Two characterization studies were undertaken to assess the concentrations and environmental loadings of 125 pharmaceuticals, personal care products, illicit drugs and their metabolites (PPCPs) in screened municipal wastewaters being discharged into Juan de Fuca Strait from two marine outfalls in the Capital Regional District, British Columbia, Canada. Two up-stream pump stations were also sampled. The PPCP concentration profiles were generally similar between the four sampling locations. Qualitative seasonal patterns in PPCP concentrations were also observed, primarily due to rainfall events that diluted wastewater contaminants during the winter. Increases in wastewater flow volumes following a rain event appeared to result in consistent shifts in PPCP concentration profiles for at least three of the four sites. Results indicated that the concentrations of PPCPs were similar to those observed in influents from other jurisdictions. Predicted environmental concentrations were predominantly well below literature concentration thresholds known to induce acute or chronic effects in organisms in the environment. However, there was slight potential for adverse chronic effects as a result of the predicted environmental concentrations of ibuprofen around the outfalls based on comparison to literature environmental effects thresholds. In general, sub-lethal and chronic effects endpoints were relatively limited in availability in the literature, as were literature thresholds derived from exposures to PPCP mixtures. Additional adverse chronic effects of these substances may be discovered in the future. Comparisons were made to regional prescription rates and population demographics to determine whether these factors could be good predictors of PPCP concentrations or loadings. Although wastewater concentrations and loadings were proportional to both prescription rates and population size, the regression relationships were statistically weak or insignificant. As such, prescription rates and population size could not be used to accurately predict pharmaceutical wastewater concentrations and loadings on their own. No qualitative relationships were observed between wastewater PPCP concentrations and either population age or gender breakdown. Overall, wastewater flow volumes, derived population equivalents and analytical method variability were also important factors to consider. Minor proportional deviations were observed following a preliminary loading comparison based on the relative population equivalent sizes of each of the four wastewater system catchment areas. These deviations could have been a result of disproportional hospital loading inputs and/or wastewater system inflow and infiltration. Comparisons were also made between the concentrations of PPCPs and the concentrations of conventional wastewater parameters typically used to characterize bulk wastewater loadings (i.e., carbonaceous biochemical oxygen demand, biological oxygen demand, total suspended solids, volatile suspended solids). Only 18 of the 125 PPCPs were positively correlated with all four conventional parameters. This suggests that designing and optimizing treatment plants to efficiently reduce conventional parameter loadings may not lead to as efficient or consistent reductions in the concentrations of all of the assessed PPCPs. However, the PPCP results were based on analyses of the filtered aqueous fraction of the wastewater samples, whereas the conventional parameter results were based on whole unfiltered effluent samples. As such, there was no direct link between the two sets of results.