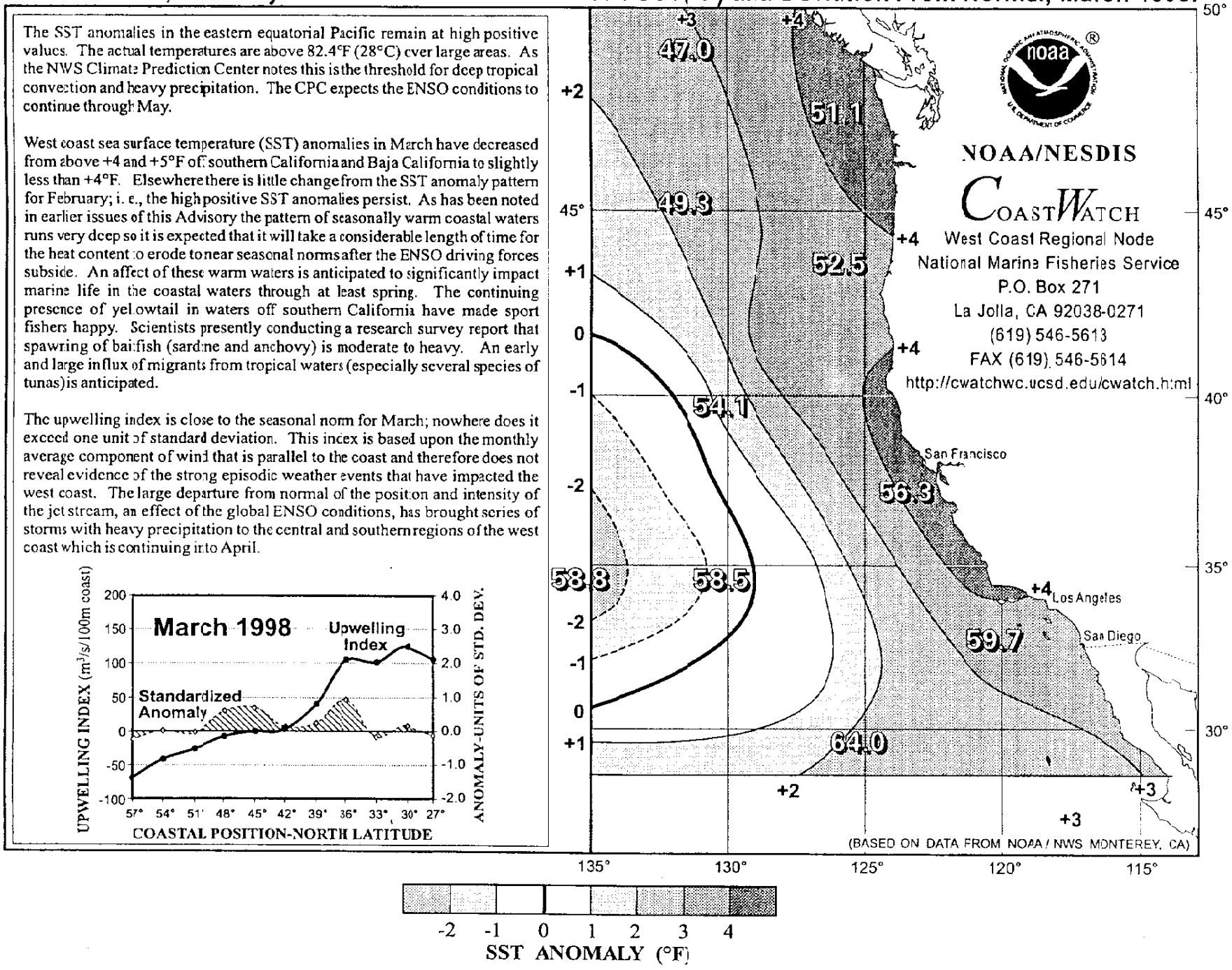
El Niño Watch, Advisory no. 98-3. Coastal Ocean Mean SST(°F) and Deviation From Normal, March 1998.

The SST anomalies in the eastern equatorial Pacific remain at high positive values. The actual temperatures are above 82.4°F (28°C) over large areas. As the NWS Climate Prediction Center notes this is the threshold for deep tropical convection and heavy precipitation. The CPC expects the ENSO conditions to continue through May.

West coast sea surface temperature (SST) anomalies in March have decreased from above +4 and +5°F off southern California and Baja California to slightly less than +4°F. Elsewhere there is little change from the SST anomaly pattern for February; i. e., the high positive SST anomalies persist. As has been noted in earlier issues of this Advisory the pattern of seasonally warm coastal waters runs very deep so it is expected that it will take a considerable length of time for the heat content to erode to near seasonal norms after the ENSO driving forces subside. An affect of these warm waters is anticipated to significantly impact marine life in the coastal waters through at least spring. The continuing presence of yellowtail in waters off southern California have made sport fishers happy. Scientists presently conducting a research survey report that spawning of baitfish (sardine and anchovy) is moderate to heavy. An early and large influx of migrants from tropical waters (especially several species of tunas) is anticipated.

The upwelling index is close to the seasonal norm for March; nowhere does it exceed one unit of standard deviation. This index is based upon the monthly average component of wind that is parallel to the coast and therefore does not reveal evidence of the strong episodic weather events that have impacted the west coast. The large departure from normal of the position and intensity of the jet stream, an effect of the global ENSO conditions, has brought series of storms with heavy precipitation to the central and southern regions of the west coast which is continuing into April.



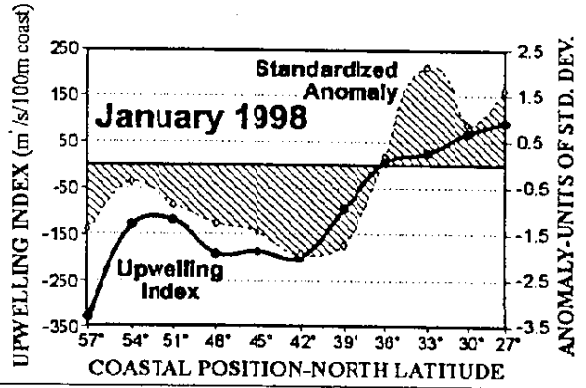
El Niño Watch, Advisory no. 98-1. Coastal Ocean Mean SST(°F) and Deviation From Normal, January 1998.

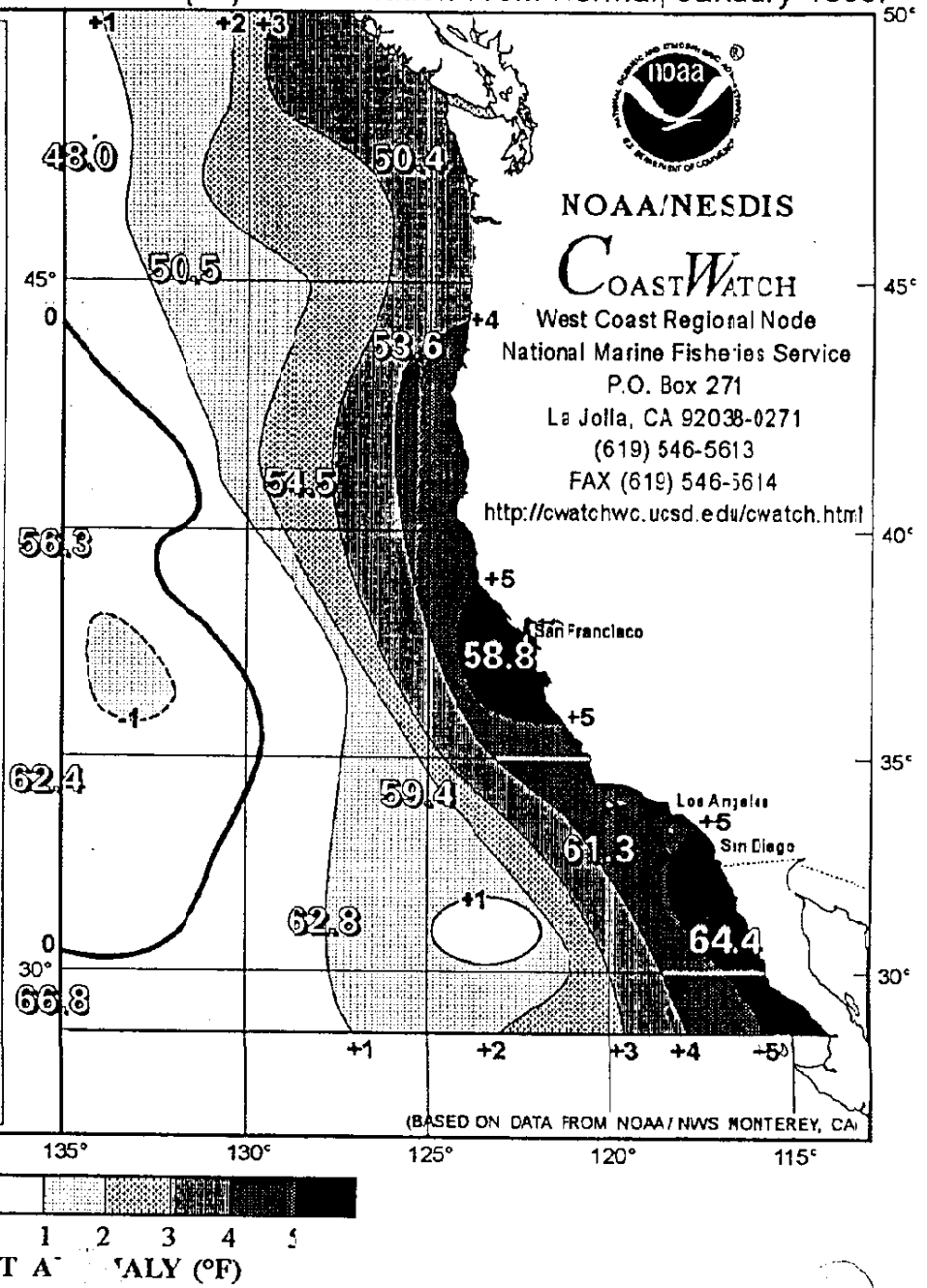
Tropical El Niño conditions continued strong through January. The increased storminess and heavy precipitation predicted by the Climate Prediction Center for the U. S. west coast became a fact during the latter part of January. Their prediction for the continuation of El Niño conditions into spring remains unchanged.

Off the U. S. West coast SST anomalies remained strongly positive during January. The map of January SST anomalies is almost an identical match to the map for December. The +3 to 4°F SST anomalies along the Pacific Northwest coast continues as do the +4 to 5°F values off northern California. The coastal anomalies above +5°F which had extended from San Francisco south along Baja California are now broken by a region slightly below +5°F off Pt. Conception and the Bight. The area of negative SST anomalies west of 130°W remains the same; it is part of a large scale pattern that dominates the central North Pacific.

Seasonal upwelling south of 38°N is at its lowest during an average December and January; it is near zero between 32 and 38°N and downwelling generally prevails north of that. In the northern latitudes downwelling is strongest during these months. The high values of standardized upwelling anomaly south of 34°N in January '98 seem less important when the actual values of upwelling are seen as still very low. North of 38°N downwelling produced by southerly winds was strong.

The warm coastal waters run deep. Findings from a CalCOFI survey that returned Feb. 14 show the surface mixed layer depth to be about 70 m within the Southern California Bight and 110 m west of the Bight; about a 60% increase over seasonal norms. Other observations include the lowest overall presence of zooplankton, high water clarity (except where there was muddy coastal runoff from the heavy rains), low fish egg counts in the Bight and from Pt. Conception to Monterey, and little to no evidence of upwelling. The general low productivity and depressed levels of forage weigh heavily against survival of winter and late spring spawn. The deep surface mixed layer will have a strong negative impact upon rockfish and survival of pinniped pups.





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Wed Feb 25 20:44:54 PST 1998 Coastwatch West Coast Regional Node (+1 619 546 5614) --> Roy Lowe pg [1/1]

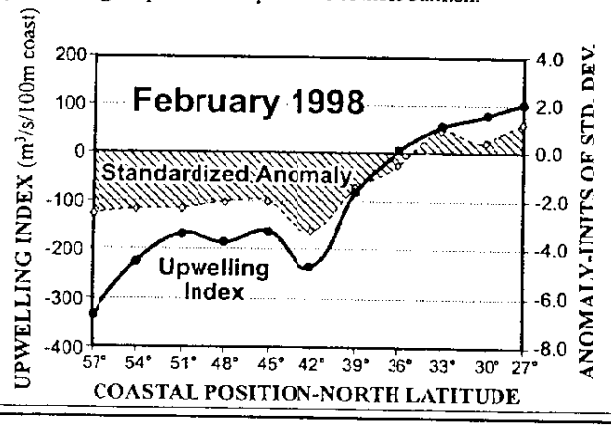
El Niño Watch, Advisory no. 98-2. Coastal Ocean Mean SST(°F) and Deviation From Normal, February 1998.

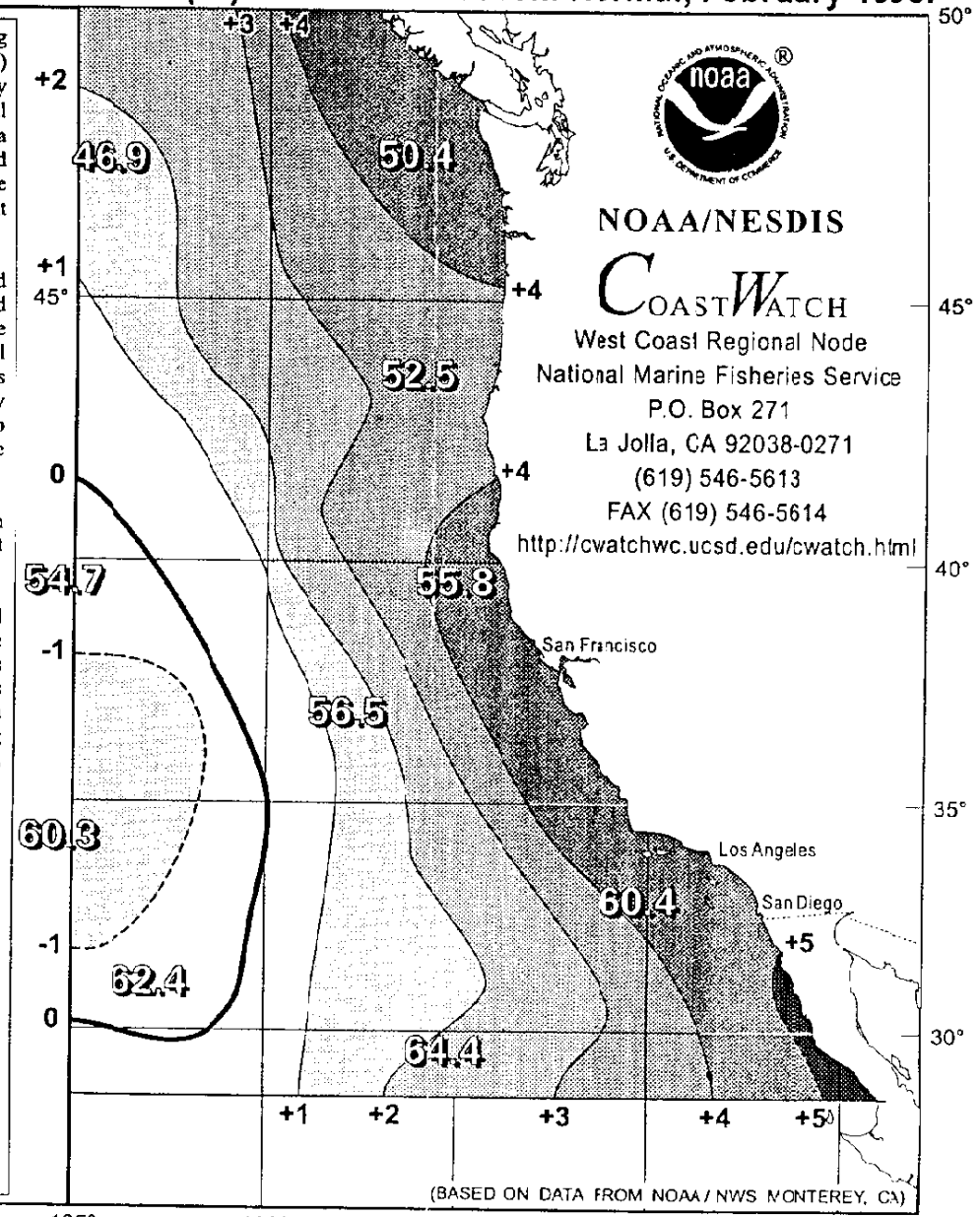
Despite, or perhaps as a consequence of, high winds and heavy seas experienced along much of the U.S. west coast in February, coastal sea surface temperature (SST) anomalies remained strongly positive. There was little change in the SST anomaly pattern for February from that seen the past couple of months. Most of the coastal waters off the western U.S. were 4°F above normal, with a small area off upper Baja California that was 5°F above normal. There was a slight reduction of the observed anomaly off San Francisco from January, and a slight increase in the anomaly off the Pacific northwest. The region offshore central California that has exhibited a slight negative anomaly expanded somewhat in February over January values.

Several storms which hit the western U.S. coast in February followed the southward displaced southern jet stream track associated with El Niño, and came ashore around central California. The predominantly warm southerly winds associated with these storms resulted in anomalously strong downwelling in coastal waters from central California north to Canada. Seasonally low upwelling, off southern California, was near normal. Observations during cruises at sea in February noted very low zooplankton abundance and a lack of upwelling in coastal waters. The observed deep mixed layers of from 70-100 meters and warm winds likely buffered any possible cooling effects from storm mixing of surface and subsurface waters.

Equatorial El Niño conditions remain strong with a large positive SST anomaly from the coast of South America westward to the dateline. Models continue to predict that these conditions will remain until late Spring or early Summer.

Warm water conditions off southern California have resulted in the continued presence of yellowtail in coastal waters. Southern California sport fishermen have landed 10,000 yellowtail since the beginning of 1998, when fishing for this species doesn't normally begin until April or May. The residual warm water which is expected to carry over into the Spring and normal seasonal warming bodes well for a strong sportfishing year for seasonal migrants from tropical waters. Early spawning of anchovy and sardine was also noted throughout the southern California Bight in February, indicating the presence of quantities of these baitfish.





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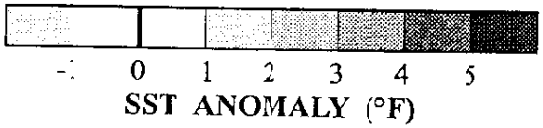


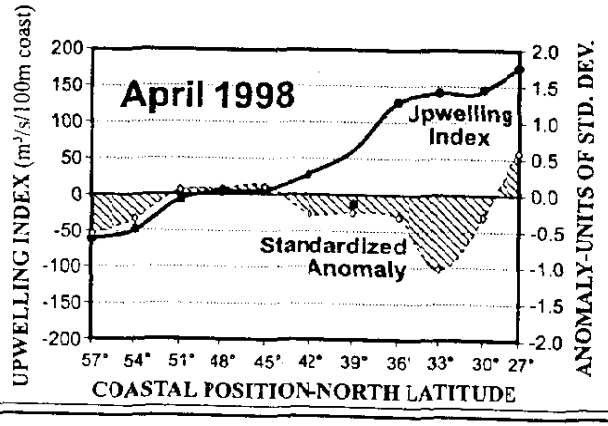
El Niño Watch, Advisory no. 98-4. Coastal Ocean Mean SST(°F) and Deviation From Normal, April 1998.

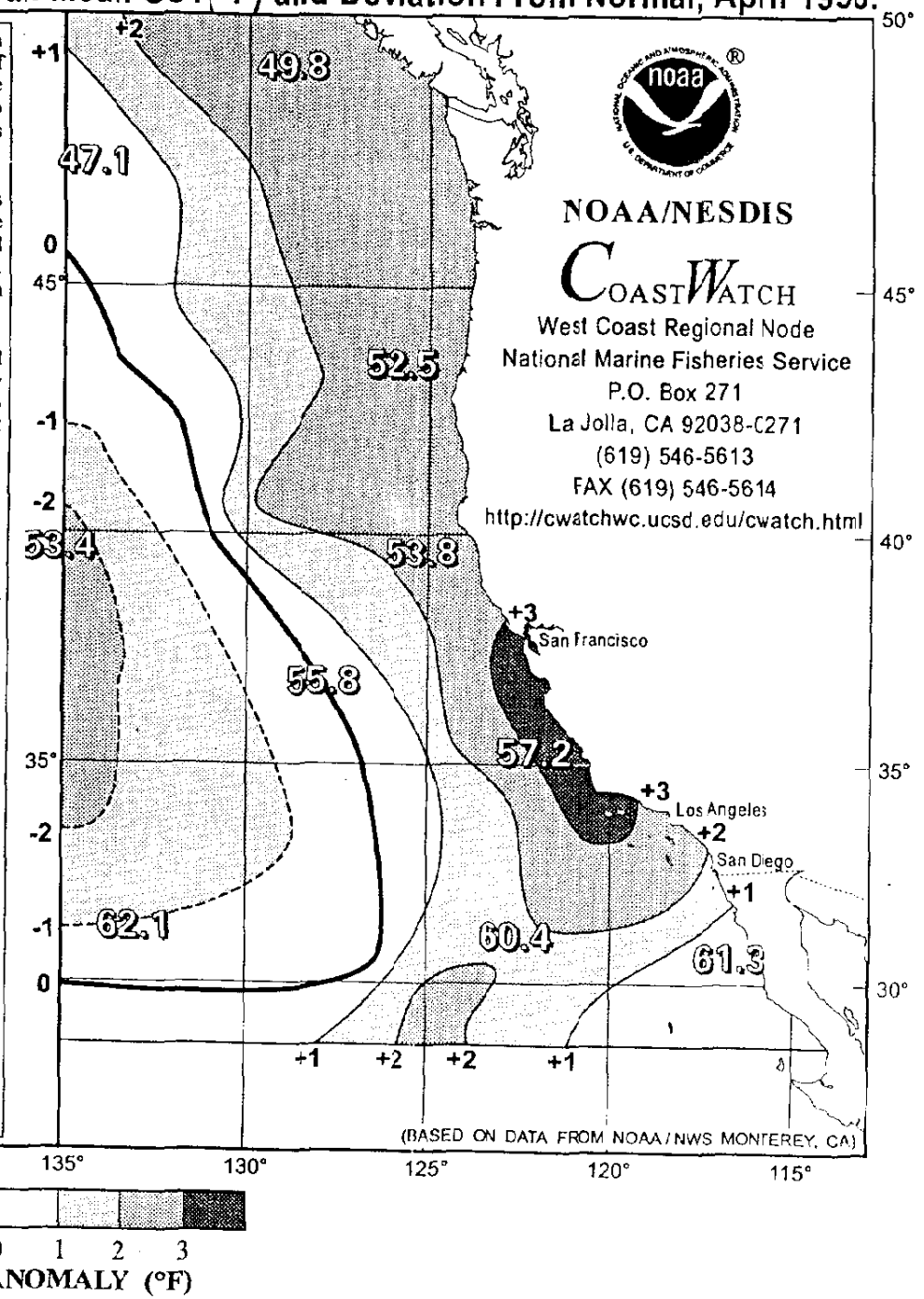
El Niño conditions in the Eastern Tropical Pacific remained strong in April, with positive sea surface temperature (SST) anomalies of greater than 3°C (5.4°F) east of 90°W longitude and greater than 2°C (3.6°F) east of 130°W. A negative subsurface temperature anomaly indicative of mature warm episode conditions continues to expand from the western Pacific into eastern Pacific waters as far as 120°W. Modelers predict that equatorial El Niño SST conditions will return to normal by June-July.

Positive SST anomalies observed off the U.S. west coast in April were about 1°F less than those observed in March. SSTs along the coast continue to be 2°-3°F above normal, while a core of cooler than normal water persists 350 miles offshore central California. Upwelling indices in April were near normal along the U.S. west coast. Research cruises in April observed only minor upwelling in waters of the southern California Bight, reflecting the slightly below normal upwelling index for this region.

Research cruises conducted in April by the National Marine Fisheries Service and Scripps Institution of Oceanography found that although SSTs were near or slightly above normal, subsurface temperatures at a depth of 100 m (300 ft) were 2.5°C (4.5°F) above normal in coastal waters of southern and central California, and as much as 5°C (9°F) above normal beyond 100 miles offshore. Zooplankton volumes in net tows taken were also very low for this time of year. Anchovy and sardine spawning were observed within the Southern California Bight, with heavy sardine spawning seen north of Pt. Conception and extending to at least San Francisco. A high incidence of jack mackerel spawning was seen in offshore waters.

Other biological effects have been reported as well. Southern California sport fishermen have landed over 40,000 yellowtail since January and report good catches of barracuda, bonito, calico and sand bass. An albacore tuna was caught at San Juan Seamount in mid-April. Salmon fishermen along the Pacific coast have reported that some runs of salmon are occurring with below-normal sized fish showing up. Seals and sea lions appear to be extremely stressed, with very low pup survival observed in breeding colonies. The occurrence of larval rockfish in surveyed areas is very low, indicating poor recruitment.





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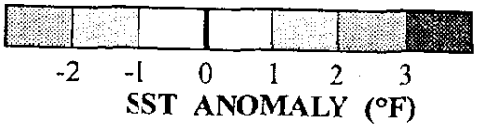


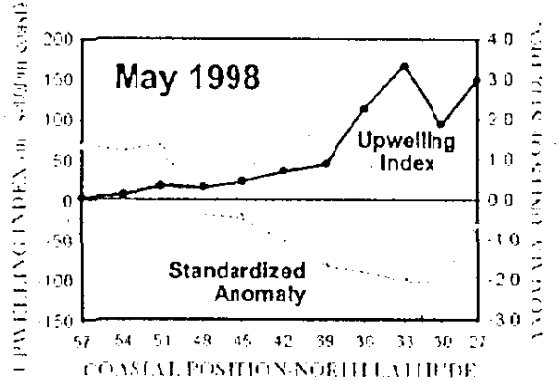
El Niño Watch, Advisory no. 98-5. Coastal Ocean Mean SST(°F) and Deviation From Normal, May 1998.

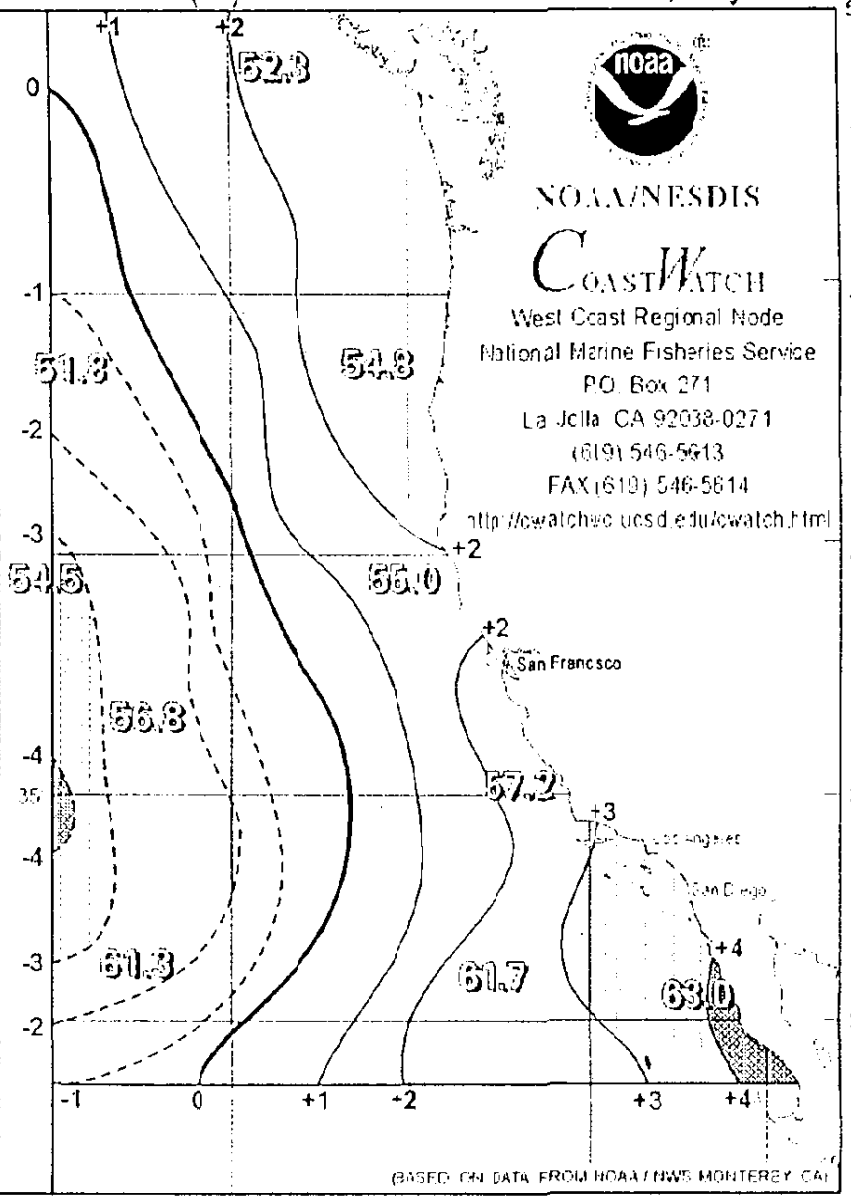
The magnitude of the positive sea surface temperature (SST) anomalies measured in the equatorial Pacific decreased in May. A positive SST anomaly of 2°C (3.6°F) persisted off the coast of South America out to about 110°W longitude, but decreased west of that area to an anomaly value of zero, with normal SSTs at 170°W and slightly below normal west of the dateline. Early indications in June are that the positive SST anomaly along the equator continues to decline towards normal values or even slightly below normal.

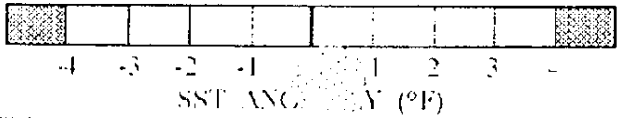
Along the U.S. west coast, positive SST anomalies were again observed in coastal waters from Baja California, Mexico to Vancouver Island, Canada. The region off Canada and the Pacific Northwest showed little change from anomaly values observed in April remaining 2°F above normal. Central California coastal SST anomalies dropped about 1°F from April values, to 2°F above normal. Southern California coastal waters showed the greatest change since April, increasing from 1°-3°F above normal to 3°-4°F above normal. A core of colder than normal water which has existed in offshore waters off California and southern Oregon was even cooler than normal in May, with observed negative SST anomalies as low as -4°F.

The upwelling indices provided by the NMFS Pacific Fisheries Environmental Lab in Monterey show that upwelling was well below normal along the coast from central California to northern Baja California, Mexico. This fact combined with the residual warmer than normal subsurface waters which have been observed off Southern California likely accounts for the increase in the positive SST anomaly off Southern California. Despite the continued breakdown of El Niño conditions in the equatorial Pacific we expect residual effects to keep local SSTs slightly above normal through the summer off much of the western U.S. coast.

Southern California sport fishermen continued to catch yellowtail in May, along with barracuda and bonito. Sporadic catches of albacore tuna, mixed with bluefin and yellowfin tuna off upper Baja California in late May gave way to good catches of albacore just 40 miles west to southwest of San Diego the last couple of days in May and into early June. Albacore were also reported off of Morro Bay, California. Good salmon fishing was reported along the northern portion of the Southern California Bight around Santa Barbara and Ventura following periods of strong winds which cooled water temperatures. Good salmon fishing was also reported off of central California.







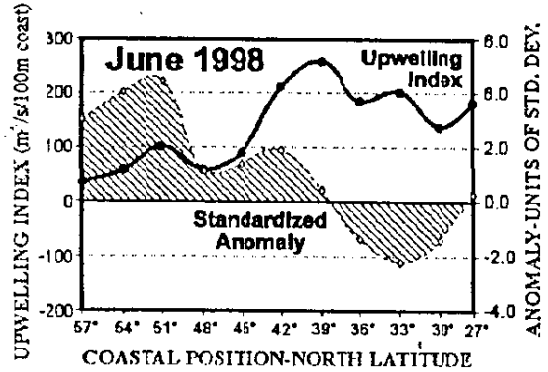
El Niño Watch, Advisory no. 98-6. Coastal Ocean Mean SST(°F) and Deviation From Normal, June 1998.

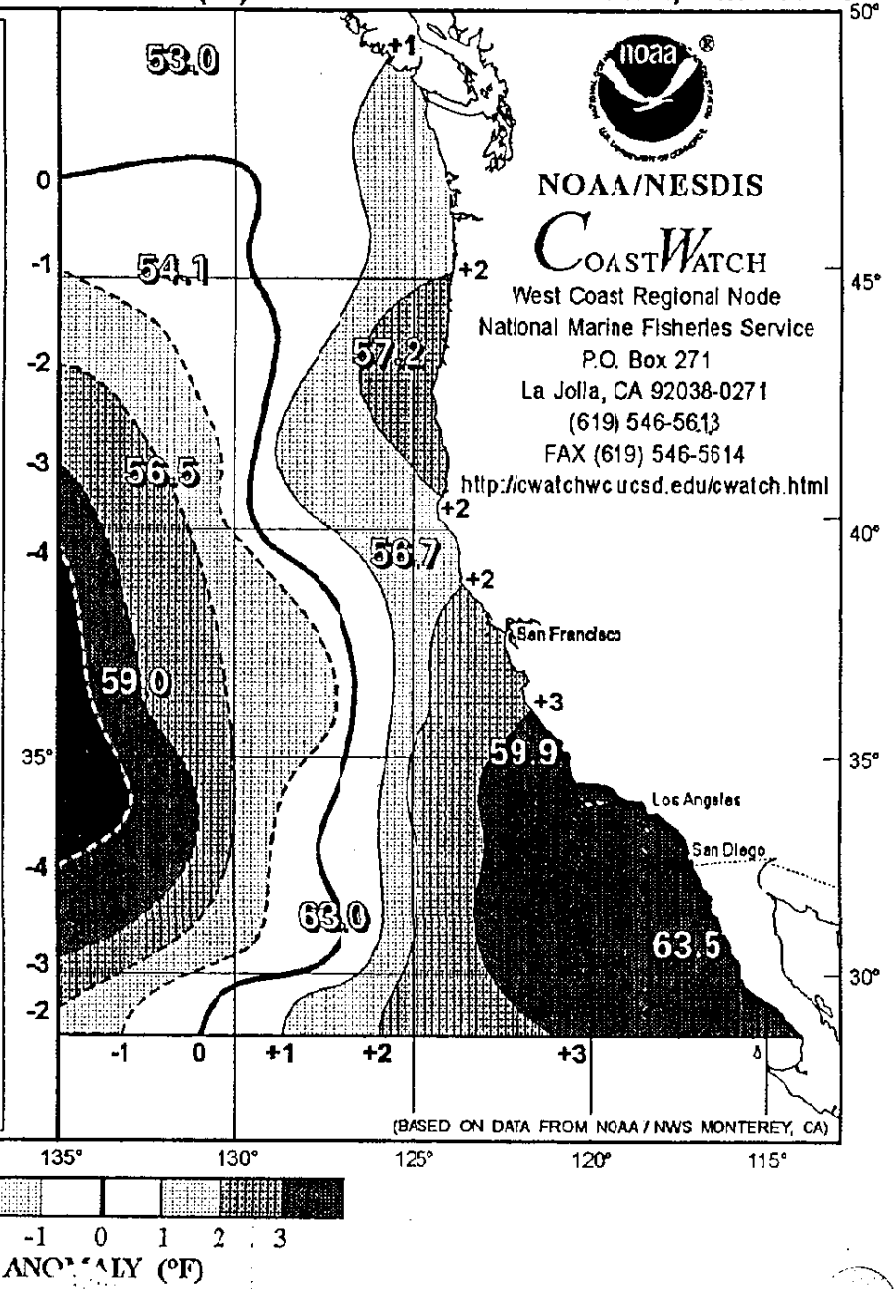
The sea surface temperatures (SSTs) in the equatorial Pacific ocean which have been well above normal for over a year during the El Niño episode, dropped rapidly in May and June and are now below normal between 110°W and 170°W longitude. This rapid change seems to indicate a shift from an El Niño to a La Niña condition. Forecasts by various models indicate a shift to cold episode, or La Niña conditions by the summer/fall of 1998 (Climate Prediction Center). Should these conditions persist into the winter of 1998-99 associated meteorological conditions could include: below normal precipitation in southern California, above normal precipitation across the Pacific Northwest, cooler than normal temperatures across the northern United States and parts of the eastern seaboard, and increased intensity and incidence of Atlantic hurricanes.

Observed SST anomalies off the U.S. west coast in June dropped slightly in coastal waters off the Pacific northwest but remained about the same as values observed in May off central and southern California. There was a very slight increase in intensity of the negative anomaly in the waters offshore of California. Most of the Pacific Northwest coastal waters were just over 1°F above normal except for the region around Cape Blanco which was over 2°F above normal. Central California SSTs remained about 2°F above normal and southern California waters were over 3°F above normal. Waters 600 miles offshore central California were as much as 4°F below normal.

The upwelling indices provided by the NMFS Pacific Fisheries Environmental Lab in Monterey show that the normal strong seasonal downwelling in June off the Pacific northwest region was replaced by slight upwelling, a shift of four standard deviations from normal. Upwelling off of southern California was greatly reduced in June, being two standard deviations below normal. Increased upwelling and associated wind conditions off the Pacific northwest likely accounts for the reduction in the positive SST anomaly in that region. Likewise, reduced upwelling in southern California has allowed coastal waters to warm and maintain the observed positive SST anomaly.

Sport fishermen continued to benefit from the warmer than normal SSTs in southern California with good to excellent landings of albacore tuna, yellowtail, Pacific barracuda and bass. Albacore tuna are being caught off upper Baja California, Mexico, southern and central California and as far north as Oregon. Yellowtail continue to be landed by sport fishermen in southern California waters and off upper Baja. Barracuda and bass have also appeared in large numbers in coastal waters of California. Salmon fishing has been reported as good, although many fish are reported to be small this year.





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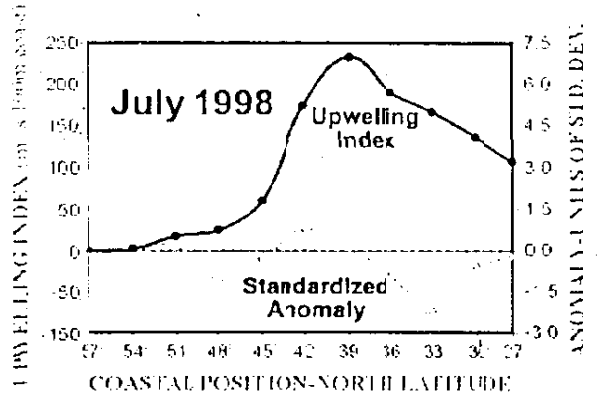
Sun Jul 12 19:58:00 PDT 1998 CoastWatch West Coast Regional Node (+1 619 546 5614) —> Roy Lowe pg 11/11

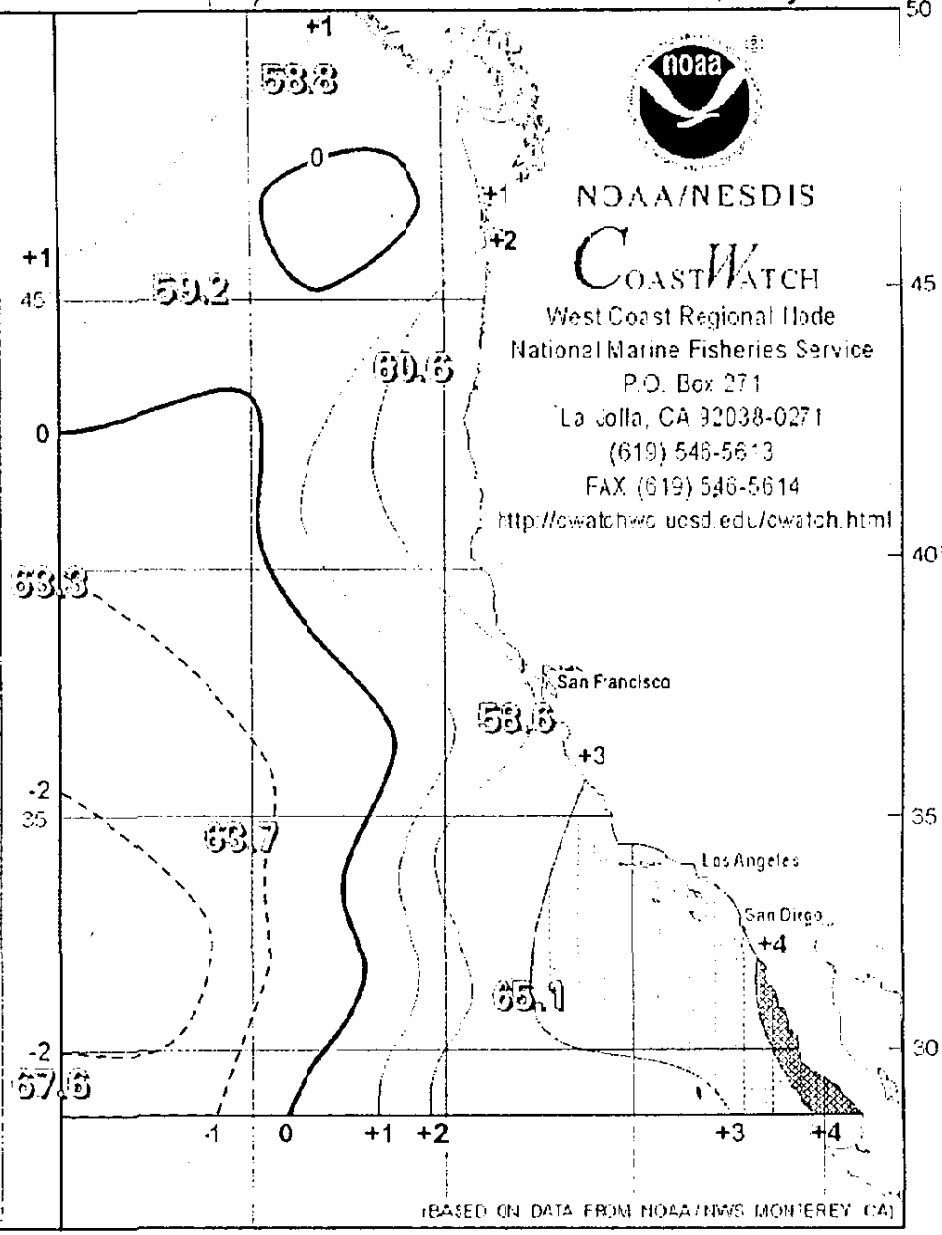
El Niño Watch, Advisory no. 98-7. Coastal Ocean Mean SST(°F) and Deviation From Normal, July 1998.

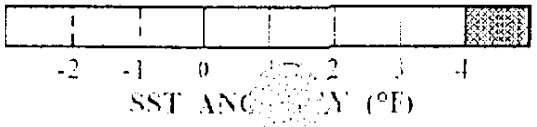
Near normal strength easterly winds have prevailed at the equator since May which have strengthened equatorial upwelling. The cooler than normal SST in the central equatorial region (110 W - 170 W) found in June continued to develop and to spread both eastward and westward. While positive SST anomalies continue close to the South American coast their magnitude is decreasing. These developments continue to match the consensus found in statistical and coupled model forecasts which predict a cold episode in the latter half of 1998 (Climate Prediction Center).

The changes from June to July have been actually rather small. This appears to be the case both at the equator and in the region off the U. S. west coast covered by our map. The largest changes off California occurred offshore; the region near 35°N, 135°W which had an SST anomaly of a negative 4°C in June now has an anomaly of negative 2°C. All the other changes have been 1 degree or less and the overall pattern remains the same. The coastal zone continues to be slightly above normal with only the southern California and Baja California exceeding +3°C. Earlier observations showed that the ocean warming experienced in the coastal zone during the El Niño had extended to considerable depth. We anticipate that these positive anomalies will dissipate slowly given normal driving forces.

The coastal upwelling indices supplied by the NMFS Pacific Environmental Lab show a mix of coastal regions both slightly above and below normal upwelling. North of 45°N upwelling is seasonally weak or non-existent. Where upwelling is seasonally strongest (39°N) it matches the long-term mean. Only off southern California is upwelling weaker than normal by 2 standard deviations. This latter condition may help explain the lingering SST anomalies above +3°C.







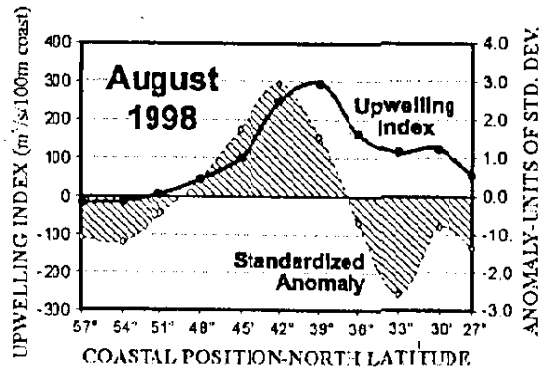
Thu Aug 13 08:02:44 PDT 1998 /cwatch/west_coast_regional_node (+1 619 546 5614) --> U.S. Fish and Wildlife Service pg 1 [1/1]

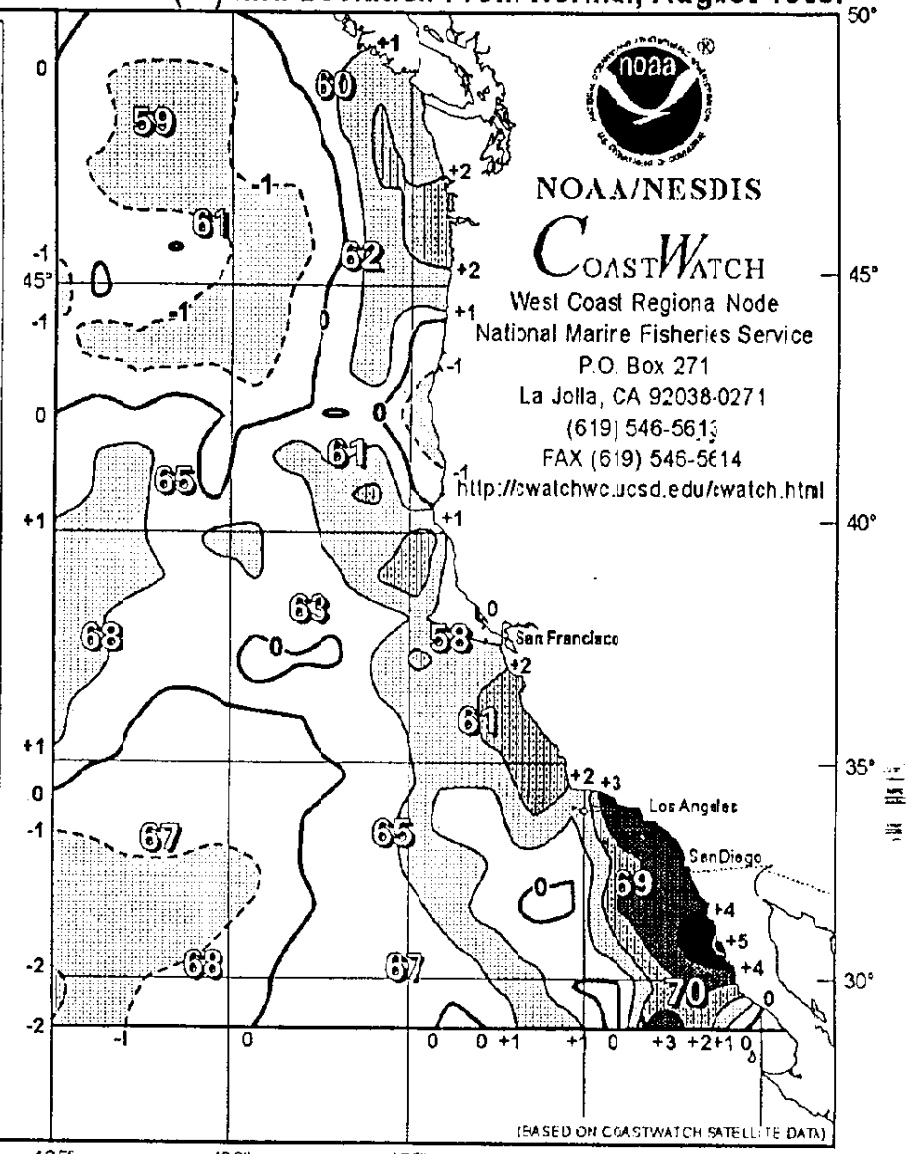
El Niño Watch, Advisory no. 98-8. Coastal Ocean Mean SST(°F) and Deviation From Normal, August 1998.

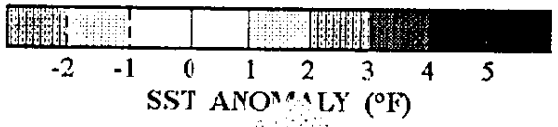
During August, there was little strengthening of the negative sea surface temperature (SST) anomalies in the east-central equatorial Pacific. SSTs along the equator remain 1°-2°C below normal between 120°W-175°W longitude. Subsurface temperatures in this region are as much as 8°C below normal, favoring a further strengthening of cold episode conditions. Statistical and coupled models forecast a strengthening of cold episode conditions during the remainder of 1998 and into the boreal Spring of 1999 (NOAA's Climate Prediction Center).

Along the U.S. west coast there were only minor changes in the August SST anomaly patterns from those observed in July. The coastal upwelling indices provided by the NMFS Pacific Environmental Lab show above normal upwelling off the California-Oregon border. This has resulted in localized upwelling and a reduction in the SST anomaly in that area from +2°F to a value of -1°F. SSTs in coastal waters along Washington and Vancouver Island, B.C. remain 1°-2°F above normal. There has also been a slight reduction of about 1°F in the positive anomalies observed off central California and southward offshore southern California. Strong positive SST anomalies up to 5°F persist in the southern California Bight and upper Baja California, Mexico where below normal upwelling indices are shown. Offshore SSTs are near normal, with anomalies of only 1°F above or below normal observed in August.

The continuation of warm water conditions off southern California has resulted in good sportfishing conditions for tropical species, notably yellowfin and bigeye tunas as well as dorado. Fishing for these species will likely continue to be good until local meteoroligical conditions cool SSTs. Albacore fishing has also reportedly been good from central California northward to Washington. A coastwide survey of sardines conducted during July-August found adult sardines as far north as northern Vancouver Island, B.C., as well as Pacific mackerel.

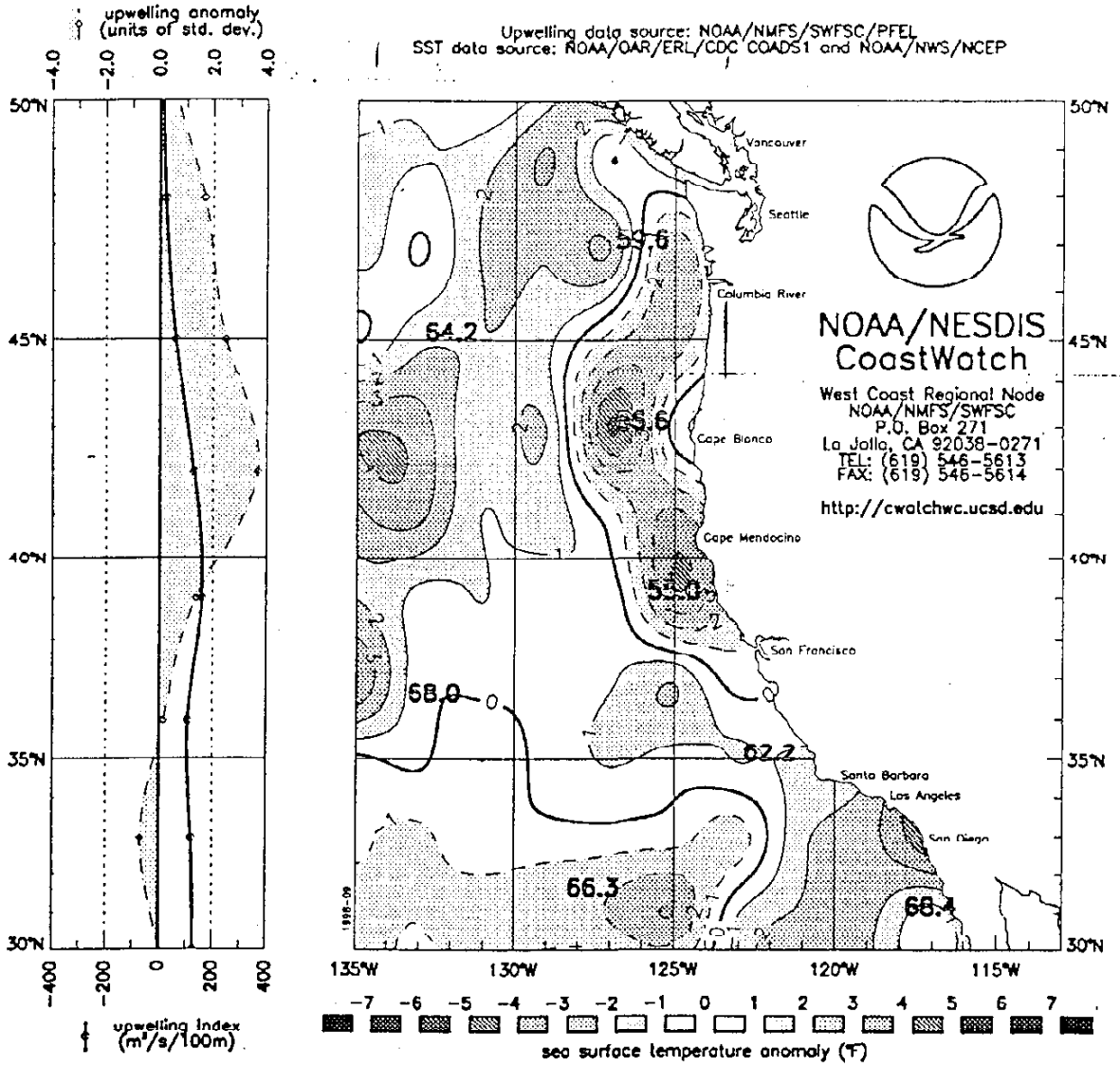






Fri Sep 18 02:17:55 PDT 1998 Coastwatch West Coast Regional Node (+1 619 546 5614) —> Roy Lowe pg [1/1]

El Niño Watch, Advisory 1998-09
Coastal Ocean Mean SST (°F) and Deviation from Normal, September 1998

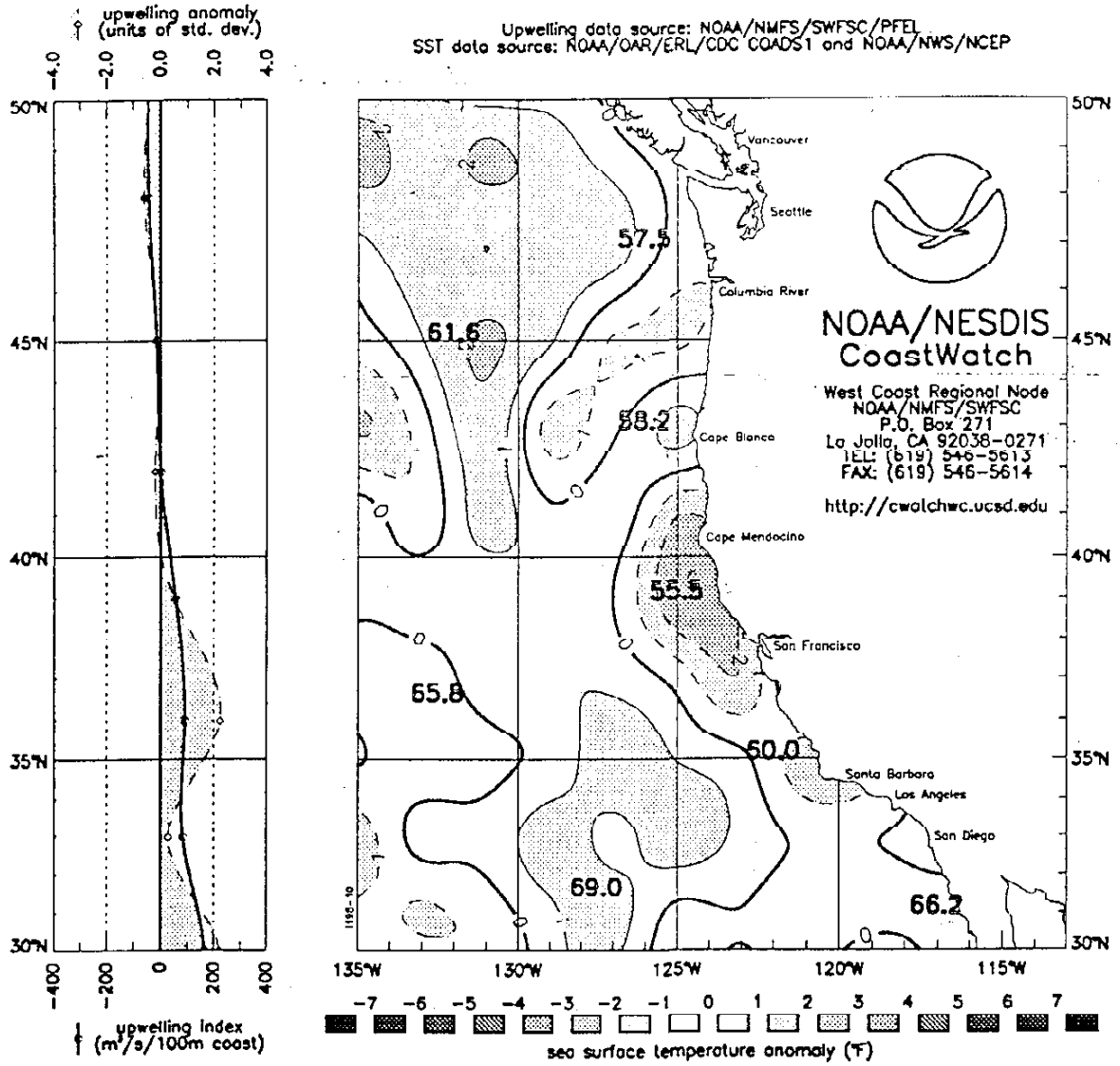


Beginning with the August 1998 Advisory, we began using a different data source for the sea surface temperature (SST) anomaly values. This data is no longer provided by the National Weather Service in Monterey. We now obtain the long-term mean data (1950-1979) from the Comprehensive Ocean-Atmosphere Data Set (COADS1) and monthly measurements from NOAA'S National Centers for Environmental Prediction (NCEP), courtesy of Richard W. Reynolds. The resolution of this data set is about twice that of our previous source so the anomaly charts will now have higher detail than in the past. In addition, the upwelling indices and anomaly values are now plotted adjacent to the SST anomaly chart to provide an improved visual impression of how they may be affecting coastal SSTs.

Throughout September there was little change in the equatorial SST anomaly, which remained 1°-2°C (1.8°-3.6°F) below normal across most of the central and eastern Pacific from 120°W to 175°W. Subsurface anomalies in this region continue to reach up to 8°C (14.4°F) below normal at depths of 100 meters.

Off the U.S. west coast there was a large cooling of coastal waters off Oregon and Washington. SST anomalies dropped as much as 4°F off Cape Blanco and 2°F off Washington. This decrease is likely attributable to the highly anomalous upwelling (near 1 to 2 standard deviations above normal) which occurred in September off northern California to Washington. Offshore northern California and southern Oregon there has been a increase of 1°-2°F in the warm anomaly pattern observed in August. The warm anomaly off southern California receded a bit in September and is now confined primarily to coastal waters where it increased by about 2°F. A CalCOFI cruise during September noted that although surface temperatures off southern California are nearing normal values, subsurface temperatures at 100 meters were still as much as 12°F above normal. The lack of any storm activity or high winds has assisted in the persistence of this warm anomaly.

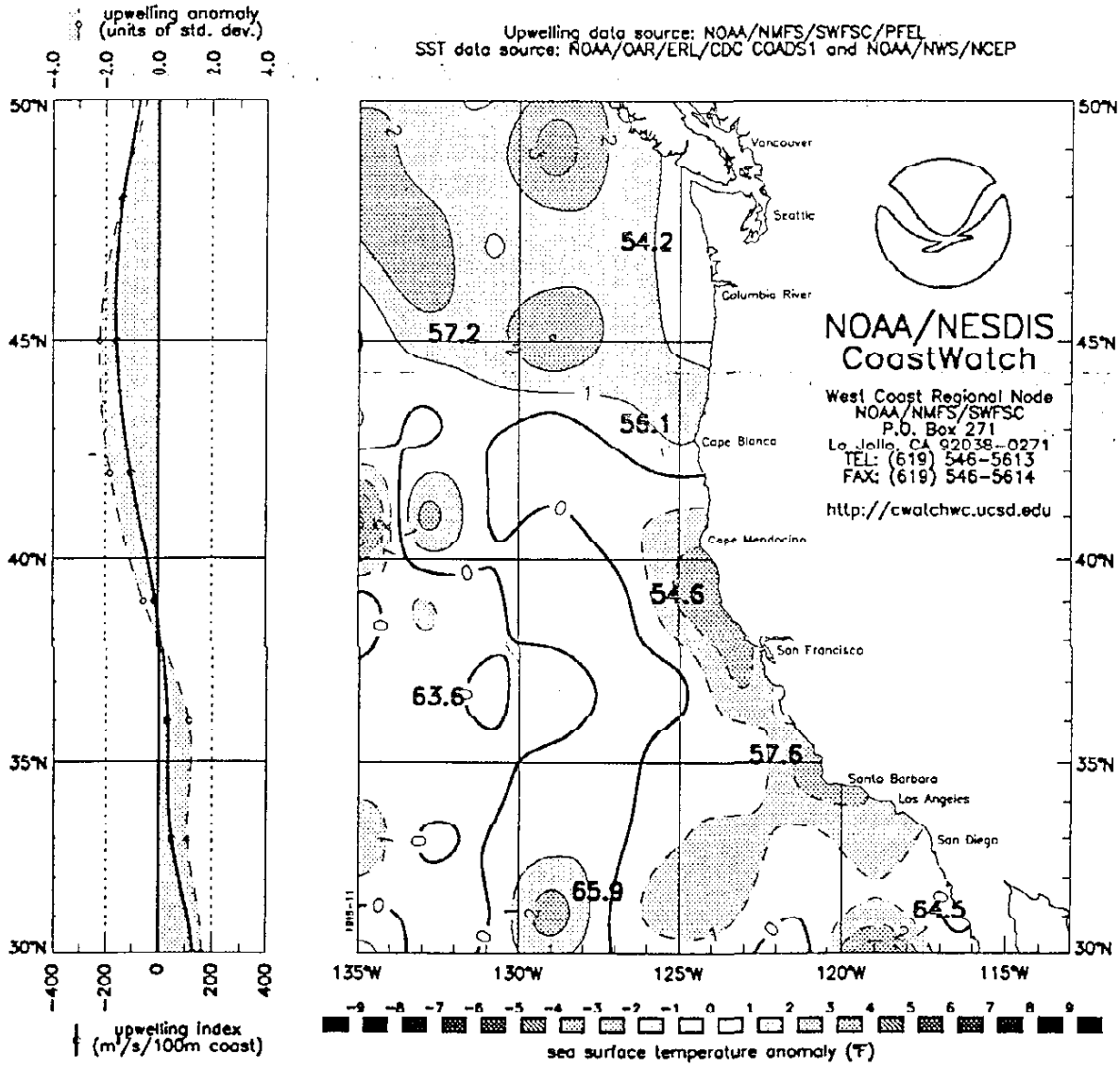
El Niño Watch, Advisory 1998-10
Coastal Ocean Mean SST (°F) and Deviation from Normal, October, 1998



The October sea surface temperature (SST) anomaly values show a return to almost normal SST conditions in Pacific Ocean waters off the western United States. There remains a slight negative anomaly of just below -2°F in near shore waters off Cape Mendocino and northern California. Offshore of Oregon and Vancouver Island, Canada a few spots greater than 2°F above normal persist as well. However, the remainder of the region shows SSTs within ±1°F of the long term mean. Above normal seasonal upwelling in October along the southern California coast likely contributed to the cooling of those coastal water. Elsewhere the seasonal upwelling was normal.

Data from the NOAA TAO buoy array indicate that the monthly SST anomaly along the equator was slightly reduced, being just less than -1.5°C (-2.7°F) at its coolest point. Below normal equatorial SSTs extended from 110°W to 150°E longitude, with a small area of above normal SSTs remaining against the coast of South America. The October equatorial subsurface temperature anomaly was also less extreme than that observed in September, being down to -6°C (-10.8°F) below normal at 125 meters rather than -8°C (-14.4°F).

El Niño Watch, Advisory 1998-11
Coastal Ocean Mean SST (F) and Deviation from Normal, November, 1998

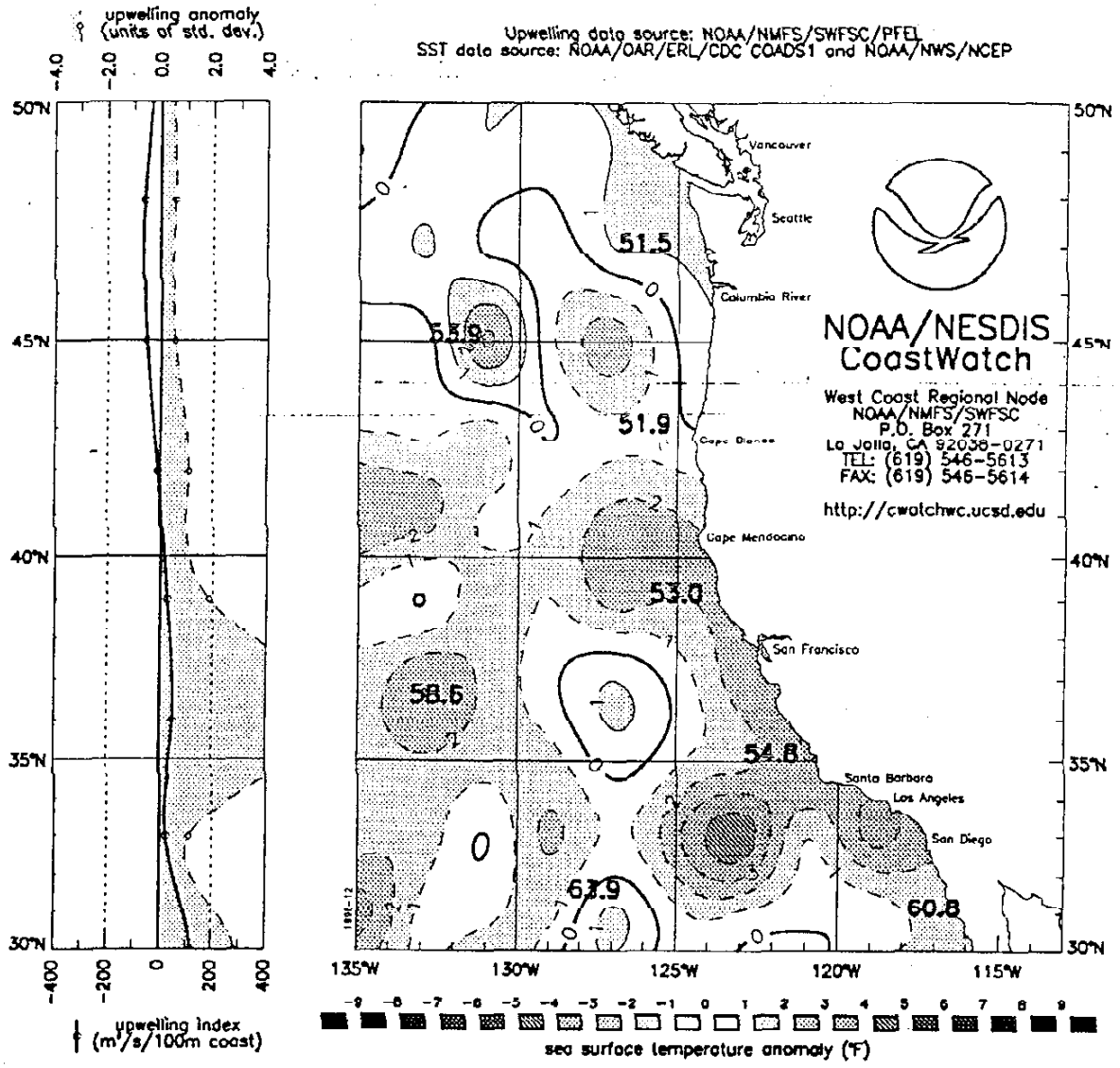


November sea surface temperature (SST) anomalies off the U.S. west coast changed only slightly from values observed in October. A slight negative anomaly of -2°F (-1.1°C) persisted in coastal waters off of central and northern California. A second region of below normal SSTs was located off Pt. Conception, CA. and extended 250 miles southwestward. Off the Pacific Northwest, SSTs were normal or slightly above normal, with most SSTs only 1-2°F (0.6-1.1°C) above normal values. The upwelling indices provided by PFEL in Monterey indicate that upwelling was slightly above normal off central and southern California and quite a bit below normal off the Pacific Northwest. These observed variations in normal wind fields and subsequent mixing and upwelling likely account for the slight deviations in the SST fields observed off the U.S. west coast in November.

Cold episode or "La Niña conditions" persist in the equatorial Pacific and are forecast to continue through the early part of 1999. Equatorial SST anomalies as reported by NOAA's TAO buoy array are negative from 90°W to 175°E, with values up to -3°C (-5.4°F). Subsurface temperature anomalies down to 100 meters depth are up to -5°C (-9°F) below normal. Forecast models are calling for a gradual decrease in the equatorial La Niña conditions in early 1999, with a return to normal SST values by mid-year.

El Niño Watch, Advisory 1998-12

Coastal Ocean Mean SST (°F) and Deviation from Normal, December, 1998



The December 1998 sea surface temperature (SST) anomalies along the U.S. west coast exhibit conditions considerably different than what we have been observing for the past several years when SSTs have generally been above normal. Coastal SSTs off California are about 2°F below normal, with a region up to 4°F below normal 200 miles southwest of Pt. Conception. A small region of slightly above normal SST remains off the Washington coast, although it is 1°F less than that observed in November. There has been an increase in the negative SST anomalies off California over those observed in November. The upwelling index provided by NOAA/PFEL in Monterey indicates that upwelling at 36°N was 6 standard deviations above normal in December. Although the actual upwelling index value at this point was a modest 51 $m^3/s/100$ m coast, the seasonal norm is 2 $m^3/s/100$ m coast, so this is a substantial variation. Upwelling is likely the cause of the increased negative SST anomaly off south-central California and offshore Pt. Conception. This anomaly pattern is quite a change from that observed in December of 1997 when coastal SSTs were up to 5°F above normal along most of the U.S. west coast.

The La Niña pattern in the equatorial Pacific has intensified somewhat in December. SST anomalies were 2°-3°C (3.6°-5.4°F) below normal from 115°W-170°W. Forecasters do not expect this pattern to return to normal until early summer of 1999. As expected, this La Niña pattern has caused shifts in meteorological patterns, with below normal precipitation in the southern California region and above normal precipitation in the Pacific Northwest.

Although local biological and fisheries effects from the observed below normal SSTs off the U.S. west coast are difficult to predict we would expect that one of the causal factors of increased upwelling would result in increased primary production and subsequently food available for marine organisms. Historically, La Niña years and the year following an El Niño have had good runs of albacore tuna off southern California.

FY97 TENYO MARU TRUSTEE COMMITTEE FUNDING - 9812-0019 & 9821-0019

BUDGET REQUEST FOR AERIAL PHOTOGRAPHIC CENSUSES BY ULRICH WILSON

WASHINGTON COMMON MURRE COLONIES

FY OTR	DCN OR PP# / Budgeted Amount	EXP#	SALARY $3,093.00		FILM & Processing $576.00		PHOTO CD'S $0.00		HELICOPTER FLTS (28 Hrs) $20,608.00		FUEL TRUCK $1,600.00	TOTAL BUDGET $25,877.00
97	13530-7-0009	15145			$192.45							
97	13530-7-0009	15524			$110.90							
97	13530-7-0009	16276			$243.15							
97	13590-7-9714	16215	$479.93									
97	13590-7-9715	16216	$892.97									
97	13590-7-9716	16217	$1,408.40									
97	98188-7-0385	15523						1st Flt	$3,434.35	1st Flt	$2,006.88	
97	98188-7-0474	16328						2nd Flt	$3,793.71			
97	98188-7-0490	16333						3rd Flt	$3,726.82			
	FUNDS EXPENDED		$2,781.30		$546.50		$0.00		$10,954.88		$2,006.88	$16,289.56
	FUNDS UNSPENT		$311.70		$29.50		$0.00		$9,653.12		($406.88)	$9,587.44