

2008 NEWSLETTER

GOMMI NEWS

Dear Friends and Colleagues,

This electronic newsletter is being sent by the [Gulf of Maine Mapping Initiative](#) (GOMMI) to keep you up to date on our activities over the past year, and to provide news on seafloor mapping in the Gulf of Maine region. This year, GOMMI made significant progress on its mission to advance seafloor mapping and make high-resolution benthic maps available for use in marine resource management, ocean planning, and commercial activities. Below are some highlights and please visit our website for more information.

Mapping coordination

GOMMI's 2006-2008 Work Plan lays out three strategies for coordinating regional mapping over this two-year period. Developed with broad stakeholder input, these strategies include distributing a yearly e-newsletter (you're looking at Issue #3!); exploring the need for a clearinghouse for mapping data; and maintaining a web-based map of multibeam surveys conducted in the Gulf of Maine. In addition, GOMMI is enhancing mapping coordination by providing fiscal support, outreach, networking, and logistical coordination for a habitat mapping project on Cashes Ledge (see case study p. 2).

Web-based Coverage Map

In November, GOMMI will post a newly updated interactive map showing multibeam coverage in the Gulf of Maine. This [coverage map](#) tracks the progress of high-resolution acoustic seafloor mapping throughout the region. The updated map is linked to websites of the survey groups. It includes new multibeam mapping coverage from the Bay of Fundy, the U.S. portion of Georges Bank, Bigelow Bight, and sections of the Maine coastline (Castine & Bagaduce River). We wish to thank Seth Ackerman at the Massachusetts Office of Coastal Zone Management (MA CZM), Jim Cradock who provides information technology services to the Gulf of Maine Council on the Marine Environment (GOMC), and the survey groups who supplied mapping information to GOMMI. This map will be updated periodically. Please contact GOMMI Coordinator, [Tracy Hart](#), as new mapping data becomes available.

Information Clearinghouse

To provide a comprehensive clearinghouse on the region's seafloor mapping efforts, GOMMI has developed a database of mapping surveys conducted with technologies other than high-resolution acoustic multibeam swath sonar (e.g. Side Scan sonar, Light Detection and Ranging ([LIDAR](#)) remote sensing systems, single beam acoustic systems, etc.) or in areas too small to be included in the coverage map. GOMMI plans to post website links to these other mapping efforts as a complement to the multibeam coverage map. Stay tuned!

Passing the Torch

In April 2008, Sara Ellis resigned from her position as GOMMI Coordinator to become the Program Manager of the Gulf of Maine Area Census of Marine Life based in Portland, Maine. Sara was hired as the first GOMMI contract employee at the end of 2005. In the past two and a half years, Sara has led GOMMI in efforts to coordinate regional mapping efforts and broaden regional and national support for seafloor mapping in the Gulf of Maine. We wish to publicly thank Sara for her exceptional work to move GOMMI toward its goals to map the Gulf of Maine Basin and provide a framework for managing the marine resources of this region. Congratulations Sara and best of luck!

Tracy Hart was hired in May 2008 to serve as the new GOMMI Coordinator. Tracy has a bachelor degree in biology from Brown University and a masters degree in conservation biology from the University of Maryland. Tracy has worked in the U.S. and internationally on marine and avian research projects. Tracy also has a decade of experience in coordinating and directing marine education and outreach programs. A native of Maine, Tracy has familiarity and working relationships with many of the groups working on marine and coastal issues in the Gulf of Maine.

Cashes Ledge Benthic Habitat Maps: GOMMI Mapping Coordination Case Study

GOMMI's top mapping priority is to complete a pilot mapping project on Cashes Ledge which began in 2005. Located approximately 80 miles east of Gloucester, Massachusetts, Cashes Ledge is a submerged mountain range renowned for its diverse habitat and invertebrate community, high densities of phytoplankton, lush kelp forests, large predatory fish (such as cod and pollock), and one of the deepest cold-water seaweed communities in the world. In an effort to maintain these unique features, the area was closed to certain types of commercial fishing in 2004. Marine managers, researchers, and outreach entities highlighted this area as a priority for seafloor mapping in a 2004 User Survey conducted by GOMMI (http://www.gulfofmaine.org/gommi/docs/gommiuser_survey.pdf, p. 27).

Mapping on Cashes Ledge began in 2005 when GOMMI assisted the University of New Hampshire Center for Coastal and Ocean Mapping/Joint Hydrographic Center (UNH CCOM-JHC) and Science Applications International Corporation (SAIC) in selecting priority areas for multibeam acoustic seafloor mapping in the Gulf of Maine utilizing \$1.5 million of funding from the National Oceanic and Atmospheric Administration (NOAA). Guided by GOMMI user survey findings and Steering Committee recommendations, UNH CCOM-JHC and SAIC collected multibeam acoustic imagery in portions of the western Gulf of Maine, including Cashes Ledge. CCOM-JHC produced maps of contoured topography and sediment texture from this data.

In 2006, Jonathan Grabowski, a Ph.D. benthic ecologist at the Gulf of Maine Research Institute (GMRI), and Tom Weber, Ph.D. (UNH CCOM-JHC), were funded by the Northeast Consortium to construct Cashes Ledge habitat maps that would be used to enhance understanding of critical nursery habitat areas for cod. Grabowski's lab collected biological data on the distribution and habitat utilization of cod. Weber collected additional multibeam data of the water column to provide information for the study of kelp habitat distribution on Cashes Ledge. The study aims to quantify the extent to which Cashes Ledge supports cod habitat. Additionally, Grabowski seeks to evaluate how the fishery closure area influences fish population dynamics and contributes to rebuilding cod populations in the Gulf of Maine.

The research collaborative conducted seasonal surveys in 2006 and 2007 on the kelp, barren cobble, and mud habitats in the vicinity of Cashes Ledge. The surveys used video, trap, and gill net sampling to quantify which habitats are used by juvenile and adult cod. These observations, and additional surveys planned in 2009, will be used to groundtruth biological habitat maps and assess their accuracy in predicting and defining habitat types.

Beginning in 2007, GOMMI secured a grant from the Davis Conservation Foundation for a Ph.D. student from the University of Ulster in Northern Ireland to join this collaborative project. The focus of Chris McGonigle's dissertation is to develop new methods for mapping seabed habitats, based on acoustic and biological data sets. McGonigle is using a computer-automated classification system and working together with Gulf of Maine researchers to create biological habitat maps of the Cashes Ledge Complex. The maps will integrate multibeam acoustic data, new groundtruthing data, and information from previous studies conducted over the past two decades on the physical structure, oceanography, and biology of Cashes Ledge (Witman and Sebens, 1992; Steneck, 1997; Steneck, unpublished data). McGonigle's preliminary maps will be released in winter of 2008. The project has been conducted with data and collaboration from the University of Southern Maine's Aquatic Systems Group and UNH CCOM-JHC.

McGonigle hopes to use the results of this study to outline the minimal level of expensive groundtruth sampling (i.e. physical samples, video, and photography) that is needed to produce statistically-valid habitat maps using acoustic data. Grabowski's lab will use the habitat maps to assess whether habitat characteristics, such as the presence of kelp (*Laminaria* spp.), influence the abundance and distribution of cod. They will also compare their cod data with those collected by researchers in the 1980s to determine if cod populations have changed since previous studies were conducted. Workshops planned by GOMMI and GMRI in 2008 will put Cashes Ledge habitat maps into the hands of managers and provide support in applying the products to fisheries management.

This is an exciting project, with applications to the Gulf of Maine and beyond. Quantifying the extent to which Cashes Ledge supports spawning, juvenile and adult cod habitat will help managers to assess the effectiveness of current management schemes and refine future management actions. Establishing habitat maps and quantifying ecosystem functions, such as the area's role in providing cod nursery habitat, will assist managers in selecting the most appropriate areas for management action. This study will provide baseline information that will be of value to ongoing efforts to assess the effectiveness of the Cashes Ledge fishery closure area. This project will also result in the first benthic habitat maps produced through collaborative efforts that have been guided by GOMMI. This project demonstrates GOMMI's capacity to secure funding, enhance collaboration, and coordinate mapping efforts.

Broadening our base of support

Steering Committee

This year, the GOMMI Steering Committee (SC) expanded to include Betsy Nicholson from NOAA Coastal Services Center (CSC) and Matt Wingate with the NOAA Office of Coast Survey Navigation Services Division. Tony Wilbur, MA CZM Marine Ecologist, replaces MA CZM Assistant Director Bruce Carlisle. Valued Steering Committee member Jim Case retired from his position at the UNH CCOM-JHC and his role with GOMMI in April 2008. Tom Lippman, an oceanographer at UNH CCOM-JHC, has agreed to fill Jim's position on the Steering Committee. We look forward to continued representation from this renowned international seafloor mapping center.

★ New Brochure!

GOMMI has developed a new brochure to broaden support for seafloor mapping in the region. The brochure *Mapping the Gulf of Maine Seafloor* will be available as a PDF on the [GOMMI website](#) in December. This document presents case studies of current and potential uses of seafloor maps to enhance marine resource management in the Gulf of Maine. The case studies outline marine activities that could benefit from improved knowledge of seabed properties, including the siting of offshore alternative energy projects (such as wind farms), designing routes for natural gas pipelines and fiber-optic and electrical cables; designating Essential Fish Habitat; evaluating area-based management measures; and coastal zone planning (for aquaculture, disposal sites, dock and pier construction, sand and gravel mining, etc.). This document also briefly describes the Gulf of Maine system, progress in seafloor mapping and technologies, and GOMMI's role in coordinating a regional seafloor mapping program. This document is an update and expansion of the publication *Mapping the Undersea Landscape* produced by GOMMI and the Gulf of Maine Council Science Translation Project in 2003.



Workshops & Presentations

Six out of twelve GOMMI Steering Committee (SC) members assisted in planning and convening the Habitat Classification & Mapping workshop hosted by the GOMC Habitat Conservation Subcommittee on September 11, 2008 in Portsmouth, NH. Steering Committee members Brian Todd (Geological Survey of Canada) and Page Valentine (U.S. Geological Survey (USGS) Woods Hole Field Center) developed the keynote address providing an overview of habitat

classification, seafloor mapping, and habitat characterization. GOMMI SC member Tony Wilbur (MA CZM) and co-presenter Dan Sampson (MA CZM) presented a case study in which their agency assessed and compared four existing classification schemes for their utility in categorizing the distribution of substrate types. As a result of this classification work, MA CZM developed bottom type maps using seafloor bathymetric, backscatter intensity, and groundtruth data from Massachusetts Bay. Betsy Nicholson (NOAA CSC) served on the Workshop Planning Committee. GOMMI's Coordinator, Tracy Hart, provided planning assistance to secure speakers, facilitators, and agenda input from GOMMI. Three GOMMI SC members, including Chair Member Megan Tyrrell (Cape Cod National Seashore), served as breakout session facilitators. A total of eight GOMMI SC members attended and participated in the workshop.

The goals of the workshop were to: (1) facilitate communication on seafloor mapping and classification; and (2) to understand management needs for information about marine habitats. The workshop sought feedback from managers on the limitations they face using seafloor mapping information, the attributes of a classification scheme that would help them to achieve their management mandate, and how these attributes differ for various Gulf of Maine agencies. Research participants were asked to provide feedback on the data and mapping techniques most appropriate for meeting management needs, how to determine and convey the accuracy of classification maps, and alternative data sources that could help to overcome current limitations or gaps. Proceedings from the workshop will soon be available at: <http://www.gulfofmaine.org/>.

Regional Mapping News

Mapping in the Bay of Fundy

In April 2006, the Geological Survey of Canada, Natural Resources Canada (NRCAN) launched a project to map the Bay of Fundy seafloor, in partnership with the Canadian Hydrographic Service and the University of New Brunswick's Ocean Mapping Group. The final phase of this survey took place in 2008, completing multibeam acoustic mapping for the entire seafloor of the Bay of Fundy! In 2009, geophysical profiles, photographs, bottom grabs, and video observations will be collected throughout the Bay to provide the necessary groundtruth for scientific interpretation of the acoustic data. In selected coastal regions, airborne topographic LIDAR data and bathymetric survey data will be combined to provide a seamless digital elevation model across the intertidal zone.

The Bay of Fundy survey effort is part of the Geoscience for Oceans Management (GOM) Program of the Geological Survey of Canada. Under this program, approximately 35,000 sq. km. of the Canadian portion of the Gulf of Maine has been surveyed and map production is underway. The GOM Program aims to deliver the geoscience knowledge base for informed decision making in Canada's offshore lands, by compiling existing surficial seafloor geoscience data, developing new mapping standards, and conducting integrated surveys of high priority areas. This data is used to produce maps, databases, and interpretive reports designed to empower stakeholders, clients and partners with the knowledge base to implement integrated ocean management.

Seafloor topography, backscatter (sediment texture), and surficial geology maps from the GOM Program are available through the [national marine map series](#). Multibeam maps can be viewed through an interactive map viewer. Substrate and habitat classification maps have also been developed by the Geological Survey of Canada for select areas of the Canadian portion of the Gulf of Maine (e.g. [Browns Bank](#)).

Mapping on the northern edge of Georges Bank

In July 2008, the NOAA Northeast Fisheries Science Center (NEFSC) completed the first multibeam acoustic mapping ever conducted on the U.S. portion of Georges Bank. The survey covered a small area on the northern edge of the Bank. The scientists hope to expand multibeam mapping in this area in future years. On September 10-11, 2008, researchers attending a workshop in Providence, RI discussed the implications of this data for the study and management of an invasive tunicate species (i.e. *Didemnum vexillum*) on Georges Bank. Follow up workshops are proposed by the MIT Sea Grant College Program, NEFSC, and GOMMI for winter/spring 2009. The focus of the follow up is to engage researchers and technology specialists in discussions about technologies for mapping, tracking, and assessing the impacts of this species on Georges Bank. The proposed workshop(s) will also target management entities to decipher ways that high-resolution seafloor mapping data can enhance invasive species management in this region.

The acoustic mapping on Georges Bank builds on several decades of research, physical sampling, and video/still photography surveys that have been conducted by multiple federal and academic institutions. Adding to this groundtruthing information, USGS and MIT scientists were aboard the July NOAA NEFSC mapping cruise to test image-creating sonar equipment mounted on an automated underwater vehicle (AUV). Efforts to integrate the new multibeam data for Georges Bank with visual and point sample data will enable the production of high-resolution maps

applicable to a number of management questions. This mapping information has the potential to inform decisions related to commercial uses, invasive species, fisheries management, and habitat protection.

Mapping in Massachusetts' coastal waters

Since 2003, USGS and MA CZM have been working cooperatively to map the seafloor in Massachusetts. Since its inception, the partnership has mapped more than 1,200 square kilometers (463 square miles) of seafloor in coastal Massachusetts. In 2006, the partnership began geophysical mapping in Cape Cod Bay along a 350 sq. km. section. An acoustic survey in summer 2007 covered an additional 150 sq. km of this area. In September 2007, the USGS-MA CZM cooperative program completed a groundtruth sampling survey in Cape Cod Bay. During this survey, sediment samples, high-resolution video, and seafloor photographs were acquired at approximately 175 sites. These data, as well as the results from a series of sediment cores, will help further characterize the seafloor and geologic framework of the region. In 2008, the partnership directed its mapping efforts to state waters outside the Gulf of Maine, including Buzzards Bay and Vineyard Sound. Mapping cruises in Buzzards Bay will begin in summer 2009.

Results of the initial phases of this project are available in two publicly accessible USGS Open-File Reports ([USGS OFR 2005-1293](#) & [2006-1008](#)). Results of mapping from Salisbury to Cape Ann will be published within the next month, followed by reports on geophysical surveys for the South Shore. The final report for the Gulf of Maine portion of Massachusetts, covering Cape Cod Bay surveys, will be published within the next two years.

In addition to the USGS-MA CZM partnership, a second mapping project focused on Cape Cod Bay was conducted by NOAA's Office of Coast Survey, NEFSC, and Office of Protected Resources in 2007, in cooperation with UNH CCOM-JHC and USGS. These agencies used acoustic technologies to map recommended shipping routes that were put in place by NOAA to minimize the likelihood of ship strikes on endangered northern right whales.

Student Mapping on the Bagaduce River in Maine

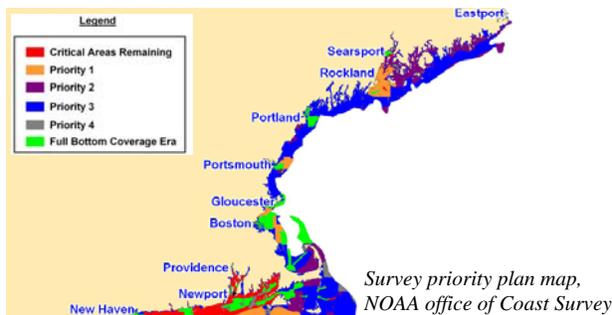
In summer 2008, students participating in a hydrographic training course at UNH CCOM/JHC had the hands-on opportunity to conduct multibeam acoustic mapping on Bigelow Bight, located 6.2 miles east of Hampton Harbor in New Hampshire, as well as in the Bagaduce River and Castine Harbor in Maine. The participants acquired and processed bathymetry, backscatter, and water column data in these areas. The data will support cod behavior studies

by the University of New Hampshire Zoology Department and provide information about geomorphology, seafloor properties, and biological activity derived from water column data. The areas covered by this survey will be featured on GOMMI's newly updated multibeam coverage map available in November 2008.

Mapping for Navigation

In May, 2008, NOAA conducted multibeam and/or side scan sonar surveys in Portsmouth Harbor, NH and Boston Harbor and Chelsea River, MA for the purpose of updating nautical charts and Electronic Nautical Chart (ENC) verification. The surveys were conducted by a regionally located NOAA team—called Navigation Response Team 5 (NRT-5)—which is under the Navigation Services Division (NSD), Office of Coast Survey (OCS). Each year, OCS conducts 40-50 hydrographic surveys to measure the depth and bottom configuration of water bodies, to produce nautical charts, and to ensure safe navigation of maritime commerce for U.S. territorial waters and the U.S. Exclusive Economic Zone (EEZ). The surveys identify seafloor materials (important for anchoring, dredging, and pipeline and cable routing), dredging areas, existing cables, pipelines, wrecks, obstructions, and fish habitats. The data is used to support activities such as port and harbor maintenance, coastal engineering (beach erosion and replenishment studies), coastal zone management, and offshore resource development. Navigation managers are stationed throughout the country to work with the maritime community to resolve charting and navigation issues. In general, they support NOAA's strategic goal to "promote safe navigation" by helping to identify challenges facing marine transportation.

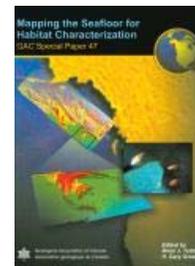
In the Northeast region, OCS has developed a long-term [survey priority plan](#) to identify surveying needs. Priority areas are determined by an assessment of ship traffic volume and patterns, adequacy of current charts, identification of areas with potentially insufficient keel clearance, and through input from the maritime community. Surveys in the Northeast will focus primarily on critical areas outside of the Gulf of Maine for next several years. Gulf of Maine critical survey areas include portions of Penobscot Bay and Bar Harbor in Maine.



Resources

Mapping the Seafloor for Habitat Characterization

Edited by Brian J. Todd and H. Gary Greene, Hardcover - 327 pages (2008) Published by the Geological Association of Canada; ISBN-13: 978-1-897095-33-1; ISSN: 0072-1042. Price: CDN \$90.00, US \$85.00.



[Mapping the Seafloor for Habitat Characterization](#) is edited by Brian J. Todd, a GOMMI Steering Committee member and research scientist with the Geological Survey of Canada, and H. Gary Greene, head of the Center for Habitat Studies at Moss Landing Marine Laboratories in California. The thirty-five papers presented in this volume represent the latest results in the field of marine benthic habitat mapping and characterization.

This volume is an outgrowth of papers and posters presented at GeoHab (Marine Geological and Biological Habitat Mapping) conferences since 2001. GeoHab brings together scientists from around the world working to develop thematic maps that link acoustic mapping and geological sampling to marine biology and sustainable ocean management. Highlighting mapping activity from around the world, this publication covers a broad spectrum of habitat studies and case studies from the Pacific and Atlantic oceans. This volume illuminates emerging technologies that enable the collection of marine physical and biological data with unprecedented efficiency and positional accuracy. It also describes how these technologies are being adapted to provide new views of seafloor habitat. Maps of habitat are recognized as crucial knowledge that can be used for informed decision-making as we adapt to changing coastal and oceanic environments.

MA CZM Habitat Classification Study

In 2007, MA CZM inventoried existing habitat classification schemes and recommended four classification frameworks for testing in Massachusetts. The report [Habitat Classification Feasibility Study for Coastal and Marine Environments in Massachusetts](#) is now available online.

The four classification frameworks recommended by this study were tested by MA CZM in 2008 utilizing multibeam bathymetry and backscatter intensity data, seafloor video and still photography, seismic profiling, and biological and geological sampling data developed by the MA CZM-USGS mapping partnership since 2003. This work compared the applicability of each framework for classifying benthic data from Massachusetts coastal,

estuarine, and marine environments and developing substrate type maps for Massachusetts state waters. For more information, contact Anthony Wilbur at tony.wilbur@state.ma.us.

New Seafloor Mapping Website

NOAA has launched a new [website](#) dedicated to seafloor mapping. The site features seafloor mapping case studies and information about high-resolution mapping technologies. The site includes a video that illustrates multibeam acoustic sonar surveying.

A Guide to Marine Habitat Mapping

A key product of the Mapping European Seabed Habitats Project (MESH) is a fully interactive guide to [Marine Habitat Mapping](#). The guide provides information at three levels to facilitate its use by everyone--from the interested lay person through to the specialist mapping scientist. Each chapter starts with an overview and introduction to set out the important principles, and then progresses through further sections offering more technical detail. Each chapter concludes with Recommended Operating Guidelines to help the field surveyor or data analyst standardize their work. The MESH guide is extensively illustrated with case studies and examples from MESH projects. It provides a series of interactive tools for the user to download. If you wish to obtain a printed synopsis of the guide or the full version on DVD, please email the [MESH Project Team](#). A PDF version of the synopsis is available for [download](#).

The Muscongus Bay Atlas & Seascapes: Guide to Characterizing Marine and Coastal Areas

The Quebec-Labrador Foundation (QLF) recently released two publications. Now available online and in print, the [Muscongus Bay Atlas](#) addresses community-based marine data collection and resource mapping in Muscongus Bay, off the coast of Maine. The Atlas presents 23 original and annotated maps comprised of over 150 GIS data layers. Together these illustrations provide a visual description of this bay region and enable the possibility of more deliberate regional thinking.

[Seascapes: Getting to Know the Sea Around Us. A Guide to Characterizing Marine and Coastal Areas](#) describes a process for characterizing marine areas. The document is written by Peter H. Taylor, Waterview Consulting, and Jennifer Atkinson, QLF and designed by Kathlyn Tenga-Gonzalez, Maine Sea Grant College Program. Now available for download or online ordering, the document guides users in the steps to characterize a marine area, prioritizing and obtaining information, and communicating data. It also provides a section on readily available information for studies in Maine, which may be expanded in the future to include information sources from other states and provinces. The document is based

on input from a broad-based working group, convened and coordinated by Jennifer Atkinson at QLF and Tracy Hart formerly with Maine Sea Grant, with representatives from state, academic, and non-profit institutions. These advisors provided insight on characterizing the biological, geophysical, cultural, and historical components of a marine area. The document highlights regional and national case studies.

Workshops

International Council for the Exploration of the Sea

The International Council for the Exploration of the Sea (ICES), the world's largest marine science and advisory body, held its 2008 Annual Science Conference at the World Trade and Convention Centre in Halifax, Nova Scotia, Canada, from September 22-26, 2008. Over 400 world renowned researchers, from 30 countries, presented scientific research on topics including comparative ecosystem studies, ecosystem health, climate change, modeling, new technologies, conservation, the valuation of nature, and ecosystem structure.

Shallow Water Survey 2008

The Fifth International [Conference on High-Resolution Surveys in Shallow Water](#) was hosted by UNH CCOM-JHC in Portsmouth, New Hampshire, October 21-24, 2008. Following the tradition established for this series of conferences, a "common data set" was collected in the waters around Portsmouth and made available before the conference. The meeting provided a lively venue for the interchange of new ideas about the challenges facing those charged with all aspects of shallow water surveying.

That's it for now! Please [send us](#) feedback on this newsletter, or tell us about projects we could highlight next time.

		
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