

**Paper for Consideration by NIPWG**

**Portrayal of the MPA feature**

<b>Submitted by:</b>	Anthropocene Institute
<b>Executive Summary:</b>	Anthropocene Institute has developed multiple variations of MPA depiction on Nautical Charts to inform generic approaches to visualisation of the S-122 standard
<b>Related Documents:</b>	Interactive demo: <a href="https://mpa.protectedseas.net/mpa_iho.html">https://mpa.protectedseas.net/mpa_iho.html</a>
<b>Related Projects:</b>	None

## Introduction / Background

As the S-100 / S-122 standards near completion, it is necessary to consider how MPAs will be depicted on electronic mapping and data systems. Anthropocene Institute (AnthInst) as part of their Marine Managed Area mapping project (<http://protectedseas.net/mpa-mapping/>) has been generating a comprehensive database of US protected and managed areas in a format amenable to S-122 conversion.

As part of their MPA mapping work, they have created an online, interactive map targeted to the general public to provide easy discovery and search of areas. This map was used as a jumping-off point to explore MPA depiction variations targeted specifically at electronic charting displays.

## Analysis/Discussion

The initial AnthInst map design uses shaded polygons to depict MPA boundaries with the shade color and color depth indicating the overall level of take restrictions as shown in Image 1. Red areas indicate no take and/or no entry – the most restrictive categories. Blue areas contain at least some gear or species restrictions without curtailing all extraction activities.

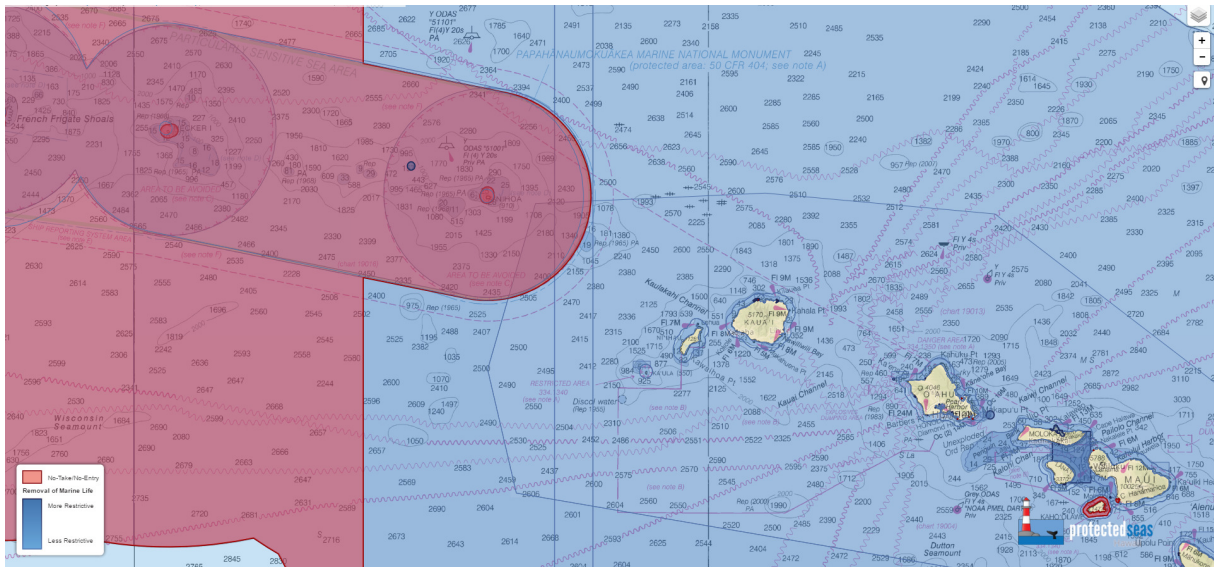


Image 1: AnthInst Public Web Depiction of MPA Areas

Based on NIPWG committee feedback on this base design, a second variation was produced. Specifically, the following changes were made:

1. All blue shaded areas were changed to a green outline with no fill to reduce chart clutter. Red, no-take areas were changed to use a mostly-transparent hatch fill while no entry areas use an icon fill based on NOAA Chart 1 for no entry.
2. At low zoom levels, green boundaries are depicted with simple lines as shown in Image 2 – which is consistent with current S-57 charting conventions for less critical boundaries.
3. Because there can be significant, complex interactions between overlapping zones at higher zoom levels, the boundaries are shown via 'T' lines which conveys a sense

of which direction is 'into' the area which is very helpful when the entire area is not in view due to zoom as shown in Image 3

An interactive version of the Hawaii Marine Managed Areas in this new display format is available at: <https://mpa.protectedseas.net/north-america/iho>

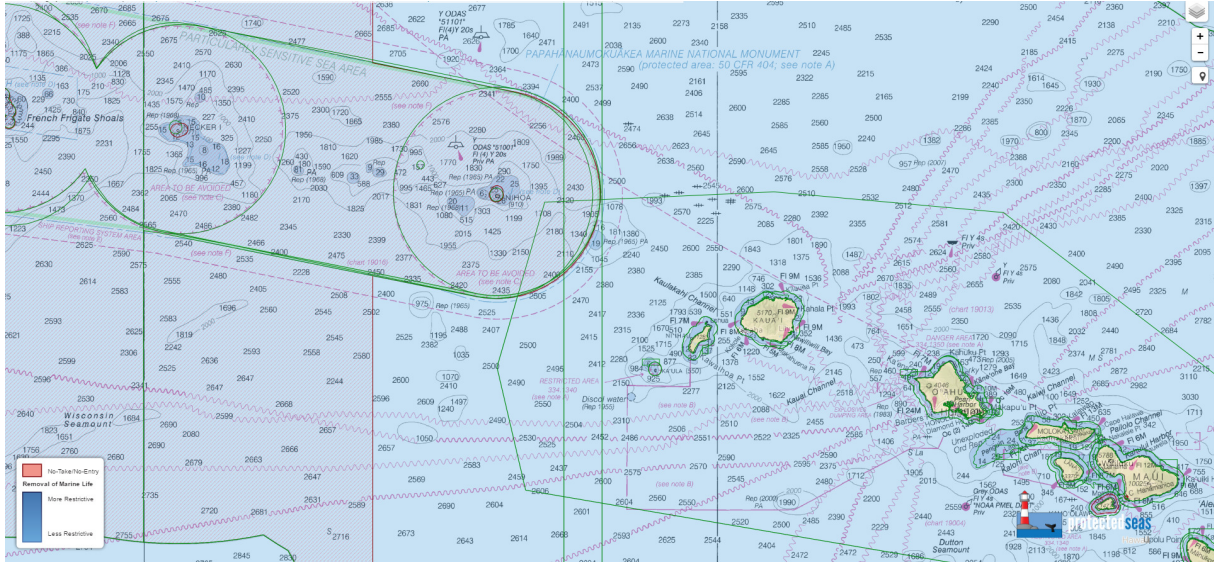


Image 2: Low Zoom with MPAs shown using simple red and green lines with light red hatching for no-take areas.

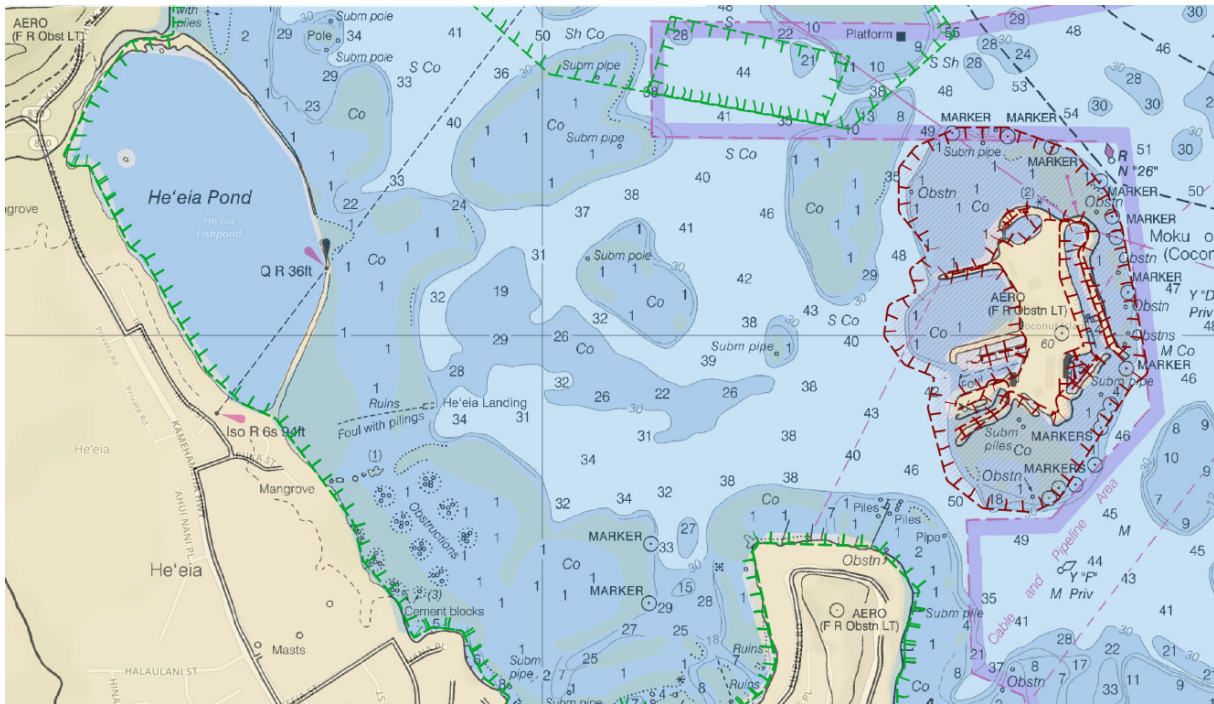


Image 3: High Zoom. MPA boundaries are shown using T lines to help indicate the directionality of the area relative to the boundary


Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

AnthInst also developed a standardised set of attribute data and its display for each MPA as shown in Image 4. The core elements being:

1. MPA Name
2. MPA Managing Authority
3. MPA Purpose Statement
4. MPA Restrictions Summary
5. MPA Exceptions (Allowed) Summary
6. Governing Regulation Citation
7. Seasonality
8. Violations Reporting Information
9. Update Source Information (phone, websites, etc)
10. Links to official online resources for that MPA (webpage, official regulations, etc)

### Northwestern Hawaiian Islands Marine Refuge

**Managed By:** Hawaii Department of Land and Natural Resources

**Purpose:** To establish a marine refuge in the Northwestern Hawaiian Islands for the longterm conservation and protection of the unique coral reef ecosystems and the related marine resources and species, to ensure their conservation and natural character. 

**Restricted:** 1. Entry into the refuge is prohibited without a permit.  
2. Fishing or taking of marine life within the refuge is prohibited.

**Allowed:** Persons may enter the refuge to engage in activities that do no harm to the coral reef ecosystem for the following purposes:

1. Scientific or education purposes;
2. Non-extractive purposes undertaken to further the knowledge of resources or which provide for enhanced resources protection or benefit resource management; and
3. Subsistence, traditional and customary practices by Native Hawaiians.

**Governing Regulation:** HAR § 13-60.5  
**Effective:** Year-round

**Report Violations to:** (808) 643-DLNR (3567)

**Latest Updates:**  
For the latest fishing regulation information:  
Check the [the Western Pacific Regional Fishery Management Council](#)  
In season changes to commercial and recreational fishing regulations, call the Hawaii Department of Natural Resources, Division of Aquatic Resources, at (808) 587-0100 or visit the DLNR [website](#).  
Announcements by the Division of Aquatic Resources are made available [here](#).

Image 4: Depiction of MPA Attributes Formatted for Mariners



For Discussion:

- Should No Take areas be depicted in Red or only No Entry (noting that No Entry areas are already generally charted)?
- More generally, should map depictions attempt to convey the level of restriction in an area or only the boundaries?
- Should polygon fill patterns be used to convey additional, specific activity restrictions (no dive, no anchor, no fishing, ...)?
  - If so, which activities should we specifically encode, and with what icons?
- Should we consider encoding areas with metadata that indicate
  - restrictions that only apply to extraction (fishing, mining, ...) ?
  - restrictions that also bear on navigation and passage (discharge, speed limits, ...)?
- What S-122 attributes are most likely useful to filter areas based on vessel type or activity?
  - Do we need to propose additional attributes to improve filtering?
- Should NIPWG recommend a minimum set of attributes when defining an MPA to ensure the information is useful to the mariner?
- Similarly, should we recommend a minimum set of attributes that should be displayed to the mariner when requested?

### **Conclusions**

MPA depiction will require a careful balance to convey important information while avoiding chart clutter. In the case of areas with less than full extraction limits, the ability to filter based on vessel type or activity would be very helpful on electronic systems.

### **Recommendations**

Revise this version of the depiction based on group consensus then share our visualisation prototypes with the Charting Committee.

### **Justification and Impacts**

The mariner community understands the importance of accurate MPA depiction. AnthInst has been presenting their MPA mapping work to regional US Fisheries Council Law Enforcement Committees and they are all strongly supportive of including MPA information in all navigational products. Navionics is piloting the use of the AnthInst dataset in their mobile navigation products using similar depictions as those proposed above.

Having reference designs for depiction should reduce the timeline between S-122 acceptance and its impact on awareness and compliance with MPAs by boaters at large.

### **Action Required of NIPWG**

The NIPWG is invited to:

- a. Note the paper
- b. Discuss the proposed solutions
- c. Take actions as appropriate