

*A young humpback whale eyeballs R/V Ibis  
Photo taken under NOAA Permit No. 932-1905*

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# LETTER FROM THE PRESIDENT & C.E.O.

## The Magic and Challenges of Cape Cod Bay and Beyond

The waters off southern New England, including Cape Cod Bay, encompass diverse ecosystems teeming with the activities of both marine and human life. This dynamic combination results in multiple opportunities for exciting scientific research as well as increasing challenges to the overall health of the ecosystem. This issue of *Coastwatch* explores aspects of those interactions, some of which we have studied for over three decades.

Many whale species visit this area throughout the year and the humpback whale is one of its most active and charismatic seasonal visitors. A favorite of whale watchers, it enchants millions of people every year with its spectacular breaching behavior. As a result of the Center's research, over the past 30 years, we have accumulated one of the largest consecutive running databases of any marine mammal in the world. From this data, leading scientists, like Director of our Humpback Whale Research Program Dr. Jooke Robbins, conduct advanced studies that reveal critical information about the humpback's population trends, feeding habits, migration patterns and threats.

Meanwhile, human beings have unquestionably and dramatically increased their year-round presence and activities on the same waters and along the shores. In an effort to understand the results of these activities, the Center has been conducting the only comprehensive water quality and habitat monitoring study of Cape Cod Bay, which is now entering its eighth field season. The resulting synthesis of the first five years of this monitoring data is now available in a Center publication entitled, *How is Our Bay?*

This report provides evidence that the nitrogen-laden wastewater that makes its way from septic tanks and other sources to our coastal waters is detrimental to the health of whales, humans, our communities and our economy; unsurprisingly it has emerged as the number one public policy issue for the Cape and Islands, and our data will prove critical to those who must address this serious problem. Dr. Amy Costa, Director of our Cape Cod Bay Monitoring Program, and Marine Policy Coordinator, Pat Hughes, have done an outstanding job of presenting these assessments in a user-friendly format.

The Bay brings pleasant surprises, too. In early January a female right whale, nicknamed "Wart," returned to the Bay unseasonably early, and appears to have borne a calf here – an unprecedented event based on our 30 years of data! Read Director Scott Landry's account of our Whale Rescue Team's multiple attempts and ultimate success in disentangling this whale, and the thrill of seeing her return to the Bay with her newborn calf. The Right Whale Aerial Survey did find one formerly entangled whale that is now gear-free in the bay and another that the Marine Animal Entanglement Response team partially disentangled last year, which at this sighting had shed more gear and was feeding freely, a testament to the importance of these whale conservation programs.

Your support is what makes all of our research and rescues possible. Thank you, in advance, for your continuing interest and financial support for the conservation and protection of the ocean and all the magnificent marine life within that creates the magical environment we all cherish.

*Richard Delaney*

## COASTWATCH

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# A Year in the Life of the Humpback Whale Studies Program

by Humpback Program Staff

The Humpback Whale Studies Program is one of the Center's longest running research programs. It has studied the Gulf of Maine humpback whale population continuously since the 1970s and is the only team to routinely monitor it across its feeding range in U.S. and Canadian waters. Field projects and collaborations are also undertaken in other areas of the world (such as American Samoa) in order to advance the scientific knowledge of this species. Research priorities are in the areas of population structure and dynamics, health assessment techniques and human impacts (especially entanglement). Additionally, we endeavor to use our extensive life history data and tissue archives to facilitate the development of new techniques for studying large whales. A particularly important research tool is our multi-decade Gulf of Maine Humpback Whale Catalog and its associated longitudinal databases. The following are just a few highlights of the research and outreach of this program over the past twelve months.

Follow Dr. Jooke Robbins, Jenn Tackaberry and their many collaborators through highlights of their research and outreach over the past twelve months.

## May 2012

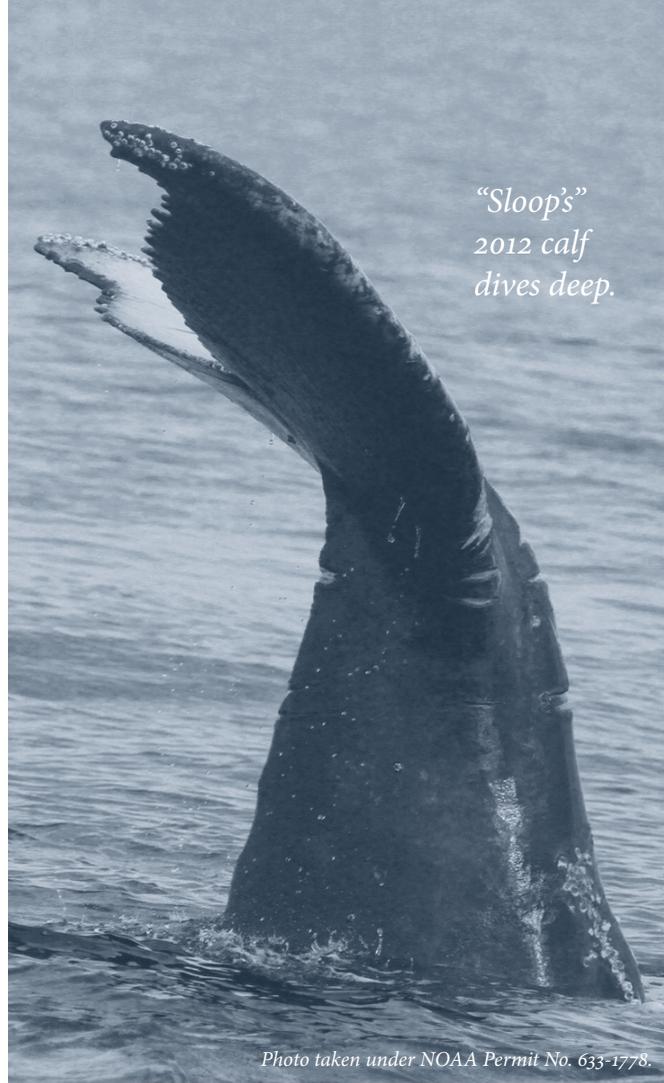
- The Center begins its annual Gulf of Maine field research when humpback whales return from their winter breeding grounds. This is usually late March or early April, but this year humpbacks were first seen in mid-February. Program research identified over 150 individuals by the end of May!
- Program staff co-authored a scientific paper this month that confirmed the relatively small size and lack of increase of an endangered humpback whale population in the South Pacific. The analysis included data from American Samoa, where CCS has undertaken research annually since 2003.

## June 2012

- Humpback program staff spent two weeks in the field working with the Stellwagen Bank National Marine Sanctuary Program as part of their humpback whale DTAG (acoustic recording tag) study. This research is producing new, detailed information on the underwater behavior of humpback whales.

## July 2012

- Seventy-six Gulf of Maine humpback whales were named by the scientific and naturalist community. This three-decade naming tradition is led by CCS and the



*"Sloop's"  
2012 calf  
dives deep.*

*Photo taken under NOAA Permit No. 633-1778.*

Whale Center of New England. Each year, groups from throughout the Gulf of Maine share images of calves and whales that they do not recognize. We first subject these to an intensive matching process to ensure that they are new to the catalogued population and then moderate the community naming process. Naming individual humpback whales facilitates research, public education and stewardship.

- The Center and the Dolphin Fleet hosted an intern from the Dominican Republic. This is an annual internship program to build capacity for research and conservation in the Wider Caribbean Region, in collaboration with the SBNMS and its Sister Sanctuaries.
- Twenty-six satellite tags were deployed on humpback whales. This is the second year of a large collaborative project which has helped to improve satellite tag design and to clarify potential health effects. This year, the deployments also included LIMPET tags, a smaller tag that is more commonly used on odontocetes. Work is being done with partners at the Alaska Sealife Center, Cascadia Research Collective and University of Alaska Fairbanks and funded by the Pacific Life Foundation Marine Mammal Research Fund at the Ocean Foundation.

## August 2012

- The Humpback Whale Studies Program continued its annual population-wide

*Continued on page 8*

# A BRIEF HISTORY OF 'WART'

by Scott Landry, Director, Marine Animal Entanglement Response (MAER)

In early January of this year, a right whale mother and calf were found in Plymouth Harbor. As our aerial survey team circled above the pair they recognized the mother almost instantly. She was the subject of a nearly two-year disentanglement effort. Her calf was one result of that effort and an especially poignant new member of a fragile population. This is the brief telling of that story.

## March 2008

Right whale #1140, nicknamed Wart, appeared in Cape Cod Bay with a long length of rope streaming from the left side of her mouth. While her condition looked poor, the entanglement did not appear serious. The MAER team spent five days on the water assessing her condition, finally managing to shorten this length of rope to prevent further entanglement. The team felt reasonably confident she would shed the remaining rope on her own as many right whales had done before her.

## February 2009

The Center's right whale aerial survey team sighted Wart in early 2009, using the unique pattern of light patches on her head to identify her. She surprised us all. She had not shed her entanglement and the rope was now passing through her mouth, streaming from both sides. Still, without any wraps around her upper jaws or flippers, the entanglement was not very serious and would likely be shed. Unfortunately she was seen on only one day that year so the team had no time to monitor her condition over time. With about 500 individuals left in the population, right whales wander widely throughout the year.

## January 2010

In 2010 things got much worse for Wart. The rope was now wrapping her upper jaw, a configuration that had ended the lives of a number of right whales. As a mature female with a last confirmed birth in 2005, she had likely skipped a calving interval during her entanglement and her condition was declining. Throughout this event the MAER team had been perfecting a new technique to deal with entanglements like the one she had developed over time. The technique would take luck but would help maintain a safe distance between her and the response team.

## May 2010

On May 1, 2010 the Northeast Fisheries Science Center aerial team sighted Wart east of Cape Cod. The MAER team approached her carefully as she had proven to be very evasive during earlier attempts. Using a modified rope-cutting arrow fired by a crossbow, the team cut through the rope wrapping her upper jaw as she surfaced for a breath. With the rope now severed, she shed the remaining entanglement just days later.



Above: A rope-cutting arrow (upper left corner) is used to cut the line (circled) wrapping Wart's upper jaw.

CCS image, taken under NOAA permit 932-1905

Right: Wart and her calf during their visit to Cape Cod Bay.

CCS image, taken under NOAA permit 14603

## January 2013

Throughout 2011 and 2012 the MAER team hoped for updates on Wart. Despite research efforts along the length of the East Coast, no sightings were recorded until January 13, 2013. Inside Cape Cod Bay Wart was found with a very young calf at her side. After nearly 600 personnel hours and many frustrating days at sea, the entanglement case of Wart had finally ended with the best of all possible outcomes: a new right whale calf. While disentanglement is not the solution to the problem of entanglements, it can help individuals and the future of the population.



The MAER Program thanks its many funders and supporters, including The Pegasus Foundation, the Hermann Foundation and the Massachusetts Environmental Trust.

**This past winter, Amy Costa, director of the Center's Cape Cod Bay Monitoring Program (CCBMP), and Pat Hughes, Marine Policy Director, published the technical report *How is Our Bay? Five Years of Environmental Monitoring of Cape Cod Bay*.**

*How is Our Bay?* presents the results of analyses of five years of data on water quality collected at 54 stations throughout the Cape Cod Bay; four years of eelgrass habitat studies at five locations, and Bay-wide aerial surveys three times per year; four years of monitoring in five harbors for the presence of marine invasive species; and a summary of a preliminary assessment for the presence of four pharmaceutical compounds at five sampling locations. Here is a brief overview of the project and a summary of the key findings.

# HOW IS OUR BAY? FIVE YEARS OF MONITORING THE HEALTH OF CAPE COD BAY

by Amy Costa, PhD and Pat Hughes

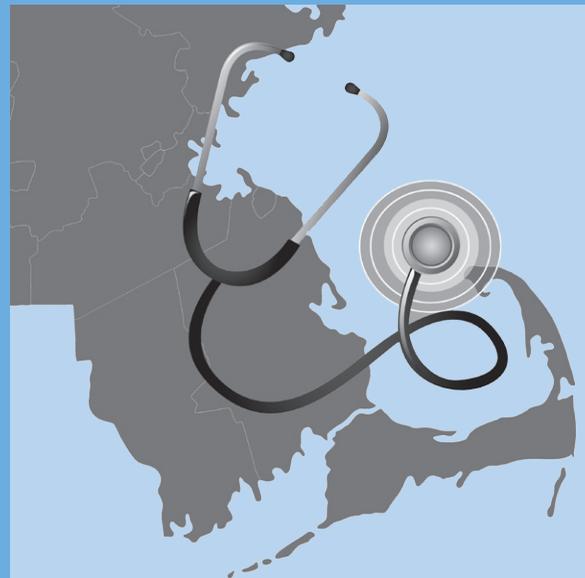
Cape Cod Bay defines the region's sense of place and quality of life. The region's economy is inextricably linked to the environmental health and productivity of Cape Cod Bay. Today, tourism and fishing, both recreational and commercial, contribute a minimum of a billion and half dollars a year to the region's economy. While the Bay is a biologically diverse and rich ecosystem, it is also fragile and easily threatened by human activity.

## The Power of Good Information

Regular monitoring helps us to understand how the Bay and its conditions change over time and expands our understanding of how human activities and management actions affect the Bay. The Cape Cod Bay Monitoring Program (CCBMP) provides information to make informed, scientifically-based decisions about its protection. As towns around the Bay take steps to reduce the amount of pollutants in groundwater, wastewater and stormwater, the results of the CCBMP, along with other data, can be compared with future results to determine change in the Bay's condition – improvements and degradation.

For example, an excess of nitrogen in coastal waters, leads to eutrophication or a polluted condition. Eutrophication is expressed by symptoms such as increased chlorophyll a (measuring the abundance of algae), decreased dissolved oxygen and a decrease in eelgrass abundance.

The Center conducts water quality sampling and analysis throughout the year in Cape Cod Bay at eight offshore, 30 nearshore and up to 25 inshore stations. Water temperature, salinity, dissolved oxygen, and pH are measured at all stations, and water samples are collected for Center-lab analyses of nitrogen and phosphorous compounds, chlorophyll a, pheophytin, and turbidity. PCCS monitors the health of eelgrass habitat at select stations, and for the presence of invasive species at three sites in the Bay. PCCS is also monitoring Bay waters for the presence of pharmaceutically active compounds (PhACs).



## What We Have Learned

Key findings from the CCBMP for period 2006 through 2010 are:

- A pattern of deteriorating conditions each year in the summer months in the inshore and nearshore stations
- Changes in the health and growth of eelgrass throughout the Bay
- An increase in the number and extent of invasive species in the Bay
- Detectable levels of four out of five monitored pharmaceutical compounds in the Bay. Higher levels of these compounds were found in areas where nitrate concentrations were highest, supporting the argument that PhACs are primarily associated with wastewater, and, correspondingly, that wastewater is a key source of nitrogen to the coastal waters of Cape Cod

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# THE IMPORTANCE OF OCEAN POLICY

*by Seana Siekman*

As the ocean has become an increasingly desirable area for commercial development, it has found an important spot on the environmental policy agenda. Massachusetts has been a pioneer as the first state to develop ocean management legislation, and Barnstable County has followed suit. The wide array of economic sectors that have traditionally relied on the ocean, coupled with emerging uses such as offshore wind energy and sand mining and extraction for beach nourishment, makes creating a sustainable ocean management plan a challenging task.

Marine spatial planning and ecosystem-based management are two important tools that have emerged, both emphasizing a more collaborative, inclusive approach than traditionally employed in management strategies. Marine spatial planning stresses the importance of cooperation between all stakeholders, enabling resources to be shared and reducing the number of conflicting goals. Ecosystem-based management also takes a more inclusive approach to resource management, attempting to consider many aspects of an ecosystem, including its diversity and health and defining appropriate human use.

The Massachusetts Ocean Management Plan (MOMP) was developed with the goals of protecting the state's ocean areas while also fostering sustainable use. It considers the natural, social, cultural, historical and economic uses of the ocean while protecting biodiversity and ecosystems, supporting responsible uses of marine resources, and accounting for changing technology and environmental conditions. The plan established three types of management areas: prohibited, renewable energy, and multi-use. Wind energy was one of the more controversial topics addressed, with the plan attempting to establish appropriate scales and locations for wind farm construction. The MOMP also sets standards for sand and gravel mining and beach nourishment, cable and pipeline construction, and fishing and aquaculture. Additionally, performance standards are included in the plan, along with a requirement to review the plan every five years. After extensive review and feedback, the final draft of the state's ocean plan was presented in December 2009.

Following the implementation of the state plan, the marine waters around Cape Cod began to receive more attention as well. In the spring of 2010 the County Commissioners nominated the ocean waters around Cape Cod as an Ocean Management District of Critical Planning Concern (OMDCPC), which



was subsequently approved by the Assembly of Delegates. The designation of the DCPC provided the Commission with a fifteen-month planning period to identify zones for various marine uses and develop regulations to help implement those designated uses. As part of this process the Cape Cod Commission (CCC) developed an Ocean Management Plan that examined existing and potential activities and projects in the OMDPC. The CCC developed this plan to establish a knowledge base of existing ecologically important areas and guidelines that would protect these areas, while also providing for future sustainable development. Implementing regulations were developed in conjunction with the Cape Cod Ocean Management Plan (CCOMP). The hope was that the Assembly of Delegates would adopt the CCC's proposed regulating implementations but unfortunately it did not.

The proposed OMDPC would have provided regulations for offshore renewable energy projects, primarily wind power, sand mining projects conducted for beach nourishment purposes, and cable and pipeline infrastructure. The CCOMP created zones and in the process considered the impact these development projects would have on the coastal region, including the ecosystems and corresponding geological features, marine mammals and wildlife, seabirds, both commercial and recreational fisheries, navigation, and scenic, cultural, and historical sites. Three classifications were established in order to specify areas where projects may take place in the future, as well as areas that were not suited for development. *Prohibited areas* do not allow for the construction of community scale wind infrastructure, sand mining, or pipeline construction and are given this classification because of they are a core habitat area for whales or important bird species, economically significant for commercial fisheries, key shipping and transportation routes, or part of the Cape Cod Ocean Sanctuary. *Exclusionary areas* are locations that contain an important habitat or ecosystem but may be suitable for development projects as long as certain requirements are met. Lastly, *provisional areas* are those within the ocean planning area that have not been designated as prohibited or exclusionary and the requirements for development projects are the least restrictive within these areas. The ocean planning area was zoned for all three types of projects separately resulting in restrictions that are specific to the impacts of a development type. Areas are designated as prohibited or exclusionary for wind, sand mining, and pipeline and cable construction.

During the creation of the CCOMP, the Provincetown Center for Coastal Studies provided the CCC with background research on an array of topics. Extensive fisheries information was contributed, including the various species found within the OMDPC, the life cycle patterns of the fish within the area, and the locations of economically important commercial and recreational fisheries. The impacts of sand and gravel mining and dredging on the benthic habitat and the productivity of fisheries were also addressed. Another important topic for which the Center provided information is how the noise from the construction and operation of wind farms affects large whales, stressing that this is an important factor to consider with proposed wind projects. The Center also provided feedback on the original drafts of both the state and county management plans. The research provided by the Center and other similar organizations was crucial in the creation of an ecosystem-based management plan, as it enabled the CCC to consider a wider array of factors in greater depth than they would have been able to on their own.

Since the original implementing regulations for the DCPC were rejected by the Assembly of Delegates, the CCC developed amendments to the coastal resources section of the Regional Policy Plan, drawing largely on the CCOMP. In an exciting victory, the amendments, which focus on sand and gravel mining projects and pipeline and cable construction, were approved by the Assembly



*Above: Commercial fishing is recognized as an existing use to be protected in both the Massachusetts and Cape Cod Ocean Management Plans.*

*Opposite: Shipping lanes into the port of Boston cross through significant habitat for endangered and threatened whales, in particular, the Stellwagen Bank National Marine Sanctuary.*

*Photos by Jesse Mechling, CCS.*

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Join us for our  
Third Annual  
Whale Week,  
July 29 through  
August 2!

### Meet Delilah

Monday July 29th, 11 am,  
at the Hiebert Marine Lab,  
5 Holway Ave. Meet Delilah.  
Step inside a life-sized right  
whale while learning about  
these amazing animals.  
Registration is not necessary.  
Suggested donation \$5

### Home Made Boat Race

Monday, July 29th, 5:00 pm,  
adjacent to Fisherman's Pier  
in front of the Crown and  
Anchor Inn, PCCS kicks-off  
Whale Week with a Home  
Made Boat Race to highlight  
marine debris in our ocean.  
Prizes will be awarded.  
Register by contacting  
Venture Athletics at 508-  
487-9442 or download the  
form at [www.coastalstudies.org](http://www.coastalstudies.org). This event is sponsored  
by Venture Athletics of  
Provincetown. Rain date  
Tuesday July 30th.

### Tidal Flats Foray

Tuesday, July 30th, 12:00 pm,  
at the West End Breakwater.  
Explore the tidal flats with  
PCCS. Every twelve hours,  
the tides of the Outer  
Cape retreat to reveal an  
exciting world of hidden  
creatures. Tidal flats are  
highly productive systems  
that support large numbers  
of animals. All ages are  
welcome and reservations  
are not necessary. Get your  
feet wet and discover the  
secret world of tidal flats  
with PCCS. Free.

### Scavenger Hunt

Wednesday July 31st,  
10:30 am. Did you know that  
Provincetown was one of the

## A Year in the Life of the Humpback Whale Studies Program

*Continued from page 3*

monitoring efforts. Each summer it surveys all of the primary habitats of humpback whales off the Northeast, from Nantucket to Nova Scotia. Southern Gulf of Maine areas were covered in the first half of the feeding season, and in August, program field work shifted to the Northern Gulf of Maine.

- The program was joined in the field by former Center scientist David Mattila and scientists from Brazil and Argentina, as part of an international training program on entanglement issues. David Mattila is currently the technical advisor on entanglement to the International Whaling Commission (IWC).



*"Andes" and "Bombay" lunge feeding.  
Photo taken under NOAA Permit No. 633-1778.*

### September 2012

- The team resumed research off Massachusetts, having completed its coverage of Gulf of Maine humpback whale habitats in the Bay of Fundy (Canada) and off Maine.
- The program received its new federal research permit and began to collect breath mucosa from humpback whales using a 32-foot sampling pole. This is part of a new collaboration with the New England Aquarium Marine Stress Research Program, intended to improve methods of assessing health and reproduction in this species. Samples of feces are also being collected. This work is funded by the Pacific Life Foundation Marine Mammal Research Fund at the Ocean Foundation.
- Program staff co-authored a paper on molecular genetic aging techniques for humpback whales. This is part of on-going efforts to determine the age of individuals that were not first seen as calves.

### October 2012

- The program completed a multi-year study of humpback whale and right whale survival after entanglement in fishing gear. This was a collaborative project with the Center's Marine Animal Entanglement Response program and colleagues at the New England Aquarium. The results are critical for determining the population-level effects of entanglement, and would not be possible without long-term population studies.
- Another co-authored paper was published this month. This study developed new quantitative techniques for analyzing photo-identification data. It also provided insight into how humpback whales use the Stellwagen Bank National Marine Sanctuary.
- Center research vessels were temporarily hauled at the end of October in preparation for Hurricane Sandy. This was a fitting end for a month hampered by unusually bad weather and low whale densities in the southern Gulf of Maine. Satellite tagged whales confirmed that some individuals had moved well out of our range, to areas east of Nova Scotia and Newfoundland.

### November 2012

- Weather and whales continued to be unusually challenging for late season fieldwork. In the meantime, program staff collaborated with the Northwest Fisheries Science Center on studies of aging and contaminant loads in female humpback whales. This latter aims to evaluate population-level impacts of persistent organic pollutants (POPs).
- Gulf of Maine humpback whale "Colorado" was found dead at sea by a NOAA aerial survey, and identified from photographs by Center staff. Our scientists were the first to catalogue this mature female back in 1997. News of her death is sad, but also important for understanding the fate of the individuals that we study.

## December 2012

- The Center conducted its last humpback whale research cruise of the year at Jeffreys Ledge, off New Hampshire. Humpback whales were studied on over 50 days at sea in 2012, at locations spanning the Gulf of Maine.
- Center scientists and colleagues at New England Aquarium completed a study of the dynamics of large whale entanglements in fixed fishing gear. This research examined the effects of gear strength and configuration on large whale entanglement outcome.
- Program staff co-authored a paper published in the *Journal of Cetacean Research and Management* this month. This study is part of an on-going effort to determine the Antarctic feeding grounds of whales from Eastern Australia and Oceania.

## January–March 2013

- Humpback whales “Spoon” and “Solo” were spotted off Provincetown in mid-January. These two mature females were likely preparing to migrate south to mate or calve in the warm waters of the Caribbean.
- Program activities shifted to the lab for the winter. The team analyzed the large volume of data collected in 2012, updated the Gulf of Maine Humpback Whale Catalog and shared information with data contributors. Focus also turned to on-going collaborations with researchers in the winter habitats of Gulf of Maine humpback whales.
- Humpback program staff co-authored a paper about humpback whale song in the South Pacific. This paper included data from our research at American Samoa and reported on song exchange at the ocean basin scale. Program director, Jooke Robbins, also travelled to New Zealand for the annual meeting of the South Pacific Whale Research Consortium.

## April 2013

- Humpback whales returned to the Gulf of Maine. Among the early sightings was “Piano” a whale that had been both struck by a ship and entangled in fishing gear in recent years. The Center monitors the fate of whales like Piano to determine the effects of human impacts on humpback whale health and survival.
- Center staff identified a humpback whale carcass off New York as “Istar”. This well-known whale, admired by researchers and the public alike, was famous for her fertility (she had at least 11 calves) and for being the first mother to ever be identified in the Gulf of Maine (in 1977). She was at least 41 years old when she died. The cause of her death is still under investigation by our colleagues at Riverhead Foundation for Marine Research and Preservation.
- Program staff provided research updates to Gulf of Maine naturalists as part of the 5th Annual Whale Watch Naturalist Workshop. This workshop was held at the Center’s Hiebert Marine Laboratory and co-organized by Whale & Dolphin Conservation and the Dolphin Fleet.
- Center staff co-authored a chapter on large whale entanglement in a scientific paper published this month in the journal *Diseases of Aquatic Organisms*.

## May 2013

- The first 2013 mother-calf pairs were documented in the Gulf of Maine. A few of the earliest returning mothers were “Apex”, “Fern” and “Pogo”.

*Continued on page 10*

## Whale Week

*Continued*

leading whaling ports in the nation in the 19th Century or that it once had more than 50 wharfs and more than 200 fishing vessels? Did you also know that East Coast whale watching began right here, or that the first entangled free swimming whale was rescued right in Provincetown Harbor? Learn about the rich maritime history of Provincetown through a family-friendly scavenger hunt. Registration is required. Free

### The Tale of IBIS

*Wednesday July 31st, 4:00 pm.* Children’s theater production. This live action/puppet production retells the story of the first whale successfully disentangled by PCCS, followed by a Q&A with Dr. Charles “Stormy” Mayo. Provincetown Town Hall. Content is suitable for all ages. Registration is not necessary. Free.

### Search for Seals

*Wednesday, July 31st, 12:30 pm,* at the Province Lands Visitor Center. A number of different species of seals occupy New England’s waters. PCCS will offer a naturalist led seal walk to search for seals on the Outer Beaches of Cape Cod. Please register by calling the Province Lands Visitor Center at 508.487.1256. Reservations are required. Free.

### Lecture: Whales of Cape Cod

*Thursday, Aug 1st, 11-12 pm,* at the Province Lands Visitor Center. Lecture: Whales of Cape Cod. Registration is not necessary. Free.

### Whale Games and Arts and Crafts

*Friday, Aug 2nd, 10 am,* Bas Relief Park, Provincetown. Marine themed games and competitions for kids of all ages 5-12. Arts and crafts activities. Registration is not necessary. Free.



*This whale displays the disfigurement from propeller cuts that gave “Piano” its name. Photo taken under NOAA Permit No. 633-1778.*



Photo by Jesse Mechling, CCS.

## Ocean policy

*Continued from page 7*

of Delegates and were formally adopted as part of the county's Regional Policy Plan in July 2012. The approval of these amendments gives the Commission the authority to review proposed projects of these types. The implementation of the state and county management plans has created a framework for other regions to follow, reinforcing the critical role research organizations, such as the Center for Coastal Studies, continue to play in protecting and conserving vital ocean resources.

### Resources:

Cape Cod Ocean Management Plan, Cape Cod Commission, October 13, 2011.

<http://www.capecodcommission.org/resources/dcp/CCOMPfinal10-13-11.pdf>

Massachusetts Ocean Management Plan, Executive Office and Energy and Environmental Affairs, December, 2011.

<http://www.env.state.ma.us/eea/mop/final-v1/v1-complete.pdf>

Pat Hughes, Provincetown Center for Coastal Studies, Personal Correspondence.

Heather McElroy, Cape Cod Commission, Personal Correspondence.

*Seana Siekman interned with the Marine Policy Program last year and was named 2013's Goodwin-Niering Center Scholar at Connecticut College. In addition to her marine policy work, Seana worked with Dr. Amy Costa and Owen Nichols on the Provincetown Beach Monitoring Project.*

## A Year in the Life of the Humpback Whale Studies Program

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- Preliminary findings on the health impacts from satellite tagging were presented at the annual conference of the International Association for Aquatic Animal Medicine. Several research abstracts on this topic were also submitted to the 20th Biennial Conference on the Biology of Marine Mammals.
- Research assistant, Jenn Tackaberry, gave the last of the Center's winter lecture series hosted by Napi's in Provincetown. "Giants in Our Backyard" summarized the Center's humpback whale research in the North Atlantic and the Pacific Oceans.
- Program staff prepared for the annual Scientific Committee meeting of the International Whaling

Commission. Dr. Jooke Robbins has been a member of the Committee since 2000 and is a convener of one of its sub-committees. A paper describing the effectiveness and impacts of satellite tagging was also submitted to the meeting.

- As we move into the 2013 season, the program wishes to thank its many collaborators and its funders for another productive year. We particularly thank the Beneficia Foundation for its many years of dedication to Center humpback whale research.

*Abstracts of the scientific papers mentioned in this article are available through the Center's website at [www.coastalstudies.org](http://www.coastalstudies.org).*

## How is our Bay?

Continued from page 5

*“The major threats to the health of Cape Cod Bay and its resources come primarily from activities within the Bay’s 600 square mile watershed – the geographic area in which all sources of water drain into it...Much of the soil in the Bay’s watershed is porous, making it highly susceptible to contamination, such as road runoff, septic tanks, leaking storage tanks and fertilizers... Ultimately, these contaminants end up in Cape Cod Bay.”*

- Improvement in conditions at 55% of the stations monitored and no change at 6% of the stations
- An overall decline in environmental conditions at 40% of the stations monitored, primarily in the inshore and nearshore regions of the Bay. Significantly, this decline is occurring in the waters that are in the highest demand for human activities- swimming, boating, fishing and shellfishing.

### Major Threats

Threats to Cape Cod Bay are in the form of increases in:

- Population – the year-round population in Barnstable County increased by 207% between 1960 (70,286) and 2010 (215,769).
- Development – there was a 193% increase in housing units built in Barnstable County and a 109% increase in Plymouth County between 1960 and 2010.
- Wastewater – the Cape Cod Commission estimates that 85% of the wastewater discharged into the Cape’s coastal waters comes from on-site septic systems. An estimated 32 million gallons per day were generated by all 15 Cape Cod towns in 2003
- Impervious Surface Area – development increases the area of hardened surfaces which results in increased stormwater flow that reduces water quality in ponds and coastal waters.

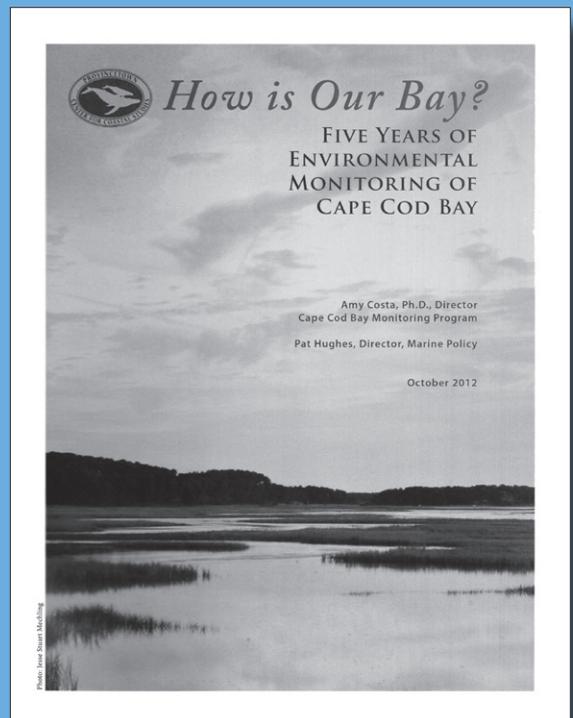
### Already Making a Difference

There are many local, regional, state and federal watershed planning and management efforts directed at habitat

protection and restoration and water quality in the Cape Cod Bay watershed. Examples include:

- Most coastal communities in the Cape Cod Bay watershed are in various stages of addressing wastewater and stormwater management; the impetus for many towns is the analyses and reports of the Massachusetts Estuaries Project
- The Town of Plymouth is implementing a state-mandated nutrient management plan that includes land acquisition and wetland restoration. The Town has purchased over 300 acres of conservation land around the Eel River and its watershed
- The Town of Sandwich upgraded on-site septic systems and improved stormwater management in the harbor and Scorton Creek area, resulting in the opening to public harvest of 210 acres of shellfish beds
- Eastham, Wellfleet and Brewster have all benefited from the Cape Cod Water Resources Restoration Project, a collaborative effort of the federal Natural Resources Conservation
- Service, the Cape Cod Conservation District, Barnstable County and Cape Cod towns. The Project’s priorities are to restore degraded salt marsh, improve fish access and improve water quality of shellfish beds.

A copy of the full report, which was published with support from the Sheehan Family Foundation, is available online at [www.coastalstudies.org](http://www.coastalstudies.org). For more information on the CCBMP, please contact Amy Costa at [acosta@coastalstudies.org](mailto:acosta@coastalstudies.org), (508) 487 3623 x 122 or Pat Hughes at [phughes@coastalstudies.org](mailto:phughes@coastalstudies.org), (508) 487 3623 x 121





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