specific cooperative opportunities for the completion of digital base maps on a statewide basis for Oregon. The aim is to convene several specific meetings aimed at finalizing written cooperative agreements between selected agencies for selected map products. The products then would be available and usable by all other agencies.

This memo summarizes generalized background information on eight specific digital map products for Oregon. Large scale mapping in urban but also in rural areas of Oregon is a concern of growing interest. The cadastral element is coming of age, and GIS applications are focusing on larger scale problem solving. Interest of the U.S.G.S. in large scale mapping has been steady for a number of years. The recent development of the image base option makes cost effective map production feasible. Digitizing of the image base map also make possible extremely powerful problem solving tools. There is some constraint in this direction voiced by private industry but it is not inclusive. The revision cycle of the 7½-minute series by the U.S.G.S. lends itself to large scale map applications at this time. A pilot 7½-minute quadrangle revision project is presently underway in Portland. Discussions between U.S.G.S. and BLM indicate possible cooperative opportunities in rural areas.

General data at a scale of 1:24,000 is being completed by the U.S.G.S. Time frame for total completion of the State, of course, is far off. Concurrently, many other agencies are interested in DLG data and other data at this scale. The BLM may propose large scale digitizing of parts of eastern Oregon. The U.S. Forest Service is digitizing up to a dozen types of data on the forests at this scale in sequential fashion. The opportunity here for cooperative agreement is relative good.

The 1:100,000 scale hydrographic data census project has led to the completion of 1:100,000 hydrographic data for much of Oregon. The data, however, are not all formatted for direct applications in GIS activities. Concurrently, the Oregon Water Resources Department has a need to plan on a basin wide scale in Oregon; and the Bonneville Power Administration is in the process of coding streams and doing other hydrographic related activities for the northwest. It is reported that a variety of other water oriented digitizing is also underway in the U.S.G.S. Water Resources Division on regional scales. Opportunities here for coop or for use of off-the-shelf data already developed is good.

The 1:100,000 scale transportation data is in high demand by a variety of agencies. In the neighboring state of Idaho, a cooperative work-share arrangement has been developed between the State of Idaho and the U.S.G.S. In Oregon, a transportation layer at a scale of 1:100,000 has been completed for the census project, but may not be completed ready for GIS use. Formatting is still required. In addition, proper development of attributes of value to Oregonians may still be incomplete. Oregon DOT reports difficulty in using U.S.G.S digital map products for internal use. In the short term, the State Resident Cartographer will attempt to solve the applications problems being experienced by DOT. Longer term, the cooperative agreement would seem fruitful. Oregon DOT also reports a plan to complete road maps for all Oregon communities within five years. The opportunities for coop at a large scale or for benefiting other coops seem to be good in this area. Language from the Idaho/U.S.G.S. Cooperative Agreement may be applicable in Oregon.

1:100,000 Public Lands Survey System (PLSS) data is widely required in Oregon. The public land net is used in such legal matters as locating mining claims, spacing oil and gas wells, locating water rights, and locating a variety of other entities. Many agencies could use reliable PLSS data on a statewide basis provided adequate standards were assured. In the field, the U.S.G.S. and the BLM in Oregon have a long history of cooperatively sharing PLSS data. This particlar topic for potential cooperation seems to lack a lead agency more so than other topics. What is needed is a coordination meeting aimed specifically at exploring the possibility of a cooperative multi-agency agreement, possibly in the work share mode. A lead agency such at the U.S.G.S alternatively could finance quality enhancement to meet their needs.

There is widespread need for 1:000,000 scale DLG data for Oregon on a statewide basis. The U.S.G.S. has as its goal to complete a DLG Map Series for Oregon by 1987. Digitizing of this data base is feasible, therefore, shortly thereafter. On September 8, 1986, a proposal was forwarded from the Western Mapping Center to study the various quality issues associated with 1:100,000 data bases of the type required. As a side issue, land use land cover designations at the same scale would be highly desirable. Given the standards questions that are involved in these layers and also the present emphasis to study these standard questions, a coordination meeting to develop a cooperative agreement possibly should be delayed for a short period of time to allow better definition of the direction of this effort. Numerous agencies could conceivably participate.

Contours at a scale of 1:100,000 and at acceptable intervals would be highly desirable for the State of Oregon. DEM's now available but derived from the 1:250,000 AMS Sheet coverage do not offer sufficient resolution for all of the problem solving that is contemplated. Alternatively, a 1:100,000 scale data base derived from higher quality base maps is seen at highly desirable. Slope elevation, slope aspect, and land forms all could be analyzed and interrelated with other data sets. At this point, it would seem that an information oriented meeting or discussion topic would be most appropriate. In addition, emerging technologies relating to scanning now offer the possibility that contour lines can be scanned at a scale of 1:24,000. If this direction is pursued, then a 1:100,000 map on a statewide basis could be developed as a derivative of the 1:24,000 data base, were it to be available first.

For all of these base maps and for other products as well. The concerns over standards must be addressed. This is one of the areas of responsibility of the State Map Advisory Committee and the Maps and Standards Subcommittee of the Oregon Land Information Advisory Committee. Development of universally expected and practical standards for digital maps in Oregon is an awesome task. Going into the process, it must be recognized that the great bulk of digital mapping in Oregon and, therefore, the great bulk of digital map products in Oregon will involve Federal effort. Fortunately, Federal efforts are now coordinated by a variety of cooperative schemes finding their impetus within reports and recommendations of the General Accounting Office and the Office of Management and Budget. For these efforts, the U.S.G.S. is the lead agency. As a minimum then, Oregon State agencies must be well informed on Federal directions. This is not to say that Oregon cannot also maintain its own set of standards as a supplement to the Federal effort to best meet our needs. It is merely to say that we must be able to use Federal products if our digital mapping efforts are to be cost effective and mutually usable across State-Federal lines. Currently, State agencies are in possession of the internal standards in use by the U.S.G.S. and also of a draft statement of numerous Federal agencies entitled "Federal Geographic Exchange Format". These, plus the State agency additional notions of preference, will guide future activities of State agencies in formulating their ideas about standards for digital base maps in Oregon.

JDB:ab

SUMMARY OF ACTIVITIES

Oregon State Map Advisory Committee, 1986

Presented at the Ninth Regional Western Mapping Conference

The year 1986 has been a transition year for the Oregon State Map Advisory Committee in many respects. Emphasis has been on topographic base maps, various other hard copy maps, needs definition, and miscellaneous efforts. These accomplishments are summarized in an attached memo dated April 23, 1986. Looking to the future, the committee has identified four major areas of increasing activity. These are coherent map revision, large scale maps, digital maps for geographic information system use, and enhanced coordination for the federal government. These areas of emphasis are summarized in the attached memo of June 1, 1986. An attached table consolidates the major points of both memos.

The committee held two major meetings during 1986, on April and the other on October. Summaries of both meetings are attached. In addition, a new working group focusing on spacial data applications was convened on August 21, 1986. At this meeting the group made initial motions to defining statewide digital data bases of common interest and an approach to formulating uniformly acceptable standards for digital mapping in Oregon. Major base maps of interest include Transportation (1:100,000), Hydrography (1:100,000), Contours (1:100,000), Public Land Survey System (1:100,000), various thematic layers related to water at various intermediate scales, and Routine General Purpose Layers (1:24,000). The demand for 1:24,000 data was broader, more immediate, than was anticipated.

The group will continue to identify specific resources in specific agencies. It will identify specific modes of cooperation (work-share, funding, data trade, or funded quality enhancement) and specific contract language that has been successful in other states. The goal is to formulate effective and timely cooperative agreements in Oregon to meet stated goals with deadlines for completion of priority map layers.

In the area of standards, the working group recognizes the need to be well informed of federal efforts already underway. This recognition is occasioned by 1) the progress already made by federal coordinating groups such as IDCCC or FIDCCC, and 2) the large volume of digital mapping being conducted by federal agencies in Oregon relative to state efforts. Concurrently, the groups recognizes that standards from a state perspective are best driven by project need rather than simply by available supply. Thus, the state will be attempting to influence standards being formulated in federal circles in a constructive and timely manner.

The awareness which has driven the definition of need for the above statewide data layers is as follows. Many GIS projects in Oregon are limited in geographic scope or application. Looking to the future, it's hard to visualize how these various individual efforts can be interrelated or how technology can be transferred from one area to the next if the data bases upon which the GIS's function are not uniform. Likewise, timely completion of general purpose digital data bases statewide will enhance GIS efforts statewide.

In a broader context, Oregon continues to experiment with non-institutionalized efforts to coordinate GIS and digital base map projects. In previous years various lead agencies have taken it upon themselves to try to formulate a statewide GIS capability. In each instance a limited availability of funding, limited scope, or the limited time frames of specific projects have spelled failure for the individual efforts. In addition, the provincial focus of the projects has not been fully sensitive to the broader spectrum of all state needs. In recent years the most visable project has been the John Day water project. In this project, data bases that are maintained by lead agencies with ongoing responsibilities were utilized. Further data bases that are available on a statewide basis were selected. This approach foreshadowed an ongoing statewide problem solving capability. As the project matured, questions focused down on policy issues particular to water and the effort became too localized to yet be considered statewide in scope.

In Oregon's latest effort, the Governor has erected a Land Information System Advisory Committee charged with bringing together the current digital efforts and giving them direction. The committee is chaired by Dr. Ken Dueker of Portland State University. Included in the committee are three subcommittees comprised of members of the committee plus other strategically selected individuals. The three subcommittees are CADASTRAL, GIS coordination, and Base Map Plus Standards. Within this structure, the State Map Advisory Committee is recognized as the subcommittee on Base Maps Plus Standards. In addition, SMAC, because of its other responsibilities, continues to function in it's historic mode.

The chairs of the various subcommittees and the chair of the committee have excellent working relationships developed over several years of working together within the SMAC structure and within other less formal groups dealing with similar issues. The management style will be loose and it is recognized that there will be much communication and cooperation in all directions. Each subcommittee will deal with its assigned area as a matter of emphasis, but each also will be involved in the activities of the other committees as matters of second or third order of priority. Membership commonly will cross committee boundaries.

The structure of the committees is viewed as a convenience of communication rather than as a rigid restriction on activities. An overview perspective is that this working group is analogous in many respects to the IDCCC within the Department of the Interior. It also conforms in general ways with conclusions tenatively presented in the draft MITRE study on the federal level. The general philosophy is that given the diverse needs of users and the new opportunities of technology, it is best to have a loose organizational structure with a focus on professionalism and cooperation, rather than to institutionalize a rigid structure in a given agency. This philosophy was several years in the making and is the product of the efforts of the subcommittee and committee chairs.

STATE MAP ADVISORY COMMITTEE

Activities and Accomplishments
1979-1986

Needs addressed	Major Elements in Need of Consideration	Accomplishments	Future Directions
Eliminate duplication in mapping.	Field work. Office compilation. Edit and review. Diverse standards. Diffuse actors, including State, Federal, private and university entities.	Linking of efforts with formal and informal agreements and sequencing of efforts. Acquired Resident Cartographer.	On-going efforts as priority of Resident Cartographer and SMAC meetings.
Get maps to the public.	General map needs. Specific map needs. Technical advice. Knowledge of map availability.	NCIC affiliate. Map maker brochure. Completed MCIS catalogue (computerized)	NCIC affiliate - implementation and expansion. MCIS update.
Finish topographic Base Map series begun in 1906 and 1955.	Poor coverage. Antiquated selection process. Low priority.	Revamped selection process. Revamped format. Upgraded priority.	Follow through on long range plan. Update revisions. Derivative map series. Computer format.
Impact of Agency Cartographic Budget Cuts.	Impact of reduced efficiency and productivity.	Pursuing cooperation on basic map series including land ownership, urban mapping, and state base map.	Complete specific cooperative agreements. Address map needs of local government.
Standard General Purpose Base Maps	Completion of products on a statewide basis with accepted standards and content.	Assist in coordination and completion of state of Orthophoto, coverage, 1:100K planimetric, Land use/land cover and various 1:500K maps.	Imput into revision cycles and cooperative updates.

Map needs definition including input into revision and update cycle.	Identify agency needs and priorities for various kinds of base maps to guide mapping activities and requests.	Completed digital needs survey and offshore base map survey.	Conduct and implement revision survey for all major base maps; Regional Map Workshops.
Map availability at large scale in urban areas with cadastral element.	Integrate base maps with land ownership element at large scale.	Link cadastral community with large scale effort and tap image map base technology.	Standing committee of SMAC linking local mappers, USGS technology and basic SMAC activities.
Digital General Purpose base maps for Oregon for use in GIS efforts etc.	Provide statewide general purpose digital base maps in cost effective manner in acceptable time frames; compatibility of data and software; adherence to standards.	Standing committeee of SMAC to define priorities, objectives, standards, and cooperative opportunities. Provide individual agency assistance; co-sponsored Regional Workshops; formulated and implemented strategy of map completion focusing on cooperative agreements.	Finalize cooperative arrangements; participate in IDCCC regional meetings, integrate map completion goals into SMAC activities; Cooperative opportunities; index distribution of 7½' digital products; participate in activities of Oregon Land Information Advisory Committee.

United States Department of the Interior

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STATE RESIDENT CARTOGRAPHER - OREGON

REPORT TO THE STATE

1986 ANNUAL REPORT

This year, the State of Oregon has taken significant steps forward in the cartographic, land information and digital fields. As State Resident Cartographer, I am happy to have had a part in Oregon's accomplishments. We have seen giant strides in cooperation between agencies without regard to state, federal or regional affiliation. There has been a leap ahead by the Oregon agencies in the digital and GIS sector. Several State agencies have implemented sophisticated GIS and digital programs with the acquisition of new hardware and software.

This report will touch on a few of the activities which the SRC has been involved with during the year.

- In September, the report "Map Revision Requirements of Oregon State Agencies" was prepared by the SRC. Fourteen agencies were queried as to their needs for various scale map series. Interesting and a few unexpected directions came out of the Report. The Report will help the USGS fit its revision program to specific needs.

- In a separate study, select agencies were queried as to the specific quadrangle areas needing revision. Discussions with eight state and federal agencies indicated a need for revision mapping focused in four areas of the State. Of these four areas (Portland, McMinnville, Baker and Chemult), Portland has been chosen as a pilot to test new revision procedures. The other three areas are scheduled for aerial photography which will determine the extent of revision necessary.

- In July, Governor Atiyeh established the Oregon Land Information Advisory Committee to ensure effective coordination of collection and management of land information. The SRC was asked to serve on the Advisory Committee to represent the USGS.

- Several cooperative agreements involving work-share or cost-share were initiated between the USGS and state or federal agencies. An agreement was finalized with BLM to produce 60 high resolution orthophoto quadrangles in the Roseburg area. Also finalized was an agreement involving the USFS and State Forestry to produce 72 high resolution orthophoto quadrangles in the Siuslaw area.

- The SRC coordinated an effort between USGS WRD hydrologists and USGS NMD field personnel to establish 20 benchmarks in the Portland Well Field. These bench marks will provide a fixed reference to detect possible ground subsistence after large amounts of water withdrawal.

- The SRC continued as the USGS advisor to the Oregon Geographic Names Board. The work on the Geographic Names Information System, Phase II was completed in July. This effort will result in publication by the USGS of the Oregon Gazetteer.

- The 1984 Wilderness Boundary Maps neared their final stages. The wilderness boundary review process was long and involved, but without review the boundaries could not be published on the USGS map series. The SRC is coordinating the release of the boundary maps to ensure that maps not yet complete will show any applicable wilderness boundaries.

- Assistance was given to the Oregon Department of Transportation in producing an index map of USGS quadrangles. Two updates to the index were produced by ODOT in 1986.

- The 1:100,000 scale digital data became available for the first time. Indexes and price lists were distributed by the SRC. Several agencies requested meetings to discuss the availability and content of the data.

- Assistance was given to the USGS WRD as it pushed forward in an extension of the John Day Basin GIS study. The SRC provided technical assistance as well as being involved in the actual stream coding using the OWRD Stream Code System.

- The SRC presented a paper to the Workshop on Modernizing Land Record Systems and Developing Multipurpose Land Information Systems. May 19 entitled "Federal Activity in Digital Mapping in the Pacific Northwest."

- The SRC was elected to the position of President, Columbia River Region, American Society of Photogrammetry and Remote Sensing.

These accomplishments have been possible because of the strong commitment that the agencies give to the State Mapping Advisory Committee. Through this Committee, the agencies can talk to one another on an equal basis and exchange the wide range of information necessary to make maps for the management of Oregon's resources.

Glenn W. Ireland

Glenn W. Ireland
State Resident Cartographer - Oregon

O R E G O N

Status of Mapping

October 1986

CONTENTS

Prepared by
Western Mapping Center
Menlo Park, CA

OREGON STATISTICAL SUMMARY FY 86

PROGRAM	Total No. of Units *	Completed to Date		Completed To date FY 86
		#	%	
NEW MAPPING				
7.5-Minute Standard Topographic	1911	1341	70%	130
MAP REVISION				
7.5-Minute Photorevision	////////////	////////////	////////////	49
7.5-Minute Limited Revision	////////////	////////////	////////////	10
7.5-Minute Complete Revision	////////////	////////////	////////////	0
ORTHOPHOTOQUADS				
7.5-Minute Orthophotoquad	1911	1824	95%	0
7.5-Minute Orthophotoquad (H/R)	////////////	1	////////////	1
INTERMEDIATE SCALE				
1:100,000-Scale Quads Planimetric		78	100%	////////////
1:100,000-Scale Quads Topographic	78	36	46%	1
1:100,000-Scale County Plan		7	////////////	0
1:50,000-Scale DMA	473	2	0%	0
LAND USE AND LAND COVER SERIES				
1:100,000-Scale	////////////	12	////////////	0
1:250,000-Scale	25	25	100%	0
1:100,000-Scale Digital	////////////	11	////////////	1
1:250,000-Scale Digital	////////////	13	////////////	2
SMALL SCALE & SPECIAL				
1:500,000-Scale State Base Rev.	1	////////////	////////////	0
1:250,000 Scale Revision	27	////////////	////////////	0
National Park Maps	1	////////////	////////////	0
**DIGITAL PRODUCTS				
Digital Elevation Models (DEM)	1911	409	21%	26
Digital Line Graphics (DLG)	1911	////////////	////////////	////////////
Land Lines	1911	851	44%	130
Boundaries	1911	825	43%	75
Transportation	1911	108	6%	42
Hydrography	1911	150	8%	23
Cultural Features	1911	38	2%	0

* Includes border quads
** Figures represent data in NDCDB

OREGON
PROGRAM HIGHLIGHTS

PRIMARY MAPPING

Western Mapping Center(WMC) is currently working on a limited revision project in the Portland, Oregon-Washington area. This project is to determine more efficient methods of accomplishing limited revision efforts in urban areas. The project consists of five quadrangles and is to be completed by WMC's Vancouver, WA office. The photography has recently been inspected and accepted. Field work is to begin in January 1987. The project is scheduled for completion in June 1989.

Certain areas in Oregon have been selected for photoinspection. These include the Baker, Chemult, Gaston, and the North Bend areas. Flight designs have been prepared for the Baker and the Chemult areas and photography should be acquired in 1987.

Western Mapping Center has entered into a cooperative effort with the U.S. Forest Service and the Oregon State Department of Forestry to produce high-resolution orthophotoquads in the Siuslaw National Forest. The scheduled completion date is September 1987.

SPECIAL MAPPING

Western Mapping Center is revising the Crater Lake National Park map at 1:62,500-Scale. It is in the cartographic finishing phase and the scheduled completion date is July 1987.

OREGON
SCHEDULED COMPLETION DATES

PROJECT	FIELD CHECK	STEREO-COMPIL.	CARTO. FINISH	PUBLISH
WESTERN MAPPING CENTER				
ANTELOPE LR	10/86	6/88	12/88	6/89
CAMAS VALLEY	9/87	9/89	2/90	8/90
CULP CREEK			11/86	5/87
DREWSEY LR	10/88	9/90	9/91	12/91
GRANTS PASS			12/86	6/87
HARPER LR	12/87	9/89	9/91	12/91
MT. JEFFERSON LR		12/87	6/88	12/88
MT. MCLOUGHLIN		9/88	7/89	1/90
OAKRIDGE			9/86	3/87
O'BRIEN	10/86	10/87	9/88	3/89
PINHEAD			11/86	5/87
PORTLAND LR	5/87	6/88	6/89	12/89
QUARTZ MTN		9/88	8/89	2/90
ROSEBURG		1/87	9/87	6/88
MID-CONTINENT MAPPING CENTER				
BLY		9/87	3/88	9/88
CHILOQUIN		12/86	3/88	9/88
ENTERPRISE	12/86	12/87	12/88	6/89
HOMESTEAD	12/86	12/87	12/88	6/89
HUNTINGTON		3/88	3/89	9/89
LAWEN		6/87	6/89	12/89
MCKENZIE		4/87	7/88	1/89
MONUMENT	12/86	12/87	3/89	9/89
POST	11/86	9/87	12/89	6/90
PRAIRIE CITY		3/88	12/89	6/90
PRINEVILLE LR		9/87	6/88	12/88
SENECA		6/87	7/89	1/90
ROCKY MOUNTAIN MAPPING CENTER				
MINERAL		9/86	9/87	3/88

PHOTO REVISION PROJECTS	OFFICE	INSP.	UPDATE	CARTO. FINISH	PUBLISH
CONDON, OR-WA	MCMC			6/87	12/87
CORVALLIS	MCMC			6/87	12/87

NOTE: Schedules subject to change at any time because of adjustments in available resources and program priorities.

CURRENT PROJECTS IN OREGON

Orthophotoquads

PROJECT	NO. QUADS	ESTIMATED COMPLETION DATE
Roseburg	60	12/86
Sherman Co.	10	5/87
Siuslaw NF	71	9/87

Digital Elevation Models

PROJECT	NO. QUADS	ESTIMATED COMPLETION DATE
Adams	8	Completed 7/86
Alvord 1	5	Completed 8/86
Bly (MCMC)	24	Priority 3
Camas	7	Priority 2
Chapman	1	Priority 2
Chiloquin (MCMC)	28	Priority 3
Ft. Rock	27	Priority 2
Harmony	27	Priority 2
Mist 2	10	3/87
Newberry 1	12	12/86
Owyhee	17	11/86
Payne Creek	9	10/86
Roseburg	60	12/86
Vantage	4	Priority 2
Willamette 2	26	8/87
Whitstran	4	Priority 2

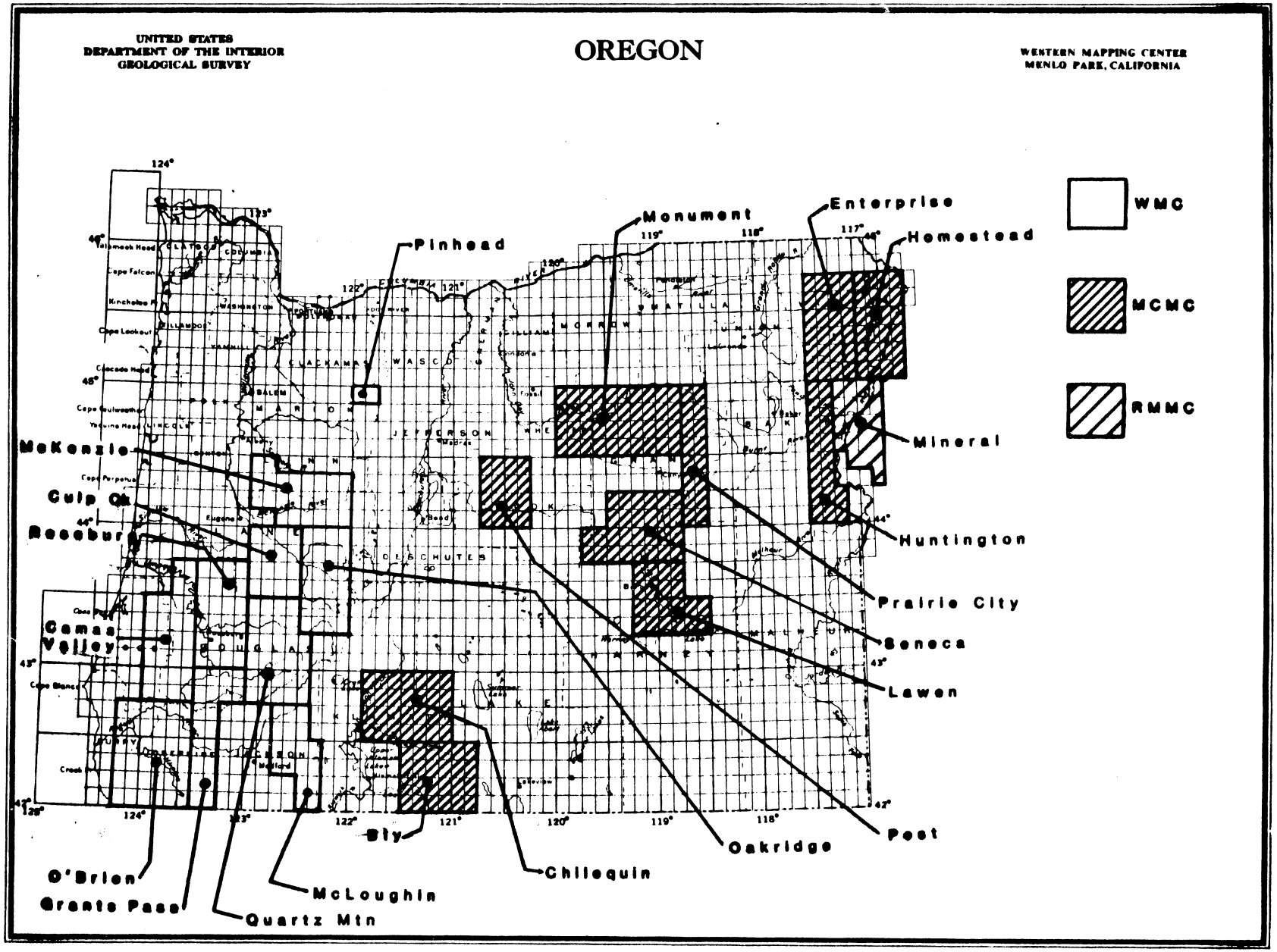
Digital Line Graphs

PROJECT	NO. QUADS	LAYERS	ESTIMATED COMPLETION DATE
Culver	4	Landnet/Bdy	Completed 7/86
Little Honey Crk	38	Landnet/Bdy/Trans	Priority 2
Mann Creek	2	Boundaries	12/86
Skamokawa	8	Landnet/Bdy	Priority 3
Siletz Res	13	Hydro/Trans	Priority 2
Tangent	36	Landnet/Bdy	Priority 2

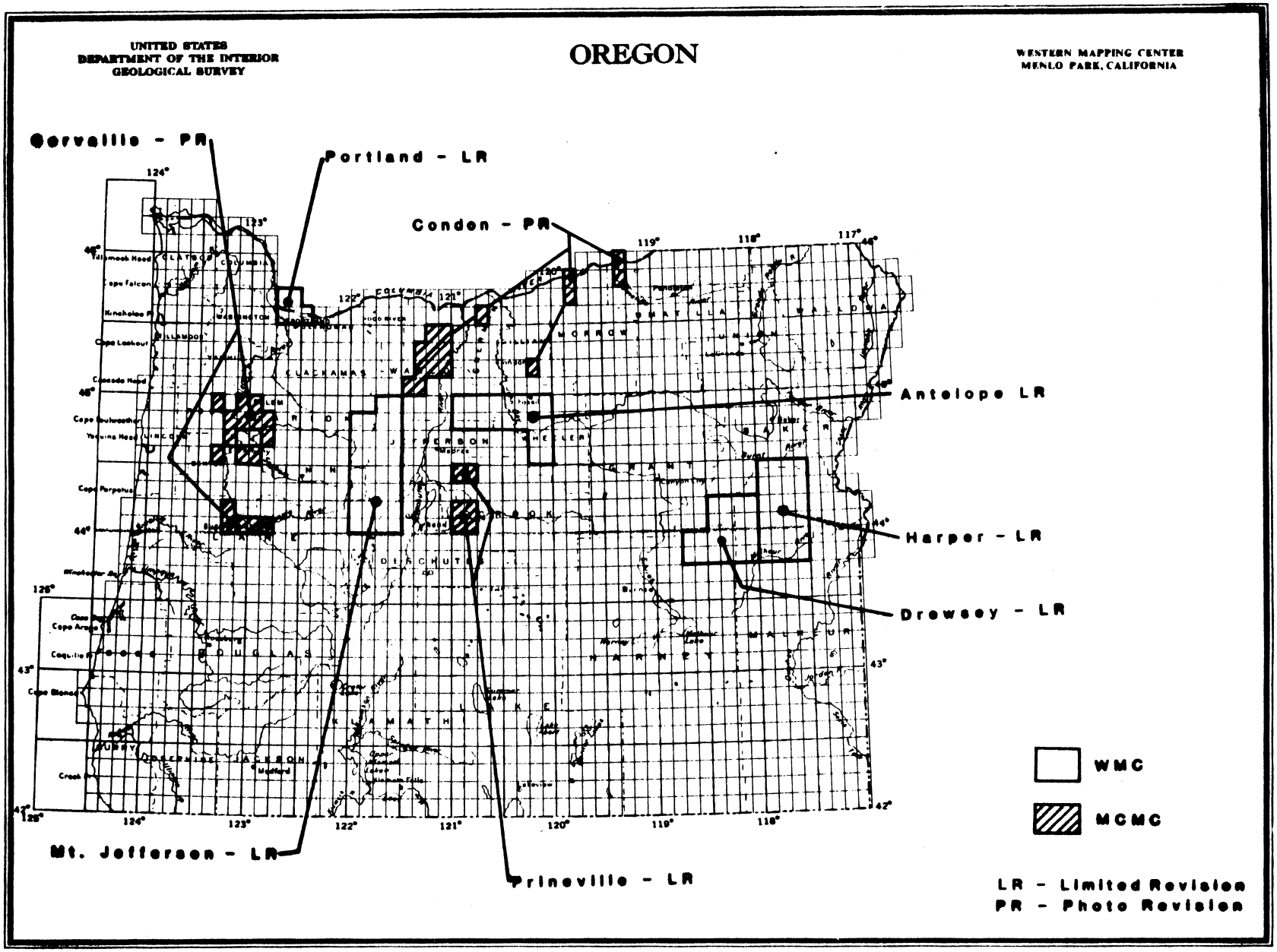
Priority 2 and Priority 3 represent projects with low priorities and will be completed as capacity becomes available.

1:100,000-Scale

PROJECT	EDITION	ESTIMATED COMPLETION DATE
Astoria OR-WA	Topo/Bathy	9/88
Bates	Topo	3/87
Canyonville	Topo	9/88
Coos Bay	Topo/Bathy	9/88
Crater Lake	Topo	9/88
Enterprise	Topo	11/86
Grants Pass	Topo	9/88
Klamath Falls	Topo	9/88
Nehalem River	Topo/Bathy	9/88
Reedsport	Topo/Bathy	6/87
Yamhill River	Topo/Bathy	9/88


UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
OREGON
WESTERN MAPPING CENTER
MENLO PARK, CALIFORNIA
WMC
MCMC
RMMC
Monument
Enterprise
Homestead
Pinhead
Mineral
McKenzie
Gulp Ck
Huntington
Prairie City
Seneca
Lawen
Oakridge
Post
Chiloquin
Bly
McLoughlin
Quartz Mtn
Grants Pass
O'Brien

REVISION PROJECTS



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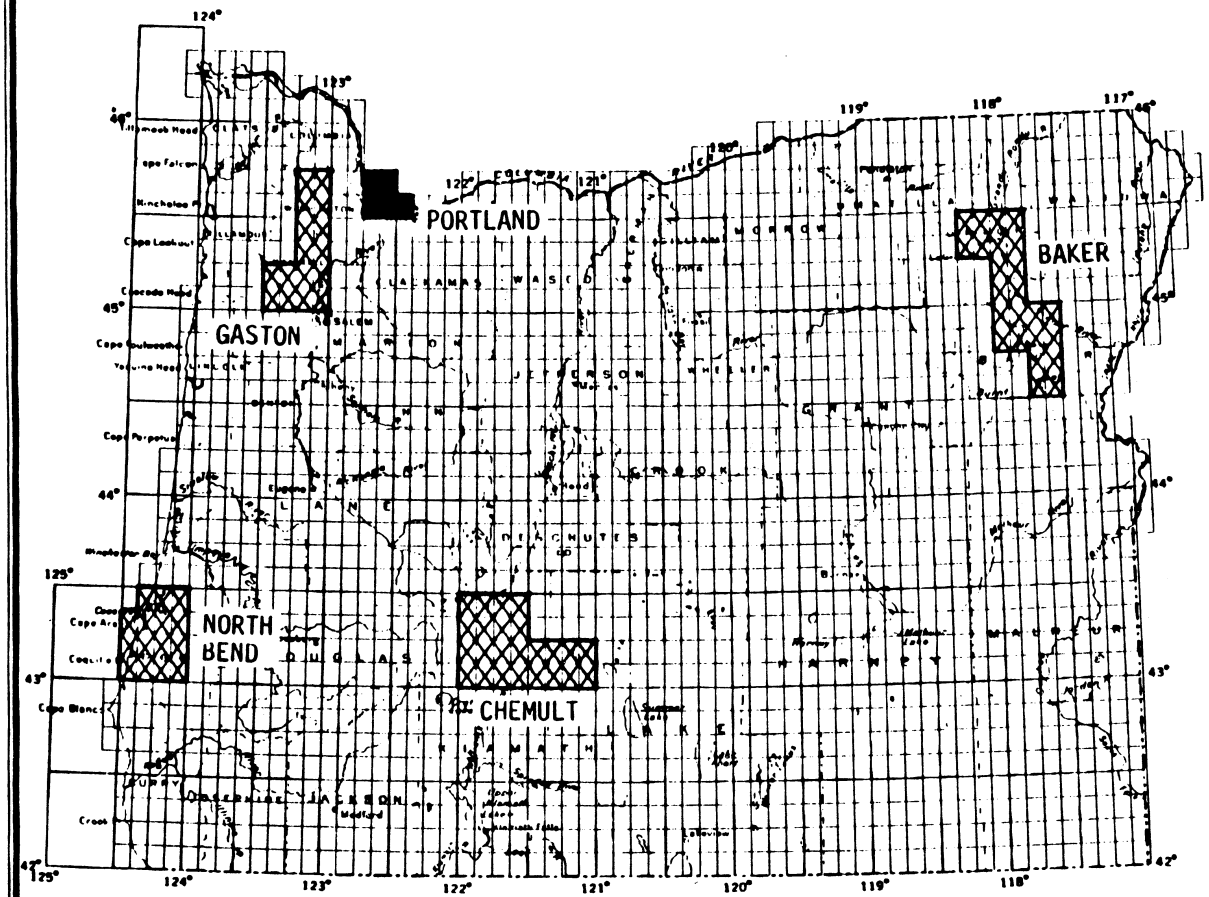
OREGON

REVISION PLANNING

WESTERN MAPPING CENTER
MENLO PARK, CALIFORNIA



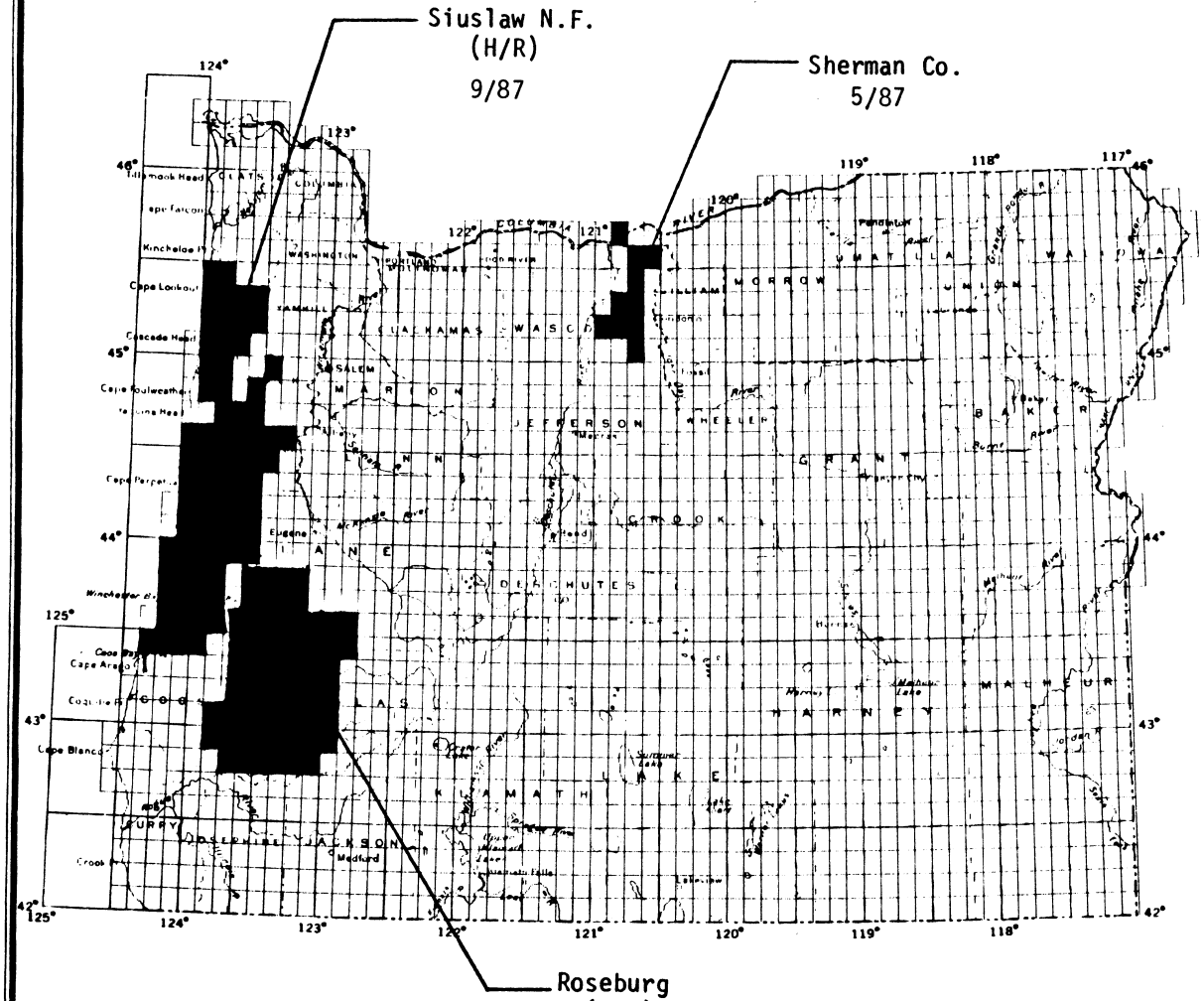
AS OF 07/86

CURRENT ORTHOPHOTOQUAD PROJECTS

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

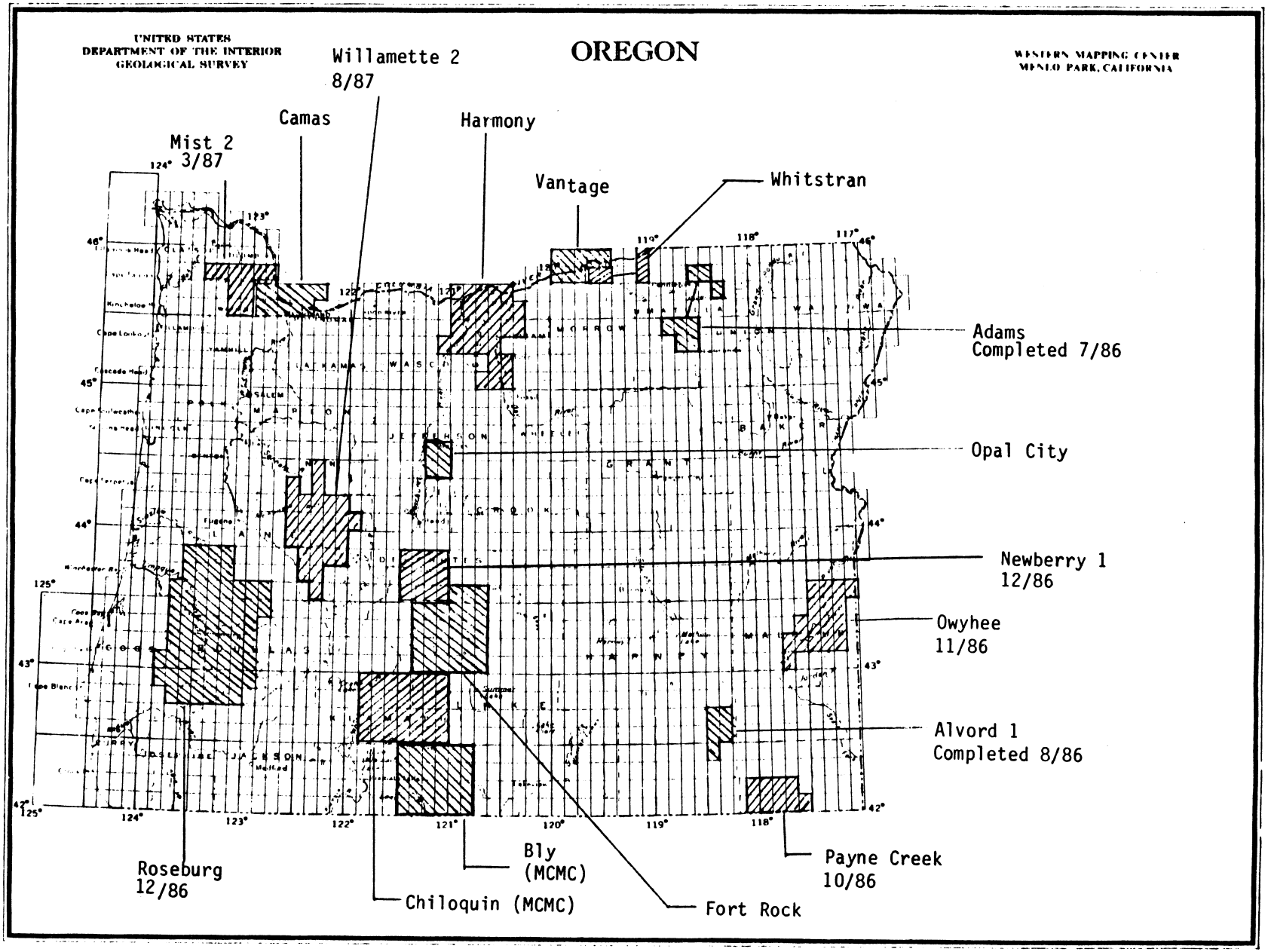
OREGON

WESTERN MAPPING CENTER
MENLO PARK, CALIFORNIA

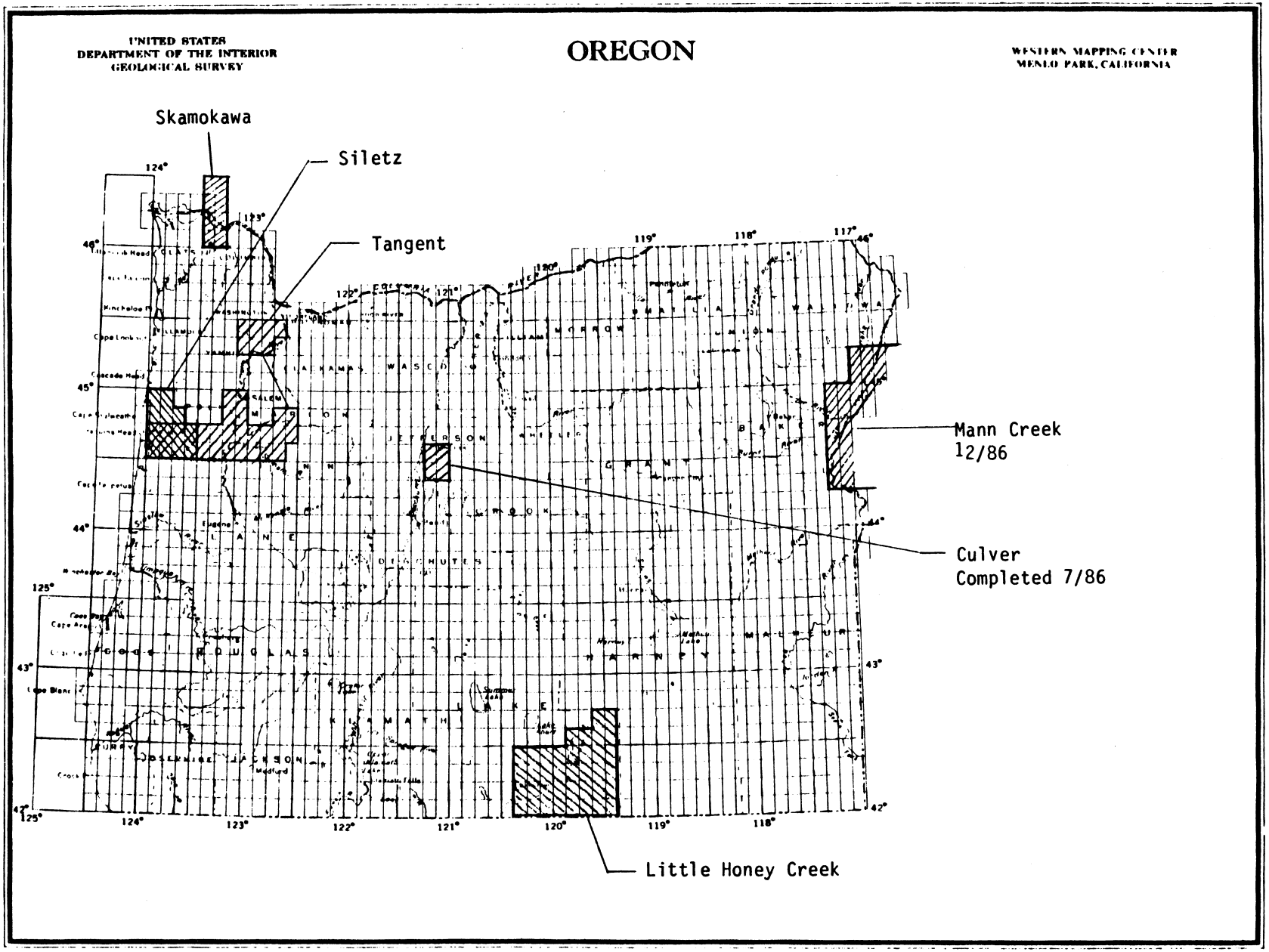


H/R = High Resolution

CURRENT DEM PROJECTS



CURRENT DLG PROJECTS



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