

**Shark Attacks off the California and Oregon Coast:
an update, 1980-84**

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ABSTRACT. In 1981 Miller and Collier reported on 47 unprovoked shark attacks which had taken place off California and Oregon from July 1926 to November 1979. Since that date, 12 shark attacks involving humans have taken place: two in 1980, one in 1981, four in 1982, one in 1983, and four in 1984. Encompassed in these 12 attacks were: six surfers, three skin divers, one paddle boarder, one scuba diver, and one swimmer. In ten of the twelve attacks the white shark was the species of implication. By geographic area: one attack occurred off southern California, four off central California, four off northern California, and three off Oregon.

In 1981 Miller and Collier reported on all shark attacks occurring off California and Oregon from 1926 through 1979. Their analysis included 47 unprovoked attacks: 45 off California and two off Oregon. Since 1979, 12 unprovoked shark attacks

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involving humans have taken place within this geographic area: two in 1980, one in 1981, four in 1982, one in 1983, and four in 1984 (these attacks took place while this paper was in press and are included primarily as summaries - to 10 Nov 84). The 12 attacks involved six surfers, three skin divers, one paddle boarder, one scuba diver, and one swimmer. In five cases there was no injury to the victim, in two cases minor injury, in three cases major injury (hospitalization), and two attacks proved fatal. In ten of the 12 attacks the white shark, Carcharodon carcharias (Linnaeus), family Lamnidae, was the species of implication. In the other two attacks only the fact that a shark (of unknown species) was involved could be established.

As pointed out by Baldrige (1974), "considerable variance exists in published accounts of what happened, again clearly attesting to the difficulties in gathering meaningful information on shark attacks of the past." This, coupled with the fact that ocean-water sports such as skin diving, scuba diving, surfing, paddle boarding, kayaking, wind surfing, etc. have increased in popularity during recent years, makes comparing early shark attack information with more recent data a difficult and somewhat questionable proposition.

By geographic area: one attack occurred in southern California (south of Point Conception), four off central California (between San Francisco Bay and Pt. Conception), four off northern California, and three off the coast of Oregon. A geographical listing of California-Oregon shark attacks is presented in Table 1; all attacks since 1926 are enumerated with a breakdown by county given. Forty-six of the fifty-nine (78

percent) shark attacks for California and Oregon can be attributed unequivocally to the white shark (Table 1). A summary of white shark attacks by month is given in Table 2. Also, a summary of attacks since 1969, indicating period between attacks, is presented in Table 3.

A chronological narrative of the twelve most recent shark attacks follows. Since the last four attacks occurred while this paper was in press only a brief summary of each of these incidents is given.

Discussion

Shark Attacks, 1980-83

Attack No. 48 - Curt Vikan. 17 October 1980, 0930 h;
California: Humboldt Co., Moonstone Beach; lat 41 02.5' N, long
124 07.5' W.

Curt Vikan was surfing off Moonstone Beach in 6 to 8 ft of water, approximately 100 yards offshore, at time of the encounter. Without warning his board was "ripped with tremendous force" from under him. Vikan was tethered to the surfboard with a leash and could only watch as the shark held his board out of water for several seconds; "the shark was kind of playing with my board in the air." During this brief period the shark's tail brushed against Vikan. Once the shark released the board, the surfer immediately caught a wave and paddled to shore. There was no injury to Vikan. A tooth fragment was found in the fin of the surfboard and identified by Dr. John DeMartini, Humboldt State

University, as that of a white shark. Attack was to the rear of the surfboard; a small section of the board was bitten-off (Fig. 1). Small amounts of blood were found embedded in the styrofoam of the board, apparently from the spongy tissue surrounding the teeth of the attacking shark. The shark was estimated as 12 plus ft by Vikar.

Moonstone Beach had been the site of a white shark attack four years earlier; William Kennedy (Attack No.42), also a surfer, was attacked on 18 October 1976.

Attack No. 49 - Christopher Cowan. 27 October 1980, 1545 h; Oregon: Douglas Co., off Umpqua River, lat 43 39.7' N, long 124 12.8' W.

On the afternoon of 27 October 1980 Chris Cowan was surfing with two friends just south of the jetty at the entrance of the Umpqua River. The three surfers had been in the water approximately 25 minutes. Cowan was 150 m from shore and had just been thrown off his board by a large wave. Upon regaining the surfboard a heavy impact knocked Cowan from his board and he was aware of a strong tugging sensation on the leash that tied his foot to the surfboard. Upon release of tension, Cowan mounted his board and noticed that his left leg was injured and bleeding. He called to his companions that a shark was in the vicinity and began paddling rapidly toward shore.

His two surfing companions, still unaware that Cowan had been injured or of the presence of a shark, continued to surf. Upon reaching shore, Cowan sent a messenger out on the jetty to

warn his friends. Upon receiving the signal of distress the two surfers immediately headed for shore.

Cowan was then driven to Bay Area Hospital in Coos Bay where four lacerations on the left leg above the knee were sutured; he was then released. The injury to Cowan is considered minor although the potential is obvious.

Examination of the surfboard (2.2 m in length and 50 cm in width; under surface of board uniform bright orange, upper surface bright yellow) revealed a number of tooth impressions. The damaged area of the board was on the left side and centered 64 cm from the rear. Tooth impressions were noted primarily on the lower surface of the board. In the area of damage equating with the mandibular symphysis, two rows of teeth were apparent. The upper surface of the board was damaged at the edge and along the circumference of the jaw outline; damage was much less severe than that to the bottom. The greatest width of the impression on the upper surface measured 360 mm. Cowan was wearing a black neoprene dry suit. We treat this case as involving the white shark.

Attack No. 50 - Lewis Boren. 19 December 1981, afternoon; California: Monterey Co, Spanish Bay, lat 36 37.2'N, long 121 57.1W.

The Lewis Boren incident probably has received the most publicity of any California shark encounter since the fatal attack of Barry Wilson in October 1950 (Bolin 1954). Not only was the attack fatal, but the fact that Boren's body was not

recovered for five days led to wild speculation by the media of the fate of the victim and to the size of the attacking shark.

Lewis Boren had chosen to surf by himself on a cold and windy Saturday (19 December 1981) at Spanish Bay off Asilomar State Beach. He had last talked to friends about 1400 h before leaving to knee surf on his 5ft 4 in. board. The following morning (20 Dec), surfers Christian Kai and David Murphy, walking along Asilomar Beach found a surfboard with a portion missing along with the matching crescent-shaped section; "the two pieces were about 15 yards apart." That afternoon the board was turned over to the Salinas Police Department who passed it on to the supervising ranger at Asilomar State Beach. On Monday (21 Dec), a missing persons report was filed by one of Boren's friends concerned that Lew Boren had not been seen nor his vehicle moved from Asilomar State Beach in two days. On the morning of Tuesday the 22nd, we were able to examine the surfboard at the Monterey Marine Resources Laboratory. The board was yellow on both upper and lower surface, measured 163 cm in length and 61 cm in width. The removed portion was 774 mm from the tip of the board and measured 400 mm wide by 259 mm deep (Figure 2). The approximate area of attack was to the left center side of the board. Damage to the upper surface was clean and symmetrical while that to the under surface quite ragged; exemplifying the differing functionality of the upper and lower jaws. Based upon the width of the jaw impressions and the individual triangular impressions on the under surface of the surfboard, we concluded the attacker to be a white shark of 17 to 19 ft. No tooth fragments were found embedded in the styrofoam but small areas of bloodstain

were noted near the base of several impressions. Upon analysis, the blood "did not respond to human typing (Sandi Pinar, California Department of Justice, pers. comm.)." We have observed bloodstains in the styrofoam of other surfboards where no injury occurred and conclude that the pulpy gum tissue of the white shark is the source of these stains (see Vikar - attack no. 48, Weldon - attack no. 55).

On Thursday, 24 December 1981, at 1100 h, a body was observed floating in a small cove approximately 1 km north of Spanish Bay. The corpse was recovered and taken to The Paul Mortuary, Pacific Grove, where the positive identification of Lewis Boren was made and an autopsy was ordered. Cause of death was listed as "severe trauma, left chest (shark bite)." No teeth or tooth fragments were recovered. Examination of the surfboard, victim's body, and wetsuit strongly suggest that Boren was in a prone position on his board, with arms outstretched at time of attack. The initial attack to the board and surfer was violent and the victim most likely fell from his board at this time. A second minor attack or more likely a repositioning of the board in the shark's jaws then took place, evidenced by left jaw impressions 125 mm forward of the main damage to the board. It is noteworthy that although Lewis Boren's body remained in the water for over 115 hours, and obviously a large quantity of blood initially accompanied the victim, Boren was only bitten once.

Sea surface temperature, taken two days prior to the attack and 2.3 nautical miles north inside Monterey Bay, was 13.3°C; temperature at 18 m was 12.8°C. Secchi disc reading at this location was 19.5 m, indicating extremely clear water.

The previous fatal attack was to Robert Pamperin, on 14 June 1959, off La Jolla. The species of shark implicated in the Pamperin attack is under controversy. It has been suggested that the assaulter was a tiger shark, Galeocerdo cuvieri (Baldrige 1974); however, the white shark can not be ruled out. There is a question in some corners concerning the authenticity of the Pamperin attack.

Attack No. 51 - Donald "Harvey" Smith. 7 February 1982, 1100 h; California: Sonoma Co., Stillwater Cove, lat 37 32.8' N, long 123 18.0' W.

Harvey Smith and Ken Shimizu were planning to scuba dive at Stillwater Cove, north of Fort Ross. They were in a 14 ft Achilles inflatable boat, approximately 1/4 mile offshore and 30 yards outside a kelp bed. The Achilles was anchored in 50 ft, on a ledge which drops off rapidly to 80 ft, and near a large rock that "boils" at low tide. Upon anchoring, Smith entered the water and remained at the surface for several minutes. He then descended along the anchor line followed by Shimizu. At 40 ft Smith stopped and considered aborting the dive because of "very very bad visibility," estimated at 2-4 ft. Smith then sensed a strong tug on his calf, "it felt like my leg got tangled in an anchor line and I was being pulled by a boat," and turned to see the head of a shark. The shark first bit his right calf, released and then bit his ankle, taking Smith's fin in the process; "it let me go in about two seconds...there was very little pain." Smith rapidly ascended to the surface, swimming past Shimizu. Shimizu saw the shark and estimated it as ca. 8

ft; the shark was not observed again. First-aid was immediately applied to Smith in the Achilles and emergency treatment was given by a Stillwater Cove Regional Park Ranger upon arrival at the beach. An air bandage was applied to Smith's profusely bleeding right leg and he was airlifted by helicopter to Sonoma Community Hospital in Santa Rosa for emergency medical care; Smith arrived within one hour from time of attack. The injury to Smith's right leg was major; surgery was required to repair nerve and tendon damage. The bite spanned ca. 15 inches from mid-calf to instep. The leg was bitten to the bone requiring a leg cast for six weeks. Several tooth fragments removed from Smith's leg were identified as those of a white shark by Dr. John McCosker, California Academy of Sciences.

Attack No. 52 - Casimir Pulaski. 24 July 1982, 1100 h;
California: San Luis Obispo Co., Point Buchon, lat 35 14.5' N,
long 120 54.6' W.

Cas Pulaski and Terry Shubert had set out on long surfboards to paddle from Montaña de Oro State Park to Avila (ca. 13.5 naut. miles); both were wearing wet suits. After paddling for a period of 45 min to 1 hr, and near the Pt. Buchon buoy, Pulaski was suddenly knocked off his board into the water. Point Buchon buoy is ca. 1 naut. mile from nearest land and is anchored in 24 fm (144 ft). Pulaski's first thought was that a sea lion had playfully hit his board. When he surfaced, he saw the board "in the mouth of a shark." "The tail of the board stayed in one spot and the nose was being moved in a circle by the shark." The head

of the shark "looked like a buoy out of water." Shubert, seeing the initial impact, first thought the board was hit by a whale. Pulaski climbed onto the aft section of the board while it was still being held by the shark. He slid forward on the wet surface and inadvertently struck the snout of the shark; "this was just an instinct reaction." Within seconds the shark let go, and with its head angled downward, departed. Pulaski headed immediately for shore but was greatly concerned about a follow-up attack. "I would take a couple of strokes, grip the board, wait a few seconds for the shark to return, then resume the process." After several minutes he realized the shark would probably not return and paddled with Shubert 15 minutes to reach shore.

We categorize this attack under the heading of "paddle boarding." The dimensions of Pulaski's O'Brien board are quite different from the modern surfboard: the board measured 3.57 m (11 ft 8.4 in.) in length and 57 cm (22.4 in.) in width and is used primarily for life guard rescue work. These dimensions are equivalent to those of Royaks, kayaks, and wind-surf boards.

The tooth impressions from the attack were to the left side of the board, 830 mm from the tip of board to center of bite. Width of bite measured 355 mm on the upper surface and 360 mm on the bottom of board (Fig. 4, 5A&B). The color of the board was a dull yellow.

There was no injury to Pulaski and no tooth fragments were found in the styrofoam of the board. Based on tooth impressions in the board and the dimensions of the bite the attacking shark was identified as a white shark. Size was estimated between 4.5 to 5.5 m (ca. 15 to 18 ft).

Attack No. 53 - John Buchanon. 29 August 1982, 0930 h;
California: San Luis Obispo Co., Morro Bay, lat 35 22.3' N, long
120 51.8' W.

John Buchanon was surfing on Sunday morning just north of Morro Rock. Buchanon was alone, with seven or eight other surfers approximately 50 yards to the north. He was on a Lightning Bolt surfboard, 6 ft 1 inch (1.85 m) in length, with red bottom and sides. The water was "pretty clean" and "7 or 8 ft" in depth.

Buchanon felt a jolt to the left front side of his board, looked down and "saw the head of an animal" between his hand and body; "The head was gray with a touch of brown ... it looked smooth and somewhat pointed." Buchanon fell into the water and began thrashing and swimming rapidly, primarily out of fear. He calmed himself, caught a wave, and swam to shore; Buchanon was not leashed to his board. The board did not wash ashore so another surfer swam out to retrieve it, unknowing of the incident which had occurred minutes before.

There was no injury to Buchanon. Two elongate impressions (ca. 50 mm each), one large circular indentation, and three small punctures were the only marks evident on the lower surface of the board. On the day before there had been two shark sightings at this beach. These could have been blue sharks (Prionace glauca), basking sharks (Cetorhinus maximus), or for that matter any other surface-dwelling shark. The species of shark that attacked Buchanon's surfboard is unknown.

Attack No. 54 - Michael J. Herder. 19 September 1982, 1430 h;
California: Mendocino Co., Bear Harbor, lat 39 55'N, long 123
56.0' W.

Mike Herder and two friends were free diving for abalone off the northern California coast. They were diving from a Zodiac inflatable and several speared fishes (lingcod and rockfishes) were hanging over the side in the water. Sea lions and harbor seals had been noted about. Two of the divers had been swimming in the area for approximately 20 minutes while Herder was resting in the inflatable. Herder entered the water, depth ca. 15 ft, and started to descend. Within a few seconds, Herder felt "a bump or tug along the left side of my torso." "At the time, I believed I was caught in kelp I was suddenly hit hard from my left side. I felt as if I had been hit by a truck."

Only one bite occurred, the shark shaking the victim violently three or four times; the attack lasted "less than 5 seconds." The depth of attack was estimated at 12 ft (within 3 ft of bottom) and visibility at 2.5 ft. Two hours elapsed from time of attack to the time Herder received medical treatment at Garberville Hospital. Approximately 120 stitches were required for deep lacerations to the upper left thigh and buttocks (Fig. 6). Four and one-half months after the attack Herder competed in an 8.2 mile run.

From time of attack to receiving medical treatment, Herder did not remove his wetsuit. It is our opinion that this measure functioned in the reduction of blood loss by providing pressure to the wounded area. This is a precaution divers and surfers should be aware of in the event of a shark attack.

A personalized account of this attack is presented by Herder (1983).

Attack No. 55 - Randy Weldon. 20 August 1983, 1000 h;
Oregon:Tillamook Co., Cape Kawanda, lat 45 12.0' N, long 123
59.0' W.

Randy Weldon had been surfing at North Kawanda Beach for about one hour on the morning of 20 August. He was on a "6 ft thruster (type of board)," 20 inches in width, color basically off-white with black and purple stripes. Weldon was ca. 75 yards from shore in 8 to 15 ft of water; visibility was considered "good." Weldon had just shifted from paddling in a prone position to sitting up on the board when the attack occurred. "I did not see the initial attack I received such a shock [tremendous impact] it threw me in the air. I landed in the water and went under a few inches and popped back up." The shark held the board for several seconds, let go and then took a second bite. "After holding [the board] for another second or two it let go and disappeared into the ocean heading south-southwest." Weldon, still leashed to his board, remounted the surfboard and "stroked very hard to shore." After several strokes, the shark surfaced 8 to 12 ft off Weldon's right and headed in a line that would have intercepted the path of the surfboard. "Then it went right back under and that's the last I saw of it."

There was no injury to Weldon in this incident. There were a number of tooth marks (20 plus) on both the upper and lower

surfaces of the board (Fig. 7 and 8). The widest dimension of the semi-circular bite measured 41.3 cm; the depth of bite into the board was 19.5 cm. Distance from tip of the board to the most forward impression was 47 cm (pers. comm., Sid Cook, Argus-Mariner). Had Weldon been lying on the surfboard instead of sitting, he would undoubtedly have received major injury to the upper torso, probably resulting in fatality. The attacking shark was described as a "very large great white...[with] tan-brown upper body and dirty white underneath." The modus operandi of the attack, and the position and geometry of the tooth impressions in the surfboard indicate a large white shark.

It is interesting to note the similarity between this attack and the Curt Vikan encounter (Attack No. 48). Also, the fortuitous nature of this attack compared to the fatal case of Lewis Boren (Attack No. 50).

Shark Attacks, 1984

Attack No. 56 - Omar Conger. 15 September 1984, 0830 h;

California: San Mateo Co., Pigeon Point, lat 37 11.3'N, long 122
24.0' W.

Attack No. 57 - Brian Cramer. 17 September 1984, 1530 h;

California: San Diego Co., Mission Beach, lat 32 47.0'N,
long 117 15.4'W.

Attack No. 58 - Paul Parsons. 30 September 1984, 1000 h;

California: Marin Co., Tomales Point, lat 38 13.8' N,
long 122 59.8' W.

Attack No. 59 - Robert Rice. 30 September 1984, 1530 h;

Oregon: Tillamook Co., Cape Kawanda, lat 45 11.0'N,
long 123 59.0' W.

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Figure 8. Randy Weldon's surboard.

A. Tooth impressions on upper surface of board.

B. Tooth impressions on bottom of board.

Photographs by Sid Cook.

TABLE 1. California-Oregon Shark Attacks by County, 1926 through 1984.

	<u>Number of Attacks</u>	<u>Species Involved</u>			
		<u>White Shark</u>	<u>Blue Shark</u>	<u>Species Unknown</u>	<u>Other Species</u>
Oregon					
Clatsop Co.	1	1			
Tillamook Co.	2	2			
Lincoln Co.	0				
Lane Co.	0				
Douglas Co.	1	1			
Coos Co.	1	1			
Curry Co.	0				
California					
Del Norte Co.	0				
Humboldt Co.	2	2			
Mendocino Co.	3	3			
Sonoma Co.	5	5			
Marin Co.	7	7			
Alameda Co.	1			1	
San Francisco Co.	1	1			
Farallon Islands	5	5			
San Mateo Co.	6	6			
Santa Cruz Co.	2	1		1	
Monterey Co.	6	6			
San Luis Obispo Co.	4	1		3	
Santa Barbara Co.	3	3			
Southern Calif. Islands ¹	1	1			
Ventura Co.	0				
Los Angeles Co.	2		1	1	
Orange Co.	0				
San Diego Co.	<u>6</u>	<u> </u>	<u>1</u>	<u>3</u>	<u>2</u> ^{2&3}
Totals	59	46	2	9	2

¹ San Miquel Island (Attack No. 43 - J. Worrel, 18 Dec 1976)
² Tiger shark (?) (Attack No. 11 - R. Pamperin, 14 June 1959)
³ Hammerhead shark, *Sphyrna* sp. (Attack No. 12 - V. Fleet, 28 July 1959)

TABLE 2. White Shark Attacks by Month ($\Sigma = 46$).

Jan	3		May	5		Sept	10
Feb	2		June	0		Oct	5
March	1		July	7		Nov	2
April	1		Aug	6		Dec	4

TABLE 3. Shark attacks since 1969 indicating date, days between attacks, and species implicated.¹

Attack No.	Victim	Date	Days since previous attack	Species white shark (W) other species (O)
25	Colby	20 July 69	358	W
26	Joslin	6 Sept 69	48	W
27	Ward	20 Oct 71	774	W
28	Himmrich	28 May 72	221	W
29	Gray	19 July 72	52	W
30	Kretschmer	9 Sept 72	52	W
31	Hancock	26 May 74	624	W
32	Kehl	26 July 74	61	W
33	Sanders	5 Aug 74	10	W
34	Webster	2 Sept 74	28 [†]	W
35	Greenlaw	2 Sept 74	-- [†]	W
36	Holcomb	14 Sept 74	12	W
37	Johnson	28 Sept 74	14	W
38	Rebstock	23 July 75	298	W
39	Brown	9 Aug 75	17	W
40	Buckley	6 Dec 75	119	W
41	Shook	24 Aug 76	262	W
42	Kennedy	18 Oct 76	55	W
43	Worrell	18 Dec 76	61	W
44	Friedman	14 Aug 77	239	W
45	Dunah	5 Aug 78	356	O
46	Sloan	11 Mar 79	218	W
47	Doudt	26 Nov 79	260	W
48	Vikan	17 Oct 80	326	W
49	Cowan	27 Oct 80	11	W
50	Boren	19 Dec 81	418	W
51	Smith	7 Feb 82	50	W
52	Pulaski	24 July 82	167	W
53	Buchanon	29 Aug 82	36	O
54	Herder	19 Sept 82	21	W
55	Weldon	20 Aug 83	335	W
56	Conger	15 Sept 84	392	W
57	Cramer	17 Sept 84	2	O
58	Parsons	30 Sept 84	13	W
59	Rice	30 Sept 84	0	W

¹ See paragraph 2 (text) discussing comparison of early and recent shark attack data.

[†] Webster and Greenlaw were together at the time of attack; the two scuba divers were swimming at the surface.