

SeaKeepers Takes 90 Million Scientific Measurements in 2008

Thanks to its growing fleet of 55+ systems, the International SeaKeepers Society took approximately 90 million individual scientific measurements in 2008 alone.

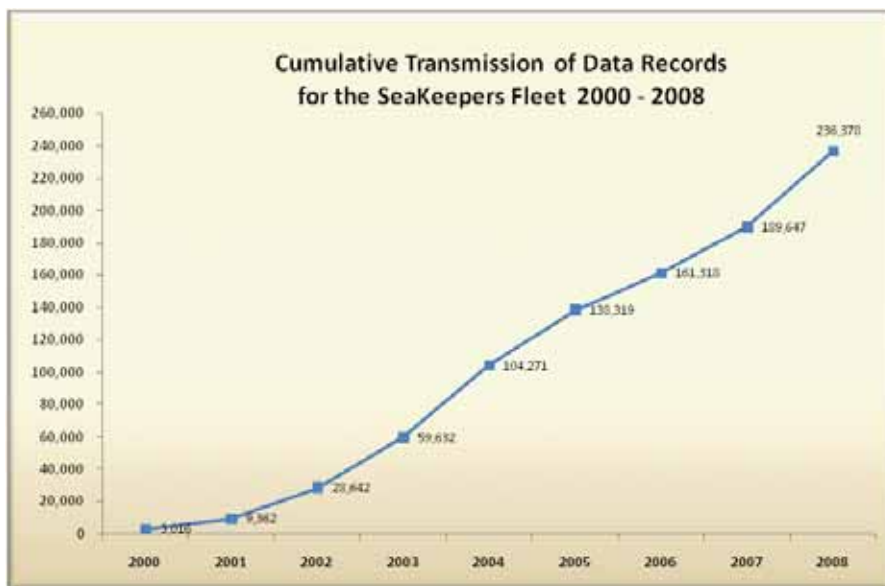
With another 17 systems in varying stages of installation, SeaKeepers is poised to significantly expand its position as one of the world's most prominent providers of marine weather data, climatological observations and scientific measurements. In terms of cost, SeaKeepers provides this critical data at an extraordinarily low cost of less than two cents per measurement!

SeaKeepers data is typically transmitted via satellite every three hours. These 3-hour summaries - or Transmitted Data Records (TDR's) - each represent 180 actual one-

minute data samples. These detailed, high-resolution data sets can be manually recovered from ships during regular service calls.

After the data messages are received by SeaKeepers computer servers, they undergo preliminary quality control, then are encoded and distributed over the Global Telecommunication System, a network managed by the United Nations' World Meteorological Organization, which channels data to 156 member countries' National Weather Services and to several international organizations that track surface oceanographic data. These latter organizations include, but are not limited to, the National Centers for Environmental Prediction in the U.S., the Marine Environmental Data Ser-

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With existing technology, most SeaKeepers' data is transmitted via satellite every three hours. These 3-hour summaries, or Transmitted Data Records (TDR's), are sent via email to SeaKeepers server computer. The data is distributed over the Global Telecommunication System, a network managed by the UN's World Meteorological Organization, which channels data to 156 member nations' National Weather Services and to several international organizations that track surface oceanographic data. Each TDR typically represents 180 actual one-minute data samples.



Vessel & Fleet Data Reports Now Available

SeaKeepers is now sharing comprehensive data reports with its Founders, yacht partners and other supporters summarizing both the individual monitoring results of member yachts as well as the collective monitoring activities of the entire SeaKeepers' monitoring fleet. These Reports provide Society supporters with a quantitative look at the important work their donations and efforts are sustaining.

Founders with a SeaKeeper 1000™ monitoring system installed onboard their yacht will receive both a Vessel Data Report, a strictly confidential summary of their vessel's contributions, as well as a Fleet Data Report, summarizing the data collection of the entire SeaKeepers' fleet. All SeaKeepers who have not underwritten a SeaKeeper 1000™ system receive the synopsis outlining the fleet's data contributions - which last year resulted in more than 90 million measurements, span-

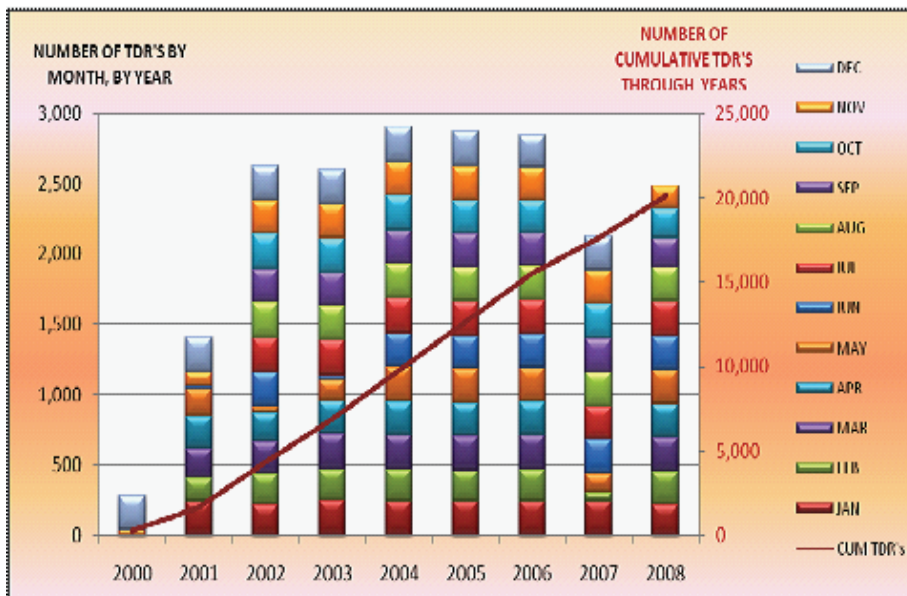
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Data Report story cont'd...

ning an estimated 2.4 million miles of ocean, at a cost of *less than two cents per measurement* [see cover story].

SeaKeepers' Fleet Data Reports include a map depicting the entire fleet's tracks across the globe. This Report also includes a quantitative analysis of the fleet's data contributions during that quarter, as well as the cumulative contribution since SeaKeepers began its data collection. A guide to understanding the monitoring terminology and SeaKeepers data collection and transmission process is also contained within.

The individual Vessel Data Reports include a ship's track along which the data was collected, a graphic depiction of the total amount of data collected in the last quarter



The graph above illustrates the type of information provided in SeaKeepers new Vessel Data Reports. The graph shows the number of Transmitted Data Records (TDR's) per month, per year, since the SeaKeeper 1000™ was commissioned on Carnival Cruise Lines' *Triumph*.

Vessel Data Report- SAMPLE

Report Date: 11/18/2008
 Platform Name: **CARNIVAL TRIUMPH - used as an example**
 Platform ID: Private - Available as Authorized Only
 Type of Platform: Cruise Line
 Date Commissioned: 11/25/2000 9:00:13 PM (date of first transmission recorded)
 Date of most Current Transmission (TDR): 11/18/2008
 Type of Hull: Steel
 Vessel Length: 900+ feet
 Vessel's Most Common Port: Miami
 Vessel's Most Common Area of Travel: Caribbean

	For Interval: 11-25-2000 through 11-18-2008		For additional data definitions, please visit www.seakeepers.org
Measurement	Carnival Triumph	ALL OF FLEET	
Number of TDR's	20,139	231,675	TRANSMITTED DATA RECORD ("TDR") is the data set that is sent via satellite, typically every three hours. The TDR is the average of the last 10 data records.
Number of Samples	3,621,420	37,629,780	SAMPLES are the actual events when water/atmosphere are analyzed and recorded - nominally done once per minute.
Number of Discrete Measurements	31,778,400	312,446,280	DISCRETE MEASUREMENTS are the individual measurements of a specific parameter. If a system measures and records 10 parameters each minute, over the period of an hour, that system has recorded 600 discrete measurements.

PLATFORM METADATA

All scientific data today must be accompanied by metadata - defined as "data about the data." Metadata, in fact, encompasses many factors. Where is the sensor located? How many feet above or below sea level (depending on meteorological or oceanographic sensor)? What is the specific model and the technology of the sensor? How accurate is it? When was it calibrated? Answers to all of these allow scientists to qualify the numbers. Thus each particular measurement needs to be put in the content of its metadata. While this might seem a minor issue, it multiplies and complicates the databases and formats, in addition to substantially increasing the volume of data to be recorded, transmitted, stored, and analyzed. Without the metadata, knowing that the sea surface temperature (SST) is 18.601°C, or that the salinity is 37.864 PSU, is of little value scientifically.

Transmission Frequency currently set at:	3 hours
SENSOR LOCATIONS:	Wind Sensor Height = 207.80 feet Barometer height = 206.60 feet Intake Depth = -27.70 feet
SENSOR MODULES:	Thermosalinograph: Idronaut 7 Parameter Thermosalinograph Meteorological Sensors: RM Young Meteorological Station
COMMUNICATIONS:	Trimble Transceiver
MET Parameters	Air Temperature Relative Humidity Barometric Pressure True Wind Speed True Wind Direction OCEAN Parameters Sea Surface Salinity Oxygen Concentration pH eH Sea Surface Temp

The above document is a sample page from a Vessel Data Report. This particular page explains data and metadata collected from *Triumph*, a cruise ship owned by Carnival Cruise Lines, as well as information on the particular sensors and communication technology used for this specific platform.

and also since the system's installation, and a sample of the raw data as it is delivered to satellites from the vessel. In addition, the Vessel Data Report includes important metadata.

All scientific data must be accompanied by metadata - defined as "data about the data," without which researchers would not be able to perform meaningful analyses. For example, the seawater intake aboard SeaKeepers-equipped cruise ships is significantly deeper, usually 20 feet deeper, than on most yachts. If these two vessels were to sample seawater in the same location at the same time, the data would look quite different. Without the attached metadata information, these differences would be inexplicable, and therefore useless to researchers.

"We are very excited to provide personalized, detailed Reports on the data SeaKeepers is collecting," said CEO John Englander. "These reports paint a tangible picture of the invaluable information being provided to the scientific community, and powerfully underscore our mission of turning yachts and other vessels into bona fide research vessels."

In addition to giving Society supporters a quantitative progress account, the Reports provide feedback to the owner and ship operators about the status of the scientific instruments installed on their vessel. "Combined with our new, real-time, data display technology [see story, pg. 3], SeaKeepers now has a concrete way of showing the important contributions our charity is making to understanding such critical issues as climate change and ocean acidification," said Michael T. Moore, board chairman.

Real-Time Data Display Technology Installed on Host Vessels

Following an initial laboratory phase, SeaKeepers' new onboard data display software is actively being deployed on several platforms, including five private yachts and a cruise liner, for shipboard testing. The new software creates an interactive graphic interface in the vessel's control room, showing real-time, visual information on the various oceanographic and atmospheric parameters the SeaKeeper 1000™ monitors.

The new graphic display is based on point-and-click navigation and has specific pages dedicated to different parameters, each reached by tabs at the top of the screen. Each page uses colorful meters to track the current conditions being measured by the SeaKeeper 1000™ system. Furthermore, some pages contain linear graphs tracing the change of each of the measured parameters over time.

For instance, the page showing seawater temperature displays not only the current temperature, but the record high and low, as well as a graph of the temperature change

over time. The same with barometric graphics, which allow a skipper at a glance to see relative changes indicating emerging weather conditions. Not only does this new display software give a real-time view of the

data being collected for the benefit of the scientific community, information including wind speed and direction is immediately valuable for those onboard the yacht. Capt. Grant Butler of M/Y *Maverick*, one of the first to



The screen above shows the Actual Wind and True Wind speeds, along with angle and direction information. Other screens can be accessed for current data on Barometric Pressure, Humidity, Air Temperature, etc.



The screen above shows the real-time near surface Water Temperature, along with the minimum and maximum temperatures recorded for the period set. Other oceanographic measurements such as Salinity, pH, Chlorophyll, etc. are accessed on other screens.

benefit from the new data display, explained, "The new software is a great step in integrating the SeaKeepers systems into our existing bridge software. It is well set up, looks professional, and gives the Officer on Watch easy access to all needed weather and met info. I have always been a supporter of SeaKeepers, but with this new setup it is easier to show others the benefit having the systems onboard."

This software was developed through a partnership with Palladium Technologies, a leader in electronic bridge displays and monitoring systems for the luxury yacht market. Software-driven, the data displays are available for free for all SeaKeeper 1000™ vessels, including those who are not existing customers of Palladium. 🐟

A Message From Our New Chairman

We are a Society of concerned, socially-aware individuals who share a common view that the only intelligent and practical solutions to the degradation of our oceans and to the changes taking place on our planet will come from plain, unadorned science-based facts. We are not concerned about whether these changes are man-made or natural. Facts, including the highly accurate and critically needed data being generated by SeaKeepers, will settle any dispute and lead to solutions.

We are, however, extremely concerned by the terrible decline in the marine environment and the unthinkable consequences these changes augur for ourselves, our children, our grandchildren and the countless souls whose well-being depend on healthy, productive seas for their food and livelihoods.

It is with both concern for the sea and with a passionate belief in the importance of our fact-based philosophy and work that I accepted the position of Chairman of the International SeaKeepers Society. As an attorney, I value data and unadorned truth above conjecture and speculation. As

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a conservative businessman, I value efficiency and productivity, which SeaKeepers and its tiny, dedicated staff delivers in vast quantities.

Accordingly, I invite you to read the cover story in this issue of *SeaKeepers Report* about the volume and cost-efficiency of our efforts, and to visit our offices and lab in Fort Lauderdale for a firsthand look at how our monitoring systems are built, maintained and calibrated - with our limited financial resources - to provide critically important scientific measurements of the sea, the weather and our changing climate.

These are troubling times, both from an economic perspective as well as from an environmental viewpoint. We face extraordinary challenges to the quantity and quality of marine

resources at a time when society is stretched to its financial limits. And yet problems such as overfishing, pollution and issues such as the rapidly increasing acidification of our oceans will not wait for economic recovery. In striving to cut costs and by the lack of resources to develop cleaner, more sustainable ways of conducting our daily lives, we may in fact accelerate some of the very processes that are contributing to the loss of marine abundance we are experiencing.

In the past, conservation of all types was viewed as a "luxury" item, something we could indulge in when we had an affluence of time and financial resources. But time and tide wait for no man, and so SeaKeepers is committed not just to surviving our current economic downturn, but with your help to strengthening our remarkable membership of private citizens and corporate partners and to parlay this powerful group of global leaders to build on our remarkable accomplishments of the first decade of our existence.

It's our ocean, it's our job, and we need your help. All the best in the year ahead. 🐟

Meet Michael T. Moore



Michael T. Moore joined SeaKeepers' Board of Directors in 2004 as Corporate Secretary for the organization, serving *pro bono*. At the annual Board meeting last October,

he was elected Chairman. Mr. Moore has practiced maritime and aviation law for over thirty years and is very involved in the maritime industry.

In 2008 he was selected by his peers for inclusion in *The Best Lawyers in America*, and again selected as a "Florida Super Lawyer" by *Law and Politics Magazine*. Mr. Moore is a Fellow of the American Bar Association. The *Martindale-Hubbell Law Directory* has awarded him the AV® Peer Review Rating the highest rating given to practicing attorneys. An AV® certification mark is a testament to the fact that a lawyer's peers rank him or her at the highest level of professional excellence.

Mr. Moore is a director of the Maritime Arbitration Board, past

chairman of The Florida Bar Admiralty Law Committee, and former president of the Marine Council of Florida. Mr. Moore was appointed to the Miami River Coordinating Commission - formed by U.S. Senator Bob Graham - and serves on the board of the US Sailing Center, the official Olympic training center for sailors.

Mr. Moore is a member of the board of trustees of the United Way of Greater Miami and a former chairman of the Alexis De Tocqueville Society. He is chairman of the board of the United States Coast Guard Foundation, President of the Admirals of the Fleet of Florida, and has been frequently cited by the *South Florida Business Journal* as one of the 100 Most Influential South Floridians. 🐟

SeaKeepers Celebrates 10 Years

More than 100 SeaKeeper Founders, directors, executives, yacht partners and select invited guests celebrated a decade of achievement at the Society's 10th Annual Founders Dinner. Held on the eve of the Fort Lauderdale International Boat Show, this festive event was highlighted by the introduction of Michael T. Moore as the incoming chairman of the board, and the presentation of a commemorative ship's bell clock from Chelsea Clocks to chairman emeritus and 3-Star Admiral's Club Member Don Tomlin and his wife Rachele. Held at an extraordinary waterfront estate, guests enjoyed exquisite hors d'oeuvres, delicious wines from Atalon Winery, and a 4-course dinner catered by Chef Clay Conley of Azul in the Mandarin Oriental Miami. The spectacular evening was supported by the generosity of Stanford Eagle and Marsh USA. 🦋



(Clockwise from top left) SeaKeepers chairman of the board Michael T. Moore and chairman emeritus Don Tomlin (l-r); 1-Star Admirals Brian & Denise Cobb; Sandra & Julian Chang of Yacht Partner Yantai-Raffles; 1-Star Admirals Howard & Rory Meyers; 1-Star Admiral Christine Lynne; 3-Star Admirals Rachele & Don Tomlin with 1-Star Admirals Karen & Mike Blake (l-r); Joe Foggia and Mary & Dave Christensen of Yacht Partner Christensen Yachts (l-r).

Yacht Professionals Gather in Support of the Sea

A large group of yacht captains, crew, media and industry raised both money and awareness for marine conservation at the 2nd Annual SeaKeepers Soiree, just prior to the Fort Lauderdale International Boat Show. Held on the Intracoastal waterway at Grille 66, the sold-out affair offered not only extraordinary views and spectacular cuisine, but also a unique opportunity for a firsthand examination and explanation of the SeaKeeper 1000™ monitoring system. The event raised money for SeaKeepers Professionals which, among several programs, is supporting the installation of these systems in the name of professional yacht crew and industry.

The 2nd Annual SeaKeepers Soirée, which attracted nearly 200 people, succeeded in completing what was begun the previous year – the purchase of a SeaKeeper 1000™ ocean, atmosphere and climate system to donate to the Oceanographic Center of Nova Southeastern University. This system is currently being installed at Port Everglades Inlet on behalf of all the captains, crew and yachting industry who make up SeaKeepers Professionals.

The evening's program was highlighted by an enthusiastic message by Captains Advisory Council member Capt. Bart van der Horst, of M/Y *Silver Lining*. He stressed the importance of SeaKeepers and captain/crew involvement saying, "SeaKeepers Professionals allows us to give back to the oceans on which we make our home and our living. SeaKeepers allows us to work together with the rest of the yachting community towards the common goal of restoring and protecting our oceans."

This outstanding event was made possible due to the support of generous industry sponsors, including Island Global Yachting,

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SeaKeepers Chairman Emeritus Don Tomlin and 100th Founding member Donatella di Filippo Campioni.

Society Welcomes 100th Founding Member

SeaKeepers reached a major milestone in December when Donatella di Filippo Campioni joined as its 100th Founding Member.

A resident of Monaco, Ms. Di Filippo has also agreed to join the newly formed Monegasque Board, joining Gerald Mackie, Lotfi Makoutouf and Gildo Pastor. The owner of a large, well-known yacht, Ms. Di Filippo is a recognized yachswoman in Mediterranean waters and is a member of the Yacht Club de Monaco. She is also extremely active in Monegasque philanthropic efforts. "We are extremely delighted to count Donatella as one of our members," said Jim Gilbert, board president. "It's particularly fitting to have her join from Monaco as our 100th Founder, as this milestone celebrates both our first decade of success as well as our profoundly deep roots in the Principality." 🐦

Google Earth Now Integrates Ocean Content

Download the new Google Earth 5.0 and explore the ocean. Until recently, the computer visualization that totally revolutionized geography essentially would not go below sea level. Google Earth 5.0 fixes that and adds wonderful layers of marine content and data. As a Contributing Partner of the oceans advisory committee, SeaKeepers CEO John Englander joined luminaries such as former vice president Al Gore, Dr. Sylvia Earle, and songwriter and ocean advocate Jimmy Buffet at the launch at the San Francisco Academy of Sciences in February. The new ocean layer of Google Earth, Englander said, is an "extraordinary" leap forward in the marine conservation movement. "This software provides the public a great opportunity to fully appreciate that Earth is an *ocean planet*."

The major update was inspired by a comment that Dr. Earle, oceanographer and SeaKeeper Award recipi-



ent, made in jest to John Hanke, the Director of Google Maps and Earth. Dr. Earle praised the firm's online mapping service, but suggested it be called "Google Dirt" because it ignored the 71 percent of the planet covered by water. "That kind of got under my skin," Hanke recalled. "She was right. We had been blind to the ocean." Hanke's team and an advisory group assembled by Dr. Earle worked on the multi-faceted Oceans project for nearly three years.

The software now maps the ocean floor, letting users explore it in 3-D. Google Earth users can click icons on sea maps to see videos of creatures that live in those locations. Users can also "swim" undersea through canyons as deep as the Mariana Trench. Thousands of mapped data points offer images, video clips, and com-

mentary on everything from undersea volcanoes, logs of real ocean expeditions, dead zones, chlorophyll levels, and even shipwrecks. This expansive information is provided by dozens of collaborators, among them universities, the National Geographic Society, Scripps Institution of Oceanography, NOAA and the Smithsonian Institute. SeaKeepers is currently developing a visualization of it's fleet of ships and other platforms carrying the SeaKeeper 1000TM monitoring system.

As the software was demonstrated at the gala, Dr. Earle commented, "Talk about a dream coming true." She added, "For the first time, everyone from curious kids to serious researchers can see the world, the whole world, with new eyes. In a stroke, [this technology] brings life and character to the blue part of the planet, and makes obvious the many ways land, water, atmosphere and living systems connect." 🐦

Professionals story cont'd...

Dockwise Yacht Transport, International Yacht Collection, Moore & Company, Atlss Insurance, The Sacks Group, SeaMobile, Brownies Yacht Diver, Yantai-Raffles, and Claire's Marine Outfitters. Media sponsors included *Dockwalk* and *The Triton*. ACES Land and Sea, Global Marine Travel, Bimini Boatyard and Rybovich added to the festivity, and to the funds raised, by donating exciting items to the silent auction. A special thank you to National Marine Suppliers for their support throughout the week. 🐦



(l-r) The crew of M/Y *Pure Bliss* at the 2nd Annual SeaKeepers Soiree, including Bosun Rob Fisher, Capt. Sandra Yawn, Chef Sally Afshinpour, Stew Rente Dimtrova and Chief Officer Rob Owen; Captains Advisory Council member Capt. Bart van der Horst, of M/Y *Silver Lining*, stressed the importance of SeaKeepers and crew involvement.

Mountains & Sea

At almost two miles in elevation, surrounded by towering volcanic peaks, Otavalo, Ecuador, seems as far removed from the ocean as any place on Earth. In the grass-covered mountain ridges high above the treeline, condors soar in the updrafts and thermals rising from sun-warmed green valleys. It's an area populated by an ancient indigenous population of short, dark, fiercely proud people who have maintained their cultural identity through wave after wave of invaders – including the Incas and Spanish Conquistadors – none of whom ever fully succeeded in changing their beliefs or subverting their culture. The elaborate iconography in the area's Catholic churches and cathedrals – full of Quechua symbols and animal figures – demonstrates that those who came hoping to change these people succeeded only in having to adapt their own beliefs to accommodate the indomitable indigenous spirit.

For four millennia, *mas o menos*, these people have held tenaciously to their belief in Pachamama, the spirit of Mother Earth. The power inherent in the natural world is all-pervasive to them, and while their Christian god provides security for their souls, every earthly facet of their lives – life, birth, death, food production, health and human relationships – is shaped by, enhanced or restricted by Pachamama.

The Quechua are an open, curious and accepting people, most of whom, restricted by their lack of material wealth, have never traveled very far beyond the broad valley formed by their three sacred dormant volcanoes of Cotacachi, Imbabura and Mojanda. And yet, given what one might expect would be a limited world view,, their appreciation of things far removed from their own experience is surprisingly vast, especially when it involves their understanding and appreciation of the natural world.

My wife, Mimi, and I recently became godparents to Sarita, an 18-month old girl from an indigenous

family whose primary language is still the ancient Quechua tongue. In a lull in the three days of fiestas that included both Christian and Pachamama rites of passage, German, Sarita's father, asked me what I did for a living. In Spanish, I told German and his friends and family that I was dedicated to helping protect and restore the sea.

At the long dining table in German's house, which sits literally at the verdant base of steep-sided Imbabura, I suddenly realized that all but a couple of the guests had ever seen the ocean, let alone the other sides of the surrounding mountains. Coming as I do from a lifelong immersion in



the sea, yachts and marine conservation, I found myself in the odd position of having to explain my life's passion to people with virtually no frame of reference to fully appreciate it.

Then I remembered a speech that Jim Moran, my late, much missed friend and fellow SeaKeeper, once gave in front of an audience of his yachting peers. He stood at the microphone with a glass of water and told the gathering, "This is the most precious commodity on Earth." I repeated those words to them, knowing full well that these farmers and ranchers know the value of water as well as anyone. I went on to explain that all our water – either salt or fresh -- that ever was, or ever will be, exists today. I explained how all rivers eventually drain from the mountains into the sea, and how moisture rises from the seas to form the clouds that rise and replenish the water in the highlands.

"Es un circulo de vida," German said, a circle of life, and in his



response I knew that he understood perfectly not only the nature of my work, but the fundamental, unifying principle behind all forms of conservation.

I went on to explain how industrialized fishing was depleting the seas far faster than life could replenish itself, how the ocean was becoming polluted with runoff from cities and erosion caused by deforestation, becoming warmer due to climate change, and more acidic due to absorption of carbon dioxide, and that these problems are even now affecting millions upon millions of people whose livelihoods and whose food supplies depend on healthy, sustainable seas. I explained how even the climate two miles above sea level cold change dramatically in the coming years because the ocean controls the world's weather and climate patterns.

My audience sat quietly for a minute after I had finished, many frowning and nodding their heads. I couldn't be sure whether they had understood my explanation, or were just demonstrating politeness. After a minute the elder man sitting on my left, Don Antonio, Sarita's quiet, dignified grandfather, spoke up. "Entonces, " he started, "Dices lo que passas al agua de la montanas passas al mar tambien." He said, "So, what you're saying is that what happens to the water in the mountains also happens to the water in the sea." I nodded my head. He continued, "And what happens to the water in the sea also happens to the water in the mountains." I nodded again and looked around the table at my new family and friends and saw that they all understood perfectly what I had been saying.

Then Maria Juana, Sarita's grandmother, surprised me by rising from her seat and taking both my hands in hers and kissing them. "Gracias mi padrito," she said. "Thank you, godfather," she said, "for everything you are doing to protect us."

I was never more honored and humbled in my life. 🐟

90M Measurements story cont'd...

vice in Canada and the Global Oceans Surface Underway Data pilot project in France. These centers archive and make the data available to the world's scientists and climatologists.

The need for open-ocean weather monitoring data is apparent; some bodies of water have few, if any, permanent monitoring stations and just one SeaKeepers system traveling across the ocean significantly increases the amount of reported weather data. This in turn affects the accuracy of the weather forecast across the world. Even in areas with weather monitoring stations, the mobile SeaKeeper 1000™ systems delivers data unavailable to static systems, further enhancing weather forecasts for those on land and at sea. Any ship or shoreline downwind of a SeaKeepers vessel is getting better weather forecasts because of our data.

Additionally, our data enables comprehensive investigation of how ocean and atmospheric variables have changed over time, which allows scientists to better understand climate change and predict trends and future

SeaKeepers: In Brief

- 90 million** Approximate number of specific measurements taken by the entire SeaKeepers fleet in 2008. Data collected includes weather data, surface sea temperature, salinity, dissolved oxygen, pH (acidity—vital for understanding critical acidification phenomenon) and more.
- \$1.7 million** Total operating budget for the Society. A model of efficiency, this funds not only staff, but building, installing, maintaining and calibrating the SeaKeeper 1000™ systems.
- 55*** Total number of SeaKeeper 1000™ systems deployed. Our cost effective network of monitoring systems is currently deployed on yachts, cruise ships, buoys, research vessels, freighters, a pier and a U.S. Coast Guard Icebreaker.
- 17*** Number of systems currently in the process of deployment.
- <2¢** Cost per individual measurement. As a result of the “free ride” on these “vessels of opportunity,” our technology costs less than two pennies per measurement.
- 100%** Amount of funding from private donations.

**As of January 2009*

outcomes. Many of the parameters measured by the SeaKeeper 1000™ including ocean pH or acidity measurements, are just now emerging as vital indicators of ocean health. Our database offers scientists the opportunity to track changes over time.

At 90 million measurements at less than two cents apiece, SeaKeepers mission of collecting cost-effec-

tive, highly accurate data is more important than ever. SeaKeepers believes passionately that the greatest way to protect the sea, and ourselves, is by providing the best possible information to the scientists and resource managers who ultimately will provide ideas of how to ensure the health, diversity and sustainability of the sea in the years ahead. 🐦



**THE INTERNATIONAL
SEAKEEPERS
SOCIETY**

BOARD OF DIRECTORS

Michael T. Moore - *Chairman*
 Donald R. Tomlin, Jr. - *Vice Chairman*
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 Frank Wlasek
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Monaco Office
 Port Palace | 7, Ave du John F. Kennedy
 98000 Monte-Carlo

www.seakeepers.org



Dr. Richard Spinrad, Director of Oceanic and Atmospheric Research, NOAA and SeaKeepers CEO John Englander sign new Letter of Agreement (LOA) for cooperation on use of SeaKeepers' data in relation to NOAA's mission of Climate Prediction and to assess SeaKeepers data against all of NOAA's goals and line offices. Until this LOA, NOAA had been using SeaKeepers data only in the area of Ocean Weather Prediction. Englander stated, "We are pleased to advance our relationship with NOAA. It is gratifying to see them acknowledging our data has climate relevance in addition to marine weather."