

Crescent Head. After the stranding, many of the Sea Hares were removed from the system on the next day's high tide and KSC used beach cleaning machinery to clear the remainder.



Figure 3: Killick Creek at low tide 4/1/2007 where numerous Sea Hares washed ashore during the high tide earlier in the day

Similar maritime conditions to the first stranding produced a second and smaller stranding of Sea Hares on the 14th January (Fig. 4). The timely arrival of south east winds however, pushed the stranding further along Killick Beach resulting in fewer Sea Hares finding their way up Killick Creek. Again the following day's high tide cleared most of the beach with KSC carrying out spot beach clean ups.



Figure 4: Sea Hares Stranding on Killick Beach 14/1/2007

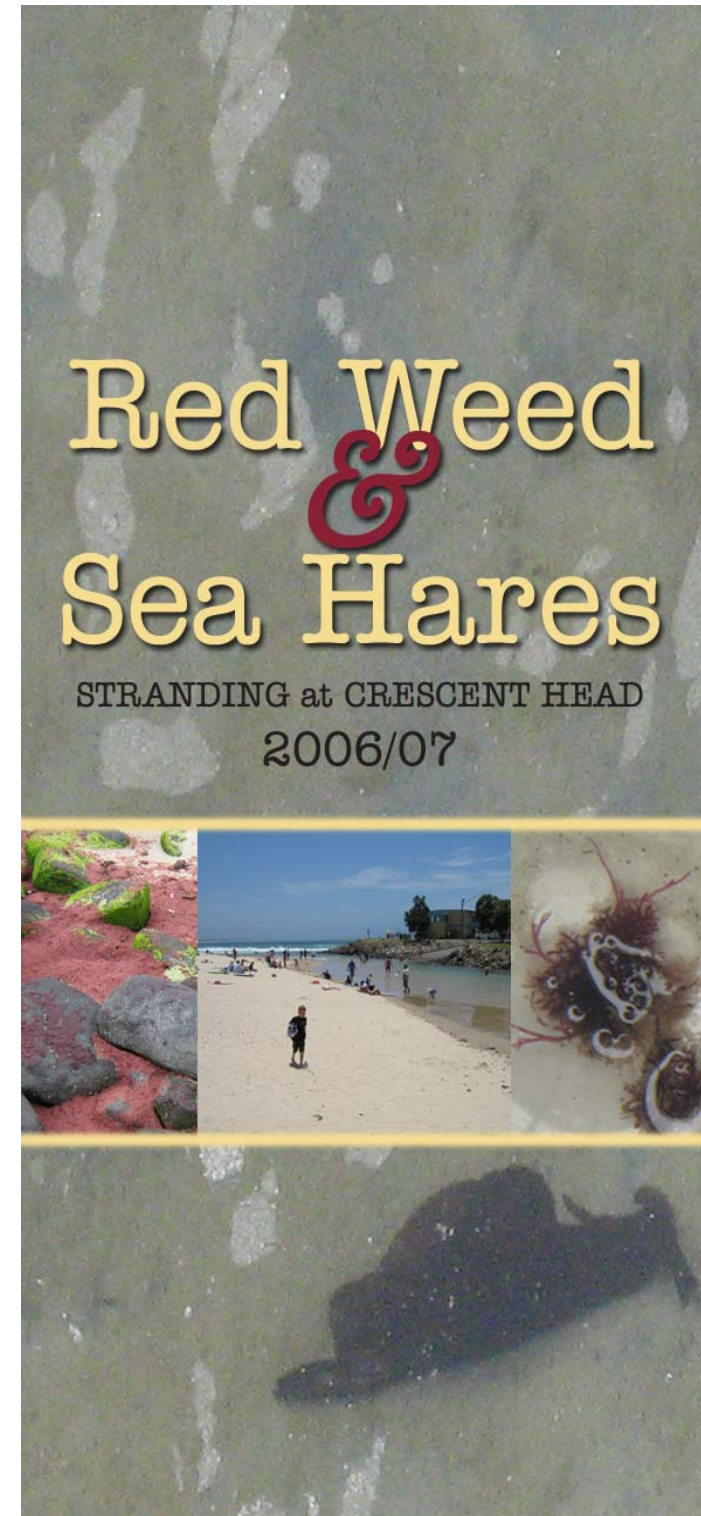
The mass stranding of Sea Hares are not uncommon throughout the world. Dr. Bill Rudman from the Australian Museum maintains an informative online Sea Slug Forum where the Crescent Head events are noted (Rudman, 2007).

Brief Sea Hare life history

Sea Hares are named from their supposed similarity in shape to the European Hare. Sea Hares are not fish; they are specialised snails (Molluscs). They are highly specialised reproducers of enormous eggmasses. Sea Hares are herbivores; feeding on macroalgae (Rudman 1998, 2000, 2003, 2007). Thus the connection between red macroalgae and marine animals such as Sea Hares has strong interrelationships that “no balanced account can be achieved without both.” (Stephenson and Stephenson, 1949). However, it is most probable that we will never know the reason for these events.

References

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KEMPSEY SHIRE COUNCIL has been closely monitoring red macroalgae blooms (red weed) and Sea Hares stranding on Killick Creek and Killick Beach at Crescent Head. The passage of these events occurred with a heavy bloom of red weed in mid December 2006. A thick coverage of red weed (*Fig. 1*) as deep as 30 cm on the foreshore was pushed onto the beach by moderate prevailing north east winds.



Figure 1: Red weed on Killick Beach 16/12/2006

Identifying the red macroalgae

Samples were collected for testing with the enlisted help of Port Macquarie Hastings Council. Concerns the red algae may be a microscopic phytoplankton (one-celled surface floating plants) known as red-tide were largely discounted by Dr. Julie Phillips, a marine algal expert (phycologist) from Eco Algae Research in Brisbane. Dr. Phillips identified the samples as a non-toxic species of red macroalgae called *Polysiphonia* (*Fig.2*). However, Dr Phillips highlighted previously known problems with deoxygenating events with bloom-forming macroalgae in seawater, particularly if the degrading blooms are unable to wash away.

Red macroalgae grow attached to rocky substrates beneath the ocean surface like common seaweed in various sub-zones of the intertidal zone (area of sea bottom lying between high and low tide extremes). Dr. Phillips reported that macroalgal bloom-forming species such as *Polysiphonia* often form drifts late in their life cycle, frequently stranding onshore during windy weather. From the Killick Creek Esturay Management Study and Plan, Dr. Phillips noted several species of macroalgae that have contributed to various blooms since 2002. She also noted that the occurrence and abundance of macroalgal species vary in where and when they grow.



Figure 2: Microscopic view of red macroalgae *Polysiphonia*.

Timing of Sea Hares stranding

On the 4th January, 2007, maritime conditions produced a mass stranding of 10,000's of Sea Hares onshore Killick Beach and Killick Creek. The strandings up the creek (*Fig.3*) were exacerbated by several features; creek opening facing several days of prevailing summer north-easterly winds, timing of spring tides and a large group of drifting Sea Hares between Hungry Head and