

Gone West; first observations of surf-zone diatom *Anaulus australis* accumulations on the West Coast

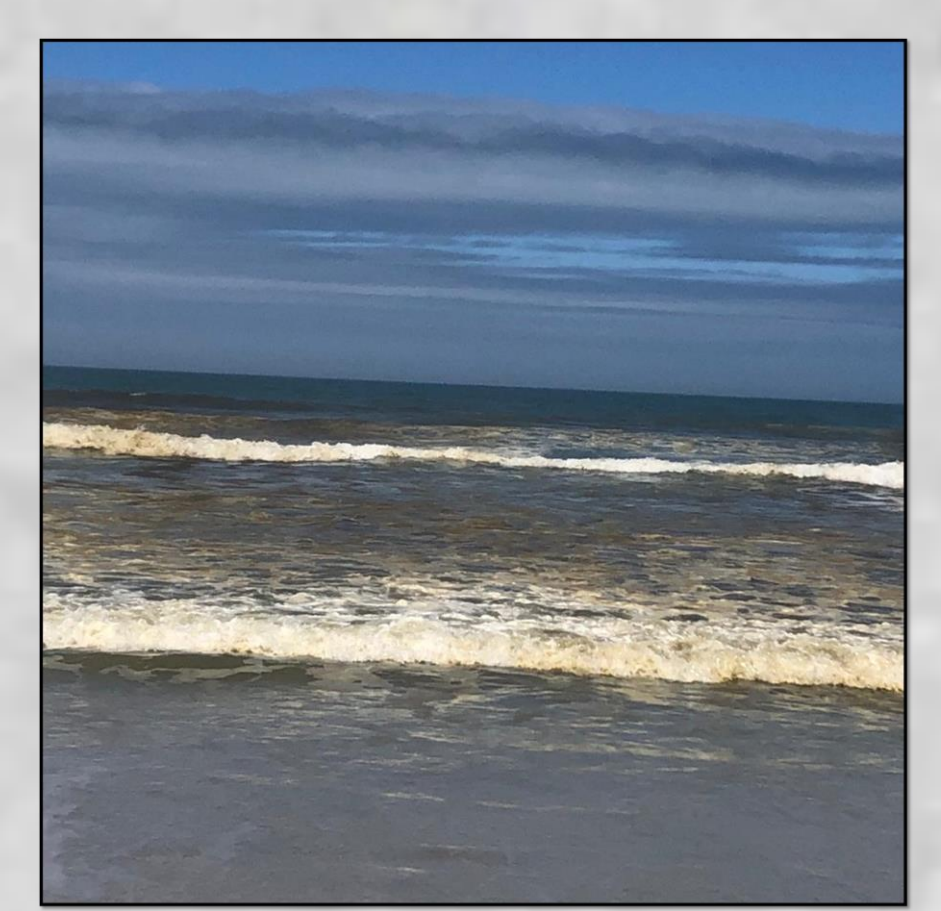
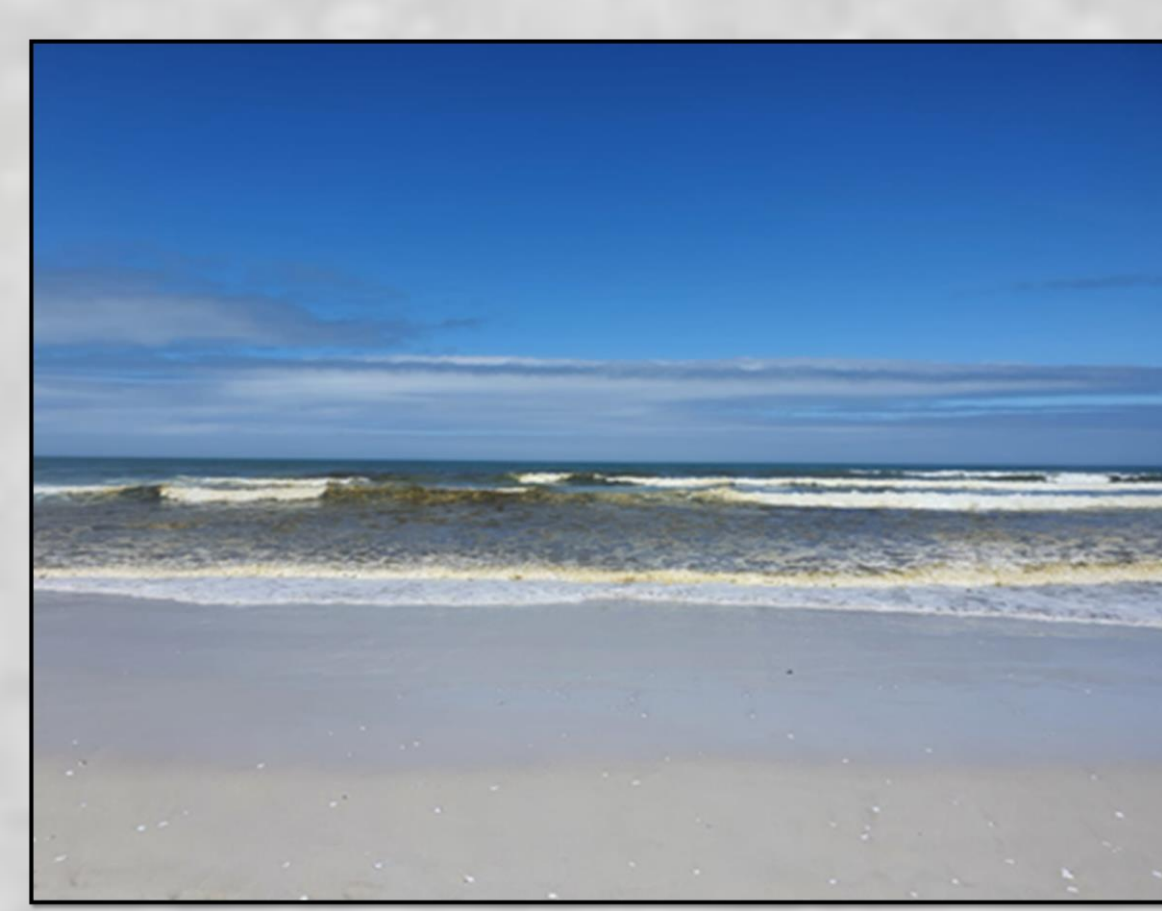
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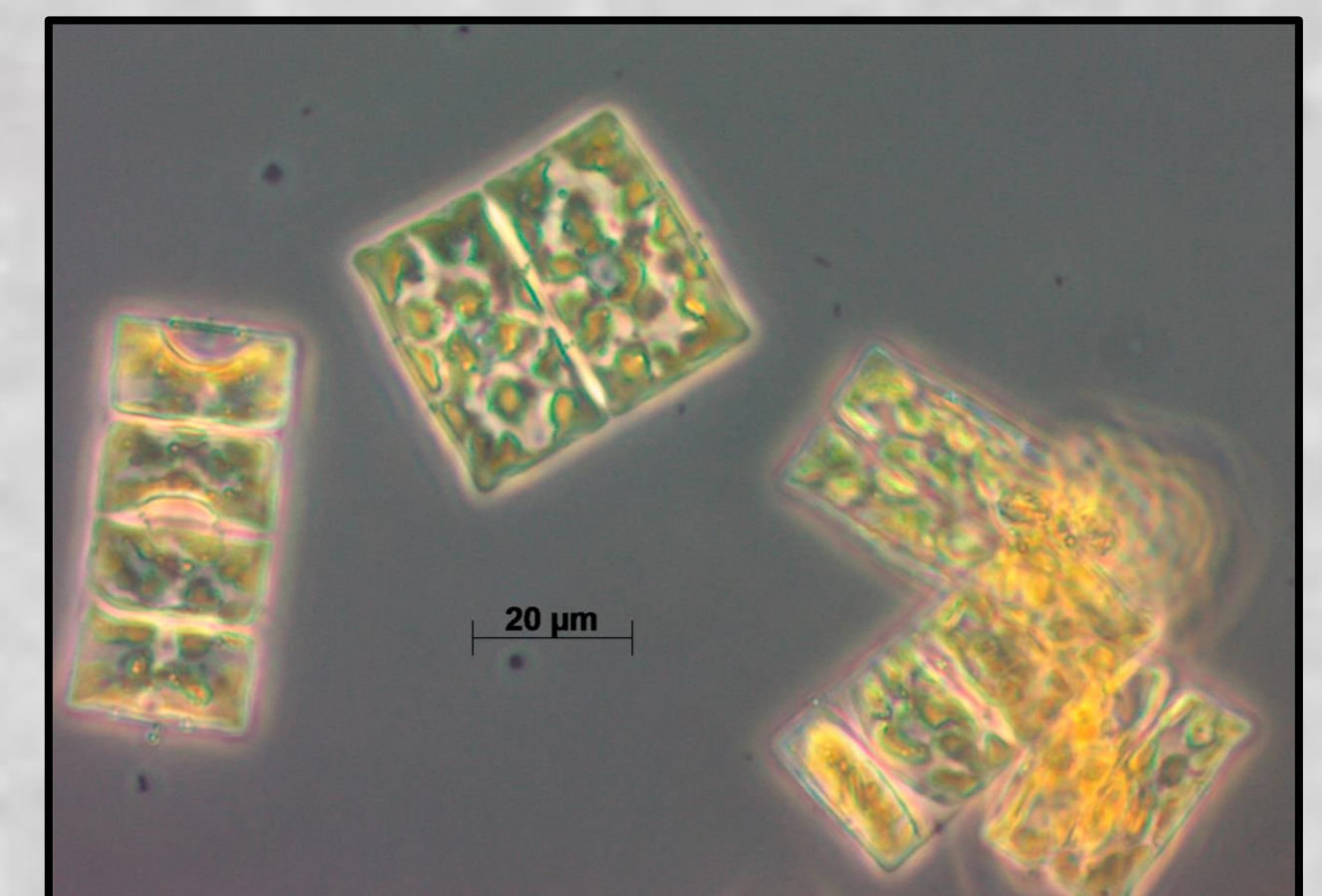
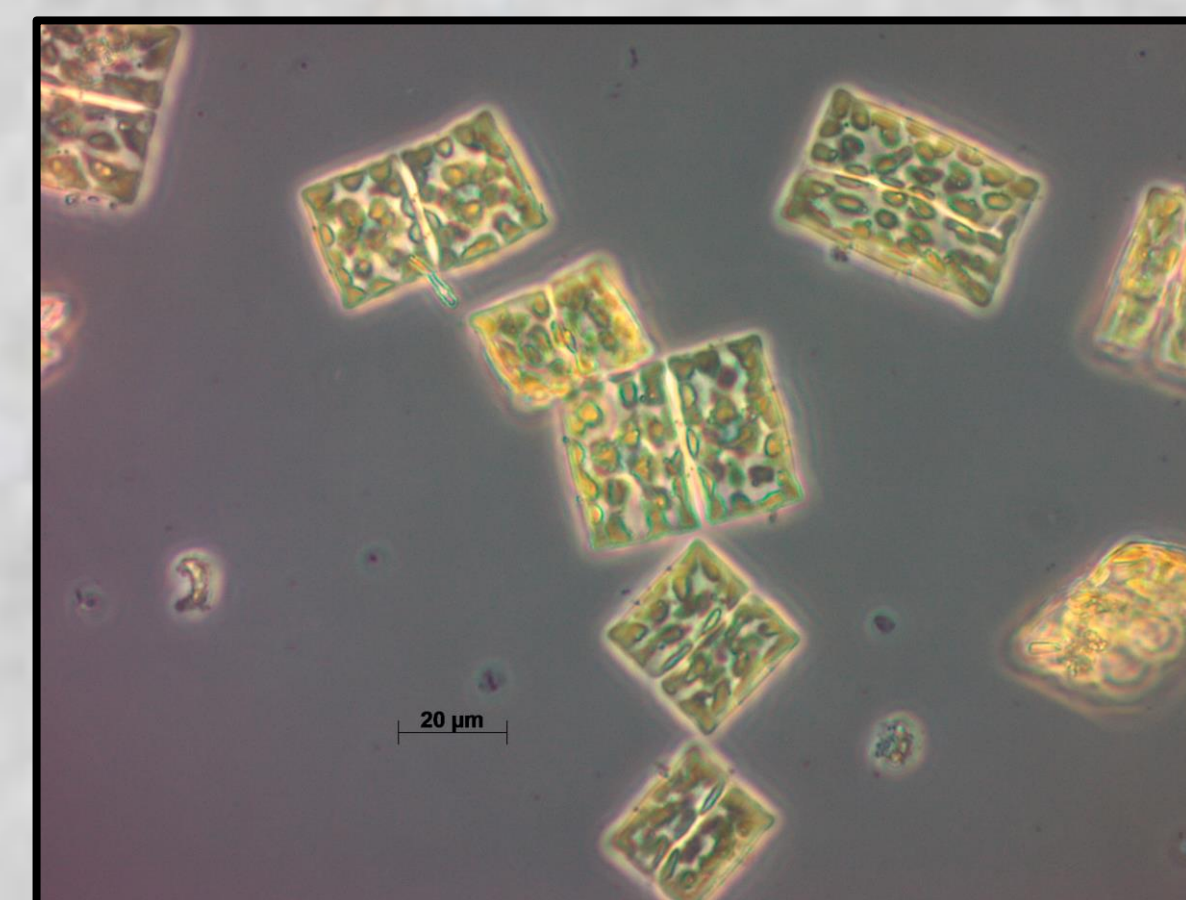
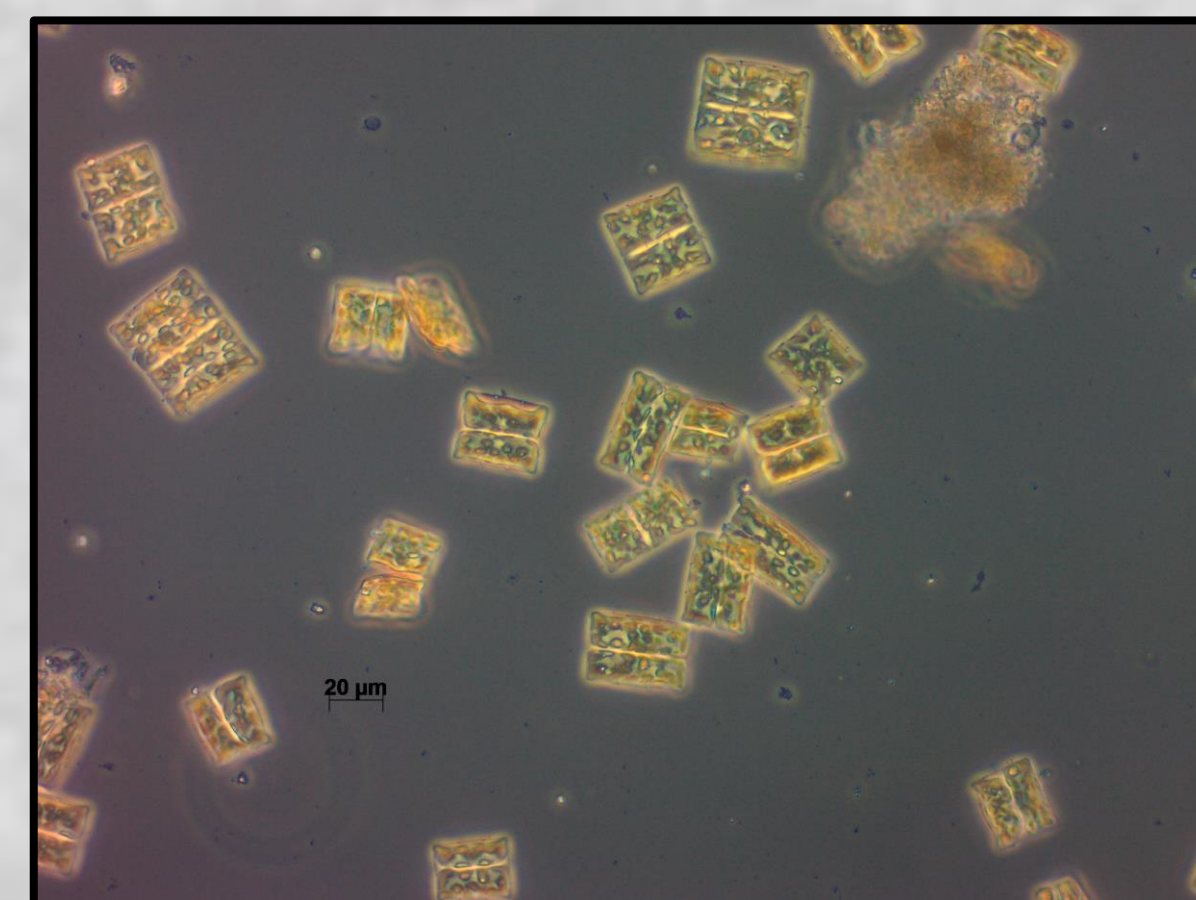
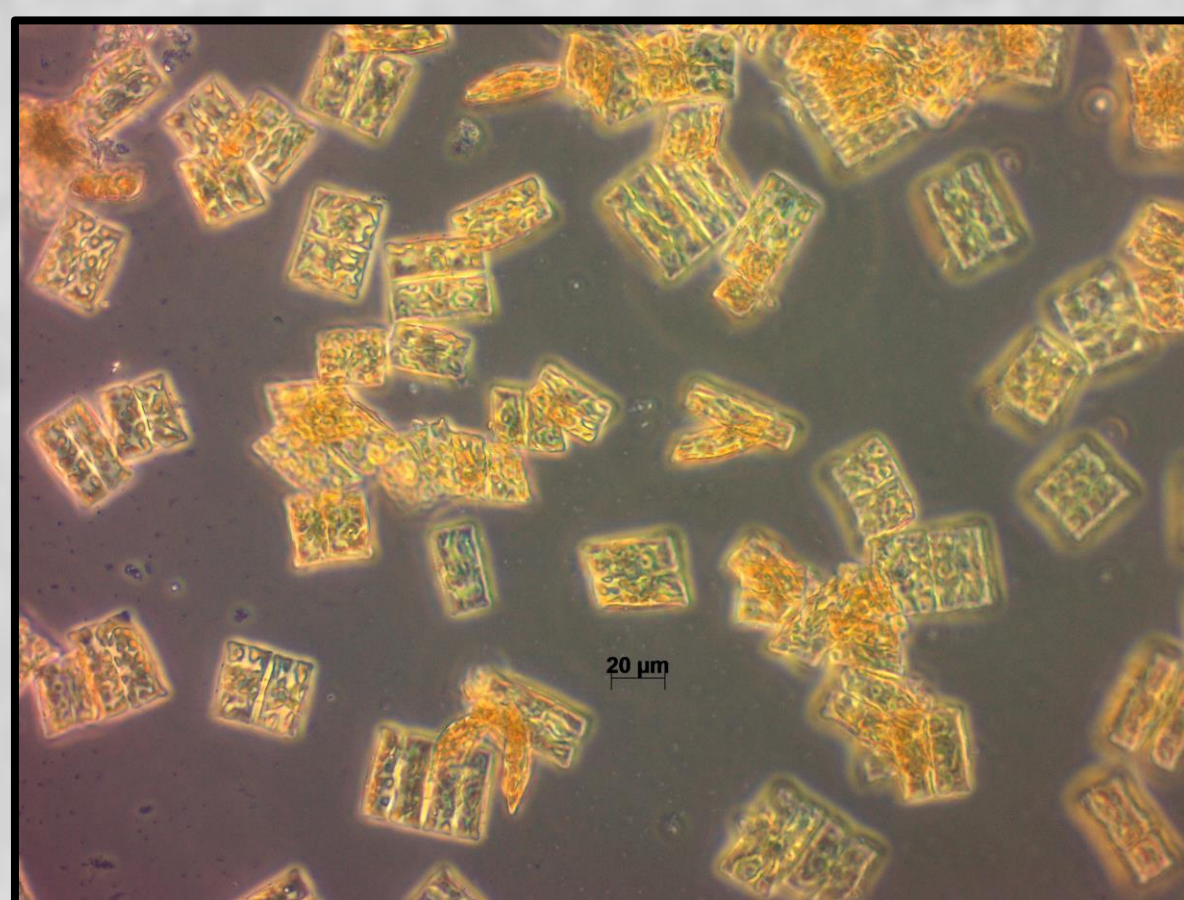


Background

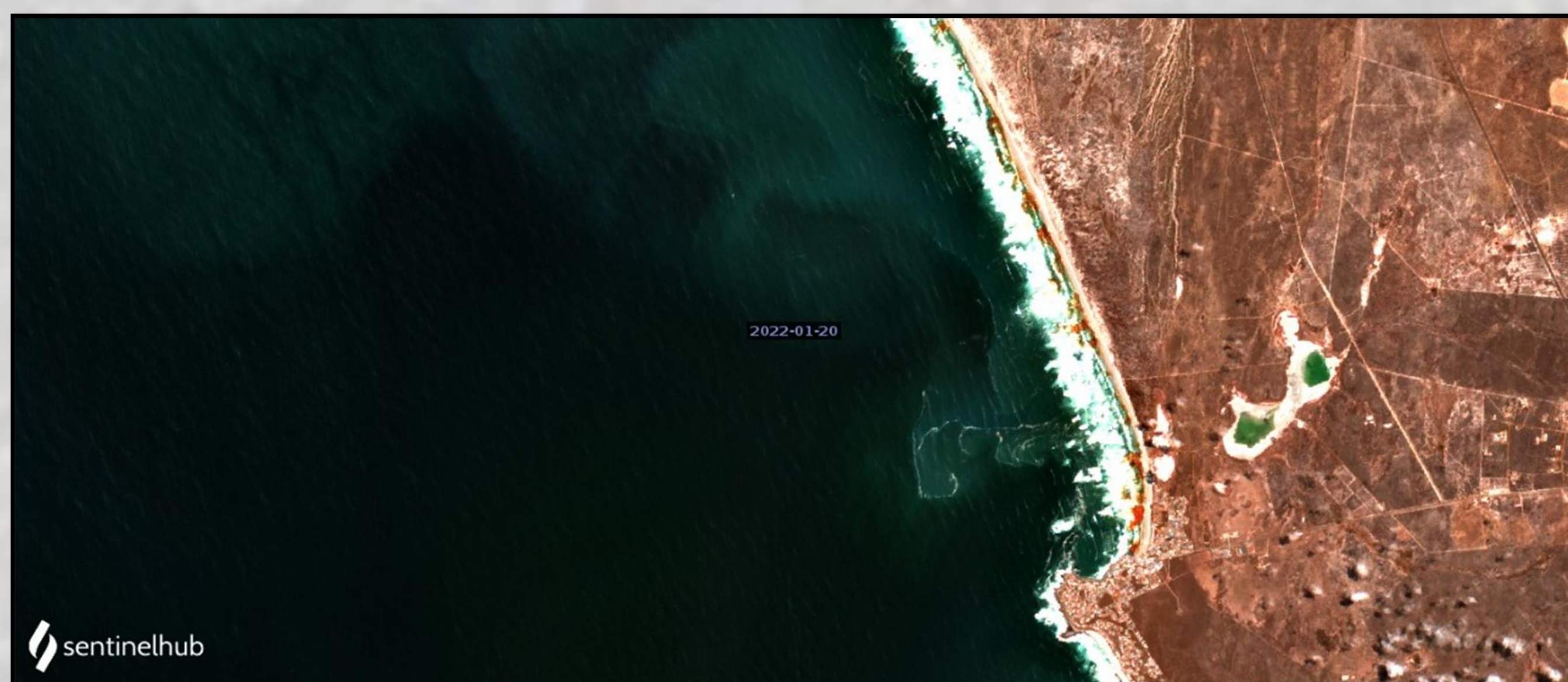
Surf-zone diatom *Anaulus australis* accumulations, recognised by brown discoloured water, are typical of long dissipative beaches on South Africa's south and east coasts, notably those with a nutrient supply from adjacent dune-field aquifers. *Anaulus* spend the daytime in the water column but are nocturnally epipsammic. Previous surf-zone diatom surveys of the West Coast (Cape Point to Alexander Bay to the Skeleton Coast) recorded benthic *A. australis* but none in the water column, nor any visible discoloured water accumulations, thus concluding a different mode of behaviour in it being epipsammic throughout the day (Bate & Campbell 1990). Sixteen Mile Beach MPA falls within the West Coast National Park, on walking it in January 2022, we discovered that "things" may have changed. We observed 17 brown discoloured patches, about one per 1.5 km. Water samples were collected in a washed-up plastic bottle and the diatoms microscopically verified as *A. australis*. The next question is, how long has it been there? Sentinel satellite images at time of sampling clearly showed the patches as did others taken over the past five years. In turn, satellite images of West Coast sites where epipsammic *Anaulus* cells but no visible water column accumulations were previously recorded (Bate & Campbell 1990), indicated patches occurring at at least 10 sites from Melkbos to the Skeleton Coast over the same time period. The recipe for *Anaulus* patches seems similar to that on the south and east coasts but weather conditions before and during their formation suggest subtle differences in accumulation dynamics. Lastly, if the accumulations are a new occurrence, what are the implications and benefits to surf-zone fish and invertebrates in the MPA?



We walked 16 Mile Beach from Yzerfontein to Langebaan in the West Coast National Park towards end January 2022. We observed a number of brown patches of water which resembled the *Anaulus australis* accumulations typical of False Bay, South and East Coasts. We collected water samples in a washed-up plastic bottle and counted a total of 17 brown water patches along the 25 km stretch of beach.



The diatoms were microscopically verified as *Anaulus australis*.



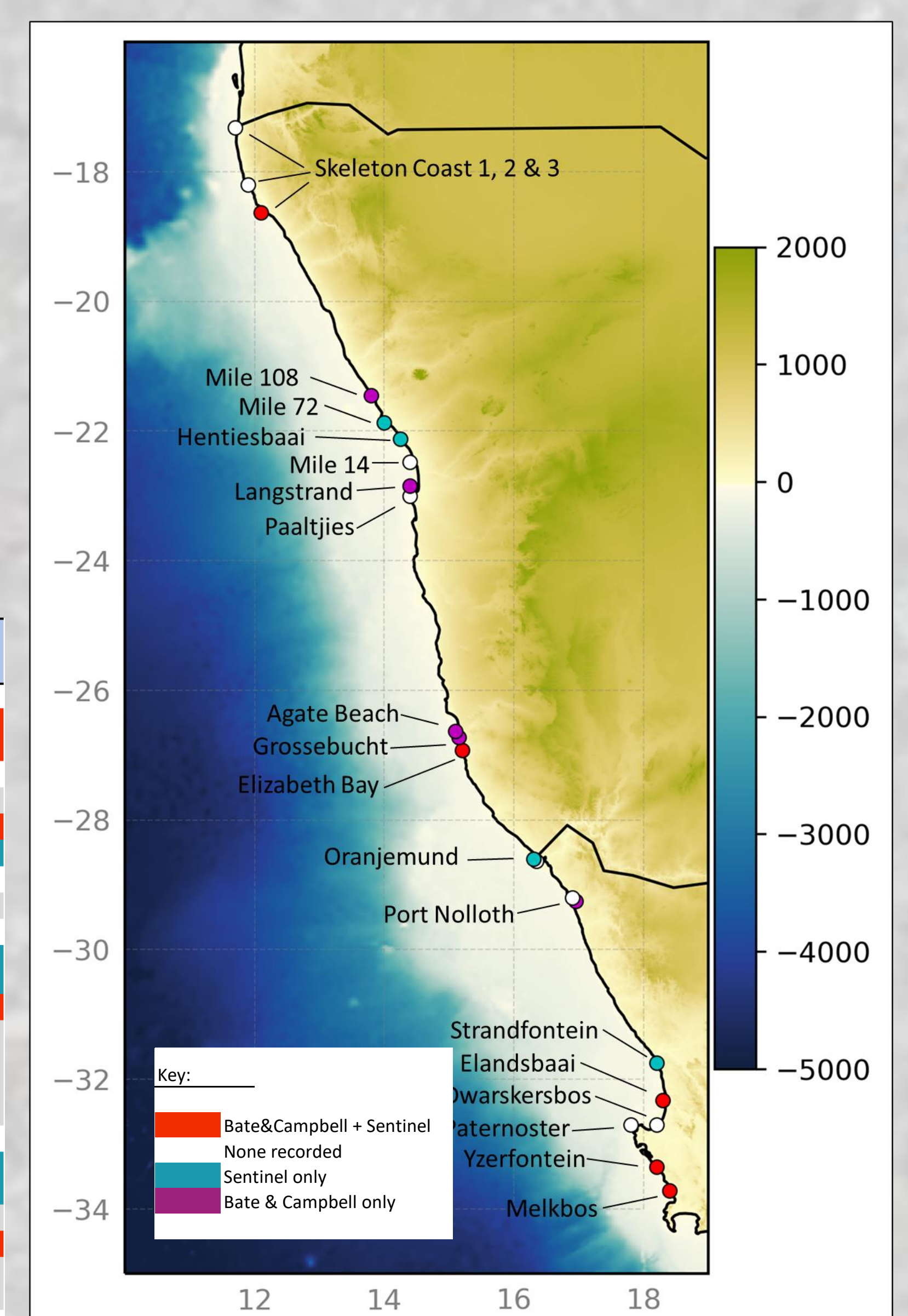
Sentinel satellite imagery from the same time as our 16 Mile Beach walk clearly showed the 17 *Anaulus australis* patches that we had counted along the way. This prompted us to look at a series of Sentinel images at 14 other West Coast sites sampled by Bate & Campbell 1990. Ltd.

Conclusions

- Surf-zone diatom *Anaulus australis* accumulations occur on the West Coast
- *Anaulus australis* is not exclusively epipsammic on the West Coast but spends the day in the water-column & is nocturnally in the sand, similar to its behaviour on the South and East Coasts.
- *Anaulus australis* patches occur all the way to the Skeleton Coast
- Sentinel images show *Anaulus australis* accumulations to be a regular occurrence, at least over the past five years.
- Frequency of occurrence and patch-intensity attenuates northwards, probably a function of beaches becoming more reflective and less flow and nutrient input from coastal dune aquifers.
- West Coast *Anaulus australis* patches are likely to be a significant source of food for surf-zone fish e.g. harder *Chelon richardsonii* as they are on the rest of the Southern African Coast



Beach	Latitude	Bate & Campbell 1990	Sentinel satellite
Melkbos	33.72	•	•
Yzerfontein	33.35	•	•
Paternoster	32.82	•	ns
Dwarskersbos	32.70	•	ns
Elandsbaai	32.32	•	•
Strandfontein	31.75	•	•
Port Nolloth	29.25	•	ns
State Alluvial	29.20	•	ns
Oranjemund	28.63	•	•
North	28.60	•	•
Elizabeth Bay	26.92	•	•
Grossebucht	26.73	•	ns
Agate Beach	26.63	•	ns
Paaltjies	23.00	•	ns
Langstrand	22.85	•	ns
Mile 14	22.48	•	•
Hentiesbaai	22.12	•	•
Mile 72	21.87	•	•
Mile 108	21.45	•	ns
Skeleton Coast 1	18.63	•	•
Skeleton Coast 2	18.20	•	ns
Skeleton Coast 3	17.32	•	ns



West Coast surf-zone sampling sites (Bate & Campbell 1990) compared to Sentinel images 2017-2022. Red = recorded by both, cyan by Sentinel only, magenta by Bate & Campbell only, white none & grey no sample. We used confirmed *Anaulus australis* patches from False Bay Sentinel images as a baseline to identify brown discoloured patches at 10 of 14 sites from Cape Town to the Skeleton Coast.

Reference:

Bate GC, Campbell EE 1990. *The Flora of the Sandy Beaches of Southern Africa II. The West Coast*. Institute for Coastal Research, University of Port Elizabeth, South Africa. Report No. 22, 72 pp.