

Biodiversity of Sydney harbour

- Pat Hutchings, Australian Museum
- Joint study with colleagues from the Australian Museum, Shane Ayhong (crustaceans), Mandy Reid (molluscs) Mick Ashcroft (GIS) and Mark McGrouther (fish)
- Very much a collaborative program



Australian Museum-College St



Australian Museum

- Oldest natural history museum in Australia, founded 1827- a state museum
- Collections date from around 1850 onwards, largely databased
- Obviously collections from Sydney Harbour well represented

Background to study

Australian Museum an associate member of SIMS (Sydney Institute of Marine Science- a consortium of the five Sydney Universities) based at Chowder Bay.

Developing the Sydney Harbour program- the Biodiversity Survey part of this program-essential baseline for any subsequent surveys, based on AM collections.



Sydney Harbour -

Scientific Advisory Committee



Sydney Harbour

- Drowned river valley formed during a rise in sea level ~10,000 years ago
- Entrance, between North and South Heads ~3 km wide, depth 30 m
- Estuary then opens up into Port Jackson, fed by Parramatta and Lane Cove Rivers to the west and Middle Harbour to the north
- 30 km long with a surface area of about 50 km² and a total catchment of 500 km²: most of the harbour (49.7 km²) is under tidal influence
- Australia's largest city built around the harbour

A drowned river valley



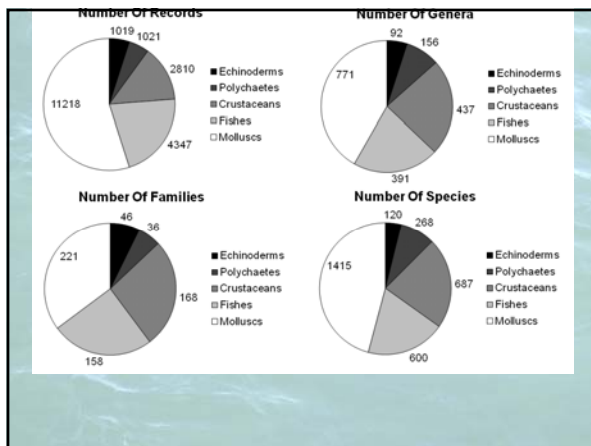
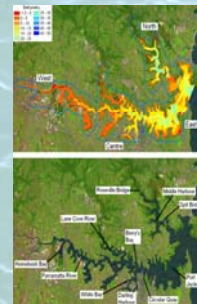
Strategy for survey

- Basically we extracted all records of fish, polychaetes, molluscs, echinoderms & crustaceans from AM databases
- Lists checked, names updated, but material not checked
- Over 20,415 records (1250 polys, 2778 crustaceans, 1017 echinoderms, 10,732 molluscs, 586 fishes)
- Plotted distributions across the 4 regions, by group and when collected

Sydney Harbour divided into 4 regions



Bathymetry of the harbour



Summary of Biodiversity

- Over 3000 species (doesn't include several groups like the bryozoans, sponges, corals & minor phyla)
- Fish, 586- (only 540 known from entire Mediterranean)
- Polychaetes, 308 species
- Crustaceans, 672 species
- Molluscs, 1375 species
- Echinoderms, 118 species
- This is without there ever having been a full survey-so would anticipate much higher nos actually present

A selection of molluscs recorded

Arvina parvula C. 3278 HOLOTYPE
Chloris neobulimoides C. 3347 HOLOTYPE
Architectonica perspectiva hawaii C. 6479 HOLOTYPE
Heterostoma sp. C. 3380 HOLOTYPE
Smargadella fragosa C. 6530 HOLOTYPE
Limulops retusus C. 6587 HOLOTYPE

More molluscs

Sepia plangon
Sepia apama Becca Saunders
Sepia mestus Photo Becca Saunders
 Large turban shells

Another cuttlefish

Metasepia pfefferi Becca Saunders

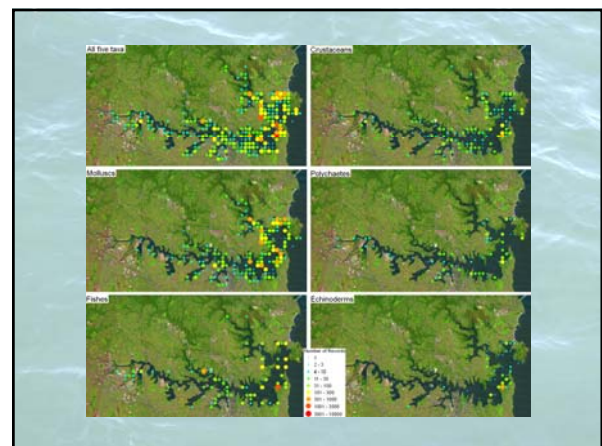
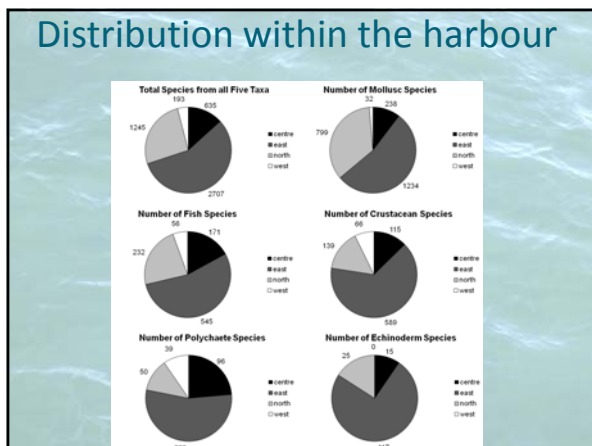
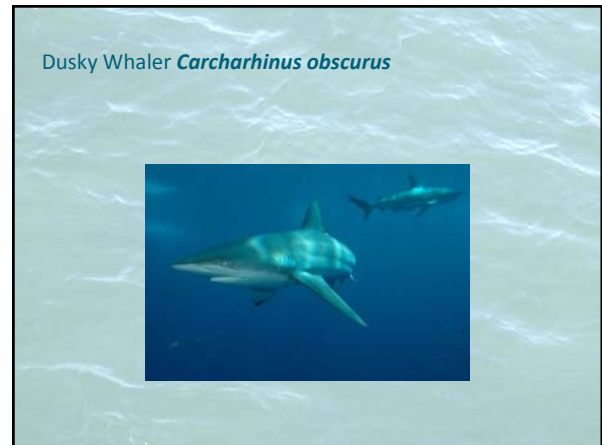
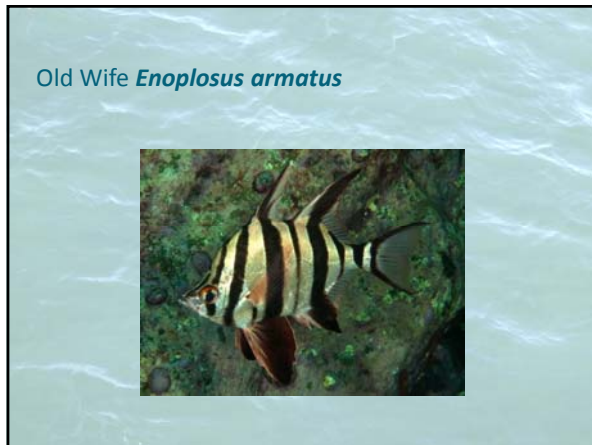
Examples of Crustaceans present in the harbour

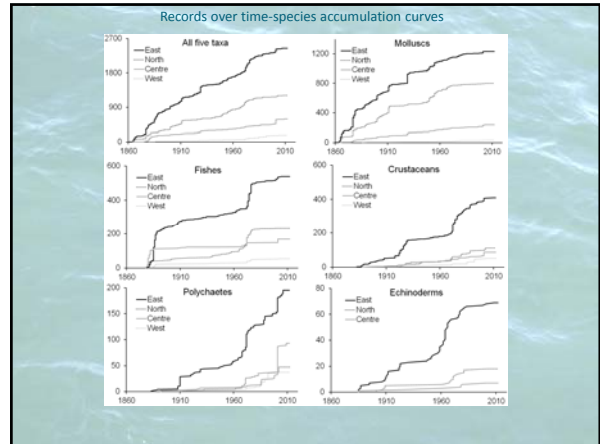
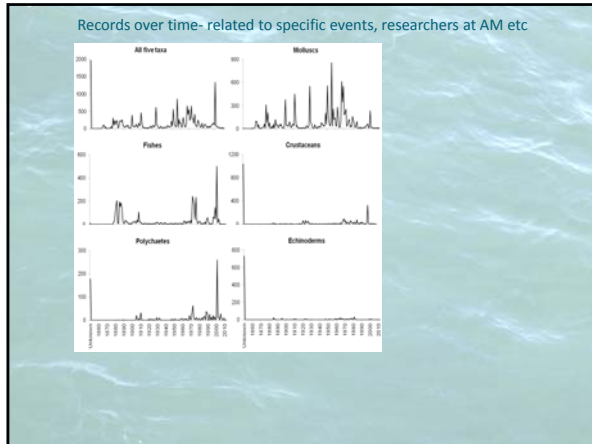
Snapping shrimp found throughout the harbour
 Mud crab- Upper harbour, Lane Cove, Middle
 Blue Swimmer found throughout harbour
 Mantis shrimp present mainly east of bridge

Selection of seaworms-polychaetes

Perinereis amblyodonta
Lepidonotus melanogrammus
Eurythoe sp.

Common Seadragon *Phyllopteryx taeniolatus*





Tremendous diversity in habitats

Some of the reasons why so many species are present- tremendous diversity of habitats

Sponge gardens just inside Sydney Heads- 20-25m

Photos Ken Thongpila

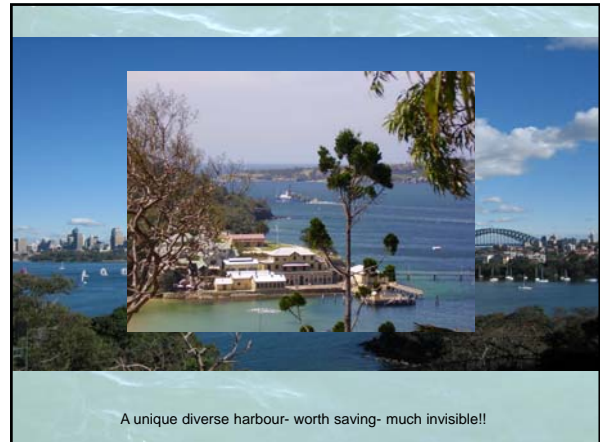
Dramatic differences in light

Dramatic differences in turbidity

Tremendous flushing, tidal influence marked all through harbour

Where to now?

- Identify gaps in sampling areas
- Has diversity changed over time- have we lost species?
- Can we increase the diversity?
- Problems- pollution- storm water drains, loss of habitat- building of seawalls
- Invasive species, climate change
- How do we maintain this diverse harbour – for its biodiversity, recreational and economic values?
- Much remains to be studied-



Acknowledgements

- Thanks to Mark McGrouther, Mandy Reid, Shane Ayhong, Ken Thongpila for slides and Emma Johnson from SIMS
- Paper summarising these findings in press Australian Zoologist- will be available on line early next week