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POPULATION GROWTH OF EELGRASS (ZOSTERA MARINA L.):
THE RELATIVE IMPORTANCE OF
SEXUAL VERSUS ASEXUAL REPRODUCTION

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Patrick J. Ewanchuk
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ABSTRACT

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The relative importance of sexual versus asexual reproduction for population growth and maintenance has rarely been addressed quantitatively. Most studies address this question in a solely descriptive manner. This study addressed not only the potential contributions of both modes of reproduction to population growth but also the effects of their actual contributions on population growth. Four populations in San Diego County were censused over a sixteen month period. I estimated 1) leaf shoot density, 2) flowering shoot density, and 3) seedling density on each census. Eelgrass populations were reduced in terms of leaf shoot density and flowering shoot density in San Diego County as compared to other populations along the west coast. However, sexual reproductive output per area was not reduced proportionally due to compensation in an increase in the number of inflorescences per flowering shoot. Because asexual reproduction in eelgrass can occur in two distinct modes, growth and vegetative fragmentation, it was important to assess not only the number of new individuals added through growth but also the role of vegetative fragmentation in population growth. I estimated 1) the relative size of the fragment population relative to the size of adjacent eelgrass populations, and 2) the potential for fragments to reestablish in eelgrass beds. I surveyed the abundance of fragments on adjacent beaches and determined the survival and growth of detached fragments and of fragments reestablished in eelgrass beds after varying time spent in the water column. Although vegetative fragments occurred throughout the year, but mostly in winter, they represented a loss of <4% of the leaf shoots in adjacent eelgrass populations. Because the survival of fragments and their ability to establish successfully in the sediments

declined with time in the water column, fragmentation represented a small net loss to the eelgrass beds studied. In order to evaluate the relative importance of the two modes of eelgrass reproduction a demographic population growth model was constructed. Results of the model indicate that the population is on a declining trajectory with the per capita rate of population growth $\lambda = 0.872$. An elasticity analysis indicated that asexual reproduction (i.e., vegetative growth) was the most important mode of reproduction for eelgrass population growth in the population studied. However, sexual reproduction, (i.e., seedling recruitment), may be important in populations that undergo catastrophic reductions in shoot density, as observed at one of the study sites.