Overall Estuary Health

The overall health of Narrawallee Inlet is fair. Some water quality concerns exist, particularly within Croobyar Creek, which is consistent with historical assessments. Over the study period the waters of the Inlet were found to be murky at times, with high algae levels.

This assessment is based on chlorophyll a and turbidity collected by Council between January 2010 to February 2011, and estuarine vegetation change between 1985 and 2006 calculated by the NSW Department of Primary Industries. While this assessment is a snapshot in time, it provides a baseline against which future sampling can be compared, allowing us to track how well we are managing this important estuary.

For more detailed information about Council’s sampling program and the methodology for analysing data, please refer to the accompanying technical report located on Council’s website.
**Water Quality Indicators**  (Grades based on OEH Estuary Health Assessment Methodology)

**Chlorophyll a** indicates the amount of microscopic algae, called phytoplankton, growing in the water. Excessive input of nutrients from catchment runoff (urban stormwater, agricultural runoff, and sewage overflows) can increase chlorophyll a levels and lead to algal blooms and detrimental effects on estuarine plants and animals.

For 2010/11 Narrawallee Inlet overall received a poor rating for chlorophyll a with 52% of total samples exceeding guideline values, with these samples moderately exceeding the guideline. The site located in Croobyar Creek had the greatest number of exceedances with 71%. Upstream land management practices are likely to be the cause with increased sediment and nutrient run-off identified in previous studies.

**Turbidity** is a measure of light scattered by suspended particles such as sediment, algae and dissolved material in the water which affect its colour or murkiness. Turbidity can increase from sediments transported in catchment runoff (particularly after heavy rainfall), shoreline erosion and increased microscopic algae. Increased turbidity can have negative impacts on seagrasses and fish.

For 2010/11 Narrawallee Inlet overall received a fair rating for turbidity with 52% of total samples exceeding guideline values, with these samples barely exceeding the guideline. Again the site located in Croobyar Creek had the greatest number of exceedances with 62%.

**Estuarine Vegetation Indicators**  (Grades based on % gain or loss in extent)

**Seagrasses** are aquatic flowering plants that form meadows near shore. They are highly productive, provide nursery and foraging habitat (for fish, crustaceans and molluscs), bind sediments against erosion and help regulate nutrient cycling. They are very sensitive to changes in water clarity.

Seagrasses in Narrawallee Inlet increased by 518% between 1985 and 2006 and therefore received a grade of very good. Seagrasses have increased in multiple locations, with large notable areas in Narrawallee Creek up to the tidal limit. Such a large increase in this valuable habitat is extremely positive.

**Mangroves** grow between mid and high tide levels. They are an important food source, provide habitat for a number of species such as crabs and juvenile fish, protect shorelines and cycle nutrients and carbon. While an increase in mangroves can be a positive outcome where they are recolonising in areas previously removed, increases in mangrove distribution can sometimes be at the expense of other important habitat types such as saltmarsh, which could be viewed as a negative outcome.

Mangroves in Narrawallee Inlet increased by 10% between 1985 and 2006. This increase has primarily occurred downstream of the Croobyar Creek and Narrawallee Creek confluence. While it appears this increase is a positive outcome, the overall benefit to estuary health is difficult to determine without specific investigations.

**Saltmarsh** is a community of plants and animals that grows above the mangroves at the highest tidal levels. Saltmarsh is important in estuarine food webs, providing a site for invertebrate breeding and a feeding area for economically important fish and shorebirds. Saltmarsh decline is a worrying trend from a number of estuaries in NSW and has led to saltmarsh being listed as an endangered ecological community under the Threatened Species Conservation Act 1995. Declines in recent years have been linked to both increased sedimentation from catchment land use pressures and sea level rise.

Saltmarsh in Narrawallee Inlet increased by 93% between 1985 and 2006 and therefore received a grade of very good. This increase has occurred primarily downstream of the Croobyar Creek and Narrawallee Creek confluence and is a positive sign for the estuary.

**Note:** Analysis of change in extent of estuarine vegetation was completed using two different aerial photo interpretation methodologies for the 1985 and 2006 surveys. As a result, some of the change observed may be due to the different methodologies, as well as actual losses and gains in vegetation extent.