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Mapping the intangibles: cultural ecosystem services obtained from Lake Macquarie estuary, New South Wales, Australia

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Abstract:

Cultural ecosystem services (CES) are the non-material benefits obtained from ecosystems that contribute to human psychological, physical and social well-being. They are often under-represented in ecosystem services assessments and decision-making processes due to difficulties identifying and valuing intangible and subjective attributes. Consequently, this risks a lack of understanding and consideration by decision-makers. This study aimed to enhance the visibility of CES derived from estuaries and explore socio-ecological relationships. Participatory community mapping exercises were conducted to identify places valued for CES and how these places correlated to underlying land use/cover. Participants mapped eleven predefined CES values by placing coded stickers in locations on an aerial image of Lake Macquarie estuary where they associated each value. Point maps were created using ArcGIS 10.3 to visually display distributions and densities of value points, and clustering analysis was performed to determine if there was significant clustering (i.e., hotspots) of value points. Differences in proportions of observed and expected frequencies of value points mapped in different land use/cover areas were assessed using Chi-square (χ^2) tests of independence and standardized residuals. Water and areas zoned open space, including modified foreshore areas and places characterized with native vegetation, were significant suppliers of multiple CES. These places were particularly valued for aesthetics, recreation, social relations, and therapeutic health. Areas zoned conservation and national park were highly valued for nature/biodiversity and intrinsic/existence/future values. In conclusion, this study demonstrated water and natural areas associated with estuaries supply important CES contributing to human well-being that are greatly valued by the community. Cultural ecosystem services should be recognized and considered in policy, planning, and management decision-making to ensure a continued supply for both current and future generations, and to facilitate sustainable development.