

Tropical Storm Allison Is Nation's Costliest Ever

—By Robert Chartuk

Each hurricane season, it's not only the "Big One" that worries National Weather Service forecasters, but also dying tropical storms and hurricane remnants that can reach far inland and cause just as much damage—if not more—than their fully formed brethren.

This was all too clear as Allison, the first tropical storm in the Atlantic this hurricane season, made landfall June 5 at the east end of Galveston Island, Tex.

Weighing in at well below hurricane force, Allison embarked on a two week odyssey that saw up to 35 inches of rain in Texas, damage in excess of \$4 billion and more than 43 deaths.

Though Allison's wanderings

were closely monitored across almost a third of the United States, the storm's genesis can be traced back even further as a tropical wave off the coast of Africa, according to hurricane specialist Lixion Avila at the National Hurricane Center in Miami. On May 21, some 26 days before it exited Newfoundland, the wave began tracking westward across the Atlantic Ocean, reaching the western Caribbean a week later on May 28. The storm cruised over Mexico and crossed into the Pacific Ocean on June 1.

"A low level circulation formed along the tropical wave southeast of Vera Cruz on June 3, then moved quickly into southeast Mexico, *continued on page 2*



Kate Naughten/NOAA Acting Administrator Scott Gudes (right) removes the hook from a catfish caught in Washington, D.C., by his fishing protege, Shemeia Watson.

NOAA Volunteers Take Kids Fishing

—By Kate Naughten

Washingtonians are used to seeing odd things on the city streets on a summer day, but a group of people carrying green fishing poles and small coolers across the Mall, down Constitution Avenue and eventually onto the Metro is a rarity indeed.

Who were these people? And why were they carrying fishing poles?

The answer might surprise you. They were NOAA staffers on their *continued on page 2*



Paige Morrison

Allison swamps cars and trucks on Interstate 10 leading into downtown Houston on June 8.

Allison

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steered by a deep southwesterly flow," Avila explained.

The system moved into the Bay of Campeche late on June 4 as an area of thunderstorms, then approached the Gulf of Mexico. On the Afternoon of June 5, a tropical storm formed only 80 miles off the coast of Galveston, making landfall later in the day, thus beginning a tale of wetness and woe that many would rather forget.

"Allison didn't make its greatest impact at landfall, but it sure made its presence known as it slogged across the southeast," said Jim Hoke of NOAA's Hydrometeorological Prediction Center in Camp Springs, Md. "In its first week, the storm dumped 100 million acre-feet of water on the United States. That's a year's supply for every household in the nation."

According to Hoke, Allison was by far the longest-lived tropical system ever tracked over land by the NOAA center.

"While the cyclone was fairly small in areal coverage," Hoke said, "it remained close enough to the Gulf of Mexico and Atlantic Ocean to feed off their moisture and warmth, allowing the system to survive such a long time over land and, more importantly, to become such an efficient rain producer."

At one point, the low pressure system that was once Allison accomplished a rare feat. It re-developed over land, Hoke said. "The cyclone regained gale-force winds which overspread the mouth of the Mississippi River and the barrier islands of the Mississippi coast," he said.

Soon, an eye-like feature appeared on Doppler radar screens at Weather Service forecast offices tracking the storm.

"Sustained winds increased to 45 mph, with gusts towards 60 mph

in its main inflow band east of the center," said Steve Rinard, meteorologist in charge of the Weather Service forecast office in Lake Charles, La. "As the system edged farther inland that afternoon, it finally weakened and lost the eye."

All that water kept Weather Service offices quite busy.

In Houston, where Allison made its worst impression, urban streets became lakes and raging rivers as torrential rains drenched southeast Texas.

More than 16,000 homes and businesses were damaged in freshwater flooding and 10,000 families were displaced.

Twenty eight counties were declared disaster areas by President George W. Bush.

Next on Allison's hit list was Louisiana, where a state of emergency was declared in 25 parishes as a week's worth of rain generated more than two feet of water.

Freshwater submerged U.S. Highway 90 for over 12 hours.

Thibodaux, La., went underwater when 15.16 inches of rain fell in the 24-hour period ending the morning of June 7.

"The message we continue to stress is that it doesn't take a major hurricane to produce major damage," Rinard said. "A tropical storm that moves inland and stalls can cause major damage. Allison is a classic example."

In Florida, thousands of homes in Jacksonville were destroyed as the storm set a 24-hour rainfall record of 10.13 inches. Here, the storm had its greatest coastal impact, with five deaths occurring in heavy surf and rip currents off Pensacola. Four others died in Florida from rain-induced flooding. The state capital at Tallahassee netted 9.86 inches of rain between the mornings of June 11 and 12, much more rain than the drought-stricken region could handle.

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Kids Fishing

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way back from a full day of volunteering at the Take A Kid Fishing Day event on June 4.

Held in the heart of the nation's capital at the Constitution Gardens pond, a stone's throw from the more famous Reflecting Pool, the annual event drew over 400 elementary and middle school students from across the Washington, D.C., area for a day of learning, fishing and fun.

Sponsored as part of National Fishing and Boating Week, the event has attracted NOAA volunteer participation for the last seven years.

NOAA Fisheries' William Price, a member of the event's organizing board, and Ginny Fay are the undisputed leaders of the pack.

Other veteran volunteers included Stephanie Bost and her son Aaron, Lenice Goines, Jennifer Olson, James McCallum, William Chappell, Gene Cope and John Hotaling, all of NOAA Fisheries, along with Michael Murphy of the National Ocean Service.

This year, several new volunteers also baited hooks and untangled line, including NOAA Lt. j.g. Liz Jones and Paula Evans of NOAA Fisheries.

Smiles and fish were plentiful throughout the day, which turned out to be picture perfect weather-wise.

At the top of everyone's list was helping the kids catch a fish or two, including sunfish, bluegill, catfish and carp.

Others overcame a long-held fear of worms. "I'd never baited a hook with live bait until that day. I was scared to death of worms as a kid, and it wasn't until I had baited my twenty-fifth hook of the day that the fear finally subsided," said a smiling Liz Jones. "All day I kept

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Tony Wu.

Dane Konop/NOAA

Tony Wu Is Team Member of the Month for July

—By Dane Konop

When 12-year-old Tony Wu arrived in the United States from Canton, China, with his parents and younger siblings, he did not know a single word of English or even the alphabet.

Now less than twenty years later, Wu is the senior network engineer for NOAA's computer network operations center in Silver Spring, Md., and NOAA's Team Member of the Month for July.

Wu, who is employed by RGII Technologies, is credited with moving NOAA to the forefront of Internet accessibility by engineering and implementing NOAA's gigabit ethernet connection to the Internet2, the successor to the Internet used by the general public.

"Two years ago, NOAA basically had a ten-megabyte connection to our Internet service provider," said Wu's supervisor, John Kyler, manager of NOAA's network

operations center. "And that was a shared connection," Kyler said, "which means you're only going to get four to six megs of traffic because it's going two ways." Even after adding a second ten-megabit connection, then two 45-megabit T3 connections, "We got to the point where we were straining," Kyler said. With the new gigabit connection engineered by Wu, "we go from having two 45-megabit connections, to a thousand megabits. It's really put us at a whole new level of access," Kyler said, actually exceeding the capacity of all but the largest Internet service providers.

The improvements Wu engineered allowed the center to move about half of NOAA's computer traffic, much of it concerning weather data, off the public Internet, Kyler said. This speeds up the general public's access to NOAA on the "commodity Internet," the Internet 1, while allowing the research community equally rapid access to scientific data on the Internet2.

Wu says immigrating to the United States was difficult, but that his father, a mechanical engineer in China, wanted his children to have a better education.

Many other family members had already immigrated to the United States, beginning with ancestors who were among thousands of Chinese recruited to build the first transcontinental railroad in the 1860s.

"At first I was homesick," Wu said, "because when I came here I did not know anyone except family members. When you are 12 years old, you've already started making friends, and I had quite a few friends, classmates, in China. But once you come here, survival instincts kick in. You just have to adapt to it if you decide to live here."

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Paul Moran.

Perry Thornton

Paul Moran Is Employee of the Month for July

—By Crystal Straughn

Paul Moran, a research population molecular geneticist in the Conservation Biology Division of the Northwest Fisheries Science Center in Seattle, Wash., is the NOAA Employee of the Month for July.

Moran conducts genetics research on Pacific salmon and other marine organisms. A significant part of his research involves the study of natural population genetic variation within salmon species and genetic interactions between domesticated hatchery brood stocks and wild fish.

Under the center's genetics program, Moran develops research designs to evaluate the success of naturally spawning hatchery fish and monitor genetic changes in both the hatchery and wild populations.

"This is a truly exciting time in genetics research. New molecular
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Focus On...

NOAA's P3 Hurricane Hunter Aircraft Celebrate 25 Years of Flying

—By Dane Konop

Two of the world's premiere research aircraft, NOAA's Lockheed WP-3D Orions, marked an historic milestone June 27—the 25th anniversary of the first NOAA P3 flight into a hurricane.

Since that flight into Hurricane Bonny in the Pacific Ocean, NOAA's two matching turbo prop P3s have flown into over a hundred hurricanes to study storm behavior and provide information to update forecasts and warnings from NOAA's National Hurricane Center in Miami.

Each P3 is flown by two pilots, a flight engineer, a navigator, a flight director/meteorologist, two or three engineering or electronic specialists, and a radio/avionics specialist.

The planes and crew are based at NOAA's Aircraft Operations Center at MacDill Air Force Base, Fla.

Both P3s carry sophisticated equipment to study storms and carry out a variety of environmental research. Up to a dozen scientists from NOAA's Hurricane Research Division in Miami can conduct onboard hurricane research in

flight. Three radars, one in the nose, one underneath the fuselage and one in the tail, give scientists a three-dimensional view of storms.

While their flights into the eyes of hurricanes in the Atlantic and Gulf of Mexico are legendary, the P3s have also flown research missions in the Indian Ocean, in the Pacific from Australia to the Solomon Islands, and in Europe from Ireland to the Alps.

Both planes can fly for 12 hours before refueling, and have a maximum flight range that is nearly 4,000 nautical miles.

The versatile P3s have even been used to study tornados, flying over "Tornado Alley" during developing thunderstorms in joint experiments with ground-based scientific storm chasers from the National Severe Storms Laboratory in Norman, Okla.

Although both P3s have reached the quarter century mark, they are kept equipped with the latest in instrumentation for flight and research, and are remarkably well maintained, despite the beatings they take from the severe weather they fly into.

James DuGranrut, an electronics engineer on that first flight into Hurricane Bonny and now deputy director of the Aircraft Operations Center, remembers, "During the flight we were so busy making sure the equipment worked, we didn't have time to get nervous. Nevertheless,"

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NOAA's two WP-3D Orion aircraft.

NOAA Central Library

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less, we were all pretty relieved by the end of the first flight that the P3 handled so well. It takes a lot of nerve to fly into a hurricane in an unproven aircraft.”

Most flights into the eye of a hurricane aboard a P3 are relatively calm and routine, with turbulence no greater than might be encountered on a bumpy commercial flight.

But some flights are not so tame.

Flight director/meteorologist Jack Parrish remembers his second hurricane flight, an usually rough flight into the eye of Hurricane Allen on Aug. 6, 1980.

“Allen was tucked in south of Cuba and it was getting some ground effects from the mountains,” Parrish said. “We got into the west eye wall, trying to go north. As we would get clear of a very terrible area (of turbulence), a new one would appear on radar and we’d have to go through that. We went through a series of four extremely turbulent rain bands to get to a place where we finally got people out of their seat belts. By then there was litter all over the airplane. Everything came loose. The guy flying next to me training me on the radar ended up closing the window (cover) because, he said, he didn’t want to see it when the wing came off. (After the flight) as we stepped off the airplane, he said, ‘You are trained. And I quit.’ He never got back on a P3 again.” ☺

WP-3D Orion Aircraft Specifications

***Maximum takeoff weight:** 135,000 lbs.

***Cruising speed:** 300 nautical miles per hour

***Ceiling:** 27,000 feet

***Maximum range:**

2,500 nautical miles (low altitude)

3,800 nautical miles (high altitude)

***Maximum flight time:** 12 hours

***Years built:**

P3 #N42RF 1975

P3 #N43RF 1976

***Instrumentation:** meteorological sensors, three radars, cloud physics system, three radiometers, GPS dropsonde atmospheric measuring system, airborne expendable bathythermographs, two scatterometers, radome flow angle sensors, and dual inertial and GPS navigation systems.

NOAA Central Library

Hurricane Greta makes landfall in Central America Sept. 17, 1978.



Norma Martinez/MacDill AFB

Members of the first NOAA P3 hurricane flight gather for a reunion at the NOAA Aircraft Operations Center at MacDill Air Force Base June 27. Pictured (left to right): David Turner, pilot, Robert Burpee, scientist, Lawrence Rose, flight engineer, Jan Zysco, chief of engineering, James DuGranrut, electronics engineer, Marshall Hatch, navigator, Leon Correll, flight engineer, Jacquie Nunn, widow of Tom Nunn, avionics technician, James Brown, mathematician/programmer.

Kids Fishing

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thinking, 'I wish they did something like this when I was kid.' Maybe that way I wouldn't have had to wait 26 years to finally get over my fear of creepy crawlers!"

Some of the volunteers go expressly for the creepy crawlers, including the "worm lady" herself, Lenice Goines, who runs the bait table like a four-star general.

"I get a very big kick out of cutting bait. I mostly enjoy the looks on everyone's faces when they see me with my hands covered in bait," said the usually impeccable Goines.

From the wiggle of the worms to the wonderful sensation of a plump catfish on the hook, participants and volunteers alike learned a few things from each other, including event participants Scott Gudes, NOAA's acting administrator, and William Hogarth, NOAA Fisheries acting assistant administrator. Both helped kids fish.

"It's great that NOAA and our Fisheries Service are able to encourage fishing among kids here in our nation's capital, and it's great to be helping hook another generation on this fantastic sport," Gudes said.

At the top of the list for fish stories from this year's event was the giant catfish reeled in by volunteer Aaron Bost, a fifth-grader from Georgian Forest Elementary School in Silver Spring, Md. It turned out to be the first and the biggest catch of the day. Aaron, a three-year veteran of the event, spent the rest of his time helping other kids bait hooks, untangle line and release fish safely back into the water.

Sometimes, the fish that never make it out of the water are exciting too, explained Chappell, who spent his day helping a group of students who had never fished

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Fair Promotes Getting Goods to Market on the Marine Transportation System

—By Danielle Renart

With the U.S. Capitol as a backdrop and a blazing sun overhead, industry groups and federal agencies called on Congress and the public to "Get the Goods" on the U.S. marine transportation system at the first annual MTS Industry Fair on June 19.

The marine transportation system comprises the ports, waterways, railways and roads that connect people to the products they buy.

At the MTS Industry Fair, nearly 50 exhibits and technology demonstrations showcased products and services under a gigantic white tent on the Mall. The event was hosted by NOAA and sponsored by 15 Congressional leaders, plus industry groups and federal agencies who have formed a partnership to promote marine transportation issues.

"Two-thirds of all consumer goods purchased by Americans are transported by the MTS," said Margaret Davidson, acting assistant administrator of the National Ocean Service, "but few Americans recognize the tremendous infrastructure delivering these goods. Whether it is bananas, belts or Volkswagon beetles, the MTS transports 95 percent of the overseas trade coming in or out of the United States each year."

Davidson moderated a press event at the start of the fair, featuring Admiral James Loy, commandant of the U.S. Coast Guard, and Chuck Raymond, president and CEO of CSX Lines, a major freight transportation company.

Raymond called for new legislation funding the marine transportation system, similar to airport and highway spending bills. "The MTS offers a cost-effective, efficient and

environmentally safe mode of passenger and freight delivery," he said. "To truly build a multi-modal transportation system, the MTS must be afforded the same type of legislative attention."

Demand for services is placing considerable strain on the system. Today, the marine transportation system faces routine traffic jams and delays caused by congestion and outdated technology and infrastructure. Many ship channels and port-side facilities cannot accommodate the new class of ships being built, some of which dwarf the U.S. Capitol in size.

Some analysts conservatively predict that the total volume of trade calling on the marine transportation system will more than double over the next twenty years. This means added delays, costs and safety risks associated with getting goods to market.

The MTS Industry Fair created an important venue for highlighting the value of the system and the services that support it.

At the fair, NOAA promoted its navigation safety programs through demonstrations of nautical charting technology, geographic positioning systems and the Physical Oceanographic Real-Time System. NOAA also exhibited information on marine forecasts, research into ballast water management, habitat restoration, National Marine Sanctuaries and environmental decision-making tools, such as oil spill trajectory models.

"Today's event is a step in the right direction because this gives us the opportunity to help our citizens, opinion makers and national leaders to better understand the importance of MTS," Raymond said. ☺

Allison

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Thunderstorms and tornadoes were Allison's other calling cards.

A 70-year-old man died in Zachary, La., when a tornado knocked a tree onto his vehicle.

Twisters damaged an elementary school in Saint Marys, Ga., and facilities at the Kings Bay Naval Submarine Base.

In Gulfport, Miss., a woman died after being struck by lightning.

Waterspouts generated by Allison were sighted from Fernandina Beach in Nassau County, Fla.

The storm even brought hail to western South Carolina.

But Allison wasn't yet finished with Texas. The storm circled back on June

8, becoming the first tropical cyclone to make landfall in Texas and then emerge back into the Gulf.

On its return, Allison again pummeled southeast Texas, causing record flooding in the Houston metropolitan area, with portions of U.S. Highway 59 and Interstate 10 deeply submerged.

"Only the tops of semi-tractor trailers were visible on those major roadways," according to Peter Gabrielsen, a hydrologist with the Weather Service eastern region who served on a Weather Service disaster survey team. "The area was getting more than an inch and a half of rain per hour for more than 12 hours."

By the morning of June 14, a blocking ridge of high pressure sitting off the New England coast brought the system to a halt as it

neared the Atlantic coast near Wilmington, N.C.

"Flooding became a major problem as the storm crawled through northeast North Carolina toward Virginia, with our Doppler radar estimating up to 21 inches of rain," said Tom Kriehn, meteorologist in charge of the Weather Service's Newport, N.C., forecast office.

"You don't normally expect a storm making landfall in Texas to affect states all the way to the mid-Atlantic coast," he said.

"Nevertheless, we were ready for it and issued flash flood warnings for some of our counties," Kriehn said.

"You don't normally expect a storm making landfall in Texas to affect states all the way to the mid-Atlantic coast."—Tom Kriehn, meteorologist in charge of the Newport, N.C., forecast office.

"As the storm center moved up along the eastern edge of the Delmarva Peninsula, a cold front moved in from the

west," Kriehn said. "This allowed moisture from Allison to pool along the front, setting the stage for heavy rains across the northern mid-Atlantic and southern New England."

The long-lived Allison brought torrents of rain to southeast Pennsylvania, with the Willow Grove Naval Air Station recording more than 10 inches.

Rainfall amounts of up to five inches soaked portions of New Jersey, southern New York, Connecticut, Massachusetts and Rhode Island.

When Allison finally exited land off the Canadian coast, the prodigious rainmaker, with winds that peaked at only 61 miles-per-hour, was the costliest tropical storm in U.S. history, easily breaking the \$500 million mark of Claudette in 1979 and 1994's Alberto. ☹

Paul Moran

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tools and methods provide powerful new approaches to long standing biological problems. I'm excited by the prospect of breaking new ground and conducting studies that were never before possible," Moran says.

Moran is recognized by NOAA for "not only a concern for the important current salmon research now occurring at the Northwest Fisheries Science Center, but a dedication to going the extra mile to provide challenging and meaningful opportunities for young people to become actively involved in science."

Along with his accomplishments in genetics, Moran takes the time to work with high school students to discover new opportunities in research. "I love seeing students pick up these new genetic technologies and apply them in ways that spark their interest and excitement about science," he said.

Recently, Moran and the center's conservation biology team worked with Centralia, Wash., High School senior Inge Nelson on a project that discovered significant genetic differences between hatchery salmon and wild coho salmon in the nearby Chehalis River.

In addition to working directly with students, Moran has made special efforts to forge collaborations with fishery managers and educators to make the results of scientific research more accessible to the public as well as the scientific community.

"My feeling is that I leverage my efforts in the sense that through teachers I can indirectly reach hundreds and perhaps eventually thousands of students and future decision-making citizens, the citizens who will ultimately determine the success or failure of

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Christian Schoppmeyer/NOAA

NOAA Fisheries special agent Logan Gregory (left), is congratulated on being named the 2000 Officer of the Year by the Northeast Conservation Law Enforcement Chief's Association by Richard Livingston, special agent in charge of the Northeast Enforcement Division.

Paul Moran

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NOAA's stewardship role in conserving and managing living marine resources," Moran said.

Moran was not expecting an award for his work.

"I'm pleased and flattered by this honor," Moran said. "However, I really need to emphasize that the recognition should go to the students and also to the high school teachers who, with so little prep time and so few resources, manage to provide opportunities for their students to conduct meaningful and exciting research. I'd also point out that without the help of our very competent and efficient technical staff, there would be no time for this work with students," he said.

An outdoors lover, Moran enjoys backpacking and camping with his 12-year-old son Drew, 5-year-old son Ian and his wife Jan. They live in Shoreline, Wash. ☺

Tony Wu

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Wu's family moved to Washington, D.C., for two years then to Hagerstown, Md., where they opened a Chinese restaurant. He enrolled in the local public school's English as a second language program and honed his language skills by working in the family restaurant.

"I loved to live in Hagerstown. People are friendly and the pace seems to be slower than here. The air and environment seem much cleaner," Wu said.

He graduated from Hagerstown High School on schedule and attended Shippensburg (Pa.) University, graduating with a degree in computer science.

But limited job opportunities in rural Maryland forced a second move, this one to the thriving computer job market in the Washington, D.C., area.

Fresh out of college in 1994, Wu was hired by RGII Technologies to work with NOAA's Systems Acquisition Office.

After a year and a half with RGII, Wu spent a five-year stint with another NOAA contractor, Global Management Systems, Inc., before returning to RGII in September 1999 to work at NOAA's network operations center.

Wu married, and he and his wife, Ni, now have a 2-year-old son, Bill.

"Most workers begin to run out of enthusiasm for completing a job, Kyler said. "Tony is a self-motivator and someone who is just as enthusiastic about a task when it's 95 percent completed as he was when he was working on the first five percent," Kyler said.

"One of the biggest problems with a guy like Tony," Kyler said, "is that a manager like me has to wonder sometimes what it would be like if he ever departed on me." ☺

Kids Fishing

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before. Chappell's highlight of the day arrived when a young girl caught a large carp.

"She didn't know what to do with the fish and was walking away from the shore of the pond screaming," Chappell said.

"I was trying to tell her to keep the tip of the rod up, but, before I could do anything, the big fish bent the hook and got away," he said. "It was just as exciting for everyone else too, since all of the kids in the vicinity were screaming along with her."

While the fish and worms are tops on some lists, still other volunteers like the end result—happy kids.

"I enjoy listening to the stories the kids tell about some of their fishing expeditions and seeing the smiles on their faces when they catch even the tiniest sunfish," Bost said.

What is hard to determine each year is who has more fun, the students who participate in the event or the event volunteers.

If the fish stories told by the volunteers on the way home in the Metro were any indication, the volunteers are the big winners each year—no contest. ☺

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