

Characteristics, distribution and persistence of thin layers over a 48 hour period

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ABSTRACT: The biological and physical processes contributing to planktonic thin layer dynamics were examined in a multidisciplinary study conducted in East Sound, Washington, USA between June 10 and June 25, 1998. The temporal and spatial scales characteristic of thin layers were determined using a nested sampling strategy utilizing 4 major types of platforms: (1) an array of 3 moored acoustical instrument packages and 2 moored optical instrument packages that recorded distributions and intensities of thin layers; (2) additional stationary instrumentation deployed outside the array comprised of meteorological stations, wave-tide gauges, and thermistor chains; (3) a research vessel anchored 150 m outside the western edge of the array; (4) 2 mobile vessels performing basin-wide surveys to define the spatial extent of thin layers and the physical hydrography of the Sound. We observed numerous occurrences of thin layers that contained locally enhanced concentrations of material; many of the layers persisted for intervals of several hours to a few days. More than one persistent thin layer may be present at any one time, and these spatially distinct thin layers often contain distinct plankton assemblages. The results suggest that the species or populations comprising each distinct thin layer have responded to different sets of biological and/or physical processes. The existence and persistence of planktonic thin layers generates extensive biological heterogeneity in the water column and may be important in maintaining species diversity and overall community structure.