OCS Study
BOEM 2012-076

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# Compendium of Avian Occurrence Information for the Continental Shelf Waters along the Atlantic Coast of the United States: Final Report (Database Section – Seabirds)

**July 2009**


U.S. Department of the Interior
U.S. Geological Survey
Patuxent Wildlife Research Center

U.S. Department of the Interior
Bureau of Ocean Energy Management
Herndon, Virginia

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# Compendium of Avian Occurrence Information for the Continental Shelf Waters along the Atlantic Coast of the United States: Final Report (Database Section - Seabirds)

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## PROJECT COOPERATION

This study was procured to meet information needs identified by the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), now called the Bureau of Ocean Energy Management (BOEM), in concert with the U. S. Geological Survey.

## DISCLAIMER

This report was prepared under a contract between the U. S. Geological Survey and the Bureau of Ocean Energy Management, by the USGS. This report has been technically reviewed by USGS and BOEM and has been approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of USGS or BOEM, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

## REPORT AVAILABILITY

This report is available at the Environmental Studies Program Information System (ESPIS) online at http://www.gomr.boemre.gov/homepg/espis/espismaster.asp?appid=1.

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# Abstract

Offshore development proposed for U.S. Atlantic waters requires that regulatory agencies such as the Minerals Management Service (MMS) and the U.S. Fish and Wildlife Service (FWS) assess the effects of activities such as the building and operation of wind turbines on marine bird populations. Information on the occurrence, distribution, and behavior of seabirds and factors influencing their distribution is needed to adequately assess the potential for impacts, especially for species considered threatened, endangered, or whose species are in decline. Unfortunately, conducting surveys of the marine environment is difficult and sampling of seabirds in this region has been haphazard over several decades with the information collected varying among surveys. In addition, the need to quickly consider alternative energy options leaves little time to establish new region-wide sampling programs that compile consistent data over many years. Under these circumstances, approaches such as predictive population modeling have been recommended to provide some guidance to agencies in assessing potential impacts of development on wildlife. Before modeling begins, however, data first need to be retrieved, reconfigured, and synthesized so that it can be effectively used in mathematical modeling and mapping activities as part of a geographic information system (GIS).

We retrieved and compiled datasets from a variety of sources including government agencies, academic scientists, non-government organizations, and private individuals. We first created a dataset catalog to contain metadata (compliant with federal standards) for each dataset. Datasets were then processed to re-organize and standardize data fields, and transferred to GIS databases to generate distribution maps. Data were standardized primarily for species codes, dates, times and data types (e.g., text fields converted to numbers or vice versa) and re-organized to have consistent fields and field ordering among datasets. We developed 12 computer programs to facilitate data processing and comparisons between historical and recent surveys (i.e., data collected with or without a geographic positioning system [gps] device). We also created two computer programs to 1) discretize continuous survey tracks into fixed distance or time transects and 2) use these discrete-distance or -time transects to calculate relative seabird densities. Finally, we used this last program to standardize sampling effort among all datasets by discretizing effort data into a common distance unit. We then summarized and mapped the quantity of sampling effort for each grid within the study area. To refine our modeling efforts, we also gathered biophysical data such as sea surface temperature, chlorophyll, ocean depth, and ocean bottom substrate. Most of these datasets also required some form of data manipulation and formatting to make them usable for mapping and in our modeling efforts.

We acquired over 85% of the seabird occurrence information for the U.S. Atlantic currently known to exist (N datasets = 65). A few datasets remain outstanding and it is unknown if they will ever become available for use in the public domain, some are still works in progress, and proprietary restrictions on some datasets may also limit future access. Significance of the data in this compendium almost certainly increases when datasets are viewed collectively rather than individually. These data can now be used to produce mappable products in an ArcGIS environment and the records are being organized into a single relational database. Given the complexity of the data, we suggest that the best way to understand the distribution of seabirds is to develop multi-scale (spatial and temporal) hierarchical models that include environmental covariates. Maintenance of the current data and future expansion of the database will require commitment and communication on the part of responsible and interested agencies and

organizations. The database currently includes 65 datasets and >400,000 seabird occurrence records from 64 datasets for the northwest Atlantic from Florida to Maine and one from Atlantic Canada. The datasets vary greatly in spatial and temporal scale. Several large datasets were acquired that date back to the 1970's and 1980's, along with more recent smaller regional datasets compiled as part of efforts to assess proposed offshore development. This assemblage of data varies widely in quality, ranging from surveys that used rigorous scientific methods to collect data to those defined as casual or undertaken strictly for recreation. The latter were conducted with little or no attention to the principles of scientific sampling.

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# ACRONYMS

| | |
|---|---|
| AVHRR | Advanced Very High Resolution Radar |
| | |
| BOEM | Bureau of Ocean Energy Management |
| BOEMRE | Bureau of Ocean Energy Management, Regulation and Enforcement |
| | |
| CBC | Christmas Bird Count (sponsored by the Audubon Society) |
| CDAS | Computer Data Analysis System |
| CONMAP | USGS Coastal and Marine Geology Program maps |
| CSAP | Cetacean and Seabird Assessment Program |
| CTD | conductivity, temperature, and depth instrument; used for continuous measurement of salinity, temperature and depth of ocean waters |
| CZCS | Color Zone Color Scanner |
| | |
| DUML | Duke University Marine Laboratory |
| | |
| ESRI | Environmental System Research Institute; makes ArcGIS and other GIS software |
| | |
| FGDC | Federal Geographical Data Committee |
| FWS | Fish and Wildlife Service |
| | |
| GAC | Global Area Coverage |
| GIS | Graphic Information System |
| GPS | geographic positioning system |
| | |
| HDF | Hierarchical Data Format |
| | |
| MA2Z | At sea off Monomoy Point, MA. Part of CBC |
| MASB | Stellwagen Bank, MA, part of CBC |
| MD15 | Baltimore Canyon, MD, part of CBC |
| MD19 | Baltimore Canyon, MD, part of CBC [how different from other |
| MDBH | Baltimore Harbor, MD, part of CBC |
| MDJB | Jug Bay, ME, part of CBC |
| ME0A | Penobscot Bay, ME, part of CBC |
| ME0B | Bay of Funday, ME, part of CBC |
| ME08 | Merrymeeting Bay, ME, part of CBC |
| MEBF | North Penobscot Bay, ME, part of CBC |
| MEMB | Machias Bay, ME, part of CBC |
| MGET | Marine Geospatial Ecology Tools |
| MMS | Minerals Management Service |

| | |
|---|---|
| NASA | National Aeronautic and Space Administration |
| NEFSC | Northeast Fisheries Science Center |
| NETCDF | Network Common Data Form |
| NJ0A | Atlantic Ocean off New Jersey (12/1/1977 to 12/31/1977), part of CBC |
| NJAO | New Jersey: Atlantic Ocean offshore (12/1/1989 to 12/31/1995) part of CBC |
| NJOS | Atlantic Ocean off New Jersey (12/1/1975 to 12/31/1979) part of CBC |
| NY0R | Atlantic Ocean off New Jersey (12/1/1980 to 12/31/1988) part of CBC |
| NJNJ | New Jersey pelagic, part of CBC |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| NODC | National Oceanographic Data Center |
| NY1Q | At sea off Brooklyn, NY, part of CBC |
| NY1R | New York Harbor and the Cholera Bank, part of the CBC |
| NY1S | Long Island Atlantic Ocean off Fire Island (12/1/1952 to 12/31/1975) part of CBC |
| NY1W | Long Island Atlantic Ocean off Fire Island (12/1/1944 to 12/31/1959) part of the CBC |
| NY1X | New York City Battery to 17 fathoms, part of the CBC |
| NY21 | New York City—Atlantic Ocean, part of the CBC |
| NY39 | 130th St Ferry, part of the CBC |
| OBIS-SEAMAP | Ocean Biogeographic Information System-Spatial Ecological Analysis of Megavertebrate Populations |
| OCS | Outer Continental Shelf |
| OPeNDAP | Open Data Access Protocol, used to transport data via the internet |
| PIROP | Programme Intergre Recherches sur les Oiseaux Pelagiques |
| PODAAC | Physical Oceanography Distributed active Archive Center |
| PWRC | Patuxet Wildlife Research Center |
| RSMAS | Rosenstiel School of Marine and Atmospheric Science |
| SAB | South Atlantic Bight |
| SEANET | Seabird Ecological Assessment Network |
| SeaWIFS | Sea-viewing Wide Field-of-View Sensor |
| SEFSC | Southeast Fisheries Science Center |
| USGS | United States Geologic Survey |
| USWTR | Undersea Warfare Training Range |
| VACB | Chesapeake Bay, VA, part of CBC |

# 1. INTRODUCTION AND BACKGROUND

Offshore wind generated electricity promises to be an important source of renewable energy for the future; however, there is the potential for negative interactions between birds and wind turbines in the marine environment (Exo et al. 2003, Garthe and Hüppop 2004). With a number of wind farms proposed along the Atlantic coast of the United States and additional permit applications expected, regulatory agencies need scientific information that will allow them to make an objective assessment of the proposed placement of these structures, thereby minimizing any adverse impacts on avian populations. Two recent reviews of impacts of wind farms on birds and how to effectively evaluate the placement of these structures recommended scientific modeling of species distributions as the most effective approach to minimize adverse impacts (Tingley 2003, U.S. Department of the Interior 2003). Technological advances in geographic information systems (GIS) and computer modeling have allowed scientists to predict species' distributions over large geographic areas using limited occurrence data (Clevenger et al. 2002) in concert with other biotic and abiotic information (Huettman and Diamond 2001, Peterson 2001, Holloway et al. 2003, Illoldi-Rangel et al. 2004, Rushton et al. 2004).

Recent work has shown that modeling the spatio-temporal distribution and abundance of birds can identify sensitive and high–use areas in need of protection (Huettman and Diamond 2001, Ford et al. 2004, Garthe and Hüppop, 2004). However, collecting data on the biological variables important to marine birds is, at best, difficult and we suggest that biophysical covariates (e.g., sea-surface temperature [SST], chlorophyll, bathymetry) will be suitable as a proxy for the variability in food resources that influence where birds occur. Thus, we propose that the most effective way to model seabird distribution is to concentrate on understanding the relationships between seabirds and biophysical variables (e.g., water temperature) and that developing the knowledge of how such features vary across the oceanscape will enhance our understanding of how birds use the marine environment. For example, measures of SST, chlorophyll, bathymetry, etc. are available over vast spatial scales, but their influence probably varies at much smaller scales (Levin 1992), suggesting that a multi-scale approach will be important for understanding how seabirds are distributed over the marine environment. Further, we expect that some covariates will be more influential than others in predicting the distribution or occurrence of a particular species and can be used to help improve our understanding of how different scales affect species' distributions. We intend to use relative abundance as the unit of analysis if the proper data are available across datasets; if adequate data (both quantity and quality) are not available, we expect to model occupancy (presence/absence).

This project focused on 4 objectives: (1) retrieve, compile, and organize seabird data for the Atlantic Outer Continental Shelf (OCS) region; (2) model seabird distribution and evaluate importance of various biological and biophysical factors on select species populations; (3) make seabird and shorebird data available in an electronic database and useable in a GIS (i.e., ArcGIS); (4) place both seabird and shorebird data into a GIS database. This report fulfills portions of objectives #1, 3, and 4. Due to the fact that shorebird data is currently being collected as part of an ongoing agreement between the United States Geologic Survey (USGS) and the United States Fish and Wildlife Service (FWS) and that datasets continue to become available over time, we will append any additional data that we acquire during this project into the database. At this time, completion of the database and conversion of all of acquired data into GIS-useable formats warranted completion of a final report. Although the database report finalizes our work on this topic, the database itself should be viewed as something that changes and expands over time as new information is added.

Our goal was to make better predictions of seabird distributions which can then be overlaid with maps of wind energy resources (http://rredc.nrel.gov/wind/pubs/atlas/maps/chap2/2-01m.html) to show where interactions may occur. These maps can then be used by regulatory agencies such as the FWS and the Minerals Management Service (MMS, now BOEM) for evaluating proposed offshore development projects. Before modeling can begin, however, data on the occurrence and distribution of birds is needed to parameterize these models. Information on the occurrence and distribution of marine birds is available for some species, but systematic sampling of the ocean environment is rarely attempted (Huettman and Diamond 2001), historical data collection has been haphazard, and region-wide information for the OCS zone along the U.S. Atlantic coast is generally lacking. Together, these factors severely limit the ability of regulatory agencies to determine species distributions and the factors that influence them. To address these issues, our objectives were to retrieve, compile, evaluate, and organize seabird observation data for the Atlantic coast of the United States and make it accessible and useable for modeling. We believe that we have identified and acquired most of the existing seabird datasets available for the Atlantic U.S. waters. Information about these datasets (i.e., metadata) is housed in a dataset catalog (Figure 1) and we have categorized and described each dataset as in Appendix A of this report.

# 2. METHODS AND TOOLS

## *2.1. Seabird dataset catalog*

We created a database in Microsoft Access 2002 based on the structure of a database recommended by the National Park Service dataset catalog (http://science.nature.nps.gov/im/apps/datacat/). This approach provides a mechanism to house an inventory of abbreviated metadata for natural resource datasets. In addition, this type of catalog incorporates Federal Geographic Data Committee (FGDC) standards, making it a good model for this type of information. The database is relational and made up of separate components including: general information about the dataset (e.g., title, abstract, size, metadata info, links to other components), contact and location information, and reference information. The main user interface (Fig. 1) allows easy access to metadata fields. The user can also access additional components through this interface that include contact information for individuals with first-hand knowledge about the database and any appropriate references that are known to be available.

We anticipate that this catalog of datasets will be a living piece of information, updated as new information becomes available. For the duration of this project the catalog will be maintained by project staff at the Patuxent Wildlife Research Center (PWRC), Laurel and Beltsville, MD and Augusta, ME. However, we recommend that arrangements be made among the interested parties (e.g., USGS, FWS, BOEM, Northwestern Atlantic Birds at Sea Conservation Cooperative, North American Bird Conservation Initiative) to secure a long-term permanent location and overseer of the information. This will insure that updates are made in a timely fashion, that the information remains current and, where appropriate, is available in the public domain.

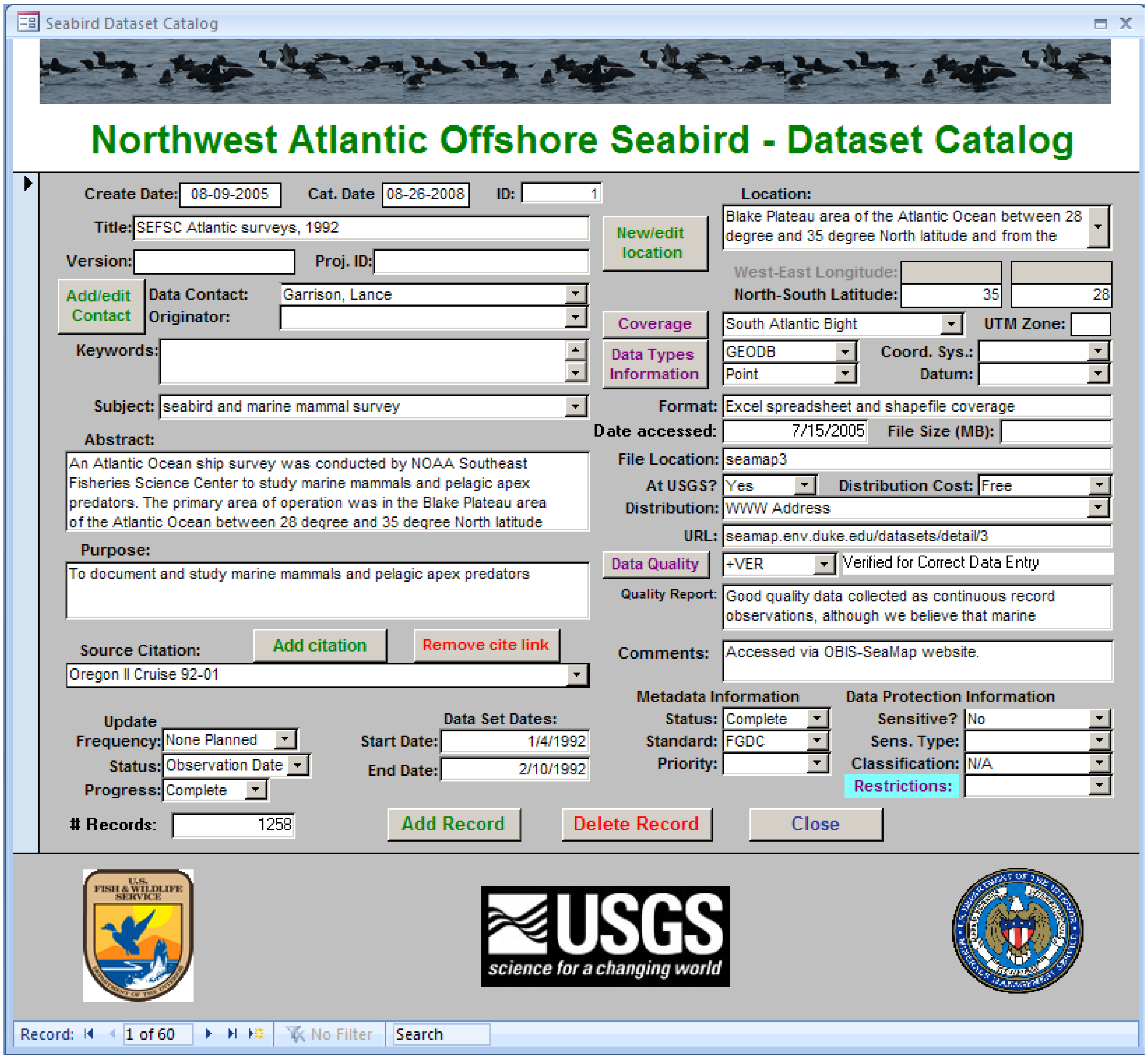


**Figure 1. The main user interface for the seabird-dataset catalog**.

## *2.2. Seabird data processing*

We received data in a variety of formats and conditions. As a result, all of the datasets required some amount of manipulation to standardize the information. Data types and fields varied widely, making it necessary to standardize the data for future modeling needs and manipulation within ArcGIS, the GIS software produced by Environmental Systems Research Institute (ESRI, Redlands, CA) to manage and display geographic information. Generally, we received data in one of several formats: an ESRI Shapefile, Microsoft Excel spreadsheet, or ASCII text file.

In a few cases, data were acquired as hand-written notes or printed datasheets. In these cases, we created relational databases in Microsoft Access with data entry forms that mimicked the original datasheets but with more complex, relational database structures. This approach facilitated data transcription, allowed for permanent electronic storage, and easy transfer to GIS. For example, data collected off the southeastern U.S. coast required development of separate databases. We developed data entry forms for surveys conducted off the coast of Georgia during the 1980's to accept information electronically (Fig. 2). As noted, these databases were relational, reducing database size by using several smaller tables linked together by identifier values (Fig. 3). This type of data structure allowed us to create the necessary files for mapping within ArcGIS while still retaining the format of the raw data from the paper records. This approach greatly speeded up data entry and the quality control process. We then imported data from these databases into ESRI geodatabase featureclasses (another type of ESRI proprietary GIS form that is more efficient, flexible, and powerful than the shapefile) for mapping in ArcMap (an ArcGIS utility). If we received data in any other GIS format, we converted it to the geodatabase featureclass (Fig. 4).

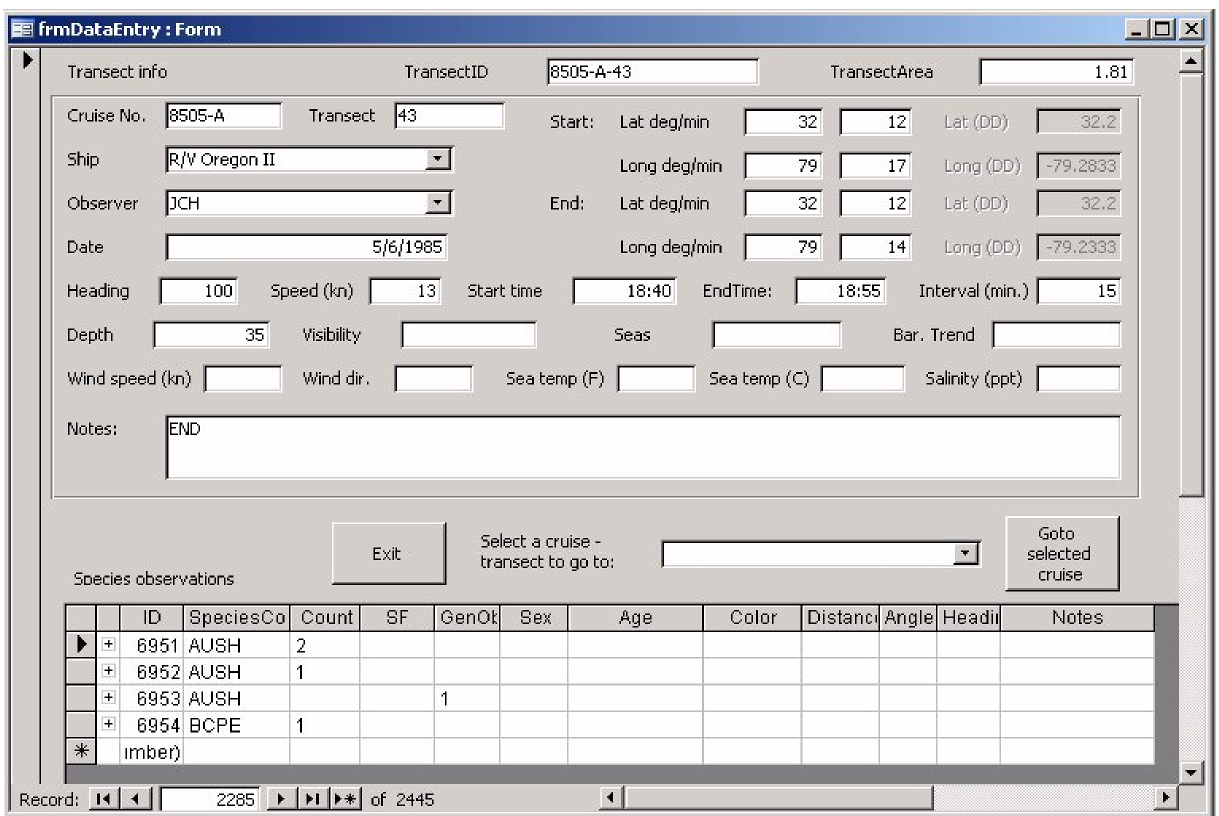


**Figure 2. Data entry form in MS-ACCESS for the Georgia pelagic seabird surveys.**

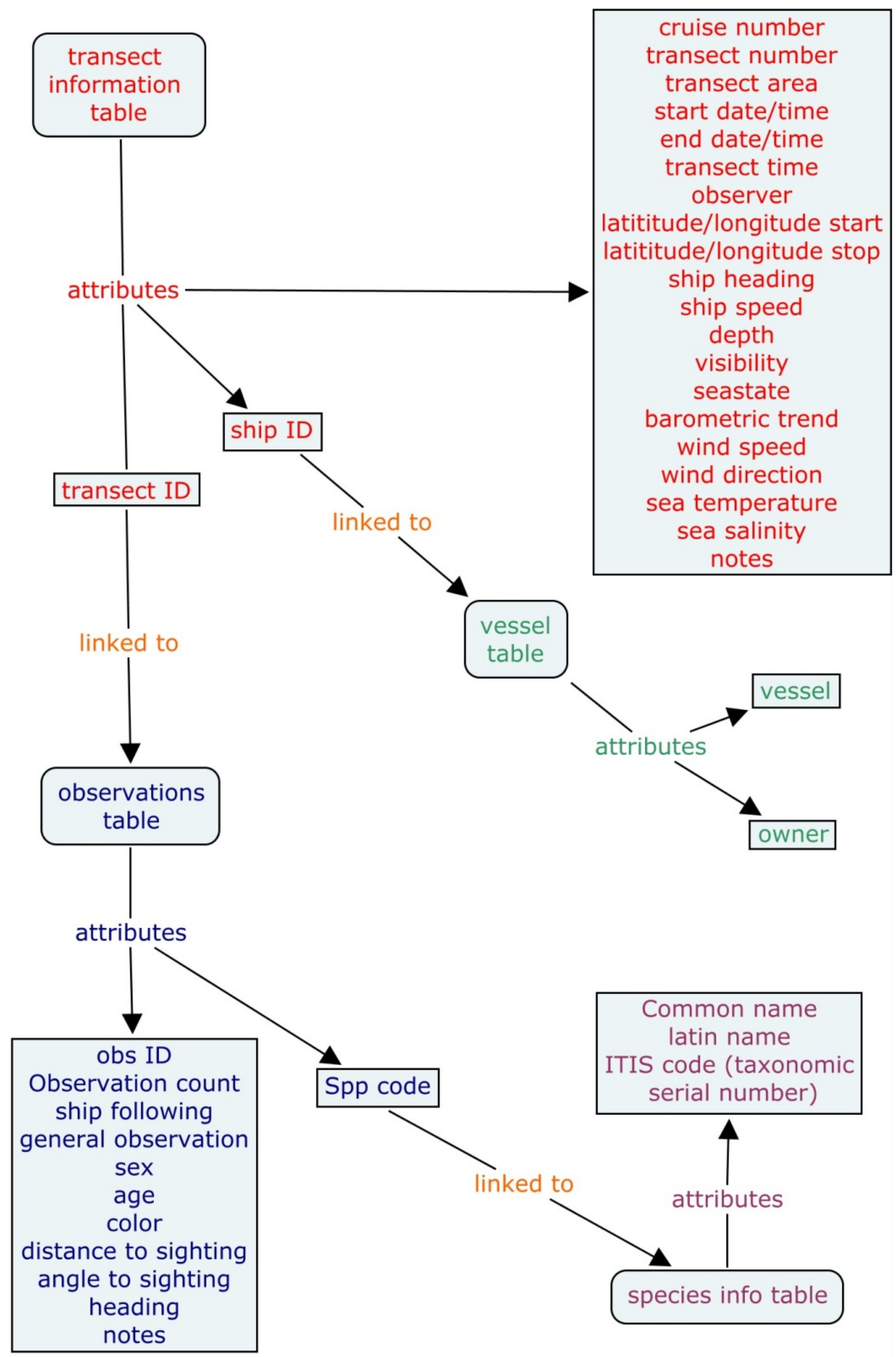


**Figure 3. Flow chart diagram of relational database describing a seabird dataset entered from paper records.**

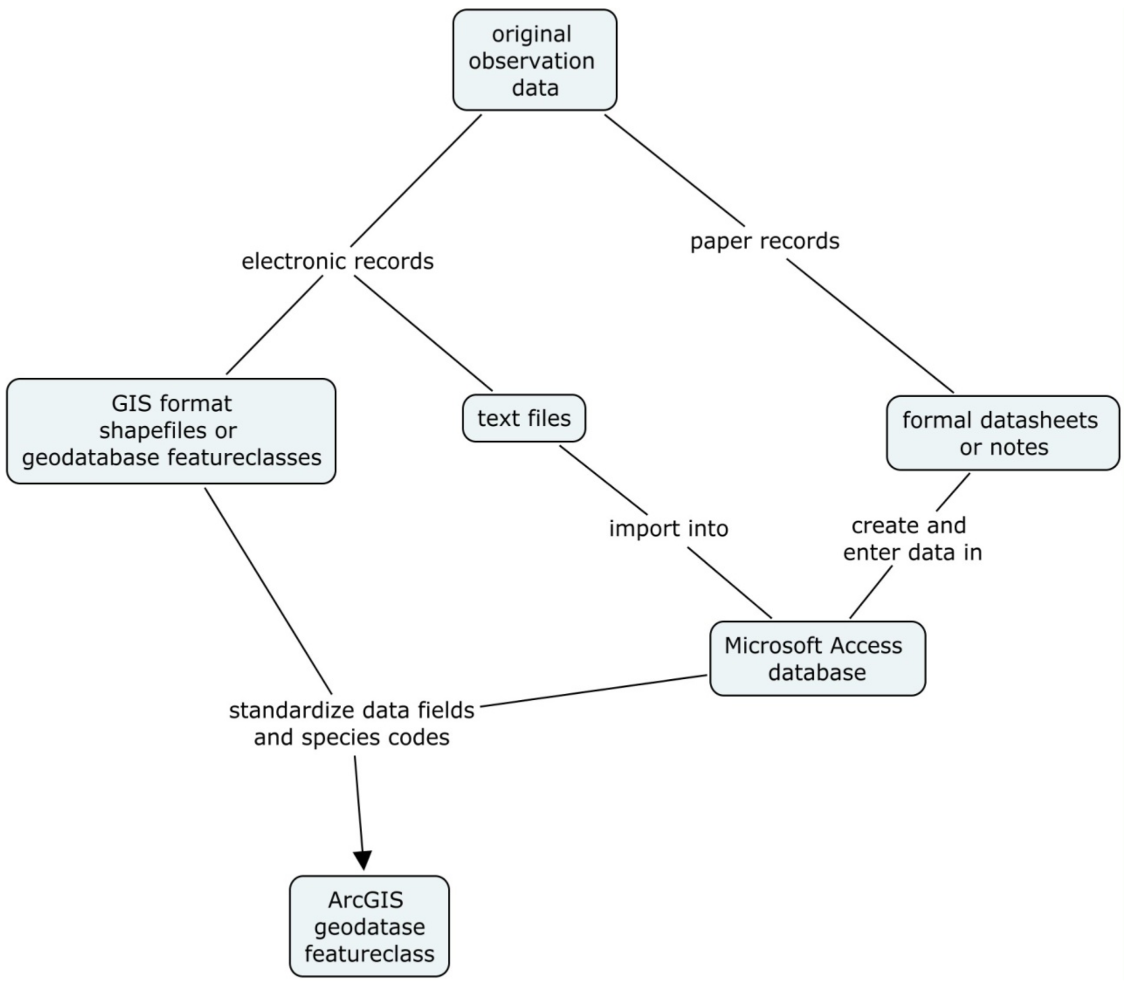


**Figure 4. Seabird data processing workflow from original records to GIS data file.**

## *2.3. Utilities for survey data and sampling effort*

Currently, seabird survey data are collected using GPS technology. Typically, laptop computers are used to record observations with positional information resulting in point observations for species recorded along a continuous survey track. This information is different from historic survey data that was collected as 10 or 15 minute summaries (transects) for which only the location of the start and sometimes the end of the fixed-time transects were recorded. In order to facilitate data processing, make useful comparisons between historic and current surveys, and facilitate standardization of sampling effort, we developed several computer programs. Most of the programs were created using ArcObjects, the development environment of ArcGIS 9.2/9.3 to create track lines from GPS position locations and generate complete sampling effort information for surveys. These utilities were modified for each dataset with continuous track data to account for differences in data fields, but the basic program converted GPS points to lines.

To accommodate differences among datasets, we developed a program that could discretize continuous track survey lines into fixed time (e.g., 10 minutes) or shortened distance segments (e.g., 2 nautical miles) (Fig. 5). This program creates a featureclass with shortened segments and additional attribute data such as distance or time surveyed and ship speed in knots traveled during each segment. This program was used to create standardized survey-length segments to allow for historical comparisons as previously described. We programmed another utility to calculate observed relative (naïve) seabird densities for a list of user-selected species using discretized survey segments and width (Fig. 6). The program outputs species densities for each segment (transect) to a text table that can be linked to the original discretized segments or exported to a spreadsheet or statistical package for further analyses. Because these estimates do not account for detection probability, they are likely biased by factors that affect this parameter such as weather, survey method, observer, or other environmental variables (MacKenzie et al. 2006). We programmed these utilities using Visual Basic .NET, a standalone Microsoft development language.

### *2.4. Oceanographic data processing*

We acquired datasets for a number of biophysical variables and are processing the information to best accommodate our modeling needs. We downloaded daily ½ degree (~24-km) and monthly ~4-km resolution satellite SST data for the period 1985-2007 from the National Oceanographic and Atmospheric Administration (NOAA). We chose to download best estimate SST data to fill in the gaps in SST resulting from cloud masking (Reynolds et al. 2007). We downloaded satellite chlorophyll data for the period 1978-1986 and 2000-2008 from the National Aeronautics and Space Administration (NASA). We retrieved ~90-m resolution bathymetry (ocean depth) data from NOAA for the U.S. Atlantic continental shelf. We retrieved coastal marine geology data for the U.S. coastal waters from NOAA. Bathymetry and coastal geology data required a minimum amount of processing for use in models. Chlorophyll and SST data required more extensive processing due to their size (file size and spatial coverage) and file format.

Biophysical data exists in various file formats, most tailored to UNIX-based systems used by scientists for modeling on large mainframe computers, but difficult to use in the windows desktop environment by packages such as ArcGIS. Sea surface temperature and chlorophyll data are available in two file formats: Network Common Data Form (NETCDF) and hierarchical data format (HDF). We created a program in Microsoft Visual Basic .NET to download and process NETCDF format files. We worked with programmers at Duke University on their program Marine Geospatial Ecology Tools (MGET) to troubleshoot a utility they developed to batch process HDF files (Roberts et al. 2007). We used MGET to handle all HDF file processing. Both programs extracted data for the spatial area of interest (i.e., northwest Atlantic) and converted data to ArcGIS-friendly raster data types. These raster formats will be suitable as inputs to statistical models.

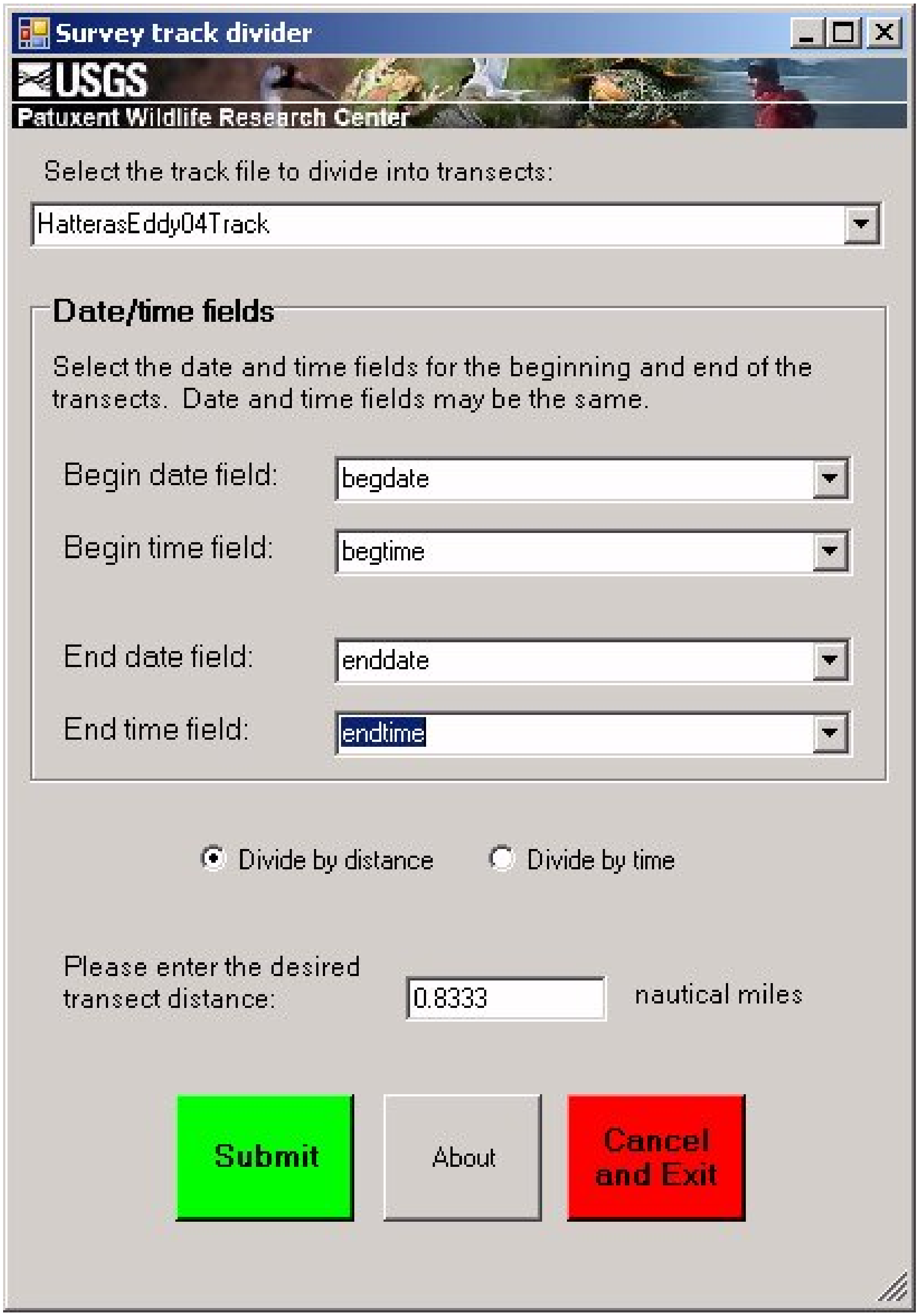


**Figure 5. Utility for dividing track lines by time or distance into shorter segments of seabird surveys.**

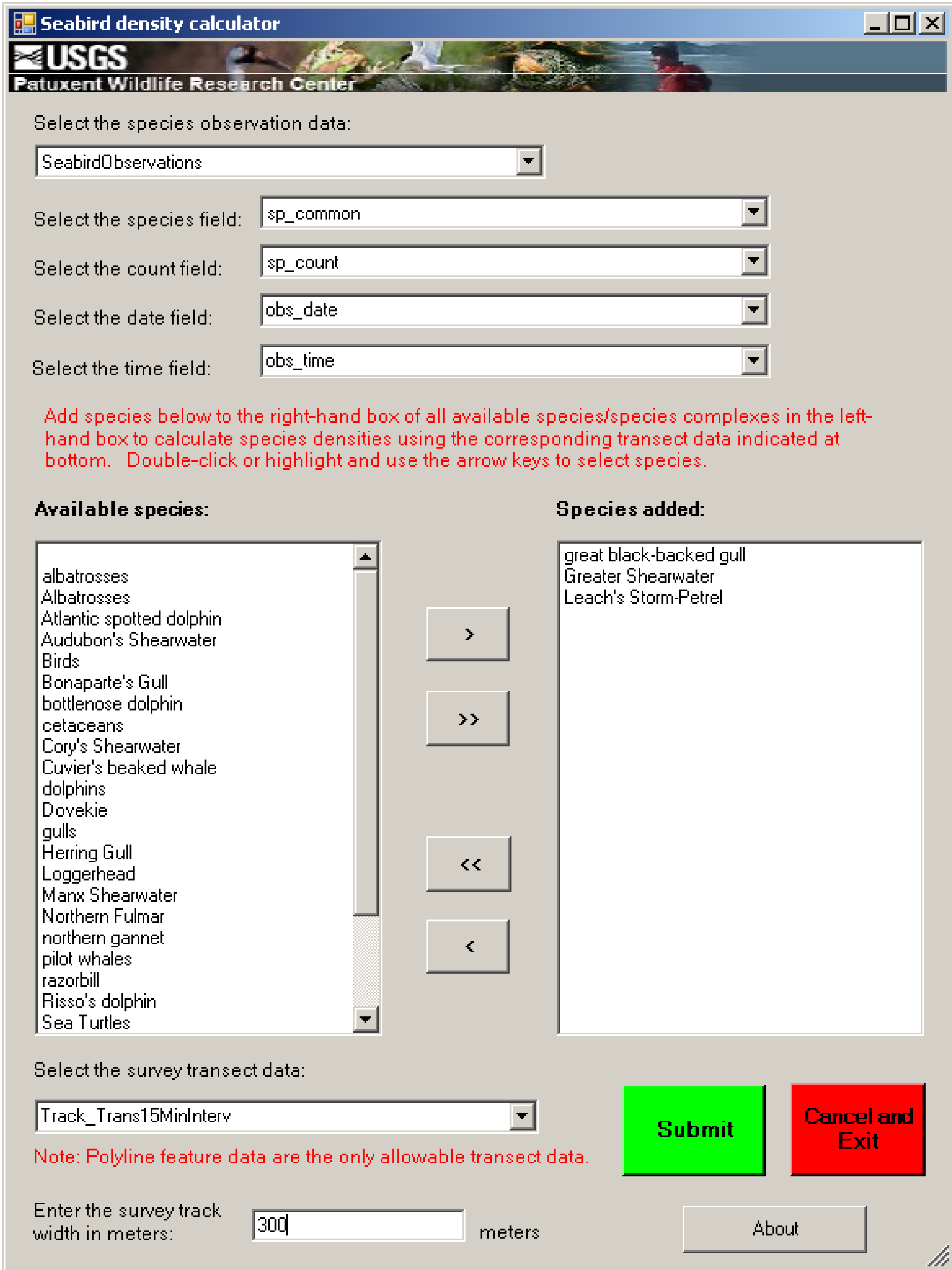


**Figure 6. Utility for calculating relative seabird densities for selected species based on track survey data.**

# 3. PRODUCTS AND DISCUSSION

## *3.1. Seabird data catalog*

Information about each dataset that we acquired or know to exist is housed in a dataset catalog as part of this report (Appendix A). To date, we have catalogued 65 datasets on seabird occurrence for the western Atlantic, representing > 400,000 observation records including the Programme Integre Recherches sur les Oiseaux Pelagiques (PIROP) dataset for Canada, one of the largest datasets available dedicated to marine bird species. We created entries for each dataset in the catalog and populated each entry with as much information as possible (see Fig. 1), irrespective of whether or not we had access to the raw data. In a few cases, we were not able to acquire raw data but if we became aware that data existed and had some background information, we created an entry in the catalog as a way of offering as complete a picture as possible of what seabird occurrence information is available (see section on Data Acquisition and Availability). We will continue to update the catalog and add new entries as the project continues (O'Connell and Gilbert 2006).

## *3.2. Seabird occurrence datasets*

We believe that we have identified all of the existing datasets of seabird occurrence known for the northwestern Atlantic. We obtained data from primary sources where possible, but in some cases we retrieved data via a third-party source such as the Ocean Biogeographic Information System - Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP), (http://seamap.env.duke.edu/), a spatially referenced online database and data provider. The original assemblage of data for this project focused on the offshore waters of the Northeast, from Maine south to Virginia (O'Connell and Gilbert 2006). We subsequently expanded our efforts to incorporate the marine environment off the southeastern U.S. coast, another region that has been lacking in organization and computerization of historical records of seabird occurrence.

We divided datasets (see Appendix A) into a number of different categories, depending on survey integrity, focus, and the geographic scale covered. First, if we thought the survey was designed with some consideration for science-based sampling (i.e., randomization) we placed these studies in a "scientific survey" category. On the other hand, if surveys were deemed to be lacking such considerations, we categorized them as "observational". This latter category is characterized by citizen-science surveys (e.g., Christmas Bird Count [CBC], whale or bird watching trips, etc.), an approach to gathering scientific information that has become popular within the conservation community. Although citizen-science surveys can generate large amounts of information, they are often at the expense of study design and data quality. Despite the failings of CBC's, sophisticated techniques can still be used to analyze such data and produce robust inferences, even estimates of population change (Link and Sauer 2007). Such an approach is not ideal, however, and we suggest that a sampling design that addresses detectability and spatial variability (Pollock et al. 2002) is preferable, promoting use of robust analytical techniques and sound inferences.

Seabirds provide unique challenges even when using estimation techniques to sample populations (e.g., Tasker et al. 1984, Spear et al. 1992). Although we advocate that future seabird surveys promote science-based design and sampling, it is worth noting that, to date, there has been little consistency among survey designs (e.g., strip versus distance sampling). Under such circumstances, comparing results and making inferences can be difficult.

### 3.2.1. Northeast and Mid-Atlantic

As previously noted, the largest source of seabird data for the western Atlantic is the PIROP database, established and maintained by the Canadian Wildlife Service., This dataset alone contains >200,000 records, mostly from the northwest Atlantic, but also includes records from the eastern Atlantic and eastern Pacific. Essentially, this database is a compilation of many smaller datasets, including data from the 1980's collected in the Gulf of Maine by Manomet Center for Conservation Sciences (Manomet, MA; formerly known as the Manomet Bird Observatory; hereafter referred to as Manomet). Several other large spatial-scale datasets are included in our database, such as the data collected by Manomet in the late 1970's and which was repeated by Manomet as part of a different project through much of the 1980's.

Since 2007, seabird surveys replicating those by Manomet have been conducted aboard NOAA vessels whose primary focus is to survey ocean fisheries. These surveys are currently referred to as "eco-monitoring" cruises (e.g., Appendix A: Eco-Mon May 2007) and are conducted several times a year, making them ideal for collecting long-term data. Current plans call for these surveys to continue. In addition, seabird surveys have been conducted during 2007 from NOAA vessels conducting acoustic surveys of Atlantic herring (*Clupea harengus*) in the Gulf of Maine (e.g., Appendix A: Acoustic Herring Survey 2007). We have obtained other large-spatial scale surveys such as the nearshore surveys conducted by the FWS (Appendix A: Winter survey of mid-Atlantic – FWS) in the mid-Atlantic region, roughly between the North Carolina-Virginia border and New Jersey. This information was generated as a result of surveys conducted between 2001 and 2003 for the MMS by the FWS. These data are linked to a dataset that originated from a mapping program designed for the MMS called the (CDAS) for the Mid-Atlantic region. We have also acquired a number of datasets that are associated with offshore development projects (e.g., wind turbine facilities) in a specific area (e.g., Nantucket Sound Seabird survey). Surveys associated with development projects are typically small in terms of geographic coverage and thus spatially limited; however, these data have good temporal coverage (seasonal and annual). In the case of the Cape Wind project proposed for Nantucket Sound off the coast of Massachusetts, surveys were conducted that resulted in the collection of a large amount of ecological information, including seabird survey data collected by the Massachusetts Audubon Society and the ESS Group, Inc. for Cape Wind Associates, LLC. All of these data have been made available and are now part of this database.

We have also obtained many relatively small datasets from cruises of short duration (e.g., Appendix A: Summer 2004/Winter 2005 Cape Hatteras) that have not been repeated and are not expected to be repeated in the future. These datasets are of limited use individually, but their significance increases when viewed as part of a larger group of datasets for the region.

Mid-winter waterfowl surveys have been conducted during January in the Atlantic Flyway by the FWS providing information on wintering waterfowl for coastal waters. Digital data are available for download from FWS for 2001-2005 and data for prior years exists in analog format only. We have not received analog data and so data prior to 2001 is not yet included in this database. Although these data are typically not locality-specific (i.e., no point location data), some states (not specified) have begun collecting data using a GPS data recorder. Once we establish which states have collected waterfowl observations with GPS locations, we hope to be able to obtain as much of it as possible. We are currently working with the FWS, Division of Migratory Birds to acquire these data.

As previously noted, a number of CBC's conducted along the coast or in nearshore coastal waters were identified for the study area. These datasets account for a third of all the datasets we have compiled and include a large number of observations. As noted earlier, however, these data are mostly collected by citizens, typically without any formal biological training and are limited to a single survey day each year. Furthermore, some of these nearshore and coastal count areas extend over land and cover a large (15 mile diameter) area, thereby limiting the usefulness of this data for understanding seabirds.

### 3.2.2. Southeast

We acquired several large datasets of seabird occurrence for the southeast in the South Atlantic Bight (SAB), including data collected off the Georgia coast in the mid-1980's (Appendix A: SAB – Haney), and more recently by NOAA scientists (Appendix A: SEFSC, 1990's). Data collected offshore of Georgia marked the first extensive survey in the region. Surveys conducted by NOAA were incidental to surveys on ships targeting marine mammals and other predators during several periods in the 1990's. Data collected off Georgia in the 1980's were not digital; we entered these records in a specially designed data form in Microsoft Access (see Fig. 2) and performed error checks on nearly 2,500 ten-minute transects and 7,000 observations.

A commercial boat operator on the Outer Banks of NC has been leading pelagic seabird trips to waters offshore Cape Hatteras between Oregon and Hatteras Inlets since 1992 (Appendix A: Patteson Pelagic Seabirding Trips). Seabird occurrence information is collected during these trips and the data provide an historical record of species occurring off of Cape Hatteras, mostly from May to October. We entered and error-checked records from these trips in a specially designed data form in Microsoft Access, recording more than 5,000 thirty-minute periods and >25,000 observations. This dataset provides a number of interesting records of rarely observed pelagic species such as Fea's Petrel (*Pterodroma feae*) and Herald Petrel (*P. arminjoniana)*, but use of these data in a formal modeling framework may not be possible given the ad hoc survey approaches (e.g., chumming) used to collect the information.

A number of smaller spatial-scale surveys limited in duration (e.g., single season) have been conducted in the SAB, focusing on waters offshore of the Outer Banks (e.g., Appendix A - Hatteras Eddy Cruise, 2004; Sargasso Sea, 2006) by a number of different individuals and organizations (e.g., Duke University, Durham, NC).

We recently received a large dataset for the SAB collected by the North Carolina Museum of Natural Sciences. These surveys were conducted from 1977-1991 (Lee 1995). The original data consisted of hand-written or typed notes and are currently being reviewed and converted to a digital format to be completed in 2009. Again, the techniques used to collect some of this information may force us to exclude these data from modeling.

### *3.3. Maps of seabird distribution and sampling effort*

We reviewed all of the datasets that we retrieved and then standardized the information as a more effective way to evaluate seabird distribution. We generated maps showing seabird distribution for the entire study area (Fig. 7) and also by region, season, decade, etc. We are also mapping species–specific distributions (e.g., Black-capped Petrels, Fig. 8) using information from different datasets. Maps of the distribution for each seabird species with a sufficient number of records will be produced as part of the modeling component of this project.

Although maps are valuable for providing a visual image of the species' locations, a map may not accurately reflect the current distribution of the target species when information is compiled from many different sources, collected over lengthy time-periods, and using different sampling techniques (e.g., plane versus boat). Some apparent variation in distribution may be due simply to sampling effort, here defined as the number of surveys conducted in an area or grid (Fig. 9). This can be important when evaluating occurrence information. For example, when two areas have an identical number of observations compiled for a particular species, the abundance or density of the species appears similar. However, if there was twice as much sampling effort made in one of the sampled areas, then we must correct for that difference in our model as it can directly affect the number of observations. Given the disparity in sampling effort among our datasets, we will account for this variability using an offset term in our models. This will help account for the notion that we expect to observe more birds in areas where we spend more time sampling. Considering that total sampling effort is necessary to evaluate the historical spatial and temporal sampling variability over the period/area of interest, this information can provide a useful framework to focus future sampling effort.

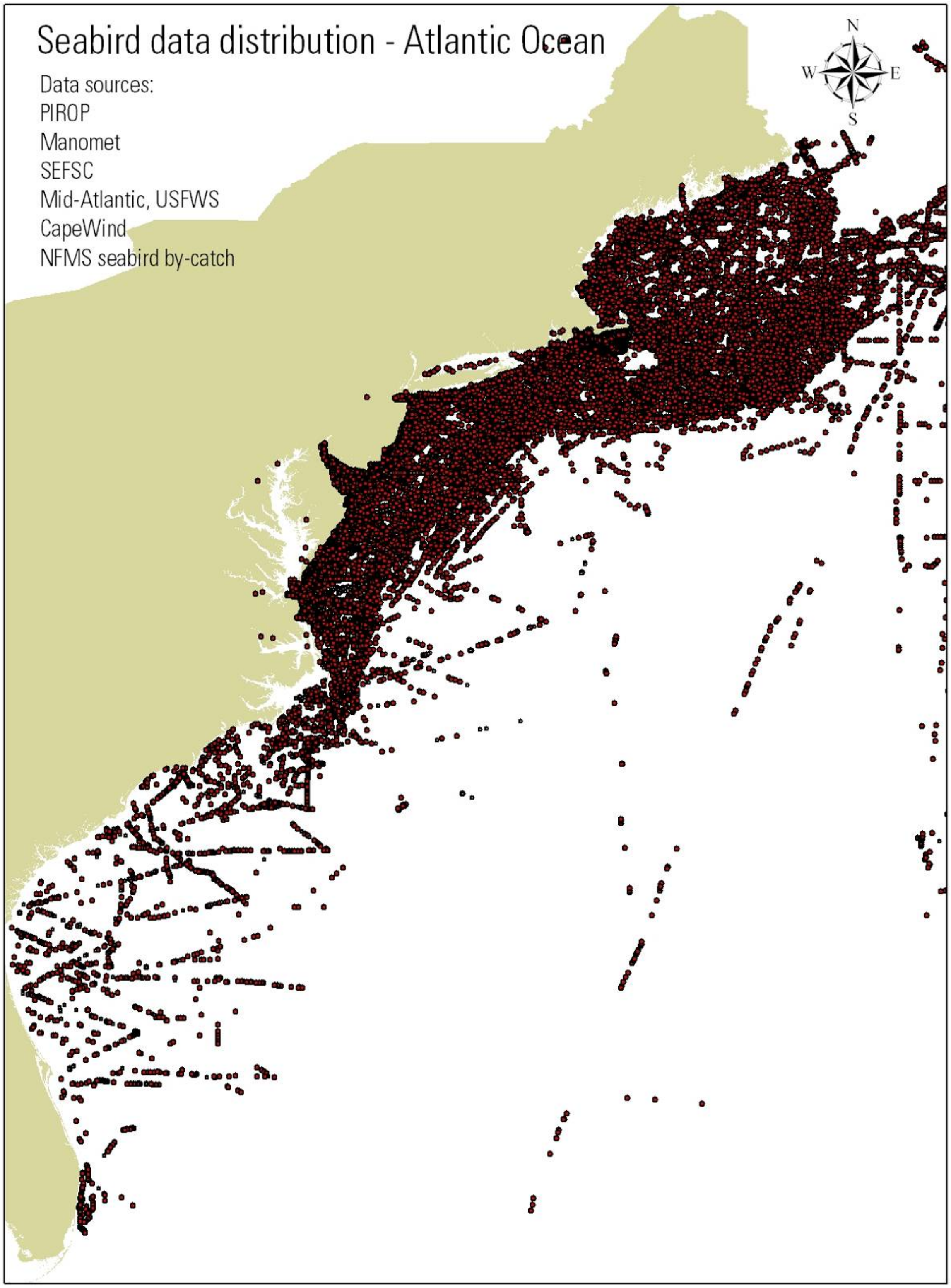


Figure 7. Seabird occurrences based on data from PIROP, SEFSC, CDAS, Cape Wind and others.

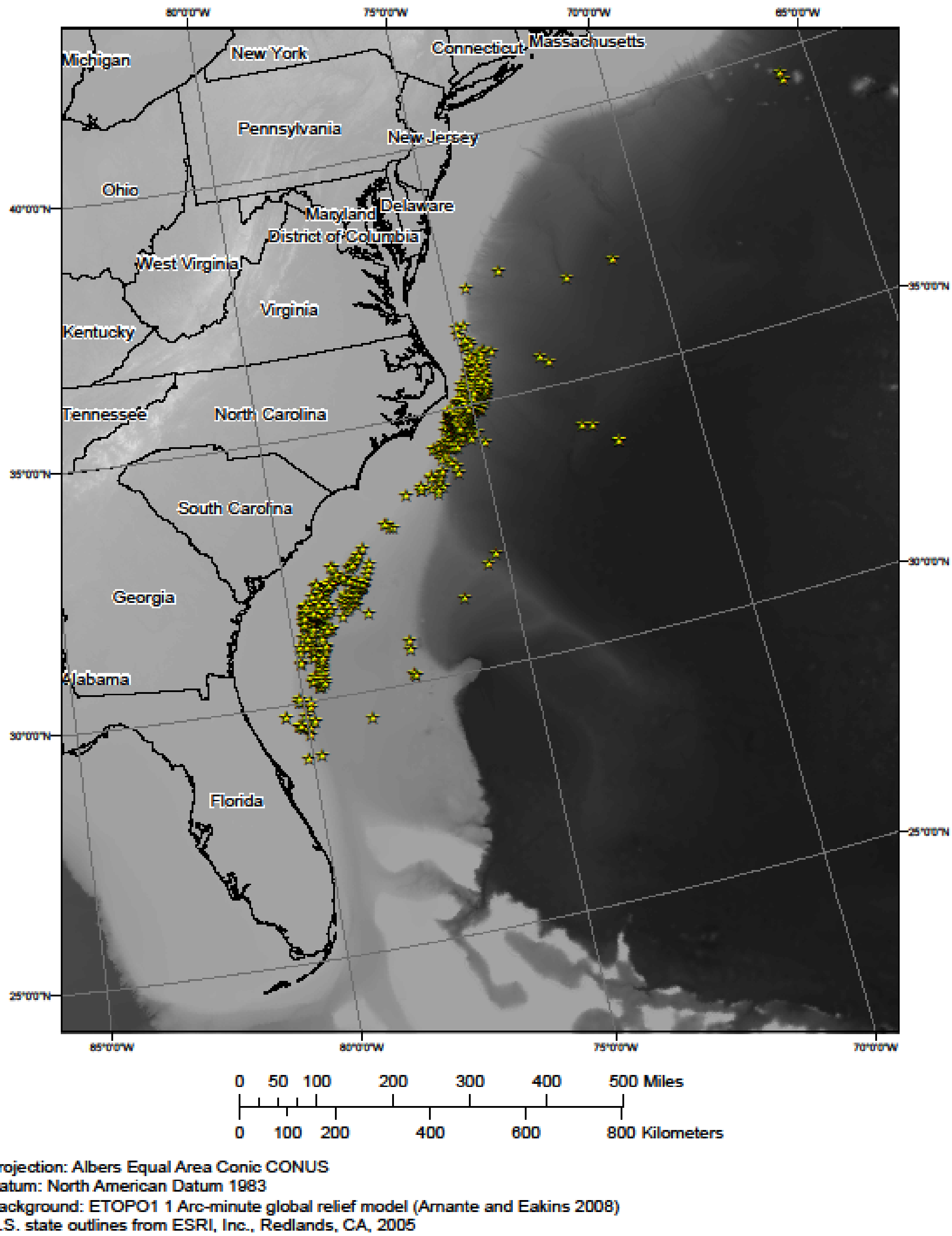


Figure 8. Historical Black-capped Petrel locations in the Southeast.

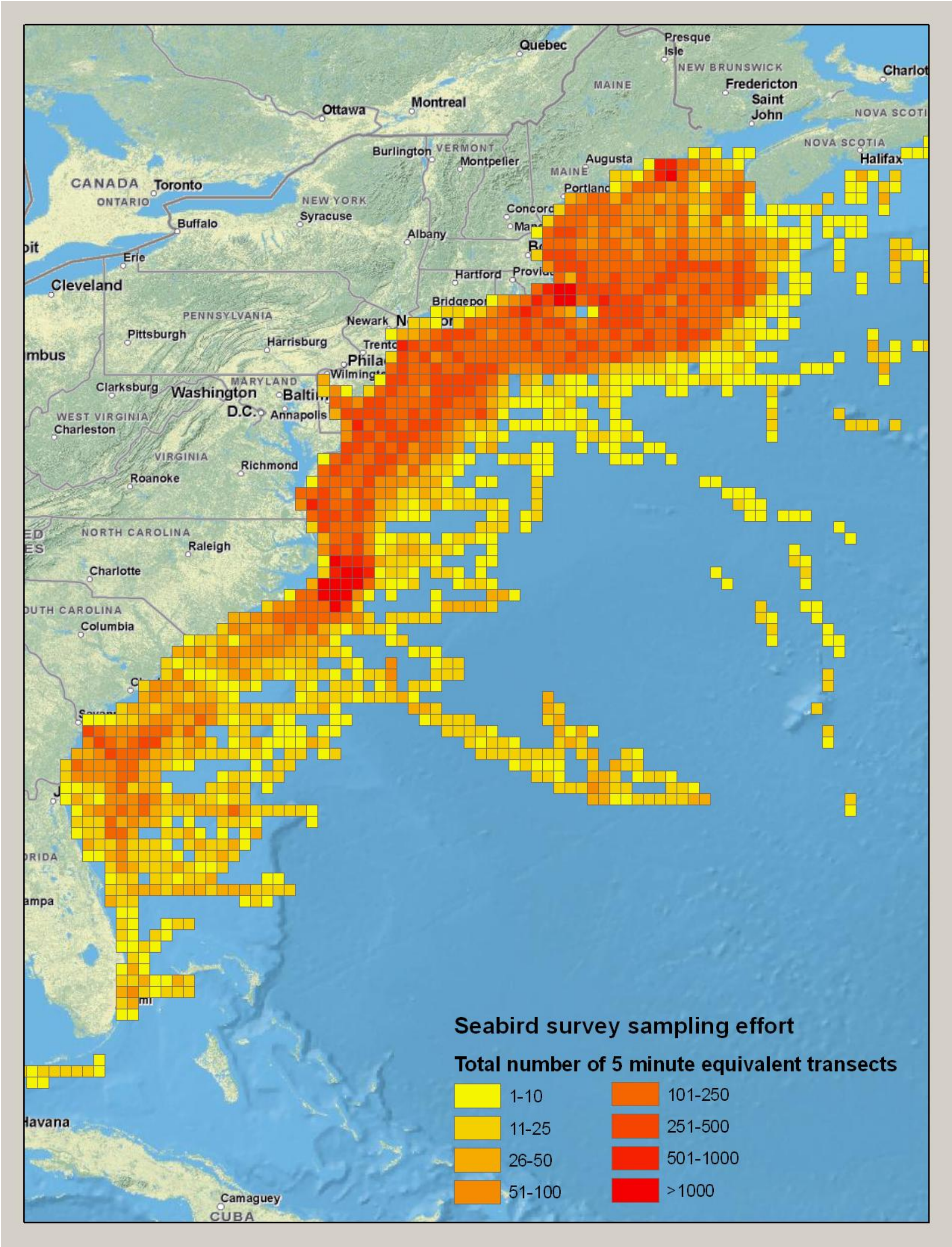


Figure 9. Sampling effort for seabirds along the Atlantic coast of the U.S during 1978-2009. Color schemes represent a standardized range of the number of surveys conducted in each grid cell.

# 4. FUTURE PLANS

## *4.1. Availability and acquisition of data*

We inquired about every known dataset but were unable to obtain some information. As a result, several datasets are currently not part of this compendium and it is unclear whether they will ever become available. The issues related to the acquisition of scientific data and data-sharing are complicated and include exclusive ownership, data hoarding, institutional policies, balance of obligations, and technology (http://ori.dhhs.gov/education/products/n_illinois_u/datamanagement/dotopic.html). Despite these potential roadblocks, there is considerable interest in maintaining avian population data in modern data management systems and facilitating access to the information as part of a sound monitoring strategy (U.S. North American Bird Conservation Initiative Monitoring Subcommittee 2007). We expect that this interest will foster additional support for collaborations, data sharing, critical examination of the data and application of the most sophisticated analytical techniques. Moreover, a continuing dialogue about data management issues is needed by individuals and organizations with a vested interest in the topic. A communicative approach will go a long way toward insuring that all involved exhibit professional responsibility and promote effective use of information for the public good (Scofield 1998). Specifically, we suggest that funding agencies and organizations clarify before projects begin what is expected of researchers and employees with respect to the sharing of scientific data (Panel on Scientific Responsibility and the Conduct of Research 1992). For example, periods of exclusive ownership needs to be defined at the outset of a research project so that researchers know what is expected of them in terms of making data available to the larger conservation community.

We have identified all those datasets we know to exist, even those we have not obtained (see Appendix A.) However, it is impossible to know the quality of information that we have not yet reviewed (e.g., Bluewater Wind LLC – New Jersey windpower site survey, Long Island Power Authority – Long Island windpower site survey). These datasets are listed to merely assist researchers or managers to quickly assess what information is available for seabirds in the northwestern Atlantic.

## *4.2. Shorebird data*

A biologist is expected to be hired during 2009 by the FWS, Region 5, Division of Migratory Birds, to begin searching for occurrence information on shorebirds. This will be a collaborative effort between the USGS/PWRC and the Division of Migratory Birds, Region 5. Whatever shorebird occurrence information is located will be added to this database; however, the efforts to retrieve, compile, and synthesize this information will be discussed in detail in a separate report.

## *4.3. Proposed list of seabird species for modeling*

We have proposed to model several seabird species (Table 1) based on foraging strategy, conservation status, and what is already known about their broad-scale distribution. We used existing conservation plans for North America such as the North American Waterbird Conservation Plan (Kushlan et al. 2002), the Mid-Atlantic/New England/Maritimes plan (Parson et al. 2006), the Southeast Waterbird Conservation Plan (Hunter et al. 2006), the U.S. Shorebird Conservation Plan (U.S. Fish and Wildlife Service 2004), and the National Audubon Society Watchlist (National Audubon Society 2002) to guide us in the selection process. Species were selected if they were listed as of least "moderate concern" after consulting with the with FWS and MMS staff. This list that may be modified in the future and may include additional species but we do not foresee many changes. Also, we note that some species such as the Magnificent Frigatebird (*Fregata magnificens*), although considered endangered or of the highest concern in some plans, have very few observations. Under these circumstances, modeling of distributions and habitat relationships is of little value.

We selected species that were of at least moderate concern in at least one plan. This list was submitted to the FWS for comment and additions were made to this list. The proposed, updated list is provided below in order of FWS preference for modeling.

Table 1. Draft seabird species to be modeled for the seabird distribution project.

| **Seabird** | **Highest Level of Concern** |
|---|---|
| Common Loon (*Gavia immer*) | highest concern |
| Greater Shearwater *(Puffinus gravis*) | highest concern |
| Common Eider (*Somateria mollissima*) | high concern |
| Northern Gannett (*Morus bassanus*) | moderate concern |
| Black Scoter (*Melanitta nigra*) | high concern |
| Roseate Tern (*Sterna dougallii*) | highest concern |
| Red-throated Loon (*Gavia stellata*) | highest concern |
| Leach's Storm-petrel (*Oceanodroma leucorhoa*) | moderate concern |
| Audubon's Shearwater (*Puffinus iherminieri*) | highest concern |
| Black-capped Petrel (*Pterodroma hasitata*) | highest concern |

### *4.4. Hierarchical modeling*

Upon completion of data collection, we propose to use a hierarchical framework to analyze the data. This framework is particularly useful when trying to combine multiple types of data across various spatial and temporal extents. Initially, we will discretize the model space (i.e., the ocean area of interest) and describe a model with explicit spatial autocorrelation. By discretizing space, we can create a mechanism for incorporating the various types of data. The effort information mentioned above can then be used in the model as an offset term to explain observed differences between counts across the model space. Conveniently, spatially correlated models allow for inferences to be made even in areas where data are not available (although we must be careful when doing so). As is the case with many spatially auto-correlated models, one is able to make better predictions closer to the areas where data were collected. As we move further away from those areas, then the prediction often tends towards the mean of the whole process and the variance of those predictions also increases. To account for this spatial difference, we will map variance to show the magnitude of this uncertainty across the prediction map. A basic model that includes count data or occurrences, spatial auto-correlation, and effort information will be extended to include habitat covariates such as SST, chlorophyll, or oceanic fronts/eddies. We will model spatial autocorrelation using either a geostatistical-based model or a spatial autoregressive model, such as the conditional autoregressive model (e.g., Webster et al. 2008). Ideally, the inclusion of all this information will provide useful maps of distribution for those species for which adequate data are available.

### *4.5. Data access and storage*

We have begun development of a relational database to store the seabird data for distribution. We are working to construct, populate and deploy a server-based database that can be used to serve data as necessary. Even though a final storage locality and administrator of these data have not yet been decided, we felt it was prudent to begin the development of a single database to house these data. We created a conceptual map of database components (Fig. 10), and from this concept we created a basic database structure. This is still a draft structure created to capture the basic data fields and further development will be necessary. We felt that this was an important first step to combine datasets for ease of querying data and to insure effective long-term storage and access. We hope that this work will ease data transfer and usage following the conclusion of this project.

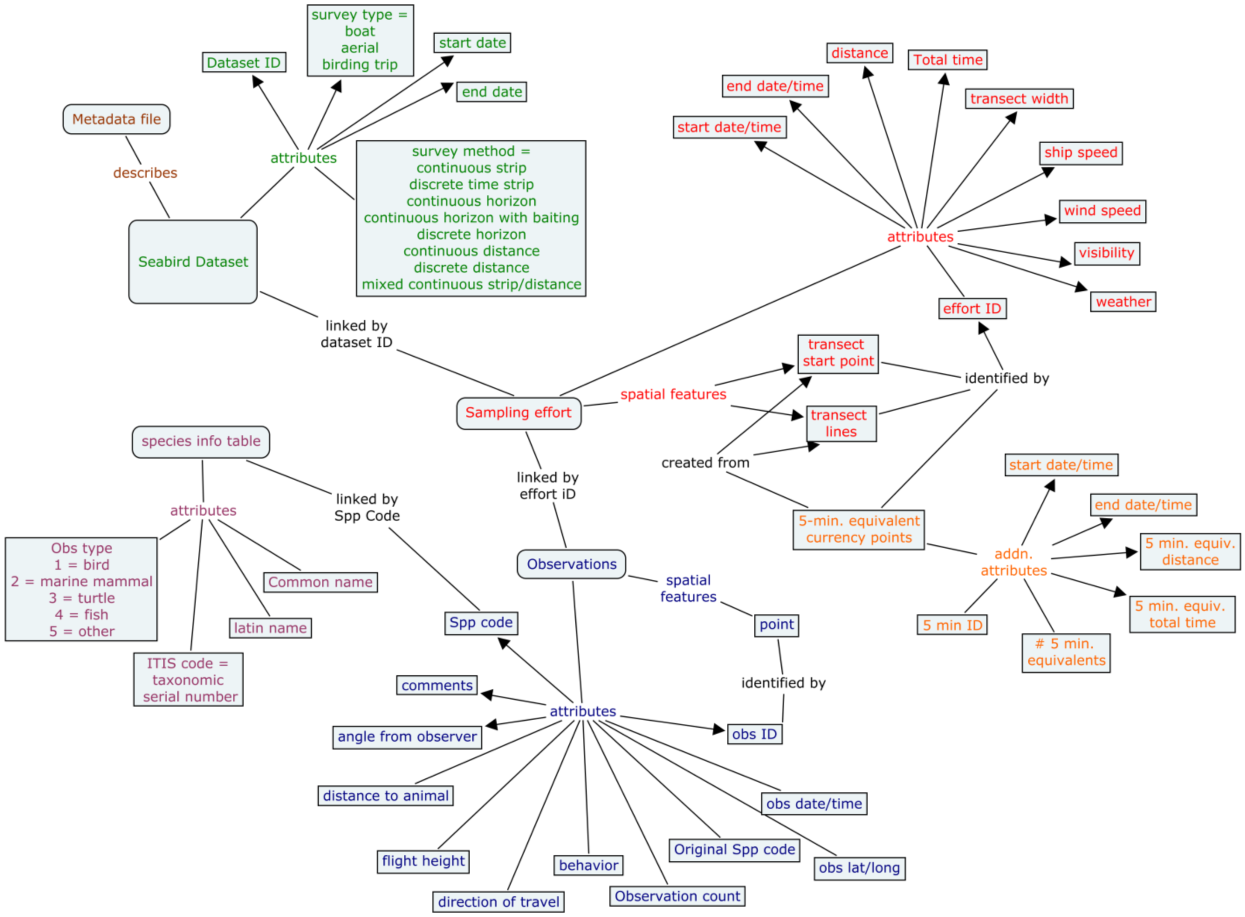


Figure 10. Conceptual map of server-based database structure for the seabird occurrence database.

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# APPENDIX A: A LISTING OF DATASETS FOR SEABIRD SURVEYS AND RELEVANT OCEANOGRAPHIC VARIABLES FOR THE WESTERN ATLANTIC OCEAN BETWEEN MAINE AND FLORIDA.

## *A.1 Dataset subtype: Large spatial-scale scientific surveys*

### A.1.1 Dataset: Manomet Center for Conservation Sciences Seabird Survey

Geographic coverage: Northwest Atlantic between 35 and 44 degrees N latitude off the U. S. coast.
Dataset dates: 1/1/1978 to 2/28/1980
Data contact: Forsell, Doug
Organization: U. S. Fish and Wildlife Service, Chesapeake Bay Field Office

Dataset summary: Seabird surveys were conducted throughout the year in shelf waters off the northeastern United States. Data were collected on board ships taking part in oceanographic monitoring and assessment surveys such as National Marine Fisheries Service (NMFS) and U.S. Coast Guard vessels. Survey transects were recorded in 10-min periods during the period from January 1978 through February 1980.

Quality: This is one of the most significant datasets for Atlantic U.S. waters. Observations were made over a large area and many seasons.

Data processing: These data were processed from text files into separate observation and sampling effort datasets. Date/time fields were standardized and project wide species code data were added. Species observation and sampling effort data were linked using a linking identifier.

Availability: Data are available as locally archived ESRI geodatabase featureclass products.

### A.1.2 Dataset: Cetacean and Seabird Assessment Program (CSAP)

Geographic coverage: Shelf waters of the northeastern United States
Dataset dates: 4/16/1980 to 10/12/1988
Data contact: Schmidt, Stephanie
Organization: Manomet Center for Conservation Sciences

Dataset summary: The Cetacean and Seabird Assessment Program (CSAP) was conducted by Manomet for the Northeast Fisheries Science Center (NEFSC) of the National Marine Fisheries Service from 1980 to 1988. CSAP was designed to provide an assessment of the abundance and distribution of cetaceans, seabirds and marine turtles in the shelf waters of the northeastern United States.

Quality: This is historically the most significant and highest quality dataset for the northwest Atlantic U.S. waters. No other dataset for the U.S. compares in spatial and temporal scale.

Data processing: These data were processed from text files into separate observation and sampling effort datasets. Date/time fields were standardized and project wide species code data were added. Species observation and sampling effort data were linked using a linking identifier.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.1.3 Dataset: South Atlantic Bight (SAB) - Haney

Geographic coverage: Georgia, Florida, South Carolina
Dataset dates: 11/15/1982 to 6/16/1985
Data contact: Haney, J. Christopher
Current Organization: Defenders of Wildlife

Dataset summary: Seabird surveys were conducted off of Georgia, South Carolina and Florida to study the relationship between seabird distribution and biophysical variables.

Quality: These are very good quality data, collected using standard transect survey techniques. Data cover a range of dates and area in the SAB.

Data processing: We received the original paper records from C. Haney and entered these into this database using data entry forms mimicking the original datasheets as separate sampling effort and observation tables. We developed a relational database with data entry forms to house the sampling effort and observational data in Microsoft Access to allow easier data entry, checking and output. This data structure and forms allows us to create the necessary GIS data files for mapping while retaining the look of the original data records. By maintaining the data in its entirety, the data is completely archived for future use. The data were checked for data entry errors and imported into an ArcGIS geodatabase featureclass. The data were checked for geographic consistency (e.g., errors in location from number transposition) and any errors were fixed. Project-wide species codes were added to standardize the information. Species observation and sampling effort data were linked using a linking identifier.

Availability: Data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

### A.1.4 Dataset: Southeast Fisheries Science Center (SEFSC) Atlantic Surveys, 1992

Geographic coverage: Blake Plateau area of the Atlantic Ocean between 28 degree and 35 degree North latitude and from the coastal boundary to the Exclusive Economic Zone
Dataset dates: 1/4/1992 to 2/10/1992
Data contact: Garrison, Lance
Organization: NOAA SEFSC

Dataset summary: A survey of marine mammals over the Blake Plateau area of the Atlantic Ocean conducted by NOAA SEFSC. Seabirds were surveyed concurrently, but were not the focus of the cruise.

Quality: Good quality data collected as continuous record observations, although we believe that marine mammals, and not birds, were a priority and therefore some birds may have been missed.

Data processing: These data were processed from ESRI shapefiles obtained from OBIS-SEAMAP as separate track line and point observation datasets. Date/time fields were standardized and project-wide species codes were added.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.1.5 Dataset: SEFSC Atlantic Surveys, 1998

Geographic coverage: SAB
Dataset dates: 7/9/1998 to 8/20/1998
Data contact: Garrison, Lance
Organization: NOAA SEFSC

Dataset summary: NOAA Ship Relentless Cruise RS 98-01 (3), a survey of marine mammals conducted by NOAA SEFSC to evaluate abundance, distribution and stock structure in southeastern U.S. Atlantic waters. Seabirds were surveyed concurrently, but were not the focus of the cruise.

Quality: Good quality data collected as continuous record observations, although we believe that marine mammals, and not birds, were a priority and therefore some birds may have been missed.

Data processing: These data were processed from ESRI shapefiles obtained from OBIS-SEAMAP as separate track line and point observation datasets. Date/time fields were standardized and project-wide species codes were added.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.1.6 Dataset: SEFSC Atlantic Surveys, 1999

Geographic coverage: SAB
Dataset dates: 8/9/1999 to 9/25/1999
Data contact: Garrison, Lance
Organization: NOAA SEFSC

Dataset summary: A survey of marine mammals conducted by NOAA SEFSC to evaluate abundance, distribution and stock structure in southeastern U.S. Atlantic waters. Seabirds were surveyed concurrently, but were not the focus of the cruise.

Quality: Good quality data collected as continuous record observations, although we believe that marine mammals and not bird were a priority and therefore some birds may have been missed.

Data processing: These data were processed from ESRI shapefiles obtained from OBIS-SEAMAP as separate track line and point observation datasets. Date/time fields were standardized and project-wide species codes were added.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.1.7 Dataset: Winter Survey of Mid-Atlantic (FWS)

Geographic coverage: Mid-Atlantic, North Carolina to New Jersey including Chesapeake and Delaware Bays
Dataset dates: 12/19/2001 to 8/3/2003
Data contact: Forsell, Doug
Organization: U. S. Fish and Wildlife Service, Chesapeake Bay Field Office

Dataset summary: These are aerial survey data collected for transects (120m width, 60 m each side) conducted in the mouth of Chesapeake Bay, in Delaware Bay, and in offshore waters from the beach outward. Aerial surveys were flown to at least 12 nautical miles offshore from northern New Jersey to the Virginia / North Carolina border, including Delaware Bay and the coastal bays. Transects were flown along every third line of latitude on any specific day.

Quality: Data has very good geographic coverage for coastal Mid-Atlantic States. Data are geo-referenced continuous records and are therefore excellent quality. This data may be used to calculate and display densities.

Data processing: These data were processed from data files extracted from the CDAS viewing program. Observation datasets were converted from a Microsoft Excel file and trackline data was created from vector track data. Date fields were standardized and project-wide species codes were added. No time data was available, though this information was probably collected originally. Information both in and out of the transect zone data were combined into the same data records. Trackline data were imported to ArcGIS and assigned transect identifiers.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.1.8 Dataset: EcoMon May 2007

Geographic coverage: Shelf waters of the northeastern United States
Dataset dates: 5/23/2007 to 6/3/2003
Data contact: Veit, Richard
Organization: College of Staten Island

Dataset summary:  Seabird surveys were conducted aboard NOAA research vessels while monitoring fishery-relevant baseline ecosystem data in the Northeast Shelf Ecosystem.

Quality:  This dataset is very good, with excellent coverage of the Northeast continental shelf. The surveys were conducted using modern survey methods and GPS equipment.  Data were recorded as continuous track data of very high resolution.  The observations have been validated and sampling effort data is available.

Data processing:  Data were received as a single Microsoft Excel data file with mixed observation and GPS track position information recorded using the survey program DLOG (R.G. Ford Consulting, Portland, OR).  Data were initially transferred to a Microsoft Access database for initial standardization and formatting.  These data were standardized for date/time and species codes and cleaned for data-entry errors when possible.  Data were then imported into ArcGIS for further processing.  Observation data were separated into an observation point featureclass for GIS and sampling effort data was created from positional information.  We developed an ArcObjects program to generate transects from the GPS positional data, creating variable distance/time transects for periods of continuous survey periods and identifying off-survey periods (e.g., fish sampling stations, CTD casts, etc.).  Observation points were linked to transects when they occurred during survey periods.

Availability:  Data are locally archived in a Microsoft Access database and as ArGIS geodatabase featureclass products.

### A.1.9 Dataset:  Acoustic Herring Survey 2007

Geographic coverage:  Gulf of Maine
Dataset dates:  10/16/2007 to 10/25/2007
Data contact:  Veit, Richard
Organization:  College of Staten Island

Dataset summary:  Seabird surveys conducted during NOAA research cruises during 2007 as part of National Marine Fisheries Service Acoustic Herring survey in the Gulf of Maine.

Quality:  This dataset is very good, with excellent coverage of the Gulf of Maine.  The surveys were conducted using modern survey methods and GPS equipment.  Data were recorded as continuous track data of very high resolution.  The observations have been validated and sampling effort data is available.

Data processing:  Data were received as a single Microsoft Excel data file with mixed observation and GPS track position information recorded using the survey program DLOG (R.G. Ford Consulting, Portland, OR).  Data were initially transferred to a Microsoft Access database for initial standardization and formatting.  These data were standardized for date/time and species codes and cleaned for data-entry errors when possible.  Data were then imported into ArcGIS for further processing.  Observation data were separated into an observation point featureclass for GIS and sampling effort data was created from positional information.  We developed an ArcObjects program to generate transects from the GPS positional data, creating variable distance/time transects for periods of continuous survey periods and identifying off-survey periods (e.g., fish sampling stations, CTD casts, etc.). Observation points were linked to transects when they occurred during survey periods.

Availability: Data are locally archived in a Microsoft Access database and as ArGIS geodatabase featureclass products.

### A.1.10 Dataset: Acoustic Herring Survey 2008

Geographic coverage: Gulf of Maine
Dataset dates: 9/4/2008 to 10/9/2008
Data contact: Veit, Richard
Organization: College of Staten Island

Dataset summary: Seabird surveys conducted during NOAA research cruises during 2007 as part of National Marine Fisheries Service Acoustic Herring survey in the Gulf of Maine.

Quality: This dataset is very good, with excellent coverage of the Gulf of Maine. The surveys were conducted using modern survey methods and GPS equipment. Data were recorded as continuous track data of very high resolution. The observations have been validated and sampling effort data is available.

Data processing: Data were received as a single Microsoft Excel data file with mixed observation and GPS track position information recorded using the survey program DLOG (R.G. Ford Consulting, Portland, OR). Data were initially transferred to a Microsoft Access database for initial standardization and formatting. These data were standardized for date/time and species codes and cleaned for data-entry errors when possible. Data were then imported into ArcGIS for further processing. Observation data were separated into an observation point featureclass for GIS and sampling effort data was created from positional information. We developed an ArcObjects program to generate transects from the GPS positional data, creating variable distance/time transects for periods of continuous survey periods and identifying off-survey periods (e.g., fish sampling stations, CTD casts, etc.). Observation points were linked to transects when they occurred during survey periods.

Availability: Data are locally archived in a Microsoft Access database and as ArGIS geodatabase featureclass products.

### A.1.11 Dataset: EcoMon January 2009

Geographic coverage: Shelf waters of the northeastern United States
Dataset dates: 1/29/2009 to 2/12/2009
Data contact: Veit, Richard
Organization: College of Staten Island

Dataset summary:  Seabird surveys were conducted aboard NOAA research vessels while monitoring fishery-relevant baseline ecosystem data in the Northeast Shelf Ecosystem.

Quality:  This dataset is very good, with excellent coverage of the Northeast continental shelf. The surveys were conducted using modern survey methods and GPS equipment.  Data were recorded as continuous track data of very high resolution.  The observations have been validated and sampling effort data is available.

Data processing:  Data were received as a single Microsoft Excel data file with mixed observation and GPS track position information recorded using the survey program DLOG (R.G. Ford Consulting, Portland, OR).  Data were initially transferred to a Microsoft Access database for initial standardization and formatting.  These data were standardized for date/time and species codes and cleaned for data-entry errors when possible.  Data were then imported into ArcGIS for further processing.  Observation data were separated into an observation point featureclass for GIS and sampling effort data was created from positional information.  We developed an ArcObjects program to generate transects from the GPS positional data, creating variable distance/time transects for periods of continuous survey periods and identifying off-survey periods (e.g., fish sampling stations, CTD casts, etc.).  Observation points were linked to transects when they occurred during survey periods.

Availability:  Data are locally archived in a Microsoft Access database and as ArGIS geodatabase featureclass products.

### A.1.12 Dataset:  Atlantic Flyway Sea Duck Survey

Geographic coverage:  Atlantic Flyway, eastern United States
Dataset dates: NA
Data contact:  Koneff, Mark and Silverman, Emily
Organization:  U.S. Fish and Wildlife Service, Division of Migratory Bird Management

Dataset summary:  The Atlantic Flyway Sea Duck Survey was established in 1991 to record sea duck numbers using near shore (within 700 m of shore) habitats from Cape Breton, Nova Scotia to Jacksonville, Florida. A pilot survey was conducted in 1990, and operational surveys have been conducted from 1991 to 2002, except 1993 and 1996. In 2001 and 2002, point location data for birds along transects were collected, but to date, these data have not yet been examined.  This survey was discontinued in 2003 because of budget shortfalls in the Division of Migratory Bird Management.  In 2008 and 2009, a survey based on the original design, was conducted and included a number of transects perpendicular to the coast.

Quality:  The design of the original survey was not well constructed, but FWS is working on reviewing all of the data for quality assurance.

Data processing:  NA

Data availability:  Data from the original survey are available on the web and have been downloaded, but do not include any location information.  We have requested additional data from FWS and currently we are working with FWS to examine the data and check for quality so that it may be included as a database in this effort.

### A.1.13 Dataset: Mid-winter Waterfowl - FWS

Geographic coverage: Atlantic Flyway, eastern United States
Dataset dates: 1/2/2001 to 5/7/2008
Data contact: Koneff, Mark
Organization: U.S. Fish and Wildlife Service, Division of Migratory Bird Management

Dataset summary: The Mid-winter Waterfowl Survey is a nationwide effort to survey waterfowl in major concentration areas by coastal zones. Only waterfowl are recorded.

Quality: Data are area counts by segments and zones so is less useful for understanding distribution except for on a larger scale. Data are only recorded for waterfowl and tend to be very close to shore so limit knowledge of other seabirds.

Data processing: These data were retrieved as Microsoft Excel summary data and have not been linked to locations information.

Data availability: Data are locally archived as Microsoft Excel spreadsheets.

### A.1.14 Dataset: Programme Integre Recherches sur les Oiseaux Pelagiques (PIROP)

Geographic coverage: Northwest Atlantic mostly and elsewhere Atlantic and eastern Pacific
Dataset dates: 12/31/1969 to 9/30/1992
Data contact: Gjerdrum, Carina
Organization: Canadian Wildlife Service, Environmental Stewardship Branch

Dataset summary: PIROP is the comprehensive seabird survey dataset for Canada. Survey data varied in technique over the years from an unlimited width transect to a fixed width transect type. The data were merged with the Manomet Seabird data from the 1980’s program.

Quality: This database of shipboard surveys is extensive, temporally as well as spatially. Data collected by Manomet in the late 80's was added to PIROP, but we present the Manomet data in this data catalog as separate entities. The PIROP data we have compiled were extracted from OBIS-Seamap (http://seamap.env.duke.edu/datasets/detail/280) and, as such, do not contain the full set of data fields that are available in PIROP. For complete attribute data, the Canadian Wildlife Service should be contacted to obtain this information.

Data processing: Data were obtained as ESRI shapefiles from OBIS-Seamap (http://seamap.env.duke.edu/datasets/detail/280). Data were standardized for date/time and species codes. We also created a separate observation dataset that does not have Manomet data by performing a spatial query to remove these data.

Availability:  Data are locally archived as ESRI geodatabase featureclass products.

## *A.2 Dataset subtype: Small spatial-scale scientific surveys*

### A.2.1 Dataset:  Summer 2004/ Winter 2005 Cape Hatteras

Geographic coverage:  North Carolina Shelf off Cape Hatteras
Dataset dates:  4/8/2004 to 2/2/2005
Data contact:  LaBrecque, Erin
Organization:  Nicholas School of the Environment and Earth Sciences, Duke

Dataset summary:  This dataset contains location information for marine mammal, seabird, and sea turtle sightings off of Cape Hatteras, North Carolina, in summer 2004 and winter 2005.  The goal was to map the distribution of upper-trophic predators with respect to physical and biological gradients.

Quality:  Very limited geographically, but a good recent survey of the Hatteras offshore waters, particularly for the less often surveyed winter period.

Data processing:  Data were obtained as ESRI shapefiles from OBIS-Seamap (http://seamap.env.duke.edu/datasets/detail/280).  Data were standardized for date/time and species codes.

Availability:  Data are locally archived as ESRI geodatabase featureclass products.

### A.2.2 Dataset:  Sargasso cruise - bird sightings

Geographic coverage:  Sargasso Sea
Dataset dates:  6/1/2004 to 6/21/2004
Data contact:  Whitehead, Hal
Organization:  Dalhousie University

Dataset summary:  This cruise surveyed marine birds and mammals in the onboard the research vessel Balaena, from Beaufort, NC into the Sargasso Sea and back.

Quality:  Survey quality is acceptable but the data are spatially and temporally limited.  Surveys extend out to an area not commonly surveyed in the Sargasso Sea, making this a somewhat unique source of information about birdlife for this region.

Data processing:  Data were obtained as ESRI shapefiles from OBIS-Seamap (http://seamap.env.duke.edu/datasets/detail/280).  Data were standardized for date/time and species codes.

Availability:  Data are locally archived as ESRI geodatabase featureclass products.

### A.2.3 Dataset: Hatteras Eddy Cruise 2004

Geographic coverage: South of Cape Hatteras offshore cold-core eddy
Dataset dates: 8/15/2004 to 8/19/2004
Data contact: Hyrenbach, David
Organization: Duke University Marine Laboratory

Dataset summary: A Duke-University of North Carolina Oceanographic Consortium cruise to survey physical and biological properties near cold-core eddies forming along the inner edge of the Gulf Stream off North Carolina in August 2004.

Quality: Very limited geographically, but a good, recent survey of the Hatteras offshore waters.

Data processing: Data were obtained as ESRI shapefiles from OBIS-Seamap (http://seamap.env.duke.edu/datasets/detail/280). Data were standardized for date/time and species codes.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.2.4 Dataset: Bar Harbor Whale Watch Survey 2005

Geographic coverage: Gulf of Maine from Bar Harbor to Mount Desert Rock and environs
Dataset dates: 6/16/2005 to 10/19/2005
Data contact: Welch, Linda
Organization: FWS, Maine Coastal Island National Wildlife Refuge

Dataset summary: Seabird surveys using standardized techniques were completed aboard the Whale Watching vessel Friendship during transit.

Quality: Very good, but local seabird dataset for the Bar Harbor area of Maine. These data were made aboard a high-speed whale watching boat, but instantaneous records were kept instead of using timed transect counts, allowing better species-habitat associations to be made. However, survey tracks were determined by whale locations and therefore probably biased towards more likely seabird locations.

Data processing: Data were received as observation and track line data. We processed tracks to account for start and stop information recorded while surveys were underway. These coded points designate beginning and end points for transects. These processed track segments (transects) were assigned id numbers. Data were standardized for date/time and species codes.

Availability: Data are locally archived as ESRI geodatabase featureclass products.

### A.2.5 Dataset: Bar Harbor Whale Watch Survey 2006

Geographic coverage: Gulf of Maine from Bar Harbor to Mount Desert Rock and environs

Dataset dates:  6/21/2006 to 10/15/2006
Data contact:  Welch, Linda
Organization:  FWS, Maine Coastal Island National Wildlife Refuge

Dataset summary:  Seabird surveys using standardized techniques were completed aboard the Whale Watching vessel Friendship during transit.

Quality:  Very good, but local seabird dataset for the Bar Harbor area of Maine.  These data were made aboard a high-speed whale watching boat, but instantaneous records were kept instead of using timed transect counts, allowing better species-habitat associations to be made.  However, survey tracks were determined by whale locations and therefore probably biased towards more likely seabird locations.

Data processing:  Data were received as observation and track line data.  We processed tracks to account for start and stop information recorded while surveys were underway.  These coded points designate beginning and end points for transects.  These processed track segments (transects) were assigned id numbers.  Data were standardized for date/time and species codes.

Availability:  Data are locally archived as ESRI geodatabase featureclass products.

### A.2.6 Dataset:  New England Seamount Chain

Geographic coverage:  New England seamount chain
Dataset dates:  10/31/2006 to 6/26/2007
Data contact:  Gjerdrum, Carina
Organization:  Canadian Wildlife Service, Environmental Stewardship Branch

Dataset summary:  Seabird surveys conducted in the Sargasso Sea in November 2006 and May-June 2007 to and from the New England Seamount Chain.

Quality:  Good quality seabird data extending well offshore, outside of the area of interest.

Data processing:  Data received as observation and transect start points which were imported into a Microsoft Access database.  These data were then imported and mapped in ArcMap.  Data were standardized for date/time and species codes.

Availability:  Data are locally archived as ESRI geodatabase featureclass products.

### A.2.7 Dataset:  Duke University Marine Laboratory (DUML) Vessel-Based Surveys for Monitoring of Proposed Onslow Bay Undersea Warfare Training Range (USWTR) site

Geographic coverage:  Oslo Bay, North Carolina
Dataset dates:  6/7/2007 to 11/20/2007
Data contact:  Urian, Kim

Organization:  Duke University Marine Laboratory

Dataset summary:  A monitoring program designed to estimate density and document distribution and seasonal residency of marine mammals, seabirds, and sea turtles in the proposed Navy USWTR in Onslow Bay, 87-km from the coast of North Carolina. Ten 40-nm long transect lines, spaced approximately 5-nm apart were surveyed.

Quality:  Unknown.

Data processing:  NA

Data availability:  Not available yet.  We have track data on hand, but this dataset is missing seabird data.  This data was requested from the data originator, Lesley Thorne (Duke University).  Lesley indicated to us recently that she has more data (~1.5 years) to be included in the database from a 40 by 40 nautical mile region near Onslow.  In coming years, she will also conduct similar surveys near Jacksonville, FL.

### A.2.8 Dataset:  Mid-winter Offshore Survey - FWS

Geographic coverage:  Delaware and Chesapeake Bays
Dataset dates: Unknown
Data contact:  Forsell, Doug
Organization:  U. S. Fish and Wildlife Service, Chesapeake Bay Field Office

Dataset summary:  Offshore seabird surveys during the 1990's in Chesapeake and Delaware Bays.

Quality:  Unknown

Data processing:  NA

Data availability:  Has not been made available.

### A.2.9 Dataset:  North Carolina off Oregon and Hatteras Inlets – David Lee

Geographic coverage:  North Carolina, off Oregon and Hatteras Inlets
Dataset dates: 1/1/1976 to 1/1/1990
Data contact:  Lee, David
Organization:  North Carolina Museum of Natural Sciences

Dataset summary:  Seabird data aboard boats from 20-1,000+ fathoms off North Carolina Oregon and Hatteras Inlets.

Quality:  Presumed to be good quality being a temporally large dataset for the NC region and collected by a very experienced ornithologist.  However, early surveys were probably conducted using non-standard survey methods.

Data processing:  We have received the paper records, but have not yet computerized them.  We anticipate that this will be completed in 2009.

Data availability:  Made available as paper records.  We expect digital records to be available at the end of 2009.

### A.2.10 Dataset:  Northwest Atlantic Sargasso Sea - Haney

Geographic coverage:  Sargasso Sea, northwest Atlantic
Dataset dates: 8/1/1984 to 9/30/1984
Data contact:  Haney, J. Christopher
Organization:  Defenders of Wildlife

Dataset summary:  Seabird data mostly from deep water in the Northwest Sargasso Sea, including outside the Exclusive Economic Zone.

Quality:  These are very good quality data, collected using standard transect survey techniques, but over a limited geographic area.

Data processing:  We received the original paper record files and entered these into a Microsoft Access database as separate sampling effort and observation tables.  The data were checked for data entry errors and imported into an ArcGIS geodatabase featureclass.  The data were checked for geographic consistency (e.g., errors in location from number transposition) and any errors were fixed.  Project-wide species codes were added.  Species observation and sampling effort data were linked using a linking identifier.

Availability:  Data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

### A.2.11 Dataset:  Cape Wind - Nantucket Sound Seabird Survey

Geographic coverage:  Nantucket Sound, MA
Dataset dates:  4/17/2002 to 2/27/2004
Data contact:  Orr, Terry
Organization:  ESS Group, Inc.

Dataset summary:  Aerial and ship-based seabird surveys conducted for the environmental assessment of the proposed CapeWind windpower project on Horseshoe Shoals in Nantucket Sound.

Quality: Good local coverage for Nantucket Sound during several seasons. High flight paths may degrade ability to detect smaller species, but allows broader coverage in shorter amount of time. This dataset has very good temporal coverage. Data was not organized very well when received and presented great challenges in organizing data into a useful, coherent dataset.

Data processing: We received extensive digital shapefile records for each species or species group recorded for each day. These data needed extensive processing to merge track and observation data back together into a coherent dataset. Once merged, we assigned transects to track data based on start/stop points. We also corrected some time errors (am to pm change). We assigned transect number to between transects to enable us to be able to create tracks automatically. We used observations to generate tracks in some cases, when track lines were missing. These are conservative tracks given that tracks start and stop only when observations were made. Data were standardized for date/time and species code information.

Data availability: Data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

### A.2.12 Dataset: Mass Audubon - Nantucket Sound Seabird Survey

Geographic coverage: Nantucket Sound, Massachusetts
Dataset dates: 8/19/2002 to 3/29/2006
Data contact: Perkins, Simon
Organization: Massachusetts Audubon Society

Dataset summary: Survey seabirds in Nantucket Sound to assess the potential effect of wind farm development on avifauna in Nantucket sound. Surveys were conducted from fixed-wing aircraft at 500 feet above the water surface and by boat.

Quality: This dataset has very good coverage for Nantucket Sound, but flight heights were reported to be quite high, limiting potential identification of some species. Data from several survey days has problems with incorrect times matched to observations, which needs to be fixed before this dataset can be used.

Data processing: Data were provided as ESRI shapefiles. These data were merged to create a single database. Several transects had time errors, being off by a set time during the same transect which were determined to be periods with two data recorders having different times and were corrected. Several transects have time errors that cannot be explained. Further guidance was requested from Simon Perkins to fix this problem, but we have not yet received corrected data.

Data availability: Incomplete data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

### A.2.13 Dataset: Nantucket Shoals - Long-tailed Duck Survey

Geographic coverage: Nantucket Shoals, Massachusetts
Dataset dates: 1998 and 2008
Data contact: Veit, Richard
Organization: College of Staten Island

Dataset summary: We have requested these data. Surveys were completed by small boat over Nantucket Shoals to survey for Long-tailed Ducks. It is believed that all species of seabirds were recorded. Surveys were completed in 1998 and again in 2008.

Quality: Unknown. We have been told that we will be given this data by Dr. Richard Veit, but have not yet received this data. We believe that standard survey techniques were used.

Data processing: NA

Data availability: Has not been made available.

### A.2.14 Dataset: Aerial survey of Upper Trophic Level Predators on Platts Bank, Gulf of Maine

Geographic coverage: Platts Bank, Maine
Dataset dates: 7/11/2005 to 7/29/2005
Data contact: Wolff, Nicholas
Organization: University of Southern Maine

Dataset summary: Aerial surveys were flown in 2005 to record the distribution and relative abundance of marine mammals, birds and large fish. Surveys were typically conducted in the morning or early afternoon and consisted of six transects, each 46 km long oriented on an east-west axis to minimize interference from reflected sunlight. Survey legs were flown at 185 km/hr and an altitude of 230 m using a high-wing, twin-engine aircraft. Observation effort (two observers) was concentrated from both sides of the plane perpendicular to the flight path.

Quality: Very limited geographically, but a good recent survey using standardized techniques of a productive marine feature in the Gulf of Maine.

Data processing: Data were obtained as Microsoft Excel spreadsheet data files, but have not yet been processed.

Data availability: Data are locally archived as Microsoft Excel spreadsheet files.

### A.2.15 Dataset: Long Island Power Authority – Long Island windpower site survey

Geographic coverage: South of Long Island, NY
Dataset dates: NA

Data contact: Coakley, Coke
Organization: FPL Energy

Dataset summary: Aerial (12-15 flights) and ship-based (65-68 trips) seabird surveys conducted for the environmental review of the proposed windpower project off of Long Island, NY.

Quality: Unknown

Data processing: NA

Data availability: We have made repeated attempts to retrieve these data from FPL Energy. We formally requested these data in a letter, by phone and email, but we have been refused. This data may become available if the project proceeds.

### A.2.16 Dataset: Bluewater Wind LLC – New Jersey wind power site survey

Geographic coverage: Offshore New Jersey
Dataset dates: NA
Data contact: NA
Organization: BluewaterWind

Dataset summary: Monthly shipboard and aerial surveys off the New Jersey coastline to determine the current distribution, abundance, and migratory patterns of avian species, fish, marine mammals, and sea turtles.

Quality: Unknown

Data processing: NA

Data availability: These surveys are ongoing and we have not yet contacted data originators to ask for this data.

### A.2.17 Dataset: Bluewater Wind LLC – Delaware windpower site survey

Geographic coverage: Offshore New Jersey
Dataset dates: NA
Data contact: NA
Organization: BluewaterWind

Dataset summary: Seabird surveys to assess environmental impact conducted by Tetra Tech for Bluewater Wind LLC.

Quality: Unknown

Data processing: NA

Data availability:  These surveys are probably ongoing and we have not yet contacted the originators requesting data.

## *A.3 Dataset subtype: Observational datasets*

Subtype summary:  These datasets of seabird observations were collected with little or no consideration toward conducting scientific surveys.  All observations are recorded and some effort information is included, such as binned observations with times.

### A.3.1 Dataset:  Brian Patteson Seabirding Pelagic Trips

Geographic coverage:  North Carolina, off Oregon and Hatteras Inlets
Dataset dates: 8/8/1992 to 7/30/2006
Data contact:  Patteson, Brian
Organization:  Brian Patteson, Inc.

Dataset summary:  These data were collected during pelagic seabird trips off of Cape Hatteras, NC.  Seabird, marine mammal, and sea turtle data were collected and documented usually in 30 minute blocks during the duration of each trip.  Trips were mostly run from May to September.

Quality:  Seabird identifications are considered very reliable, but data were collected using non-scientific survey techniques.  For example, the use of chum and chasing of seabirds may bias sightings of certain species.  Because the surveys have been conducted over a long time period, the data provide a unique temporal perspective and provide many more observations of rare species.

Data processing:  We received copies of the paper records and entered these into a Microsoft Access database.  We developed a relational database to house the sampling effort and observational data in Microsoft Access to allow easier data entry, checking and output.  This data structure allowed us to create the necessary GIS data files for mapping while retaining the format of the original paper records.    Data were checked for data entry errors and imported into an ArcGIS geodatabase.  Transect lines were created by a custom ArcObjects programs from location information.  Transect lines were checked for spatial consistency and any errors were fixed.

Data availability:  Data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

### A.3.2 Dataset:  M. S. Gordon Surveys off Southern New England on Blue Dolphin

Geographic coverage:  Off southern New England, Martha's Vineyard south to just south of 39 deg 30' N

Dataset dates: 6/13/1953 to 8/27/1953
Data contact: Gordon, Malcolm S.
Organization: Department of Ecology and Evolutionary Biology, University of California, Los Angeles

Dataset summary: Observations of seabirds were made aboard the RV Blue Dolphin off southern New England during the summer of 1953. Surveys were conducted in three areas corresponding with coastal, shelf, and shelf-slope waters.

Quality: Data is of limited use, observations are not tied to survey points or transects. The dataset is believed to exist, but its condition is unknown.

Data processing: NA

Data availability: Not available.

### A.3.3 Dataset: New York to France Atlantic Crossings by R.H. Wiley

Geographic coverage: New York, NY to Cherbourg, France and back from Le Havre to New York, NY
Dataset dates: 7/11/1957 to 8/18/1958
Data contact: Wiley, R. Haven
Organization: University of North Carolina, Chapel Hill

Dataset summary: Observations of seabirds made on board the HMS Queen Elizabeth during July 1957 and August 1958 by R. H. Wiley.

Quality: Data is of limited use, observations are not tied to survey points or transects. The dataset is believed to exist, but its condition is unknown, attempts were made to retrieve data, but were not fruitful.

### A.3.4 Dataset: Rowlett Offshore Maryland

Geographic coverage: Offshore Ocean City, MD
Dataset dates: 1/1/1971 to 12/31/1977
Data contact: Rowlett, R. A.
Organization: NOAA

Dataset summary: Sightings of 56 species of marine birds and 11 species of marine mammals recorded from 1971 - 1977 [for the] northern Chesapeake Bight.

Quality: Unknown. Several attempts to contact R. Rowlett have not been returned.

Data processing: NA

Data availability:  Possibly from R. Rowlett.

### A.3.5 Dataset:  Avalon Seawatch

Geographic coverage:  Avalon, New Jersey
Dataset dates: 9/22/1993 to 12/15/2005
Data contact:  Mizrahi, David
Organization:  New Jersey Audubon

Dataset summary:  The Avalon Sea Watch is a stationary count of migrating seabirds conducted from an observation point overlooking the ocean at the north end of Avalon, NJ.  Birds are counted seven days a week, from dawn to dusk, from September 22 to December 22.

Quality:  Very limited geographically, but a good survey of nearshore coastal migrants in New Jersey.

Data processing:  NA

Data availability:  Available as annual summaries in report, no raw data was made available to us.

### A.3.6 Dataset:  Seabird Ecological Assessment Network (SEANET)

Geographic coverage:  Coastal northeastern United States
Dataset dates:  NA
Data contact:  Ellis, Julie
Organization:  Seabird Ecological Assessment Network

Dataset summary:  Beached-bird surveys conducted by volunteers during monthly or more frequent beach walks.

Quality:  This dataset is good for identifying threats to seabirds and may offer some information about bird distribution (i.e., location of carcass) under the caveat that the last location of the bird alive is unknown.  Data are collected by volunteers and checked and therefore should be reasonably accurate.  We will begin working with SEANET in 2009 to develop spatial models of beached bird distributions, which may prove insightful in determining baseline levels of mortality.

Data processing:  Dr. Ellis is currently working on the data quality and database management for the SEANET beached bird data.

Data availability:  Data are not currently available but we are working with Dr. Ellis to acquire and use the data.

### A.3.7 Dataset: Seabird Bycatch - Northwest Atlantic

Geographic coverage: Offshore northeastern U.S.
Dataset dates: 8/10/1989 to 7/13/2005
Data contact: Potter, David
Organization: NOAA, Northeast Fisheries Science Center

Dataset summary: The objectives of this program include: estimates of takes of protected species and discards of fishery resources, biological sampling of the catch, design and monitoring of conservation gear, monitoring of experimental fisheries, economic information on revenue and costs, gear performance and characteristics, and foreign fishery monitoring.

Quality: These data are bycatch only and therefore represent only what was reported by observers and brought on board. Many seabirds were not identified to species and this data is therefore of lower quality. However, it represents good seabird threat information from fisheries related mortality.

Data processing: These data were imported into a Microsoft Access database and then into an ArcGIS geodatabase. Data were standardized for date/time and species codes.

Data availability: Data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

### A.3.8 Dataset: Sargasso Sea 2006

Geographic coverage: Sargasso Sea
Dataset dates: 5/9/2006 to 6/23/2006
Data contact: Wong, Sarah
Organization: Dalhousie University, Department of Biology

Dataset summary: This data originate from a trip to Kelvin and Manning Seamounts to deploy some acoustic recording devices. Seabird observations were made when time permitted but were not conducted as scientific surveys. Observations were recorded hourly, although they may not have been made for a full hour in some circumstances. Locations are available for every ten minutes in May and every hour in June.

Quality: Non-scientific observations only, not a survey focused on seabirds, so of limited use.

Data processing: We received summary spreadsheet records of observations which we converted to individual observation records. These data were imported into a Microsoft Access database, standardized for date/time and species codes and then imported into an ArcGIS geodatabase.

Data availability: Data are locally archived in a Microsoft Access database and as ESRI geodatabase featureclass products.

## *A.4 Dataset Subtype: Observational dataset – National Audubon Christmas Bird Count (CBC)*

Subtype summary: Christmas Bird Counts are a specialized count conducted annually in December and early January. While the locations differ, the type of information and methods are the same for every count. A generalized summary and quality report has been given for all CBC datasets.

Data contact: LeBaron, Geoffrey S.
Organization: National Audubon Society

Dataset summary: Christmas Bird Count is the annual survey of birds within a designated count circle. Count circles usually occur on land, but can also be in the ocean or a combination of the two. These counts are repeated annually on a single day, though many counts were not repeated every year or have been discontinued. Observer numbers and quality varies among survey locations and years. Minimal effort information is recorded. Data is recorded for the count area and spatially linked to the count center of a 15 mile diameter circle.

Quality: The quality of CBC counts varies widely by year and count because of observer differences. Data are submitted for CBC circles measuring 15 miles in diameter and therefore are quite coarse in resolution. While the data are useful as an index of species population change, they are somewhat more limited for looking at offshore distributional patterns.

### A.4.1 Dataset: National Audubon Society Christmas Bird Count - New York Harbor to and at the Cholera Bank [NY1R]

Geographic coverage: New York Harbor to and at the Cholera Bank, NY [NY1R]
Dataset dates: 12/1/1907 to 12/31/1907

### A.4.2 Dataset: National Audubon Society Christmas Bird Count - 130th St. ferry [NY39]

Geographic coverage: 130th St. Ferry, New York [NY39]
Dataset dates: 12/1/1908 to 12/31/1912

### A.4.3 Dataset: National Audubon Society Christmas Bird Count - New York City-New York City Battery - 17 fathoms [NY1X]

Geographic coverage: New York City Battery - 17 fathoms, NY [NY1X]
Dataset dates: 12/1/1909 to 12/31/1914

### A.4.4 Dataset: National Audubon Society Christmas Bird Count - New York City-Atlantic Ocean [NY21]

Geographic coverage: New York City - Atlantic Ocean [NY21]
Dataset dates: 12/1/1917 to 12/31/1917

### A.4.5 Dataset: National Audubon Society Christmas Bird Count - L.I. Atlantic Ocean off Fire Island [NY1W]

Geographic coverage: L.I. - Atlantic Ocean off Fire Island, NY [NY1W]
Dataset dates: 12/1/1944 to 12/31/1959

### A.4.6 Dataset: National Audubon Society Christmas Bird Count - at sea off Monomoy Point [MA2Z]

Geographic coverage: At sea off Monomoy Point, Cape Cod, MA [MA2Z]
Dataset dates: 12/1/1948 to 12/31/1948

### A.4.7 Dataset: National Audubon Society Christmas Bird Count - at sea off Brooklyn [NY1Q]

Geographic coverage: At sea off Brooklyn, NY [NY1Q]
Dataset dates: 12/1/1949 to 12/31/1949

### A.4.8 Dataset: National Audubon Society Christmas Bird Count - L.I. Atlantic Ocean off Fire Island [NY1S]

Geographic coverage: L.I. - Atlantic Ocean off Fire Island, NY [NY1S]
Dataset dates: 12/1/1952 to 12/31/1975

### A.4.9 Dataset: National Audubon Society Christmas Bird Count - Bay of Fundy [ME0B]

Geographic coverage: Bay of Fundy, Maine [ME0B]
Dataset dates: 12/1/1968 to 12/31/1973

### A.4.10 Dataset: National Audubon Society Christmas Bird Count - Penobscot Bay [ME0A]

Geographic coverage: Penobscot Bay, Maine [ME0A]
Dataset dates: 12/1/1970 to 12/31/1973

### A.4.11 Dataset: National Audubon Society Christmas Bird Count - Merrymeeting Bay [ME08]

Geographic coverage: Merrymeeting Bay, Maine [ME08]
Dataset dates: 12/1/1974 to 12/31/1974

### A.4.12 Dataset: National Audubon Society Christmas Bird Count - Atlantic Ocean off New Jersey [NJOS]

Geographic coverage: Atlantic Ocean off New Jersey [NJOS]
Dataset dates: 12/1/1975 to 12/31/1979

### A.4.13 Dataset: National Audubon Society Christmas Bird Count - Atlantic Ocean off New Jersey [NJ0A]

Geographic coverage: Atlantic Ocean off New Jersey [NJ0A]
Dataset dates: 12/1/1977 to 12/31/1977

### A.4.14 Dataset: National Audubon Society Christmas Bird Count - Baltimore Canyon [MD15]

Geographic coverage: Baltimore Canyon [MD15], offshore Maryland
Dataset dates: 12/1/1979 to 12/31/1980

### A.4.15 Dataset: National Audubon Society Christmas Bird Count - Machias Bay [MEMB]

Geographic coverage: Machias Bay, Maine [MEMB]
Dataset dates: 12/1/1979 to 12/31/2004

### A.4.16 Dataset: National Audubon Society Christmas Bird Count - Atlantic Ocean off New Jersey [NJ0R]

Geographic coverage: Atlantic Ocean off New Jersey [NJ0R]
Dataset dates: 12/1/1980 to 12/31/1988

### A.4.17 Dataset: National Audubon Society Christmas Bird Count - Baltimore Harbor [MDBH]

Geographic coverage: Baltimore Harbor [MDBH], Maryland
Dataset dates: 12/1/1980 to 12/31/2004

### A.4.18 Dataset: National Audubon Society Christmas Bird Count - Jug Bay [MDJB]

Geographic coverage: Jug Bay [MDJB], Maryland
Dataset dates: 12/1/1982 to 12/31/2004

### A.4.19 Dataset: National Audubon Society Christmas Bird Count - Baltimore Canyon [MD19]

Geographic coverage: Baltimore Canyon [MD19], offshore Maryland
Dataset dates: 12/1/1982 to 12/31/1982

### A.4.20 Dataset: National Audubon Society Christmas Bird Count - Stellwagen Bank [MASB]

Geographic coverage: Stellwagen Bank [MASB]
Dataset dates: 12/1/1988 to 12/31/2004

### A.4.21 Dataset: National Audubon Society Christmas Bird Count - NJ: Atlantic Ocean offshore [NJAO]

Geographic coverage: Atlantic Ocean offshore, NJ [NJAO]
Dataset dates: 12/1/1989 to 12/31/1995

### A.4.22 Dataset: National Audubon Society Christmas Bird Count - Chesapeake Bay [VACB]

Geographic coverage: Chesapeake Bay [VACB], Virginia
Dataset dates: 12/1/1992 to 12/31/2004

### A.4.23 Dataset: National Audubon Society Christmas Bird Count - New Jersey pelagic [NJNJ]

Geographic coverage: New Jersey pelagic [NJNJ]
Dataset dates: 12/1/1998 to 12/31/1999

### A.4.24 Dataset: National Audubon Society Christmas Bird Count - North Penobscot Bay [MEBF]

Geographic coverage: North Penobscot Bay, Maine [MEBF]
Dataset dates: 12/1/2002 to 12/31/2004

## *A.5 Dataset subtype: Oceanographic datasets*

We have listed below the biophysical data we have on hand with information about processing, quality and availability.

### A.5.1 Dataset: Advanced Very High Resolution Radiometer (AVHRR) sea surface temperature

Geographic coverage: Worldwide
Dataset dates: 1985-2007
Data contact: National Aeronautic and Space Administration (NASA) Jet Propulsion Laboratory (JPL) podaac@podaac.jpl.nasa.gov
Organization: NOAA/NASA JPL

Dataset summary: "The 4 km Pathfinder effort at NODC and the University of Miami's Rosenstiel School of Marine and Atmospheric Science* (RSMAS) is an extension of and improvement on the sea surface temperature (SST) fields from the older NOAA/NASA AVHRR Oceans Pathfinder project. These new Version 5.0 data are being developed at RSMAS and NODC and distributed in partnership with the NASA Physical Oceanography Distributed Active Archive Center (PODAAC). In this 4 km Pathfinder project, some shortcomings in the old 9 km data have been corrected, and the entire 1985-2001 time series reprocessed at the 4 km Global Area Coverage (GAC) level, the highest resolution possible globally. Formal Pathfinder data for the years 2002-2006 have also recently been added, and interim data for 2007 through near present have also been generated. All of these data are available through NODC's ftp, http, and OPeNDAP access systems. Follow the links below to learn more about this effort " (http://www.nodc.noaa.gov/SatelliteData/pathfinder4km/).

Quality: Very good.

Data processing: These data were downloaded as NETCDF and HDF format data files. We wrote a Visual Basic .NET program to automate downloads and process NETCDF format SST data. We worked with programmers at Duke University on the program Marine Geospatial Ecology Tools (MGET) to troubleshoot a utility they developed to batch process HDF format files (Roberts et al. 2007). We used MGET to process all HDF files. Both tools converted the SST files into ArcGIS readable raster formats and extracted data into smaller geographic datasets for future modeling.

Data availability: Data are locally archived as ArcGIS geodatabase rasters.

### A.5.2 Dataset: Coastal Zone Color Scanner (CZCS) chlorophyll

Geographic coverage: Worldwide
Dataset dates: 1978-1986
Data contact: Feldman, Gene Carl
Organization: NASA

Dataset summary: Satellite-derived chlorophyll estimates from the NIMBUS 7 satellite.

Quality: Data were downloaded and not further processed.

Data processing: NA

Data availability: Data are locally archived as compressed files.

### A.5.3 Dataset: Sea-viewing Wide Field-of-view Sensor (SeaWIFS) chlorophyll

Geographic coverage: Worldwide
Dataset dates: 2000-2008
Data contact: Feldman, Gene Carl
Organization: NASA Goddard Space Flight Center

Dataset summary: (SeaWiFS) Project provides quantitative data on global ocean bio-optical properties to the Earth science community. Subtle changes in ocean color signify various types and quantities of marine phytoplankton (microscopic marine plants), the knowledge of which has both scientific and practical applications. The SeaWiFS Project will develop and operate a research data system that will process, calibrate, validate, archive and distribute data received from an Earth-orbiting ocean color sensor. A detailed description of the objectives, organization and operations, as well as the current status of the SeaWiFS Project is available at: (http://oceancolor.gsfc.nasa.gov/SeaWiFS/BACKGROUND/SEAWIFS_BACKGROUND.html)

Quality: Very good.

Data processing: Downloaded as spatially-rectified image GeoTiff image files using an online program that outputs data for specified date and location. A Visual Basic .NET utility was written to automate generation of the http request to NASA to download this data.

Data availability: Data are locally archived as GeoTiff image files.

### A.5.4 Dataset: Coastal model bathymetry

Geographic coverage: U.S. coastal shelf waters
Dataset dates: NA

Data contact:  Metzger, Dan R.
Organization:  NOAA

Dataset summary:  Modeled bathymetry (ocean depth) for U.S. shelf waters gridded at 3 arc-seconds (~90 meters) with depth resolution of 10 cm.

Quality:  Very good.

Data processing:  None.

Data availability:  Data are locally archived as a raster dataset.

### A.5.5 Dataset:  Coastal Marine Geology (CONMAP)

Geographic coverage:  U.S. Atlantic continental shelf waters
Dataset dates:  1982-1991
Data contact:  Poppe, Larry
Organization:  USGS, Woods Hole Science Center

Dataset summary:  Map of the marine geology of the continental margin.

Quality:  Very good.

Data processing:  None.

Data availability:  Data are locally archived as ESRI shapefiles.

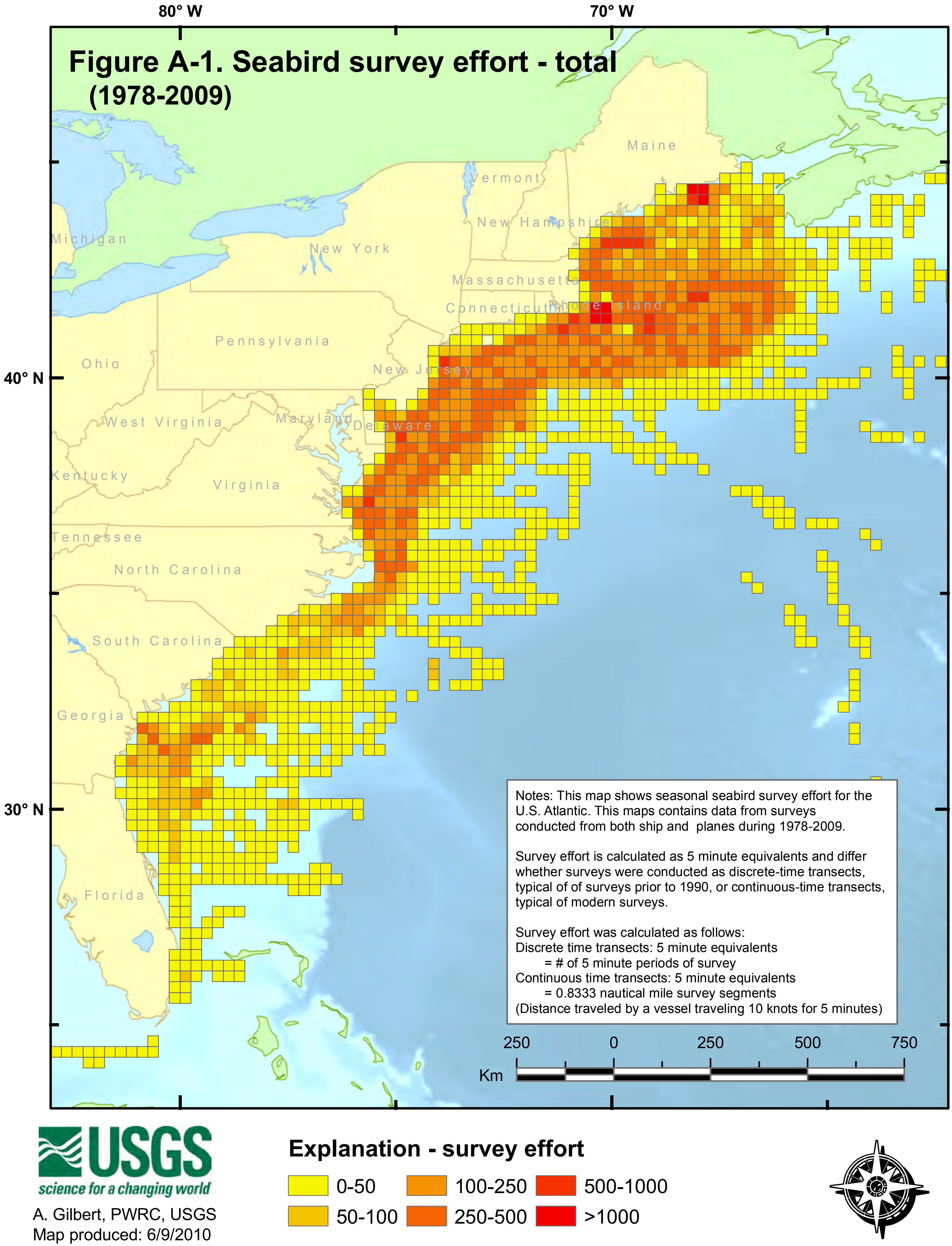
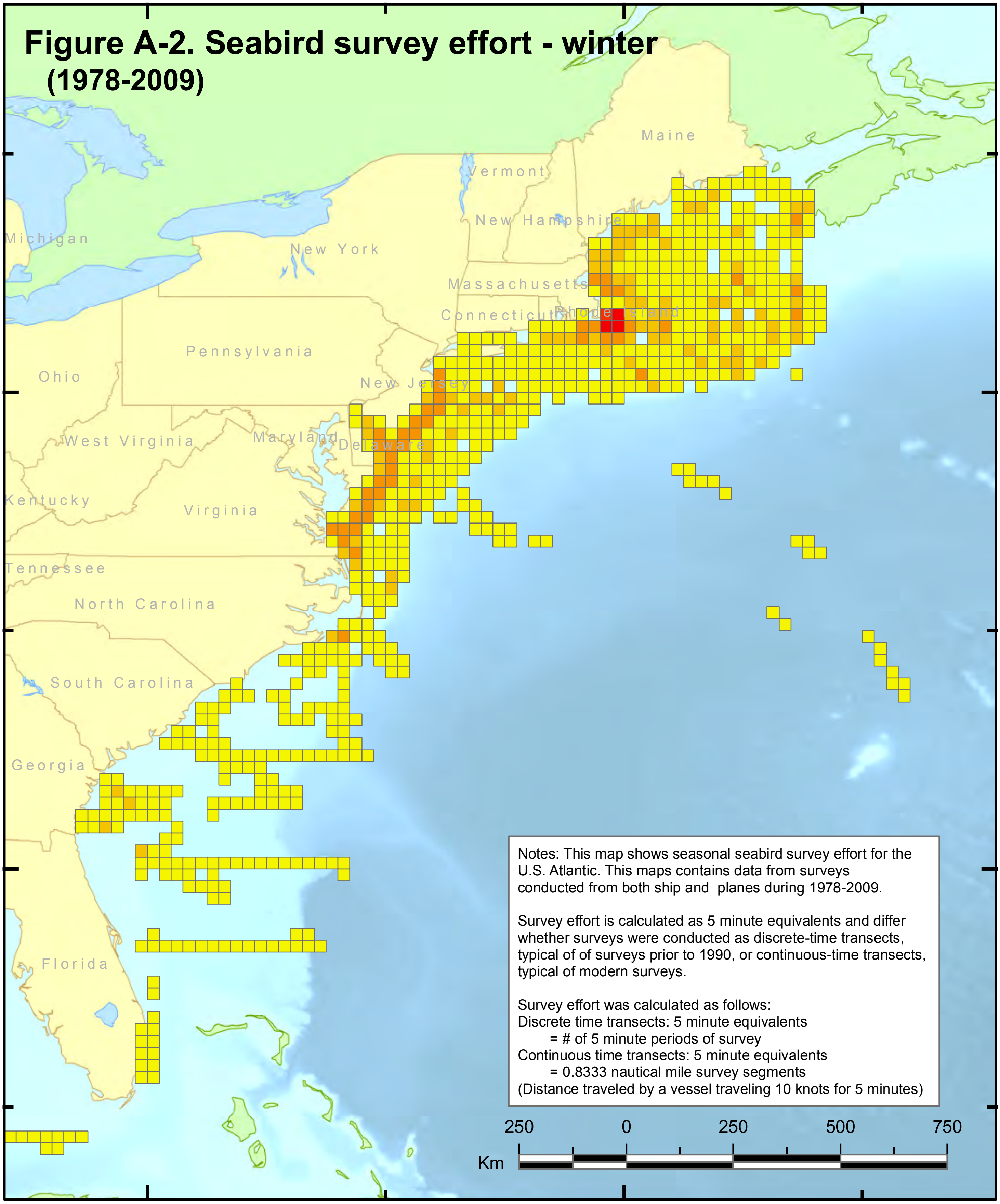


Figure A-1. Seabird survey effort - total
(1978-2009)
80° W
70° W
40° N
30° N
Maine
Vermont
New Hampshire
Michigan
New York
Massachusetts
Connecticut
Rhode Island
Pennsylvania
Ohio
New Jersey
West Virginia
Maryland
Delaware
Kentucky
Virginia
Tennessee
North Carolina
South Carolina
Georgia
Florida
Notes: This map shows seasonal seabird survey effort for the U.S. Atlantic. This maps contains data from surveys conducted from both ship and planes during 1978-2009.
Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.
Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)
250
0
250
500
750
Km
USGS
science for a changing world
A. Gilbert, PWRC, USGS
Map produced: 6/9/2010
Explanation - survey effort
0-50
100-250
500-1000
50-100
250-500
>1000




# Figure A-2. Seabird survey effort - winter (1978-2009)

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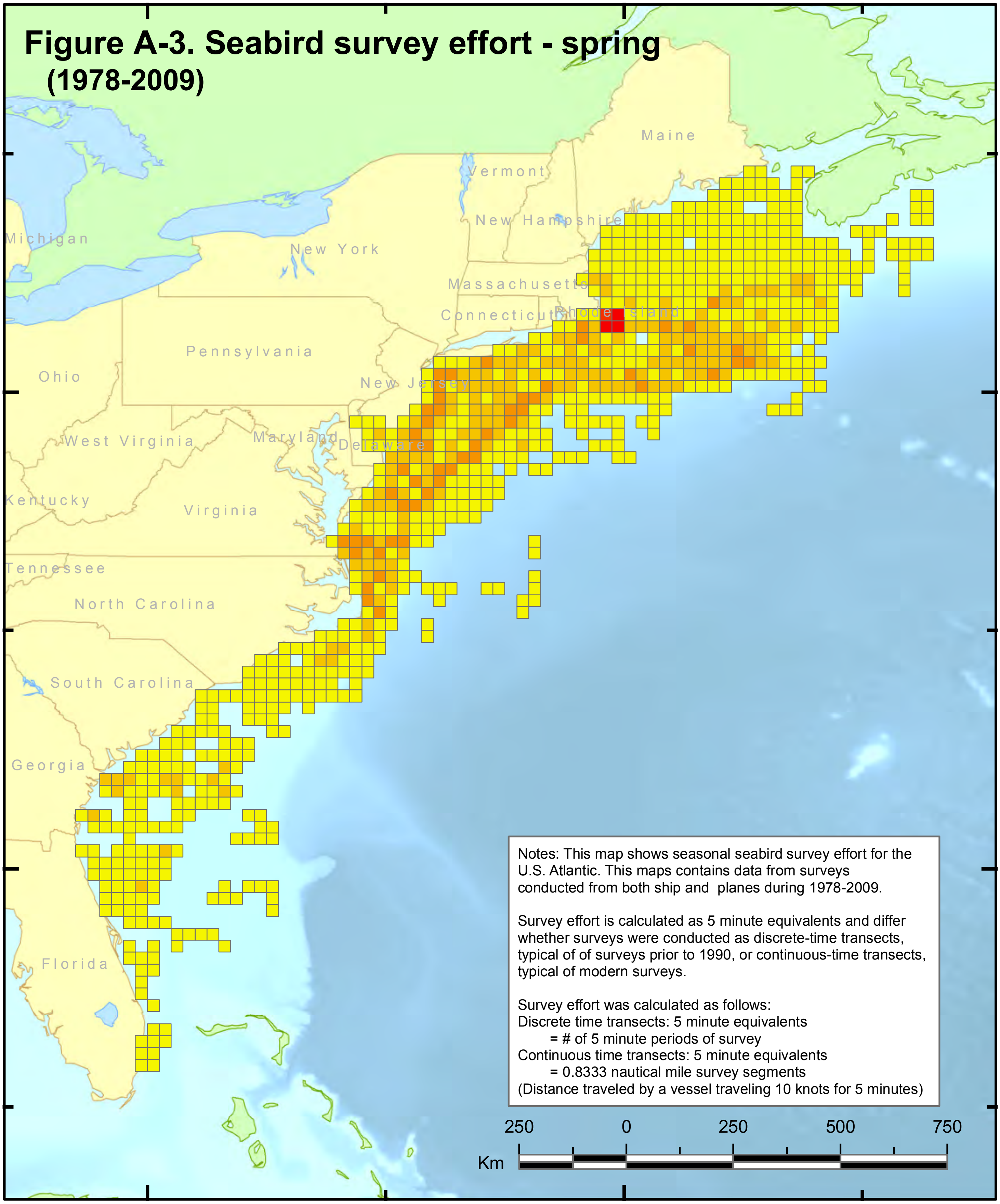
A. Gilbert, PWRC, USGS
Map produced: 6/9/2010

**Explanation - survey effort**

0-50 | 100-250 | 500-1000
50-100 | 250-500 | >1000

# Figure A-3. Seabird survey effort - spring (1978-2009)




USGS
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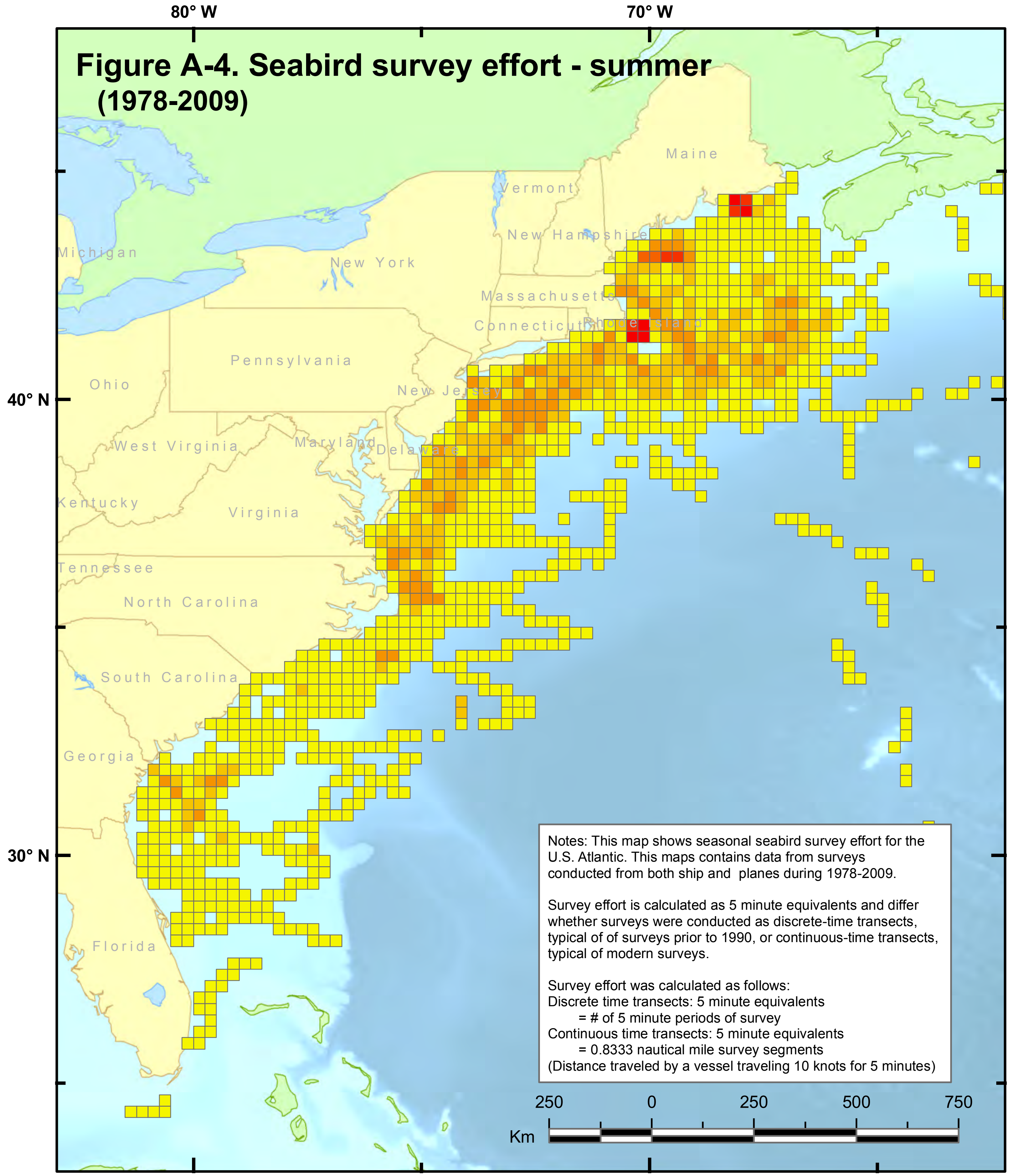
Map produced: 6/9/2010

## Explanation - survey effort

0-50
100-250
500-1000
50-100
250-500
>1000Figure 2.




# Figure A-4. Seabird survey effort - summer (1978-2009)

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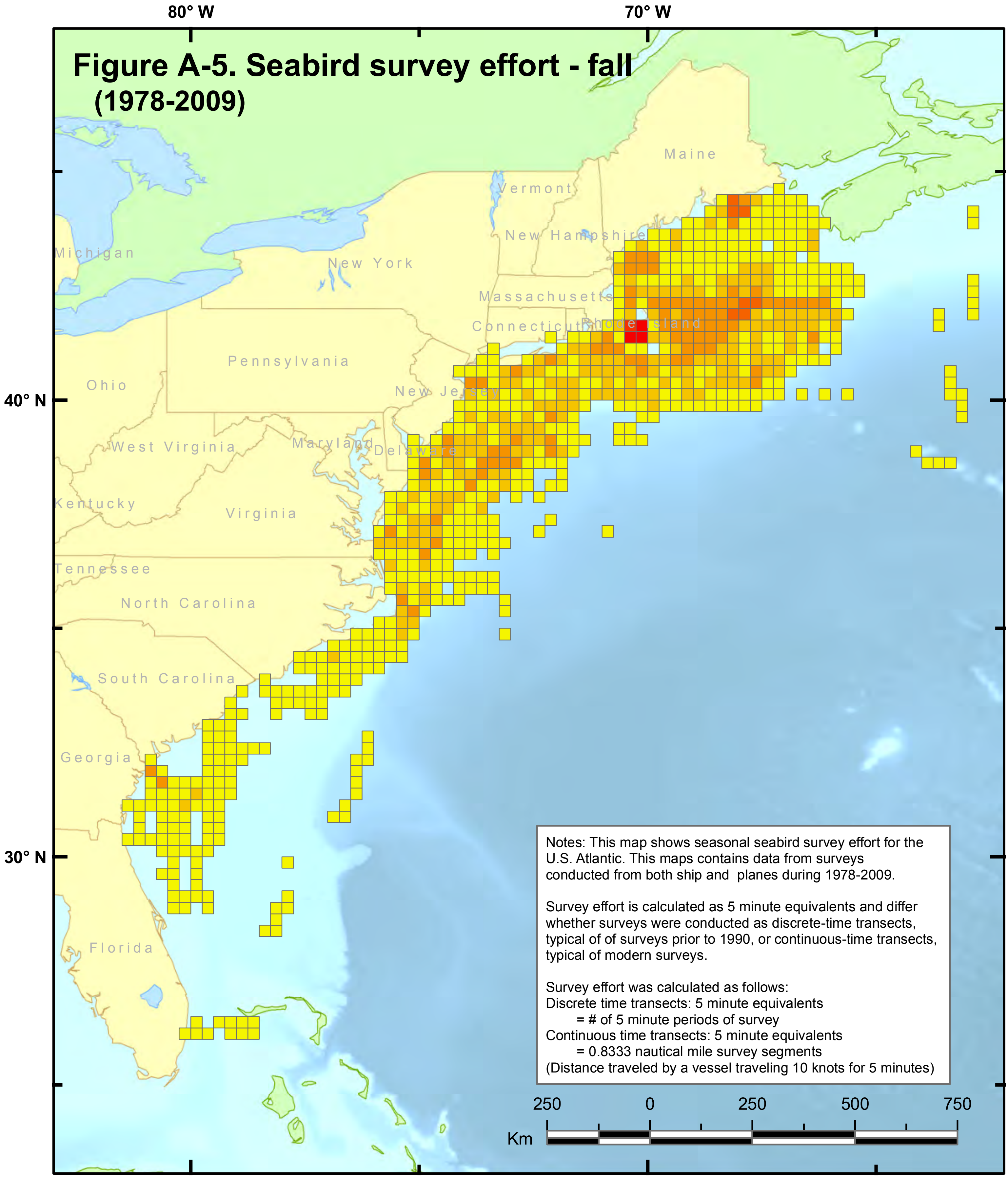
Map produced: 6/9/2010

**Explanation - survey effort**

0-50
50-100
100-250
250-500
500-1000
>1000

# Figure A-5. Seabird survey effort - fall (1978-2009)

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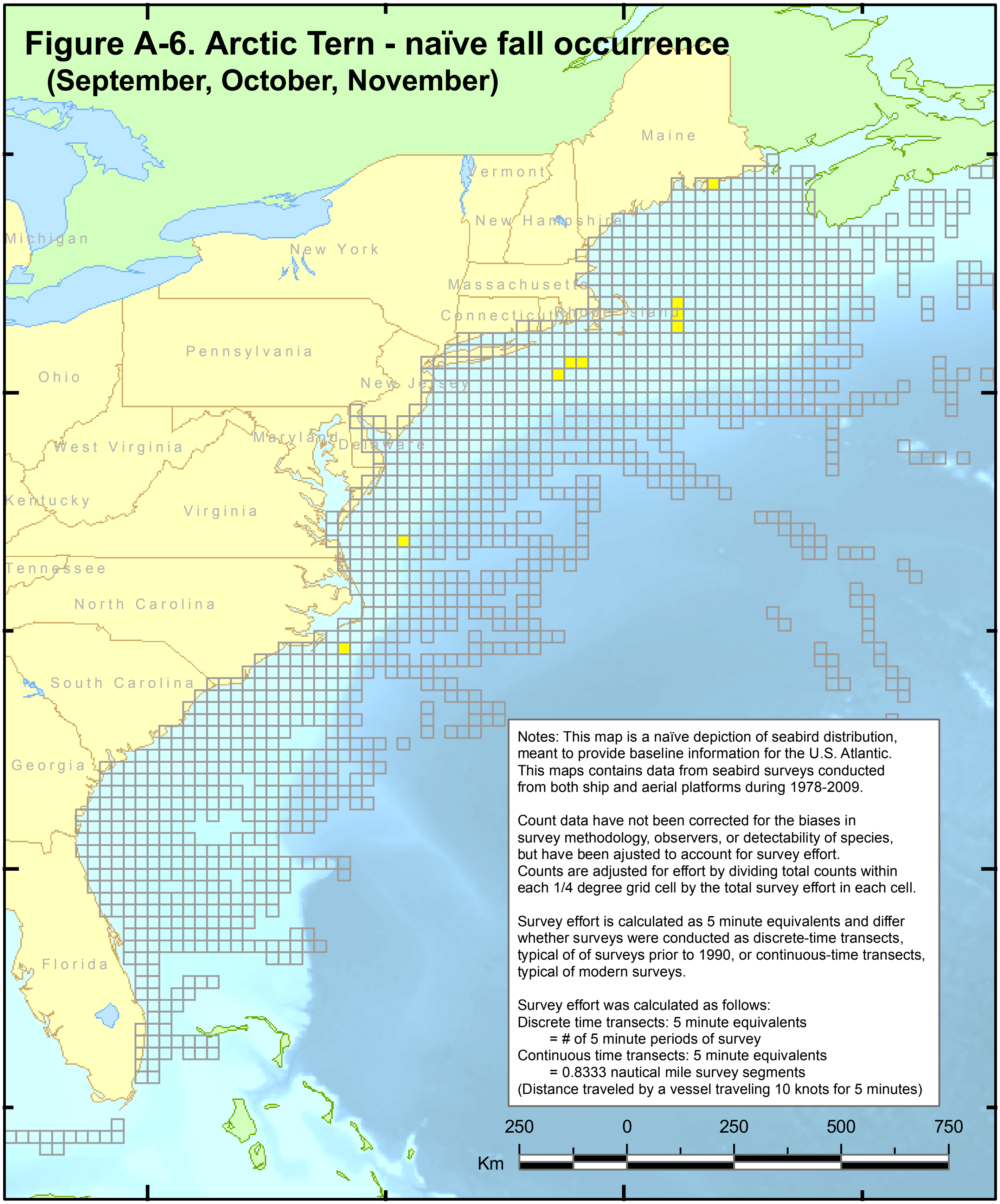
Map produced: 6/9/2010

**Explanation - survey effort**

0-50, 50-100, 100-250, 250-500, 500-1000, >1000




# Figure A-6. Arctic Tern - naïve fall occurrence (September, October, November)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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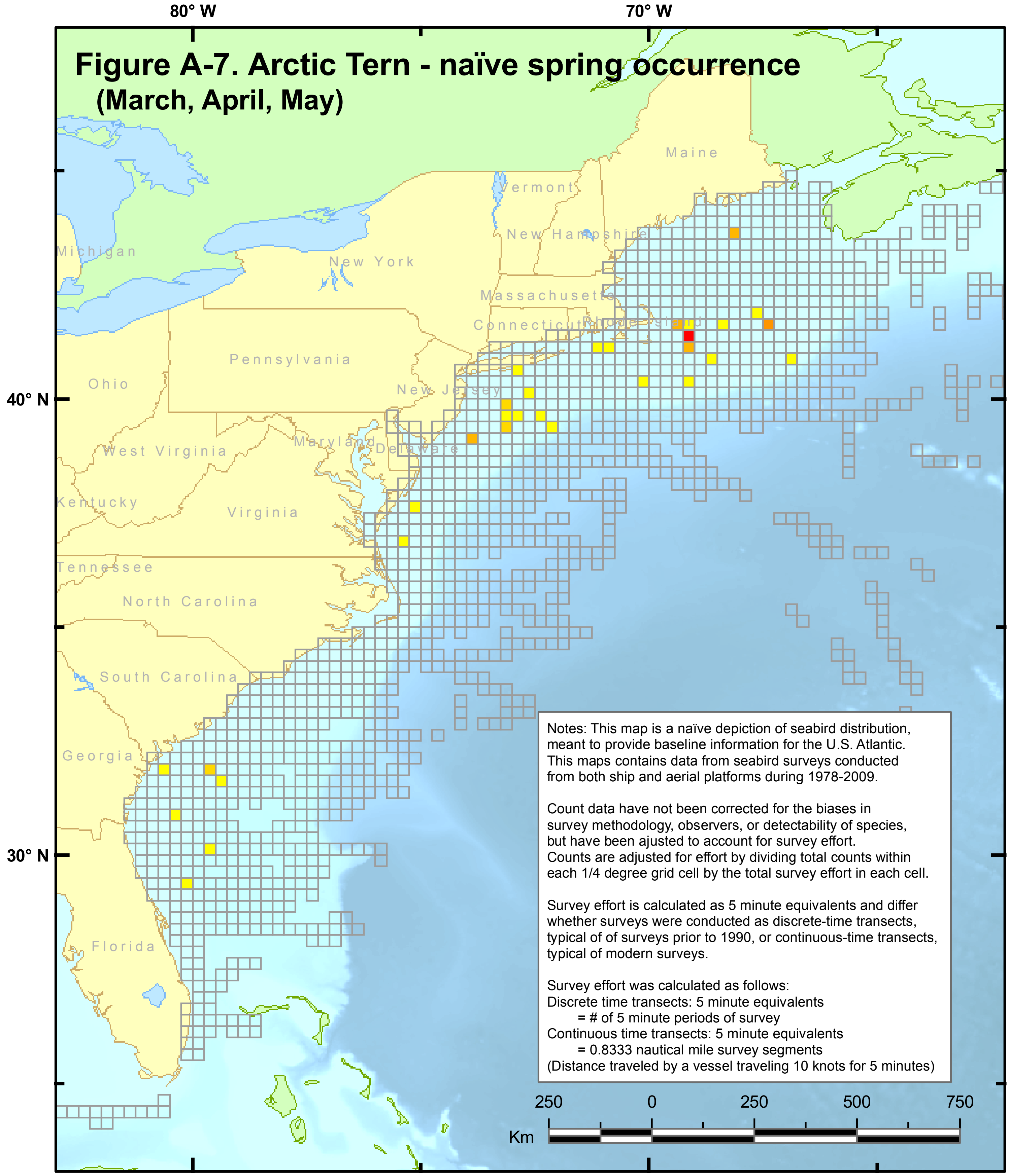
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-7. Arctic Tern - naïve spring occurrence (March, April, May)

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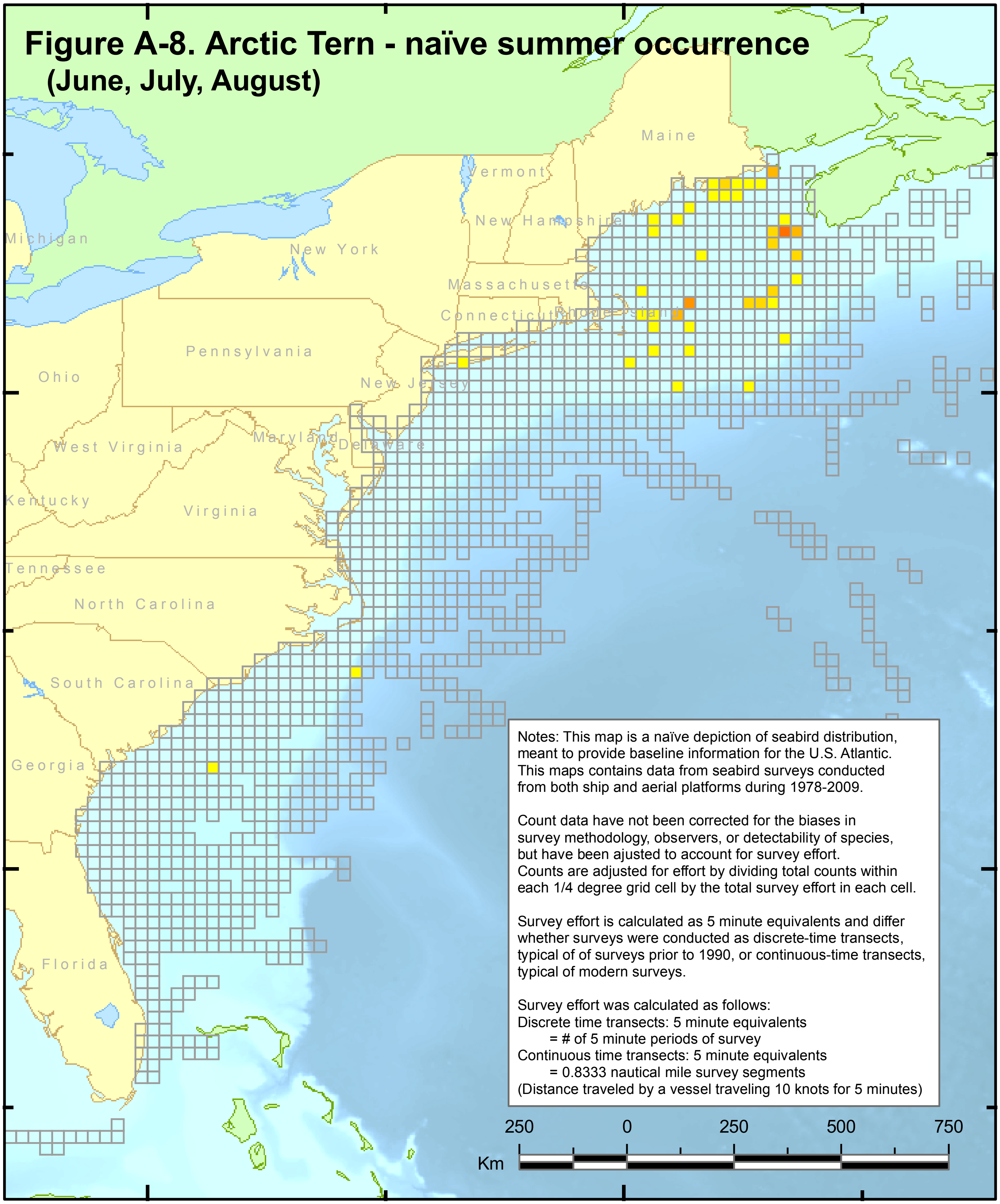
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 9.7

# Figure A-8. Arctic Tern - naïve summer occurrence
## (June, July, August)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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Map produced: 5/28/2010

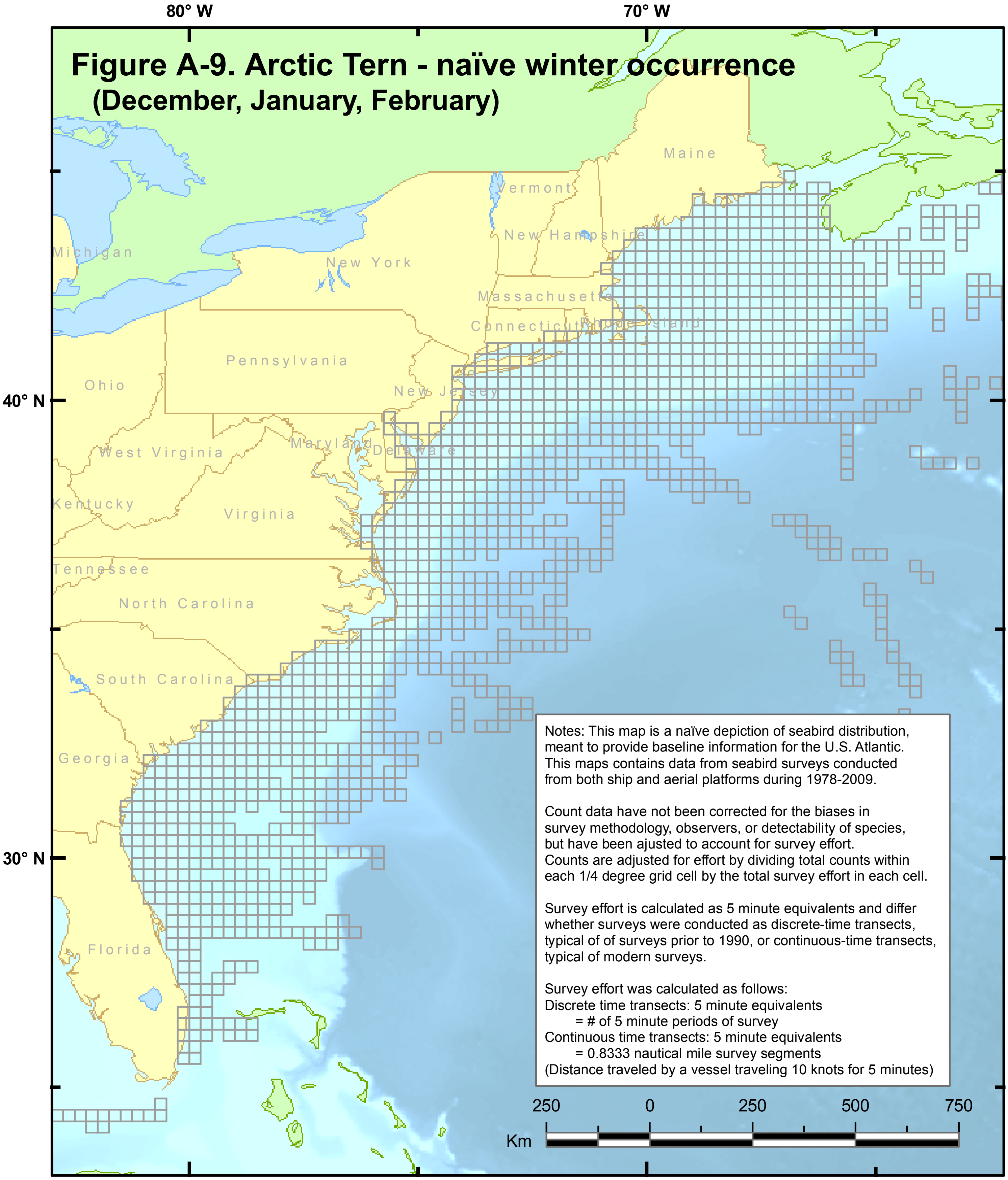


**Figure A-9. Arctic Tern - naïve winter occurrence (December, January, February)**

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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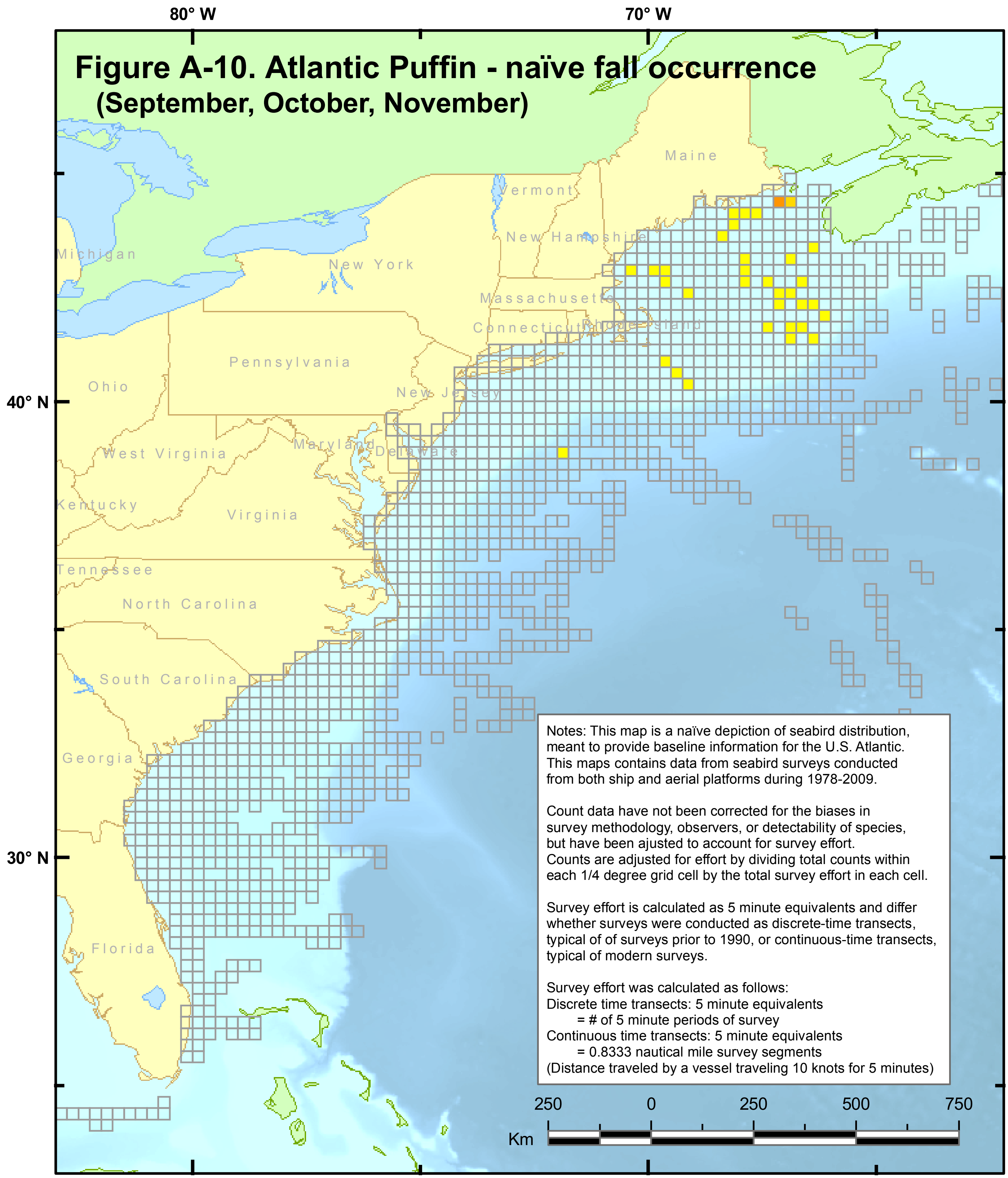


**Figure A-10. Atlantic Puffin - naïve fall occurrence (September, October, November)**

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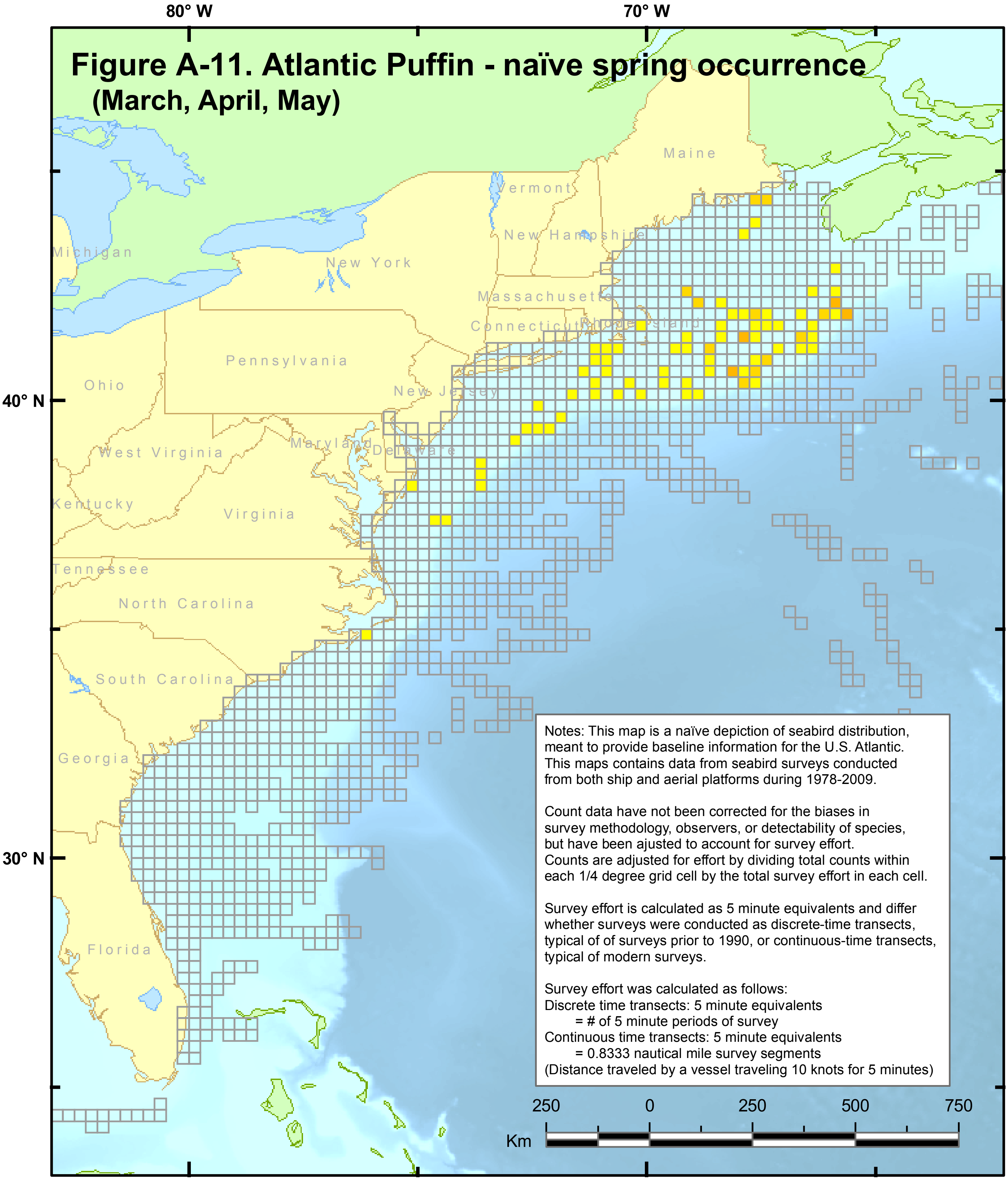
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-11. Atlantic Puffin - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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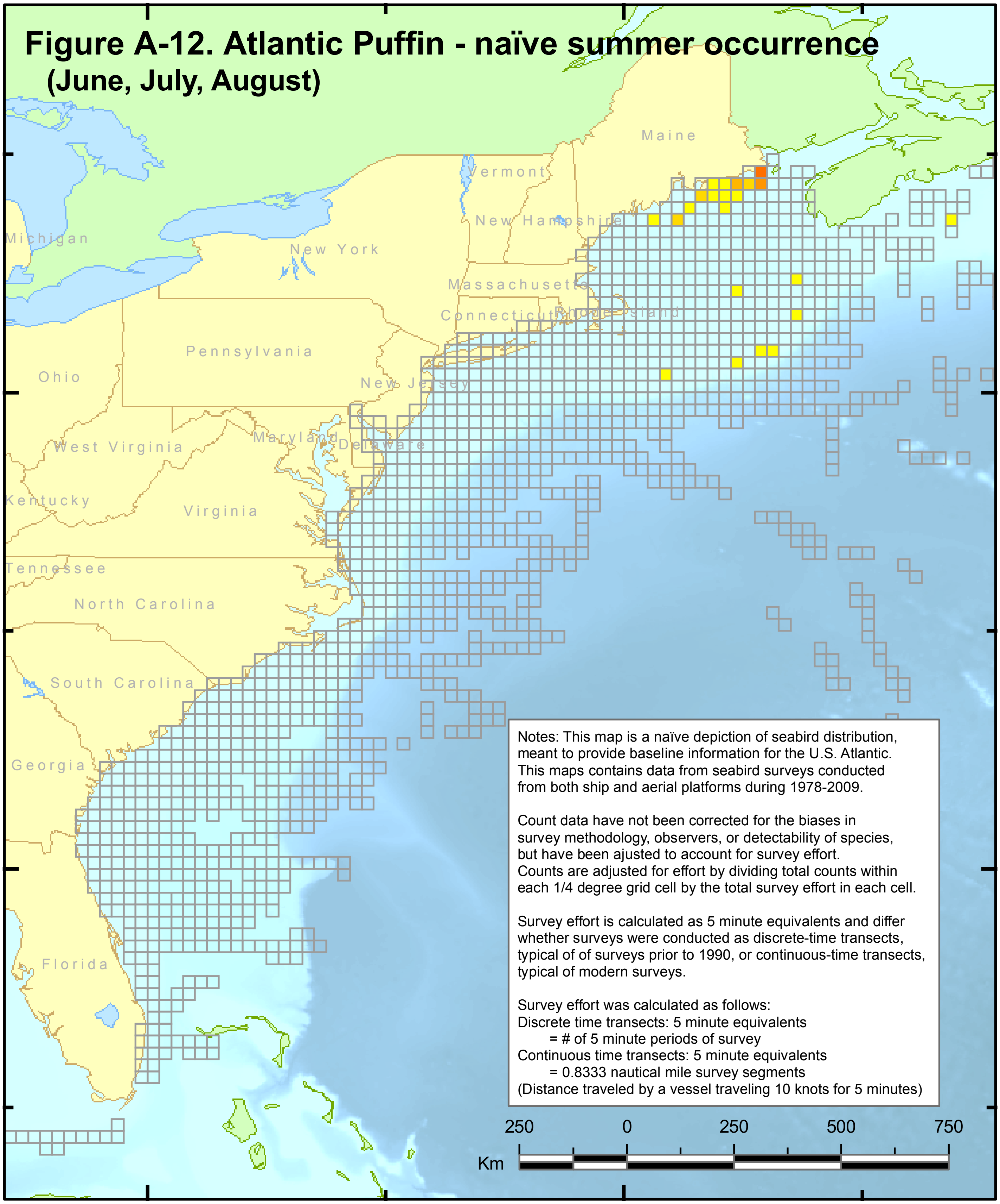
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-12. Atlantic Puffin - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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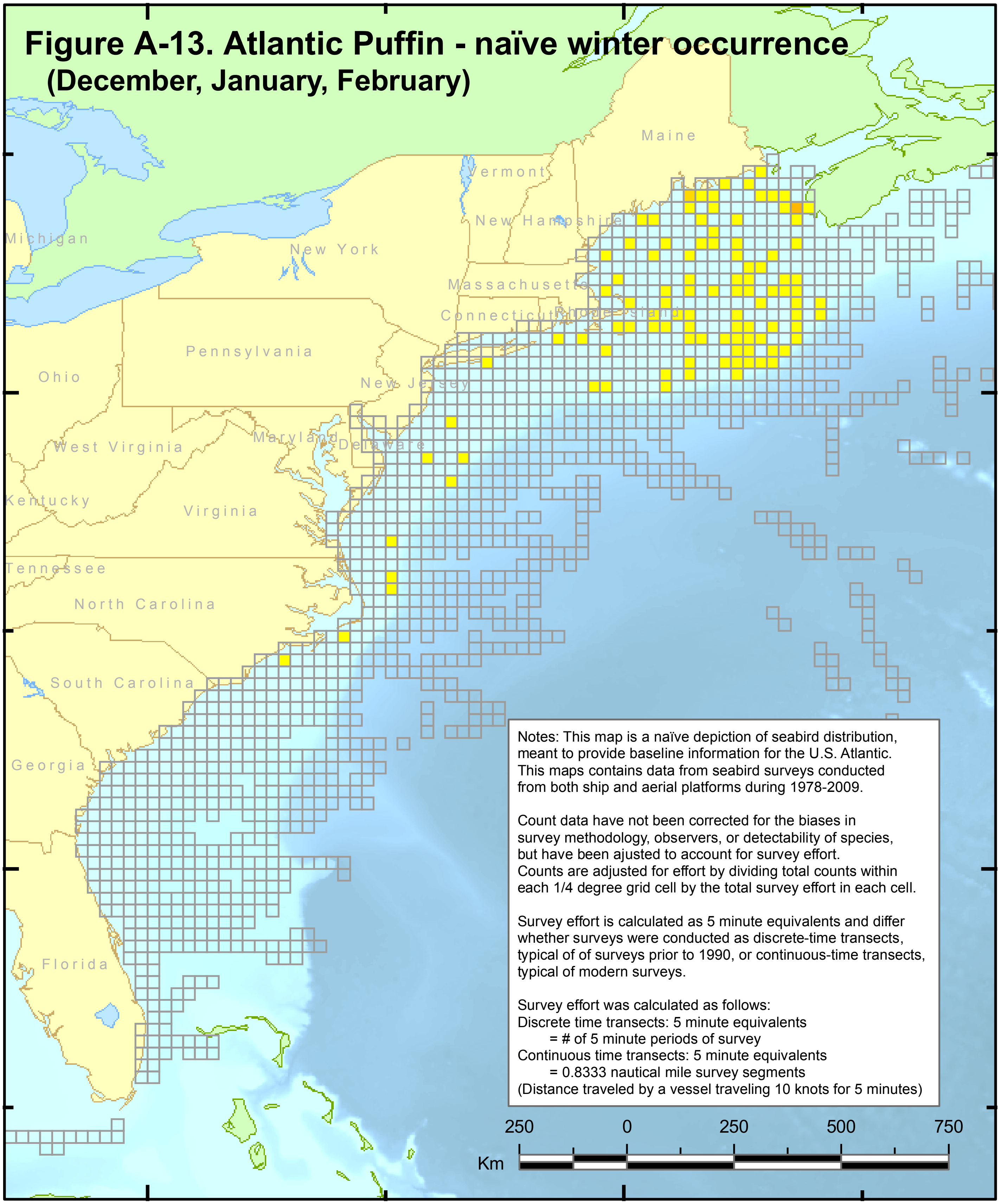
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-13. Atlantic Puffin - naïve winter occurrence (December, January, February)

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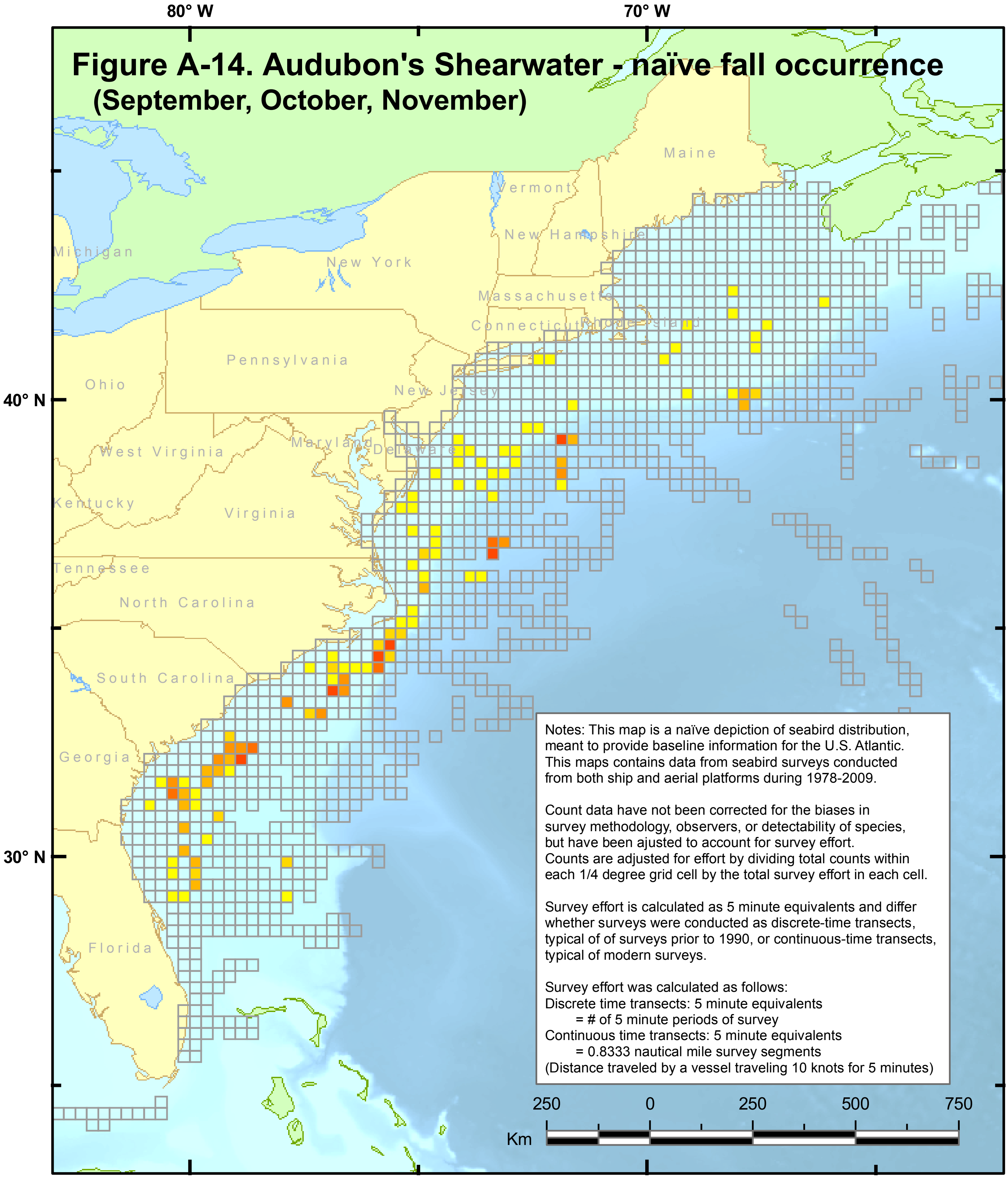
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-14. Audubon's Shearwater - naïve fall occurrence
## (September, October, November)

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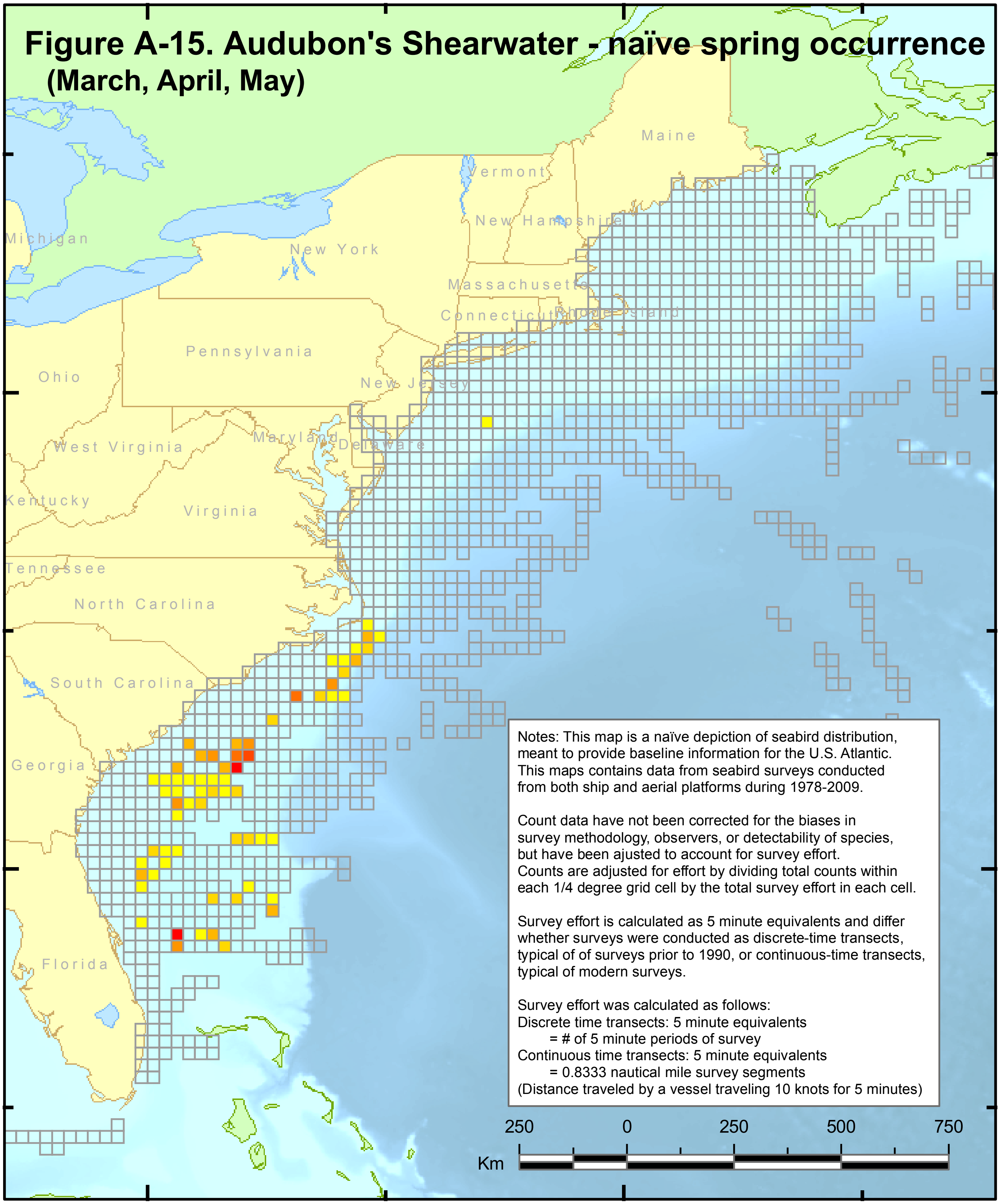
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-15. Audubon's Shearwater - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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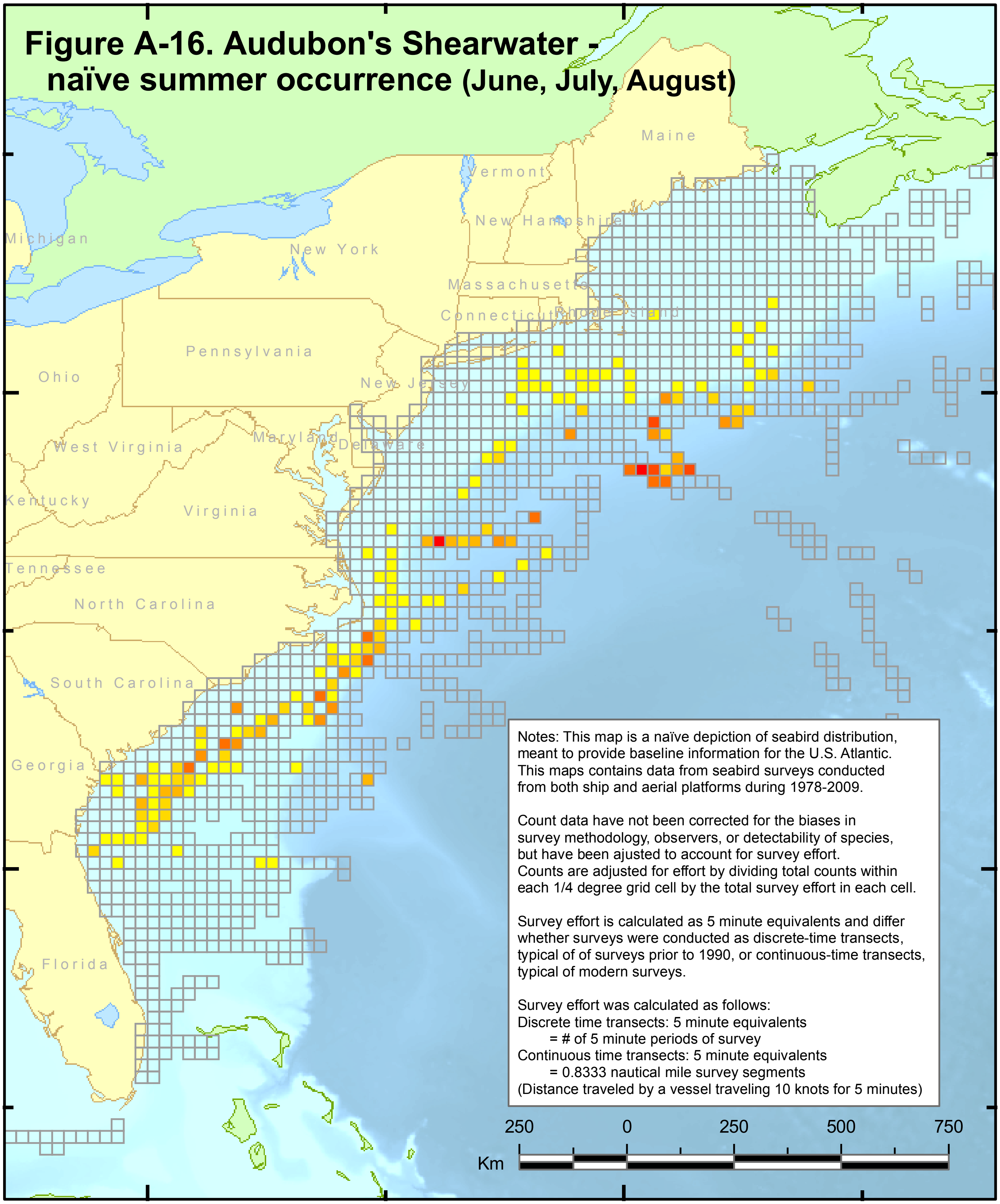
## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 7

# Figure A-16. Audubon's Shearwater - naïve summer occurrence (June, July, August)

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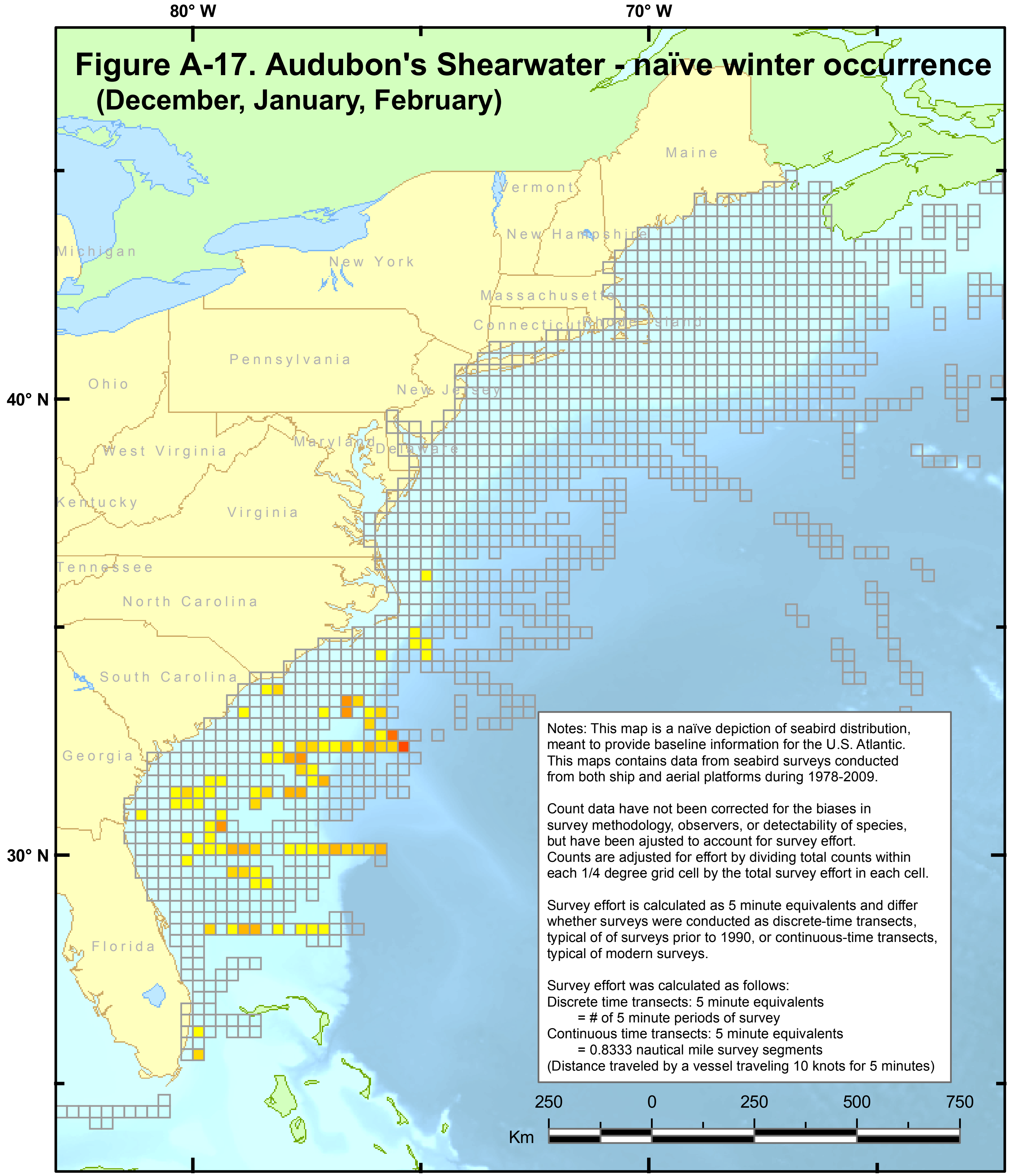
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 8.1 |

# Figure A-17. Audubon's Shearwater - naïve winter occurrence (December, January, February)

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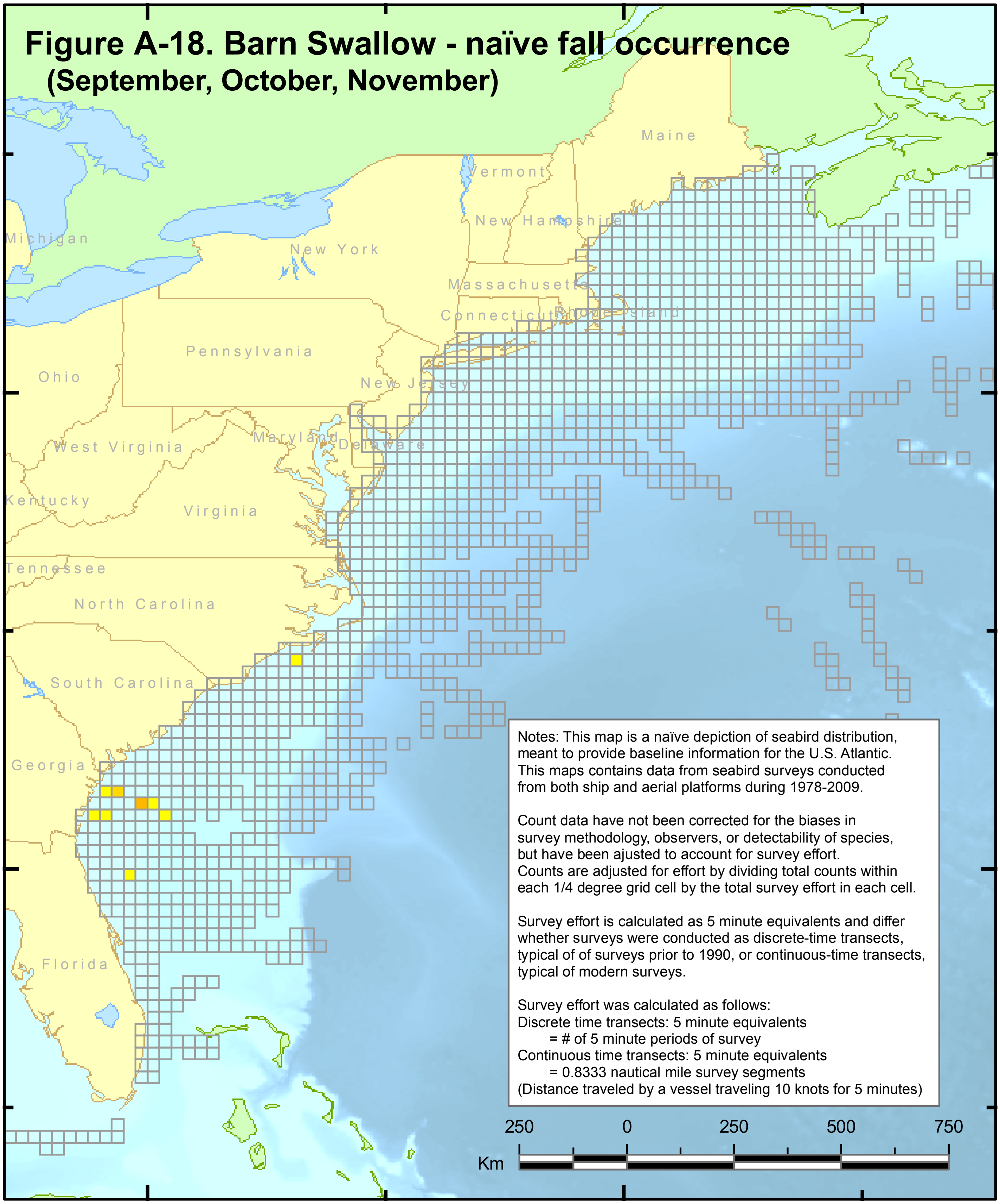
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-18. Barn Swallow - naïve fall occurrence
(September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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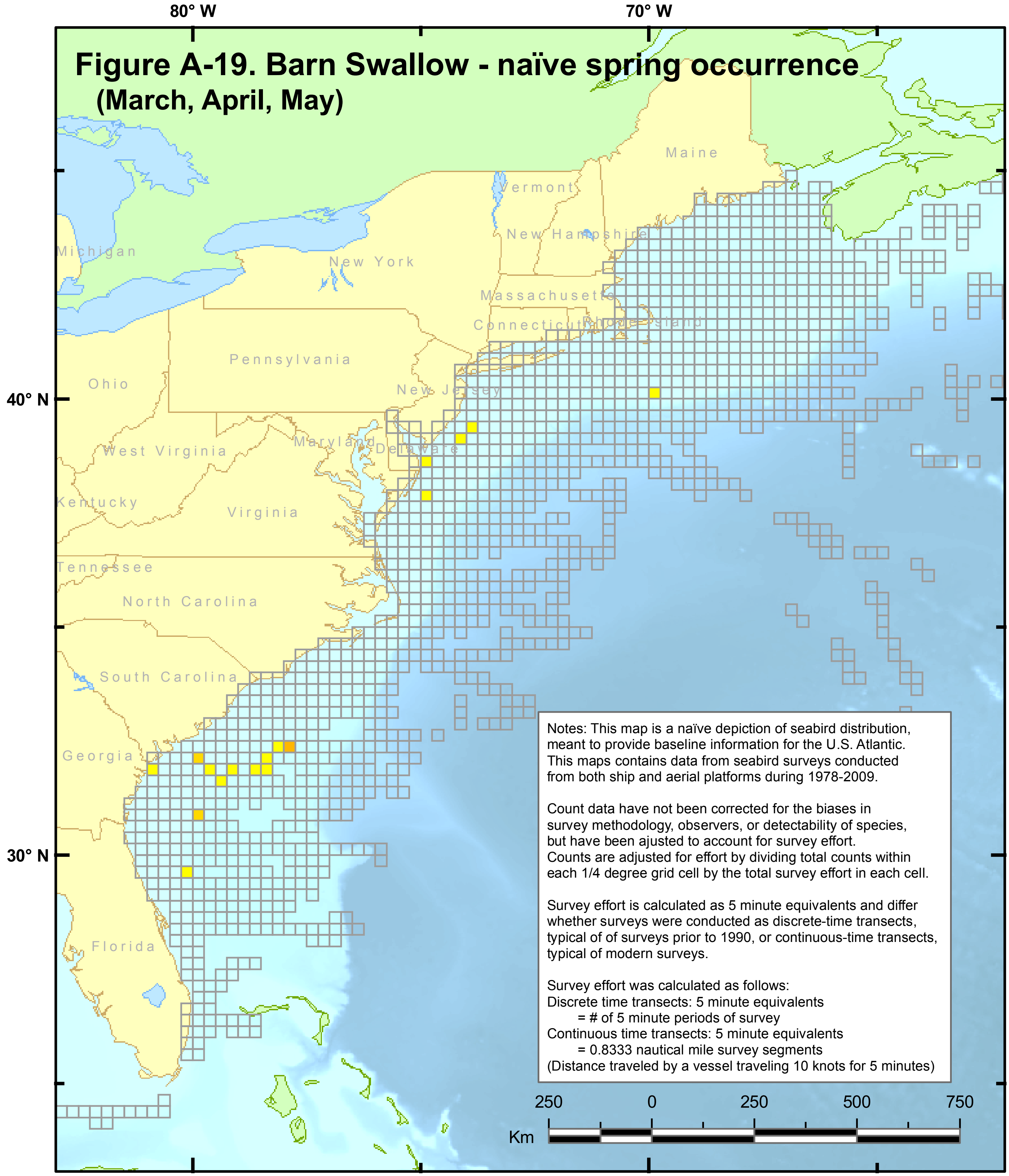
Map produced: 5/28/2010

# Figure A-19. Barn Swallow - naïve spring occurrence (March, April, May)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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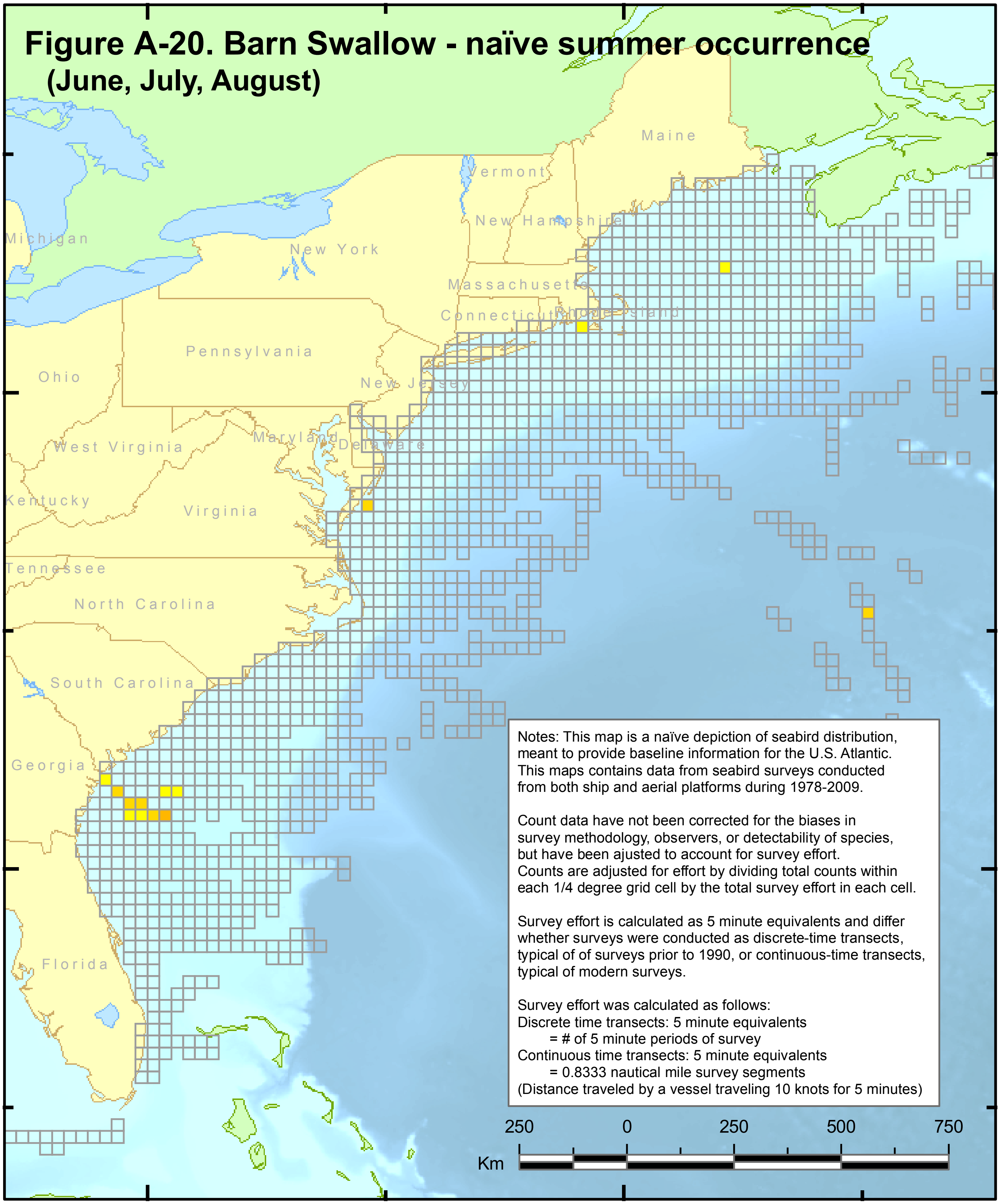
# Figure A-20. Barn Swallow - naïve summer occurrence (June, July, August)

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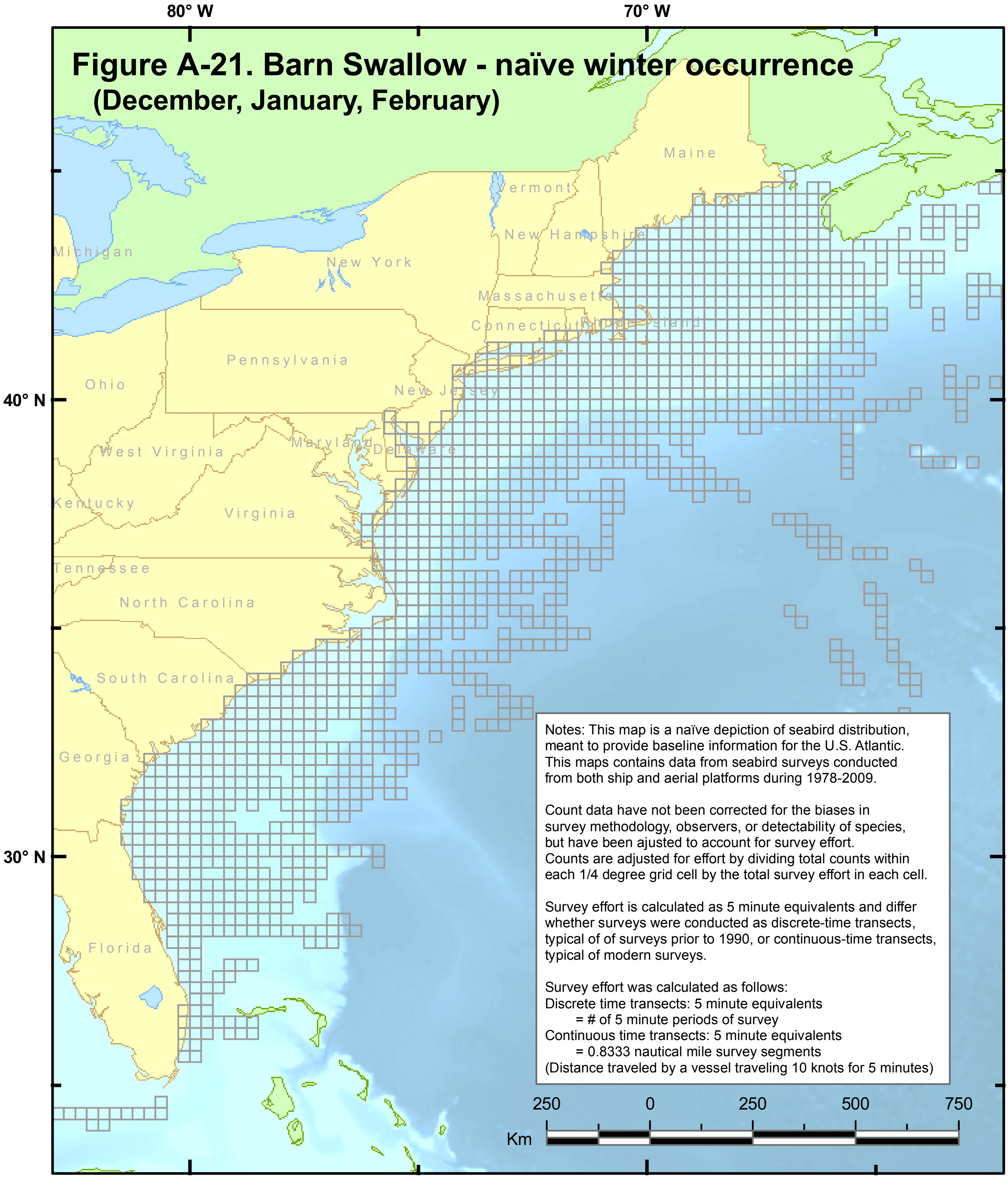
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-21. Barn Swallow - naïve winter occurrence
## (December, January, February)

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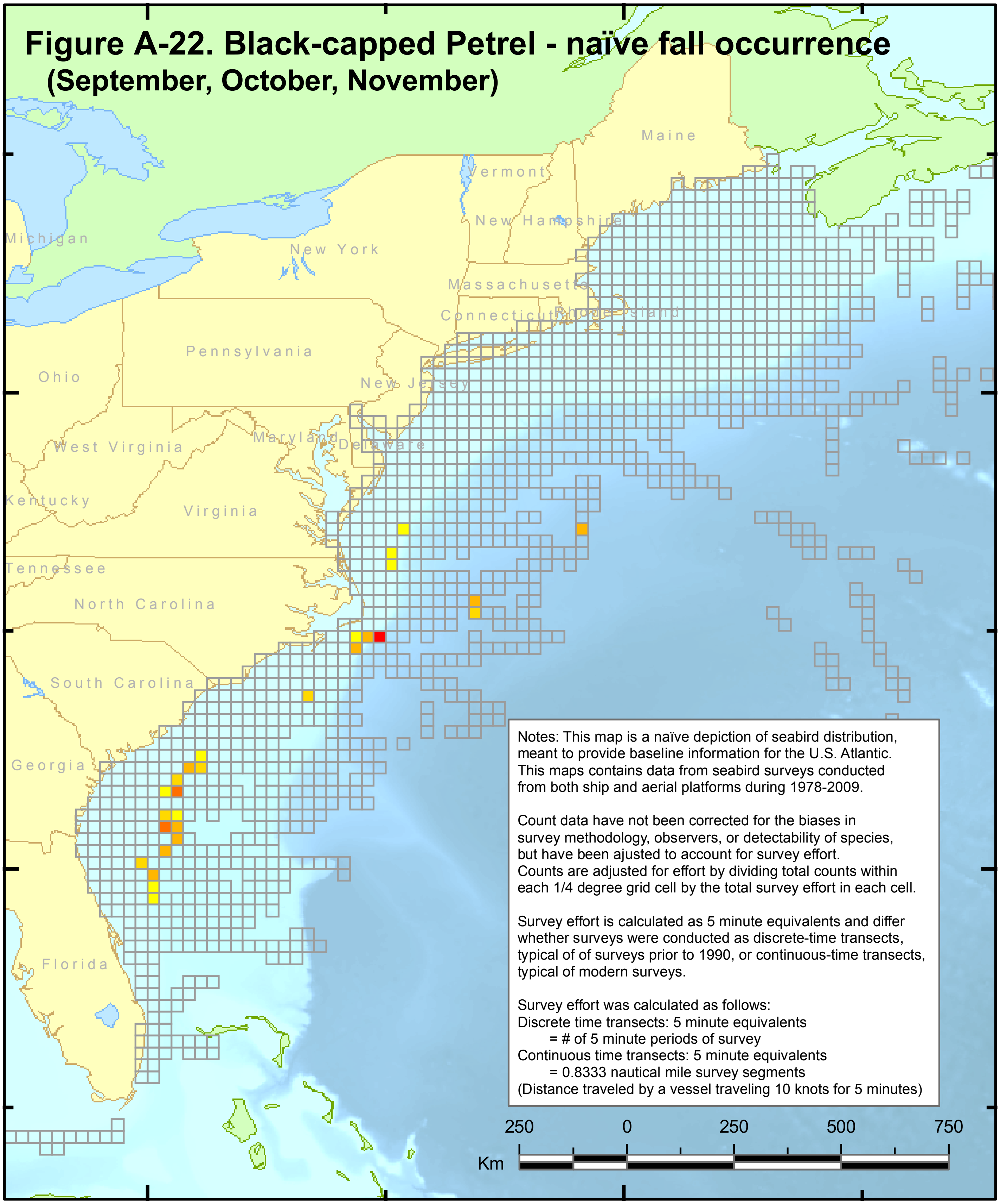
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-22. Black-capped Petrel - naïve fall occurrence (September, October, November)

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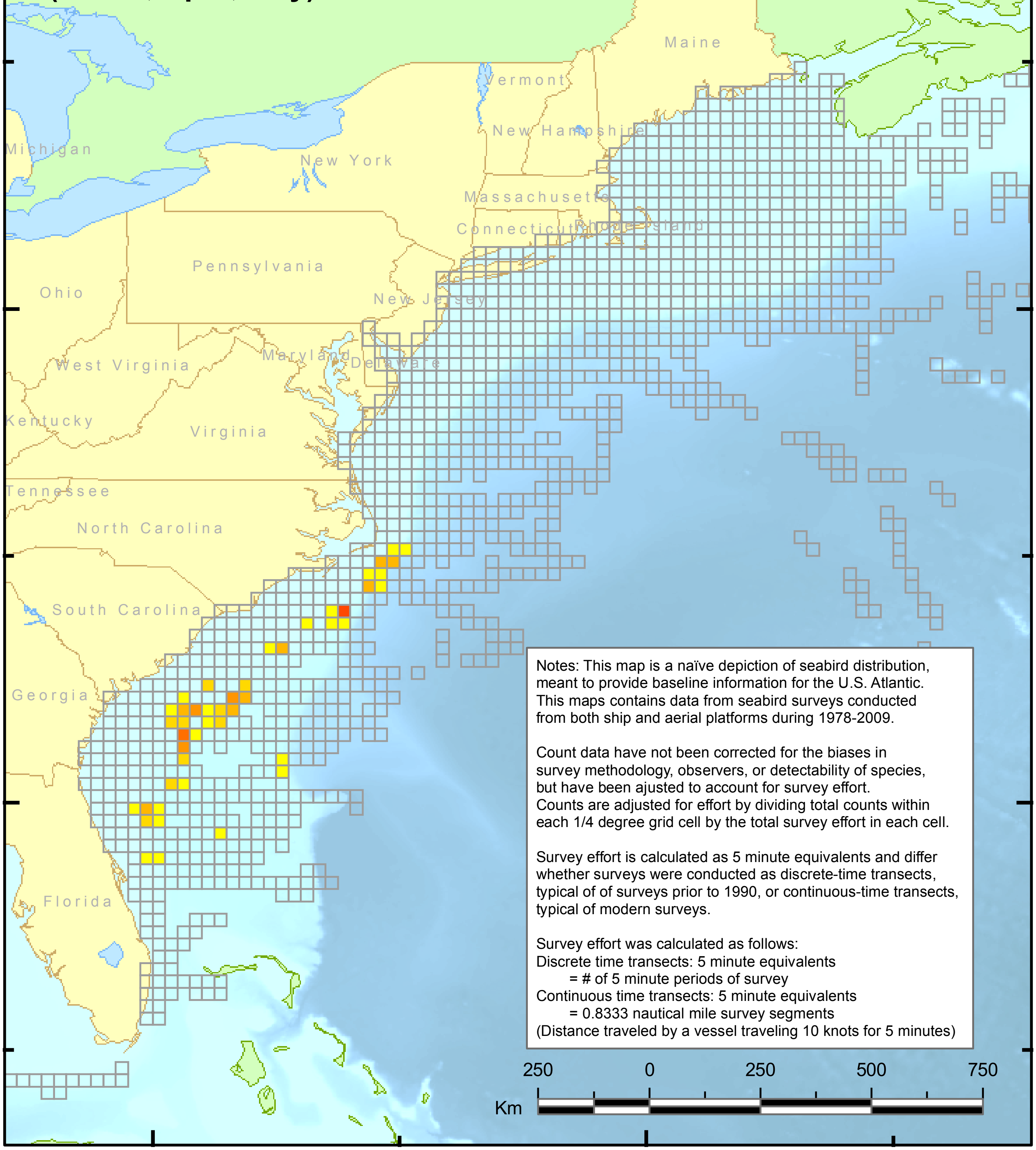
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 6.4 |

# Figure A-23. Black-capped Petrel - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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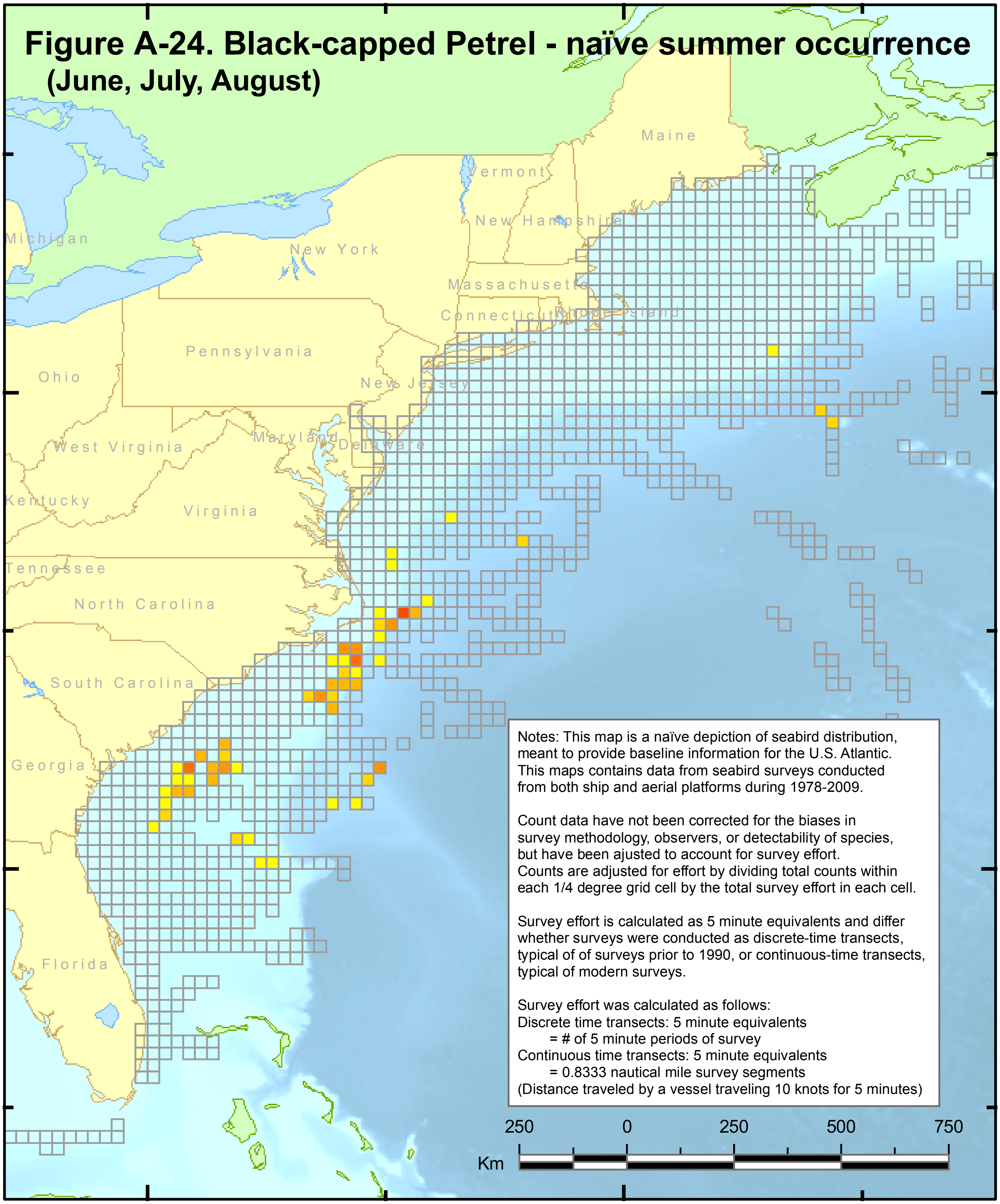
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-24. Black-capped Petrel - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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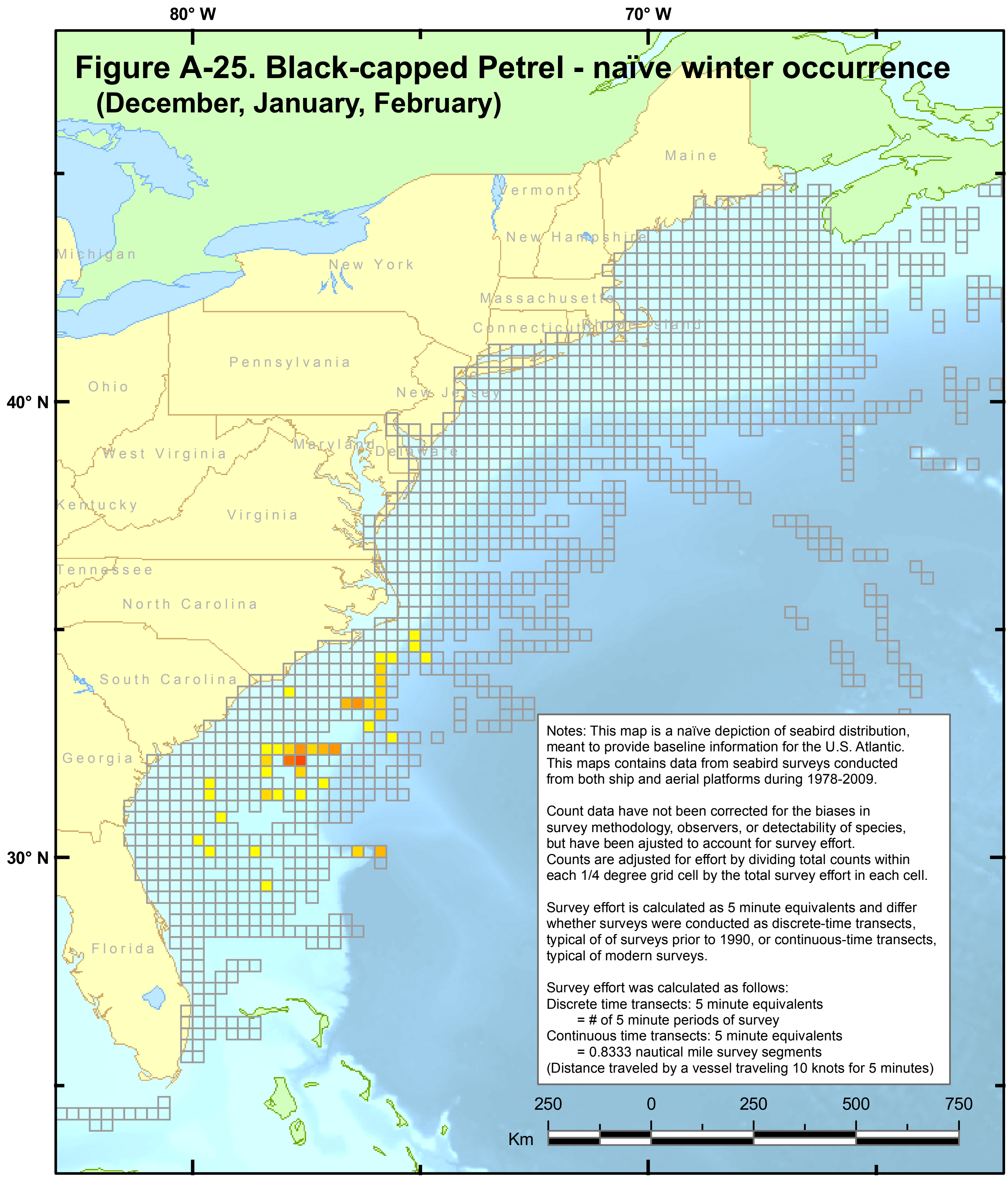
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-25. Black-capped Petrel - naïve winter occurrence
(December, January, February)

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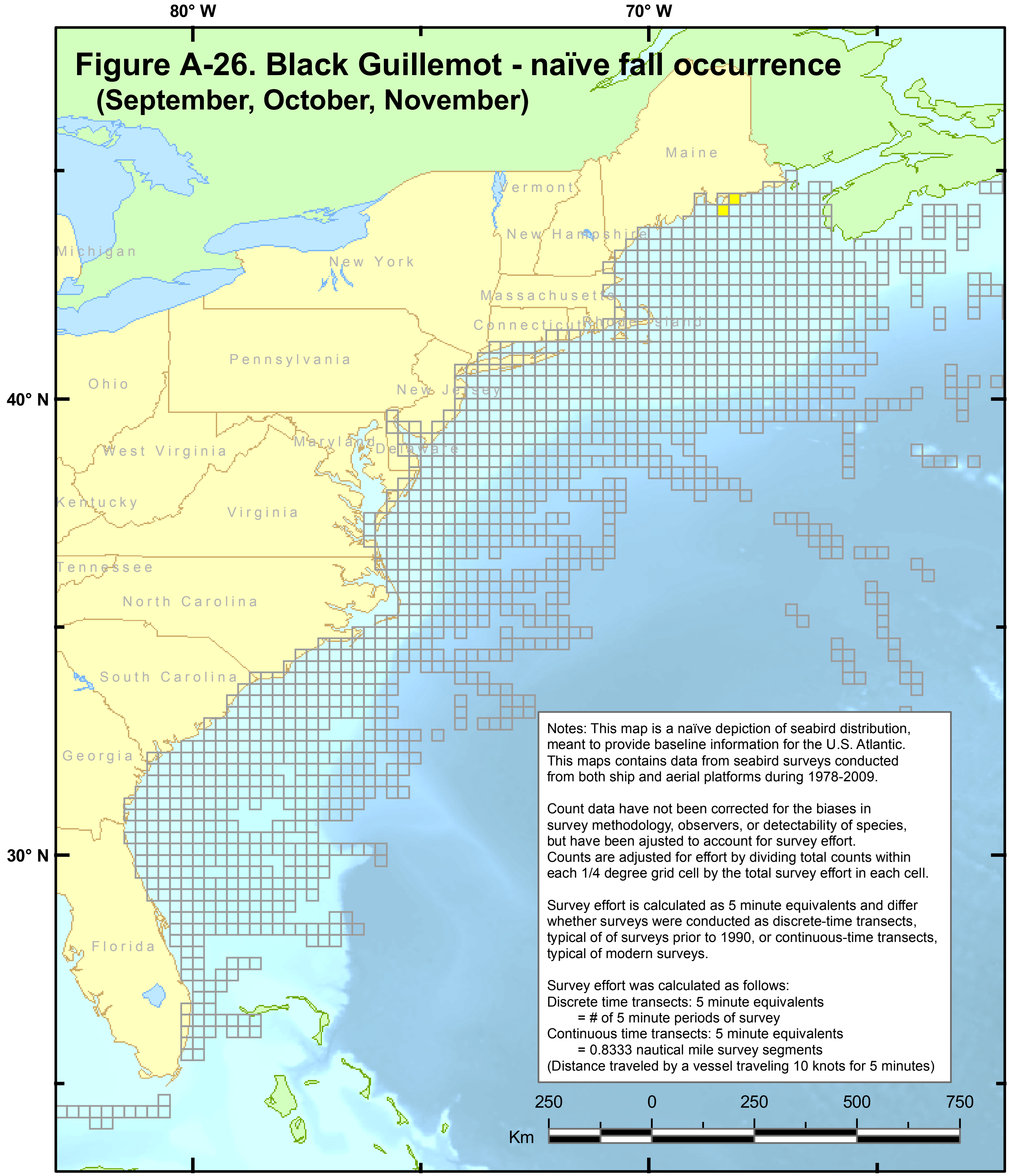
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

# Figure A-26. Black Guillemot - naïve fall occurrence (September, October, November)

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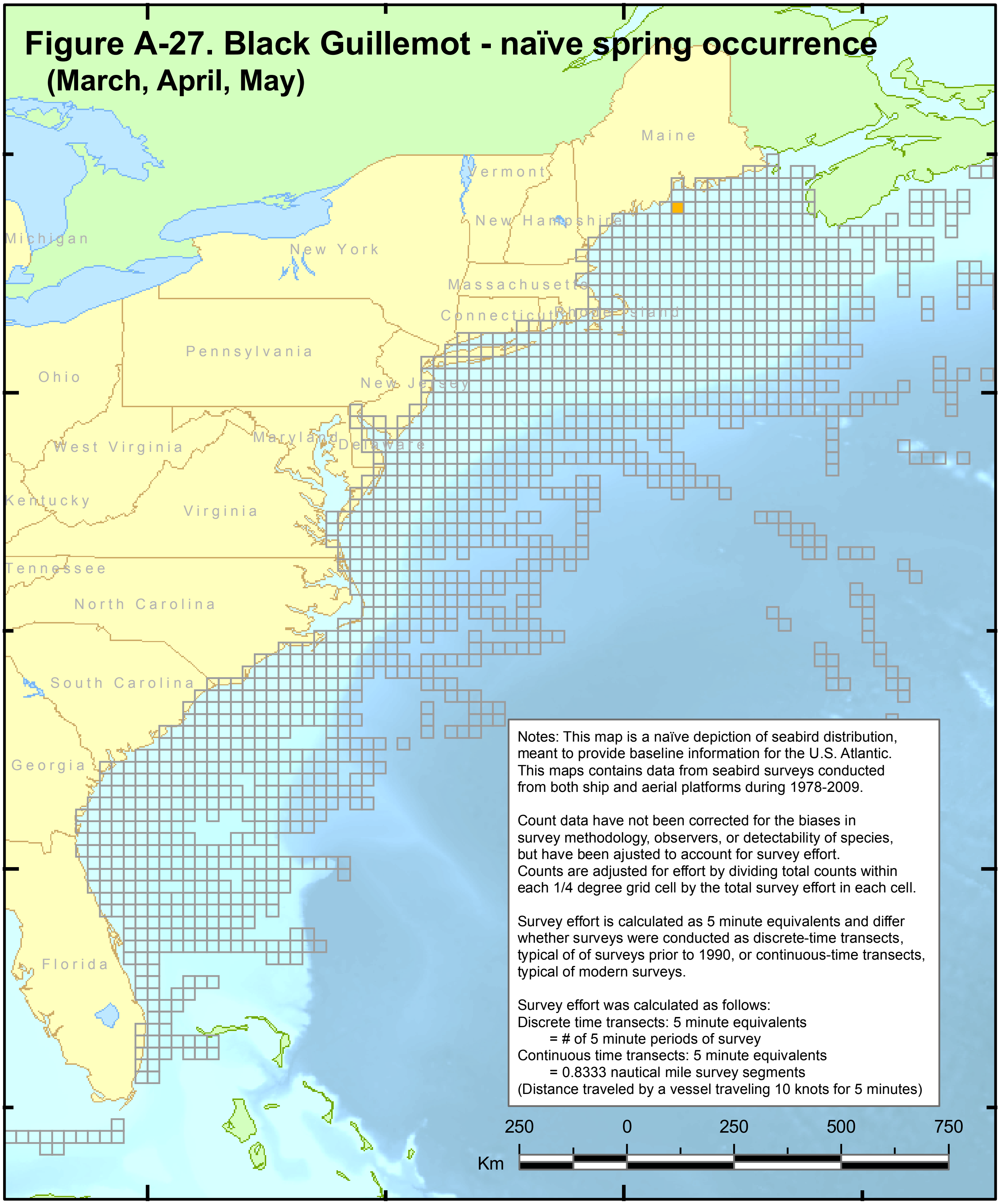
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-27. Black Guillemot - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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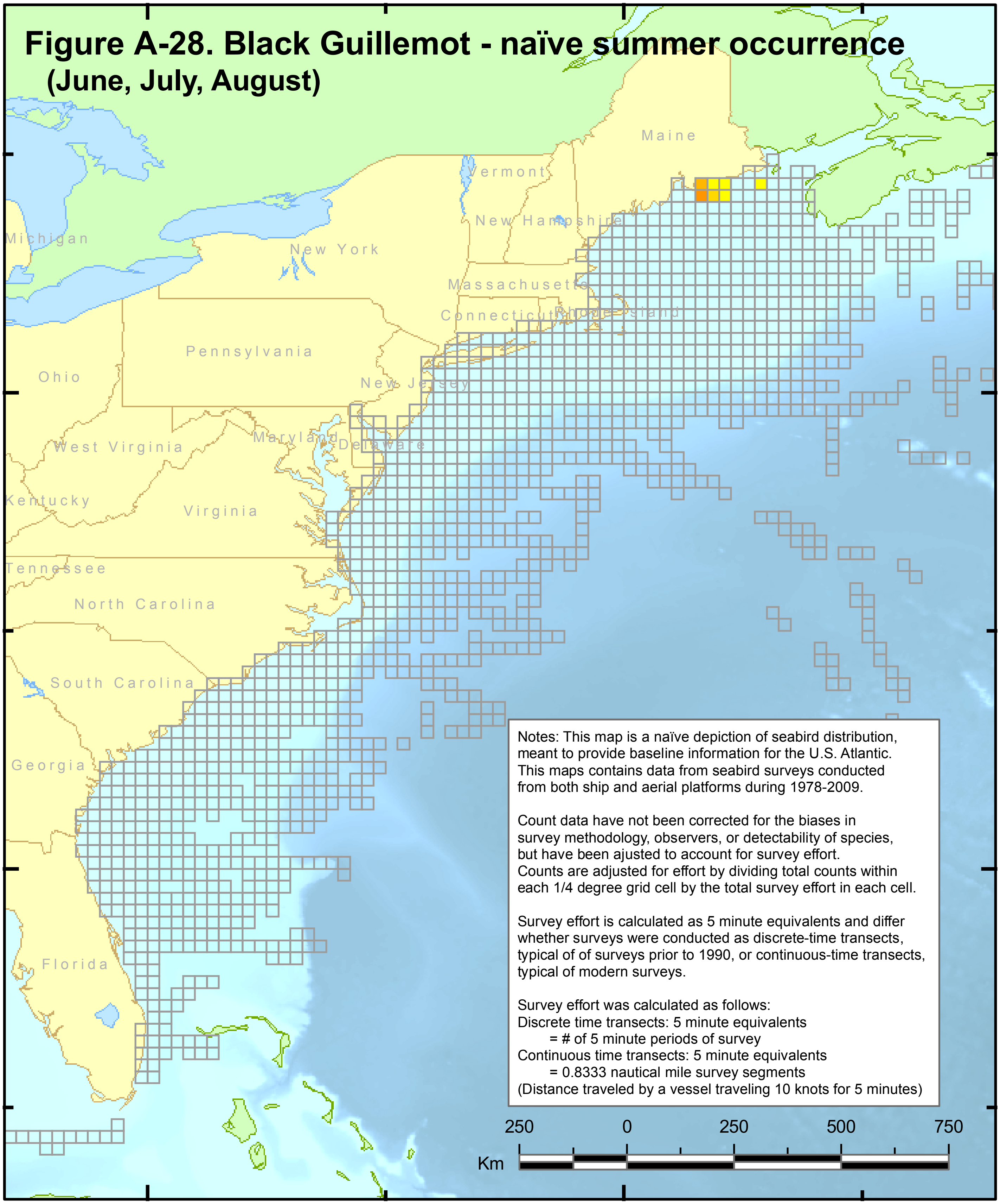
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-28. Black Guillemot - naïve summer occurrence (June, July, August)

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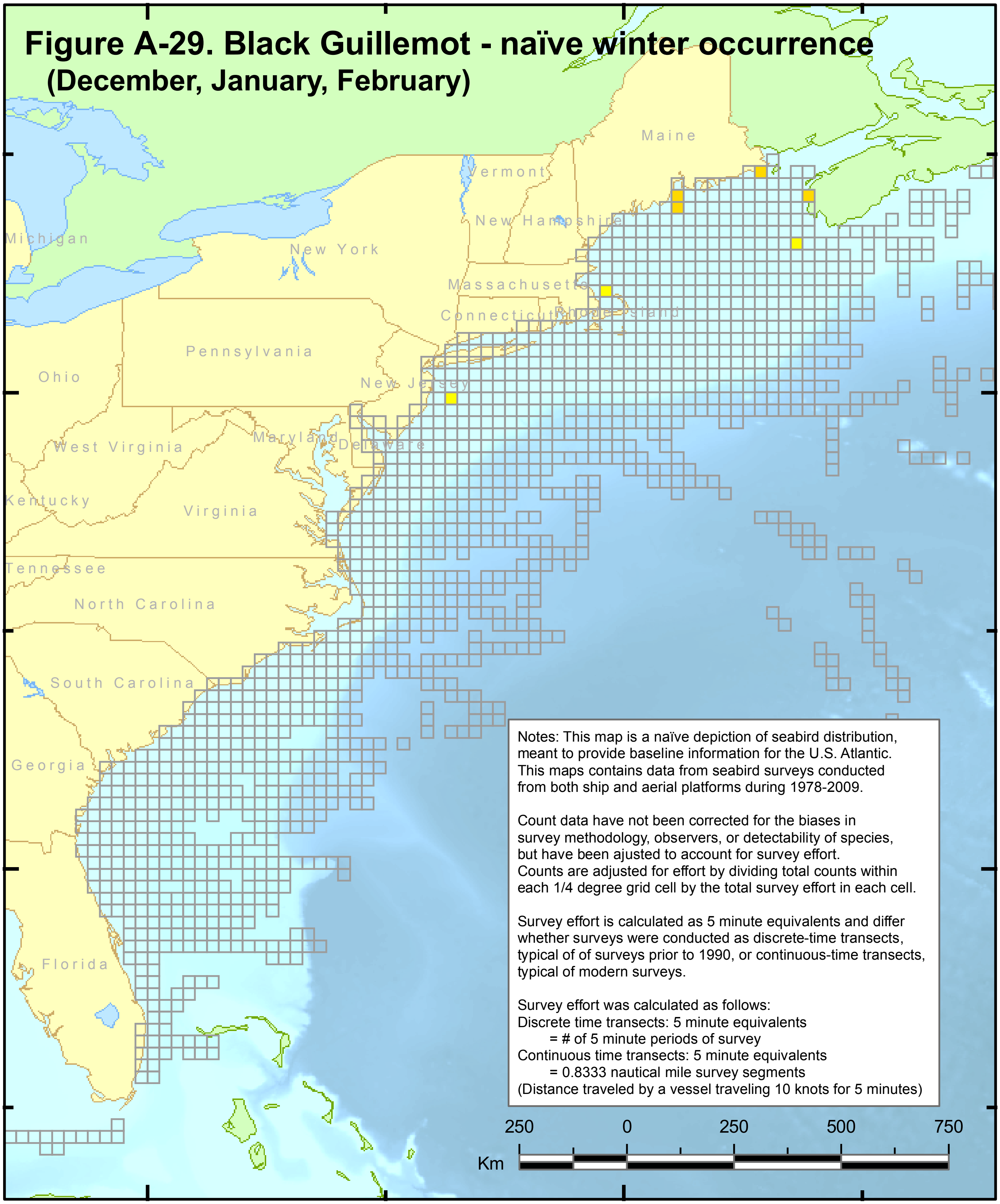
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-29. Black Guillemot - naïve winter occurrence
## (December, January, February)

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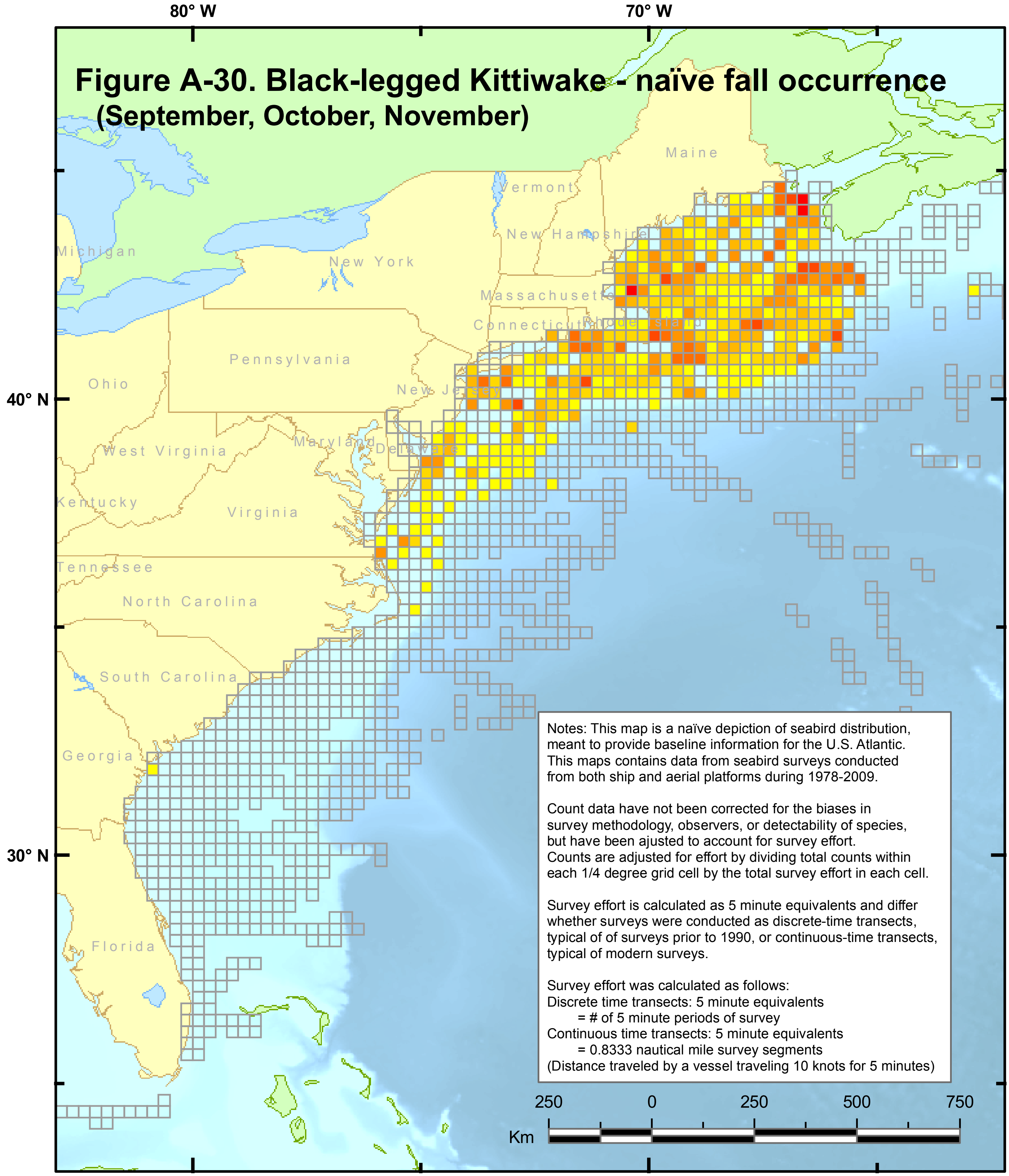
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-30. Black-legged Kittiwake - naïve fall occurrence (September, October, November)

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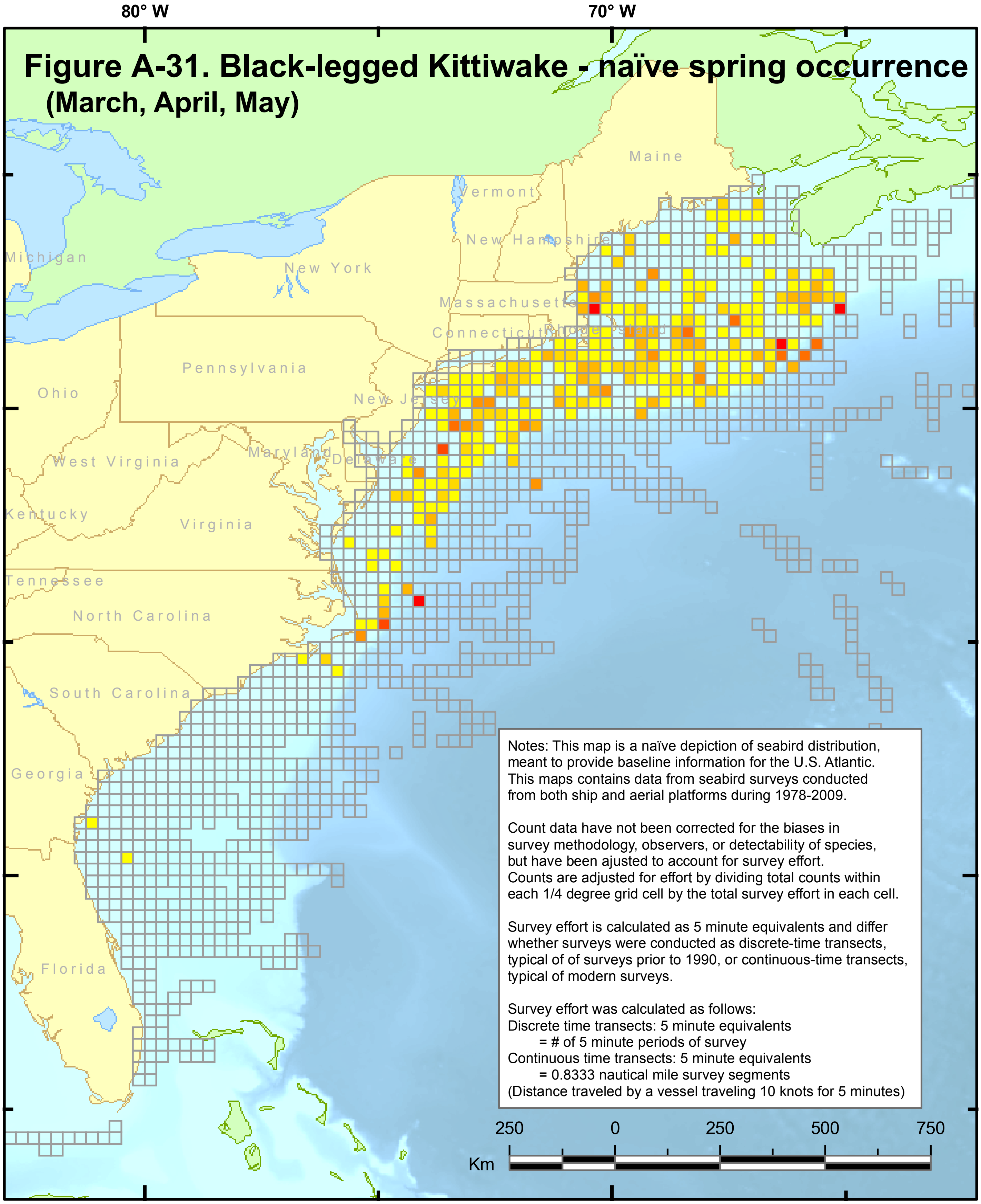
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 338.2

**Figure**

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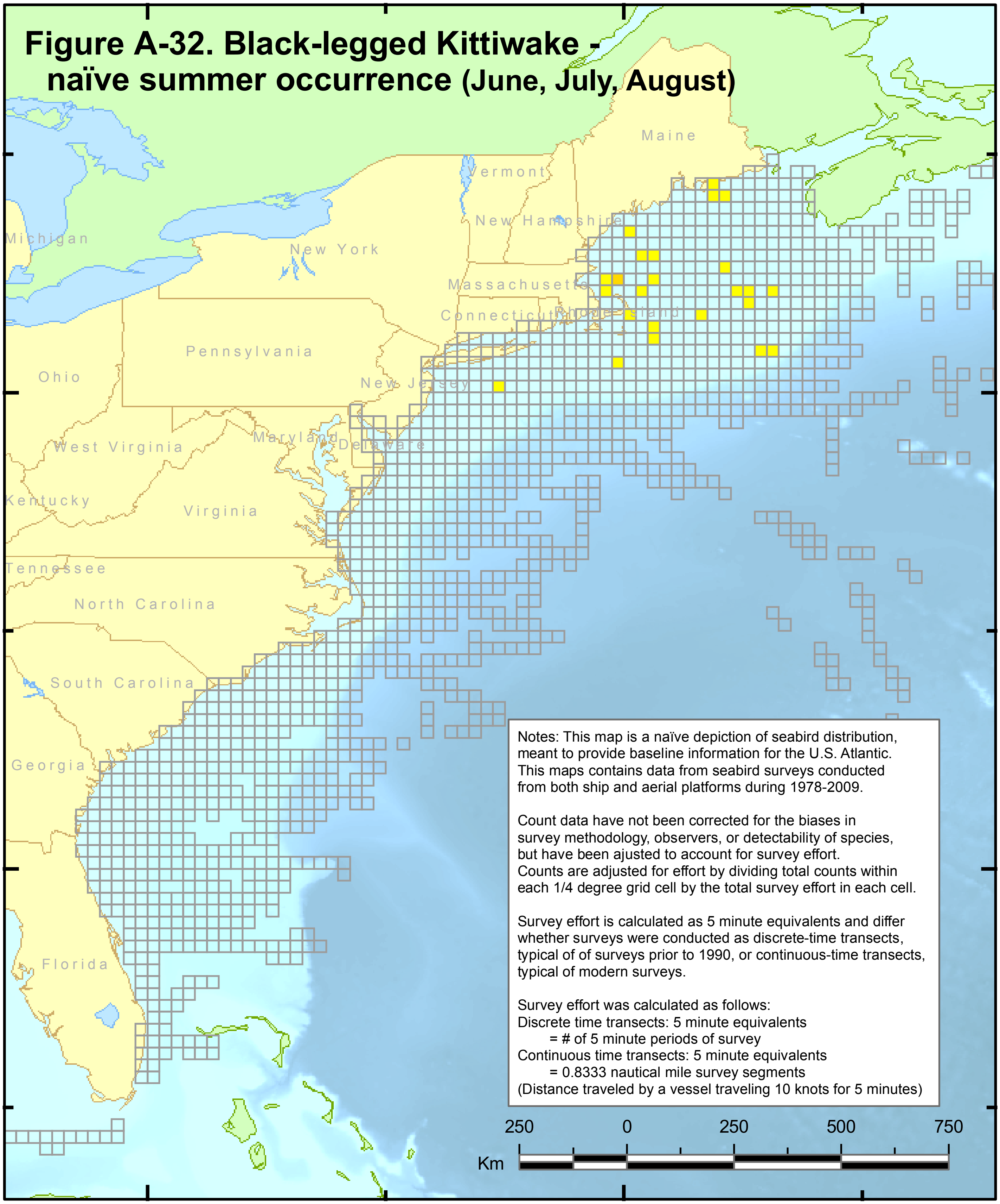
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 26.5 |

# Figure A-32. Black-legged Kittiwake - naïve summer occurrence (June, July, August)




**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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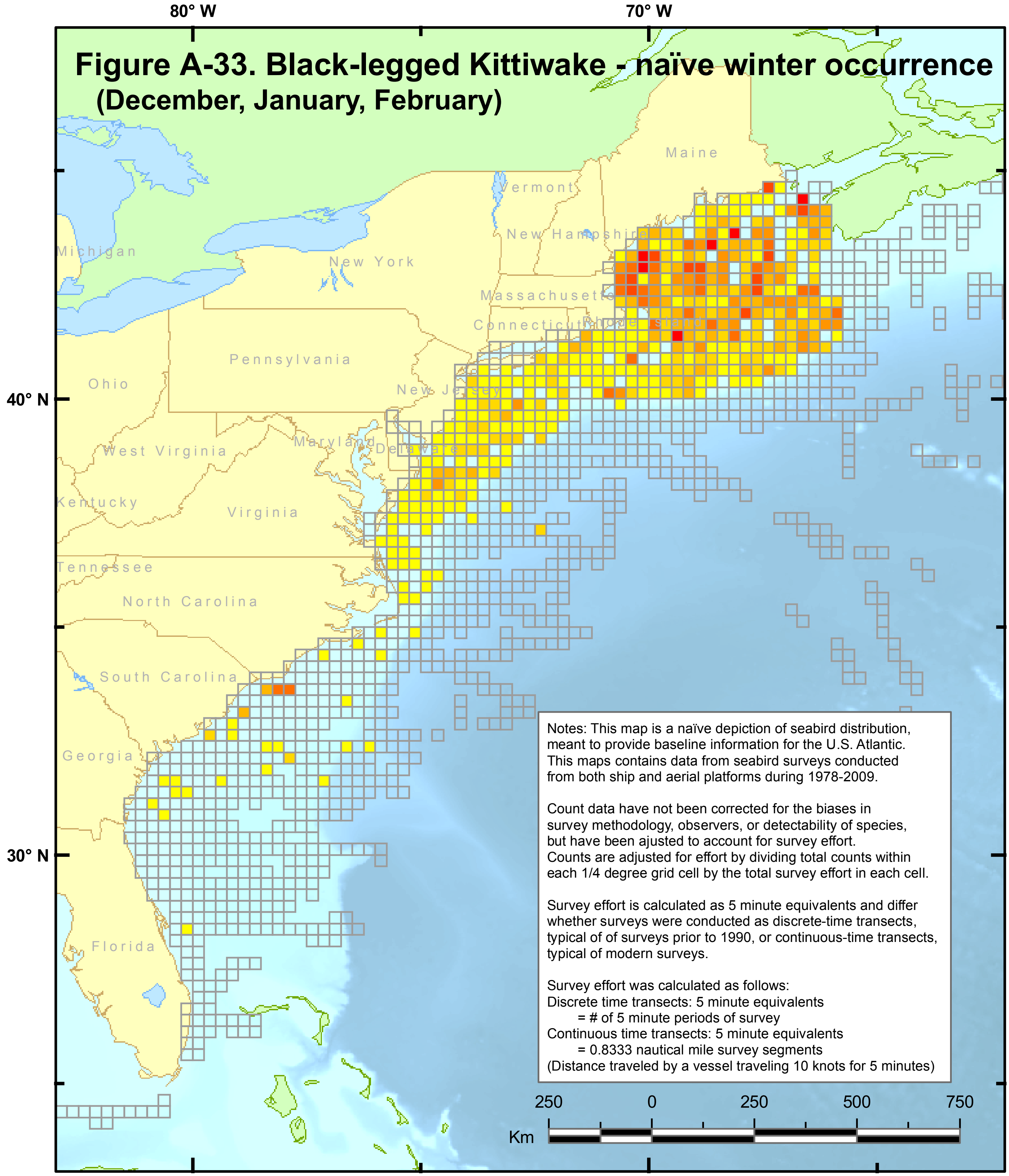


**Figure A-33. Black-legged Kittiwake - naïve winter occurrence (December, January, February)**

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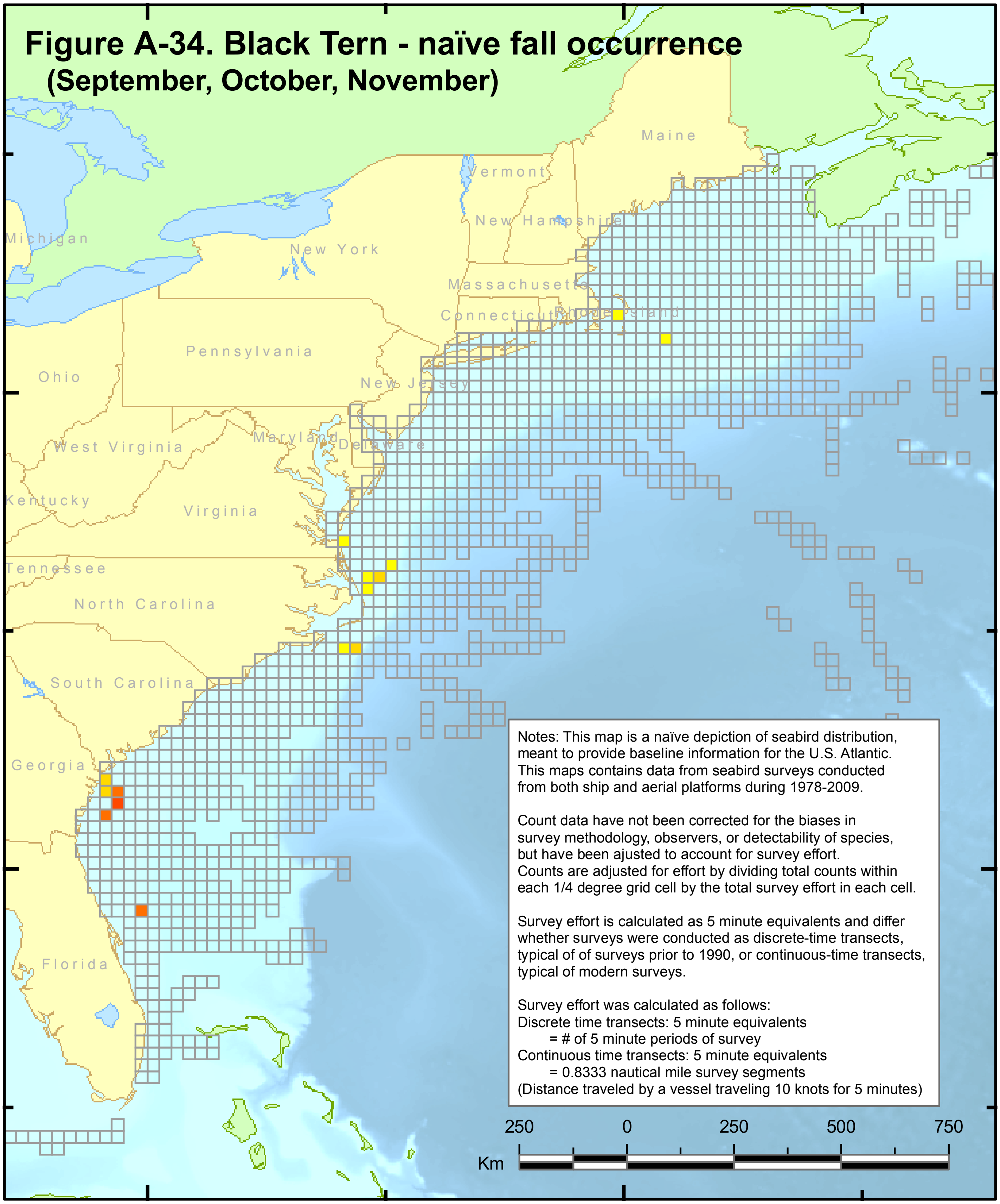
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 24.2 |




# Figure A-34. Black Tern - naïve fall occurrence
## (September, October, November)

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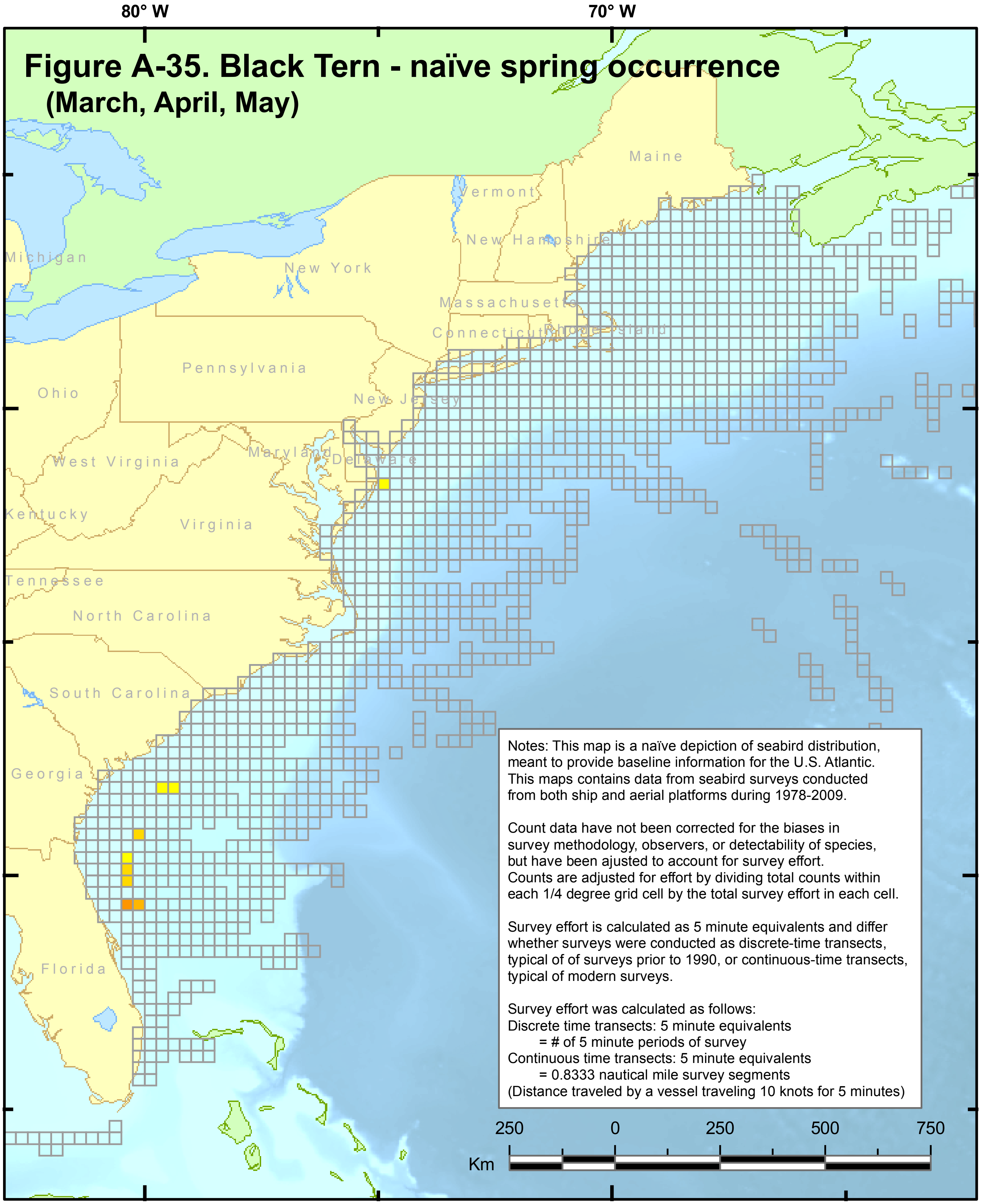
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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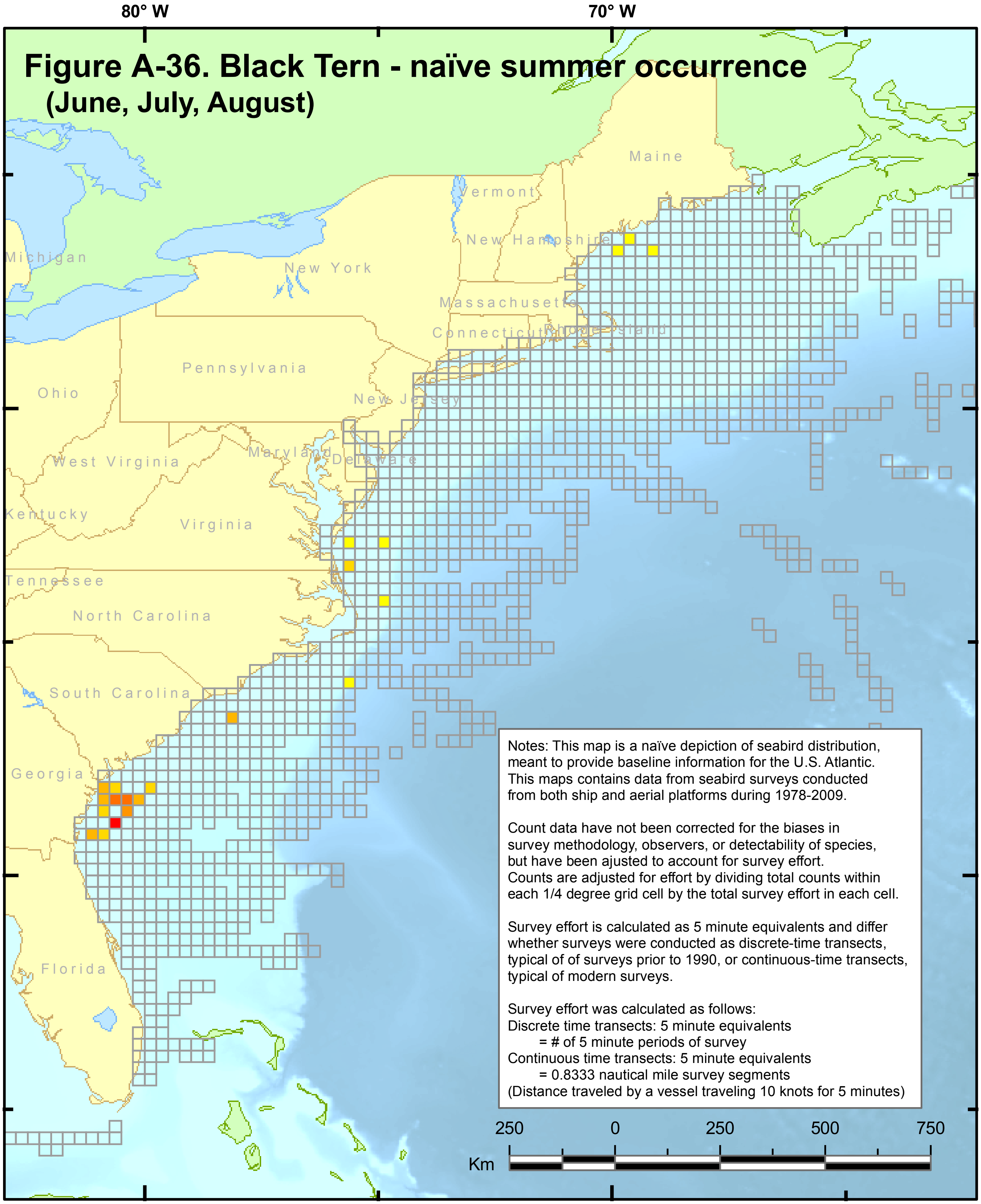
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-36. Black Tern - naïve summer occurrence (June, July, August)

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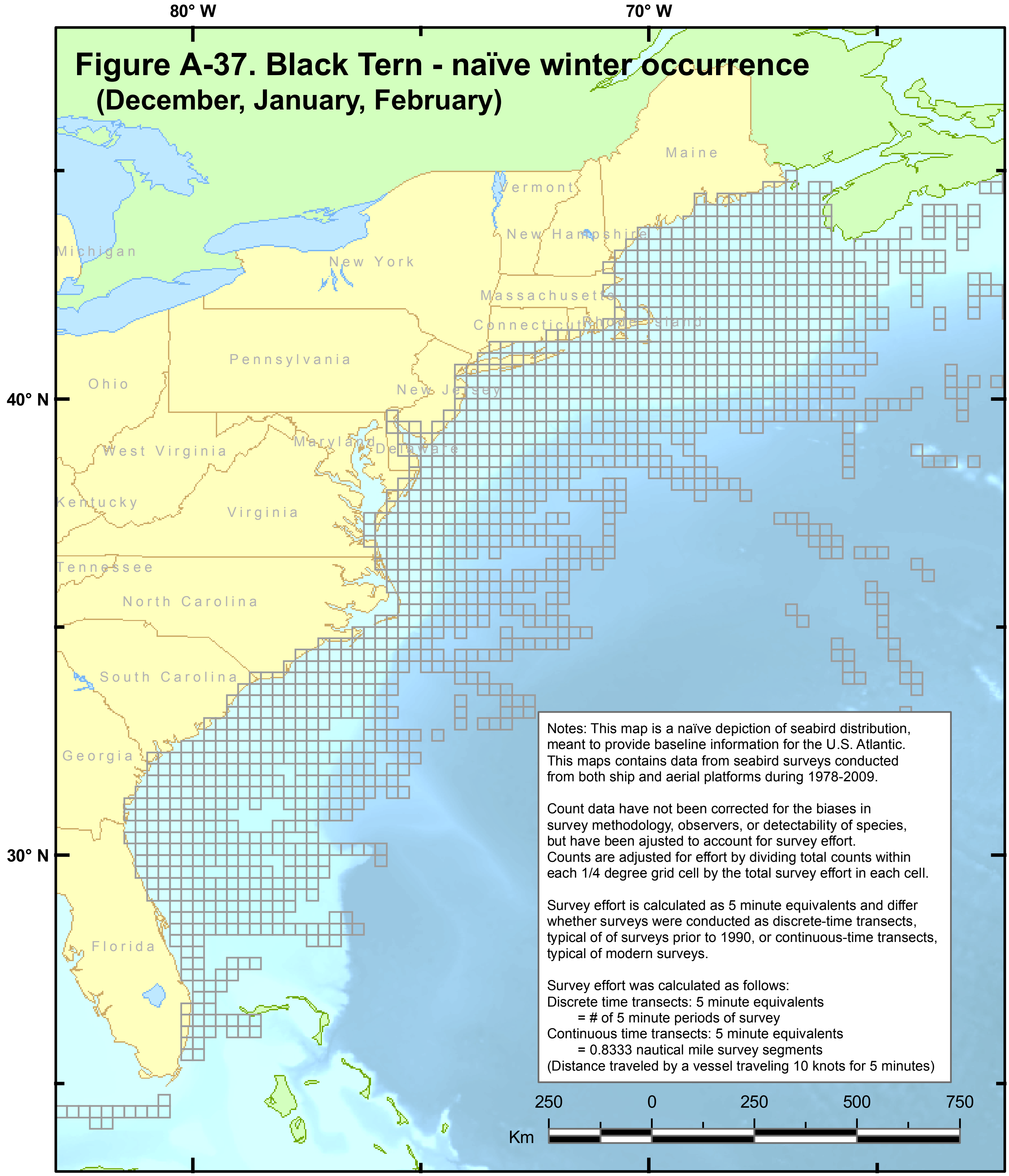
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 19 |

**Figure A-37. Black Tern - naïve winter occurrence (December, January, February)**

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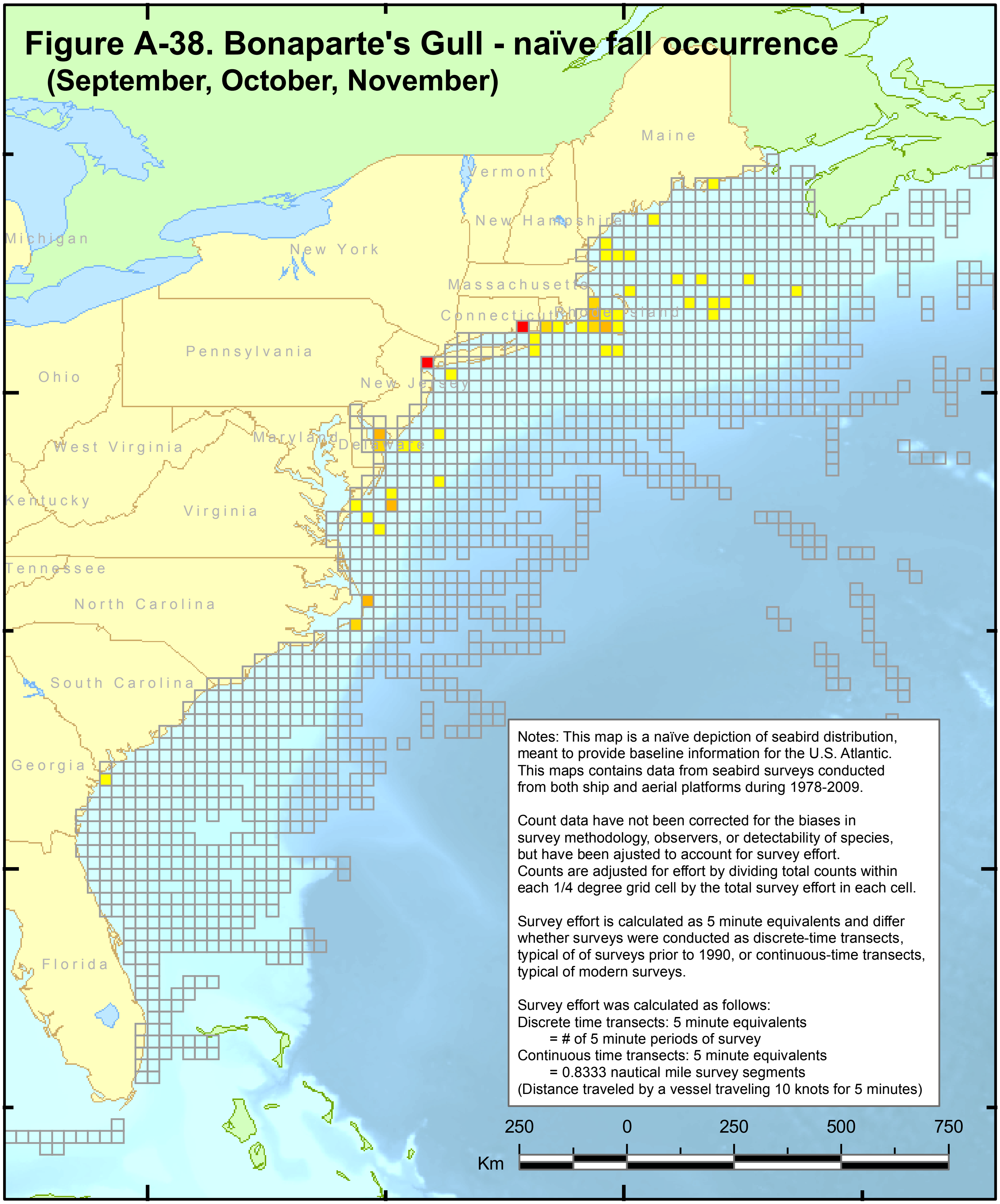
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-38. Bonaparte's Gull - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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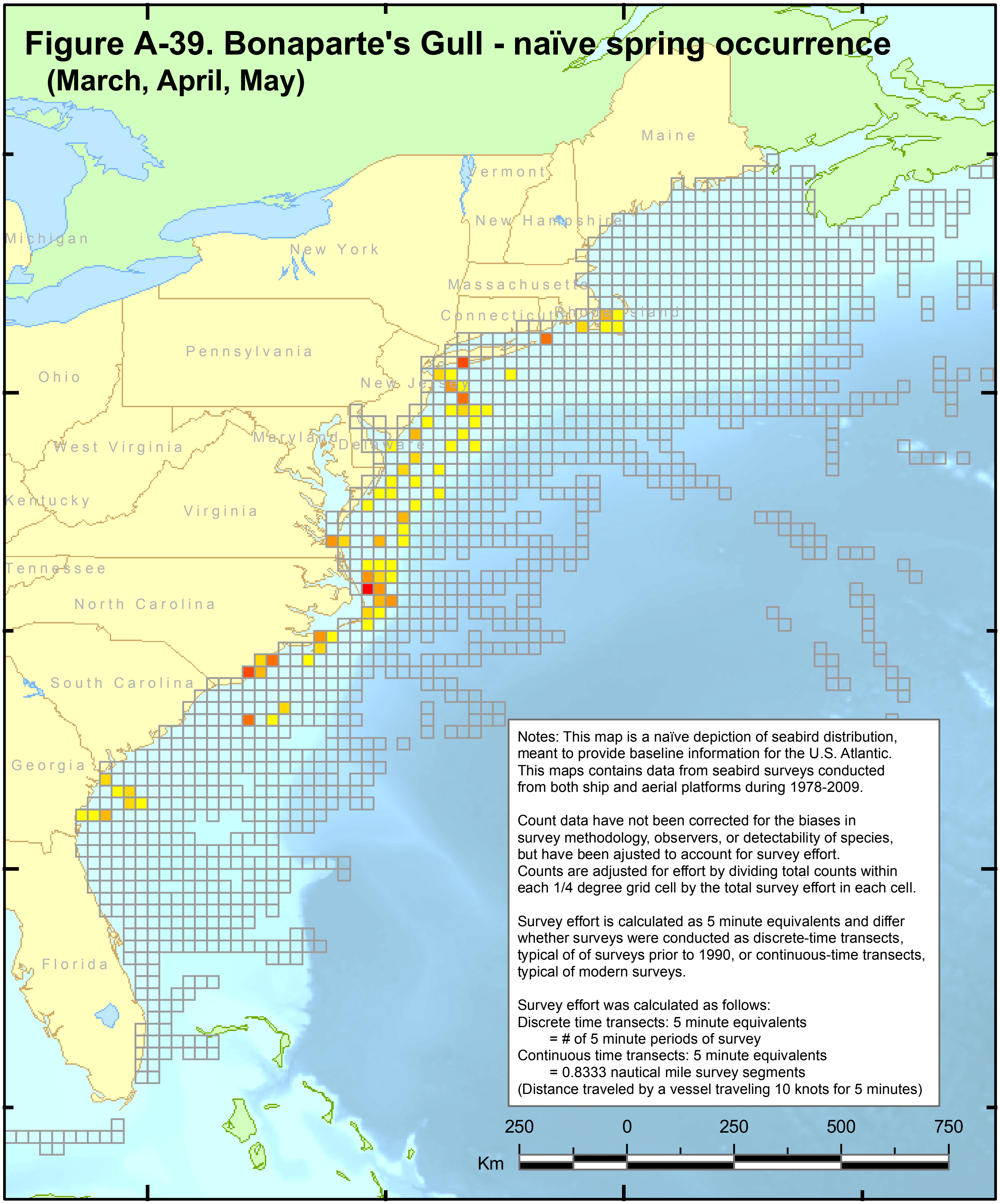
**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 6

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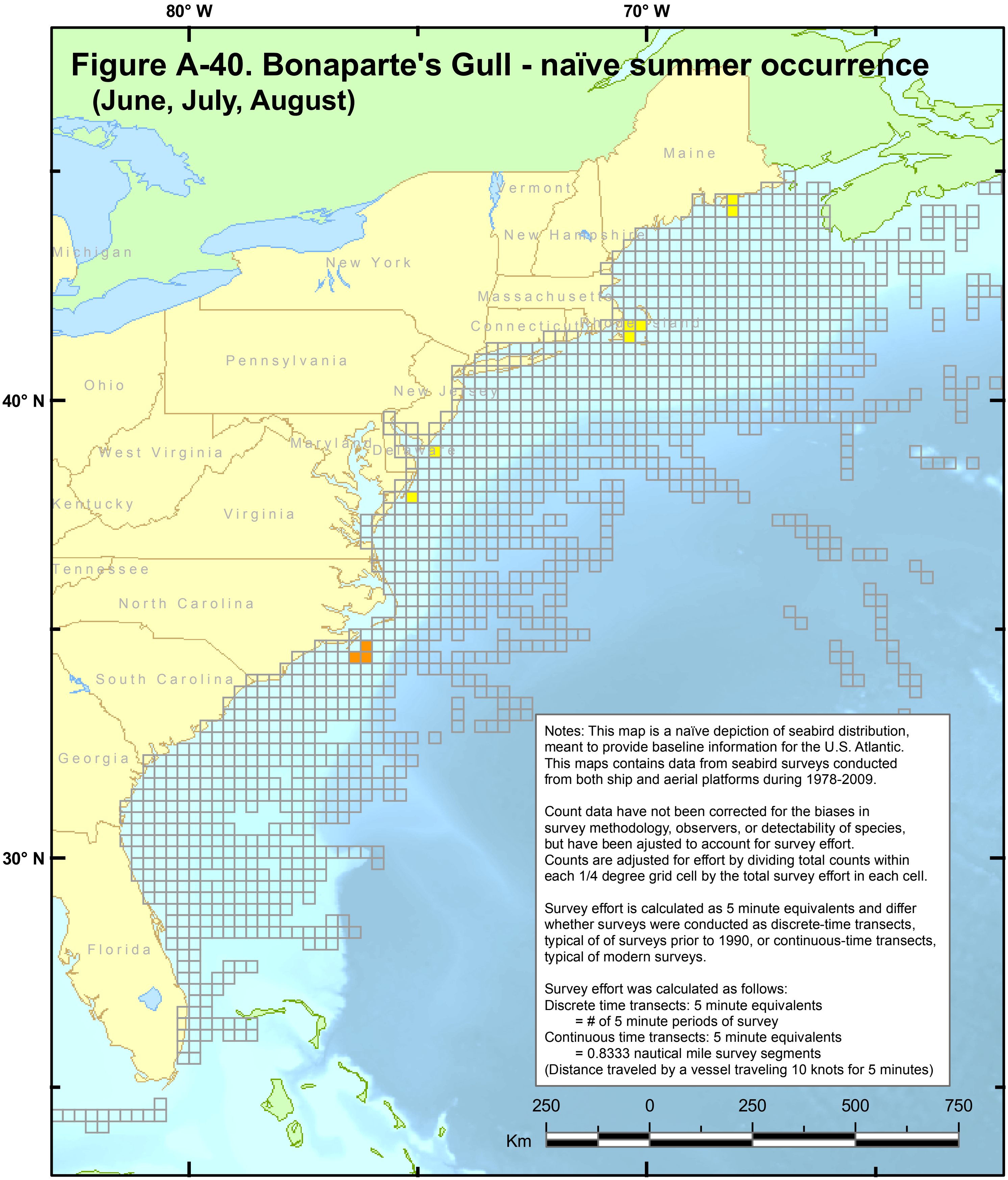
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 9.5 |




# Figure A-40. Bonaparte's Gull - naïve summer occurrence (June, July, August)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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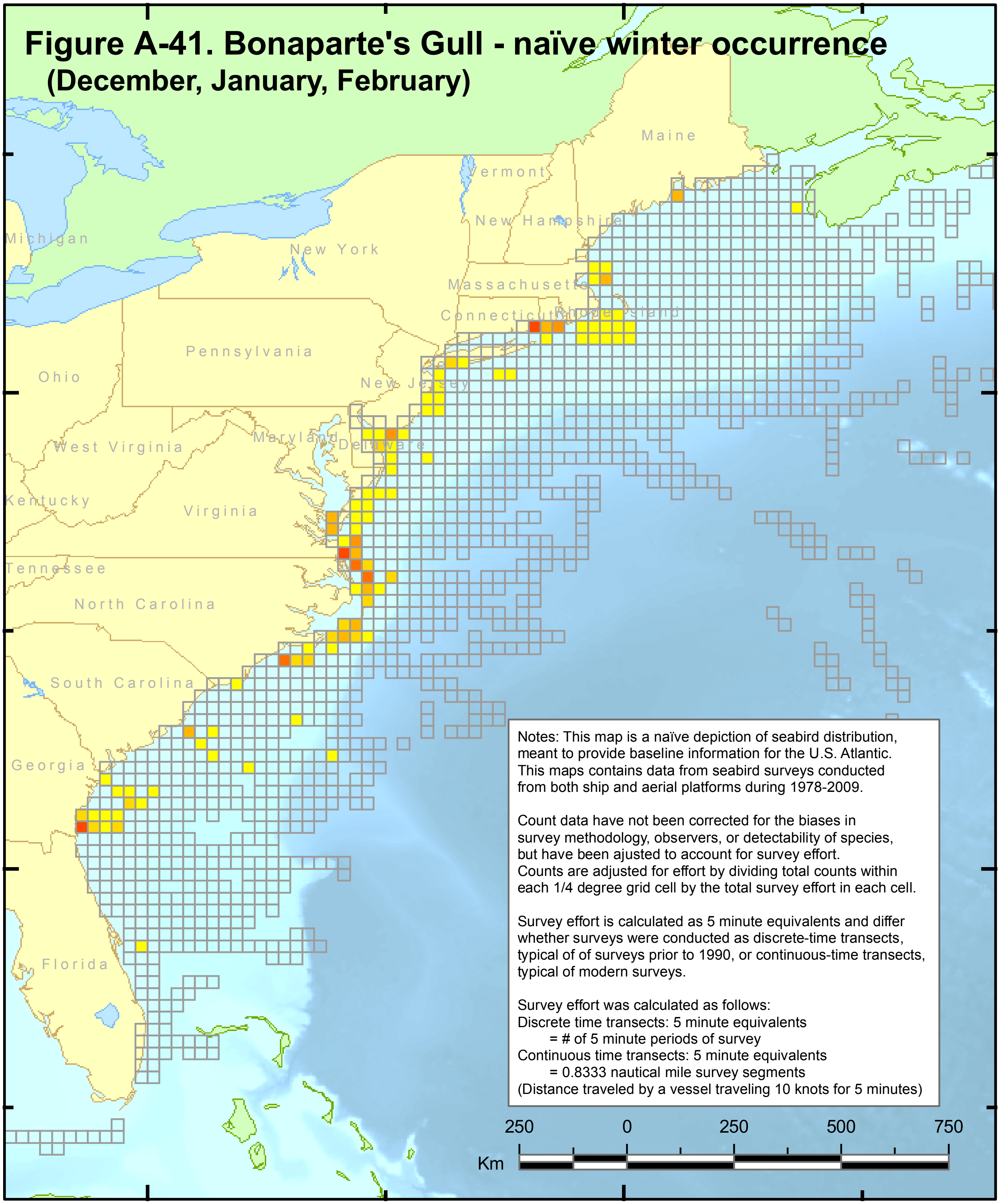
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5




# Figure A-41. Bonaparte's Gull - naïve winter occurrence
## (December, January, February)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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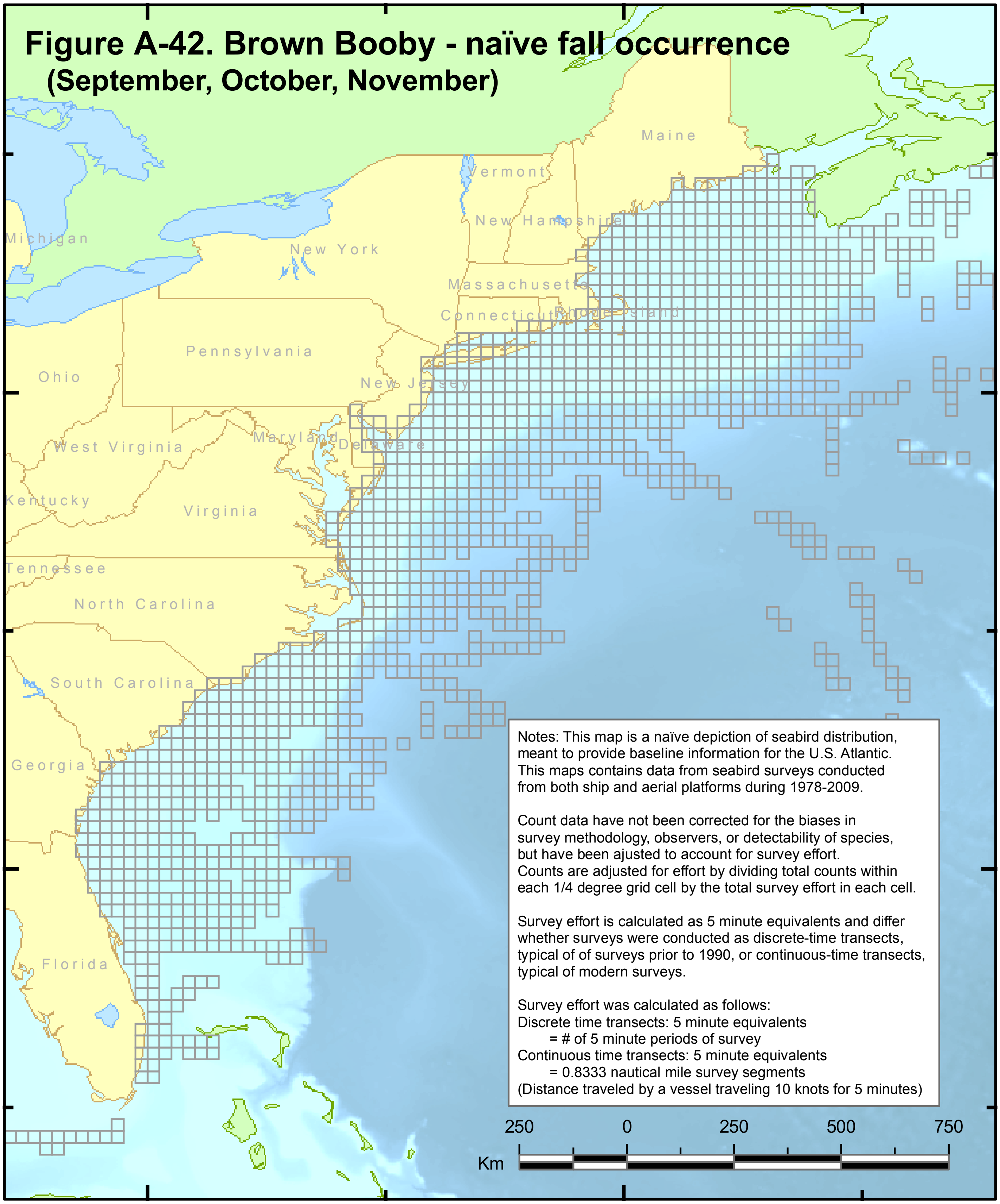


# Figure A-42. Brown Booby - naïve fall occurrence
(September, October, November)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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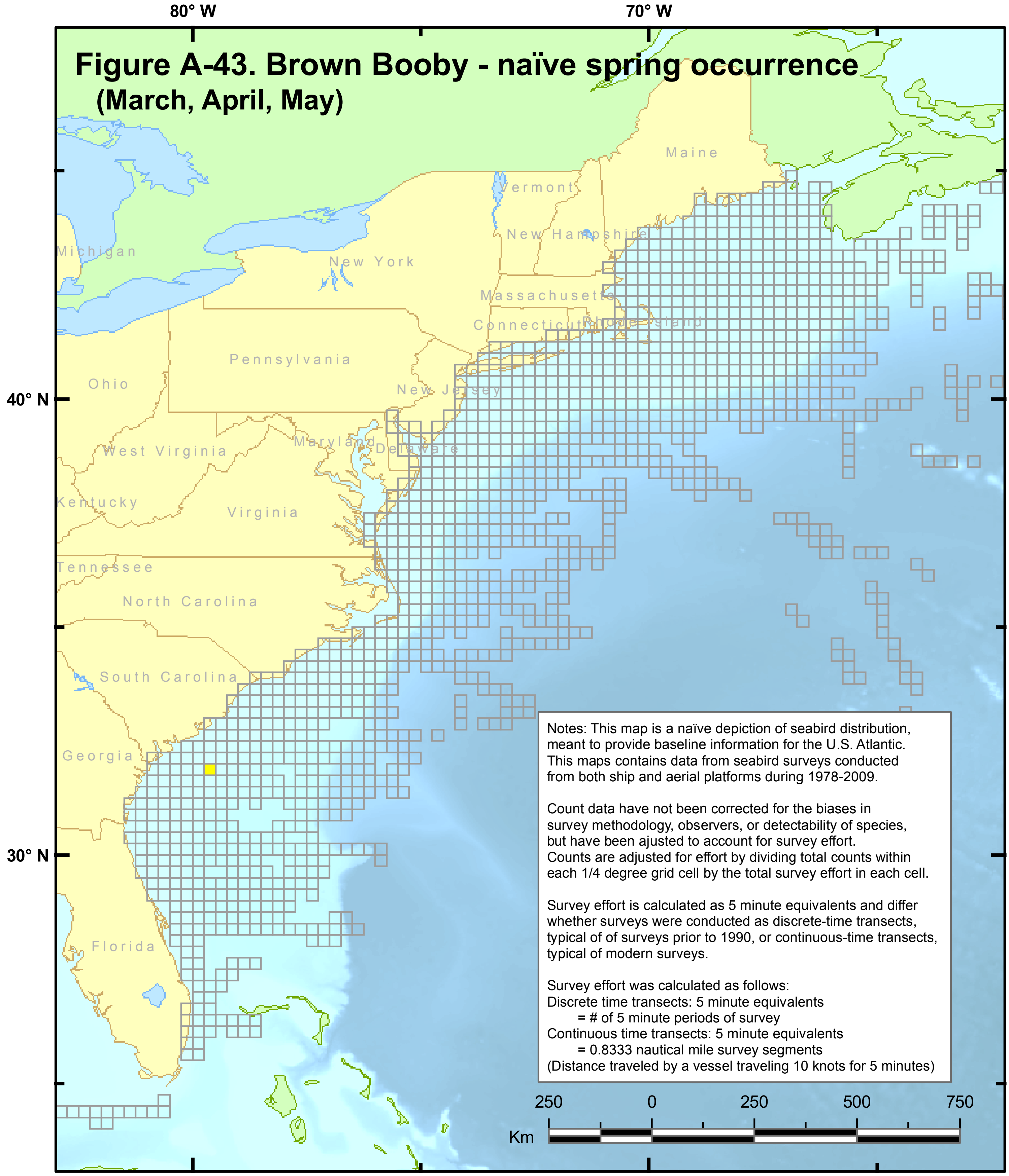
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

## Figure A-43. Brown Booby - naïve spring occurrence (March, April, May)

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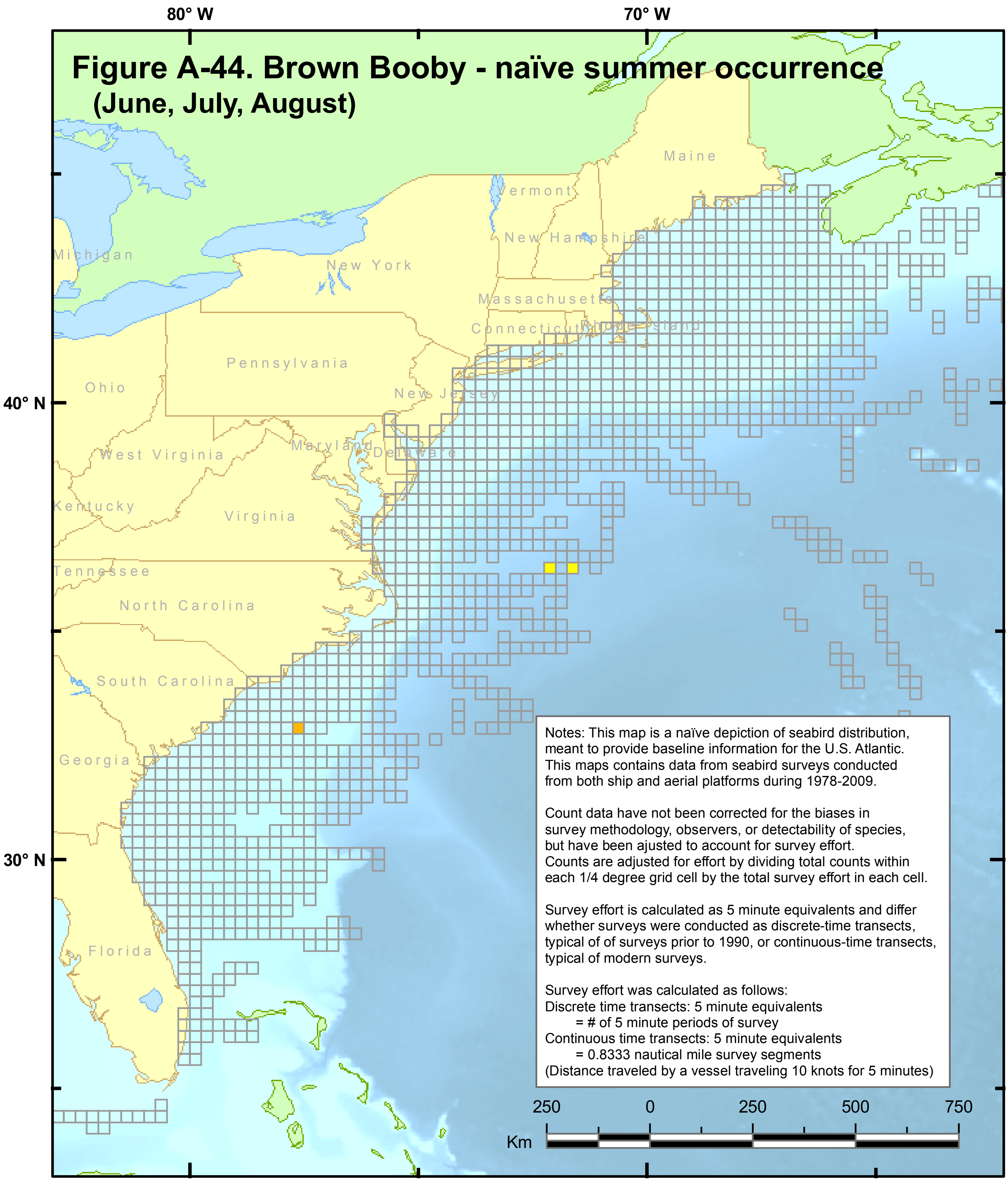
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-44. Brown Booby - naïve summer occurrence
## (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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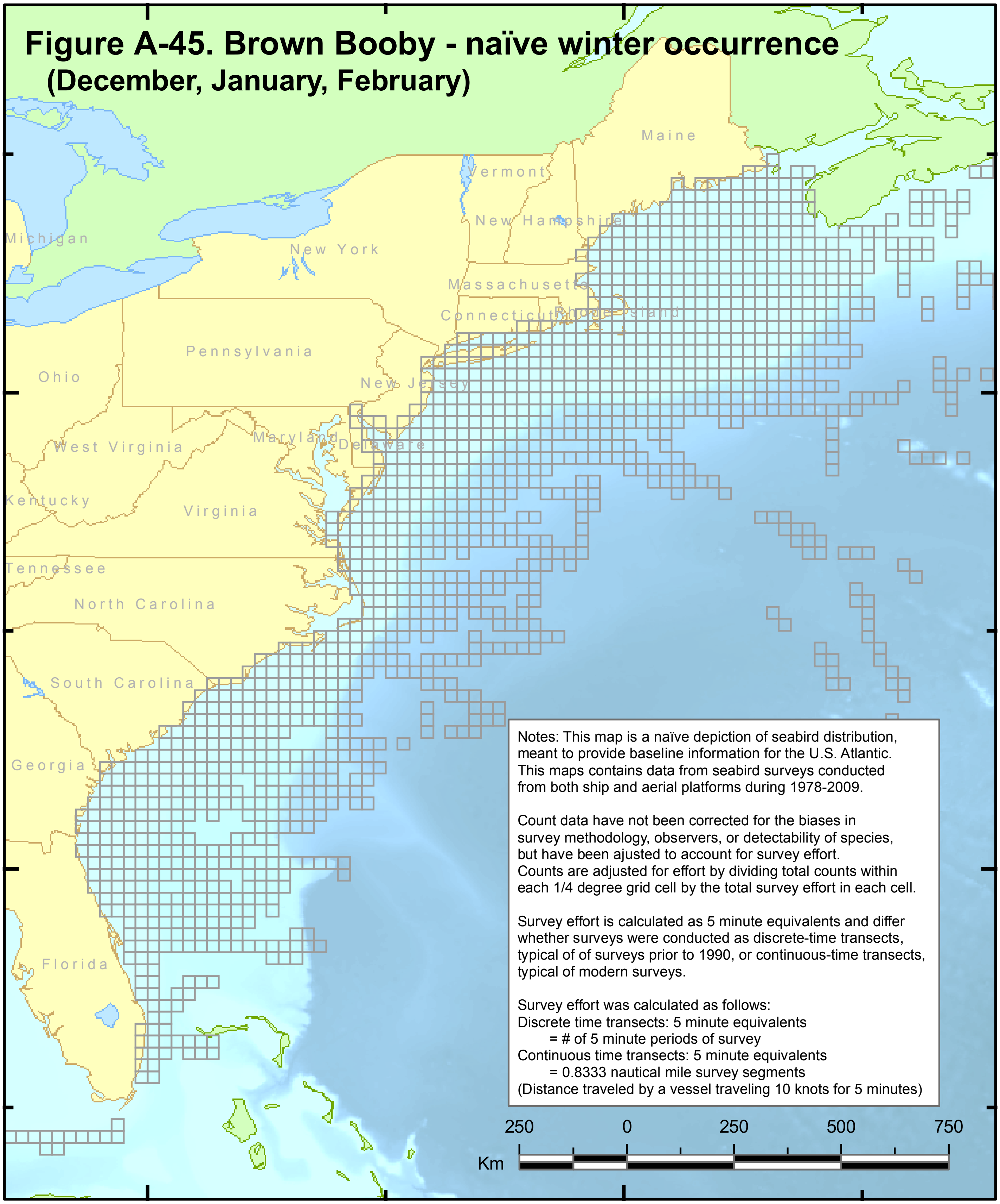
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-45. Brown Booby - naïve winter occurrence
## (December, January, February)

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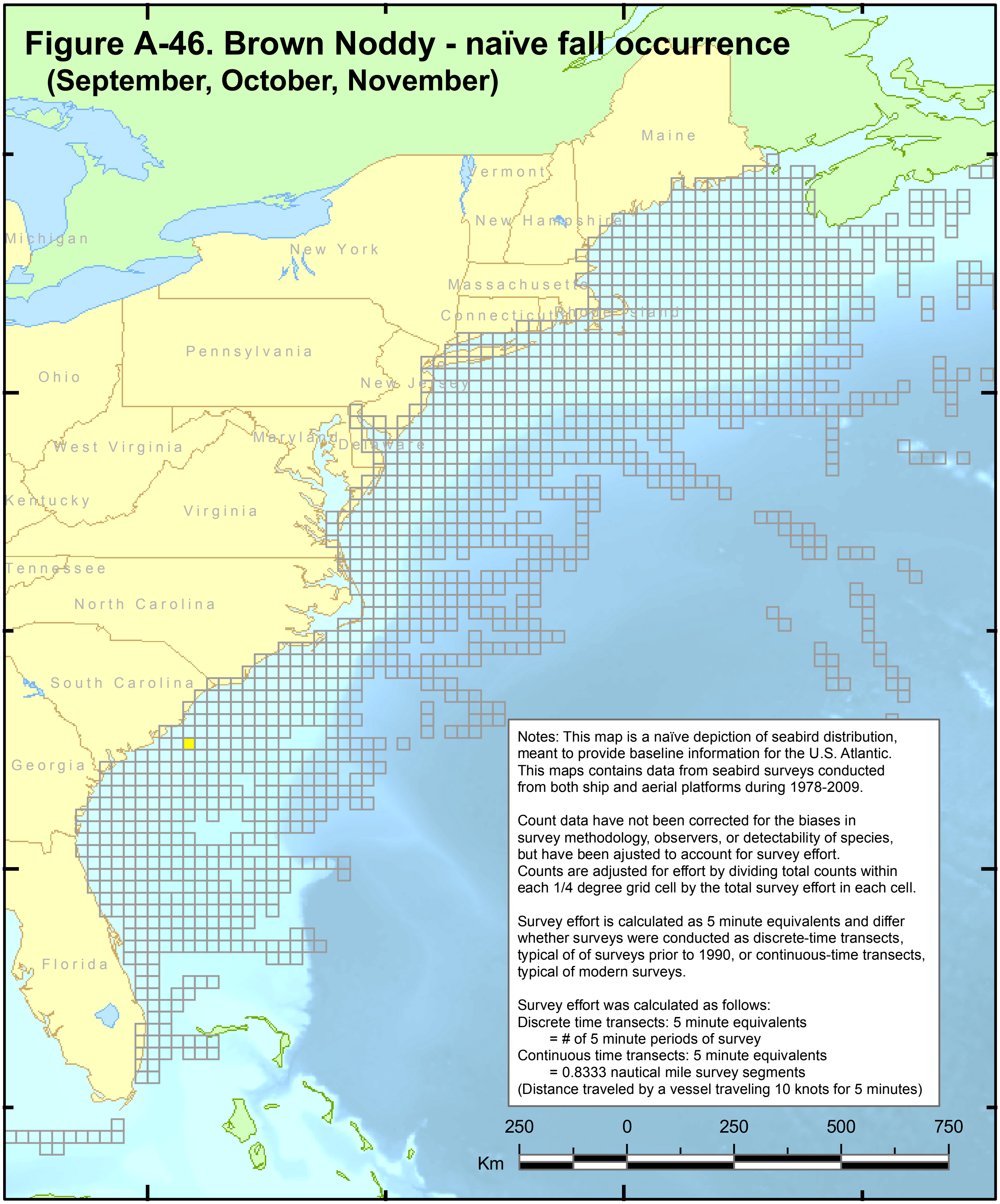
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-46. Brown Noddy - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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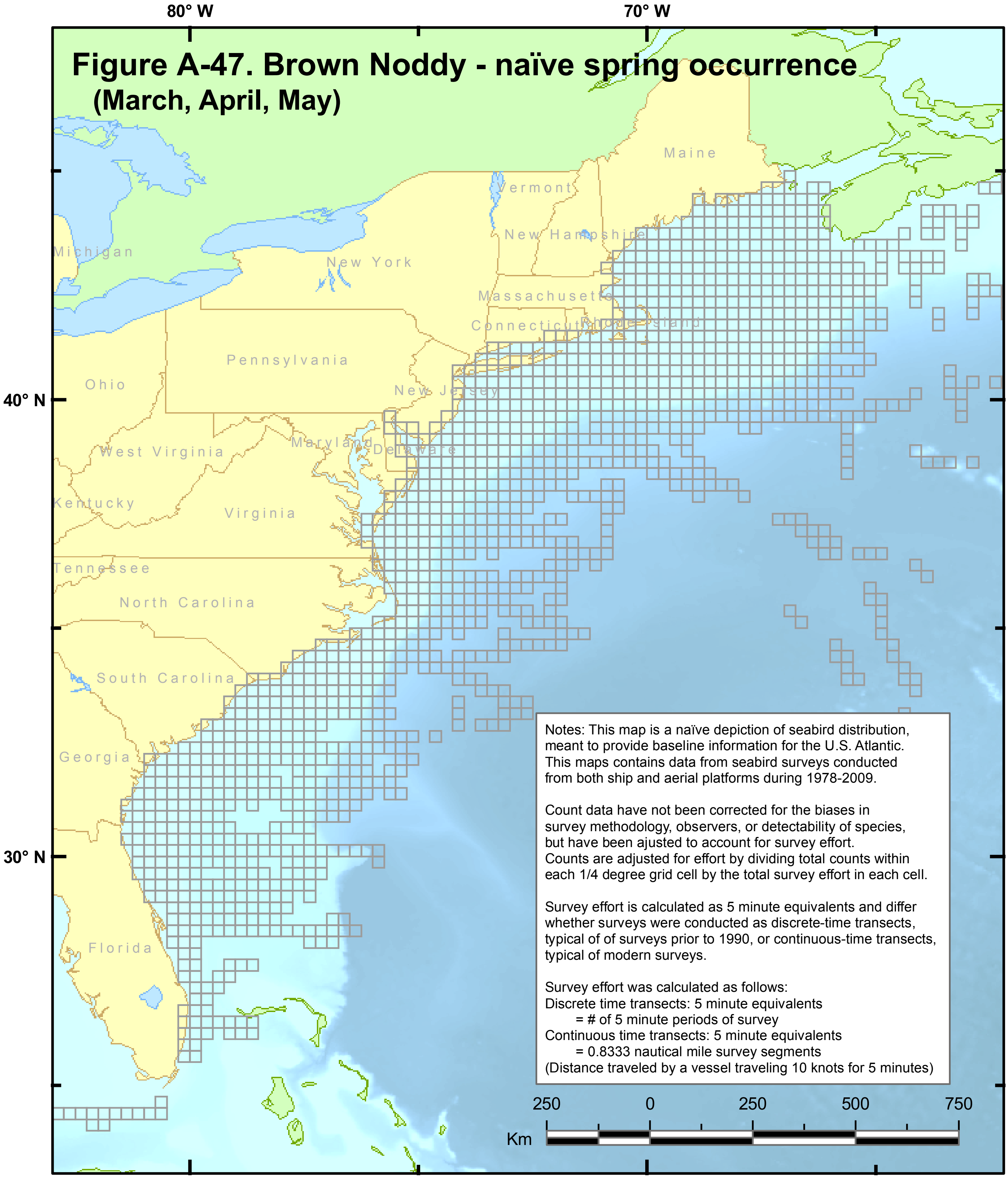
**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

# Figure A-47. Brown Noddy - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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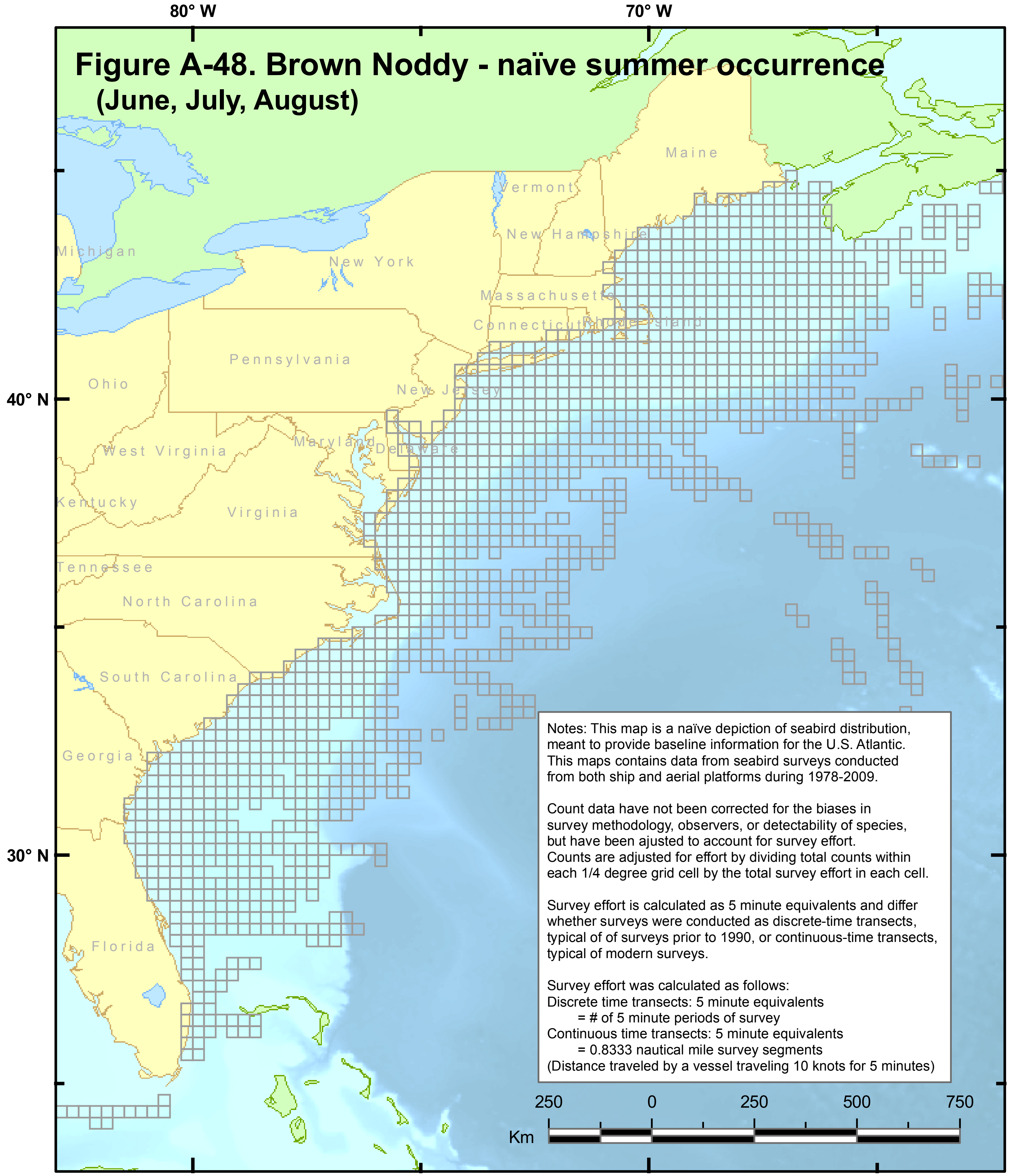
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-48. Brown Noddy - naïve summer occurrence (June, July, August)




## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5F |

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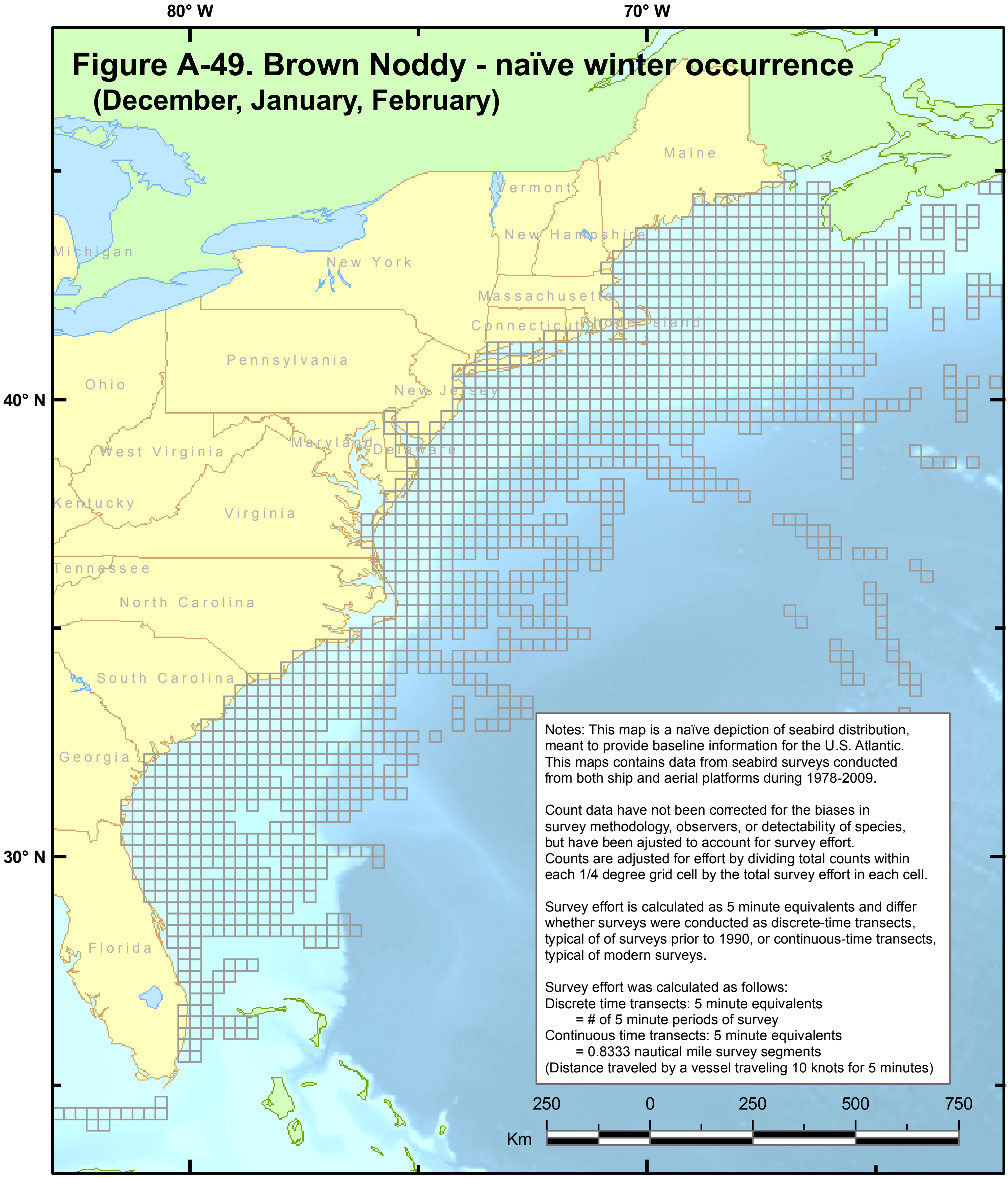
# Figure A-49. Brown Noddy - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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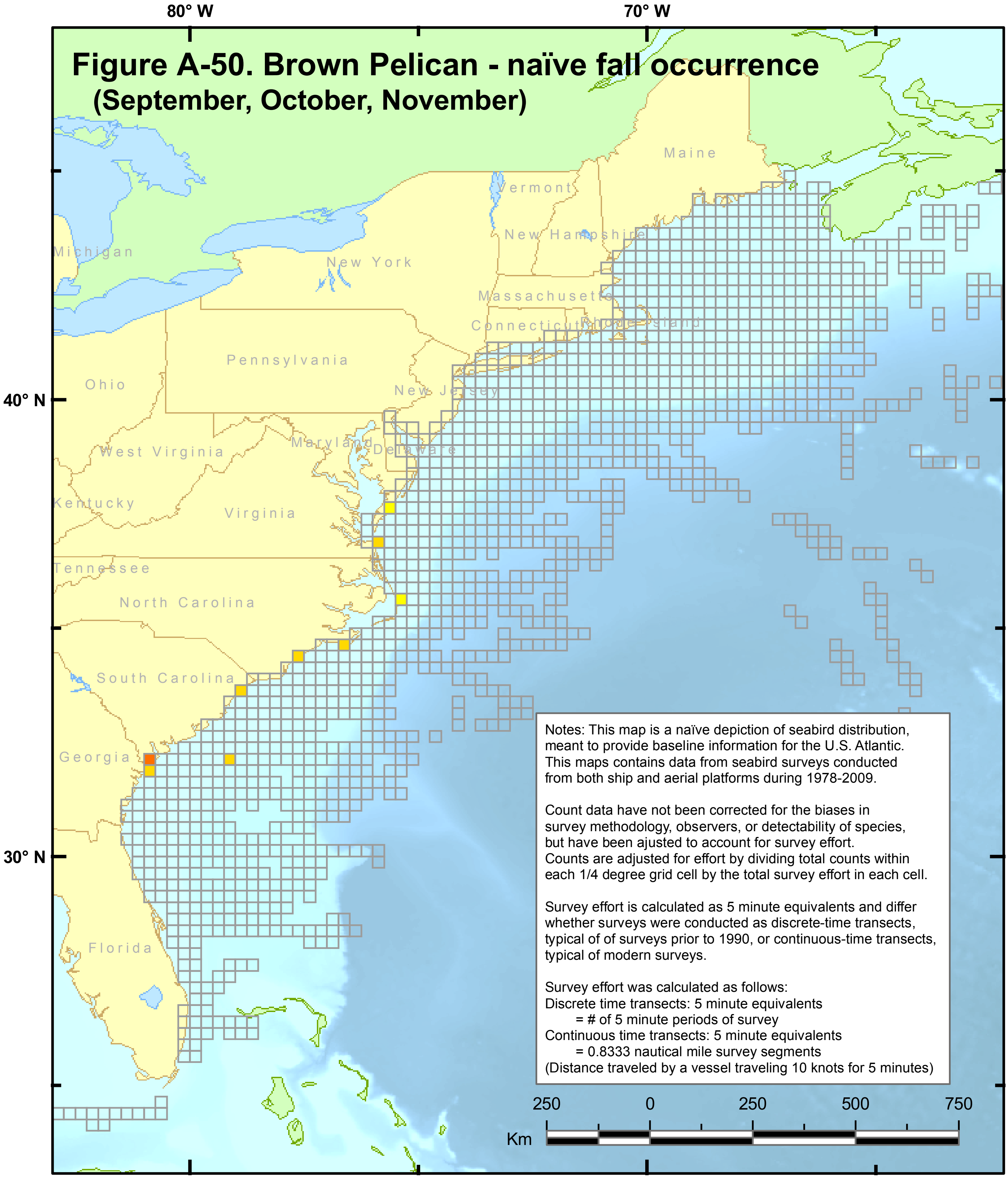
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-50. Brown Pelican - naïve fall occurrence (September, October, November)

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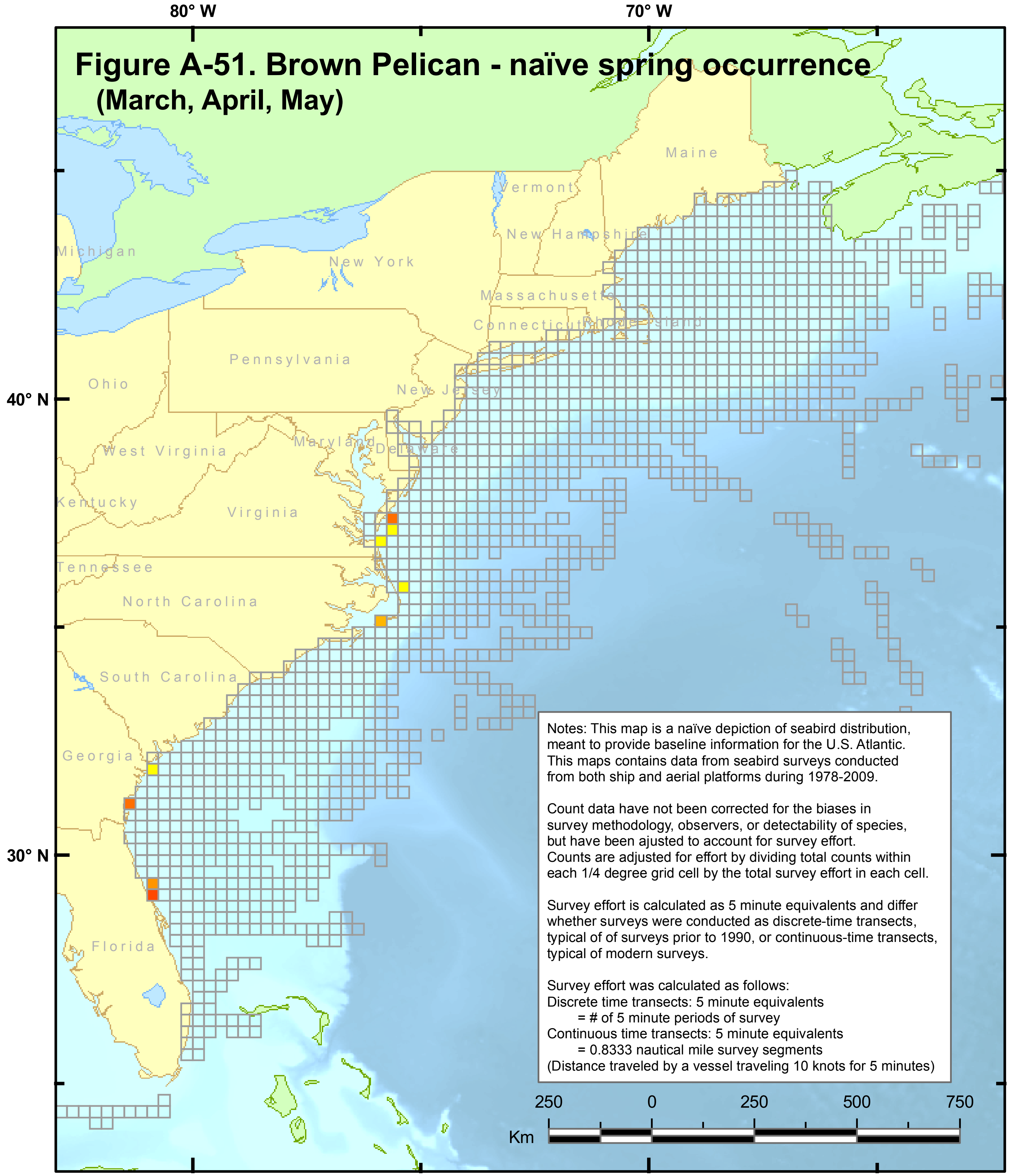
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-51. Brown Pelican - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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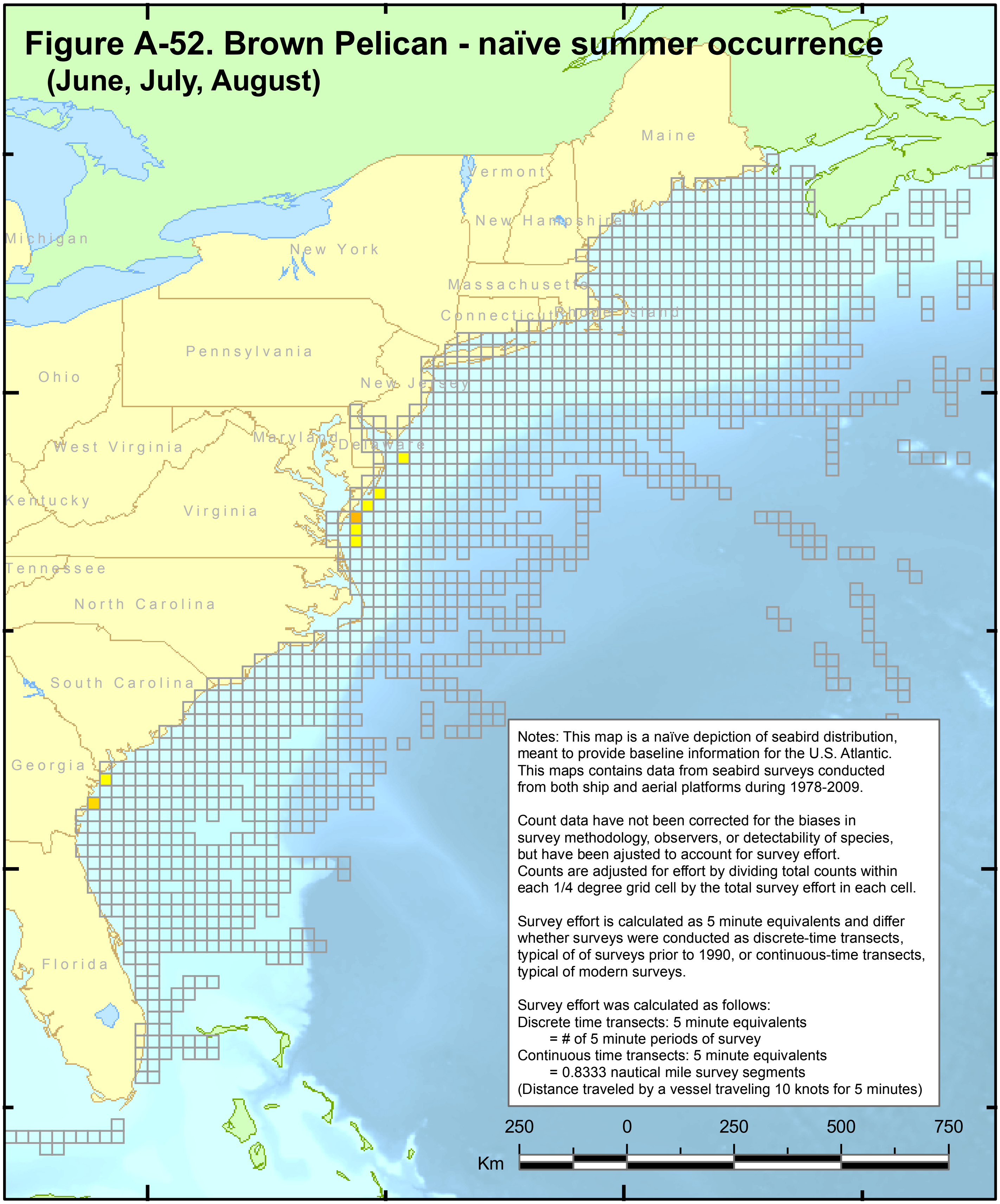
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-52. Brown Pelican - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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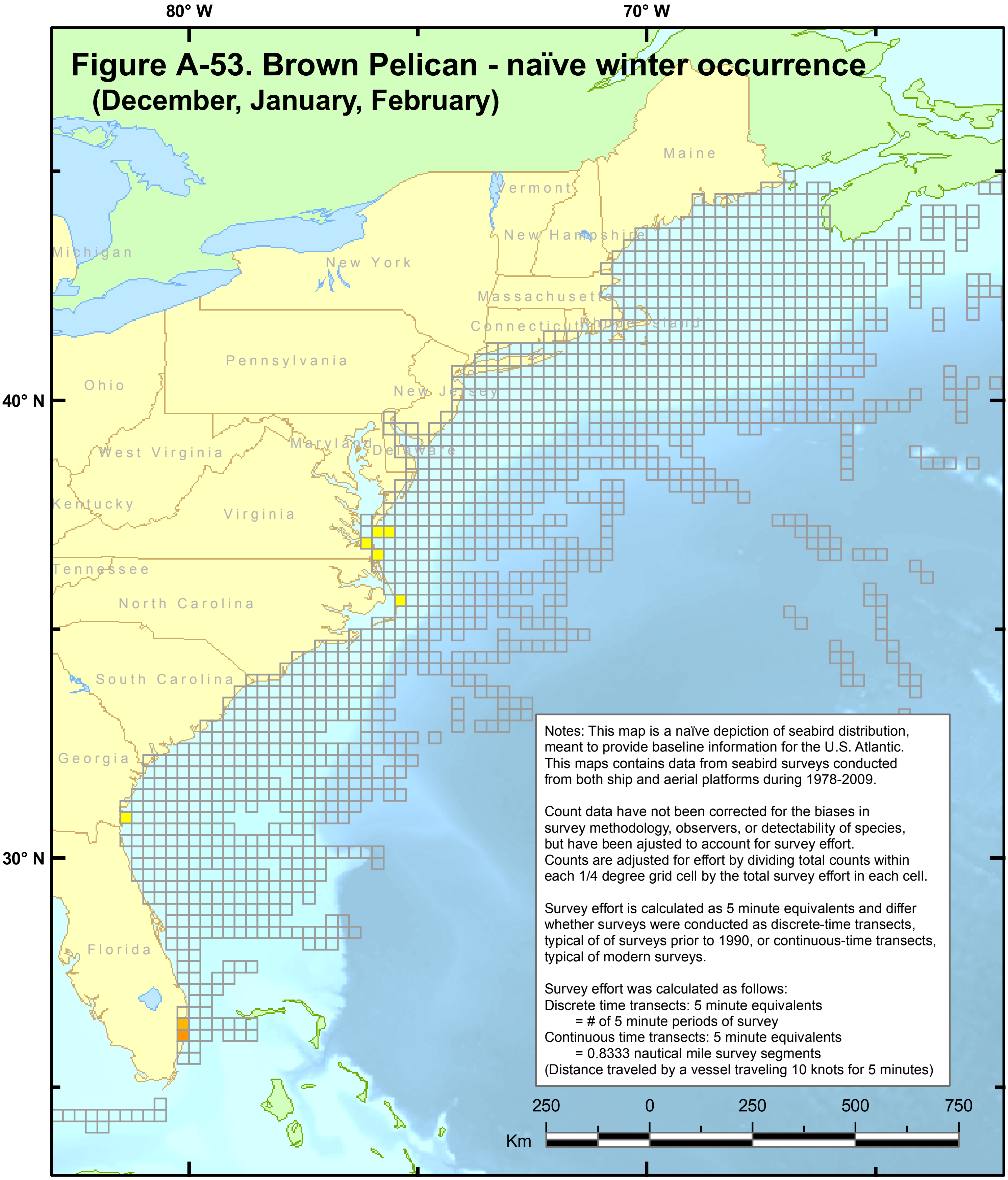
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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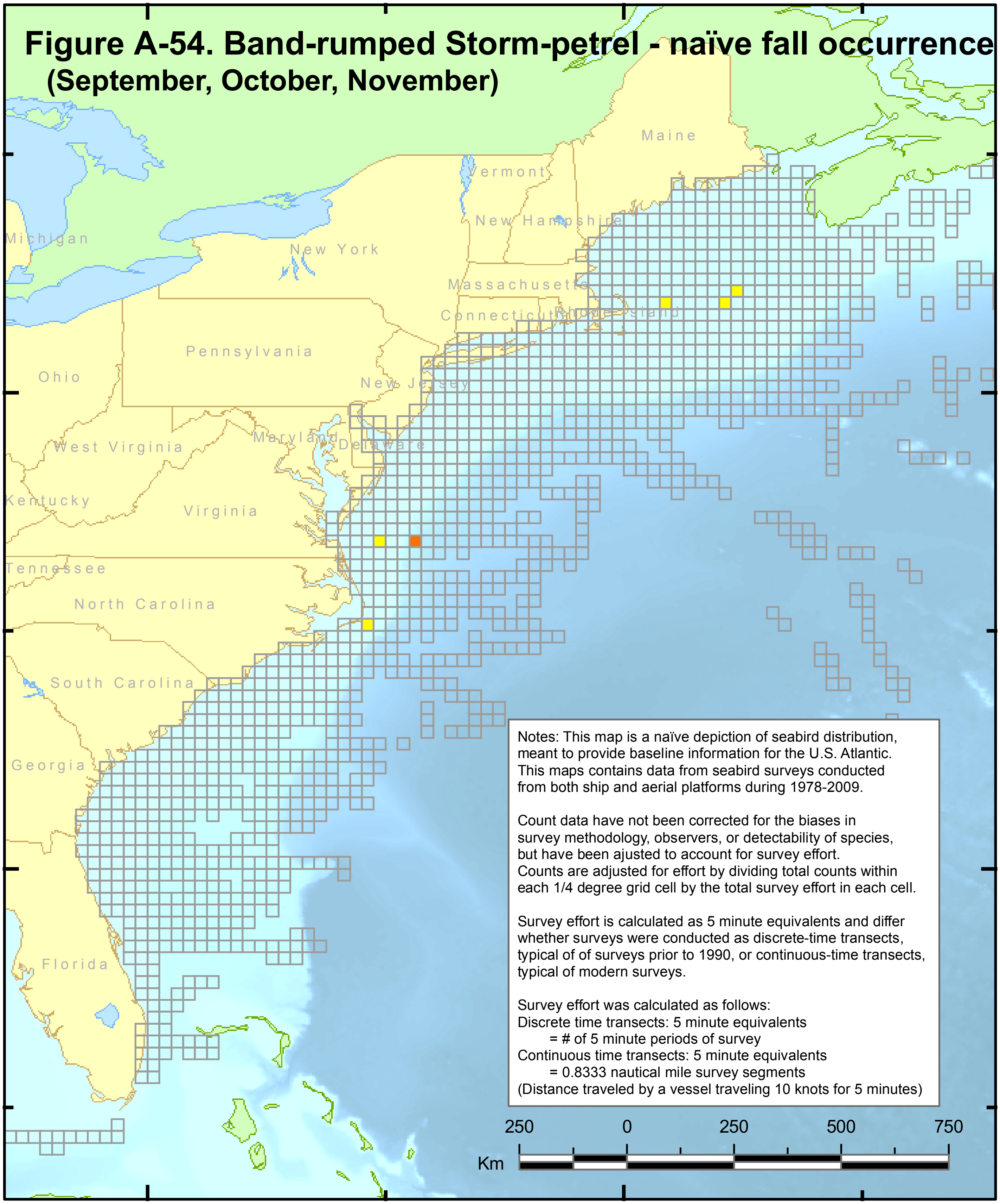
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-54. Band-rumped Storm-petrel - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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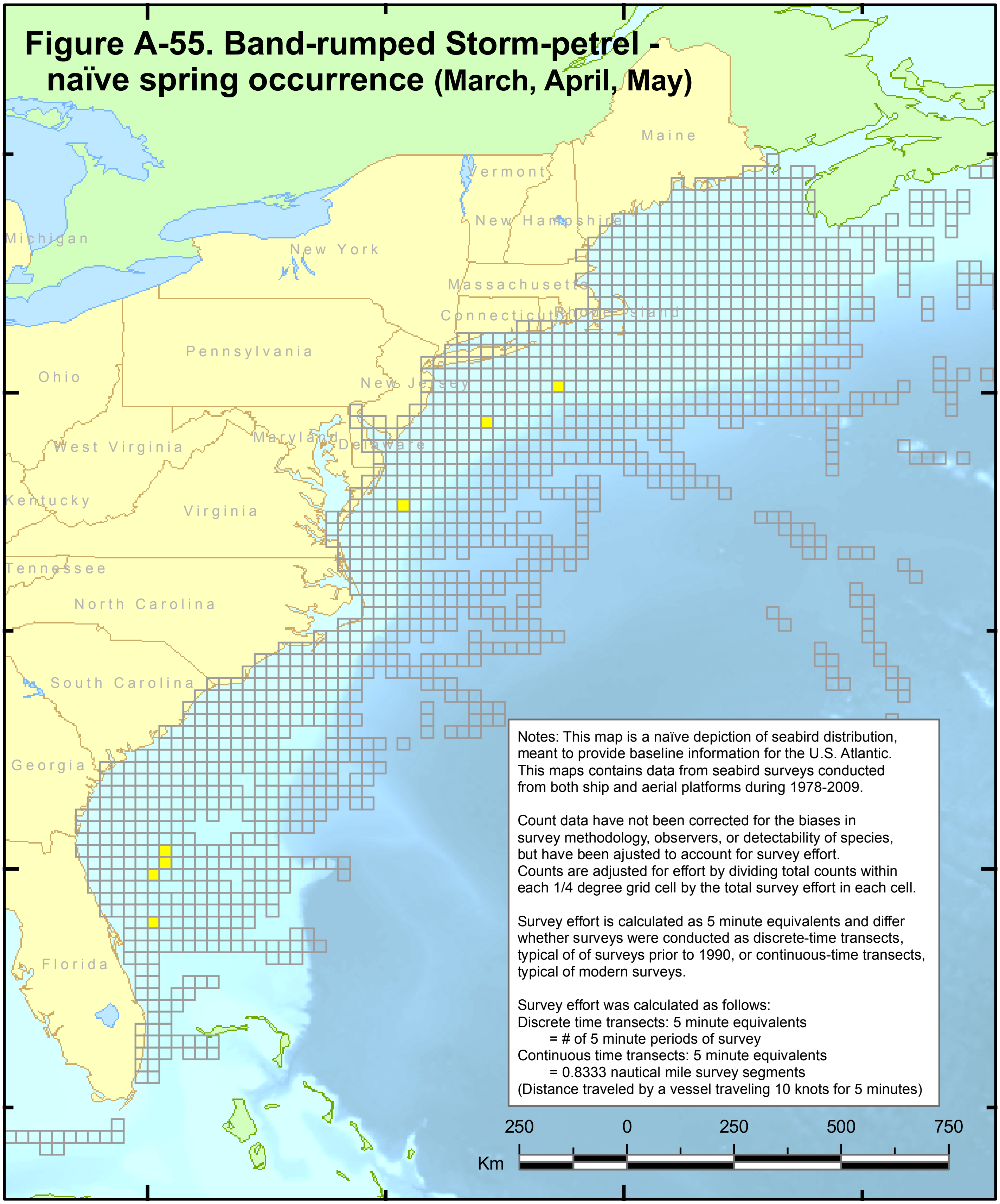
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5




# Figure A-55. Band-rumped Storm-petrel - naïve spring occurrence (March, April, May)

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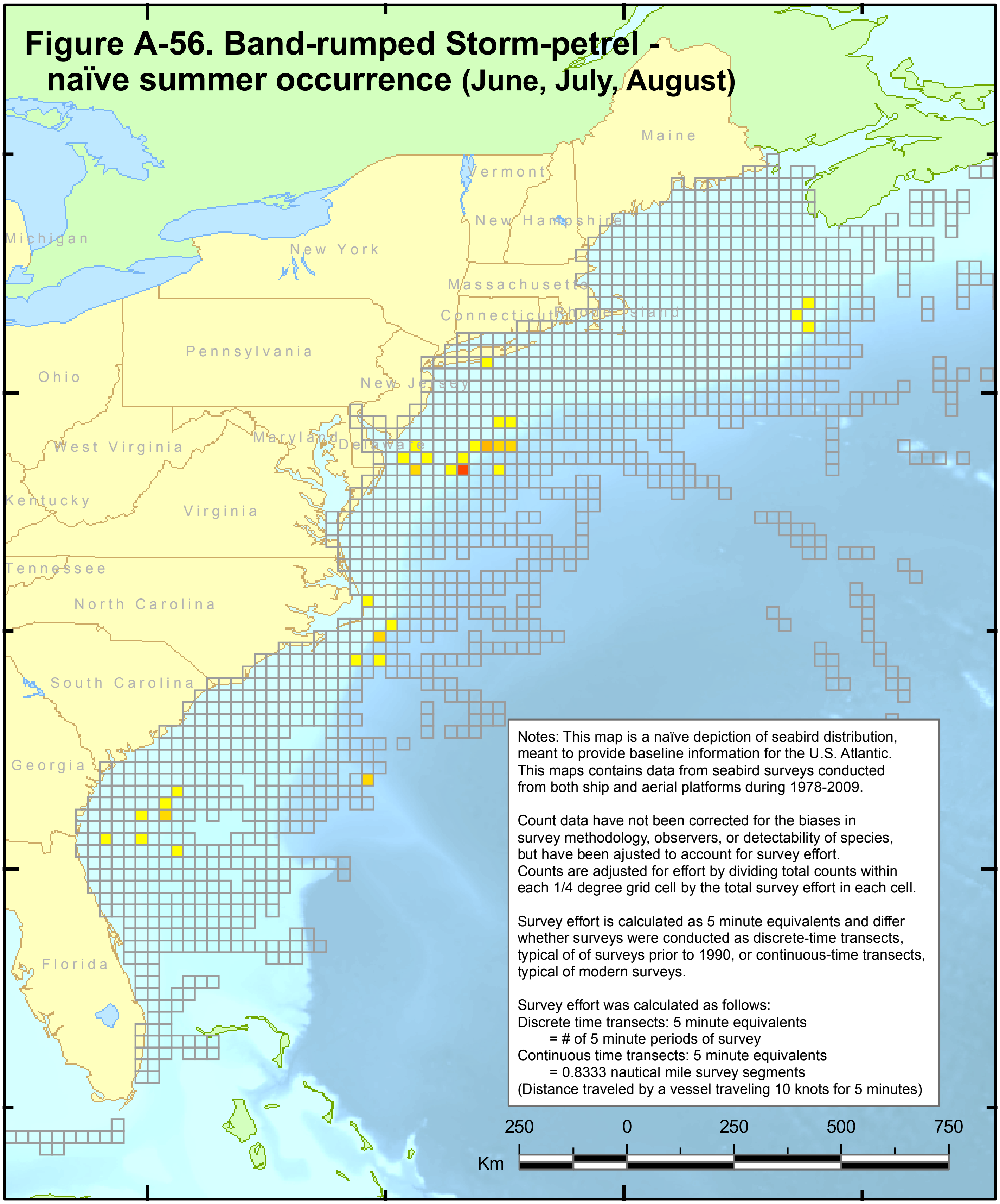
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5




# Figure A-56. Band-rumped Storm-petrel - naïve summer occurrence (June, July, August)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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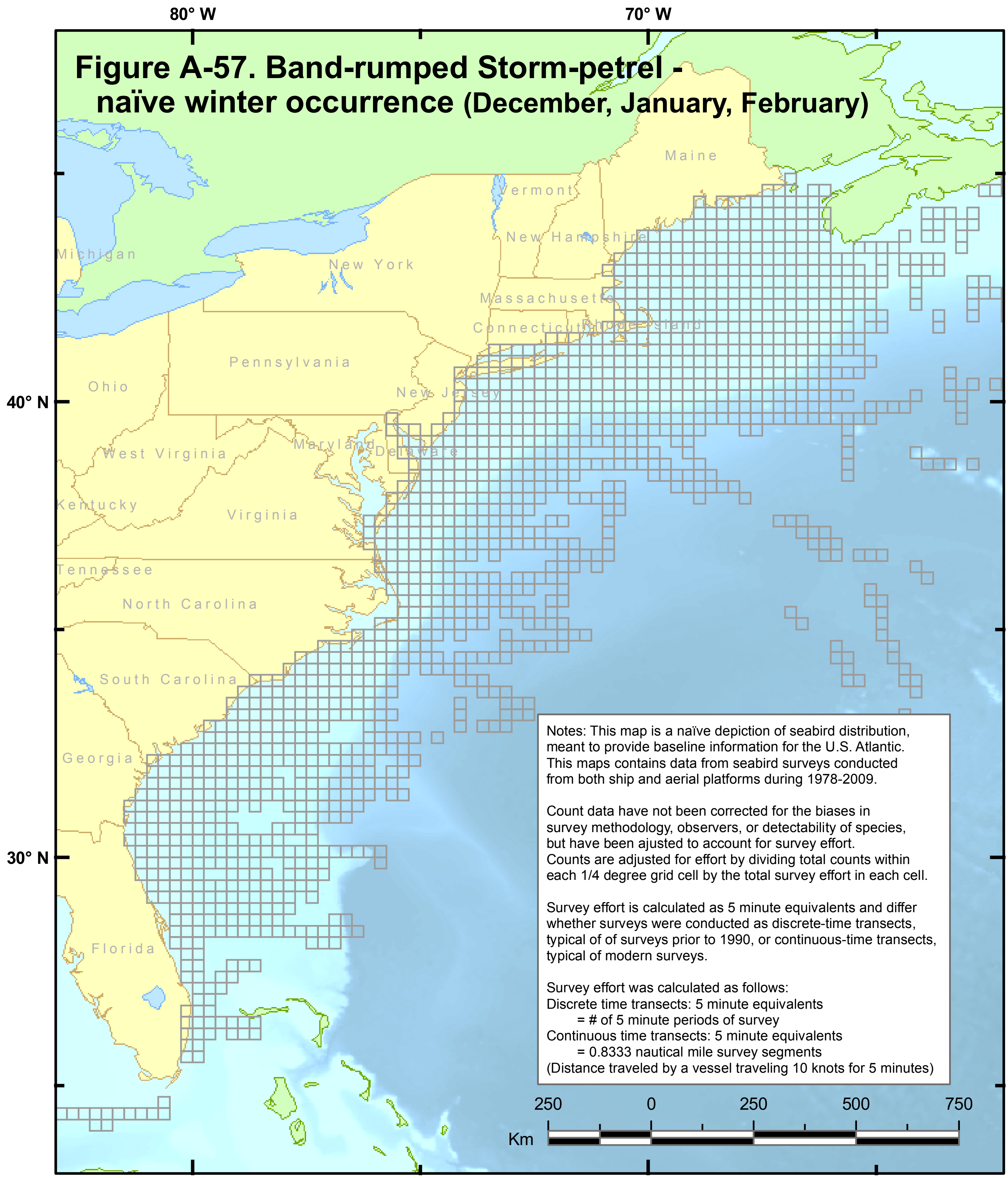
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-57. Band-rumped Storm-petrel - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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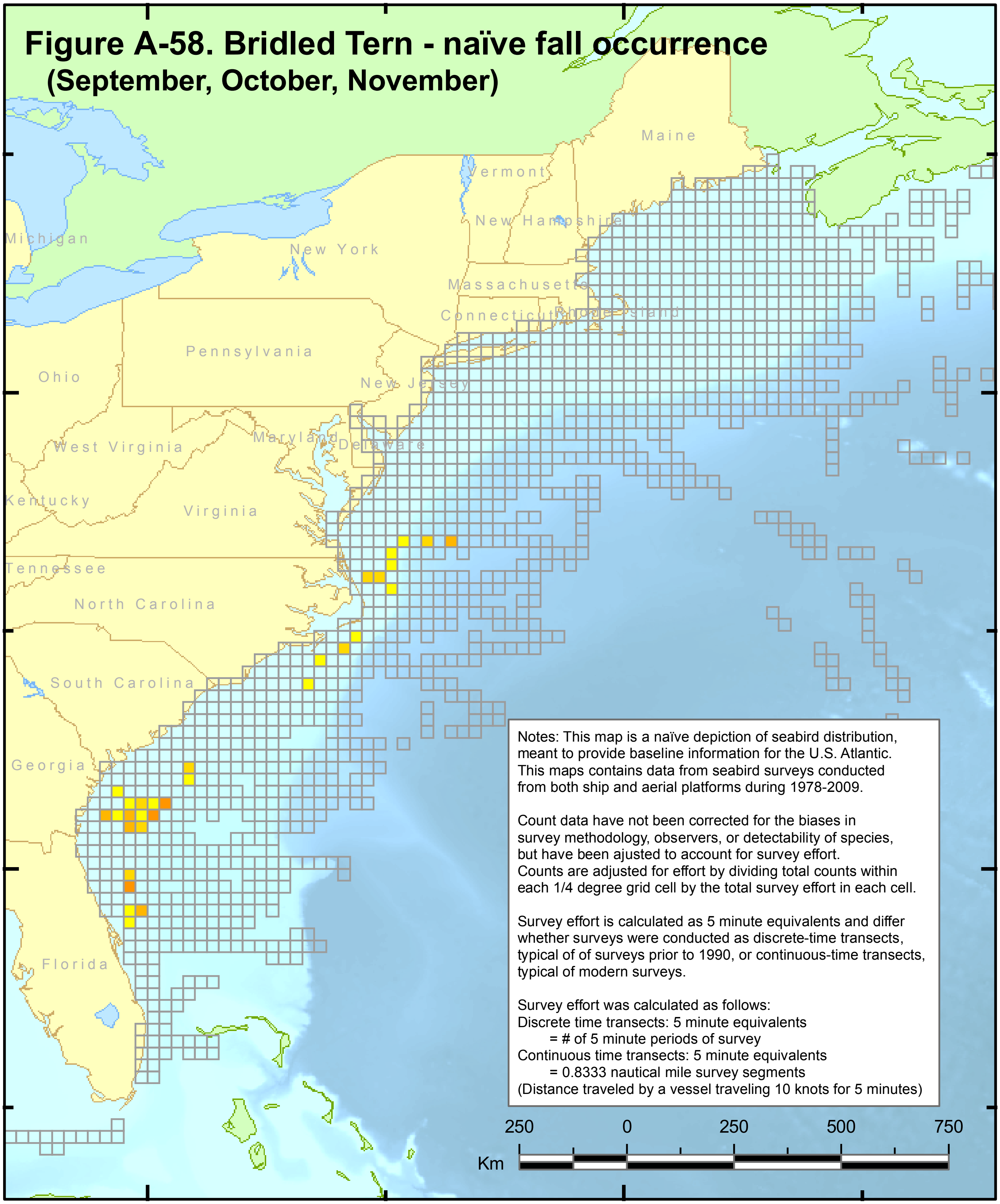
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-58. Bridled Tern - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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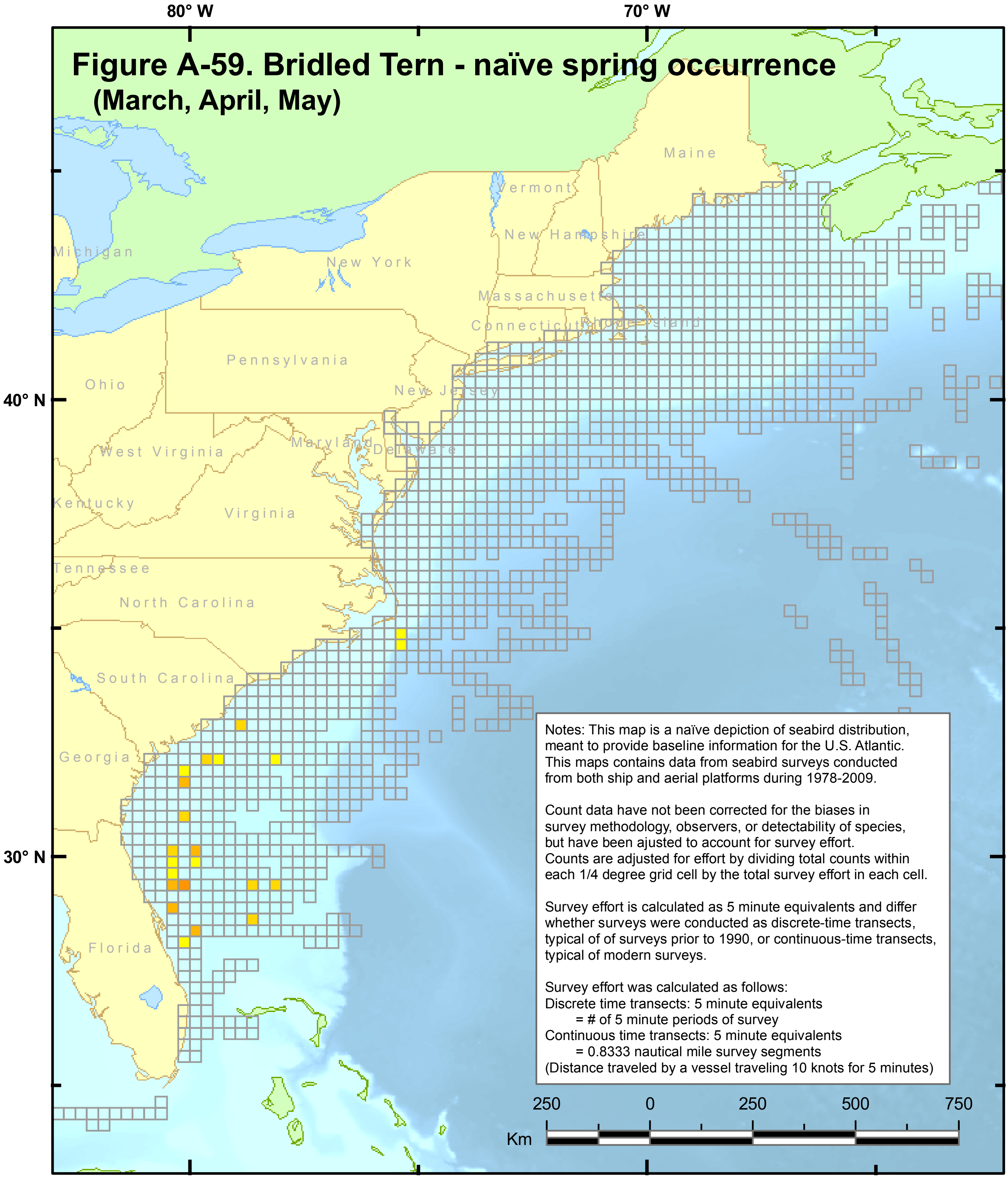
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5




# Figure A-59. Bridled Tern - naïve spring occurrence (March, April, May)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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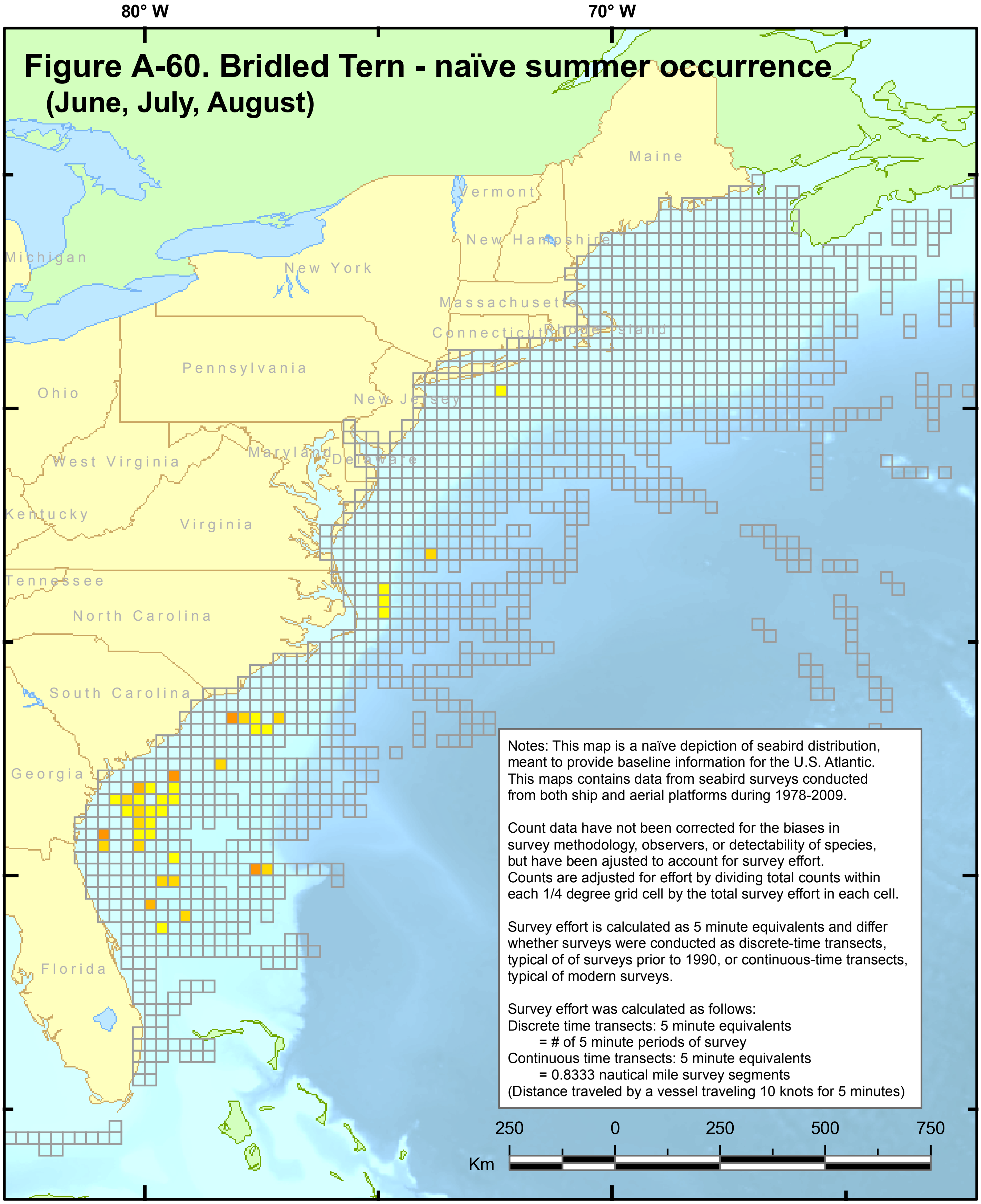
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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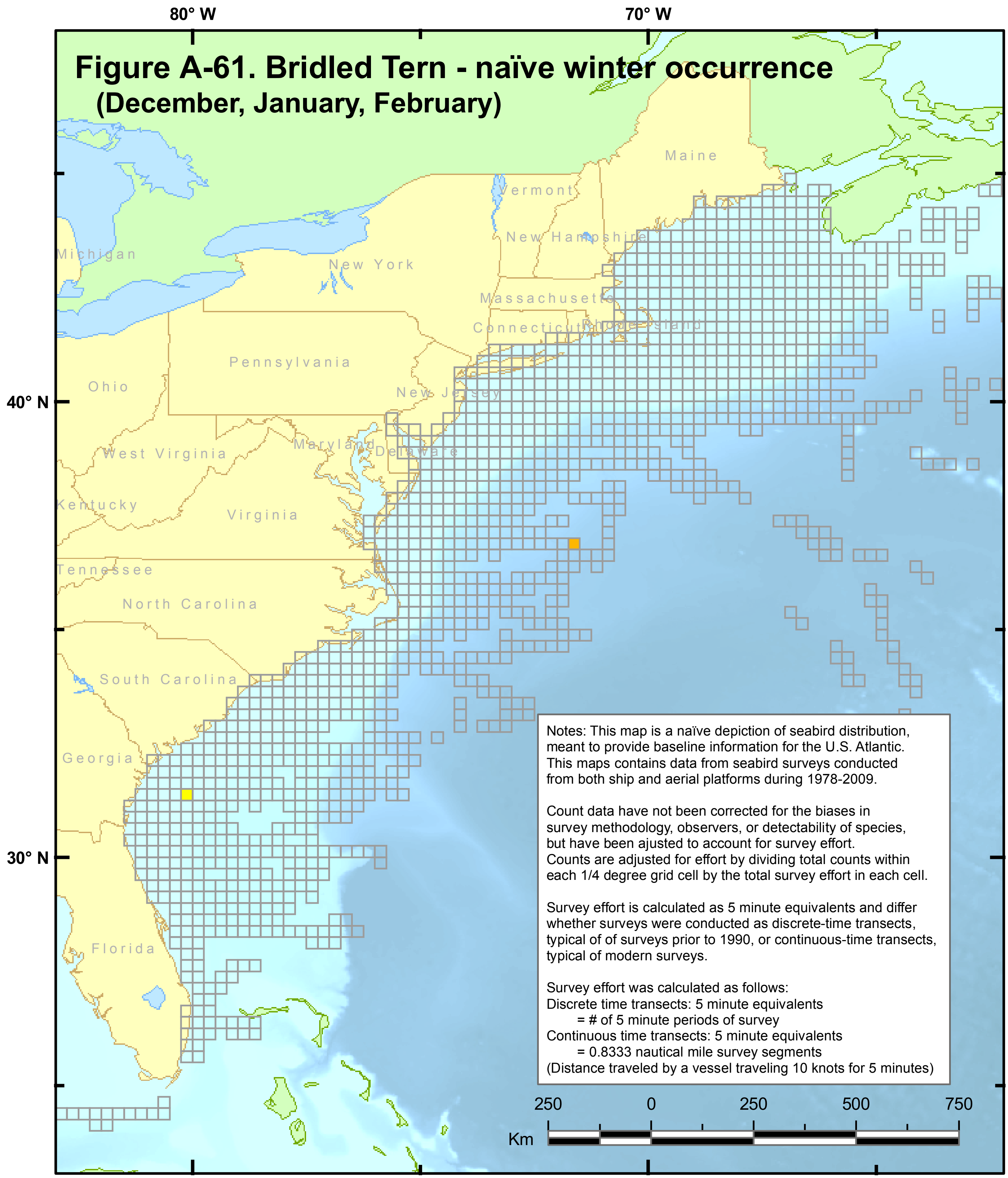
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-61. Bridled Tern - naïve winter occurrence (December, January, February)

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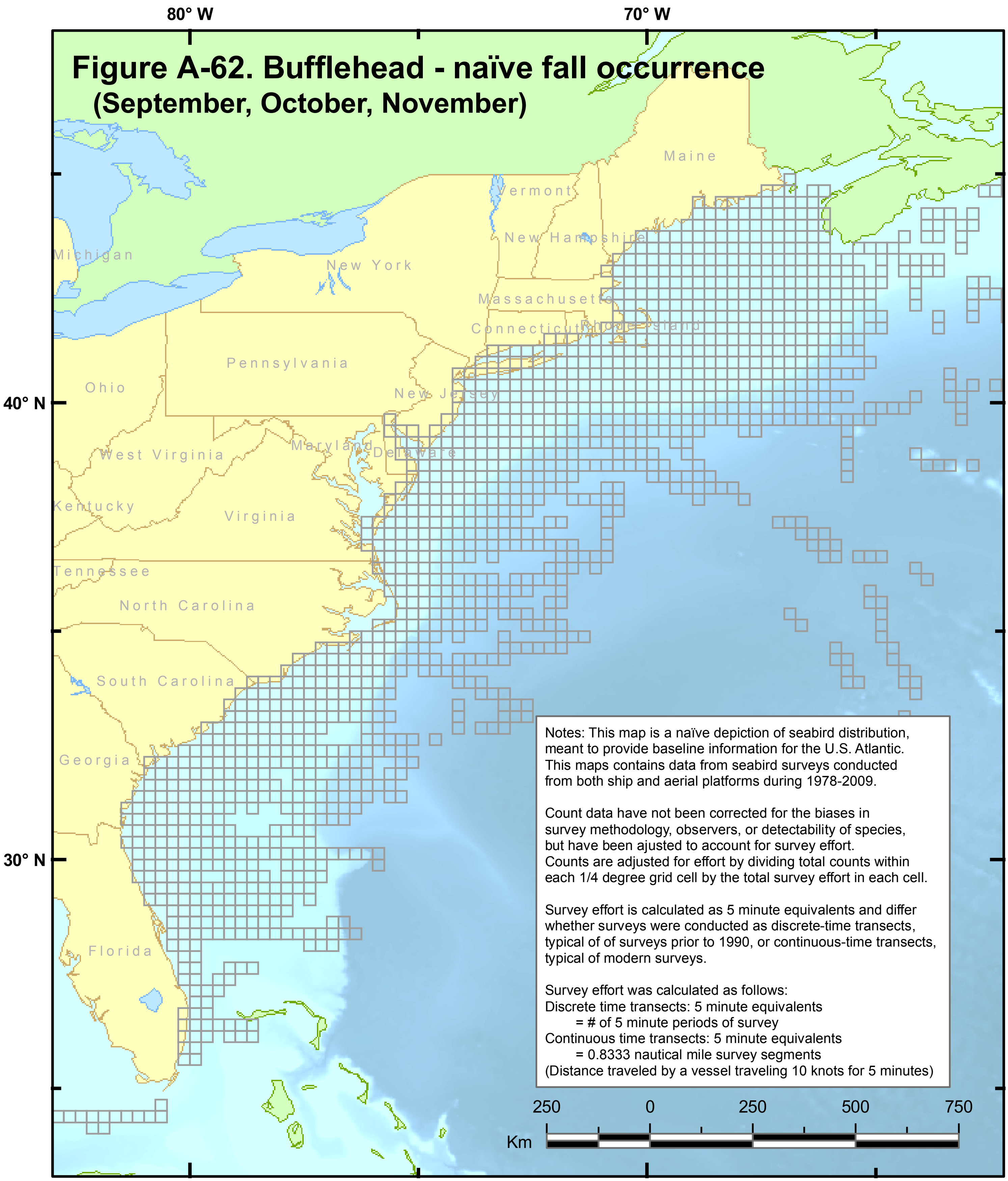
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-62. Bufflehead - naïve fall occurrence (September, October, November)

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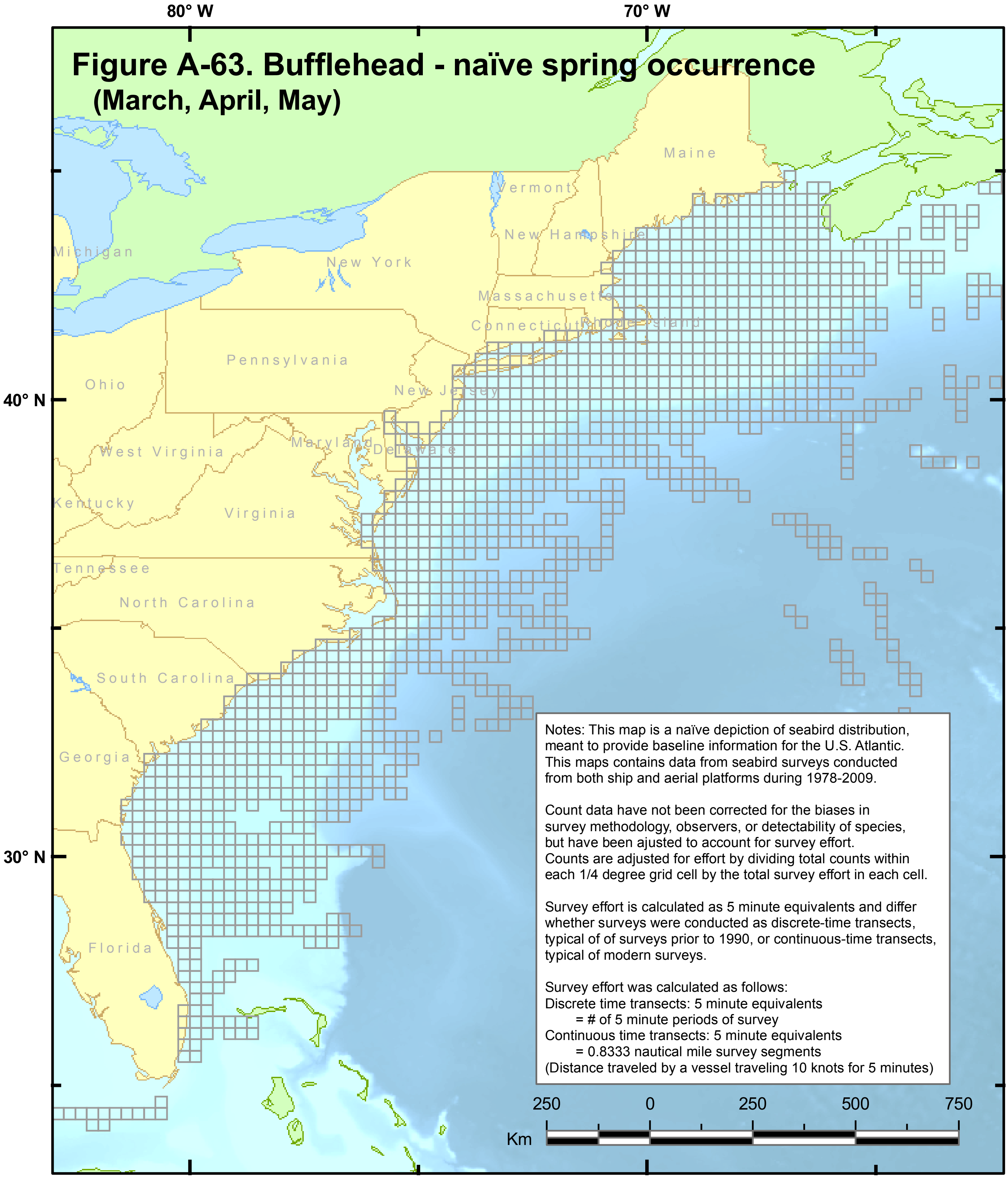
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-63. Bufflehead - naïve spring occurrence (March, April, May)

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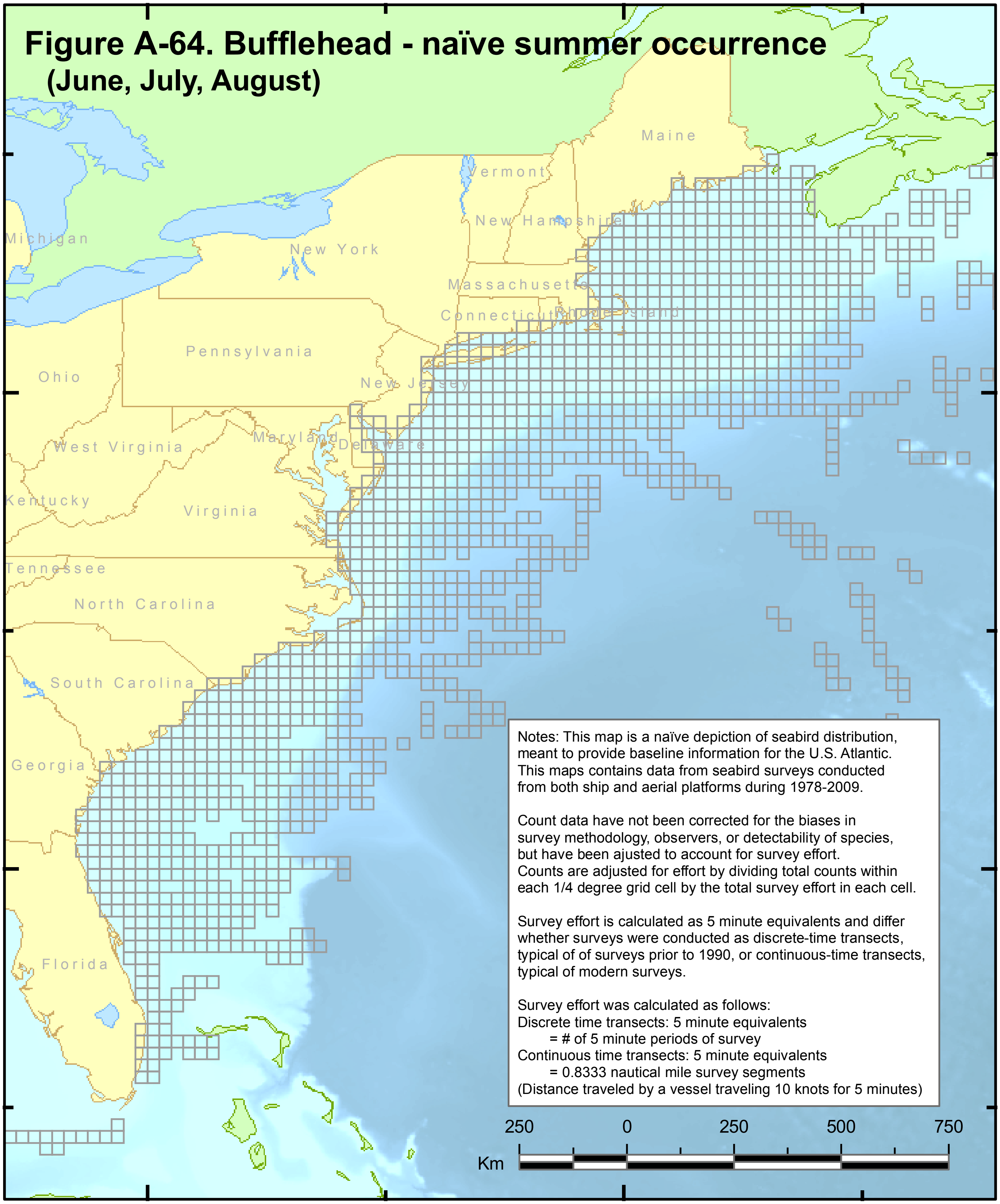
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-64. Bufflehead - naïve summer occurrence (June, July, August)




## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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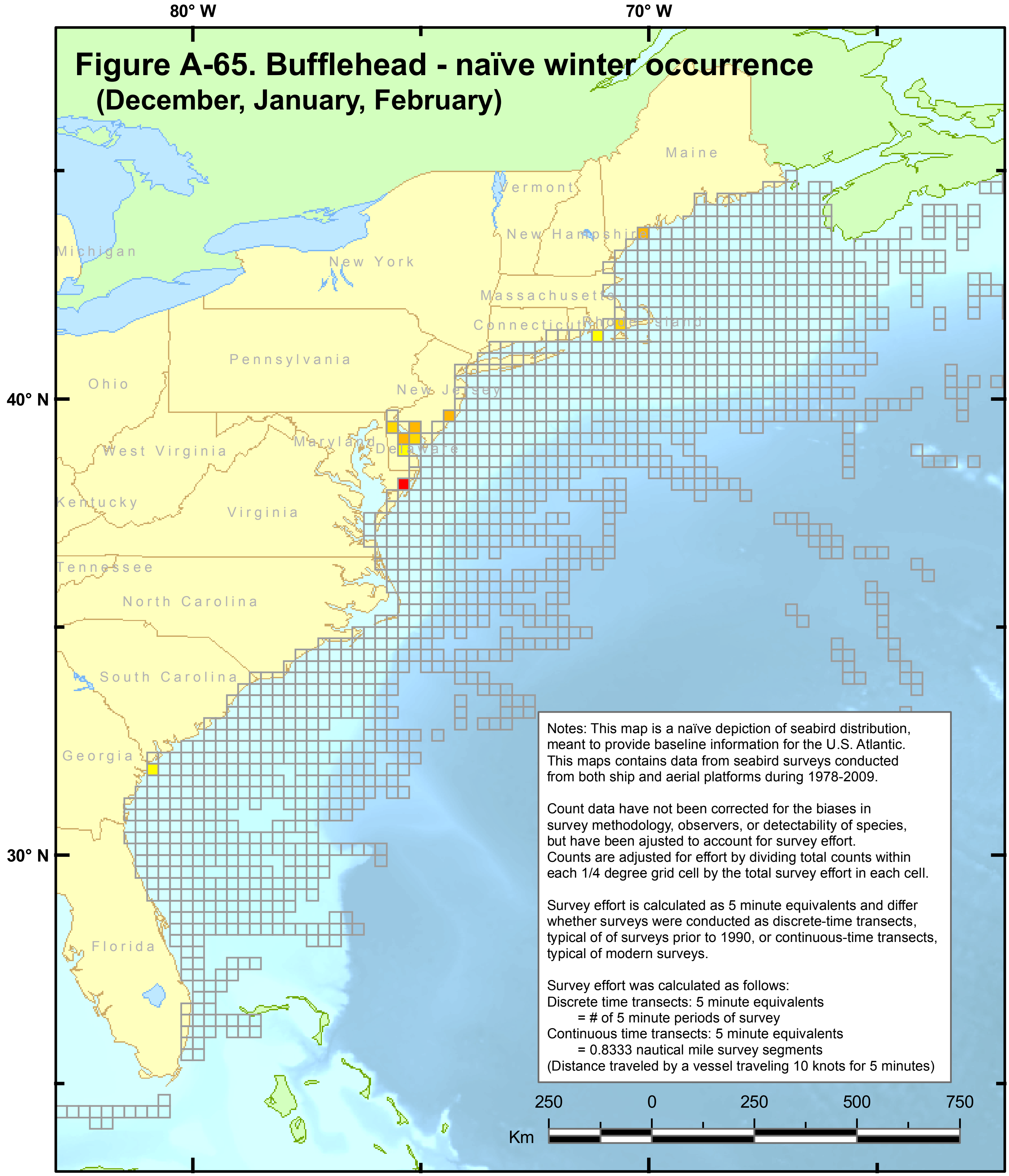
# Figure A-65. Bufflehead - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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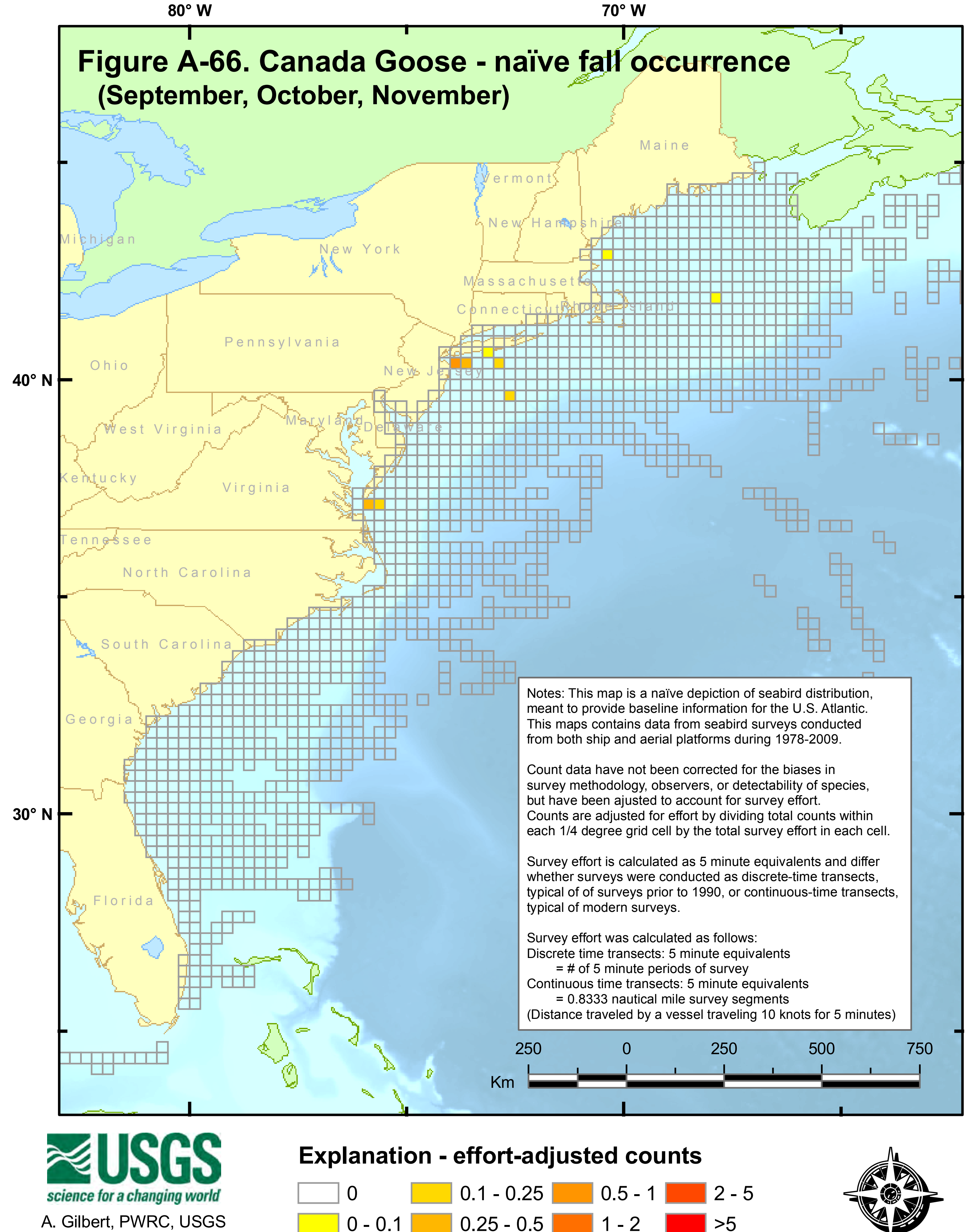
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 24.1

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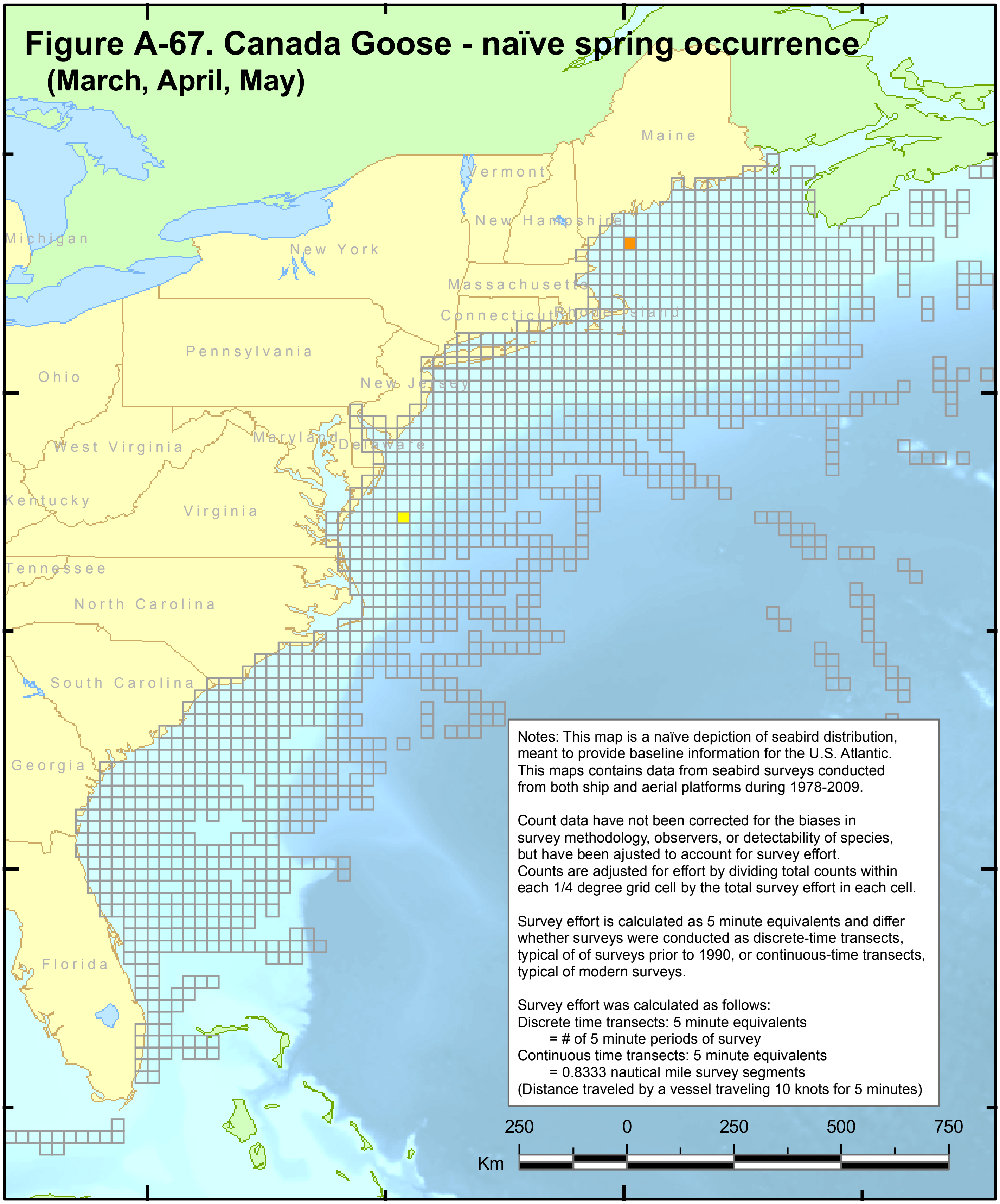
# Figure A-67. Canada Goose - naïve spring occurrence
(March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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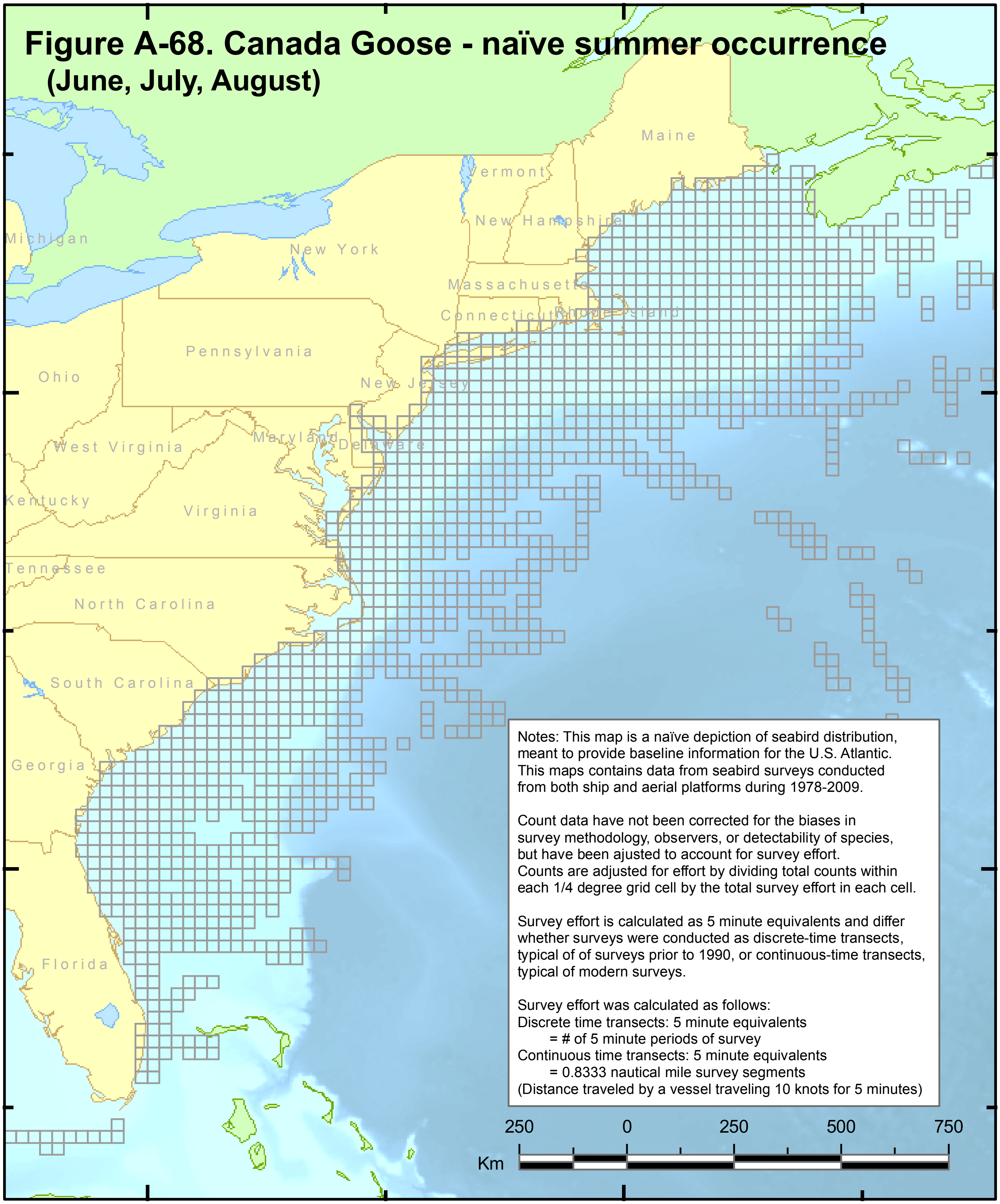
**Explanation - effort-adjusted counts**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 | | 0.1 - 0.25 | | 0.5 - 1 | | 2 - 5 |
| | 0 - 0.1 | | 0.25 - 0.5 | | 1 - 2 | | >5 |

# Figure A-68. Canada Goose - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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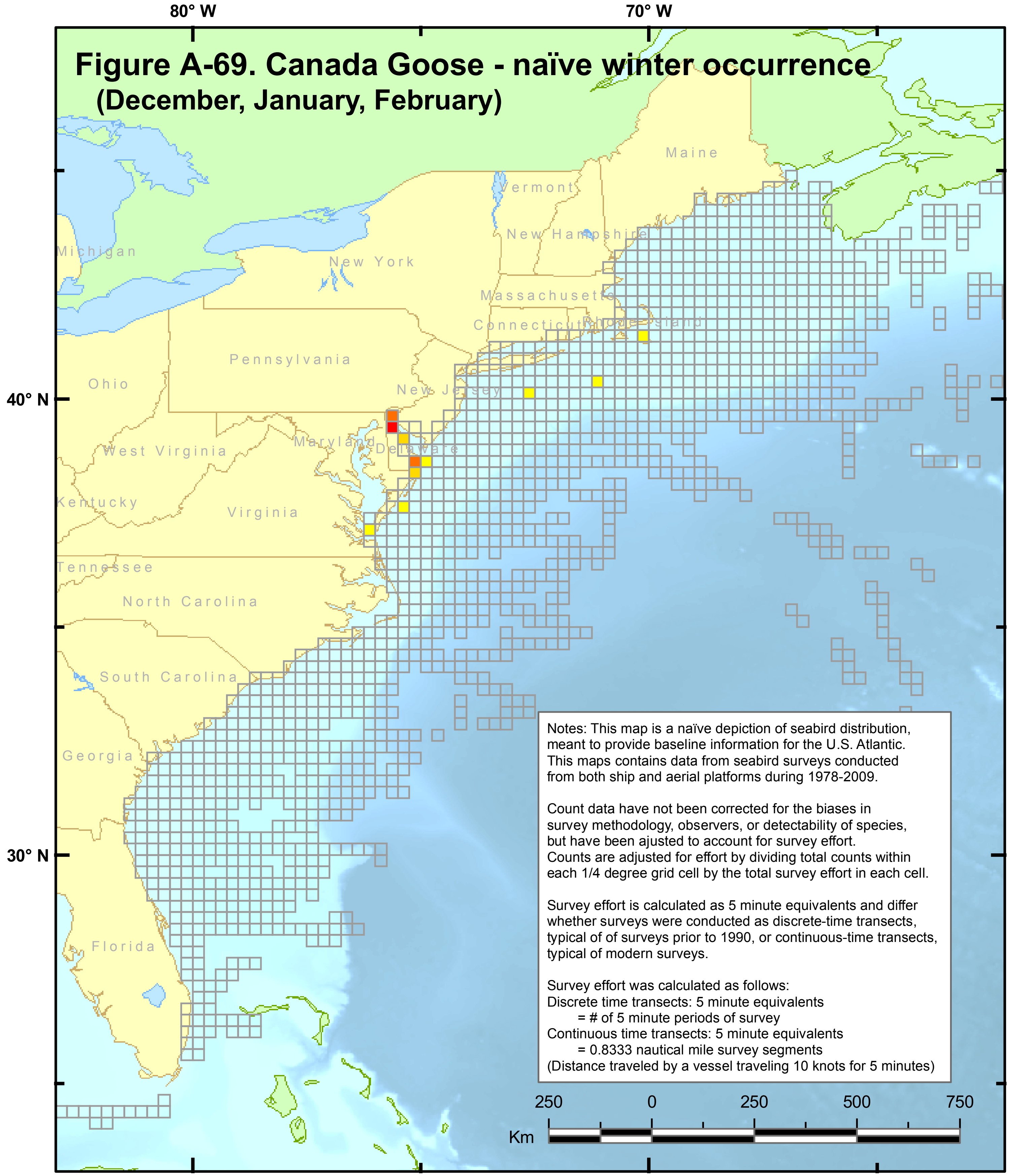
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-69. Canada Goose - naïve winter occurrence (December, January, February)

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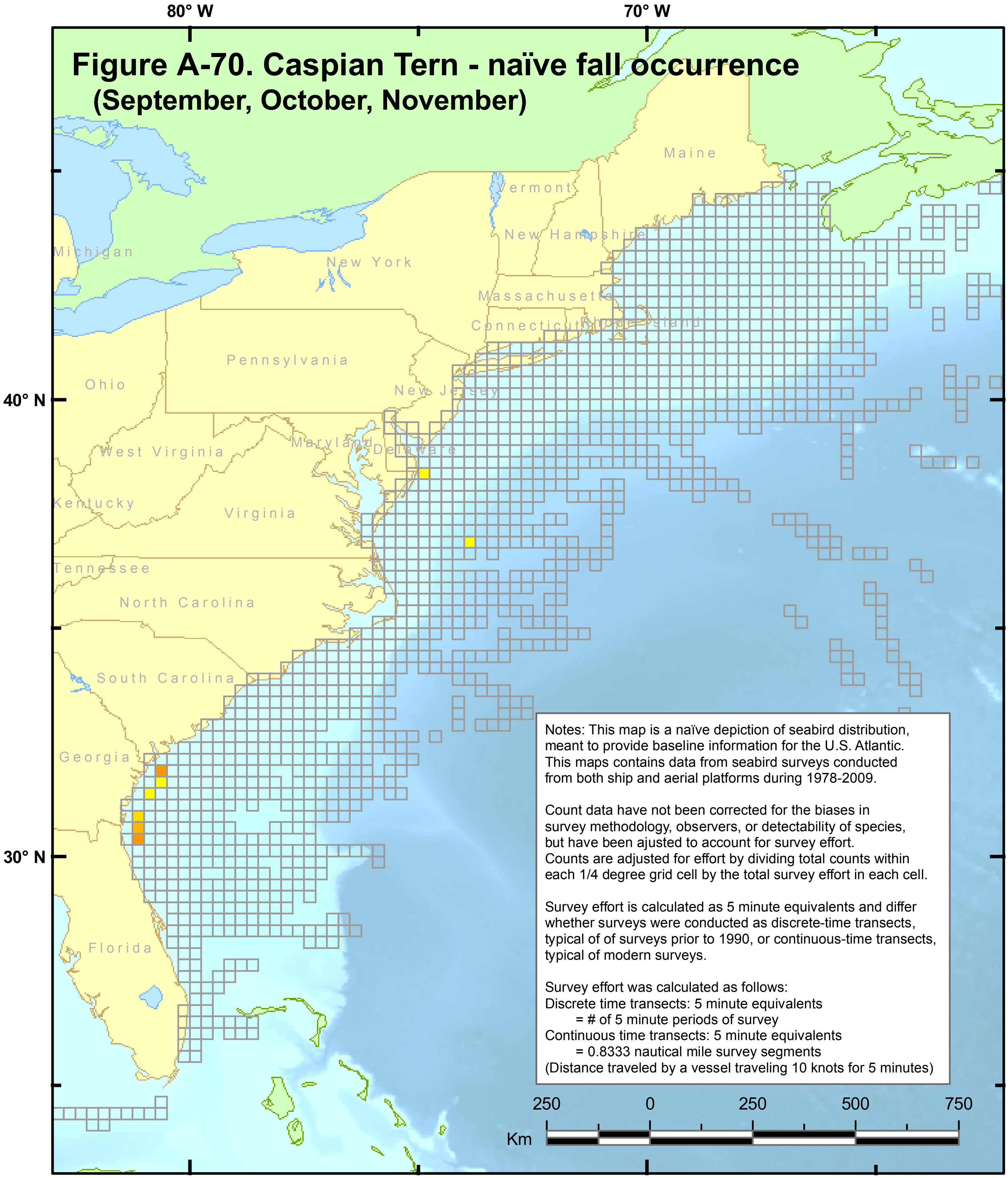
## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 8.3

**Figure A-70. Caspian Tern - naïve fall occurrence (September, October, November)**

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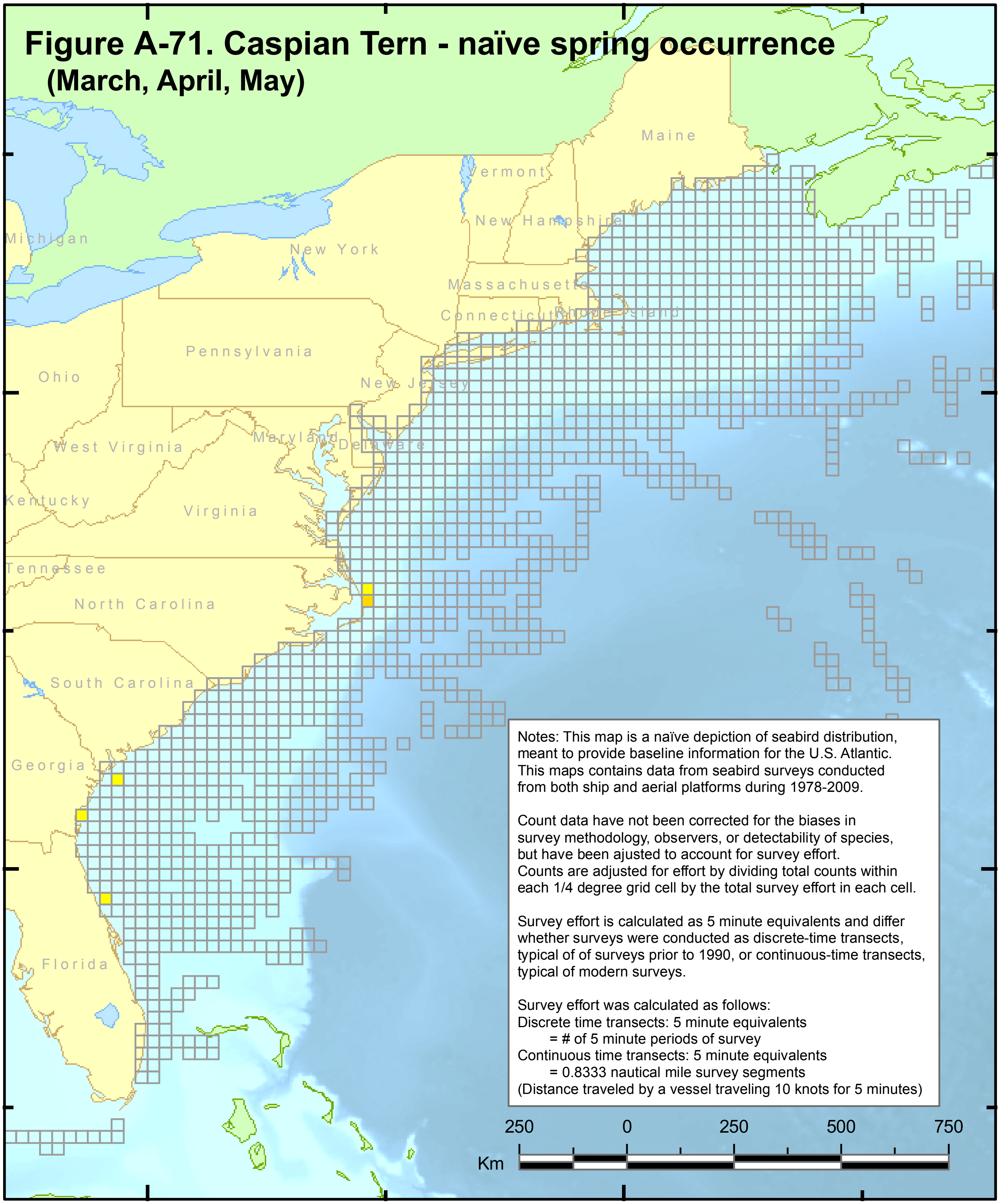
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-71. Caspian Tern - naïve spring occurrence (March, April, May)

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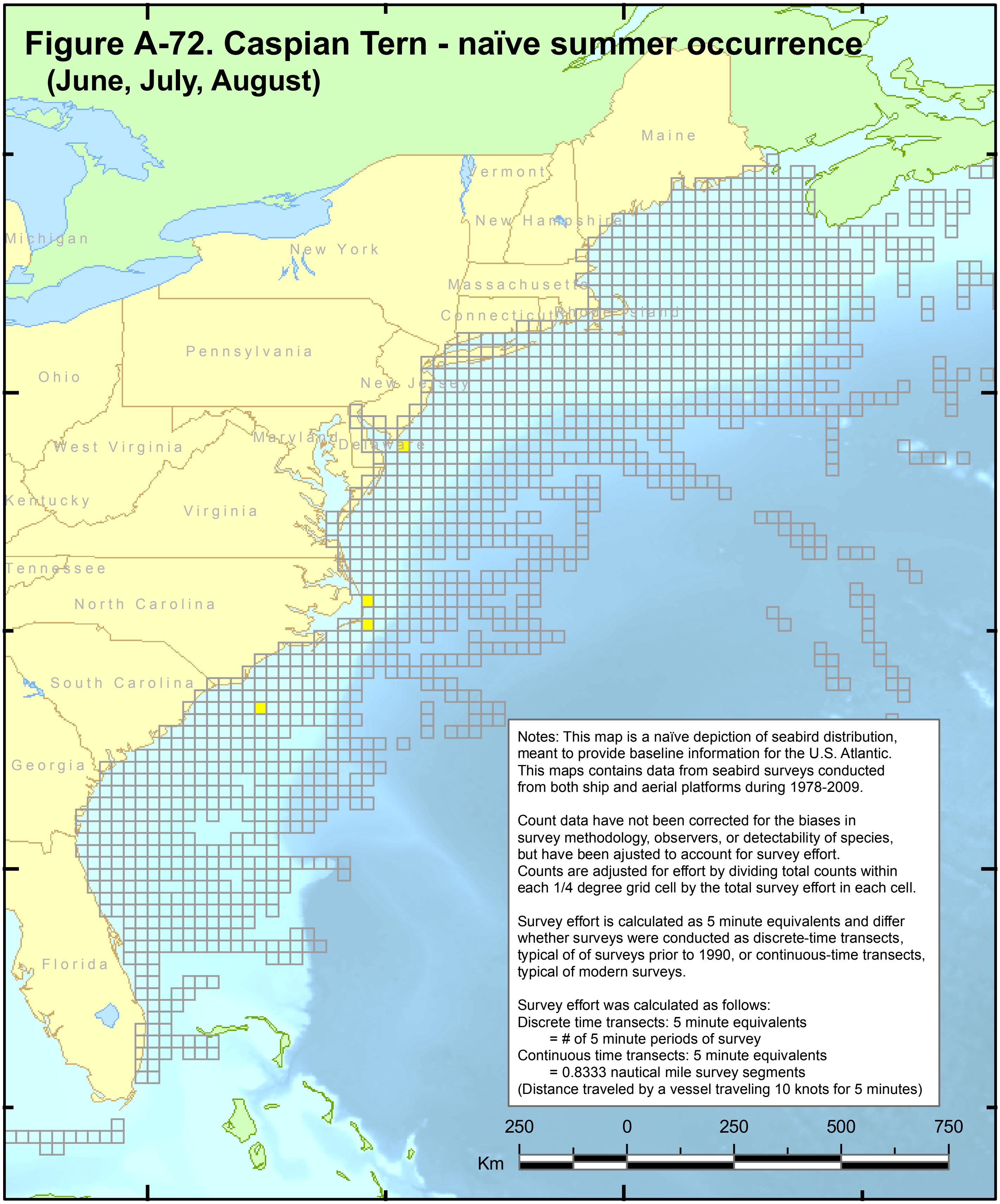
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5Figure 71.

# Figure A-72. Caspian Tern - naïve summer occurrence (June, July, August)




**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5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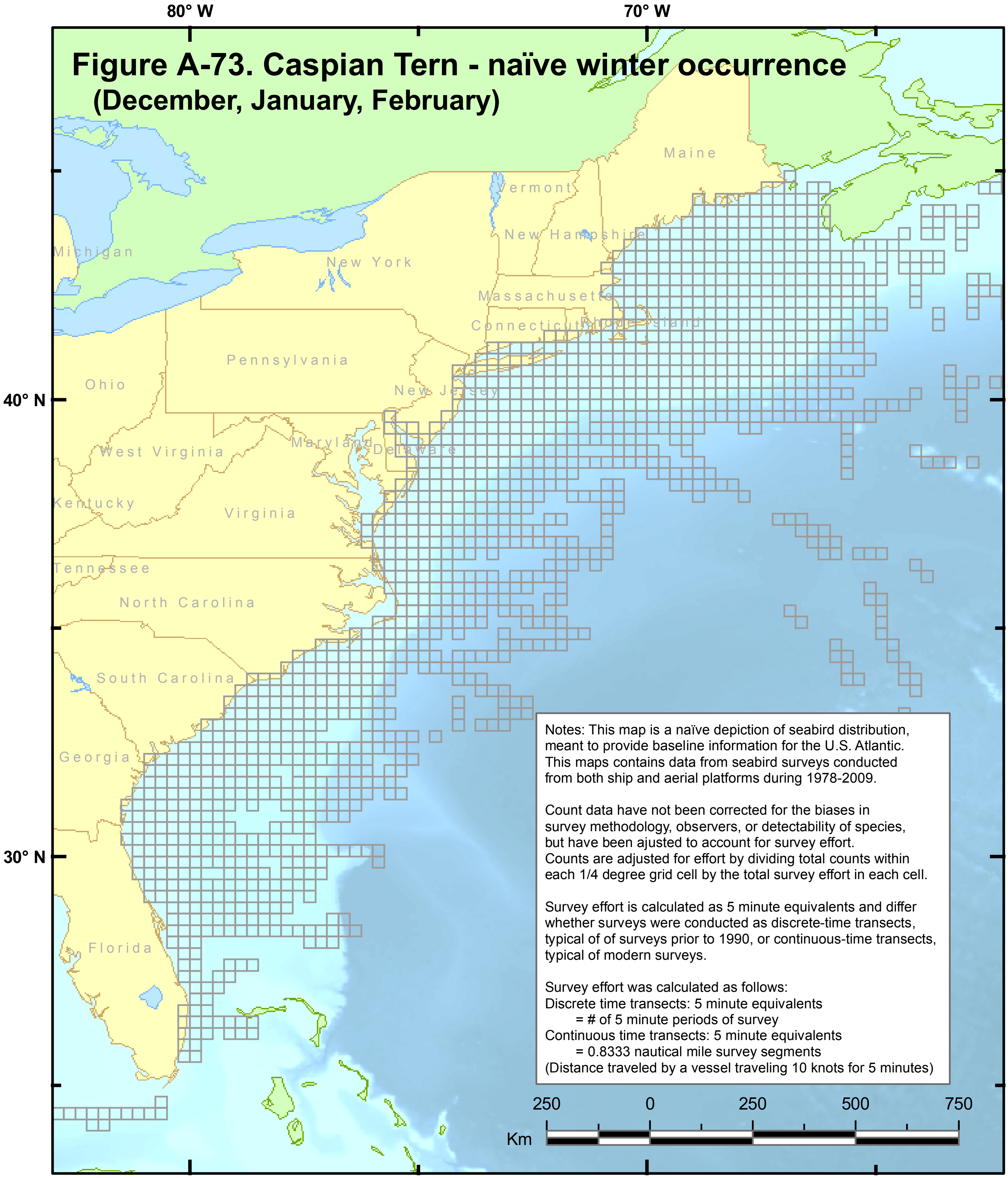
Map produced: 5/28/2010




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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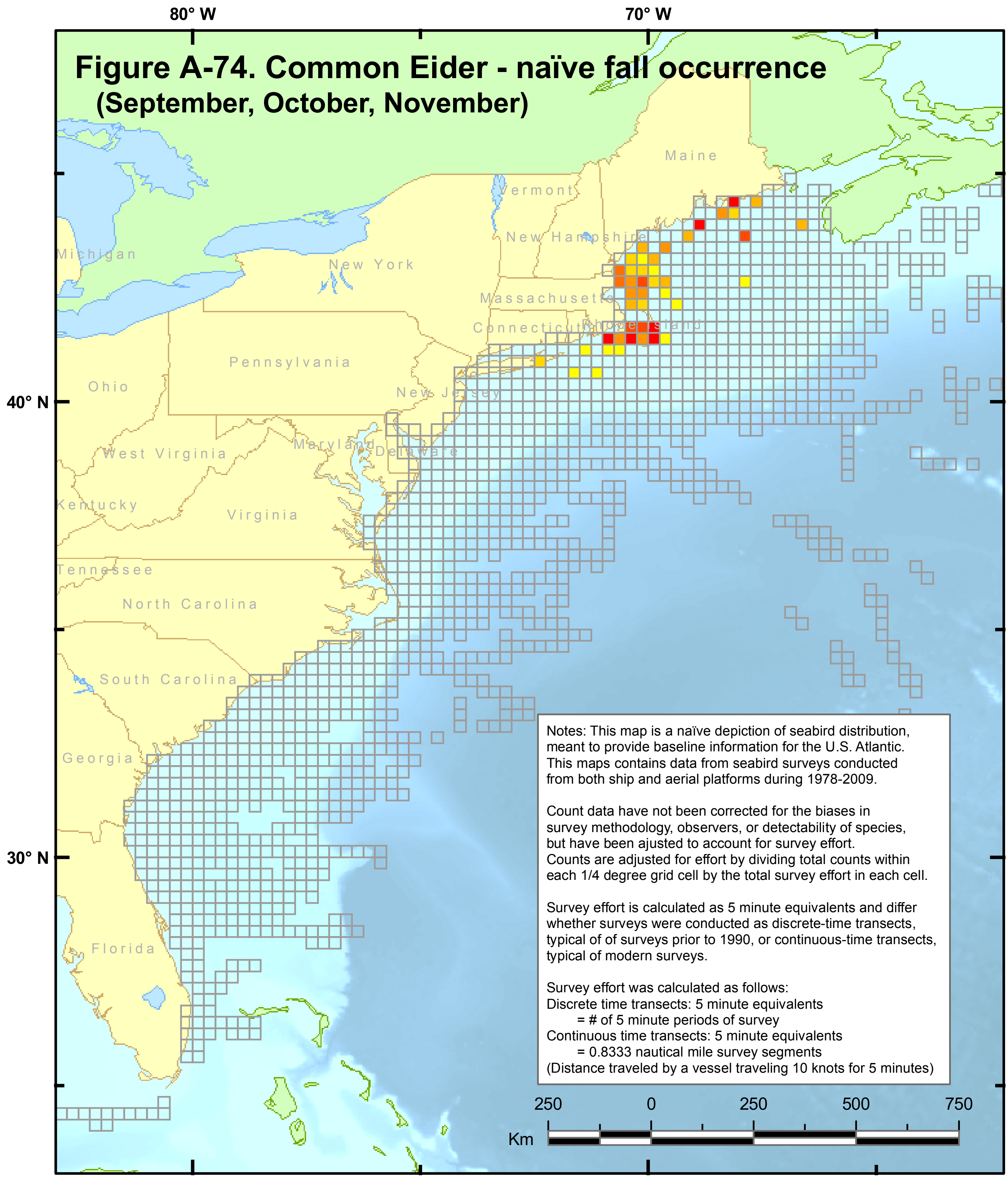


# Figure A-74. Common Eider - naïve fall occurrence (September, October, November)

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 329.8 |

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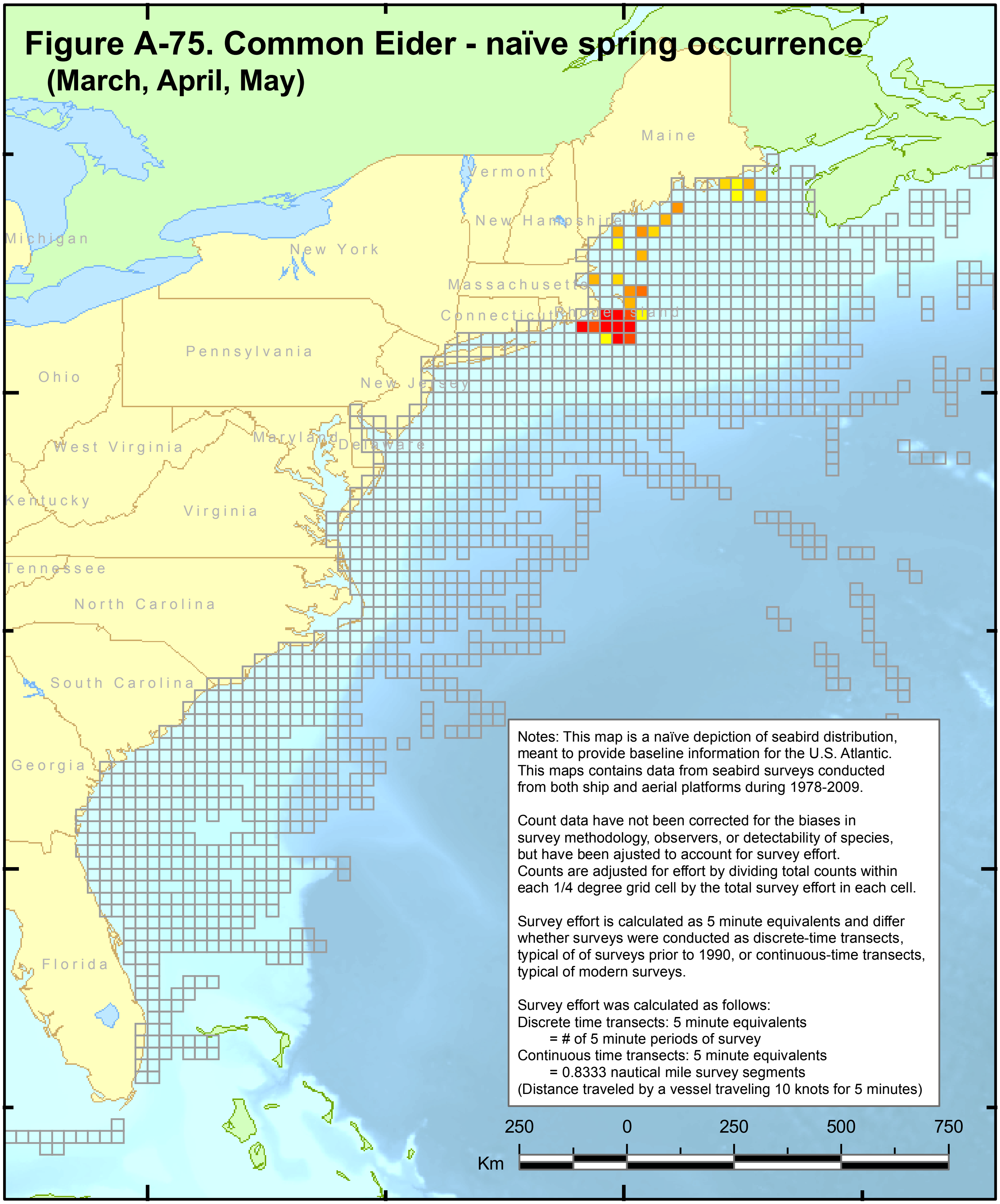
# Figure A-75. Common Eider - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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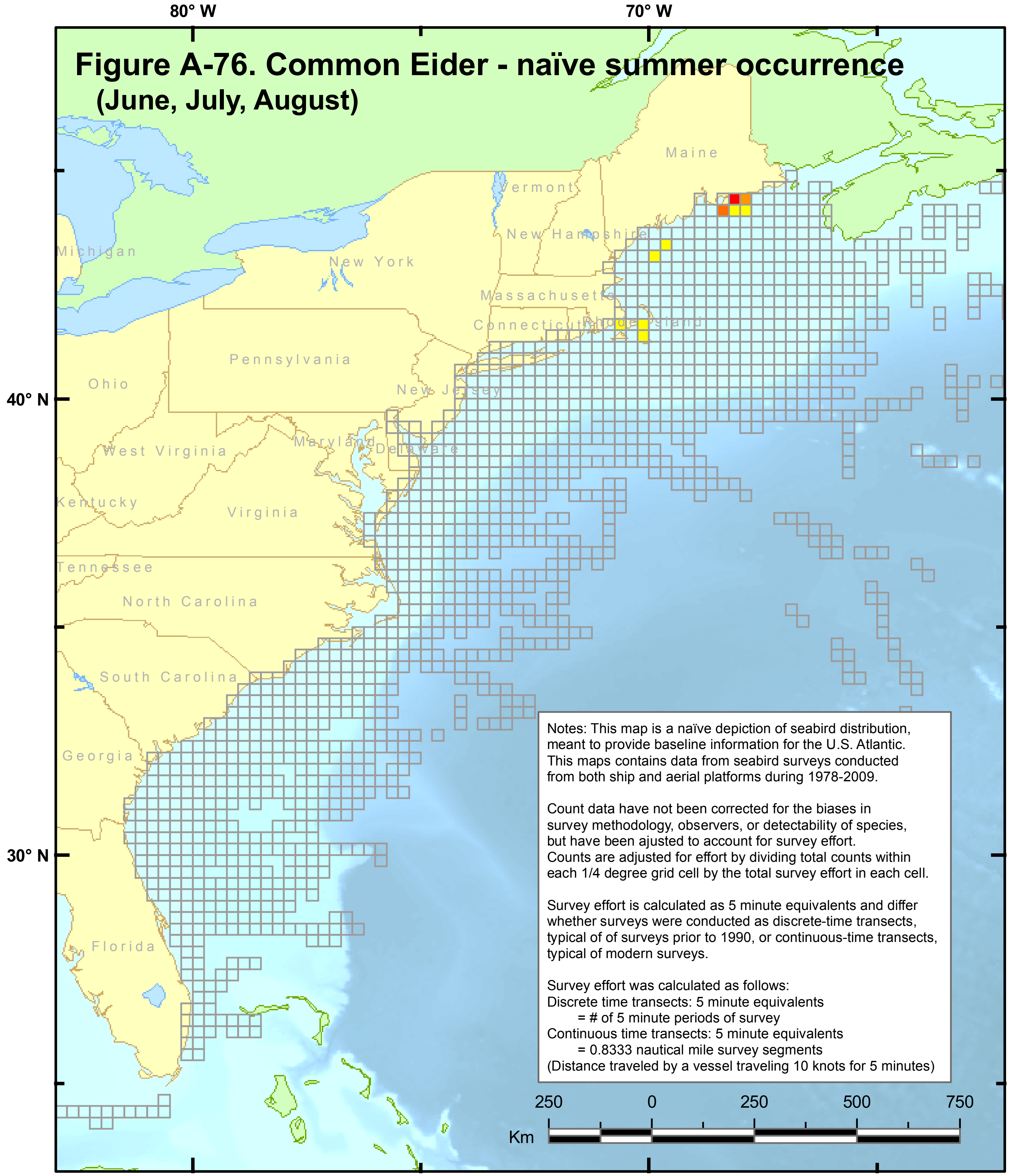
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 109.4 |

# Figure A-76. Common Eider - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 25.3 |

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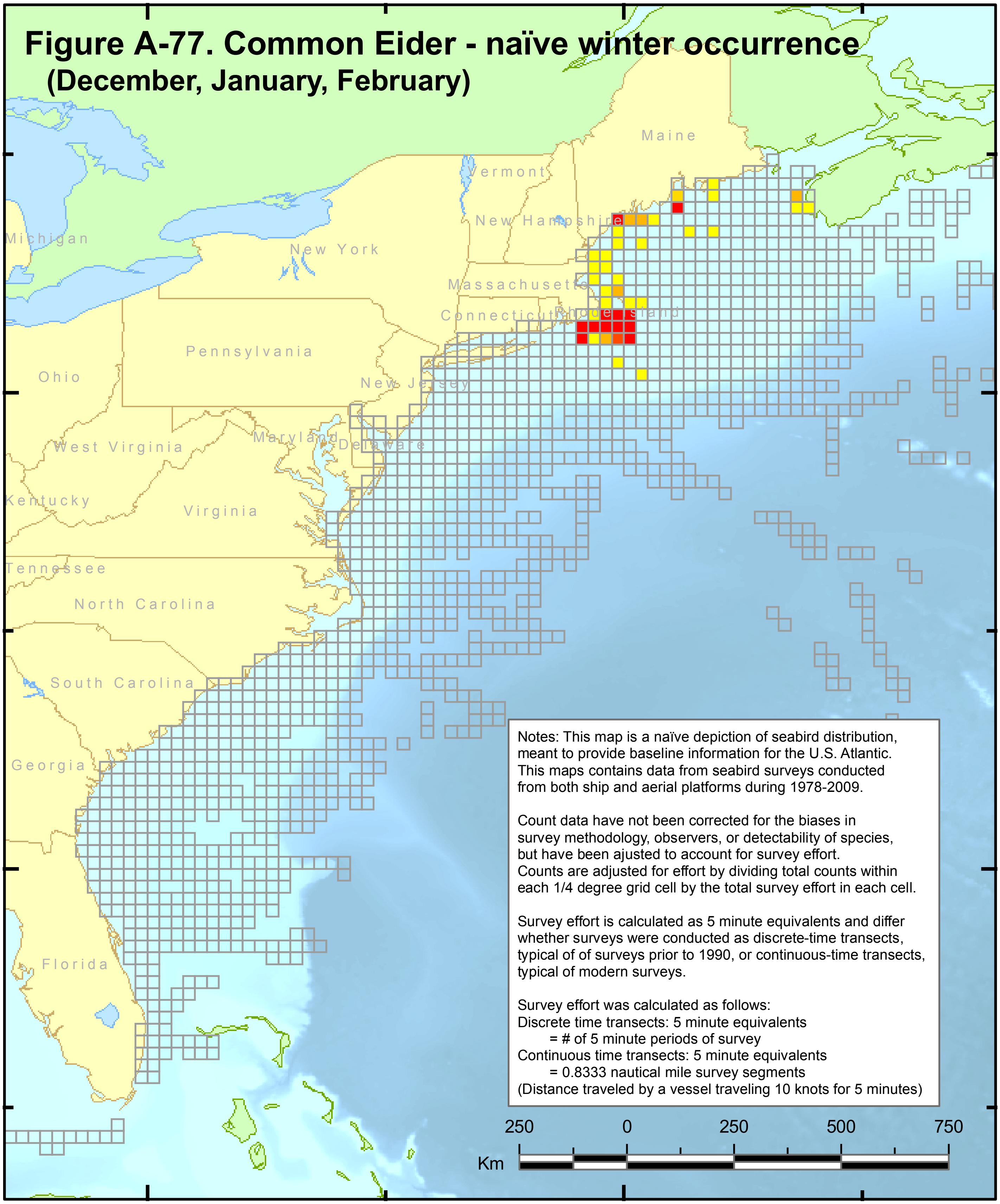


# Figure A-77. Common Eider - naïve winter occurrence (December, January, February)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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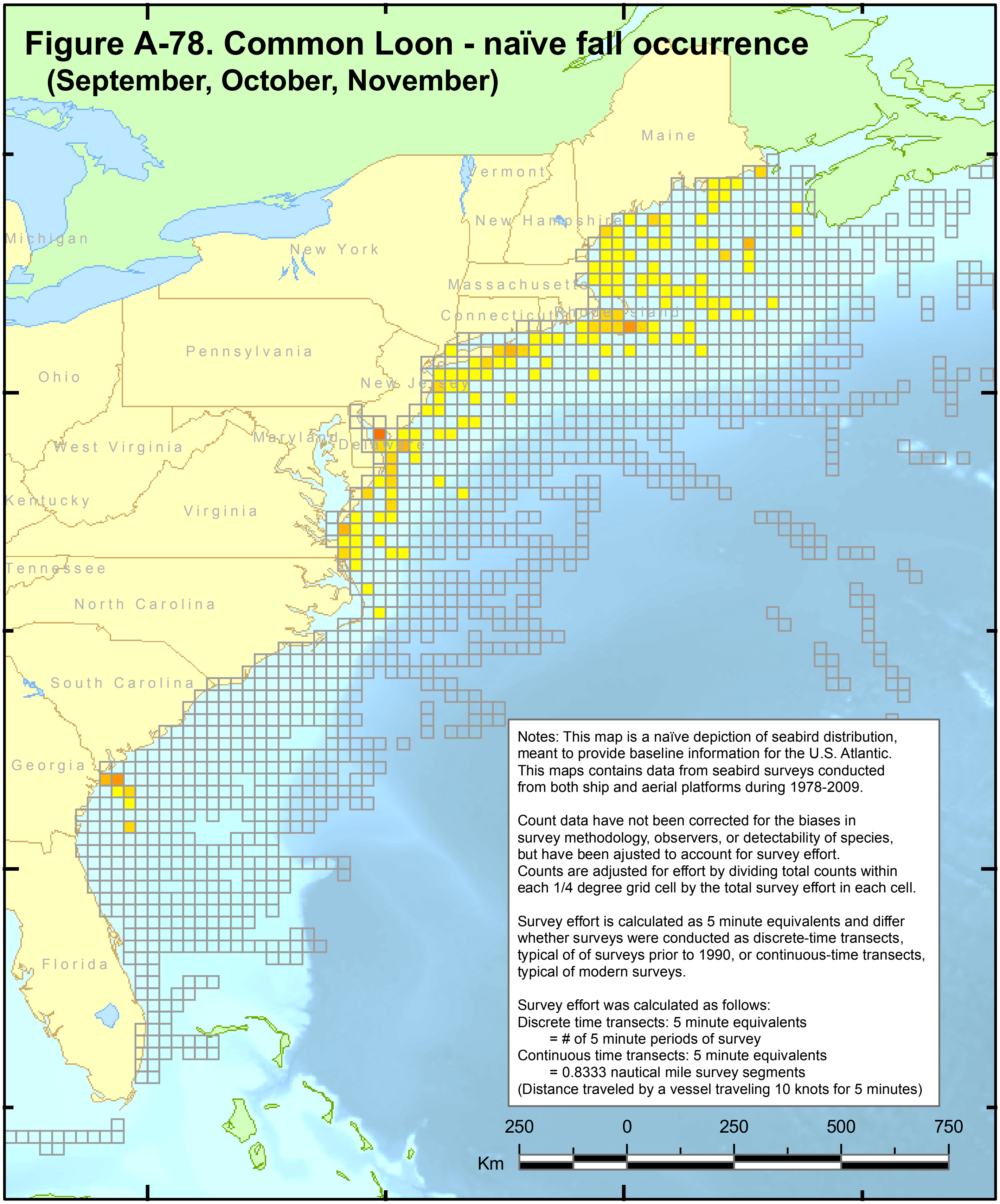
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 558.8

# Figure A-78. Common Loon - naïve fall occurrence (September, October, November)

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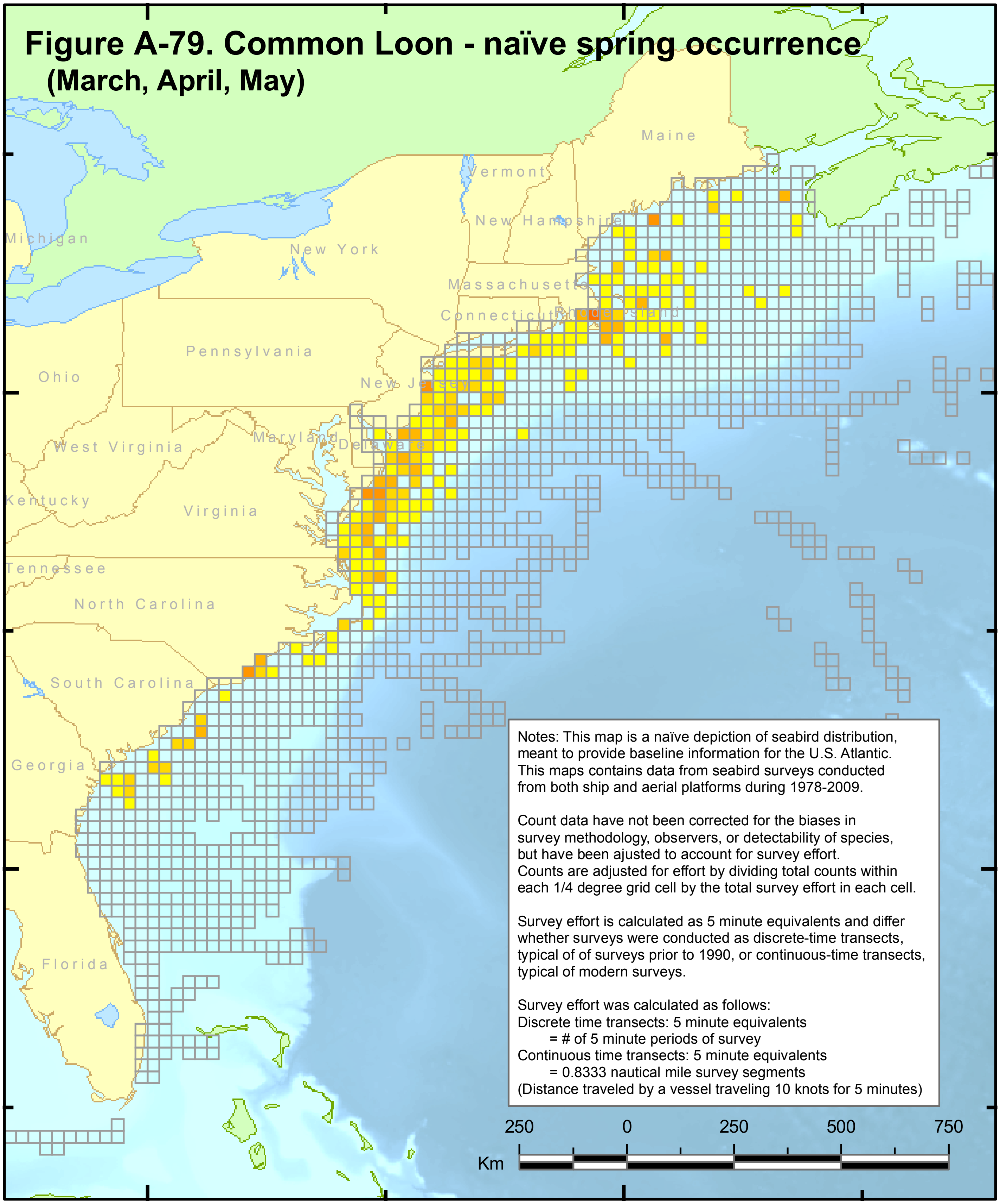
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5F |

# Figure A-79. Common Loon - naïve spring occurrence (March, April, May)

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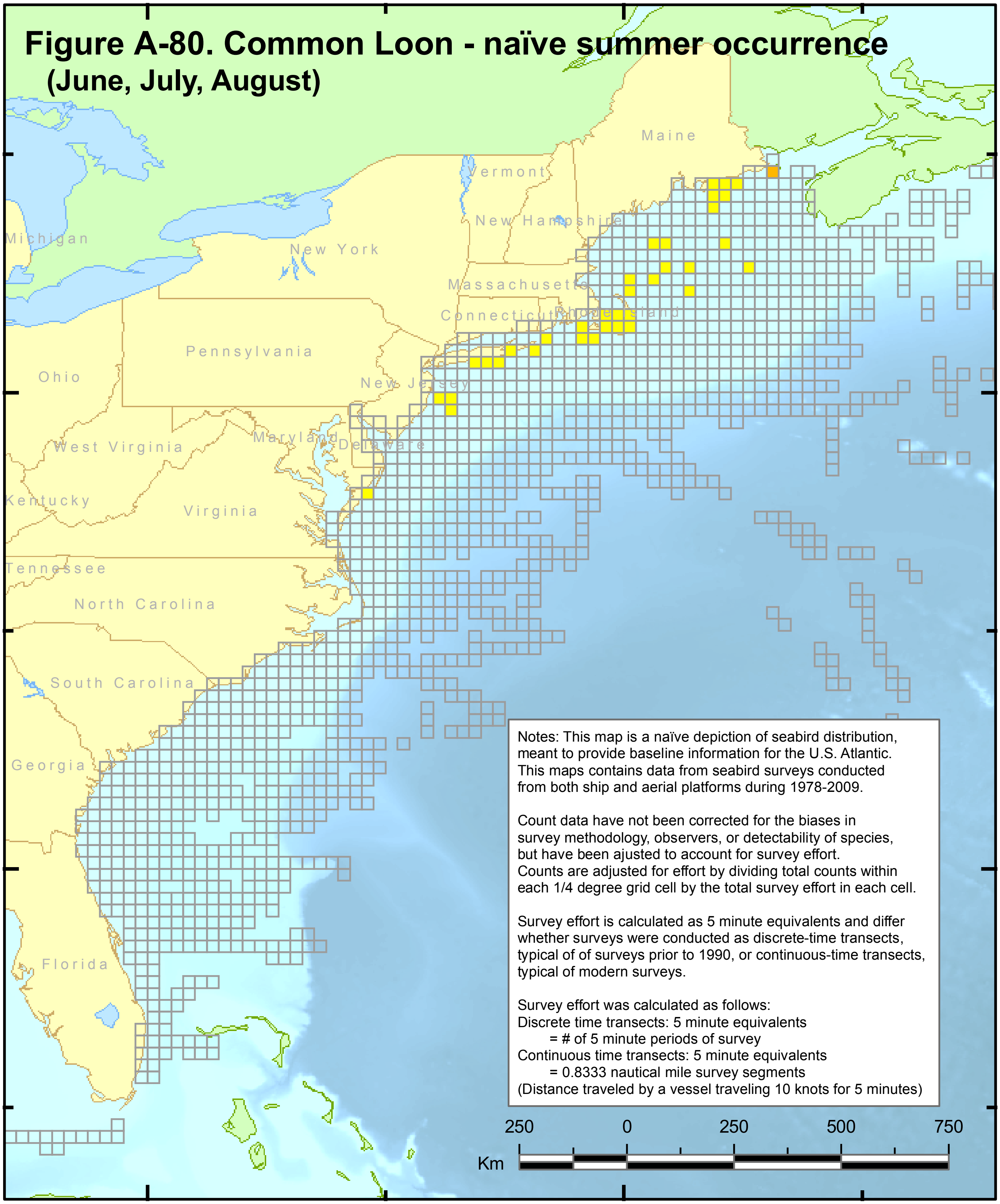
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-80. Common Loon - naïve summer occurrence (June, July, August)

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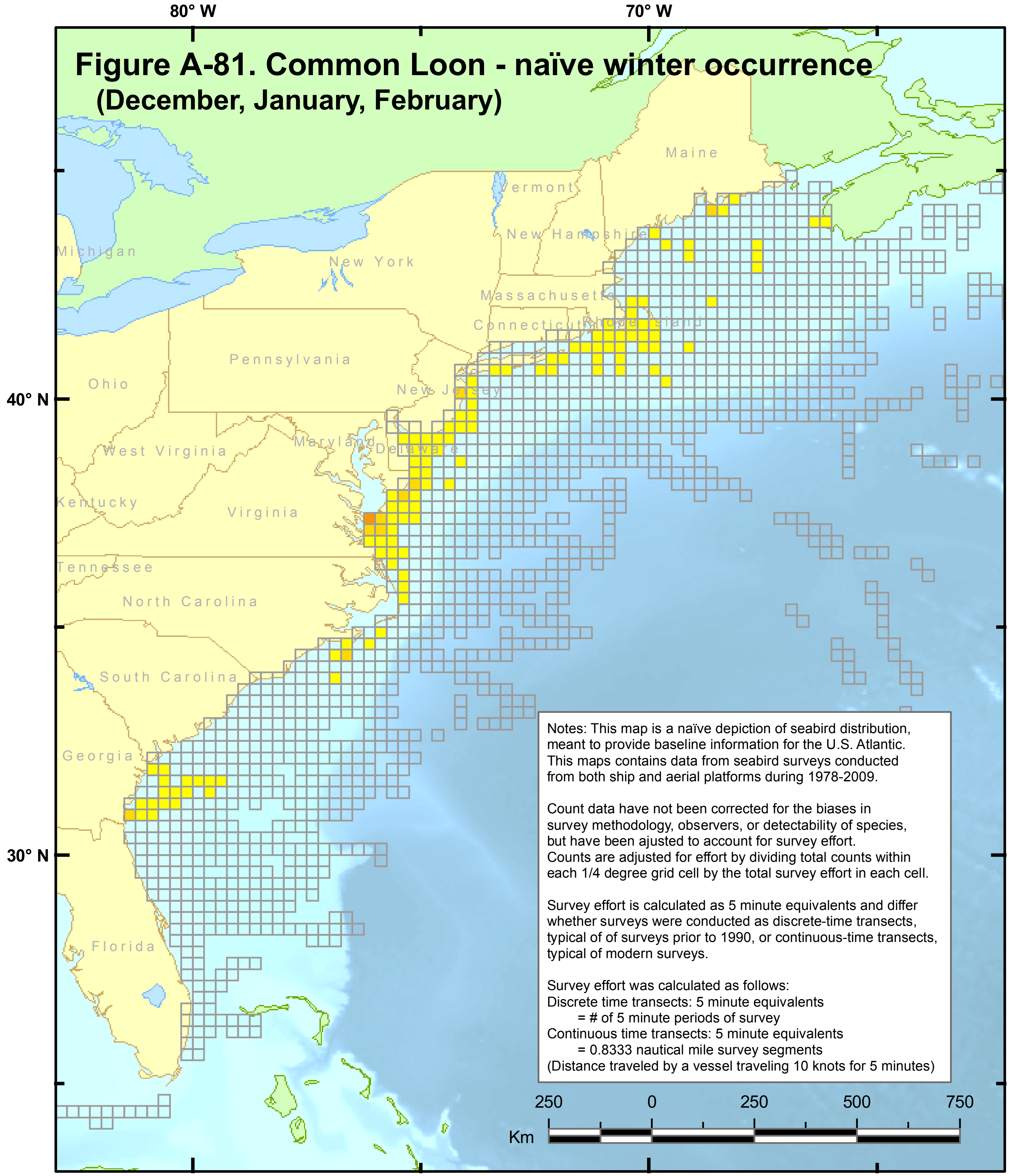
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-81. Common Loon - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

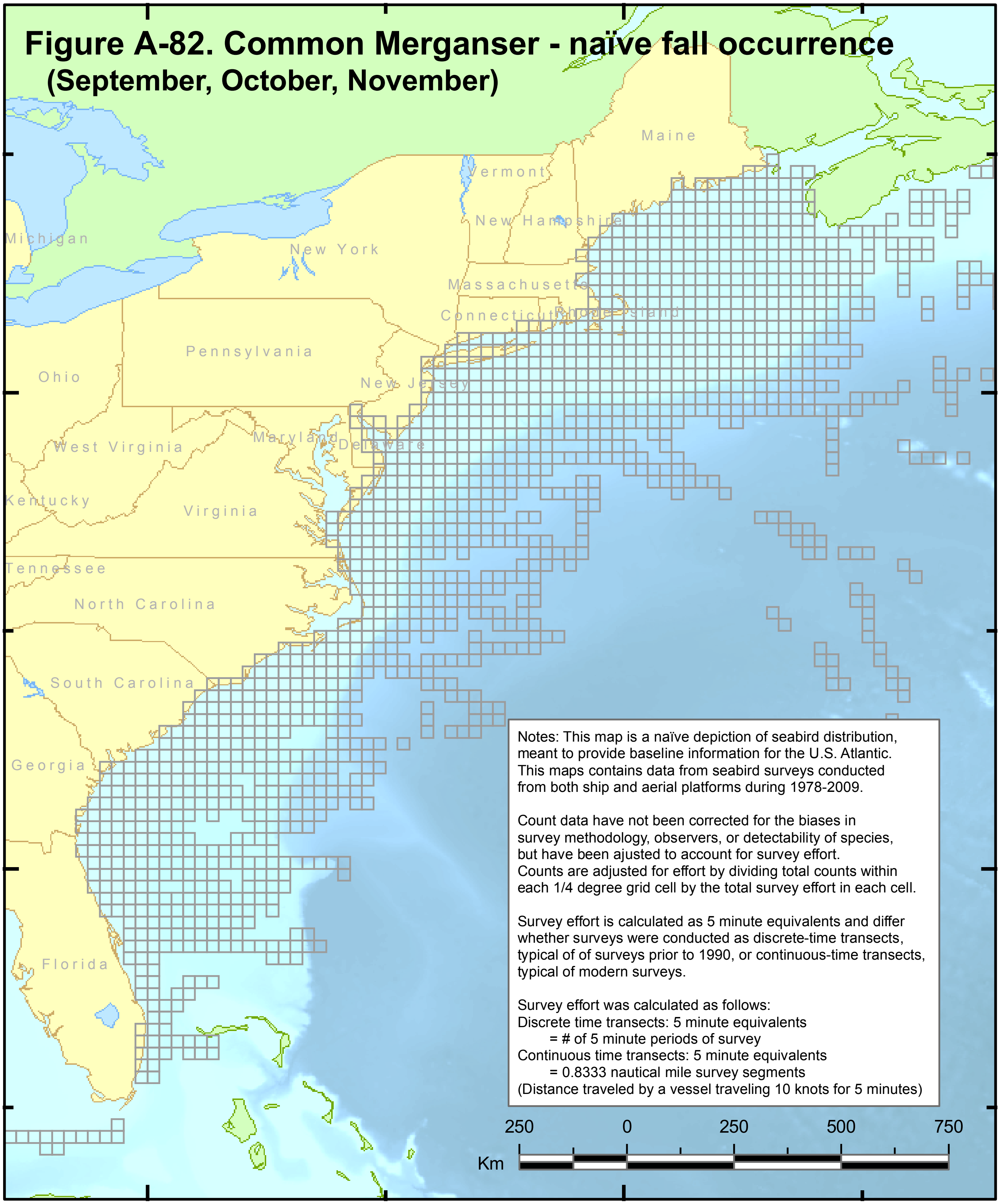


**Figure A-82. Common Merganser - naïve fall occurrence (September, October, November)**

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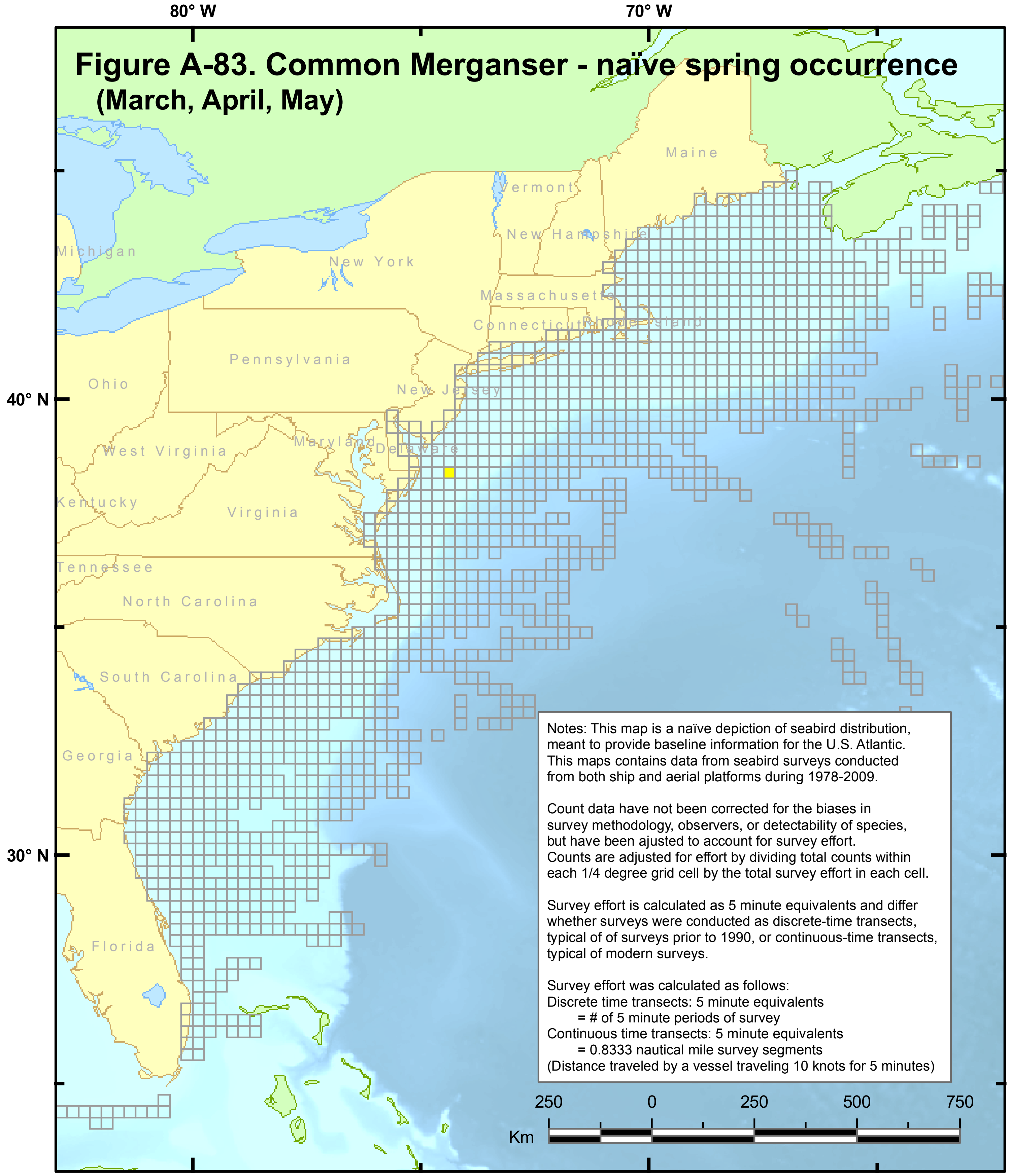
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-83. Common Merganser - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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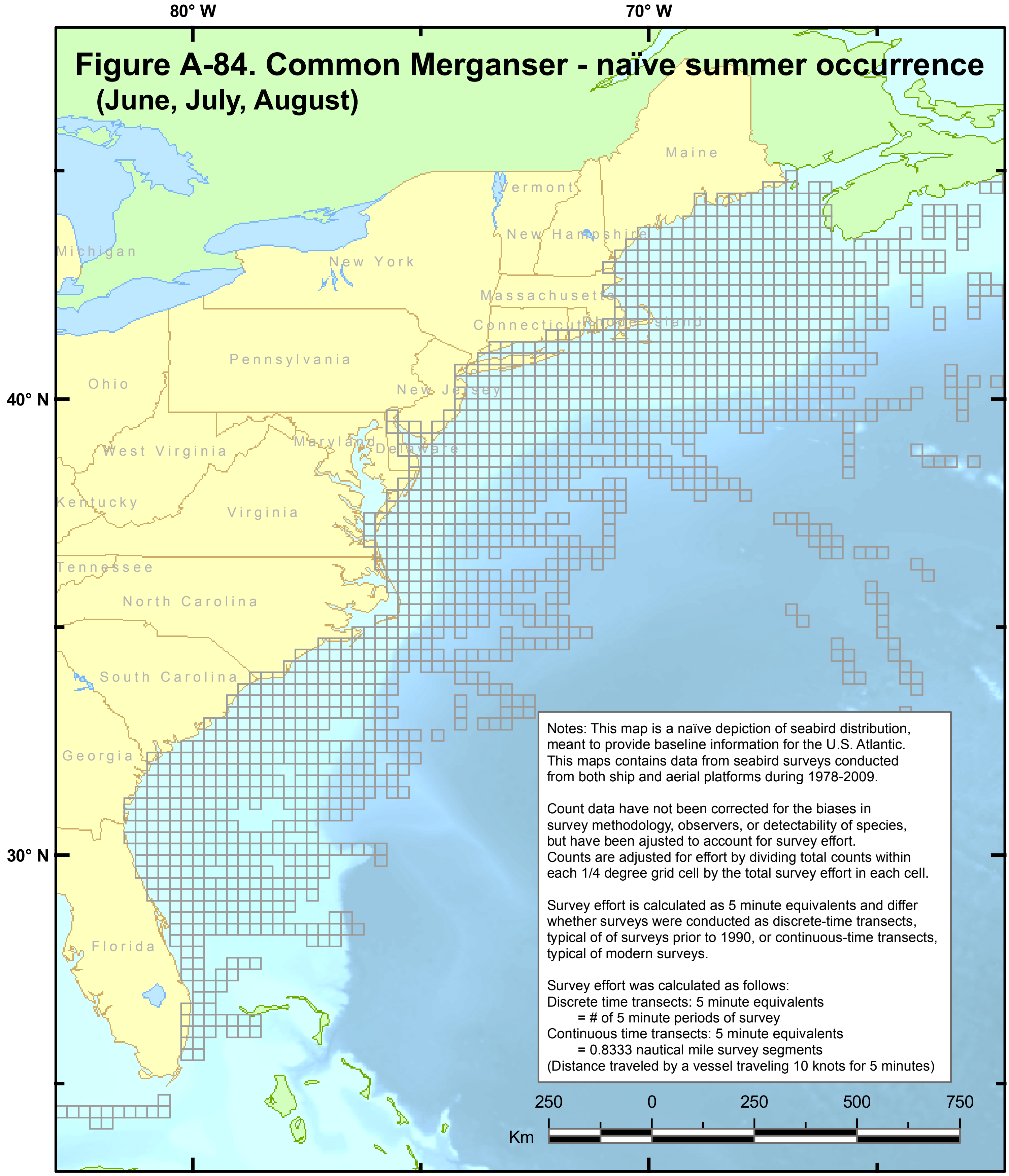
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-84. Common Merganser - naïve summer occurrence (June, July, August)




## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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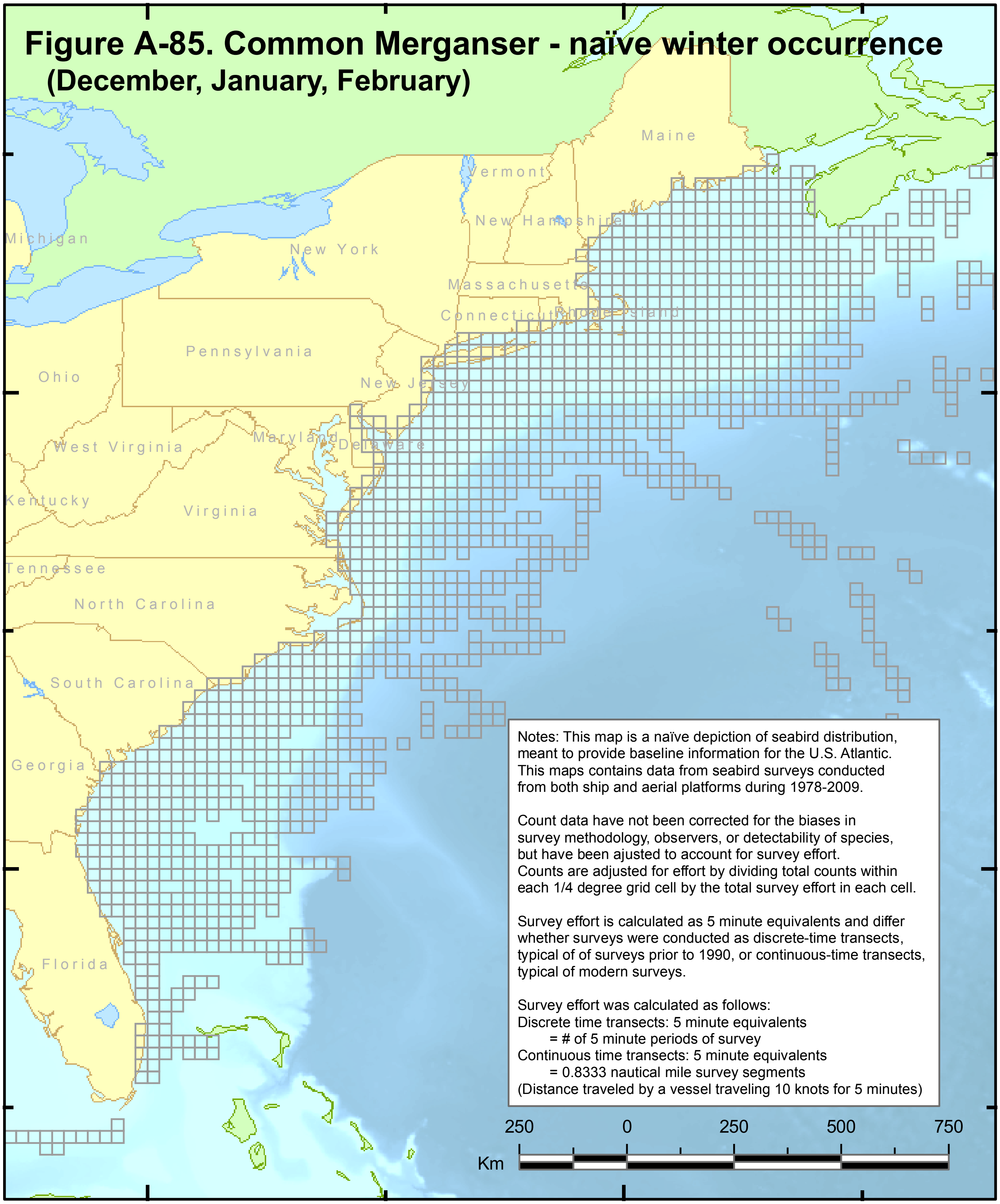


# Figure A-85. Common Merganser - naïve winter occurrence (December, January, February)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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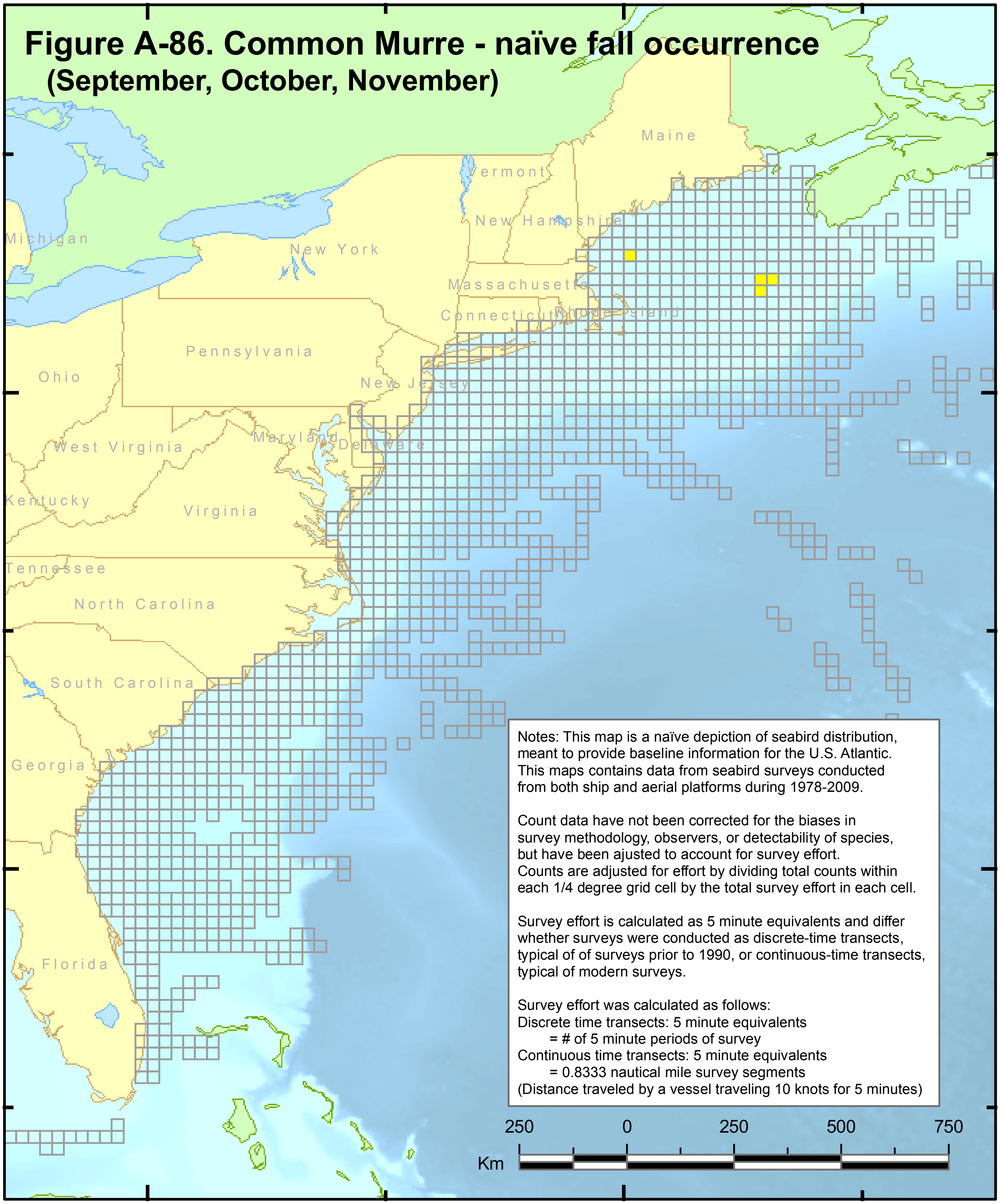
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

Figure A-86. Common Murre - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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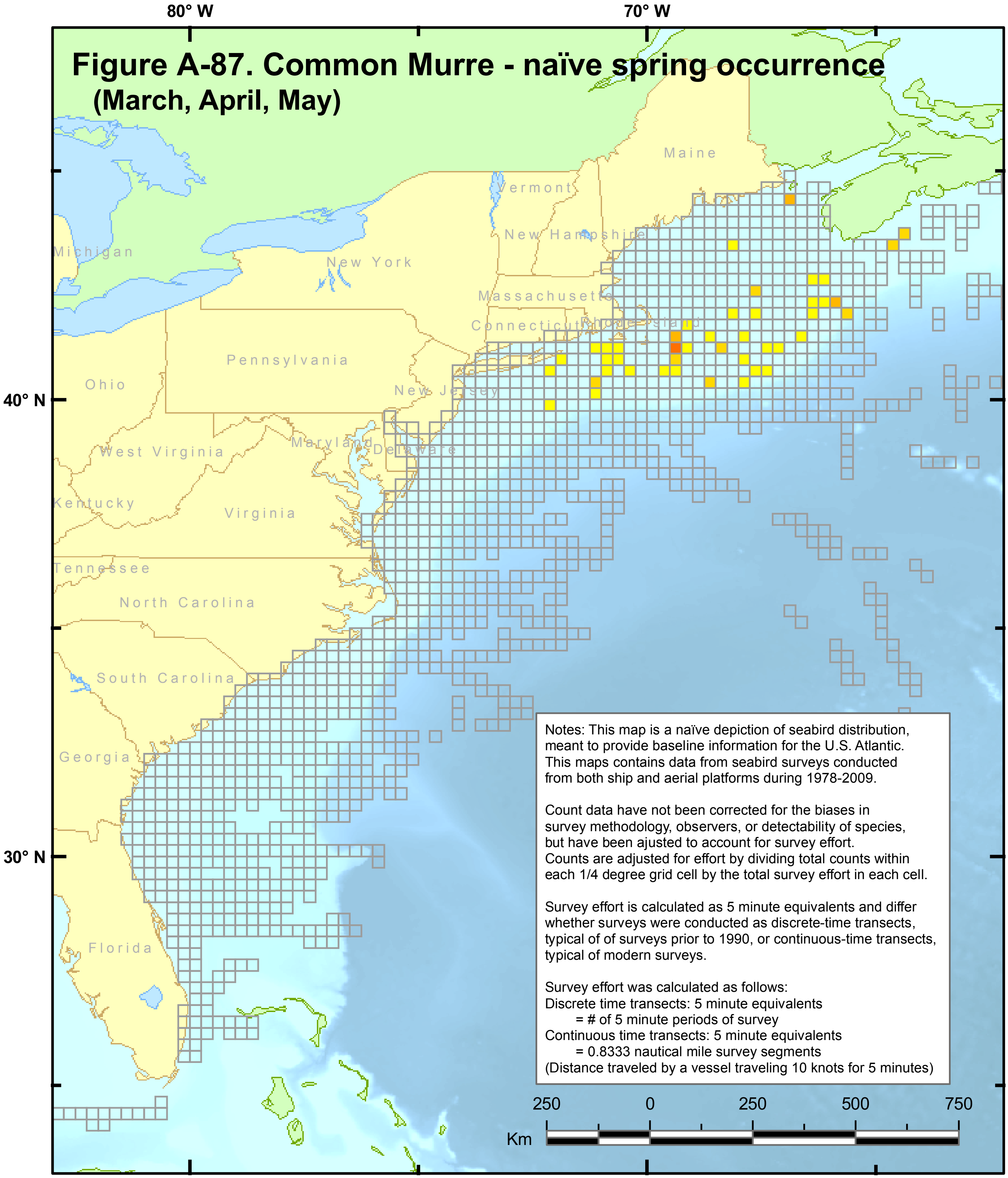
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-87. Common Murre - naïve spring occurrence (March, April, May)

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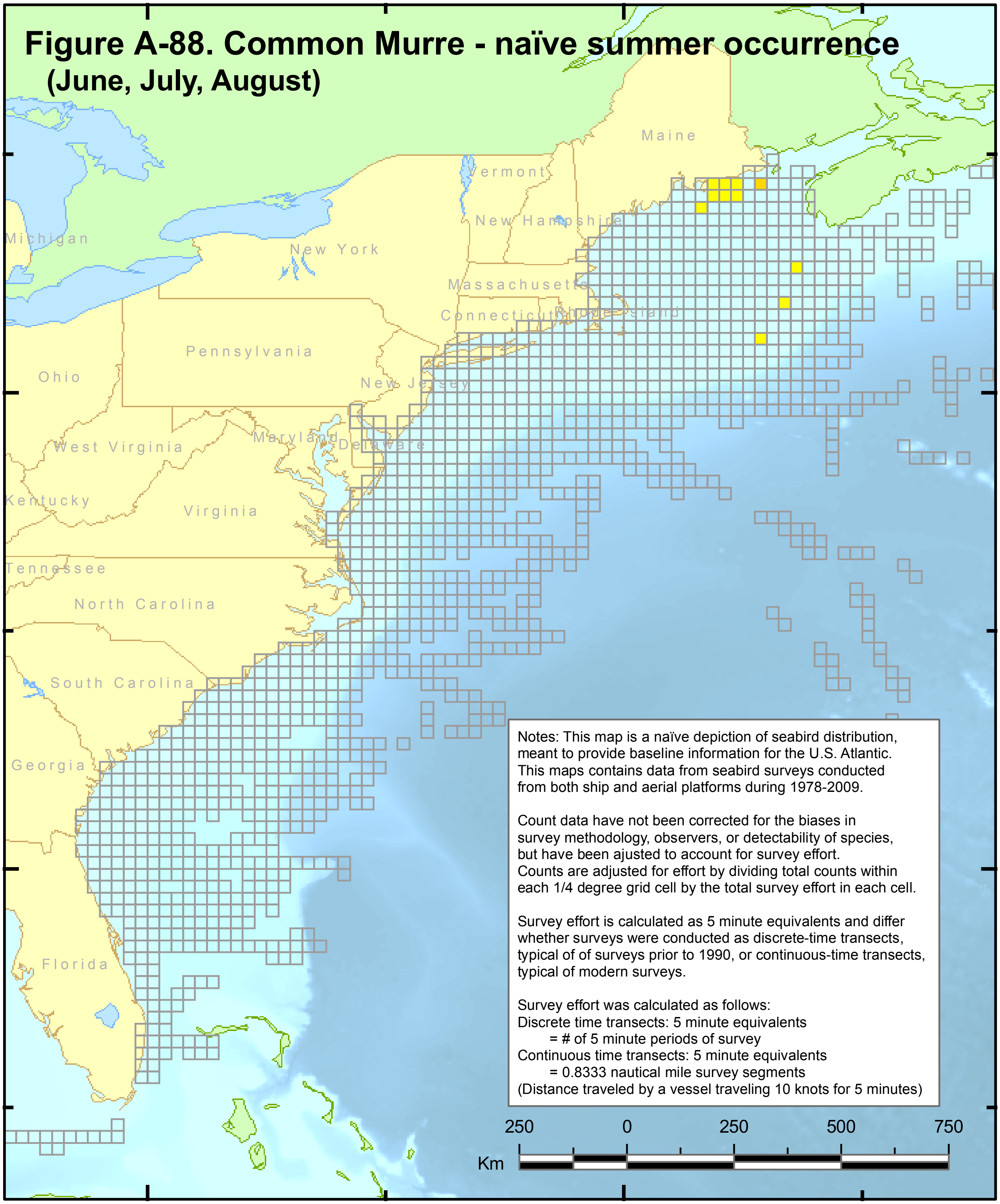
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-88. Common Murre - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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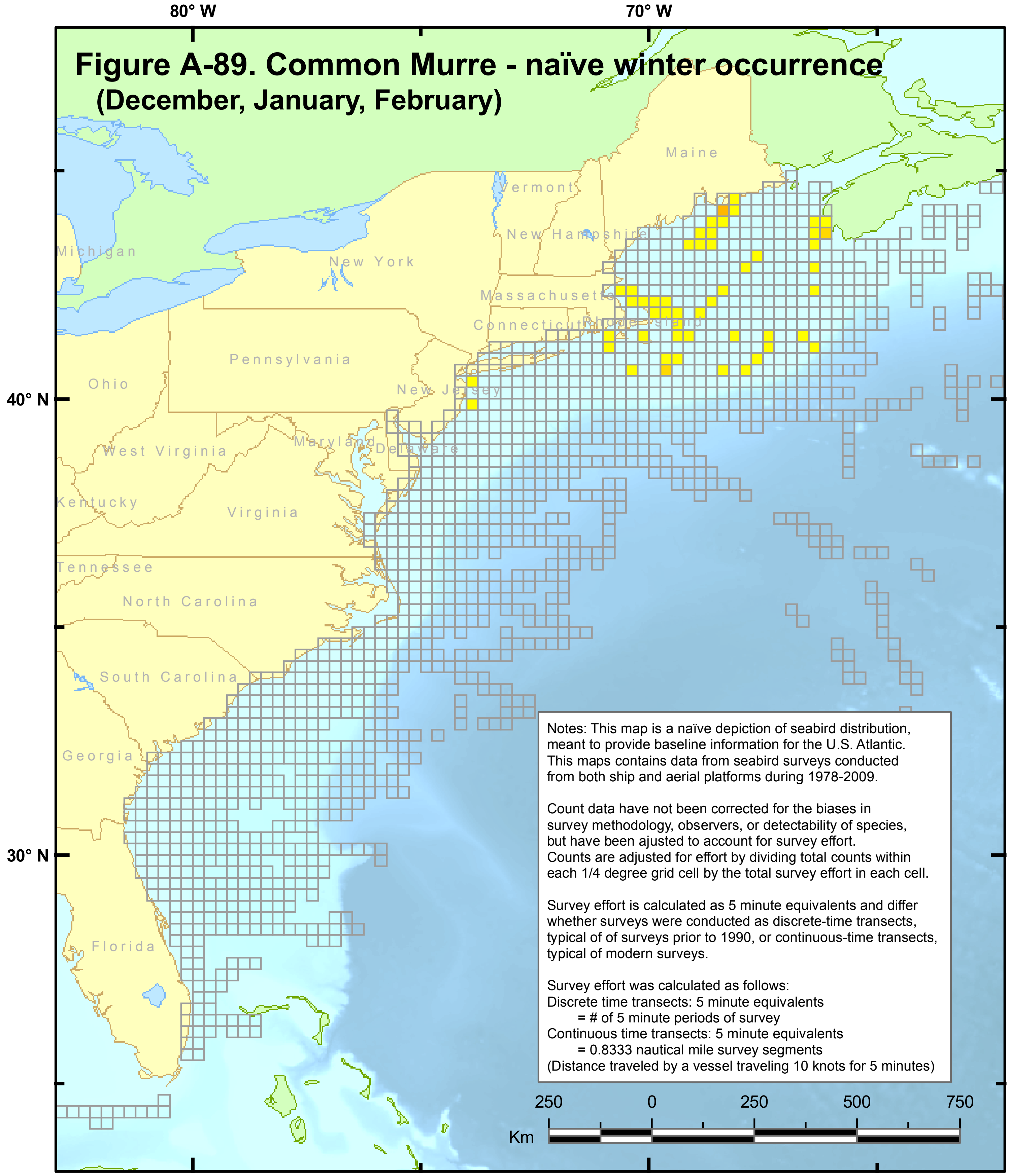
# Figure A-89. Common Murre - naïve winter occurrence (December, January, February)




## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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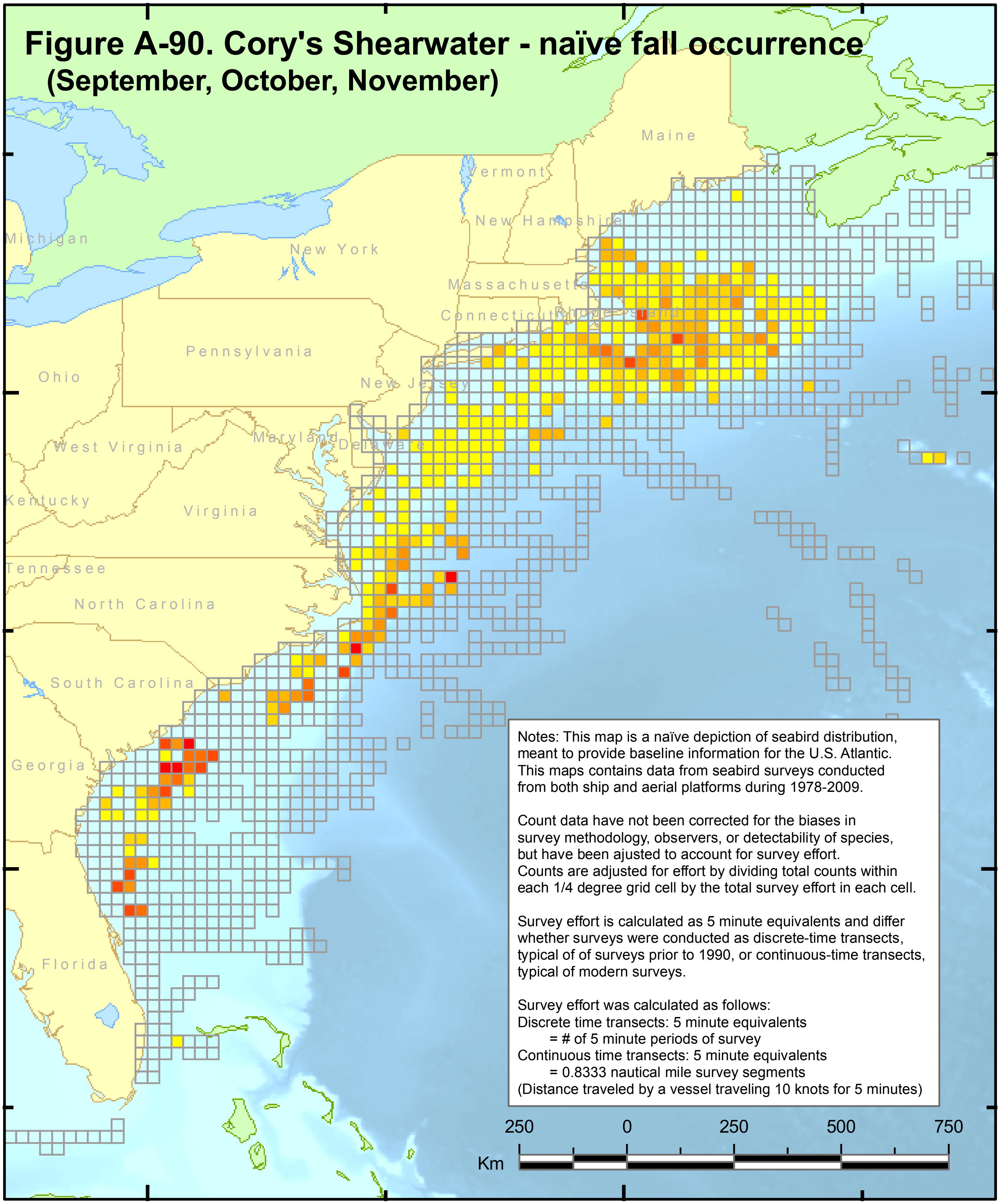
# Figure A-90. Cory's Shearwater - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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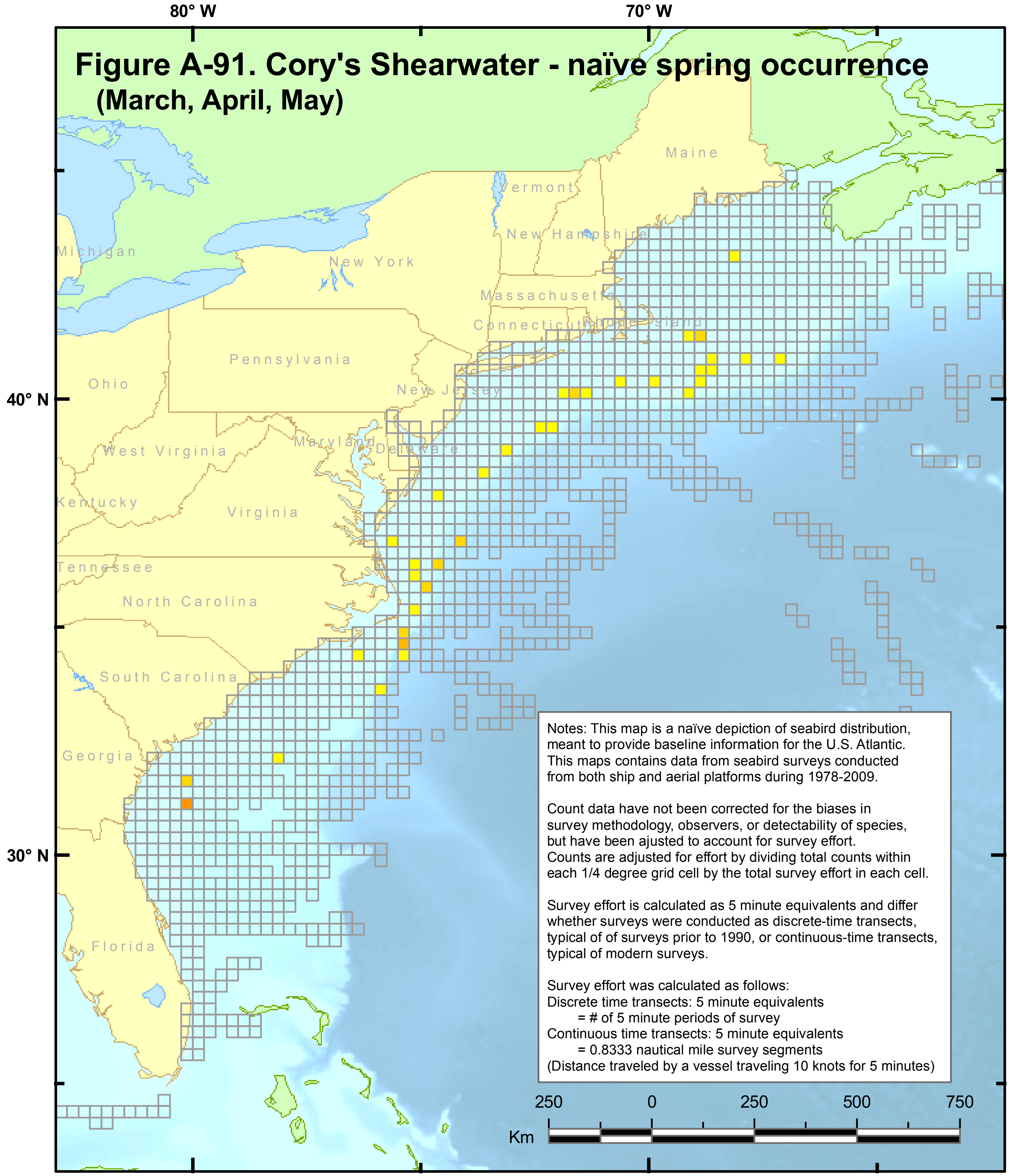
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 18.1




# Figure A-91. Cory's Shearwater - naïve spring occurrence (March, April, May)

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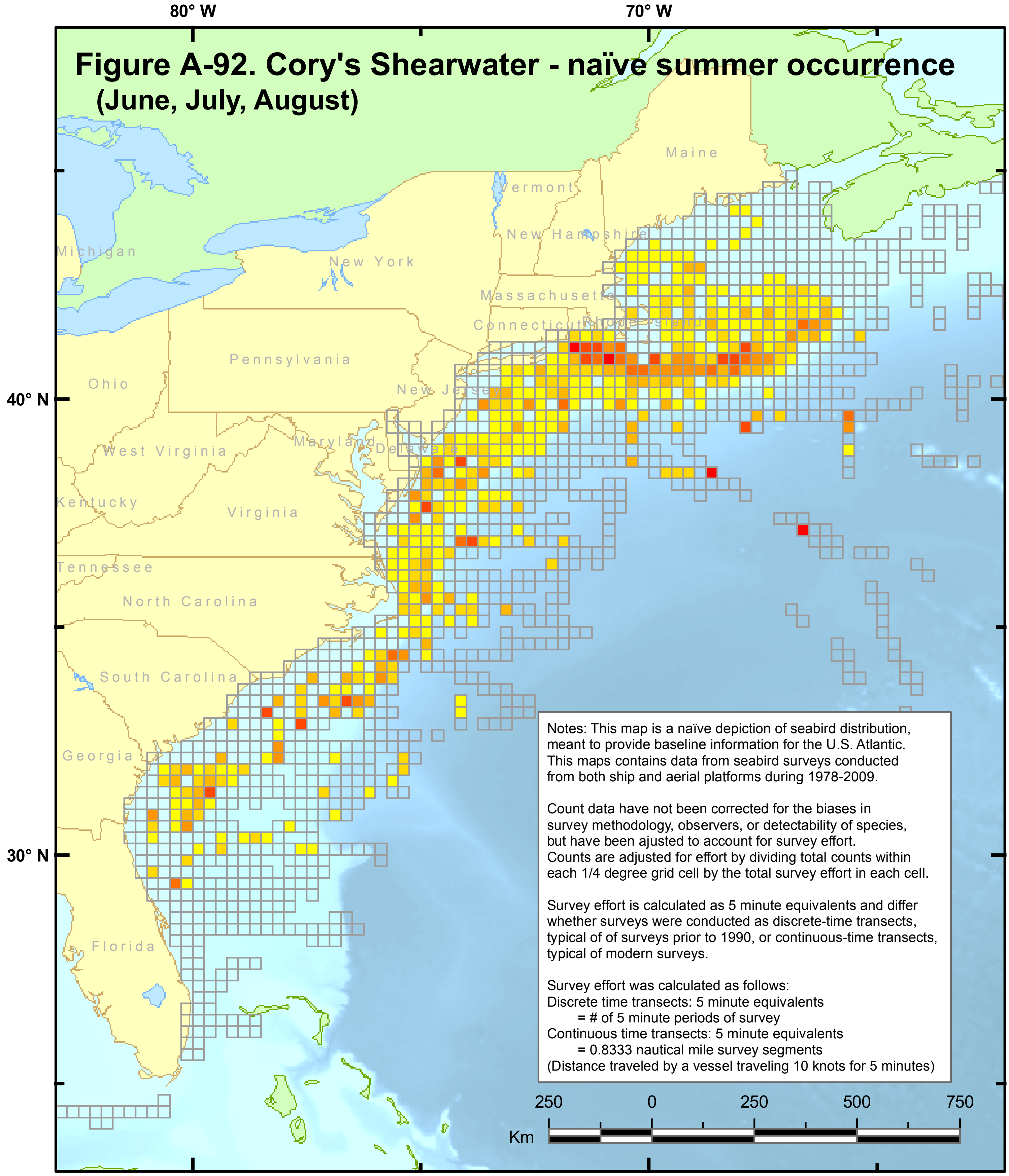
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-92. Cory's Shearwater - naïve summer occurrence (June, July, August)

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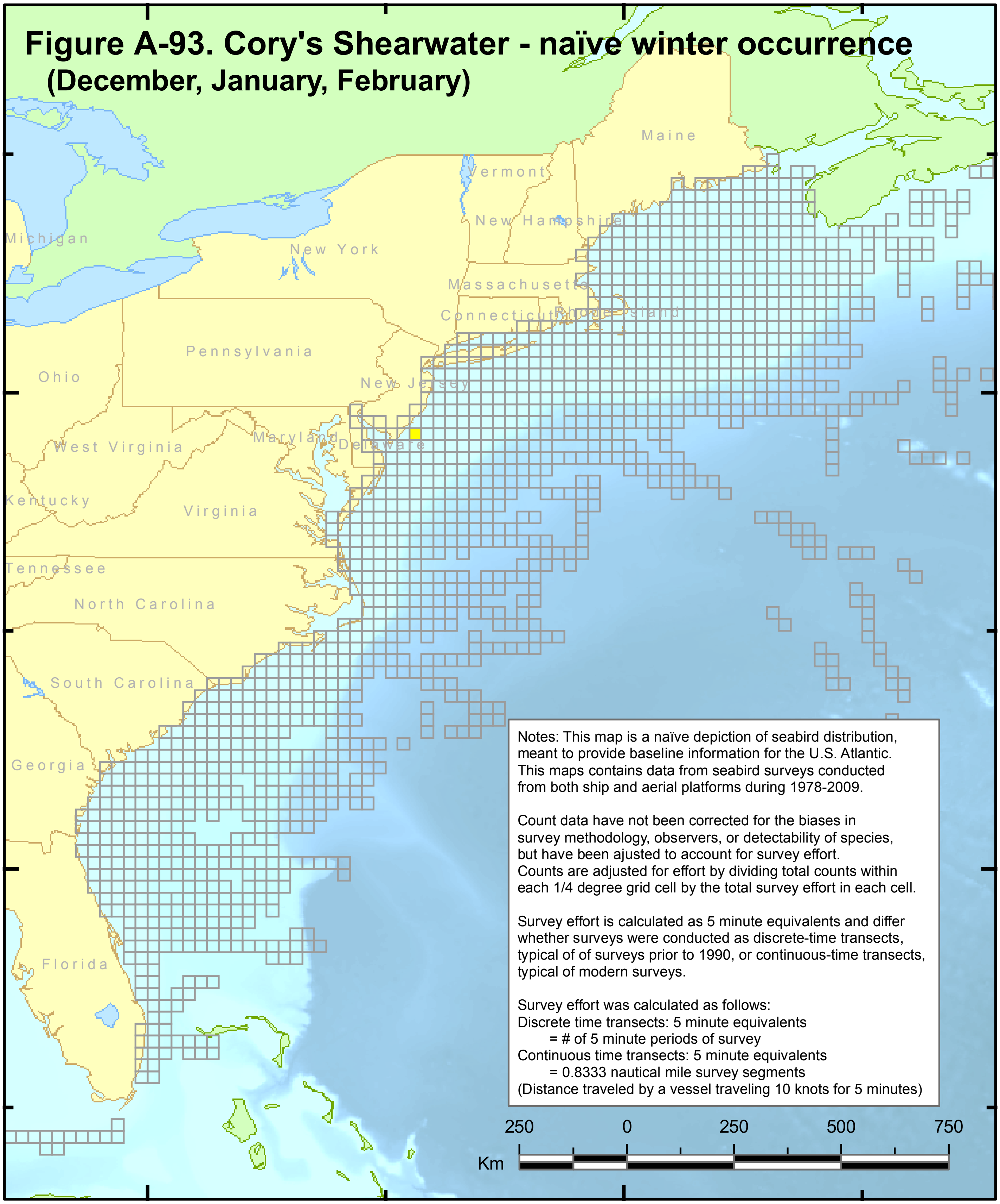
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 10 |

## Figure A-93. Cory's Shearwater - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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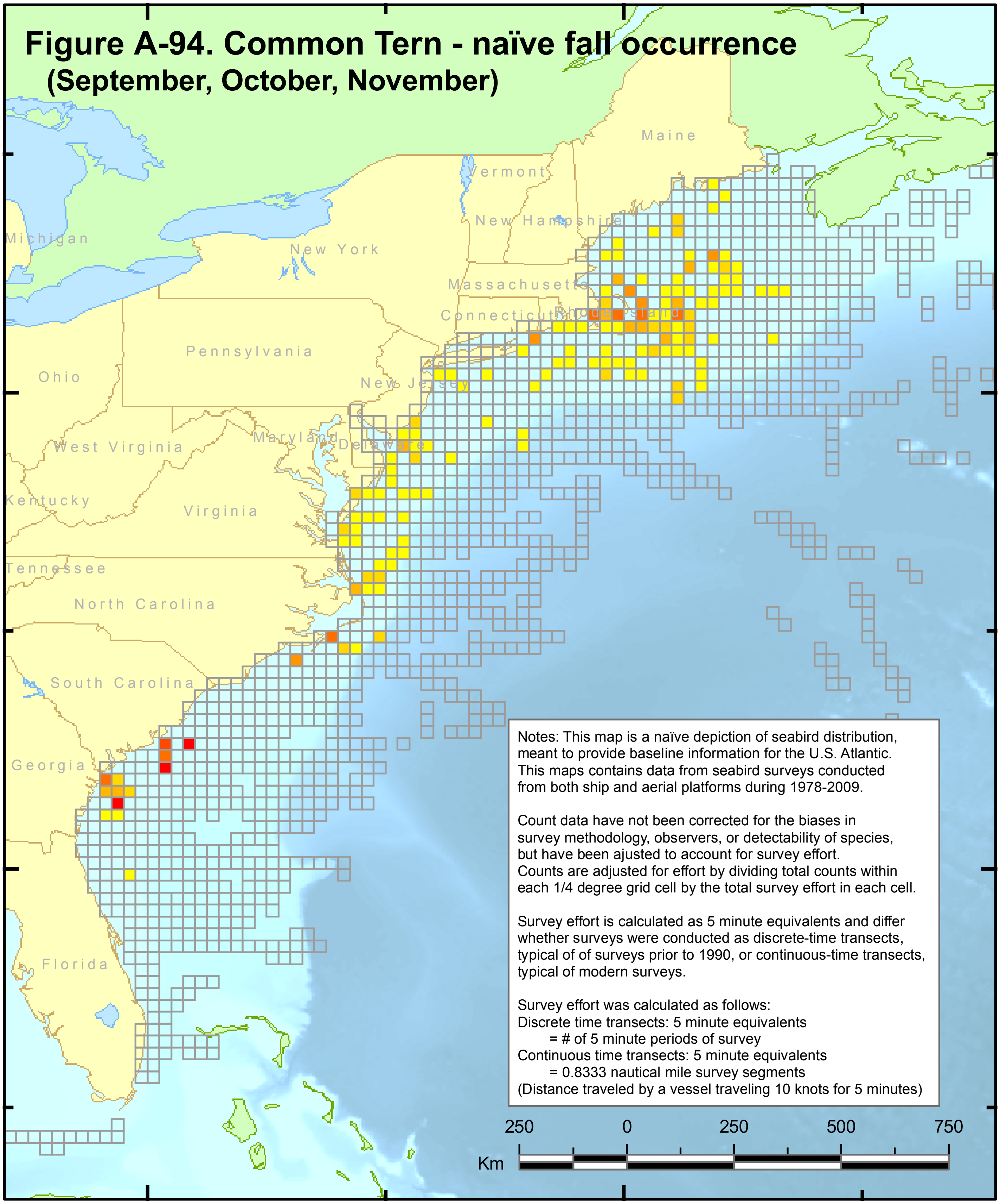
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-94. Common Tern - naïve fall occurrence (September, October, November)




## Explanation - effort-adjusted counts

| | |
|---|---|
| 0 | 0 - 0.1 |
| 0.1 - 0.25 | 0.25 - 0.5 |
| 0.5 - 1 | 1 - 2 |
| 2 - 5 | 5 - 92.1 |

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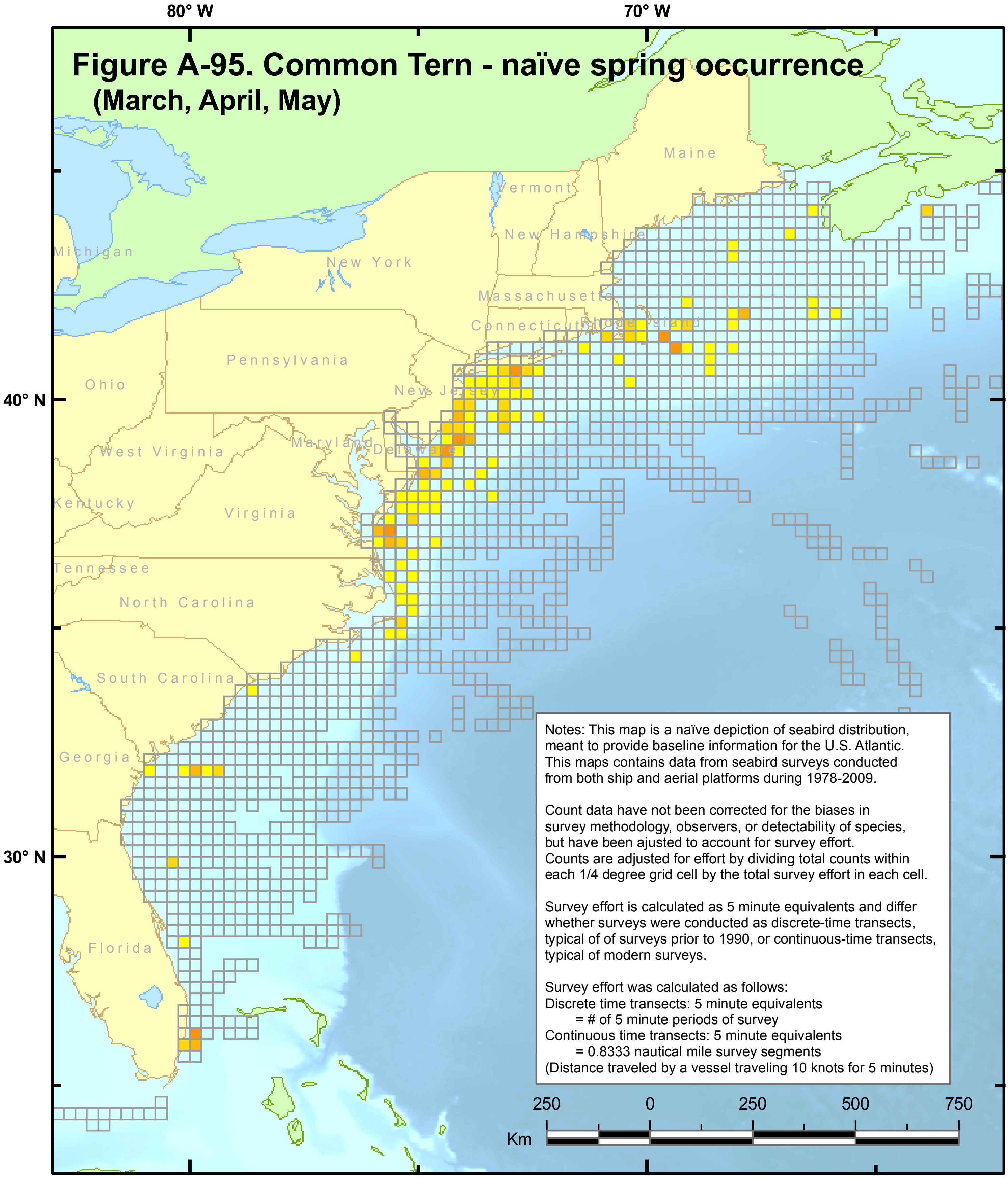
# Figure A-95. Common Tern - naïve spring occurrence (March, April, May)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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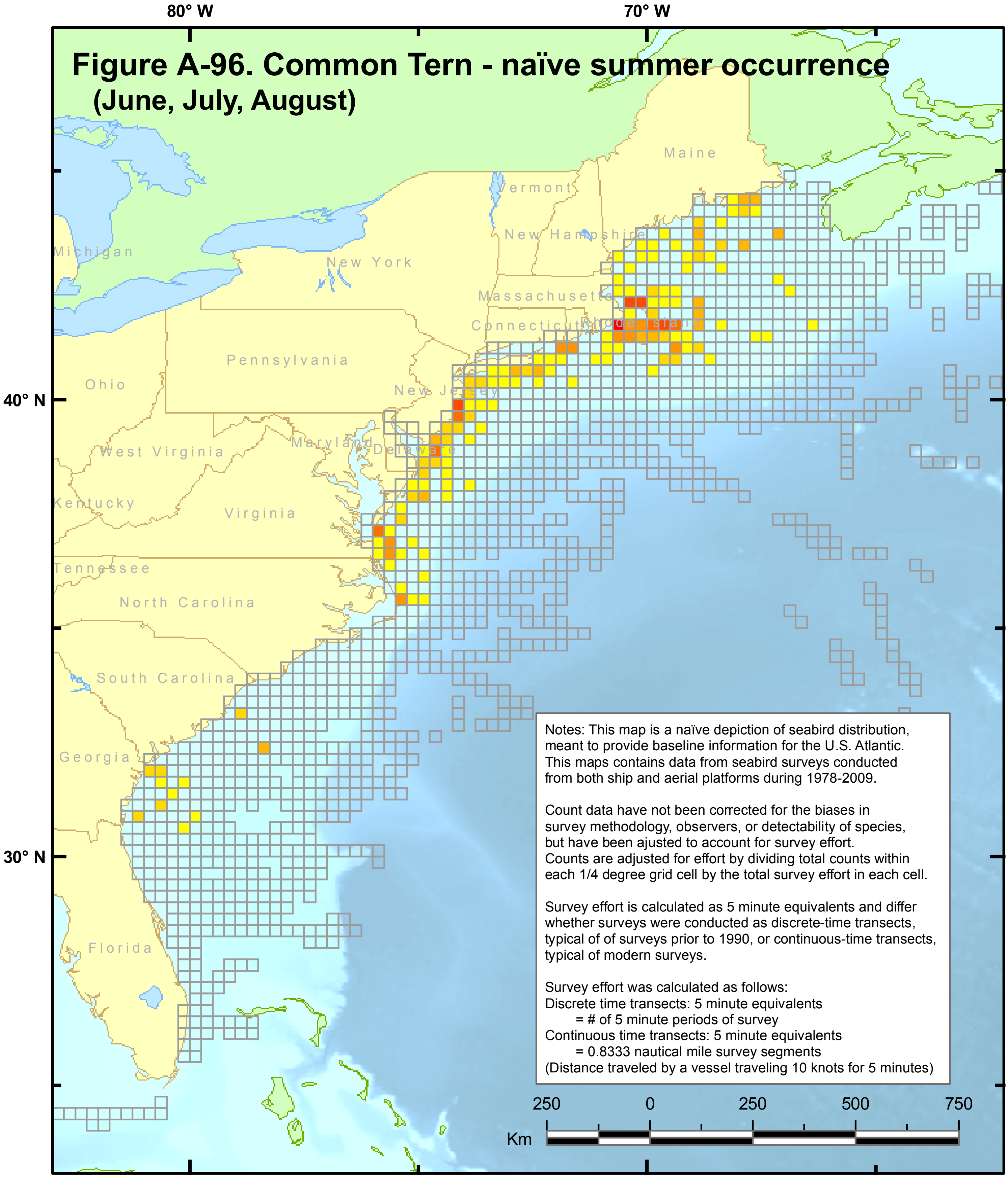
# Figure A-96. Common Tern - naïve summer occurrence (June, July, August)

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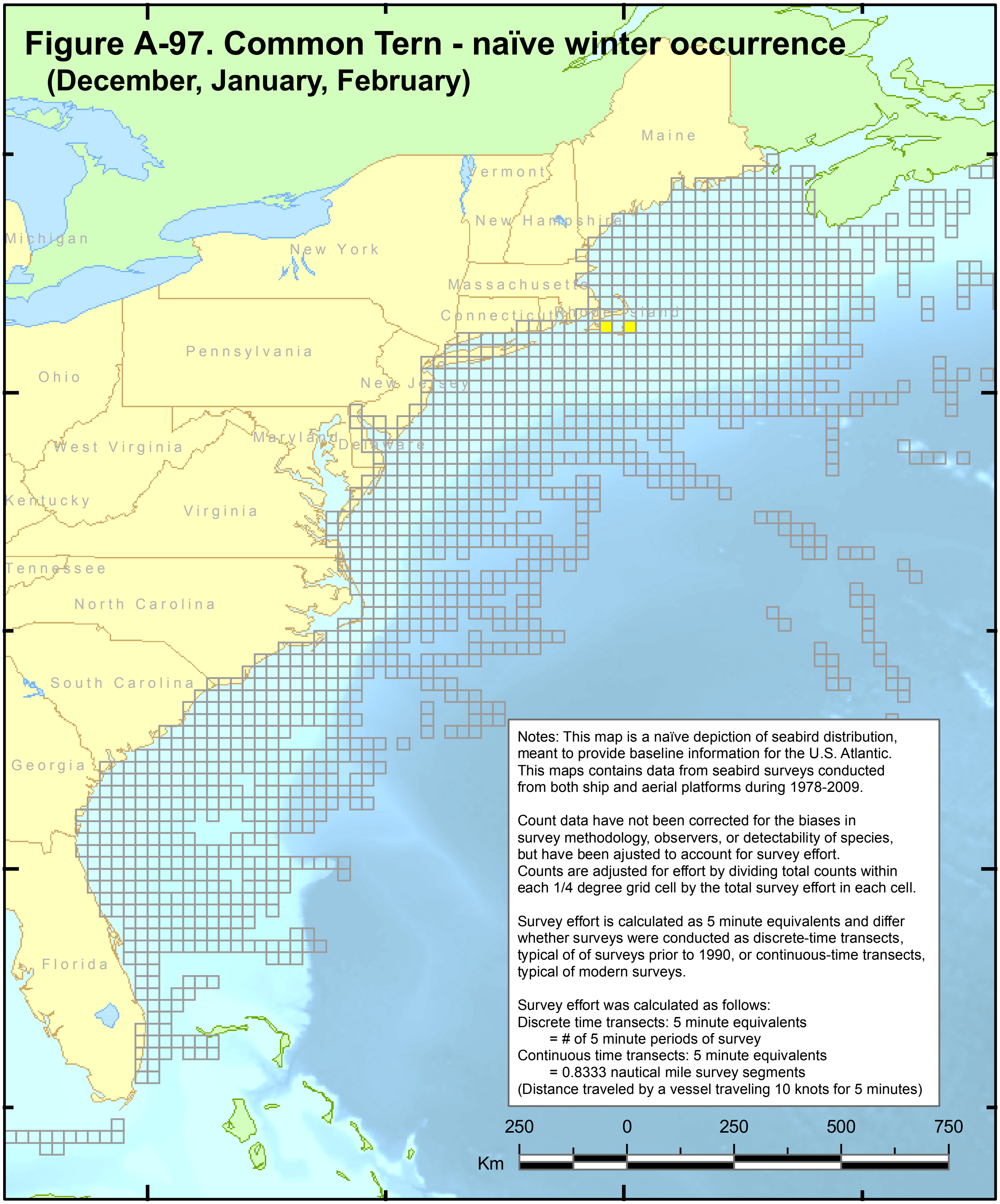
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 6.2 |

# Figure A-97. Common Tern - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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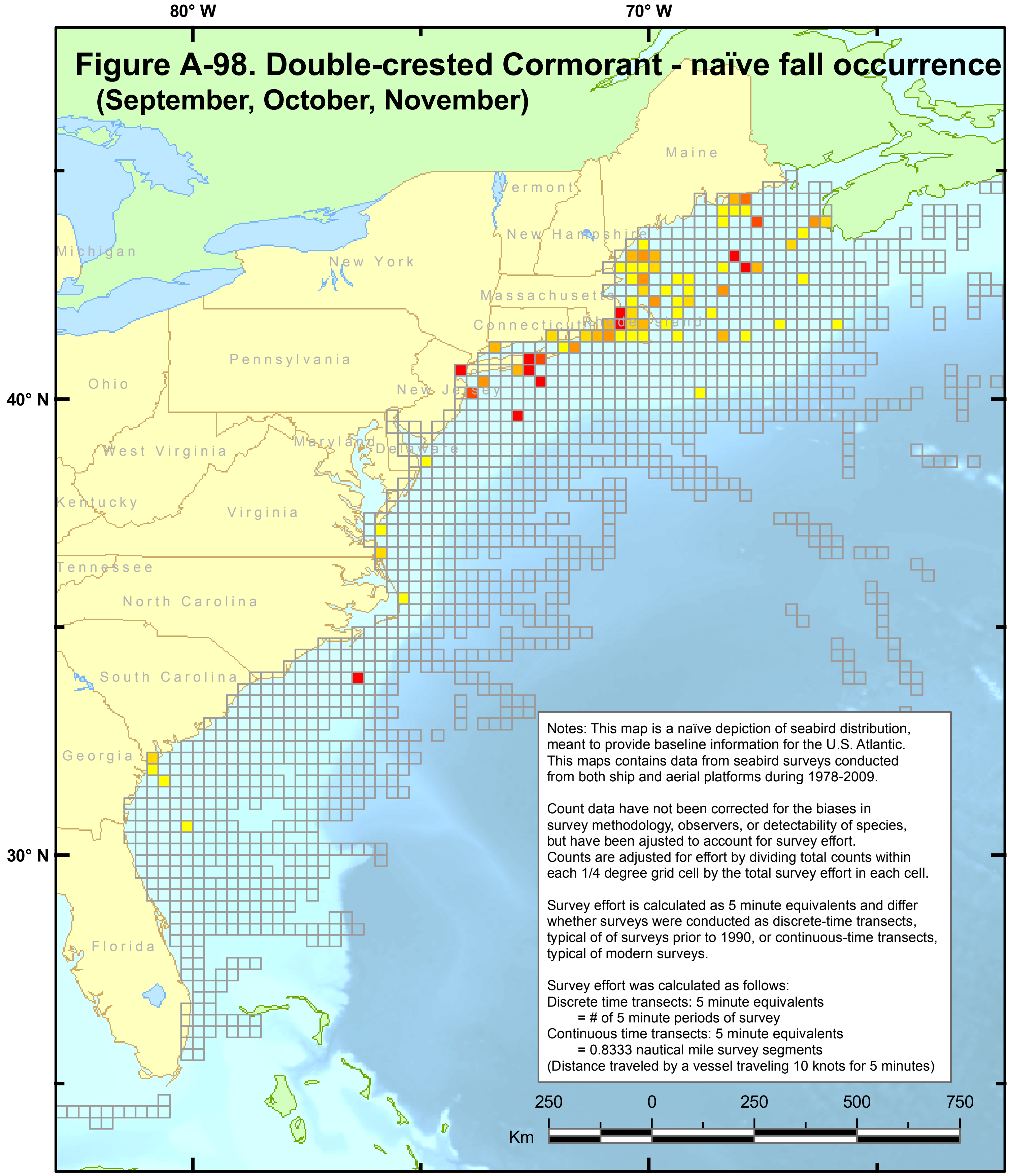
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

## Figure A-98. Double-crested Cormorant - naïve fall occurrence (September, October, November)

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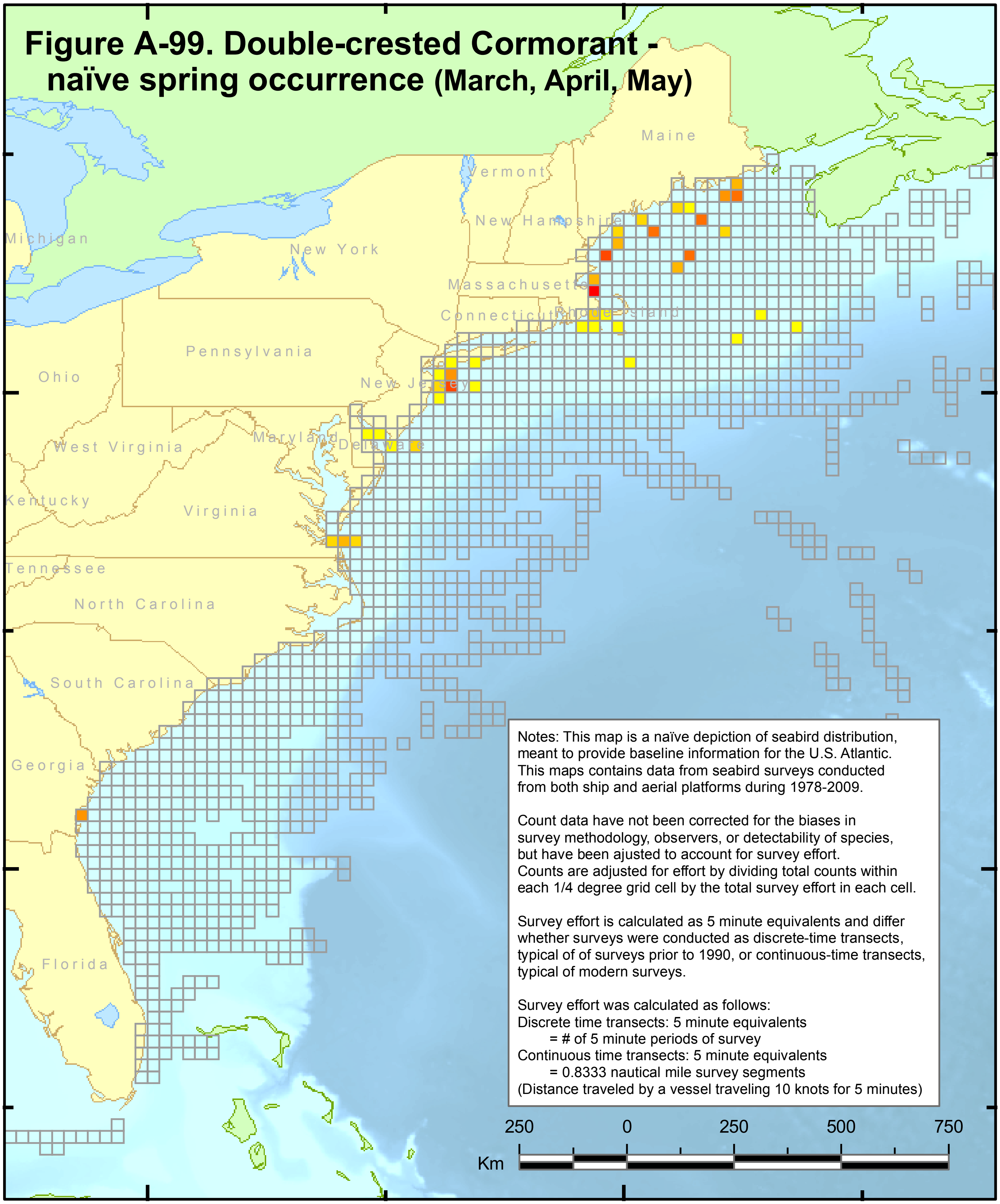
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 61.7

# Figure A-99. Double-crested Cormorant - naïve spring occurrence (March, April, May)

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## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 5.1

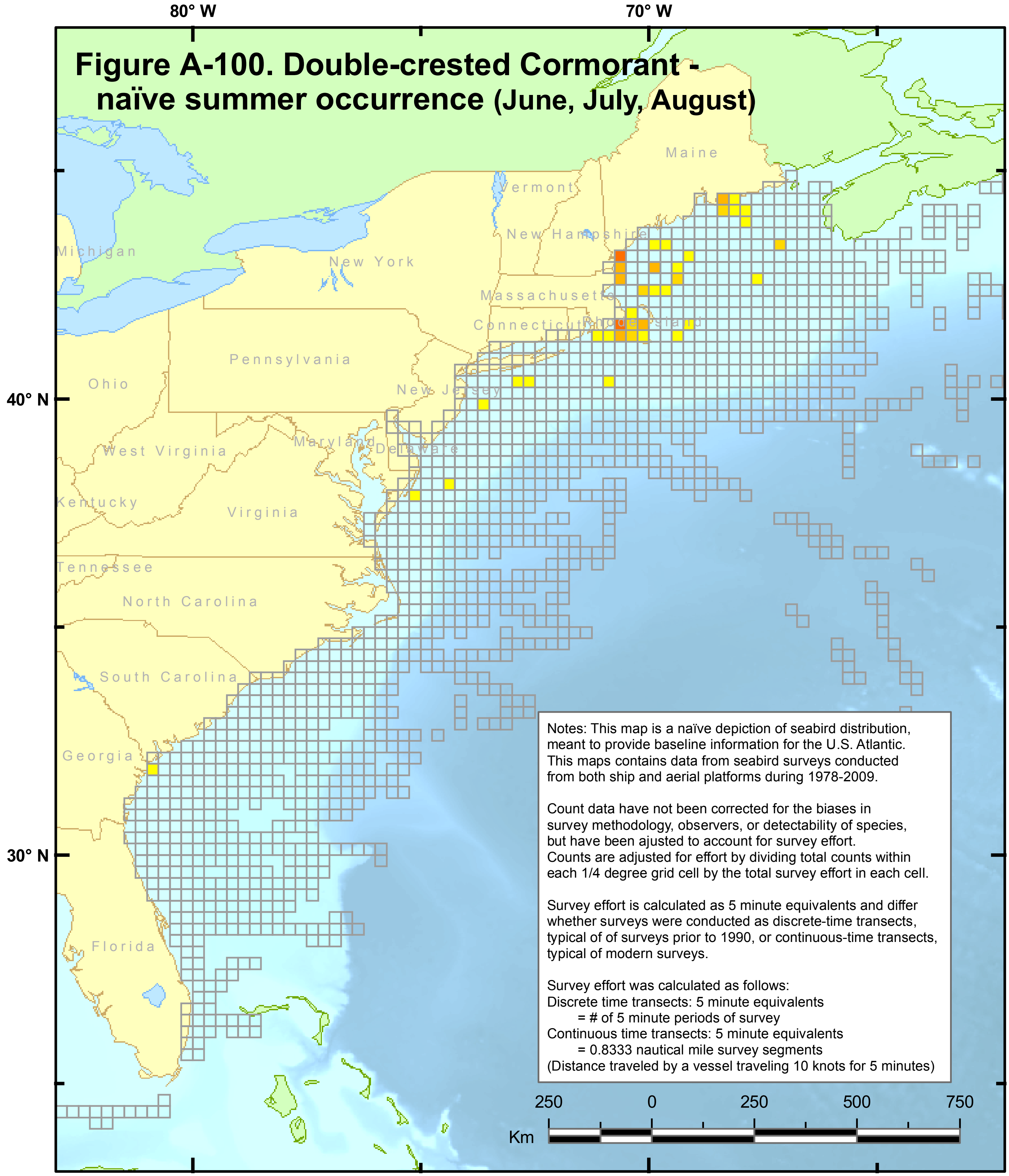


**Figure A-100. Double-crested Cormorant - naïve summer occurrence (June, July, August)**

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**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

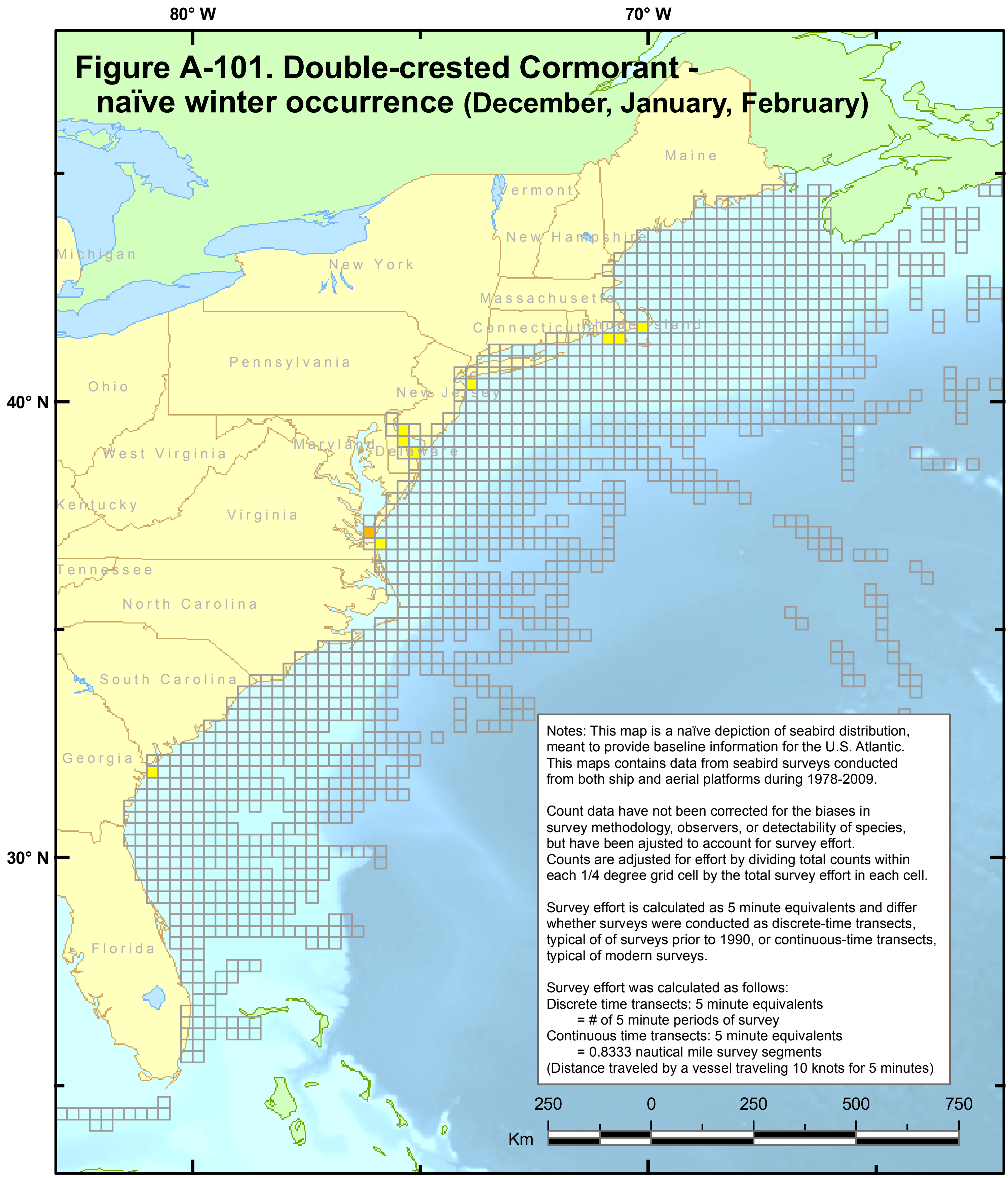


**Figure A-101. Double-crested Cormorant - naïve winter occurrence (December, January, February)**

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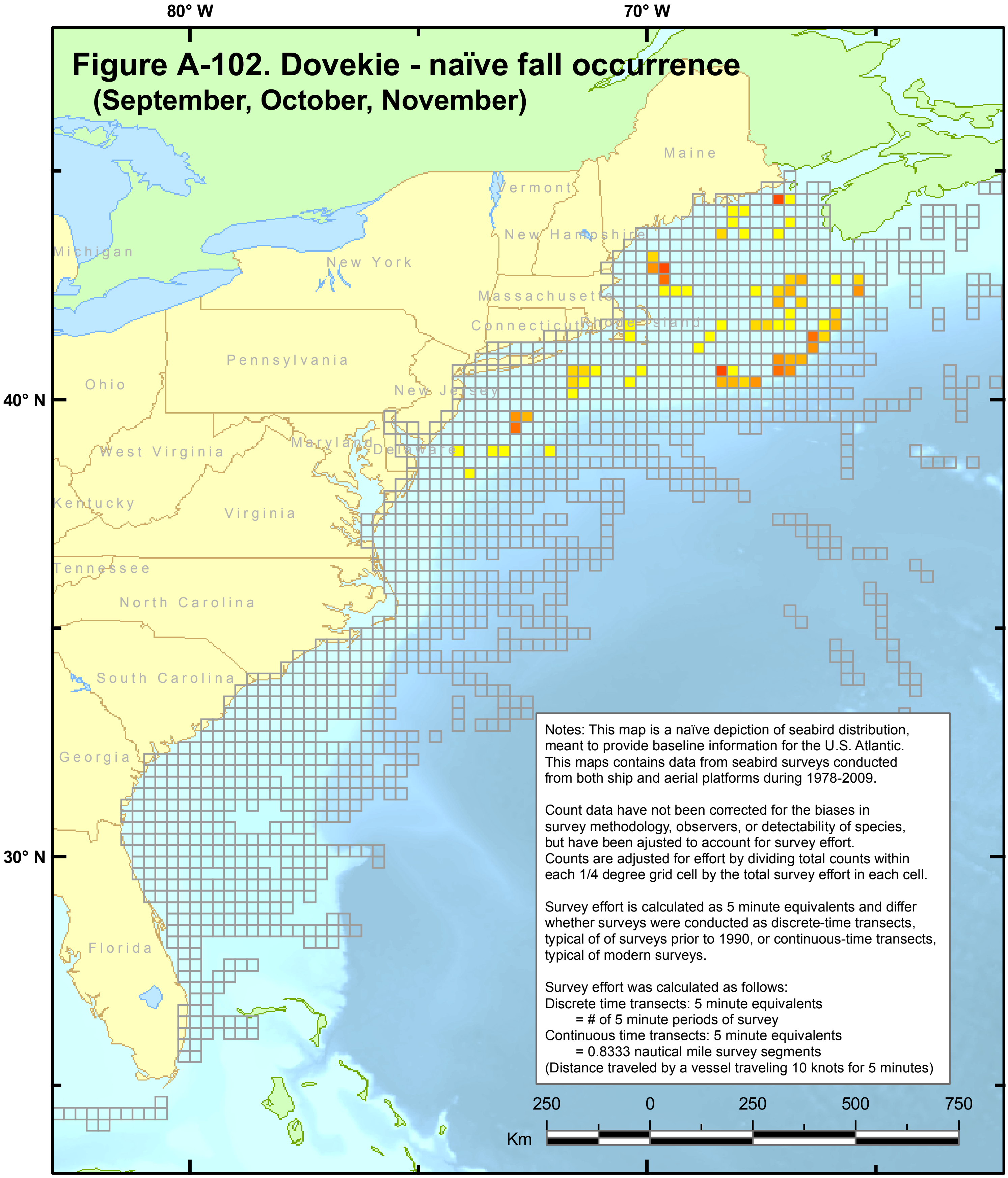
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-102. Dovekie - naïve fall occurrence (September, October, November)

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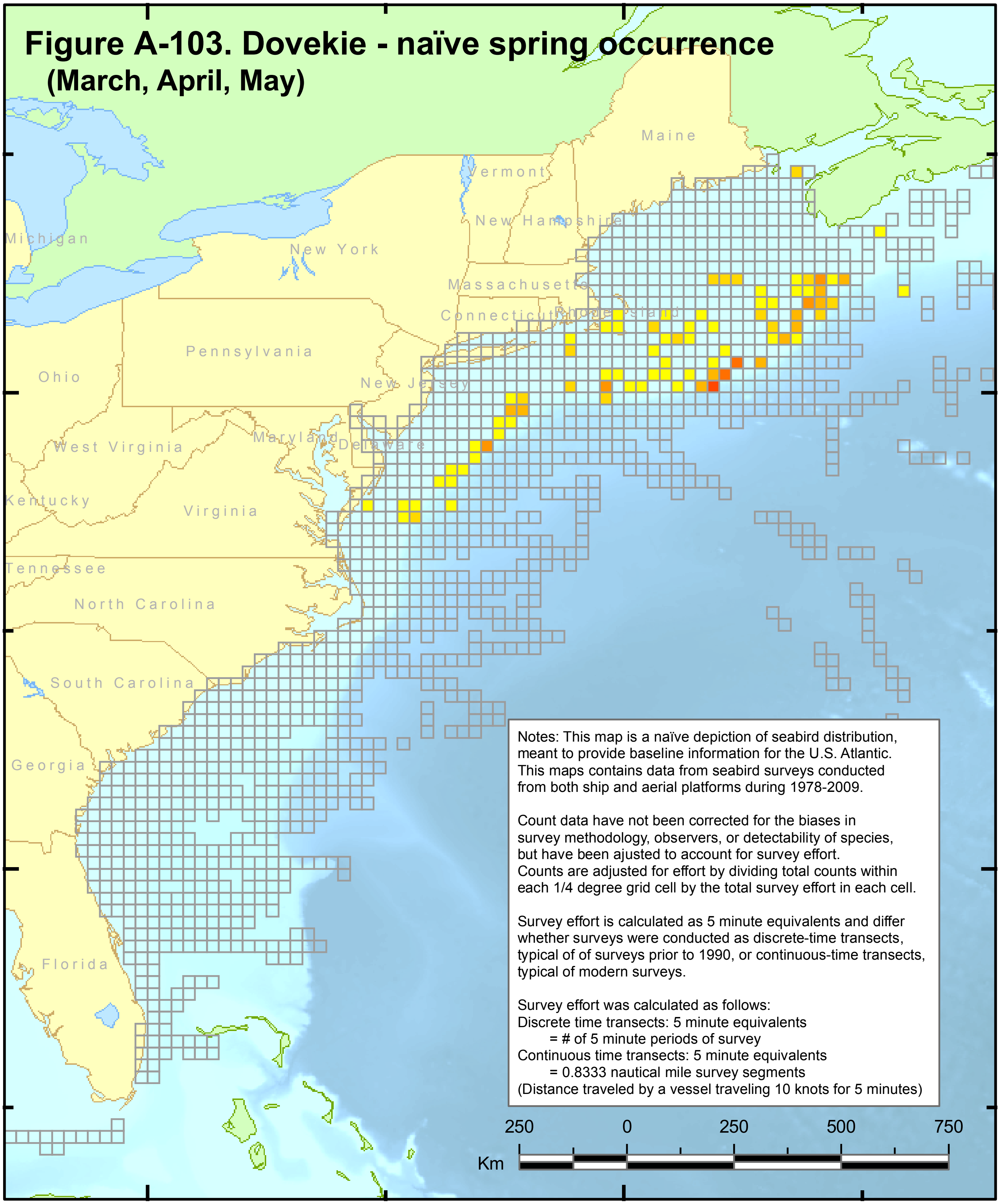
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5




# Figure A-103. Dovekie - naïve spring occurrence (March, April, May)

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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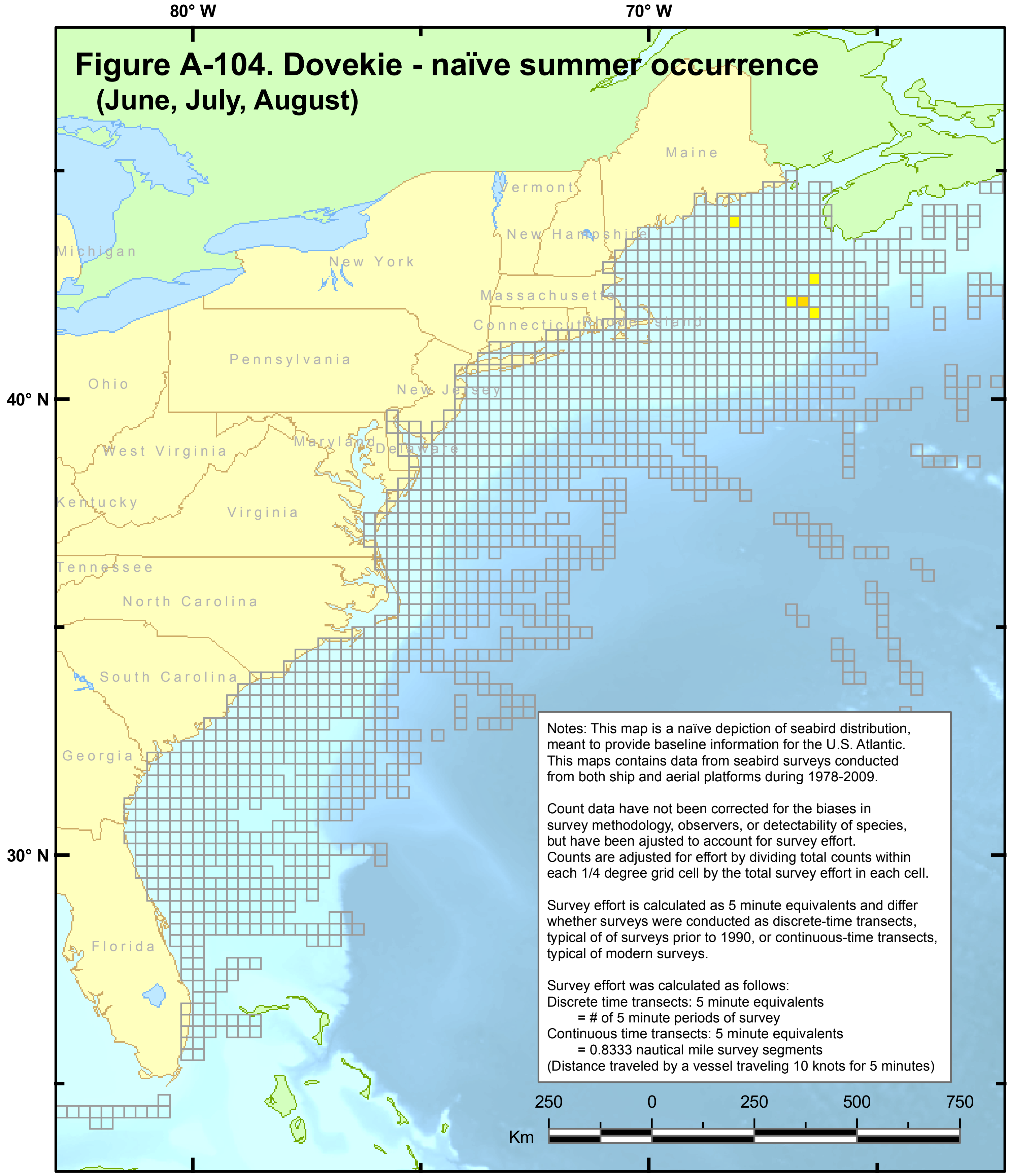


**Figure A-104. Dovekie - naïve summer occurrence (June, July, August)**

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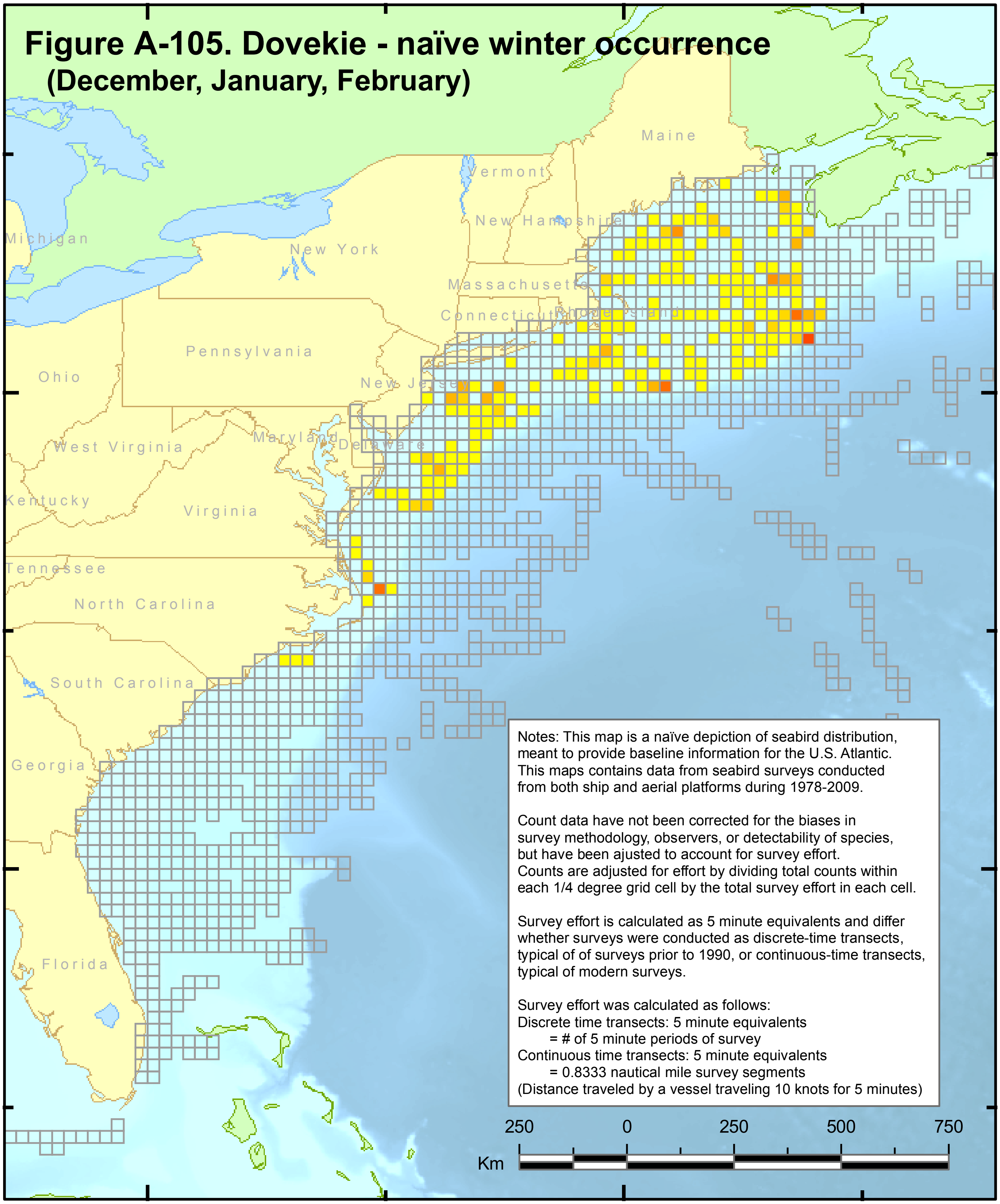
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5




# Figure A-105. Dovekie - naïve winter occurrence
## (December, January, February)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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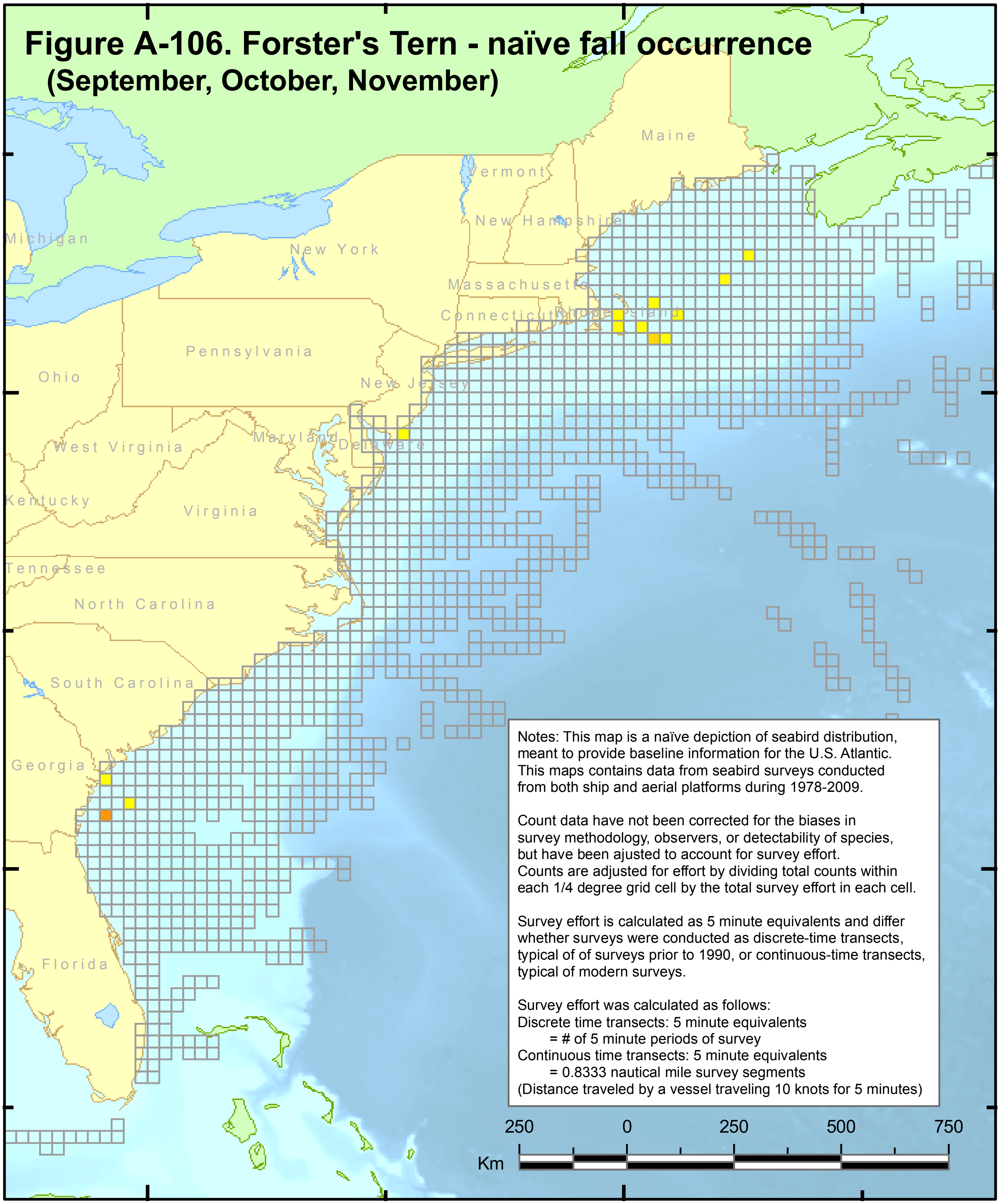
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-106. Forster's Tern - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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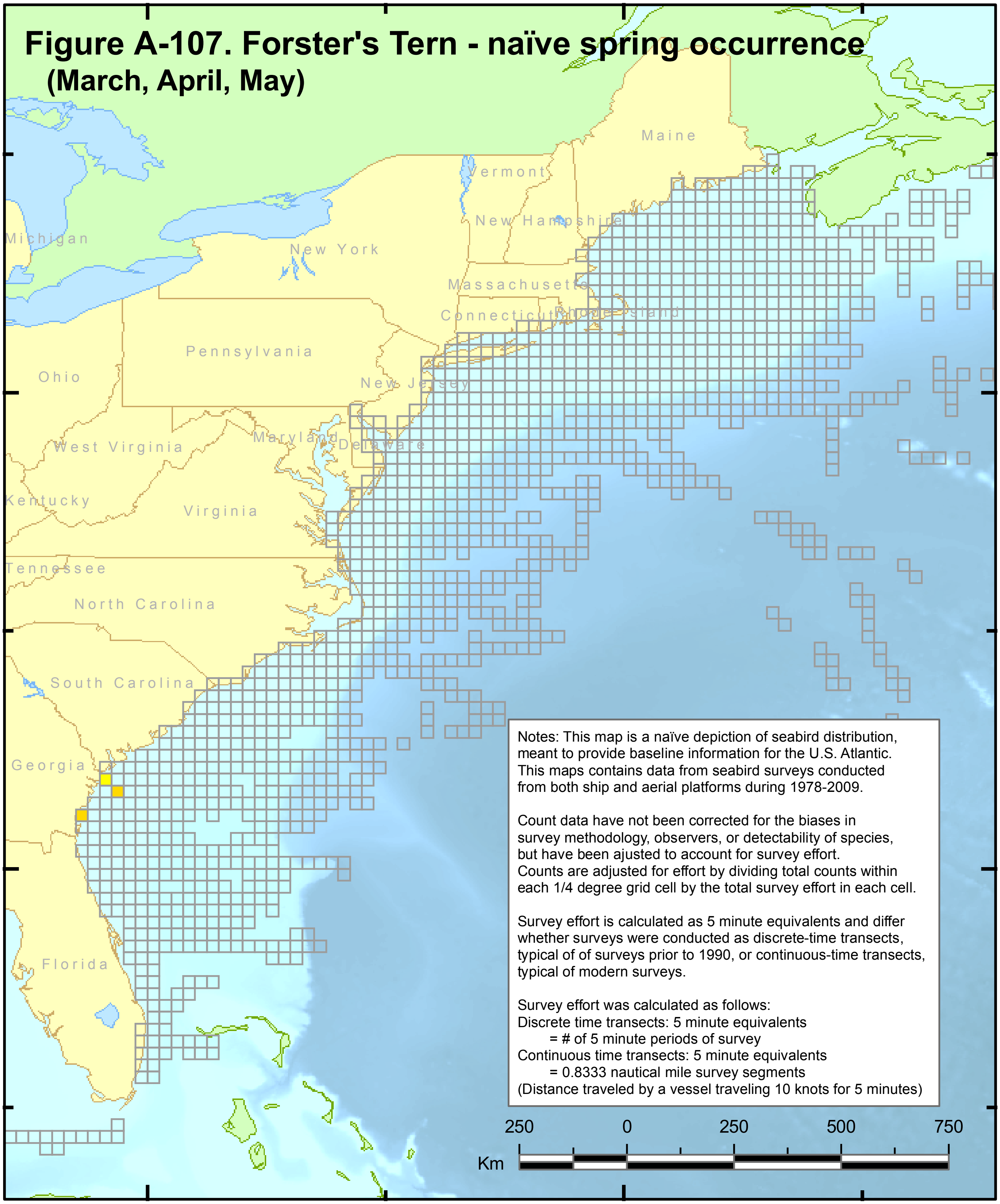
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

Figure A-107. Forster's Tern - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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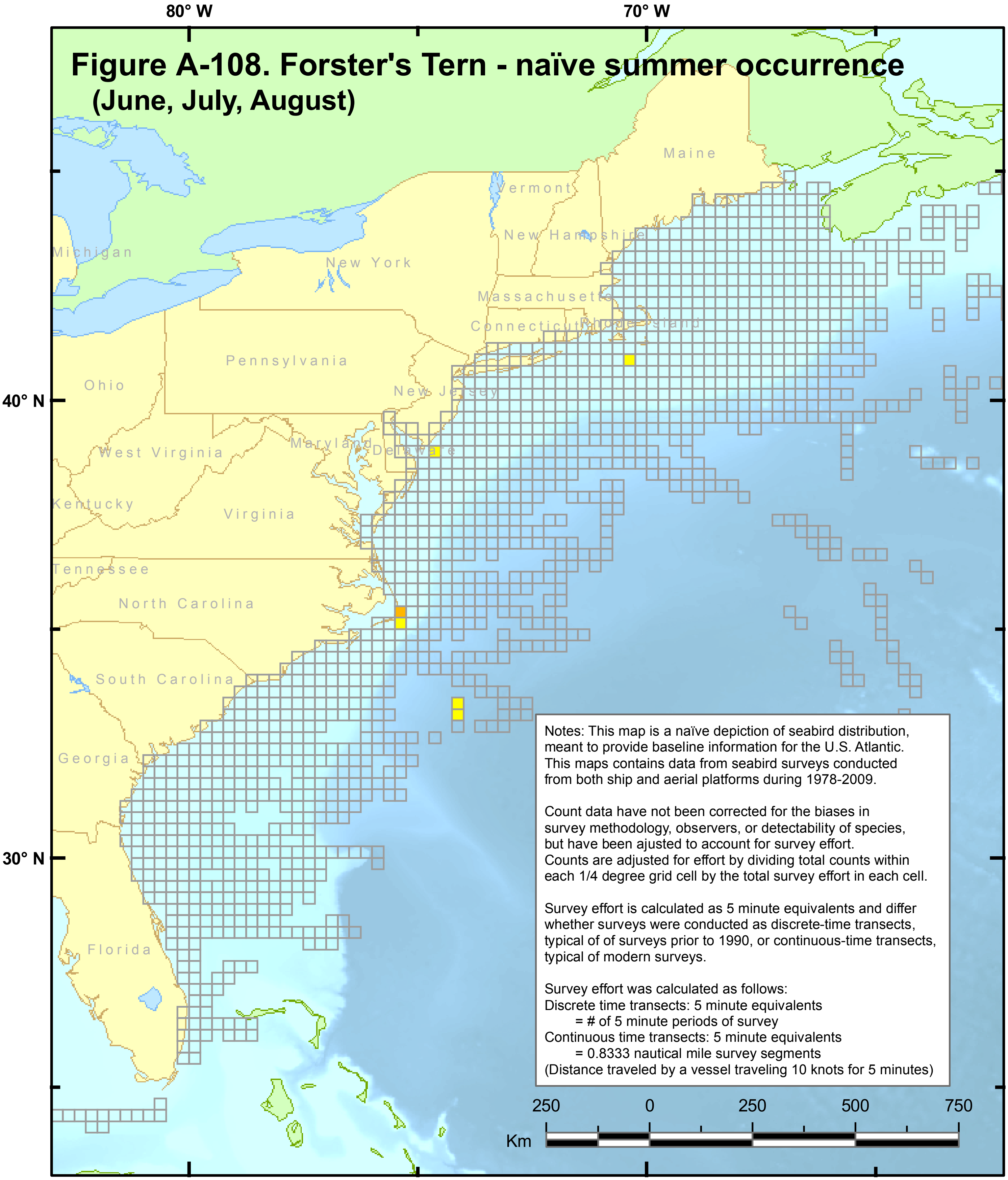
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-108. Forster's Tern - naïve summer occurrence (June, July, August)

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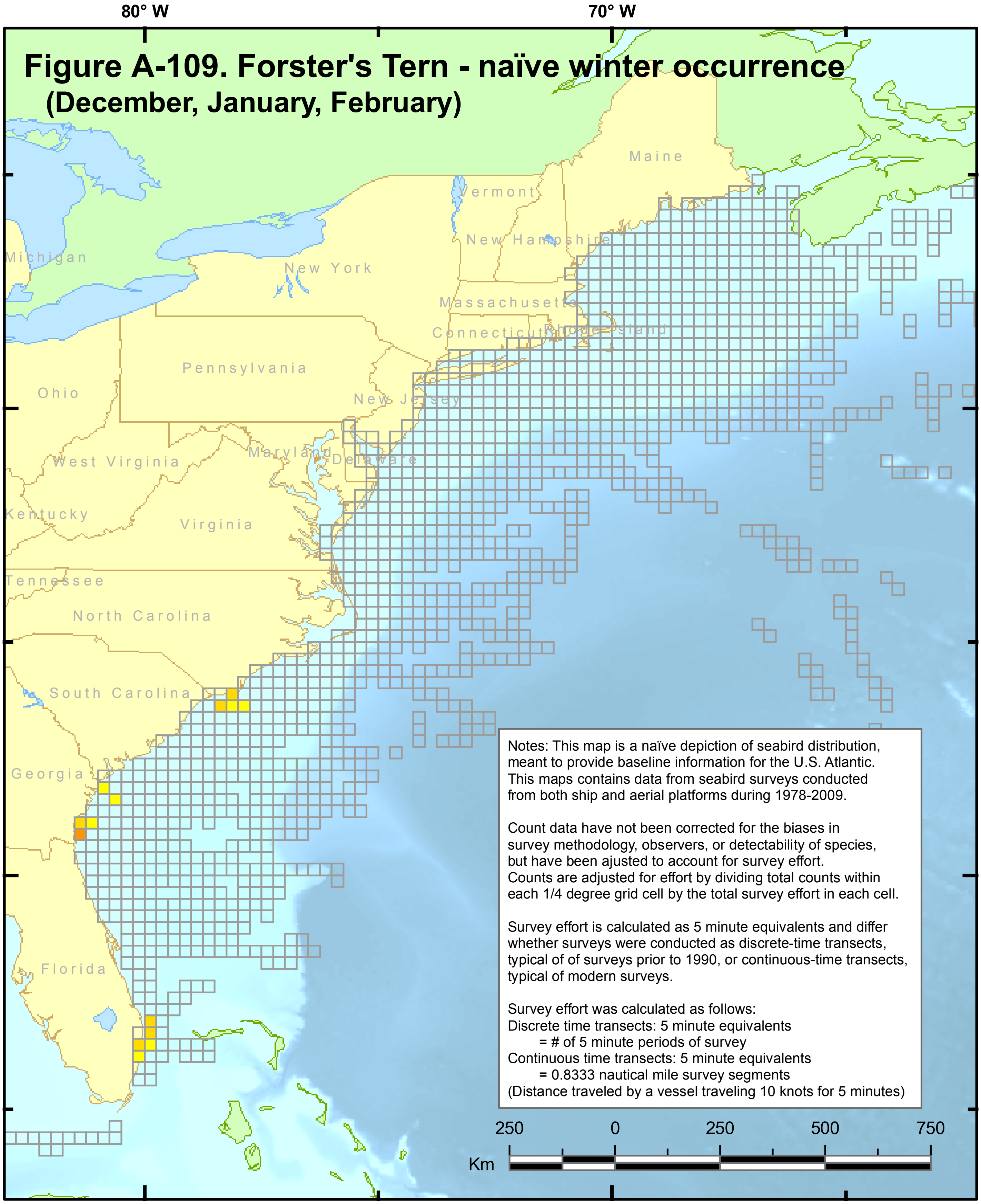
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-109. Forster's Tern - naïve winter occurrence (December, January, February)

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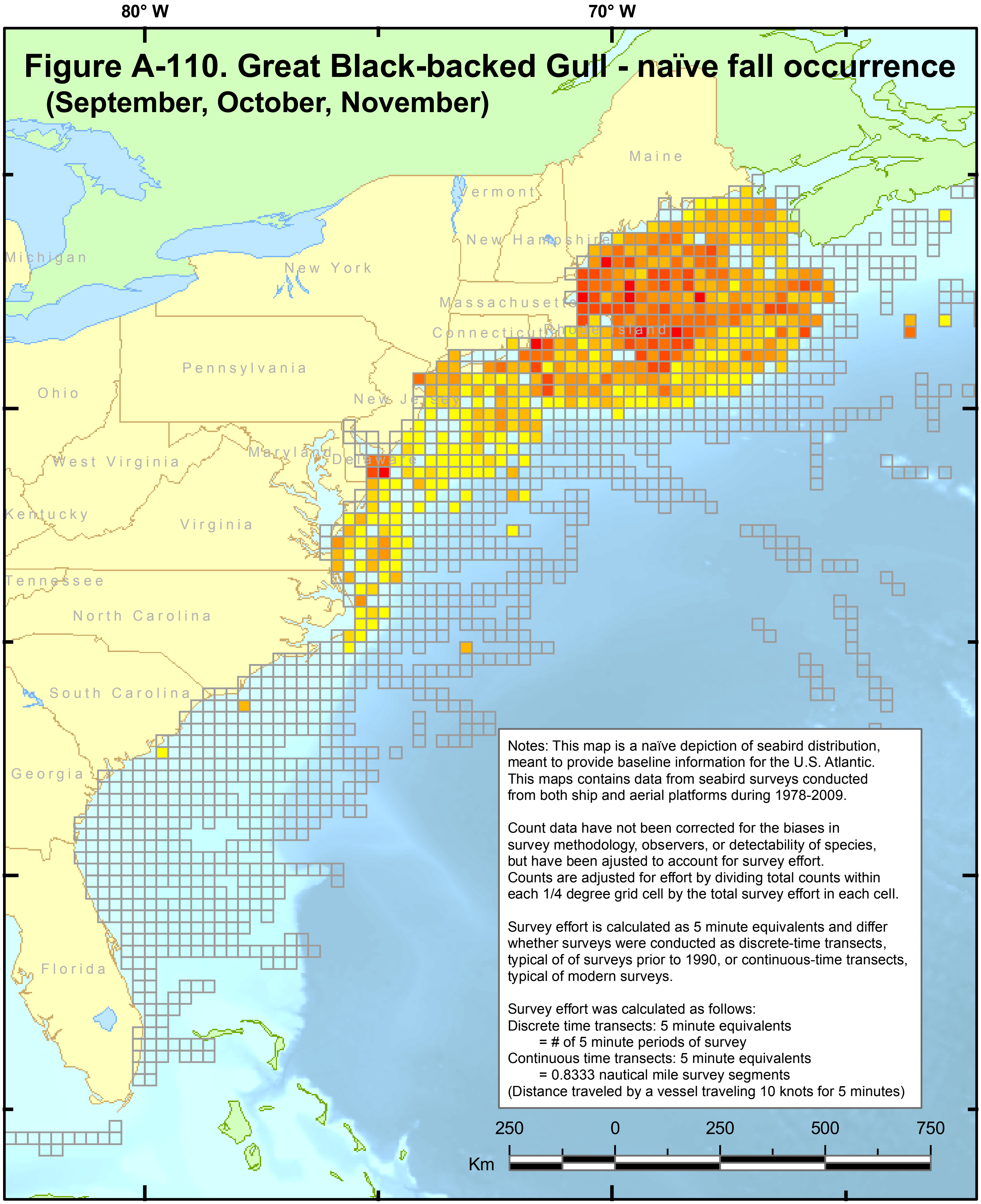
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5




# Figure A-110. Great Black-backed Gull - naïve fall occurrence (September, October, November)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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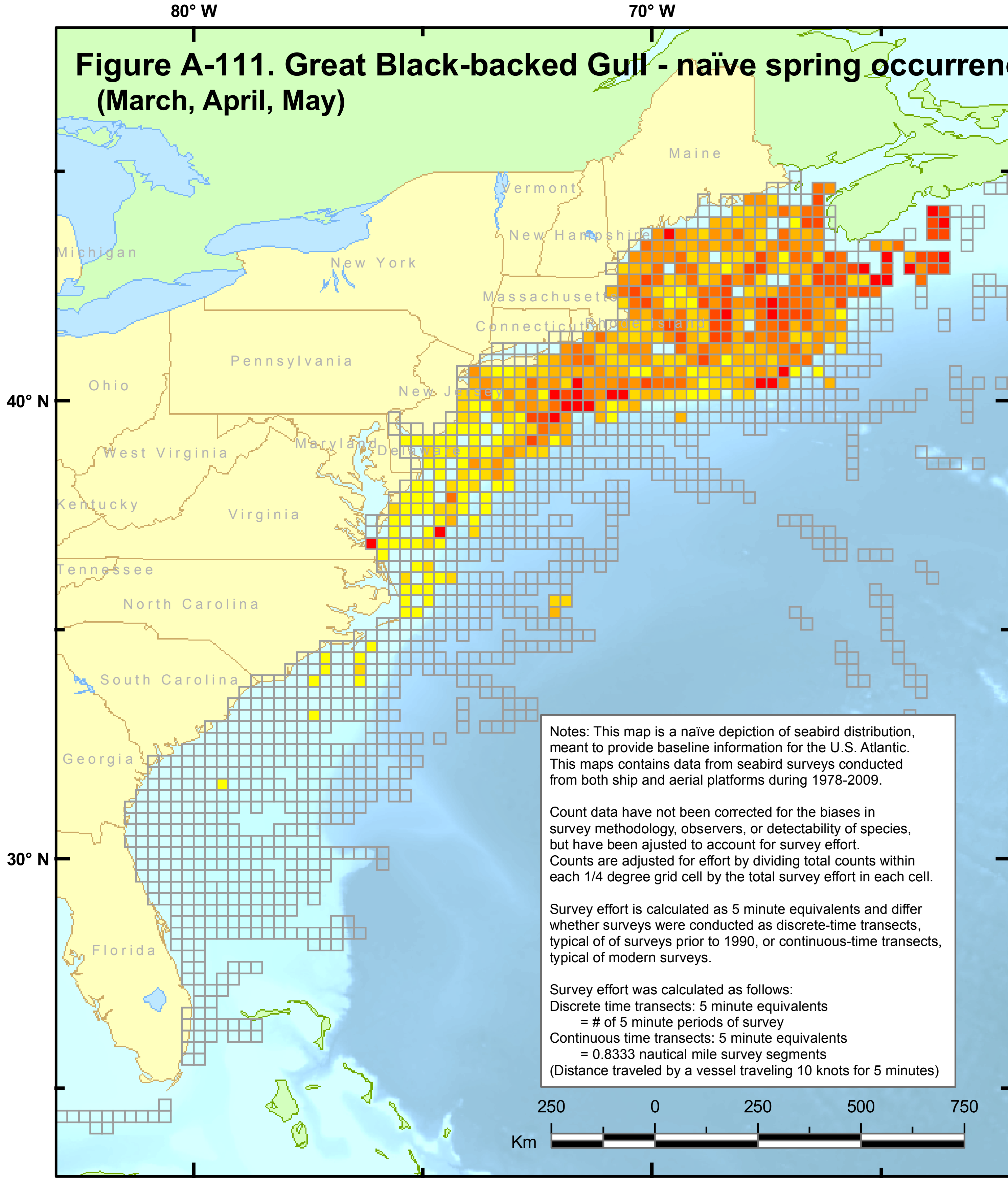
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 29.7

# Figure A-111. Great Black-backed Gull - naïve spring occurrence (March, April, May)

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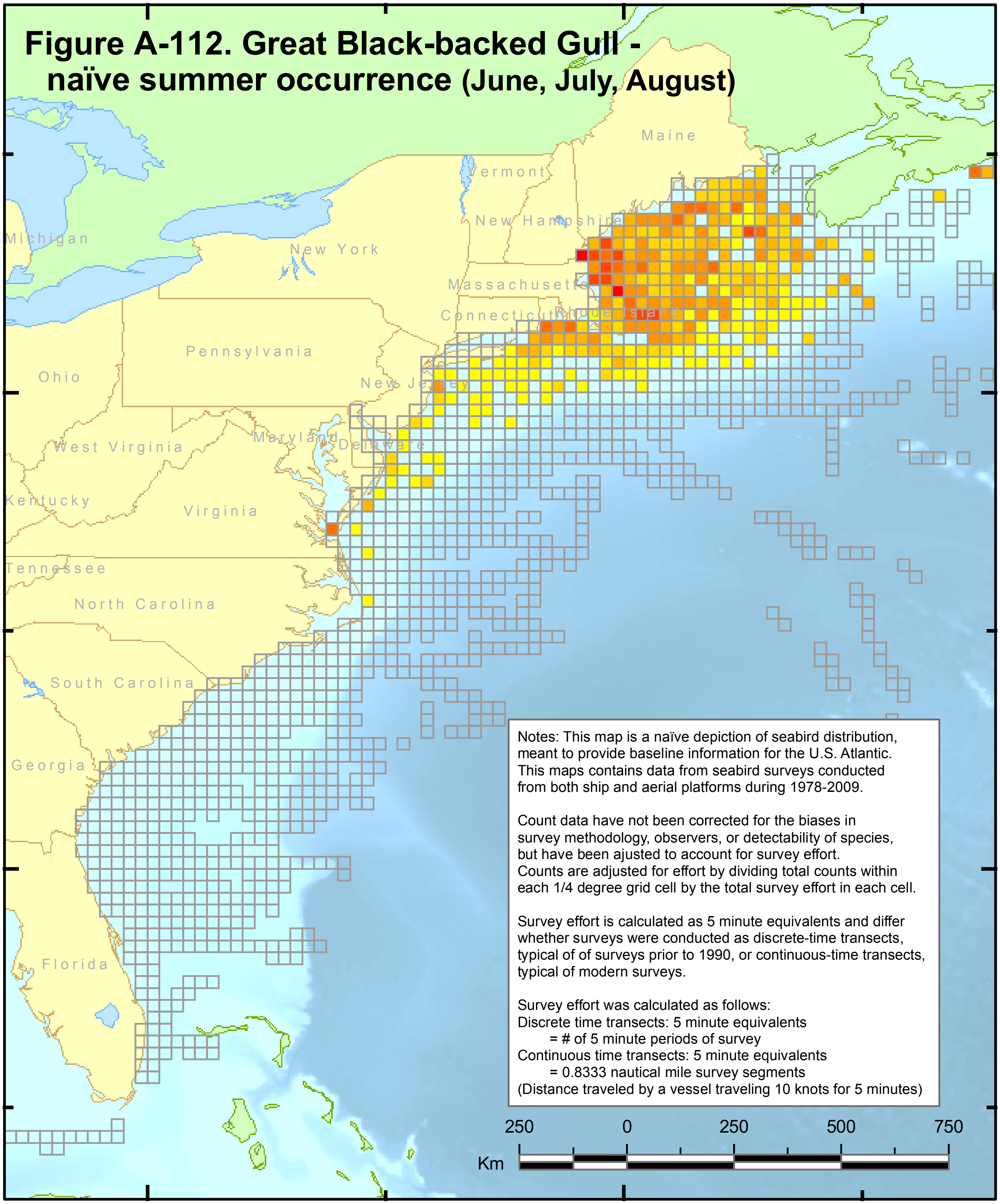
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 49.3 |

# Figure A-112. Great Black-backed Gull - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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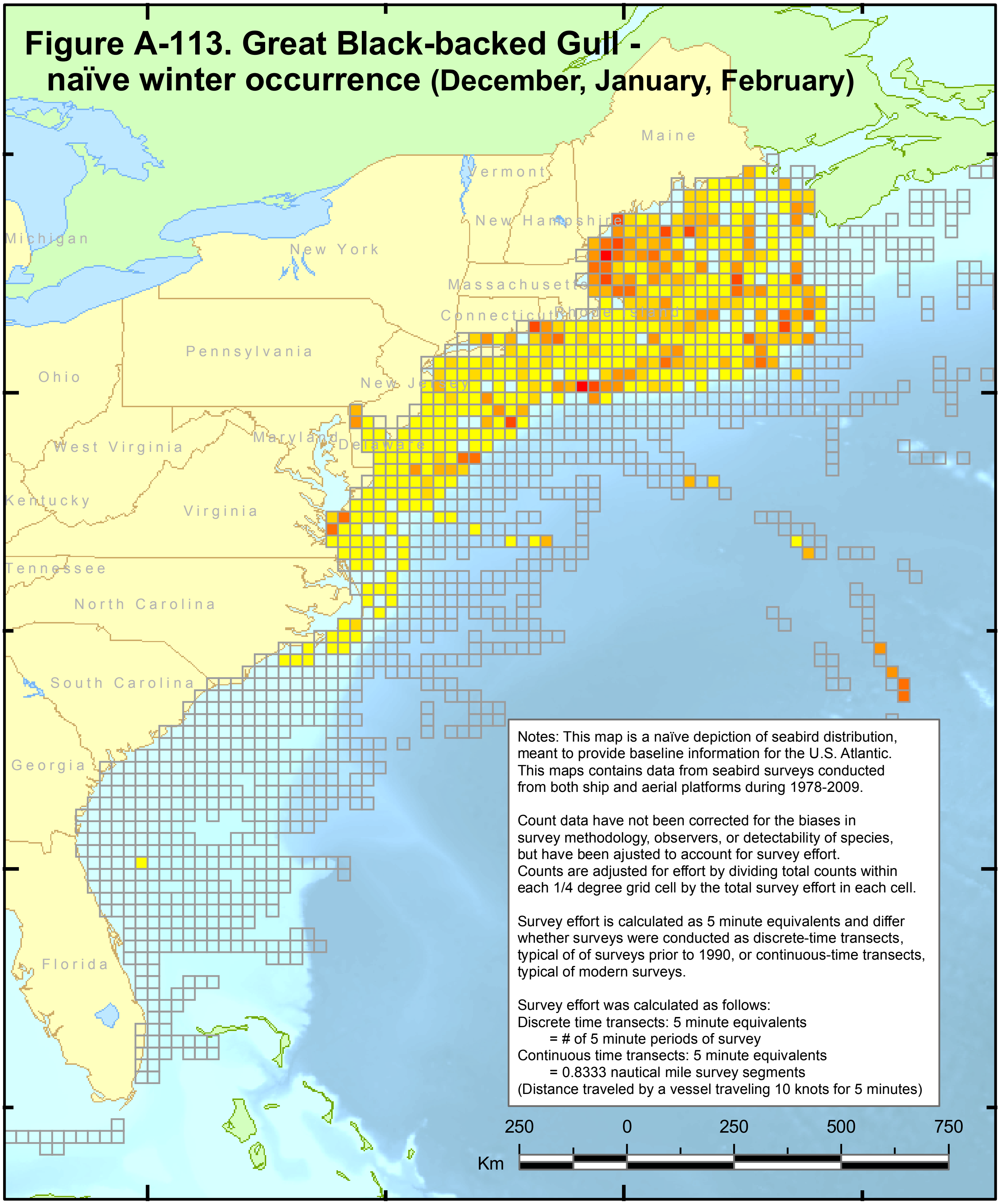
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 15.7

# Figure A-113. Great Black-backed Gull - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 9.3

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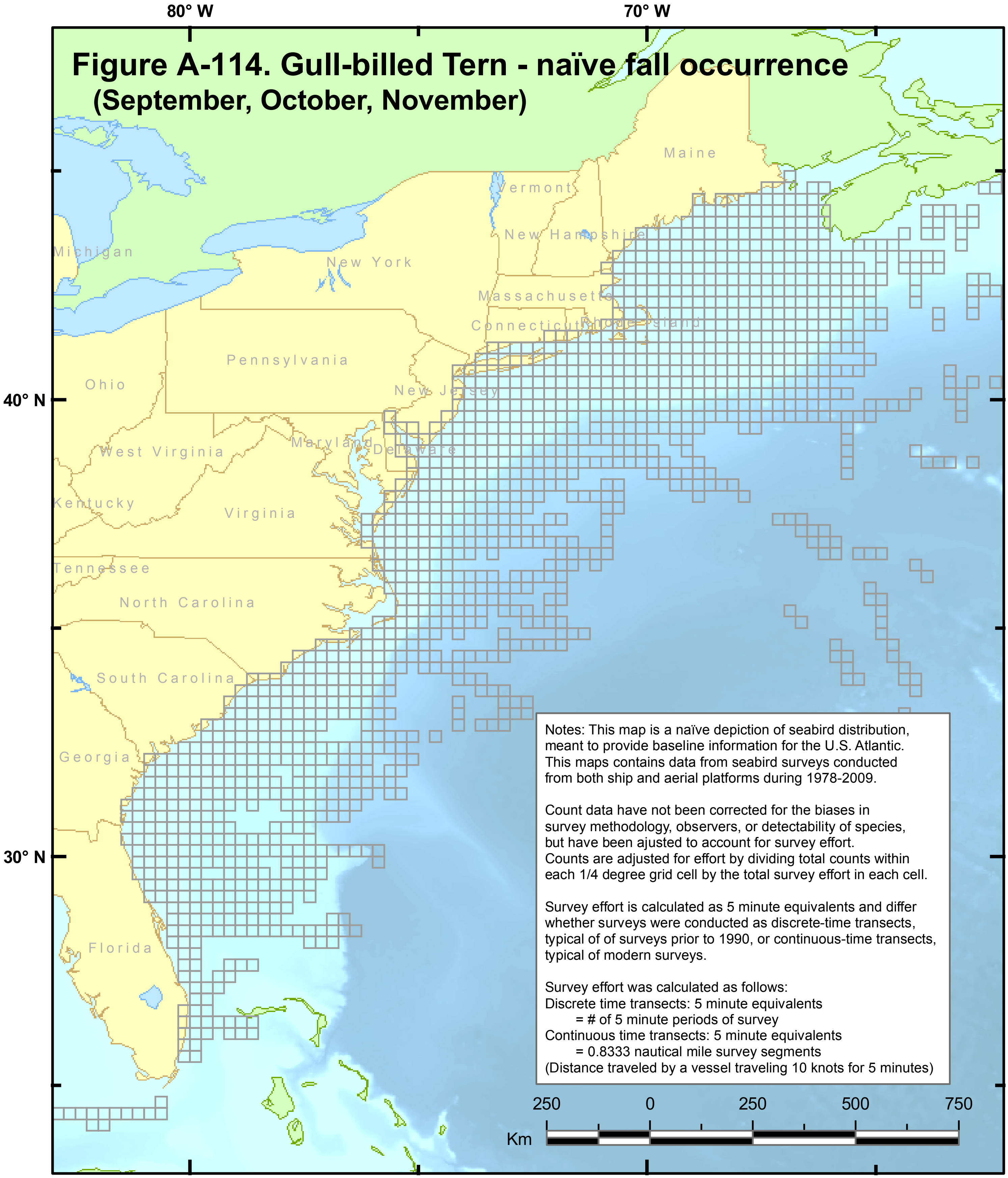
# Figure A-114. Gull-billed Tern - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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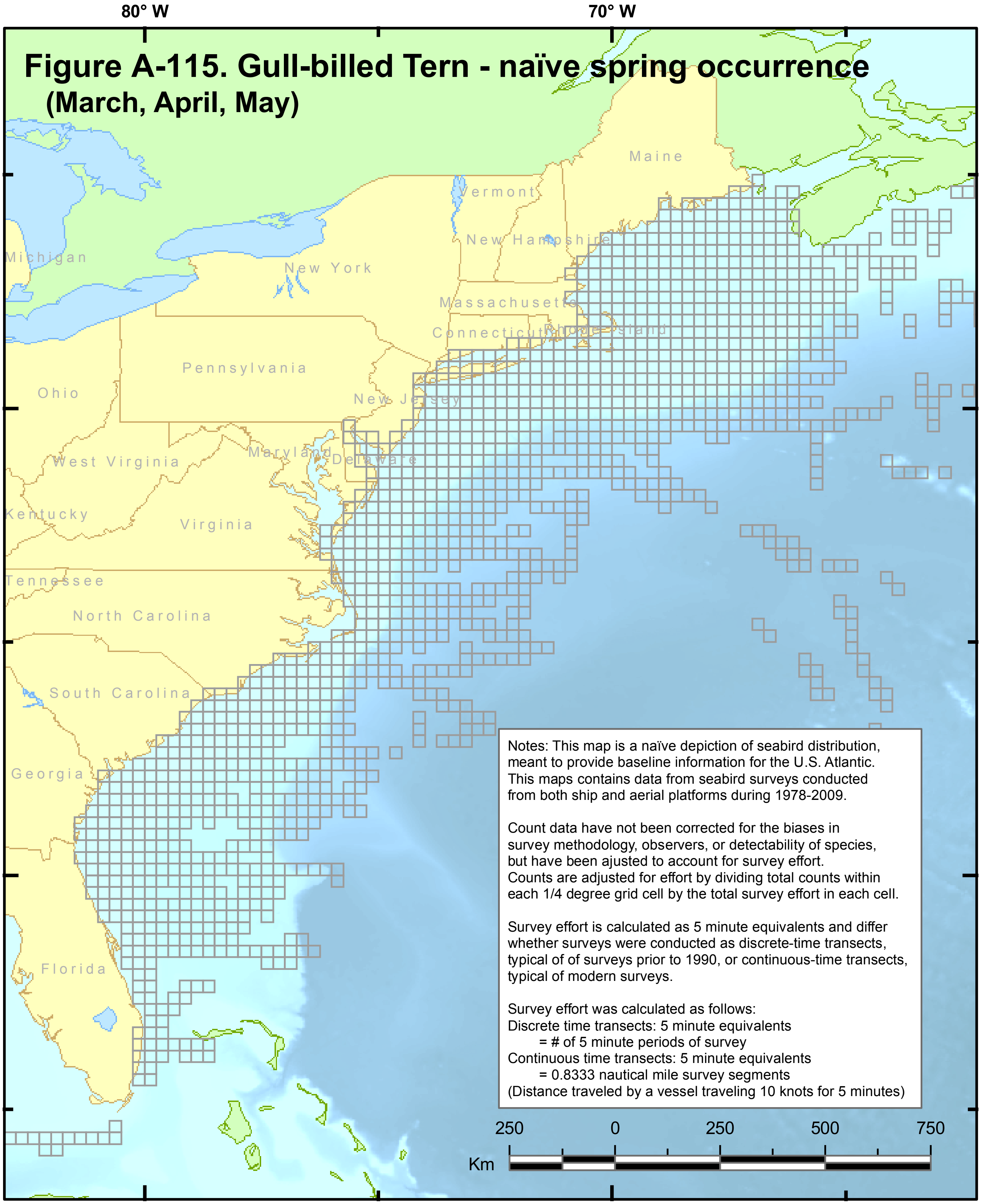
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-115. Gull-billed Tern - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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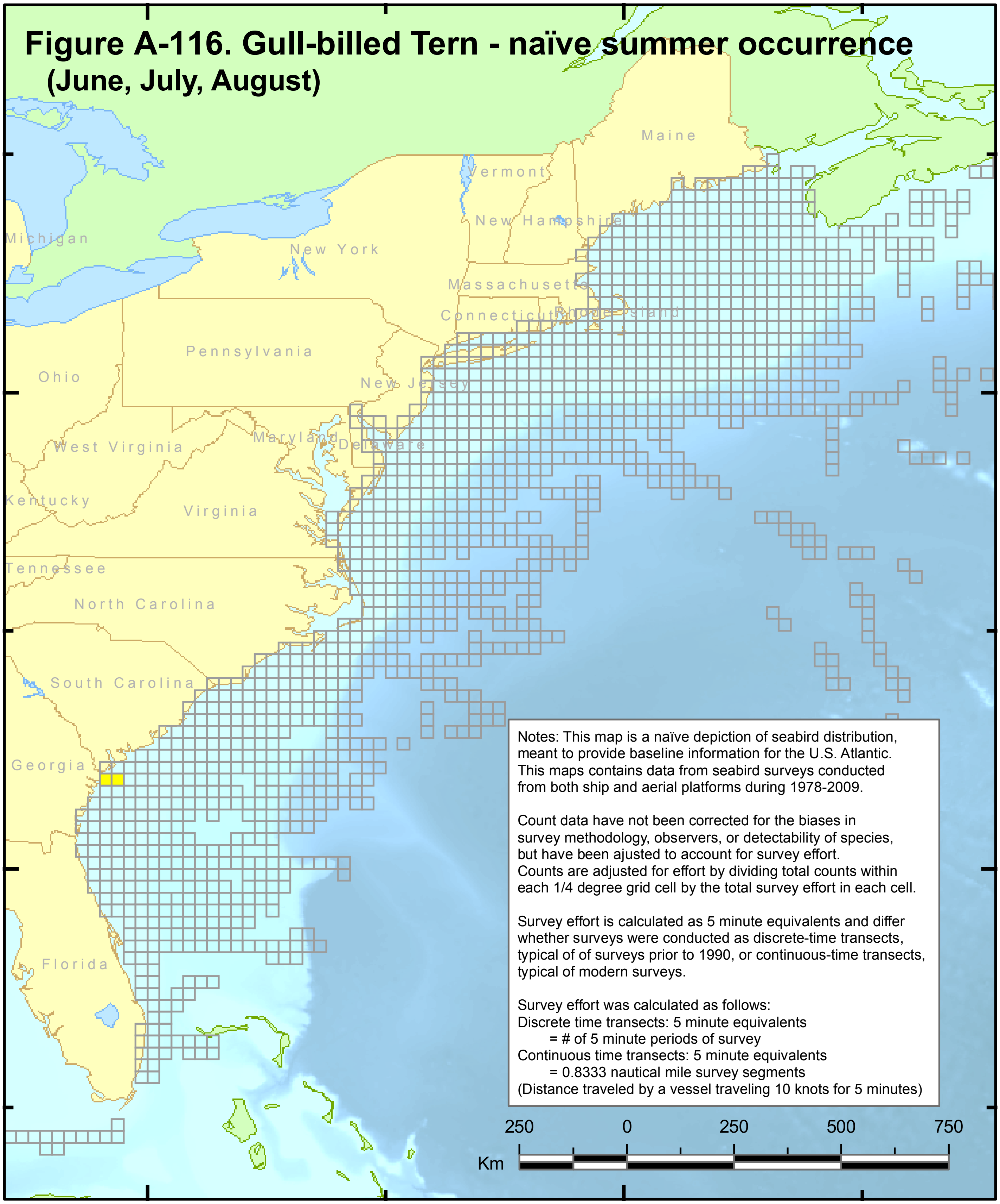
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-116. Gull-billed Tern - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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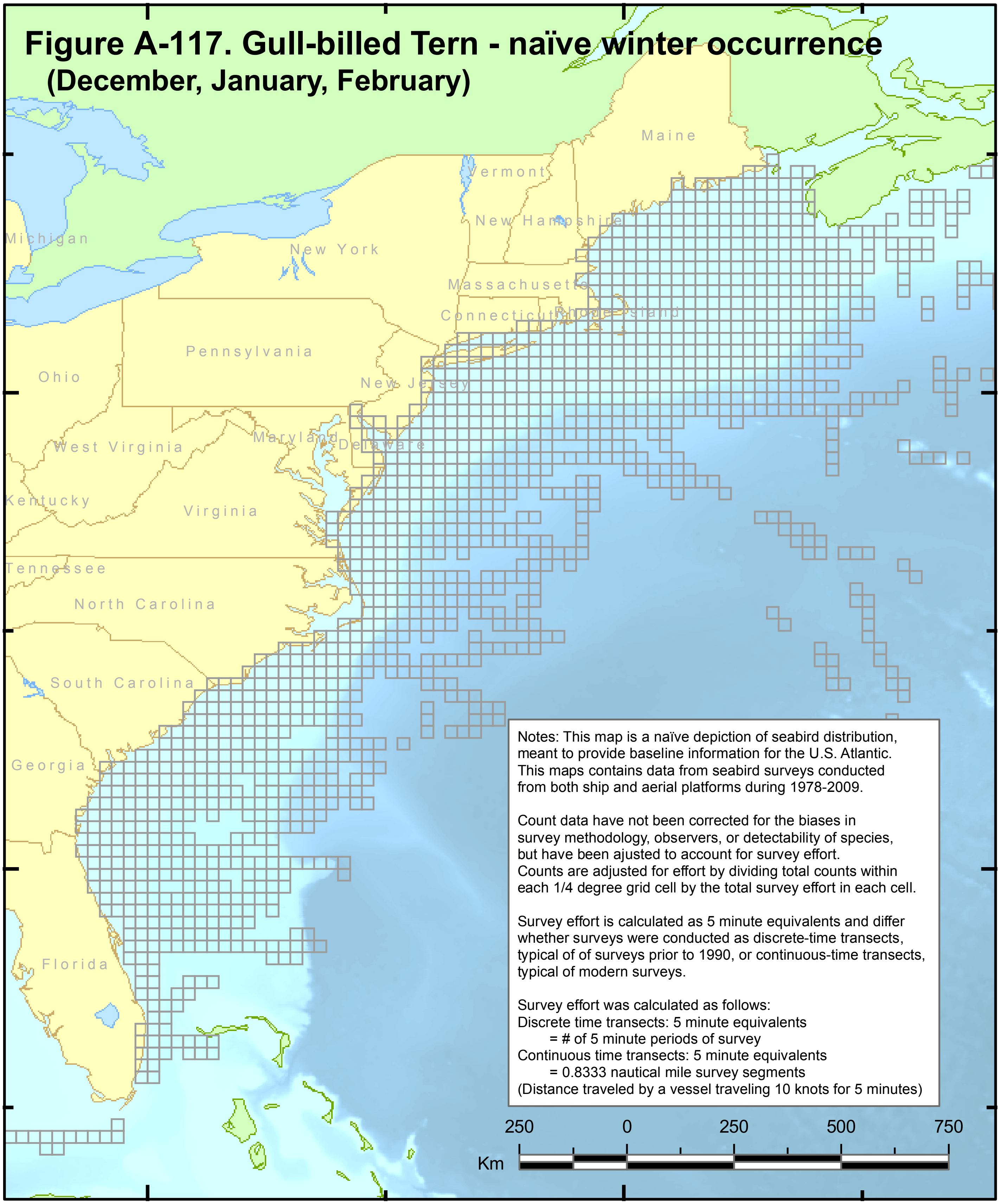
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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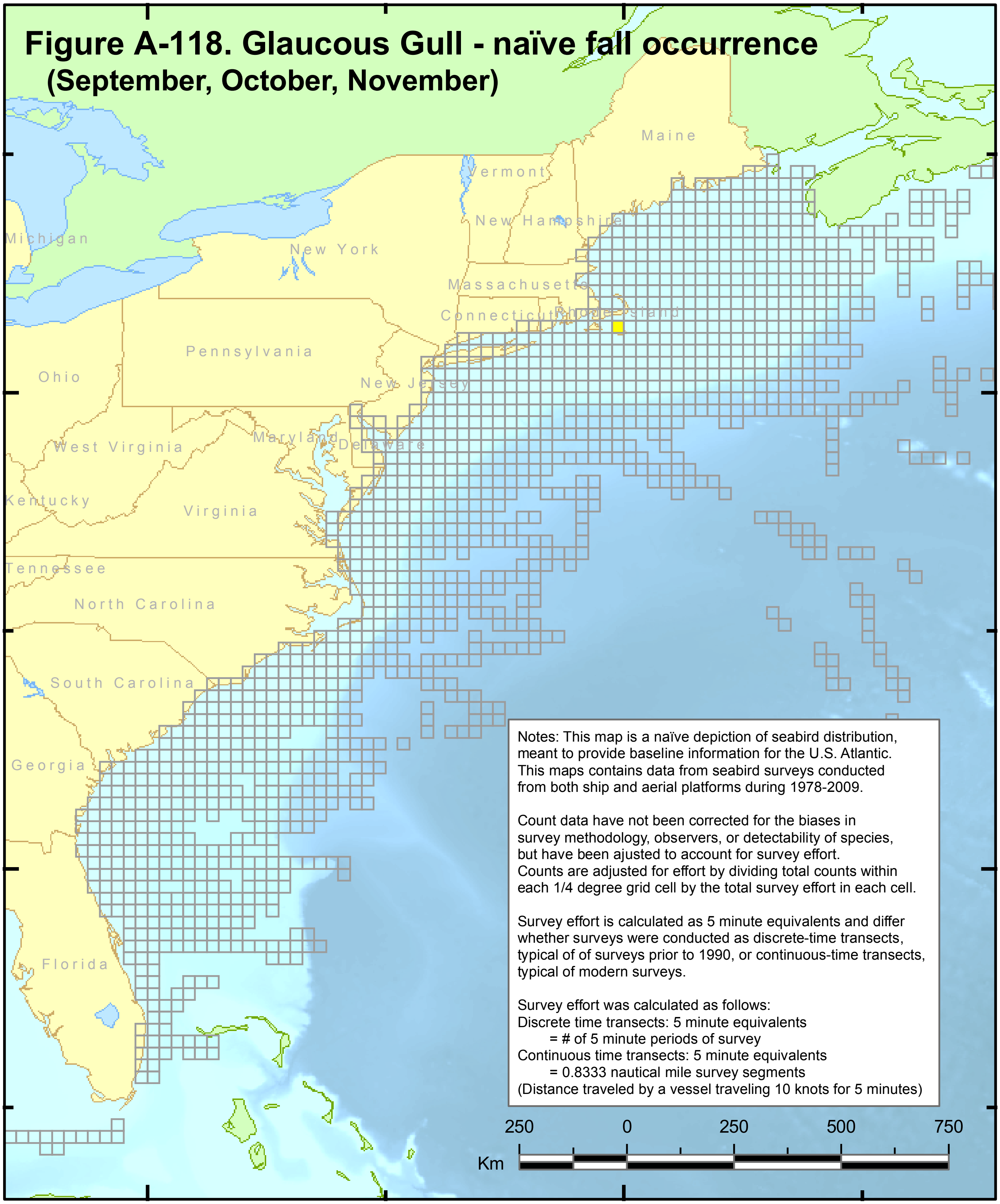
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-118. Glaucous Gull - naïve fall occurrence
(September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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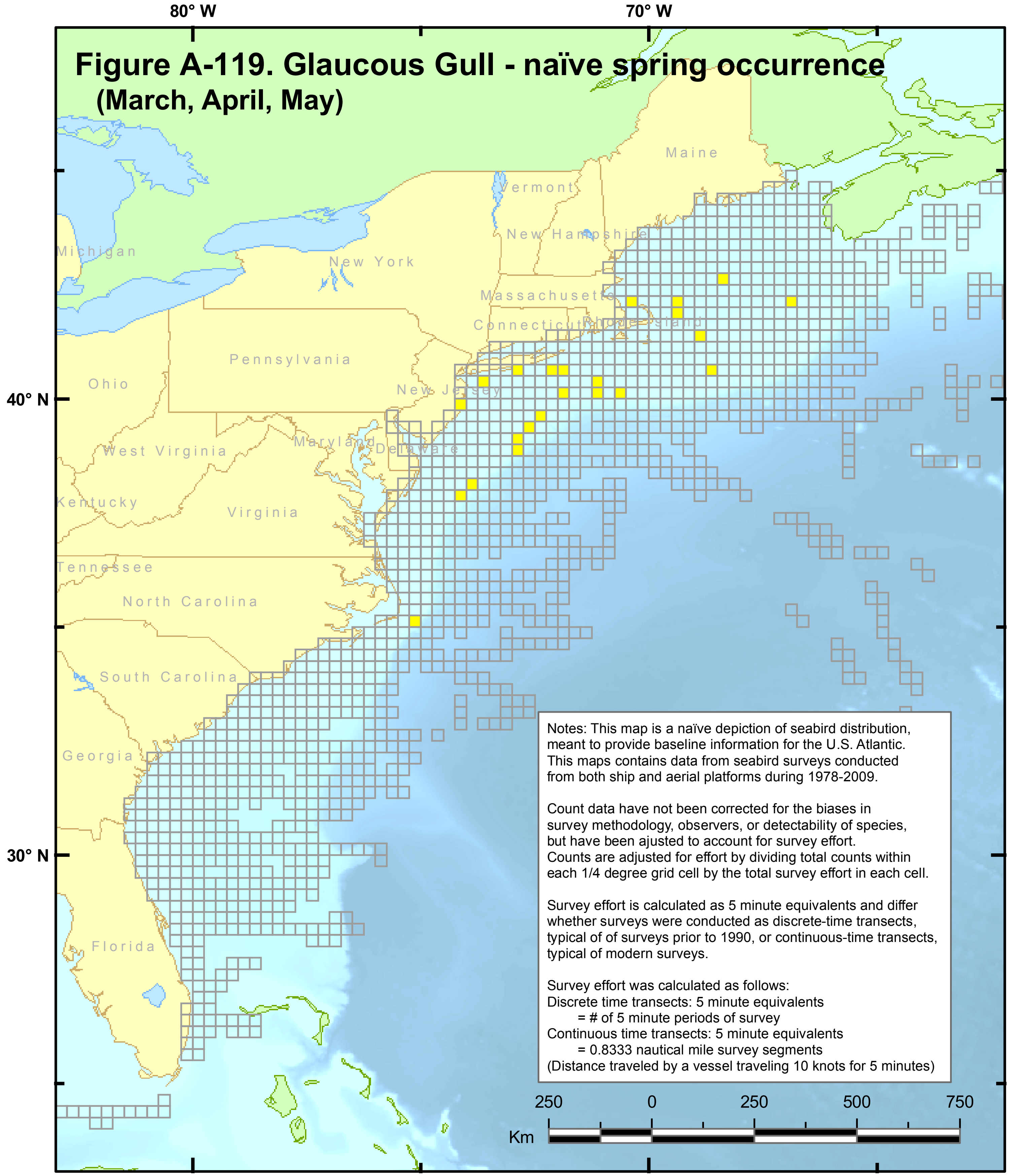
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-119. Glaucous Gull - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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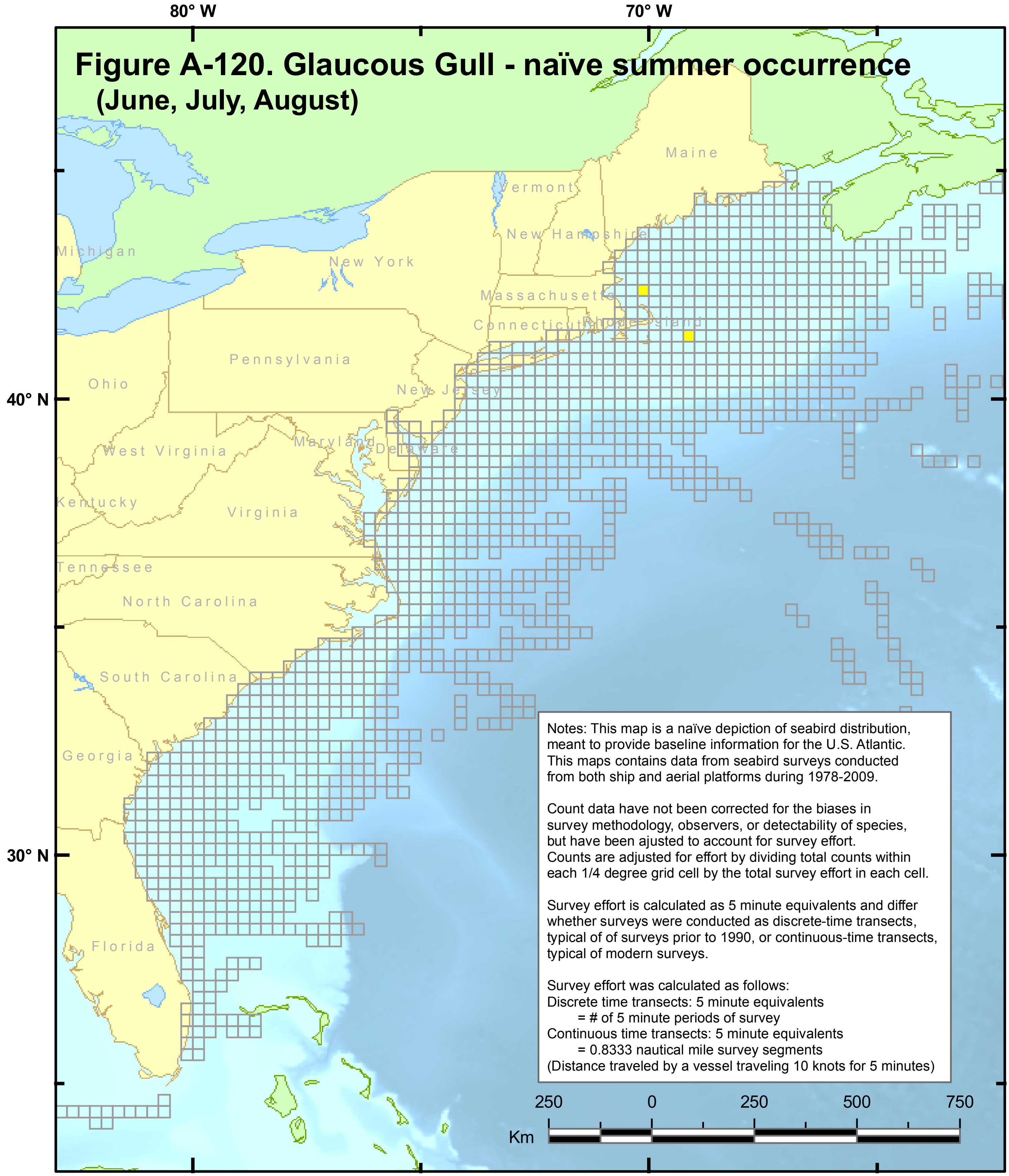
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-120. Glaucous Gull - naïve summer occurrence (June, July, August)

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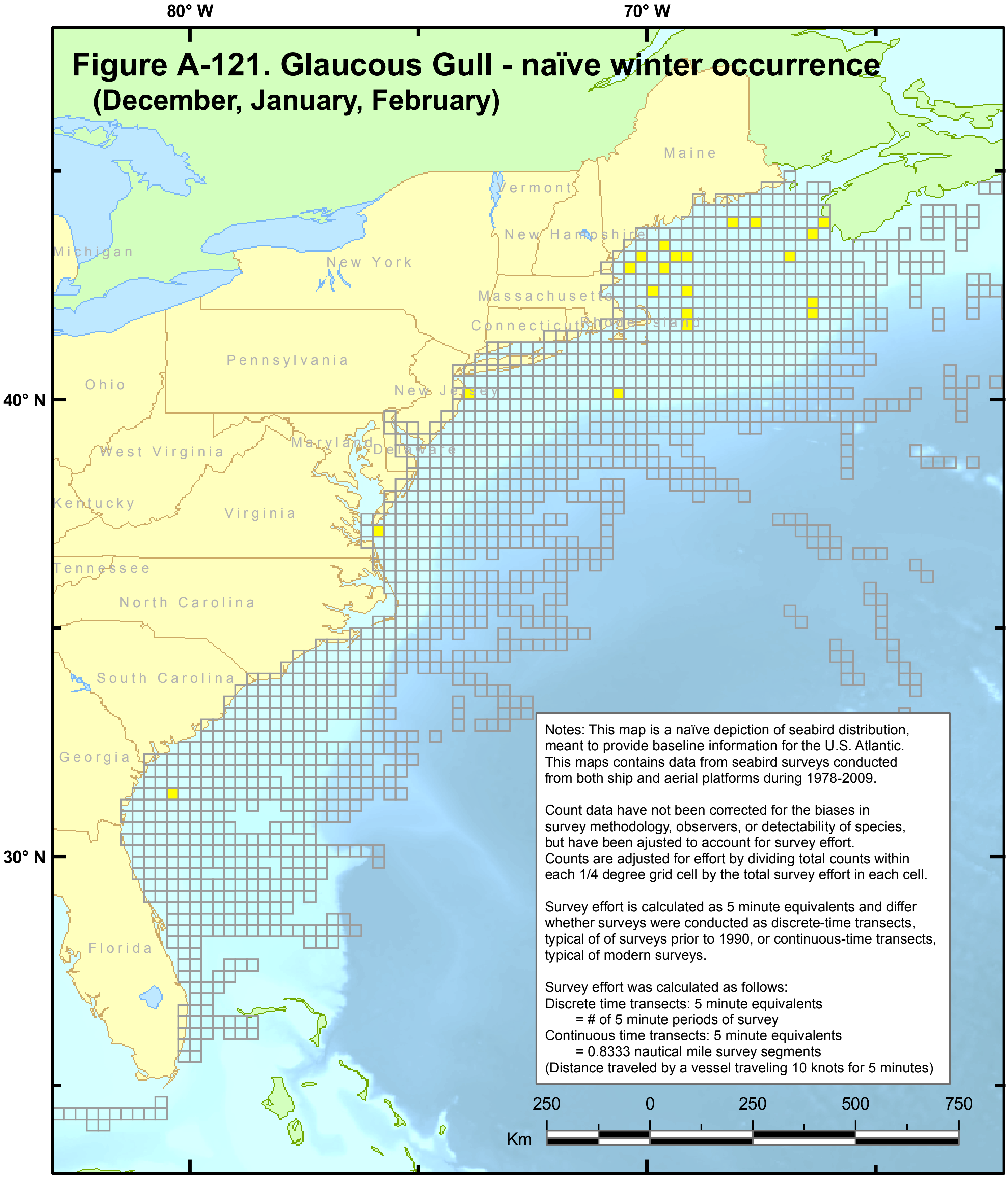
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-121. Glaucous Gull - naïve winter occurrence (December, January, February)

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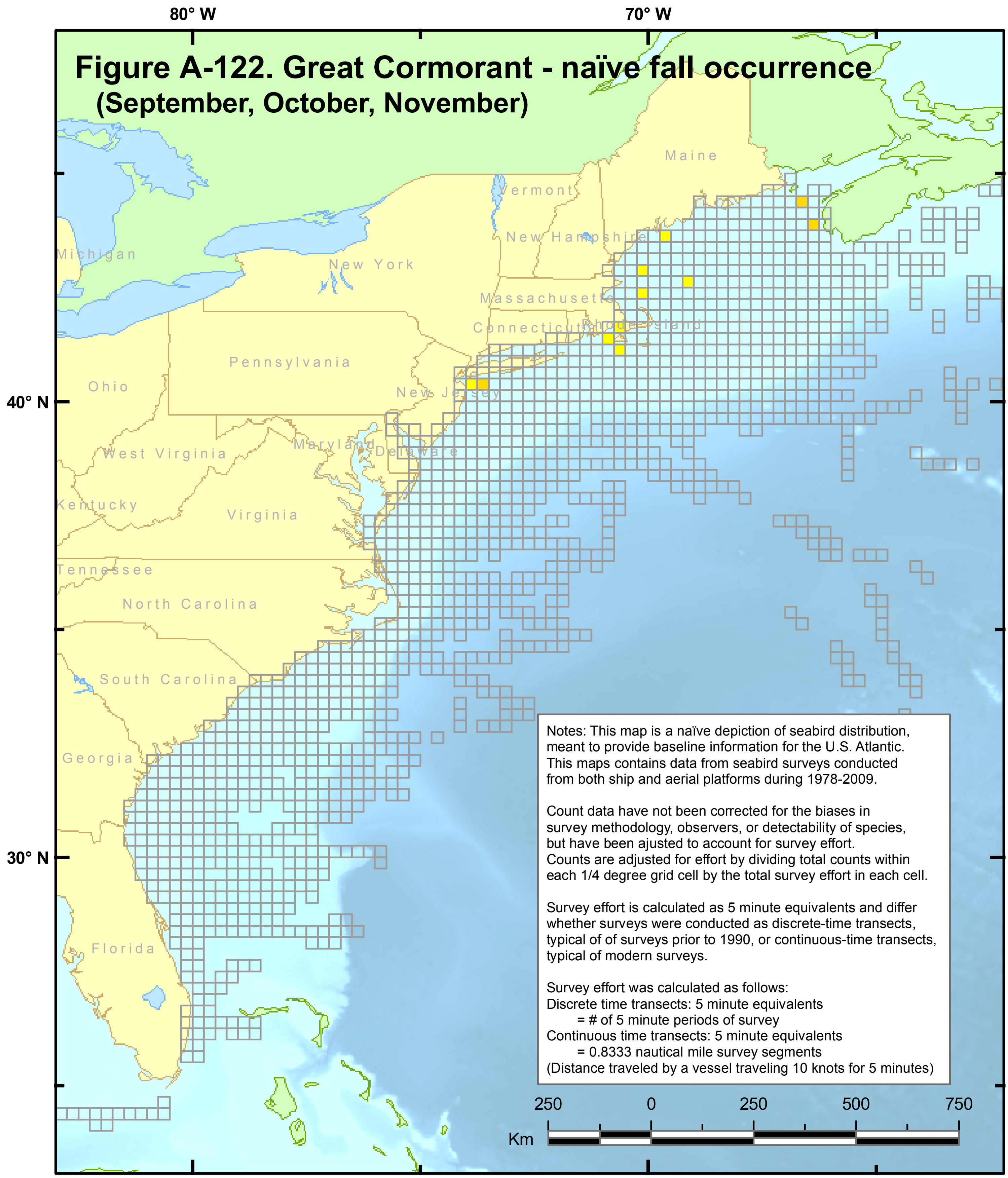
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-122. Great Cormorant - naïve fall occurrence (September, October, November)

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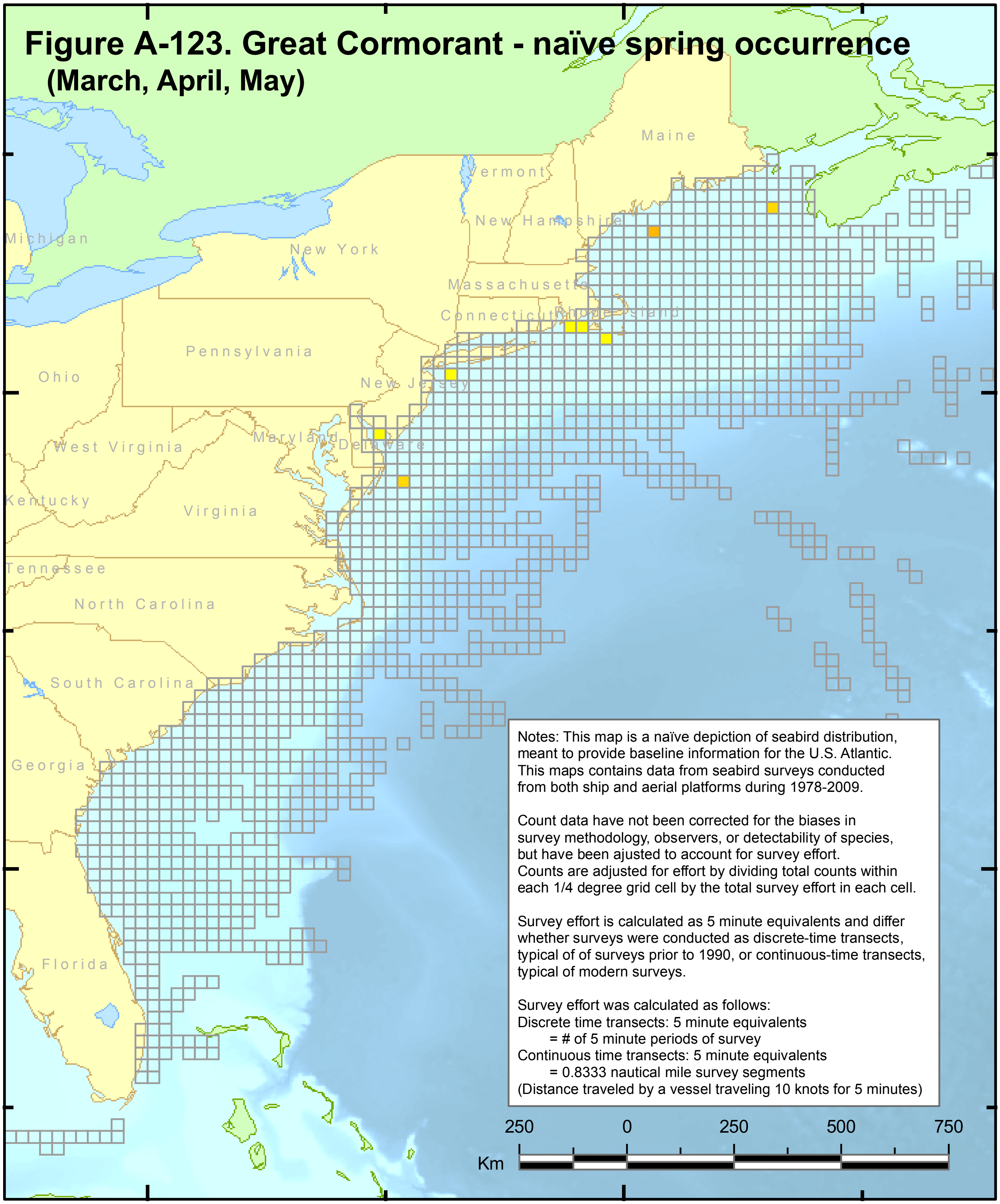
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-123. Great Cormorant - naïve spring occurrence (March, April, May)

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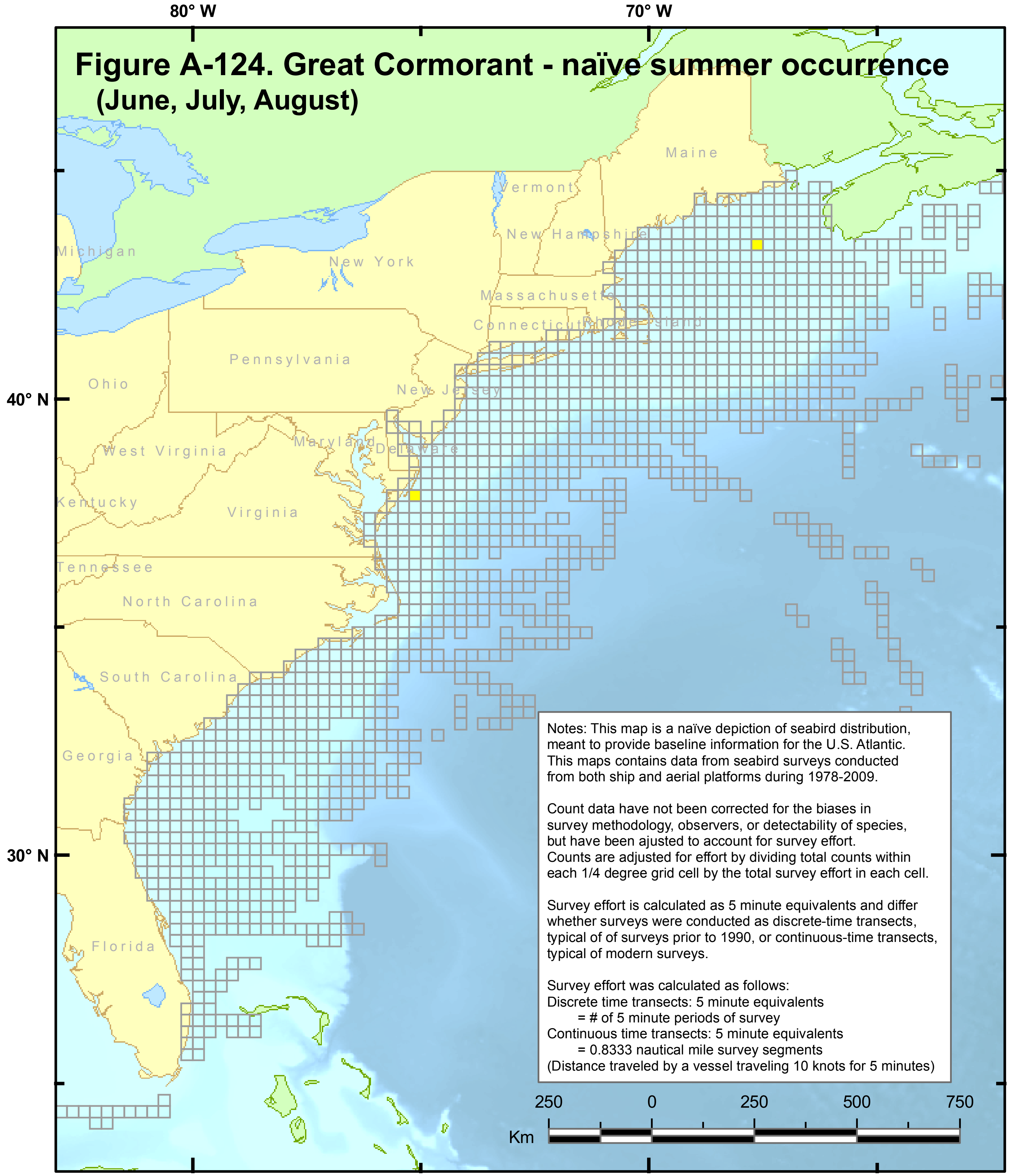
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-124. Great Cormorant - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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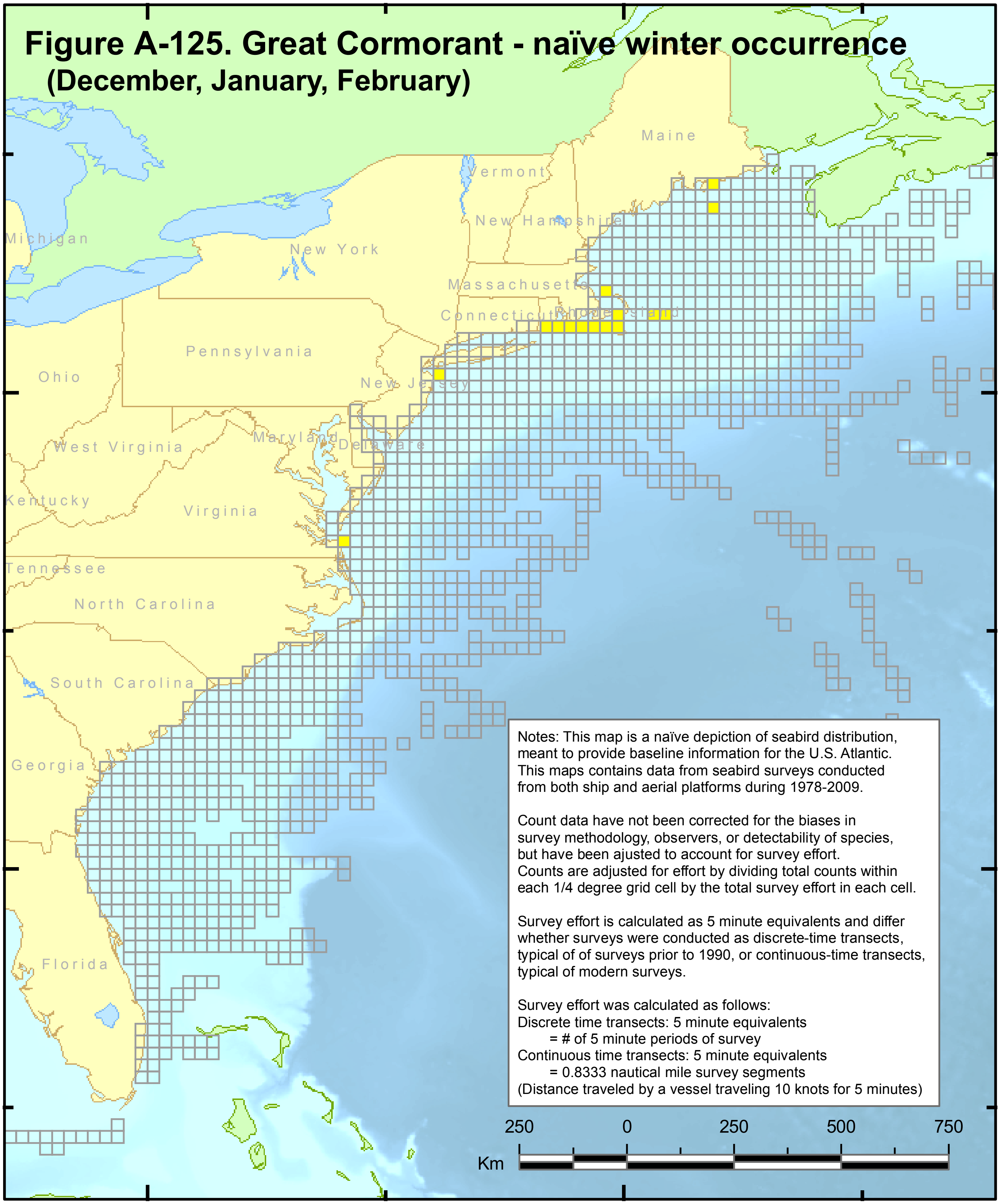
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-125. Great Cormorant - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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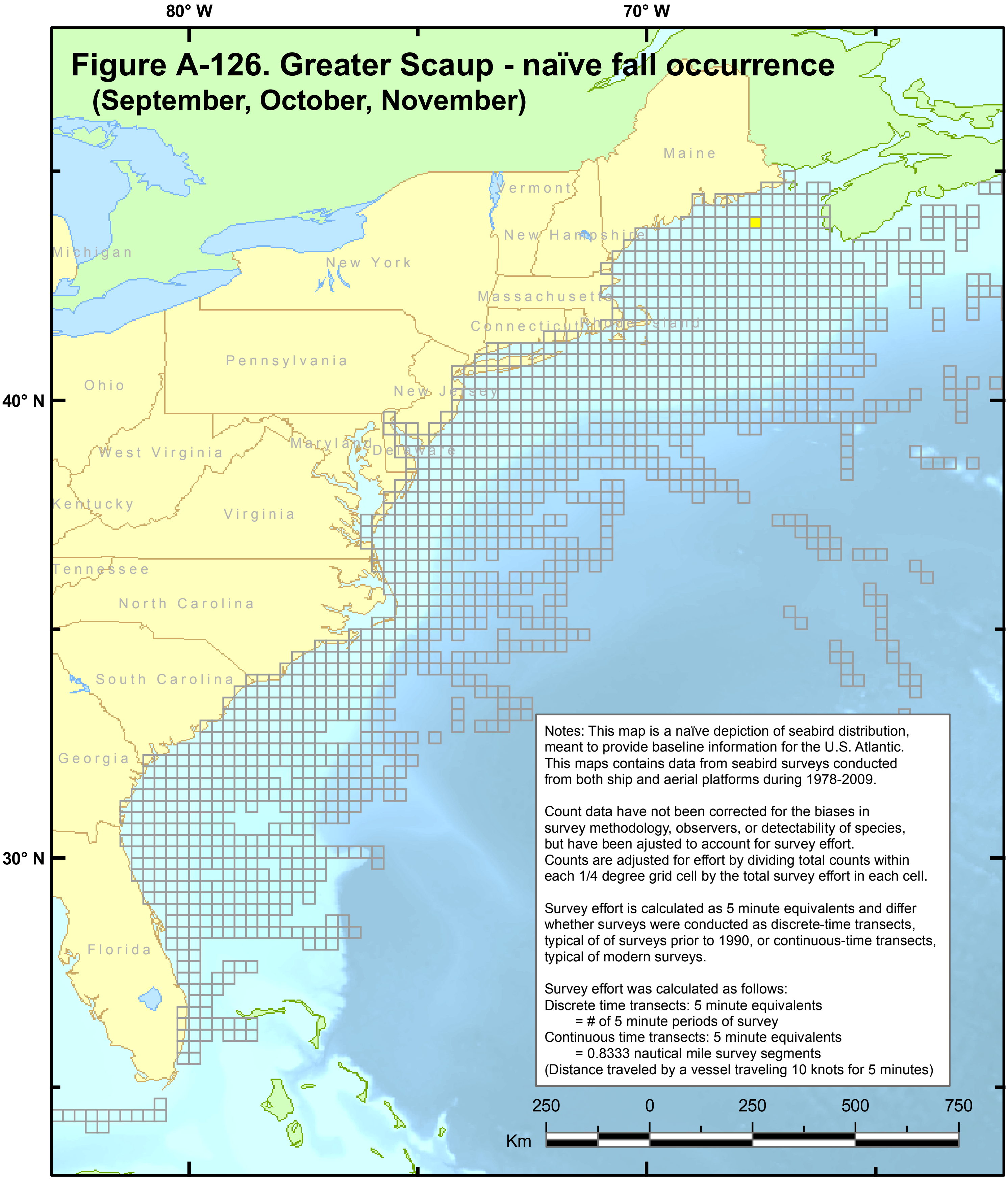
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5F

# Figure A-126. Greater Scaup - naïve fall occurrence
(September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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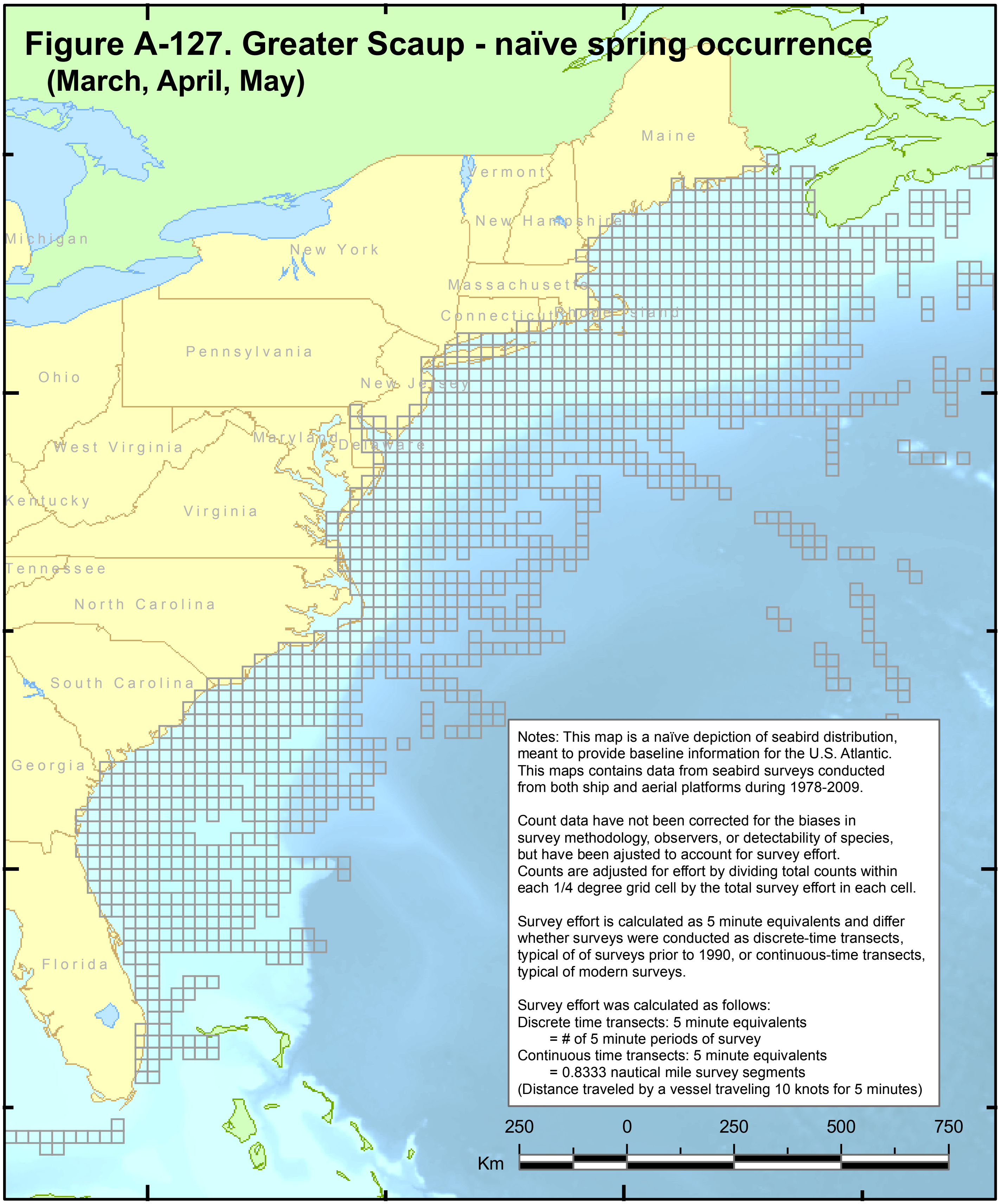
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-127. Greater Scaup - naïve spring occurrence (March, April, May)

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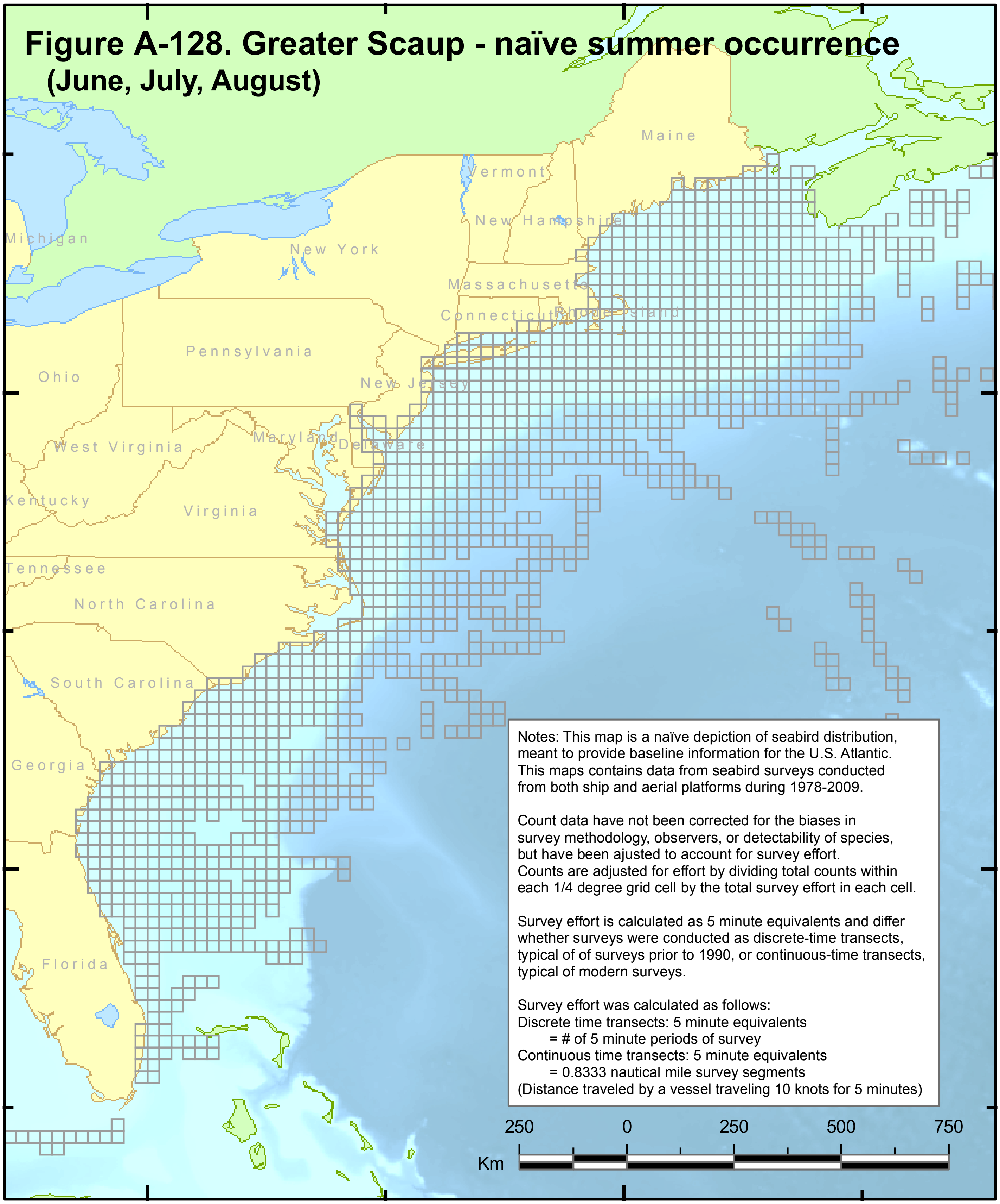
## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

## Figure A-128. Greater Scaup - naïve summer occurrence (June, July, August)




### Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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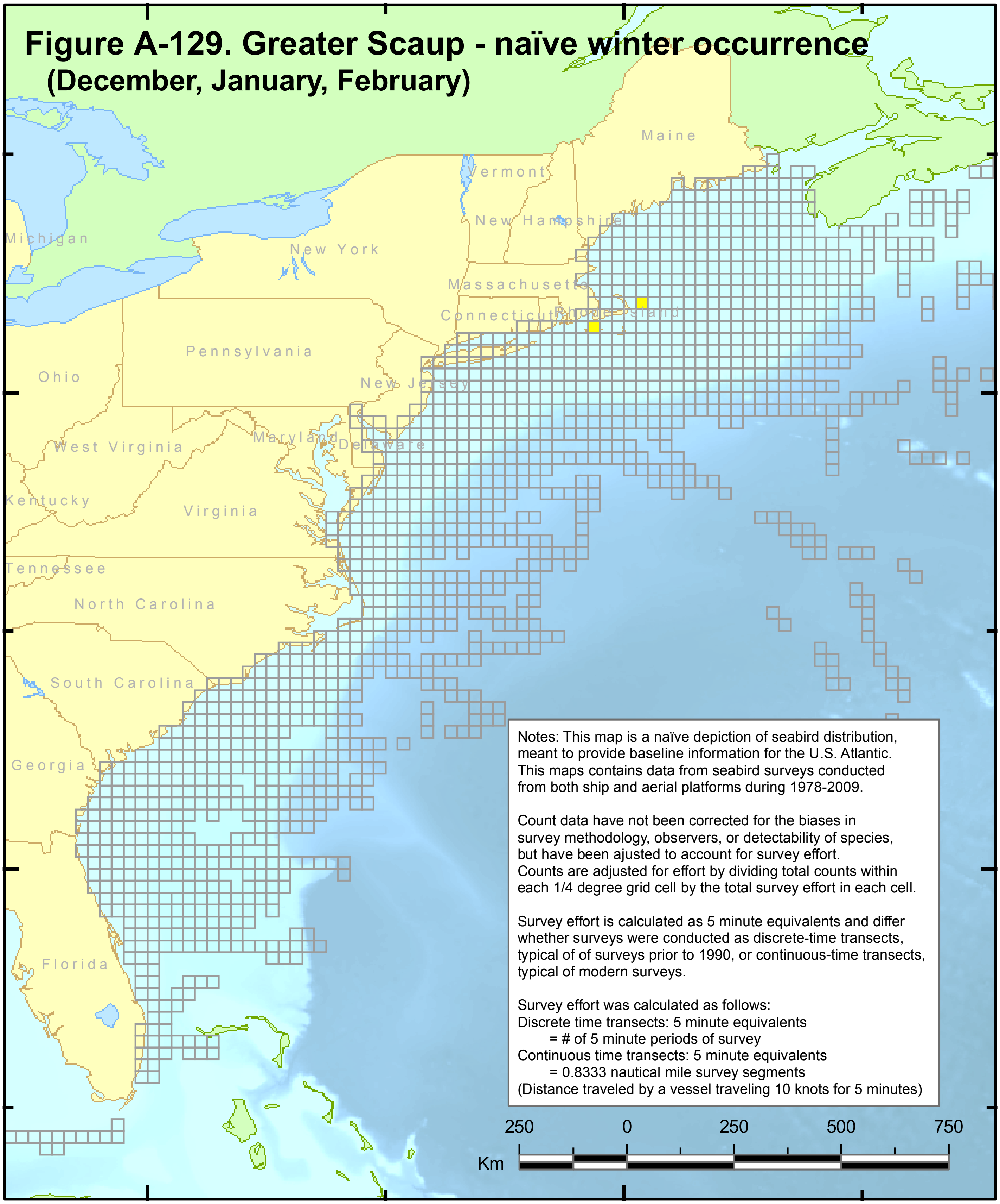


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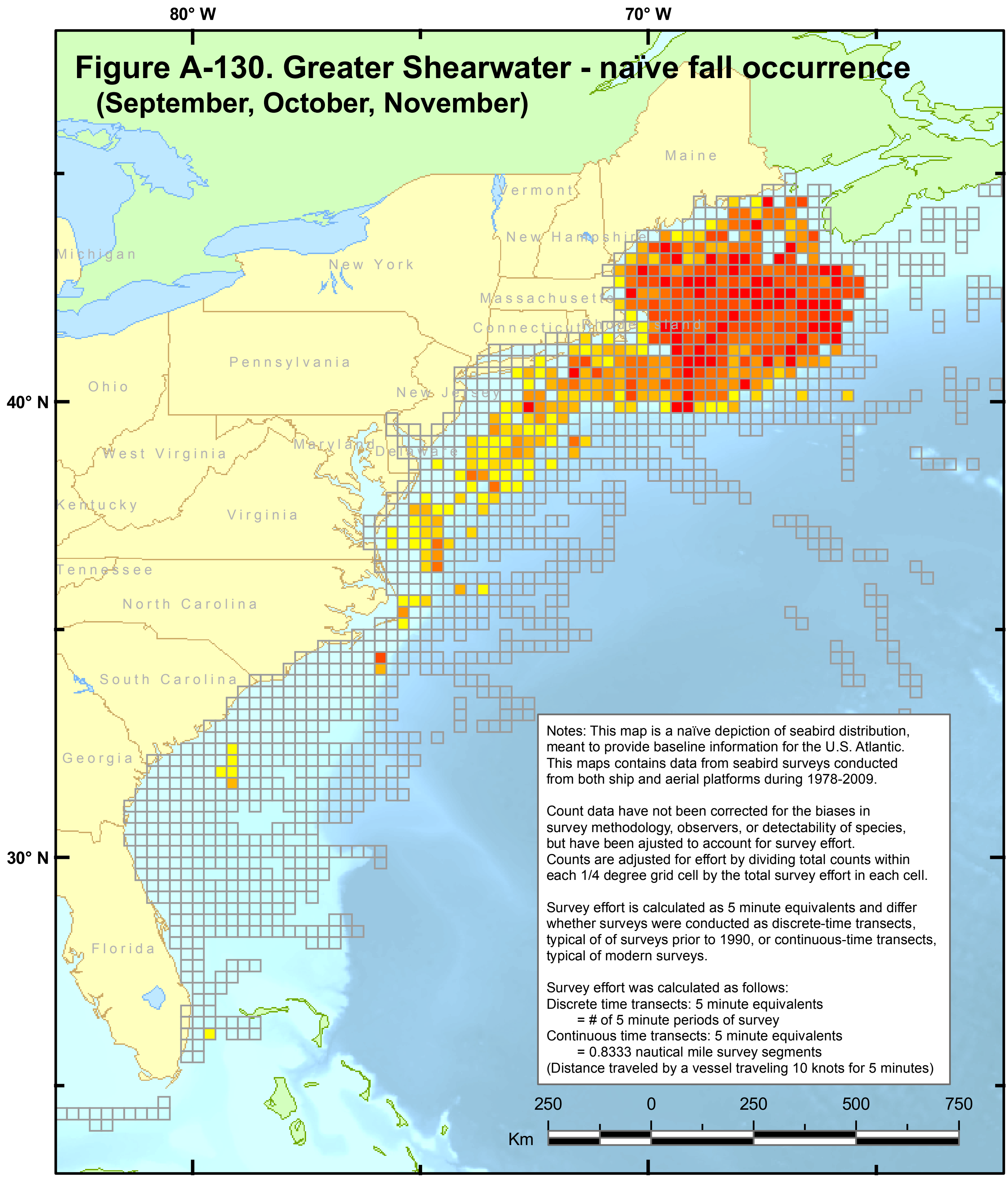
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-130. Greater Shearwater - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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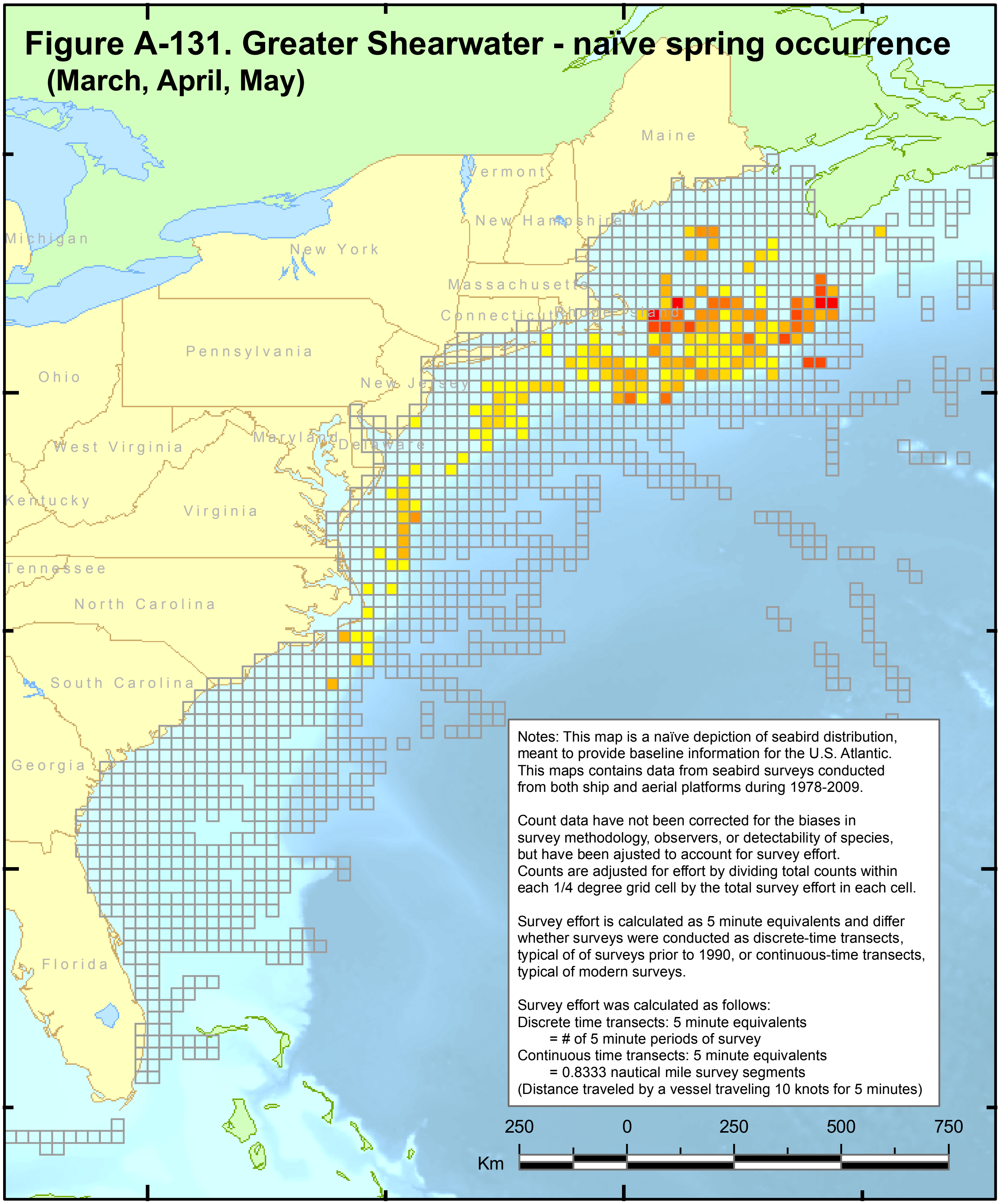
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 32.7 |

# Figure A-131. Greater Shearwater - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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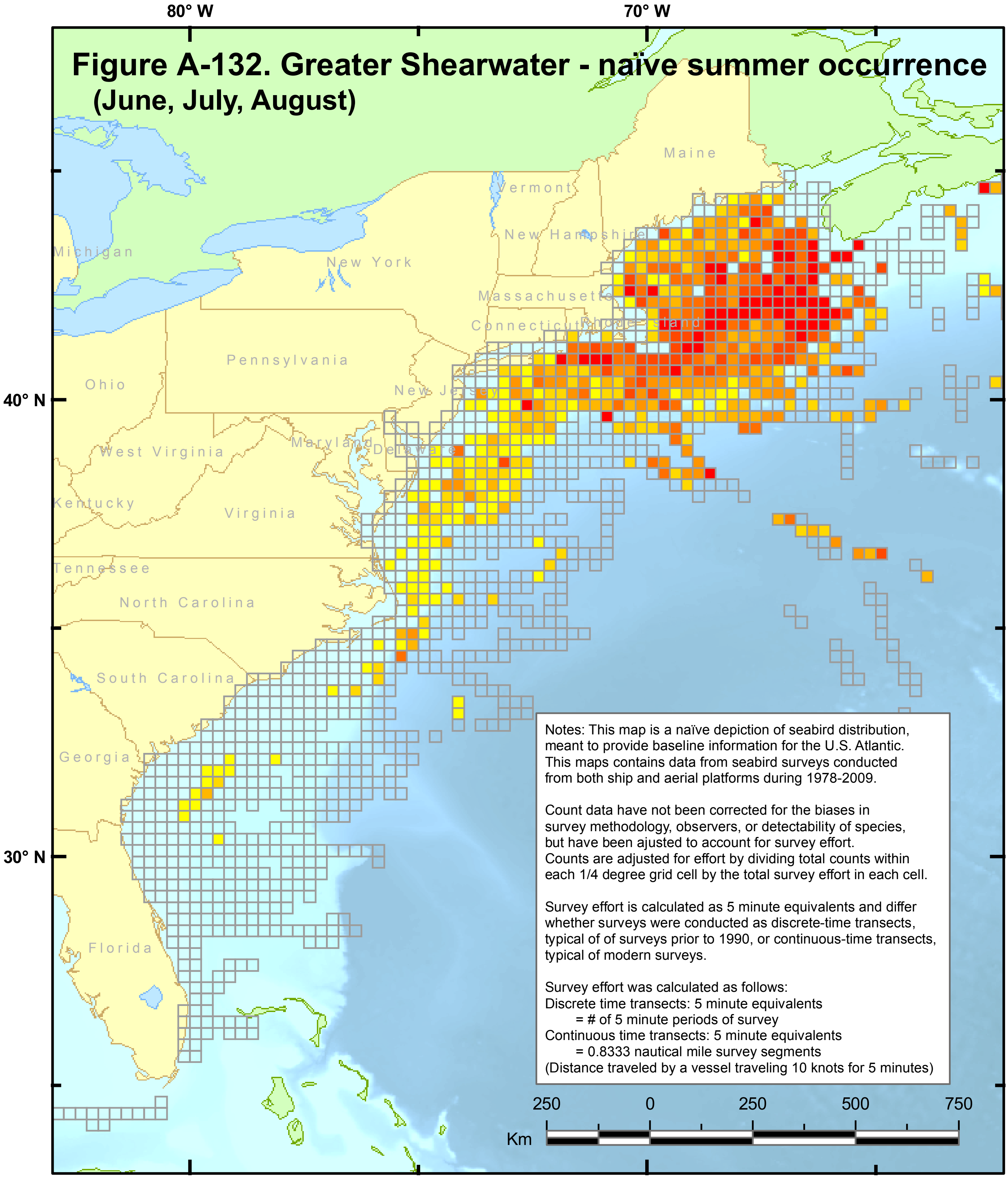
**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 17.6

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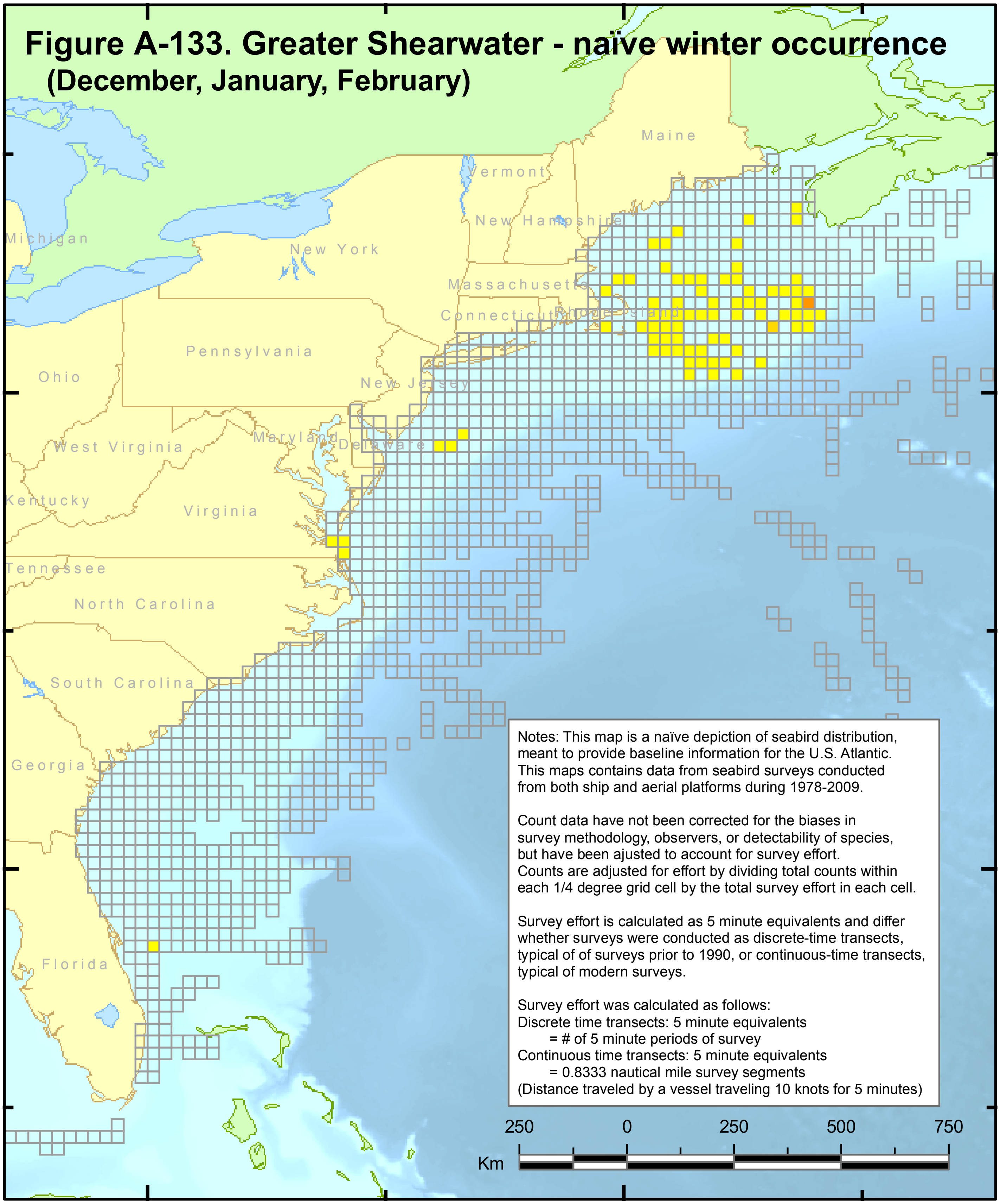
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 276.5

# Figure A-133. Greater Shearwater - naïve winter occurrence (December, January, February)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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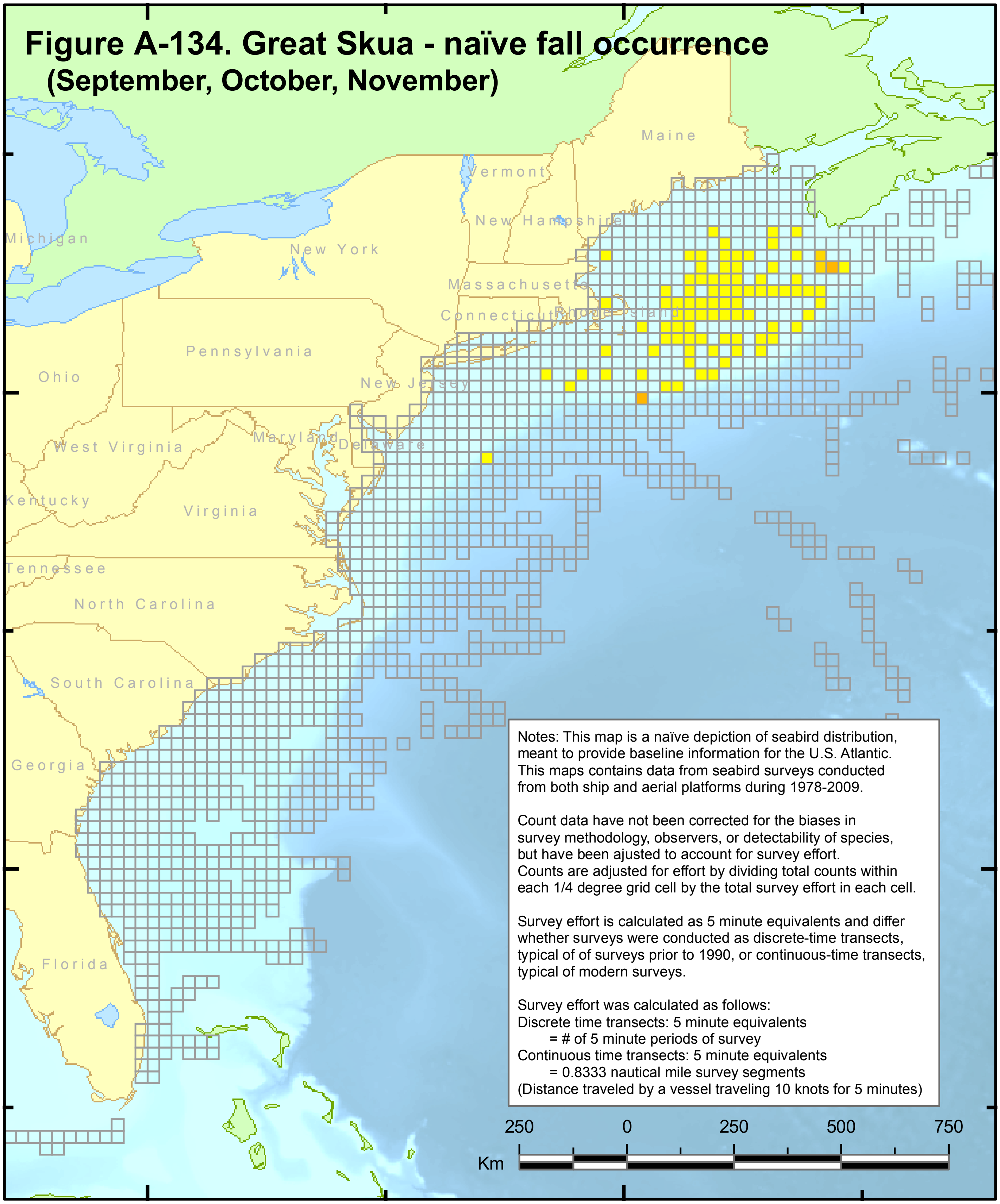


# Figure A-134. Great Skua - naïve fall occurrence (September, October, November)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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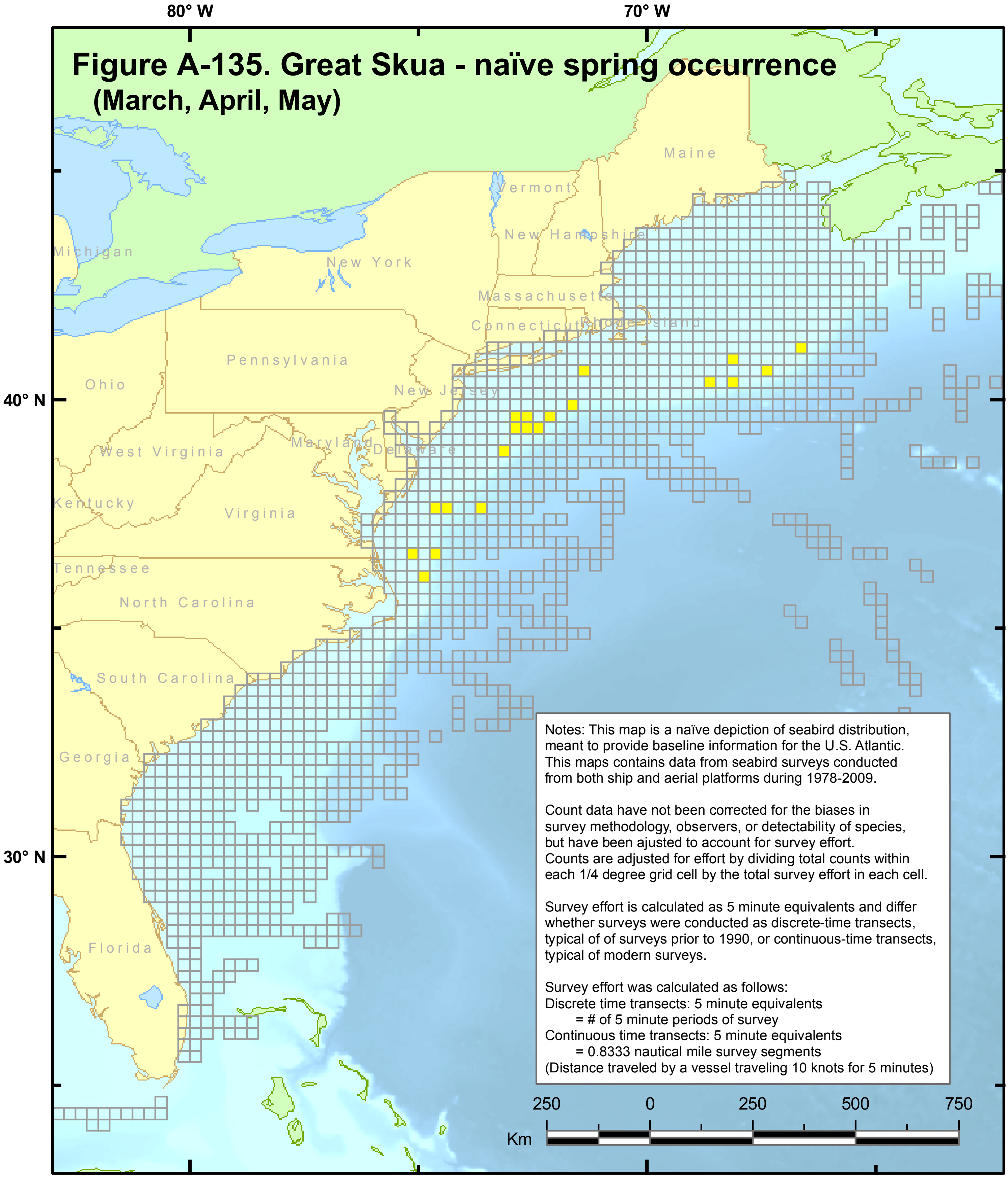
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-135. Great Skua - naïve spring occurrence (March, April, May)

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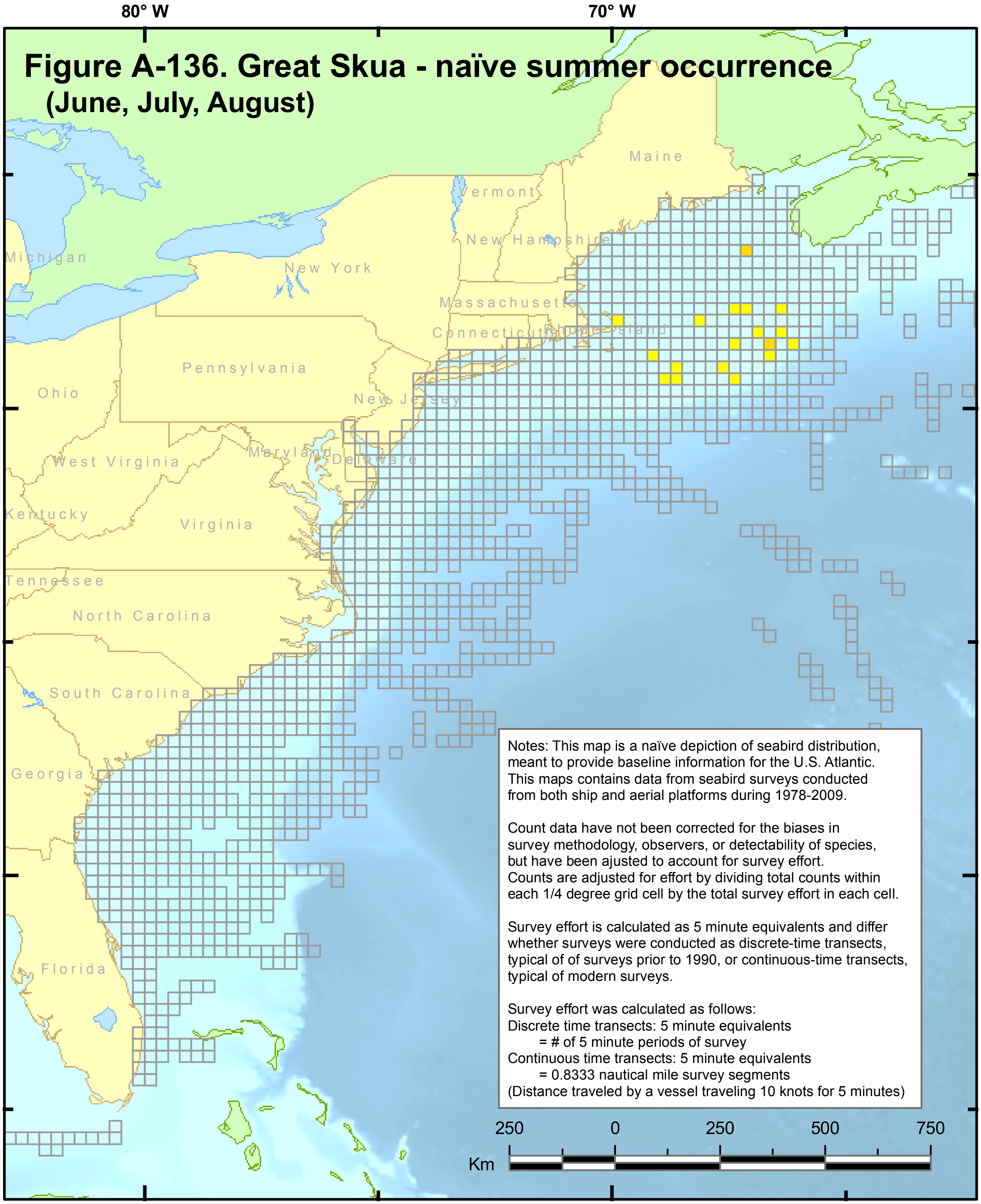
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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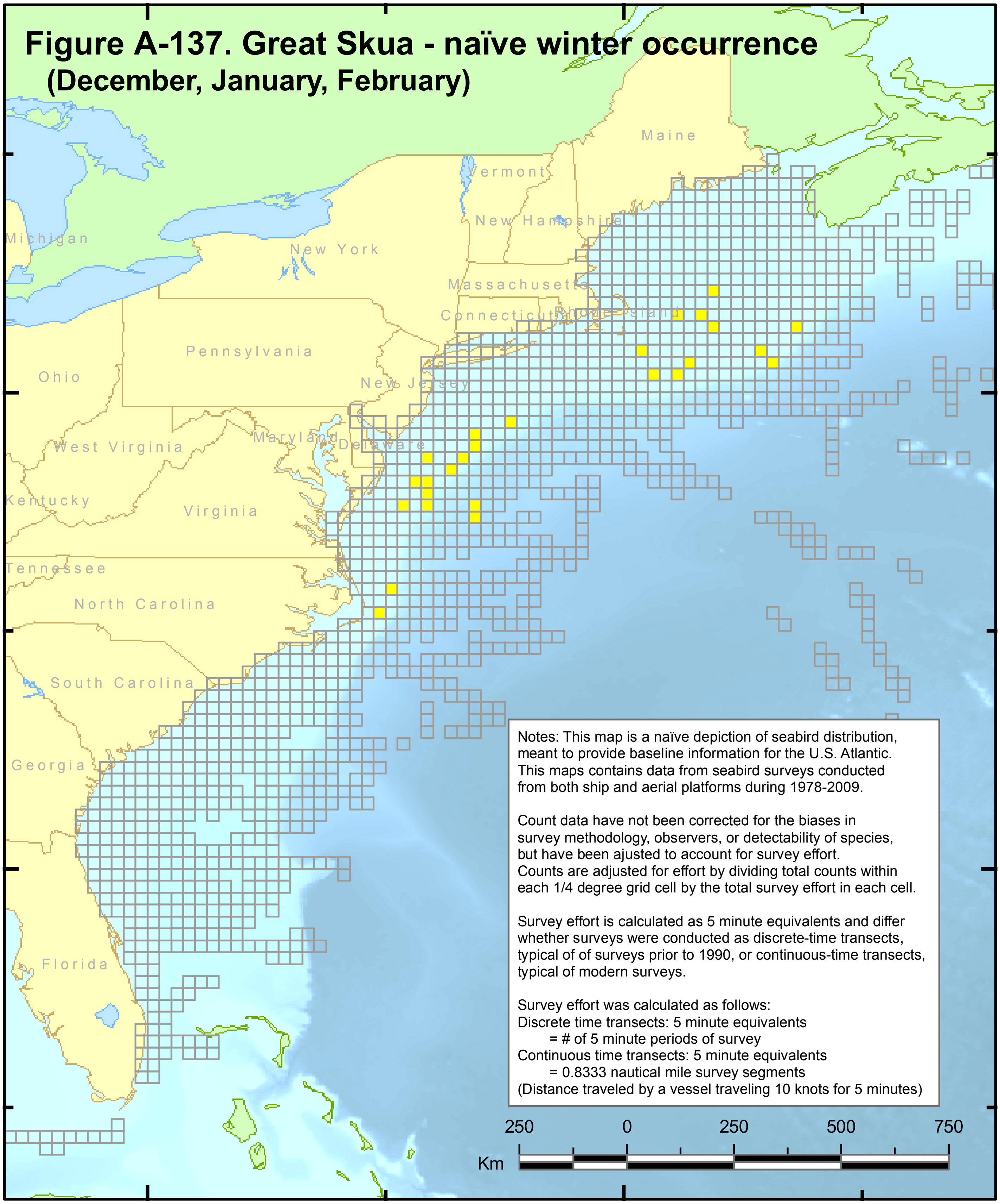
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-137. Great Skua - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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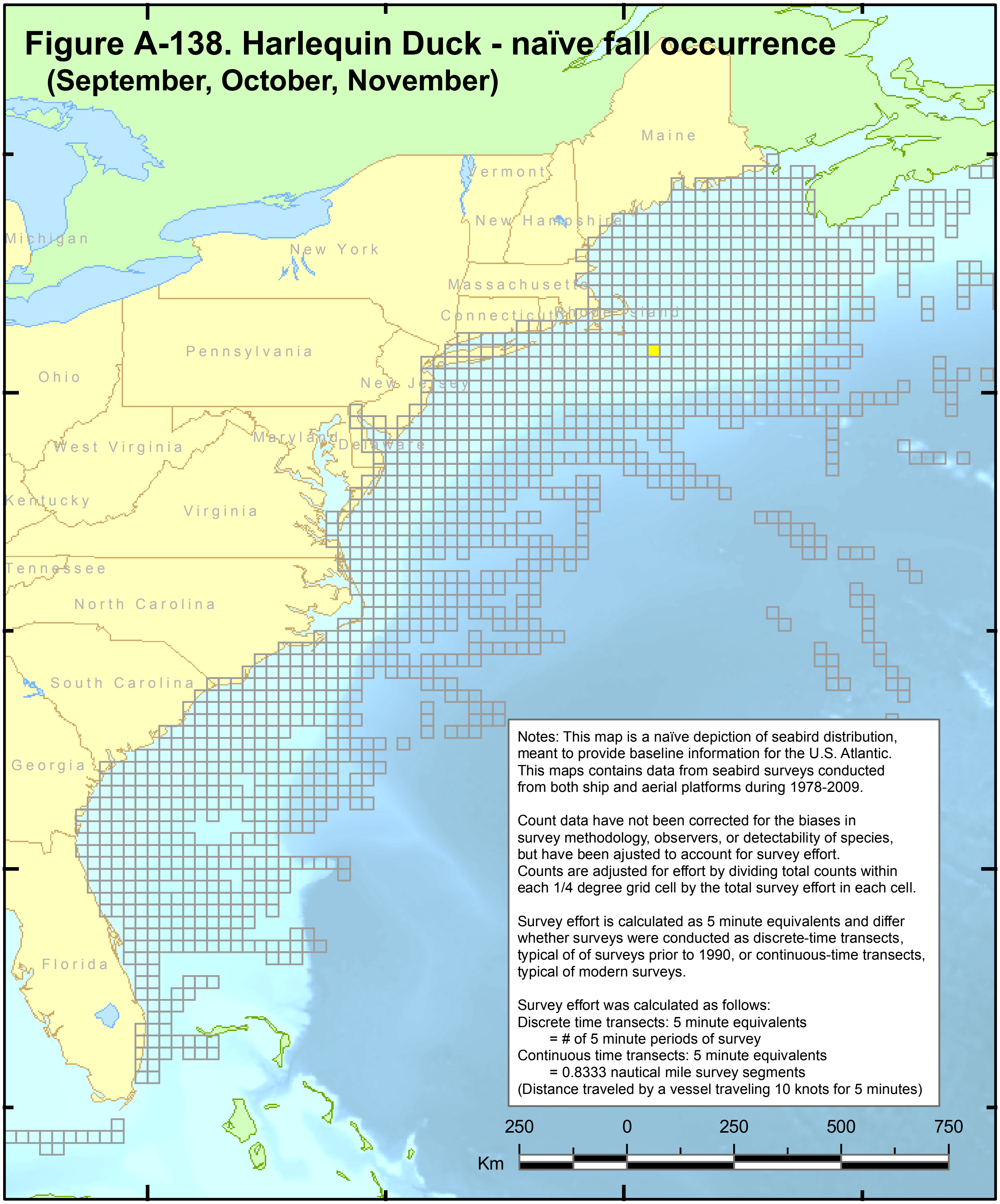
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-138. Harlequin Duck - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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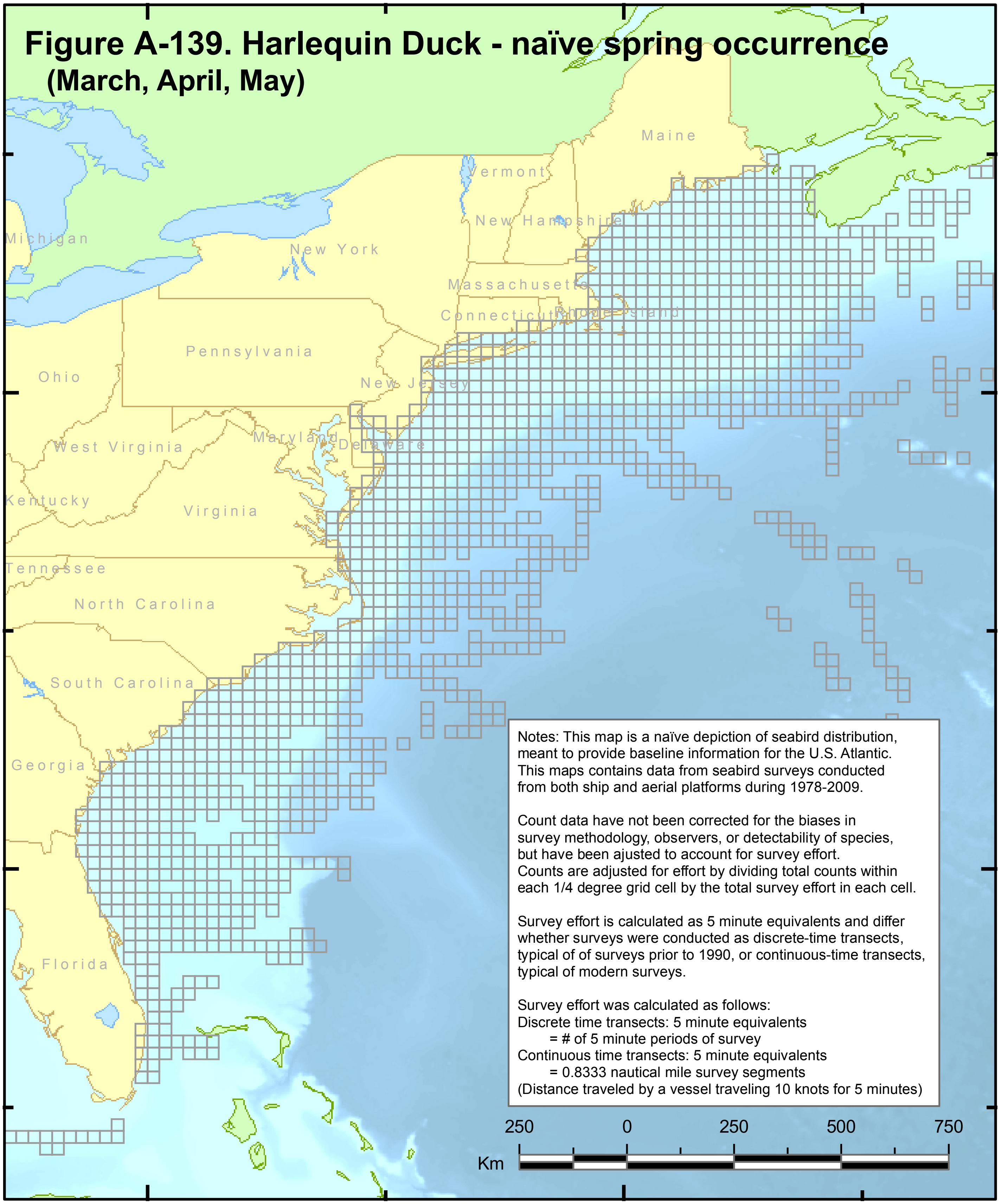
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-139. Harlequin Duck - naïve spring occurrence
## (March, April, May)

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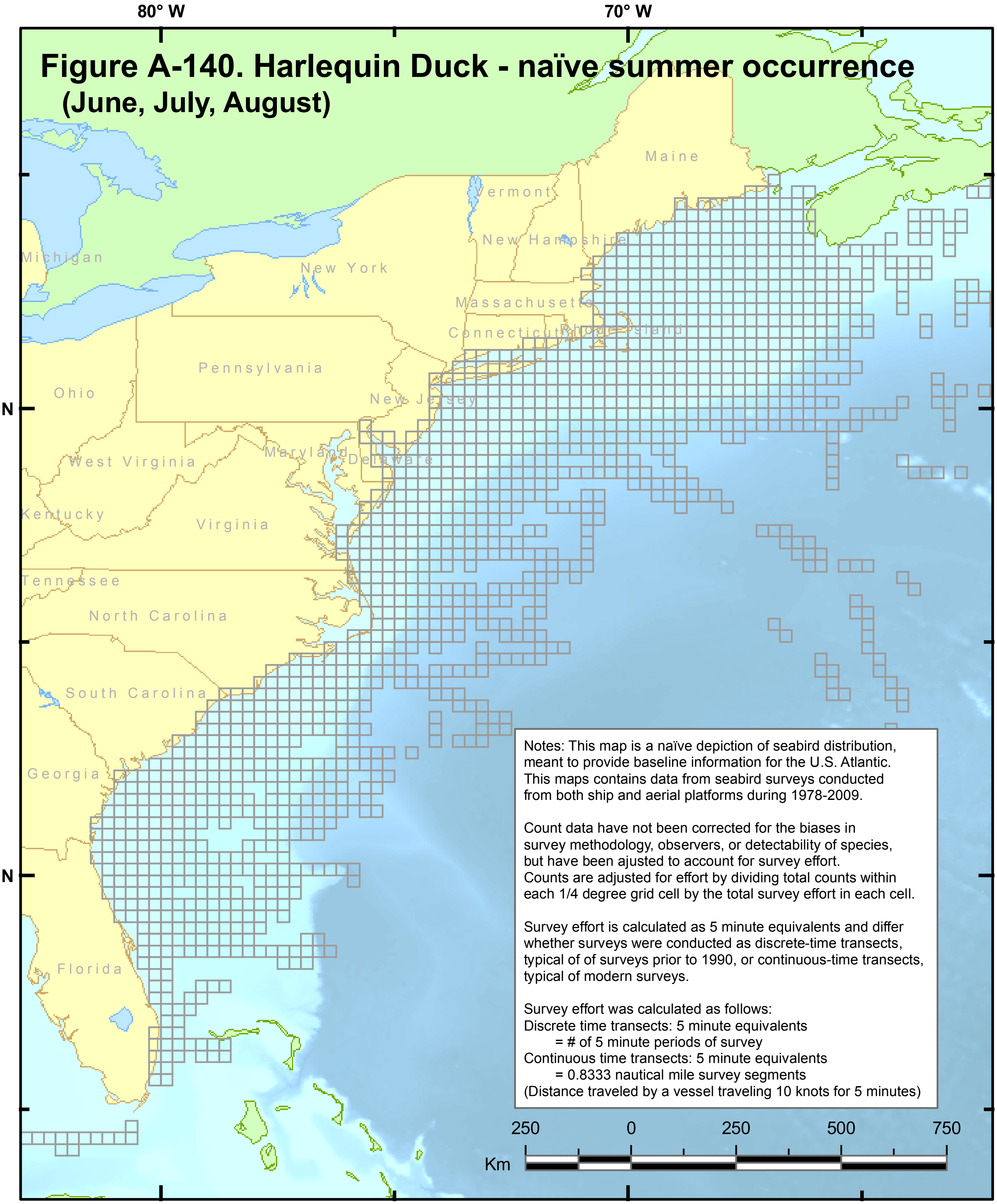
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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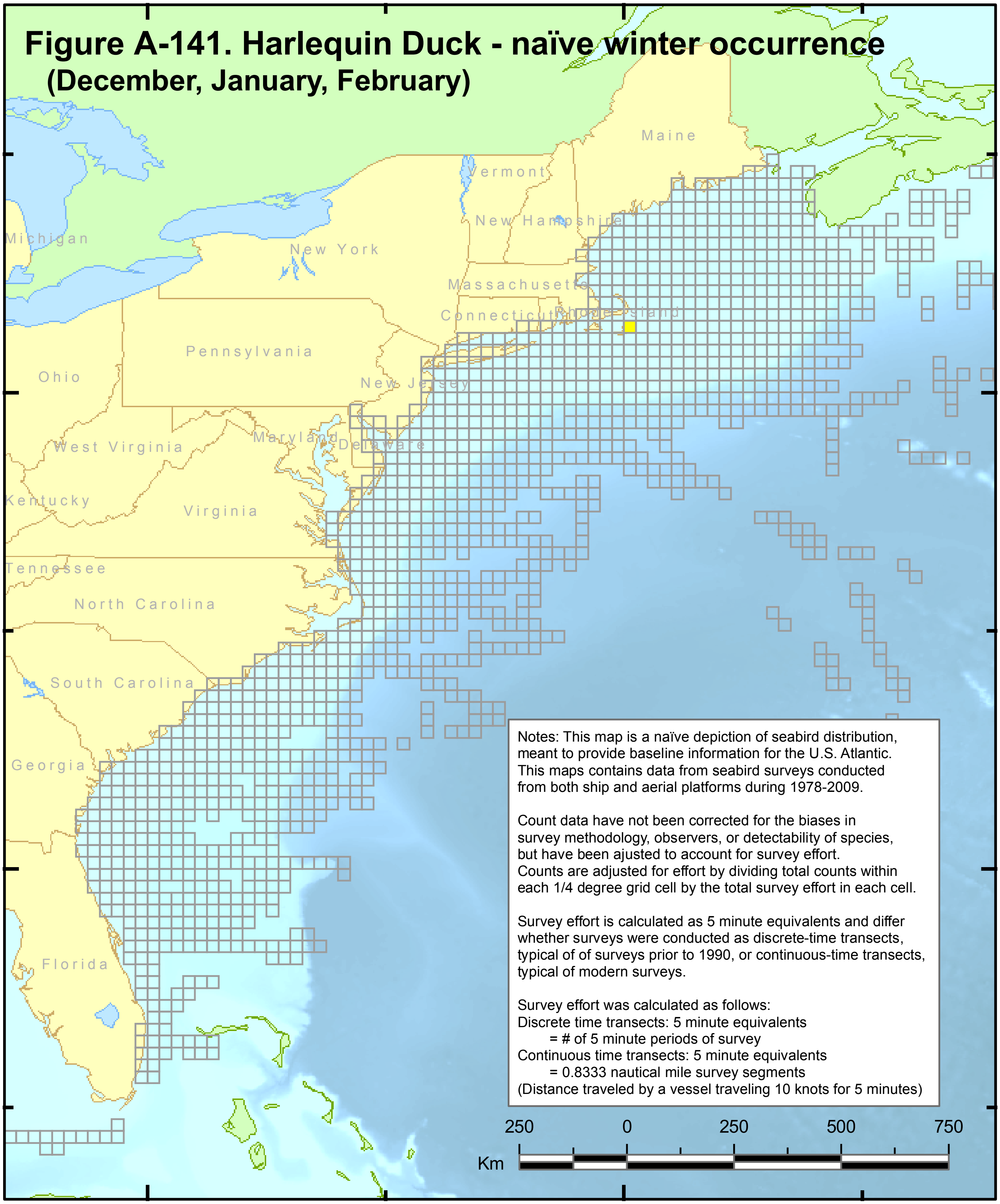
# Figure A-141. Harlequin Duck - naïve winter occurrence
(December, January, February)




**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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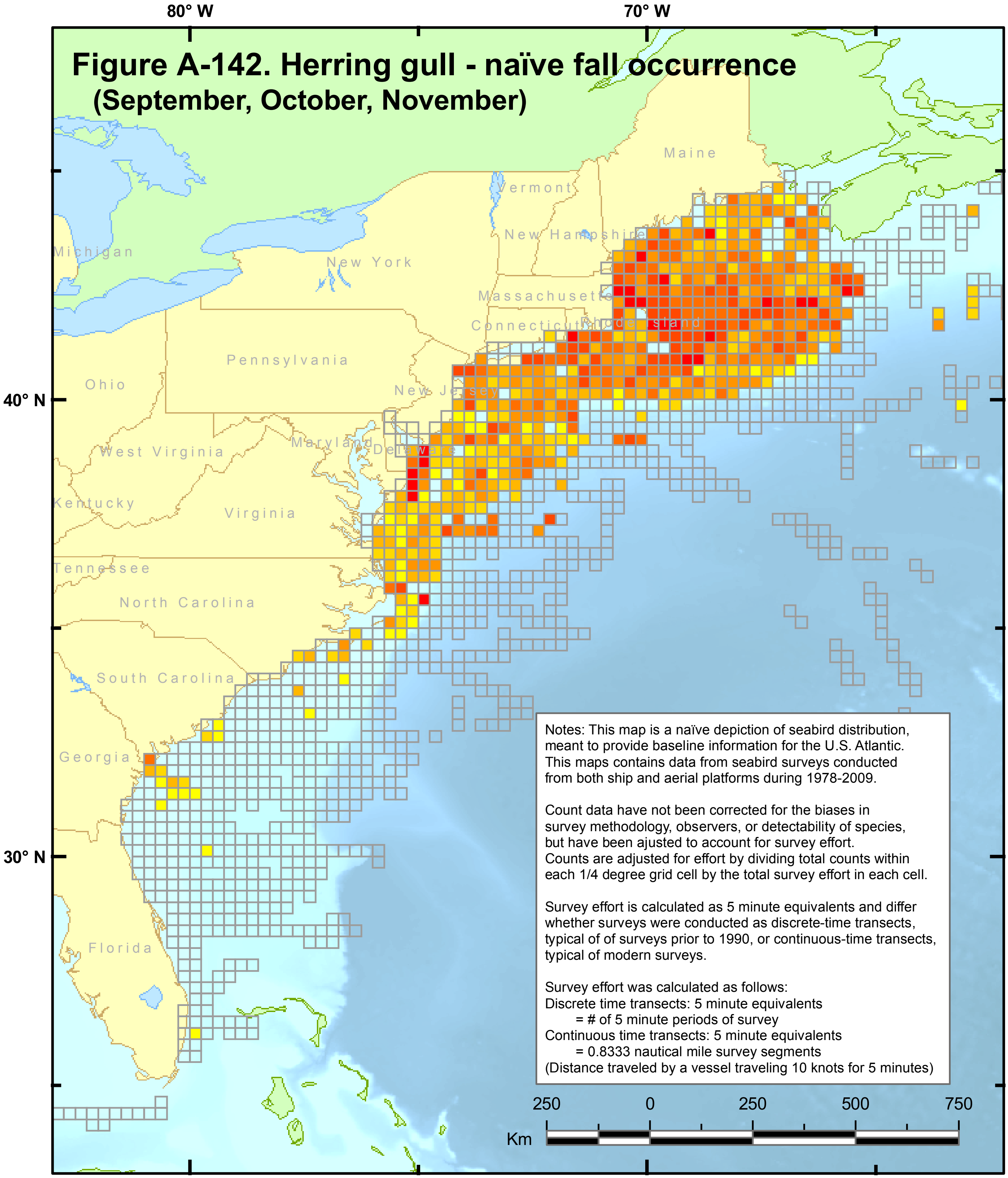
# Figure A-142. Herring gull - naïve fall occurrence
## (September, October, November)

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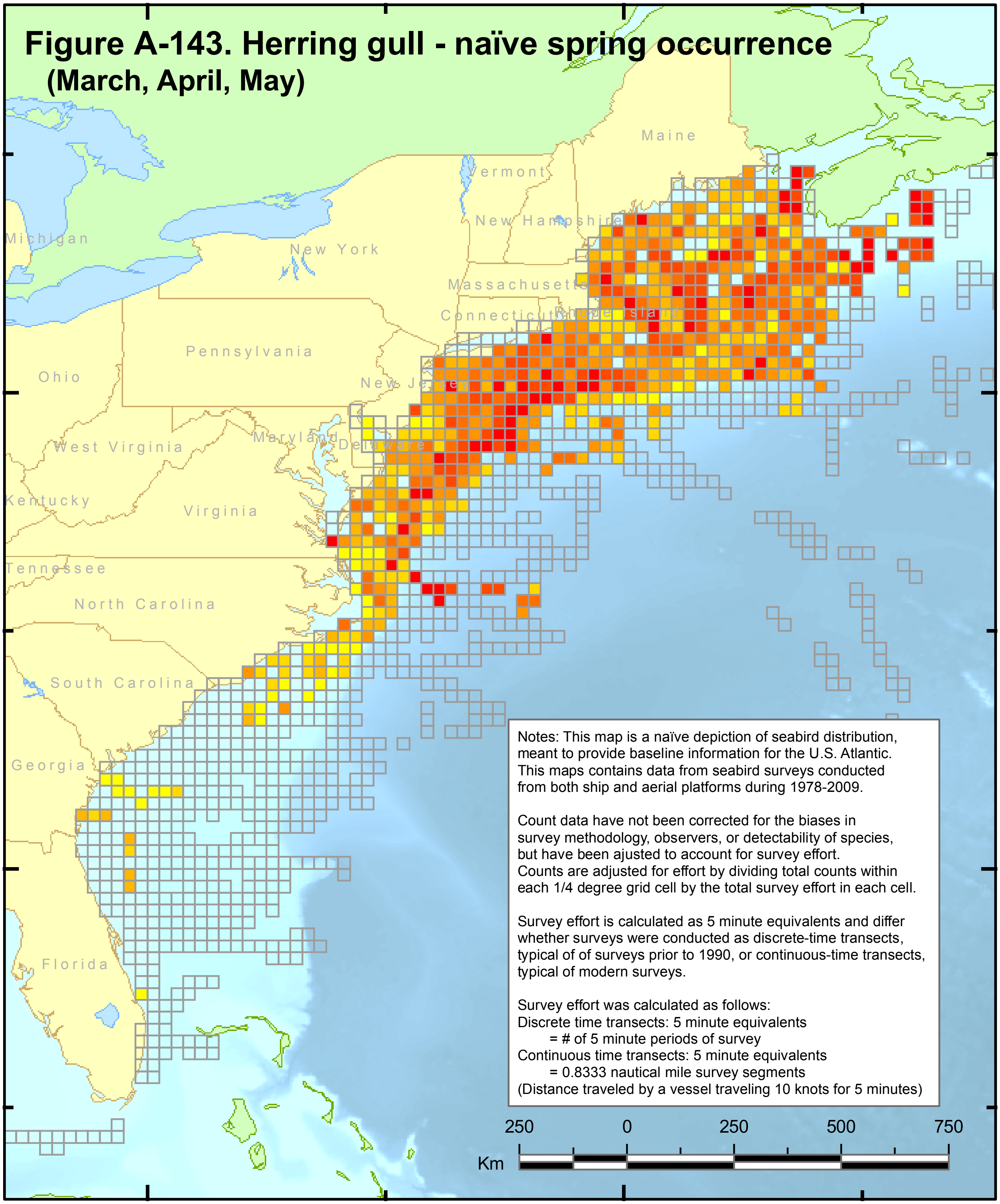
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 43.7

# Figure A-143. Herring gull - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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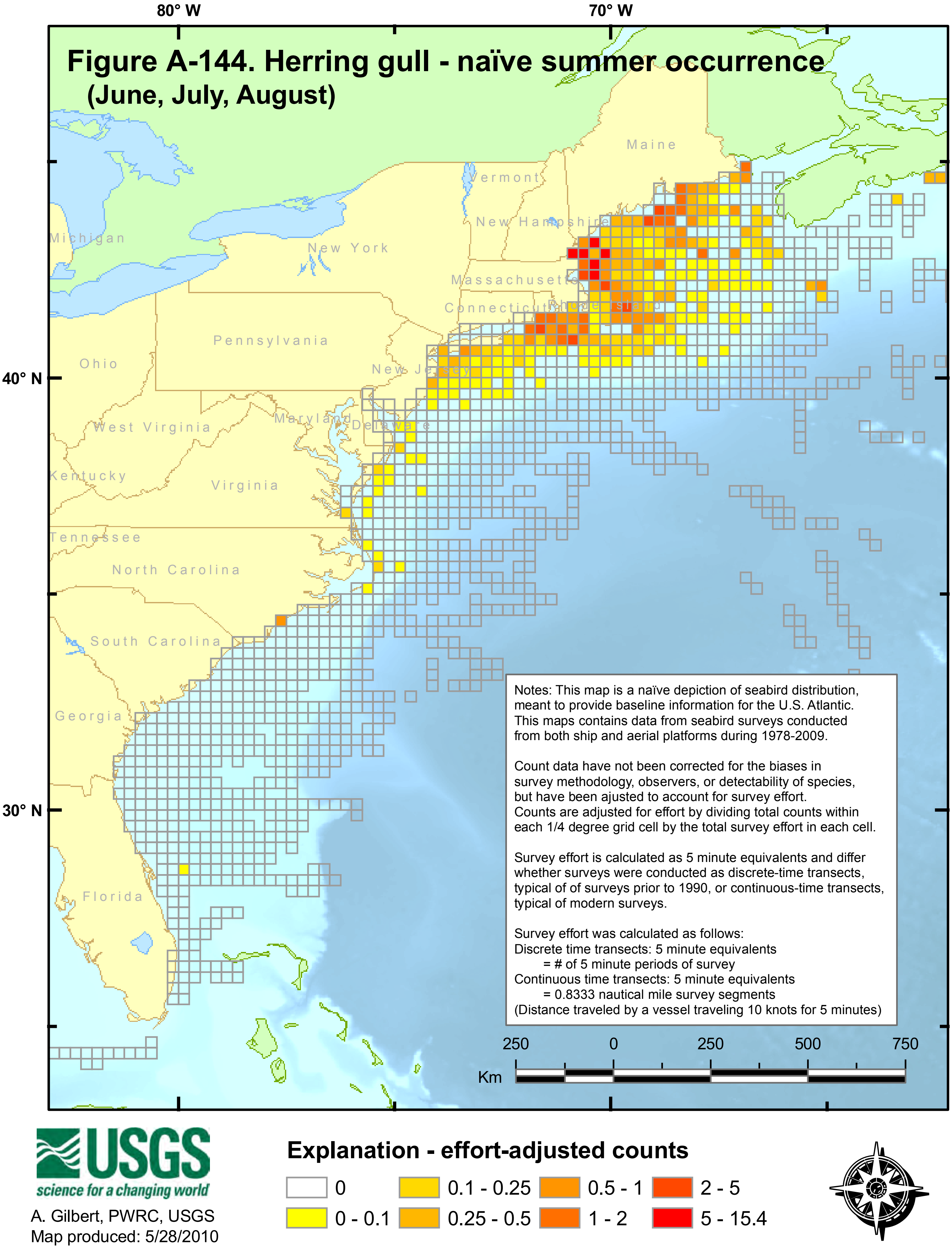
Map produced: 5/28/2010

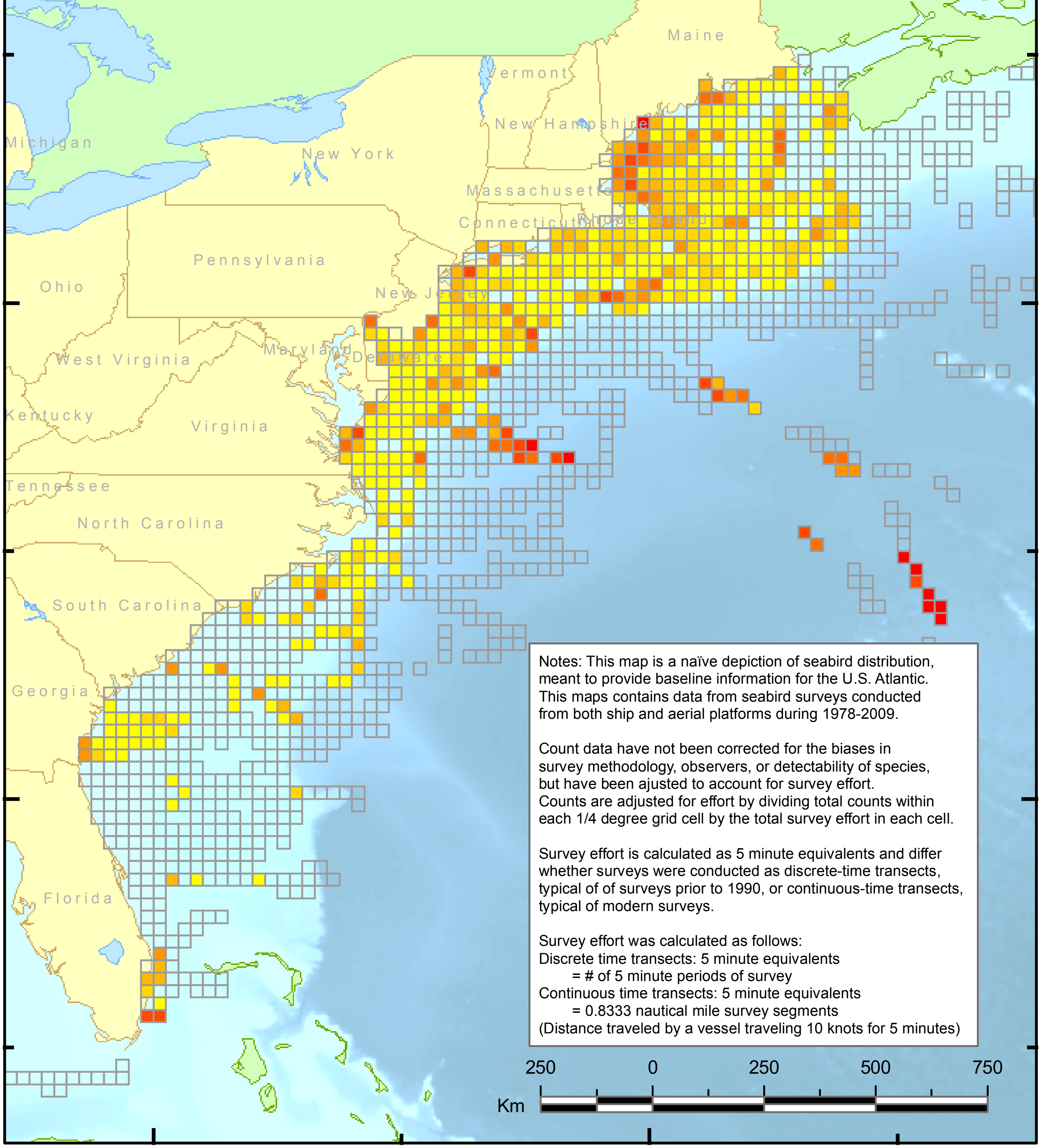
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 440.4

# Figure A-144. Herring gull - naïve summer occurrence (June, July, August)



# Figure A-145. Herring gull - naïve winter occurrence
## (December, January, February)

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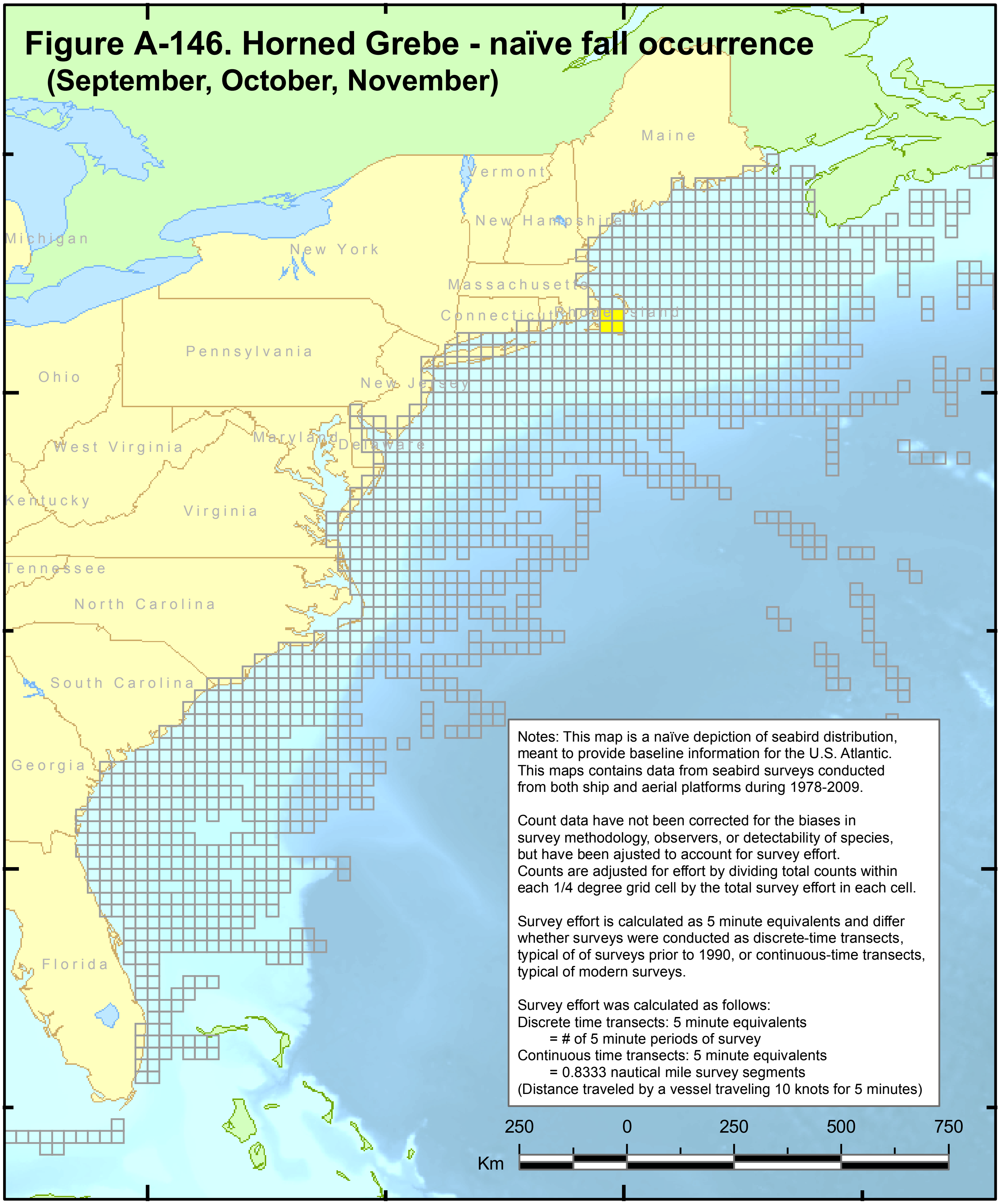
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 12.5

# Figure A-146. Horned Grebe - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

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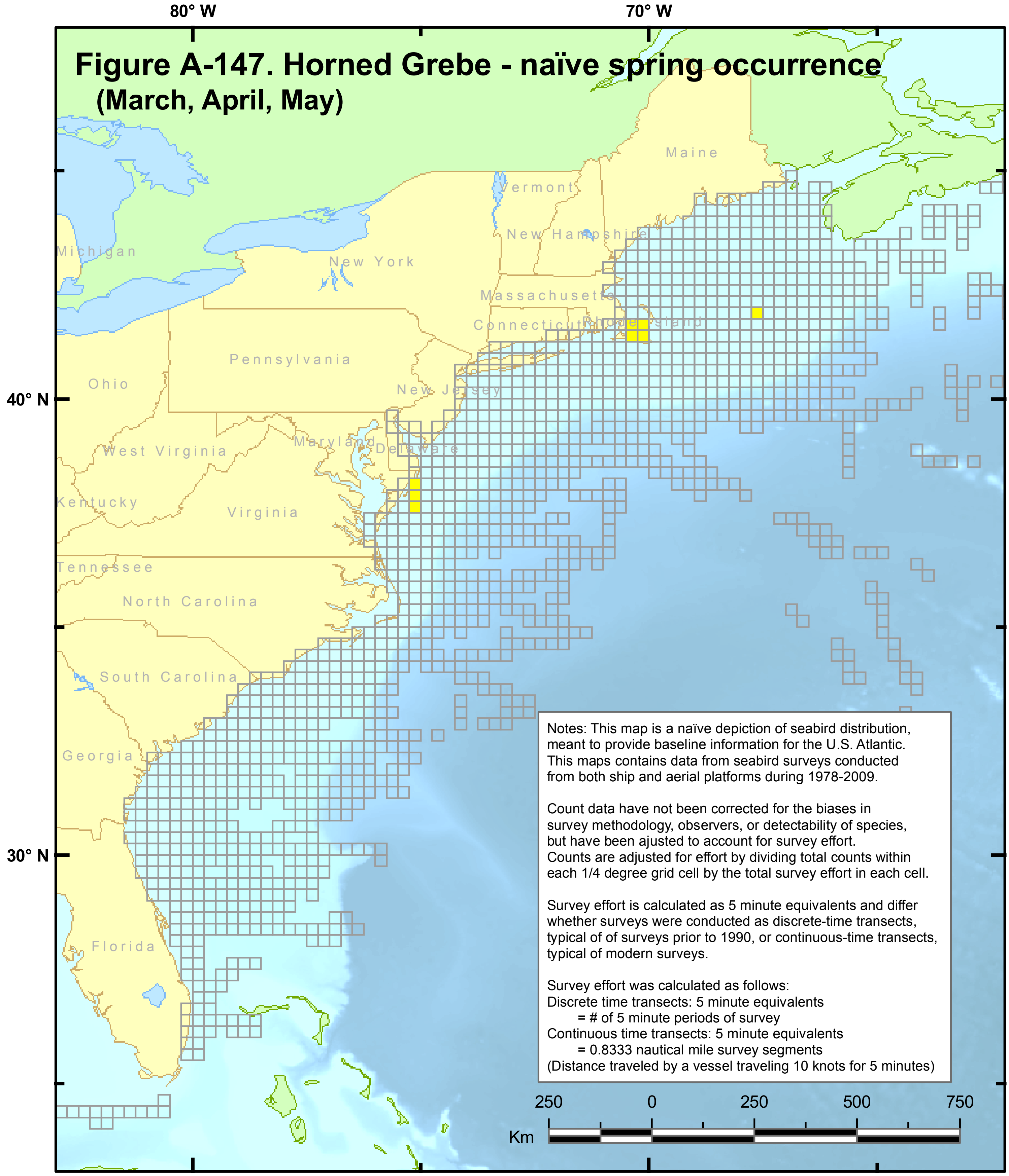


# Figure A-147. Horned Grebe - naïve spring occurrence (March, April, May)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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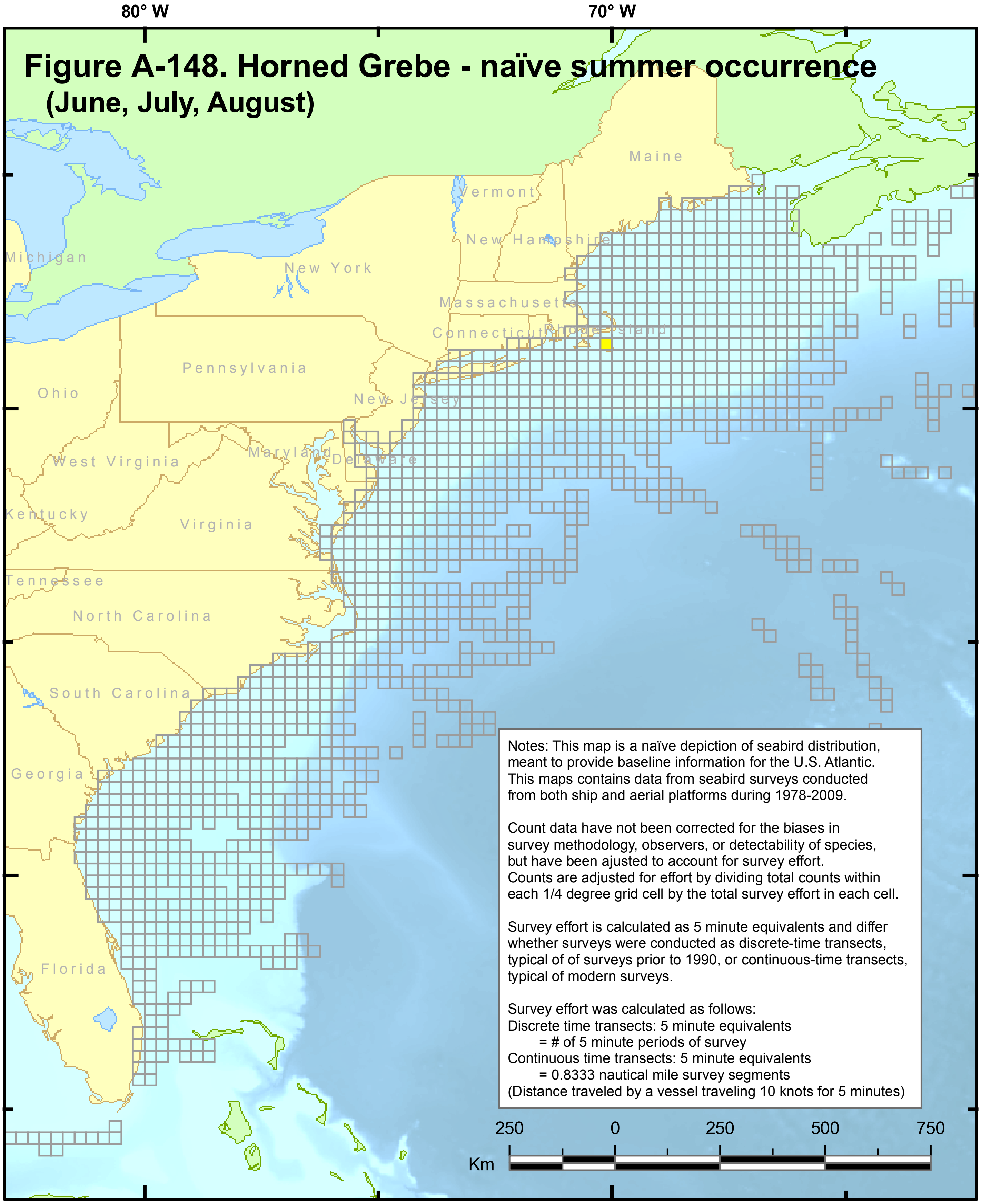
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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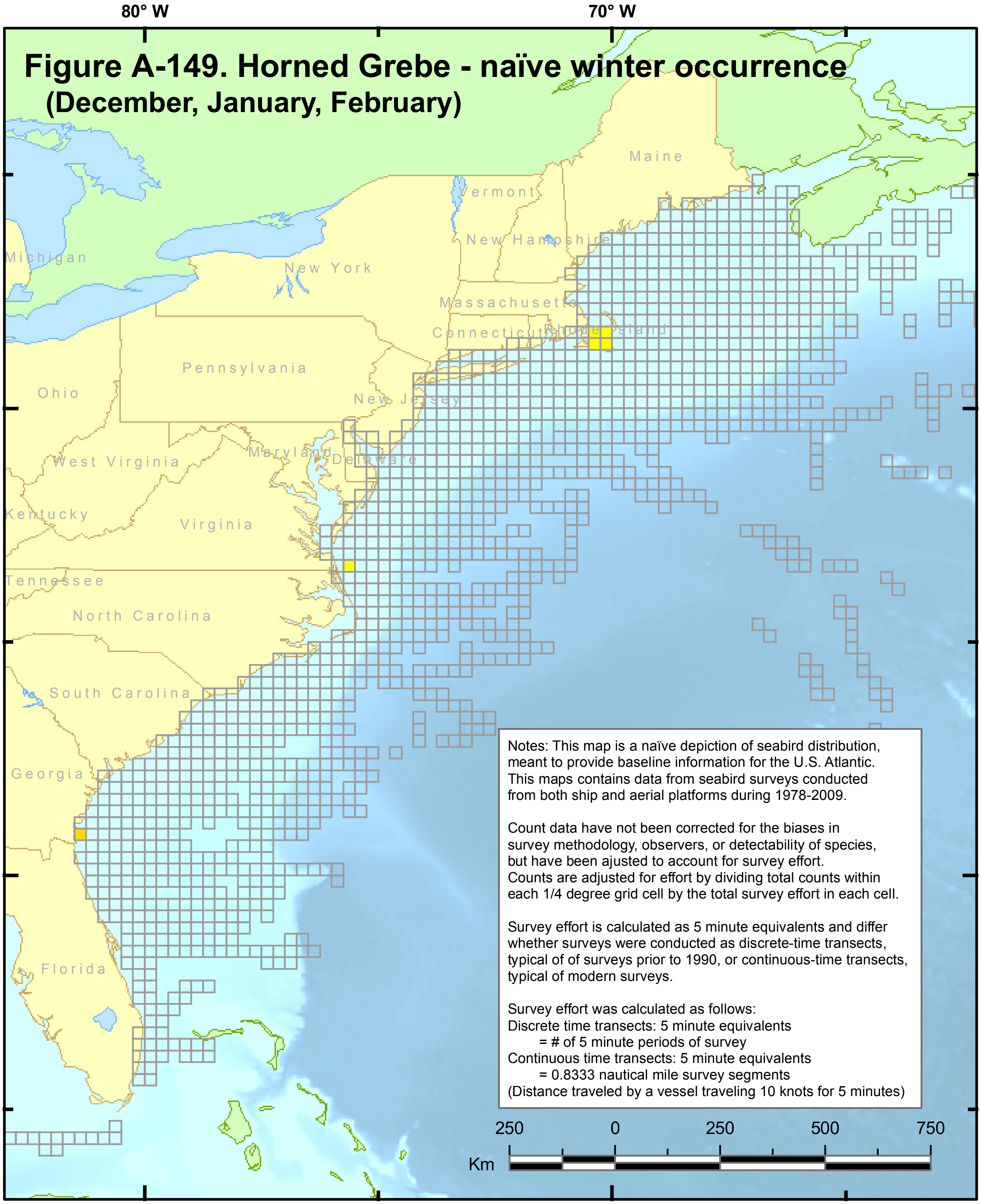
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5F |

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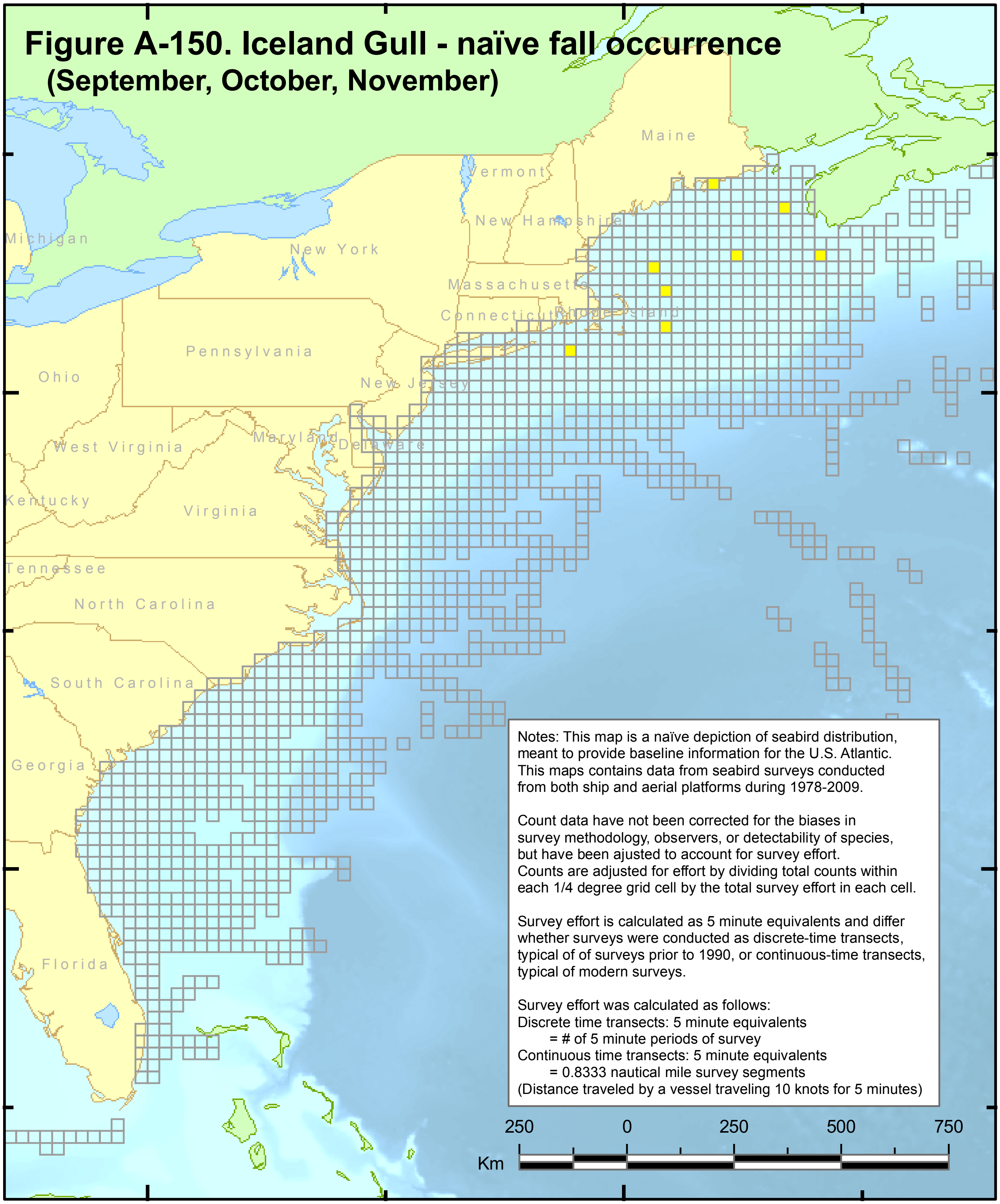
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-150. Iceland Gull - naïve fall occurrence
(September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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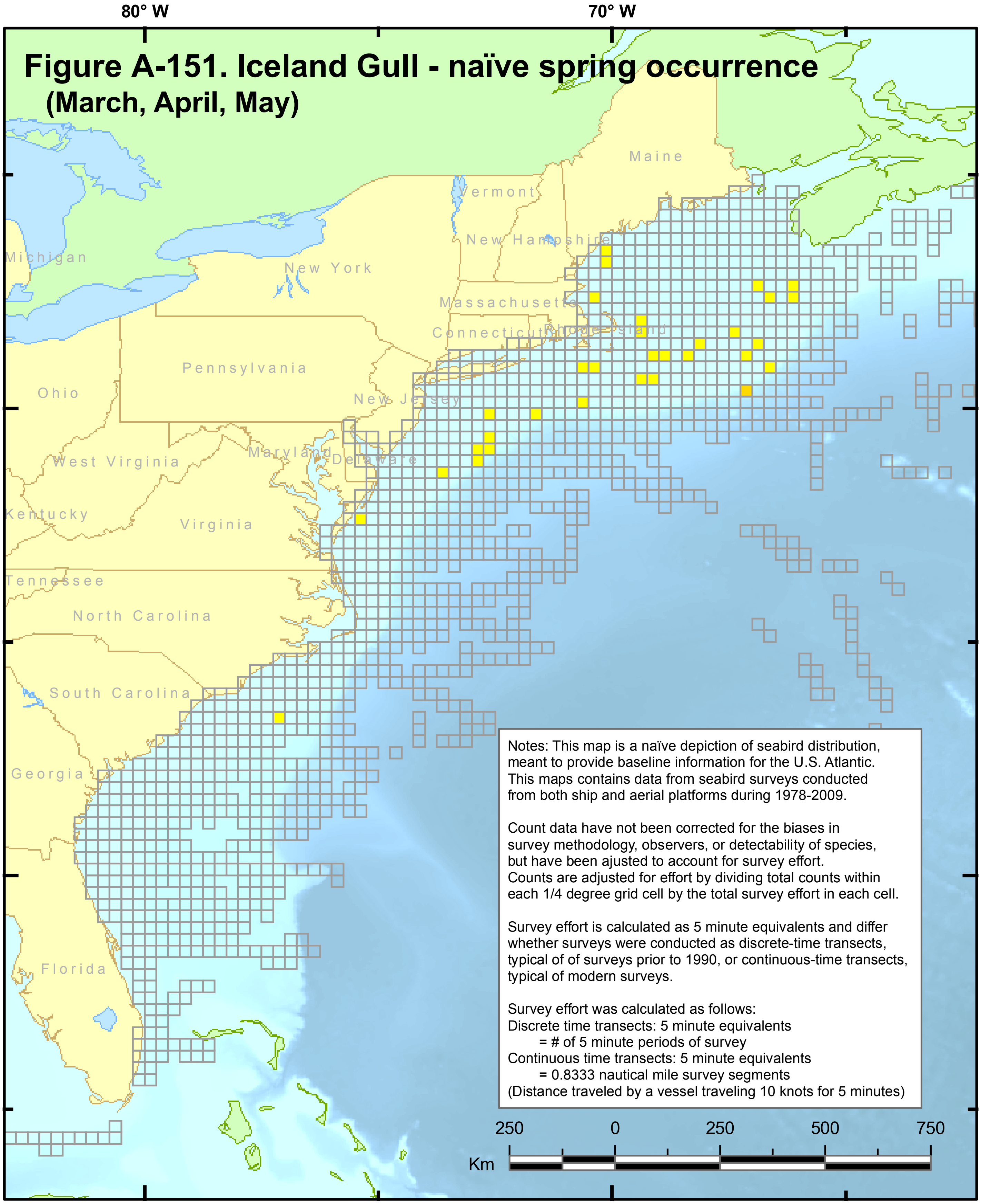
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-151. Iceland Gull - naïve spring occurrence
## (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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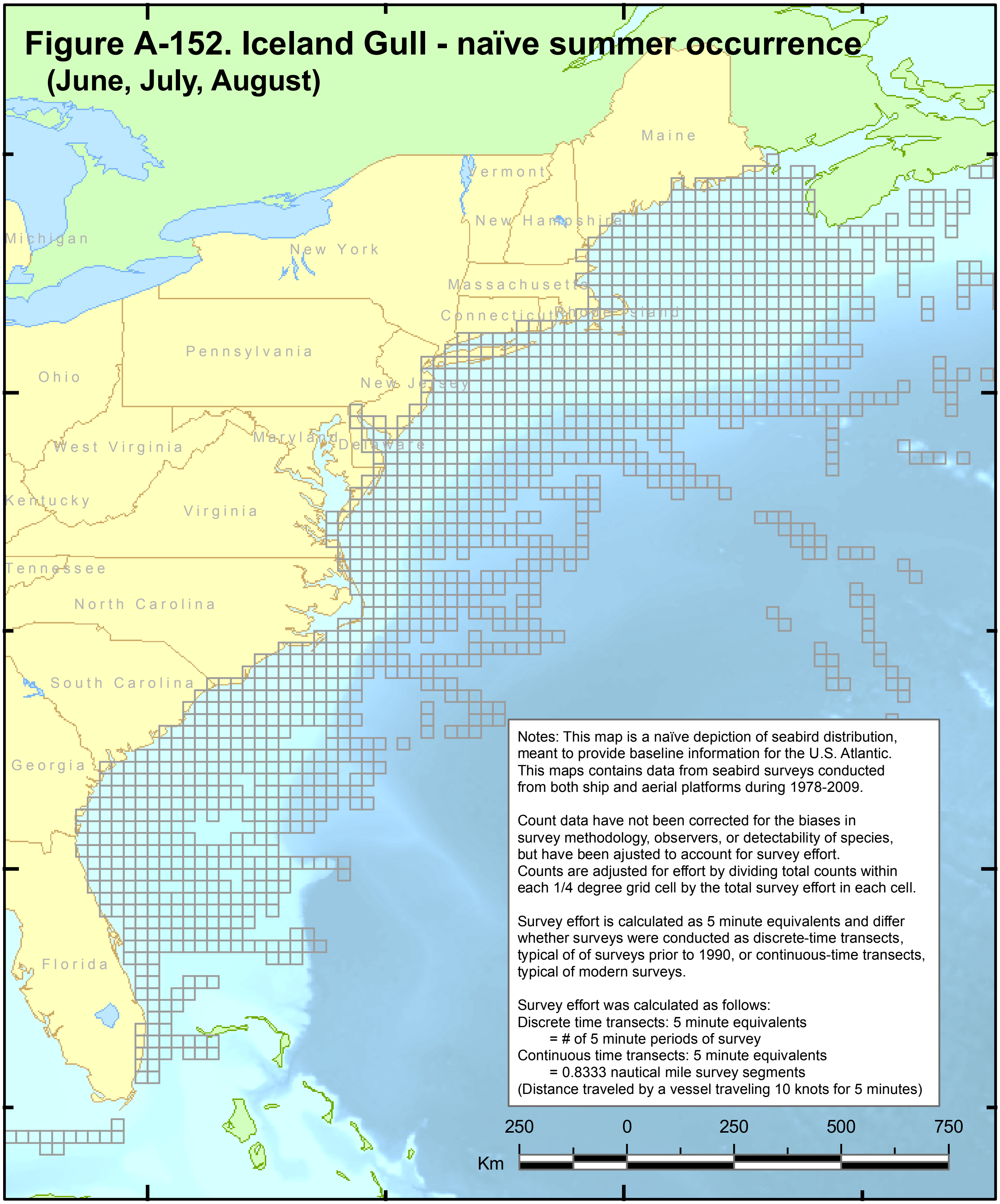
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5




# Figure A-152. Iceland Gull - naïve summer occurrence (June, July, August)

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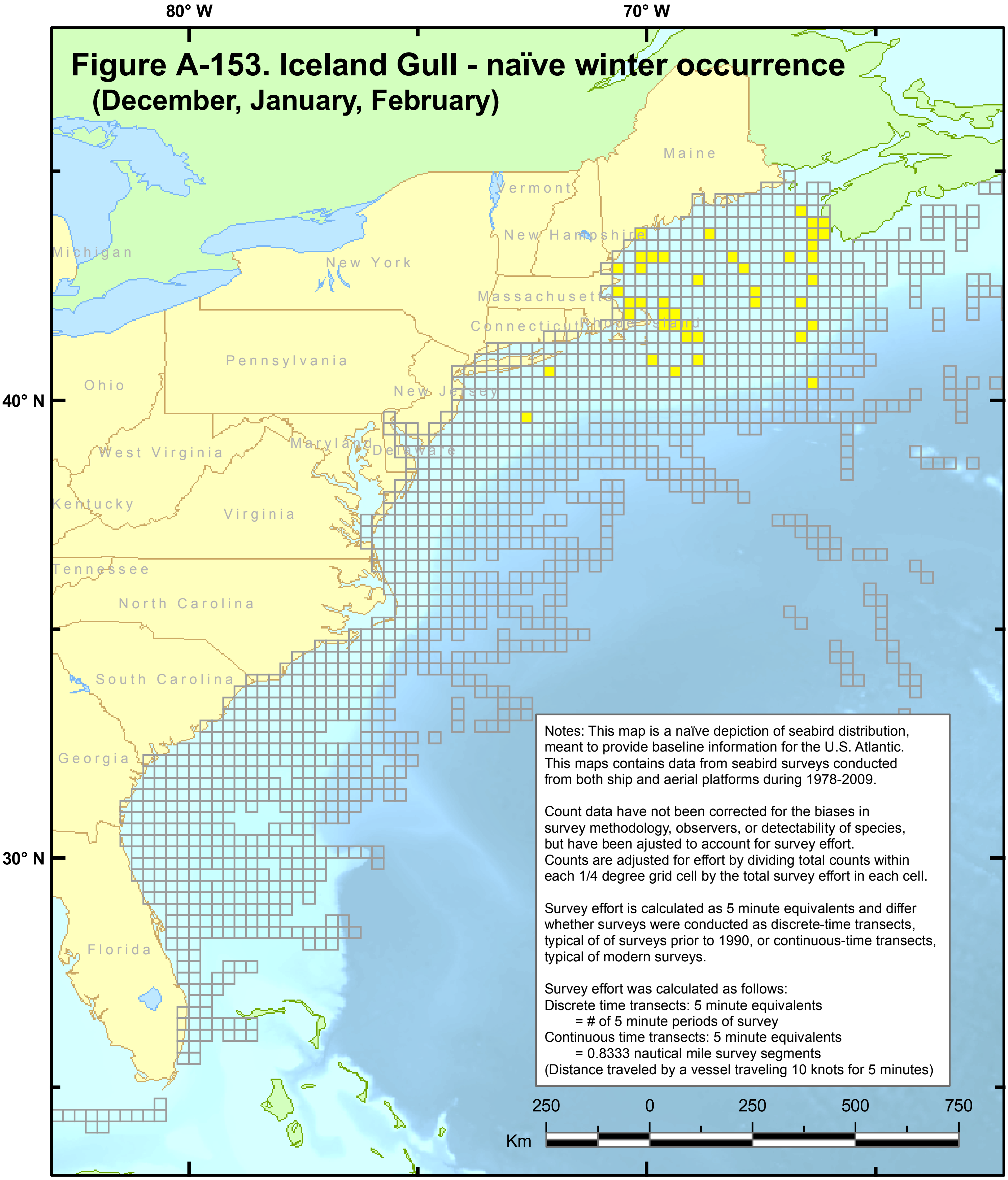
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-153. Iceland Gull - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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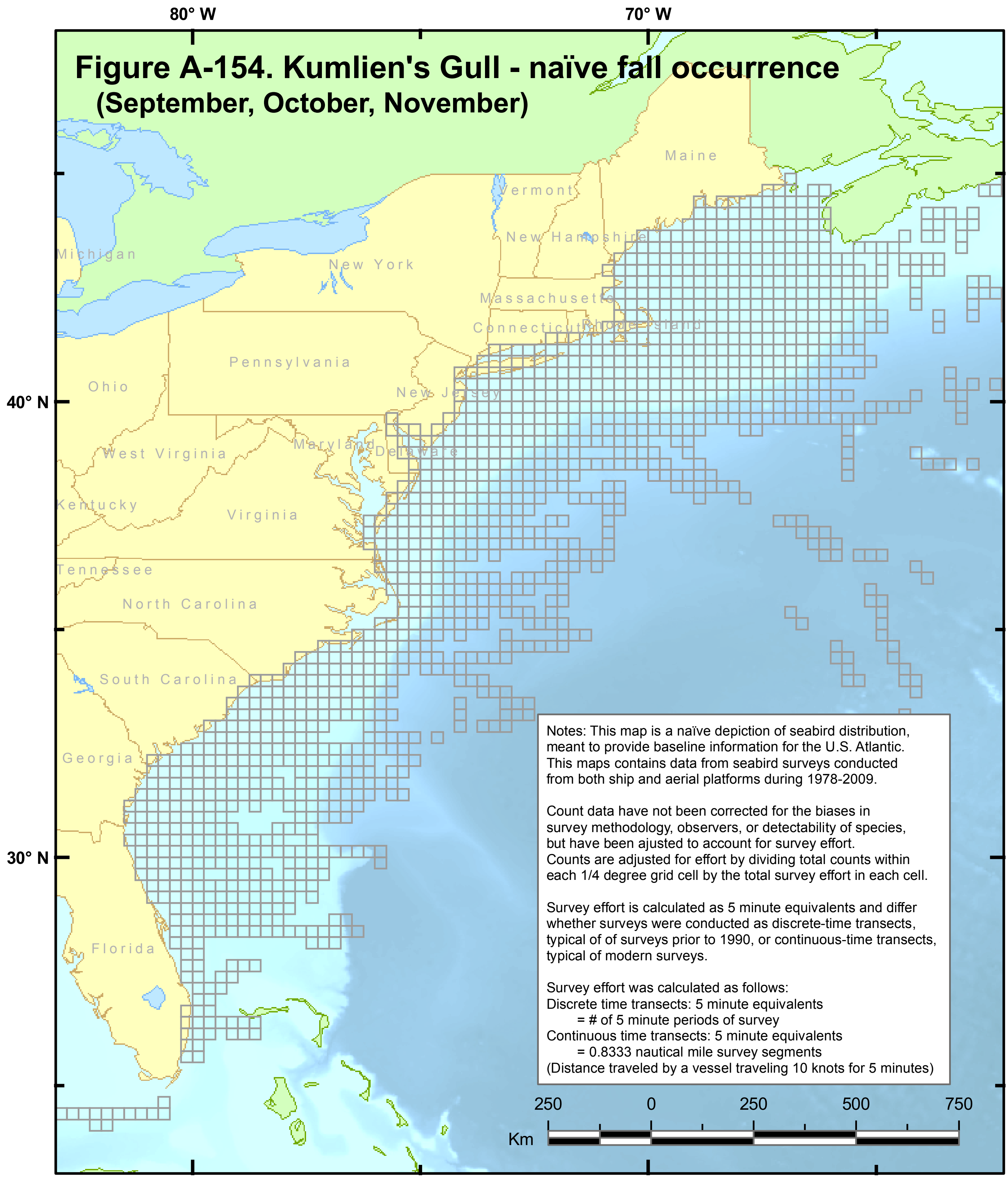
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-154. Kumlien's Gull - naïve fall occurrence
(September, October, November)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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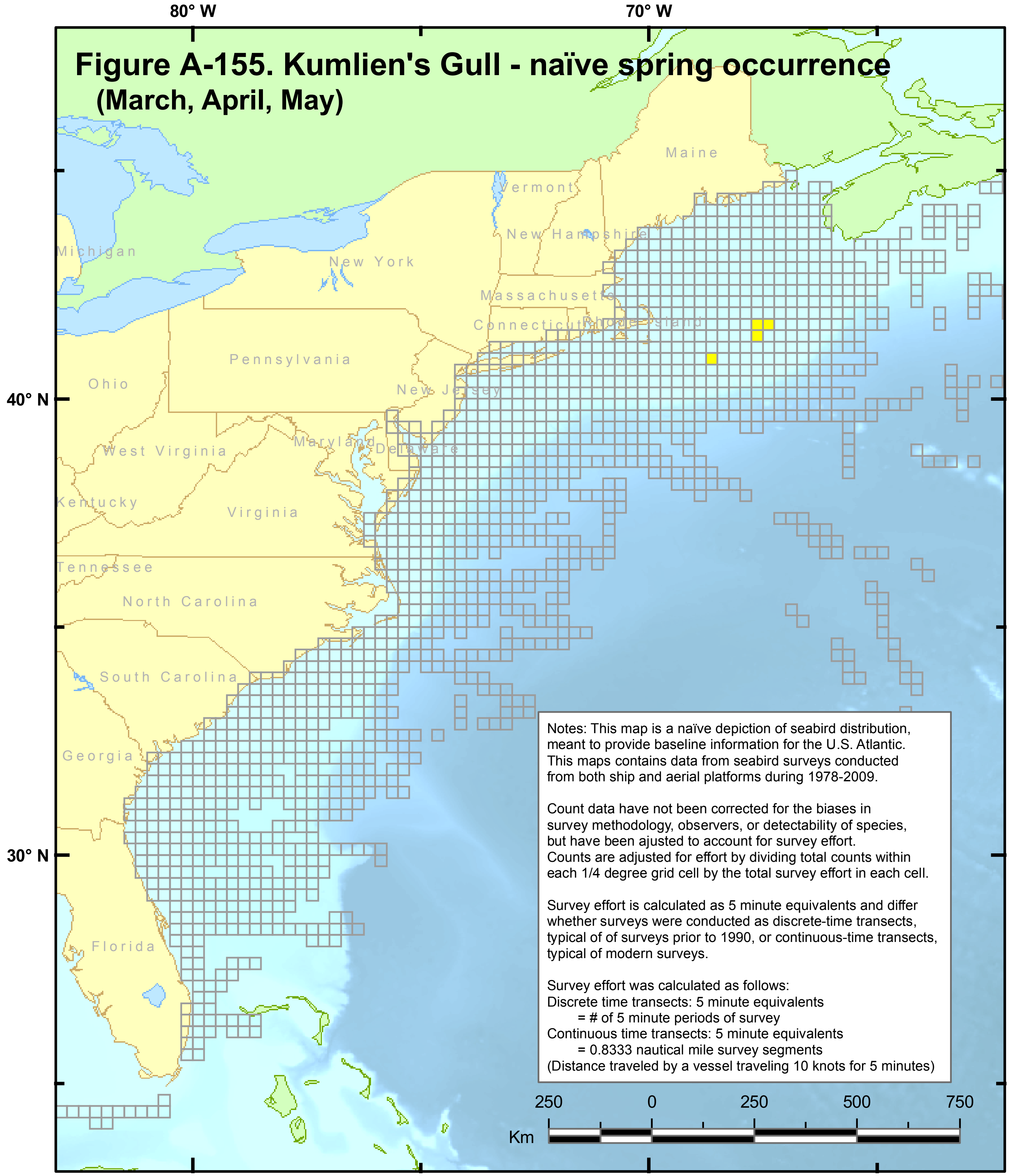
# Figure A-155. Kumlien's Gull - naïve spring occurrence (March, April, May)

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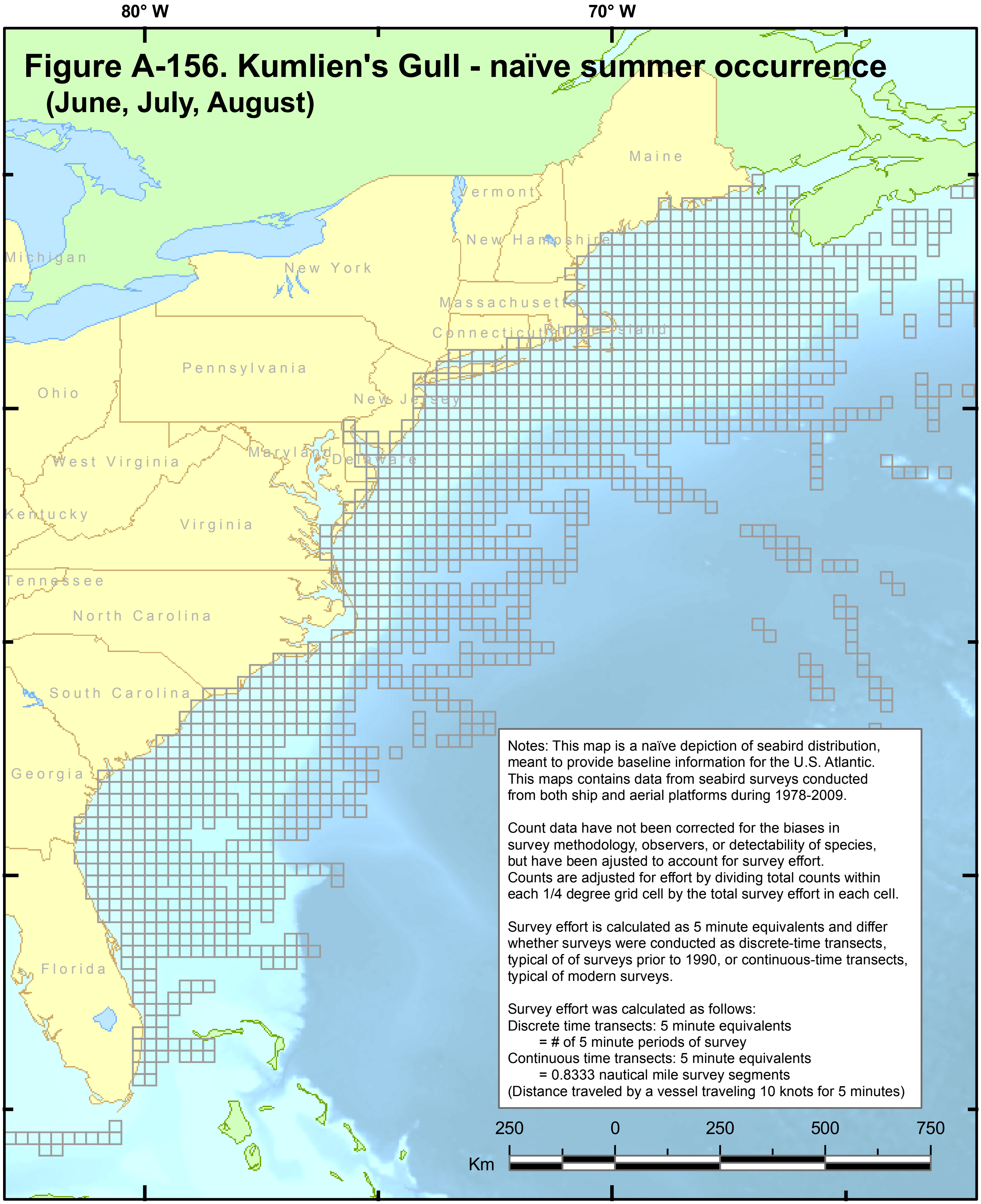
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

## Figure A-156. Kumlien's Gull - naïve summer occurrence (June, July, August)

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A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

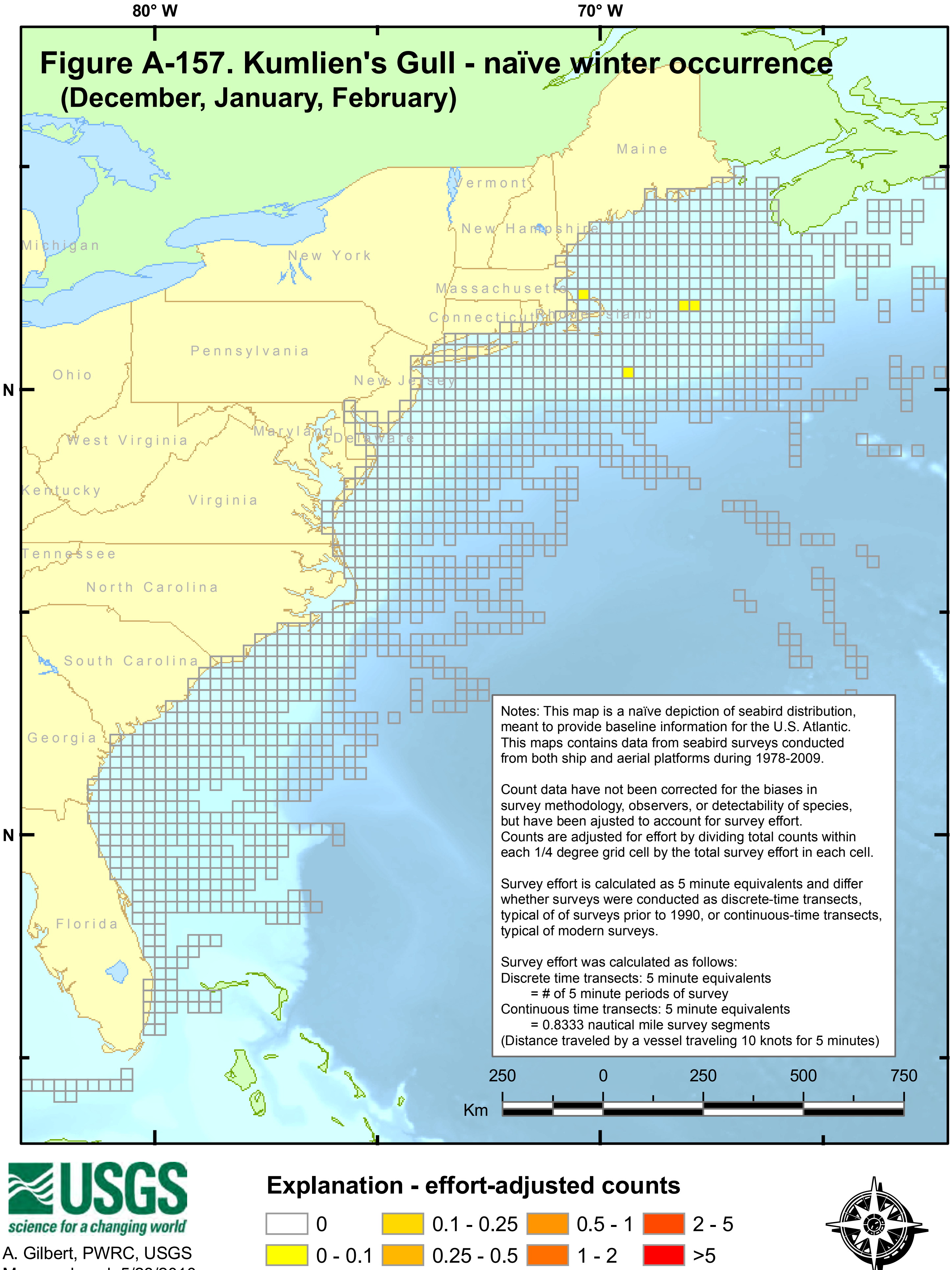


**Figure A-157. Kumlien's Gull - naïve winter occurrence (December, January, February)**

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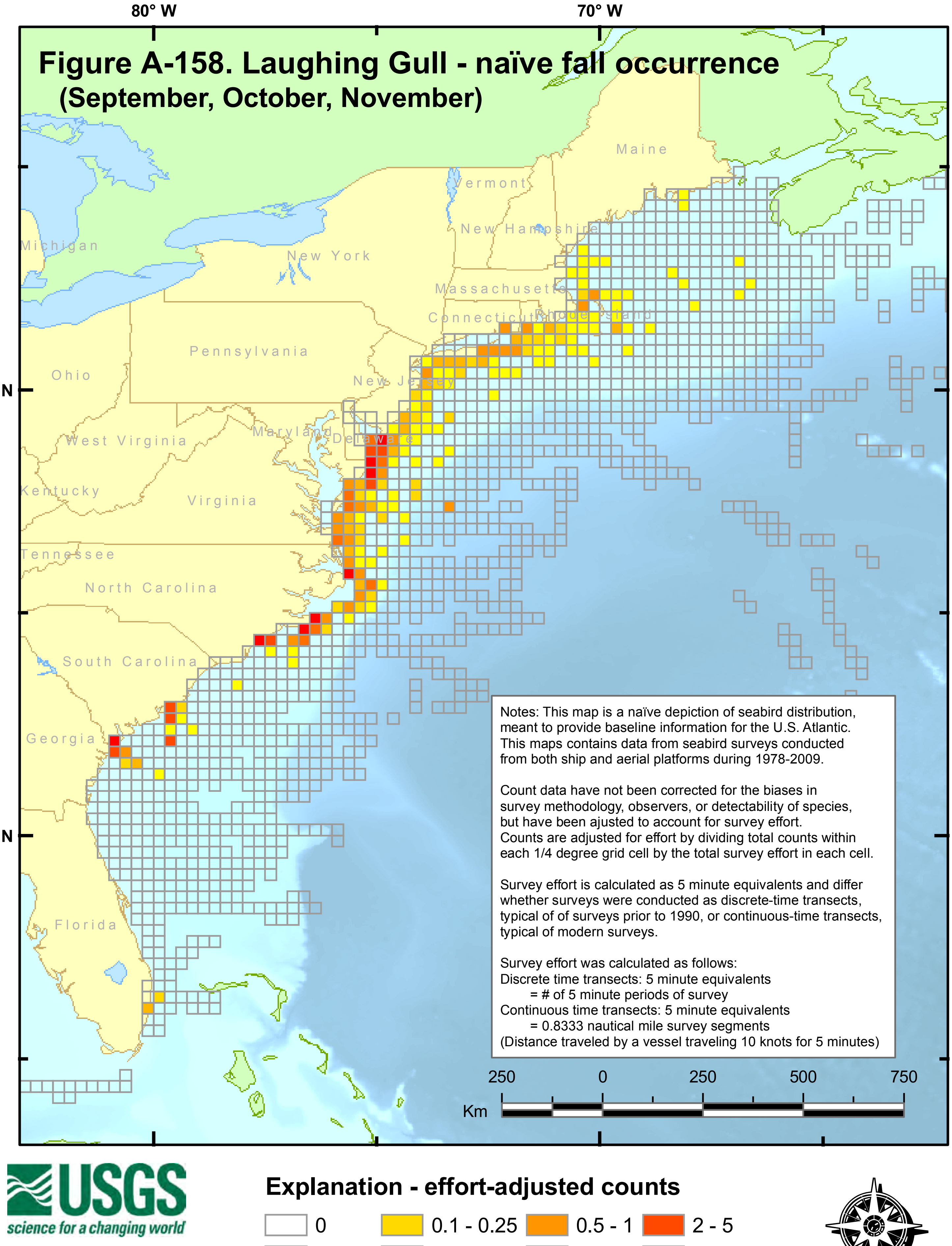
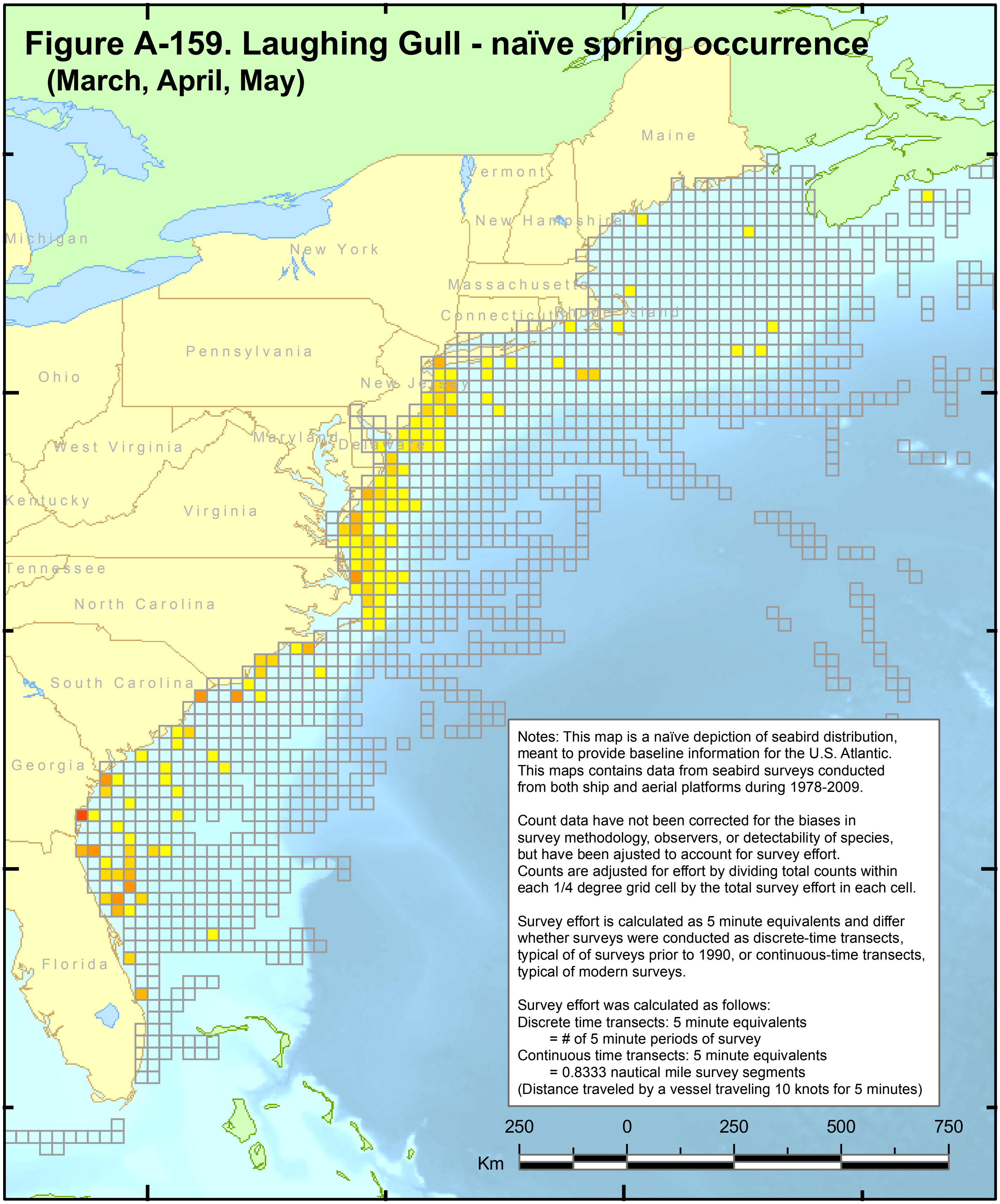



**Figure A-158. Laughing Gull - naïve fall occurrence (September, October, November)**

A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

# Figure A-159. Laughing Gull - naïve spring occurrence (March, April, May)




## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

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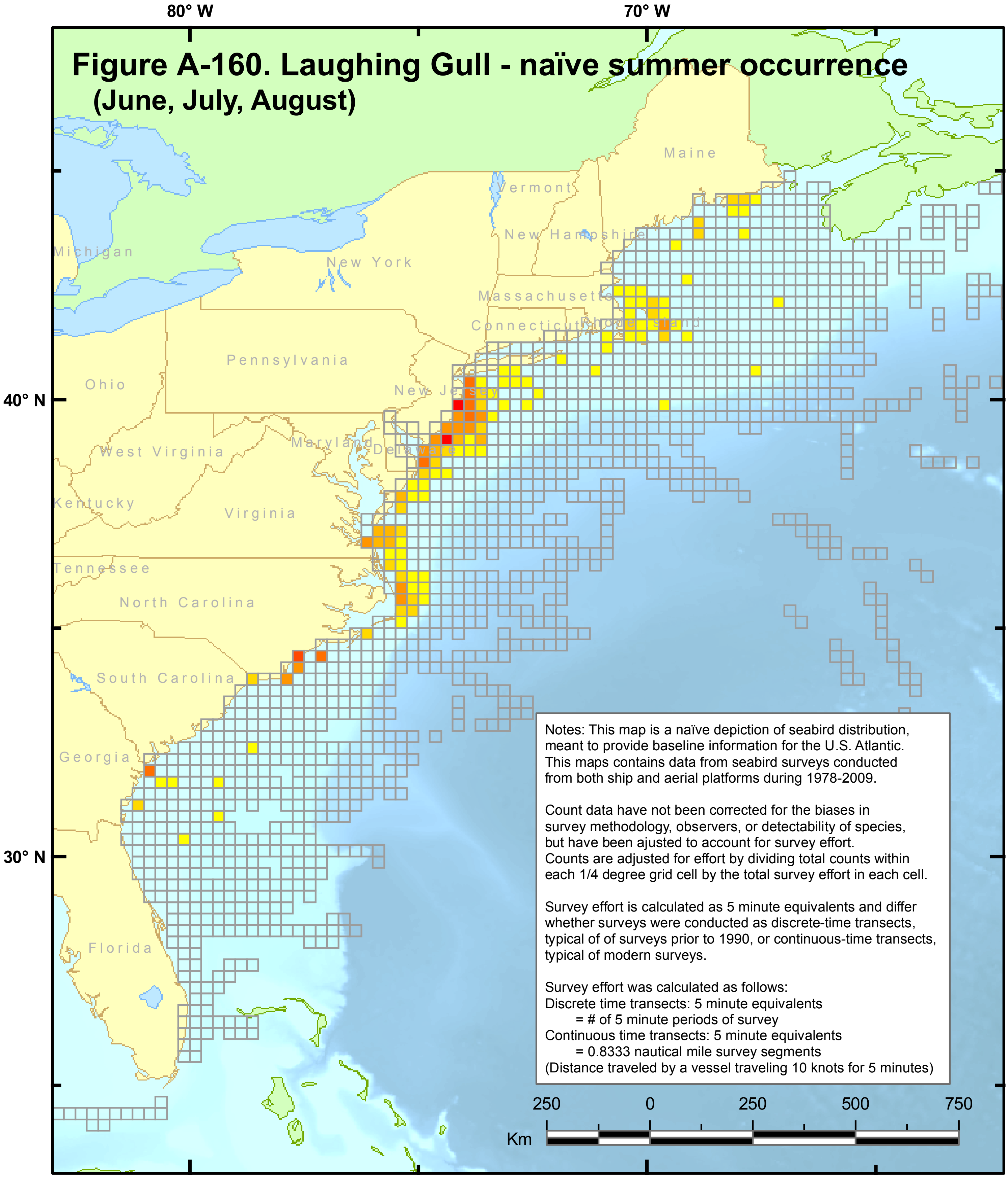
Map produced: 5/28/2010

# Figure A-160. Laughing Gull - naïve summer occurrence (June, July, August)

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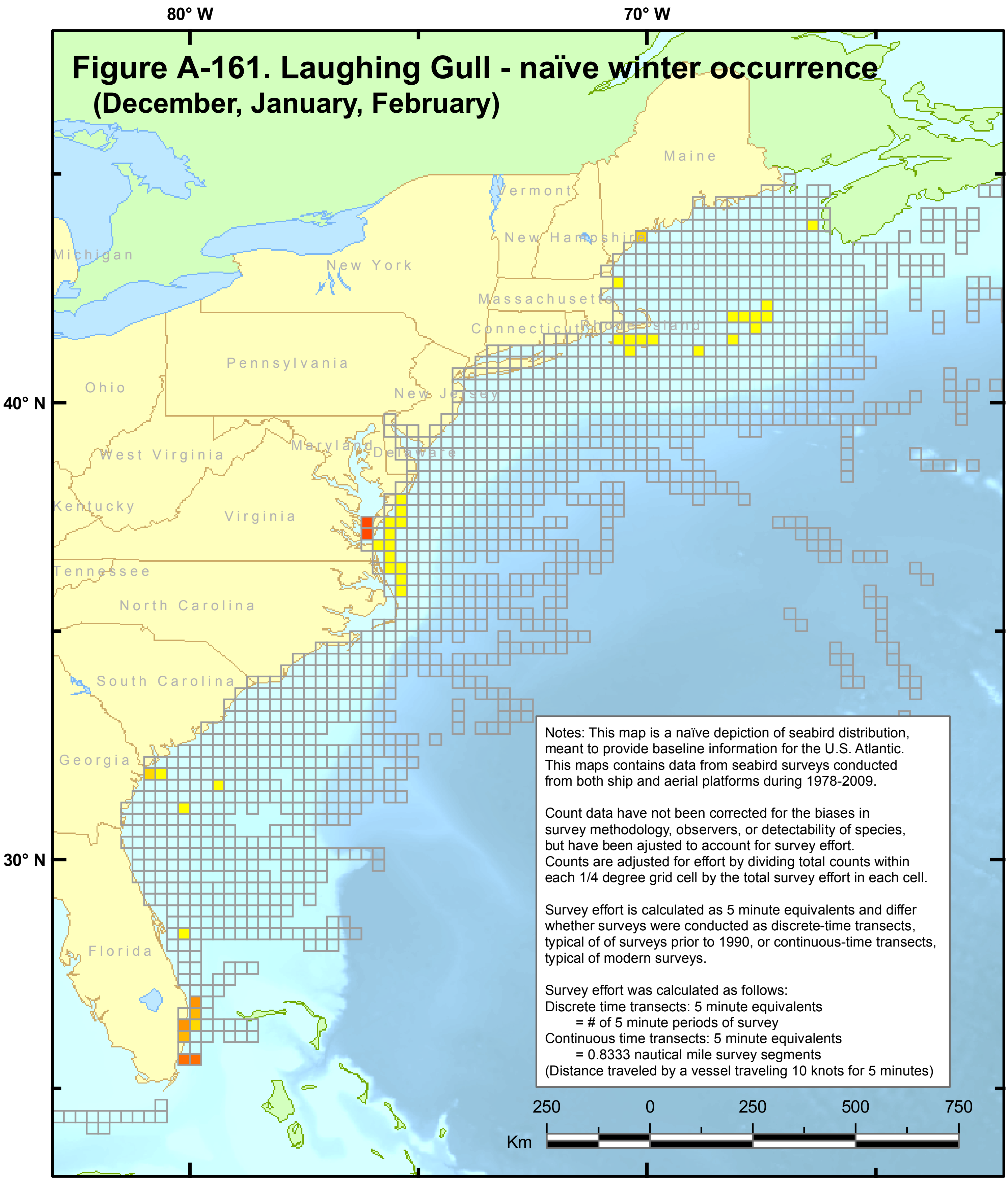
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 13.5 |




# Figure A-161. Laughing Gull - naïve winter occurrence
## (December, January, February)

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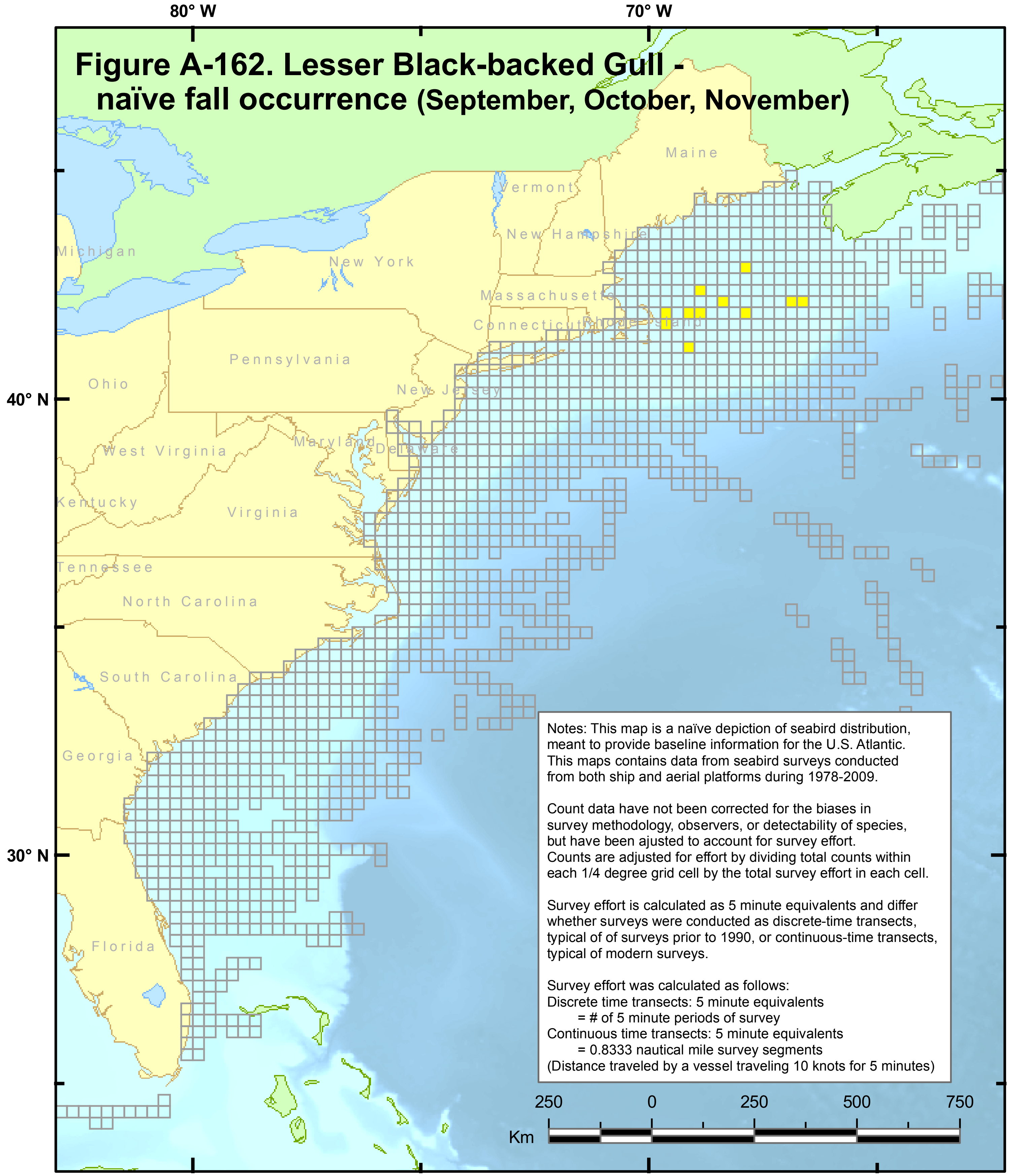
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-162. Lesser Black-backed Gull - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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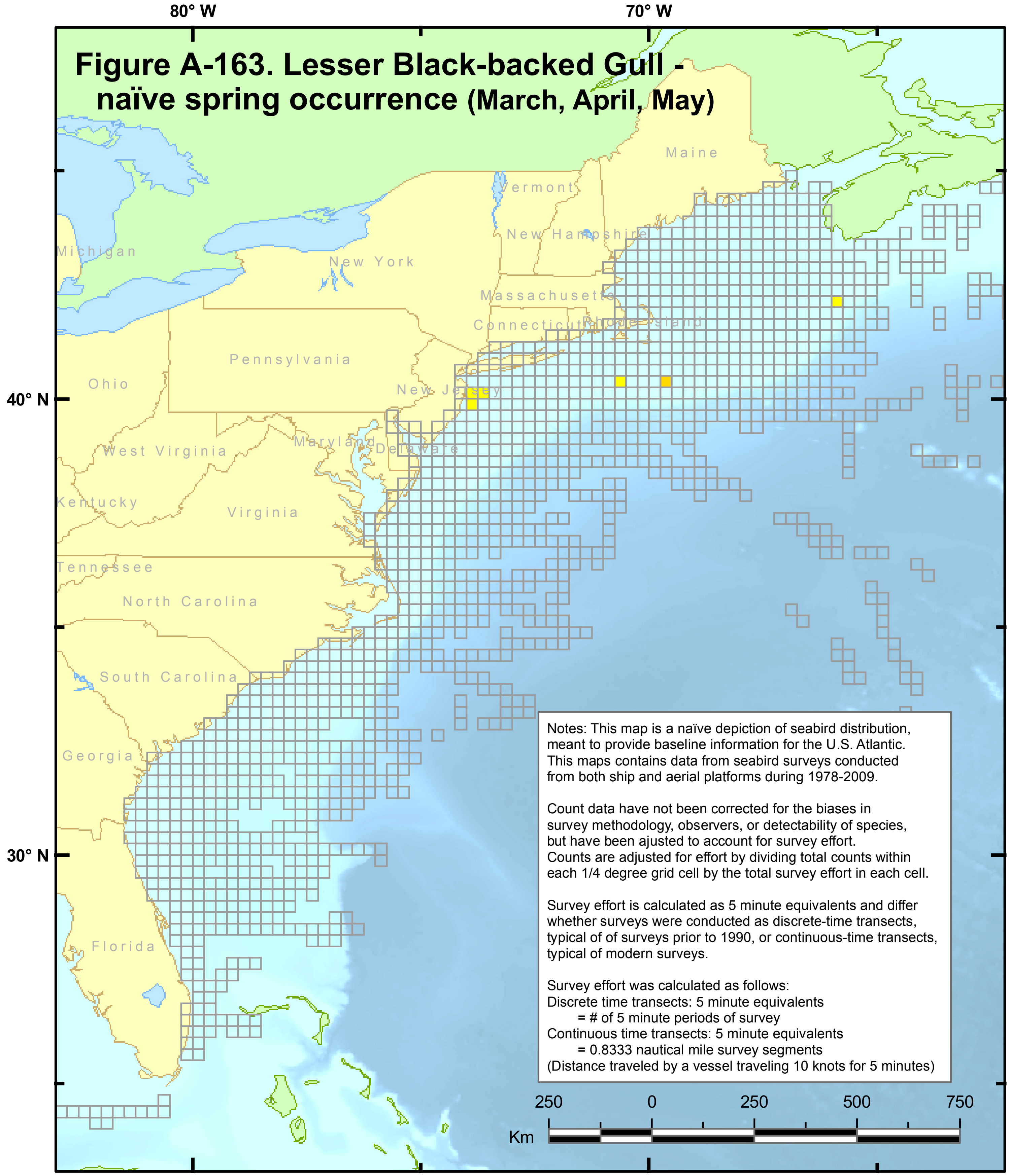
Map produced: 5/28/2010




# Figure A-163. Lesser Black-backed Gull - naïve spring occurrence (March, April, May)

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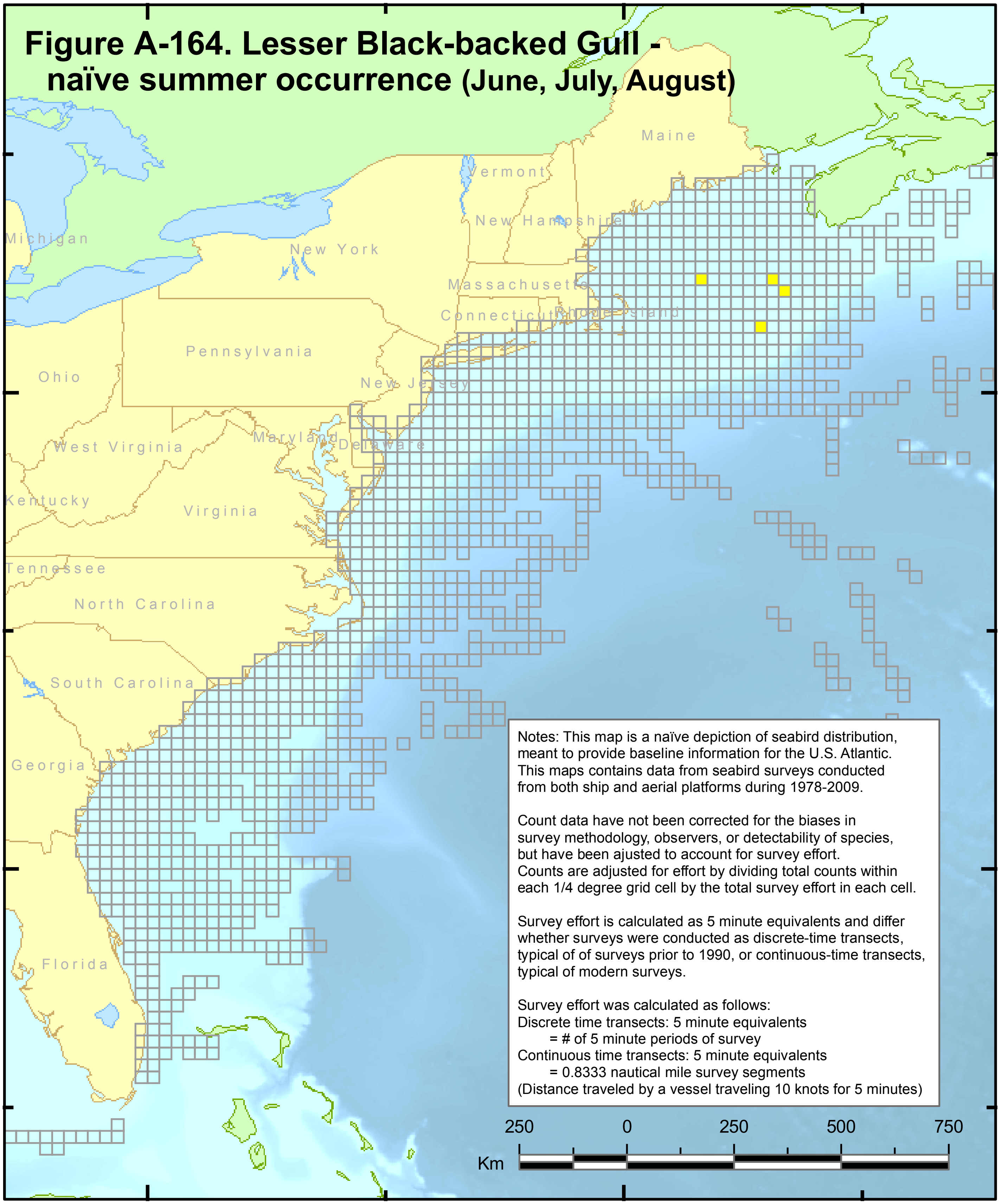
**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

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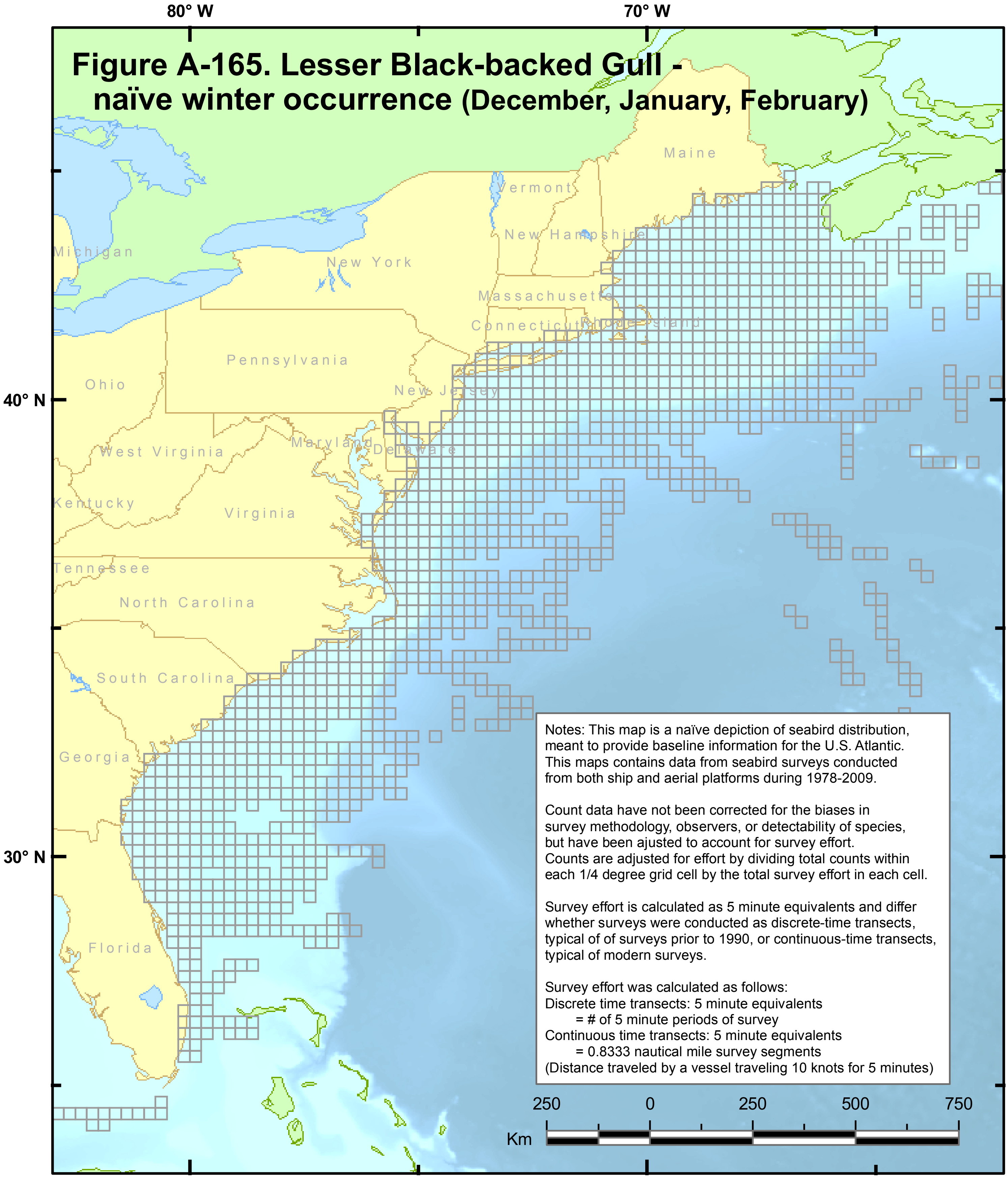
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-165. Lesser Black-backed Gull - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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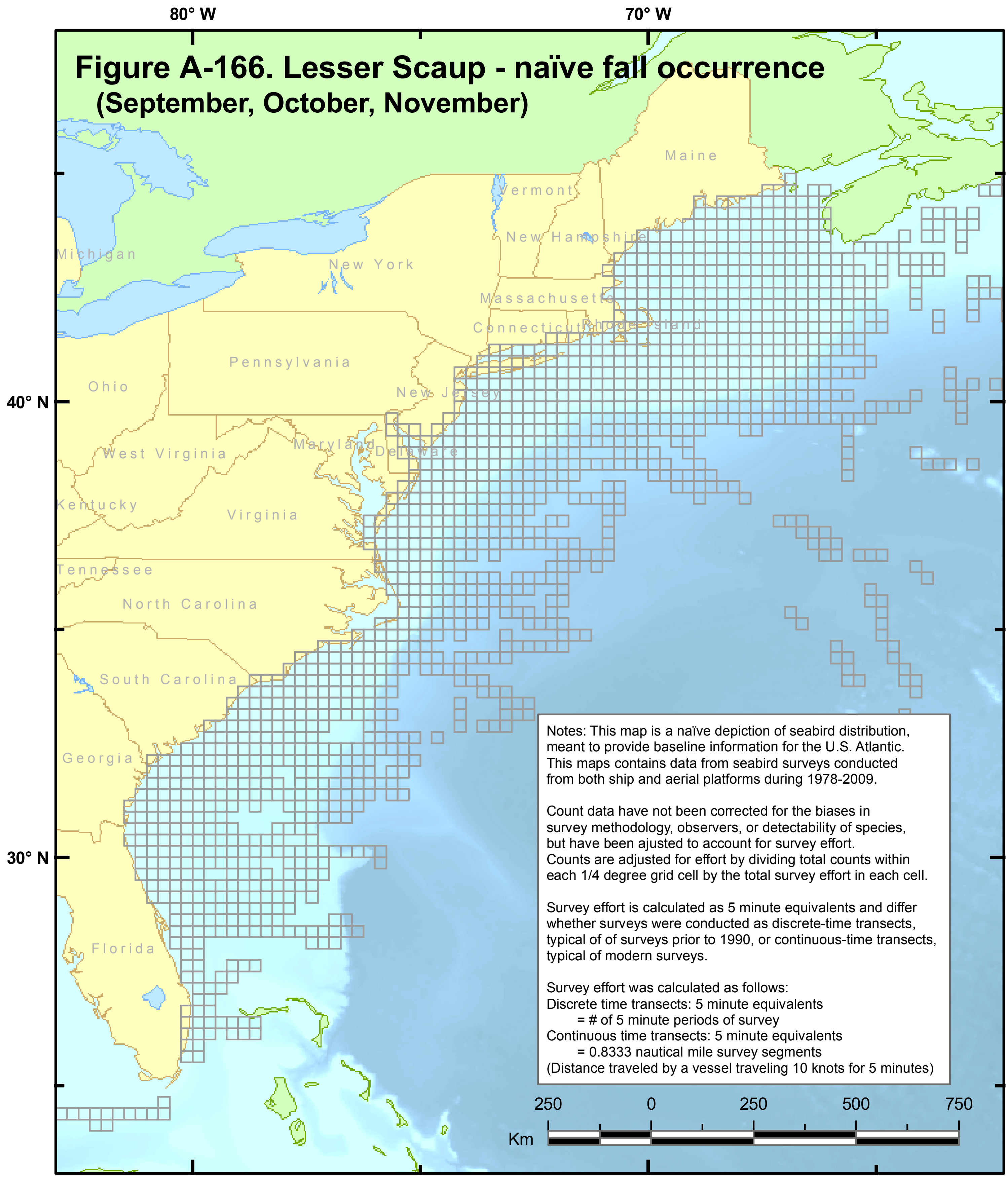
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-166. Lesser Scaup - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

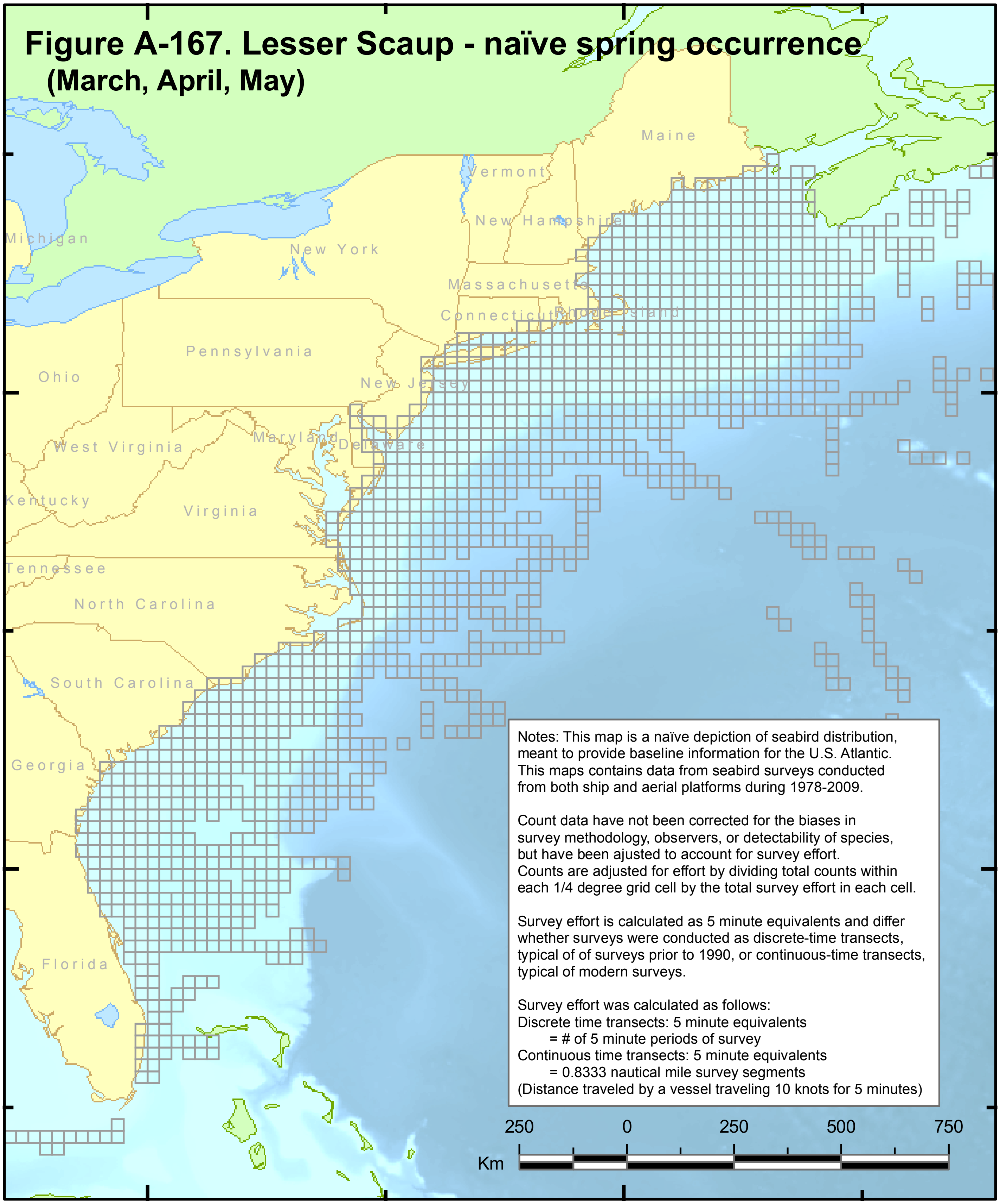


**Figure A-167. Lesser Scaup - naïve spring occurrence (March, April, May)**

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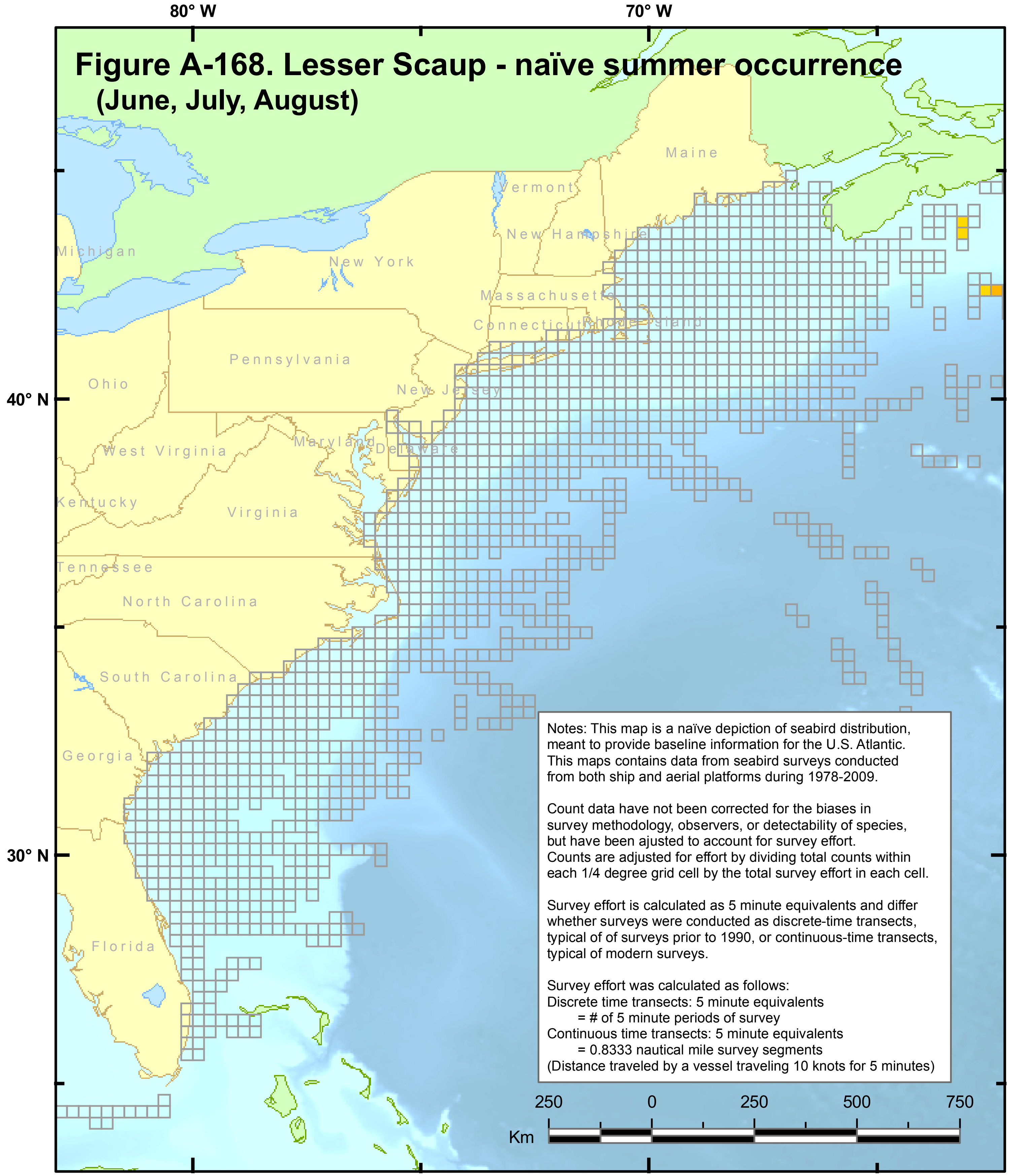
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-168. Lesser Scaup - naïve summer occurrence (June, July, August)

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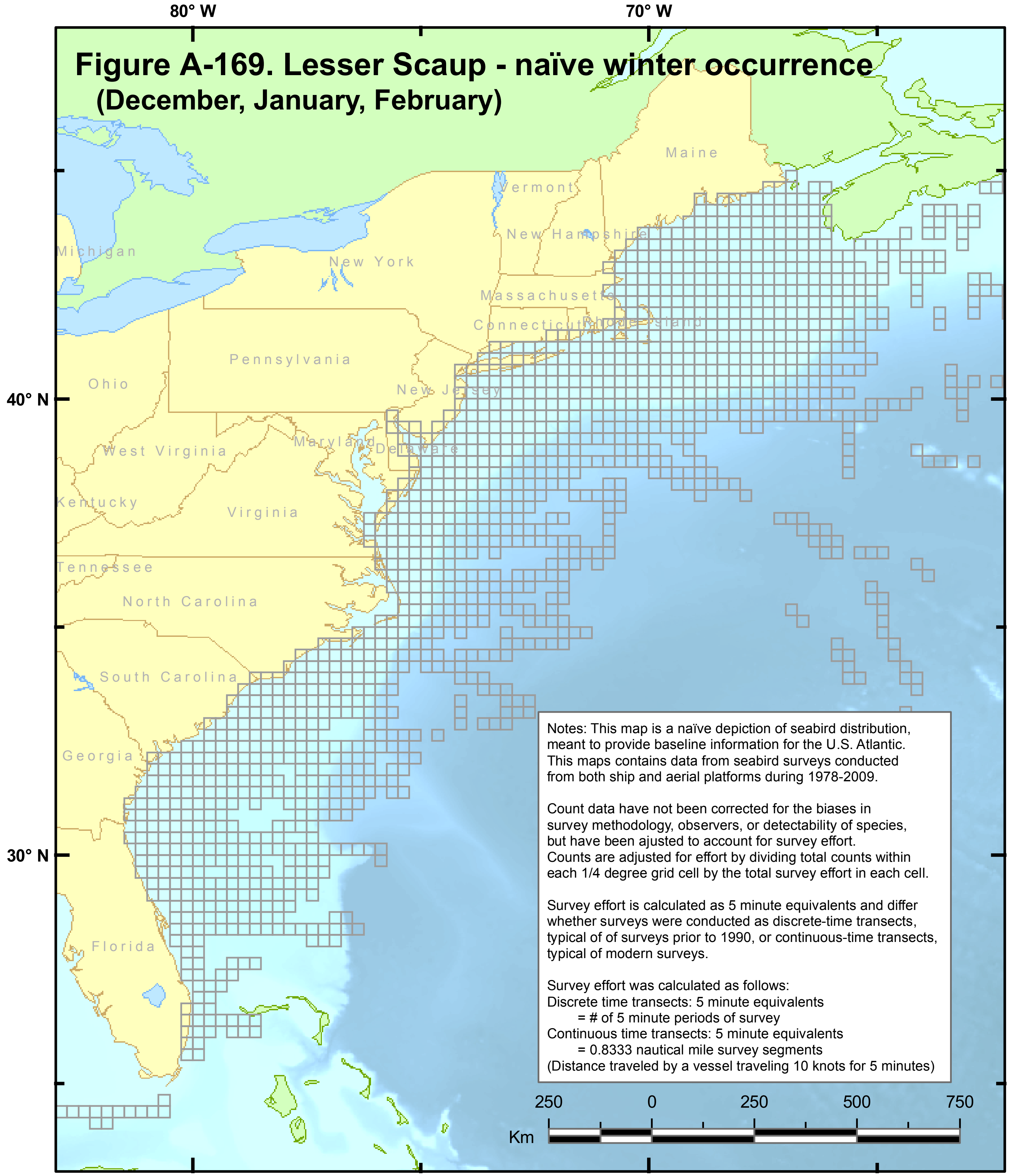
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-169. Lesser Scaup - naïve winter occurrence
## (December, January, February)




## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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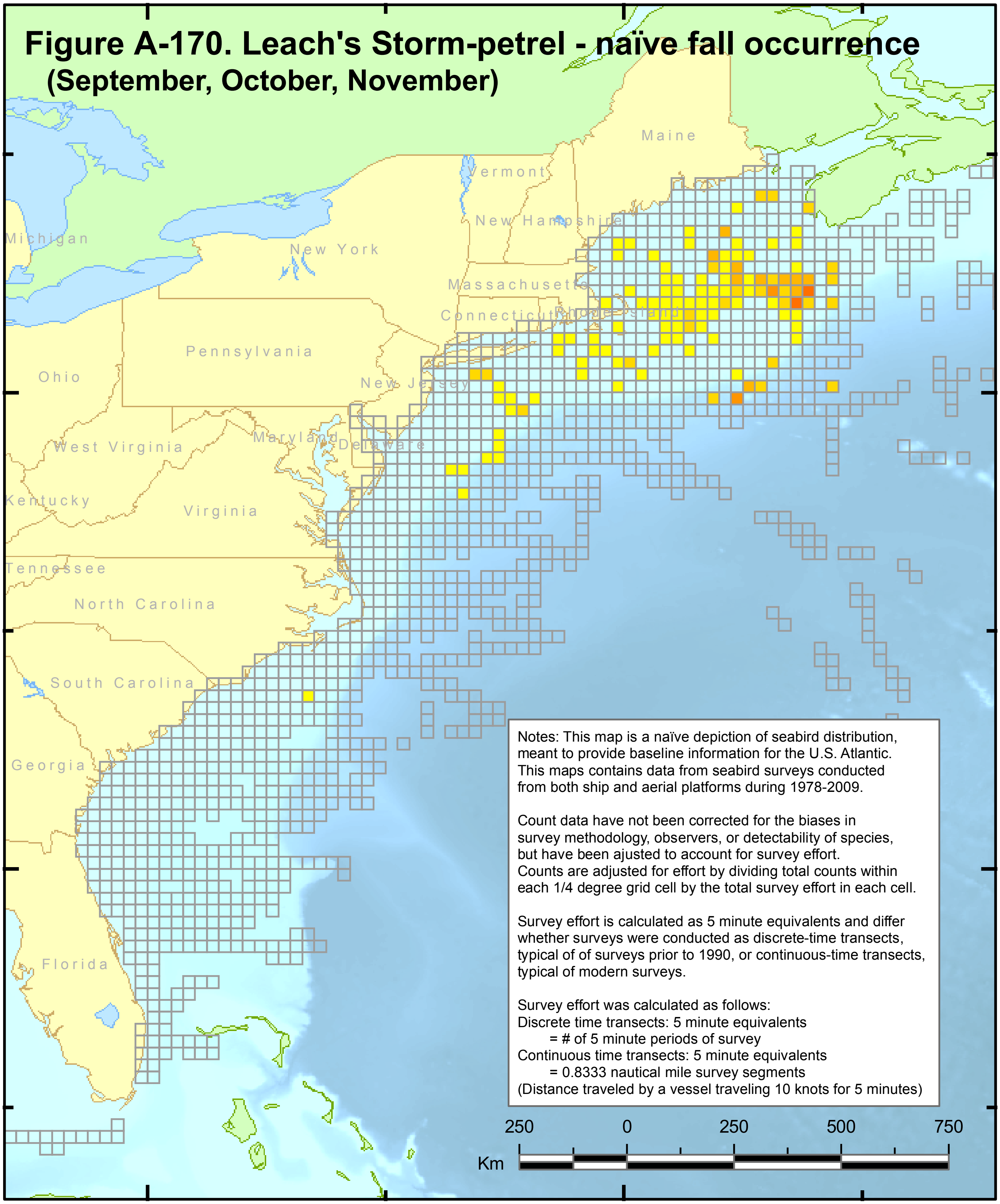
# Figure A-170. Leach's Storm-petrel - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort.
Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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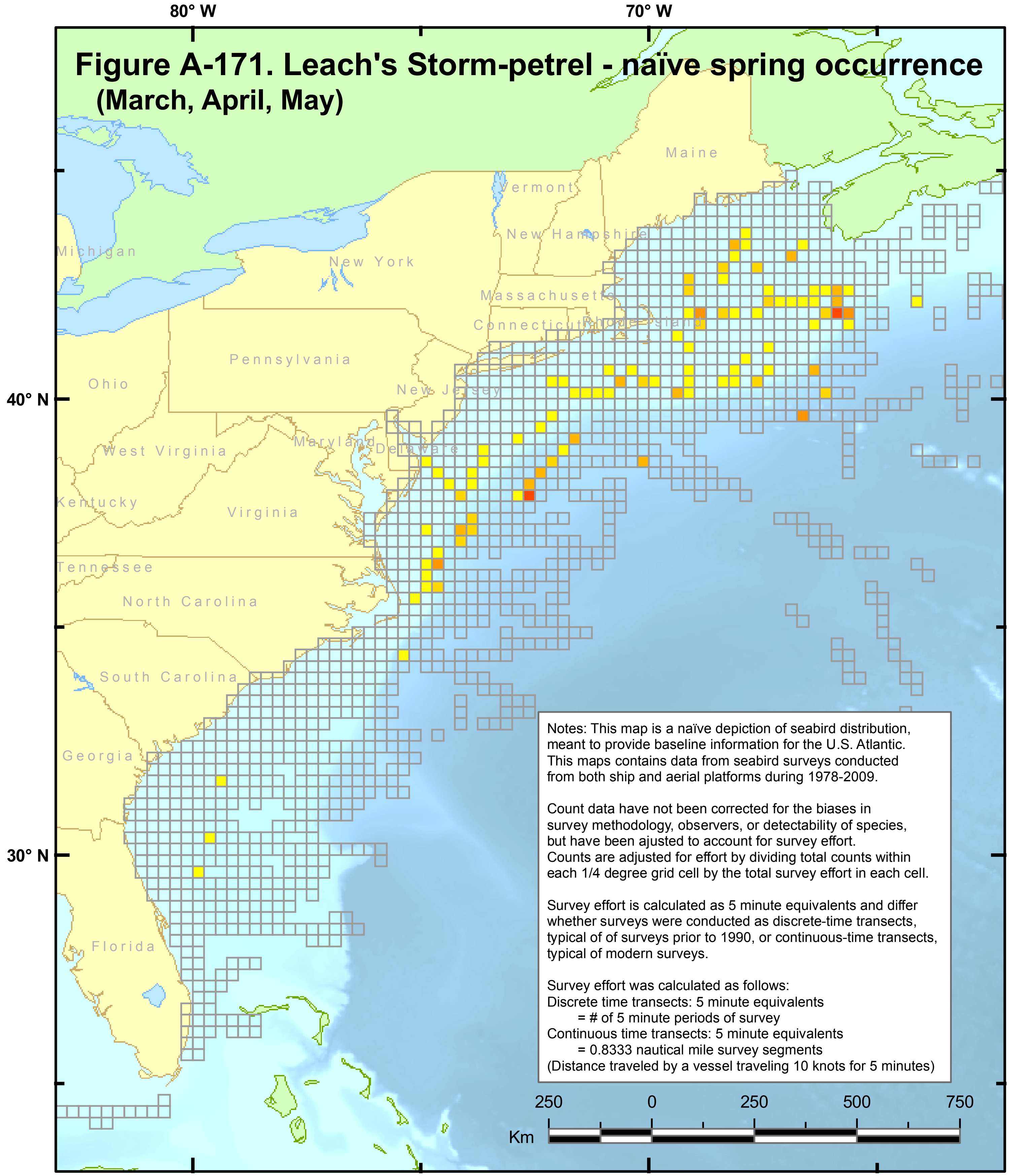


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**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

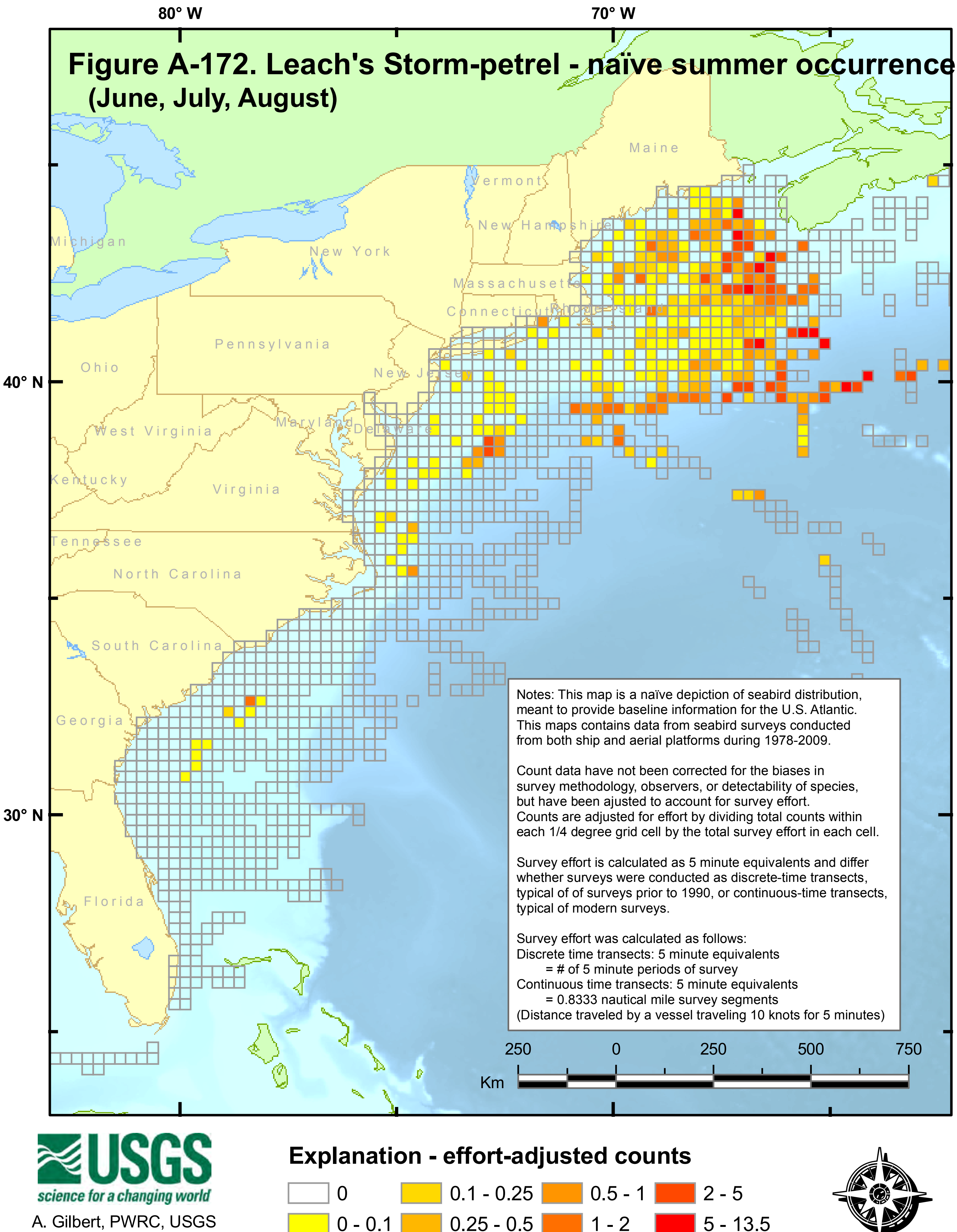


Figure A-172. Leach's Storm-petrel - naïve summer occurrence (June, July, August)

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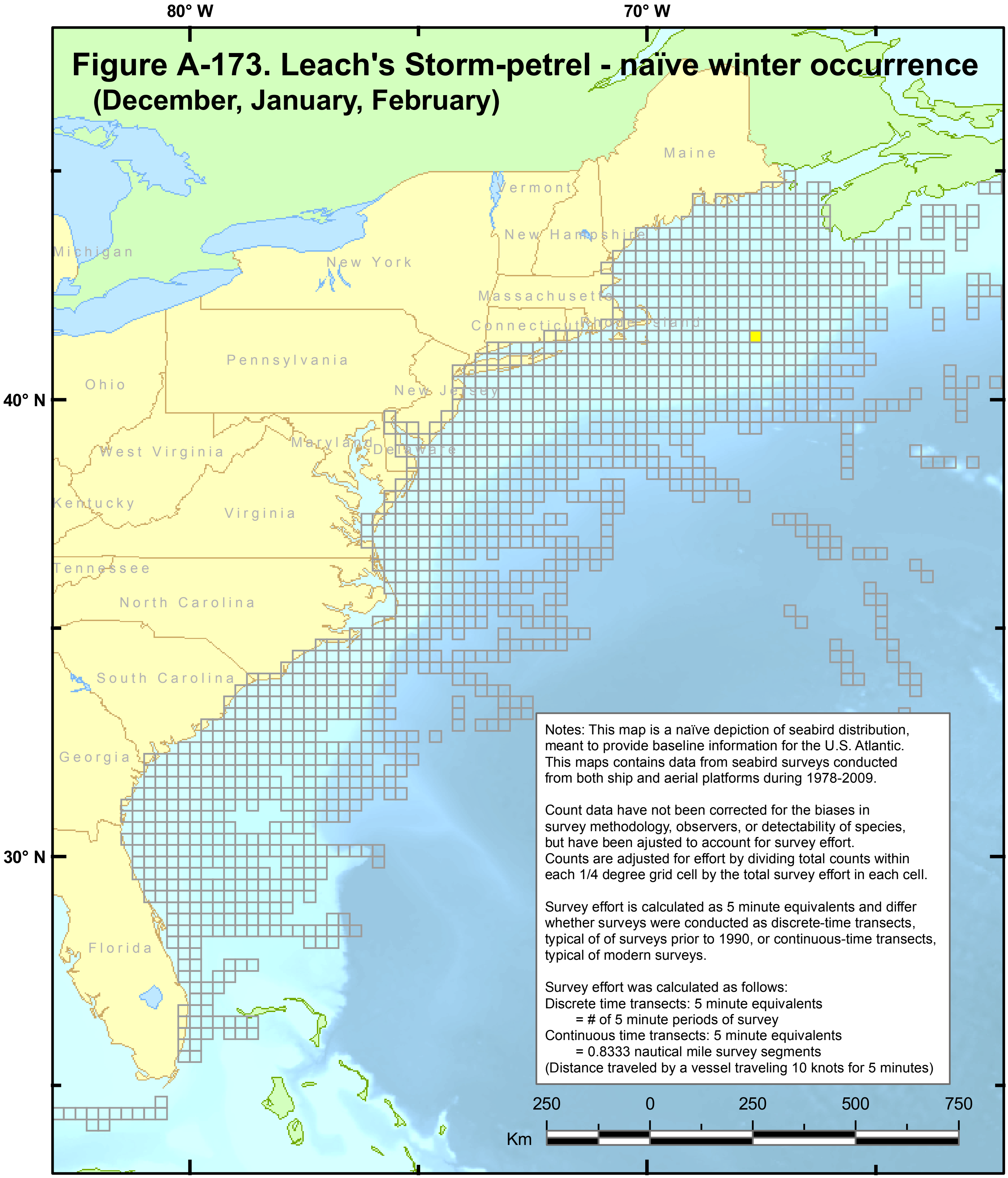
Map produced: 5/28/2010

# Figure A-173. Leach's Storm-petrel - naïve winter occurrence (December, January, February)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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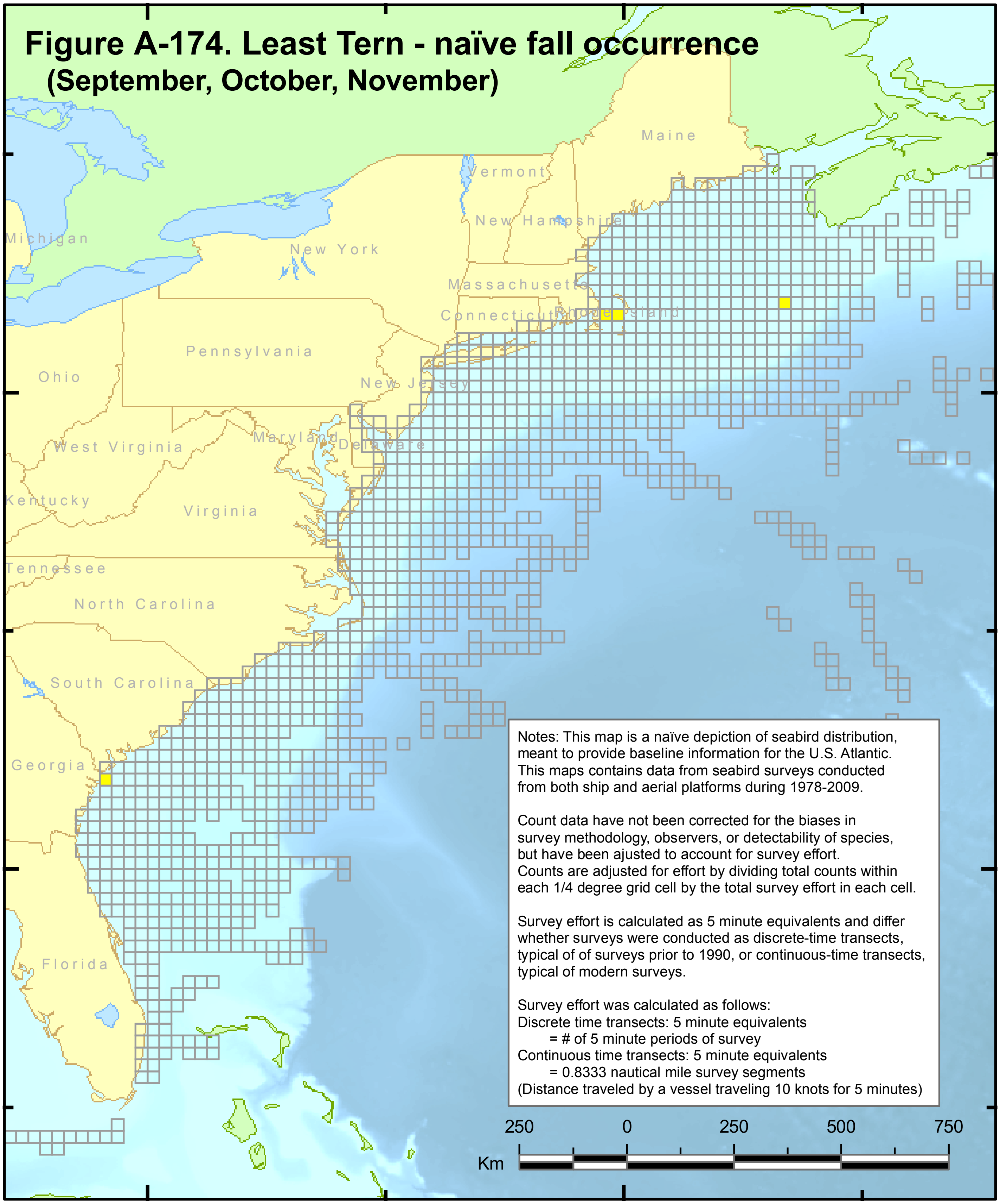
# Figure A-174. Least Tern - naïve fall occurrence (September, October, November)

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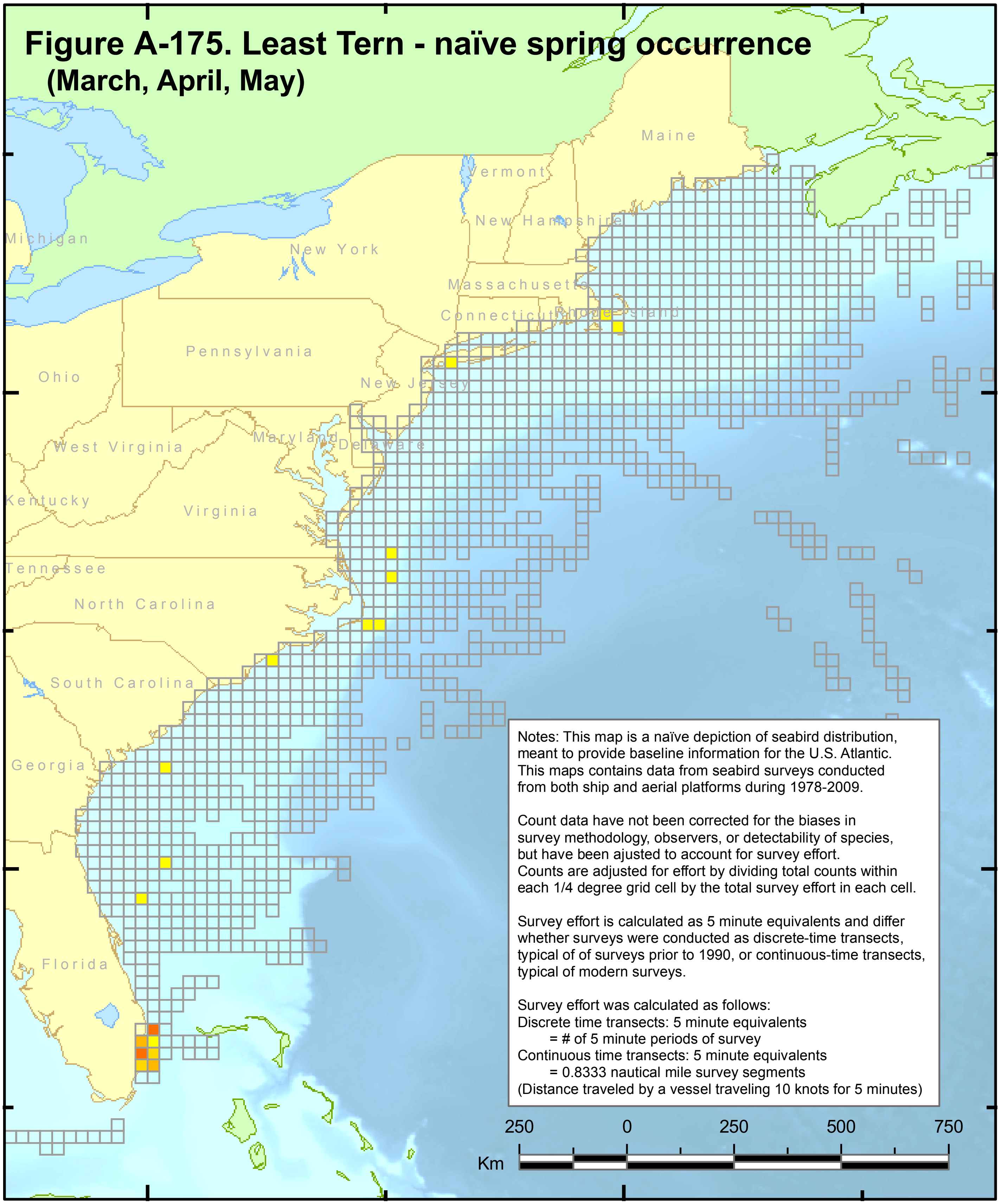
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0 - 0.1 | 0.1 - 0.25 | 0.25 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 5 | >5




# Figure A-175. Least Tern - naïve spring occurrence (March, April, May)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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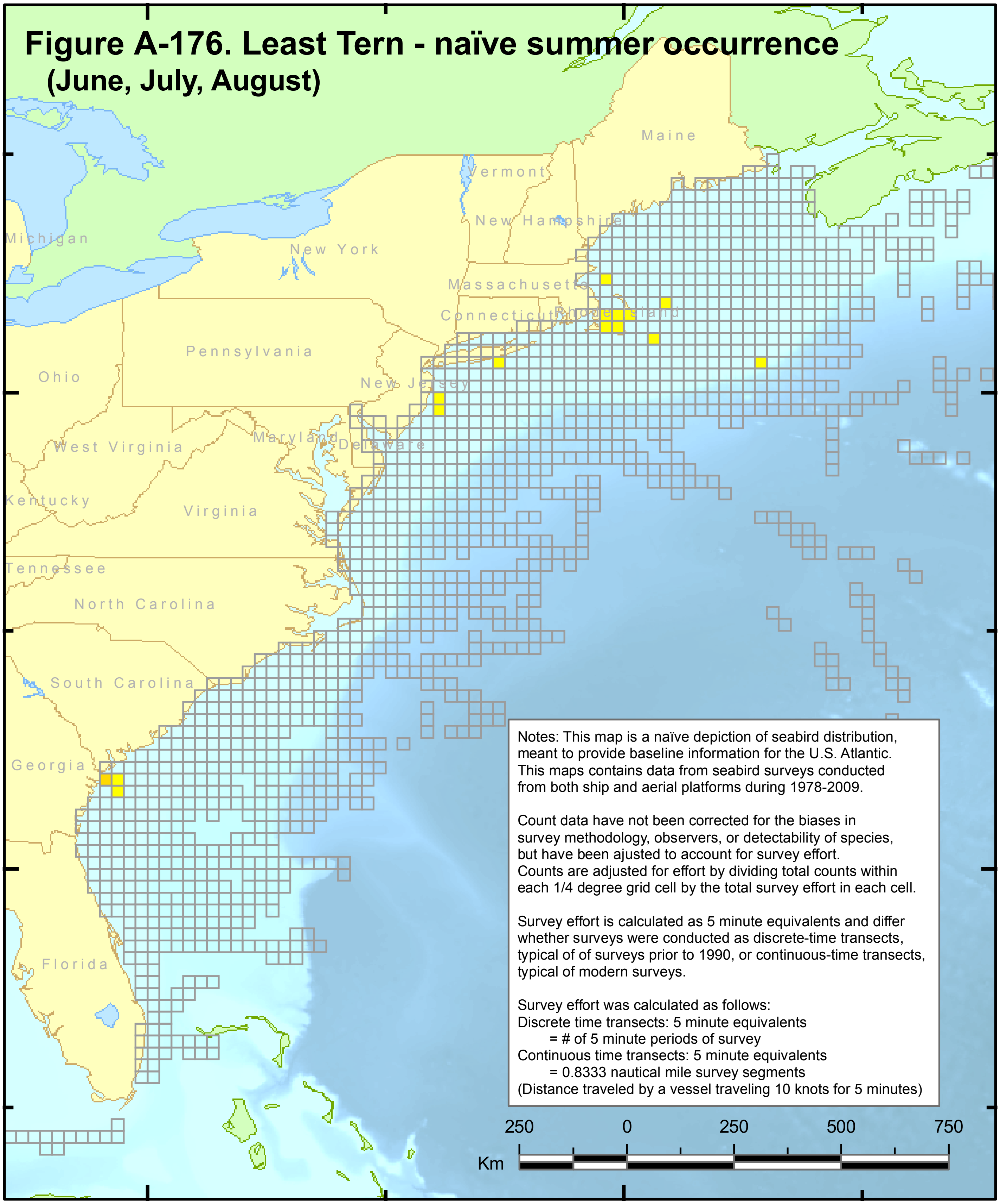
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-176. Least Tern - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

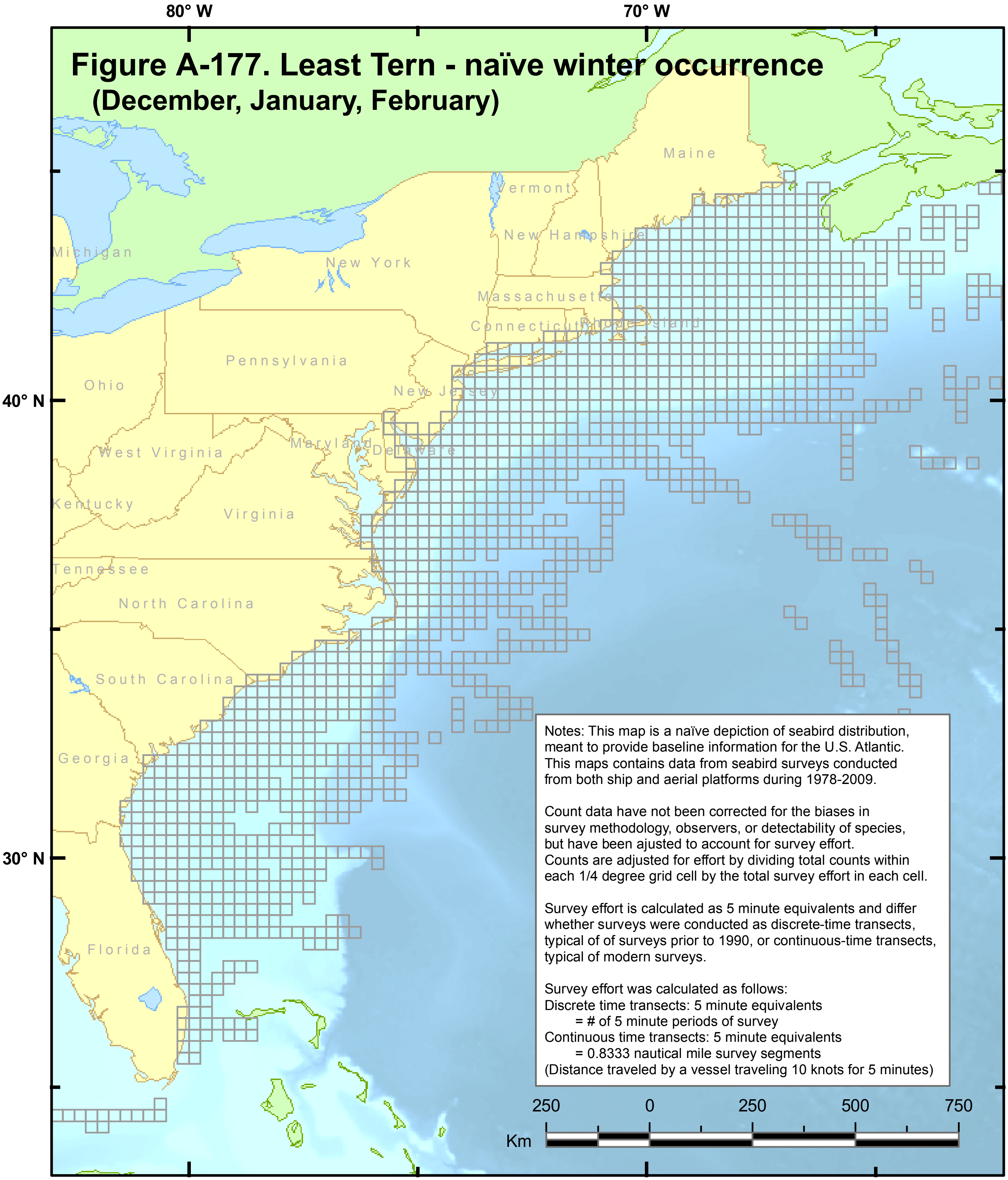
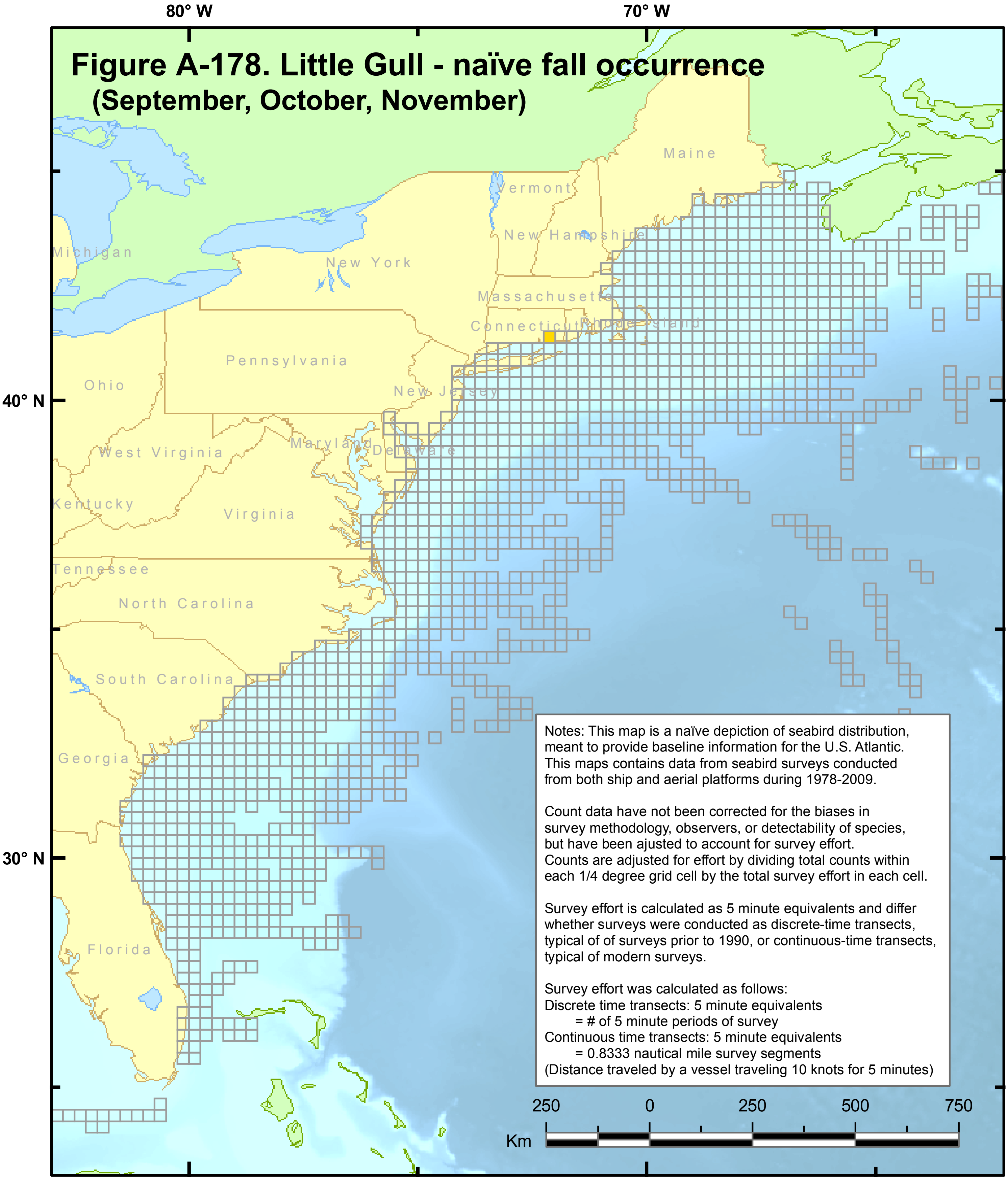



**Figure A-177. Least Tern - naïve winter occurrence (December, January, February)**

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

A. Gilbert, PWRC, USGS
Map produced: 5/28/2010




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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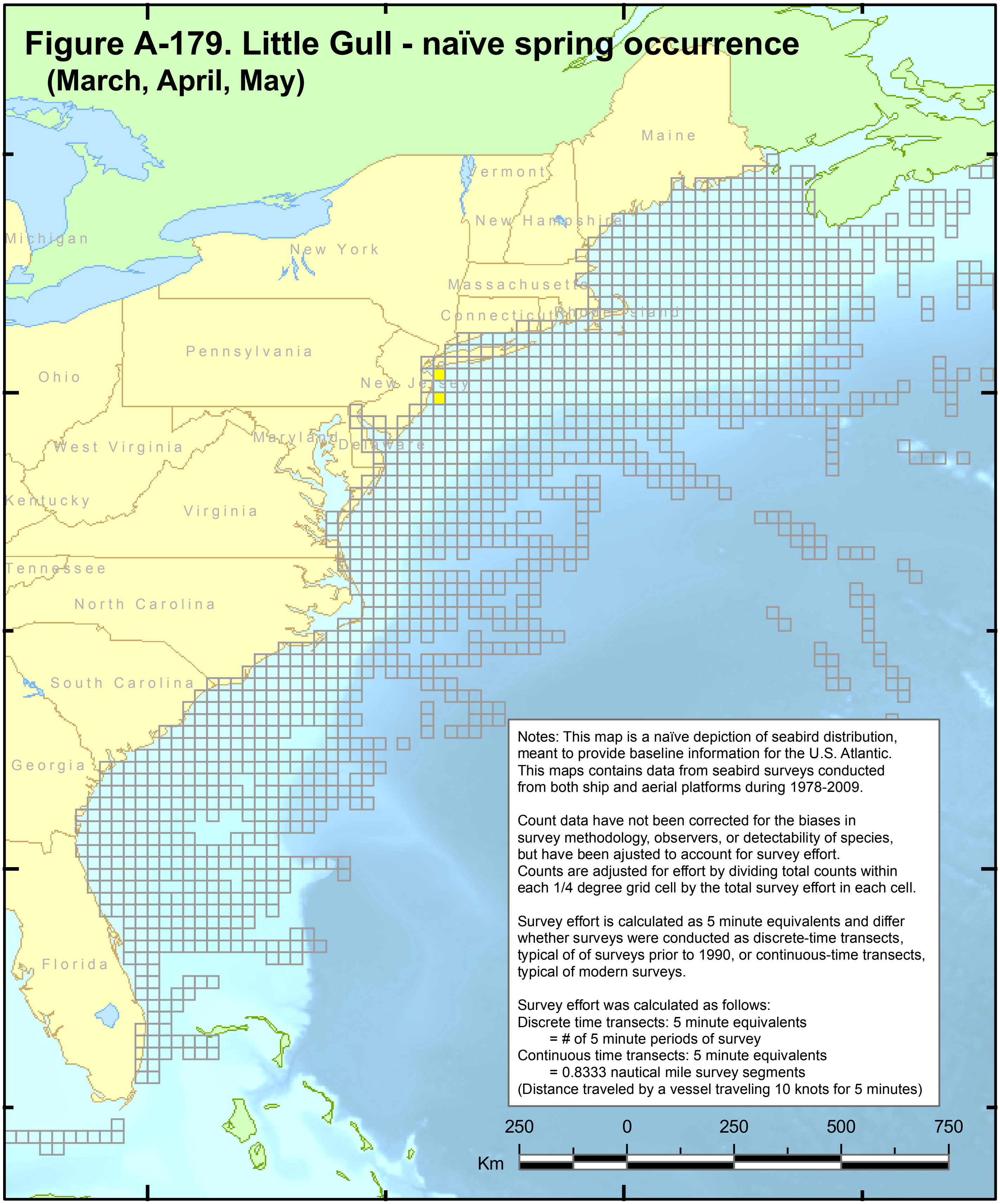
# Figure A-179. Little Gull - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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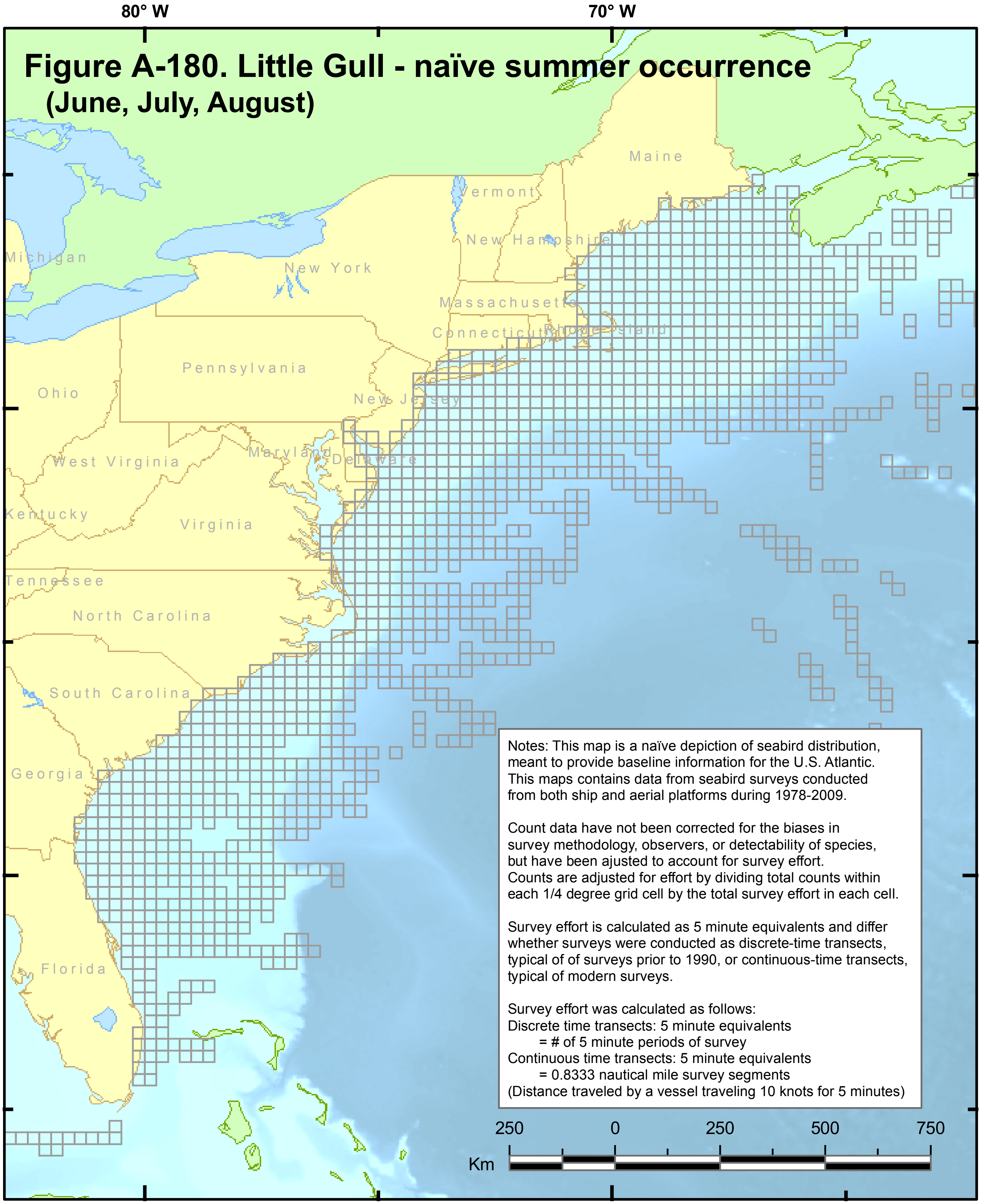
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-180. Little Gull - naïve summer occurrence (June, July, August)

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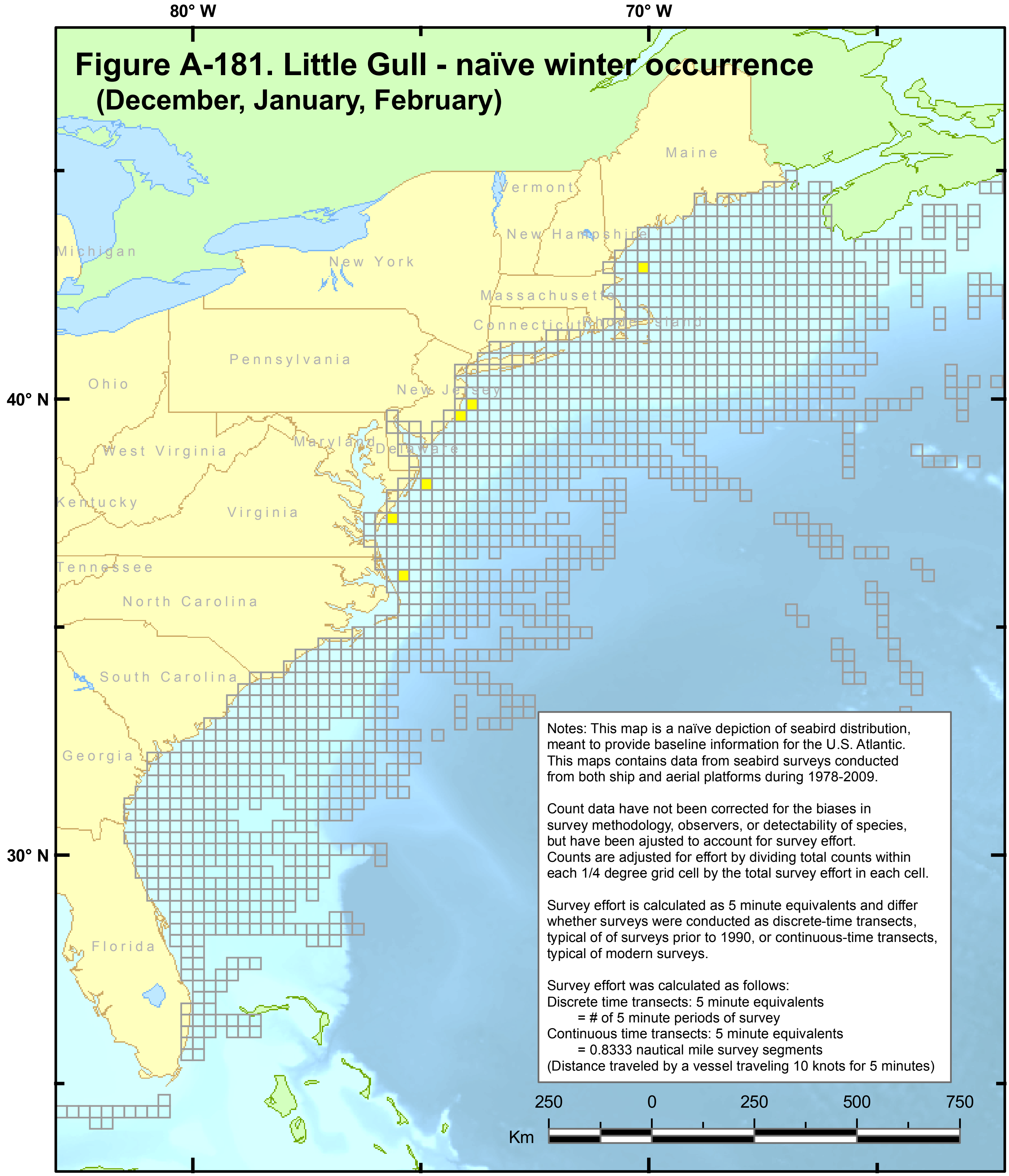
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-181. Little Gull - naïve winter occurrence (December, January, February)




USGS
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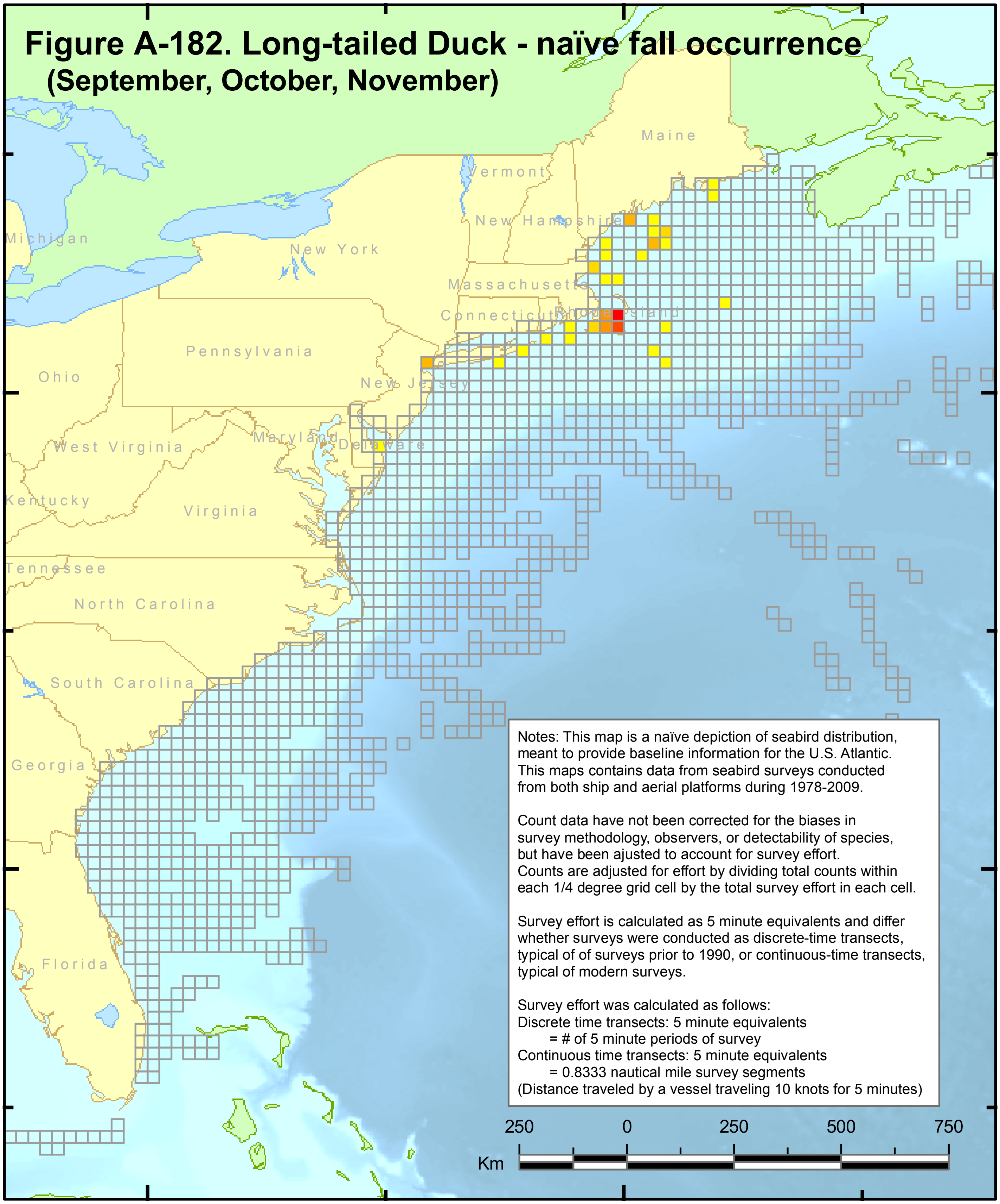
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-182. Long-tailed Duck - naïve fall occurrence
(September, October, November)

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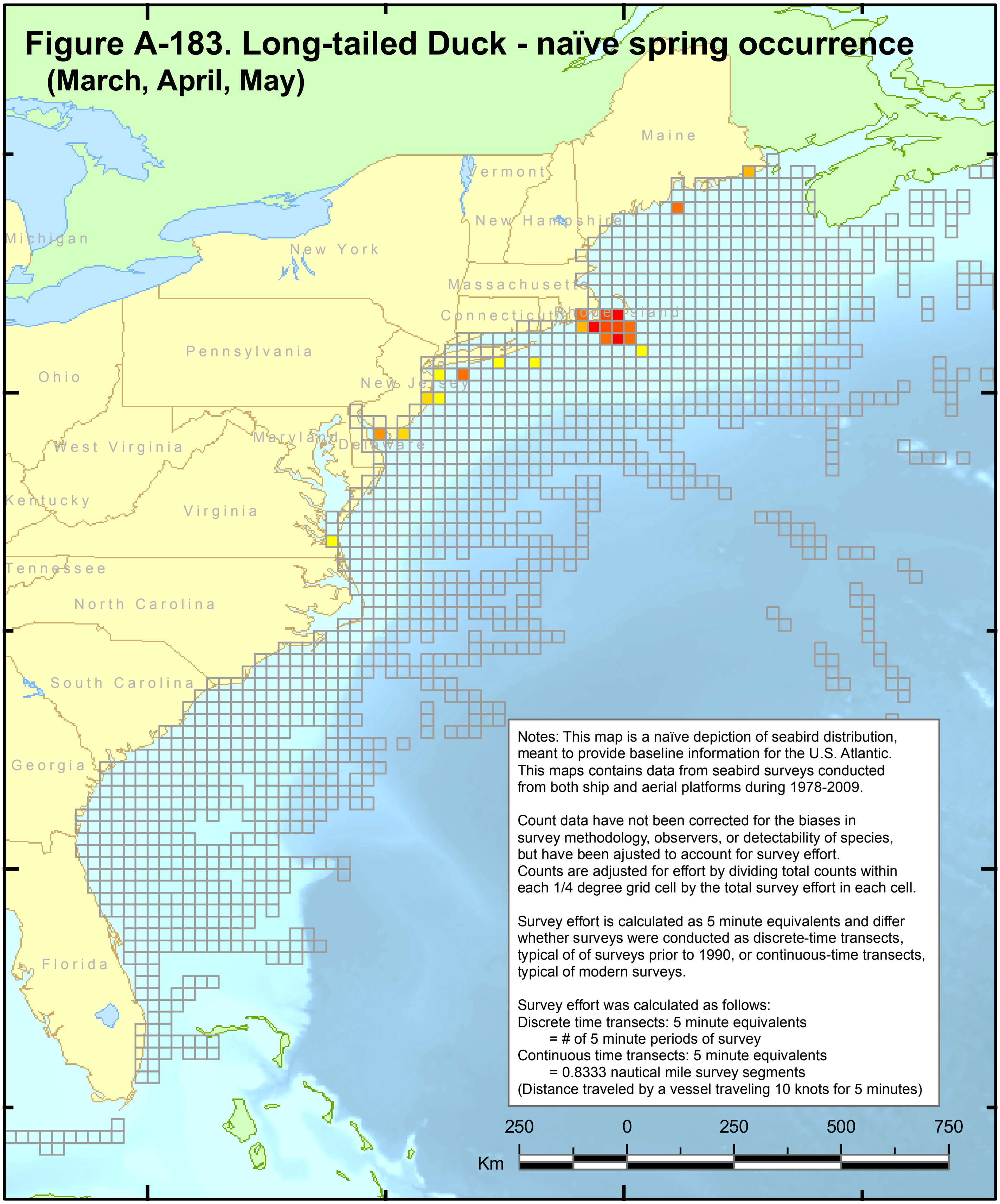
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 5.6fF




# Figure A-183. Long-tailed Duck - naïve spring occurrence (March, April, May)

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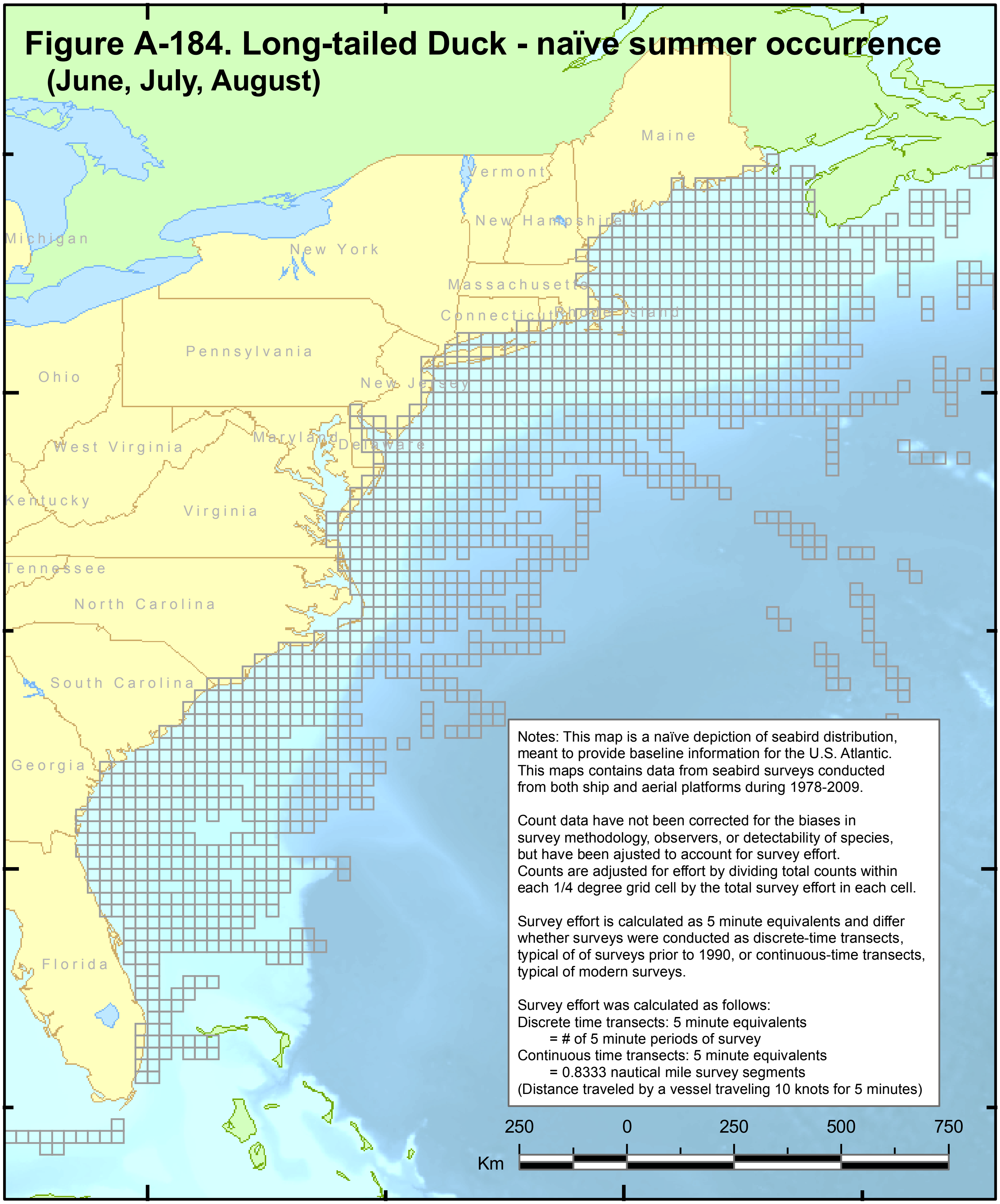
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 583.9

# Figure A-184. Long-tailed Duck - naïve summer occurrence (June, July, August)

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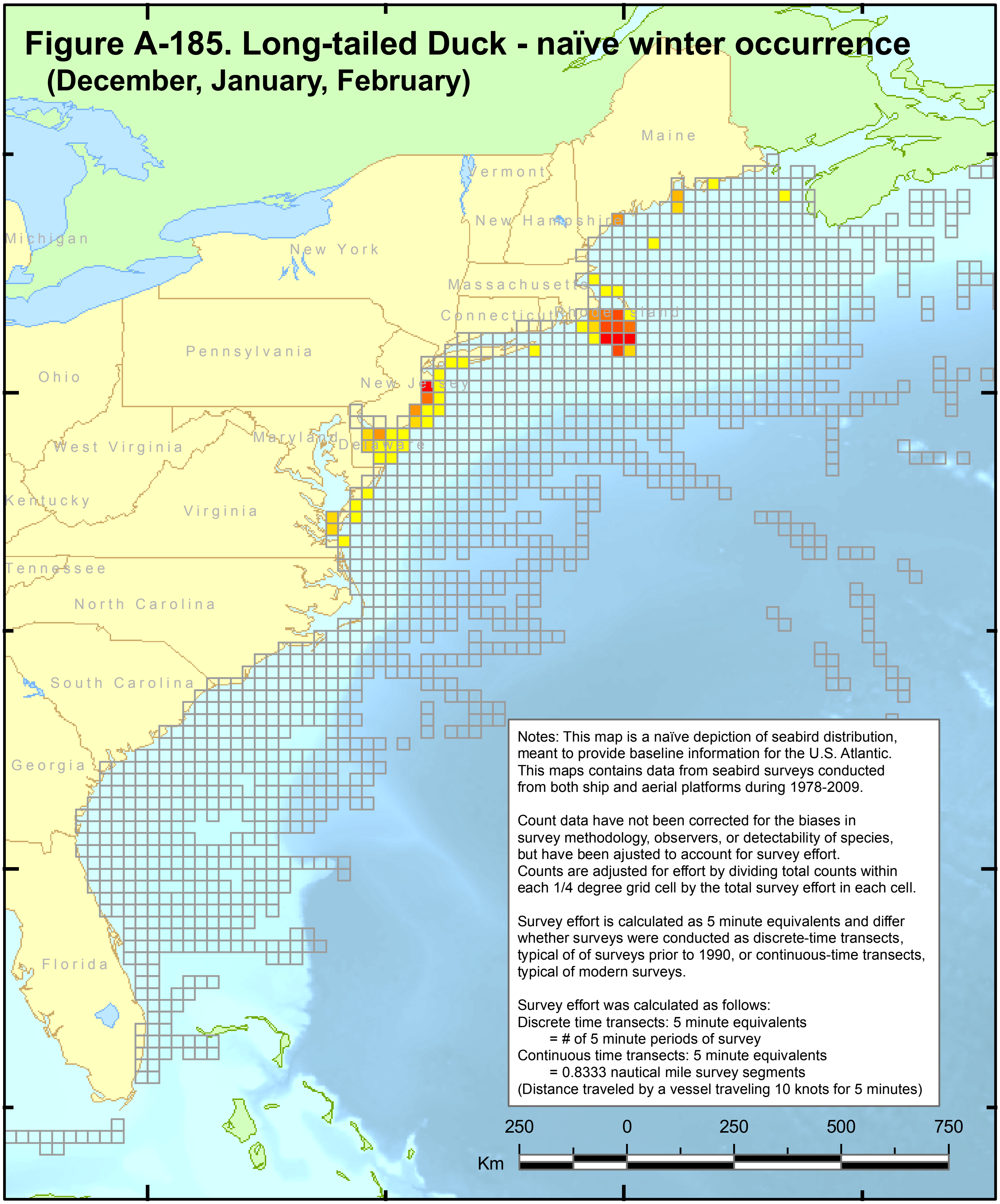
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0 - 0.1 | 0.1 - 0.25 | 0.25 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 5 | >5

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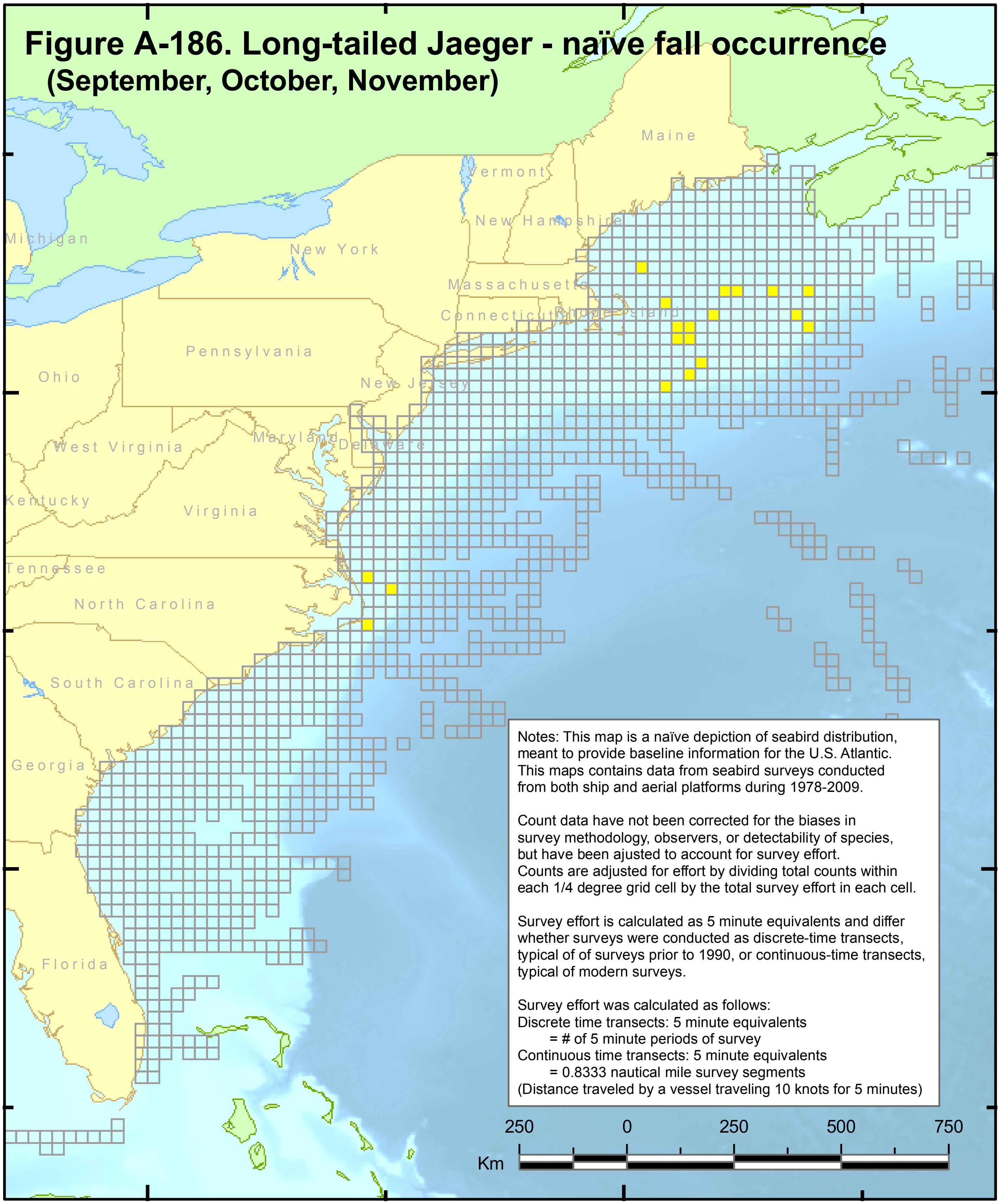
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 146.5 |

# Figure A-186. Long-tailed Jaeger - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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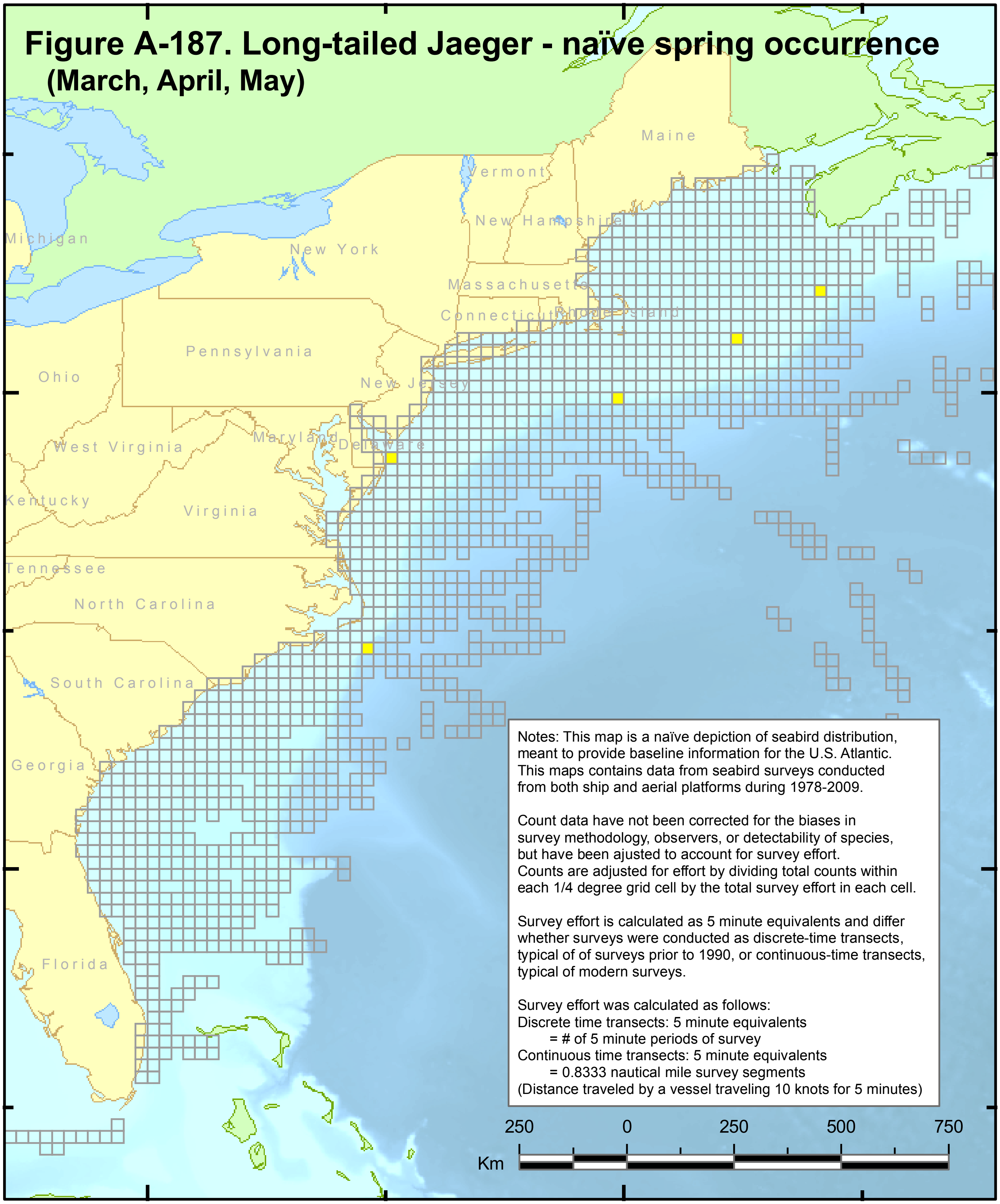
# Figure A-187. Long-tailed Jaeger - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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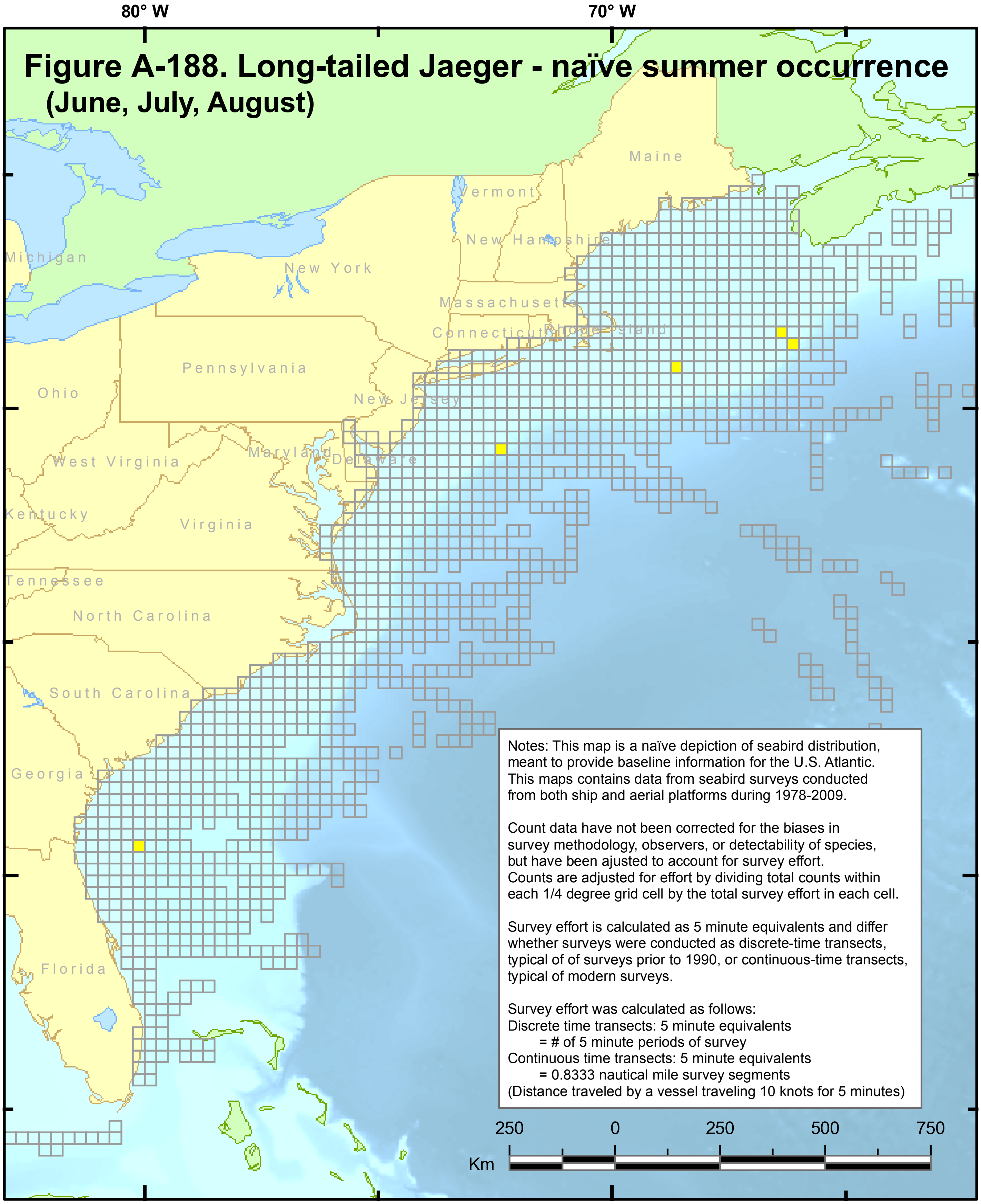
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-188. Long-tailed Jaeger - naïve summer occurrence (June, July, August)

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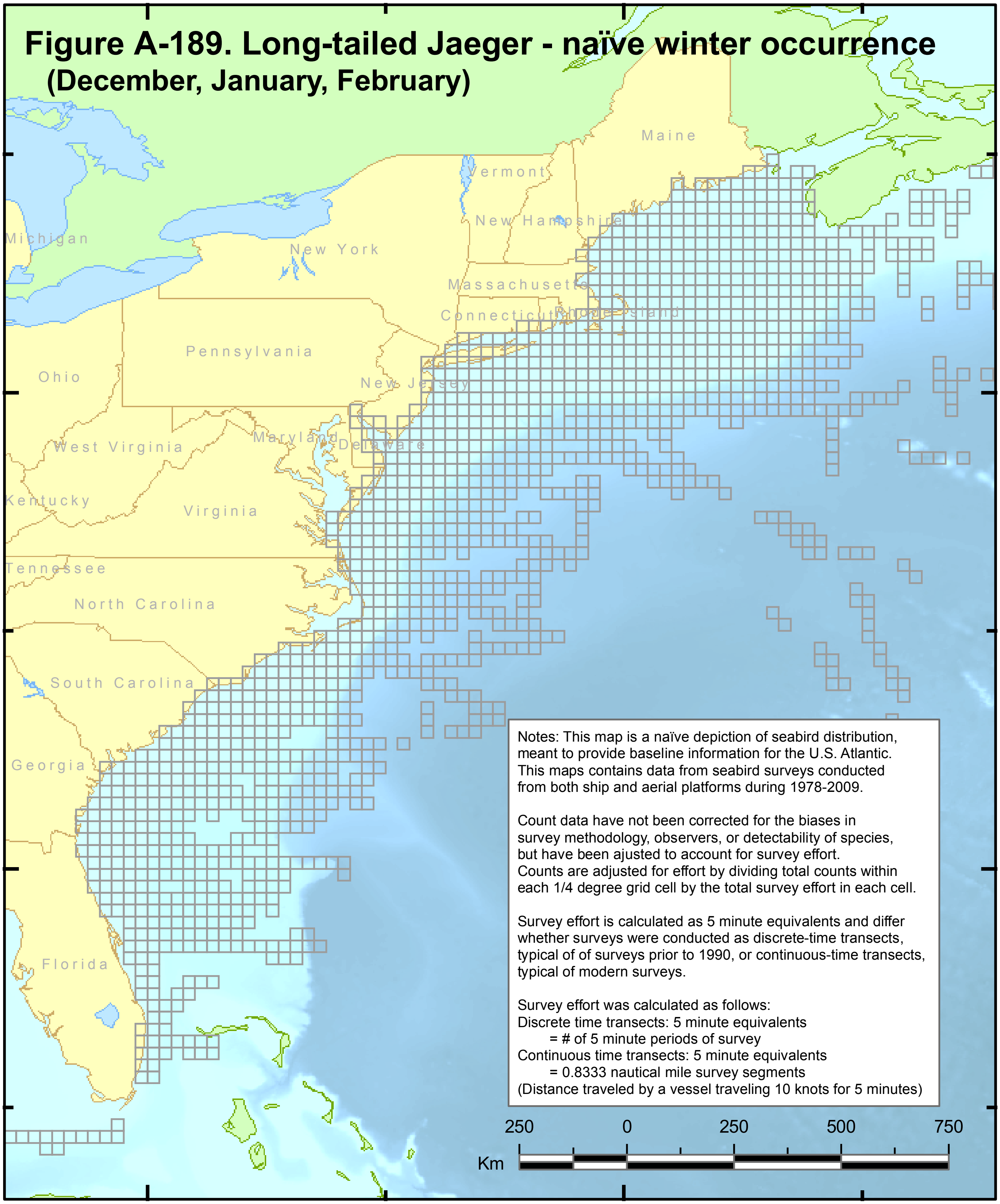
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5Figure

# Figure A-189. Long-tailed Jaeger - naïve winter occurrence
## (December, January, February)

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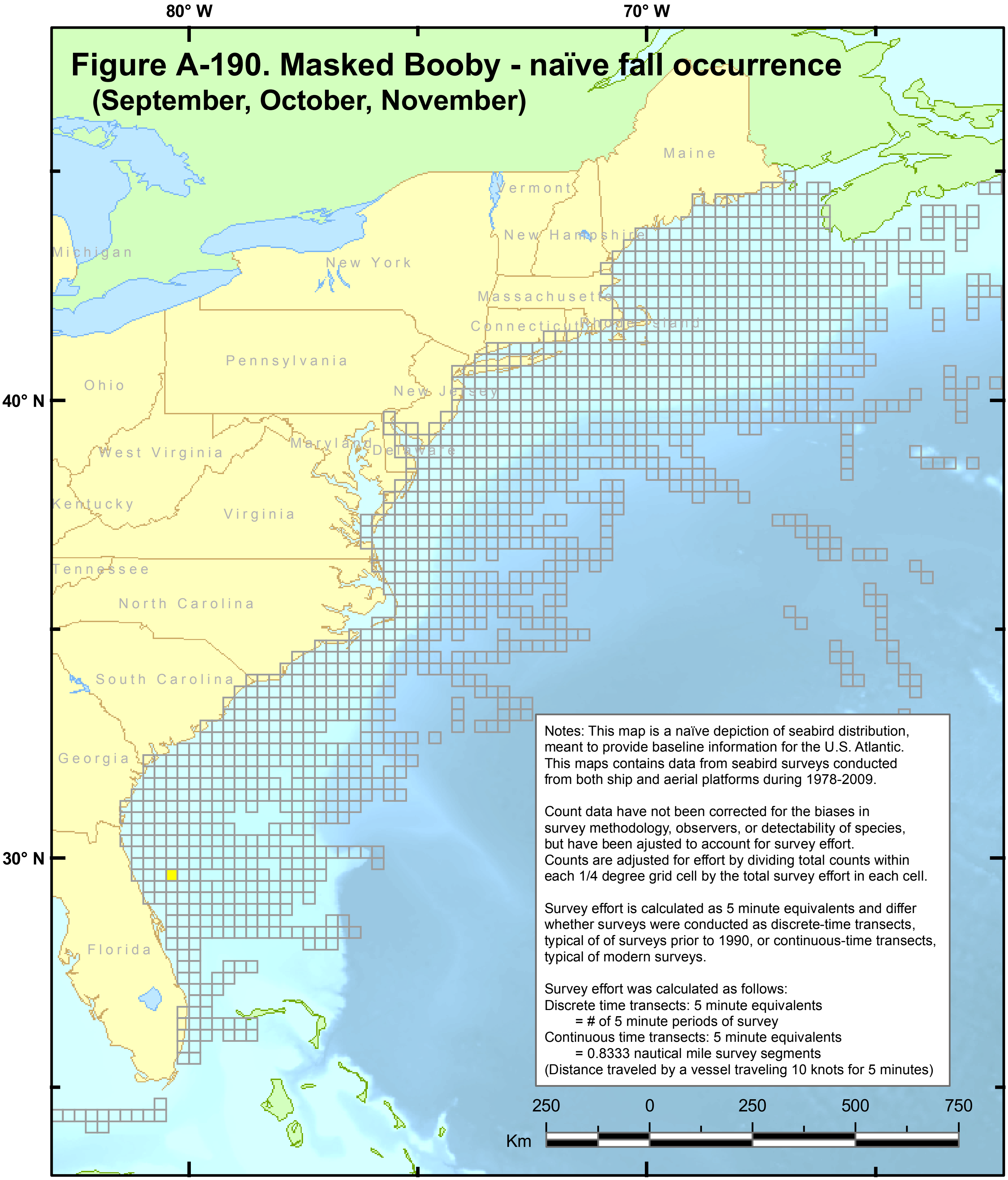
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-190. Masked Booby - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

0 | 0 - 0.1 | 0.1 - 0.25 | 0.25 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 5 | >5

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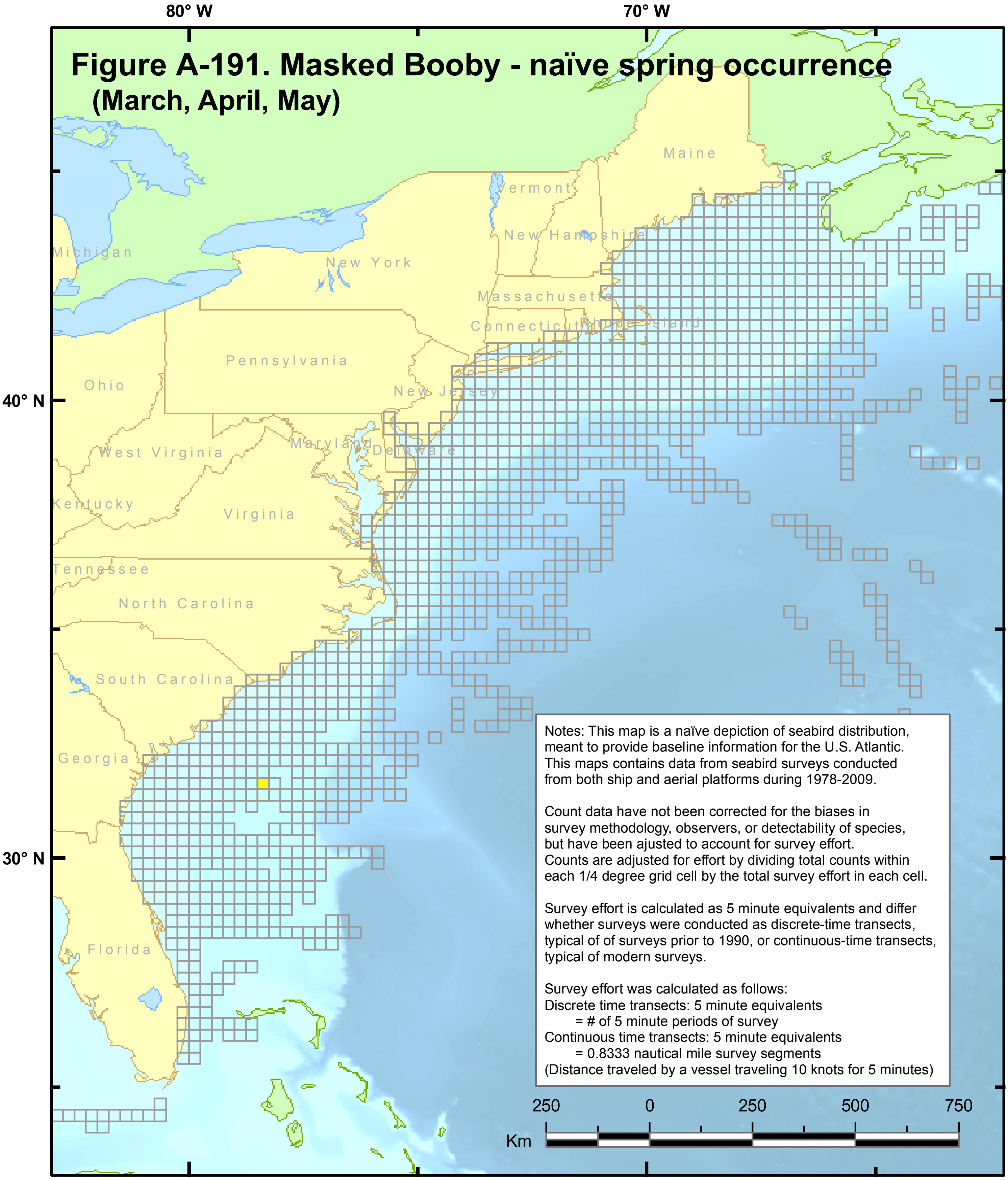
# Figure A-191. Masked Booby - naïve spring occurrence (March, April, May)




**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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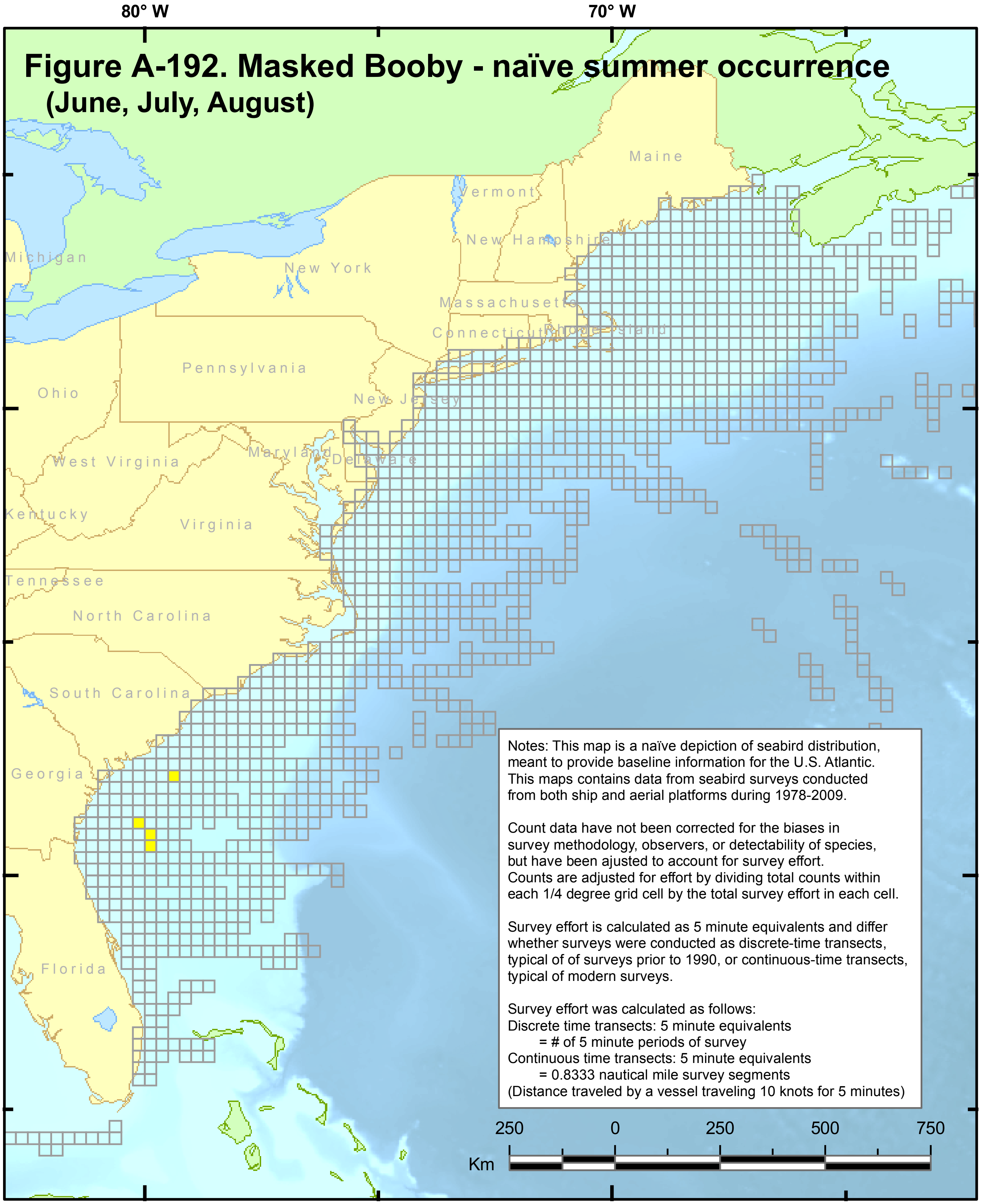


Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8833 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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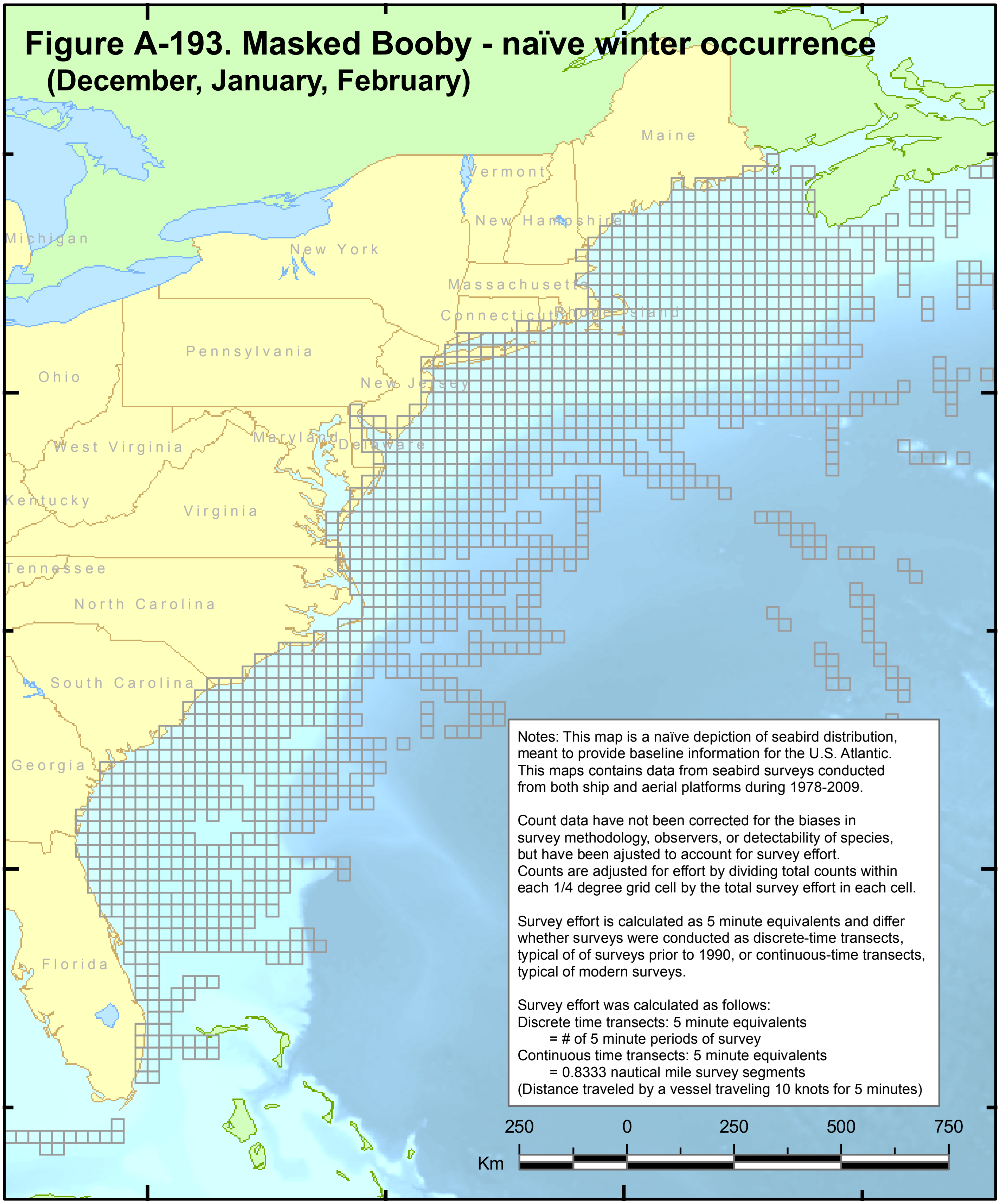
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-193. Masked Booby - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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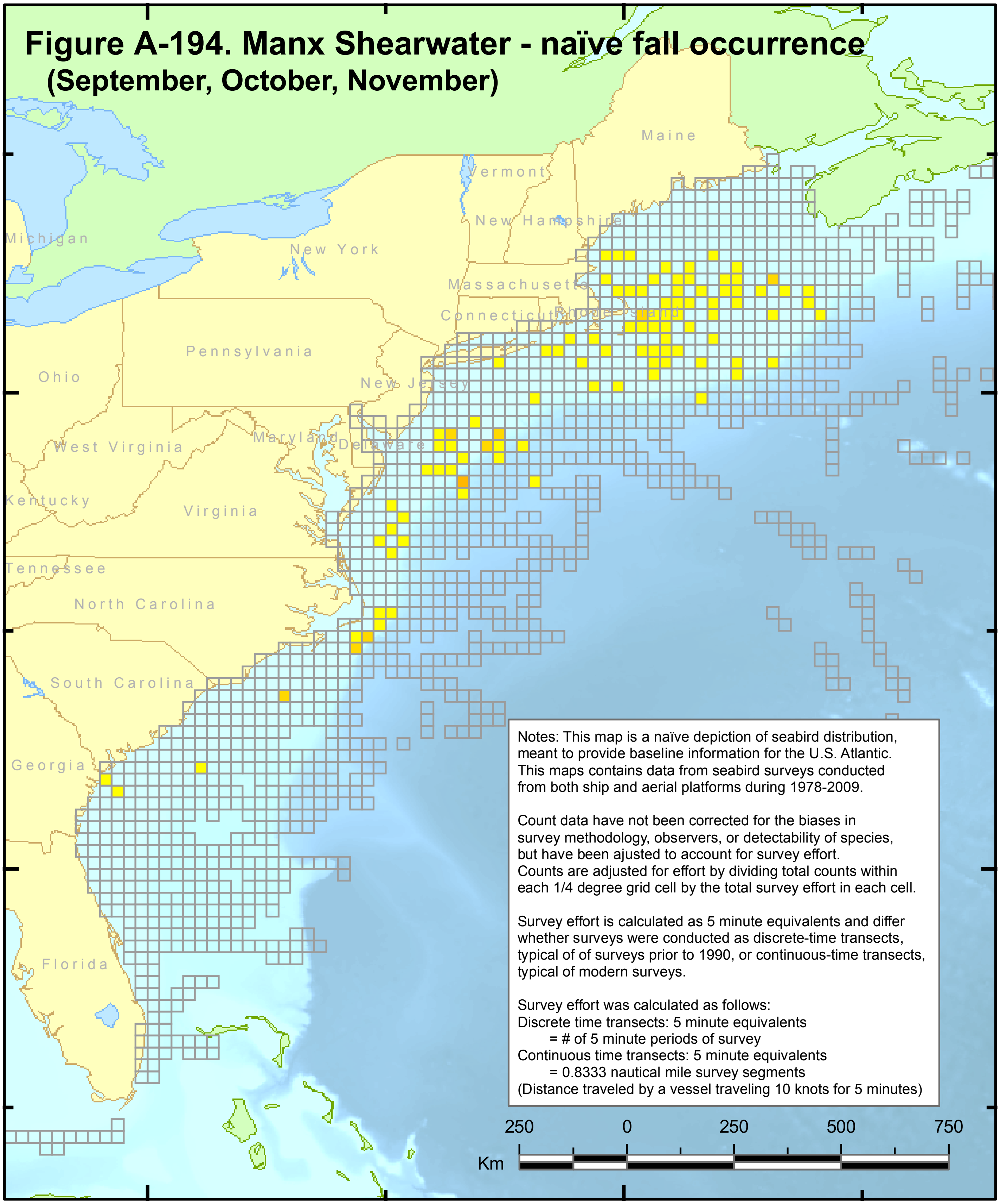
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-194. Manx Shearwater - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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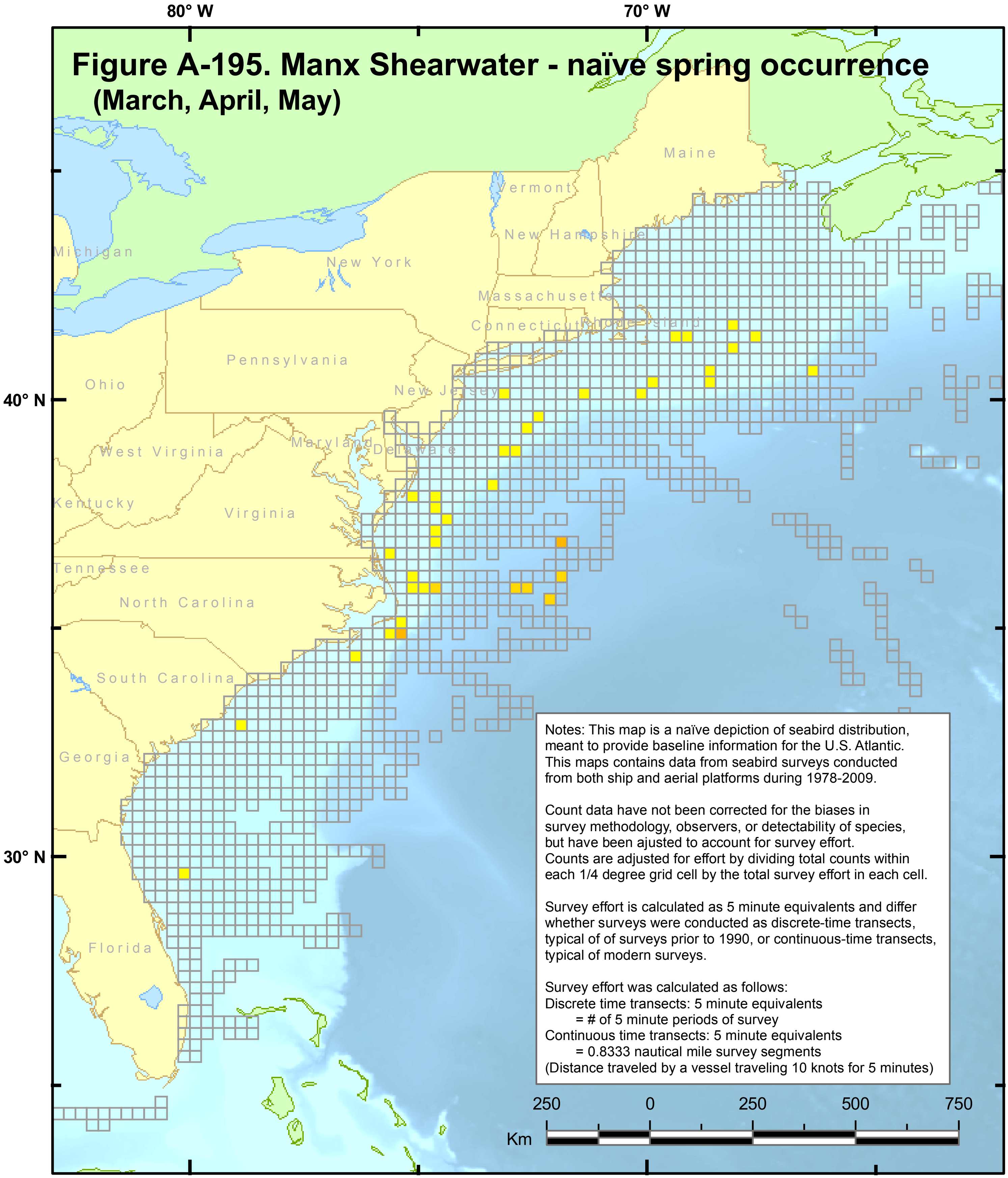
# Figure A-195. Manx Shearwater - naïve spring occurrence
## (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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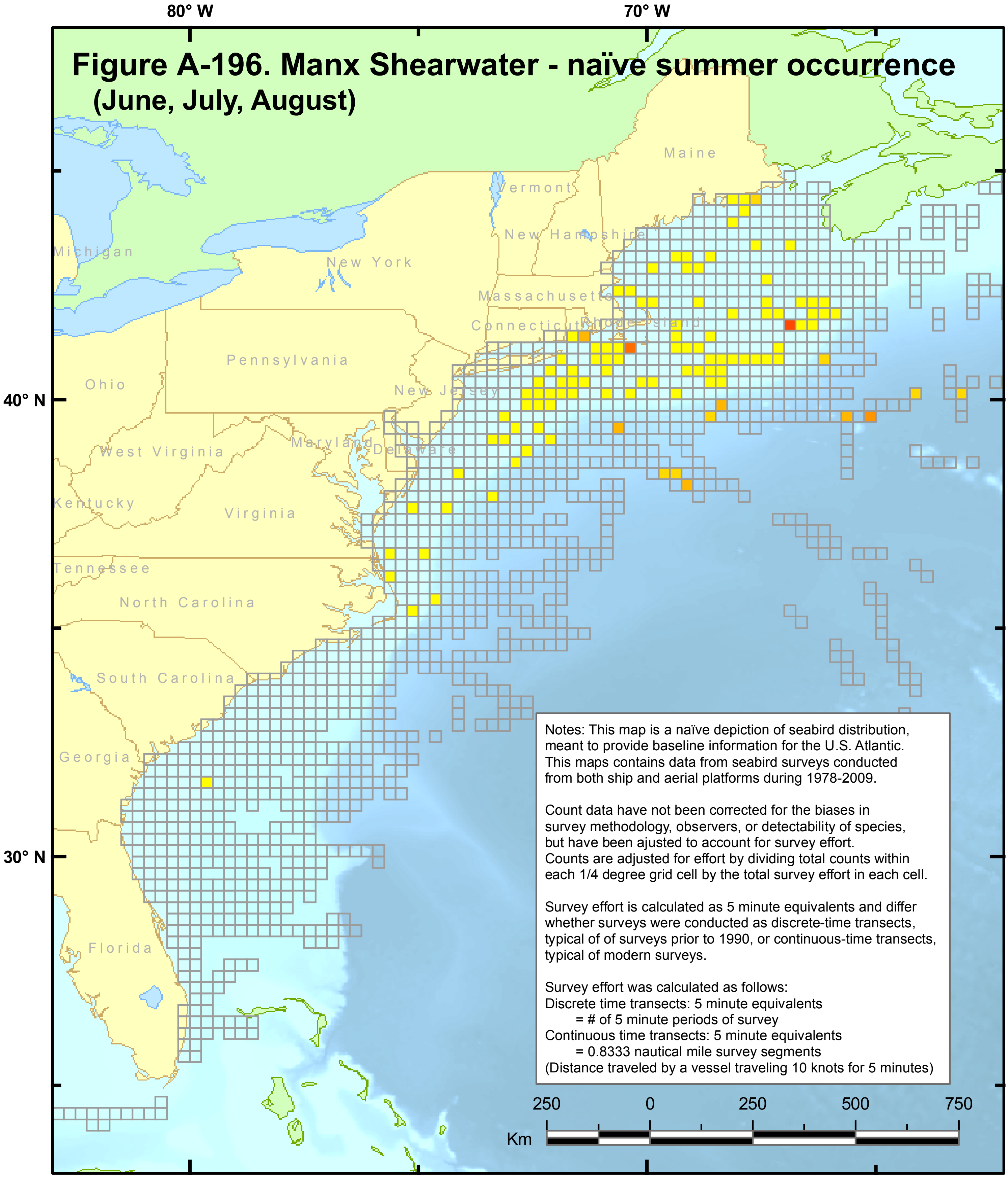
# Figure A-196. Manx Shearwater - naïve summer occurrence (June, July, August)




## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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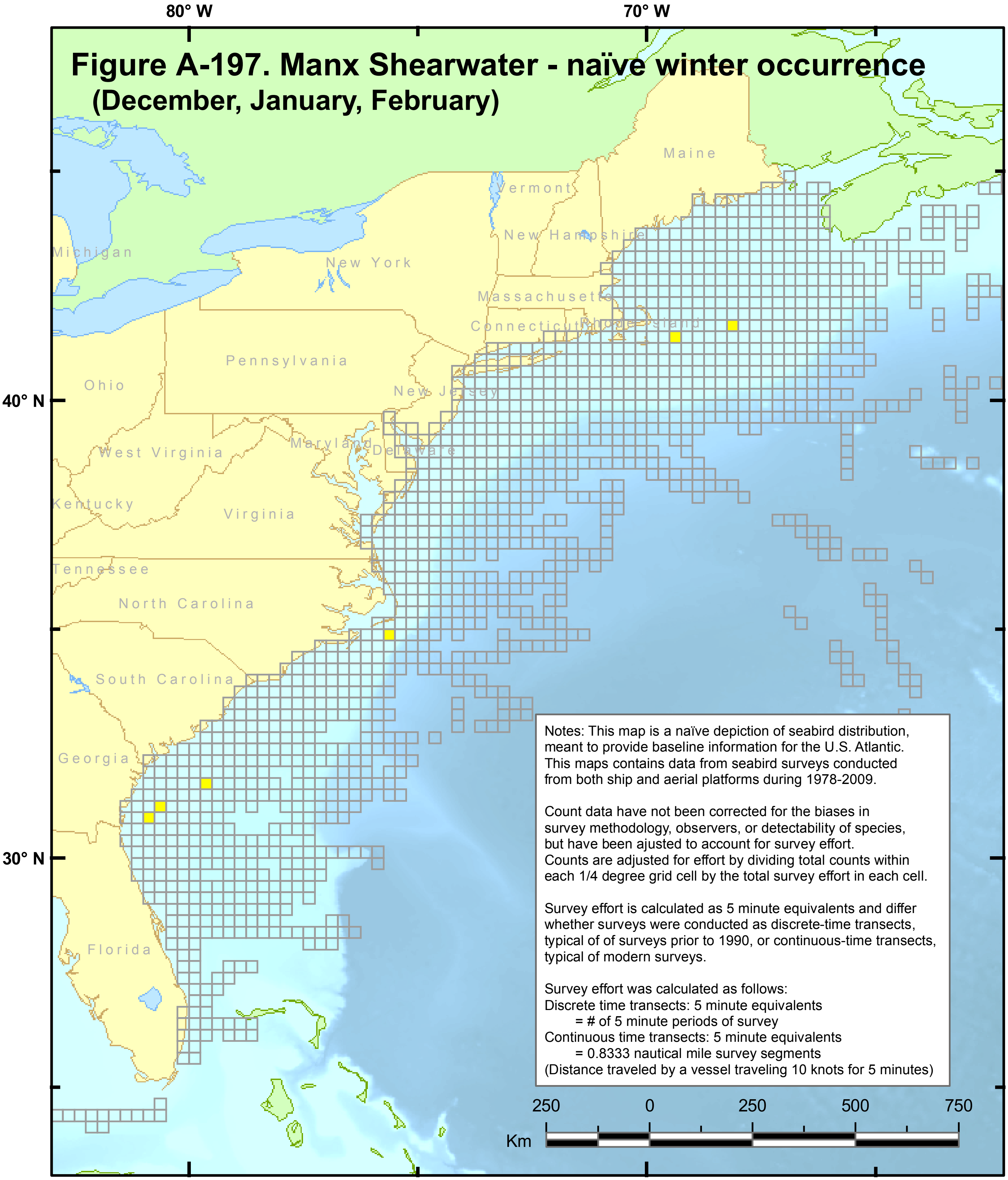


**Figure A-197. Manx Shearwater - naïve winter occurrence (December, January, February)**

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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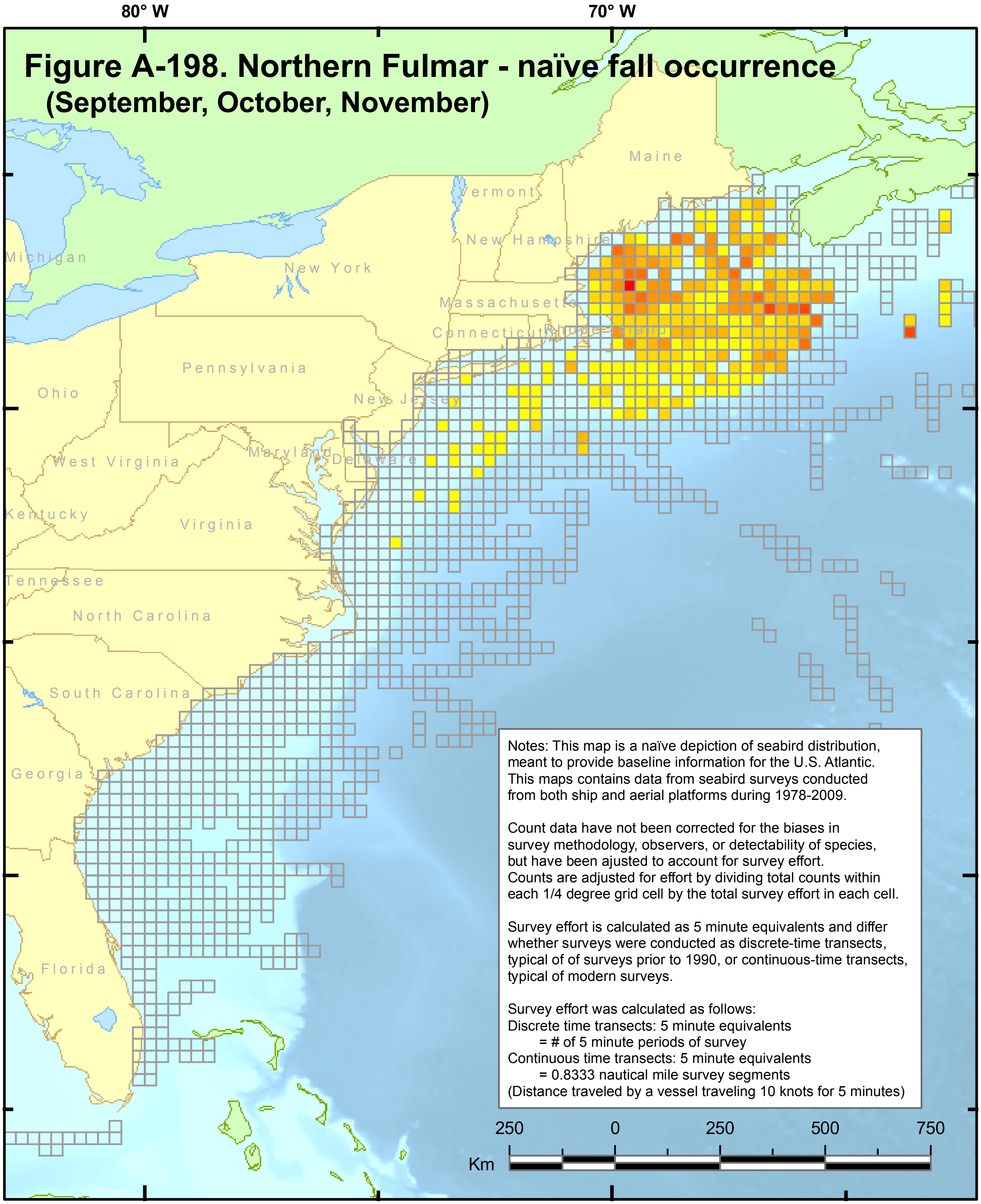


Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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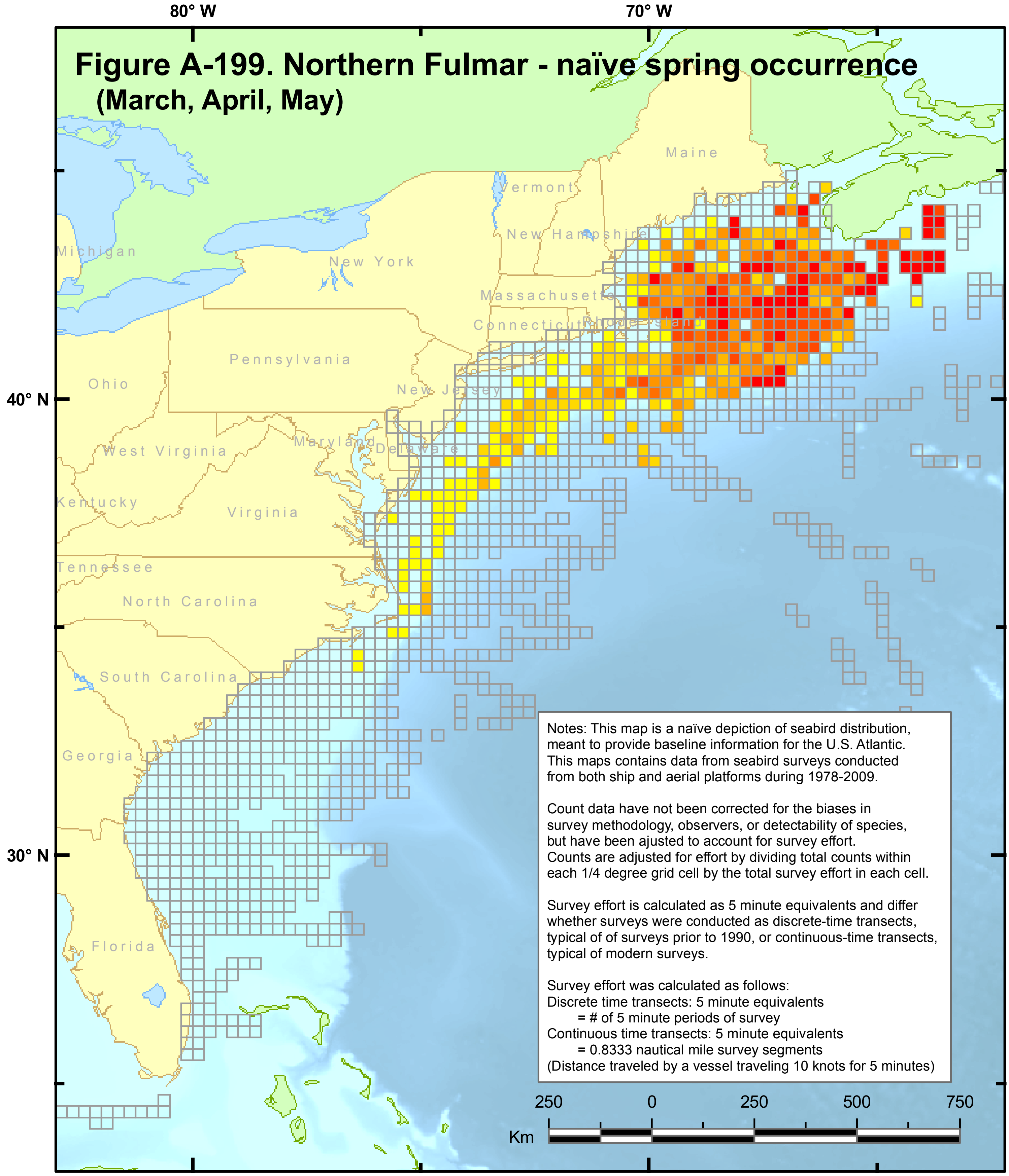
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 31.2 |




# Figure A-199. Northern Fulmar - naïve spring occurrence (March, April, May)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 12

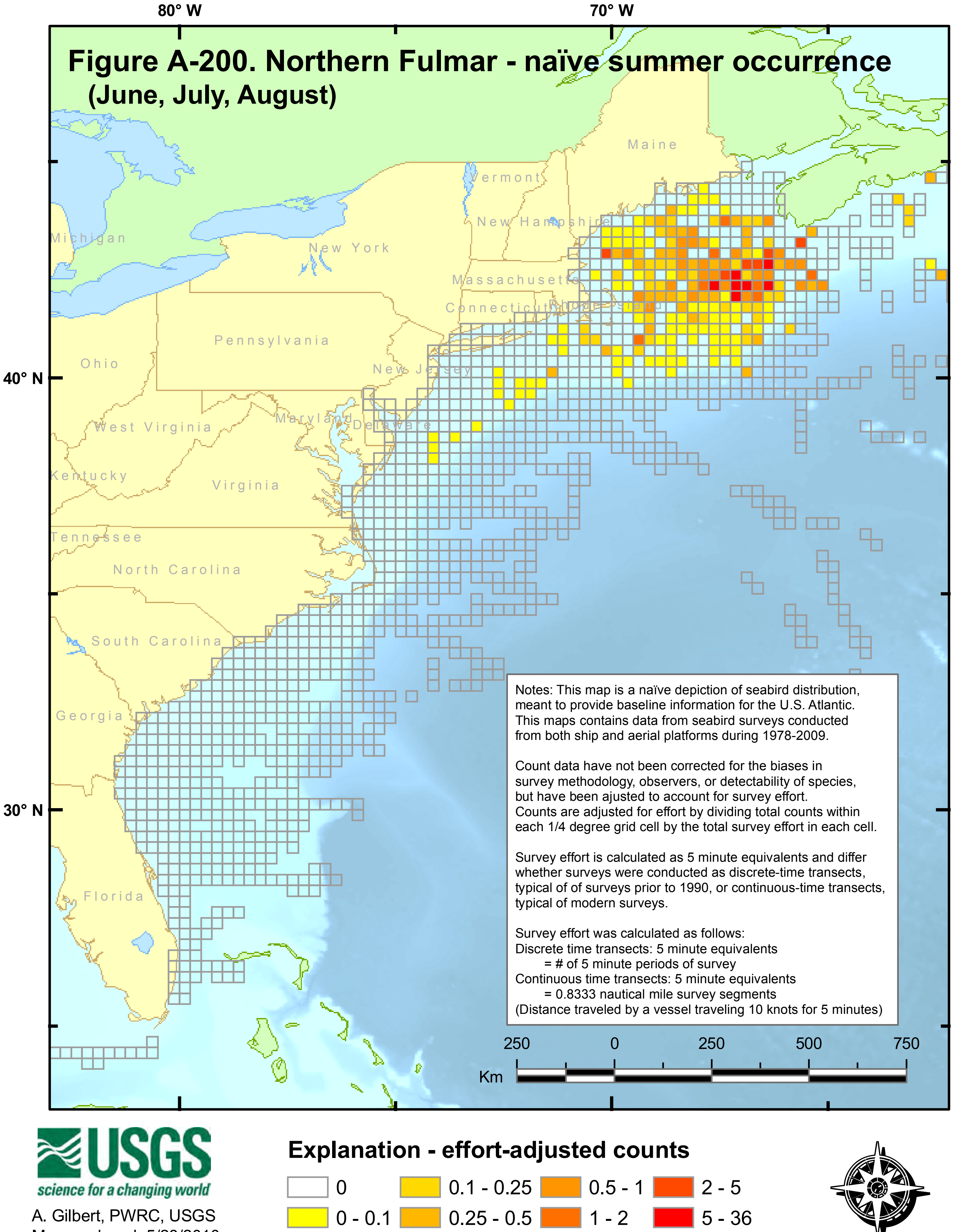


**Figure A-200. Northern Fulmar - naïve summer occurrence (June, July, August)**

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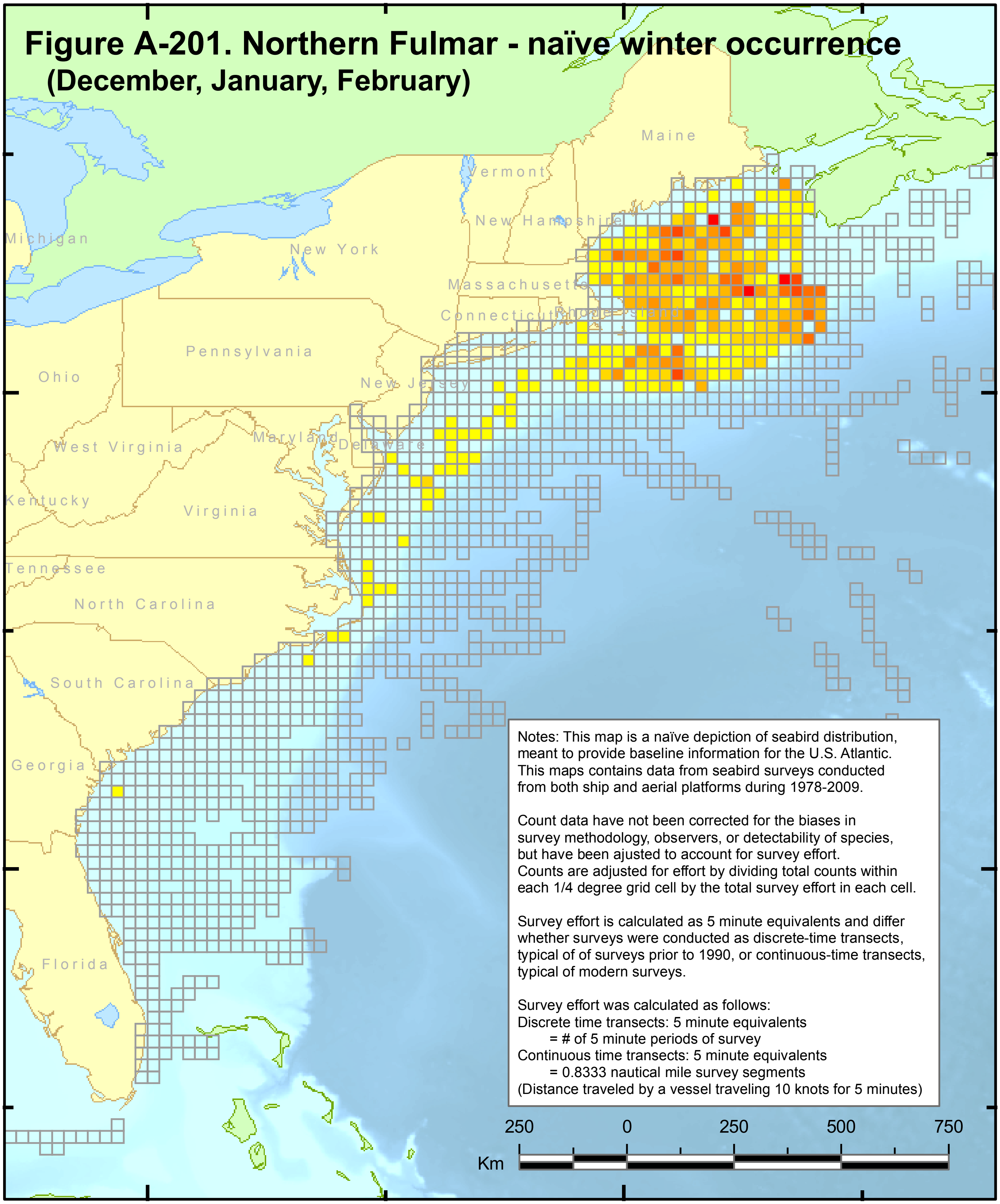
Map produced: 5/28/2010

# Figure A-201. Northern Fulmar - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 58.3

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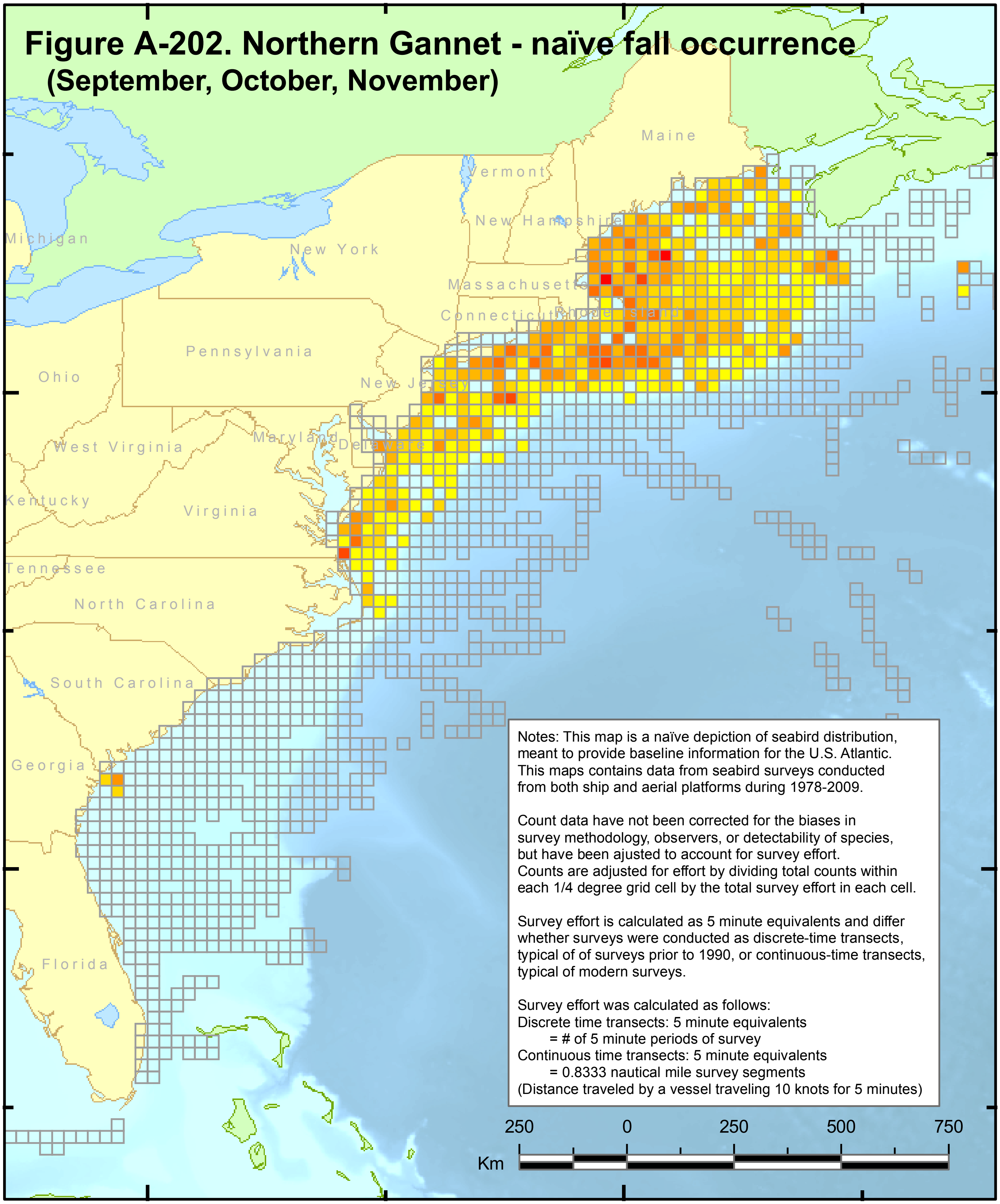
# Figure A-202. Northern Gannet - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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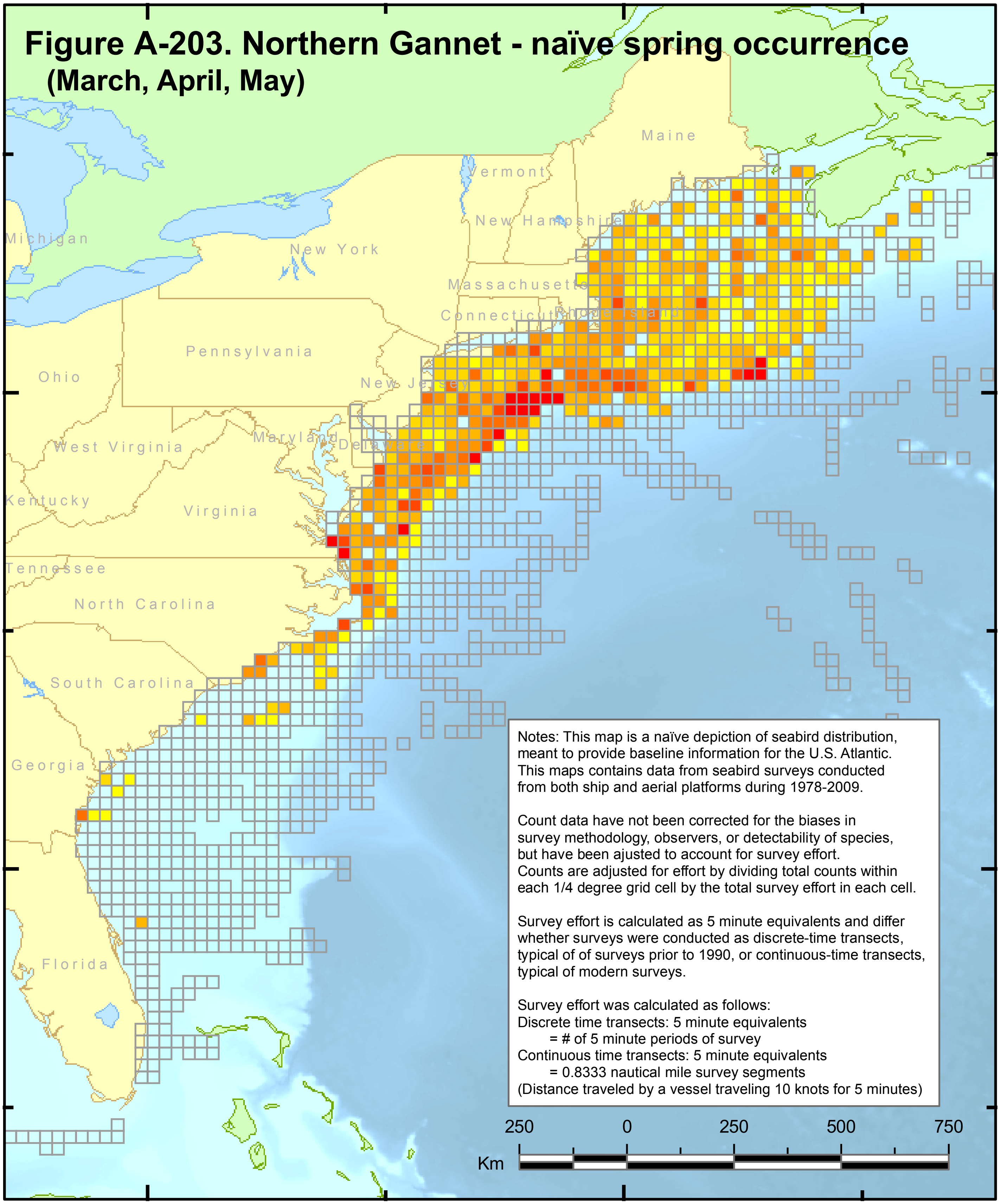
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 31.9

# Figure A-203. Northern Gannet - naïve spring occurrence (March, April, May)

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A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 207.5 |

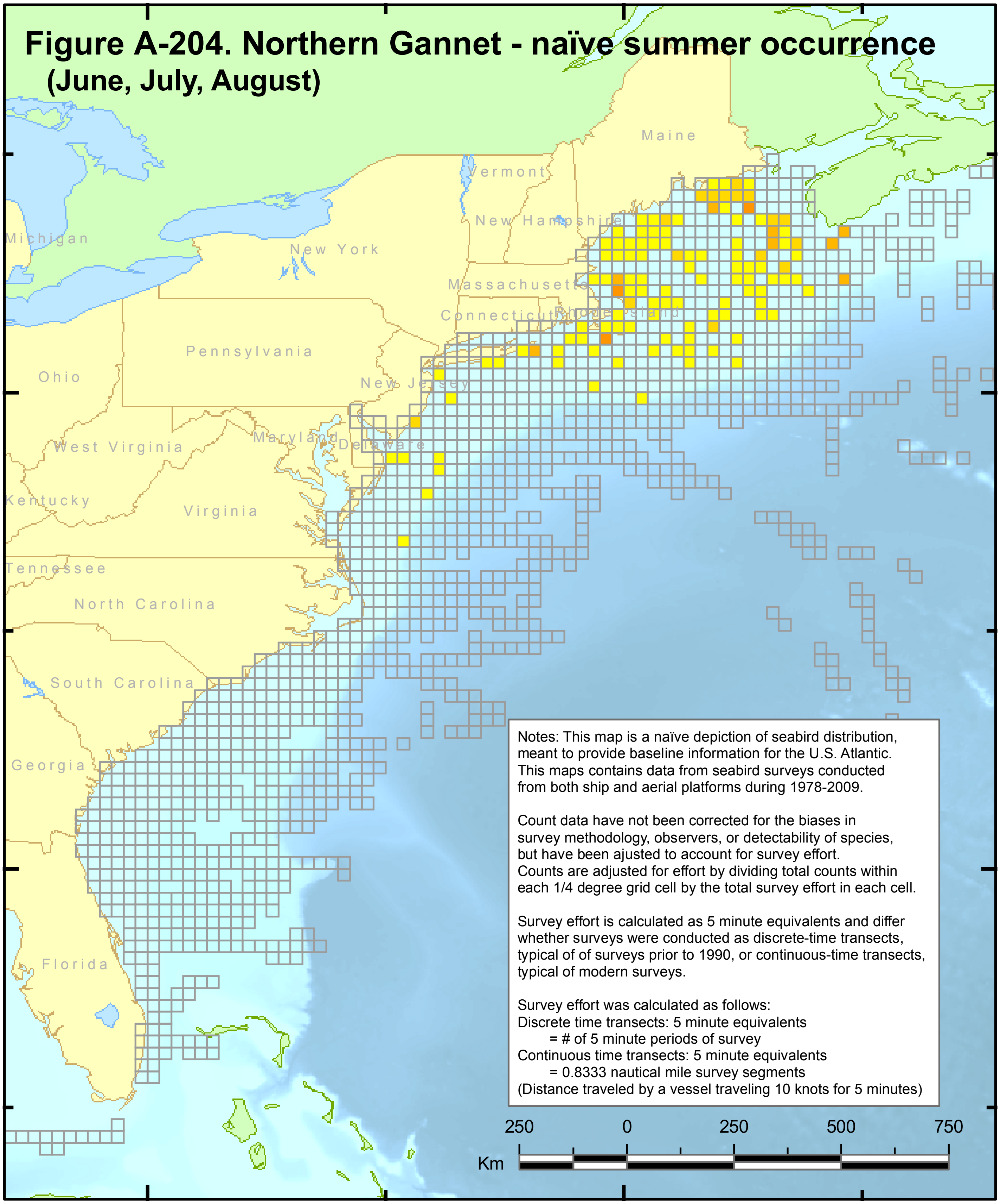


**Figure A-204. Northern Gannet - naïve summer occurrence (June, July, August)**

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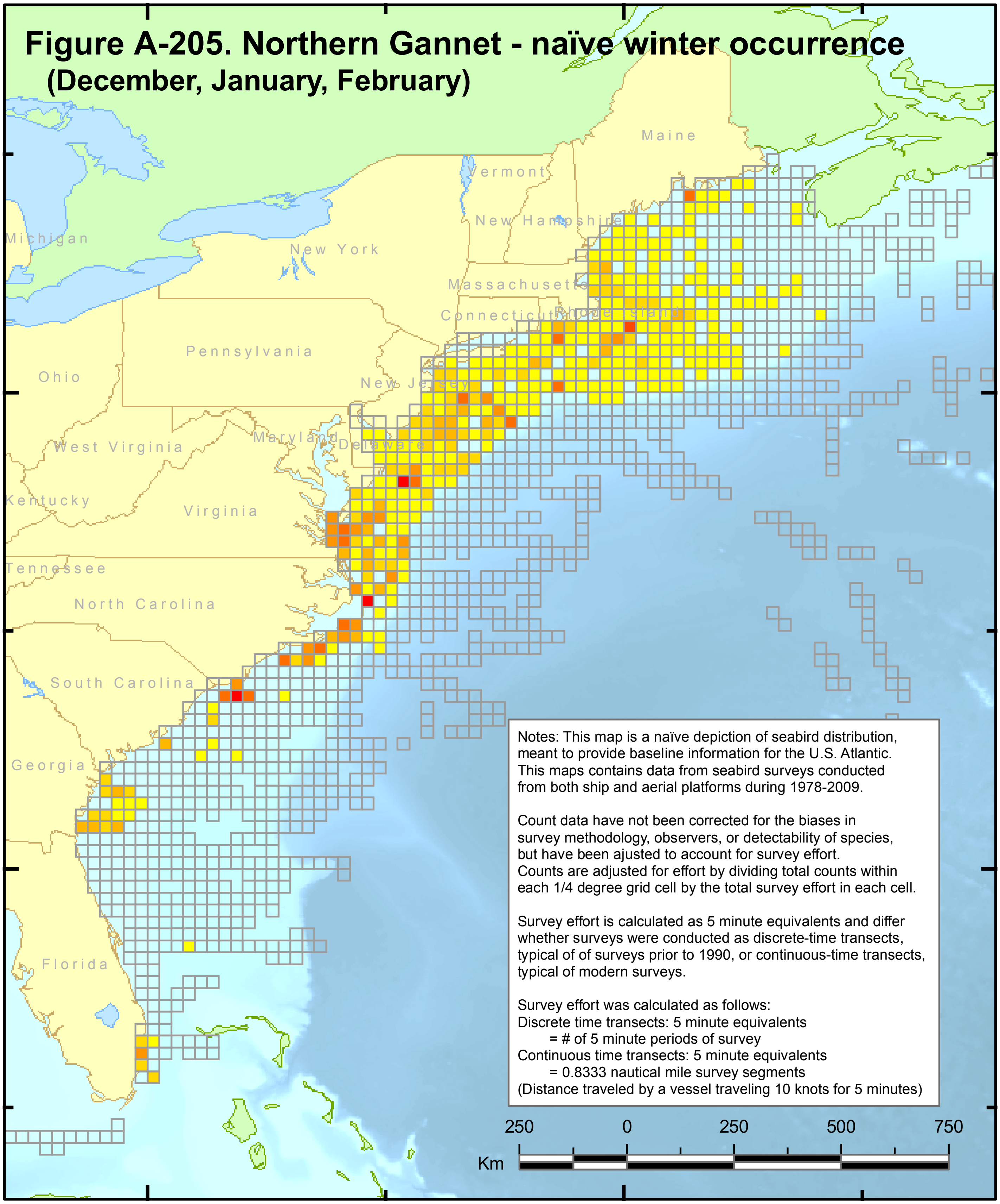
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-205. Northern Gannet - naïve winter occurrence (December, January, February)

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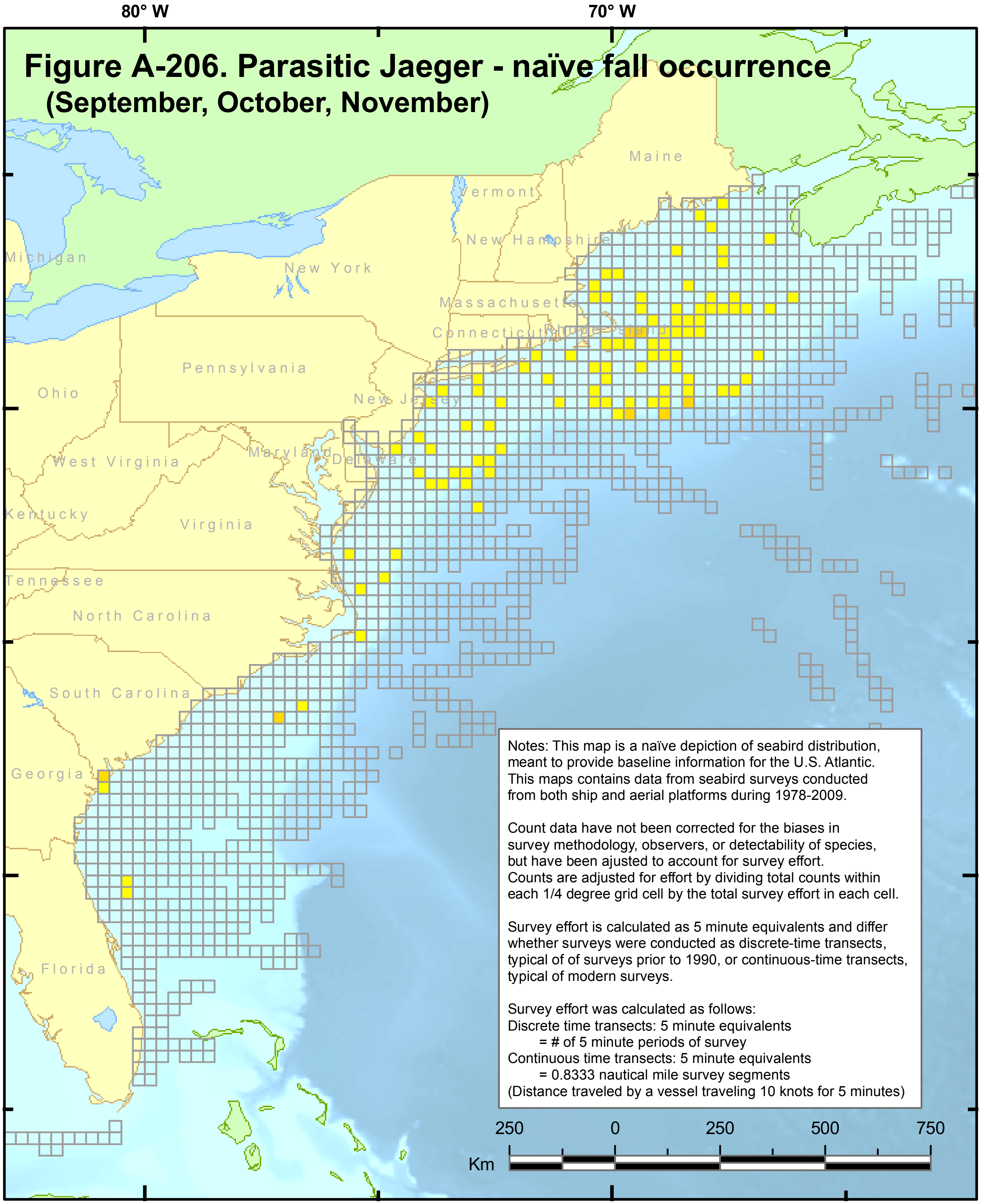
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 12.4 |

# Figure A-206. Parasitic Jaeger - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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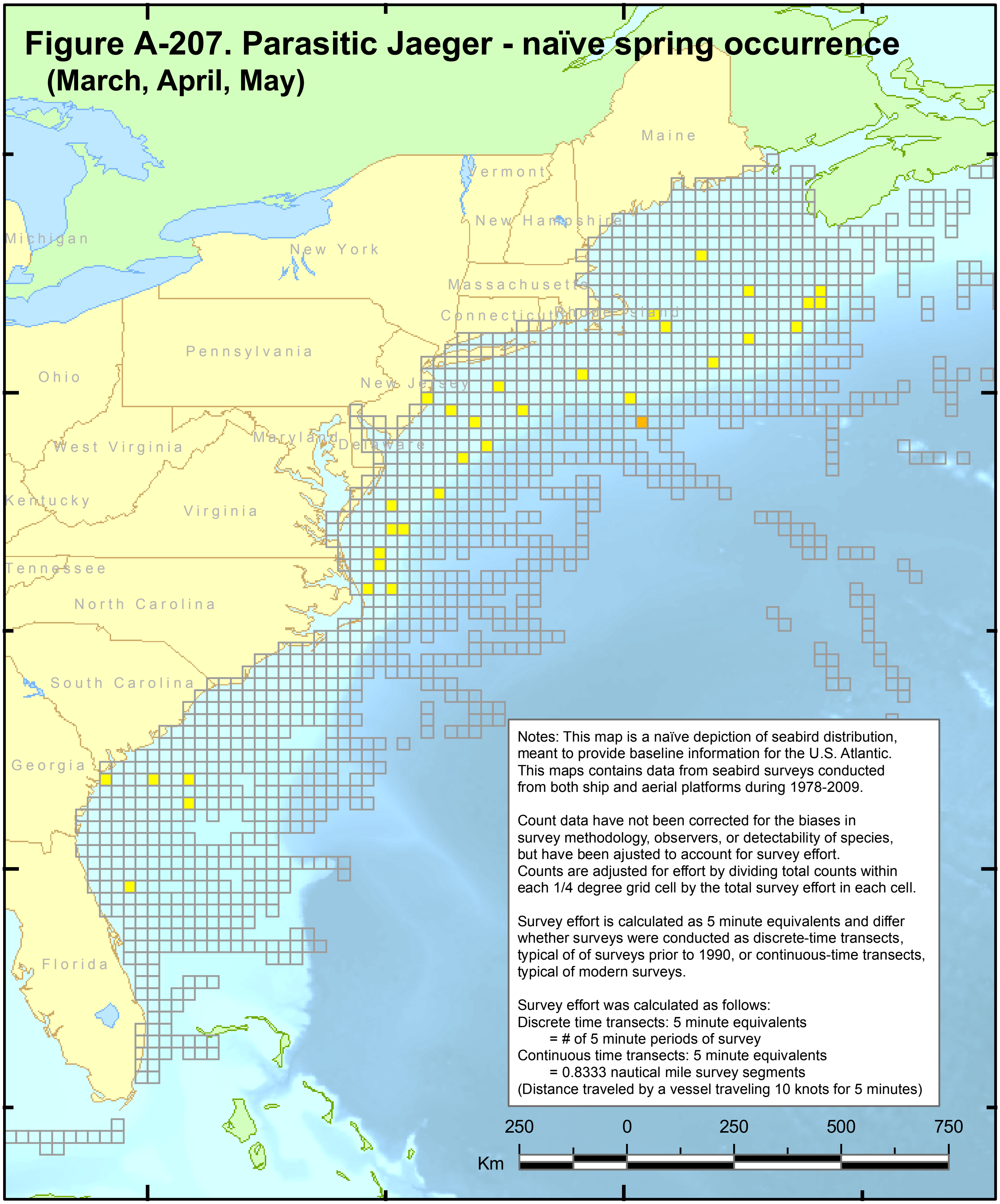
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-207. Parasitic Jaeger - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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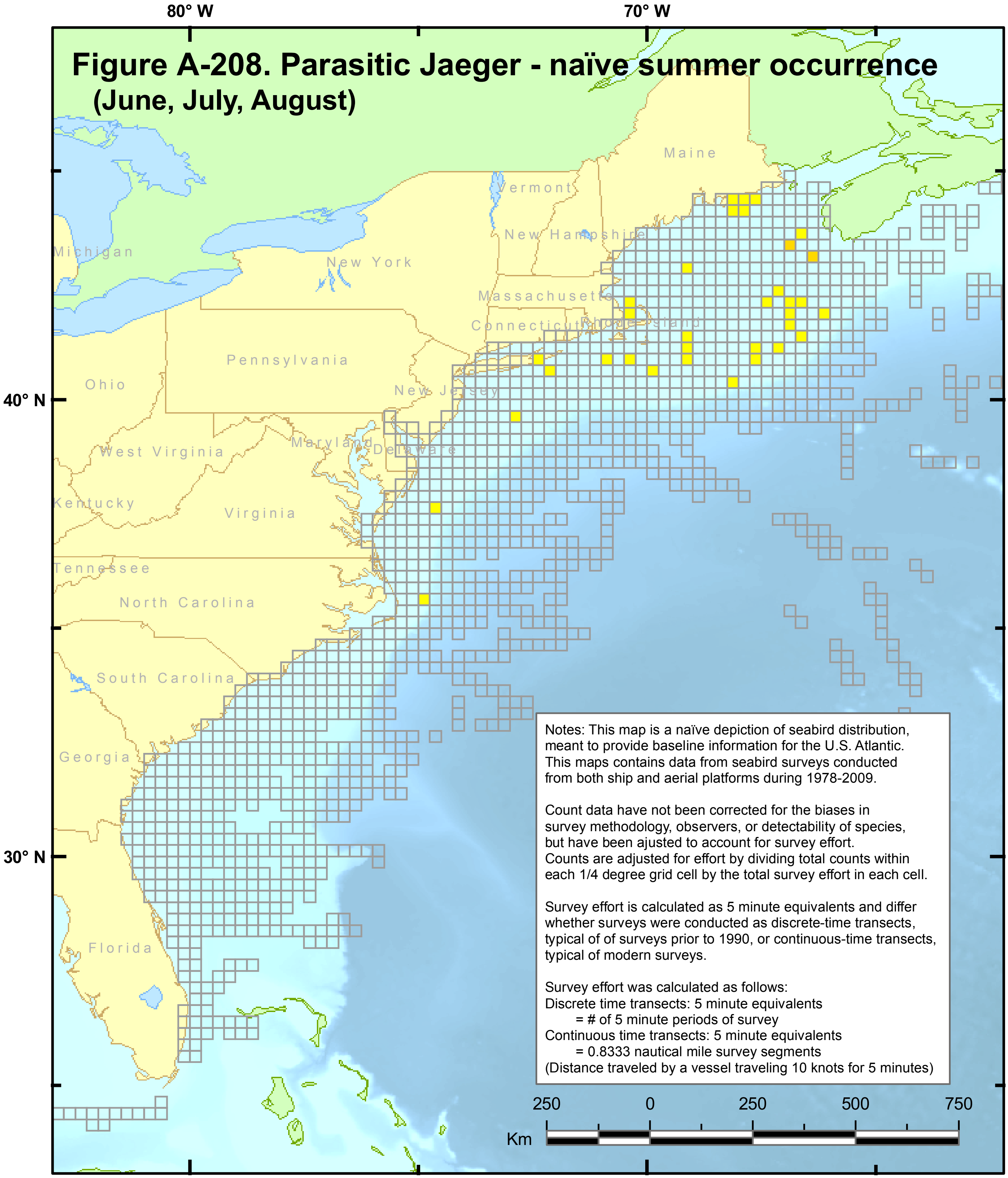
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-208. Parasitic Jaeger - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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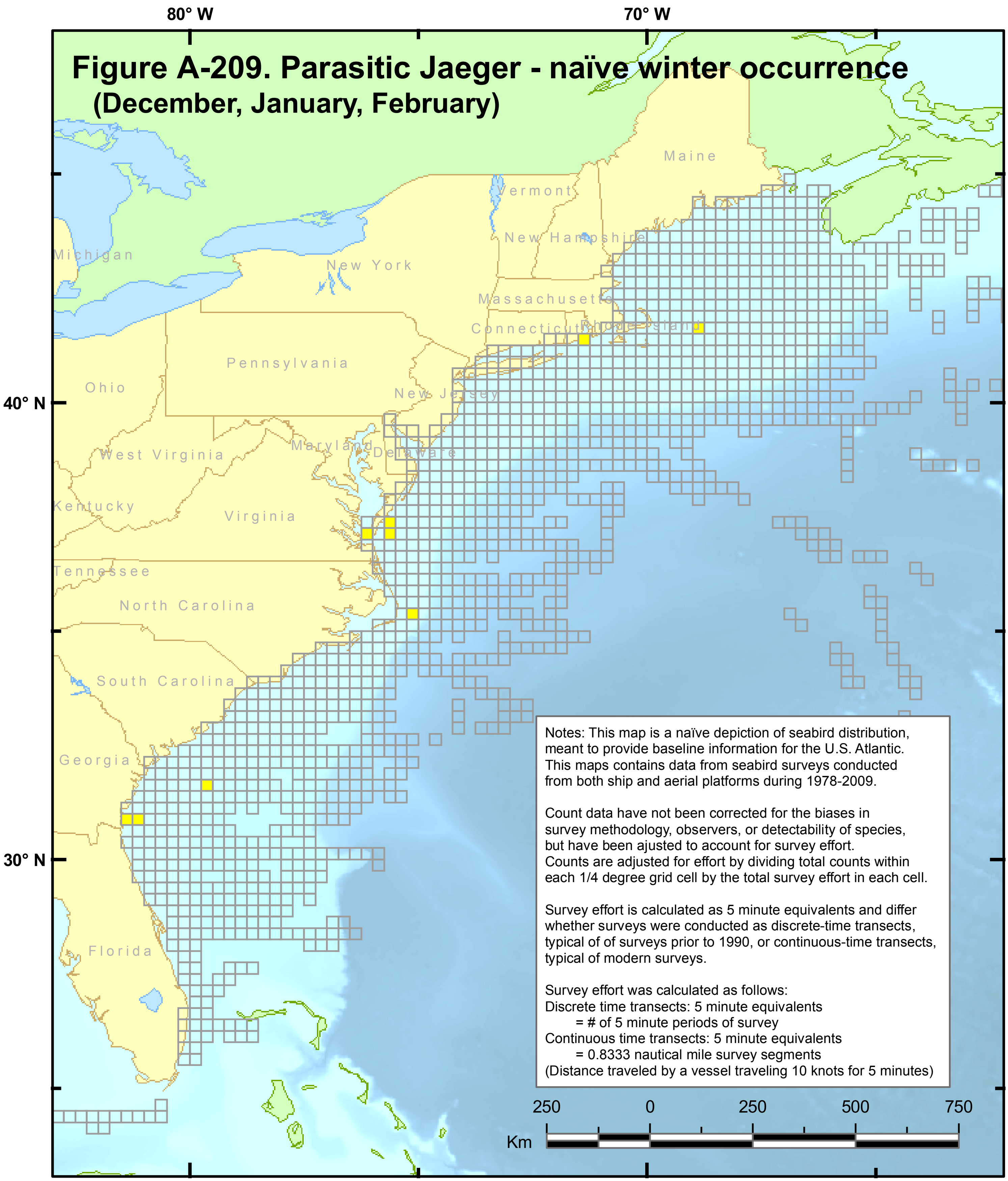
Map produced: 5/28/2010

# Figure A-209. Parasitic Jaeger - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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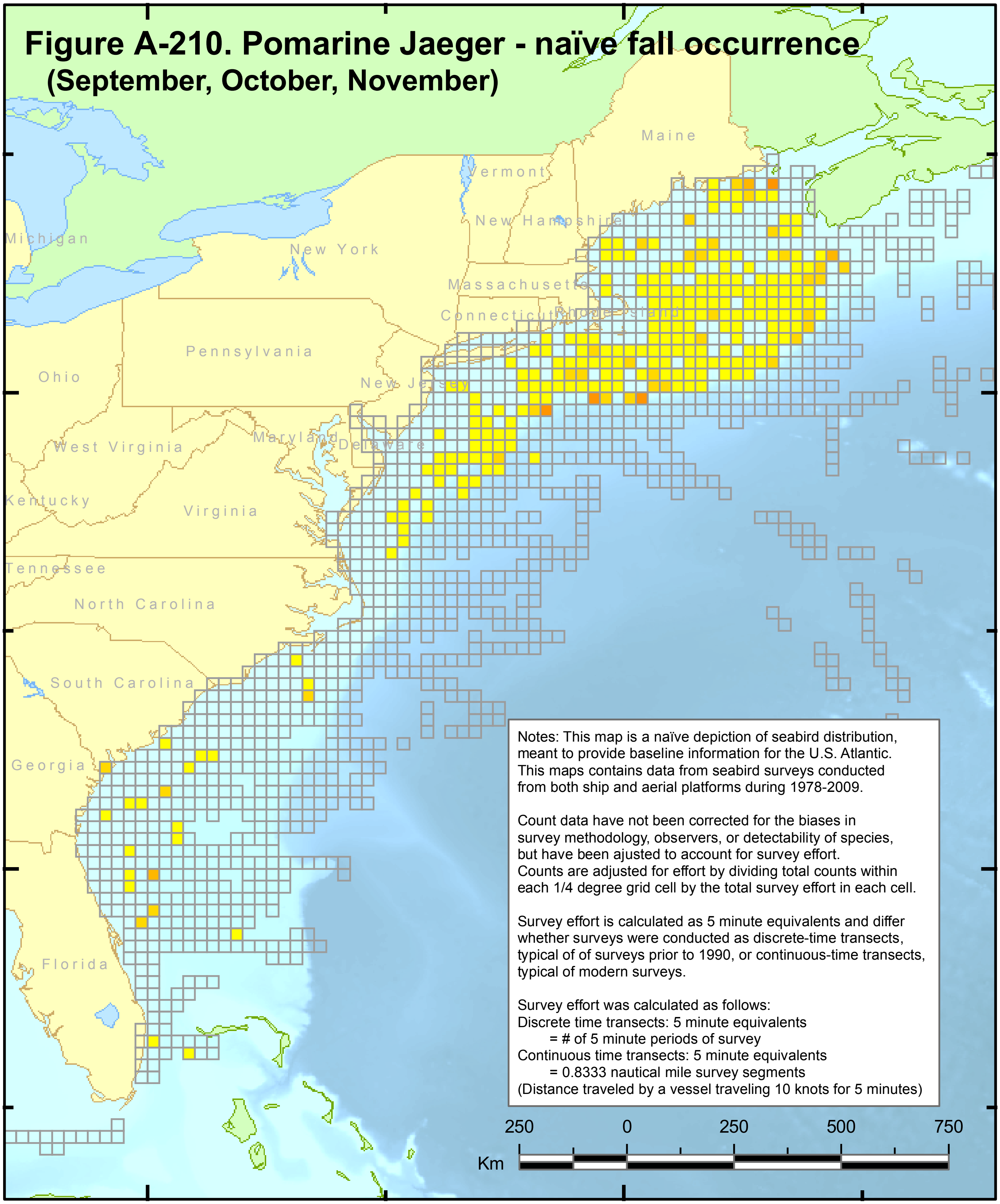
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

# Figure A-210. Pomarine Jaeger - naïve fall occurrence
(September, October, November)

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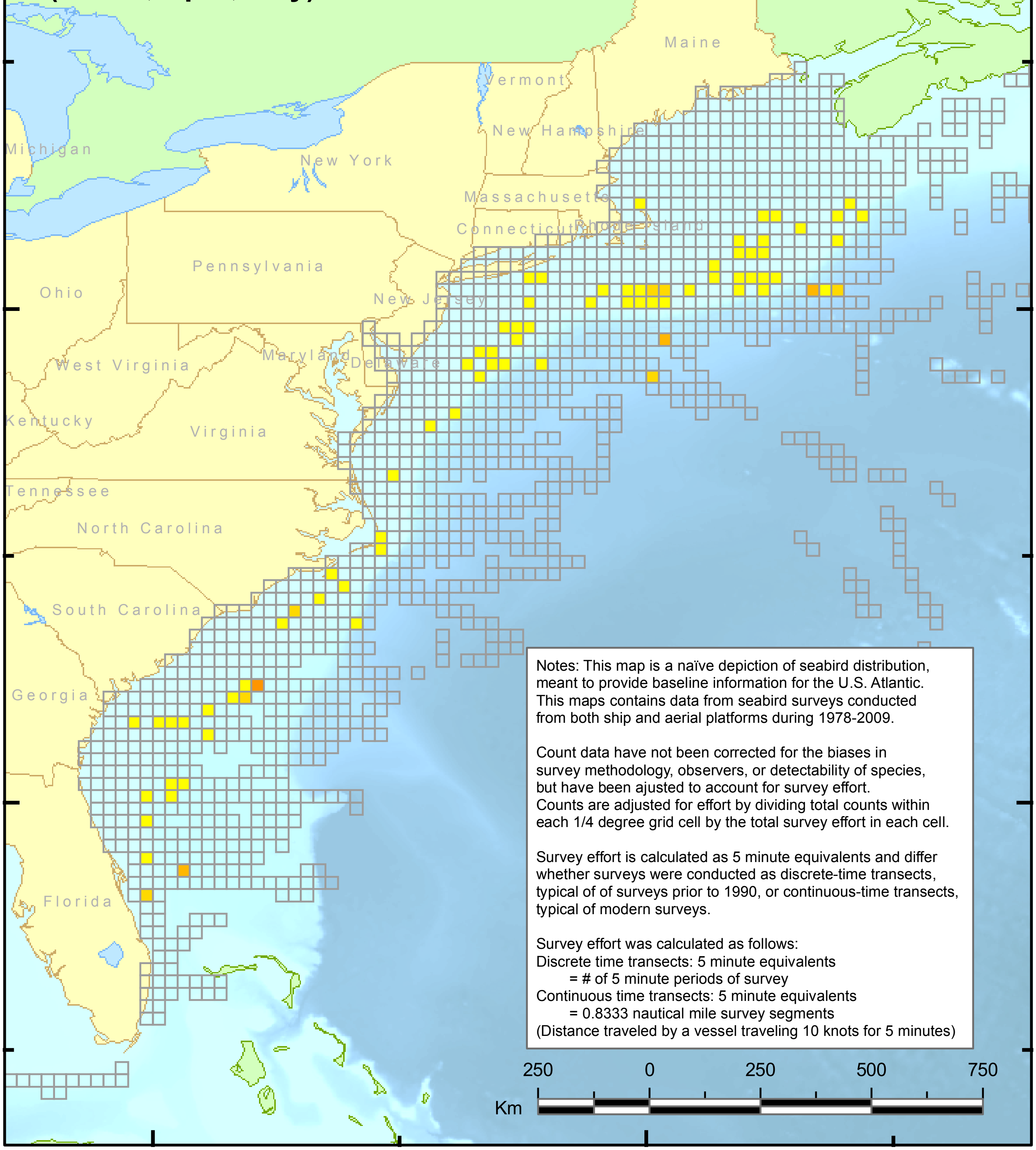
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-211. Pomarine Jaeger - naïve spring occurrence (March, April, May)

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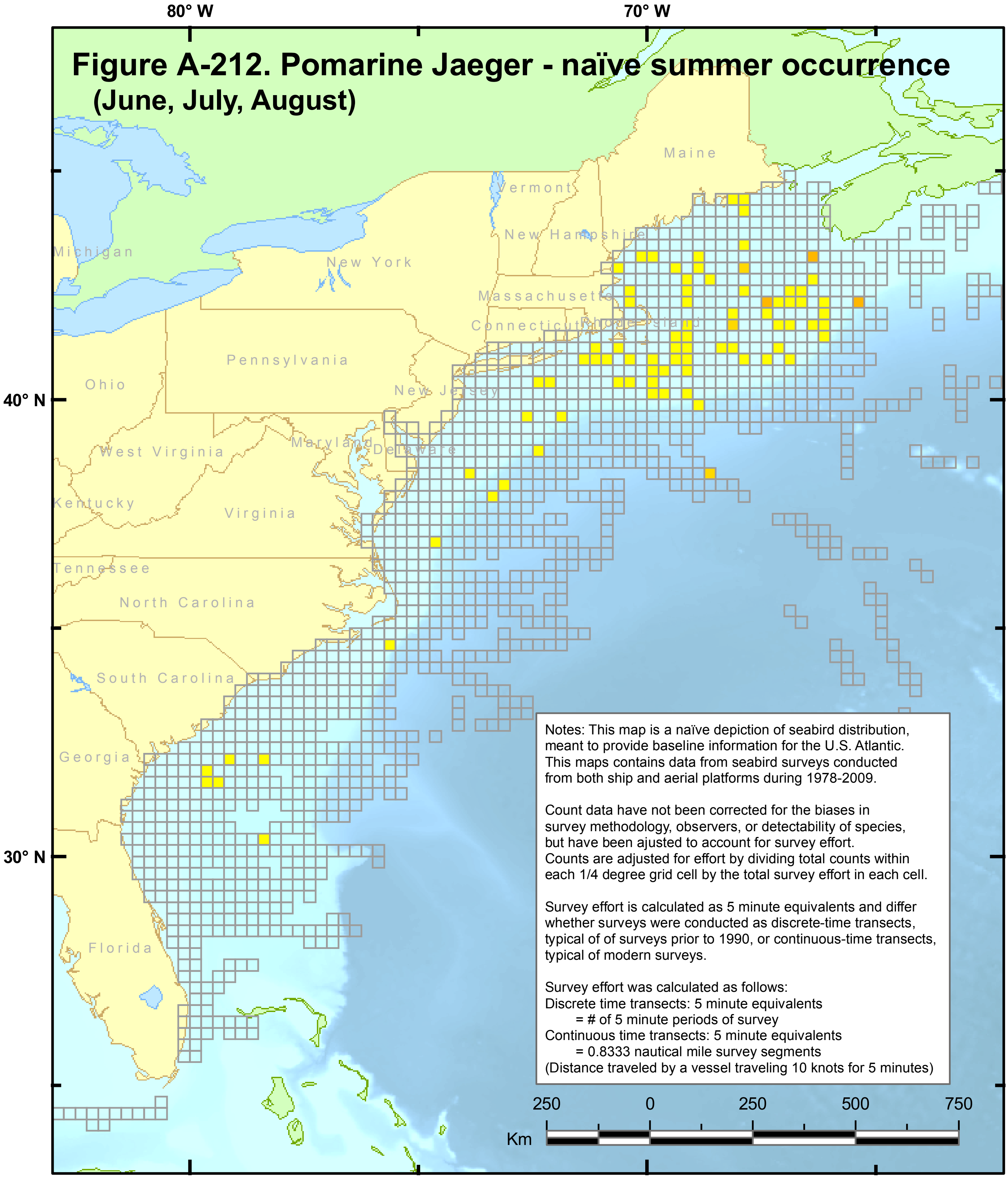
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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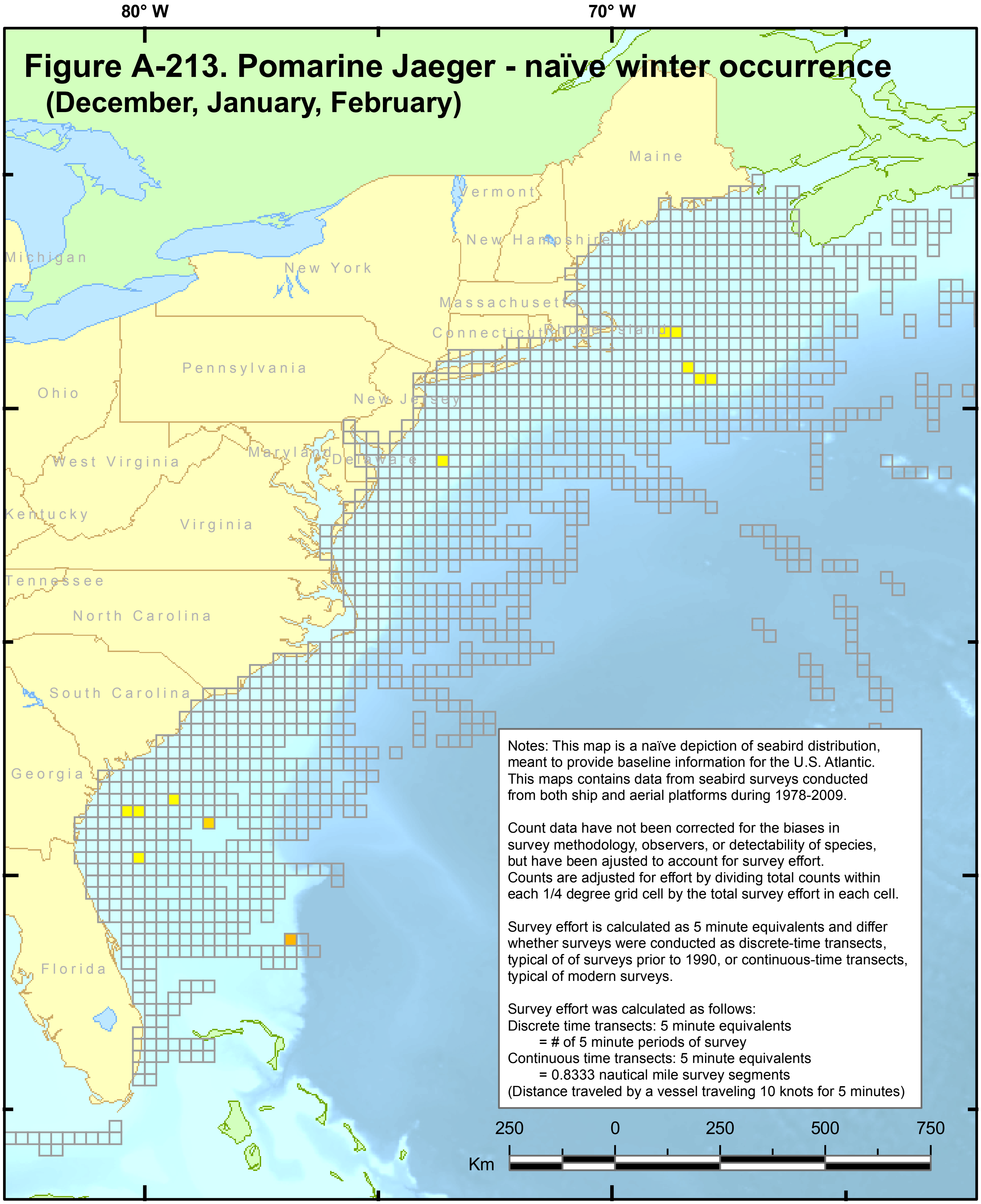
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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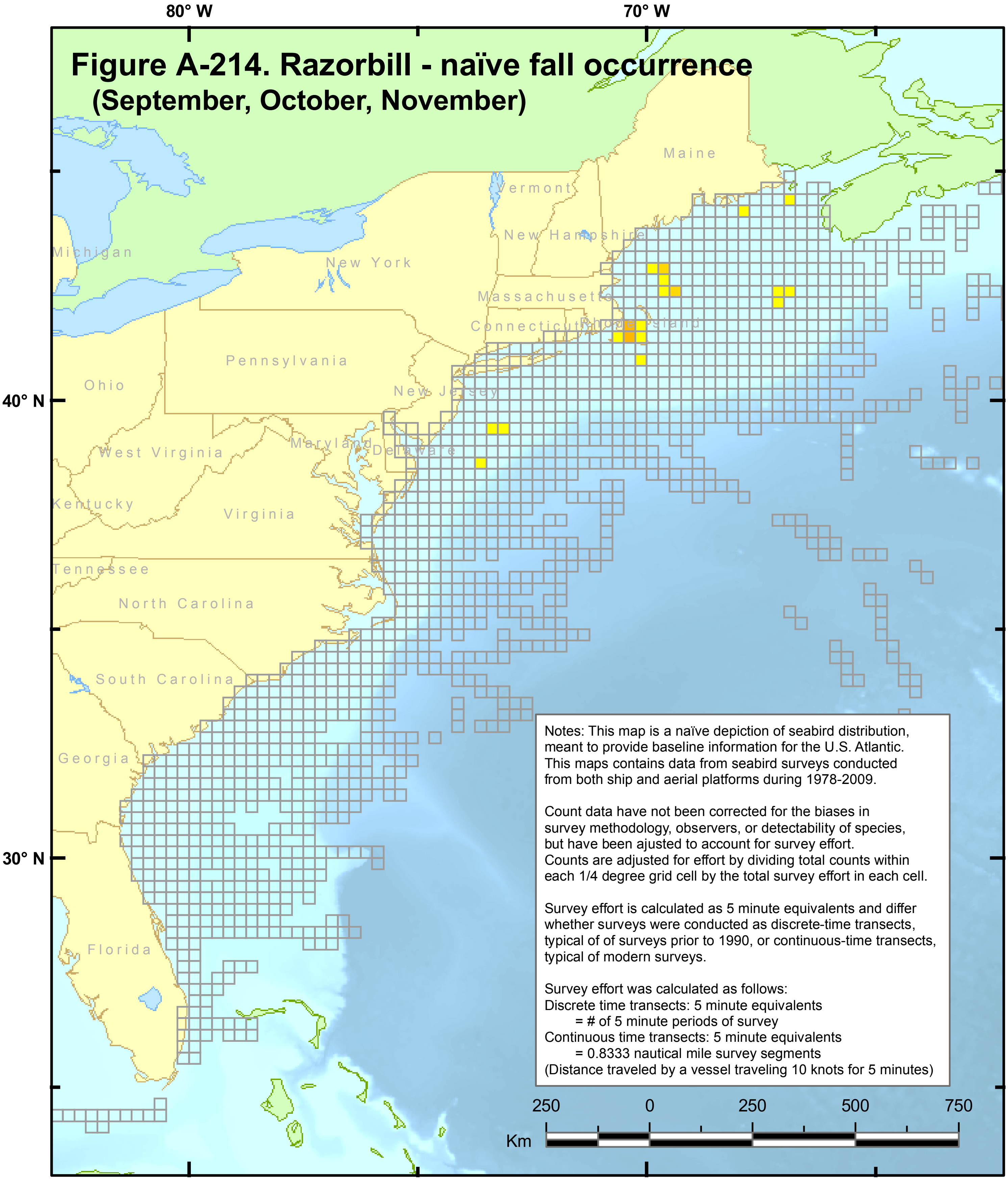
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-214. Razorbill - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

0 | 0 - 0.1 | 0.1 - 0.25 | 0.25 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 5 | >5

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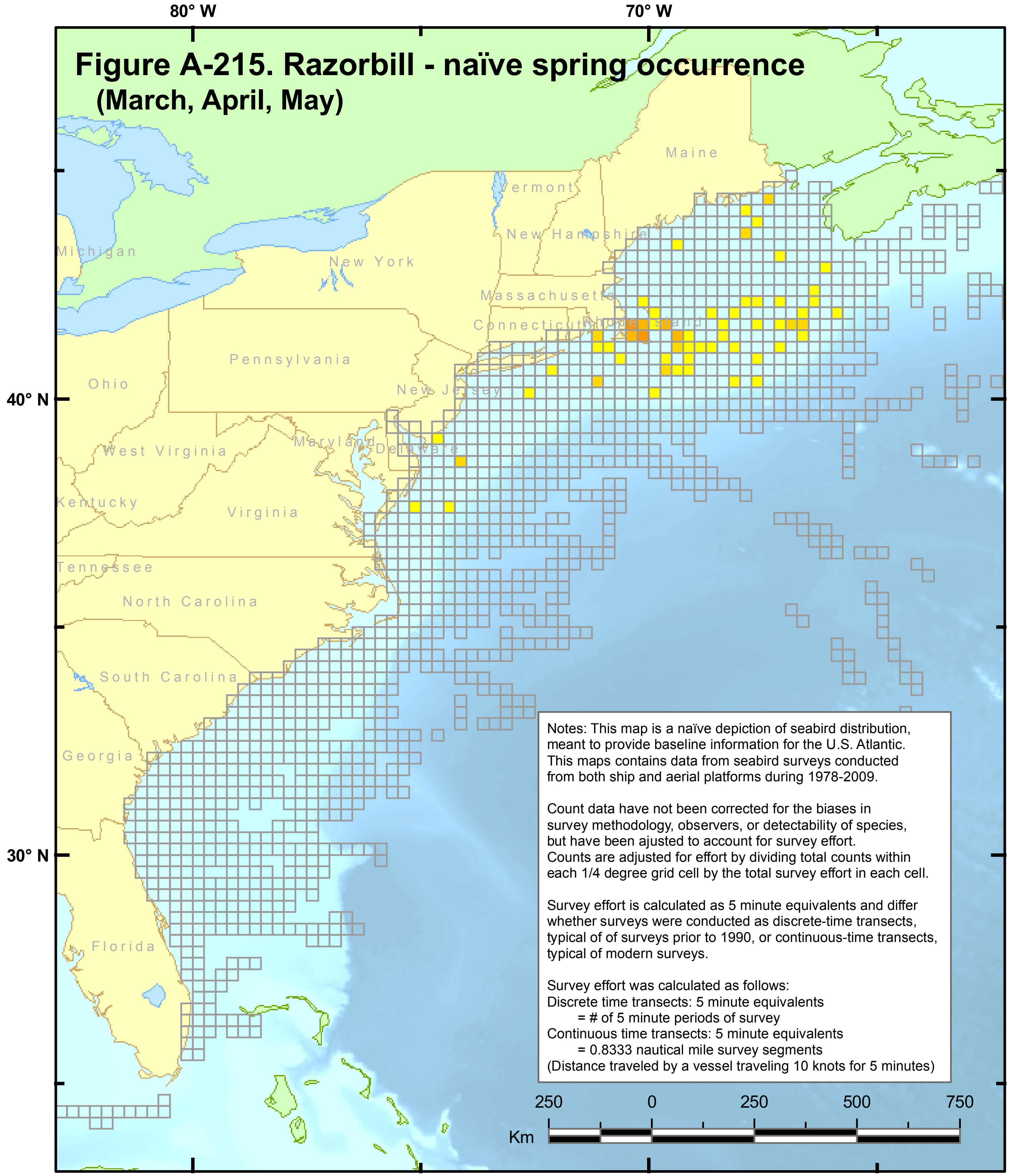
# Figure A-215. Razorbill - naïve spring occurrence (March, April, May)

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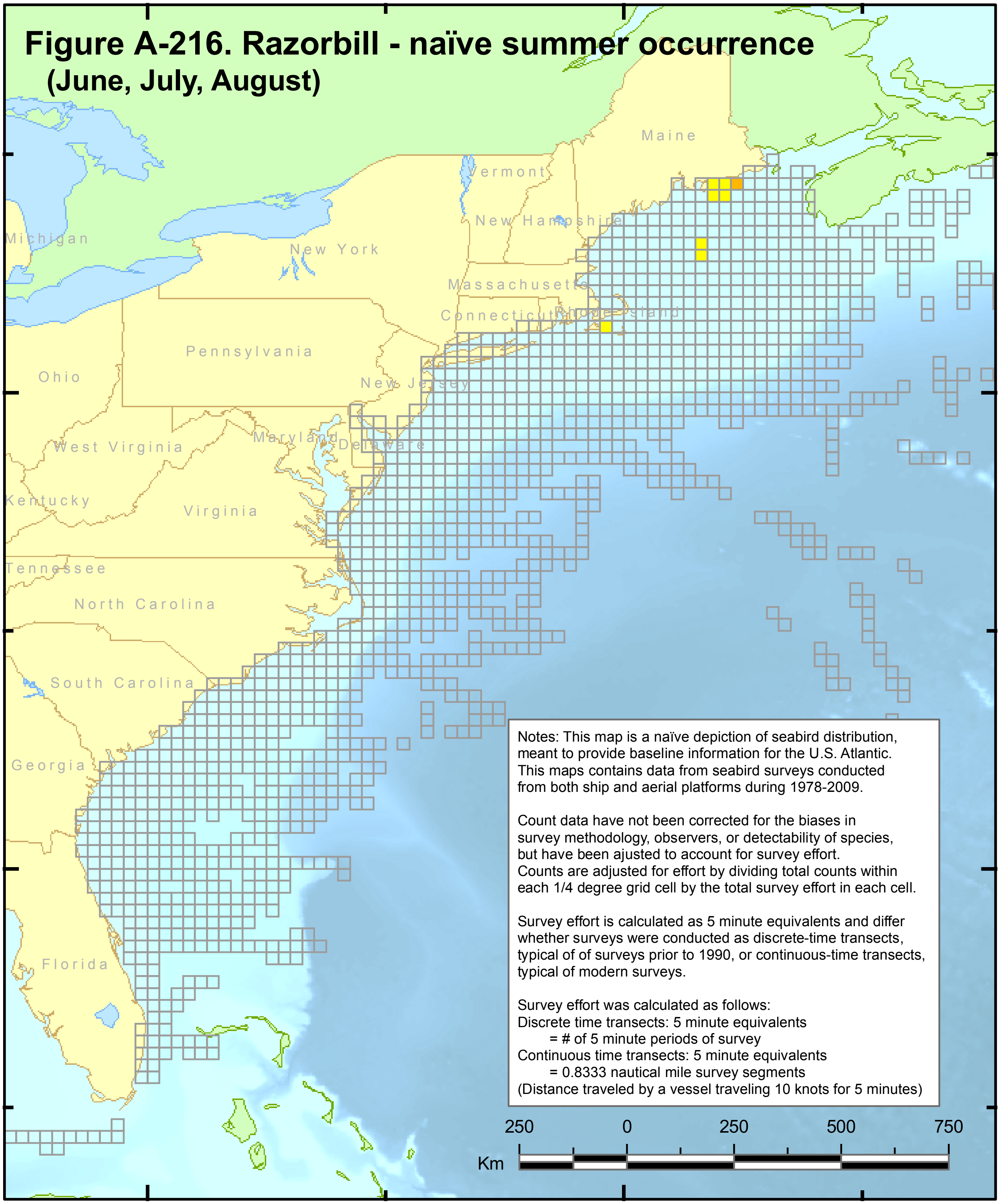
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-216. Razorbill - naïve summer occurrence (June, July, August)

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## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

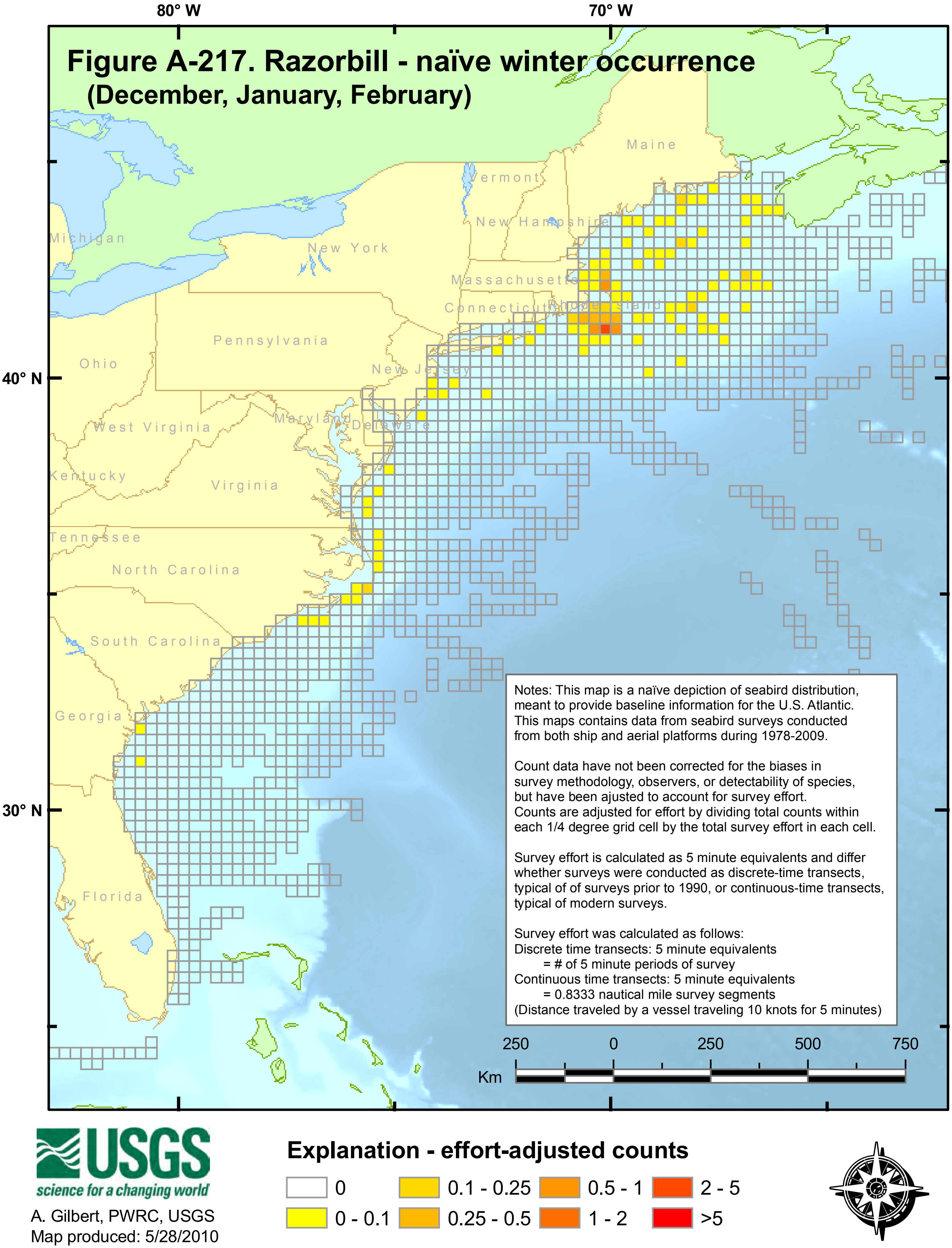
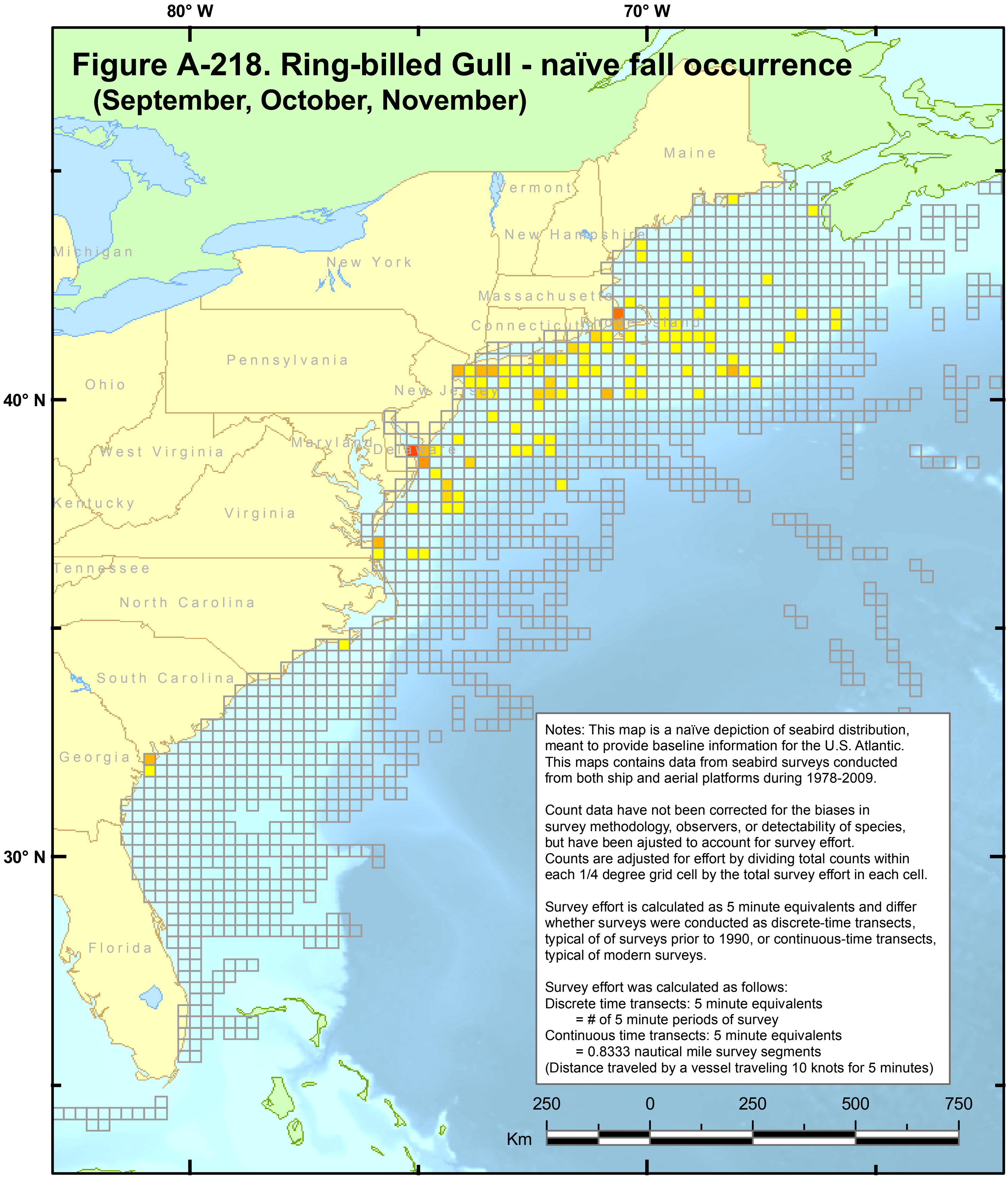



**Figure A-217. Razorbill - naïve winter occurrence (December, January, February)**




# Figure A-218. Ring-billed Gull - naïve fall occurrence (September, October, November)

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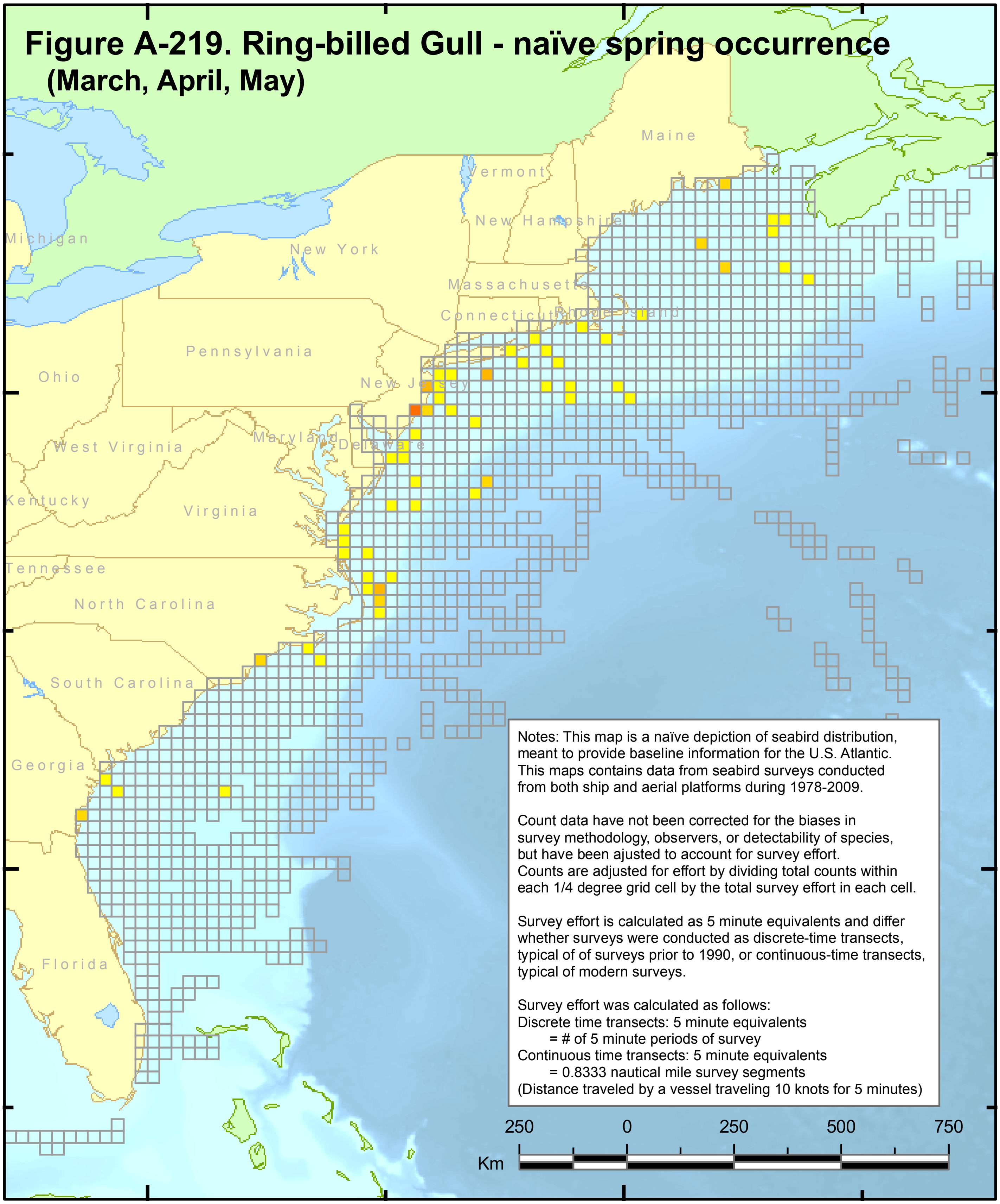
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-219. Ring-billed Gull - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

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Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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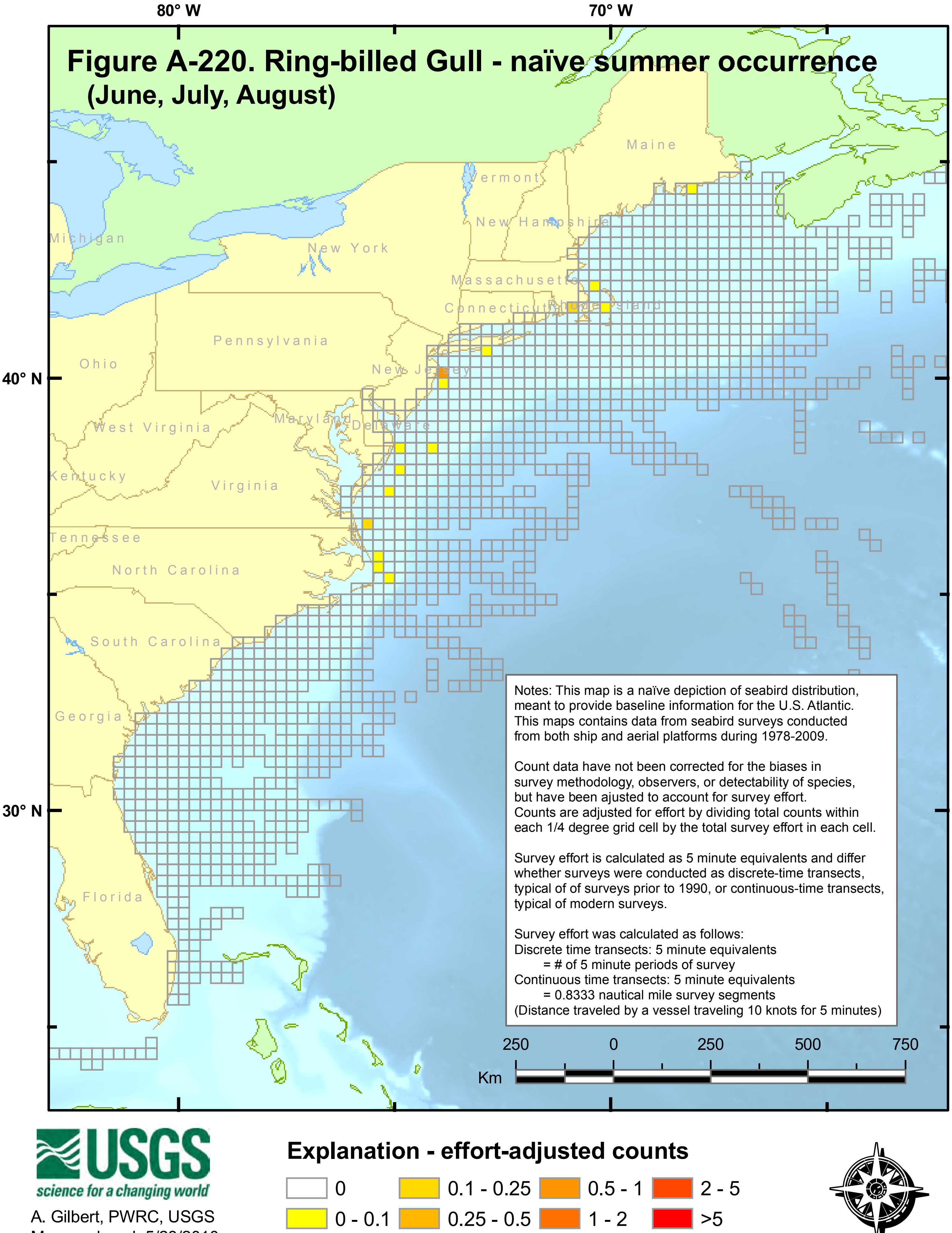
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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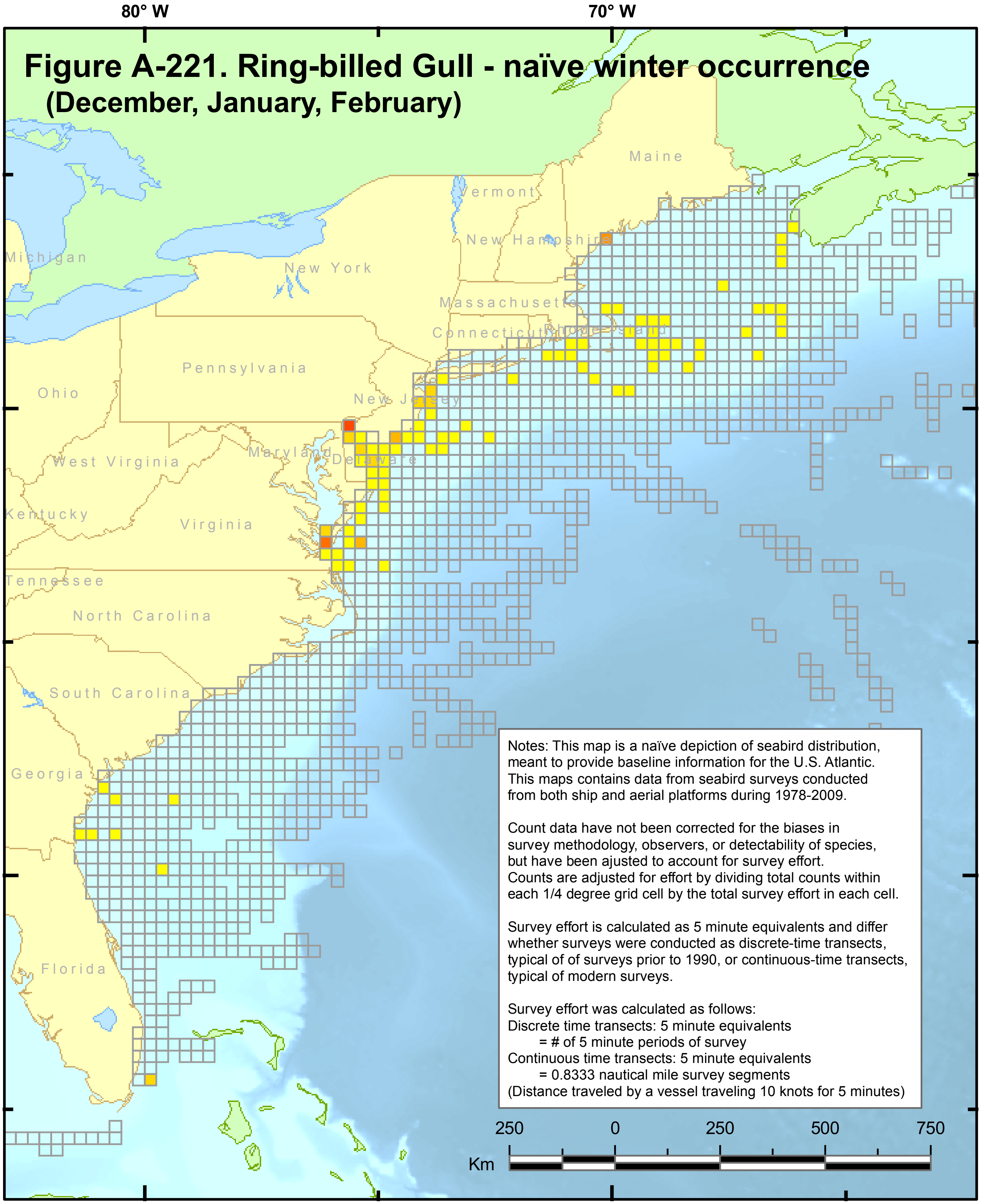


**Figure A-221. Ring-billed Gull - naïve winter occurrence (December, January, February)**

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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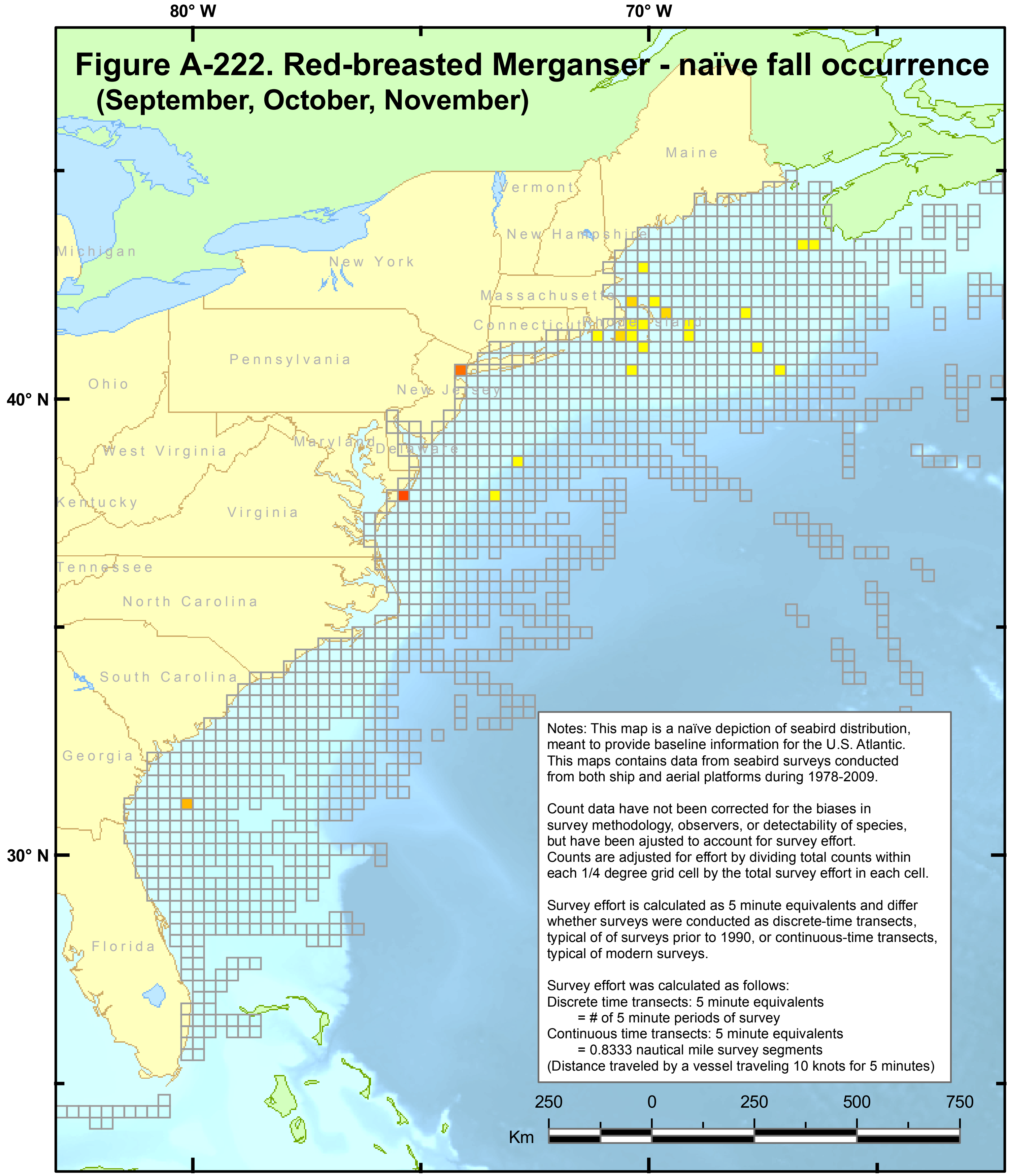


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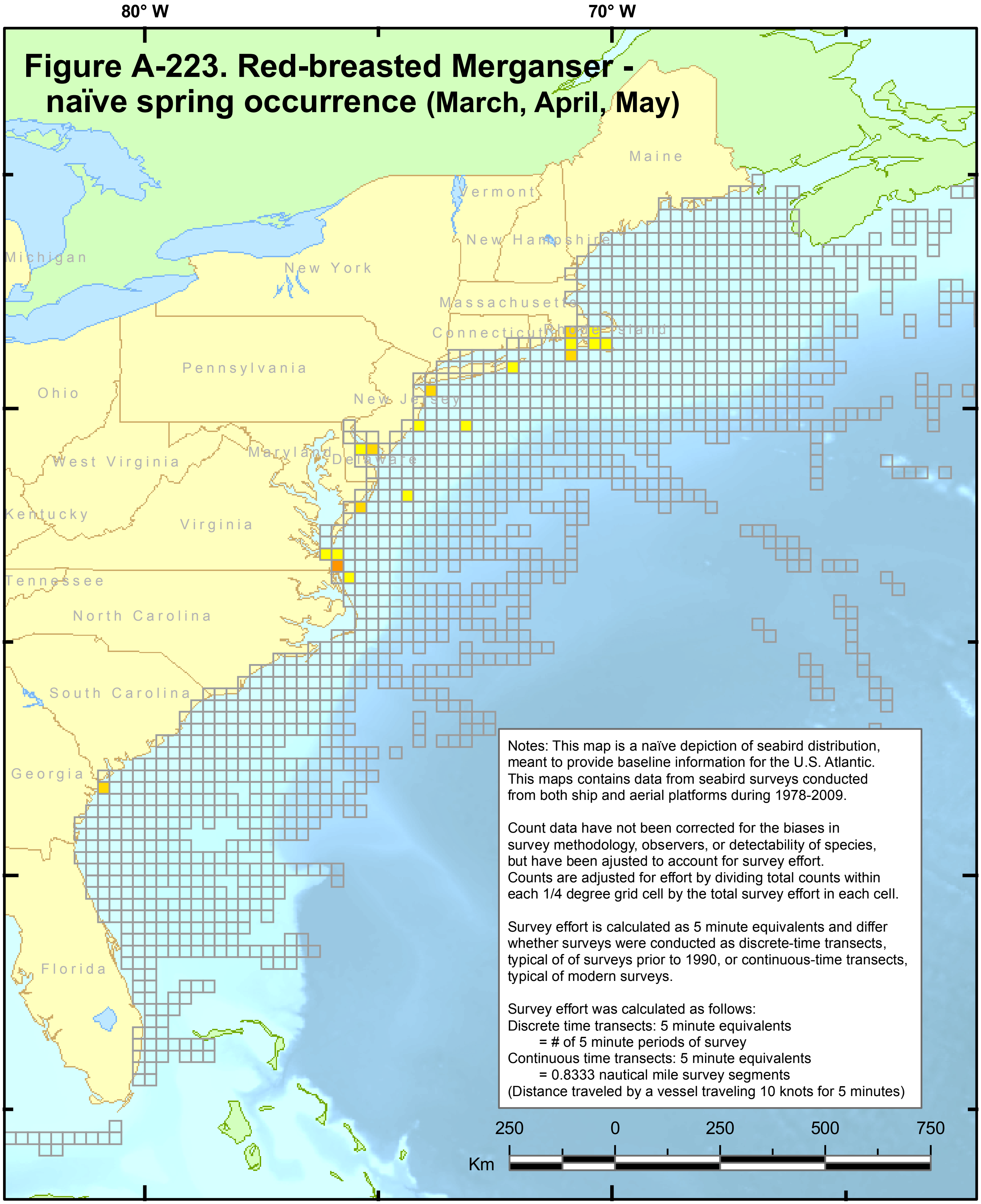
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-223. Red-breasted Merganser - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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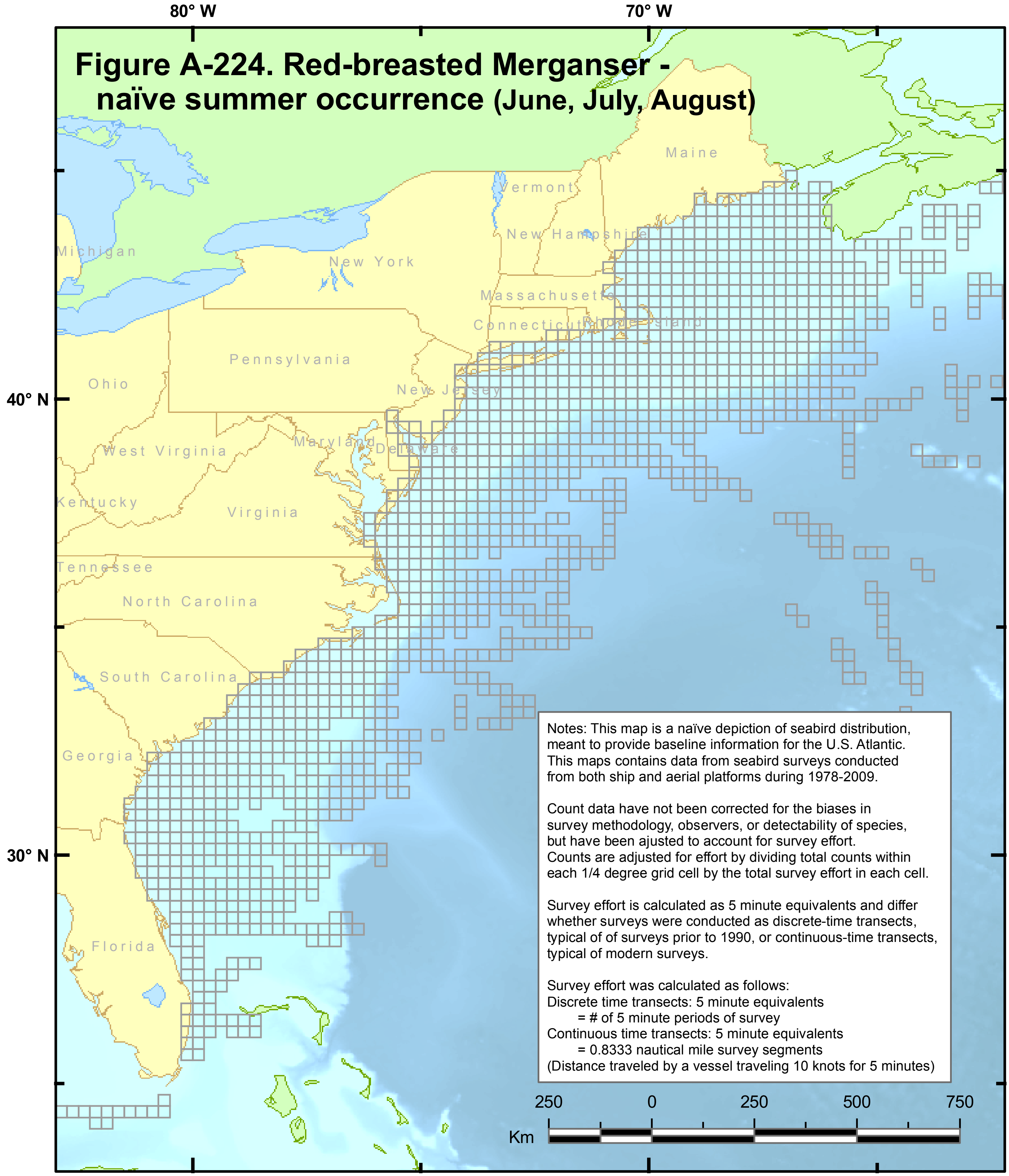
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |




# Figure A-224. Red-breasted Merganser - naïve summer occurrence (June, July, August)

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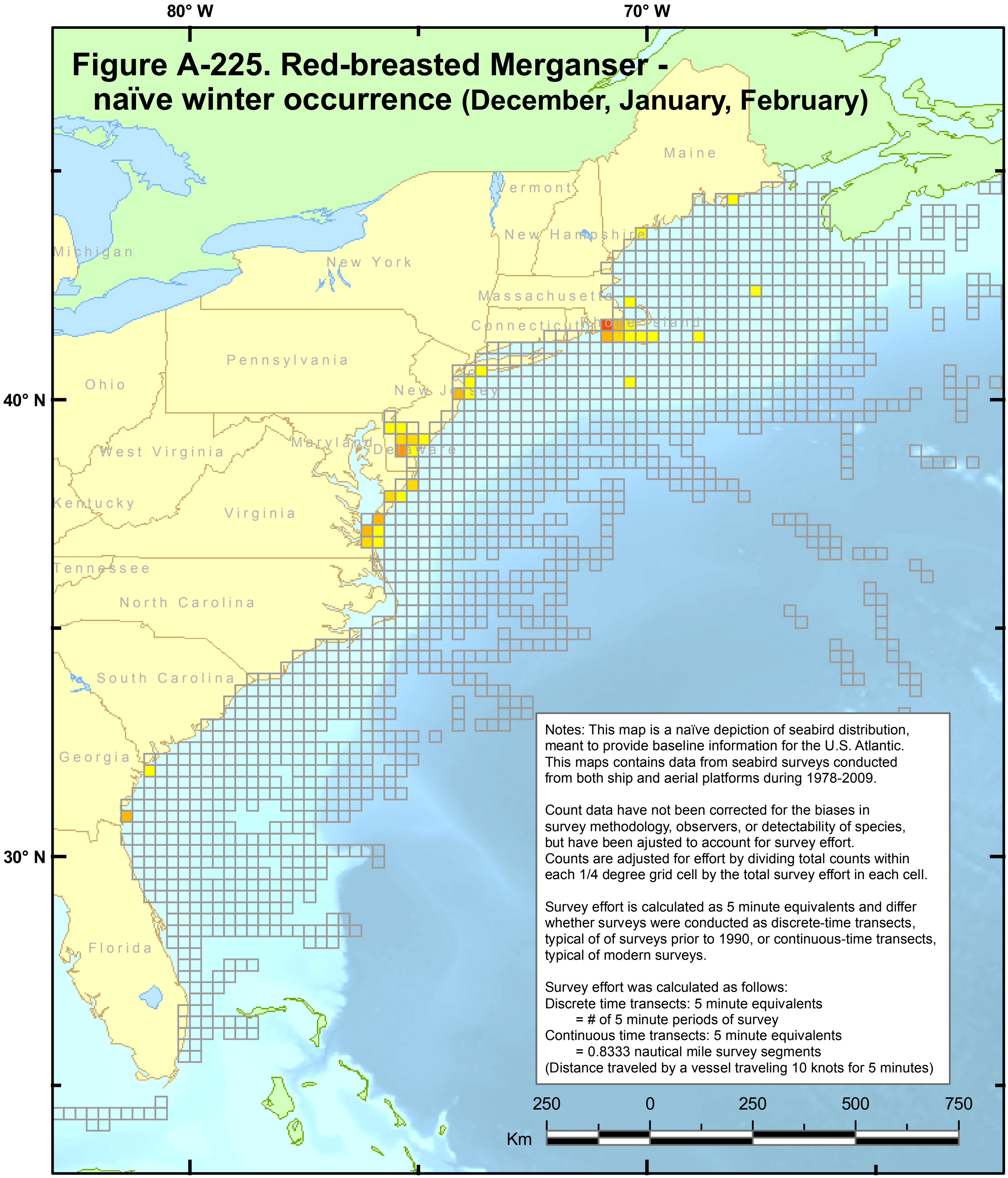
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-225. Red-breasted Merganser - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

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Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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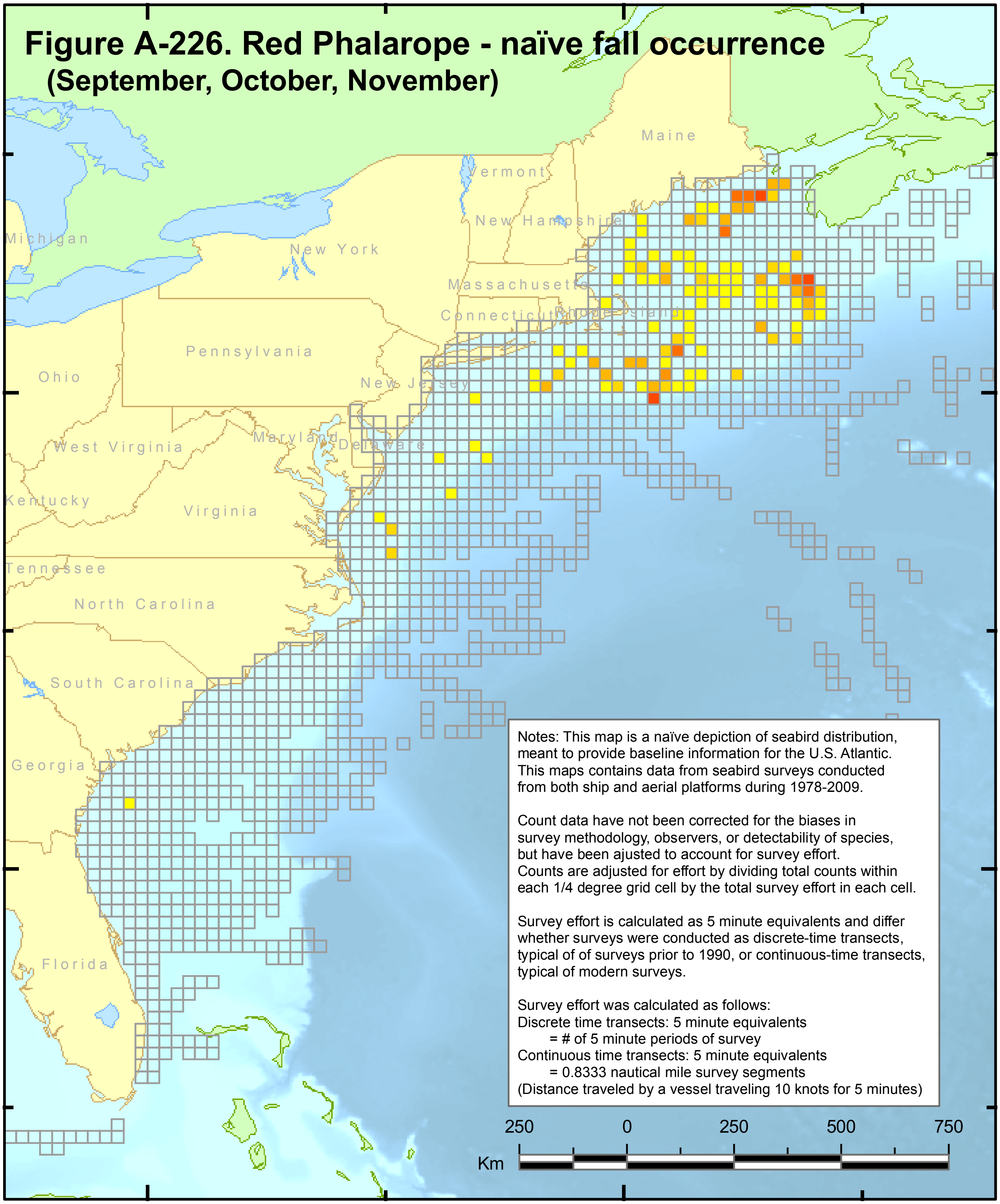
Map produced: 5/28/2010

**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-226. Red Phalarope - naïve fall occurrence
## (September, October, November)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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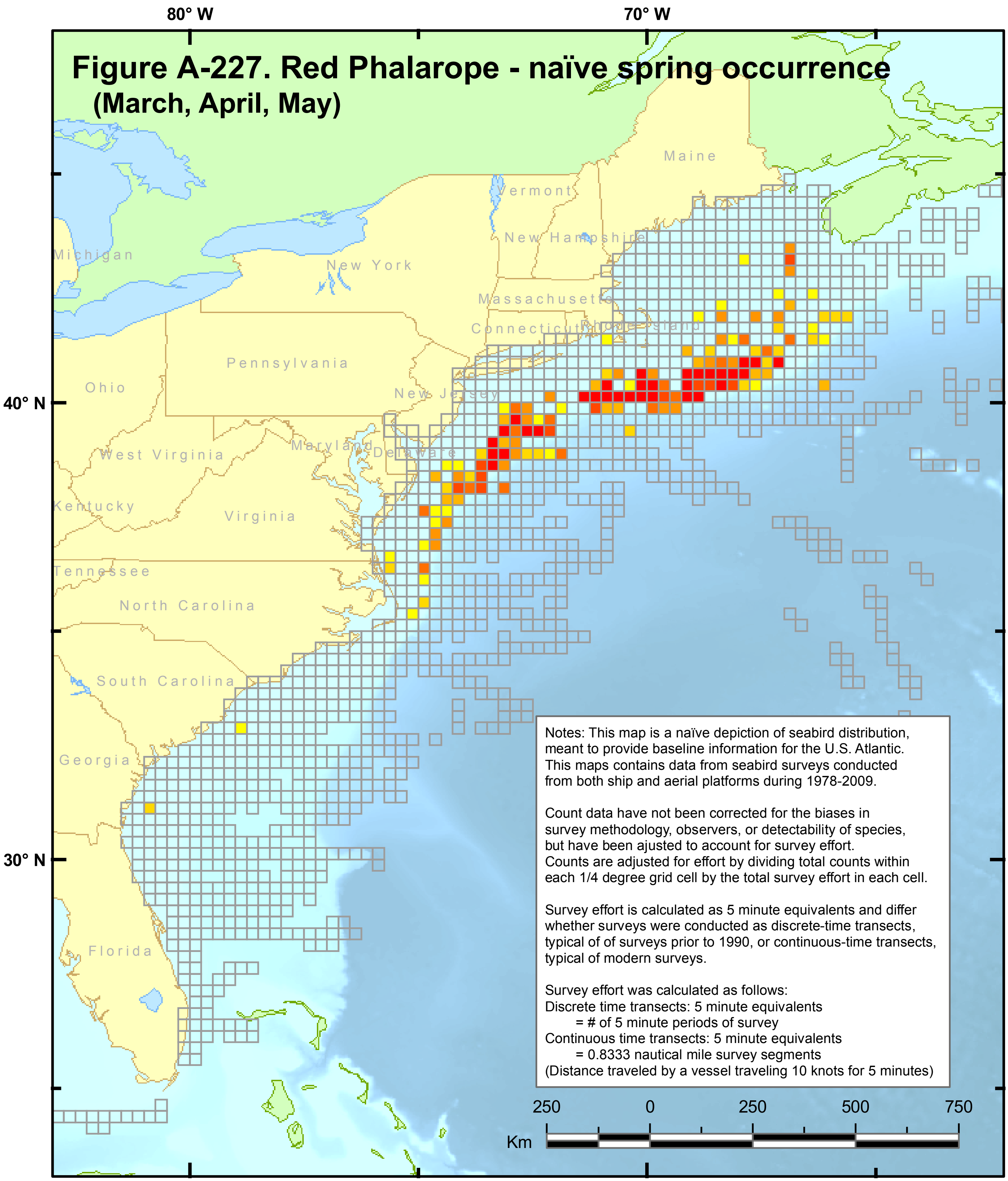
# Figure A-227. Red Phalarope - naïve spring occurrence (March, April, May)

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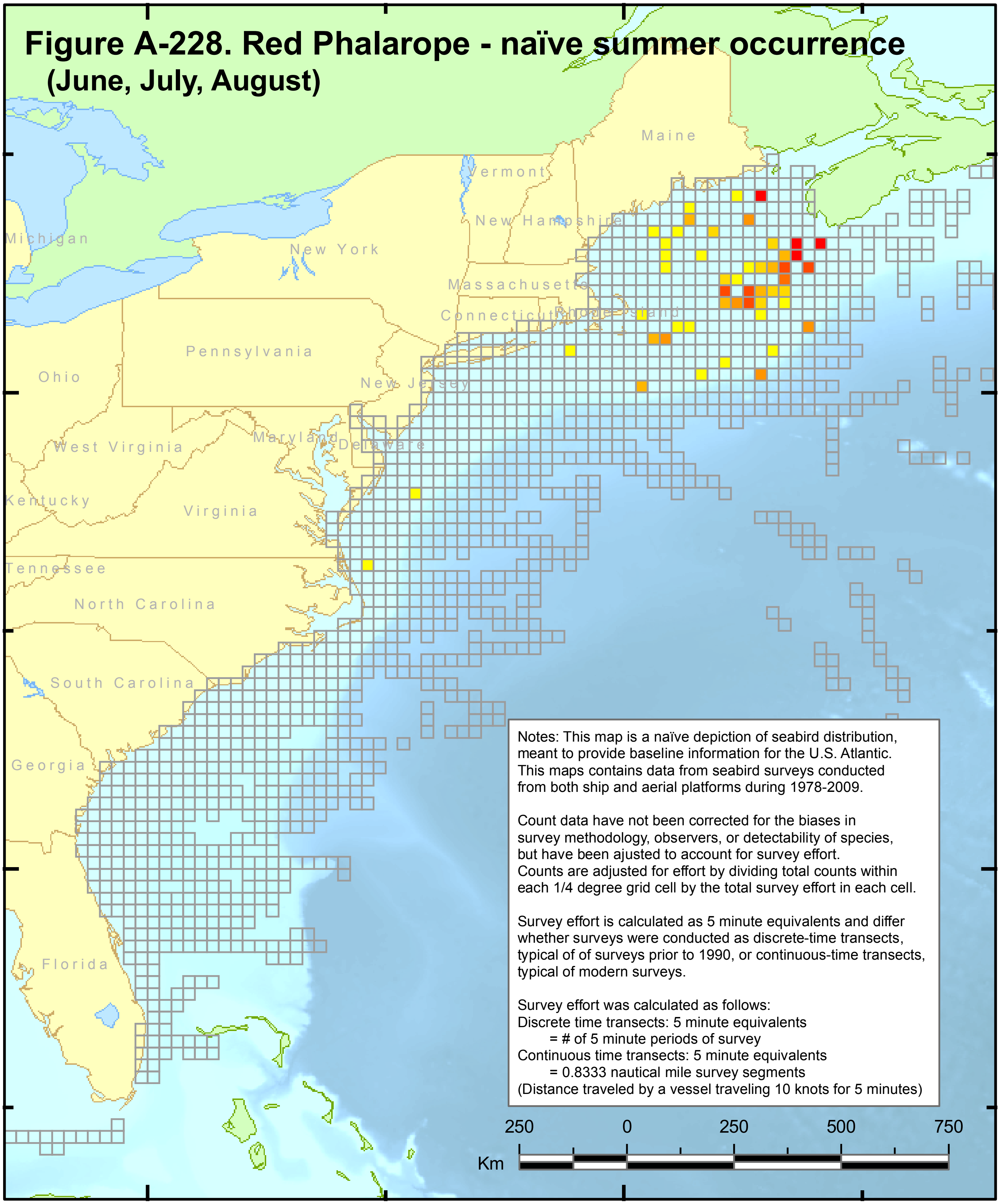
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 820.1 |

# Figure A-228. Red Phalarope - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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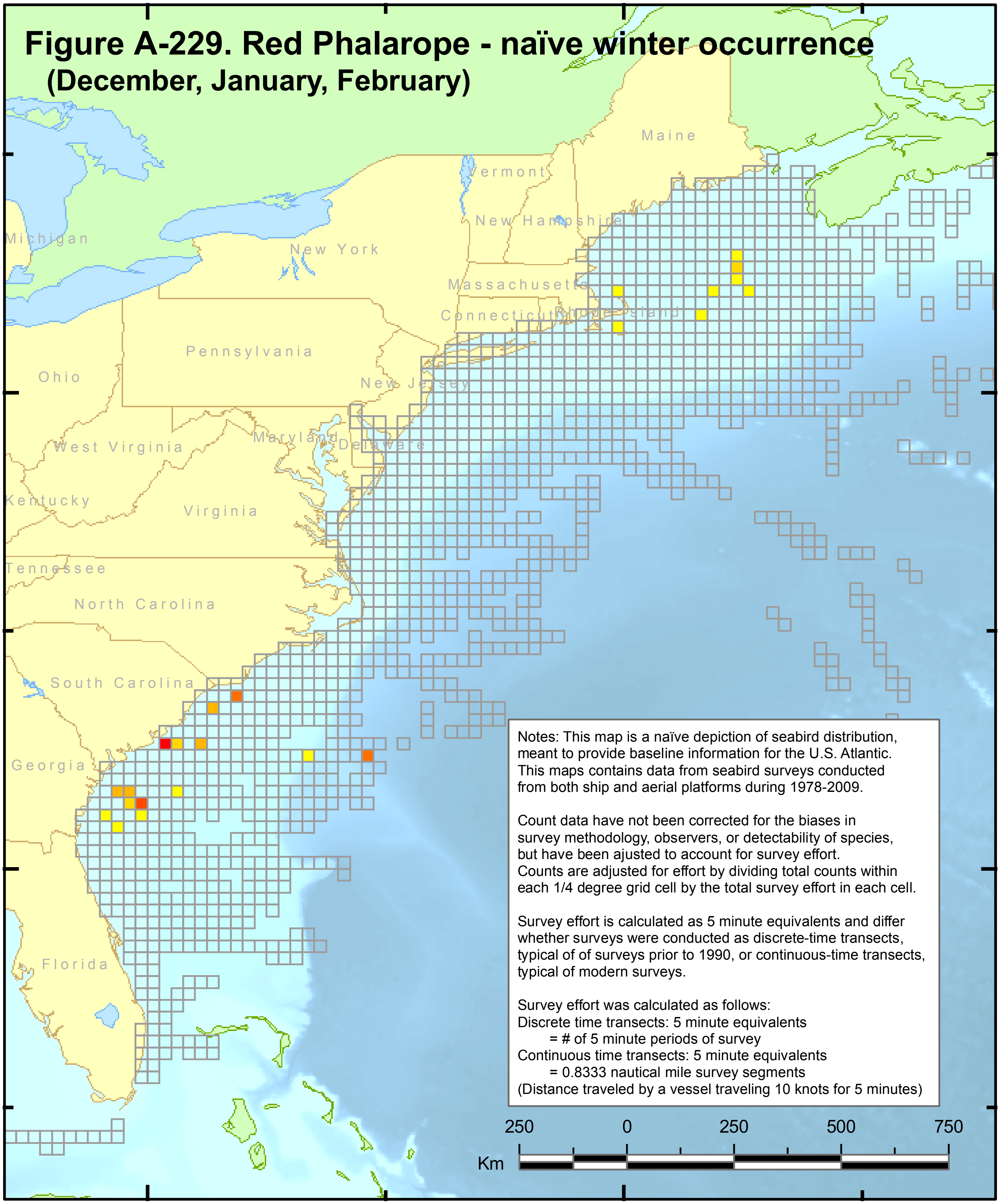
Map produced: 6/2/2010

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 1111.1

# Figure A-229. Red Phalarope - naïve winter occurrence (December, January, February)

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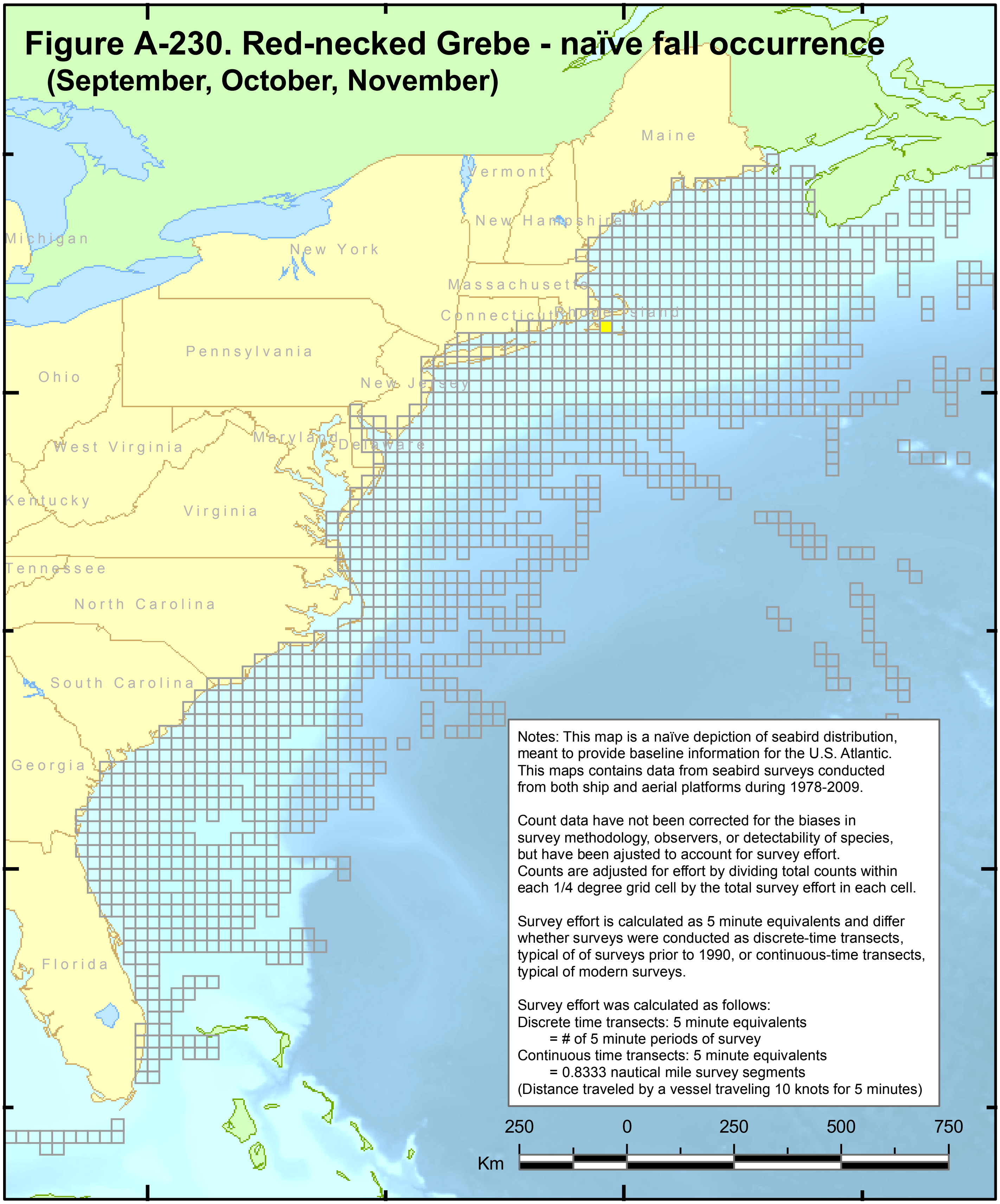
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 12.1

# Figure A-230. Red-necked Grebe - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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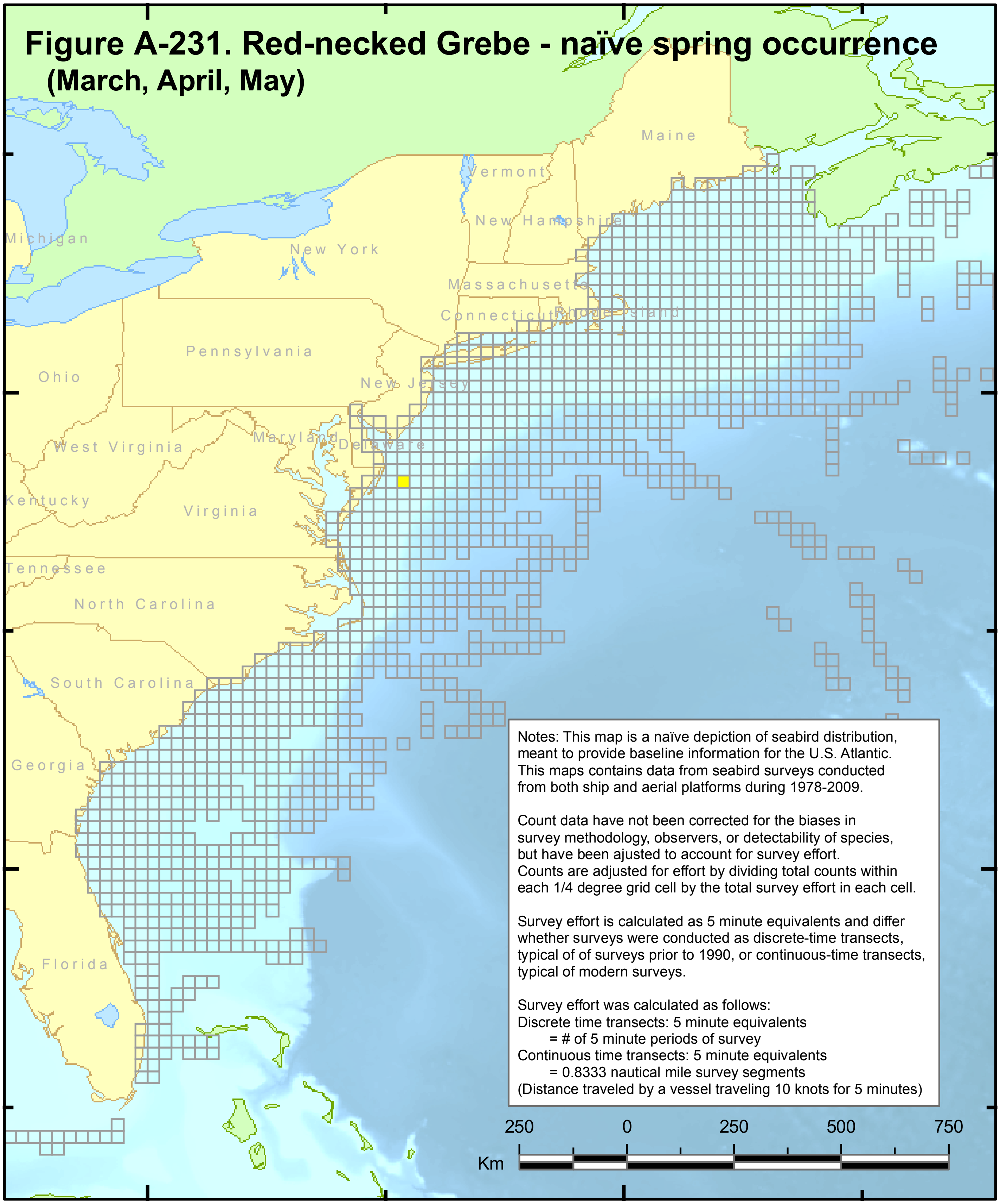
A. Gilbert, PWRC, USGS
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-231. Red-necked Grebe - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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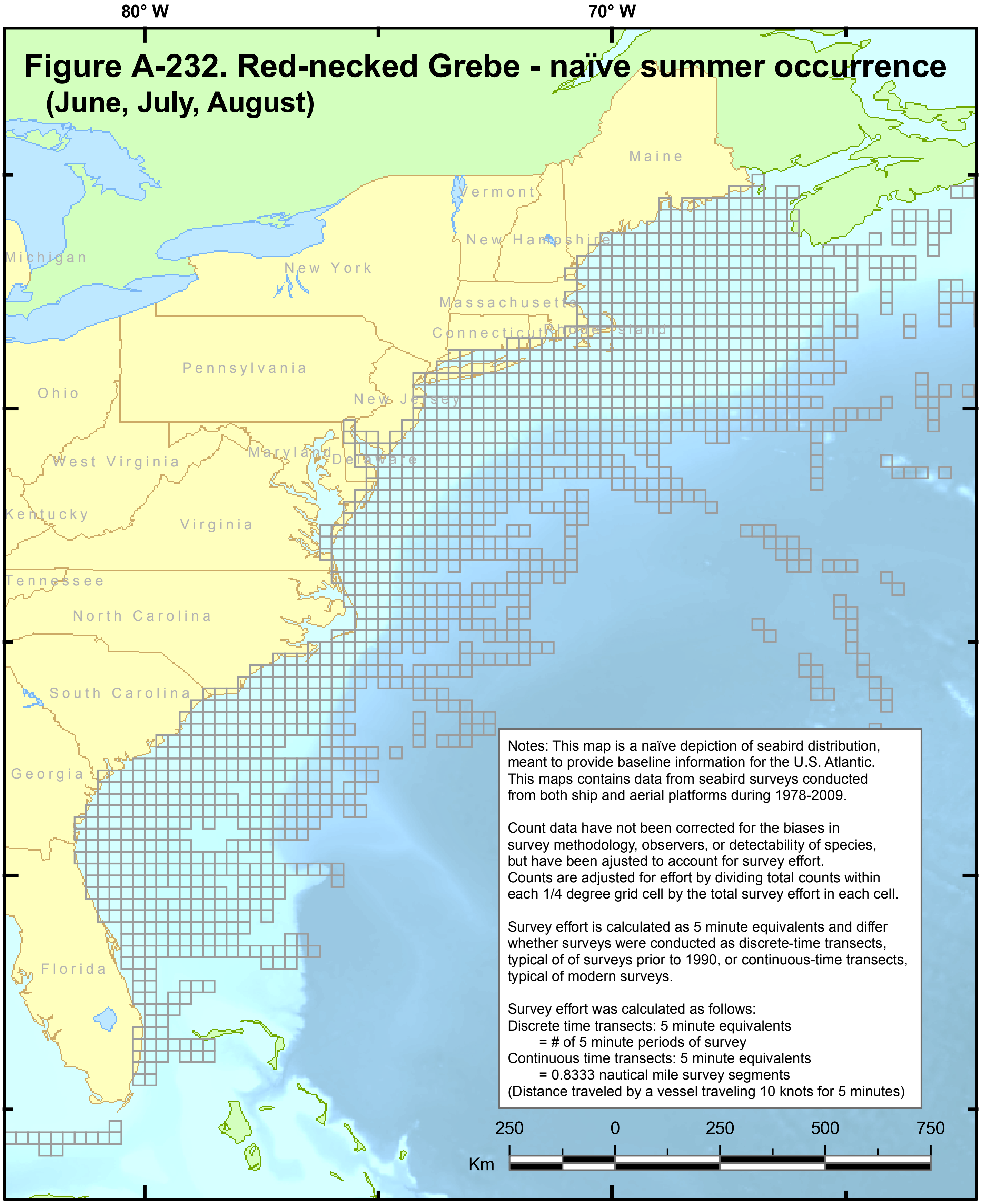
Map produced: 5/28/2010

## Explanation - effort-adjusted counts

0; 0 - 0.1; 0.1 - 0.25; 0.25 - 0.5; 0.5 - 1; 1 - 2; 2 - 5; >5

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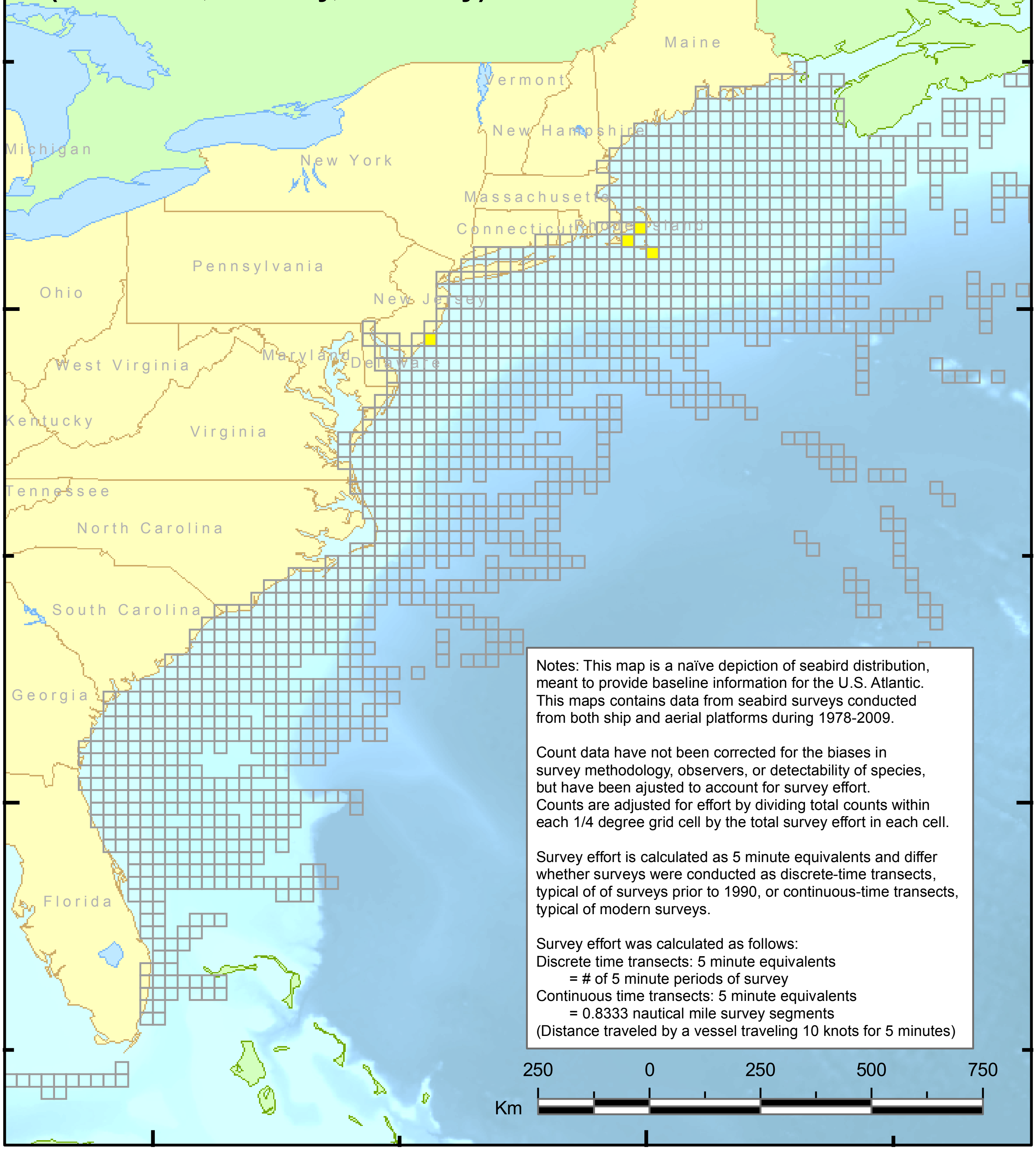
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-233. Red-necked Grebe - naïve winter occurrence
(December, January, February)

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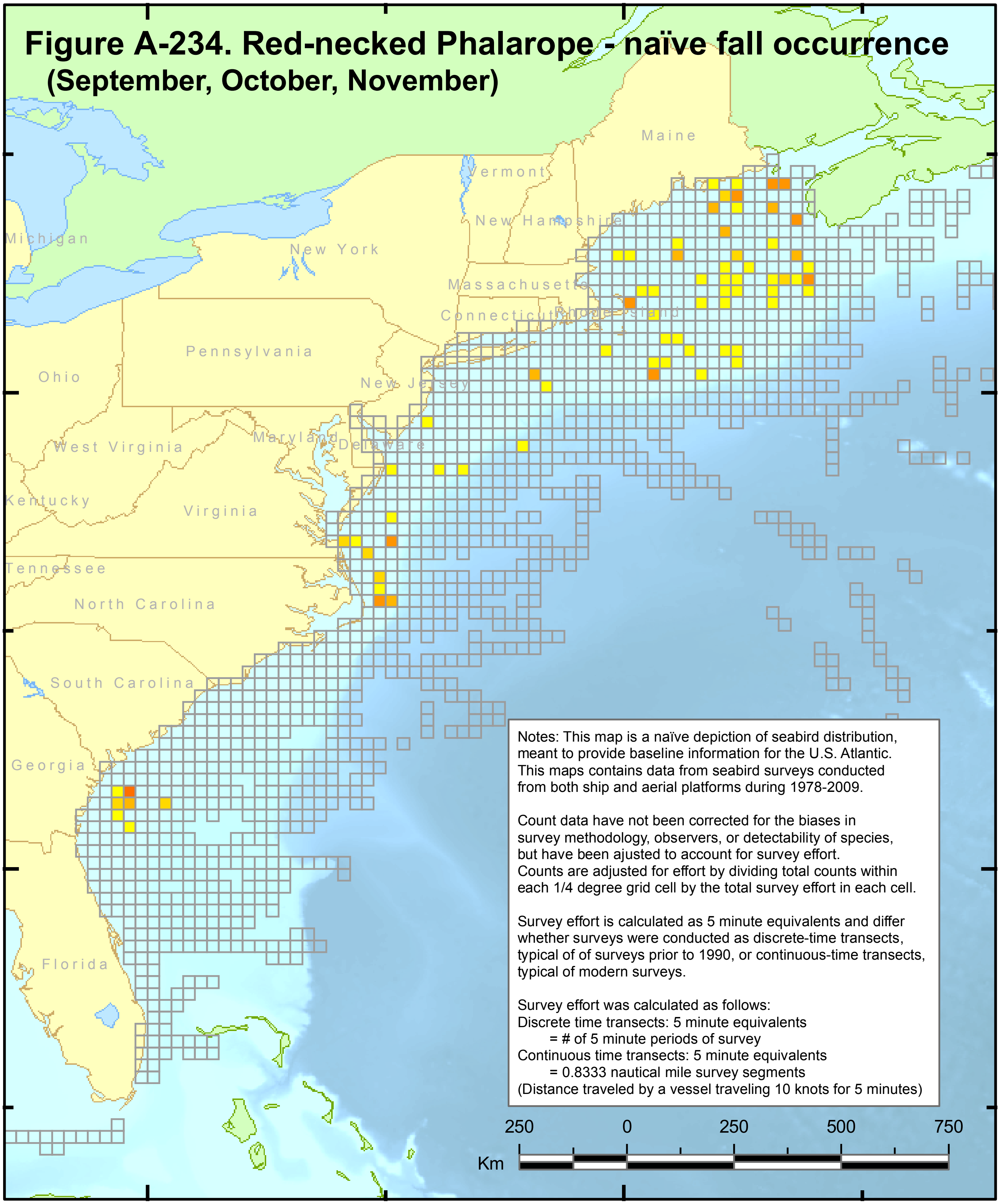
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-234. Red-necked Phalarope - naïve fall occurrence
## (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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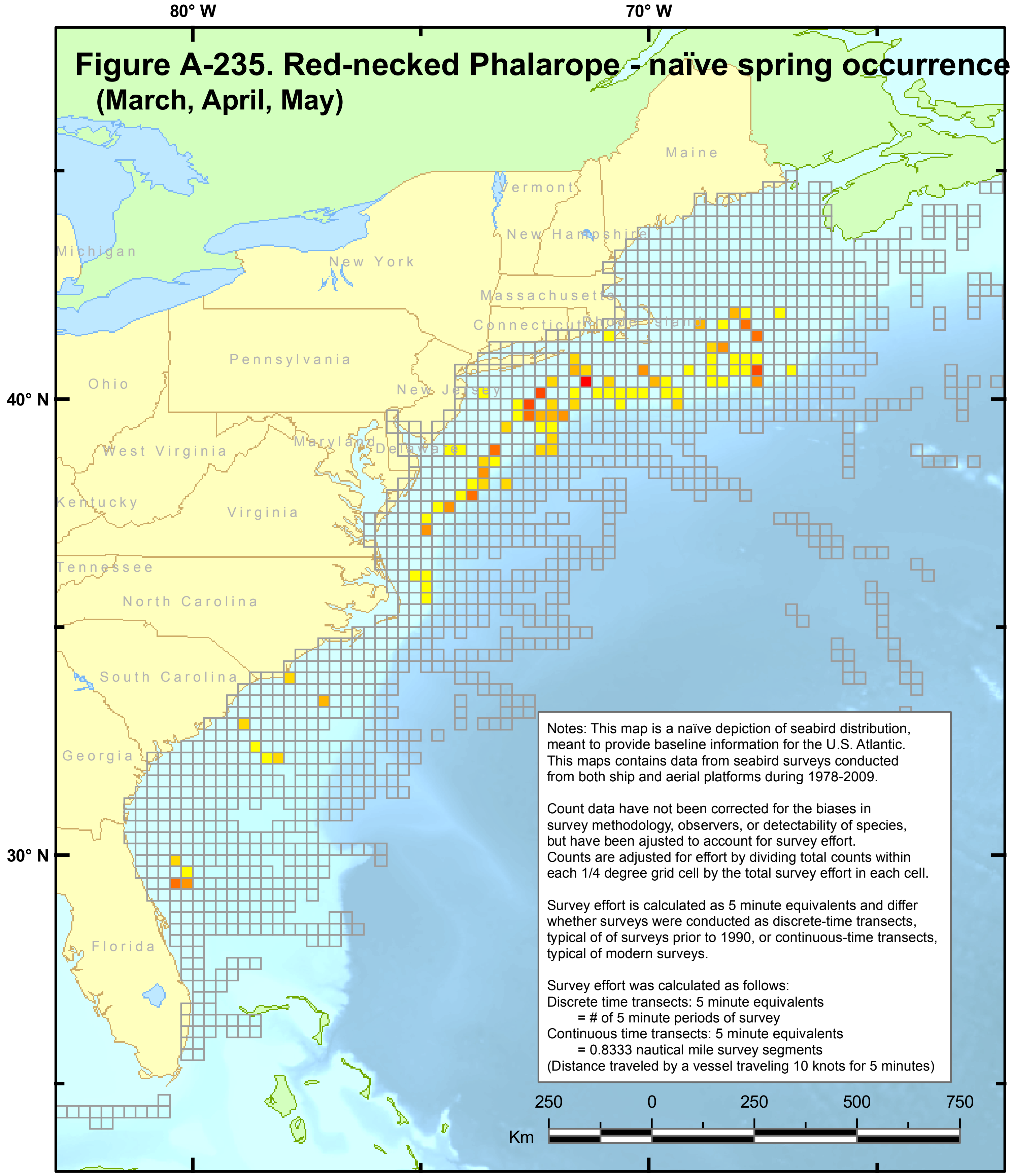
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-235. Red-necked Phalarope - naïve spring occurrence (March, April, May)

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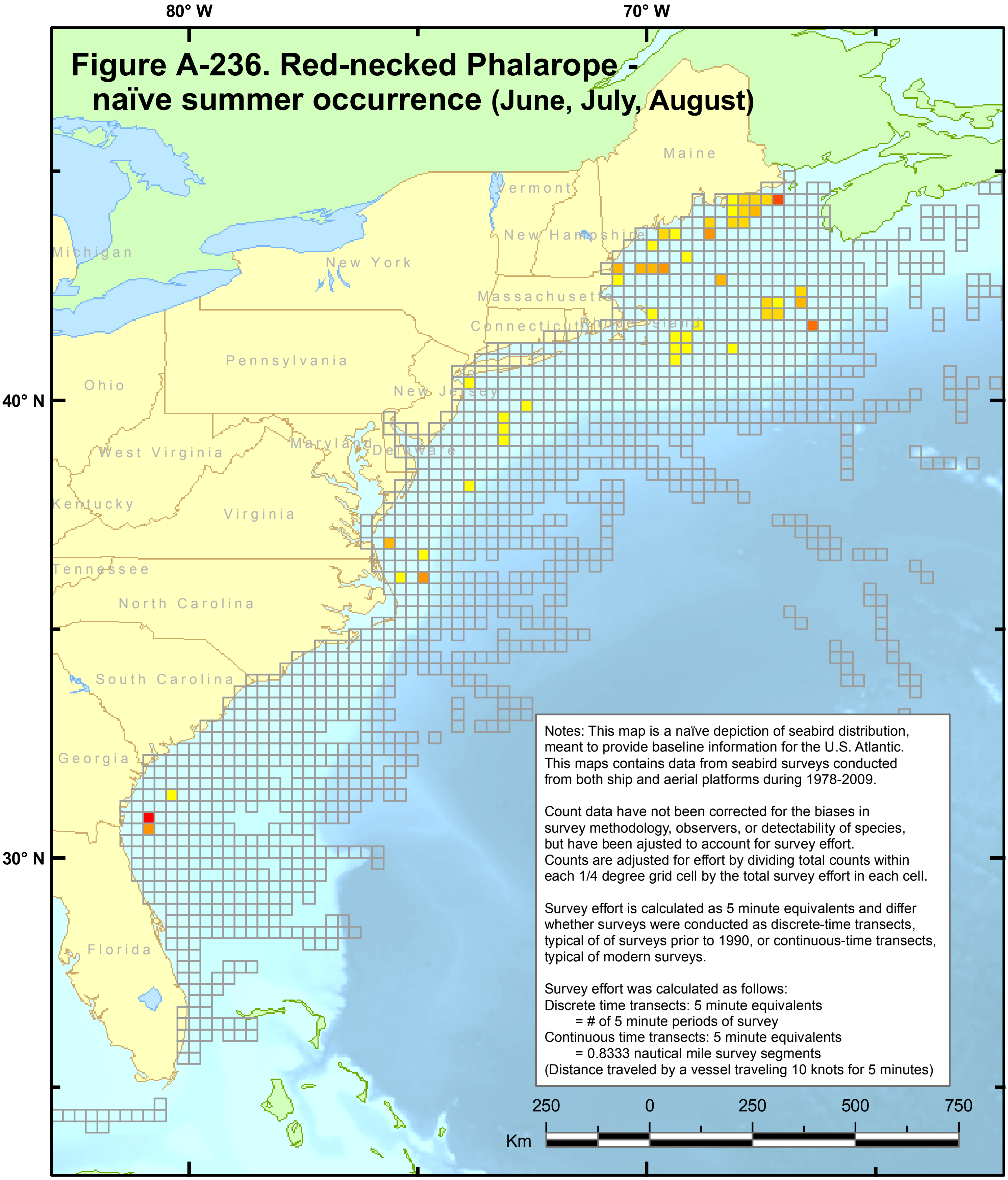
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 38.5

# Figure A-236. Red-necked Phalarope - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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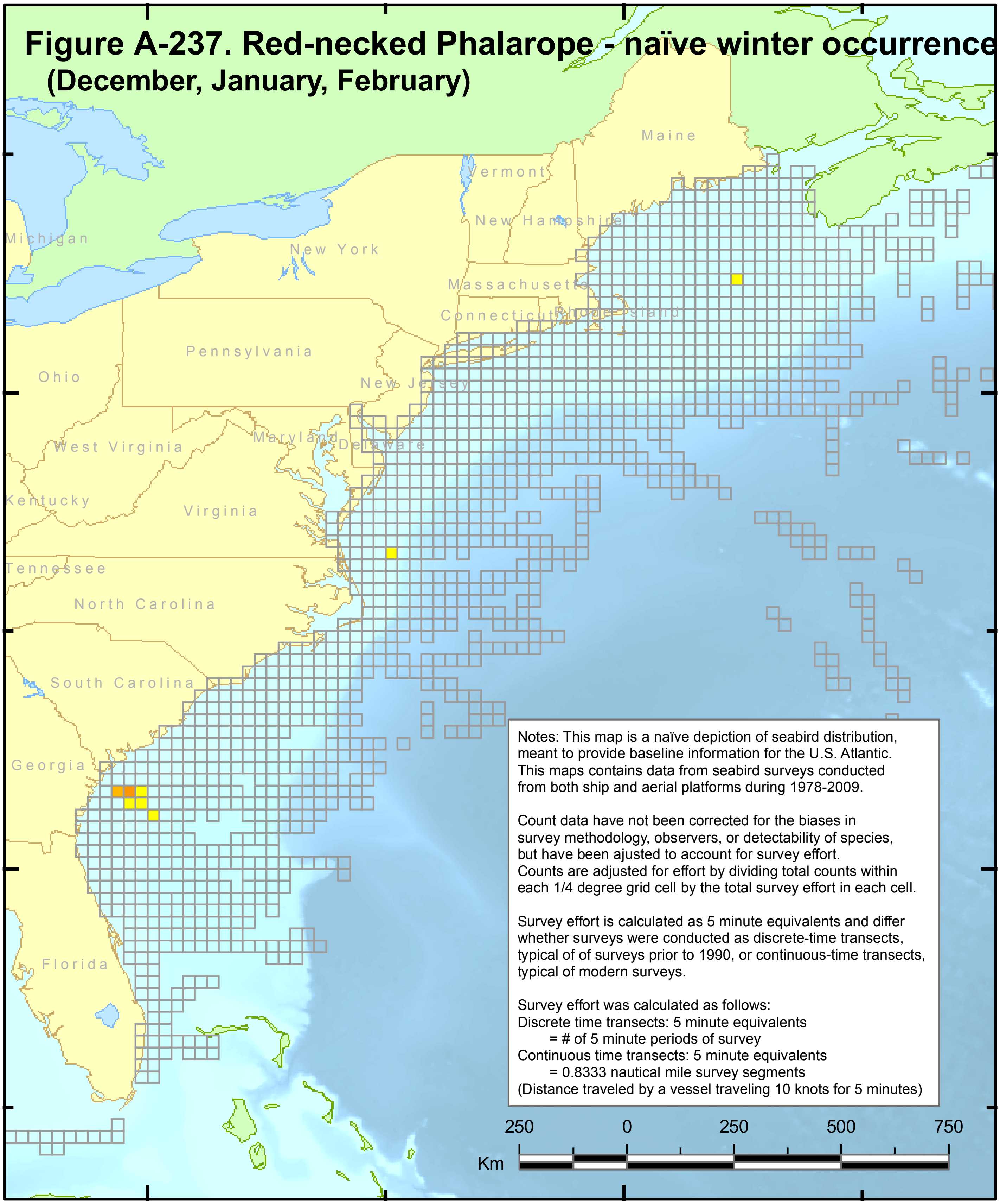
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 31.5

# Figure A-237. Red-necked Phalarope - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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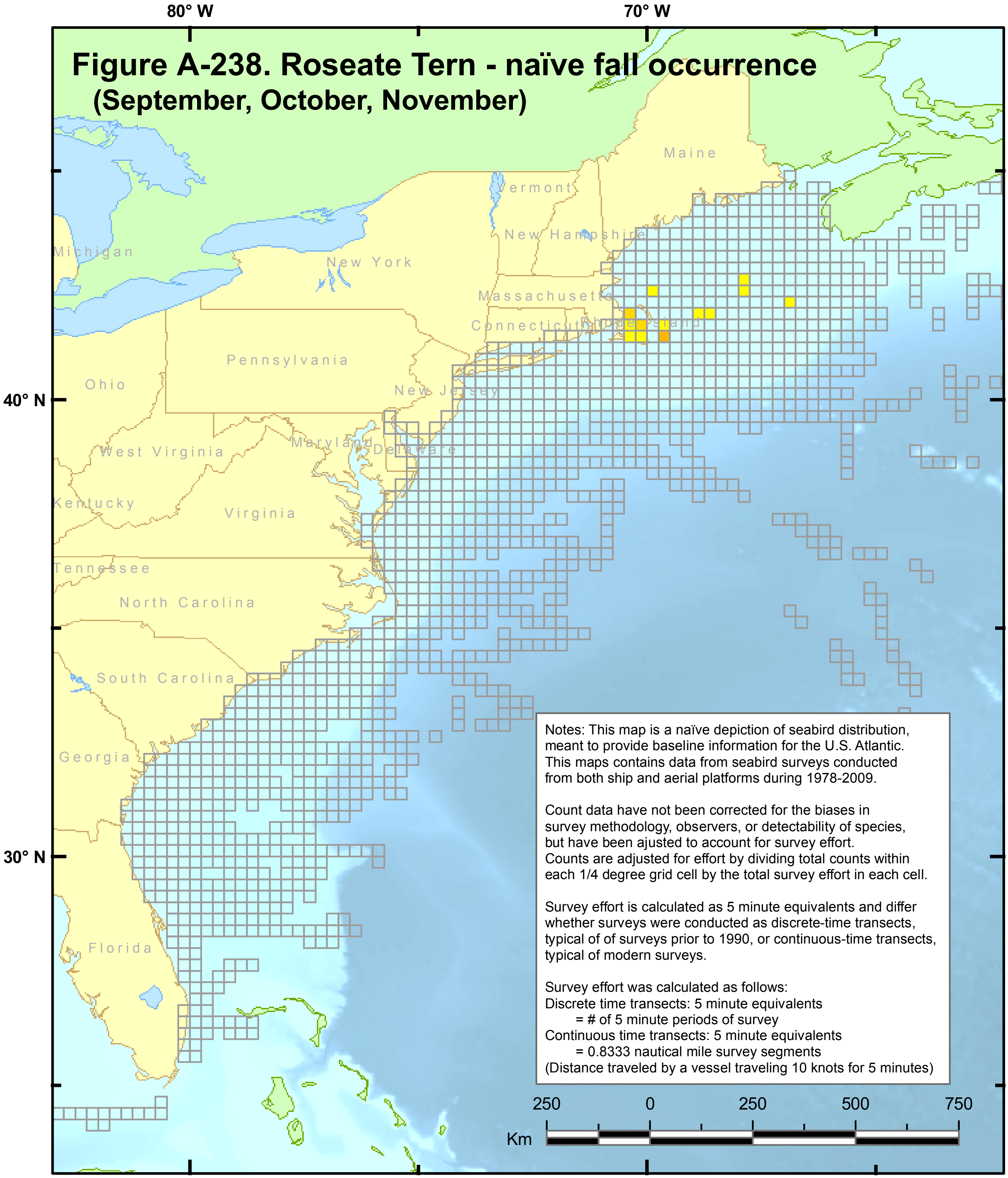
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-238. Roseate Tern - naïve fall occurrence (September, October, November)

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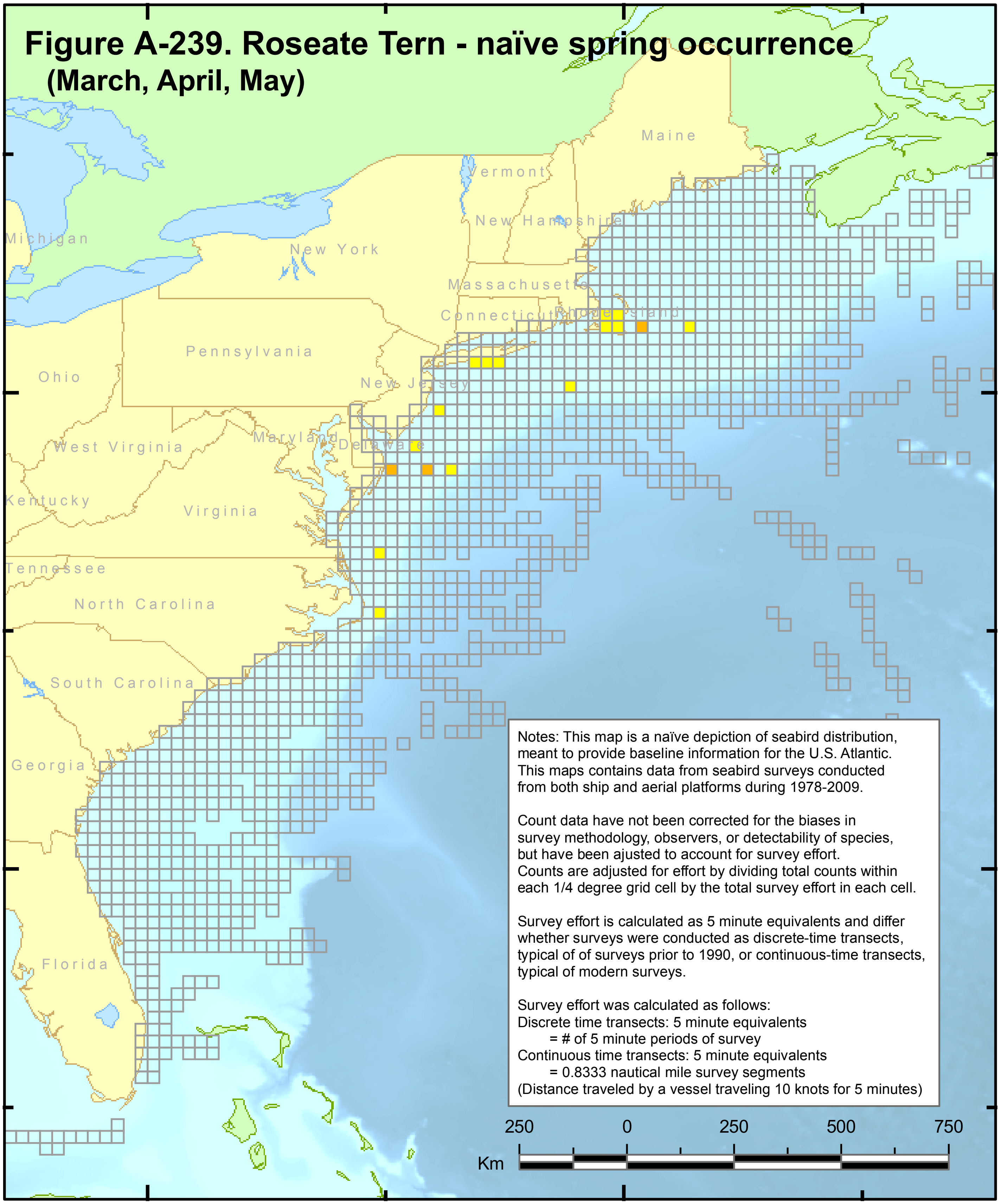
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-239. Roseate Tern - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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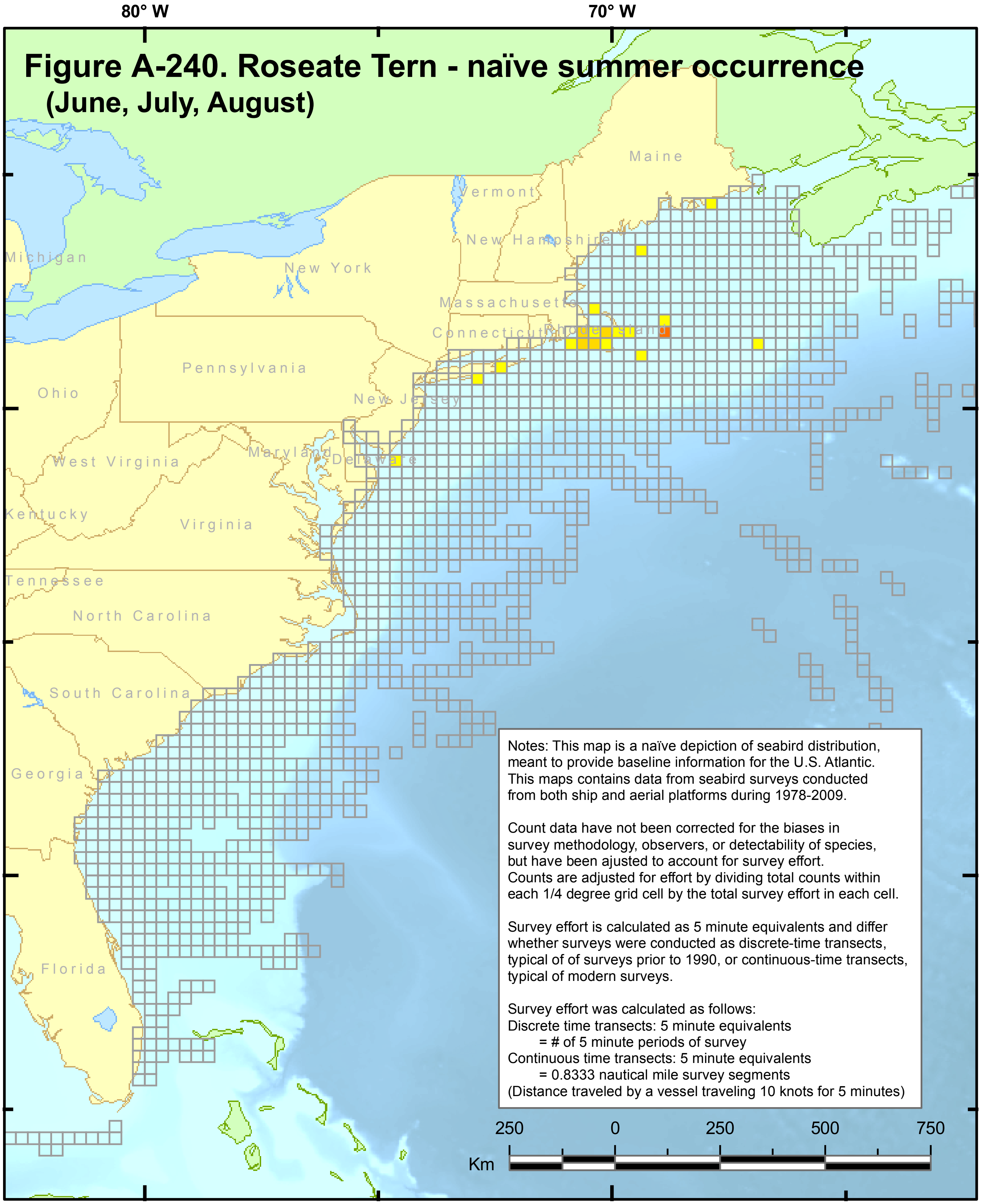


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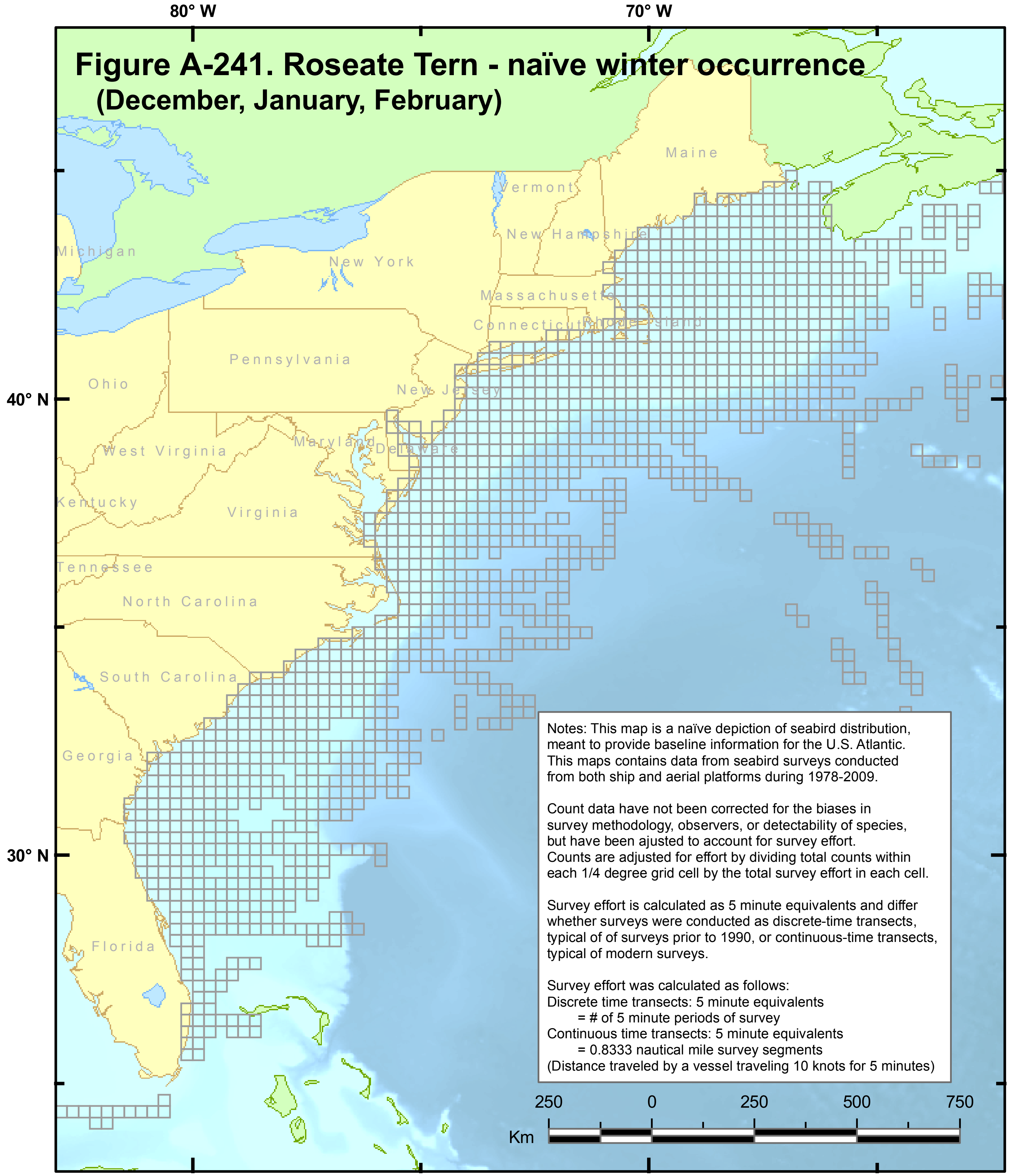
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-241. Roseate Tern - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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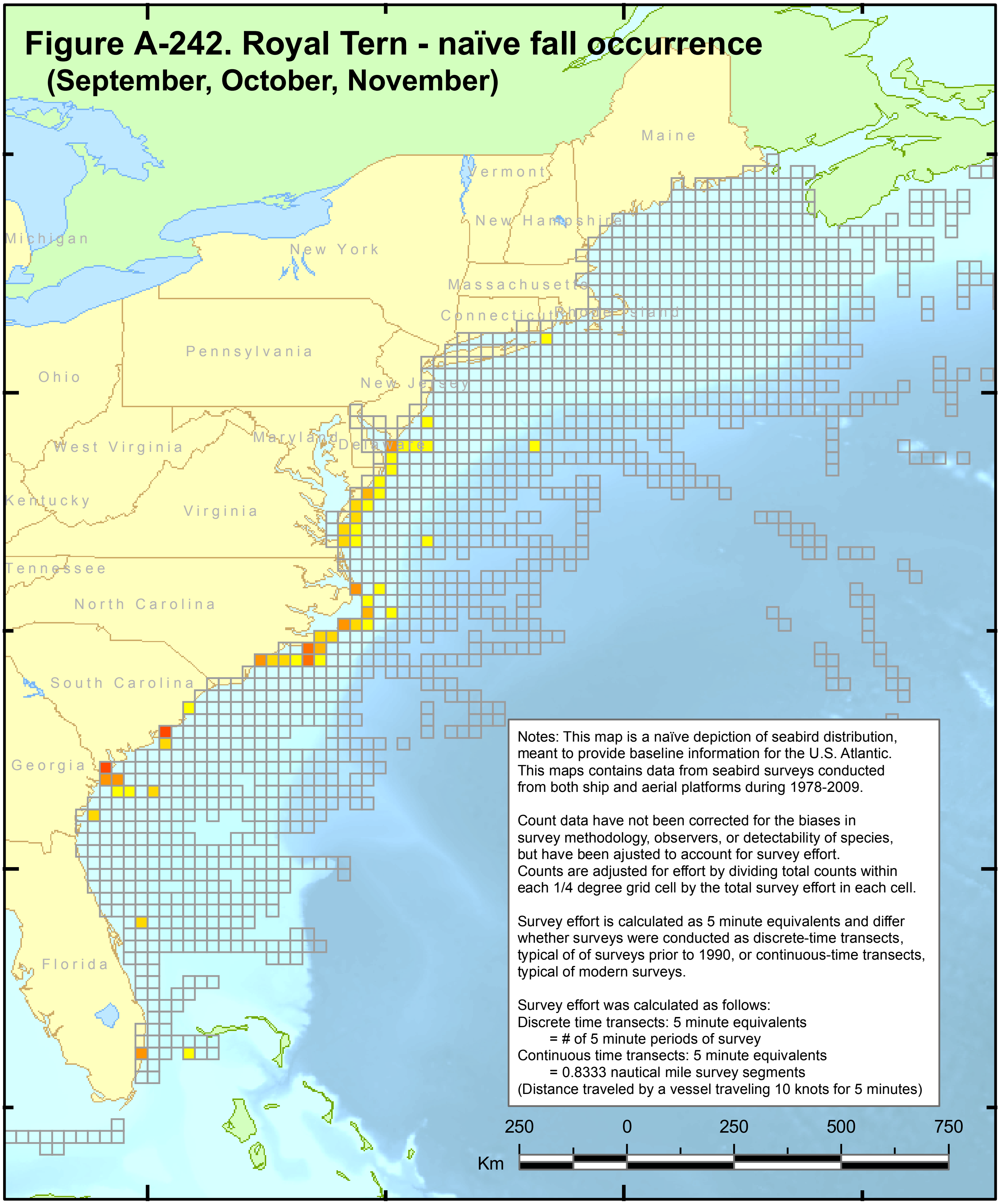
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-242. Royal Tern - naïve fall occurrence
(September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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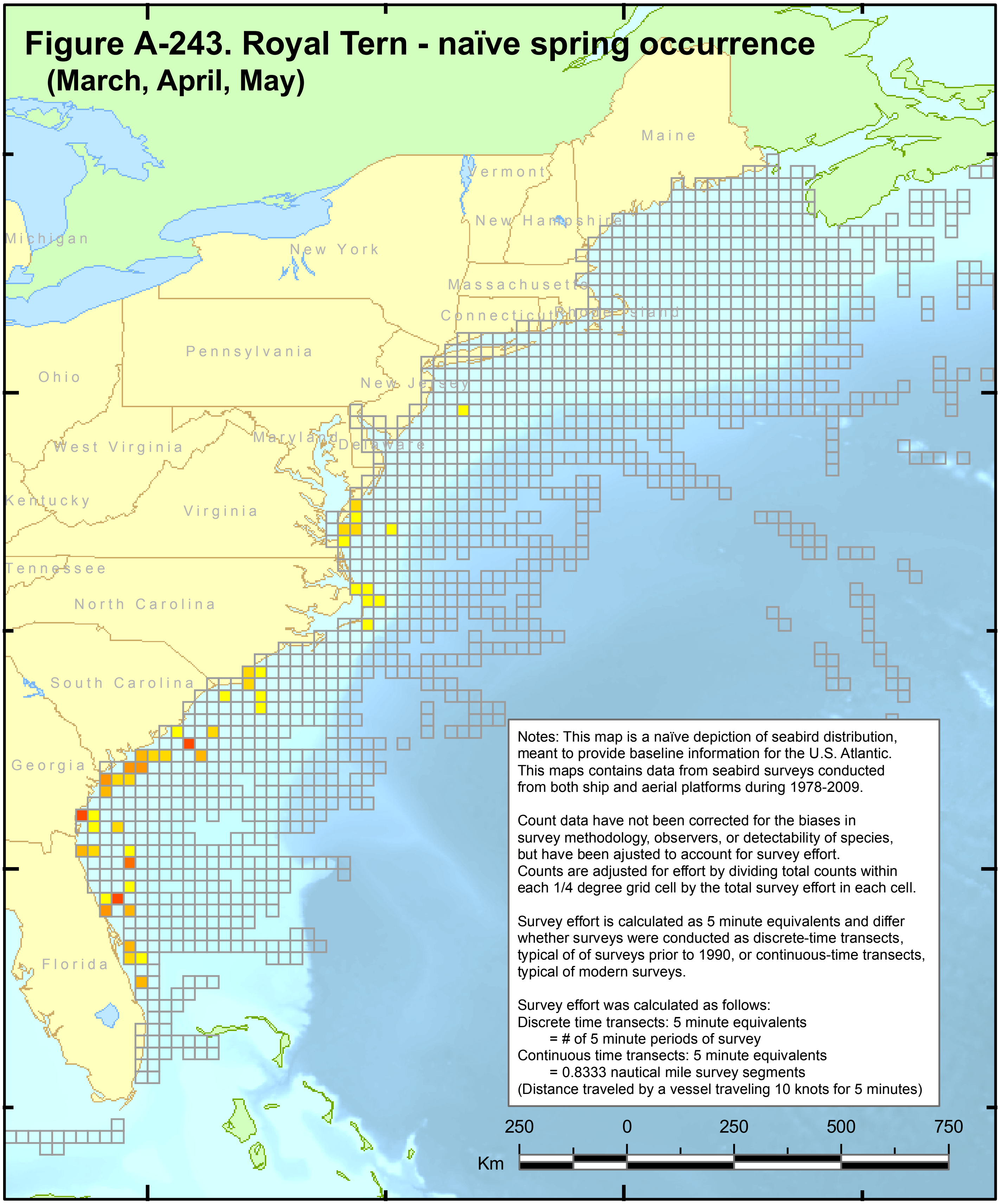
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-243. Royal Tern - naïve spring occurrence
(March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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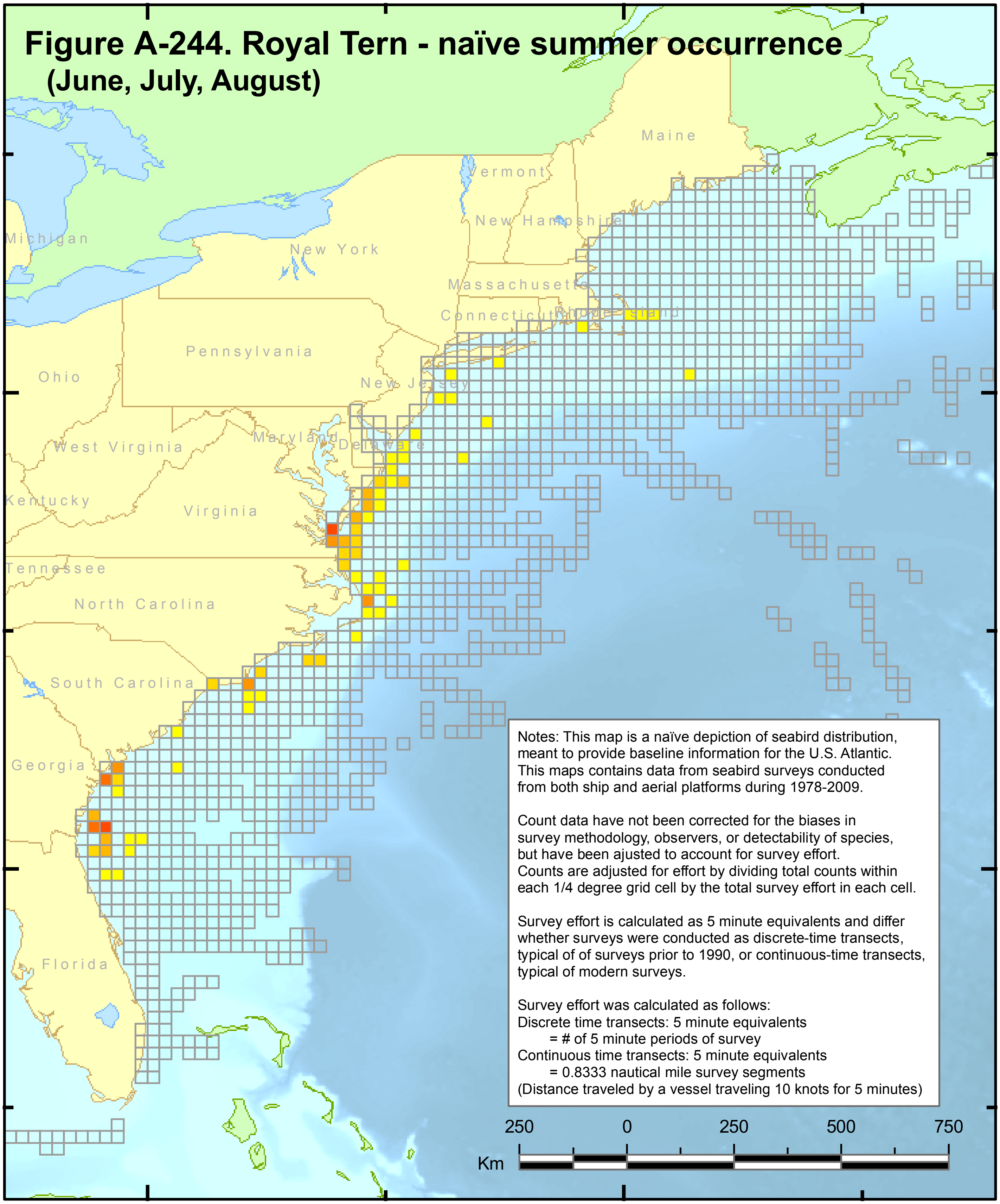
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

**Figure A-244. Royal Tern - naïve summer occurrence (June, July, August)**

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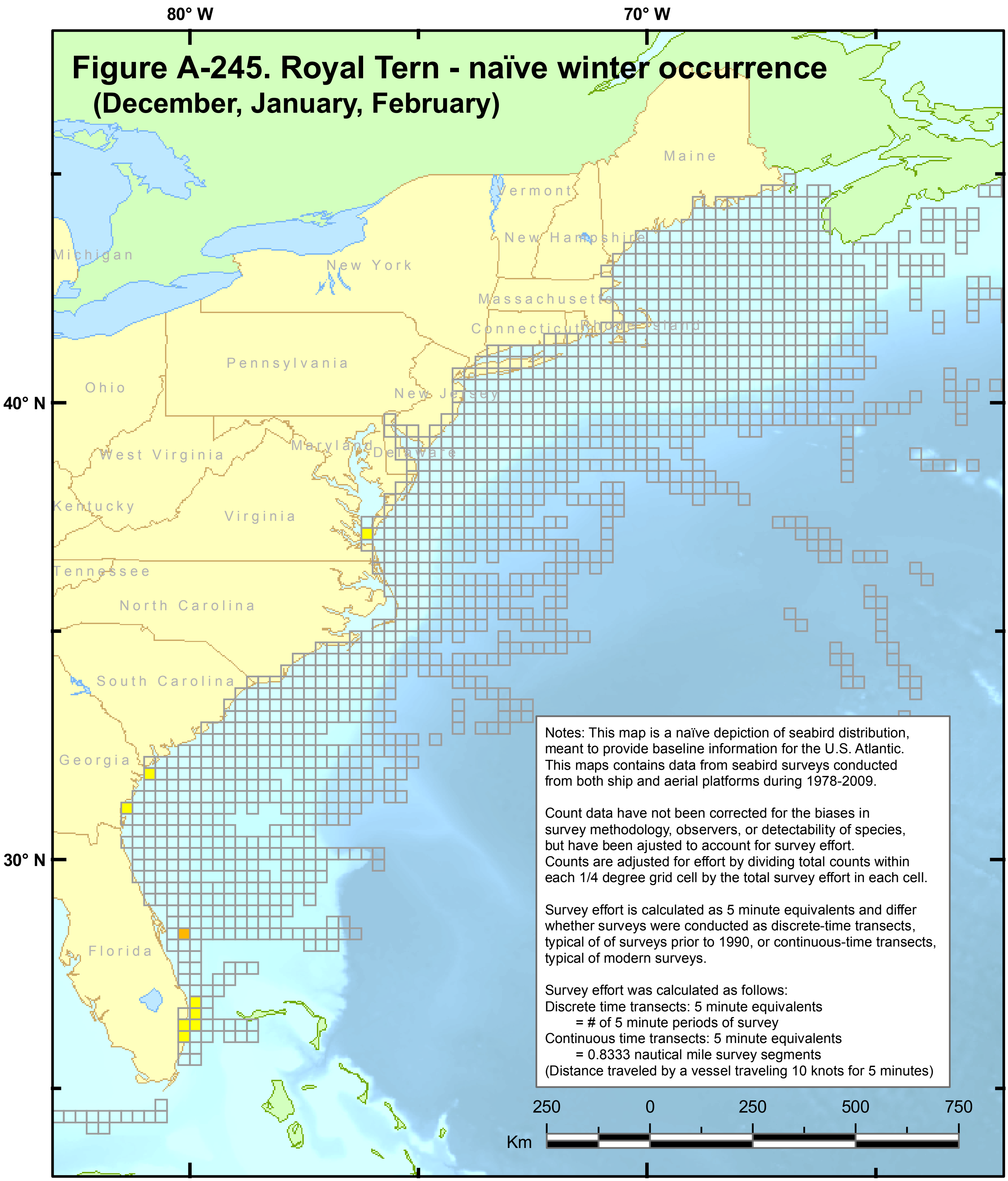
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-245. Royal Tern - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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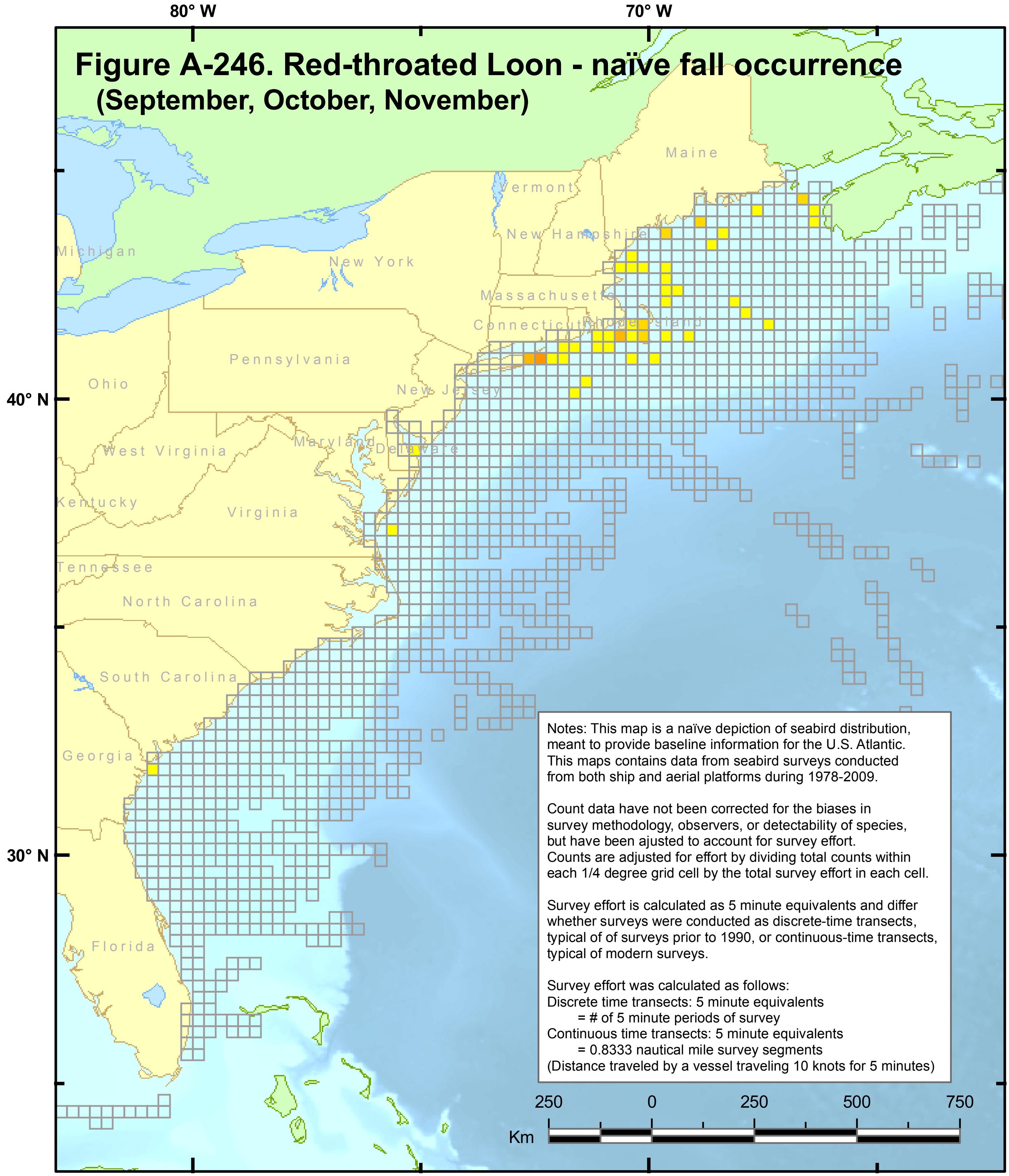


# Figure A-246. Red-throated Loon - naïve fall occurrence (September, October, November)

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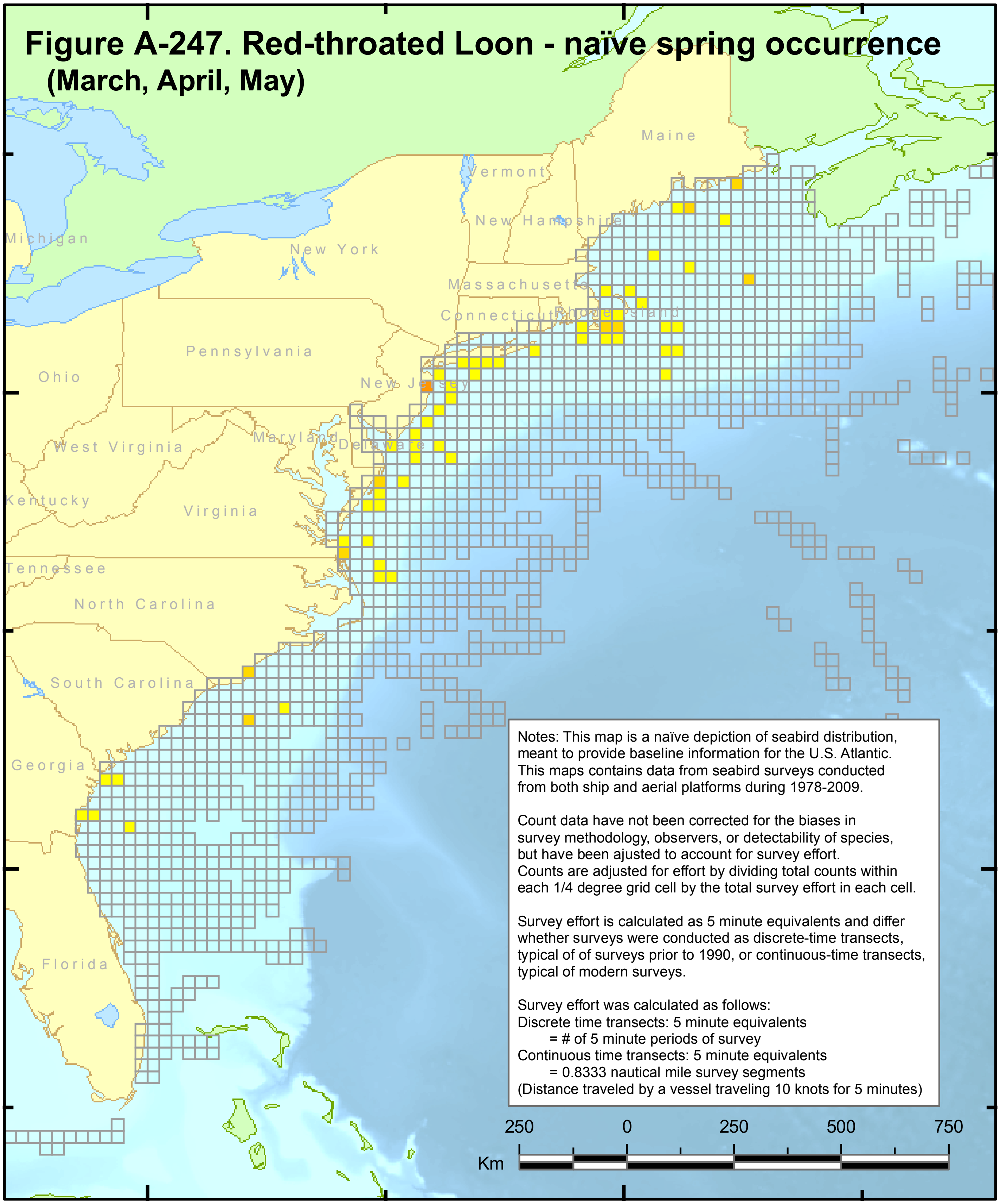
## Explanation - effort-adjusted counts

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 | | 0.1 - 0.25 | | 0.5 - 1 | | 2 - 5 |
| | 0 - 0.1 | | 0.25 - 0.5 | | 1 - 2 | | >5 |

# Figure A-247. Red-throated Loon - naïve spring occurrence (March, April, May)

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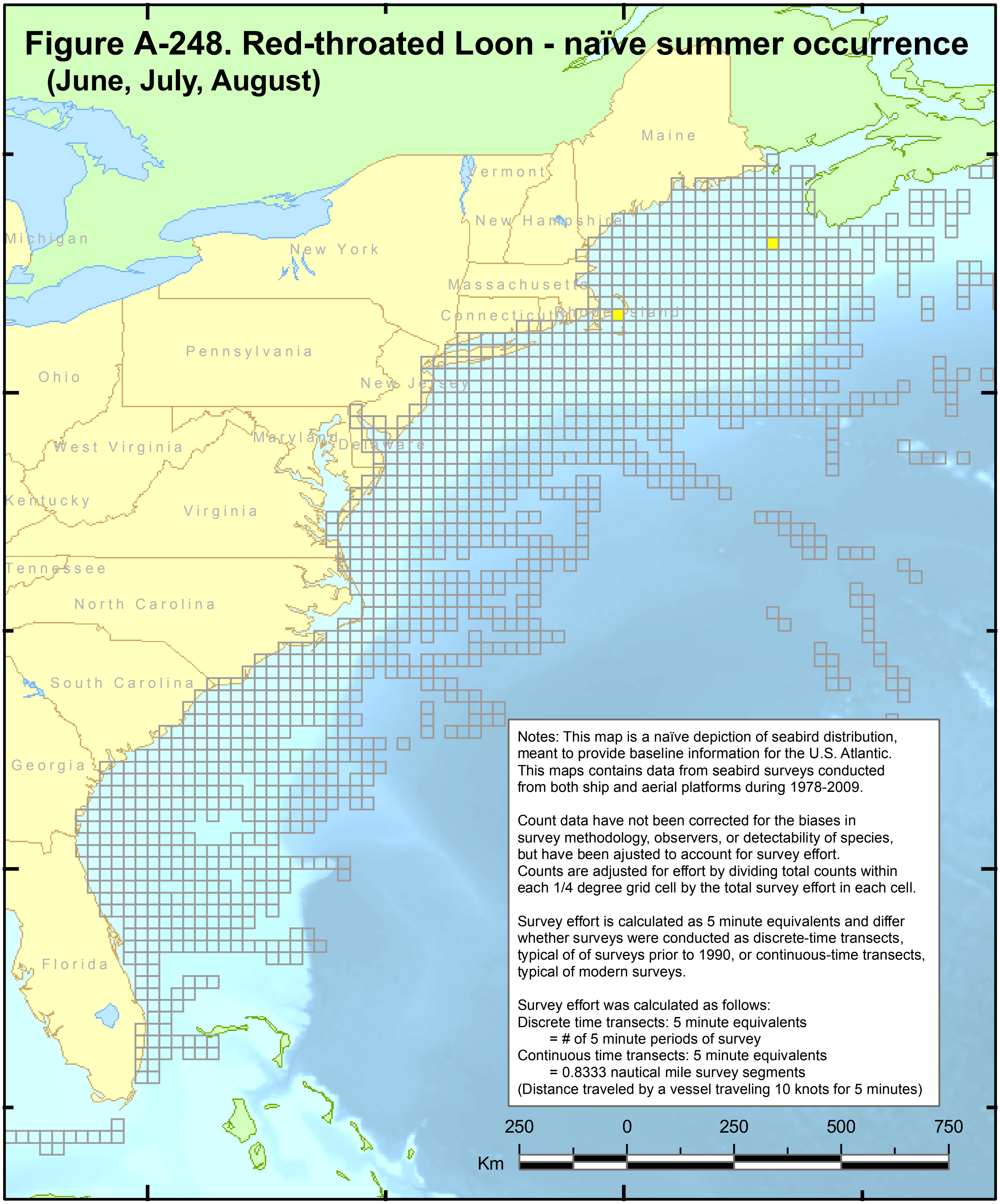
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-248. Red-throated Loon - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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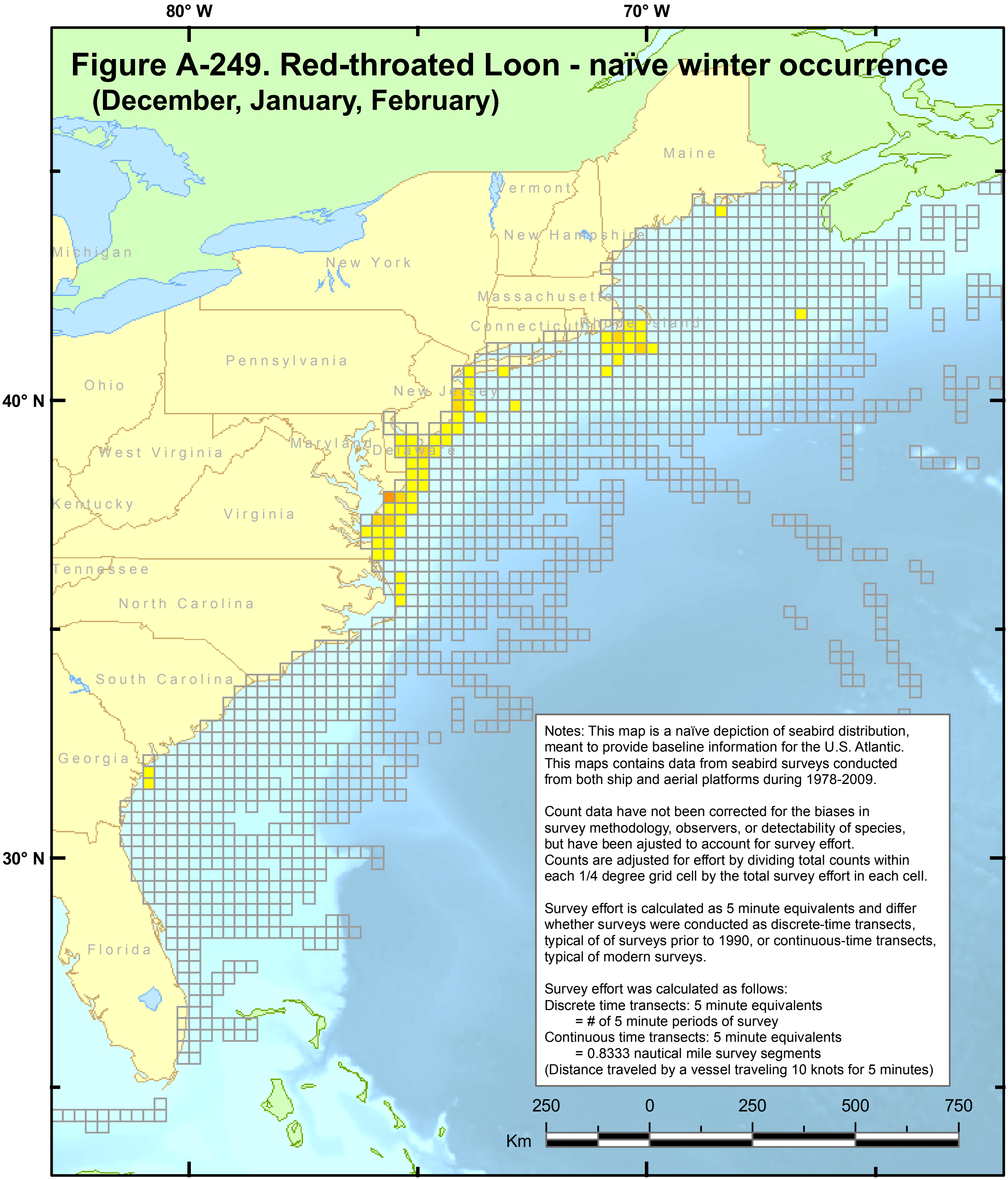
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-249. Red-throated Loon - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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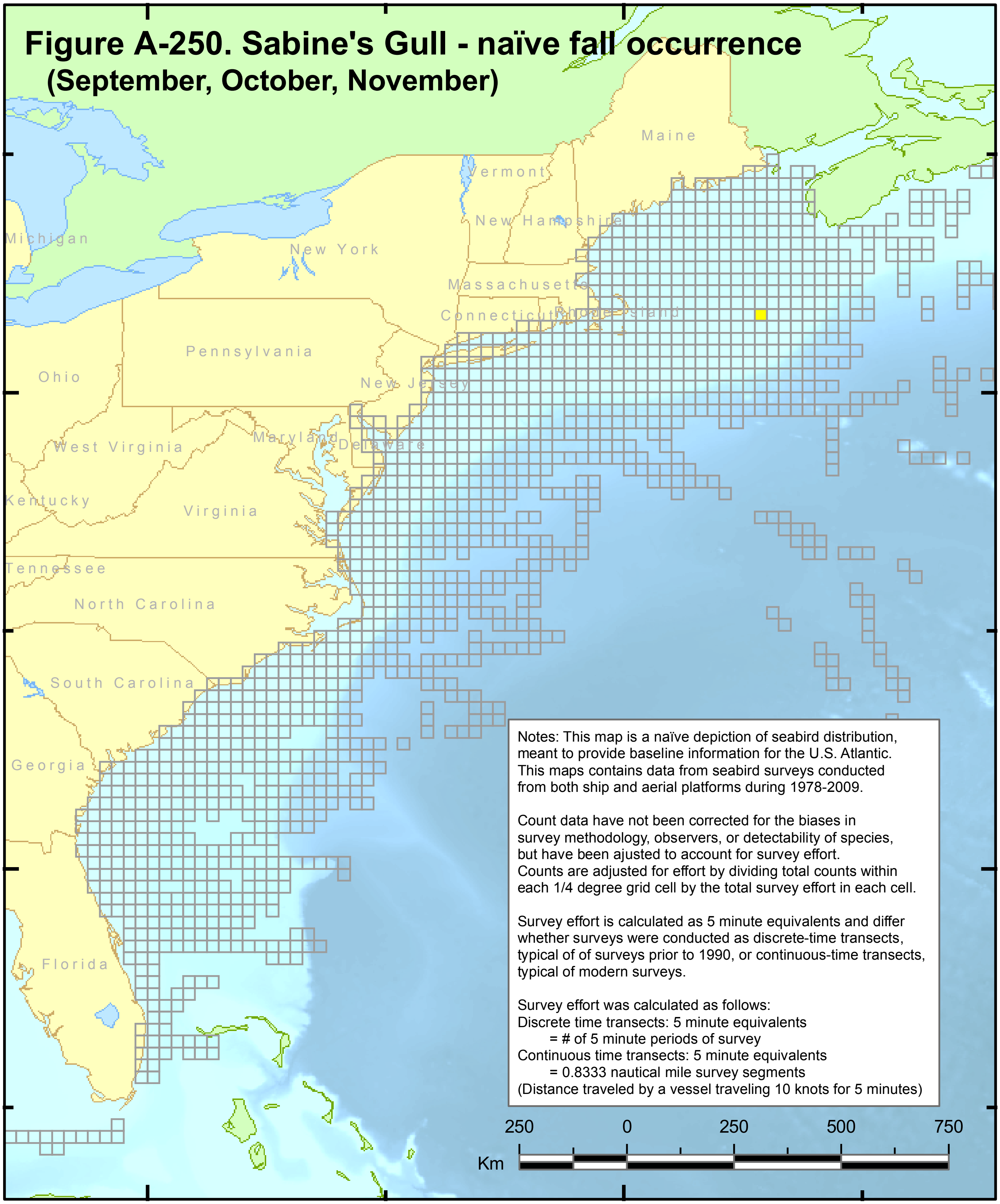
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-250. Sabine's Gull - naïve fall occurrence
## (September, October, November)

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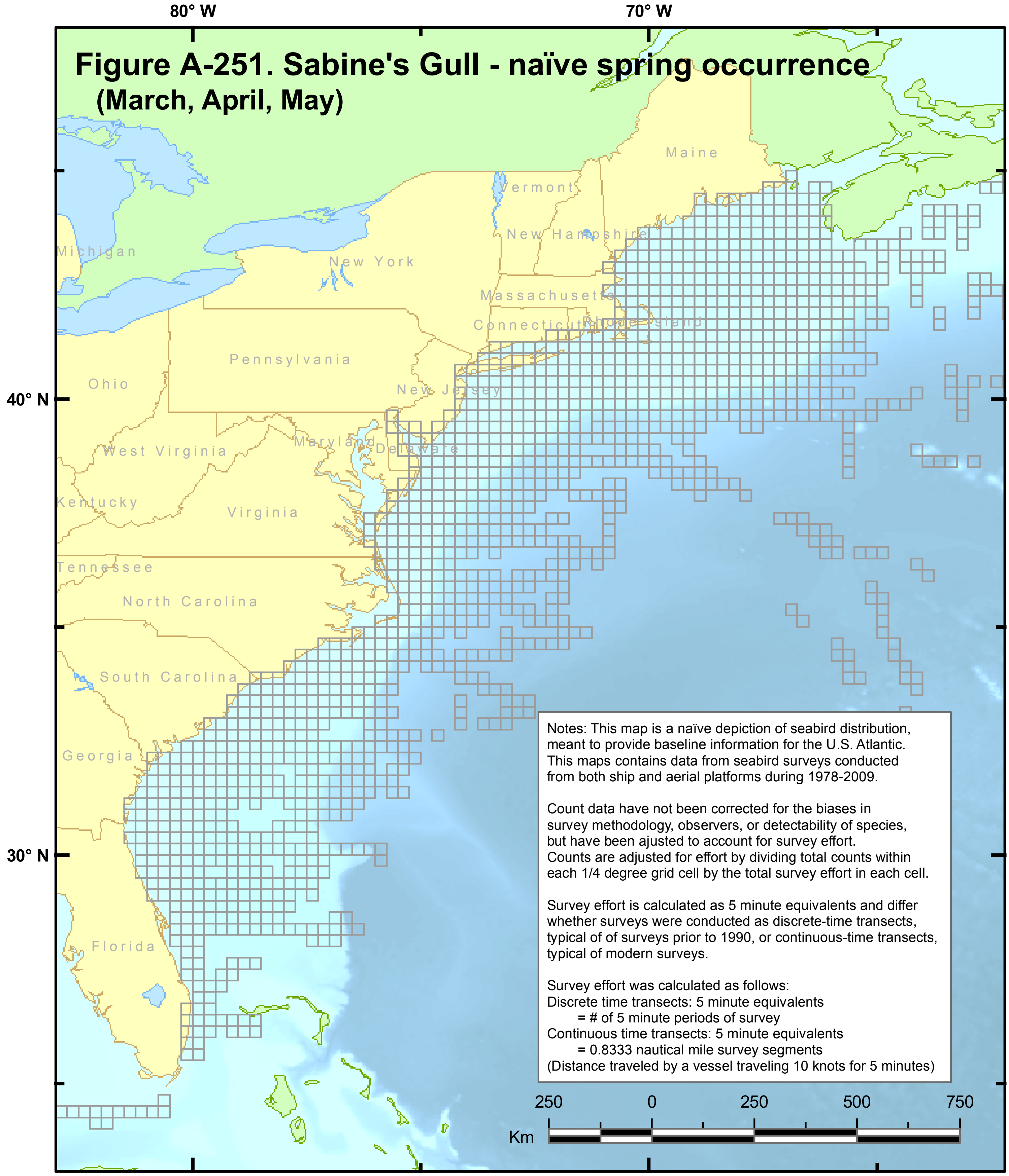
**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5




# Figure A-251. Sabine's Gull - naïve spring occurrence (March, April, May)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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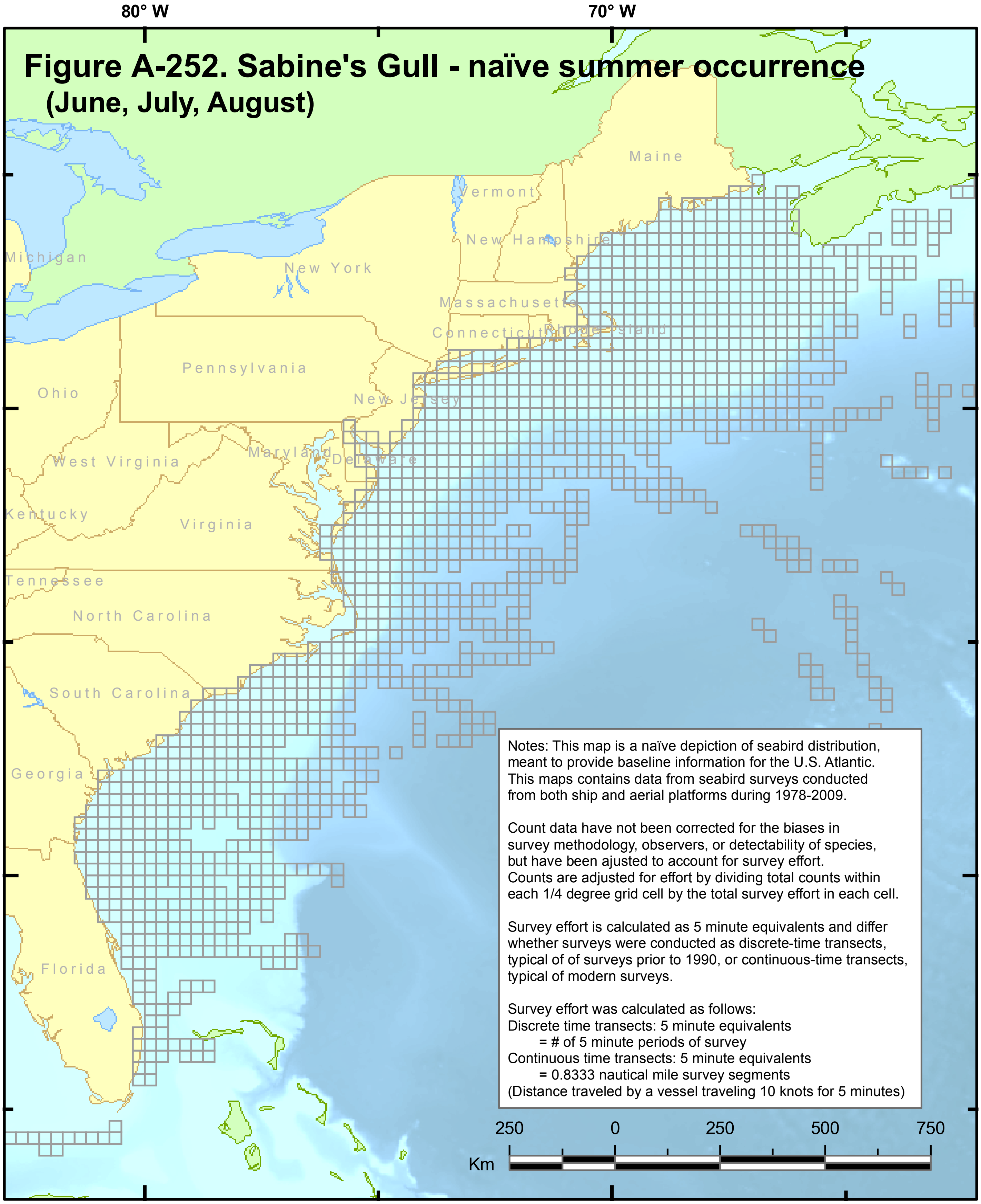
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-252. Sabine's Gull - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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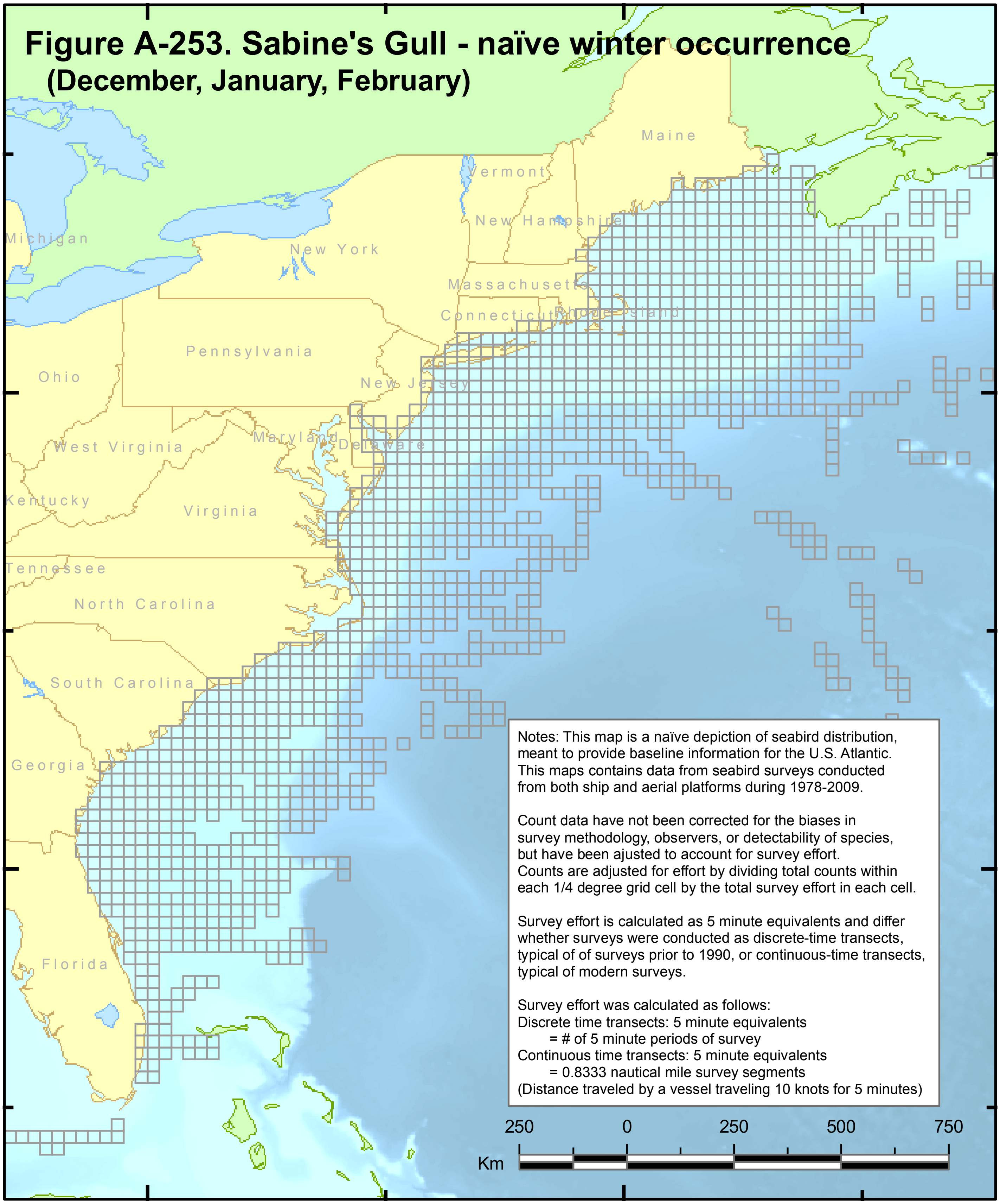
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5




# Figure A-253. Sabine's Gull - naïve winter occurrence (December, January, February)

Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

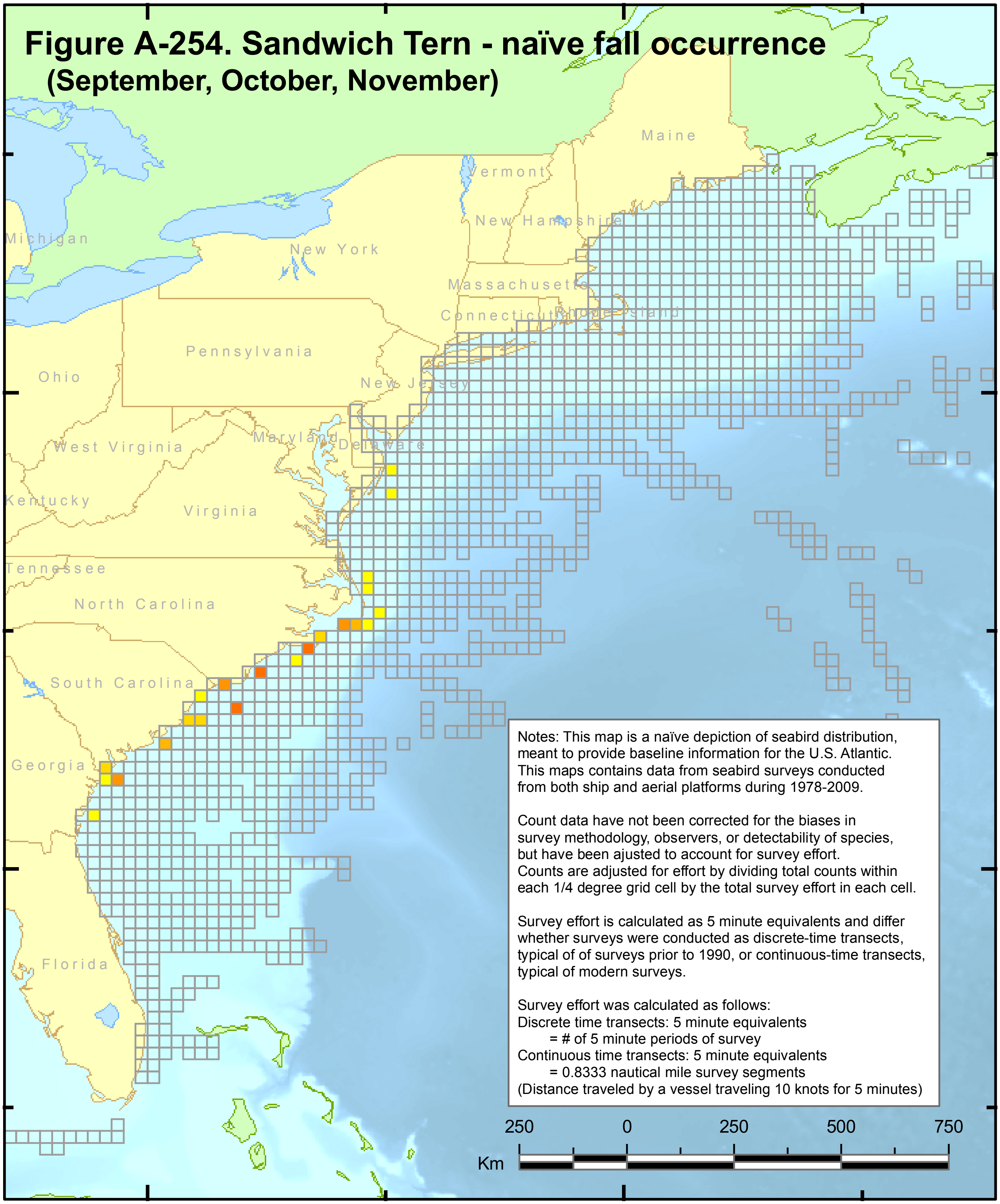


**Figure A-254. Sandwich Tern - naïve fall occurrence (September, October, November)**

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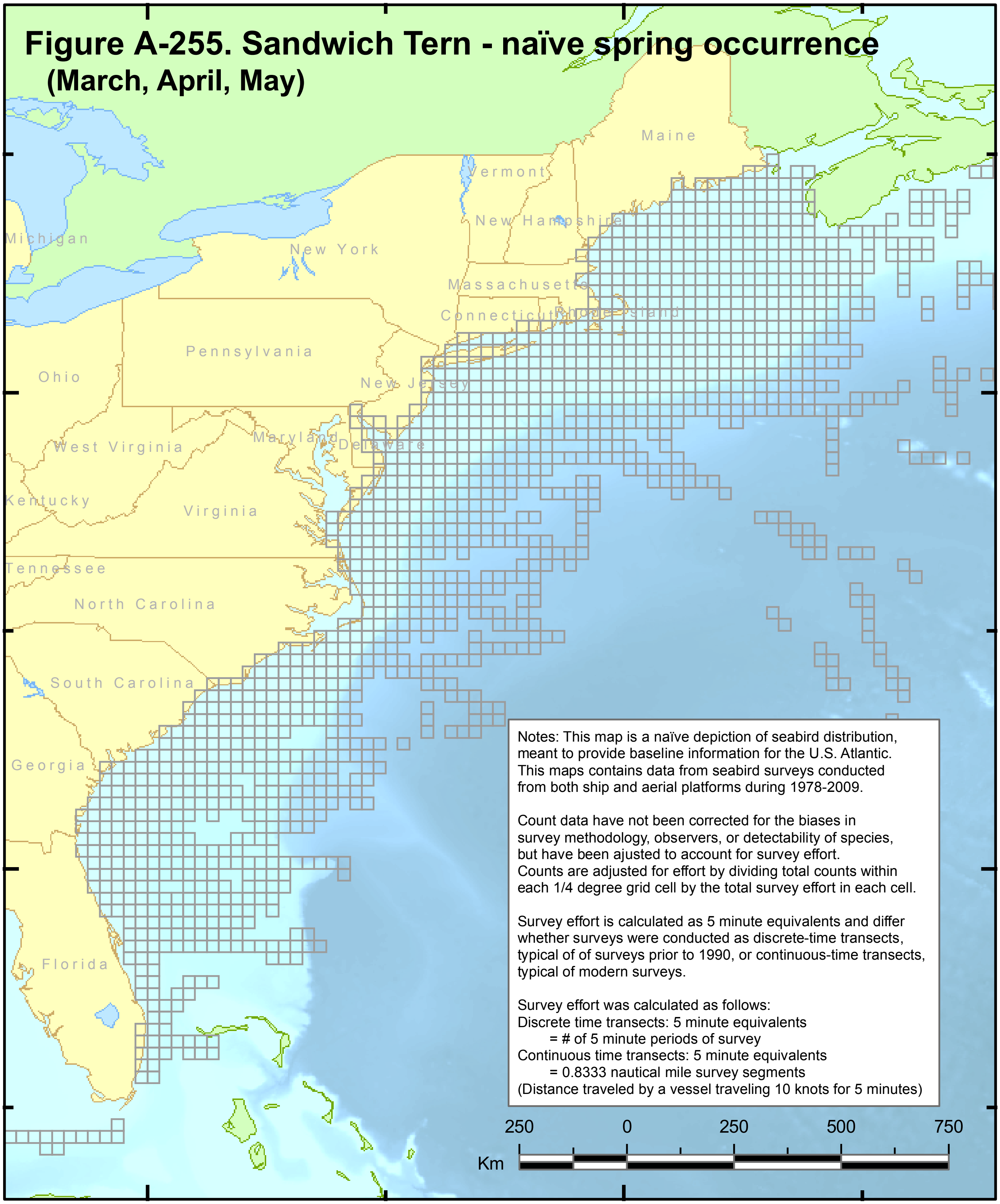
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-255. Sandwich Tern - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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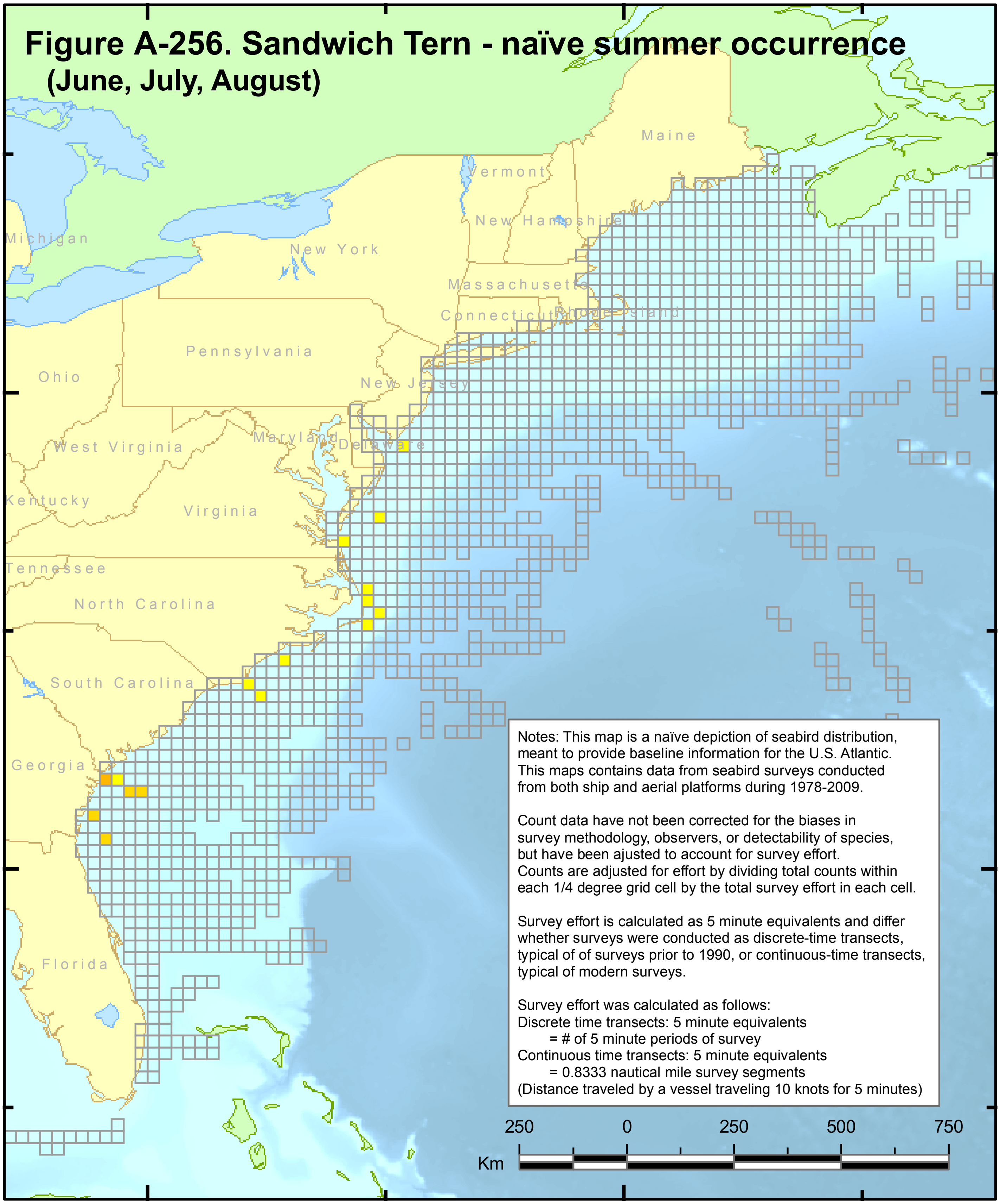
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-256. Sandwich Tern - naïve summer occurrence (June, July, August)




## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5

0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

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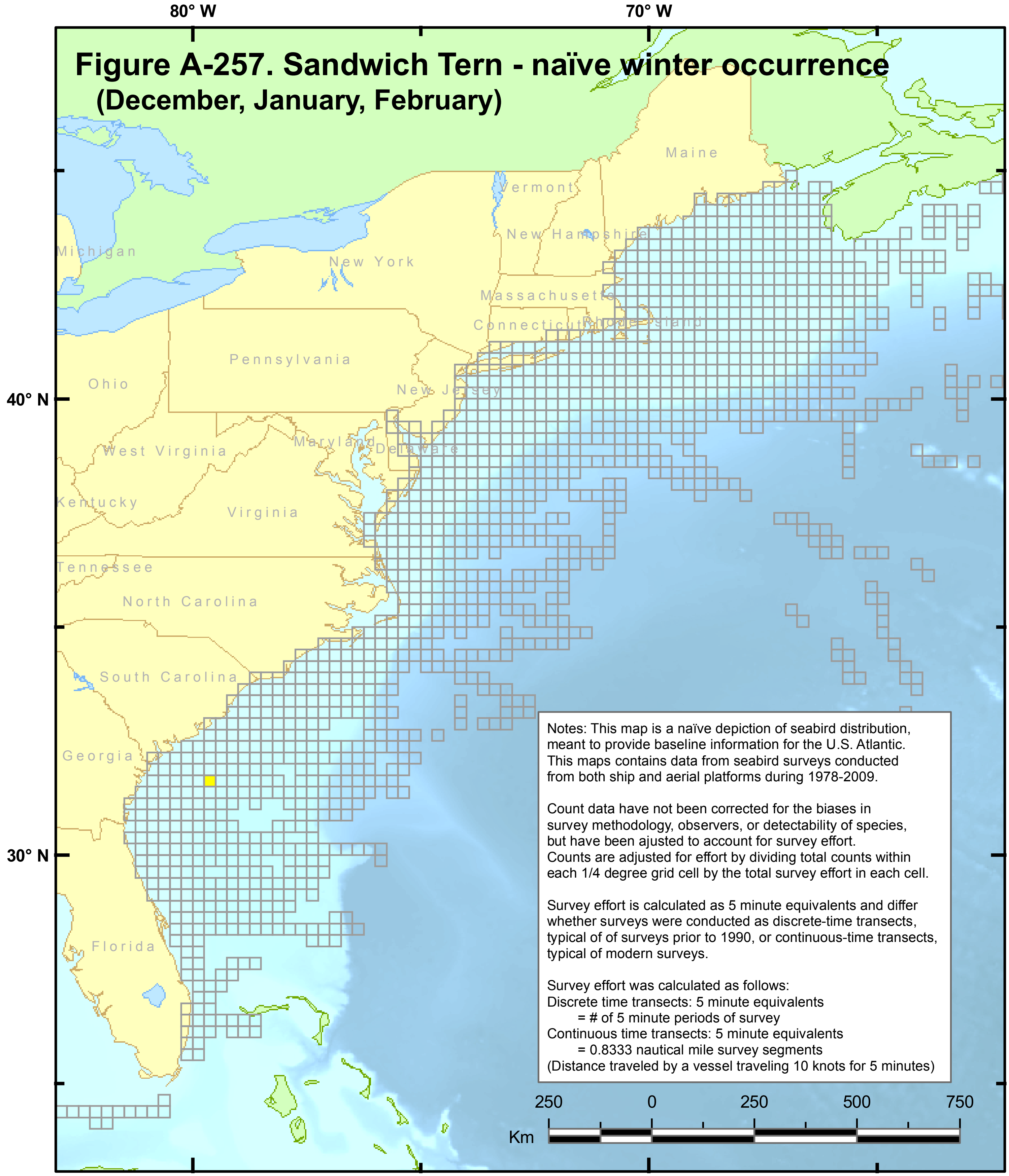
# Figure A-257. Sandwich Tern - naïve winter occurrence
(December, January, February)

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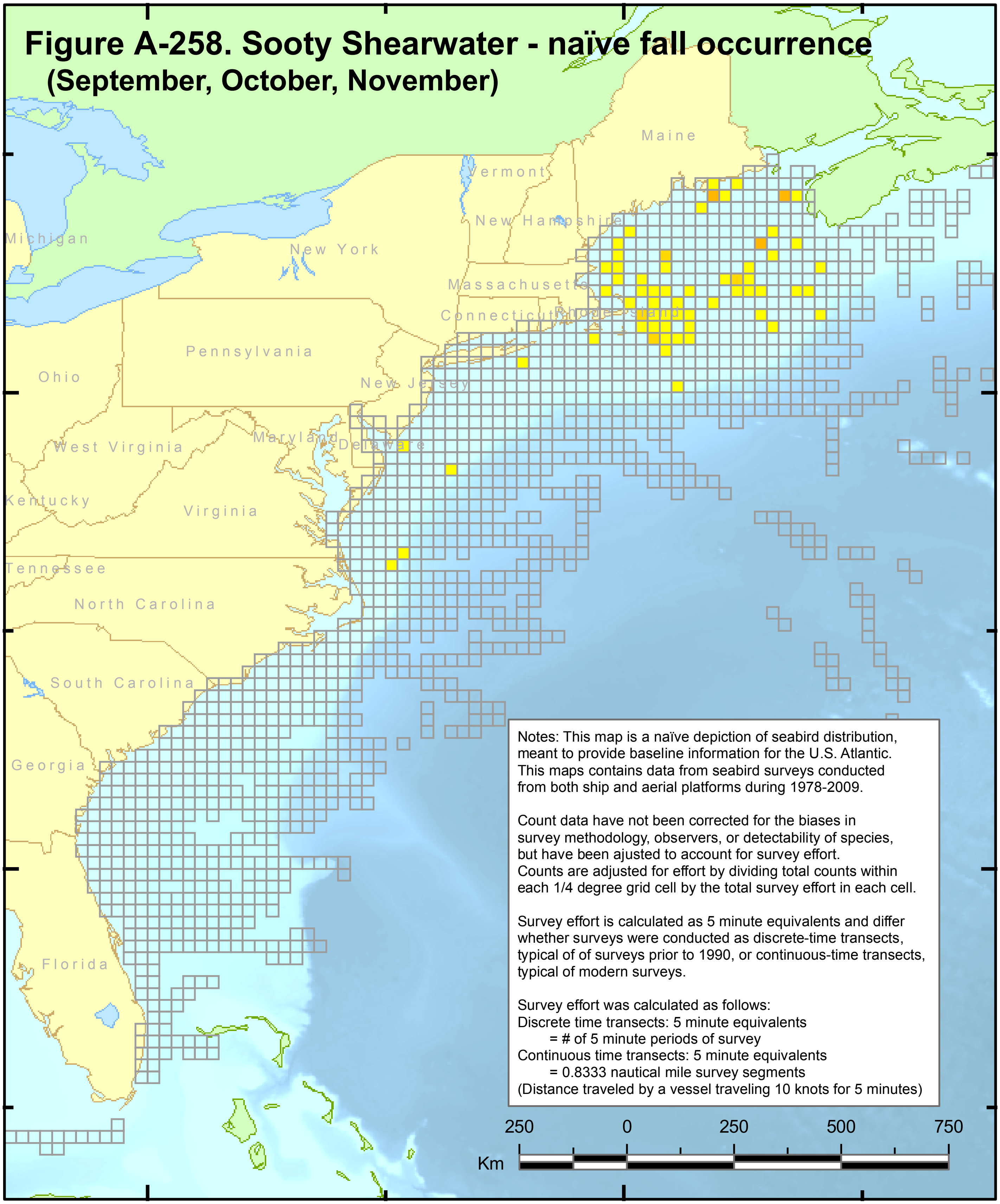
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-258. Sooty Shearwater - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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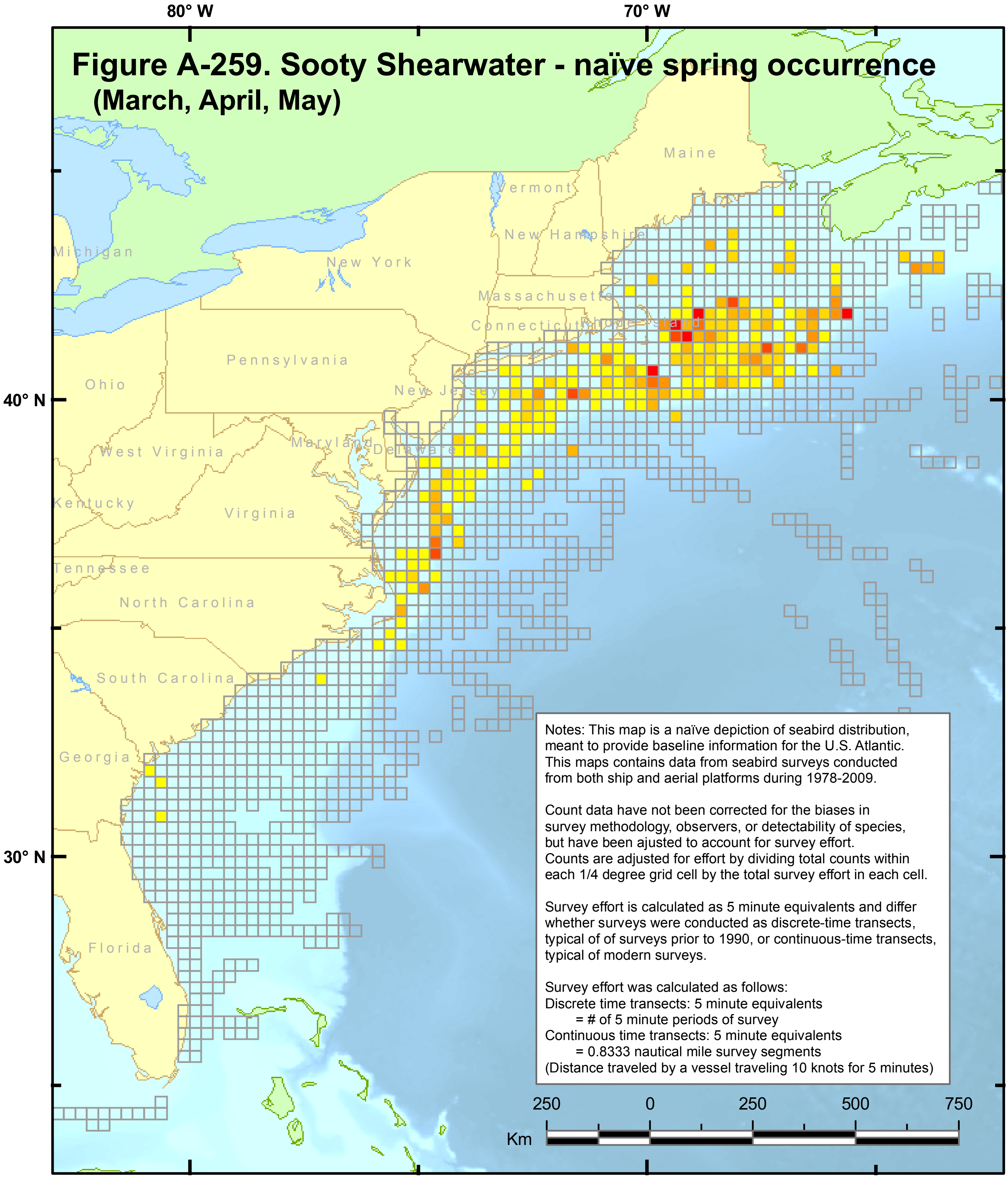
# Figure A-259. Sooty Shearwater - naïve spring occurrence (March, April, May)

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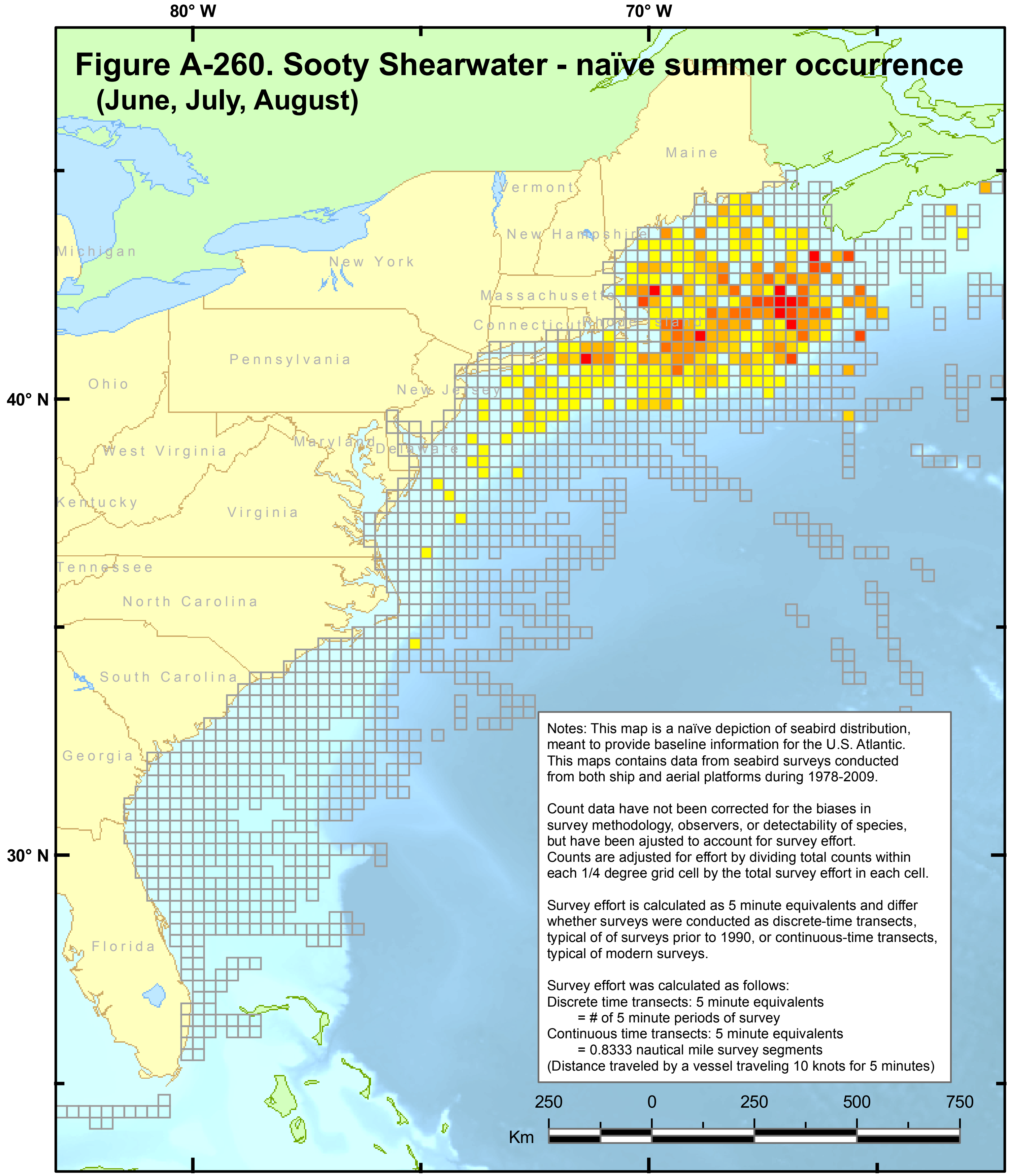
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 22.2 |

# Figure A-260. Sooty Shearwater - naïve summer occurrence (June, July, August)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 116.8 |

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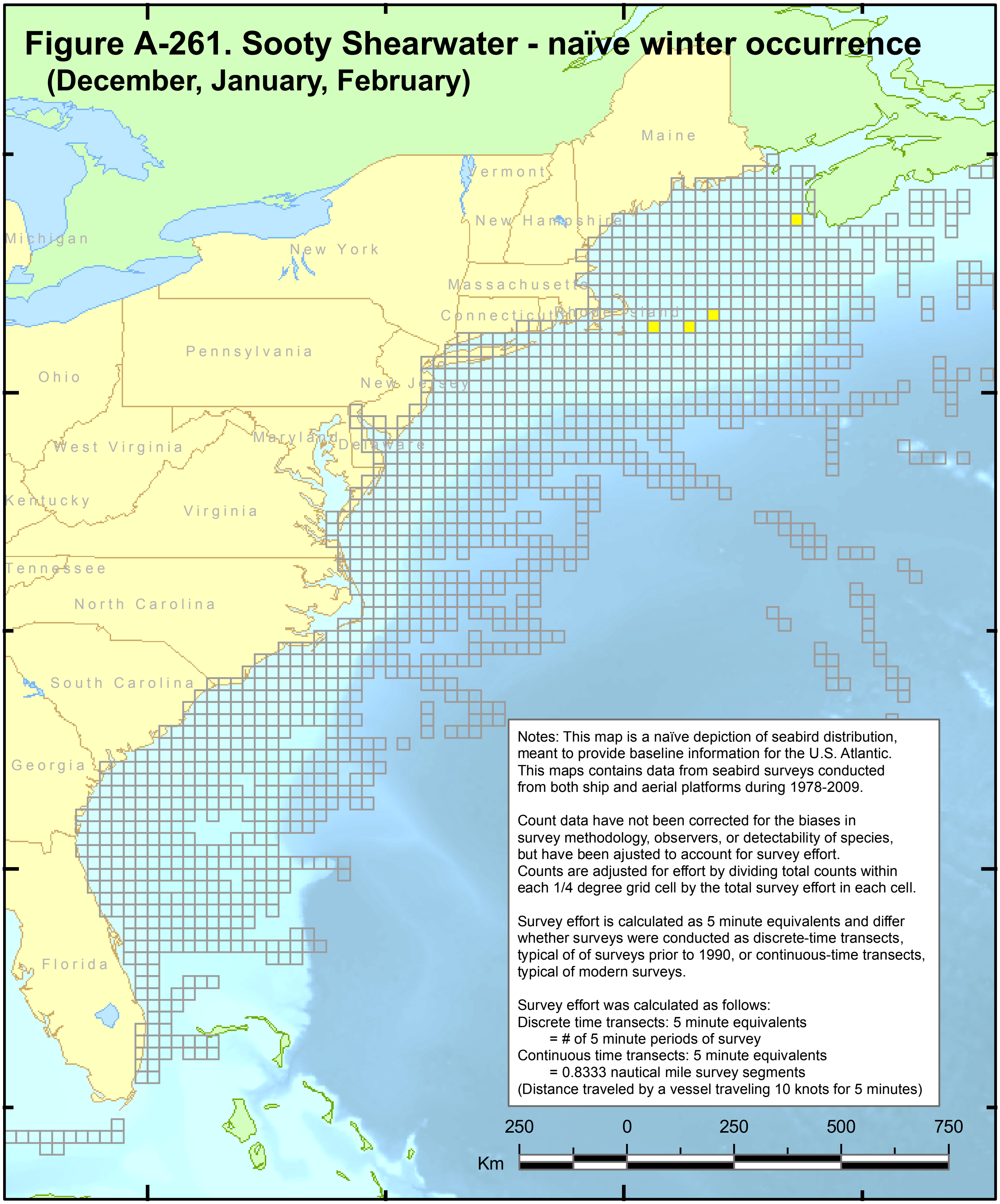


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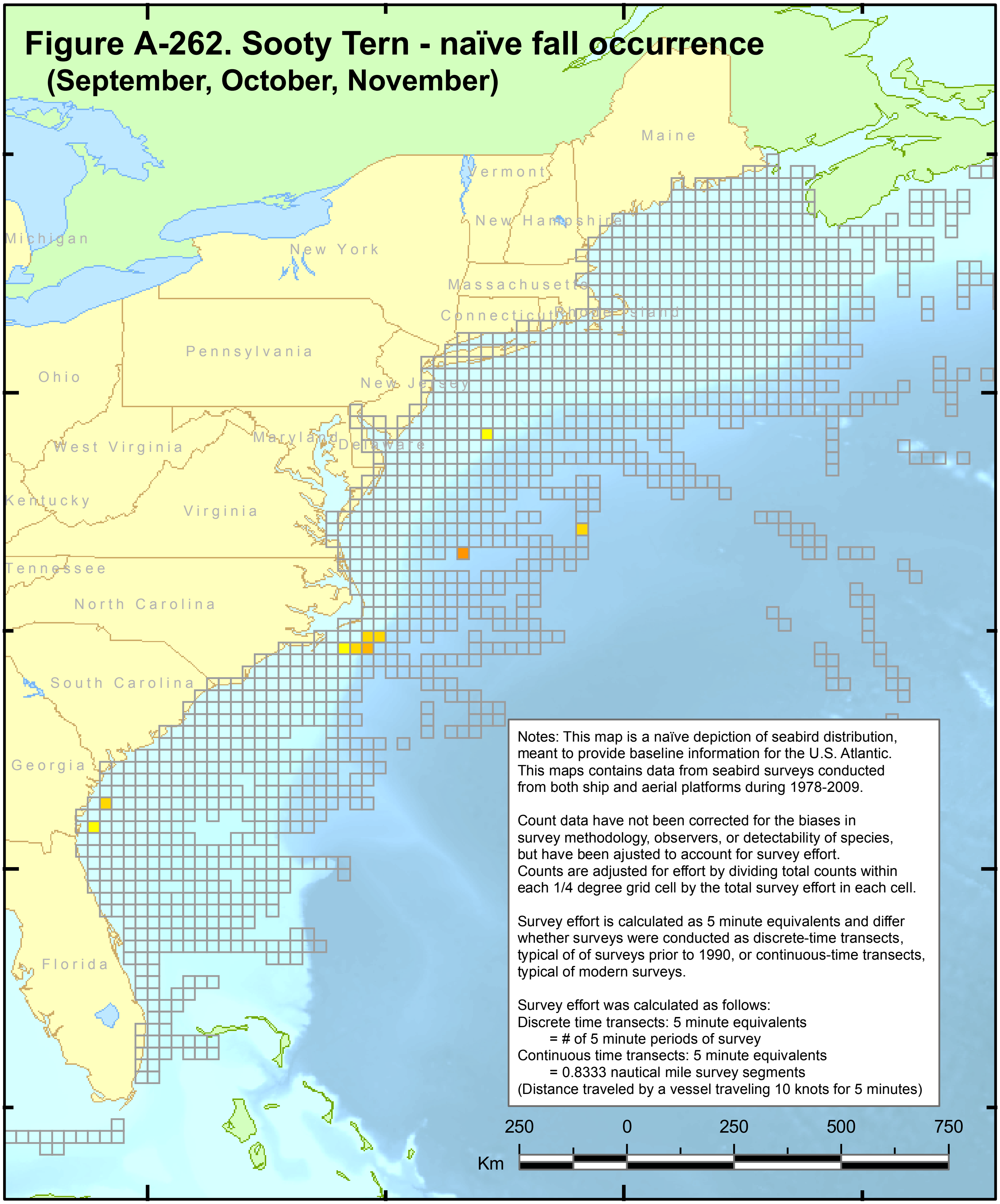
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-262. Sooty Tern - naïve fall occurrence (September, October, November)

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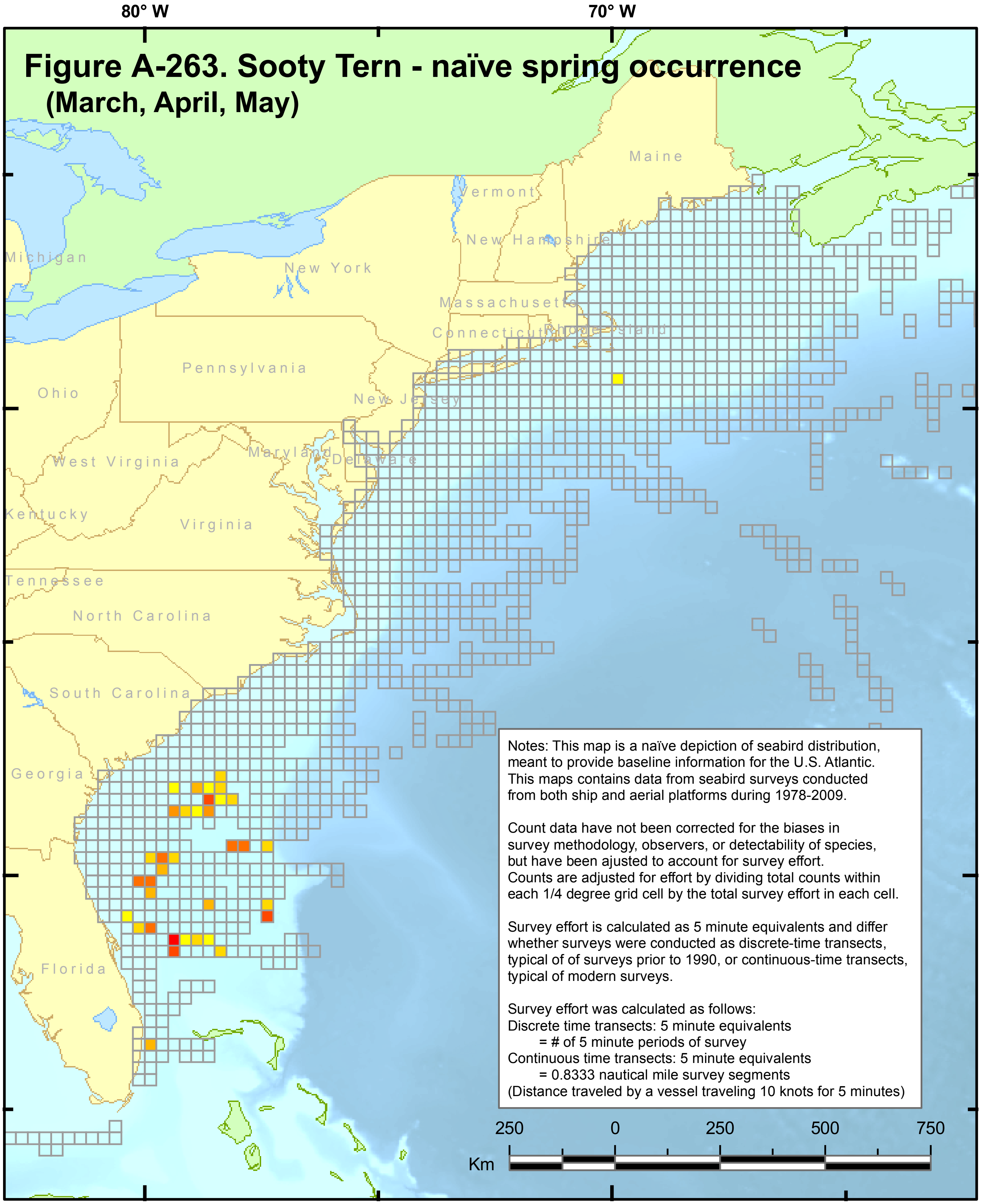
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-263. Sooty Tern - naïve spring occurrence (March, April, May)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 21.7 |

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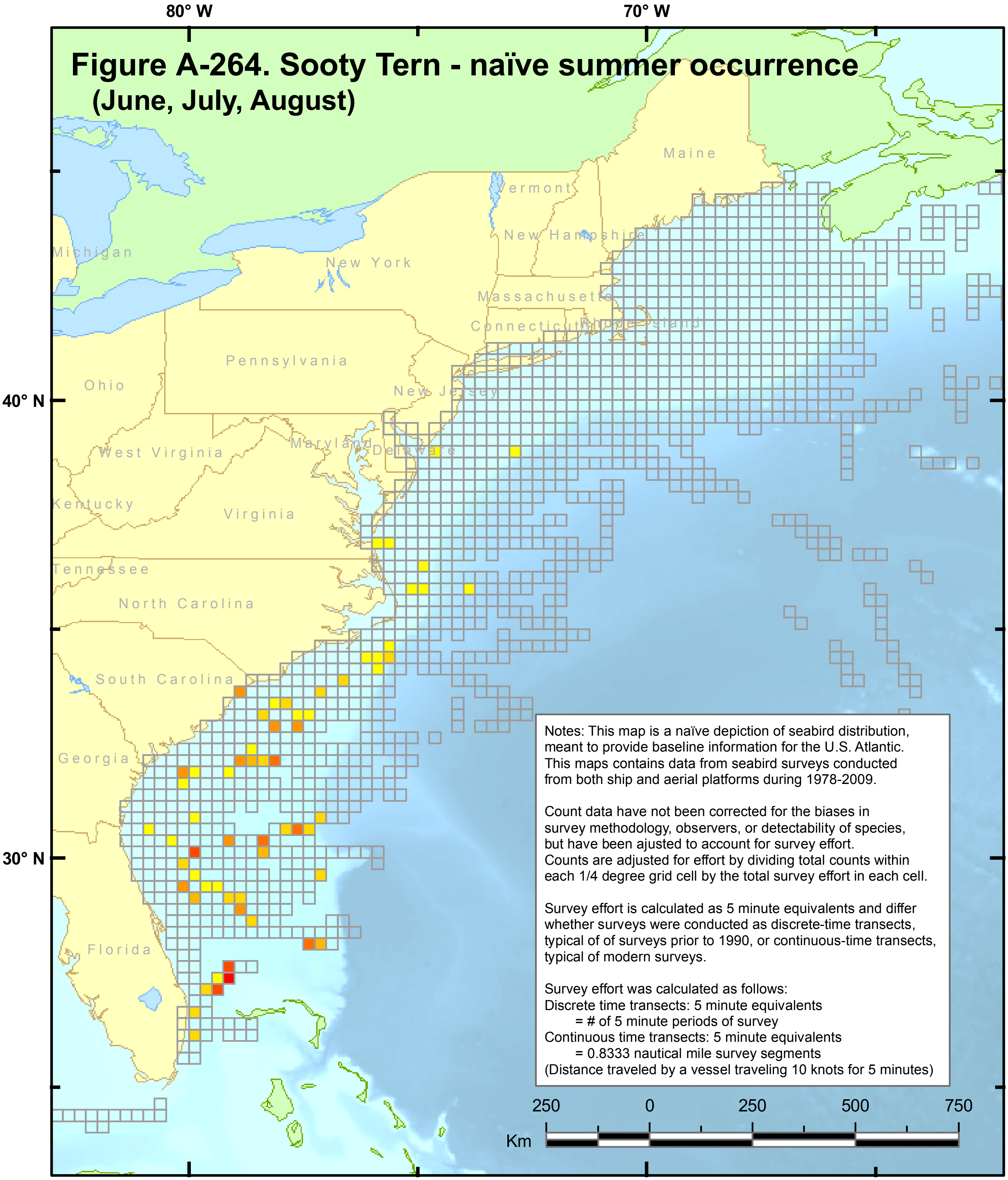
# Figure A-264. Sooty Tern - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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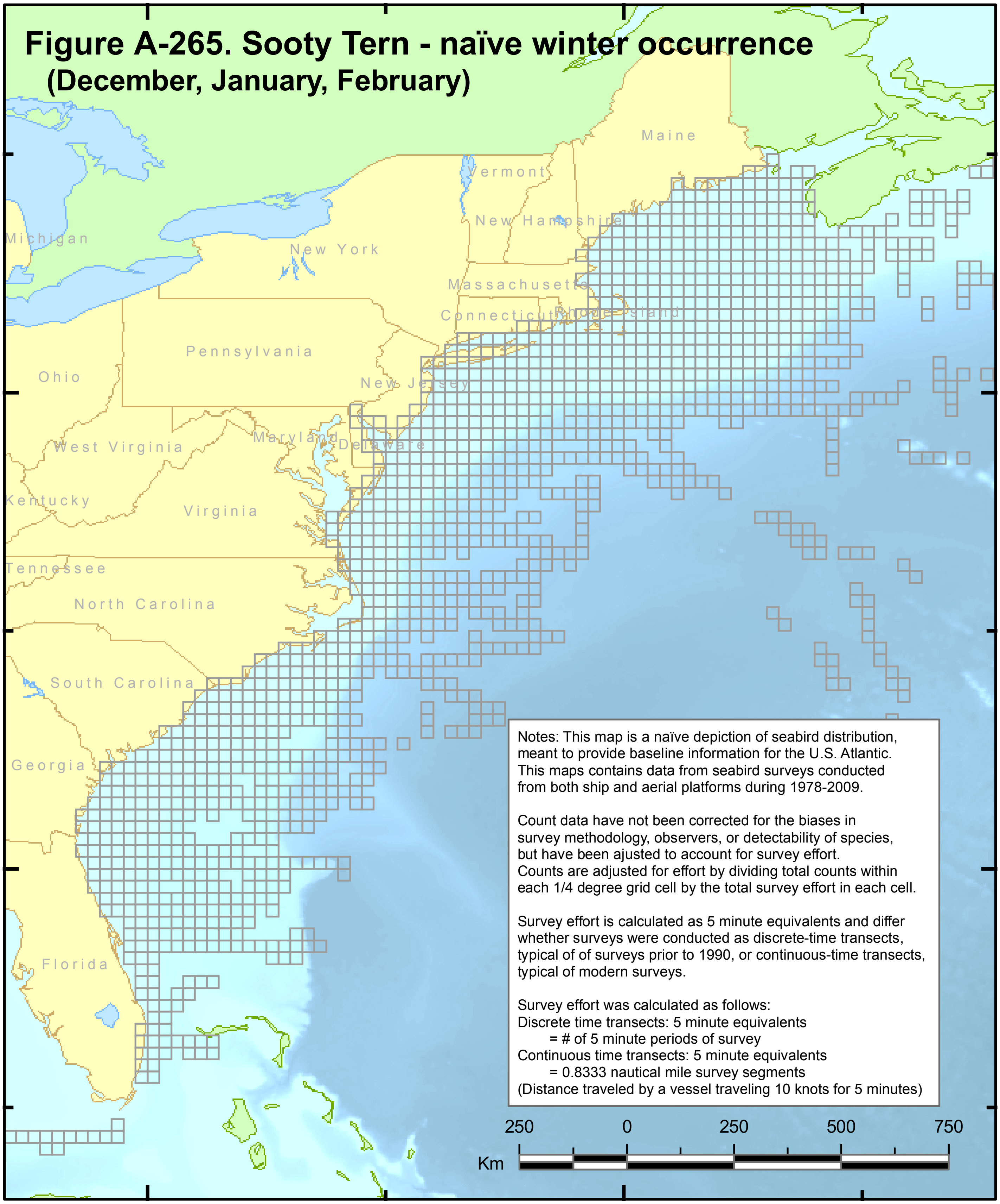
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 15 |

# Figure A-265. Sooty Tern - naïve winter occurrence
## (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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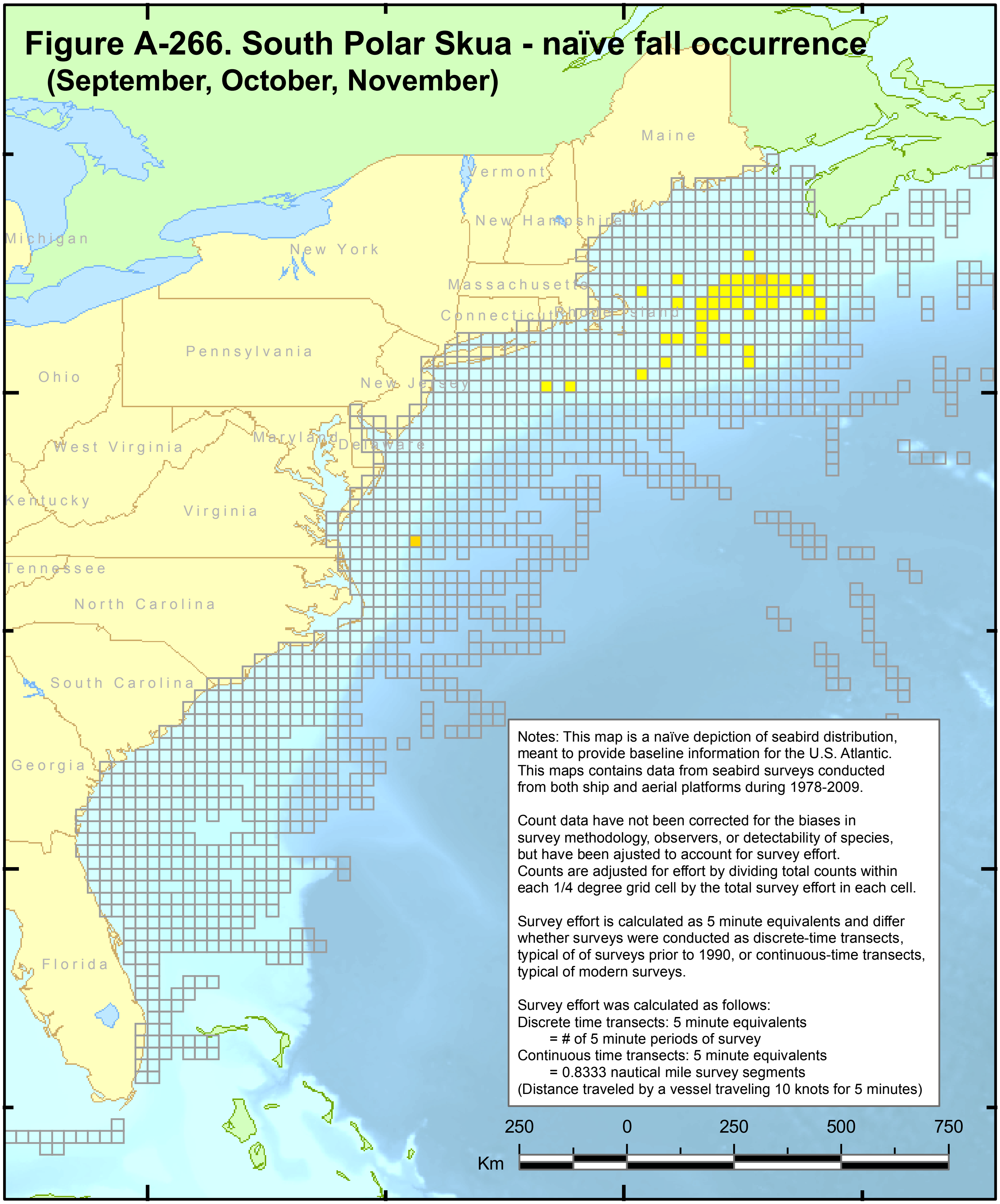
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-266. South Polar Skua - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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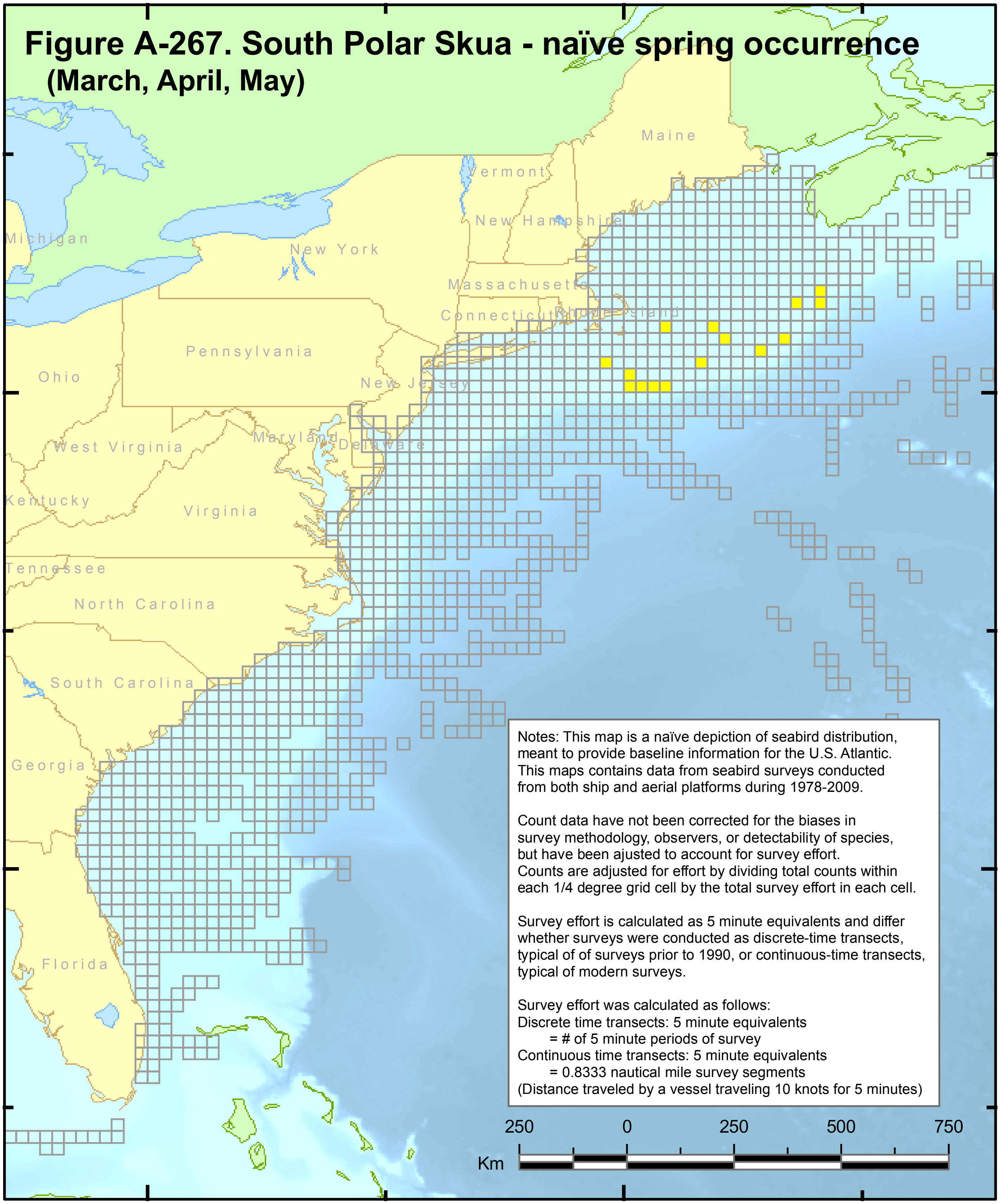
# Figure A-267. South Polar Skua - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

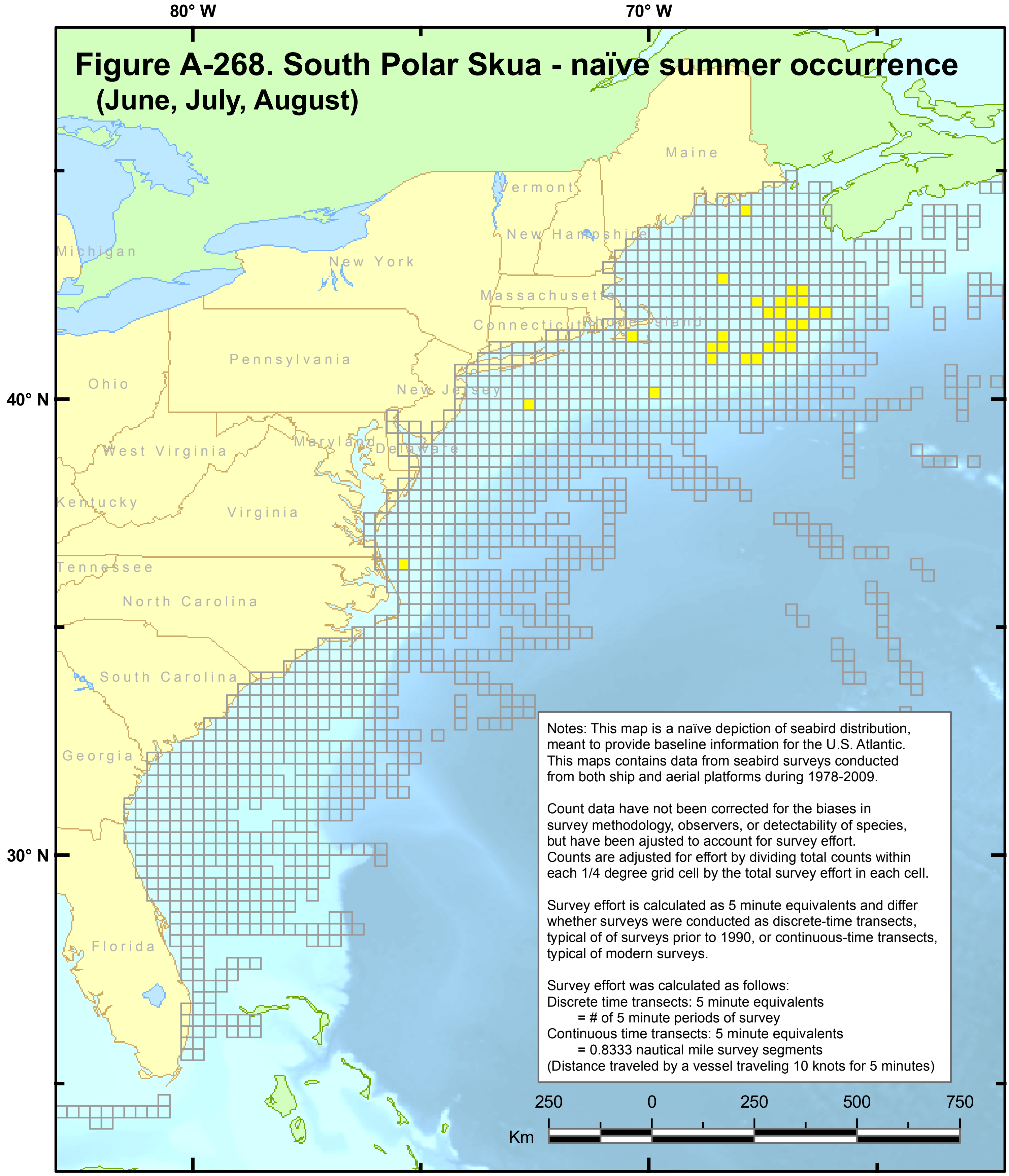


**Figure A-268. South Polar Skua - naïve summer occurrence (June, July, August)**

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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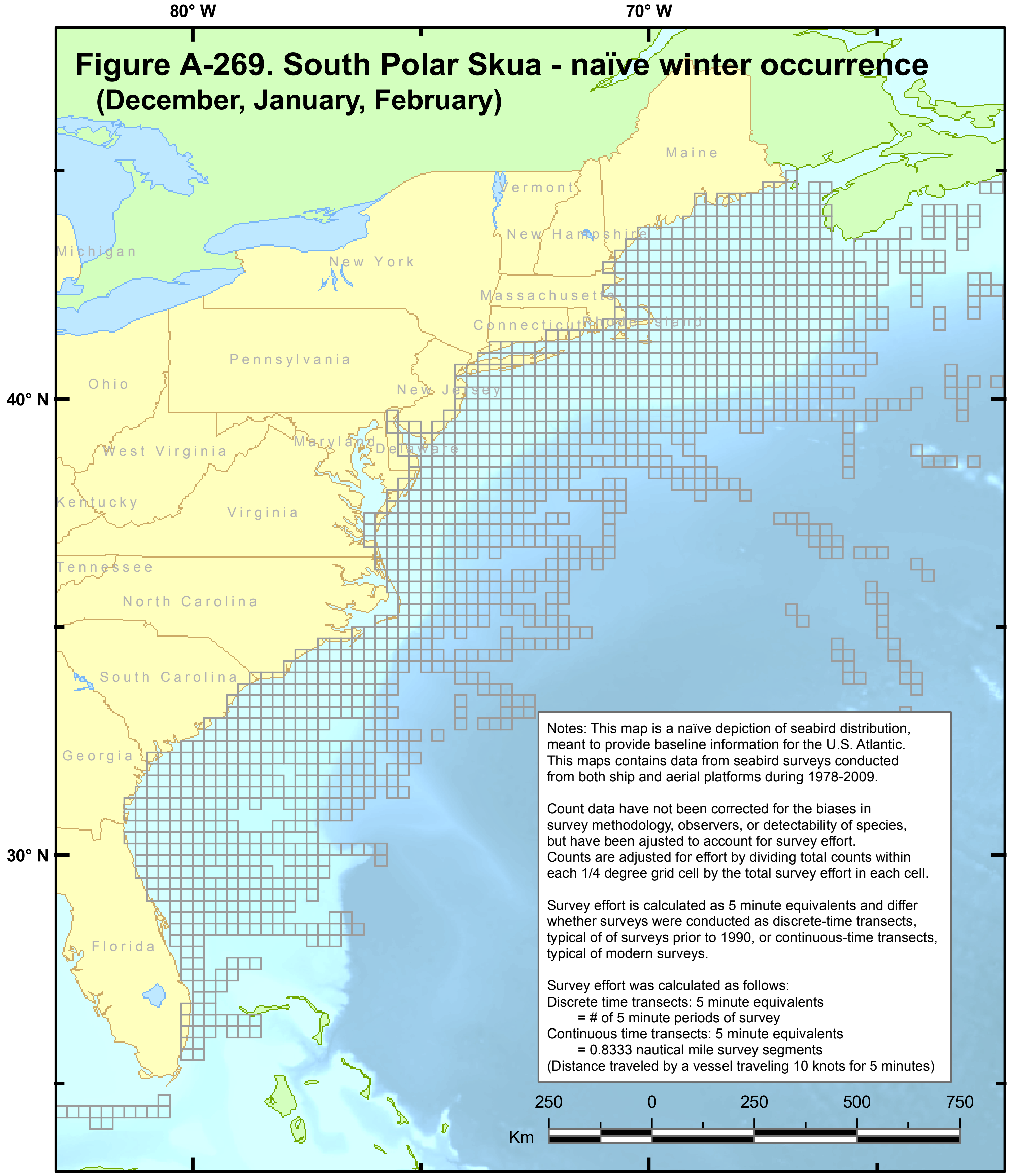
# Figure A-269. South Polar Skua - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

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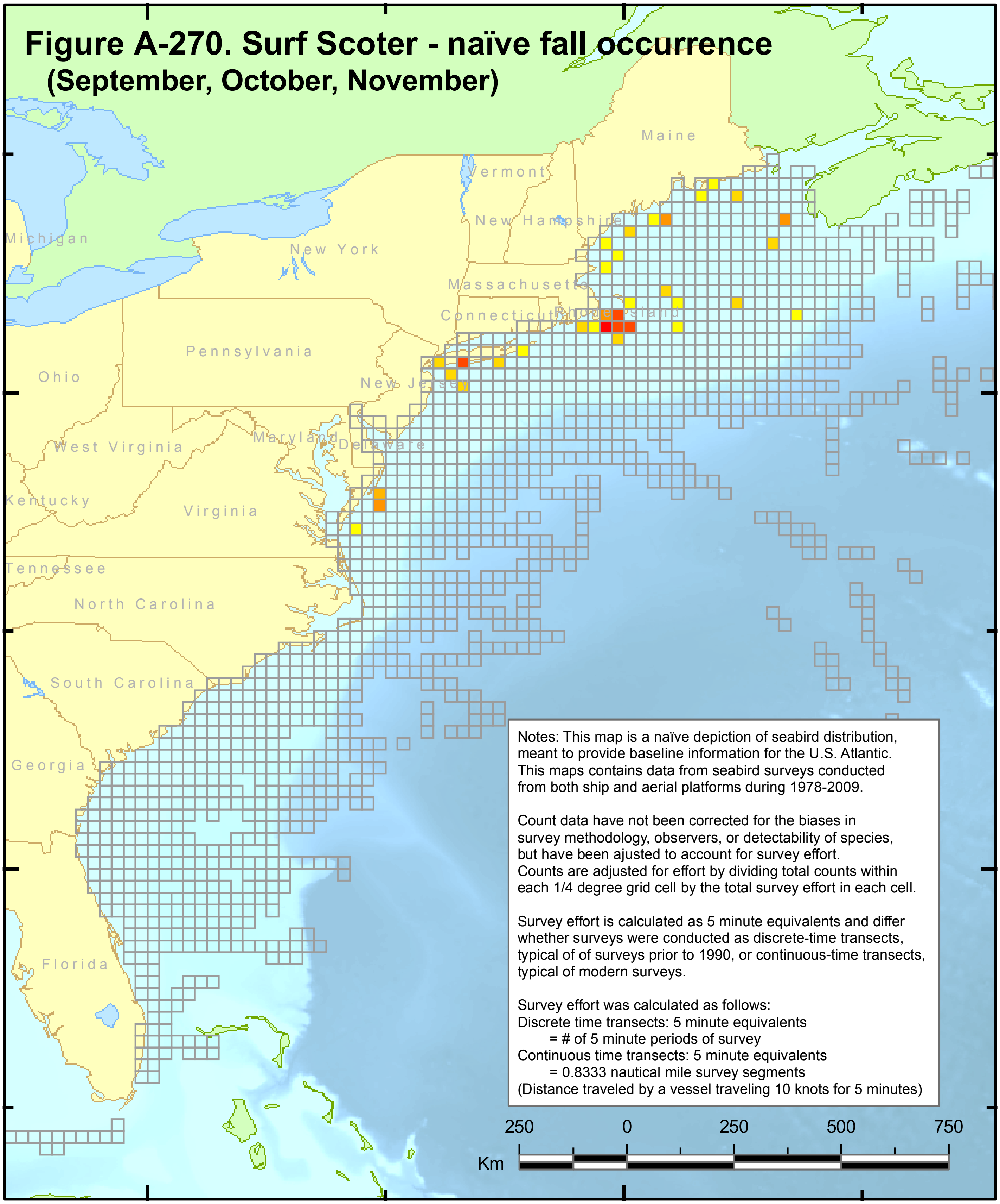
# Figure A-270. Surf Scoter - naïve fall occurrence (September, October, November)




**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 5.6

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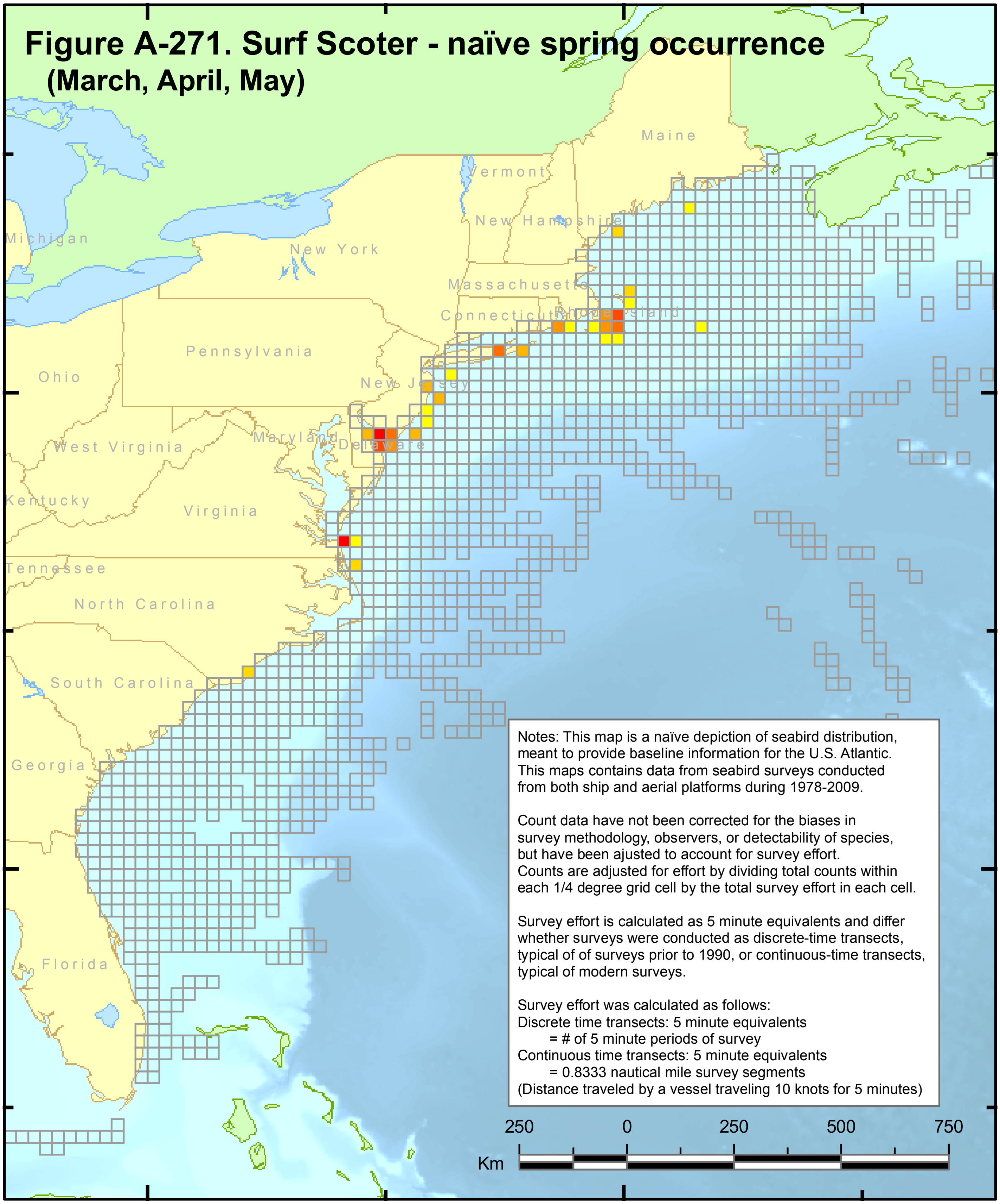
# Figure A-271. Surf Scoter - naïve spring occurrence (March, April, May)

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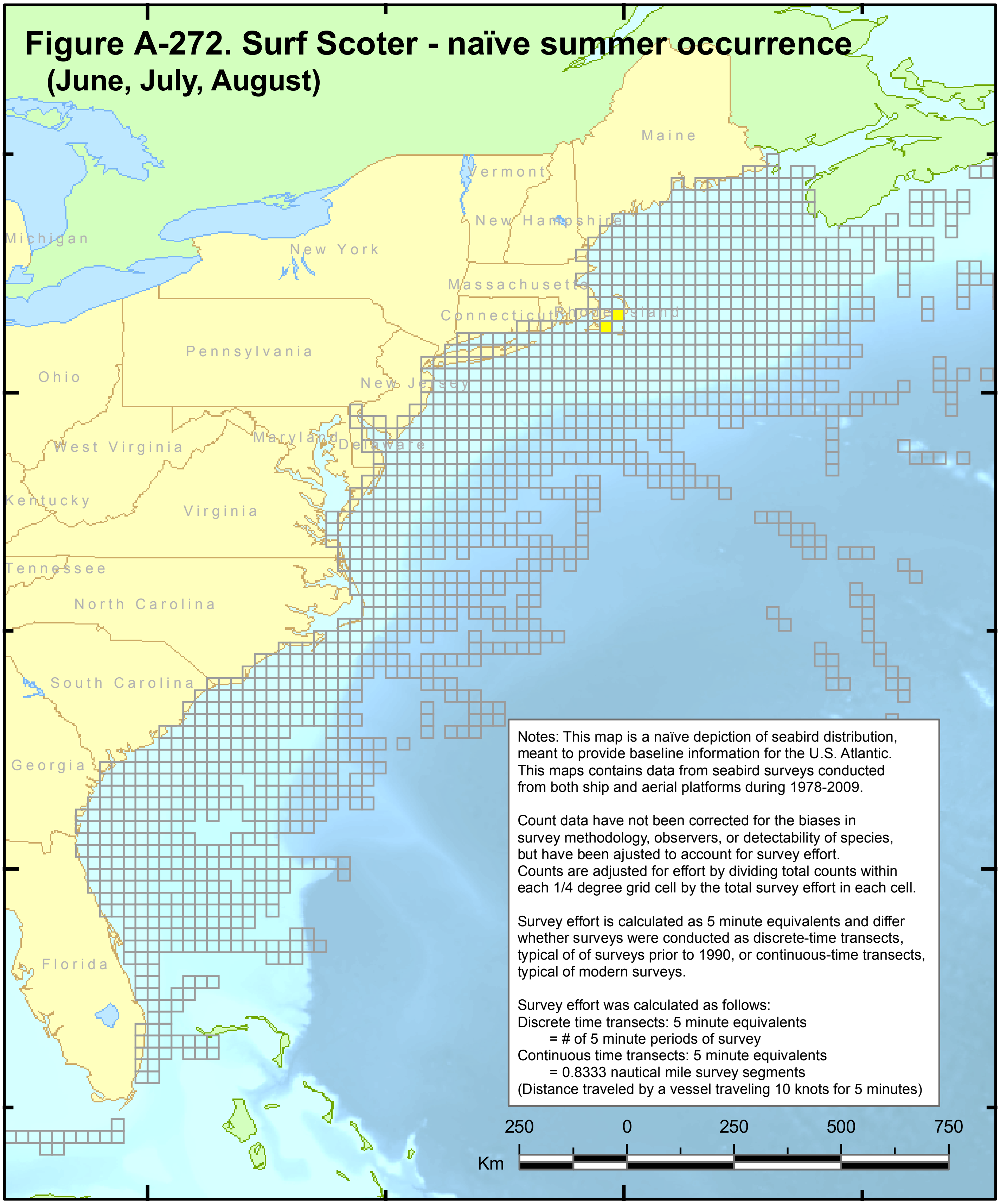
## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 7.3

# Figure A-272. Surf Scoter - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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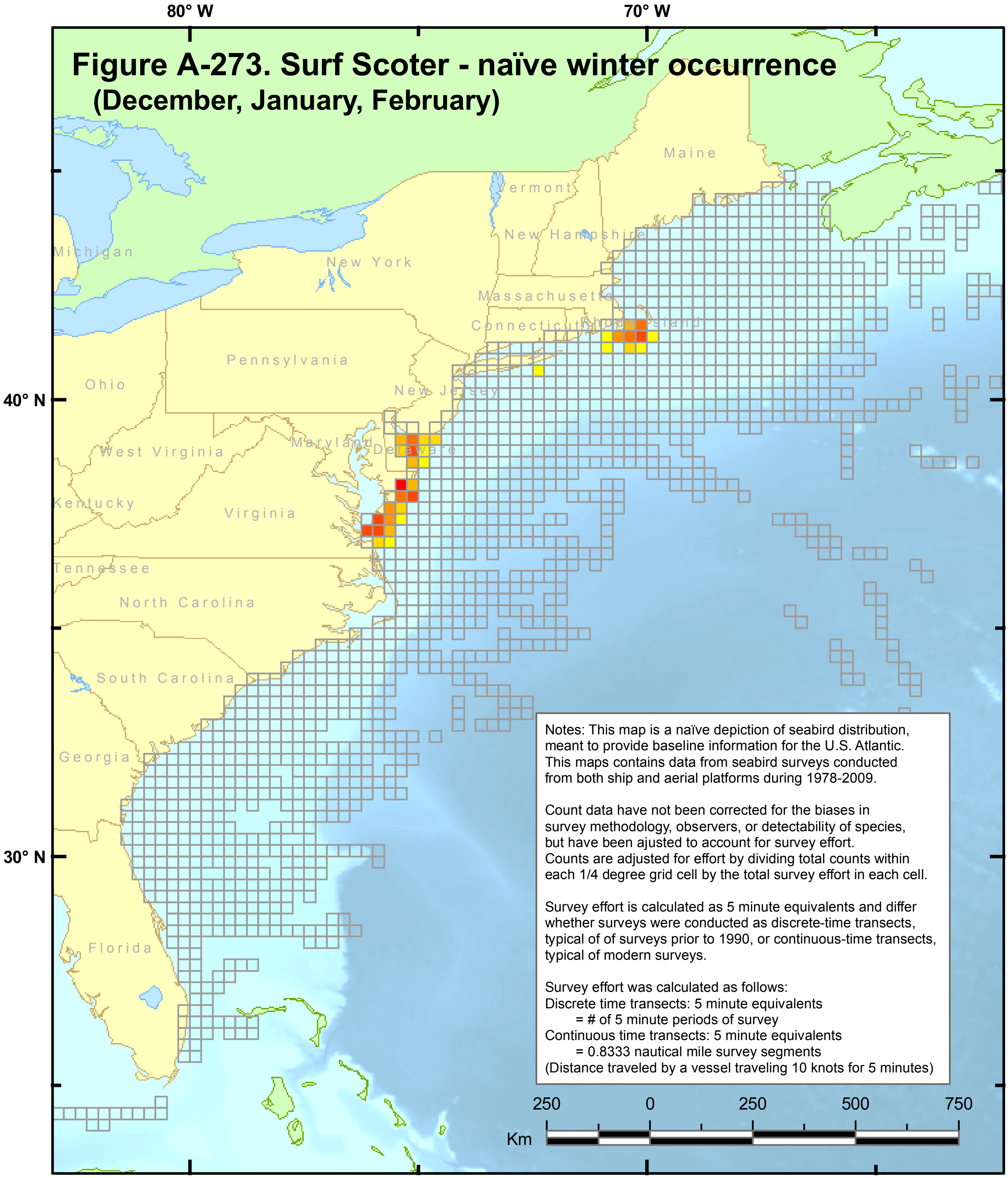
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-273. Surf Scoter - naïve winter occurrence (December, January, February)

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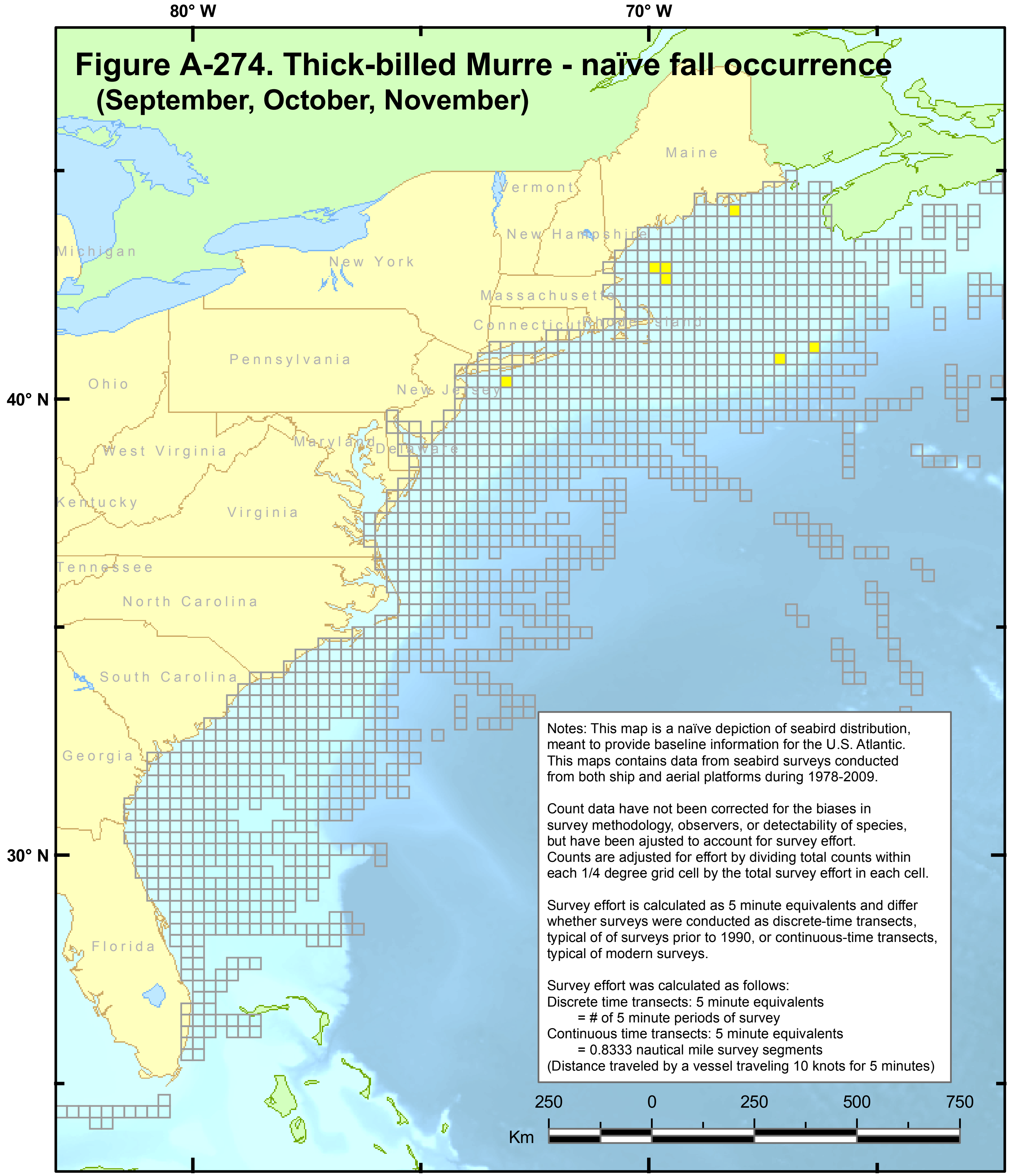
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 13.3 |

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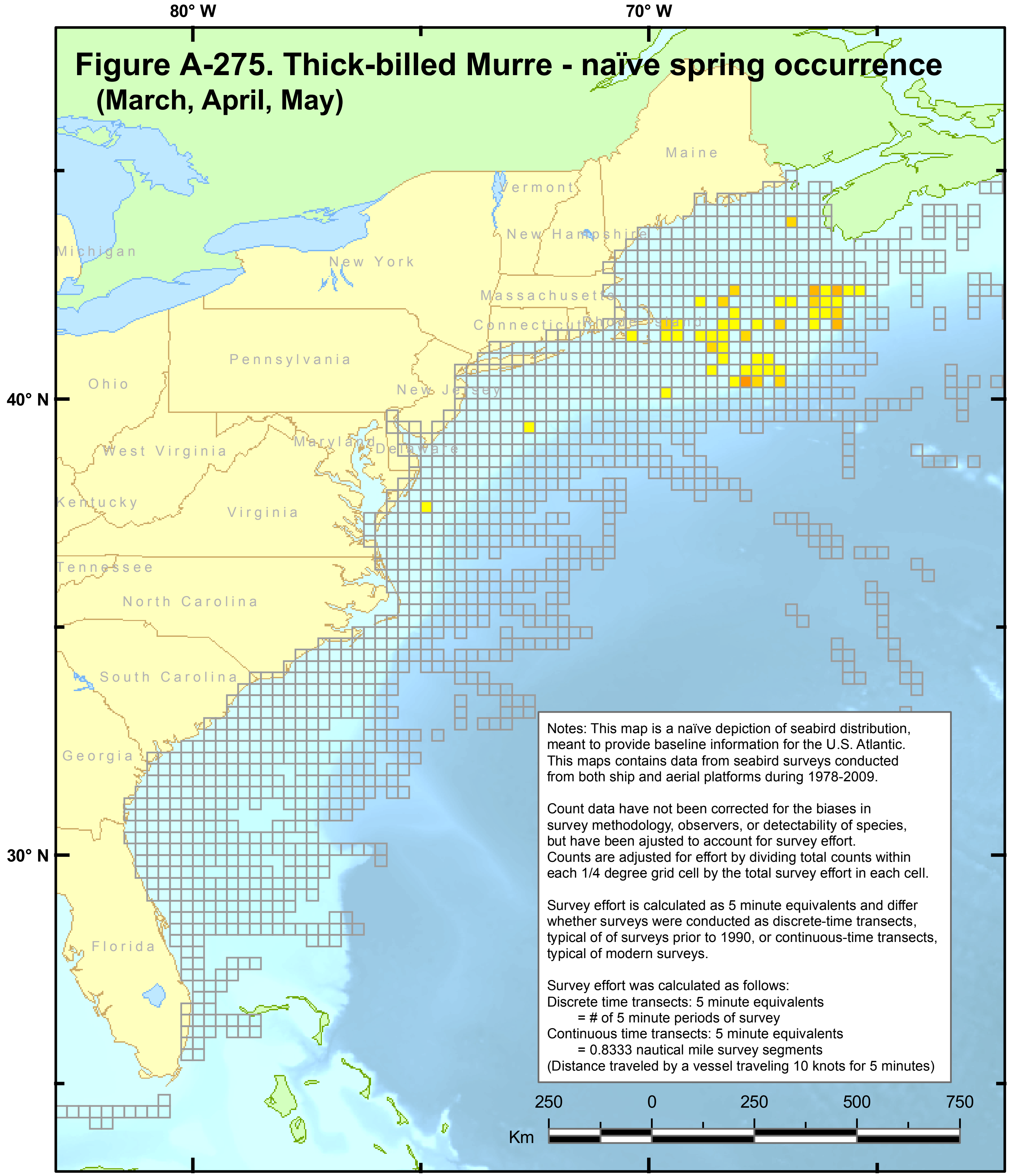
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5




# Figure A-275. Thick-billed Murre - naïve spring occurrence (March, April, May)

**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

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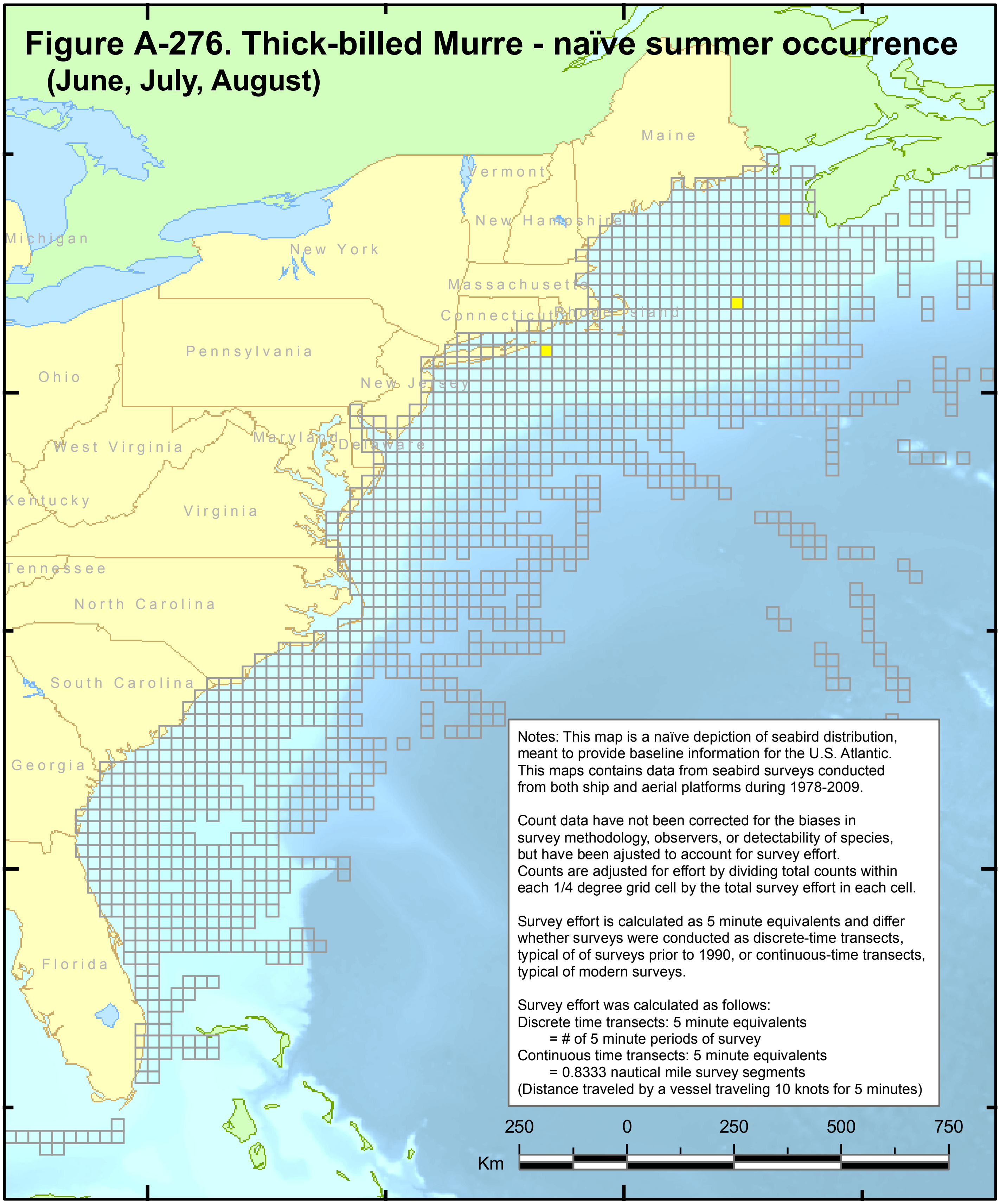
# Figure A-276. Thick-billed Murre - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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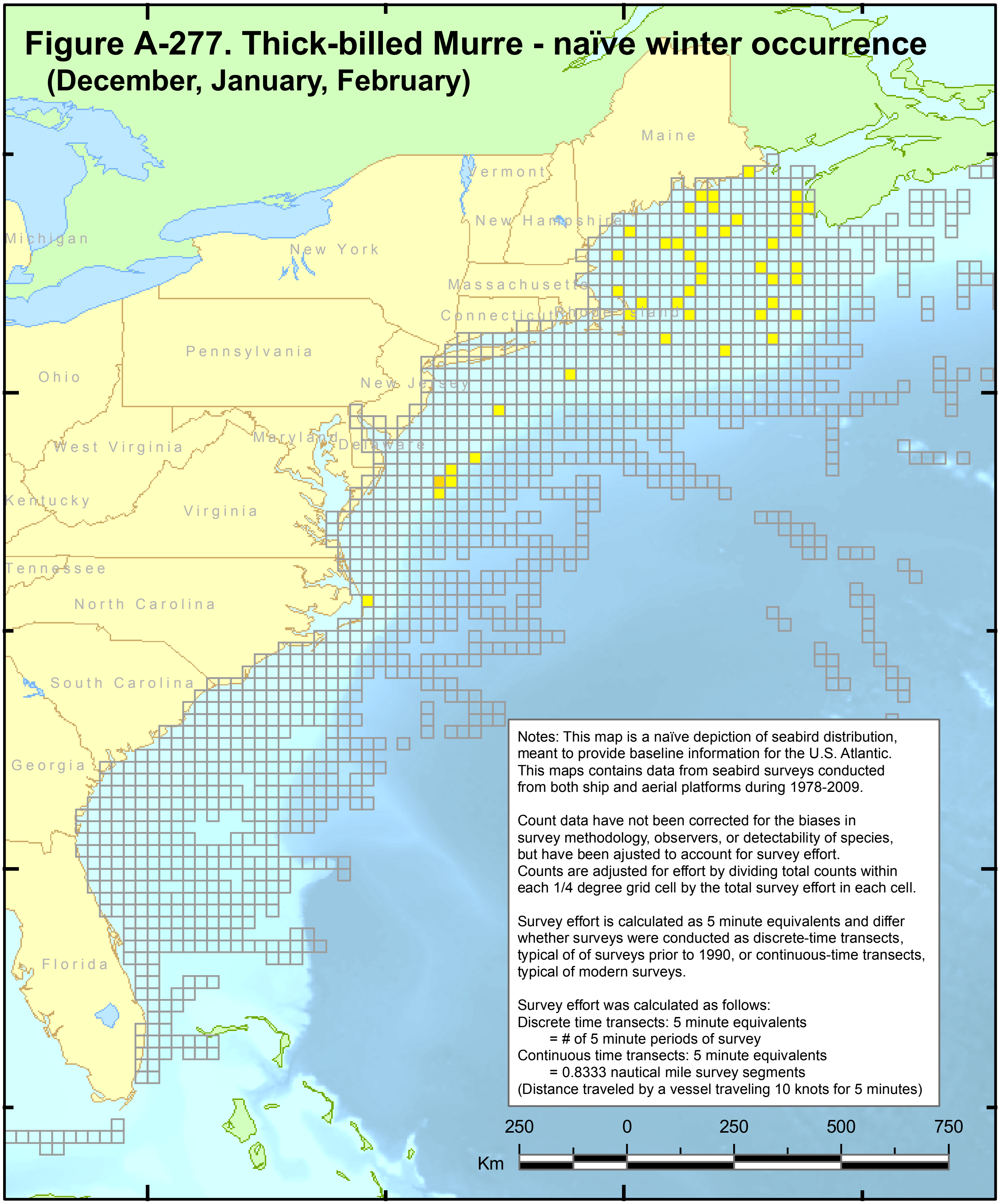
## Explanation - effort-adjusted counts

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-277. Thick-billed Murre - naïve winter occurrence (December, January, February)

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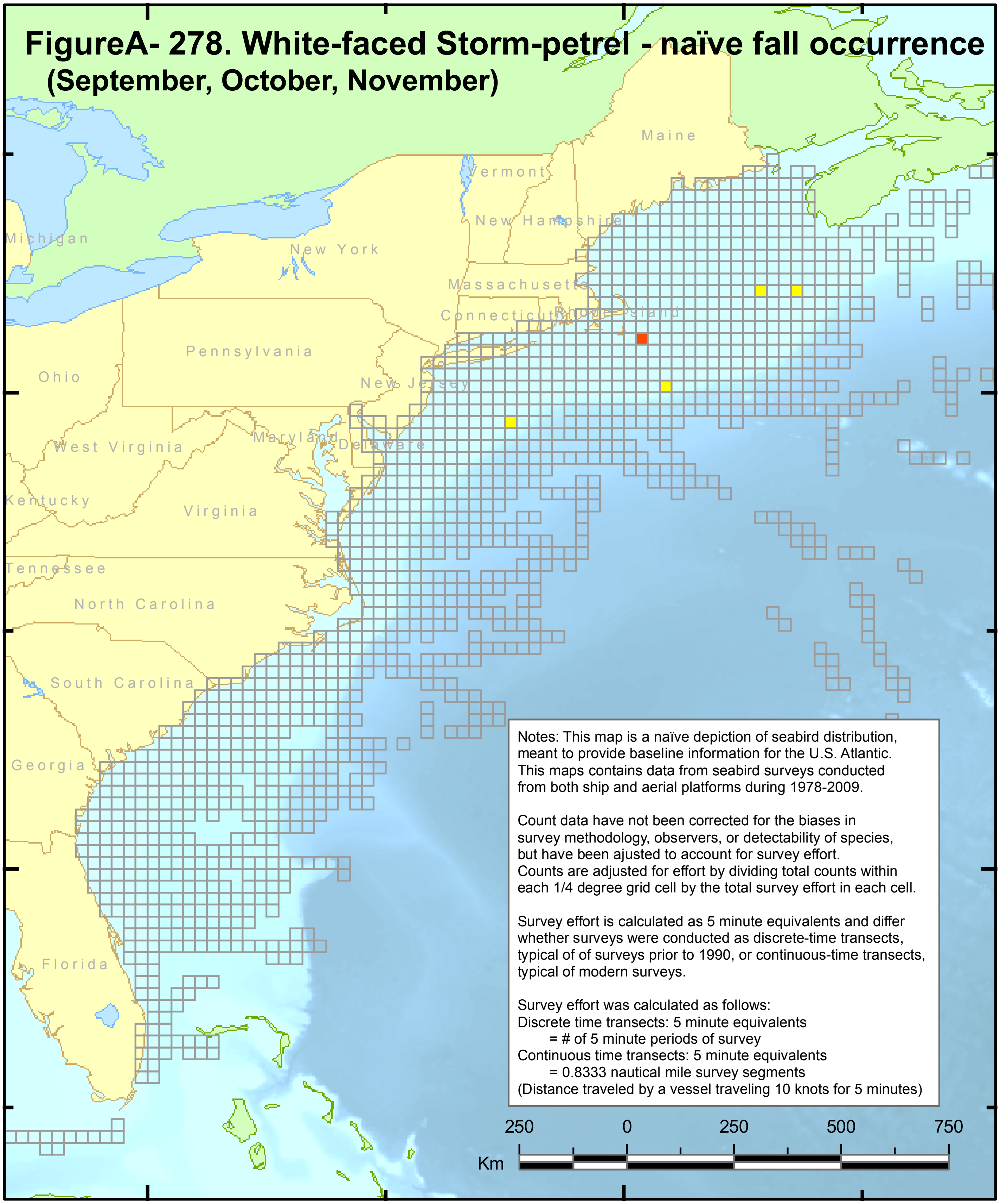
## Explanation - effort-adjusted counts

0; 0 - 0.1; 0.1 - 0.25; 0.25 - 0.5; 0.5 - 1; 1 - 2; 2 - 5; >5

# FigureA- 278. White-faced Storm-petrel - naïve fall occurrence (September, October, November)

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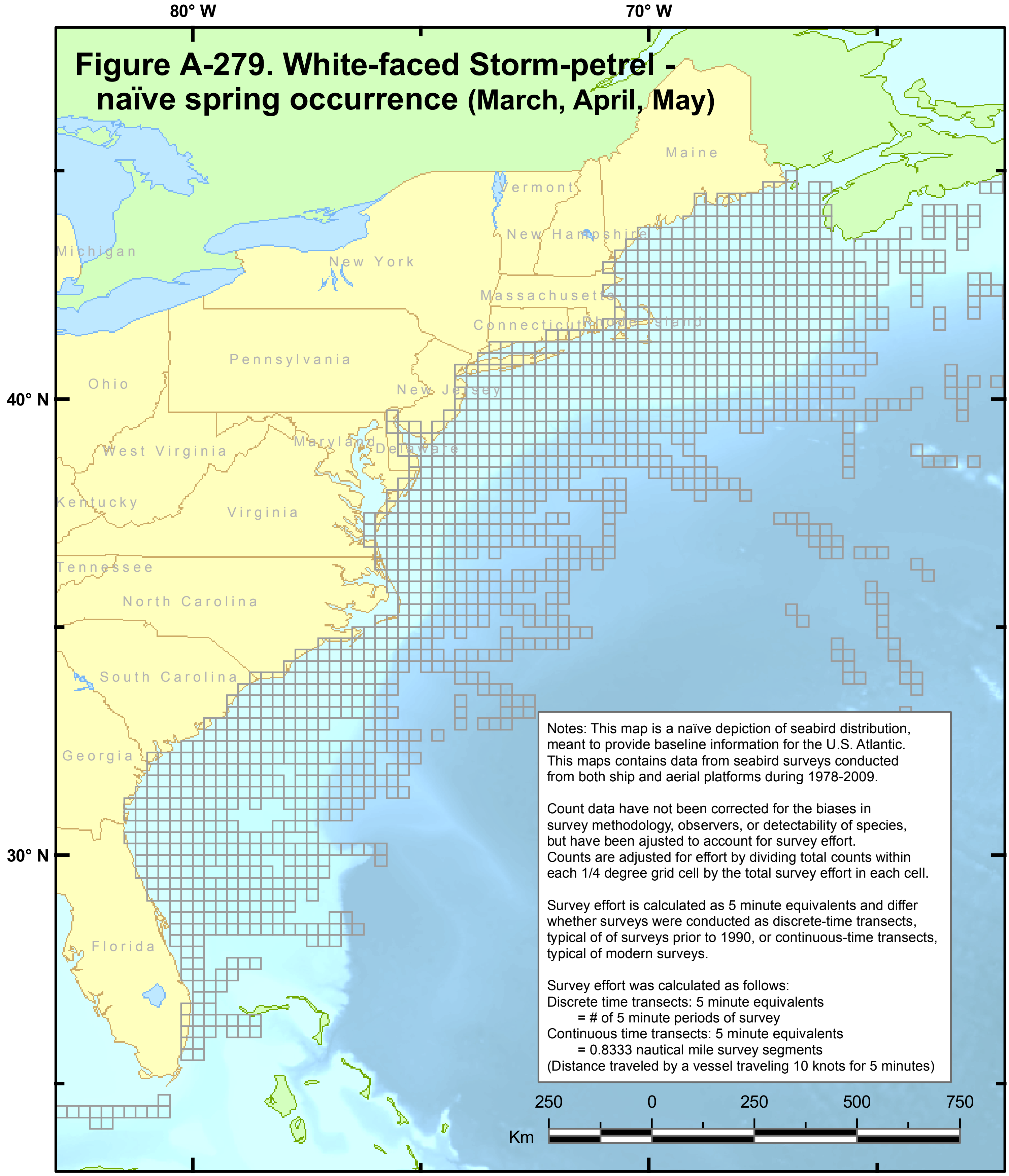
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5

# Figure A-279. White-faced Storm-petrel - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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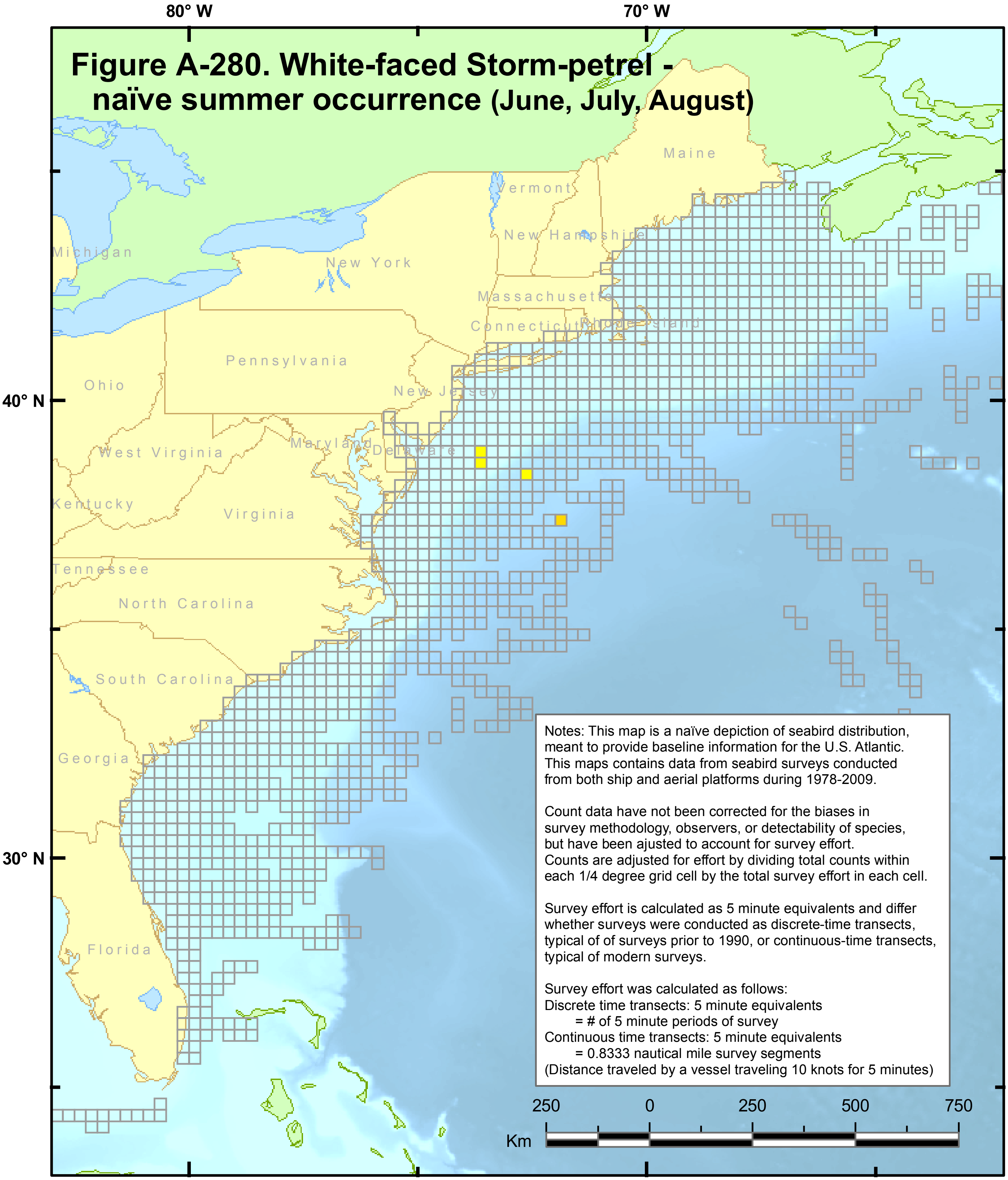
## Explanation - effort-adjusted counts

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- >5

# Figure A-280. White-faced Storm-petrel - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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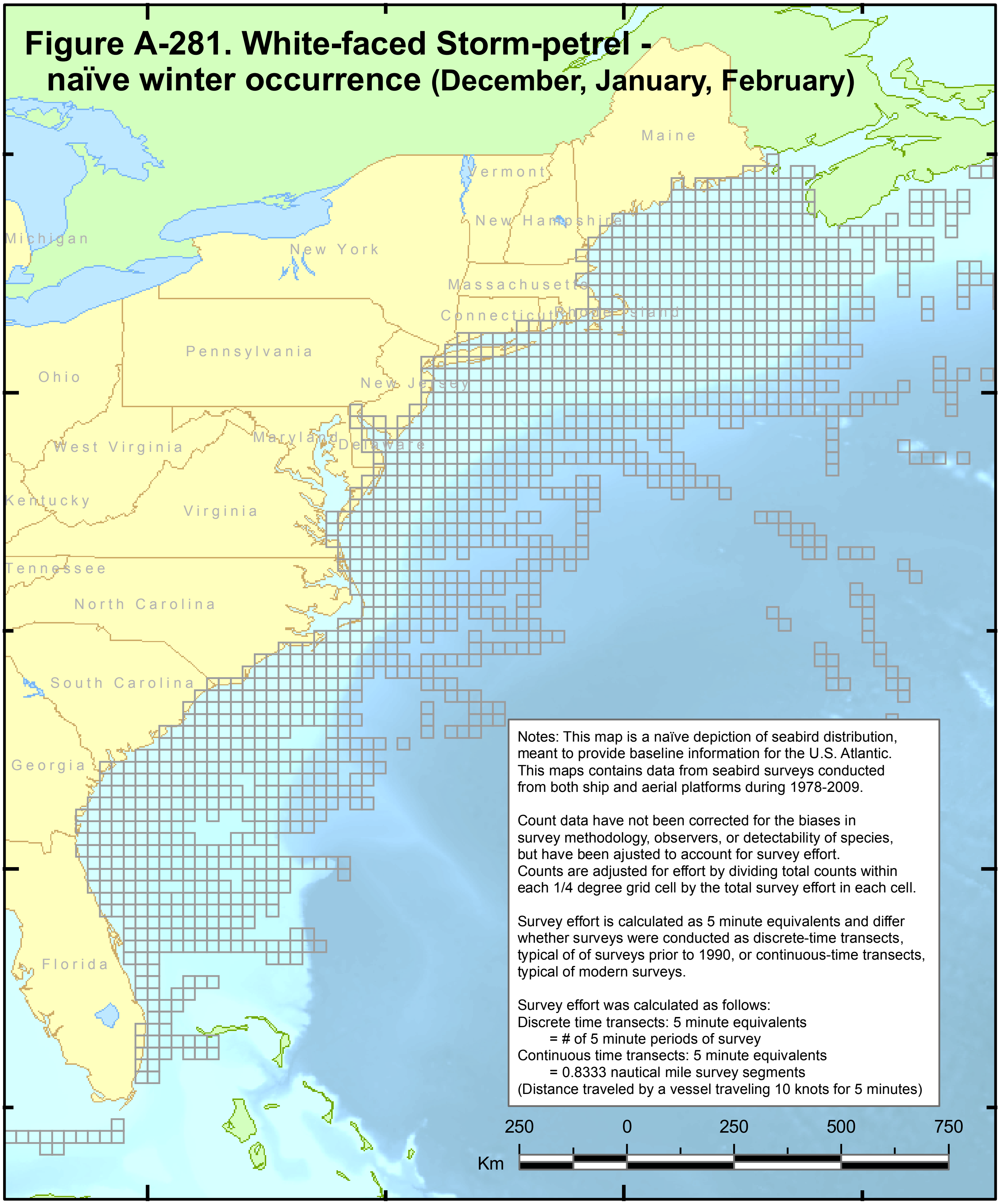
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-281. White-faced Storm-petrel - naïve winter occurrence (December, January, February)




## Explanation - effort-adjusted counts

0; 0 - 0.1; 0.1 - 0.25; 0.25 - 0.5; 0.5 - 1; 1 - 2; 2 - 5; >5

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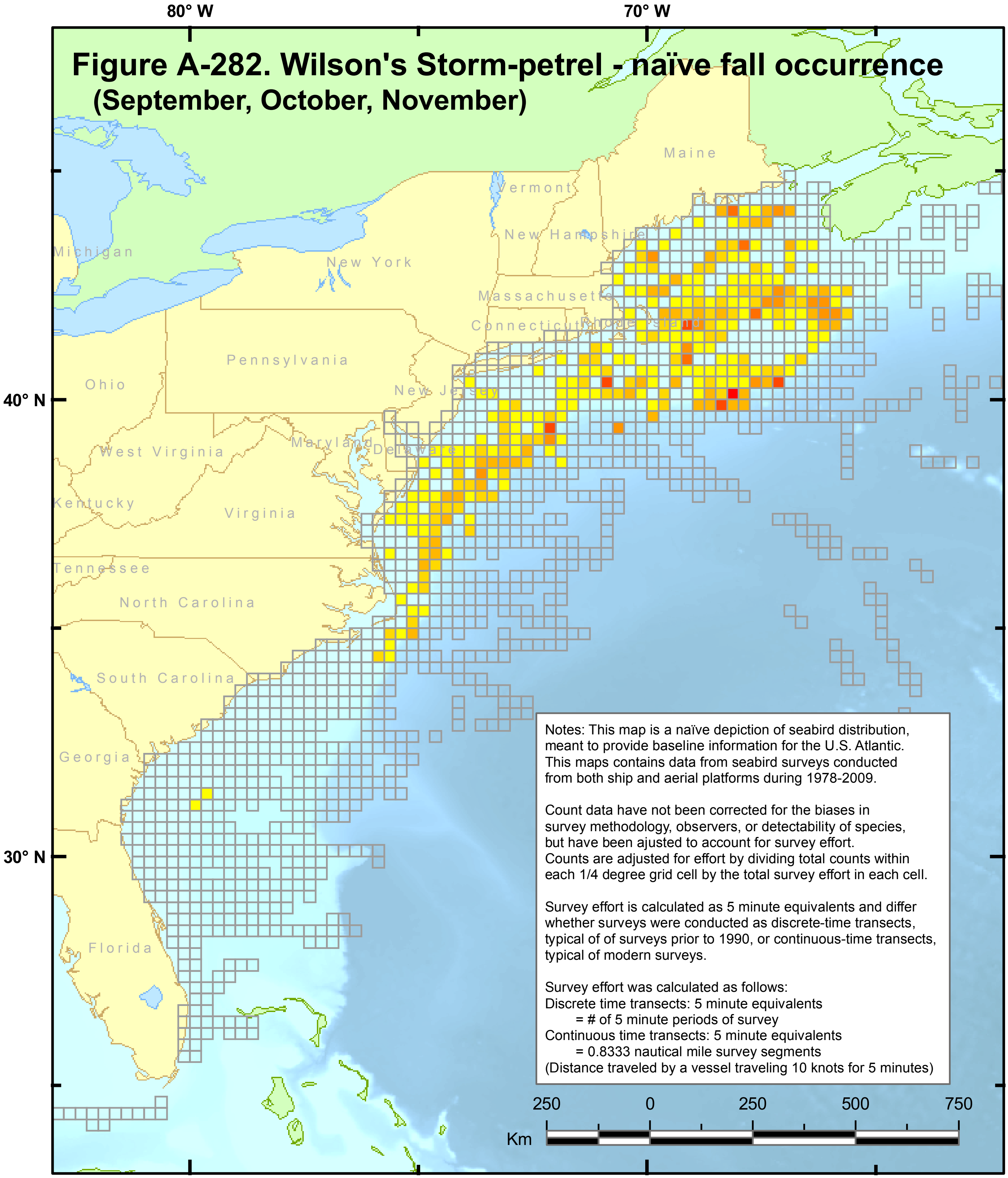


**Figure A-282. Wilson's Storm-petrel - naïve fall occurrence (September, October, November)**

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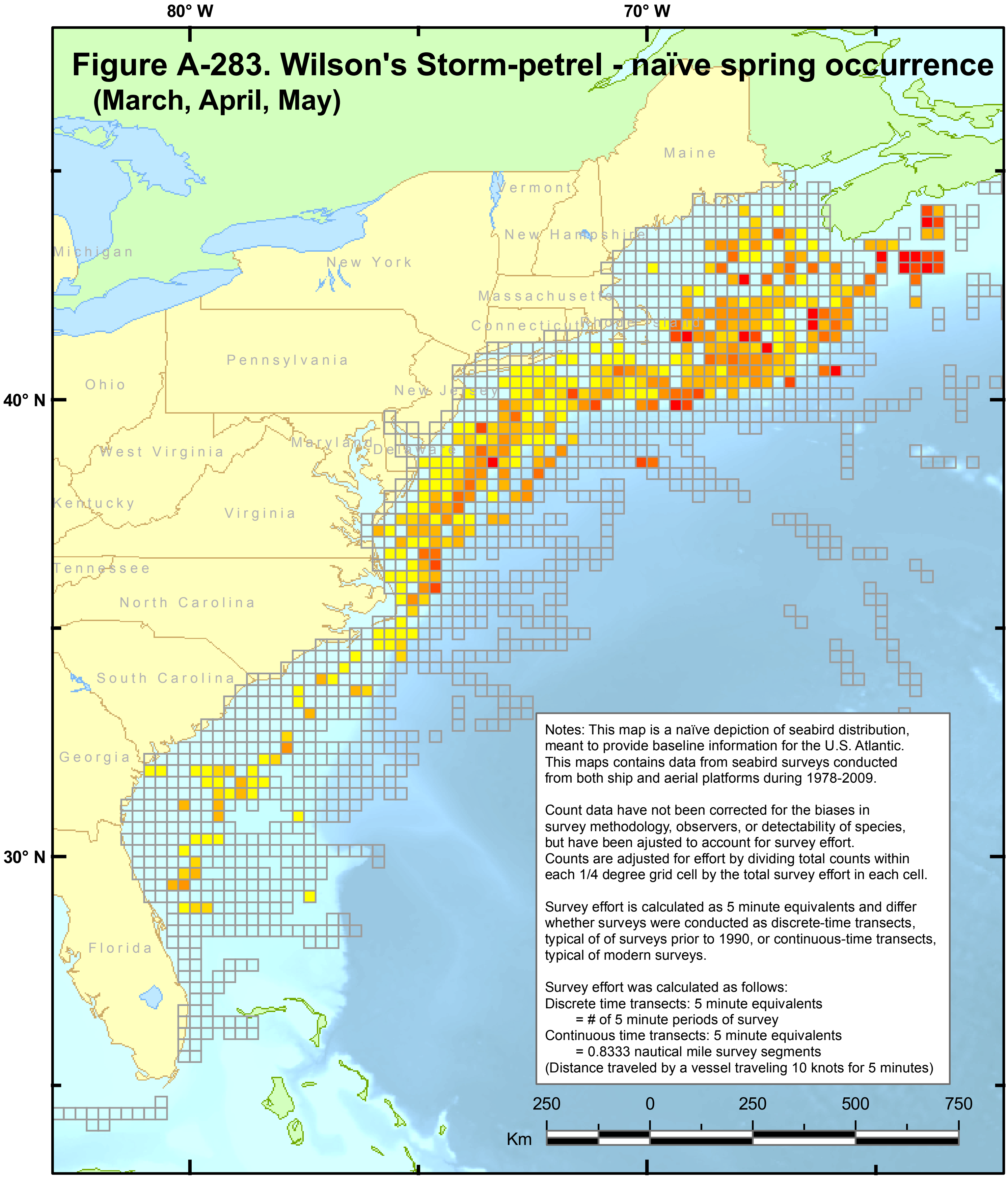
**Explanation - effort-adjusted counts**

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 11.2

# Figure A-283. Wilson's Storm-petrel - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 111.2

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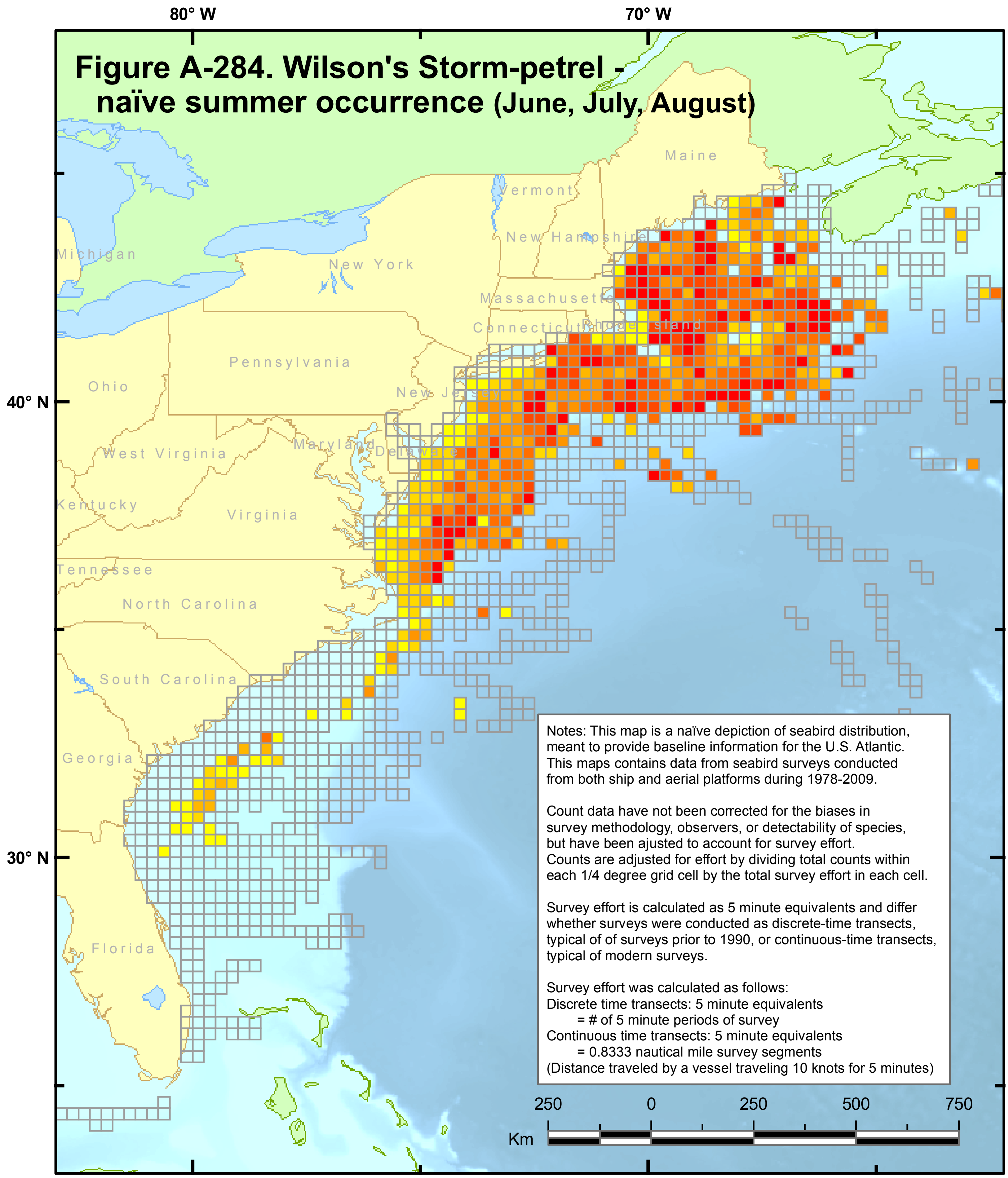
# Figure A-284. Wilson's Storm-petrel - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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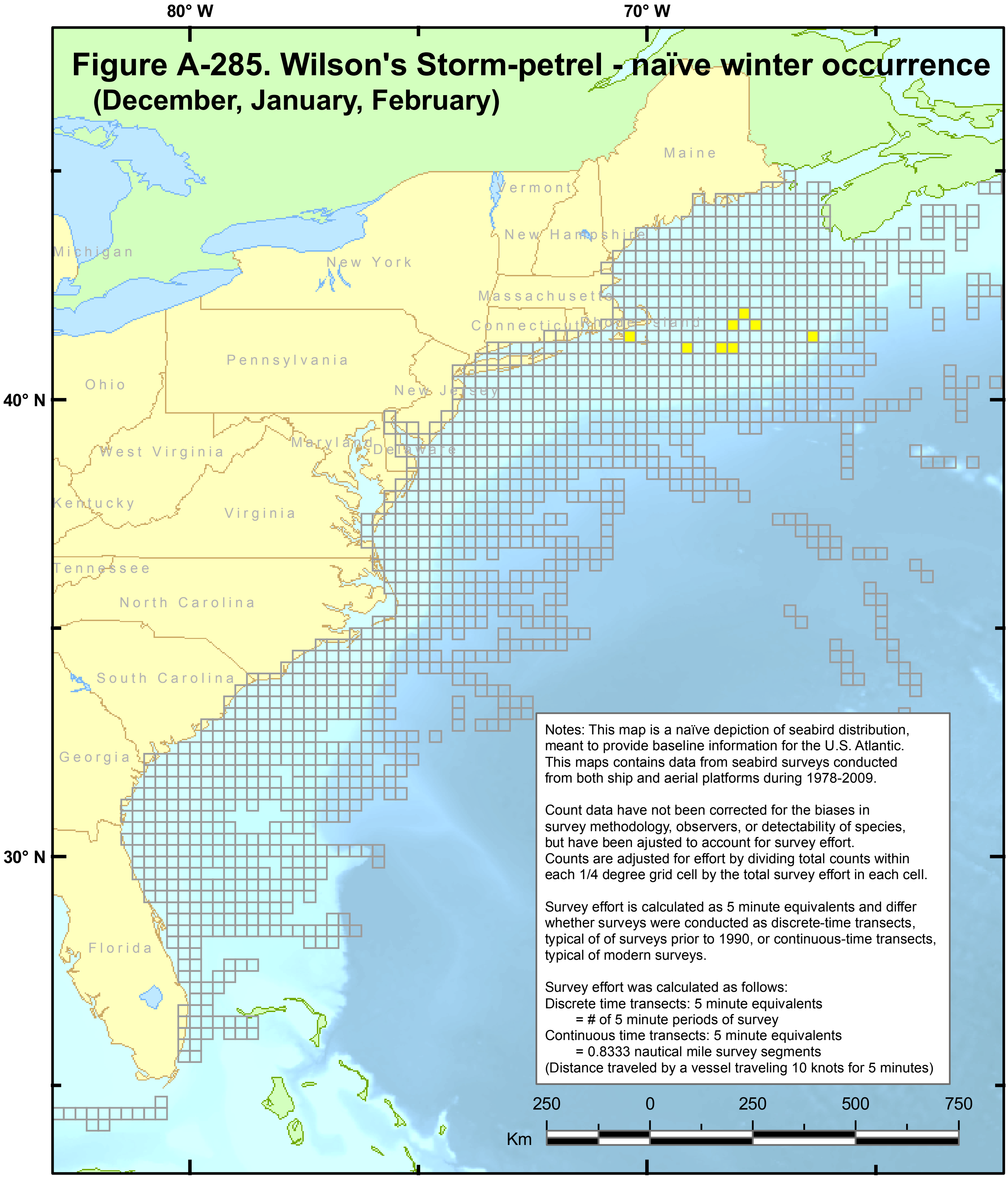
**Explanation - effort-adjusted counts**

- 0
- 0 - 0.1
- 0.1 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 2
- 2 - 5
- 5 - 86.6

# Figure A-285. Wilson's Storm-petrel - naïve winter occurrence (December, January, February)

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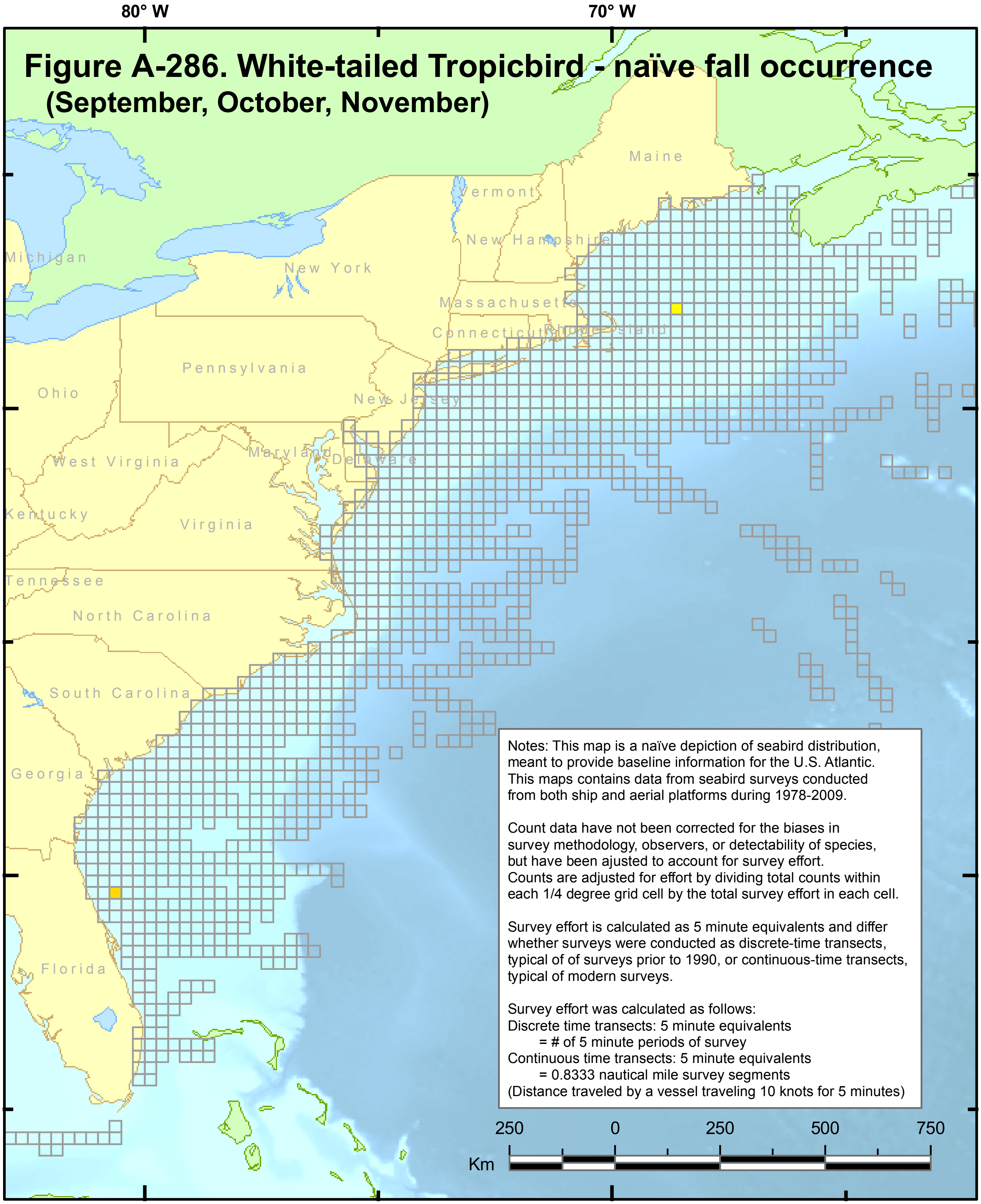
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-286. White-tailed Tropicbird - naïve fall occurrence (September, October, November)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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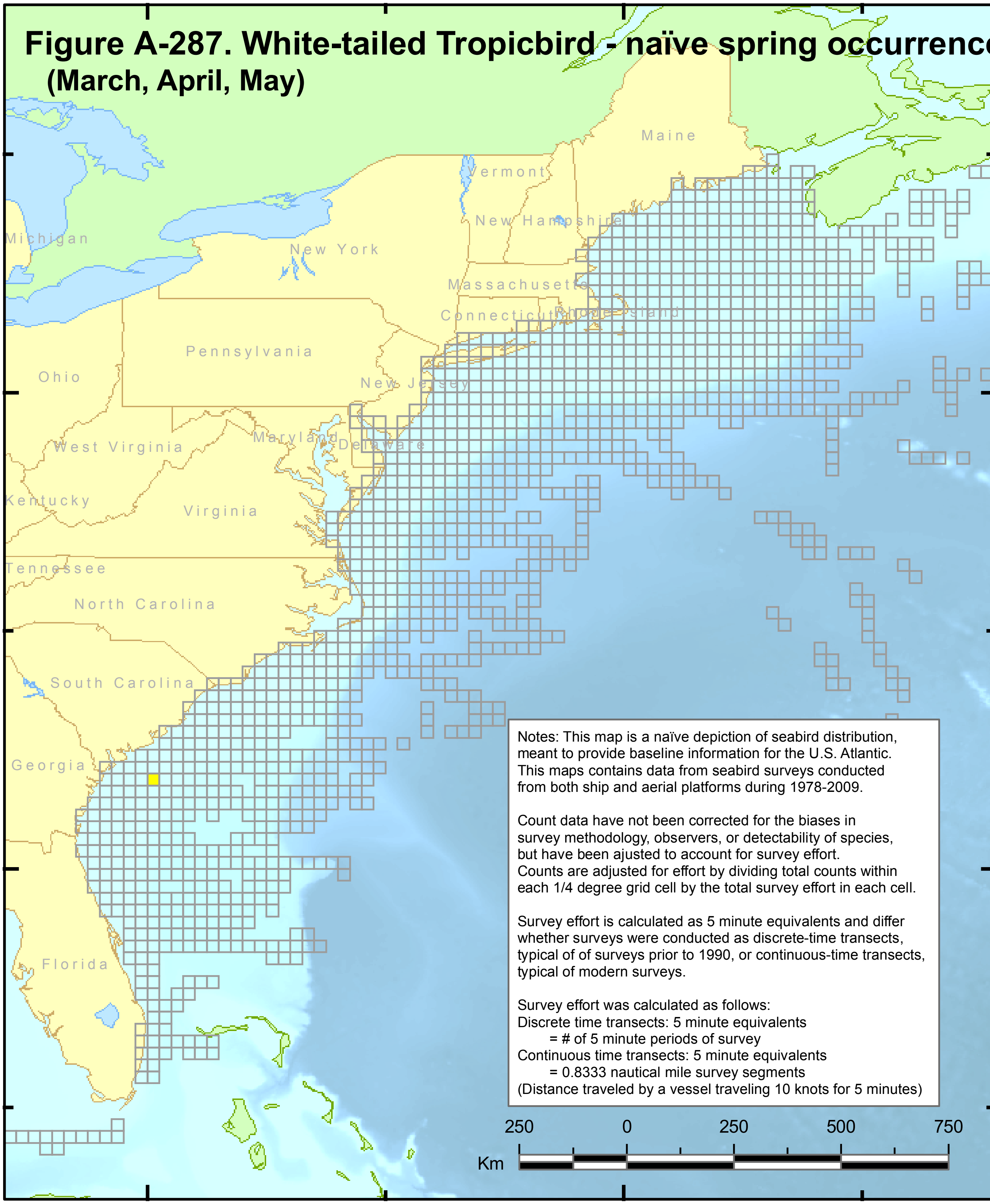
## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-287. White-tailed Tropicbird - naïve spring occurrence (March, April, May)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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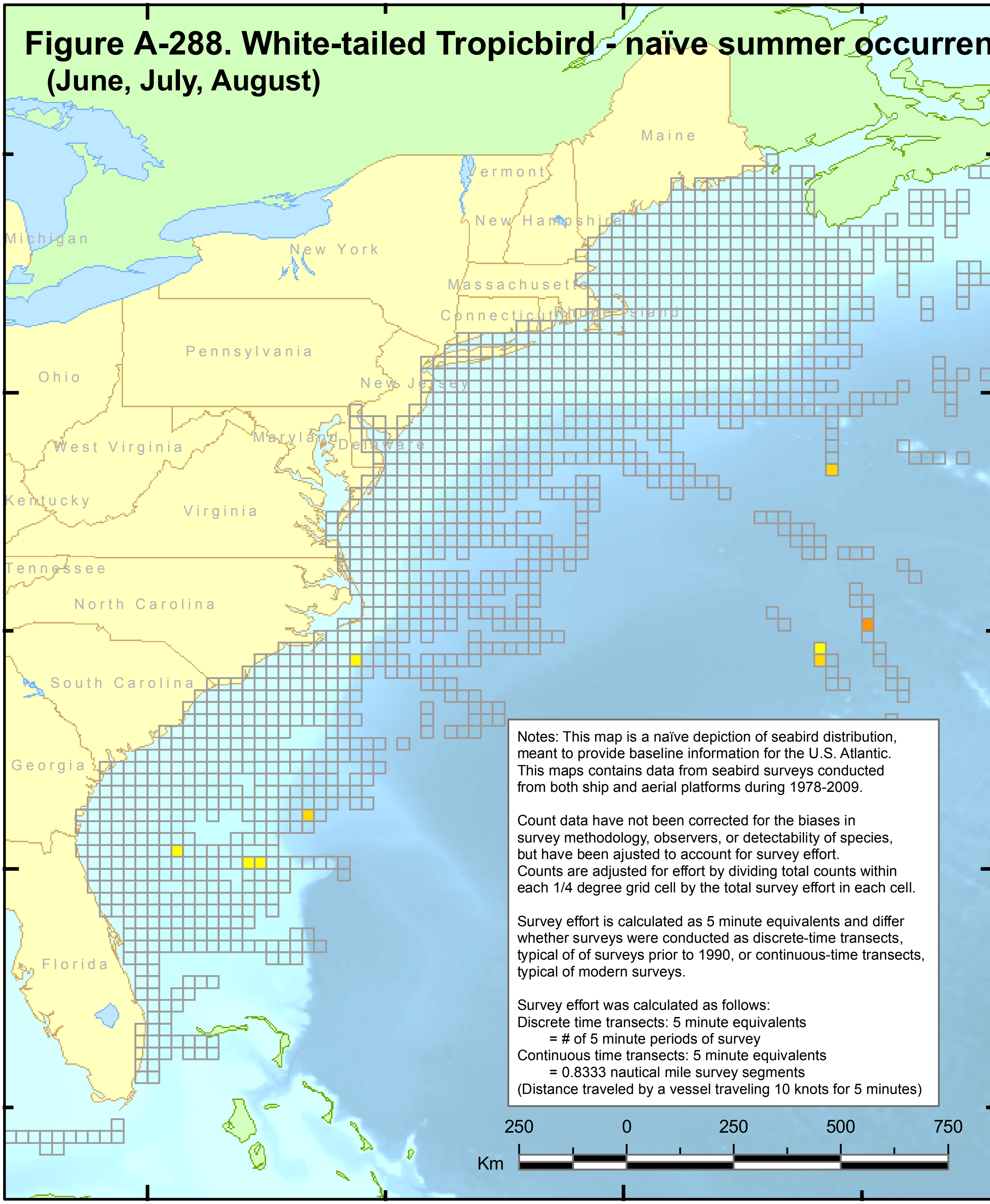
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-288. White-tailed Tropicbird - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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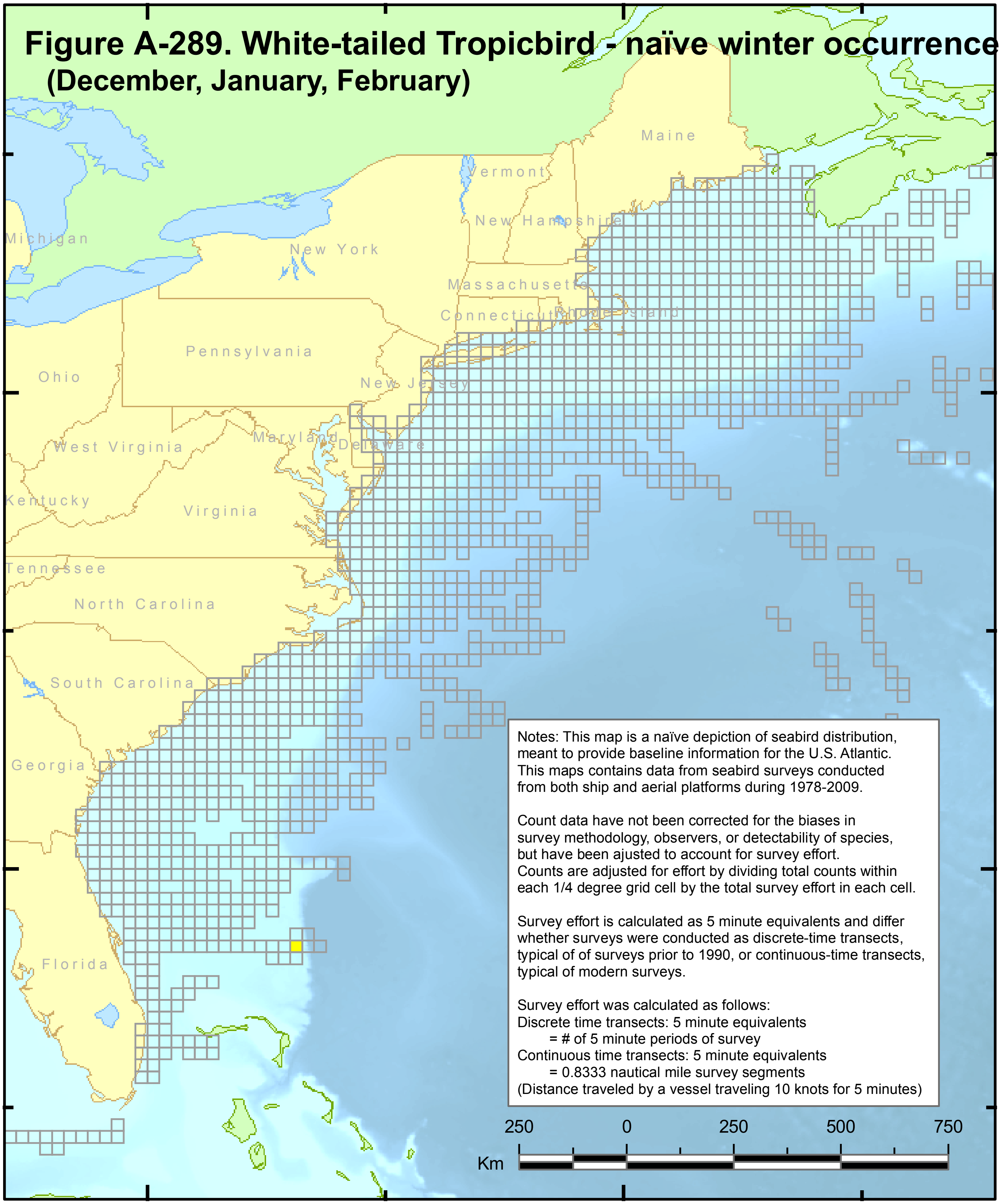
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 5.1

# Figure A-289. White-tailed Tropicbird - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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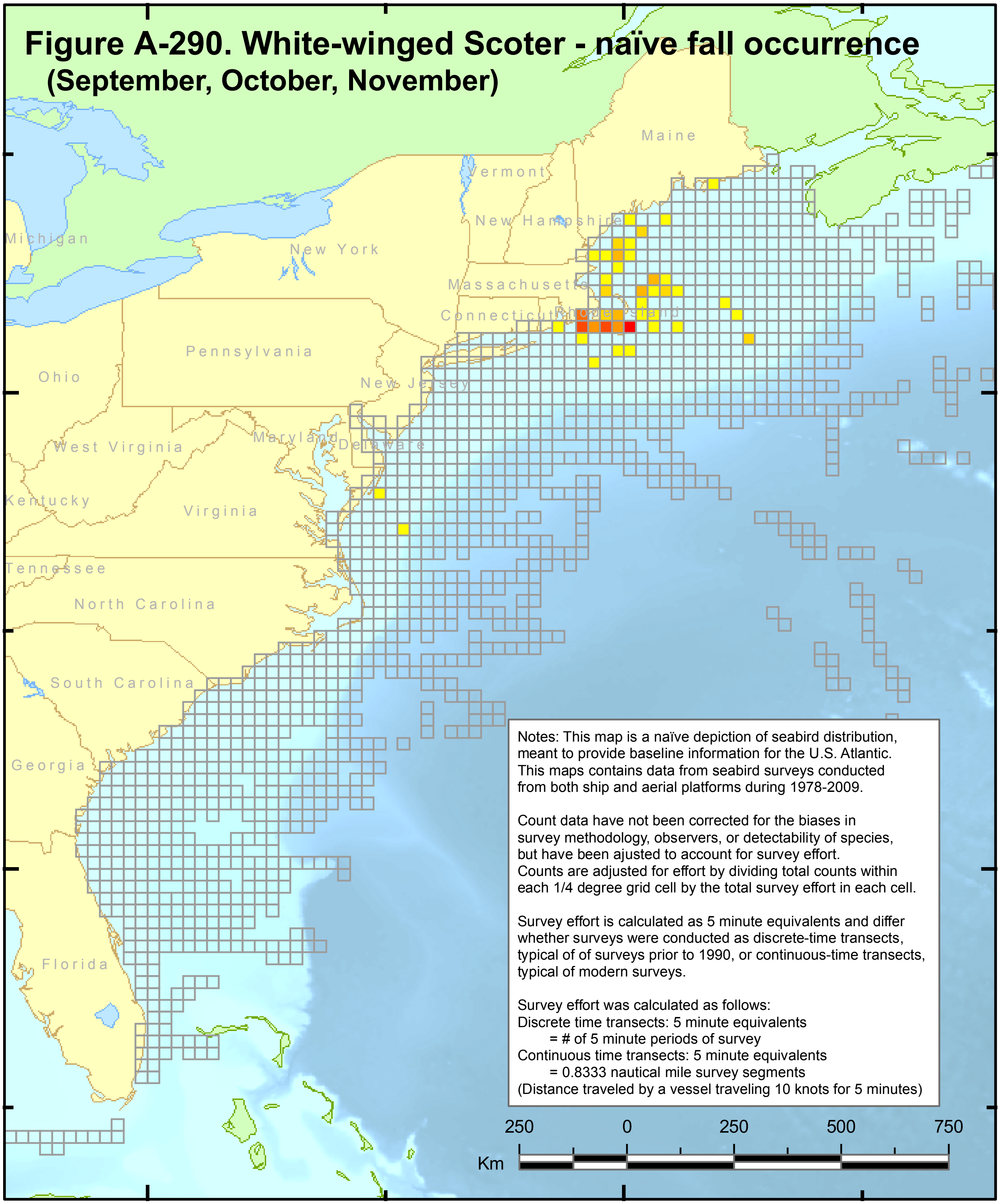
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
>5

# Figure A-290. White-winged Scoter - naïve fall occurrence (September, October, November)

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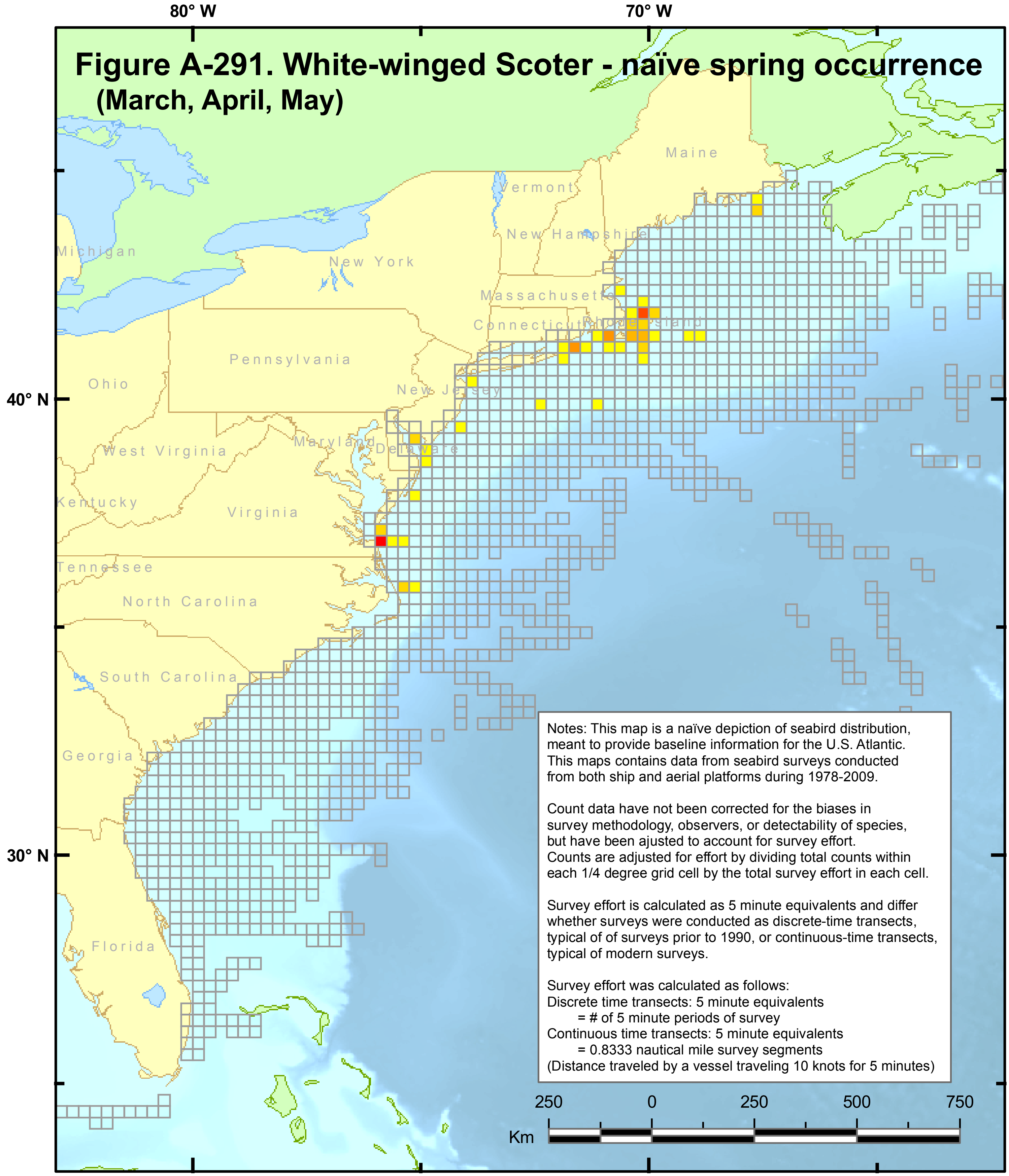
**Explanation - effort-adjusted counts**

0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5
0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 6.8

# Figure A-291. White-winged Scoter - naïve spring occurrence (March, April, May)

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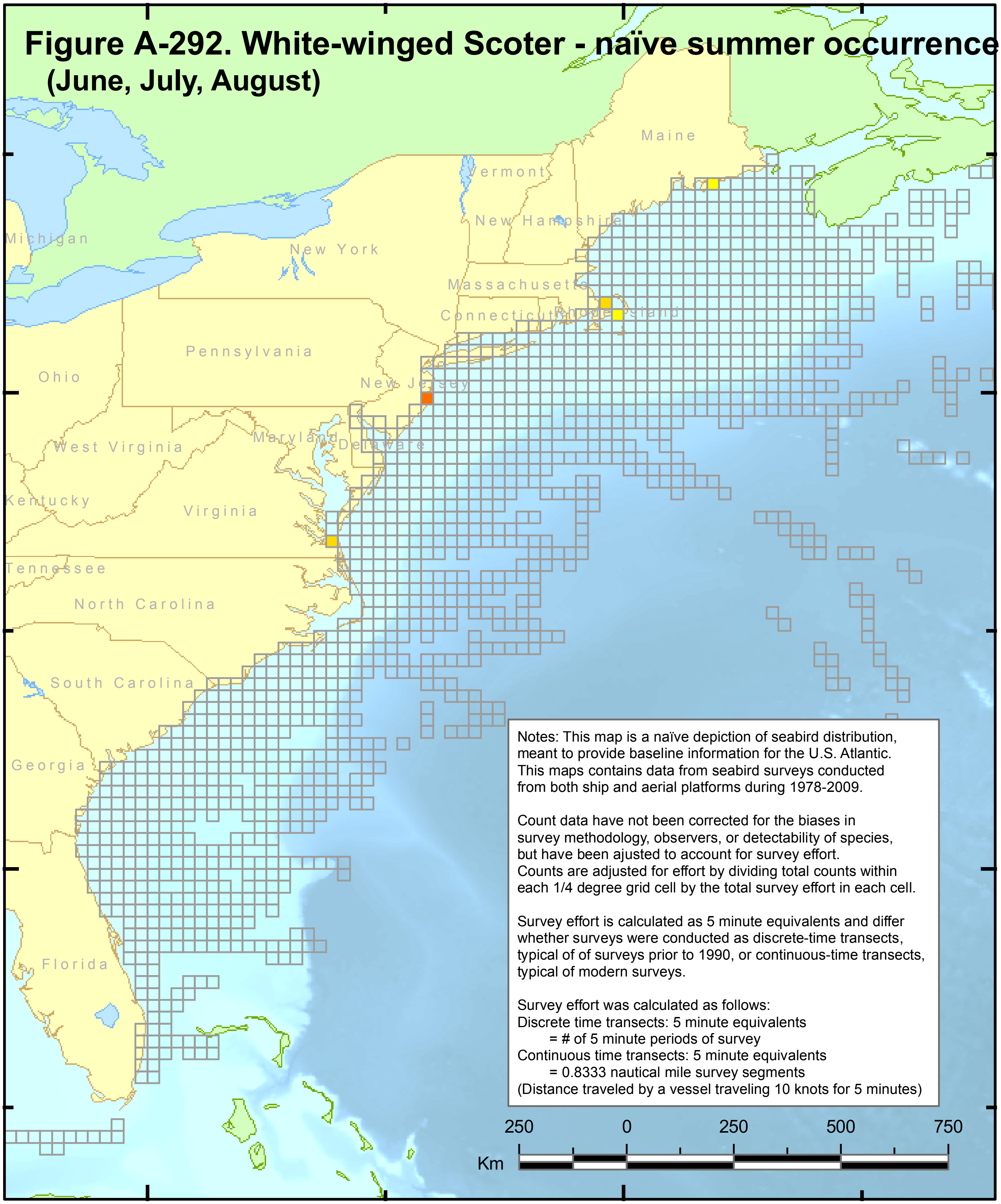
## Explanation - effort-adjusted counts

0
0 - 0.1
0.1 - 0.25
0.25 - 0.5
0.5 - 1
1 - 2
2 - 5
5 - 5.3

# Figure A-292. White-winged Scoter - naïve summer occurrence (June, July, August)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

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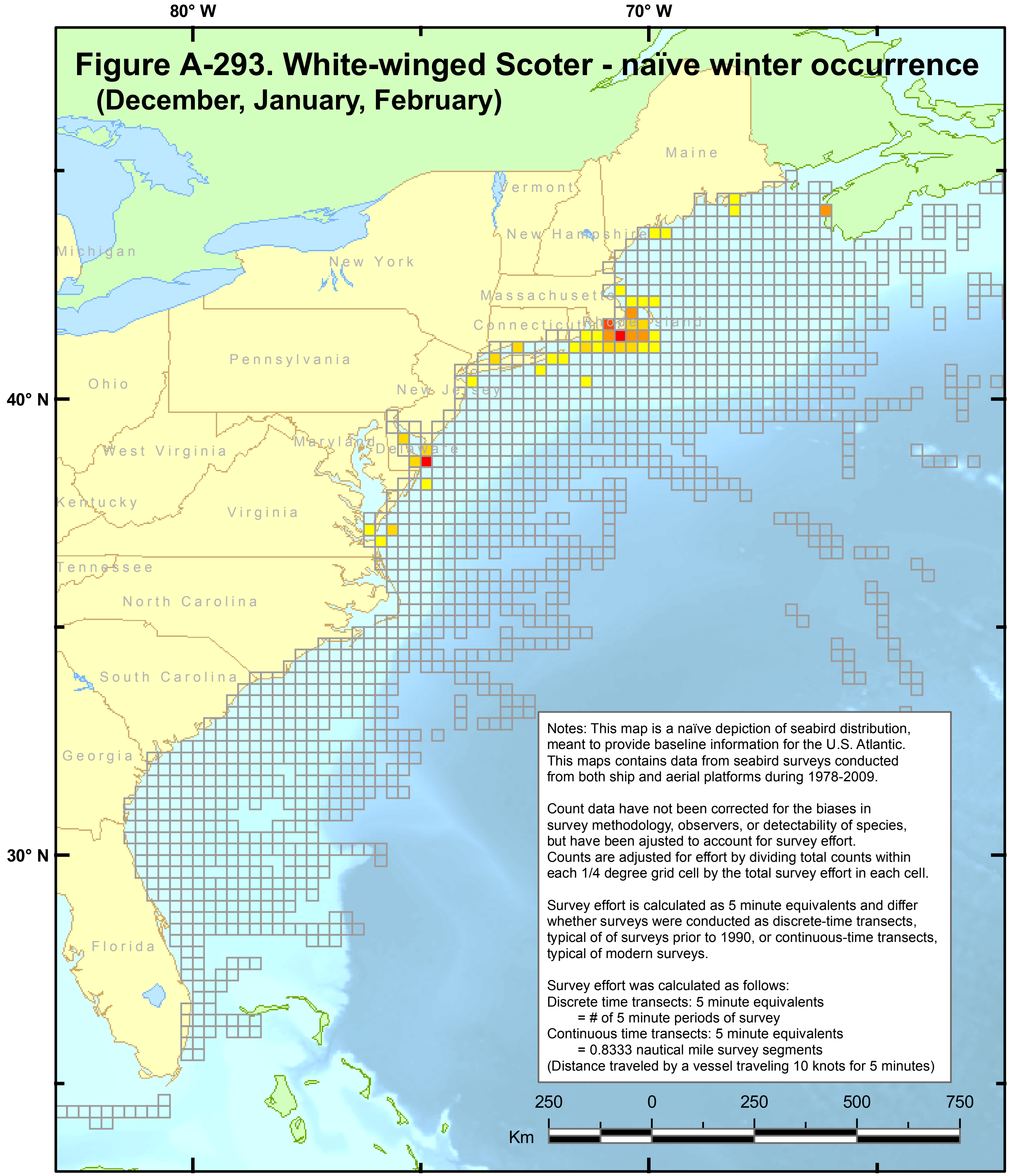
**Explanation - effort-adjusted counts**

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | >5 |

# Figure A-293. White-winged Scoter - naïve winter occurrence (December, January, February)




Notes: This map is a naïve depiction of seabird distribution, meant to provide baseline information for the U.S. Atlantic. This maps contains data from seabird surveys conducted from both ship and aerial platforms during 1978-2009.

Count data have not been corrected for the biases in survey methodology, observers, or detectability of species, but have been ajusted to account for survey effort. Counts are adjusted for effort by dividing total counts within each 1/4 degree grid cell by the total survey effort in each cell.

Survey effort is calculated as 5 minute equivalents and differ whether surveys were conducted as discrete-time transects, typical of of surveys prior to 1990, or continuous-time transects, typical of modern surveys.

Survey effort was calculated as follows:
Discrete time transects: 5 minute equivalents
= # of 5 minute periods of survey
Continuous time transects: 5 minute equivalents
= 0.8333 nautical mile survey segments
(Distance traveled by a vessel traveling 10 knots for 5 minutes)

## Explanation - effort-adjusted counts

| | | | |
|---|---|---|---|
| 0 | 0.1 - 0.25 | 0.5 - 1 | 2 - 5 |
| 0 - 0.1 | 0.25 - 0.5 | 1 - 2 | 5 - 8.4 |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