EstuaryWatch Fact Sheet

TAKING THE PULSE OF OUR LOCAL ESTUARIES

An estuary is a semi-enclosed coastal water body where inflowing freshwater meets and mixes with seawater. EstuaryWatch volunteers conduct monthly monitoring to help determine the health of our region's estuaries.

Volunteers have recorded estuary water quality since the program began in 2006. So how do they shape up? Overall our estuaries are in good health according to the many parameters used to measure their health.

Monitoring the Painkalac Creek estuary at Aireys Inlet

HEALTH INDICATORS

Estuary water quality can vary greatly in time and space. Factors contributing to the dynamic nature of our estuaries include:

- wind strength and wind direction
- sea state
- tides
- fresh water inflow
- land use and topography.

The Estuarywatch program is a community based monitoring program recording a range of water quality variables monthly. These include:

- salinity
- temperature
- dissolved oxygen
- pH and water clarity.

All these factors can affect estuary health, and the plant and animal life depending on them for food and habitat.

MEASURING UP

So why do we monitor a range of water quality variables? Estuaries are dynamic systems. By regularly monitoring an estuary's physical and chemical parameters EstuaryWatch can develop a picture of what natural processes occur in a particular estuary at different times of the year.

Once these natural variations are understood, it's easier to detect changes in water quality due to human impacts.

Capturing an estuary's physical and chemical changes also tells us the kind of environment estuary provides for animals, and assists in explaining the habitat types found.

In addition, information collected also assists the Corangamite CMA and other organisations to make more informed choices when making management decisions surrounding our local estuaries.

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pH

The pH of water is a measure of its acidity (pH<7) or alkalinity (pH>7). Factor affecting an estuary's pH including natural minerals dissolved in the water from the surrounding environment, and wastes from humans, as well plants and animals through respiration and photosynthesis.

Changes in pH have direct and indirect effects on aquatic organisms and bacterial processes. For example, extremes of pH can cause damage to fish gills, skin and eyes, along with increasing vulnerability to infections and disease.

The pH scale is 0 to 14. Most estuarine organisms prefer conditions with pH values ranging from 6.5 to 8.5. EstuaryWatch monitors have captured pH as low as 4 in the Anglesea River estuary due to coastal acid sulphate soils, and as high as 9.6 in the Barwon River estuary during an algal bloom event in 2012.

SALINITY

Salinity is a measure of the amount of salts dissolved in water. Estuaries usually exhibit a gradual change in salinity throughout their length, as freshwater entering the estuary from rivers and creeks mixes with seawater moving in from the ocean.

Salinity is very important to aquatic plants and animals and controls to a large degree, the types of plants and animals that can live in different estuary zones, as each species adapts to live in particular salinity ranges.

Salinity is measured in parts per thousand (ppt). Seawater is generally around 35ppt and freshwater <0.5ppt. In May 2008 due to drought conditions EstuaryWatch volunteers recorded a salinity level of 42.7ppt along Painkalac Creek, indicating the estuary was hyper saline, or saltier than seawater.

TEMPERATURE

Water temperature is closely connected to many physical, biological and chemical characteristics and processes in an estuary. Estuary temperature varies depending on air temperature, time of day, water depth, seasonality and the influence of either fresh or salt water.

Temperature is important to measure as affects plant respiration, the metabolic rates of aquatic organisms and the sensitivity of organisms to toxic wastes, parasites, and diseases. Many species also regulate the timing of important events, such as reproduction and migration, according to specific water temperatures.

DISSOLVED OXYGEN

Nearly all aquatic life needs oxygen to survive and animals, microbes and plants use dissolved oxygen during the night. Without enough dissolved oxygen, estuarine animals will die or move elsewhere.

Measuring the concentrations of dissolved oxygen in an estuary indicates the water's aeration. Photosynthesis within an estuary can generate oxygen, or it's mixed into surface waters from the atmosphere, or imported to the estuary in fresh or marine waters.

Of all the parameters that characterize an estuary, the level of oxygen in the water is one of the best indicators of the estuary's health.

Dissolved oxygen is measured as percentage saturation. Ranges in an estuary can be anywhere from 0-100%, but can exceed this when plants and algae produce large amounts of oxygen. In 2013 the Barwon River EstuaryWatch group recorded levels at 189.9%, indicating an unhealthy imbalance in the estuarine system as a result of a large algal bloom.

TURBIDITY

Water clarity, i.e. turbidity, is a measure of how cloudy the water is due to the amount of suspended material in the water. Factors influencing estuary turbidity include:

- water turbulence from storms and wave action
- algae presence
- sediment runoff from either natural processes or by human land use including agricultural and forestry activities
- introduced pest species such as carp
- unsealed roads can also tribute to the clarity of the water.

Apart from making the water look muddy, highly turbid water has many effects on the estuarine environment. If an estuary is excessively turbid over long periods, its health and productivity can be greatly diminished. This may include lowering the oxygen available to animals by affecting plant growth, clog the gills of fish, alter habitat and smother aquatic organisms.

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