



Ocean literacy of Monterey Bay coastal residents regarding seawater desalination and impacts on marine ecosystems

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Introduction & Research Objectives

Seawater desalination is increasingly pursued as a reliable, climate independent water supply option to address drinking water supply shortages in coastal areas. Public literacy about this technology and its impacts on the ocean is vital to empower local communities to become more involved stewards of the ocean.

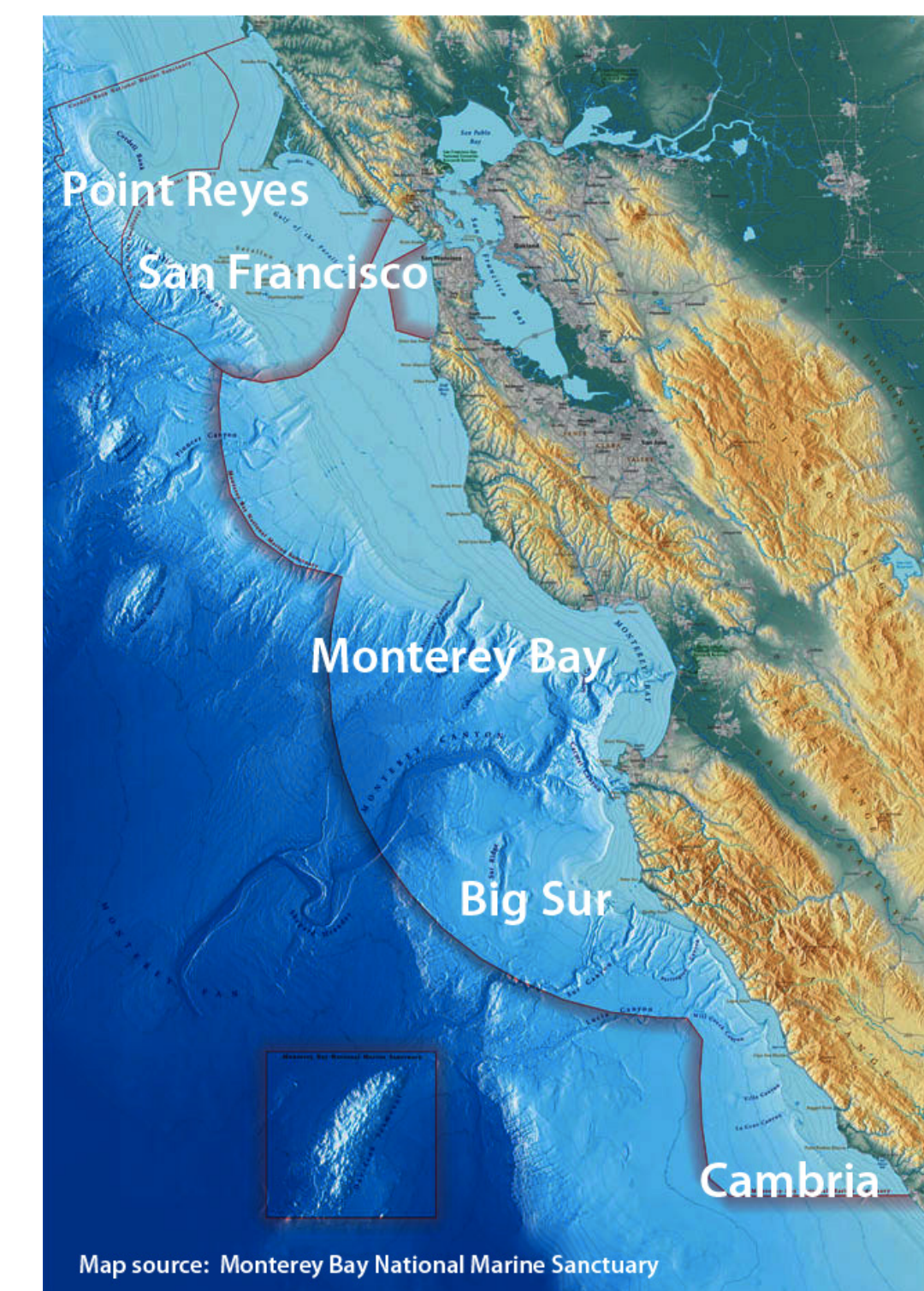
Variables that shape public literacy about impacts on the ocean and ocean processes are not well understood. Our study investigates public ocean literacy related to seawater desalination in coastal communities in the Monterey Bay. We explore how much the public knows about these issues, and identify information sources that increase public ocean literacy. Data is still being analyzed and only preliminary results are shown here.

Fig. 1. Location of Monterey Bay



Service layer credit ESRI

Fig. 2. Monterey Bay and Monterey Canyon



Map source: Monterey Bay National Marine Sanctuary
 Source <http://www.seasonsintthesea.com/about/about.shtml>

Methods

- We conducted a questionnaire-based survey in June and July of 2016
- The survey was distributed to 1,400 coastal residents randomly selected from postal records
- Response rate: 416 (29%)
- We assessed self-assessed and factual knowledge based on the ocean literacy principles
- Data analysis with SPSS 23: Descriptive statistics, Spearman correlation.

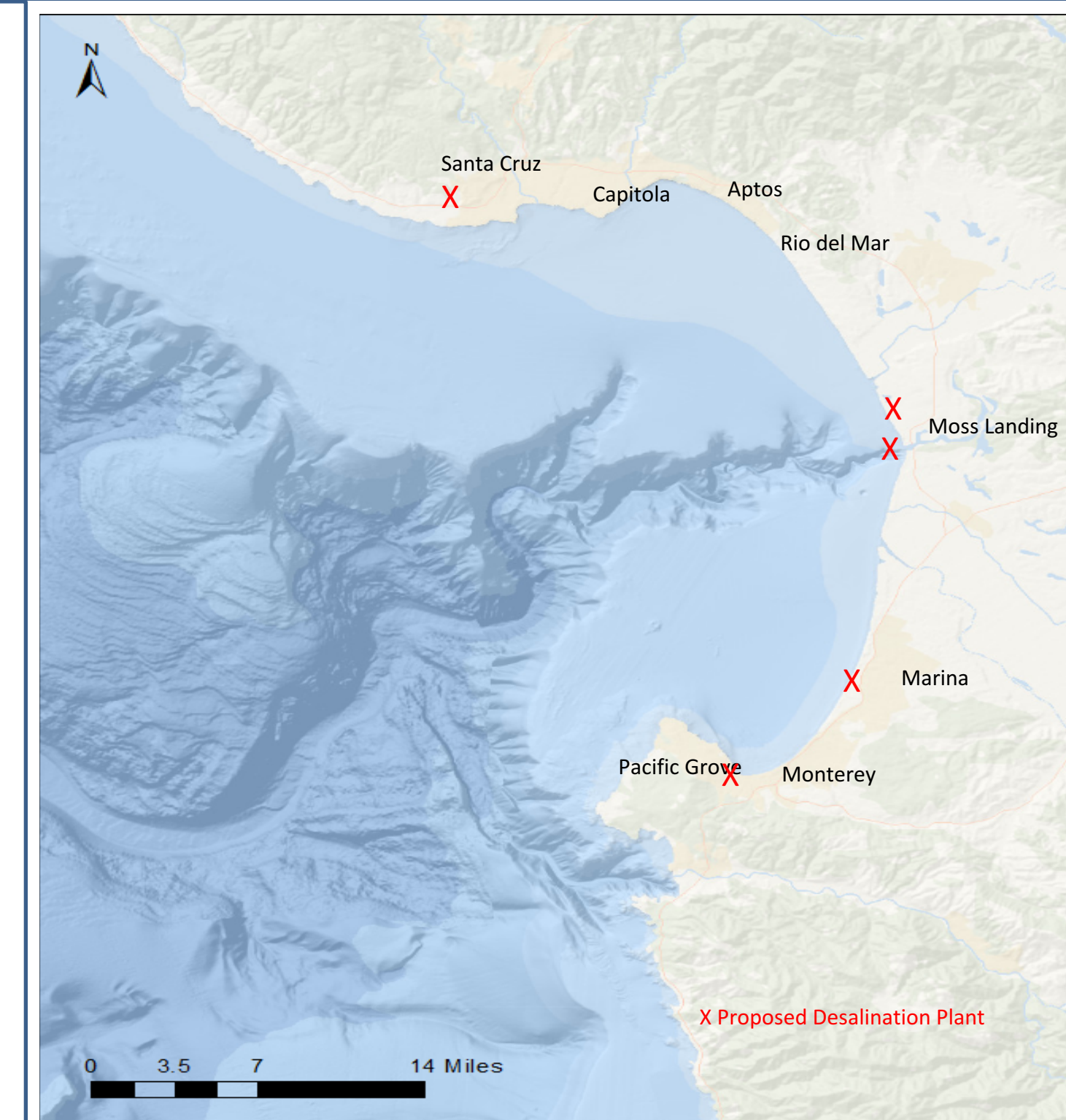
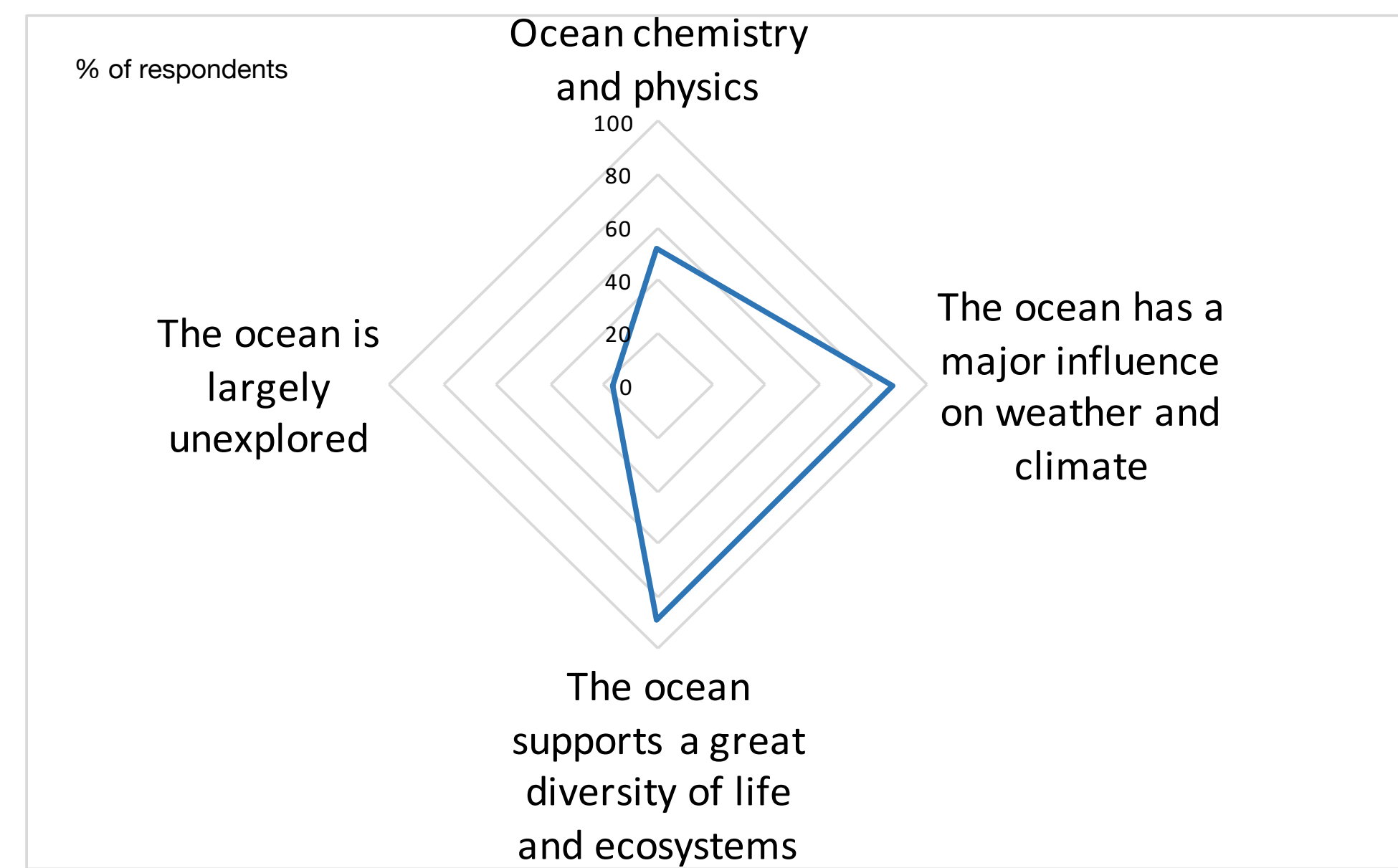


Figure 4. Map of coastal communities surveyed and locations of proposed desalination plants (service layer credit ESRI)

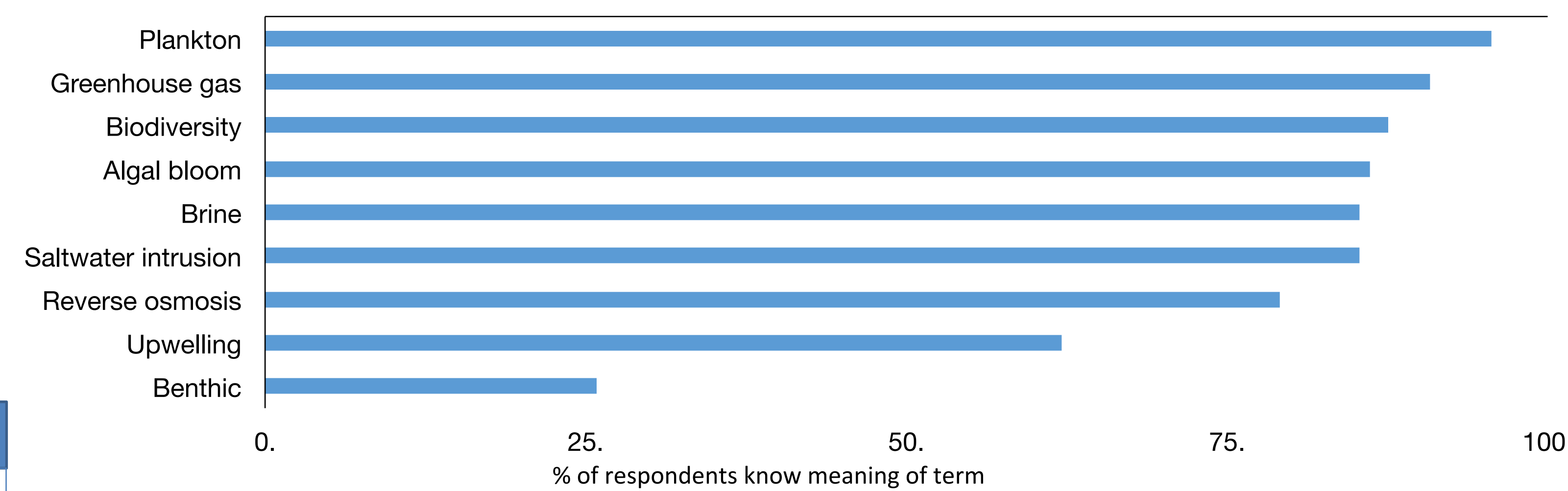
Fig. 7 Understanding of Ocean Literacy Principles



- High percentage of respondents literate about the role of the ocean for climate and biodiversity
- Knowledge gaps about chemistry, physical processes, and scientific uncertainty

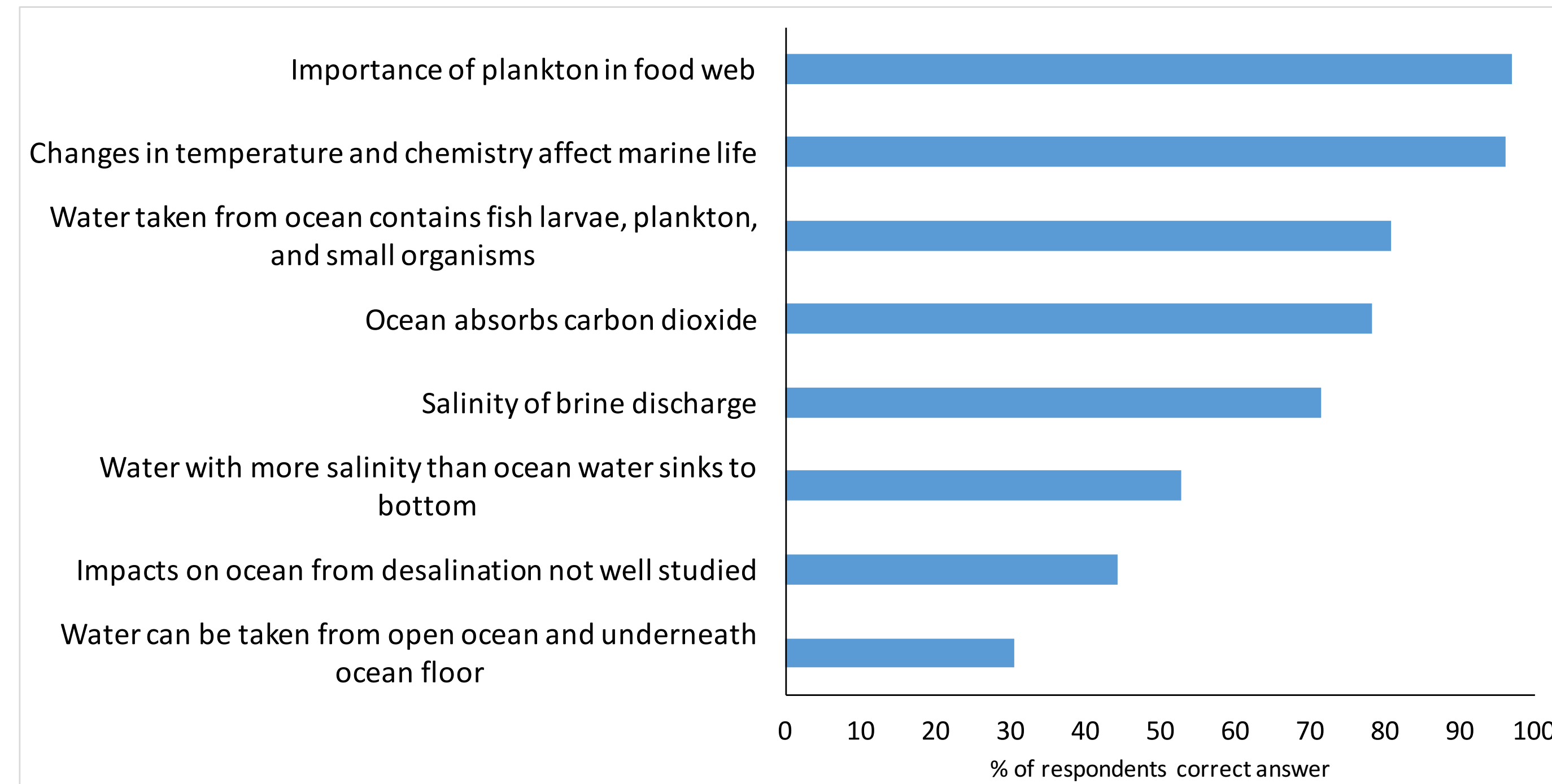
Public Ocean Literacy

Figure 5: Knowledge about ocean related terminology



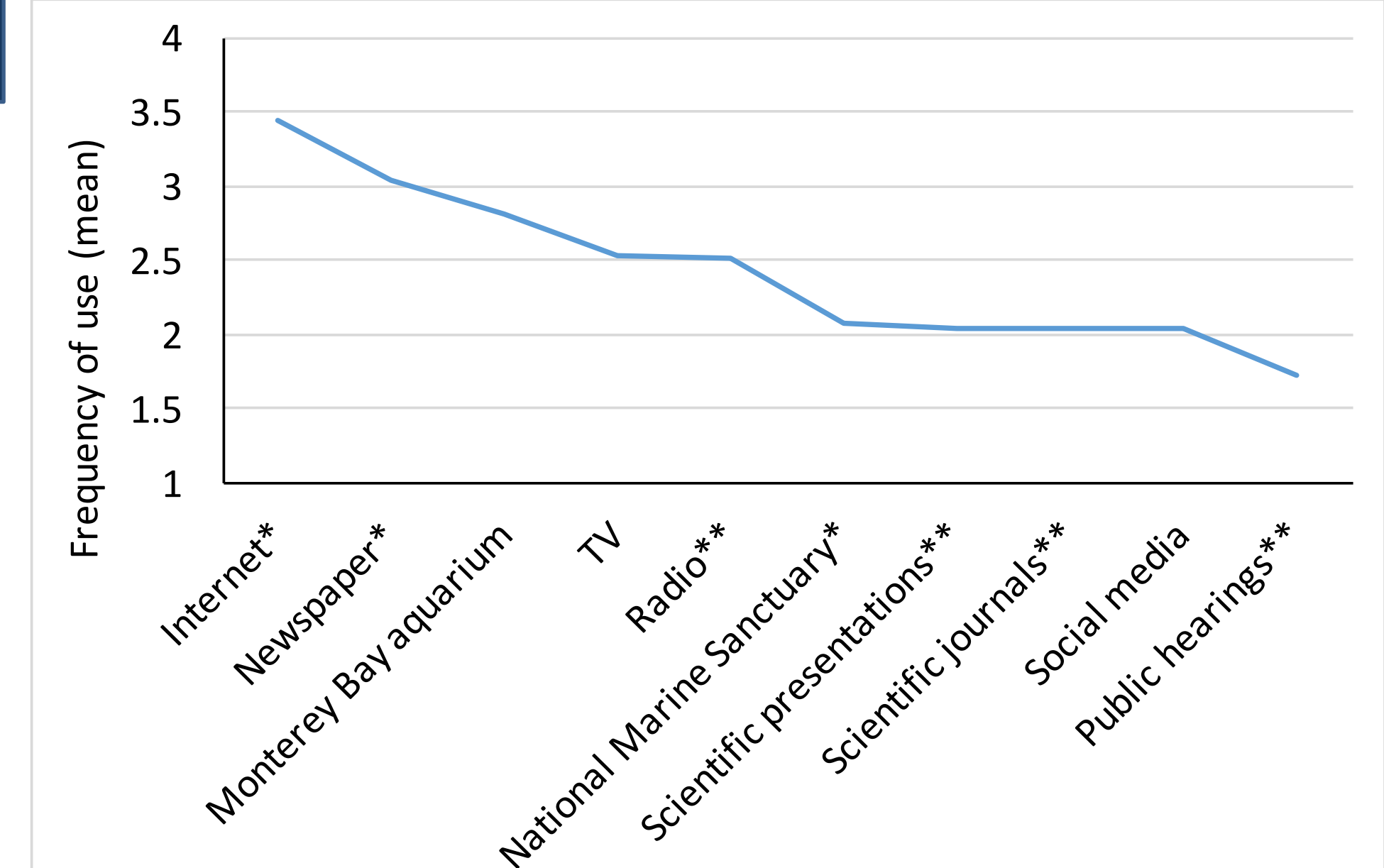
- Low knowledge with specific ocean terms including benthic and upwelling
- High knowledge about marine ecosystem terminology and climate related terms

Fig. 6 Ocean knowledge based on factual knowledge questions



- Low knowledge about scientific uncertainty and deep ocean features

Fig. 8 Information sources



Assessed on a 5-point scale from never to very frequently; *sign. at 0.05, **sign. at 0.01 Spearman correlation: information source and number of correct answers

- The Internet, Newspapers, TV, Radio and the Aquarium main information sources
- Scientific presentations, scientific articles, and public hearings most effective communication means to increase knowledge

Conclusions

- Public literacy of ocean principles high for biodiversity but low for other marine issues and benthic features in particular
- Frequently used information sources not the most effective ones to increase public knowledge
- Findings provide important insights to tailor ocean literacy education and outreach efforts to improve public awareness about marine ecosystems and effects of desalination.

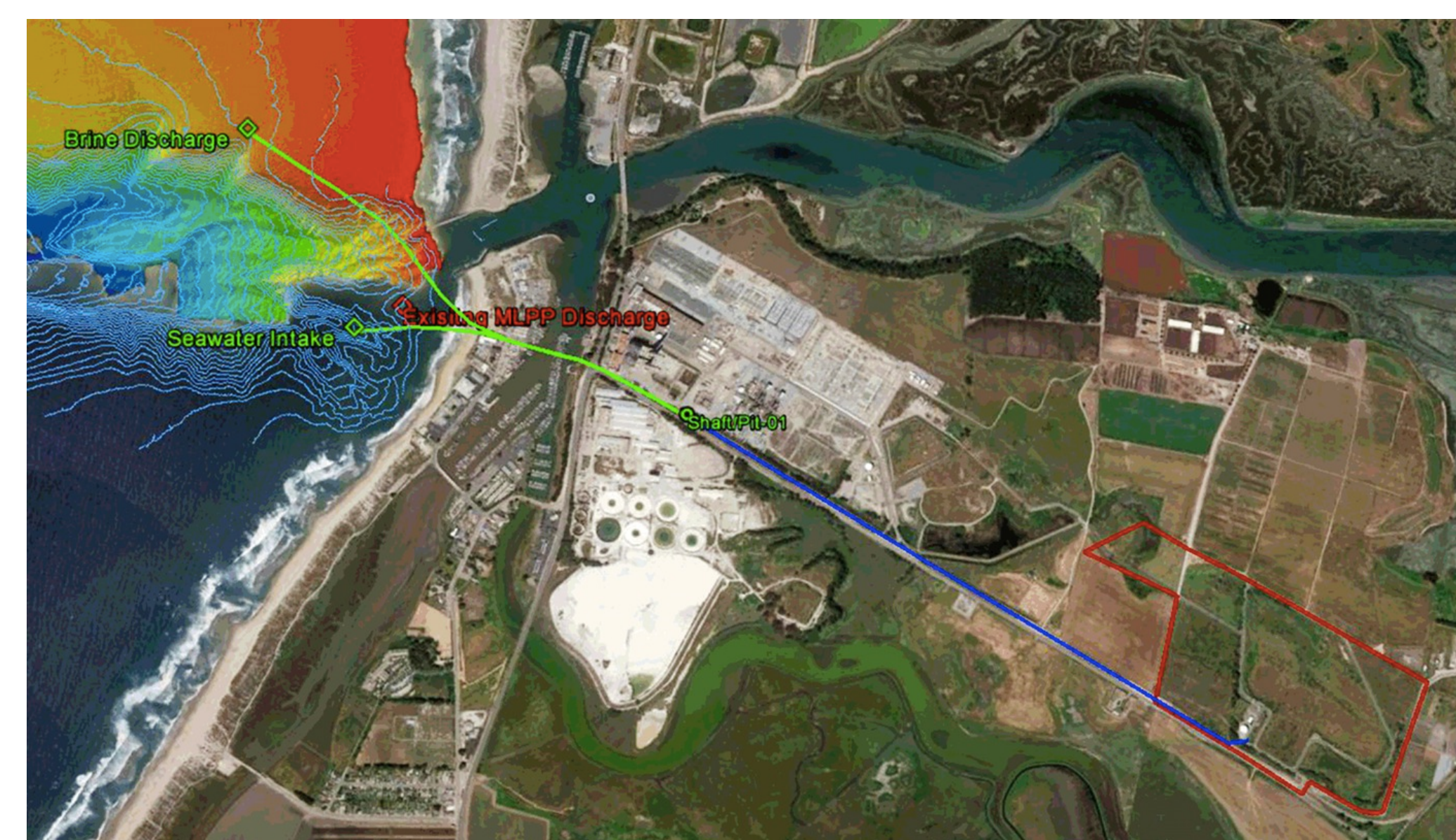
Acknowledgments

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Desalination in Monterey Bay

Monterey Bay is home to a very diverse marine ecosystem and is protected as part of the Monterey Bay National Marine Sanctuary. Currently there are 4 desalination plants proposed in the area with a capacity of over 1 million gallons per day. Desalination is a contested water supply option in the area partly due to its marine impacts and the high scientific uncertainty concerning these impacts.

Figure 3. Map showing location of a proposed desalination plant and brine discharge in Moss Landing



Source: <https://www.newsdeeply.com/water/articles/2016/07/27/deep-water-desalination-proposed-in-monterey-bay>