

## Unusual invertebrates and fish observed in the Gulf of Alaska, 2004–2005

By Bruce L. Wing

During the past two years, unusual fish and invertebrates have been reported by fishermen and biologists working in the coastal waters of the eastern and central Gulf of Alaska. These observations are associated with the anomalously warm water found in the eastern North Pacific for at least the past three years. This is not the result of an El Niño event, but rather an overall warming of the whole North Pacific. The long-term implications of this ocean warming on the distribution and abundance to Alaskan fisheries are not clear. Here, I report on the continued presence of jumbo squid (*Dosidicus gigas*) in Southeast Alaska waters, as well as selected or noteworthy occurrences of pelagic animals. I also comment on the natural history and importance of some of these animals.

The records of occurrences were compiled from personal communication with Alaska Department of Fish and Game biologists and port samplers who receive their information from commercial fishermen, charter boat operators, sports fishermen, *etc.* Some observations are from National Marine Fisheries Service (NMFS) personnel conducting surveys of juvenile salmon, sablefish, and inshore fish habitats. Individual fishers and biologists also brought to our attention unusual species encountered during their work. Where possible, the identifications were confirmed through photographs or actual specimens submitted to the Auke Bay Laboratory reference collections.

Zooplankton are seldom noticed by fishermen or others working on the water unless the species is very abundant or very large. Otherwise, it is usually the specialist doing detailed analysis of plankton net tows who spots an unusual occurrence of zooplankton species. In 2004 and 2005, specialists and non-specialists noted unusual zooplankton in the Gulf of Alaska. *Limacina helicina* is the most common pteropod there. Typically, this small purple snail is an abundant but not dominant zooplankton in our plankton net tows. In the spring of 2005, *Limacina* was reported as a dominant zooplankton in net tows from Chatham Strait, Peril Strait, and Icy Strait. *Limacina helicina* and the pyramid clio, *Clio pyramidata*, are most frequently encountered in abundance in offshore waters, where they feed on small microflagellate phytoplankton. Their abundance in inshore waters may be the result of strong onshore transport of surface waters from the central Gulf of Alaska. When very abundant, they are fed on extensively by chum and pink salmon, herring, and whales. When Southeast Alaska had herring reduction fisheries prior to 1965, this was the principal component of “black feed” evident in both herring and pink salmon diets. It was not considered as desirable as “red feed” (euphausiids and copepods) because of the low oil content resulting in a “wet” and difficult-to-dry fish meal and a strong tendency for fish to “belly burn” in the hold of seiners.

In addition to the pteropods, a heteropod, *Atlanta* sp., and several copepods, *Mesocalanus tenuicornis*, *Paracalanus parvus*, *Clausocalanus* sp., *Aegisthus mucronatus*, and a *Sapphirina* sp., were reported from northern Gulf of Alaska zooplankton samples in 2004. These zooplankton are usually associated with the California Current system and are rarely encountered north of British Columbia. *Paracalanus parvus* was also seen in the southeastern Bering Sea in 2004.

Squid attracted considerable interest among fishermen and biologists in 2004 when jumbo squid were first taken off northern Southeast Alaska (Cosgrove, 2005). Their continued presence in Alaska was confirmed by a brief Auke Bay Laboratory survey in August 2005 (**Photo 1**). This large squid forms an important fishery in the Gulf of California. It is taken sporadically in sport fisheries off Southern California and more recently off Oregon and Washington. Considered a tropical species, its range and abundance have increased in Peru and Chile where it is thought to be a serious predator of hake. The Alaskan specimens collected last summer were feeding on euphausiids and squid.



Photo 1 Wade Loofborough, Captain of FRV Media, with a jumbo squid, August 2005. (NMFS photo)

Several specimens of the boreal clubhook squid, *Onychoteuthis borealijaponicus*, were collected off the northern coast of Southeast Alaska in 2005, along with the jumbo squid during surface night trawling by the Auke Bay Laboratory survey. This medium-sized squid was of minor importance in the former North Pacific high seas driftnet fishery. Its northern distribution is typically along the southern edge of the Gulf of Alaska (~55°N). We have earlier

specimens from Cape Ommaney from the late 1970s. Like the neon flying squid, *Ommastrephes bartrami*, little is known of this squid's biology in the eastern Pacific and Gulf of Alaska.

Opalescent inshore squid, *Loligo opalescens*, is a small squid that at times has been abundant in southern Southeast Alaska. During periods of abundance, they are important forage for salmon in this region (Reid, 1961). Previously reported in northern Southeast Alaska in the early 1980s (Wing and Mercer, 1990), no additional occurrences were noted north of Prince of Wales Island until the spring of 2005, when they were abundant in the Sitka area and in northern Clarence Strait. This is the market squid of California, and it is important in commercial and sport fisheries from California to southern British Columbia. Its abundance in Southeast Alaska fluctuates radically, thus it has never become a commercial species and is rarely harvested in subsistence or sport fisheries.

Two specimens of the eight-armed luminescent squid, *Octopoteuthis deletron*, were photographed December 2004, from a research trawl catch in northern Southeast Alaska (**Photo 2**). Unfortunately the specimens were not saved. It has previously been reported only as far north as central Vancouver Island (~50°N) (Jefferts, 1983). Little is known about the biology of this unusual squid.



Photo 2 Luminescent eight-armed squid, Lynn Canal, December 2004. (ADF&G photo)

Although white sharks, *Carcharodon carcharias*, occur in Alaska waters, they are not abundant. Their presence usually generates considerable interest by the fishing community and the public. In 2004, white sharks were reported from southern Southeast Alaska north to Yakutat, Alaska. Karinen (2004, personal comm.) reported that at least five were seen off Noyes Island in 2004. Most notable was one photographed off Yakutat after taking a bite out of a sport-caught halibut. The photographs were widely circulated by news media and the Internet. Although not restricted to warm waters, white shark occurrences in Alaska are often associated with El Niño conditions (Karinen *et al.*, 1985; Mecklenberg *et al.*, 2002).

At least three thresher sharks, *Alopias vulpinus*, were reported in Alaska in summer 2004 (**Photo 3**). These confirm an earlier landing in 1990 that had no location data (Mecklenberg *et al.*, 2002). The 2004 observation from west of Yakobi Island (55°57'N) is the farthest north record for thresher sharks.



Photo 3 Thresher shark from Yakobi Island, Alaska, August 2004. (NMFS photo)

The blue shark, *Prionace glauca*, was reportedly common along the outer coast of Alaska in 2005. Although typically associated with the warmer southern waters, they may be more closely associated with waters from the central Gulf of Alaska. Blue sharks are frequently reported during the strong El Niño years. Most of the blue sharks observed in Alaska are small, less than 150 cm, and appear to move northward with warming water during the summer.

Two opahs, *Lampris guttatus*, were landed in Sitka in 2005 (**Photo 4**). Reported weights were 6.8 and 15.9 kg, respectively. They have been reported to 68 kg from the western Gulf of Alaska with a maximum weight of 273 kg (Mecklenberg *et al.*, 2002). Six Alaskan specimens have been reported to the Auke Bay Laboratory since 1962. Two large opahs caught south of Kodiak Island in 1998 were feeding on squid. Opah appear to be more abundant south of the North Pacific transition zone. They occasionally are seen in fish markets in Hawaii and California.



Photo 4 Opah landed at Sitka, Alaska, August 2005. (NMFS photo)

Pacific sardines, *Sardinops sagax*, were reported in unusual abundance in southern Southeast Alaska and were captured as far north as Cross Sound. Previously reported in 1998 following a 67-year absence (Wing *et al.*, 2000), the 2005 reports represent the highest abundance and most northerly presence of sardines in Alaska. Recent reports indicate that some sardines have remained in Alaska through February 2006. The Alaskan occurrences follow a trend of increasing abundance in British Columbia.

Anchovy, *Engraulis mordax*, is an important forage species in British Columbia and south. Previously accounted for only in 1997 from Alaska (Mecklenberg *et al.*, 2002), they were reported as abundant in 2005 from southern Southeast Alaska.

In 2005, shiner surfperch, *Cymatogaster aggregata*, was found to be very abundant in Yakutat Bay. This is a 210-nautical mile northwest range extension from their previous (1998) northern limit of Sitka. This range extension appears limited to the outer coast. Shiner surfperch have not been reported north of Petersburg in the inside passages of Southeast Alaska.

Four species of marine turtles were reported from Alaska. (Hodge and Wing, 2000; Wing, 2004). A skeleton of a Pacific Ridley turtle, *Lepidochelys olivacea*, was found in August 2004 south of Yakutat, but may have been the remains of a 2003 stranding. The Pacific Ridley is the smallest and rarest of turtles found in Alaska. Hard-shelled turtles, although arriving with warm waters in summer and early fall, lack cold tolerance and typically die from hypothermia before being able to return to more southern areas.

Monthly average sea surface temperatures (SST) at the Auke Bay Laboratory have been about 0.75°C above average for most of the past two years (Fig. 1). Peak anomalies were +2.48°C and +2.83°C in May 2004 and 2005, respectively. Similar anomalies were observed throughout most of the eastern North Pacific and Gulf of Alaska (see details at www.fnmoc.navy.mil/PUBLIC). The temperature patterns differ from El Niño conditions in that the warming was initially observed in the Central Pacific and gradually extended east, then north and west to include the Gulf of Alaska and Bering Sea. A typical El Niño event begins in the equatorial western Pacific, moves east to the coast of South America, and then north and south along the coasts of the eastern Pacific Ocean.

If warm oceanic conditions remain stable and continue to support sizable populations of *Loligo*, *Onychoteuthis*, *Ommastrephes*, *Dosidicus*, and *Sardinops*, fisheries may develop for them. There are currently markets for these species as food and bait. Alaskan fisheries for these species may be a desirable diversification for the seine and jig (troll) fleets. However, before management and the fishing industry invest a great effort in new fisheries, we need to have a better understanding of these species and their dynamics at the northern limits of their distribution. Shifts in the food webs in

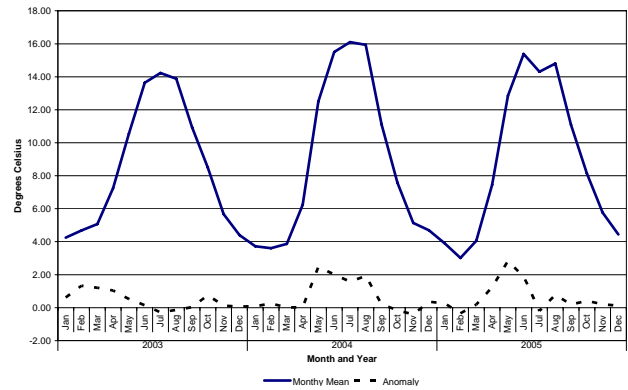


Fig. 1 Monthly mean SST and anomalies (2003–2005) from the long-term mean at Auke Bay, Alaska.

the eastern Gulf of Alaska could be either detrimental or beneficial to current fisheries. Some of the unusual catches these past few summers will probably always be rare and noteworthy.

## References

- Cosgrove, J.A. 2005. The first specimens of Humboldt squid in British Columbia. *PICES Press* 13(2), 30–31.
- Hodge, R.P. and Wing, B.L. 2000. Sea turtle occurrences in Alaska, 1960–1998. *Herp. Rev.* 31(3), 148–151.
- Jefferts, K. 1983. Zoogeography and systematics of cephalopods of the northeastern Pacific Ocean. Ph.D. thesis, Oregon State Univ. Corvallis, OR. 291 p.
- Karinen, J.F., Wing, B.L. and Straty, R.R. 1985. Records and sightings of fish and invertebrates in the eastern Gulf of Alaska and oceanic phenomena related to the 1983 El Niño event. pp. 253–267. In: Wooster, W.S., and Fluharty, D.L., Eds. *El Niño North: Niño effects in the eastern subarctic Pacific Ocean*. Washington Sea Grant Program Publication WSG-WO 85-3. Univ. Washington, Seattle, WA.
- Mecklenburg, C.W., Mecklenburg, T.A. and Thorsteinson, L.K. 2002. *Fishes of Alaska*. American Fisheries Society, Bethesda, MD.
- Reid, G.M. 1961. Stomach content analysis of troll-caught king and coho salmon, southeastern Alaska, 1957–1958. *U.S. Fish Wildl. Serv. Spec. Sci. Rep. Fish.* 379, 8 p.
- Wing, B.L. 2004. Alaskan marine turtles: An update. Proceedings of the First Statewide Conference on Amphibians of Alaska, March 31–April 1, 2004, Juneau, AK.
- Wing, B.L. and Mercer, R.W. 1990. Temporary northern range extension of the squid *Loligo opalescens* in Southeast Alaska. *Veliger* 33(3), 238–240.
- Wing, B.L., Murphy, J.M. and Rutecki, T. 2000. Occurrence of Pacific sardine, *Sardinops sagax*, in southeastern Alaska. *Fish. Bull.* 98, 881–883.



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