U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

# noaa week

Volume 4 Number 17

April 20, 1973

National Climatic Center
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## Sea Grant Team Recommends Superport in Louisiana

A team of marine specialists from Louisiana State University has recommended that the state start work immediately on the Nation's first superport west of the mouths of the Mississippi River, but cautioned that effective environmental safeguards must also be established against accidental oil spillage and onshore development associated with the superport.

The port, capable of receiving ships with a minimum dead weight tonnage rating of 200,000 and drafts up to 90 feet, would be constructed initially to import crude oil and gas to Louisiana refineries to help alleviate the growing shortage of these resources.

The LSU researchers were sponsored by the privately-supported Louisiana Superport Task Force and, in part, by a NOAA Sea Grant. Their recommendation that the state create an agency to deal specifically with superport problems was carried out during 1972, when the State Legislature created the Louisiana Deep Draft Harbor and Terminal Authority.

(Continued on page 6)

## Solid-Particle Air Pollution Not Spread Over Oceans

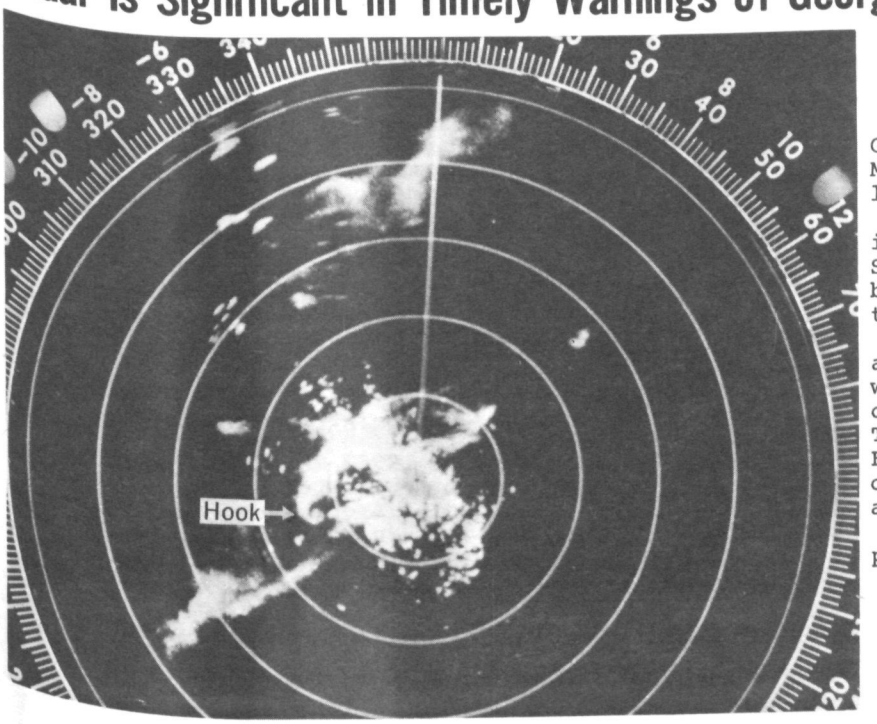
Except for "downwind" areas extending over the oceans from industrial centers, man-generated particulate pollution has not yet affected the atmosphere over most of the global ocean, according to an Environmental Research Laboratories scientist.

Further, as regulations to reduce the output of solids and some gaseous precursors of aerosols are strictly enforced and begin to become successful, the concentration of these pollutants in the "downwind" areas should begin to decline and the contribution to global climatic changes caused by particulate pollution in the lower atmosphere could become insignificant. The same statement, however, may not be true for the effect of gaseous pollutants, which are emitted by the same pollution sources.

William E. Cobb, a research meteorologist with the Atmospheric Physics and Chemistry Laboratory, bases these conclusions on a comparison of concentrations of aerosols--suspended solids--determined from measurements of atmospheric electrical conductivity made more than half a century apart.

(Continued on page 6)

## Radar Is Significant in Timely Warnings of Georgia Tornado




A tornado struck the Athens, Ga., area on the evening of March 31, 1973, taking two lives and causing heavy damage.

Timely and accurate warnings issued by the National Weather Service Office at Athens were based largely on radar observations.

The WSR-57 radar observer at Athens tracked the storm with its associated hook echo continuously from 6:15 to 6:58. This photo was taken at 6:40 EST. The range markers (concentric circles) are spaced at 10 nautical mile intervals.

North is at the top of the photo.

# ERL's Research Flight Facility Has New Acting Director

Dr. James D. McFadden has been appointed Acting Director of the Environmental Research Laboratories' Research Flight Facility, succeeding Howard J. Mason, Jr. Commander Robert L. Sandquist has been named Deputy Director.

The RFF, based at Miami, Fla., International Airport, operates and maintains aircraft equipped with special instruments for oceanographic, atmospheric and environmental studies. The aircraft are also used in weather modification research.

Dr. McFadden, a research meteorologist who was formerly Chief of the RFF Data Management Branch, has been a NOAA employee since 1965. He was assigned to the Miami Laboratories in 1967, and joined the flight facility in 1968. He received his bachelor's degree in geology from Virginia Polytechnic Institute and State University and his Ph.D. in meteorology from the University of Wisconsin.

Commander Sandquist was appointed to the Commissioned Corps in 1959 after graduation from Colorado State University in Fort Collins. His assignments aboard various NOAA Ships included service as Executive Officer of the RAINIER. Since completing flight training at the Army Aviation School in 1962, he has served two tours of duty with RFF--the first as a DC-6 pilot from 1965 to 1967, and the current one beginning in 1970.

## NOS Field Party Completes Louisiana Survey

A 20-man National Geodetic Survey field party headed by Lieutenant John C. Albright has completed a 15-month survey of more than 2,400 square miles in southern Louisiana, including New Orleans.

The $250,000 survey, carried out in cooperation with the state, is part of a long-range program in which over 15,400 square miles of the state have been surveyed since 1968.

The cooperative program is designed to provide geographic positions of latitude and longitude at points spaced every three to eight miles throughout Louisiana. The survey data will provide a basis for accurately determining land boundaries, mapping natural resources and aligning public utilities.

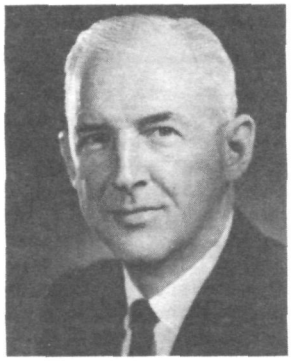
## ALBATROSS IV Engaged in Groundfish Survey

The ALBATROSS IV, a fisheries research vessel assigned to the National Marine Fisheries Service's Northeast Fisheries Center at Woods Hole, Mass., is at sea on her sixth consecutive spring survey of groundfish stocks of the North Atlantic Continental Shelf. Groundfish are those species such as haddock, cod, flounder, hake, and pollock, which spend much of their adult lives on or near the ocean floor.

Federal fisheries research is the responsibility of the NMFS.

# John S. Gottschalk Retires As Assistant to NMFS Director

John S. Gottschalk, who for the past 2 1/2 years has been Assistant for Sport Fisheries to the Director of the National Marine Fisheries Service, is retiring on April 28. His 28 years of Federal service included 25 with the Interior Department's Bureau of Sport Fisheries and Wildlife, the last six as Director.



He has accepted the position of Executive Vice President of the International Association of Game, Fish and Conservation Commissioners, an organization with offices in Washington, D.C., primarily serving the interests of State and Canadian Provincial fish and game agencies.

Educated at Earlham College and Indiana University, he was with the Indiana Department of Conservation for 11 years before entering the Federal service.

## 1973 Tidal Current Chart Diagrams Issued

The National Ocean Survey has published the 1973 edition of "Tidal Current Chart Diagrams for Block Island Sound and Eastern Long Island Sound Tidal Current Charts and Long Island Sound and Block Island Sound Tidal Current Charts."

The set of 12 monthly diagrams constitutes a simplified method for calculating the speed and direction of tidal currents in bays, estuaries, and harbors, which anyone utilizing the tidal current charts for navigation or determining the water circulation can quickly learn to use.

The diagrams eliminate the need to make computations by the method described on the inside of the tidal current charts, which, while still valid, is time-consuming and may lead to error.

The set of diagrams, which were developed by Demetrio A. Dinardi, Acting Chief of the Tidal Current Section of the NOS Oceanographic Division's Oceanographic Surveys Branch, can be purchased for $2. They are available from the National Ocean Survey Distribution Division (C44), 6501 Lafayette Ave., Riverdale, Md. 20840, or from authorized sales agents at marinas, yacht basins and other areas catering to mariners.

## Newsletter Features Estuary Research

The February, 1973 issue of Outdoor America, the newsletter of the Izaak Walton League of America, presents as its centerfold feature an article entitled, "Estuaries--Ugly Ducklings and Graceful Swans," which deals with competition, conflicts, and pressures in our estuaries. The article was authored by Bill Wick, Head of the Oregon State University Marine Advisory Program and Coordinator of the Pacific Sea Grant Advisory Program.

# New Baltimore VHF-FM Station Begins 1,000 Watt Transmission

Continuous broadcasts of weather information to serve Eastern Maryland began operation on April 18 from the Baltimore Weather Service Office's new VHF-FM radio station KEC83. The 1,000-watt transmitter, located in downtown Baltimore, is the first of the more powerful transmitters to be installed by the NWS. It transmits on 162.40 megaHertz 24 hours a day.

Twenty-two Federal, state, and local officials or their representatives attended the dedication for the new service, which was held at the WSO at Friendship International Airport on the 18th. NOAA Associate Administrator Dr. John W. Townsend, Jr., was the principal speaker, and other speakers included: Karl R. Johannessen, Associate Director of the NWS for Meteorological Operations; Carl Sattler of the Maryland Department of Transportation, speaking for Governor Mandel; and Thomas LaCosta of the Baltimore City Office of Civil Defense, speaking for Baltimore Mayor Schaefer.

*Dr. Townsend and Ms. Johanna Malachin of the staff of Representative Marjorie Holt of Maryland's 4th District, cutting the ribbon at the dedication ceremony.*

The Baltimore transmitter is part of a complex of broadcast stations that will service the Maryland-Delaware coastal area, Eastern Virginia, Chesapeake Bay, and the Greater District of Columbia area, and of the larger expanding network of more than five dozen stations across the country.

Since the new transmitter provides coverage of approximately 40 to 50 miles, the antenna for VHF-FM radio station KHB36, about 15 miles east of Washington, D.C., at Davidsonville, Md., in operation since 1967, has been reoriented to improve reception to the west and south of Washington. A third transmitter will be activated on the shore of Chesapeake Bay at Eden, Md., within a couple of months.

## Survey of 55 Great Lakes Harbors To Begin

The Lake Survey Center's Revisory Section personnel will spend five months beginning April 30 surveying over 55 Great Lakes harbors to acquire data to update nautical charts for commercial, as well as recreational boaters. The party, which will use the 54-foot, electronically-equipped LAIDLY, will work in Lake Erie, Lake Ontario, and the New York Barge Canal. Data recorded during this trip will appear on nautical charts for the next boating season.

# Scientists Use Acoustic Sounder To Study Rocky Mountain Winds

An acoustic echo sounder, which detects atmospheric temperature inversion layers that sometimes trap pollutants in cities, is helping scientists understand the damaging high winds that strike the east side of the Rocky Mountains.

It may also help planners avoid placing industrial plants--such as the potential Colorado oil shale processing plants--in mountain areas where atmospheric conditions would make pollution episodes likely.

The mountain sounder, which is likened to an atmospheric sonar system, was engineered by J.W. Wescott. The data will be analyzed by meteorologists Dr. D.W. Beran and Dr. Freeman Hall of the Environmental Research Laboratories' Wave Propagation Laboratory, in Boulder, Colo. Dr. Douglas Lilly of the National Center for Atmospheric Research, also in Boulder, suggested the installation, and is working with the two NOAA scientists on airborne wind measurements and the theoretical aspects of mountain winds.

The device is basically a horn, or loudspeaker, which emits periodic beeps, straight up into the atmosphere from near Fraser, Colo. When the sound waves encounter the turbulence associated with an inversion layer, they are scattered in all directions--including back to the original loudspeaker unit.

The backscattered sound is then recorded on a facsimile graph, which shows patterns of heavier lines in the region of the atmosphere where an inversion layer exists. The equipment at Fraser can detect echoes at considerably greater altitudes than the earlier, less powerful, sounders used by the same scientists to measure Denver pollution-trapping inversions. It gives readings from as high as the Continental Divide and occasionally higher.

The current experiment at Fraser is a preliminary feasibility study, and Dr. Beran and Dr. Hall plan next winter to install a doppler sounder which will provide a vertical profile of the winds associated with the inversion.

## Fourth Underwater Mining Institute Held

Marine scientists and engineers from the United States and abroad attended the Fourth Underwater Mining Institute at the University of Wisconsin-Milwaukee last week. Interest focussed on the search for and recovery of manganese nodules from the ocean floor. These irregular lumps of metal are rich sources of cobalt, copper, and nickel, and may constitute an invaluable mineral resource.

The Underwater Mining Institute has gained worldwide recognition since its inception in 1969, and is a product of the University of Wisconsin Sea Grant Program's advisory services to marine-related industries.

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*April 22 - 28 is National Secretaries Week.*

# Retirement

This is the second in a series of articles dealing with retirement benefits. The first article discussed Government service creditable toward retirement. This article will treat the computation of annuities. Subsequent articles will explain the types of retirements available and specific retirement benefits. Questions relating to these articles should be directed to servicing personnel offices.

The amount of annuity payable depends primarily upon length of service (including credit for unused sick leave) and the high-three year average pay. Other considerations which enter into determining annuities include annuity increases for voluntary employee contributions, reductions for retirement before age 55, failure to make deposit for those years when retirement was not deducted, and election of a survivor-type annuity.

In determining the length of service for annuity computation, all creditable periods of service are added together. Any fractional part of a month in total service is eliminated (e.g. If total service equals thirty years, five months and fourteen days, the fourteen days would be eliminated). The length of service for annuity computation is determined by adding all periods of service which are creditable plus the period represented by any unused sick leave (as explained in the April 6, 1973, Personnel Perspective). The fractional part of a month in total service is then eliminated and the total is expressed in years and months.

The high-three year average pay refers to the largest annual pay rate resulting from averaging, over any period of three consecutive years of creditable service, an employee's rates of basic pay in effect during that period, with each rate weighted by the length of time it was in effect. The three-year period over which the average pay is computed need not start on January 1, or the first day of any other month, or the date of a pay change. It starts and ends on whichever dates produce the highest average pay.

The three years of service over which the high-three average pay is computed need not be continuous, but they must consist of consecutive periods of service. Thus, two or more separate periods of employment may be joined, provided there is no interverning period or periods of service to be considered. The three-year period may include service for which retirement deductions have been refunded, even though not redeposited.

In computing a high-three average pay, generally the rate of annual basic pay--not the pay actually received by the employee--is to be used. The basic pay rate is that fixed by applicable law or regulation. Included in the basic pay rate are night differential pay for wage employees, environmental differential pay for employees exposed to various degrees of hazard, physical hardship and unusual working conditions, and premium pay for standby time (effective the first pay period beginning after November 2, 1966). Excluded from the basic pay rate are night differential pay bonuses, allowances, overtime, holiday and military pay of General Schedule employees. A lump-sum payment covering accrued and accumulated leave is not considered pay for retirement purposes.

An illustration of a typical high-three average, for a GS-13, step 7, would be:

| Rate in Effect From | Length of Time Rate in Effect | | | | Annual Basic Rate | | Total Basic Pay Paid |
|---|---|---|---|---|---|---|---|
| | Years | Months | Days | | | | |
| 7-1-70 to 12-31-70 | 0 | 6 | 0 | x | 19,555 | = | $ 9,778 |
| 1-1-71 to 6-30-71 | 0 | 6 | 0 | x | 20,721 | = | 10,361 |
| 7-1-71 to 12-31-71 | 0 | 6 | 0 | x | 21,313 | = | 10,657 |
| 1-1-72 to 12-31-72 | 1 | 0 | 0 | x | 22,487 | = | 22,487 |
| 1-1-73 to 6-30-73 | 0 | 6 | 0 | x | 23,642 | = | 11,821 |
| Total | 3 | 0 | 0 | | | | $65,104 |

High-three average pay = $21,701 ($65,104 ÷ 3)

The basic annuity is obtained as follows:

Step 1 - Take one and one-half percent of the high-three average and multiply the result by five years of the total service, or, if total service was less than five years, multiply by whatever the total service is.

Step 2 - Add one and three-quarters percent of the high-three average pay multiplied by the number of years of service between five and ten.

Step 3 - Add two percent of the high-three average pay multiplied by all service over ten years.

An illustration of this procedure, again using a GS-13, step 7, with the above computed high-three average, and 30 years, 6 months' service, would be:

| | | |
|---|---|---|
| 1 1/2% x $21,701 x 5 years' service | = | $ 1,628 |
| 1 3/4% x $21,701 x 5 years' service | = | $ 1,900 |
| 2% x $21,701 x remaining 20 years' 6 months' service | = | $ 8,897 |
| Basic annuity | - | $12,425 |

The anticipated cost-of-living increase, should it amount to six percent, would increase this annuity as follows:

| | |
|---|---|
| Basic annuity | $12,425 |
| 6% Cost-of-living increase | +746 |
| Adjusted annuity | $13,171 |

Hence, this employee's taking advantage of the cost-of-living increase would amount to a substantial increase in the basic annuity.

An employee under age 60 retiring for disability is allowed a minimum basic annuity, if it is greater than the basic annuity computed under the general formula. The minimum basic annuity amounts to the lesser of:

1) 40 percent of the high-three average pay; or
2) The annuity obtained by using the general formula after increasing the length of actual service by the period elapsing between the date of retirement separation and the date the employee would reach age 60.

An illustration of this guarantee, using an employee age 50, with a high-three of $20,000 and 10 years' length of service would be:

1) 40% x $20,000 = $8,000
2) General formula with service increased by ten years (the difference between the employee's age and age 60):

| | | |
|---|---|---|
| 1 1/2% x $20,000 x 5 years' service | = | $1500 |
| 1 3/4% x $20,000 x 5 years' service | = | $1750 |
| 2% x $20,000 x additional 10 years' service | = | $4000 |
| Basic annuity | - | $7250 |

The lesser of these is #2, $7250. This would be the amount this employee would be minimally guaranteed under disability retirement procedures.

The basic annuity of any employee may not exceed 80 percent of the high-three year average except by crediting unused sick leave. If an annuity computed under the general formula exceeds this percentage, unless increased sick leave added to the total length of service produced the excess, it must be reduced to an amount equal to 80 percent of the high-three average. This has no bearing on any increases or reductions (such as cost-of-living increases or survivor annuity reductions) applied after the basic annuity is computed.

An illustration of a legal annuity which exceeds the 80 percent limitation, using an employee with a high-three average of $20,000 and 41 years', six months' service plus six months' unused sick leave, would be:

| | | |
|---|---|---|
| 1 1/2% x $20,000 x 5 years' service | = | $ 1,500 |
| 1 3/4% x $20,000 x 5 years' service | = | $ 1,750 |
| 2% x $20,000 x remaining 31 years', 6 months' service | = | $12,600 |
| Basic annuity | - | $15,850 |

Since 80 percent of $20,000 equals $16,000, this basic annuity of $15,850 is within the 80 percent limitation. Hence, the six months' unused sick leave may be added to the full 41 years', six months' service, bringing the total length of service to an even 42 years. This extra service increases the basic annuity by $200 to $16,050, thereby exceeding the 80 percent limitation legally, by employing unused sick leave.

The basic annuity is subject to certain reductions. Except when retirement is due to total disability, the annuity of an employee who retires before age 55 is reduced by one-sixth of one percent for each full month (two percent a year) under that age. If deposit is not made for a period of civilian service in which retirement deductions were not made, the annuity is reduced by ten percent of the amount unpaid. The annuity of an employee who names his or her spouse as a survivor annuitant is reduced as follows:

a) Two and one-half percent of that portion up to $3,600 elected as a base for the survivor benefit; plus
b) Ten percent of that portion over $3,600 elected as a base for the survivor benefit.

The basic annuity is also subject to increases. The periodic cost-of-living increases are exemplative of this as are increases purchased by voluntary contributions. For each $100 in an employee's voluntary contribution account, the annuity is increased by seven dollars a year plus twenty cents for each full year over age 55 at retirement time. For example, if an employee who has a total of $500 credited to the voluntary contribution account retires at age 60, the annuity is increased eight dollars for each $100 credit, or a total of $40 a year.

An immediate retirement annuity of any type begins on the day following the employee's separation, or on the day after the employee's pay ceases and the service and age requirements are met. An annuity may be waived if an employee so chooses and the waiver may later be rescinded but the annuity waived in the interim may not be paid.

# Conservationist Commends NOAA For St. George Seal Harvest Ban

Lewis Regenstein, one of the Nation's most prominent conservationists and National Director of the Fund for Animals, Inc., has acclaimed the recent experimental ban on seal harvesting on St. George Island, Alaska, and has congratulated NOAA for its leadership.

In a letter to Dr. Robert M. White, NOAA Administrator, Mr. Regenstein called the ban, "...certainly the most significant protective step any government has taken on this matter since the 'seal harvesting' was re-established after World War II."

Mr. Regenstein, a strong advocate for a total U.S. ban on seal harvesting, said,

"I am aware of the realities of this situation; and I am proud that our country was leading the effort to provide this important, additional conservation measure to the fur seal management program."

Commenting on the administration of the Marine Mammal Protection Act, Mr. Regenstein said, "I would like to reiterate my deep appreciation for the most responsible and enlightened manner in which NMFS has been dealing with the conservation community on these matters. In fact, we could hardly ask for a more responsive and sincere group of people with whom to work on these frustrating problems that so often arise.

"...I feel strongly that NMFS has been most cooperative and forthcoming in their dealings with the conservationists; and I believe my appreciation is shared by most of my colleagues. We cannot reasonably expect any agency to take our advice 100 percent of the time; the important thing is that we are being listened to and are able to participate in the decision making process. Our meetings have been an enormous drain of time and energy on NMFS, and I am grateful for this contribution, particularly in light of the severe budgetary restrictions now in effect.

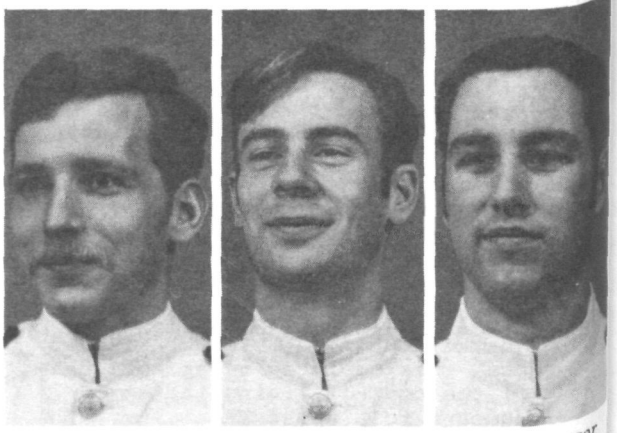
"Again, thank you for the concern NOAA and NMFS are showing for the protection of marine mammals, and for the world leadership our Government has assumed on this issue."

## Superport (Continued from page 1)

They also recommended that the port be located in waters at least 100 feet deep between Bayou LaFourche and Southwest Pass; be constructed as soon as possible; be only an oil-receiving terminal at first and be the only such terminal built in Louisiana waters; and be designed so that other commodities could be handled at a later time.

The development of superport facilities is of major concern to several other coastal states. With assistance from the NOAA Sea Grant Program, comparable research on superport development is currently being conducted at Texas A&M University, the University of Delaware, Massachusetts Institute of Technology, and the State University of New York.

# Ensign John L. Oswald Leads 43rd Officer Training Class



*Ensign Oswald* *Ensign Gastaldo* *Ensign Mercer*

Ensign John L. Oswald of Columbus, Ohio, was top man in the recently concluded 43rd NOAA Officer Training Class at the U.S. Merchant Marine Academy, Kings Point, N.Y. The second and third-ranking men in the class were Ensign Edward Gastaldo of Los Angeles, Calif., and Ensign Roger W. Mercer of Seattle, Wash., respectively.

## Air Pollution (Continued from page 1)

Noting that the measurements refer to the atmosphere only near its boundary with the sea, Mr. Cobb stresses that his results show only one aspect of man's effect on the atmosphere and climate and that aerosols trapped elsewhere in the atmosphere (in the stratosphere, for example), possibly more important in forcing climatic changes, should be made the subject of a similar systematic investigation.

He emphasizes that pollution caused by particulate matter in the atmosphere is only a small part of the global air quality problem, in which such gaseous pollutants as carbon monoxide, carbon dioxide, ozone, nitrogen oxides, and sulphur oxide are quite important. A broader examination of air quality is the subject of the Global Monitoring for Climatic Change program, the United States' portion of which is conducted by ERL's Air Resources Laboratories.

Mr. Cobb compared electrical conductivity measurements made by him at the ERL's Mauna Loa Observatory, in Hawaii, at polar and island observatories, by the NOAA Ship OCEANOGRAPHER on her globe-circling expedition in 1967, and by the sailing ships GALILEE in 1908 and CARNEGIE from 1911 to 1929. From this comparison, he was able to establish benchmarks of the atmosphere's electrical climate, and so of its cargo of suspended pollutants.

In an earlier, 1970, study, he and his colleagues found that the aerosol concentration over the North Atlantic had approximately doubled in the preceding 60 years, but that there had been no significant change in the South Pacific.

# Special NSSFC Wrap-Up Shows Abnormal Winter Weather Across U.S.

The word "normal" should be removed from the National Weather Service's lexicon--at least so far as the past winter goes.

In a special winter weather wrap-up--the first of its kind--disseminated by the National Severe Storms Forecast Center in Kansas City, only a few Weather Service offices reported anything resembling normal temperatures and precipitation.

Perhaps the most topsy turvy weather occurred in Southeastern U.S. Georgia reeled from a record snow across the state on February 9. The storm had begun in Alabama and also spread its fury into the Carolinas. Near-blizzard conditions were reported as far north as Norfolk, Va. Norfolk also caught 10 inches of snow from a January 7-8 ice storm that caused extensive damage in Louisiana, Alabama, Georgia, North and South Carolina, and Virginia.

Paradoxically, those same six states reported above-normal temperatures for the winter. But Florida reported "the kind of winter the Chamber of Commerce dreams about," with warm temperatures even in the northern part. Pensacola, nipped by the February 9 ice storm, had a touch of severe winter weather.

In the Southwest, winter began very early. Grand Junction, Colo., had its greatest snowfall on record for October. One or more inches of snow was recorded on 79 continuous days. Eighty-five inches of snow at Salt Lake City,Utah, set a new record. Ely,Nev., hit an all-time low temperature of -28 on December 10. Most of California was colder and wetter than usual. Phoenix, Ariz., had its third wettest winter on record. A 10 1/2-inch snowfall in Albuquerque, N. Mex., on March 29-30 was an all-time record.

Temperatures in the State of Washington were near normal, but the winter was dry. December was especially cold in Oregon, Idaho, and Montana. At Great Falls, the first ten days of December saw six all-time lows, yet March in Great Falls this year was the second warmest on record.

The usually frigid states--the Dakotas, Minnesota, and Wisconsin--had a mild winter. Bismarck had the warmest winter in 12 years and the least snowfall in 10. In Minneapolis-St. Paul it was the coldest December in 10 years, but the warmest March since 1910. Michigan, Iowa, Illinois, Indiana, and Ohio were warmer and wetter than usual. Northern Maine was one of the few areas to report normal winter weather. All stations in Vermont had above-normal temperatures. The 10-inch total snowfall at Boston, Mass., was the third lightest since records began. The absence of snowfall made news in several other places in the East. The New York throughway saved a half million dollars in snow removal. Newark, Atlantic City, and Trenton, N.J., reported virtually no snow. Philadelphia had the first winter ever without measurable snow. Wilmington, Del., had its earliest snowfall ever--October 19, but only 1.2 inches for the whole winter.

It was the first March on record in which snow wasn't measured at Kansas City or Topeka, Kansas. Arkansas was about the only state that had both temperature and snowfall close to normal. Tulsa, Okla., set a new wet record with about 12 inches of precipitation in March, while earlier in December Tulsa went 11 consecutive days without a freeze--also a record.

Texas had below-normal temperatures. Snowfall was above normal for every area except the extreme south. Brownsville reported snow in the Rio Grande Valley. It was wet and cold in the Panhandle with snow at Amarillo and Lubbock about twice normal. Abilene had 13 1/2 inches in January for a new record, while San Antonio had its first snow in seven years. It was the second coldest winter ever at Corpus Christi, and the wettest January and February ever at El Paso. Wichita Falls had the wettest March on record. Galveston reported the coldest winter of the century. Only in 1895 did Galveston have more snow.

## Marine Mammal Exemption Hearings Scheduled

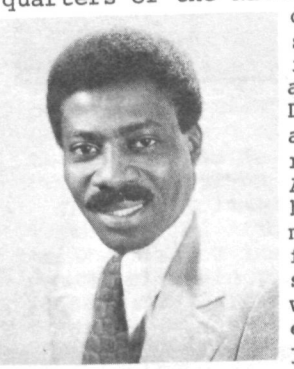
Public hearings on five applications for economic hardship exemptions under the Marine Mammal Protection Act are scheduled at three different locations from April 24 to April 30, the National Marine Fisheries Service has announced. NMFS is responsible for that part of the Act dealing with seals, sea lions, porpoises, and whales.

With certain exceptions, the Marine Mammal Protection Act of 1972, signed into law by President Nixon on October 21, 1972, and effective 60 days later, prohibits the taking of marine mammals or the importation of marine mammals or products made from such mammals. The Secretary of Commerce has the authority to grant exemptions from such prohibition in cases of undue economic hardship.

The hearings will be held in Galveston, Tex., on April 24; in Pensacola, Fla., on April 25; and in Mystic, Conn., on April 30.

## Johnson Named to NOS Electronic Computing Post

Thomas E. Johnson has been appointed Chief of the Electronic Computing Division's Planning Branch at the Rockville, Md., headquarters of the National Ocean Survey. His duties will include assisting the NOS and NOAA in planning,developing, and evaluating Automatic Data Processing equipment and systems for use in various NOS activities. A computer specialist, he has been with Commerce Department agencies for 11 years, serving six as a mathematician with the National Weather Service prior to joining the Coast and Geodetic Survey, predecessor of the NOS, in 1968. He received a B.A. in mathematics from Morehouse College, Atlanta, Ga., and a master's degree from Atlanta University.



# Fish Recipe of the Week

As part of the National Marine Fisheries Service's program to increase consumers' awareness of fishery products as an alternative protein source, NOAA WEEK will run a feature budget recipe in each issue.

This week's recipe features ocean perch, one of the best buys in the market. They are in good supply the year around, either fresh or frozen, and offer the homemaker chafing dish elegance with pin-money economy.

PERCH-POTATO PANCAKES

1 pound ocean perch fillets or other fish fillets, fresh or frozen
3 eggs, beaten
2 tablespoons flour
2 tablespoons grated onion
1 tablespoon chopped parsley
2 teaspoons salt
Dash nutmeg
Dash pepper
2 cups finely grated raw potatoes
Applesauce

Thaw frozen fillets. Skin fillets and chop finely. Combine all ingredients except applesauce; mix thoroughly. Drop 1/3 cup fish mixture onto a hot, well-greased griddle or frying pan. Flatten slightly with a spatula. Fry until brown on one side; turn carefully and brown the other side. Cooking time approximately 6 to 8 minutes. Drain on absorbent paper. Keep warm. Serve with applesauce.

Serves 6.

## Herman C. Steffan Dies

Herman C. Steffan, Chief of the Data Verification Branch at the Environmental Data Service's National Climatic Center in Asheville, N.C., died on April 14. He had served the Federal government for more than 32 years. He is survived by his wife, Mary, of 45 Pinehurst Road, Asheville, N.C. 28805, a son, a daughter, and a brother.

# Fishery Research in Honolulu Is Aided by Captive Tuna

Biological experiments with captive tunas show that a change in water temperature of even a fraction of one degree can radically alter the feeding behavior of the sensitive fish. This and other responses to alterations in the environment of Pacific tunas have been under study for more than a decade at the Honolulu Laboratory of the Southwest Fisheries Center of the National Marine Fisheries Service.

Researchers from NMFS and the University of Wisconsin mounted an experiment in which a free-swimming Kawakawa (the Hawaiian version of a bonito tuna) was conditioned to respond to the scientists' questions about its sensitivity to changes in water temperature. As the kawakawa's training progressed, it became evident that the fish was able to detect and respond to temperature changes of as little as two-tenths of a degree Fahrenheit.

Related experiments with skipjack tuna equipped with electrocardiographic wiring revealed that the heart rate slowed in anticipation of slight temperature changes.

Other studies at the laboratory have revealed that some tunas evidently react most favorably to waters of about 75° F., all other factors being equal, but that survival is possible in temperatures of as low as 57° F., and as high as 93° F.

In a study centered on the swimming and feeding behavior of tunas at various temperatures, the fish stopped feeding at three degrees short of the lethal low and high temperatures.

## NOVAC Elects New Board of Directors

Members of NOAA Voluntary Action, Inc., met in their annual meeting March 28 to hear a report on the progress of the organization over the past year and to elect a board of directors for the coming year.

President Gail Young reported that substantial progress was made during the past twelve months, the second full year of operation of NOVAC. Since the formation of the organization late in 1971, income totalled nearly $8,000 and during this time the organization has been able to help more than 35 people with work-related or financial problems.

About $1,000 will be put in reserve to build a fund to be used by NOVAC for the establishment of its own day care center in future years. While most of the income has come from voluntary contributions, fund-raising activities such as the recycling of paper and the arts and craft sale have also been important factors.

The Board of Directors elected for the coming year includes Meredith Beeg, Judy Berne, Robert Carnahan, Robert Corbey, Charles Cotton, Frank Evangelista, Keith Johnson, Duane Kidwell, Evelyn Mudd, Gregory Richter, Beverly Stevens, Wayne Sulecki, and Gail Young.

Items to be considered for publication in NOAA WEEK should be submitted to:
Office of Public Affairs, NOAA, Room 221, Bldg. 5, Rockville, Md. 20852. Phone (301) 496-8243

# National Oceanic and Atmospheric Administration

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July 23, 2010