

# **A STUDY OF ENVIRONMENTAL CHANGE IN HIROSHIMA BAY USING ROCKY SHORE ORGANISMS AS BIOINDICATORS, 1995-2005**

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## **Abstract**

This paper details a survey of the marine environment in Hiroshima Bay with SAMB, a bioassessment technique utilizing intertidal rocky shore organisms as bioindicators, undertaken during the warm seasons between 1995 and 2005 at 7 stations ranging from the coastal zone to the center of the bay. A decrease in polluted water bioindicators (shellfish *Mytilus galloprovincialis* and/or ascidians *Styela plicata*), coupled with a rapid increase in clean water bioindicators (crustaceans *Capitulum mitella* and/or shellfish *Serpulorbis imbricatus*), led to substantial improvement in SAMB value at each of the stations. Ujina Island, the most polluted area of the bay, had an especially drastic change in SAMB value, increasing from 25 points in 1995 and 2001 to 44 points in 2003, when *C. mitella* reappeared, and finally to 56 points in 2005, aided by the additional reappearance of *S. imbricatus*.

Another notable finding from the study involved the steadily increasing population of shellfish *Reishia clavigera* since 1996. The growing numbers of this species of *Reishia* led to a noticeable decrease in the populations of previously dominant organisms, shellfish *Crassostrea gigas* and *Mytilus galloprovincialis*, who now found themselves prey to the larger numbers of *Reishia*. Furthermore, some clean water bioindicators, such as *C. mitella* and *S. imbricatus* progressed into the niche after the previous inhabitants began to disappear. Since 1990, The Japanese Government has consistently regulated the use of organic tin compounds, which this study suggests is a major factor in the improvement of the water quality and the rapid increase of the *Reishia* population. We conclude that red algae *Amphiroa zonota* and/or green algae *Caulerpa okamurae* will reappear in coastal zones with further improvements in water quality.