5. PRIMARY PRODUCTION MEASUREMENTS

Water column primary production was estimated from the uptake of ^{14}C-bicarbonate (Steelman Nielsen 1952). General experimental details are summarised in Furnas and Mitchell (1987). Briefly, subsurface water samples were collected with acid-cleaned Niskin Go-Flo bottles. Surface samples were collected with a clean plastic bucket or Go-Flo bottles. Nine 250 ml unscreened subsamples from up to six sampling depths (corresponding to 100, 50, 30, 20, 8 and 2 percent of surface irradiance) were spiked with 5 μCi (185 KBq) ^{14}C-bicarbonate (Amersham). The bottles were incubated for four (4) hours in seawater cooled deck incubators with compartments screened by neutral shadecloth to match nominal in situ irradiance levels. Three of the nine bottles were wrapped in aluminium foil to be dark bottles. At the end of the incubation, sets of three bottles (two light, one dark) were filtered onto either Whatman GF/F (total population), 2 μm Nuclepore (> 2 μm fraction) and 10 μm Nuclepore filters (> 10 μm fraction). The filters were placed in scintillation vials and acidified with 0.1 ml of 1N HCl to remove inorganic carbon. Radioactivity remaining was counted by liquid scintillation spectrometry (96% efficiency). Hourly primary production rates were calculated accordingly to Strickland and Parsons (1972). Daily production was estimated by multiplying the total production measured during the four hour incubation period by two. Approximately half the daily irradiance dose occurs within the 1000-1400 hr period nominally used for incubations. Because of electronic problems, integrations of daily incoming irradiance could not be made. As cloud-free conditions largely prevailed, the previously determined factor of two was presumed to prevail. Areal production was estimated by trapezoidal integration.