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Joseph B. Liddle* (jbliddle@uas.alaska.edu), 609 Sawmill Creek Rd., Sitka, AK 99835, and **Michael Musyl** (Michael.Musyl@noaa.gov), University of Hawaii, Pelagic Fisheries Research Programme, Kewalo Research Facility/NOAA, Honolulu, HI 96814. *Optimizing data returned by pop up satellite tags*. Preliminary report.

Pop-up satellite archival tags (PSATs) are an invaluable sampling tool used for recording ambient pressure (depth), temperature and light irradiance (from which daily "geolocations" can be calculated) on pelagic fishes, sharks and turtles. Before deploying the PSAT, the researcher must first choose the pop-up period and the interval between data points. If the pop-up period is too long, the PSAT will lack sufficient battery power to communicate the data it has recorded to the geosynchronous system of polar orbiting ARGOS satellites. If it is too short, there will be little data returned. The interval between points influences data resolution. There is also a risk of total system failure with no data return. For optimizing the sampling design, it is desirable to find what pop-up period returns the greatest amount of data. We therefore derived a model describing the amount of data returned from PSATs dependant on the pop-up period and interval between data points, which yielded an estimator of the optimal pop-up period. We evaluate the sensitivity and variability of the optimum estimates with bootstrap analysis. (Received September 16, 2008)