

Warm Pacific Ocean 'blob' facilitated vast toxic algae bloom

By PHUONG LE
Associated Press

SEATTLE — A new study finds that unusually warm Pacific Ocean temperatures helped cause a massive bloom of toxic algae last year that closed lucrative fisheries from California to British Columbia and disrupted marine life from seabirds to sea lions.

Scientists linked the large patch of warm ocean water, nicknamed the "blob," to the vast ribbon of toxic algae that flourished in 2015 and produced record-breaking levels of a neurotoxin that is harmful to people, fish and marine life.

The outbreak of the toxin domoic acid, the largest ever recorded on the West Coast, closed razor clam seasons in

Washington and Oregon and delayed lucrative Dungeness crab fisheries along the coast. High levels were also detected in many stranded marine mammals.

"We're not surprised now having looked at the data, but our study is the first to demonstrate that linkage," said Ryan McCabe, lead author and a research scientist at the University of Washington's Joint Institute for the Study of the Atmosphere and Ocean. "It's the first question that everyone was asking."

McCabe and his co-authors explain how the toxic algae bloom thrived in their study published in the journal *Geophysical Research Letters*.

Seasonal algae blooms are common each year along the West Coast, but most are not toxic. The scientists found that the algae bloom was dominated by a single species called "Pseudo-nitzschia australis" that is highly toxic. The algae survived and took advantage of warm, nutrient-poor conditions set up by the patch of water that was warmer at the surface than normal.

Coastal upwelling last spring — a seasonal event that brings nutrient-rich, cooler waters up from the deep ocean — provided nutrients for the algae to bloom into a large population fairly quickly at sea. Finally, a series of late spring storms delivered the bloom to the coast.

TV LISTINGS Evening listings FRIDAY-SUNDAY

FRIDAY EVENING												SEPTEMBER 30	
A	L	6 PM	6:30	7 PM	7:30	8 PM	8:30	9 PM	9:30	10 PM	10:30	11 PM	11:30
2	KATU	(2) KATU News at 6		Jeopardy!	Wheel of Fortune	Last Man St. (N)	Dr. Ken (N)	Shark Tank (N)		20/20		KATU News at 11	(35) H.S. Blitz
4	KOMO	(4) KOMO 4 News		Wheel of Fortune	Jeopardy!	Last Man St. (N)	Dr. Ken (N)	Shark Tank (N)		20/20		KOMO 4 News	(35) Jimmy Kimmel
5	KING	(5) NBC Nightly News	KING 5 News	KING 5 News	Evening	Superstore	The Good Place	Dateline NBC Investigative features are covered.				KING 5 News	(35) Tonight Show
6	KOIN	(6) KOIN 6 News at 6	CBS Evening News	Extra	Ent. Tonight	MacGyver "Metal Saw" (N)	Hawaii Five-0 (N)	Blue Bloods (N)				KOIN 6 News @ 11	(35) S. Colbert
7	KIRO	(7) KIRO 7 News	CBS Evening News	The Insider	Ent. Tonight	MacGyver "Metal Saw" (N)	Hawaii Five-0 (N)	Blue Bloods (N)				KIRO News	(35) S. Colbert
8	KGW	(8) KGW News at 6:00 p.m.		Live at Seven	Inside Edition	Superstore	The Good Place	Dateline NBC Investigative features are covered.				KGW News at 11	(35) Tonight Show
9	KRCW	(9) Last Man Standing	Last Man Standing	Modern Family	Modern Family	Illusion (N)	Masters of Illusion	Penn&Teller "To Tea or Not to Tea"		KGW News at 10	Two and a Half	Two and a Half	Met Your Mother
10	KOPB	(10) Burt Wolf: Travels	Business (N)	PBS NewsHour		Wash. Week (N)	Hollywood Idols	Place Call Home	(45) Place Call Home	"That's Amore"	Masterpiece Classic	"Indian Summers"	Film School Shorts
12	KPTV	(12) 6 O'Clock News	Timbers in 30	Family Feud	Family Feud	Hell's Kitchen "Crepe Grand Prix" (N)	The Exorcist (N)	10 O'Clock News		10 O'Clock News	2 Broke Girls	11 O'Clock News	2 Broke Girls
13	KPDX	(13) Mike & Molly	Mike & Molly	Big Bang Theory	Big Bang Theory	FOX 12's 8 O'Clock News on PDX-TV	FOX 12's 9 O'Clock News on PDX-TV	The Simpsons	Family Guy	The Simpsons	American Dad	Cleveland Show	The Simpsons
19	KCPQ	(19) Modern Family	Modern Family	Big Bang Theory	Big Bang Theory	Hell's Kitchen "Crepe Grand Prix" (N)	The Exorcist (N)	10 O'Clock News		10 O'Clock News	Most Wanted	The Simpsons	The Simpsons
20	TBS	(20) Seinfeld	Seinfeld	Eleague "Overwatch Open Grand Final" (L)				Big Bang Theory	Big Bang Theory	Bob's Burgers	Bob's Burgers	Seinfeld	Seinfeld
22	KZJO	(22) Two and a Half	Two and a Half	Last Man Standing	Last Man Standing	Modern Family	Modern Family	Q13 News at 9		Big Bang Theory	Big Bang Theory	Friends	Friends
29	ESPN	(29) NCAA Football	Stanford at Washington State: Husky Stadium -- Seattle, Wash. (L)					SportsCenter		SportsCenter		SportsCenter	
30	ESPN2	(30) (4:00) MLB Baseball (L)		Baseball Tonight (L)	NCAA Football	Toledo at BYU Site: Lavell Edwards Stadium -- Provo, Utah (L)				(15) Baseball Tonight (L)		Jalen & Jacoby (N)	NFL's Greatest
31	NICK	(31) Henry Danger	Henry Danger	Crashletes (N)	Mega Life (N)	All In/ Cam (N)	Game Shakers	Garfield: The Movie '04	Breckin Meyer	Full House		Friends	Friends
32	DISN	(32) Backstage (N)	Liv and Maddie	Bunk'd	Elena Avalor (N)	Liv Maddie Cali (N)	Bunk'd (N)	K.C. Undercover	Bizaardvark	Star vs. Forces/Evil	Star vs. Forces/Evil	LEGO Freemaker	Liv Maddie Cali
34	FAM	(34) (5:30) *** Love and Basketball (2000, Romance)	Omar Epps, Alfre Woodard, Sanaa Lathan.					*** Save the Last Dance (2000, Drama)	Sean Patrick Thomas, Kerry Washington, Julia Stiles.			The 700 Club	
35	FMC	(35) Movie	(40) *** Star Trek: Into Darkness (2013, Sci-Fi)	Zachary Quinto, Zoe Saldana, Chris Pine.				(20) FXM Presents	*** Takers (2010, Action)	Matt Dillon, Hayden Christensen, Chris Brown.		(40) FXM Presents	
36	LIFE	(36) Grey's Anatomy "Idle Hands"		Grey's Anatomy "Can't Fight This Feeling"	Grey's Anatomy "She's Killing Me"	Grey's Anatomy "Sleeping Monster"	Grey's Anatomy "Do You Believe in Magic?"	Grey's Anatomy "Readiness Is All"				Grey's Anatomy "Readiness Is All"	
38	ROOT	(38) (4:30) MLS Soccer	Mariners-Pre-game	MLB Baseball Oakland Athletics at Seattle Mariners Site: Safeco Field -- Seattle, Wash. (L)				Post-game		MLB Baseball Oakland Athletics at Seattle Mariners			
39	F51	(39) (5:00) To Be Announced								MLB Whiparound (L)		Fox Sports Live	Skip and Shannon: Undisputed
43	SPIKE	(43) Jail: Las Vegas	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Skip and Shannon: Undisputed	Jail
44	COM	(44) Futurama/Futura	(55) Futurama "Jurassic Bark" (L)			(25) Futurama	(55) South Park	South Park	South Park	Kevin Hart: I'm a Grown Little Man		Kevin Hart: Seriously Funny	
45	HIST	(45) Aliens "The Doomsday Prophecies"		"Ancient Aliens "Aliens and Monsters"			Aliens "Secrets of the Pyramids"	Ancient Aliens "Shiva the Destroyer"		Doomsday (N)		Kevin Hart: Seriously Funny	
46	A&E	(46) The First 48		First 48 "Closing Time! Family Matters"			The First 48 "The Fighter/ Final Ride"	The First 48		The First 48 "Chopper"		(05) The First 48 "Ringside Seat"	
47	TLC	(47) Say Yes-Dress	Say Yes-Dress	Dateline NBC "Indiscretion"			Dateline NBC "The Collector"	Dateline "Mystery on Sunrise Drive"		Dateline "Mystery on Sunrise Drive"		(05) Dateline "Mystery on Sunrise Drive"	
48	DISC	(48) Deadliest Catch "Lost at Sea"		Bering Sea Gold "Double Jeopardy"			Bering Sea Gold "Backseat Diver"	Bering Sea Gold "Lady Luck" (N)		Bering Sea Gold		Bering Sea Gold "Lady Luck"	
49	NGEO	(49) Primal Survivor "Extreme Cold"		Primal Survivor "Deadly Waters"			Live Free or Die "Bring It Home"	Live Free or Die "Home Stretch"		Wicked Tuna "Luck Be a Tuna Tonight"		Primal Survivor "Tropics"	
50	TNT	(50) Bones "The Spark in the Park"		Bones "The Ghost in the Killer"			*** Red 2 (2013, Action)	Helen Mirren, John Malkovich, Bruce Willis.		*** Red (2010, Action)	Sam Worthington, Christian Bale.	*** Red (2010, Action)	Mary-Louise Parker, Bruce Willis.
51	AMC	(51) (5:00) *** John Carter (2012, Action)		Lynn Collins, Willem Dafoe, Taylor Kitsch.			*** Men in Black (1997, Sci-Fi)	Tommy Lee Jones, Vincent D'Onofrio, Will Smith.		*** Terminator Salvation (09)	Sam Worthington, Christian Bale.		
52	USA	(52) Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family	Modern Family
53	FOOD	(53) Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins
54	HGTV	(54) TinyHouseHunters	TinyHouseHunters	TinyHouseHunters	TinyHouseHunters	TinyHouseHunters	TinyHouseHunters	Love It or List It "Sink or Swim"		Love It or List It		House Hunters (N)	House Hunters
56	FX	(56) *** How to Train Your Dragon (10)		Gerard Butler, Jay Baruchel.			*** How to Train Your Dragon 2 (2014, Animated)	Kit Harington, Kristen Wiig, Jay Baruchel.		*** How to Train Your Dragon (10)	Jay Baruchel.		
57	CNN	(57) Anderson Cooper 360		All Business: The Essential Donald Trump (2016, Documentary)			Unfinished Business: The Essential Hillary Clinton (2016, Documentary)			Unfinished Business: The Essential Hillary Clinton (2016, Documentary)		Anthony Bourdain "Hanoi"	
58	FNC	(58) The Kelly File With Megyn Kelly		Hannity			The O'Reilly Factor			Hannity		On the Record	
61	CNBC	(61) Undercover Boss "O'Neill Clothing"		Undercover Boss "Buffets, Inc."			Green "Silk Road: Digital Drug Dealers"			Amer. Greed "Jamaican Lottery Scam"	American Greed "The Sky's the Limit"	Paid Program	Paid Program
63	BRAV	(63) Real Housewives "The Moral Minority"		The Real Housewives			Real Housewives "Bye, Bye, Beadors"			Reunion (SF) (N)	*** The Holiday '06, Rom)	Kate Winslet, Cameron Diaz.	
64	TCM	(64) (5:00) *** Reds (1981, History)	Diane Keaton, Jack Nicholson, Warren Beatty.				*** Under Fire (1983, Drama)	Gene Hackman, Joanna Cassidy, Nick Nolte.		(45) *** A Bridge Too Far (77)	James Caan, Dirk Bogarde.		
65	SYFY	(65) (3:30) The Hulk	*** G.I. Joe: The Rise of Cobra '09	Christopher Eccleston, Adewale Akinnuoye-Agbaje.			Z Nation "Murphy's Miracle" (N)			Van Helsing "Stay Inside" (N)		Z Nation "Murphy's Miracle"	
69	RFD	(69) Country Reporter	FarmHer	Joey Canyon	Roping and Riding	TruCountry	Rural Eve. News	Country's Family Reunion "CFR 2010"		Country Reporter	Virginia Dreams	Time Life Library	

SATURDAY EVENING												OCTOBER 1	
A	L	6 PM	6:30	7 PM	7:30	8 PM	8:30	9 PM	9:30	10 PM	10:30	11 PM	11:30
2	KATU	(2) (5:05) NCAA Football	Louisville at Clemson (L)			(20) Studio	Paid Program	MyDestination.TV	Paid Program	Wheel of Fortune	Jeopardy!	KATU News at 11	(35) Castle
4	KOMO	(4) (5:05) NCAA Football	Louisville at Clemson (L)			(20) Studio	Paid Program	MyDestination.TV	Paid Program	Wheel of Fortune	Jeopardy!	KOMO 4 News	(35) Castle
5	KING	(5) KING 5 News		L.M. Traveler	Raw Travel	The Voice "The Blind Auditions 3"	This Is Us "The Big Three"	48 Hours	48 Hours	48 Hours	48 Hours	KING 5 News	Sat. Night (SP) (N)
6	KOIN	(6) KOIN Local 6 at 6	Weekend News	Entertainment Tonight	Weekend	Scorpion "The Fast and the Nerdiest"	Scorpion "The Fast and the Nerdiest"	48 Hours	48 Hours	48 Hours	48 Hours	KOIN 6 News @ 11	(35) Up Late NW
7	KIRO	(7) Weekend News	KIRO 7 News	Steve Raible	Insider Weekend	Scorpion "The Fast and the Nerdiest"	Scorpion "The Fast and the Nerdiest"	48 Hours	48 Hours	48 Hours	48 Hours	KIRO News	(35) Scandal
8	KGW	(8) Grant's Getaways	Straight Talk	Give (P) (N)	Champion (P) (N)	The Voice "The Blind Auditions 3"	This Is Us "The Big Three"	Saturday Night Live		KGW News at 10	(35) Person of Interest	KGW News at 11	Sat. Night (SP) (N)
9	KRCW	(9) Modern Family	Modern Family	WHL Hockey	Portland Winter Hawks vs. Seattle Thunderbirds			Just for Laughs		Father Brown "The Hangman's Demise"		Masterpiece Classic "Poldark"	
10	KOPB	(10) Great British Baking	Masterclass 1"	Travel: Art Wolfe	Staves' Europe	Globe Trekker "Paris City Guide"		Doc Martin "Listen With Mother"		10 O'Clock News		Hell's Kitchen	
12	KPTV	(12) (5:30) NCAA Football (L)						TMZ		CSI: Miami "Permanent Vacation"		CSI: Miami "Going Ballistic"	
13	KPDX	(13) (5:30) NCAA Football (L)						The X-Files "Pilot"		10 O'Clock News		Modern Family	Modern Family
20	TBS	(20) 2 Broke Girls	2 Broke Girls	2 Broke Girls	2 Broke Girls	Big Bang Theory	Big Bang Theory	Pawn Stars	Pawn Stars	Big Bang Theory	Big Bang Theory	Full Frontal	Movie
22	KZJO	(22) Bones "The Bones That Foam"		The X-Files				Q13 News at 9	Seahawks	Most Wanted	Name Game	Name Game	Anger Manage
29	ESPN	(29) (4:00) NCAA Football (L)		Football Score.	NCAA Football (L)					(15) Football Final	Reviews of the current day's match-ups. (L)	Top Ten	
30	ESPN2	(30) (4:00) Hockey	SportsCenter	(15) NCAA Football (L)									
31	NICK	(31) The Thundermans	The Thundermans	Henry Danger	Henry Danger	Henry Danger (N)	Game Shakers (N)	School of Rock (N)	The Thundermans	Full House	Full House	Friends	Friends
32	DISN	(32) Jessie	Stuck in Middle	Girl Meets World	Liv and Maddie	Bizaardvark	K.C. Undercover	Bunk'd	Bunk'd	Gamer Guide	Kirby Buckets	K.C. Undercover	Friends Whenever
34	FAM	(34) Movie	(50) *** Hitch (2005, Comedy)	Eva Mendes, Kevin James, Will Smith.				*** Titanic (1997, Drama)	Kate Winslet, Billy Zane, Leonardo DiCaprio.				
35	FMC	(35) (5:00) *** The Wolf of Wall Street (2013, Drama)	Jonah Hill, Kyle Chandler, Leonardo DiCaprio.			(40) *** The Wolf of Wall Street (2013, Drama)	Jonah Hill, Kyle Chandler, Leonardo DiCaprio.						
36	LIFE	(36) Kept Woman (2015, Drama)	Shaun Benson, Courtney Ford.			My Husband is Missing (2016, Thriller)	Aaron Pearl, Nicole Munoz, Daphne Zuniga.			A Wife's Nightmare (2014, Drama)	Dylan Neal, Lola Tash, Jennifer Beals.		
38	ROOT	(38) MLB Baseball Oakland Athletics at Seattle Mariners Site: Safeco Field -- Seattle, Wash. (L)						Post-game		MLS Soccer Portland Timbers at Colorado Rapids		Post-game (N)	
39	F51	(39) (5:30) NASCAR Truck Racing	DC Solar 350 (L)			UFC Fight Night	Featuring UFC match-ups. John Lineker vs. John Dodson (L)	UFC Fight Post "Lineker vs. Dodson" (L)		NHRA Drag Racing	Keystone Nationals		
43	SPIKE	(43) Cops	Cops	Cops	Cops	Cops	Cops	Jail: Big Texas	Cops	Cops	*** The Expendables (2010, Action)	Eric Roberts, Jet Li.	
44	COM	(44) (5:55) *** Beefert (2006, Comedy)	Paul Soter, Cloris Leachman, M.C. Gainey.			*** Super Troopers (2002, Comedy)	Steve Lemme, Paul Soter, Kevin Heffernan.			Kevin Hart: Laugh at My Pain		Kevin Hart: Seriously Funny	
45	HIST	(45) Amer. Pickers "Guys and Dollhouses"		American Pickers "Deuce Digging"			American Pickers "Duck, Duck, Moose"	Amer. Pickers "Red Barn, Black Keys"		A. Pickers "Escape to Motor Mountain"		(05) Amer. Pickers "Civil War Pickings"	
46	A&E	(46) The First 48		The First 48 "Tagged/ Without a Trace"			First 48: Drugs Kill "Broad Daylight"	The First 48		The First 48 "Burned Alive" (N)		(05) The First 48: Deadly Debt	
47	TLC	(47) Women in Prison		Wedding "A Love Worth Fighting For"			My Big Fat American Gypsy Wedding	An American Gypsy in Romania"		My Big Fat American Gypsy Wedding		Wedding "A Love Worth Fighting For"	
48	DISC	(48) Edge of Alaska "Last Days of Winter"		Edge of Alaska "The Thaw"			Edge of Alaska "The Road"	Edge of Alaska "Bear Attack"		Edge of Alaska "The Motherlode"		Edge of Alaska "McCarthy Rising"	
49	NGEO	(49) Live Free or Die "Bring It Home"		Live Free or Die "Home Stretch"			Drugs, Inc. "Alaska Heroin Rush"	Drugs, Inc. "Molly Madness"		Drugs, Inc. "Memphis Mayhem"		Drugs, Inc. "Flesh-Eating Krokodil"	
50	TNT	(50) (5:00) *** Pacific Rim (2013, Action)	Charlie Hunnam, Rinko Kikuchi, Idris Elba.			*** Transformers (2007, Action)	Megan Fox, Josh Duhamel, Shia LaBeouf.			Arrow		Arrow	
51	AMC	(51) Fear the Walking Dead "Pilot"		Fear the Walking Dead "So Close, Yet So Far"			Fear the Walking Dead "The Dog"	Fear the Walking Dead "Not Fade Away"		(35) Fear the Walking Dead "Cobalt"		(40) Fear the Dead	
52	USA	(52) NCIS "Borderland"		NCIS "Worst Nightmare"			NCIS "Enemy on the Hill"	NCIS "Chasing Ghosts"		NCIS "Aliibi"		NCIS: Los Angeles "Active Measures"	
53	FOOD	(53) Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Diners, Drive-Ins	Halloween Wars "Infestation"	Halloween Wars "Hybrid Horror"	Halloween Wars "Grave Robber"		Halloween Wars "Grave Robber"		Halloween Wars "Undead Dinner Party"	
54	HGTV	(54) Love It or List It "Functioning for Four"		Love It or List It		Property Brothers	Property Brothers	Property Brothers		Reno. "Fashion Blogger's Dream Closet"		House Hunters	House Hunters
56	FX	(56) (5:00) Kung Fu Panda 2 (11) Jack Black.		*** How to Train Your Dragon 2 (2014, Animated)	Kit Harington, Kristen Wiig, Jay Baruchel.		*** How to Train Your Dragon 2 (2014, Animated)	Kit Harington, Kristen Wiig, Jay Baruchel.		*** How to Train Your Dragon 2 (2014, Animated)	Kit Harington, Kristen Wiig, Jay Baruchel.		
57	CNN	(57) Anthony Bourdain "Mexico City"		Anthony Bourdain "Russia"		Anthony Bourdain "Iran"	Anthony Bourdain "Libya"	Anthony Bourdain "Istanbul"		Anthony Bourdain "Istanbul"		Anthony Bourdain "Cuba"	
58	FNC	(58) Justice With Judge Jeanine		The Greg Gutfeld Show			Justice With Judge Jeanine	The Greg Gutfeld Show		Justice With Judge Jeanine		Fox News Sunday	
61	CNBC	(61) Undercover Boss "ADT"		Undercover Boss "Menchie's"			Cleveland "Soda Bars and Pickle Jars"	Cleveland "Location, Location, Location"		ClevelandHustles "Expanding Horizons"		Paid Program	Paid Program
63	BRAV	(63) B.Deck "Hair Models and Filthy Martins"		Below Deck "That Tuna is F#%ed!"			Don't Be Tardy... "Don't Be Tardy..."	Don't Be Tardy... "50 First Dates"	(04, Romance)</				