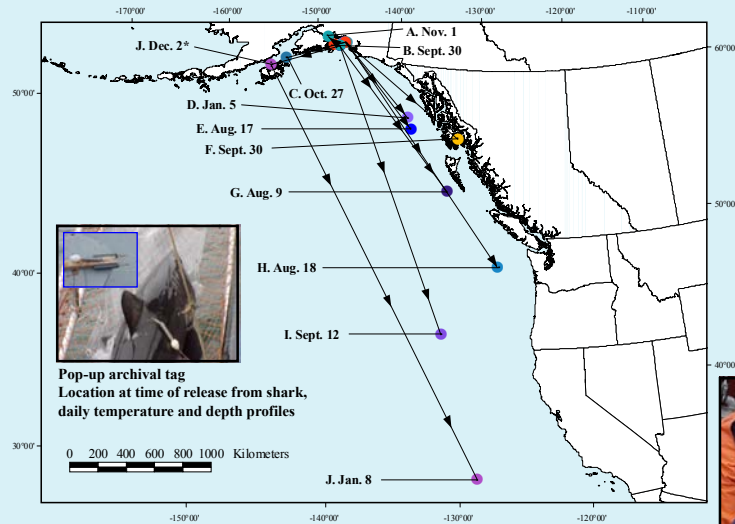




Salmon shark foraging and migratory movements



Based on geographic and vertical movement data accumulated during the study, we identified two modes of salmon shark activity: **Migrations**, and **Foraging Movements**. The figures below show representative depth, temperature, and movement activity for sharks engaged in large migratory movements, and localized foraging movements. The figure at left are all large-scale movement data to date.

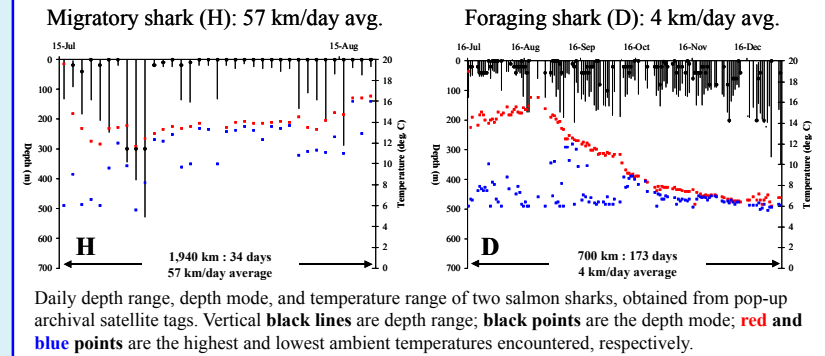
Do salmon sharks reside in Prince William Sound year-round?

Salmon sharks typically disperse and move out of Prince William Sound as salmon spawning migrations taper off in late Summer. Fifty percent of the sharks tracked by this study underwent large southeasterly migrations toward the west coasts of Canada and the U.S. by the end of September. However, some linger into winter months in northern Gulf of Alaska. Fifty percent of the sharks were still in the northern Gulf of Alaska at the end of September and into January. Salmon sharks are occasionally taken as bycatch in the Prince William Sound walleye pollock trawl fishery during January and February. Salmon sharks are also known to congregate in Prince William Sound during herring spawning aggregations in April and May. **Conclusion:** While some salmon sharks appear to reside in Prince William Sound and northern Gulf of Alaska year-round, large salmon shark aggregations are likely associated in time and space with adult salmon spawning migrations.

Salmon shark movements and migrations in eastern North Pacific and Gulf of Alaska obtained from satellite transmitters carried by each animal, except shark F which was a conventional tag recovery by a commercial fisherman. All but shark E are female. All sharks were released in Prince William Sound during the month of July. Arrows indicate general direction of movement. Letter designations correspond to detailed movement behavior of sharks shown in the figures to the right.



Daily diving behavior of two salmon sharks



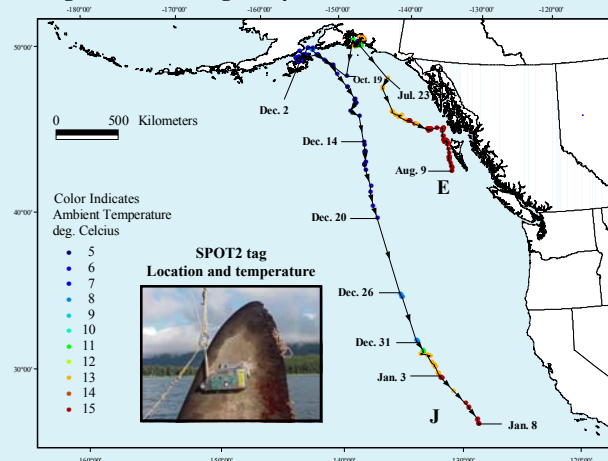
Is the timing of salmon shark residency in Prince William Sound related to environmental cues (temperature or photo period), prey abundance, and/or sexual maturity?

Salmon sharks appear to be quite tolerant of seasonal temperature changes. Vertical movements through the thermocline are common, and they often spend a majority of time in cold water below the thermocline. Some also remain in northern Gulf of Alaska into winter months when the nights are long and the water column is uniformly cold (6-8 deg. Celcius).

Salmon shark residency in Prince William Sound appears to be largely correlated in time and space with salmon and herring spawning aggregations.

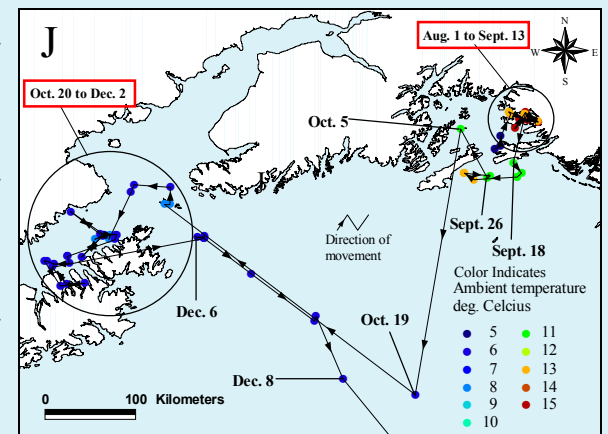
Salmon shark large-scale geographic migrations might ultimately be related to sexual maturity. Of 119 salmon sharks handled during the study, 117 were females of remarkably similar size (mean pre-caudal length = 198 cm, mean weight = 135 kg). Ninety percent of salmon sharks sampled by Japanese and Russian scientists in the western Pacific are male. We hypothesize that large southerly movements are likely reproductive migrations. However, we were surprised to find that none of the 19 sharks dissected during the study had mature ovaries.

High resolution migratory movements of two salmon sharks



Salmon shark migratory movements and ambient temperature modes. Both sharks are female. They were released at Hinchinbrook Entrance, Prince William Sound on 18 July 2001.

High resolution foraging movements of one salmon shark



Salmon shark foraging movements and mode of time at ambient temperature in northern Gulf of Alaska. The figure is detail of shark J movements in northeast Gulf of Alaska.