

The Center Scene



The real anglers are Laura Foster, 2, and Evan Nelson, 2½, while the kibitzers are, from left, Becky Foster, Jan Nelson, and Nancy Holt. Becky works in the Technique Development and Applications Branch. Jan and Nancy (Laura's aunt) work in the Technical Information Section.



Who can ever forget the thrill of the first catch? Evan has not only caught his first fish—he's caught fishing fever. Laura's expression clearly shows her mixed emotions about the slippery creature. (Photos by Bill Winn)

FISHING FOR FUN AT LAKE EROS

Phyllis Wiekping

Take one beautiful South Dakota summer day. Add a lake full of fish, two little fishermen (generically speaking), a couple of moms and a proud aunt and you have a preview of the EROS "Fishing for Fun" program.

Early last summer, EROS entered into an agreement with the U.S. Fish and Wildlife Service to convert our man-made lake into a recreational fishing facility for EROS employees and their families. The lake was stocked with 2,500 largemouth bass fingerlings and 100 adult bass. More than 6,000 bullheads were removed from the lake in 1984; 3,147 additional bullheads were netted this spring to avoid overpopulation.

Lake EROS was constructed as a part

of the Data Center's chemical waste management program that includes an aeration pond, a settling pond, two polishing ponds and the holding lake. It complies with all Environmental Protection Agency requirements and was designed as a prototype for the future. If there were any doubts about the purity and safety of the water in the lake, the prolific bullhead population has laid those doubts to rest.

In order to improve the fishing potential, bullhead fishing has been opened to EDC employees and their families; families include children, parents, and grandparents. Bullhead fishing ONLY is permitted at this time. All bullheads must be retained. Woody Yaroch, EROS Administrative Officer, said, "Bass are not to be removed from the

lake. In the event that you catch one of these fish while bullhead fishing, you must return it to the lake. These are the seeds for our future recreational 'Fishing for Fun' management program."

Family fishermen must comply with Lake EROS fishing rules. Hours are between 7 a.m. and 7 p.m. on weekends and holidays. An EROS employee must accompany family members and the employee must register at the guard desk before entering the lake area. Fires and picnicking are prohibited in the lake area and the use of minnows for bait is forbidden. No swimming is allowed in the lake and motor driven boats are prohibited. A complete set of regulations may be obtained from the EDC Administrative Office.

EROS COOPERATIVE PROJECTS - FEDERAL MINERAL LAND INFORMATION SYSTEM

K.C. Wehde

(The third in a series on EROS cooperative projects.)

The Federal Mineral Land Information System (FMLIS) is a U.S. Geological Survey (USGS) project designed for rapid retrieval, display, and analysis of minerals information on Federal lands through the use of geographic informa-

tion system (GIS) technology.

Started in 1982, this project was developed by the USGS to assist land managers, policy makers, and others in responding to minerals policy questions. In the past, it was difficult to make timely policy decisions because of the lack of a single source from

which to draw the needed information. A GIS is a method whereby this information may be effectively and efficiently compiled, stored, manipulated and analyzed in one automated system.

The objectives of FMLIS are: (1) to develop a geographic data base con-

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UP FRONT

If all goes as planned, before the end of this year, a French Earth-observing satellite will be launched, providing direct, international competition with the U.S. Landsat system. Known as Systems Probatoire D'Observation De La Terre, or SPOT, this satellite is currently scheduled for launch on November 15, 1985.

If SPOT is successfully launched, it could become the only Earth resources observation satellite in operation in the late 1980's because Landsat 5 (launched in July, 1984) must exceed its three-year design lifetime if it is to provide image data up to the launch of Landsat 6. Since the final contract for Landsat commercialization has not been signed at this time (although it's expected very soon) it is doubtful that Landsat 6 will fly before 1989.

Key features of the SPOT system include a 20-meter ground resolution in three visible and near infrared spectral bands and a broader panchromatic spectral band with 10-meter resolution. This compares with Landsat's seven bands—six in the visible and near-infrared portion of the spectrum with 30-meter resolution and a thermal infrared band with 120-meter resolution. While Landsat data are vertically imaged, SPOT has the potential for off-nadir viewing. This provides the ability to "look" to one side or the other of the satellite ground track, thereby providing the possibility of revisit coverage of one to several days, a useful tool for monitoring localized phenomena, such as flooding, on a short timescale. Another important feature of SPOT is the acquisition, during successive satellite passes, of stereoscopic pairs of images.

The SPOT program was initiated in 1978 by the French government in cooperation with Belgium and Sweden, and is managed by the French Space Agency (CNES). SPOT data distribution will be carried out on a commercial basis by SPOT IMAGE, a French corporation, in concert with a network of regional receiving stations, licensed distributors, and SPOT IMAGE subsidiary corporations. One such subsidiary is SPOT IMAGE Corporation (USA), located in Washington, D.C., established to serve all U.S. customer orders for SPOT data, both domestic and foreign.

The Data Center will be actively involved with SPOT data when they become available. Research and development activities such as SPOT data characterization, linear-array data evolution and processing, off-nadir and stereo data processing, stereo model development, and disciplinary applications research will be conducted. SPOT data will be utilized in various EDC project and program activities, in-

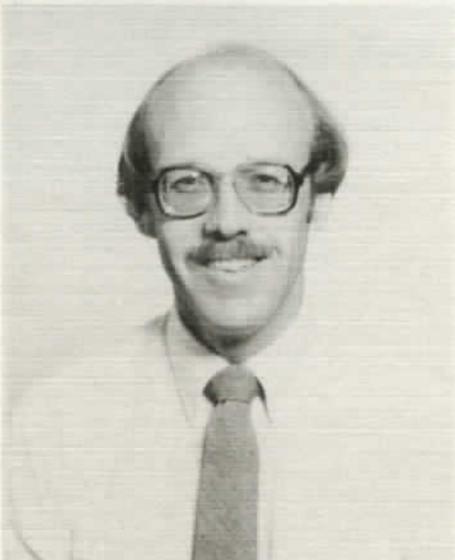
cluding the production of image maps. In addition, discussions are under way to establish roles for EDC in archiving selected SPOT data, facilitating Federal user acquisition of SPOT data, and providing specialized SPOT data processing and product generation services to Federal users.

The French SPOT system is the first of several major foreign Earth remote sensing programs on the horizon. The future of satellite remote sensing may well rest on international cooperation in obtaining scientific data from Earth-observing satellites. It is an "expensive" technology, and in all probability, no one nation, or commercial entity, can afford to continue to supply all needed data and simultaneously continue required technological advances. A "world Earth observation systems" organization may be the future mechanism for this cooperation.

The years ahead hold great promise for a significant expansion of remote sensing programs and activities worldwide, and the EROS Data Center will continue to play a prominent role in this exciting future.

Allen H. Watkins

LARRY PETTINGER: OUR MAN IN WASHINGTON



Phyllis Wiepking

Most of our EDC employees are well aware that we have associates in a field office in Alaska, but many may not know that one of our staff members is located "back east."

Larry Pettinger, Our Man in Washington, serves as a link between EDC and the National Center in Reston. His responsibilities include coordinating, reviewing and appraising interagency agreements and providing data for documents and reports such as capability statements and EROS budget

justification documents. He also is involved in providing information to the Survey's report process for remote sensing and geographic information systems.

In addition, he serves as liaison between EDC and other parts of the Survey. In this capacity he participated in the International Remote Sensing Coordination Committee and provided NMD contributions. He also provides information for Congressional testimony on remote sensing and such issues as Landsat Commercialization.

Another area of responsibility is interagency coordination. Larry shares technical and policy information with other Department of the Interior and remote sensing contacts. He represents NMD and the USGS on the Interagency Committee for the United Nations Commission on Peaceful Uses of Outer Space and prepares background papers on remote sensing within the Survey and the Department. A current project is an ad hoc interagency committee which is attempting to develop policies for acquiring SPOT data that will be advantageous to Federal users. SPOT is the Earth surveying satellite that France will soon launch. He served on the Technical Advisory Committee of the Source Evaluation Board that developed the Request for Proposals for Landsat commercialization and later evaluated the proposals.

Larry says that his job is interesting and challenging. "Sometimes I feel that it's difficult to keep up with EDC and what's going on there on a day-to-day basis. I don't travel back as often as I'd like to, and communication by telephone isn't always ideal. However, I do participate by telephone in the EDC Senior Staff meetings, and I have frequent meetings with EDC staff who travel to Reston." Larry attends NMD staff meetings and is a contact in Reston for inquiries about EDC.

He worked for Earth Satellite Corporation in Washington before accepting a position with Technicolor Government Services at EDC in 1975. He served as supervisor in the Training and Assistance Section and, later, as supervisor of the Bioscience group in the Applications Branch. He joined the USGS staff at EDC as a remote sensing scientist in the fall of 1981, later transferring to the EROS Program Office in Reston where he served as Bioscience Coordinator. The need for an EDC liaison position in the National Center was recognized when the Program Office was closed. Larry accepted that position, Special Assistant to the Chief, EDC.

He and his wife, Connie, live in Reston within walking distance to his work—"when I'm ambitious," he said. Connie is Executive Director of the

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taining information on surface and subsurface ownership, restrictions to mineral development, and mineral occurrence and potential for Federally owned and/or managed land, (2) to develop procedures for assessing and analyzing data in the data base, (3) to establish agreements with appropriate Federal agencies for entering and maintaining data in the GIS, and (4) to implement procedures for a fully operational system in FY 1986.

Several pilot projects have been developed, two of which are still under way, to test and document the concepts of the FMLIS. The first, a 1:250,000-scale quadrangle area in Medford, Oregon, was selected because data were readily available. The Bureau of Land Management (BLM) supplied Federal land surface and subsurface ownership data, as well as data on mining restrictions and withdrawals. The USGS Geologic Division supplied mineral potential and occurrence data via the Conterminous United States Mineral Assessment Program and the Mineral Resources Data System. The USGS National Mapping Division supplied base-cartographic data (roads and hydrography) in the form of 1:2,000,000-scale digital-line-graph data.

Policy questions on land management and mineral development were posed as a test for FMLIS. The EROS Data Center performed the work for the Medford pilot project using spatial data and the analytical capabilities of the Interactive Digital Image Manipulation System. This testing procedure was effective in demonstrating the viability of the FMLIS concept, which led to the development of a second pilot project in Alaska.

Research and development continues for FMLIS with the Alaskan project, which will be the first state to have complete data input into the system. The BLM has made arrangements to provide data from its Alaska Automated Land Record System. The USGS Geologic Division is preparing Alaska Mineral Resource Assessment Program studies, which cover 1:250,000-scale map sheets and Regional Alaska Mineral Resource Assessment Program data covering five regions within Alaska. The National Mapping Division has 1:2,000,000-scale base cartographic data available in digital form. The Alaska pilot project serves as the basis for further testing of FMLIS for a large region.

A third pilot project is under way, involving the development of a data base on the ARC/INFO geographic information system. The required FMLIS data sets of surface and subsurface ownership, mining restrictions, mineral data, and base cartographic data, all covering the Silver City 1:250,000-scale USGS

quadrangle, have been entered into ARC/INFO. Testing retrieval, display, and analysis requirements of FMLIS on this relatively new GIS is providing some of the critical information on which to base the FMLIS operational design.

As research and development of this interagency and interdivision cooperative project continue in response to the needs of Federal agencies, testing and documentation of the results will continue as well. It is hoped that FMLIS will provide a basic set of information which may be expanded according to user needs.

More information on this project may be obtained from Jim Sturdevant, Technique Development and Applications Branch.

FEDERAL WOMEN'S PROGRAM

Mary E. Holm, Director of the Sioux Falls College Center for Women and a National Certified Counselor, was the first speaker in the newly activated EDC Federal Women's Program. Mary described the mission of the Center for Women and explained a number of the Center's programs that are designed to provide information and assistance to women who are considering returning to college or seeking career direction or change.

Gail Hanson, EDC Federal Women's Program Coordinator, said that a monthly "Lunch and Learn" session is planned. Community resource persons will discuss such topics as time management, financial planning, women's history, legal assistance, insurance programs, etc., during the lunch period. Quarterly mini-workshops in related fields are also planned.

Suggested speakers and topics will be welcomed by Gail and her program committee, Kris Constant, Jean Paulson, and Phyllis Wiepking.

EDCEA PICNIC PLANNED

Terry Bobbie

The 1985 EDCEA summer picnic is scheduled for 1 p.m., Saturday, August 10, at the Data Center picnic grounds.

Your employees' association will furnish and serve hamburgers, hot dogs, baked beans, chips, and beverages at no cost to EDC employees and their families. To add variety and a great taste treat to the menu, we are asking that you bring your favorite hot dish, salad, or dessert to make the picnic into a fabulous potluck. Cups and napkins will also be provided; please bring your own plates and utensils.

There will be games and prizes for all ages. A short program is planned. Bring along blankets or lawn chairs and plan to have a lot of fun.

ADA - THE PROGRAMMING LANGUAGE FOR THE 80'S

S. Jean Paulson

The programming language, Ada, although a fairly large and complex language to learn, has advantages that are expected to make it the choice among programmers as the best computer language for the 80's and beyond. The EROS Data Center has purchased an Ada compiler from TeleSoft for the SUN workstation and has begun to evaluate the language for possible future use.

The development of the Ada language has been one of the most outstanding recent developments in the field of computer science. Its research and development was sponsored by the United States Department of Defense (DoD) during the late 1970's in an attempt to reduce the rapid cost escalation of military software systems. Studies showed that DoD was spending between 40 and 75 percent of its total computing budget on software, and that over half of that was directly related to the development and maintenance of embedded systems (those in which the computer is an integral part of a larger system). Further investigation determined that the problem was related to the programming languages being used.

While FORTRAN and COBOL were widely used for scientific and business programming, there was no accepted standard language for use in embedded systems development. Rather, each branch of the service used a different high-level language and many different assembly languages. To complicate the situation, many variants of these languages had been developed to suit the needs of individual projects. This required the development of a corresponding variety of compilers and additional programmer training, which in turn resulted in substantially higher costs.

In 1975, DoD formed the Higher Order Language Working Group (HOLWG) to establish a standard high-level language for use by the Army, the Navy, and the Air Force. The final version of the requirements contained about 100 specifications of data types, control structures, modules, tasks, and exception conditions together with more general directives concerning the readability, simplicity, and verifiability of the new language.

Using these requirements, the HOLWG then evaluated 26 existing languages and determined that none of them were suitable for use as the common language. They recommended that a new language be competitively designed using Pascal, Algol 68, or PL/I as a starting point. Consequently, DoD

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This is very serious business to Evan but Laura wonders why in the world anyone in his right mind would spend an afternoon sitting on rocks dangling worms in the lake. (Story on page 1)

(Ada - cont. from page 3)

issued a language design procurement in May, 1977, and of the 16 proposals received, four were funded for a six-month preliminary design period. During February and March of 1978 these four preliminary designs (coded Green, Red, Yellow, and Blue) were studied by approximately 80 different evaluators from universities, industry, and government. Two, Green, submitted by CII-Honeywell-Bull, and Red, submitted by Intermetrics, were selected for a year of further development.

In May, 1979, following more extensive evaluations, the HOLWG made the final choice and selected Green as the winner. It was named Ada in honor of Augusta Ada Byron (1816-1852) daughter of Lord Byron and Countess of Lovelace, for her work with Charles Babbage in programming his mechanical analytical engine. Several factors influenced the choice of the Green language including the fact that its design had been more stable and it provided better support for software engineering concepts such as separate compilation needed for building large systems consisting of many interdependent modules.

Ada is becoming popular for a variety of programming needs from operating system and compiler development to large applications programs. DoD is certainly not the only organization that has experienced a software crisis. Software projects are often behind schedule, over budget, or unreliable and their life-cycle maintenance costs often exceed the original development costs.

The problem is more complicated if it becomes necessary to move the software to a different computer system, since extensive modifications may be required due to differences in the computer architecture, operating system environment, or languages available. Ada addresses these issues by supporting the software engineering concepts that attempt to reduce the complexity inherent in many large software systems.

Software engineering is a discipline that emerged during the 1970's as the problems of designing, developing, and maintaining large software systems became more pronounced. It seeks to reduce the complexity that accompanies large software systems by partitioning them into smaller more manageable parts and defining how these parts interact. Programming languages that support software engineering concepts include features that promote modularization of programs and data and type abstraction. Modularization of large systems allows programmers to develop individual pieces of a system concurrently and independently. Abstraction is a method of featuring certain common or essential features of a collection of objects while hiding their dissimilar or unimportant characteristics. Thus abstraction can be used to reduce the complexity of a system by reducing the amount of information that must be dealt with at one time.

Software engineering attempts to solve the software crisis by providing

CHRISTENSEN FINDS SABBATICAL EXCITING

Harold Christensen, on sabbatical leave from Sioux Falls College, is enthusiastic about his transition from academia to the real world of computer technology.

"This is a terribly exciting experience. Everybody is very helpful and I'm having a wonderful time. It's been a long time since I've been able to concentrate so intensely on a single subject. I'm thoroughly enjoying the stimulation of the research and activities I'm involved in and the exciting things that are happening at EROS."

Christensen, Assistant Professor and Director of Computer Services at the college, described his feelings as he begins a one-year assignment with Computer Services Branch at EDC. Some of his duties this year will be to survey computer graphics needs and graphics software—especially standardized software, and then make recommendations.

His wife, Nora, was recently graduated from North American Baptist Seminary with a masters of divinity degree. They have two children, Hilary, 16, and Mike, 15.

tools to make software systems easier to develop and maintain. While Ada resembles Pascal, it contains many new features that should reduce software development and maintenance costs such as allowing separate compilation of program unit specifications and bodies and the concepts of packages, and generic tasks. These features allow software development projects to be organized for team programming since the interfaces between modules can be clearly specified. This reduces the need for interaction among team members. By defining a set of functions that provide a service to the calling module without making any of the implementation details visible, a package can be used to provide canned software building blocks that can be re-used without any modification.

With the support of DoD and the academic community, Ada is expected to become a standard language for all types of programming during the next decade. No previous programming language has been so thoroughly designed and evaluated or has enjoyed such widespread acceptance from industry. Ada is also the first programming language that uses a set of validation tests that each compiler must pass before it can use the name Ada to ensure the standardization of the language. A number of books on Ada are currently available from the Data Center's Technical Reference Unit.

EMPLOYEE NEWS

WELCOME ABOARD

K.C. Wehde

Mark W. Barber, from South Sioux City, Nebraska, joins the Technical Information Section. Mark has a bachelor's degree in journalism from the University of Nebraska, Lincoln, and is currently working on a master's in journalism from South Dakota State University. Mark was a radio/TV editor for the Office of University Relations at SDSU. He enjoys watching and participating in organized sports activities. His wife Melissa (Misty) has a degree in Child Development and is employed by Tiny Tot Day Care, Brookings.

Stephen M. Howard, previously a remote sensing analyst with the Idaho Department of Water Resources, joins the Center as a scientist in the Bioscience Applications Section of the Technique Development and Applications Branch. Steve, who has attended South Dakota State University, Brookings, and State University of New York, Albany, holds an associate degree in forest technology, and bachelor's and master's degrees in geography. Steve, his wife Linda, and children Kyle, 5, and Daniel, 3, are from Dell Rapids.

Carl Markon is a bioscientist in the Alaska Field Office, Anchorage. A graduate of the College of Forestry, Anchorage Community College, and the University of Minnesota, St. Paul, Carl holds an associate degree in wildlife biology and a bachelor's degree in forest resource management. Previous experience includes seven years as a Natural Resource Specialist with the U.S. Fish and Wildlife Service. From Superior, Wisconsin, Carl enjoys swimming, running, hunting, and weight lifting.

Cynthia A. Paggett, from Sherman, joins the Photographic Laboratory after 1½ years at Qualitone Photo. Cynthia has two daughters and she states, "...that is enough of a hobby for me to take care of."

Stephen P. Pringle, a scientist at the Alaska Field Office, was previously employed as Manager of Information Systems at Continental Forest Industries, Savannah, Georgia. Steve was also a summer hire at the Data Center in 1981. He attended Virginia Tech., Blacksburg, Virginia, where he received bachelor's and master's degrees in forestry. From Fairfax County, Virginia, Steve and his new wife, Karen, who is also a forester, enjoy backpacking, canoeing, and love Alaska.

Bryan S. Rieger, a graduate of Augustana College, Sioux Falls, with a bachelor's degree in computer science, is a programmer in the Software Development Section of the Computer

Services Branch (CSB). Bryan, his wife Deb, and daughter Stephanie, are from Sioux Falls. Bryan enjoys bicycling, reading, and fishing.

Charles W. Smith joins the Technical Information Section as an illustrator. Charles is a graduate of Southeastern Area Vocational Technical Institute with a certificate in advertising design. He has also completed a bachelor's degree in psychology from Augustana College. Charles, his wife, Jamie, and stepson, Brandon, are from Sioux Falls.

Sandra K. Stansbury joins the Photographic Laboratory after 10 years as a Darkroom Technician for McKennan Hospital. Sandra has completed Kodak Processor School in Sioux Falls and attended Barber College; she also has been a Cardio Pulmonary Resuscitation instructor for seven years and an Emergency Medical Technician for five years. Sandra is married and has three sons. She enjoys softball, basketball, cooking, and playing bingo.

Karen M. Zaner, Freeman, joins the Data Center as a programmer in the Scientific Software Group of the Software Development Section, CSB. Karen is a graduate of Augustana College with a bachelor's degree in computer science. Karen has worked at the Data Center on a part-time basis as part of the Survey's government student program.

STUDENT EMPLOYEES

Ten Technician summer hires are on board at the Data Center and the Alaska Field Office. **Nancy Bradwisch** joins the Computer Services Branch in the Production Control Section assisting with the Tape Library. From Sioux Falls, Nancy attends the South Dakota School of Mines and Technology, Rapid City, majoring in mechanical engineering and math. She enjoys tennis, swimming, and fishing. Data Management welcomes **Jon Kragt** from Rock Rapids, Iowa. Jon attends the University of Northern Iowa, Cedar Falls, where he is working on a bachelor of arts degree in geography. Jon enjoys fishing, skiing, canoeing, tropical fish, and science fiction. **Bill Waltz**, from Dell Rapids, returns to the Logistics Section. Attending the University of South Dakota, Vermillion, Bill has completed a bachelor of science degree in chemistry and biology. He is currently working on a master's degree in physiology/pharmacology at the University's School of Medicine. Bill's latest hobby is golf. Also from Dell Rapids, **Kurt Doeden** joins the Photographic Laboratory. Kurt attends Hope College, Holland, Michigan, where he is working on a bachelor of science degree in physics.

Michelle Smidt, a summer hire in the User Services Section, is from Sioux Falls. She is working toward a bachelor's degree in communication disorders and elementary education. She will student teach in the fall and plans to continue her education with a master's degree in communication disorders. The Technique Development and Applications Branch welcomes five summer hires. **Kirsten Ortmeier**, from Sioux Falls, joins the Bioscience Applications Section. Kirsten attends South Dakota State University, where she received a bachelor of science degree and is currently working on a master's degree in geography. **Ken Schreuder**, originally from Kalamazoo, Michigan, joins the Geo-information Sciences Section. Ken received a bachelor of science degree in geology from Hope College, Holland, Michigan in 1983. He currently attends the South Dakota School of Mines and Technology, Rapid City, where he is working on a master's degree in engineering. **Jacquelyn Storm**, from Mitchell, joins the Technique Development Section. Jacquie is a Senior at Augustana College, Sioux Falls. Also joining the Technique Development Section is **Tony Davis** from Blair, Nebraska. Tony attends the University of Chicago where he is working on a bachelor of science degree in mathematics. The Alaska Field Office welcomes **Don Thornton**, who is attending the University of Alaska, Anchorage, and is working toward a bachelor of science degree in computer science. Don has also been a part-time employee for the Alaska Field Office assisting with various duties including the implementation of the Data Base Access System.

A CLIMATOLOGICAL SUMMARY OF SIOUX FALLS

Sioux Falls is located in the Big Sioux River valley in southeastern South Dakota. The surrounding terrain is gently rolling. Within a 100-mile radius, the land slopes upward 300 to 400 feet to the north and northwest, and slopes downward 200 to 300 feet to the southeast. Little change in elevation occurs in the remaining directions.

Cold air masses arrive from the interior of Canada; warm, moist air from the Gulf of Mexico; cool, rather dry air from the northern Pacific; or hot, drier air from the southwest.

Temperatures fluctuate frequently as cold air masses move in very rapidly. During the late fall and winter, cold fronts accompanied by strong, gusty winds drop temperatures by 20 to 30 degrees in a 24-hour period. Tempera-

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(Larry Pettinger - cont. from page 2)

Reston Interfaith Social Services Organization, a group that serves low and moderate income families in Reston. In addition to their busy professional lives, they find time to enjoy the beautiful historic sights in the D.C. area and even play a little golf.

When you're in the District, look up Our Man in Washington and let him know what's happening at EDC.

FIRST SURVEY COOPERATIVE STUDENT AT EDC

The EROS Data Center, the South Dakota School of Mines and Technology (SDSM&T), and Andrew Ingalls are all benefitting from EDC's participation in the U.S. Geological Survey's Cooperative Education Program.

Andrew, who attends SDSM&T, is the first EDC participant in that program, which is a blend of academic study and work experience.

The contractual agreement between the Survey and the School of Mines lists agency and institution responsibilities.

Andrew's selection was made by the Survey's Central Region staffing office. He was hired as a student trainee computer specialist in the Technique Development and Applications Branch. He will alternate semesters of work and study for the remainder of his college program.

The Federal Personnel Manual explains that, for the student, the program makes learning relevant, provides a realistic exposure to career opportunities and to a real work environment, broadens exposure to people, places and situations, and helps pay school expenses. For the college or university, it enriches curricula by expanding teaching resources and faculty knowledge, provides financial assistance to students who might not be able to attend school, and gives substance to counseling programs. For the employer, it permits selection for career jobs on the basis of proven performance and permits the employer to contribute to social goals by supporting education and providing work experience and income for tomorrow's generation of professionals, administrators, and technicians.

EDC is fortunate to obtain a student of Andrew's caliber. With a major in computer science and a minor in mathematics, he maintains a grade point average of 3.96. He also participates in the SDSM&T Master Chorale. Singing and golf are his hobbies.

EMPLOYEE AWARDS

Gary Nelson, Senior Electronic Field Engineer, and Terry Bobbie and Jerry Fischer, Electronic Field Engineers,

Computer Services Branch, received awards for their outstanding performances and successful efforts in the timely move of the EROS Field Office to the campus of the Alaska Pacific University.

Gary was recognized for his excellent leadership role in responsibility for coordination of the move of the computer systems and for assuring that involved EDC personnel were informed and aware of all job requirements.

Terry's citation recognized his dedication and expert achievement, particularly in the integration of the HYPERBUS network installation at the new facility.

Jerry was cited for capable assistance to Gary and Terry throughout the move and for his extensive work in the reassembly of the peripherals to the Interactive Digital Image Manipulation System.

Karla Sprenger received an award for outstanding performance as the National Cartographic Information Center (NCIC) Coordinator for EDC. Her citation noted her exceptional grasp of new technologies and her unique ability to represent the Data Center when dealing with users in NCIC field offices.

Gordon Strom, Supervisor of the User Services Section, was honored for his outstanding performance, dedication, reliability, and sustained tenacity of purpose that provided new leadership and direction to the User Services operation.

Steven Shivers and Gregory Durocher, Alaska Field Office, received special achievement awards for their outstanding contributions to the success of the Alaska NCIC Office.

Gregory's award recognized his role in the establishment of the Information Unit, his initiative in automating the data base and linking it to NCIC/Headquarters Aerial Photography Summary Record System data base, and for the rapport he has established between the NCIC Alaska office and other government and private agencies.

Steven was honored for his outstanding organizational ability in setting up and implementing procedures for customer accounting and for organizing aerial photographs in the NCIC Alaska office and more recently, for his achievements in the new Earth Science Information and Sales Office in Alaska.

(Climatological - cont. from page 5)

tures usually fall to 20 to 25 degrees below zero Fahrenheit several times each winter. Severe cold spells usually last only a few days. In 1936, from January 18th to February 22nd, daily minimums were well below zero and maximums did not exceed 17 degrees above zero.

The winter months of December

through February of 1978-79 were the coldest on record, averaging only 8 degrees. The record cold spell of 61 consecutive days below 32 degrees also occurred that winter from December 23rd to February 22nd. The warmest winter, 1930-31, averaged 10.3 degrees above normal.

Temperatures of 100 degrees above usually occur only about one in every three years, and will most likely happen in July. Summer nights are usually comfortable with temperatures falling below 70 degrees. The coolest summer was June through August of 1915 with an average temperature of 7.1 degrees below normal. The warmest summer was in 1936 with an average temperature of 6.9 degrees above normal.

The average date of the last freeze (32 degrees and below) in the spring is May 5th. The average first freeze in the fall is October 3rd, for an average growing season of 152 days. The latest dates of 32 degrees or below were June 7, 1897 and 1901. The earliest fall date of 32 degrees or below was September 3, 1974.

One or two very heavy snows usually fall each winter. Eight to twelve inches of snow may fall in 24 hours. There have been a few snows in excess of 15 inches. February 17-18, 1962 produced a 24-hour snowfall of 26.0 inches which is the only occurrence of more than 20 inches. Strong winds often cause drifting snow, and blizzard conditions may block highways for a day or so.

Southerly winds prevail from late spring to early fall with northwest winds the remainder of the year. Strong winds of 70 mph with gusts to 90 mph occurred on June 23, 1952.

Thunderstorms are frequent during the late spring and summer, with June and July the most active months. The thunderstorms usually occur during the late afternoon and evening with a secondary peak of activity between 2 and 5 o'clock in the morning. Some of the most severe thunderstorms with damaging winds, hail, and an occasional tornado pass through the area in June.

(Thanks to Howard Warriner and Bud Youngren, our NOAA associates, for providing the information on the Sioux Falls weather scene.)

JUDGES SCIENCE FAIR

Lawrence "Bud" Youngren, Assistant Landsat Production Program Manager, National Oceanic and Atmospheric Administration, served as a judge at the 31st Annual Eastern South Dakota Science and Engineering Fair held on the campus of South Dakota State University for junior and senior students from 24 area high schools.