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**Chapter 5: Commercial and Recreational Fisheries**

**APPENDIX B**

**FISHERIES ACTIVITY MAPS: METHODS AND DATA SOURCES**

**1. Fisheries Activity Maps Based on Qualitative Input**

1. Commercial and recreational fisheries usage Geographic Information Systems (GIS) data layers and maps for Rhode Island's offshore waters were developed from September 2008 – August 2009 and finalized in October 2009. Three data layers and maps were created: recreational fishing usage areas; commercial fishing usage areas – mobile gear; and commercial fishing usage areas – fixed gear.
2. The main purpose of this data collection effort was to document the fishing grounds used by RI commercial and recreational fishermen. This effort took place as part of the Ocean SAMP planning process, and so data collection focused on the SAMP area, which encompassed RI's coastal and ocean waters, encompassing both state and federal jurisdictions, out to 20 miles offshore. These data layers were created for use in the Ocean SAMP planning process, but were also intended as an update and refinement to a similar set of maps created in 2004 by New England regional Sea Grant.
3. Fisheries usage data layers are based on qualitative data and were developed using standard qualitative research methods. Data were collected through interviews and mapping exercises conducted in person, both one-on-one and in small groups, with RI commercial and recreational fishermen. Interviews took place between September 2008 and January 2009. Approximately 30 fishermen, including representatives of commercial and recreational fishing groups and numerous unaffiliated fishermen, were interviewed. Interview subjects were identified by RI fisheries experts, and representatives from all RI fishing industry groups were invited to participate. Effort was made to schedule in-person meetings in places and at times that were convenient to fishermen. Groups that participated included the RI Fishermen's Alliance (RIFA), the RI Lobstermen's Association, the Eastern New England Scallop Association (ENESA), the RI Saltwater Anglers Association (RISAA), and the RI Party and Charter Boat Association (RIPCBA).
4. In each interview, fishermen were first given a brief introduction to the RI Ocean SAMP planning process and shown NOAA nautical charts of the SAMP area. Fishermen were also told that their individual input would be kept confidential, and that only aggregate data, in the form of GIS data layers, maps, and metadata, would be shared with the public. This was important in order to preserve individual fishermen's information about their most important fishing areas, which is essential to the success of their businesses. Researchers then asked the fishermen to describe where they fish, and to draw polygons encompassing these areas on the nautical charts. Fishermen were then asked follow-up questions about these areas, including (1) During which seasons do you fish in each

area?; (2) With what gear?; and in some cases (3) What are your target species in each area? This information was notated directly on NOAA nautical charts and additional notes were taken where appropriate. Fishermen were also asked if they had questions or concerns about the Ocean SAMP planning process. This input was recorded and used to shape the SAMP stakeholder process as well as the framework for developing the SAMP fisheries chapter.

5. Following these meetings, data were aggregated onto three sets of NOAA nautical charts to represent the three different data layers described above. The raw data, which exists in the form of the original nautical charts with fishermen's confidential information, are archived by David Beutel, Aquaculture Coordinator at the RI Coastal Resources Management Council. These aggregate charts were first compared with the 2004 maps for corroboration, and then combined with the 2004 data to complete the current information. Charts were then scanned and georeferenced and polygons were digitized in order to create Geographic Information Systems (GIS) shapefiles. Attribute fields were created for the data layers to record available information about either seasonality or gear type. See Chapter 5 for final maps based on these data layers.
6. This dataset has some limitations. In many cases, fixed gear areas are not always differentiated by gear type because this information was not available; for example, gillnet gear is not thoroughly differentiated from lobster gear, which is not further differentiated from fish pots. In addition, these data do not include out-of-state fisheries which may be conducted within the SAMP area, such as the herring mid-water trawling fishery based out of other New England ports.
7. While the data represented in these data layers is anecdotal, comparison with past usage maps shows that it is consistent. Moreover, there are few other data sources that indicate where fishermen fish, and none which is universally deemed reliable. See below for further discussion of other fisheries activity data sources.

## **2. Fisheries Activity Maps Based on Quantitative Data**

1. Additional commercial fisheries usage GIS data layers and maps were created for the Ocean SAMP through the use of quantitative fisheries-dependent monitoring data obtained from NMFS. There is no one dataset, nor a combination of datasets, available that accurately represent the exact locations of all commercial fisheries activity. The best available data that provide insight into the spatial and temporal characteristics of commercial fishing activity are two NMFS monitoring datasets: Vessel Trip Report (VTR) data; and Vessel Monitoring Systems (VMS) data. VTR data are based on the individual fisherman reporting his or her activity, whereas VMS data are based on an independent electronic satellite tracking system, and reflect both vessel transits as well as fishing activity. Both of these datasets are subject to strict confidentiality provisions designed to protect fishermen's privacy. Because of numerous limitations associated with the use of VMS data in mapping, only VTR data were used to create maps for the Ocean SAMP.
2. As a means of monitoring fisheries activity, NMFS requires commercial fishermen with federally-permitted groundfish, scallop, and monkfish vessels operating in the SAMP

area to submit one VTR for each fishing trip. On each report, the fisherman reports the location of that trip as one set of coordinates (latitude/longitude or Loran). VTR location information is only an approximation of fishing activity because the fisherman self-reports only one set of coordinates for the trip, despite the fact that one trip may include multiple tows that take place in many different locations across a much wider area.

3. VTR data for Rhode Island-based vessels for 1998 – 2008 were obtained from NMFS, subject to data access agreements that are designed to ensure fishermen’s privacy. Fishing activity maps were created by aggregating all VTRs as one set of point data, and then aggregating the data by gear type to reflect bottom trawling; scallop dredging; gillnetting; and mid-water trawling activity. A density plot was then created, using a 1-minute by 1-minute grid overlay, to determine the relative density of fishing trips by gear type and in aggregate. Darker-shaded areas represent the areas with a higher density of fishing activity; see Chapter 5 for the final maps based on these data. In addition, because VTR data include the dates of each fishing trip, data were aggregated by gear type and season (Winter: Jan 1 – March 31; Spring: April 1 – June 31; Summer: July 1 – September 30; Fall: October 1 – December 31) in order to highlight the seasonal variation in fishing activity; see Figures 1-12 below.
4. It is important to emphasize that VTR data have some limitations. As noted above, VTR location information is only an approximation of fishing activity because the fisherman self-reports only one set of coordinates for the trip, despite the fact that one trip may include multiple tows or sets that take place in many different locations across a much wider area. In addition, VTR data do not reflect lobstering, which is one of the main commercial fishing activities that takes place in the SAMP area. No equivalent dataset is available from any state or federal regulatory agency that can be used to map lobstering activity at this level of resolution. Whereas RIDEM collects logbook data (similar to VTRs) from lobstermen, these data include location information reported by statistical area only and are therefore insufficient for mapping fishing activity in the SAMP area.

Figure 1. Gillnet and Mobile Gear Fishing, Winter, Based on NMFS Vessel Trip Reports, 1998 - 2008

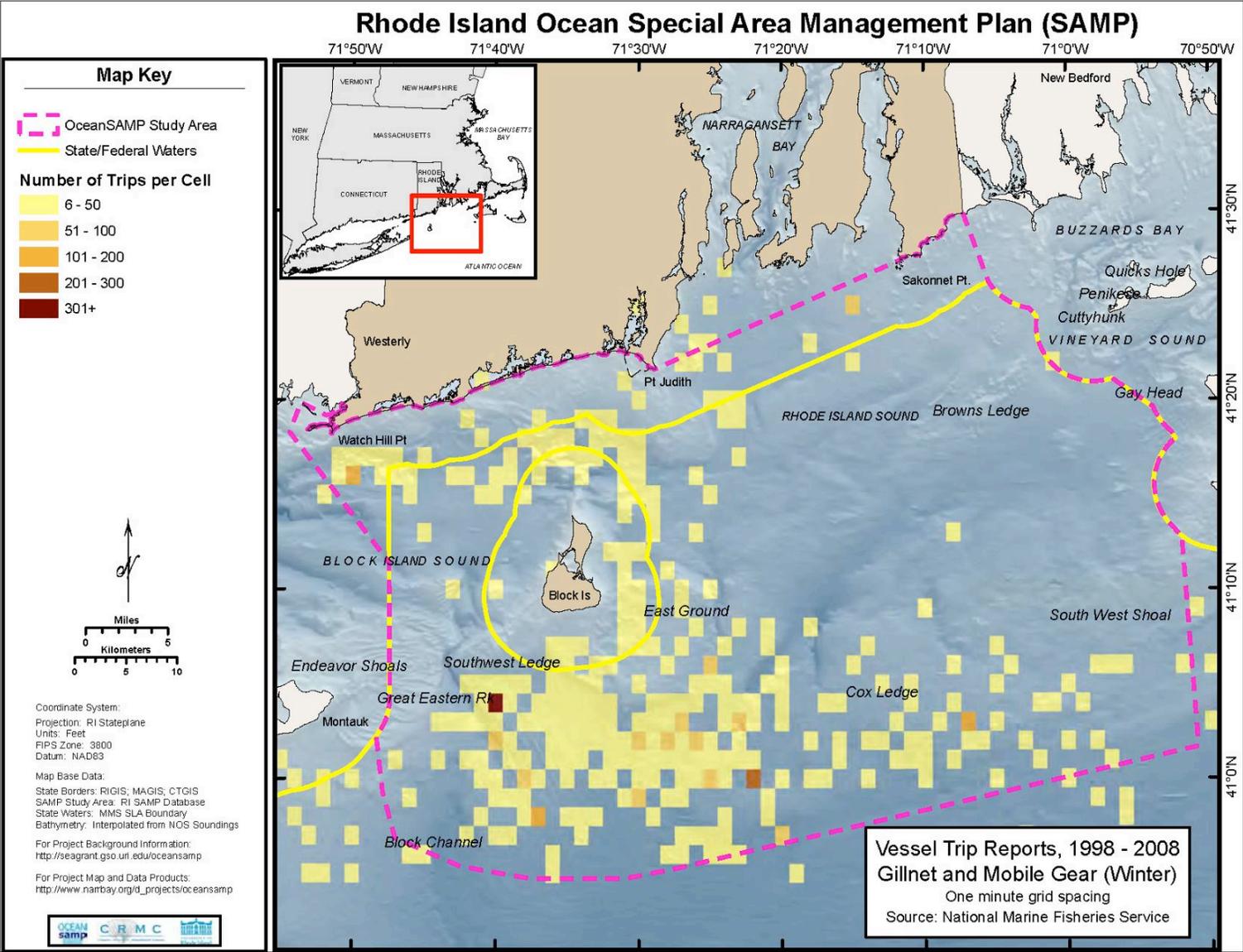


Figure 2. Gillnet and Mobile Gear Fishing, Spring, Based on NMFS Vessel Trip Reports, 1998 - 2008

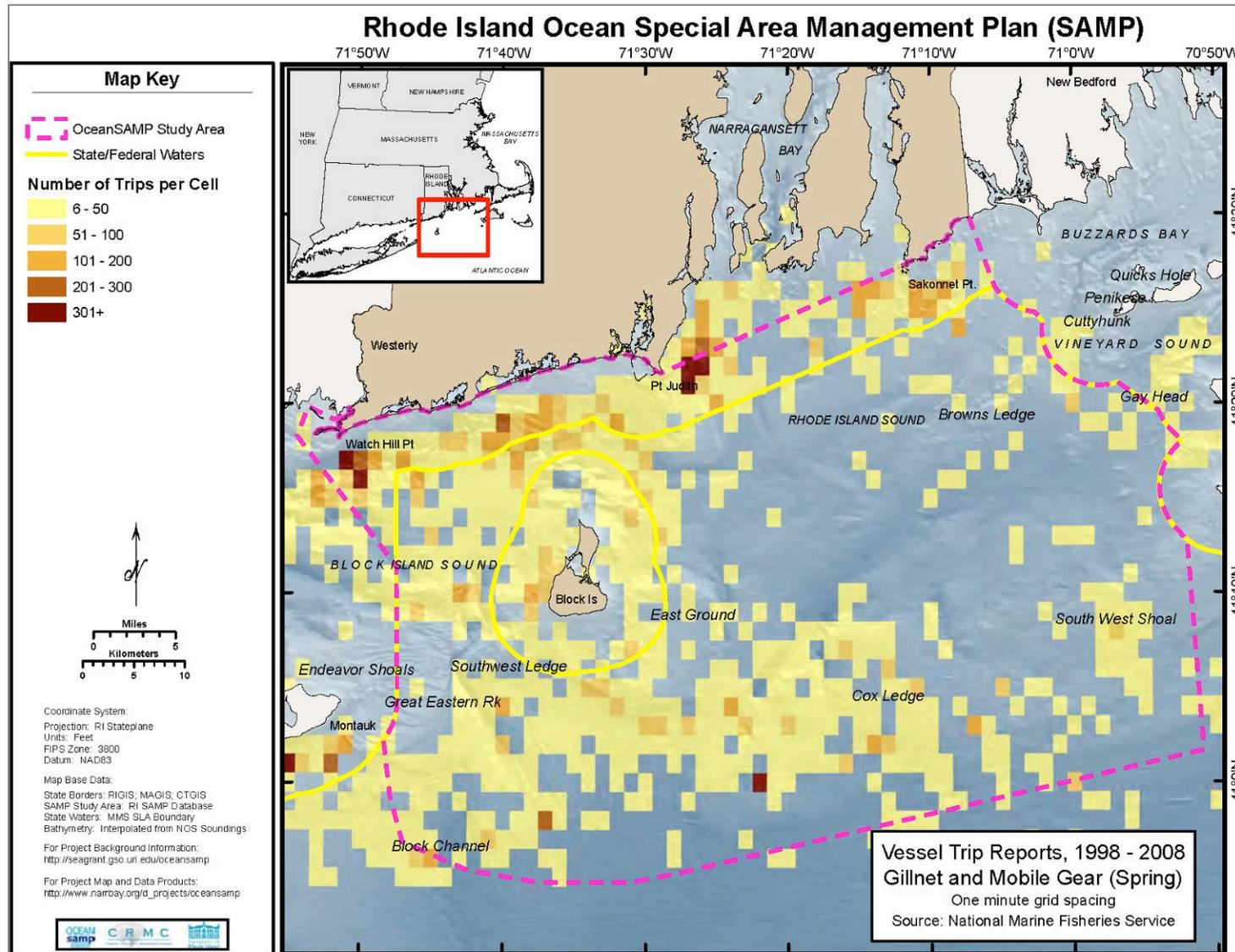


Figure 3. Gillnet and Mobile Gear Fishing, Summer, Based on NMFS Vessel Trip Reports, 1998 - 2008

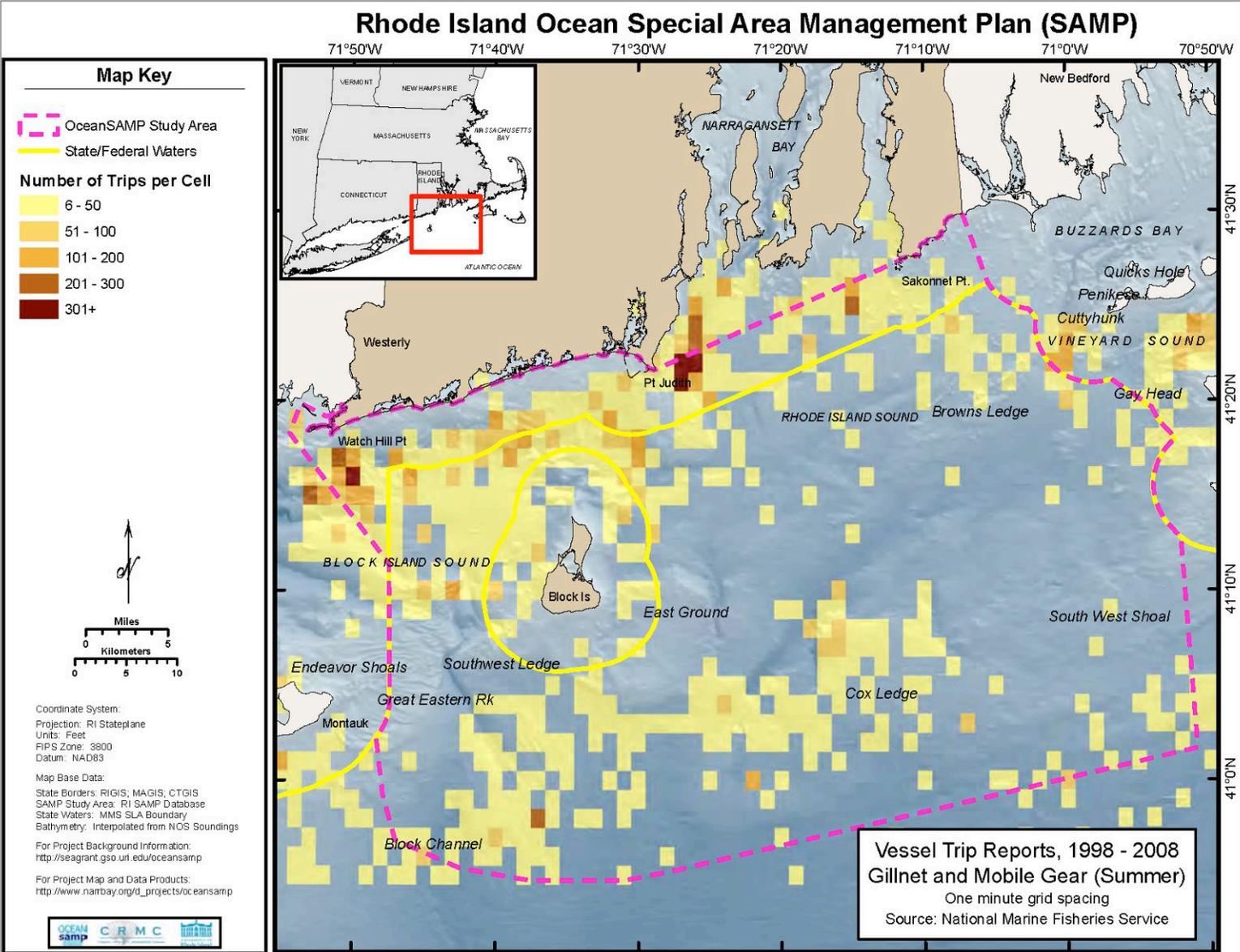


Figure 4. Gillnet and Mobile Gear Fishing, Fall, Based on NMFS Vessel Trip Reports, 1998 - 2008

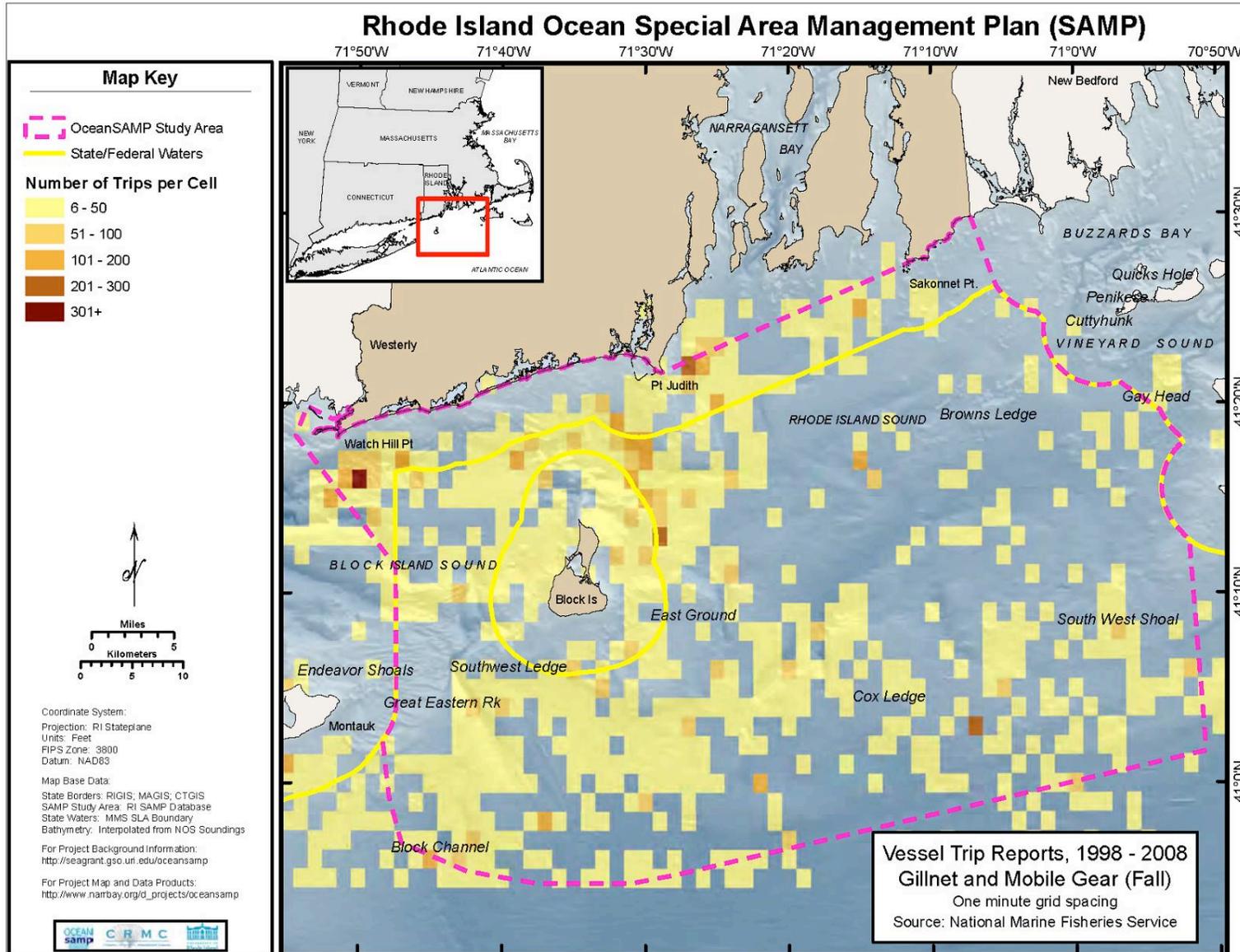


Figure 5. Bottom Trawling, Winter, Based on NMFS Vessel Trip Reports, 1998 - 2008

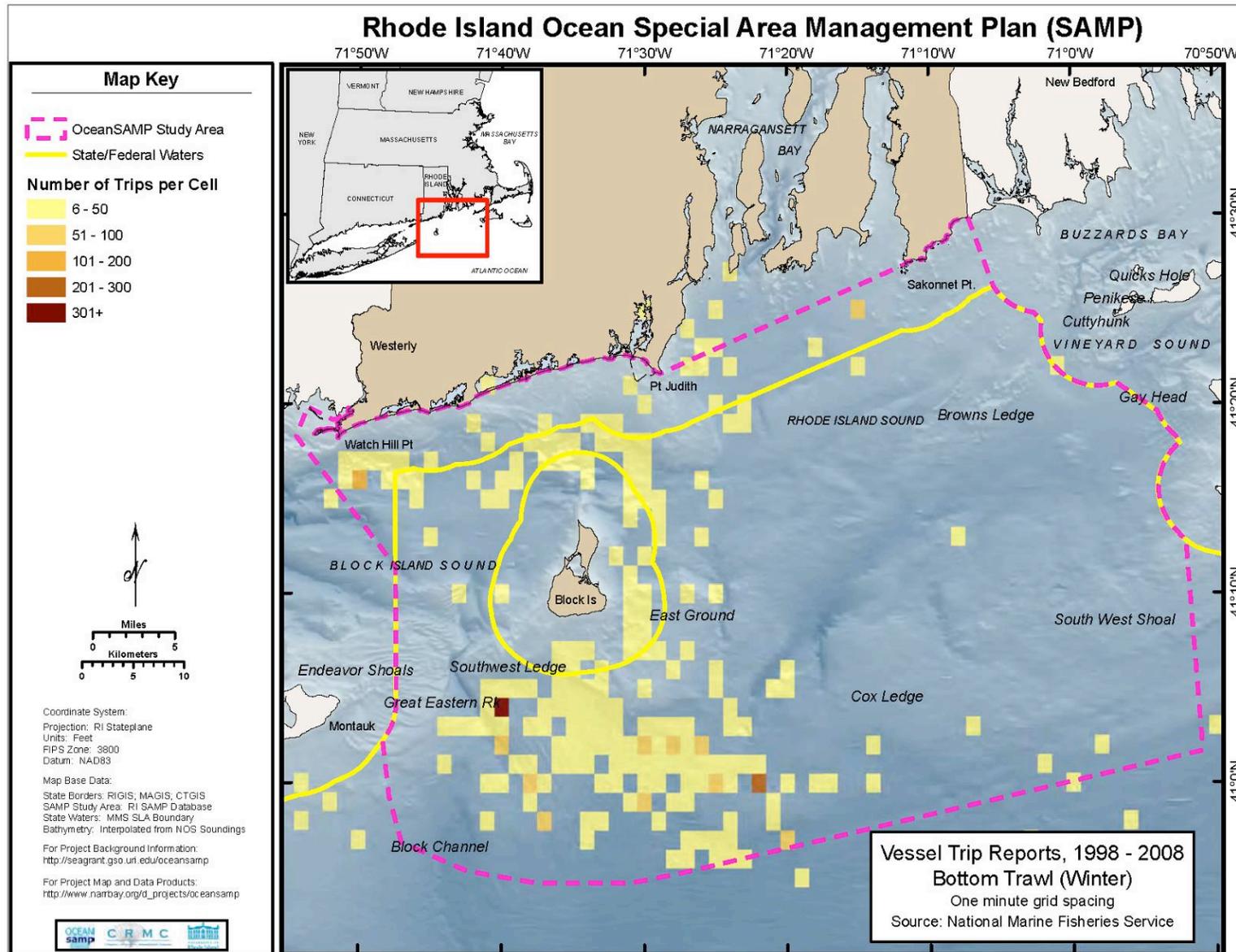


Figure 6. Bottom Trawling, Spring, Based on NMFS Vessel Trip Reports, 1998 - 2008

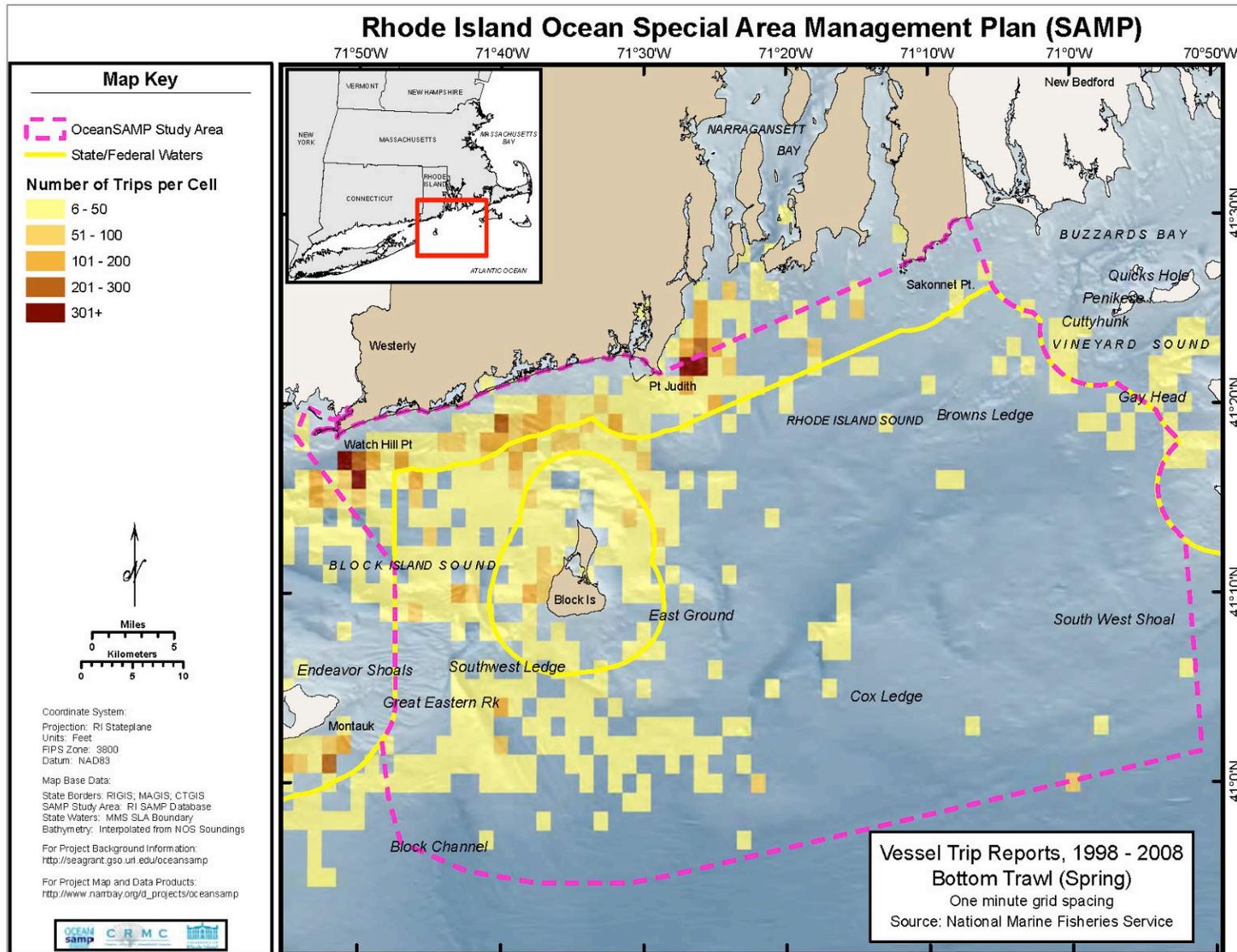


Figure 7. Bottom Trawling, Summer, Based on NMFS Vessel Trip Reports, 1998 - 2008

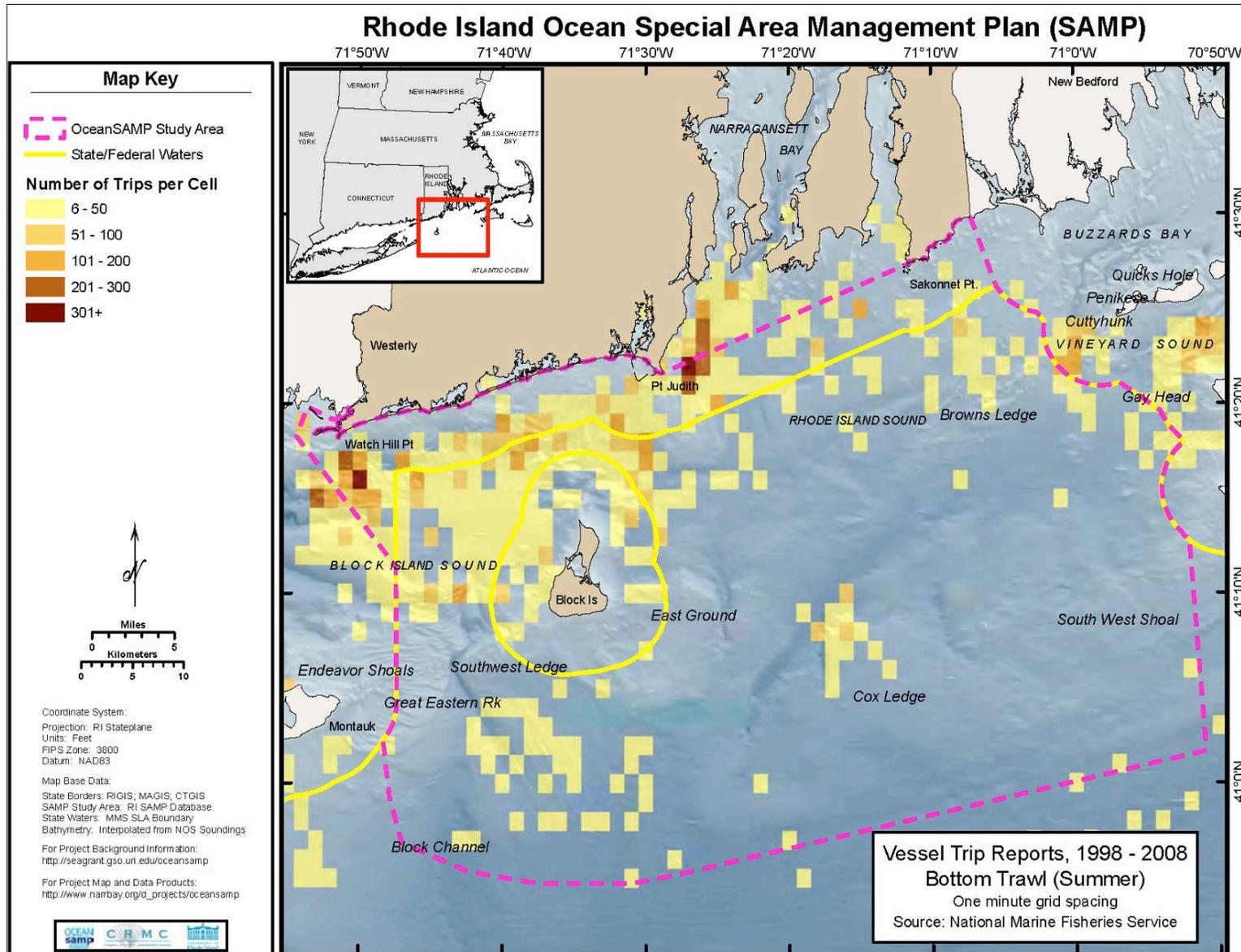


Figure 8. Bottom Trawling, Fall, Based on NMFS Vessel Trip Reports, 1998 - 2008

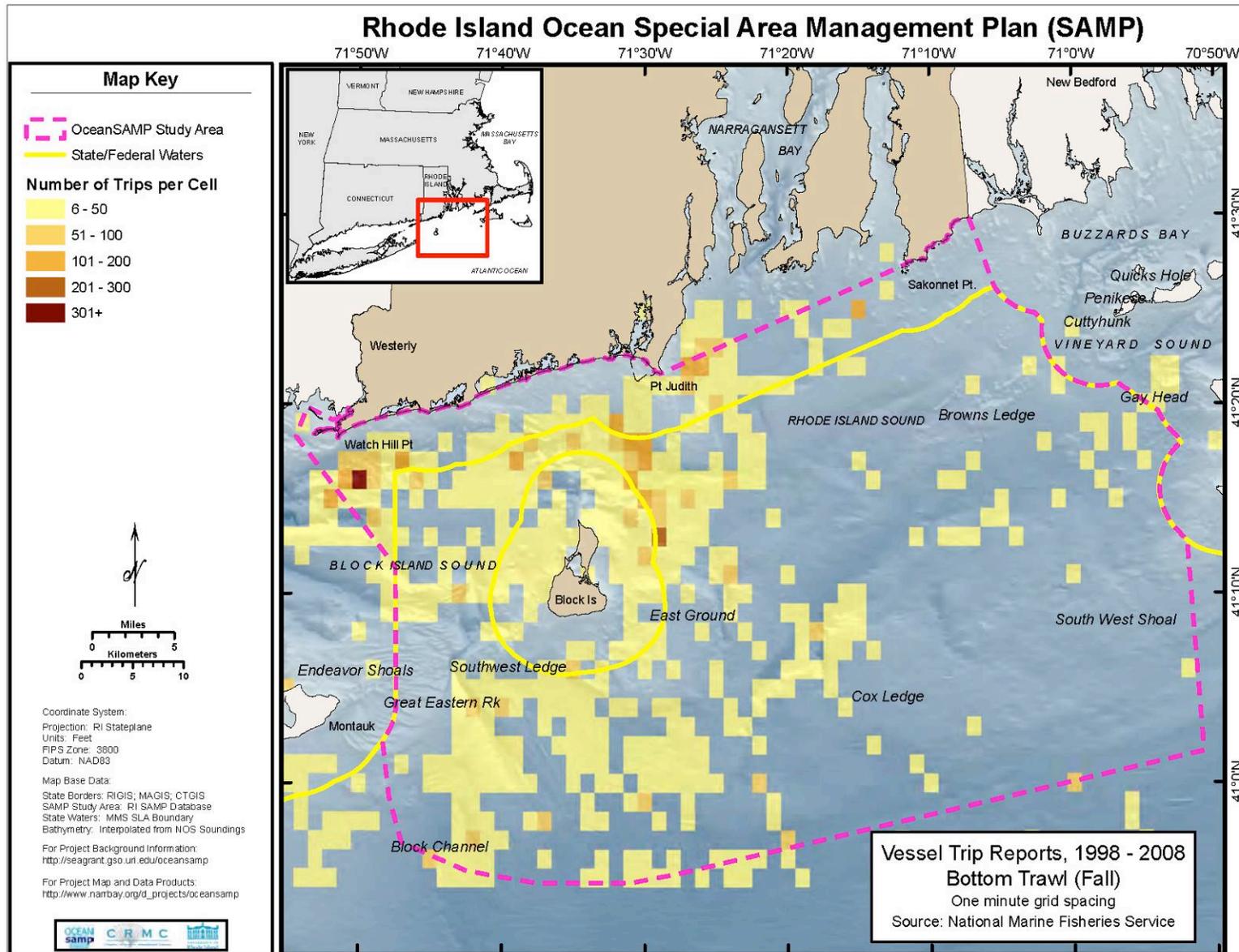


Figure 9. Gillnetting, Winter, Based on NMFS Vessel Trip Reports, 1998 - 2008

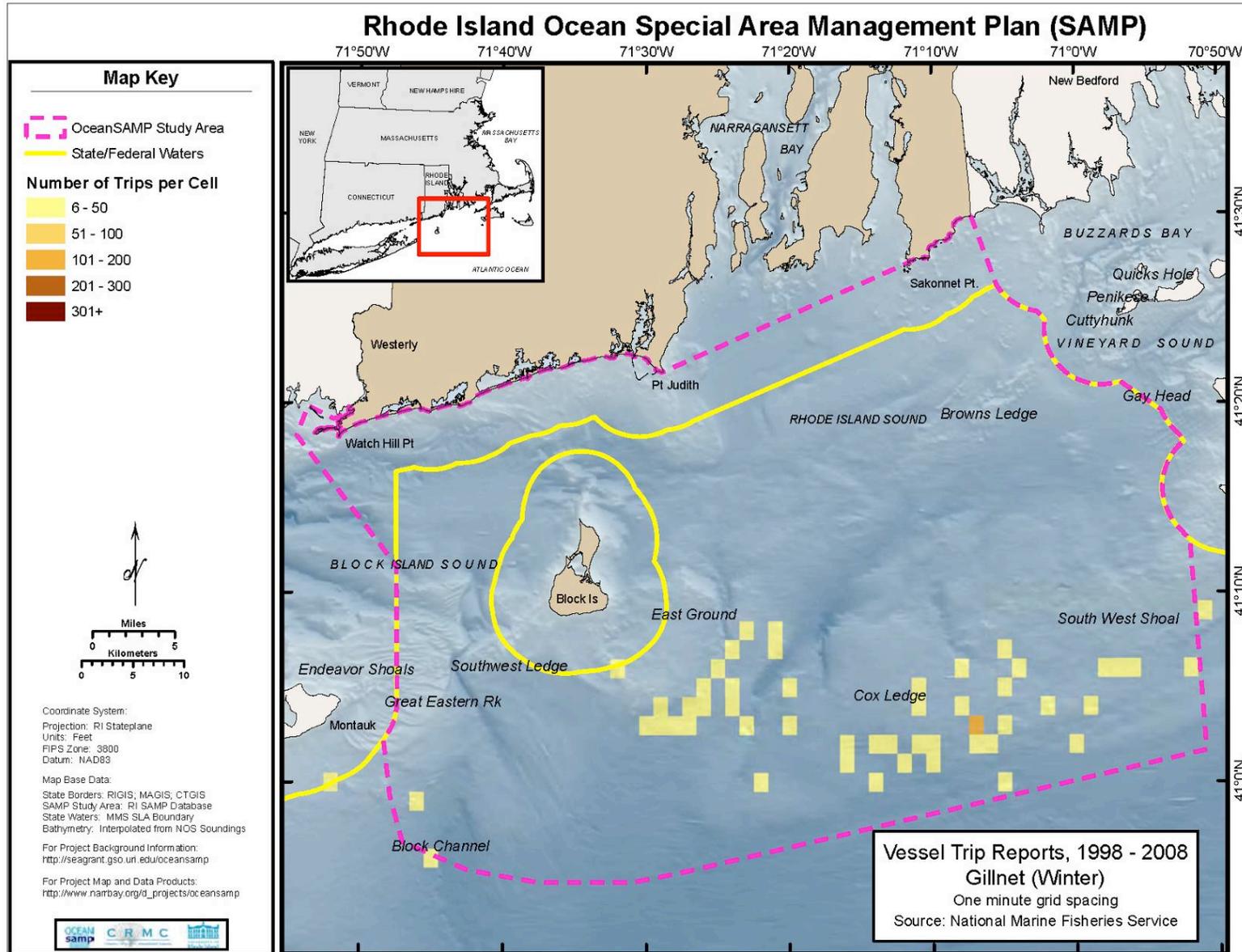


Figure 10. Gillnetting, Spring, Based on NMFS Vessel Trip Reports, 1998 - 2008

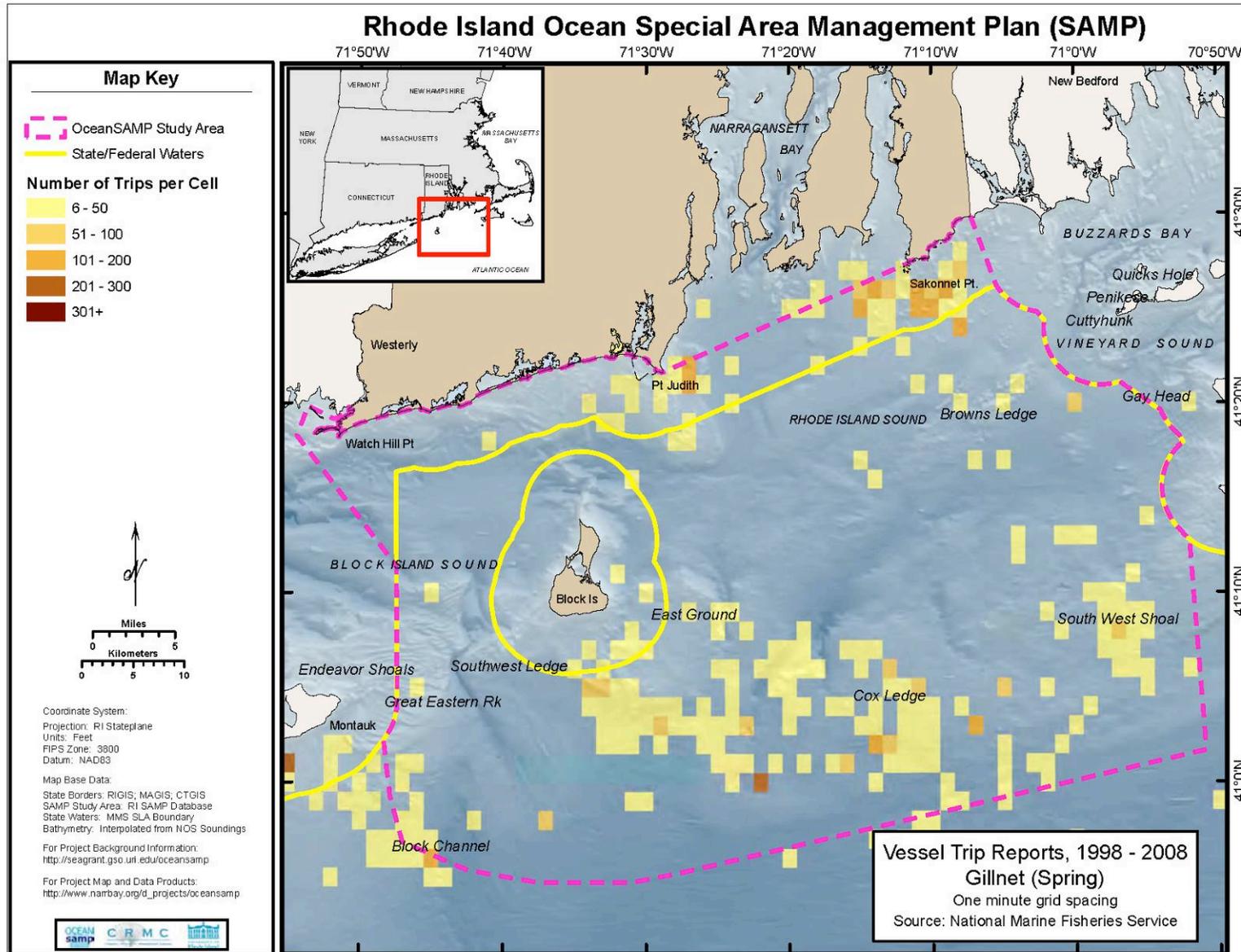


Figure 11. Gillnetting, Summer, Based on NMFS Vessel Trip Reports, 1998 - 2008

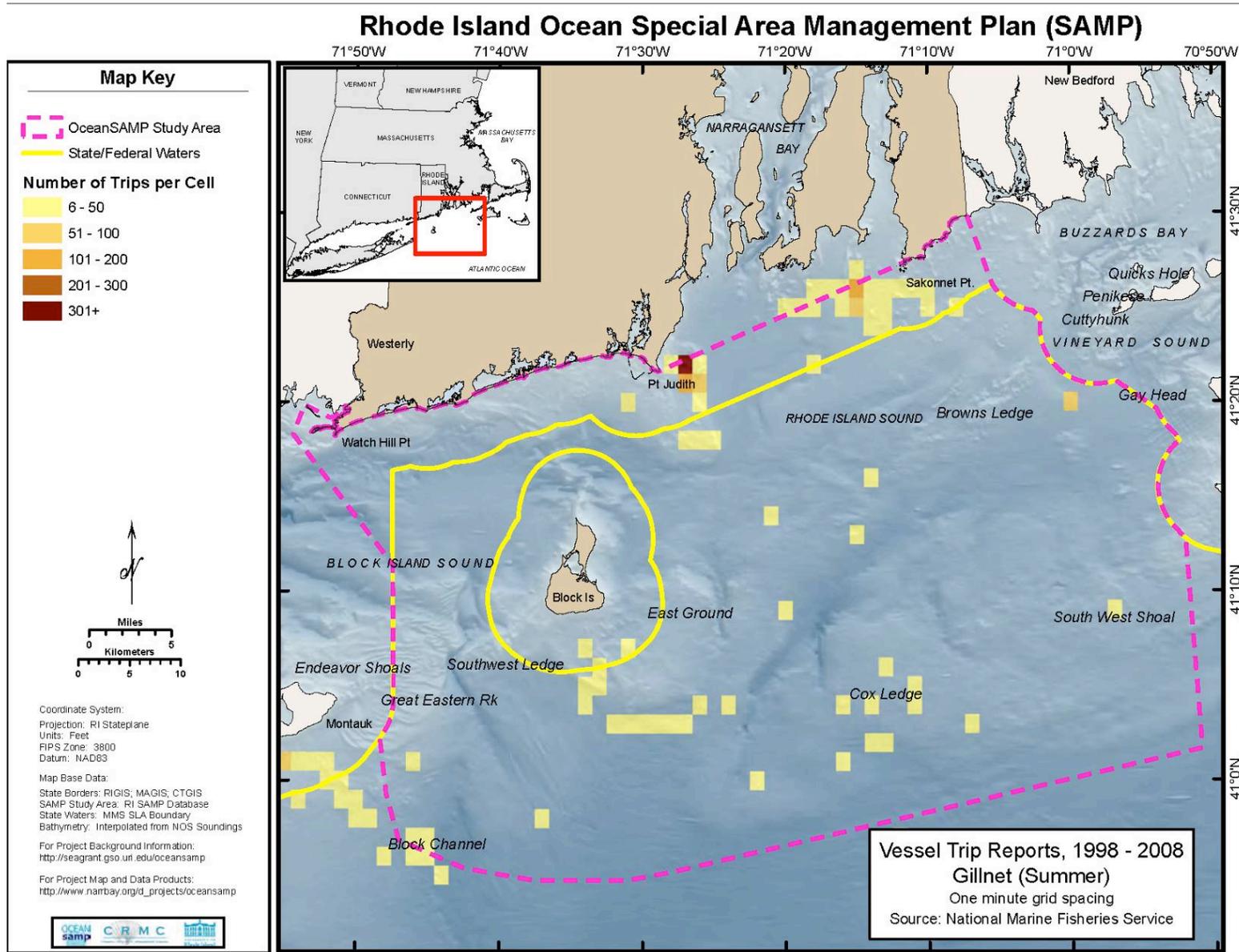


Figure 12. Gillnetting, Fall, Based on NMFS Vessel Trip Reports, 1998 - 2008

