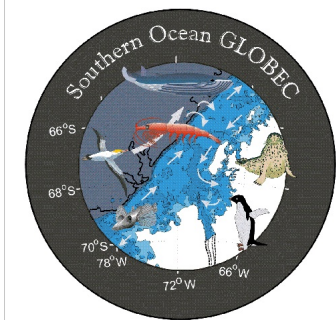


Report of  
RVIB Nathaniel B. Palmer Cruise 01-03  
to the  
Western Antarctic Peninsula



24 April to 5 June 2001

United States Southern Ocean  
Global Ocean Ecosystems Dynamics Program  
Report Number 2

♦ Report of  
RVIB Nathaniel B. Palmer Cruise 01-03  
to the  
Western Antarctic Peninsula  
24 April to 5 June 2001

Report prepared by Peter Wiebe, Eileen Hofmann, Bob Beardsley, Christine Ribić, Erik Chapman, Carin Ashjian, Scott Gallagher, Cabell Davis, Wendy Kozlowski, Ari Friedlander, Catherine Berchok, Howard Rutherford, Joe Warren, Karen Fisher with assistance from colleagues in the scientific party, and of the Raytheon Support Services.

United States Southern Ocean  
Global Ocean Ecosystems Dynamics Program  
Report Number 2

Available from  
U.S. Southern Ocean GLOBEC Planning Office  
Center for Coastal Physical Oceanography  
Crittendon Hall  
Old Dominion University  
Norfolk, VA 23529

Sponsored by the Office of Polar Programs, National Science Foundation



Acknowledgments

The success we enjoyed on this expedition is due in large part to the very excellent technical assistance we received from all nine members of the Raytheon Marine Technical support group. Led by Alice Doyle (Marine Project Coordinator), they responded in a very positive and experienced way to the technical problems that arose and they provided a steady professional hand on the day-to-day operations. ♦ Likewise, the ship's officers and crew provided excellent ship handling, enabling us to safely work through high winds and seas, through sea ice and around icebergs, and in shallow, uncharted topography. ♦ The friendly atmosphere that was set by Captain Mike Watson was evident throughout the ship. ♦ It made this expedition a pleasure to be on.

NBP01-03 Cruise Participants on the Bow of the RVIB N.B. Palmer

Back Row (L-R): Rebecca Conroy, Maureen Taylor, Matthew Burke, Erik Chapman, Cabell Davis, Sue Beardsley, Jim Dolan, Wendy Kozlowski, Mike Thangam, Joe Warren, Boris Salihoglu, Karen Fisher, Howard Rutherford, David Green

Middle Row (L-R): Ari Friedlander, Catherine Berchok, Carin Ashjian, Mark Dennett, Eileen Hofmann, Bob Beardsley, Jeff Otten, Jan Szelag, Jesse Doren, Christine Ribić, Scott Gallagher, Andy Girard, Peter Wiebe

Front Row (L-R): Susan Howard, Aparna Sreenivasan, Rosario Sanay, Alice Doyle, Tom Bolmer, Mark Christmas

Not Shown: ♦ Aaron Hunt  
Photograph by Mark Christmas, National Geographic. ♦♦♦♦♦



TABLE OF CONTENTS

|  |    |
|--|----|
| PURPOSE OF THE CRUISE  | 9  |
| CRUISE NARRATIVE   | 11 |
| INDIVIDUALS PROJECT REPORTS                                    | 23 |
| 1 ♦♦♦♦♦ Report for Hydrography and Circulation Component       | 23 |
| 1.1 Introduction   | 23 |
| 1.2 Data Collection and Methods                                | 23 |
| 1.2.1 Data Description   | 23 |
| 1.2.2 CTD and Water Samples                                    | 24 |
| 1.2.3 Temperature Profiles                                     | 24 |
| 1.2.4 ADCP Measurements  | 27 |
| 1.3 Preliminary Results  | 27 |
| 1.3.1 Upper Jet Distribution                                   | 27 |
| 1.3.2 Distribution of Temperature Maximum Below 200 m          | 29 |
| 1.3.3 ADCP-derived Current Distributions                       | 32 |
| 1.3.4 ADCP-derived Shear and Richardson Number Profiles        | 32 |
| ♦♦♦♦♦ 1.4 Acknowledgments                                      | 32 |
| 2 ♦♦♦♦♦ Ocean Measurements                                     | 33 |
| 2.1 Introduction   | 33 |
| 2.2 Drifter Deployments on NBP01-03                            | 34 |
| 2.3 Preliminary results  | 35 |
| 2.3.1 Low-frequency flow                                       | 35 |
| 2.3.2 High-frequency flow                                      | 37 |
| 2.4 Summary  | 36 |
| 3 ♦♦♦♦♦ Mesosynoptic Measurements                              | 38 |
| 3.1 Introduction   | 38 |
| 3.2 ♦♦♦♦♦ Instrumentation and Processing                       | 39 |
| 3.3 Problems and Solution                                      | 41 |
| 3.4 ♦♦♦♦♦ R/VAS sampling frame                                 | 41 |
| 3.4.1 ♦♦♦♦♦ R/VAS sampling frame                               | 41 |
| 3.4.2 Time and instrument failures                             | 42 |
| 3.4.3 Time and instrument failures                             | 42 |
| 3.4.4 ♦♦♦♦♦ Time and instrument failures                       | 42 |
| 3.4.5 Thermographic compensation                               | 43 |
| 3.5 Description of Cruise Weather and Surface Forcing          | 43 |
| 3.5.1 Surface Cooling - Part 1                                 | 43 |
| 3.5.2 Surface Cooling - Part 2                                 | 43 |
| 3.5.3 ♦♦♦♦♦ Clouds   | 43 |
| 4 ♦♦♦♦♦ Automated Weather Station Installation Report          | 51 |
| 5 ♦♦♦♦♦ Nutrients  | 52 |
| 5.1 Introduction   | 52 |
| 5.2 Methods  | 52 |
| 5.3 Data   | 53 |
| 5.4 Preliminary Results  | 53 |
| 5.5 References   | 53 |
| 6 ♦♦♦♦♦ Nitrate Production                                     | 53 |
| 6.1 Introduction   | 53 |
| 6.2 Methods  | 54 |
| 6.2.1 Location   | 54 |
| 6.2.2 Depth  | 54 |
| 6.2.3 Size for Sampling  | 54 |
| 6.2.4 Equipment  | 55 |
| 6.3 Data Collected   | 55 |
| 6.4 Preliminary Results  | 55 |
| 7 ♦♦♦♦♦ Mesozooplankton studies                                | 59 |
| 7.1 Objectives   | 59 |
| 7.2 Methods  | 59 |
| 7.3 Brief Preliminary Results                                  | 60 |
| 7.4 References   | 60 |
| 8 ♦♦♦♦♦ Zooplankton Studies                                    | 63 |
| 8.1 MOCNESS report   | 63 |
| 8.1.1 Introduction   | 63 |
| 8.1.2 Methods and Apparatus                                    | 63 |
| 8.1.3 Results  | 63 |
| 8.1.4 A Note on Sampling for Larvae and Stable Isotope studies | 64 |
| 8.2 BIOVOLUME & Survey   | 67 |
| 8.2.1 Acoustic Data Collection, Processing and Results         | 67 |
| 8.2.1.1 Introduction   | 69 |

|   |     |
|---|-----|
| 8.2.1.2 Methods.....  | 69  |
| 8.2.1.3 Results.....  | 70  |
| 8.2.1.4 Ship Motion Recorder Results.....                                       | 71  |
| 8.2.2 Overview.....   | 73  |
| 8.2.2.2 Methods.....  | 73  |
| 8.2.2.3 The VPD system.....   | 76  |
| 8.2.2.4 Sampling Methods.....   | 77  |
| 8.2.2.5 Results and Discussion.....   | 77  |
| 8.3 ROV observations of juvenile koi distribution, abundance, and behavior..... | 87  |
| 8.3.1 Observing and Methods.....  | 87  |
| 8.3.2 Results.....  | 88  |
| 8.4 General EXOSU Studies of volume backscatter.....                            | 89  |
| 8.4.6 Seafloor Distribution in the Marguerite Bay Area.....                     | 90  |
| 9.1 Introduction.....   | 91  |
| 9.2 Methods.....  | 91  |
| 9.3 Diverine Surveys.....   | 92  |
| 9.3.1 Methods.....  | 92  |
| 9.3.1.1 Data Collected.....   | 93  |
| 9.3.1.2 Preliminary Results.....  | 93  |
| 9.4 Seafloor Nighttime Surveys.....   | 93  |
| 9.4.1 Methods.....  | 93  |
| 9.4.2 Data Collected.....   | 93  |
| 9.4.3 Preliminary Results.....  | 93  |
| 9.5 Diver Sampling.....   | 94  |
| 9.5.1 Methods.....  | 94  |
| 9.5.2 Data Collected.....   | 94  |
| 9.5.3 Preliminary Results.....  | 94  |
| 10.0 Cetacean Visual Survey and Biopsy.....                                     | 95  |
| 10.1 Introduction.....  | 95  |
| 10.2 Methods.....   | 95  |
| 10.3 Results.....   | 95  |
| 10.3.1 Sightings.....   | 95  |
| 10.3.2 Biopsy.....  | 95  |
| 10.4 Preliminary Findings Discussion.....                                       | 97  |
| 11.0 Passive Seining.....   | 99  |
| 11.1 Introduction.....  | 99  |
| 11.2 Methods.....   | 99  |
| 11.3 Data Collected.....  | 100 |
| 11.4 Preliminary Results.....   | 101 |
| 11.5 Sufficiency of region and seining surveys.....                             | 101 |
| 11.6 Seismic Volume Reports.....  | 102 |
| 11.7 National Geographic Society.....   | 102 |
| 11.7.1 USCGC.....   | 102 |
| 11.7.2 USCGC.....   | 102 |
| 11.7.3 USCGC.....   | 102 |
| 11.7.4 USCGC.....   | 102 |
| 11.7.5 USCGC.....   | 102 |
| 11.7.6 USCGC.....   | 102 |
| 11.7.7 USCGC.....   | 102 |
| 11.7.8 USCGC.....   | 102 |
| 11.7.9 USCGC.....   | 102 |
| 11.7.10 USCGC.....  | 102 |
| 11.7.11 USCGC.....  | 102 |
| 11.7.12 USCGC.....  | 102 |
| 11.7.13 USCGC.....  | 102 |
| 11.7.14 USCGC.....  | 102 |
| 11.7.15 USCGC.....  | 102 |
| 11.7.16 USCGC.....  | 102 |
| 11.7.17 USCGC.....  | 102 |
| 11.7.18 USCGC.....  | 102 |
| 11.7.19 USCGC.....  | 102 |
| 11.7.20 USCGC.....  | 102 |
| 11.7.21 USCGC.....  | 102 |
| 11.7.22 USCGC.....  | 102 |
| 11.7.23 USCGC.....  | 102 |
| 11.7.24 USCGC.....  | 102 |
| 11.7.25 USCGC.....  | 102 |
| 11.7.26 USCGC.....  | 102 |
| 11.7.27 USCGC.....  | 102 |
| 11.7.28 USCGC.....  | 102 |
| 11.7.29 USCGC.....  | 102 |
| 11.7.30 USCGC.....  | 102 |
| 11.7.31 USCGC.....  | 102 |
| 11.7.32 USCGC.....  | 102 |
| 11.7.33 USCGC.....  | 102 |
| 11.7.34 USCGC.....  | 102 |
| 11.7.35 USCGC.....  | 102 |
| 11.7.36 USCGC.....  | 102 |
| 11.7.37 USCGC.....  | 102 |
| 11.7.38 USCGC.....  | 102 |
| 11.7.39 USCGC.....  | 102 |
| 11.7.40 USCGC.....  | 102 |
| 11.7.41 USCGC.....  | 102 |
| 11.7.42 USCGC.....  | 102 |
| 11.7.43 USCGC.....  | 102 |
| 11.7.44 USCGC.....  | 102 |
| 11.7.45 USCGC.....  | 102 |
| 11.7.46 USCGC.....  | 102 |
| 11.7.47 USCGC.....  | 102 |
| 11.7.48 USCGC.....  | 102 |
| 11.7.49 USCGC.....  | 102 |
| 11.7.50 USCGC.....  | 102 |
| 11.7.51 USCGC.....  | 102 |
| 11.7.52 USCGC.....  | 102 |
| 11.7.53 USCGC.....  | 102 |
| 11.7.54 USCGC.....  | 102 |
| 11.7.55 USCGC.....  | 102 |
| 11.7.56 USCGC.....  | 102 |
| 11.7.57 USCGC.....  | 102 |
| 11.7.58 USCGC.....  | 102 |
| 11.7.59 USCGC.....  | 102 |
| 11.7.60 USCGC.....  | 102 |
| 11.7.61 USCGC.....  | 102 |
| 11.7.62 USCGC.....  | 102 |
| 11.7.63 USCGC.....  | 102 |
| 11.7.64 USCGC.....  | 102 |
| 11.7.65 USCGC.....  | 102 |
| 11.7.66 USCGC.....  | 102 |
| 11.7.67 USCGC.....  | 102 |
| 11.7.68 USCGC.....  | 102 |
| 11.7.69 USCGC.....  | 102 |
| 11.7.70 USCGC.....  | 102 |
| 11.7.71 USCGC.....  | 102 |
| 11.7.72 USCGC.....  | 102 |
| 11.7.73 USCGC.....  | 102 |
| 11.7.74 USCGC.....  | 102 |
| 11.7.75 USCGC.....  | 102 |
| 11.7.76 USCGC.....  | 102 |
| 11.7.77 USCGC.....  | 102 |
| 11.7.78 USCGC.....  | 102 |
| 11.7.79 USCGC.....  | 102 |
| 11.7.80 USCGC.....  | 102 |
| 11.7.81 USCGC.....  | 102 |
| 11.7.82 USCGC.....  | 102 |
| 11.7.83 USCGC.....  | 102 |
| 11.7.84 USCGC.....  | 102 |
| 11.7.85 USCGC.....  | 102 |
| 11.7.86 USCGC.....  | 102 |
| 11.7.87 USCGC.....  | 102 |
| 11.7.88 USCGC.....  | 102 |
| 11.7.89 USCGC.....  | 102 |
| 11.7.90 USCGC.....  | 102 |
| 11.7.91 USCGC.....  | 102 |
| 11.7.92 USCGC.....  | 102 |
| 11.7.93 USCGC.....  | 102 |
| 11.7.94 USCGC.....  | 102 |
| 11.7.95 USCGC.....  | 102 |
| 11.7.96 USCGC.....  | 102 |
| 11.7.97 USCGC.....  | 102 |
| 11.7.98 USCGC.....  | 102 |
| 11.7.99 USCGC.....  | 102 |
| 11.8 USCGC.....   | 102 |
| 11.9 USCGC.....   | 102 |
| 12.0 USCGC.....   | 102 |
| 12.1 USCGC.....   | 102 |
| 12.2 USCGC.....   | 102 |
| 12.3 USCGC.....   | 102 |
| 12.4 USCGC.....   | 102 |
| 12.5 USCGC.....   | 102 |
| 12.6 USCGC.....   | 102 |
| 12.7 USCGC.....   | 102 |
| 12.8 USCGC.....   | 102 |
| 12.9 USCGC.....   | 102 |
| 13.0 USCGC.....   | 102 |
| 13.1 USCGC.....   | 102 |
| 13.2 USCGC.....   | 102 |
| 13.3 USCGC.....   | 102 |
| 13.4 USCGC.....   | 102 |
| 13.5 USCGC.....   | 102 |
| 13.6 USCGC.....   | 102 |
| 13.7 USCGC.....   | 102 |
| 13.8 USCGC.....   | 102 |
| 13.9 USCGC.....   | 102 |
| 14.0 USCGC.....   | 102 |
| 14.1 USCGC.....   | 102 |
| 14.2 USCGC.....   | 102 |
| 14.3 USCGC.....   | 102 |
| 14.4 USCGC.....   | 102 |
| 14.5 USCGC.....   | 102 |
| 14.6 USCGC.....   | 102 |
| 14.7 USCGC.....   | 102 |
| 14.8 USCGC.....   | 102 |
| 14.9 USCGC.....   | 102 |
| 15.0 USCGC.....   | 102 |
| 15.1 USCGC.....   | 102 |
| 15.2 USCGC.....   | 102 |
| 15.3 USCGC.....   | 102 |
| 15.4 USCGC.....   | 102 |
| 15.5 USCGC.....   | 102 |
| 15.6 USCGC.....   | 102 |
| 15.7 USCGC.....   | 102 |
| 15.8 USCGC.....   | 102 |
| 15.9 USCGC.....   | 102 |
| 16.0 USCGC.....   | 102 |
| 16.1 USCGC.....   | 102 |
| 16.2 USCGC.....   | 102 |
| 16.3 USCGC.....   | 102 |
| 16.4 USCGC.....   | 102 |
| 16.5 USCGC.....   | 102 |
| 16.6 USCGC.....   | 102 |
| 16.7 USCGC.....   | 102 |
| 16.8 USCGC.....   | 102 |
| 16.9 USCGC.....   | 102 |
| 17.0 USCGC.....   | 102 |
| 17.1 USCGC.....   | 102 |
| 17.2 USCGC.....   | 102 |
| 17.3 USCGC.....   | 102 |
| 17.4 USCGC.....   | 102 |
| 17.5 USCGC.....   | 102 |
| 17.6 USCGC.....   | 102 |
| 17.7 USCGC.....   | 102 |
| 17.8 USCGC.....   | 102 |
| 17.9 USCGC.....   | 102 |
| 18.0 USCGC.....   | 102 |
| 18.1 USCGC.....   | 102 |
| 18.2 USCGC.....   | 102 |
| 18.3 USCGC.....   | 102 |
| 18.4 USCGC.....   | 102 |
| 18.5 USCGC.....   | 102 |
| 18.6 USCGC.....   | 102 |
| 18.7 USCGC.....   | 102 |
| 18.8 USCGC.....   | 102 |
| 18.9 USCGC.....   | 102 |
| 19.0 USCGC.....   | 102 |
| 19.1 USCGC.....   | 102 |
| 19.2 USCGC.....   | 102 |
| 19.3 USCGC.....   | 102 |
| 19.4 USCGC.....   | 102 |
| 19.5 USCGC.....   | 102 |
| 19.6 USCGC.....   | 102 |
| 19.7 USCGC.....   | 102 |
| 19.8 USCGC.....   | 102 |
| 19.9 USCGC.....   | 102 |
| 20.0 USCGC.....   | 102 |
| 20.1 USCGC.....   | 102 |
| 20.2 USCGC.....   | 102 |
| 20.3 USCGC.....   | 102 |
| 20.4 USCGC.....   | 102 |
| 20.5 USCGC.....   | 102 |
| 20.6 USCGC.....   | 102 |
| 20.7 USCGC.....   | 102 |
| 20.8 USCGC.....   | 102 |
| 20.9 USCGC.....   | 102 |
| 21.0 USCGC.....   | 102 |
| 21.1 USCGC.....   | 102 |
| 21.2 USCGC.....   | 102 |
| 21.3 USCGC.....   | 102 |
| 21.4 USCGC.....   | 102 |
| 21.5 USCGC.....   | 102 |
| 21.6 USCGC.....   | 102 |
| 21.7 USCGC.....   | 102 |
| 21.8 USCGC.....   | 102 |
| 21.9 USCGC.....   | 102 |
| 22.0 USCGC.....   | 102 |
| 22.1 USCGC.....   | 102 |
| 22.2 USCGC.....   | 102 |
| 22.3 USCGC.....   | 102 |
| 22.4 USCGC.....   | 102 |
| 22.5 USCGC.....   | 102 |
| 22.6 USCGC.....   | 102 |
| 22.7 USCGC.....   | 102 |
| 22.8 USCGC.....   | 102 |
| 22.9 USCGC.....   | 102 |
| 23.0 USCGC.....   | 102 |
| 23.1 USCGC.....   | 102 |
| 23.2 USCGC.....   | 102 |
| 23.3 USCGC.....   | 102 |
| 23.4 USCGC.....   | 102 |
| 23.5 USCGC.....   | 102 |
| 23.6 USCGC.....   | 102 |
| 23.7 USCGC.....   | 102 |
| 23.8 USCGC.....   | 102 |
| 23.9 USCGC.....   | 102 |
| 24.0 USCGC.....   | 102 |
| 24.1 USCGC.....   | 102 |
| 24.2 USCGC.....   | 102 |
| 24.3 USCGC.....   | 102 |
| 24.4 USCGC.....   | 102 |
| 24.5 USCGC.....   | 102 |
| 24.6 USCGC.....   | 102 |
| 24.7 USCGC.....   | 102 |
| 24.8 USCGC.....   | 102 |
| 24.9 USCGC.....   | 102 |
| 25.0 USCGC.....   | 102 |
| 25.1 USCGC.....   | 102 |
| 25.2 USCGC.....   | 102 |
| 25.3 USCGC.....   | 102 |
| 25.4 USCGC.....   | 102 |
| 25.5 USCGC.....   | 102 |
| 25.6 USCGC.....   | 102 |
| 25.7 USCGC.....   | 102 |
| 25.8 USCGC.....   | 102 |
| 25.9 USCGC.....   | 102 |
| 26.0 USCGC.....   | 102 |
| 26.1 USCGC.....   | 102 |
| 26.2 USCGC.....   | 102 |
| 26.3 USCGC.....   | 102 |
| 26.4 USCGC.....   | 102 |
| 26.5 USCGC.....   | 102 |
| 26.6 USCGC.....   | 102 |
| 26.7 USCGC.....   | 102 |
| 26.8 USCGC.....   | 102 |
| 26.9 USCGC.....   | 102 |
| 27.0 USCGC.....   | 102 |
| 27.1 USCGC.....   | 102 |
| 27.2 USCGC.....   | 102 |
| 27.3 USCGC.....   | 102 |
| 27.4 USCGC.....   | 102 |
| 27.5 USCGC.....   | 102 |
| 27.6 USCGC.....   | 102 |
| 27.7 USCGC.....   | 102 |
| 27.8 USCGC.....   | 102 |
| 27.9 USCGC.....   | 102 |
| 28.0 USCGC.....   | 102 |
| 28.1 USCGC.....   | 102 |
| 28.2 USCGC.....   | 102 |
| 28.3 USCGC.....   | 102 |
| 28.4 USCGC.....   | 102 |
| 28.5 USCGC.....   | 102 |
| 28.6 USCGC.....   | 102 |
| 28.7 USCGC.....   | 102 |
| 28.8 USCGC.....   | 102 |
| 28.9 USCGC.....   | 102 |
| 29.0 USCGC.....   | 102 |
| 29.1 USCGC.....   | 102 |
| 29.2 USCGC.....   | 102 |
| 29.3 USCGC.....   | 102 |
| 29.4 USCGC.....   | 102 |
| 29.5 USCGC.....   | 102 |
| 29.6 USCGC.....   | 102 |
| 29.7 USCGC.....   | 102 |
| 29.8 USCGC.....   | 102 |
| 29.9 USCGC.....   | 102 |
| 30.0 USCGC.....   | 102 |
| 30.1 USCGC.....   | 102 |
| 30.2 USCGC.....   | 102 |
| 30.3 USCGC.....   | 102 |
| 30.4 USCGC.....   | 102 |
| 30.5 USCGC.....   | 102 |
| 30.6 USCGC.....   | 102 |
| 30.7 USCGC.....   | 102 |
| 30.8 USCGC.....   | 102 |
| 30.9 USCGC.....   | 102 |
| 31.0 USCGC.....   | 102 |
| 31.1 USCGC.....   | 102 |
| 31.2 USCGC.....   | 102 |
| 31.3 USCGC.....   | 102 |
| 31.4 USCGC.....   | 102 |
| 31.5 USCGC.....   | 102 |
| 31.6 USCGC.....   | 102 |
| 31.7 USCGC.....   | 102 |
| 31.8 USCGC.....   | 102 |
| 31.9 USCGC.....   | 102 |
| 32.0 USCGC.....   | 102 |
| 32.1 USCGC.....   | 102 |
| 32.2 USCGC.....   | 102 |
| 32.3 USCGC.....   | 102 |
| 32.4 USCGC.....   | 102 |
| 32.5 USCGC.....   | 102 |
| 32.6 USCGC.....   | 102 |
| 32.7 USCGC.....   | 102 |
| 32.8 USCGC.....   | 102 |
| 32.9 USCGC.....   | 102 |
| 33.0 USCGC.....   | 102 |
| 33.1 USCGC.....   | 102 |
| 33.2 USCGC.....   | 102 |
| 33.3 USCGC.....   | 102 |
| 33.4 USCGC.....   | 102 |
| 33.5 USCGC.....   | 102 |
| 33.6 USCGC.....   | 102 |
| 33.7 USCGC.....   | 102 |
| 33.8 USCGC.....   | 102 |
| 33.9 USCGC.....   | 102 |
| 34.0 USCGC.....   | 102 |
| 34.1 USCGC.....   | 102 |
| 34.2 USCGC.....   | 102 |
| 34.3 USCGC.....   | 102 |
| 34.4 USCGC.....   | 102 |
| 34.5 USCGC.....   | 102 |
| 34.6 USCGC.....   | 102 |
| 34.7 USCGC.....   | 102 |
| 34.8 USCGC.....   | 102 |
| 34.9 USCGC.....   | 102 |
| 35.0 USCGC.....   | 102 |
| 35.1 USCGC.....   | 102 |
| 35.2 USCGC.....   | 102 |
| 35.3 USCGC.....   | 102 |
| 35.4 USCGC.....   | 102 |
| 35.5 USCGC.....   | 102 |
| 35.6 USCGC.....   | 102 |
| 35.7 USCGC.....   | 102 |
| 35.8 USCGC.....   | 102 |
| 35.9 USCGC.....   | 102 |
| 36.0 USCGC.....   | 102 |
| 36.1 USCGC.....   | 102 |
| 36.2 USCGC.....   | 102 |
| 36.3 USCGC.....   | 102 |
| 36.4 USCGC.....   | 102 |
| 36.5 USCGC.....   | 102 |
| 36.6 USCGC.....   | 102 |
| 36.7 USCGC.....   | 102 |
| 36.8 USCGC.....   | 102 |
| 36.9 USCGC.....   | 102 |
| 37.0 USCGC.....   | 102 |
| 37.1 USCGC.....   | 102 |
| 37.2 USCGC.....   | 102 |
| 37.3 USCGC.....   | 102 |
| 37.4 USCGC.....   | 102 |
| 37.5 USCGC.....   | 102 |
| 37.6 USCGC.....   | 102 |
| 37.7 USCGC.....   | 102 |
| 37.8 USCGC.....   | 102 |
| 37.9 USCGC.....   | 102 |
| 38.0 USCGC.....   | 102 |
| 38.1 USCGC.....   | 102 |
| 38.2 USCGC.....   | 102 |
| 38.3 USCGC.....   | 102 |
| 38.4 USCGC.....   | 102 |
| 38.5 USCGC.....   | 102 |
| 38.6 USCGC.....   | 102 |
| 38.7 USCGC.....   | 102 |
| 38.8 USCGC.....   | 102 |
| 38.9 USCGC.....   | 102 |
| 39.0 USCGC.....   | 102 |
| 39.1 USCGC.....   | 102 |
| 39.2 USCGC.....   | 102 |
| 39.3 USCGC.....   | 102 |
| 39.4 USCGC.....   | 102 |
| 39.5 USCGC.....   | 102 |
| 39.6 USCGC.....   | 102 |
| 39.7 USCGC.....   | 102 |
| 39.8 USCGC.....   | 102 |
| 39.9 USCGC.....   | 102 |
| 40.0 USCGC.....   | 102 |
| 40.1 USCGC.....   | 102 |
| 40.2 USCGC.....   | 102 |
| 40.3 USCGC.....   | 102 |
| 40.4 USCGC.....   | 102 |
| 40.5 USCGC.....   | 102 |
| 40.6 USCGC.....   | 102 |
| 40.7 USCGC.....   | 102 |
| 40.8 USCGC.....   | 102 |
| 40.9 USCGC.....   | 102 |
| 41.0 USCGC.....   | 102 |
| 41.1 USCGC.....   | 102 |
| 41.2 USCGC.....   | 102 |
| 41.3 USCGC.....   | 102 |
| 41.4 USCGC.....   | 102 |
| 41.5 USCGC.....   | 102 |
| 41.6 USCGC.....   | 102 |
| 41.7 USCGC.....   | 102 |
| 41.8 USCGC.....   | 102 |
| 41.9 USCGC.....   | 102 |
| 42.0 USCGC.....   | 102 |
| 42.1 USCGC.....   | 102 |
| 42.2 USCGC.....   | 102 |
| 42.3 USCGC.....   | 102 |
| 42.4 USCGC.....   | 102 |
| 42.5 USCGC.....   | 102 |
| 42.6 USCGC.....   | 102 |
| 42.7 USCGC.....   | 102 |
| 42.8 USCGC.....   | 102 |
| 42.9 USCGC.....   | 102 |
| 43.0 USCGC.....   | 102 |
| 43.1 USCGC.....   | 102 |
| 43.2 USCGC.....   | 102 |
| 43.3 USCGC.....   | 102 |
| 43.4 USCGC.....   | 102 |
| 43.5 USCGC.....   | 102 |
| 43.6 USCGC.....   | 102 |
| 43.7 USCGC.....   | 102 |
| 43.8 USCGC.....   | 102 |
| 43.9 USCGC.....   | 102 |
| 44.0 USCGC.....   | 102 |
| 44.1 USCGC.....   | 102 |
| 44.2 USCGC.....   | 102 |
| 44.3 USCGC.....   | 102 |
| 44.4 USCGC.....   | 102 |
| 44.5 USCGC.....   | 102 |
| 44.6 USCGC.....   | 102 |
| 44.7 USCGC.....   | 102 |
| 44.8 USCGC.....   | 102 |
| 44.9 USCGC.....   | 102 |
| 45.0 USCGC.....   | 102 |
| 45.1 USCGC.....   | 102 |
| 45.2 USCGC.....   | 102 |
| 45.3 USCGC.....   | 102 |
| 45.4 USCGC.....   | 102 |
| 45.5 USCGC.....   | 102 |
| 45.6 USCGC.....   | 102 |
| 45.7 USCGC.....   | 102 |
| 45.8 USCGC.....   | 102 |
| 4   |     |