

Core D1 was the site with apparent depositional rates most affected by the dam as evidenced by the large break in continuity between the mid-1930s and 1950. Core D3 depositional rates were also affected, but not to the same extent as core D1 (Figure 4-5). For both cores, there are overlapping dates between the top (post-1951) and bottom (pre-1951) core sections. This is due partly to the statistics of modeling the core in two sections and partly due to the mixing of upland fill and native sediment during construction of the dam.

The sedimentation rates vary between the core locations and between the two sections of cores D1 and D3. Core D3 has the lowest sedimentation rates: 0.29 g/cm²/yr before 1951 and 0.24 g/cm²/yr after 1951. Core D1 exhibited a large shift in sedimentation rates after construction of the dam, from 0.68 g/cm²/yr to 0.45 g/cm²/yr. Lastly, core D2 indicated a consistent sedimentation rate of 0.60 g/cm²/yr.

As stated above, these sedimentation rates may not apply to all locations in Budd Inlet, but in general it can be assumed that the surface samples (0–10 cm) consisted of sediment deposited within the past 10–20 years. Cascade Pole operated from 1957 through 1986, corresponding to sediment depths ranging from 16–37 cm (6–15 inches) in cores D1 and D2 and 12–26 cm (4–10 inches) in core D3.

4.4.2 Biological Surface Mixed Layer

Be-7 is a naturally occurring radioisotope in the earth's atmosphere. Through precipitation, it reaches the surface and is bound to soil or sediment. Owing to a short half-life of 53 days, measuring Be-7 in a core is an effective method for determining whether sediment has recently been in contact with the surface. Detection of this isotope beneath the surface of the sediment is a means of determining the depth of the surface mixed layer.

The top 10 cm of each radioisotope core was analyzed for Be-7 in 2-cm increments for a total of 15 samples. Cores were collected on April 10, 2007, but they were not analyzed within 53 days (June 2, 2007). Although one half-life had elapsed prior to analysis, half of the Be-7 in each sample would still be present and detectable. Be-7 was undetected in all 15 samples. With such low sedimentation rates, this result is not surprising. Be-7 can only be detected in sediments deposited within the previous year. Given the low sedimentation rates, one year worth of sediment represents a small portion of the top 10 cm. Therefore, the biological mixed layer could not be determined by Be-7 in the cores collected.

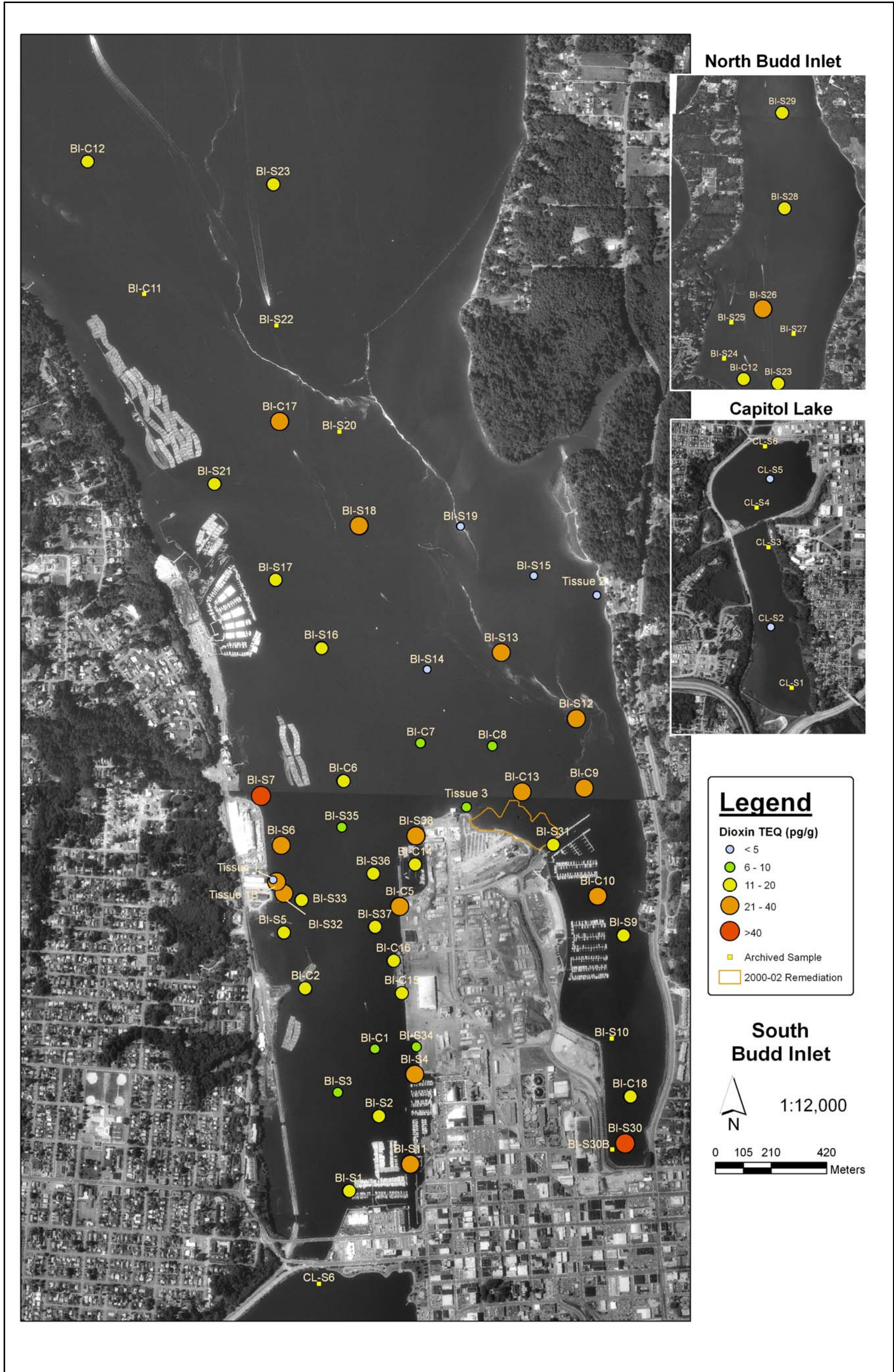


Figure 4-1. Surface Sediment Dioxin/Furan TEQs in Budd Inlet and Capitol Lake