NOAA REPORT

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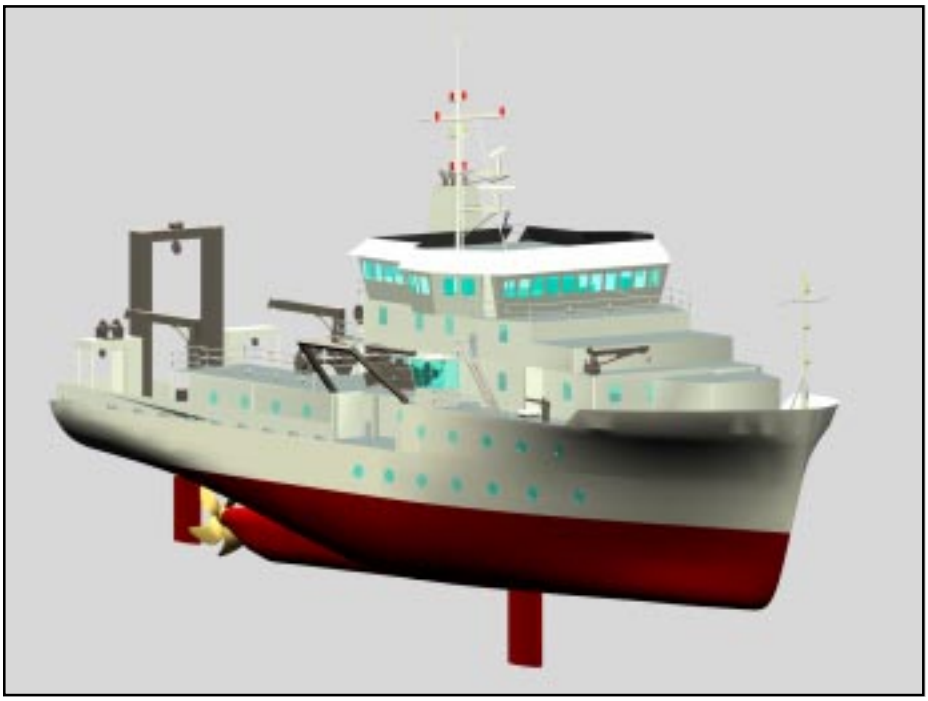

Paul Archibald/OAK Mgt.

A computer generated rendering of NOAA's new fisheries survey ship Oscar Dyson.

Construction Begins on New, Quiet Fisheries Survey Ship

—By Jeanne Kouhestani

Using acoustic technology developed for Navy submarines, NOAA's newest fisheries survey vessel will be able to approach fish so quietly that the fish won't be startled away.

That's the plan, at least, for a new fishery survey vessel that is currently under construction at Halter Marine, Inc., in Moss Point, Miss. Though ship keels have been replaced by modular-built hulls, a traditional keel-laying ceremony is scheduled for early September to mark the first major milestone of the ship's construction—moving the first module from the workshop and setting it up outside to begin assembly.

The ship, designated FSV 40, will be the first of four new fisheries ships that will either augment or replace aging ships in the NOAA fleet. It will operate off Alaska, its primary mission to monitor the Bering Sea and Gulf of Alaska ecosystems, particularly Alaskan pollock, the nation's largest, multi-billion dollar fishery. Though it won't be official until the ship is commissioned in 2004, FSV 40 already has a designated name—*Oscar Dyson*, after the late Alaska fishing industry leader.

Dyson has the distinction of

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Scientists Aboard NOAA Ship Brown Study Air Quality in New England

—By Barbara McGehan

On July 12, the flagship of NOAA's research fleet, *Ronald H. Brown*, left its home port in Charleston, S.C., to begin a month-long research cruise to New England to study air quality.

"With the combined capabilities of several NOAA research laboratories and our university colleagues, we have assembled the most complete package of atmospheric gas and particle sampling instrumentation ever deployed aboard *Ronald H. Brown*," said chief scientist Tim Bates from NOAA's Pacific Marine Environmental Laboratory in Seattle, Wash.

On board the ship were 32 scientists from three NOAA Research laboratories—the Aeronomy Laboratory and the Environmental Technology Laboratory in Boulder, Colo., and the Pacific Marine Environmental Laboratory—and university scientists, including those from NOAA's cooperative institutes at the University of Colorado, the University of Washington and the University of New Hampshire.

Understanding what's in the air that is transported to New England is essential to understanding the entire picture of air pollution in the region.

New England suffers from the

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NOAA Satellites Help Swimmers Avoid Sea Nettles

—By Patricia Viets

The annual summertime infestation of sea nettles, a type of stinging jellyfish, is in full force in the Chesapeake Bay. But boaters and swimmers now have a chance to avoid them, thanks to a team of scientists at NOAA.

The team is led by NOAA oceanographer Christopher Brown, who works in the Office of Research and Applications at the National Environmental Satellite, Data, and Information Service's facility in Camp Springs, Md.

"Sea nettle stings can ruin your day at the bay," Brown said. "While we can't eliminate the jellyfish, we can lessen the incidence of stings by letting swimmers and boaters know where they are likely to be, thereby avoiding [them] or maintaining caution while in those areas."

Brown and his team have developed a method to map the current locations where sea nettles, or *Chrysaora quinquecirrha*, are likely to be found. Hydrodynamic computer models and sea-surface temperature data from NOAA's polar-orbiting satellites can identify areas of moderate salinity and warm water. Because the sea nettles prefer these conditions, the scientists can predict where they are likely to occur.

The work is a team effort, Brown said, as the salinity fields are derived from a numerical circulation model run by Tom Gross of NOAA's National Ocean Service and Zhen Li, a contractor who works with Gross and Brown.

NOAA "nowcast" maps show the current likelihood of sea nettles in Chesapeake Bay and its major

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New Fisheries Ship

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being the first NOAA ship named by Congress, as the name was specified in appropriations language, along with its future home port, Kodiak, Alaska.

Its price tag will be more than $55 million when completed.

"Our plan to revitalize the fleet with replacement ships began in 1996, and we made it our first priority," said William Fox, director of the NOAA Fisheries Office of Science and Technology. "At the time, the NOAA fleet was under fire from Congress, universities and the inspector general not to replace them, to use existing ships, charters or university ships instead. But we put together a plan that showed that a mix of new and charter ships was the best and most cost-efficient option. The result will be four sister ships, a new generation of ships purposefully designed for the mission of NOAA Fisheries."

NOAA's fisheries ships have highly specialized capabilities, such as the ability to do oceanographic sampling at the same time they are sampling fish, that are not found in the fishing industry or university research fleets.

According to Fox, "Nobody in the private sector owns ships that can do our work better than the ships we're now using. Although we've tried very hard to find companies to build ships to meet our needs, NOAA's authority to lease is only five years, and we have 30-year requirements."

NOAA Fisheries has also been trying to convince UNOLS, the allied fleet of university ships, to build ships that meet NOAA's fisheries mission needs, but hasn't had any luck so far. NOAA's requirements are too specialized, and the universities appear to have other priorities, Fox said.

Oscar Dyson has been designed with capabilities that greatly exceed those found in current NOAA vessels. Most important is acoustic quietness, a feature that will enable it to monitor fish populations without affecting their behavior.

The new-generation NOAA ships not only will outclass fishing vessels worldwide, but will come the closest to meeting tough standards set by the International Council for Exploration of the Seas, a European-based organization that has developed a set of standards to optimize the effectiveness of fisheries research.

Another important capability is hydroacoustic technology, which uses sound waves to "see" fish on a computer screen. Scientists will use nets to bring up the fish they see on the screen to verify what they are seeing, and to determine "signatures" of different populations. Once they learn the signatures, the nets will be of secondary importance.

Unlike aged NOAA fisheries survey vessels, which are outfitted to target specific species, *Dyson* and its sister ships will also be able to carry a wide spectrum of gear, giving them maximum flexibility. If future missions require it, these ships can work off any coast in the United States and target the ecosystem of any fishery.

But that's still a long way off. Today, *Dyson* exists on computer screens at the shipyard and in pieces of metal being welded together inside the workshop.

Getting to this point has been a long process begun by NOAA Fisheries, which came up with its design requirements with the help of the U.S. Naval Surface Warfare Center's Carderock (Md.) Division and private contractors. The Carderock center specializes in ship quieting and test drives its prototypes in a model basin. NOAA's former Systems Acquisition Office

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Leslie Carnahan/NOAA
Paul Kirkwood.

Paul Kirkwood Is Employee of the Month for August

—By Ron Trumbla

Twenty six years ago, Paul Kirkwood stood at his bedroom window staring at his first Oklahoma hailstorm. The fascinated five-year-old watched softball size hail pounding into the ground until one large chunk smashed through his window showering him with glass fragments. He wasn't hurt, but he was hooked.

A year later, the youngster's growing fascination with weather took another leap forward when he witnessed a lightning strike that exploded a neighbor's chimney. From then on, he knew he would become a weatherman.

Kirkwood, NOAA's August Employee of the Month, is currently serving as chief of the dissemination enhancement team at the National Weather Service's southern region headquarters in Fort Worth, Texas. He was cited for his outstanding work in developing and implementing software designed to capitalize on the Weather Service's powerful new advanced weather interactive processing system, called AWIPS, and the associated interactive forecast preparation system, called IFPS.

"Paul is clearly the most innovative person I have ever met," said Steven Cooper, chief of the southern region's Climate, Water and Weather Division. That innovation came under the national spotlight when Kirkwood developed a unique system for archiving critical Doppler radar system data. A valuable functional support tool for AWIPS, the new system is also compatible with the Weather Service's weather event simulator. Its ability to absorb a full range of meteorological data, including surface and upper air observations, radar and model data, helps solve a critical training need.

"Paul is an example of how the initiative and contribution of just one person can make a significant difference," said William Proenza, director of the southern region. "His software development within AWIPS and its compatibility with the highly acclaimed weather event simulator make this excellent training tool even more valuable. His achievement provides all Weather Service field offices with a true weather event 'archiver' that will greatly benefit training and performance."

At the Weather Service forecast office in Norman, Okla., forecasters demonstrated the utility of the new system as a training and assessment tool when a recent storm system moved across Oklahoma. Never before possible, the new system allowed them to replay and review the model data and radar imagery even before the storms had left the state.

Kirkwood began his Weather Service career in Wichita, Kan., where he quickly saw the face of

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Jeff Miller/U. Wisc.
John J. Magnuson.

John J. Magnuson Is Team Member of the Month for Aug.

—By Crystal Straughn

John J. Magnuson, professor emeritus of zoology and director emeritus of the Center for Limnology at the University of Wisconsin-Madison, has been named the NOAA Team Member of the Month for August.

During the course of his career, Magnuson advanced the interface of science and policy on difficult fisheries and natural resource issues that are a critical part of NOAA's mission, including the protection and management of Pacific salmon, the conservation and protection of sea turtles and the global impacts of climate change.

Magnuson's contributions to Pacific salmon science, policy and management are good examples of the impact he has had on NOAA and on the advancement of marine and freshwater science. In the 1990's, Magnuson chaired a National Research Council com-

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Focus On...

Saving Springer

—By Brian Gorman

Kent Laborde/NOAA

After being rescued from Puget Sound, Springer the "killer whale" swims in her temporary home, a 40-by-40-foot net pen at the NOAA Fisheries Laboratory in Manchester, Wash. Biologists installed a 3-foot-high skirt around the pen to limit the whale's visual contact with humans.

Kent Laborde/NOAA

All clear! NOAA's Brent Norberg holds a guy line as Springer is carefully transferred to a holding tank aboard a waiting high-speed catamaran that will reunite her with her pod in Canada.

Human efforts to save stranded marine mammals are not often successful.

But the story of Springer, the young orphaned orca, or "killer whale," stranded in Puget Sound this past spring and summer, was a happy exception.

When the orca was first spotted in mid-January in Puget Sound just a few miles from downtown Seattle, Wash., her future looked bleak. It was clear she was off course. Worse, she was alone and in a location where killer whales almost never winter over.

Orcas are actually members of the dolphin family and are remarkably social, gregarious animals, staying with family members in a close-knit group called a pod virtually their whole lives.

By mid-February, both Canadian and U.S. scientists had confirmed the young orca belonged not to a group of killer whales that visits northern Puget Sound every spring and summer, but to a far more distant pod.

The Canadians had assigned an identifier to her, calling her "A73," from her pod designation and birth order in the 2000 season. Her mother had disappeared last year and was most likely dead. She had few close relatives in her pod.

Her health also raised concerns. According to Brad Hanson, a biologist with NOAA's National Marine Mammal Laboratory, who was making almost daily trips to check on her, A73 had a skin disorder that was changing her slick black-and-white appearance to mottled gray. She didn't seem to be eating very robustly and she had a strange odor to her breath.

In mid-April, Joseph Scordino, deputy administrator of NOAA Fisheries' northwest regional office, spelled out at a public meeting the agency's intention to "keep [A73]

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in the environment," even if she were captured, rehabilitated and moved to Canada to be reintroduced to her pod. A broad coalition of environmental and animal protection groups from the region supported this call.

On May 23, Robert Lohn, head of NOAA Fisheries' northwest regional office, announced that the agency would try the unprecedented by capturing the 1,200-pound whale, rehabilitating her in the nearby NOAA Fisheries Laboratory in Manchester, Wash., and transferring her to Canadian waters for release in the presence of her pod.

On June 13, Springer was held gently for a few moments with a rope around her tail and then gingerly lifted by a 12-foot crane while cradled in a fleece-lined full-body sling onto a waiting 65-foot landing craft for the short trip to Manchester.

Following a month of more blood tests to make sure the whale wouldn't introduce any novel diseases into Canadian waters, a dose of worming medicine to rid her of intestinal parasites and feedings of live salmon—as much as 60 pounds a day—Springer was pronounced fit and healthy by both NOAA Fisheries and its Canadian counterparts. She was ready to make her move.

On July 13, reporters, veterinarians, biologists, whale advocates and volunteers assembled on the 600-foot pier at Manchester at 5:30 on an overcast morning to watch an outsized crane lift Springer from her net pen to an 18-foot-long tank on the stern of a high-speed, jet-powered catamaran ferry for her expected 10-hour trip to Johnstone Strait.

At 6:50 a.m., with its new passenger on board, the 140-foot catamaran backed down from the float that had been the whale's home for a month, turned east and headed out of Clam Bay and then north through Puget Sound to British Columbia.

Kent Laborde/NOAA

Jeff Foster (right), the leader of the team that rescued Springer from Puget Sound, helps team member Greg Schorr drape Springer with wet towels to keep her cool in a special transportable tank.

Kent Laborde/NOAA

Springer is surrounded by a team that will monitor her throughout the 10-hour trip by high-speed catamaran from Puget Sound to her home waters in Canada.

In a repeat of her transfer to her Manchester net pen, A73 was lowered gently into a larger pen near Vancouver Island's Telegraph Cove about seven that evening.

The following afternoon, a large group of orcas swam nearby and began making familiar sounds.

Springer responded by vocalizing and slapping her tail several times in the water. After spending less than a day in her new pen, this two-year-old killer whale that had managed to win the hearts of millions of Canadians and Americans over the past six months was released. She hesitated just long enough to grab one last free salmon from her net pen and headed in the direction of her pod.

New England Air

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haze and humidity that are typical during long, hot summers along the East Coast.

"A review of air pollution episodes in New England suggests that blobs of polluted air often lurk in the Gulf of Maine during the summer months, causing high pollution levels in coastal areas," said James Meagher of NOAA's Aeronomy Laboratory. "The sophisticated instrumentation on board NOAA's research vessel gave us just the tools we needed to better understand the sources and fate of this pollution."

In addition to the heavily instrumented ship, data also were collected from a G-1 Gulfstream research aircraft operated by the U.S. Department of Energy's Pacific Northwest National Laboratory.

Tim Bates/NOAA

University of Virginia scientist William Keene, high in the NOAA Ship Brown's superstructure, changes a filter on instruments that measure the acidity of aerosols in the atmosphere.

During the first few days of the study, the ship traveled up the East Coast making stops in New York and Boston harbors to study the pollution exported from those cities into the marine atmosphere and to quantify emissions from the ship traffic around those ports.

The scientists had to adjust to working on a ship instead of in a laboratory or on a plane, where much of their previous field research had been done.

Donna Sueper, a professional research assistant with NOAA's Cooperative Institute for Research in Environmental Sciences in Boulder, Colo., said it took her about a day "just to get the lay of the land, to find out where supplies were, where the network drops were and to just get adjusted."

On July 19, the ship arrived in the Gulf of Maine and began a series of sweeps throughout the area to characterize the air pollution that is produced in the area or is imported from other heavily polluted areas of the East Coast.

The ship also cruised up the coast of Maine to the Canadian border to quantify the role of natural emissions from the abundant forests in the region in the formation of ozone and fine particles.

For the scientists, the cruise aboard *Brown* was a rare opportunity. Many of them had never been aboard a ship and found the environment very appealing.

"The neatest thing for me was to be able to walk 20 steps to go outside and there was a big ocean right in front of you," Sueper said. "I've never really experienced that before. So, while you were working all the time, there were little reprieves. There were always other ships, fishing vessels or recreational craft going by. There was always something to look at."

And there were lobster pots—everywhere.

"During the cruise, the navigators had a chore, and had to watch very carefully to navigate between them," she said.

On board *Brown* is a comprehensive suite of state-of-the-art instrumentation that allows the shipboard scientists to study the meteorology, chemistry and physics of the marine atmosphere to a degree that has not previously been possible.

An onboard wind profiler coupled with frequent balloon releases provided a wealth of information on the physical structure of the atmosphere above the ship. Other instruments examined nighttime chemistry, marine aerosols, vertical profiles of ozone and aerosol pollution.

Early results from the cruise were already in by the end of July.

"The New England Air Quality Study and the *Ron Brown* cruise in particular have generated some exciting new insights into the atmospheric processes that result in adverse pollution episodes in New England," Meagher said. "The comprehensive array of instrumentation for the characterization of marine aerosols has provided new insights on their composition and size. Also, the first-time deployment of a system for the measurement of nitrogen oxides has provided new information on the fate of nitrogen oxides during nighttime transport," he said.

The New England Air Quality Study continues through mid-August.

New Fisheries Ship

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put out a solicitation package in 1999. Halter Marine developed a detailed design and won the contract.

The fisheries survey vessel program became the responsibility of the Office of Marine and Aviation Operations last year. The office hired Geoffrey Fuller as program and acquisition manager. Fuller, who came to NOAA from the Advanced Marine Center of Computer Sciences Corporation, found a great deal more to *Dyson* than he had expected.

"When I first came in, I was impressed with the complexity of the 'fish boat' design. It's an extremely sophisticated research platform. It will accommodate scientists who will be deployed for weeks at a time. The labs and sonar systems are unbelievable. Fishing gear is state-of-the-art, as are the oceanographic research equipment and quieting acoustics. It's really a phenomenal package," Fuller said.

Fuller gets a kick out of taking cyber-walks through the ship, courtesy of the computer aided design tools being employed at the shipyard.

"It's fascinating. They'll walk you into the engine room and they'll say, okay, let's go down into the double bottom. They'll drop through the steel tanktop and you'll look around and see the arrangement of all the piping in that region. It's all done on screen," he said.

According to Fuller, the ship is being built in modules under cover, out of the weather. When the modules are ready to be joined, they're taken outside. Most of the specialized equipment is installed as the appropriate module is built.

"The keel laying is the first step in putting the modules together," Fuller said. "When you finish [assembling the modules], you have a completed ship."

The other major milestones will be the launch in 2003 and the commissioning in mid-2004.

Making sure the ship operates properly is the next big hurdle to cross. Fuller said that any new ship has to go through a shakedown period. "It's supposed to work a certain way," he said, "but things rarely go precisely according to plan. The biggest challenge is getting the mission equipment to work, and seeing how the trawl will run. We'll conduct sea trials, test the acoustics, measure how much noise the ship makes, and so on, before we take delivery," he said.

Following delivery, the Office of Marine and Aviation Operations is planning a short shakedown period.

Where Dyson will be docked in Kodiak is still undetermined. City officials want the ship at its commercial pier downtown, and are willing to widen the entrance and dredge the harbor to accommodate the 208-foot ship. The U.S. Coast Guard facility at Woman's Bay is another possibility.

According to Fox, *Dyson* will greatly improve NOAA Fisheries' ability to provide data to the area fishery management council, which uses the information to regulate the industry.

"Ships are the lynchpin of the science that goes into fishery management," Fox said. "With the *Dyson* and upcoming new ships, we'll get more days at sea, with less down time. The ship will collect more data, as it goes faster and covers more area per day. The hydroacoustic technology will enable us to 'see' much farther out into the ocean per track line; we expect a 50-percent improvement in those data. Also, the new quieter technology will enable NOAA to move way ahead in this component of the Coastal Ocean Observing System," Fox said.

Sea Nettles

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tributaries, such as the Susquehanna and Potomac Rivers. These maps are updated every Friday and placed on a Web site, which provides the data on sea nettles as well as a forum for comments. Brown uses the feedback he has received to make the material more understandable to the user community.

Recently he received an e-mail message from a sailboat owner who said he was "delighted to find a [nettle] probability map and put it to use this weekend. After turning tail from the bottom of the Choptank on June 29 (always a nettle wherever you looked), we checked your map and trailered the sailboat to Claiborne, Maryland, on July 2. The bay was nettle-free all the way to the Western Shore and back, except for a sting outside Claiborne."

Brown and his colleagues will add other variables known to affect sea nettle concentrations, such as wind speed and depth of the water. Eventually, they hope to predict the effect of climate change on sea nettle concentrations by analyzing the effect of that change on the specific variables relevant to the nettles. Extending the technique to other organisms will be more difficult, they note, because other factors, such as nutrient concentrations, would have to be taken into consideration, and those are not as easily monitored on a continuing basis.

Once the maps illustrating the current likelihood of nettle presence in the bay are validated, Brown would like to steer the sea nettle program from research into operations. For the future, he would like to use the same concept to produce nowcasts of harmful algal blooms, such as *Pfiesteria*, in the Chesapeake Bay.

Magnuson

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mittee on the protection and management of Pacific Northwest anadromous salmon. The committee's report, "Upstream: Salmon and Society in the Pacific Northwest," synthesized scientific knowledge about salmon and provided major recommendations to achieve their long-term protection and recovery. Since its publication, the report has provided important direction to the Pacific salmon debate and the recovery actions being implemented by NOAA Fisheries and other agencies in the Pacific Northwest.

Magnuson also chaired a selection committee for the independent science advisory board established by NOAA Fisheries and the Northwest Power Planning Council to provide independent scientific advice and recommendations on issues related to regional fish and wildlife recovery programs.

More recently, Magnuson served on a NOAA Fisheries committee to select members for the recovery science review panel that guides the salmon recovery planning process throughout Washington, Oregon, Idaho and California. As a consequence of Magnuson's efforts, scientists of the highest caliber are members of both panels.

"John is a renowned researcher who also happens to be a tireless advocate for natural resources," said Usha Varanasi, director of NOAA's Northwest Fisheries Science Center in Seattle, Wash. "He is a truly remarkable person; he is a great teacher that has both a sense of humor and appreciation of diverse viewpoints. These traits have made him an invaluable asset to NOAA Fisheries and everyone who has worked closely with him. He exemplifies everything a NOAA team member should be."

In addition to his work with Pacific salmon, Magnuson has produced outstanding research on tuna swimming behavior, studied the role of isolation and extinction on the formation and existence of fish communities and researched the influence of climate change on fish. He has chaired a number of National Academy committee reports related to fisheries. These have covered issues of sea turtle conservation and shrimp fishing in the southeast, assessment of bluefin tuna in the Atlantic and redrafting the Fisheries Management and Conservation Act of 1976.

He has also served as a writer on the 1995 and 2001 Intergovernmental Panels on Climate Change, analyzing, synthesizing and writing sections on impacts to freshwater ecosystems.

Magnuson's hard work and commitment to NOAA have not stopped his tireless work with his students at the University of Wisconsin-Madison, where he has mentored many graduate and undergraduate students in the area of aquatic ecology.

"I have enjoyed being in the field with them, watching them develop from the new student in the laboratory to a strong, capable and knowledgeable colleague in the short years of their academic careers," Magnuson said. "I have two remaining Ph.D. students to see through their degree programs and enjoy mentoring research of the bright undergraduates we encounter."

Magnuson said he is most pleased with being NOAA Team Member of Month. "I began my professional career with the predecessor of NOAA Fisheries, the Bureau of Commercial Fisheries, at the Honolulu Biological Laboratory studying tuna behavior," he said. "Ever since, I have always had a warm place in my spirit for the issues of fisheries and rational management and conservation, based on information and knowledge. I appreciate NOAA's recognition primarily because my colleagues there, through this, express that they appreciate my contributions."

Kirkwood

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the future. "I got caught up the modernization as soon as I started in Wichita," he said. "We had two computers and we were one of the first sites to have operational AWIPS. So, I've been working with AWIPS since its first deployment in field offices."

Kirkwood is currently devoting most of his expertise to the interactive forecast preparation system. He was instrumental in mapping the path the Weather Service would take in implementing the system in its field offices.

He believes NOAA's National Weather Service is just beginning to travel that path. "We still have a long way to go, but with AWIPS and IFPS software we'll be able to give users exactly what they want. If they ask us for it, we can do it. I think that's where we are heading in the future."

Kirkwood and his wife, Mindy, live in Saginaw, Texas, with their daughters, Cheyenne and Sierra.

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