



Monitoring hypoxia on Cordell Bank

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1. Cordell Bank National Marine Sanctuary
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3. Cordell Bank and Greater Farallones National Marine Sanctuary

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Background



- Oxygen is essential for living organisms, including those in marine environments
- Low oxygen (hypoxia) can occur naturally or through anthropogenic activities
 - Biological activity can create (through photosynthesis) and decrease (through decay) oxygen.
 - Upwelling can bring water with low oxygen to the surface



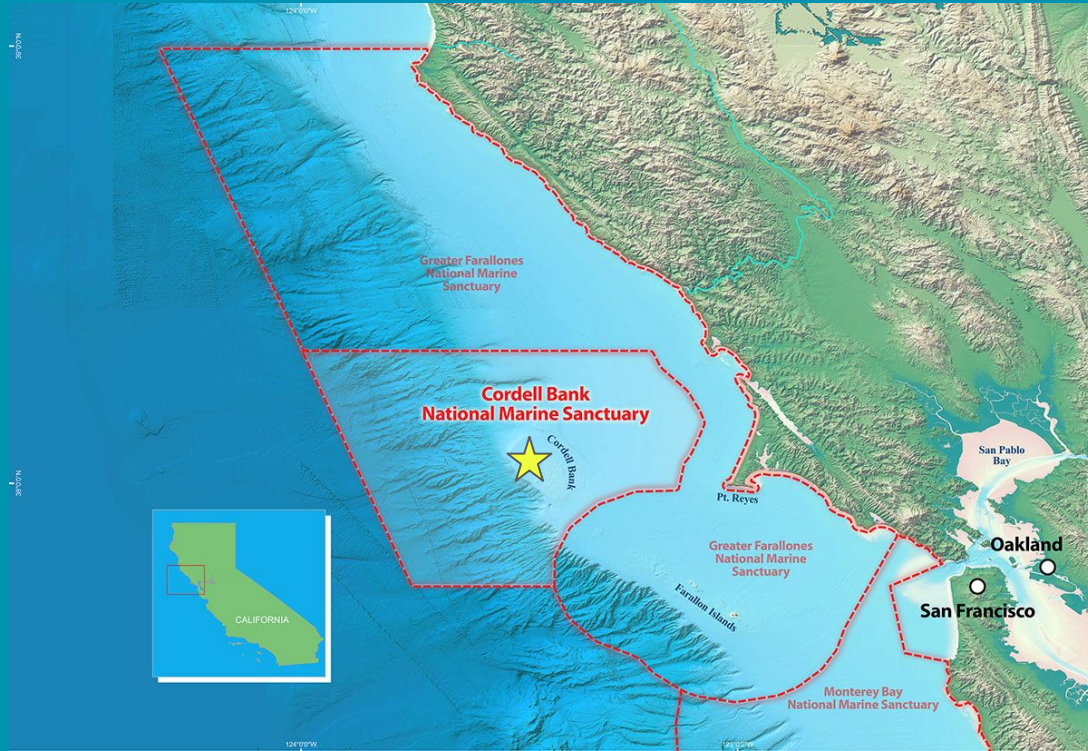
Background



Photos: ONMS/NOAA

- Organisms have different tolerance levels of low oxygen conditions - stress can cause behavioral changes, stress or mortality
- Hypoxic events observed along the West Coast
- Need better understanding of hypoxic events (frequency, duration, intensity) in CBNMS to effectively manage and protect life on the Bank

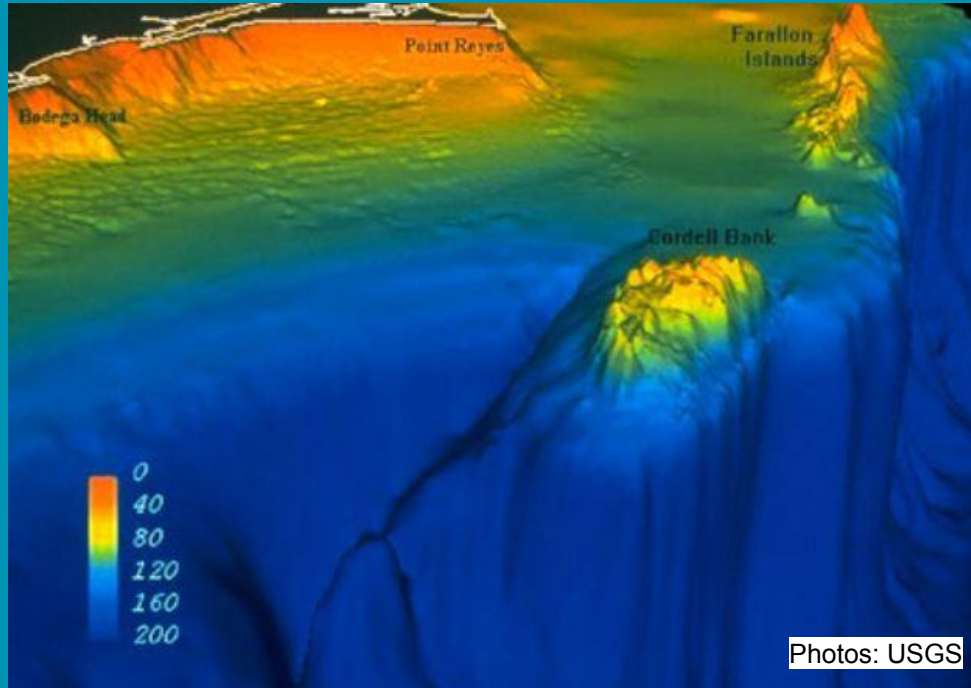
Study Site



Cordell Bank National Marine Sanctuary

- 1286 sq miles
- Cordell Bank: 9.5 x 14.5 miles

Study Site



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Photo: R. Lee

Cordell Bank National Marine Sanctuary

- 1286 sq miles
- Cordell Bank: 9.5 x 14.5 miles
- ≥ 286 fishes and ≥ 1245 invertebrates

Methods

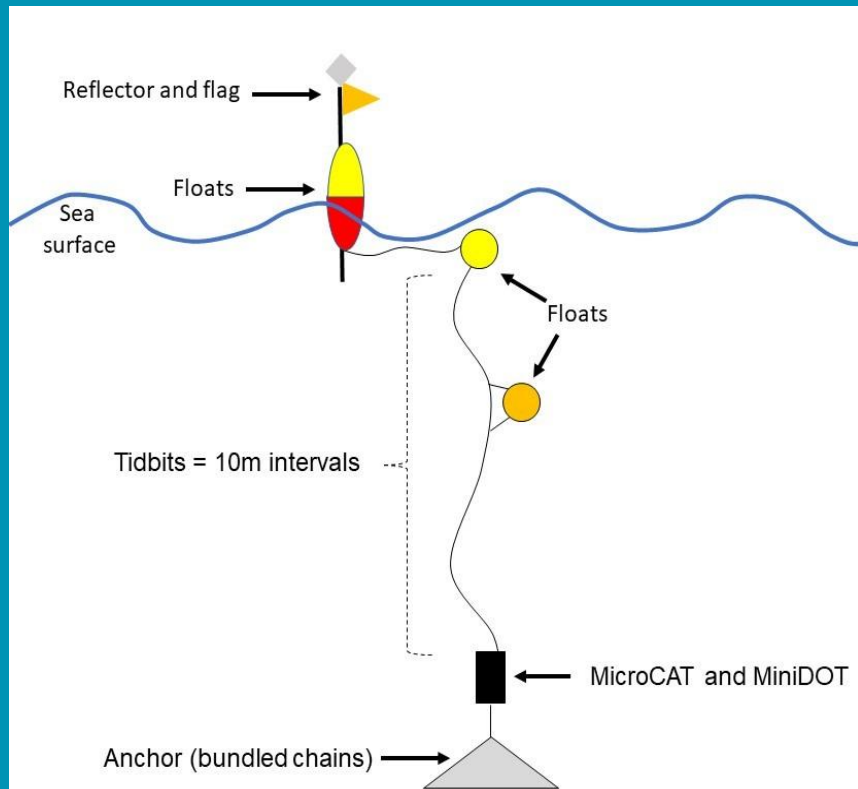


Photo: R. Pound/CBNMS

Cordell Bank National Marine Sanctuary and UC Davis Bodega Marine Lab Collaboration

- Moorings deployed:
 - Shallow (83 m): 2014-present
 - Deep (114 m): 2014-2018

Methods



Cordell Bank National Marine Sanctuary and UC Davis Bodega Marine Lab Collaboration

- Moorings deployed:
 - Shallow (83 m): 2014-present
 - Deep (114 m): 2014-2018
- Instruments:
 - Surface to depth
 - Temp - 10m intervals (tidbits)
 - At depth
 - Oxygen (MiniDOT)
 - Conductivity (MicroCAT) in 2016

Methods



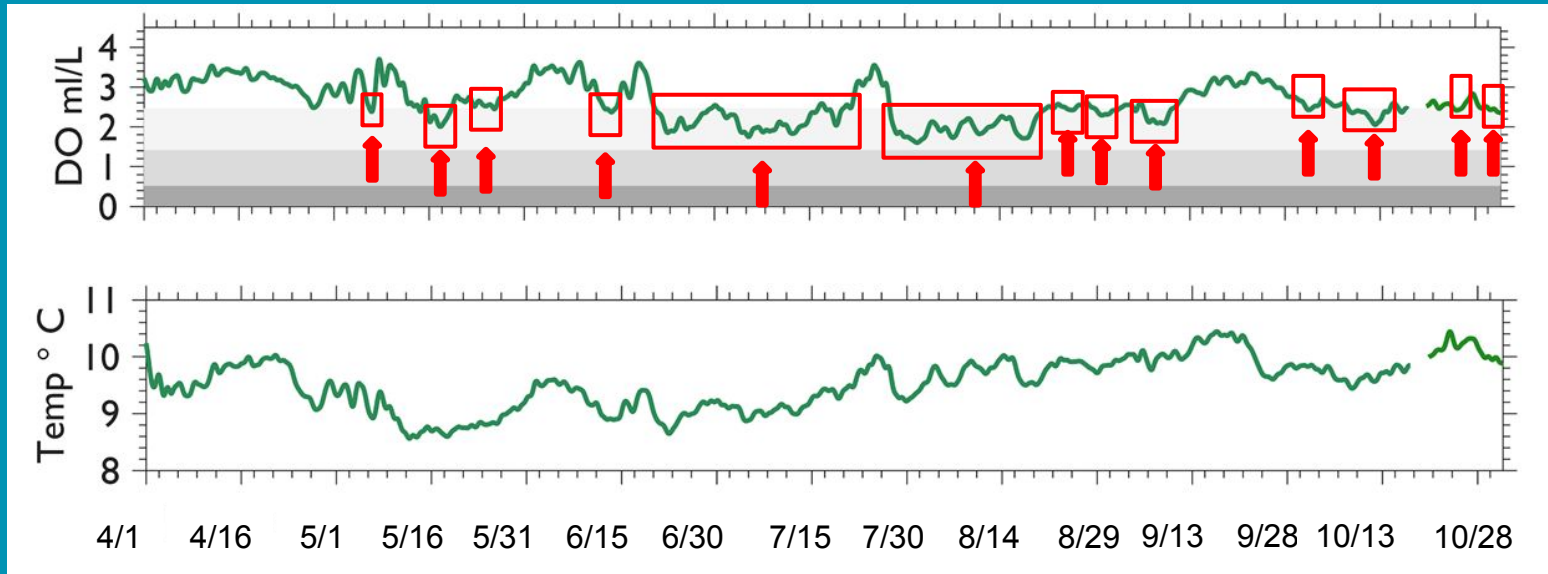
and MiniDOT

Photo: S. Neil/BML

Cordell Bank National Marine Sanctuary and UC Davis Bodega Marine Lab Collaboration

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Results



2017
Deep mooring
(sensors ~100m)

- Some periods of mild hypoxia
- No intermediate or severe hypoxia

Mild: ≤ 2.45 and > 1.4 m/L
Intermediate: ≤ 1.4 and > 0.5 m/L
Severe: ≤ 0.5 and > 1.4 m/L

(Hewett and Largier 2022, in prep)

Conclusions/Applications



- Mild hypoxia occurs on CB
- Currently no extreme hypoxic events as seen elsewhere
- Many species found in CBNMS could be susceptible to changes in oxygen levels
- Hypoxic events are predicted to worsen with climate change
- Continue monitoring hypoxic conditions on the bank



Thank you!



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Coastal and Marine Sciences Institute



**CORDELL MARINE
SANCTUARY
FOUNDATION**

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More information:
Hewett and Largier 2022, in prep