This translation was prepared by Professor Song SUN, Chair of the Chinese National Implementation Committee of the Census of Marine Life.

海洋生物普查| 2006 集锦
www.coml.org

AT THE LIMITS OF KNOWLEDGE
Discoveries of record-breaking extremes at the frontiers of knowledge highlighted the year. And six years into its 10-year program, the Census of Marine Life has gone fully global. The 17 core Census projects involve networks of researchers spanning all ocean realms. Affiliated projects added during 2006 in the Gulf of Mexico and along Australia's Great Barrier Reef bring the participants to more than 2,000 from 80 nations. Nine regional and national committees ensure that all areas of the global ocean are represented.

突破极限
在知识领域破纪录的发现是今年的亮点。在这个10年计划的前6年中，海洋生物普查已经全面走向了全球化。17个核心普查项目及其建立起的研究者网络使整个普查计划涵盖了海洋的各个角落。2006年在墨西哥湾和澳大利亚大堡礁一带增加的附属项目使参与者增加到来自80个国家的2000多人。9个地区和国家委员会确保代表了全球海洋的所有区域。

To census the diversity, distribution, and abundance of marine life, participants pooled their talents and specialties, ships and laboratories, archives and technology. They sailed on 19 expeditions, for example, in the Southern Ocean bringing onboard more new species than species already seen by centuries of explorers. Nearshore, the number of active sampling sites has grown exponentially from 30 to128 in 2006 alone. Across the open ocean, Census participants tracked with satellites more than 20 species of animals from sharks and squid to sea lions and albatross, distributing themselves through hundreds of thousands of kilometers of national and international waters. With sound waves, participants outlined schools of abundant fish spanning tens of kilometers of ocean, whose three dimensions could not be revealed previously by one-dimensional traverses. The now-proven effectiveness of the Census' unprecedented international links, coordination of work, and sharing of data in 2006 point toward a census by 2010 of what lived, now lives, and will live in the world's oceans.

为了调查海洋生命的多样性、分布和丰度，普查的参与者们汇集了他们的才干和专长、调查船和实验室、档案和技术。例如，他们在南大洋进行了19个航次的调查，所获得的新物种数目比多个世纪以来所发现的物种总数还要多。在近岸水域，采样站点的数目在2006年迅速从30个增加到128个。在开放的大洋，普查的参与者们用人造卫星追踪了包括鲨鱼、鱿鱼、海狮和信天翁在内的20余种动物，它们分布在范围几十万公里的国有和国际水域。参与者们还使用声波描绘了分布范围数十公里的鱼群，这在以前通过一维的横断很难揭示它们的三维图像。海洋生物普查计划在

2006年所建立的空前的国际联系、协作和数据共享，对2010年了解全球海洋生命的过去、现在和未来将起到关键作用。

Hottest
ChEss Near a vent 3 km beneath the equatorial Atlantic, Census researchers, using equipment attached to the remotely operated vehicle Quest, found shrimp and other life forms. They were found living near a hydrothermal vent billowing chemical-laden water at an unprecedented 407º C, a temperature at which lead melts easily. It was the hottest marine temperature ever recorded.

Photo caption: MARUM, University of Bremen © 2006.

最热的
ChEss 在赤道大西洋水下3公里处的热液出口附近，普查的研究者们通过使用遥控设备，发现了虾和其它的生命形式。它们生活在一个热液出口附近，翻腾在充满化学物质的水中，温度高达407º C。在这一温度下，铅可以很容易地被熔化。这是曾经记录过的最高的海洋温度。

照片标题： MARUM, University of Bremen © 2006.

Deepest
CMarZ In a zooplankton trawl 5 km below the surface of the Sargasso Sea, Census experts from 14 nations caught drifting, often menacing looking, animals such as this amphipod, a small prawn-like crustacean, the supposed inspiration for the movie *Alien*. They collected more than 500 species, likely including12 wholly new species that eat each other or live on organic matter falling like snow from above.

Photo caption: R. Hopcroft, University of Alaska Fairbanks © 2006.

最深的

CMarZ 来自14个国家的普查专家们在马尾藻海表层以下5公里处的一次浮游动物拖网中，捕获了这种漂浮的、相貌丑陋的端足类动物，它是一种小型的、类似对虾的甲壳类。专家们在这里采集了500多种生物，可能包括12个新物种，它们之间互相捕食，或者以海雪状沉降的有机物为生。

照片标题：R. Hopcroft, University of Alaska，Fairbanks © 2006.

Richest
ICoMM In the sense that biodiversity is richness, Census microbe hunters found a richness of 20,000 kinds of bacteria floating in a single liter of sea water. Samples were taken in the Atlantic and Pacific, including from an eruptive fissure 1,500 m deep. Revealed by DNA studies, most were unknown and likely rare, inviting an estimate that the diversity of bacteria in the oceans eclipses five to ten million.

Photo caption: J. Fuhrman, University of Southern California © 2006.

最丰富的
ICoMM 微生物普查的调查者们发现在一升海水中细菌的丰富度达到20000种。样品采自大西洋和太平洋，包括来自一个1500米深的火山喷发裂缝。DNA研究表明，大部分种类是未知的，且可能是稀有物种，估计海洋中细菌的物种多样性超过5百万到1千万。

照片标题：J. Fuhrman, University of Southern California © 2006.

Farthest
TOPP Tracking tagged sooty shearwaters by satellite, Census researchers mapped a small bird's 70,000 km search for food in a giant figure eight over the Pacific Ocean, from Hawaii to New Zealand to Polynesia to Japan and back. Making this longest-ever electronically recorded migration in only 200 days, the bird averaged a surprising 350 km per day. In some cases, a breeding pair made the entire journey together.

Photo caption: TOPP © 2006.

最远的
TOPP 普查的研究者们通过跟踪卫星标记的海鸥类飞鸟，绘制了一个小型鸟类在太平洋上空7万公里寻找食物的图像，其飞行路线为从夏威夷到新西兰到玻利尼西亚到日本然后返回。科学家们在仅200天的时间内制作了这一最长的电子记录迁移路线，令人吃惊的是这只鸟平均每天飞行350公里。在有些情况下，一对繁殖期的鸟类在整个行程中都会在一起。

照片标题：TOPP © 2006.

Darkest
CAML A community of marine life
shrouded beneath ice 700 m thick
and 200 km from open water
surprised Census Antarctic scientists,
who filmed scores of species
including a jellyfish, possibly Cosmetirella
davisi, swimming with tentacles raised.

Photo caption: AGAD, D. Rasch © 2006.

最暗的
CAML 一个隐藏在厚700米的冰下、距离开放水域200公里的海洋生物群落令南极普查的科学家们感到惊奇，他们在这里拍摄了许多物种，包括一种可能是*Cosmetirella davisi*的水母，正在用触手游泳。

照片标题： AGAD, D. Rasch © 2006.

Largest
NaGISA Among the many new
species discovered by Census participants
during 2006, the 4 kg rock
lobster that a Census explorer found
off Madagascar may be the largest.
Named *Palinurus barbarae*, the
main body spans half a meter.

Photo caption: J. Groenevelt, Marine and Coastal
Management, South Africa © 2006.

最大的
NaGISA 在2006年调查所发现的许多新物种中，一位调查者在马达加斯加岛发现的这个4公斤重的大螯虾可能是最大的。命名为*Palinurus barbarae*，主体长半米。

照片标题：J. Groenevelt, 海洋和海岸带管理，南非 © 2006.

Oldest
CenSeam Census seamount researchers
found a “Jurassic” shrimp,
Neoglyphea neocaledonica, believed
extinct for 50 million years,
alive and well on an under water
peak in the Coral Sea.

Photo caption: B. Richer de Forges © 2006.

最老的
CenSeam 海山调查的研究者们发现了一种“侏罗纪”的虾*Neoglyphea neocaledonica*，被认为已经灭绝了5千万年，却仍很好地存活在珊瑚海的水下山顶上。

照片标题：B. Richer de Forges © 2006.

Most
GoMA Eight million herring swimming
in a school the size of Manhattan
off the New Jersey coast qualified
as most abundant. Focused sound,
like the beam from a lighthouse,
scans ocean areas 10,000 times larger
than previously possible. Instantaneous
and continuous updates reveal
the extension and shrinking, fragmentation
and merging of fish schools.

Photo caption: N. Makris © 2006.

最多的
GoMA 由800万鲱鱼聚集成大小与曼哈顿岛相似的鱼群，沿新泽西海岸游动，被认为是数量最丰富的种群。它们所聚集的声音，正如从灯塔中发出的光线一样，比以前可能存在的声音大10000倍。即时的和连续的更新资料显示了鱼群的扩展和收缩、分散和融合。

照片标题：N. Makris © 2006.

DISCOVERING DIVERSITY
Because species are the currency that measures the diversity of life, finding
and naming a new one adds, while the extinction of an old one subtracts

from the wealth of known biodiversity. Millennia of exploration and two centuries of naming species, combined with extinctions, might have diminished the chance of finding new ones. Instead, new technology, exploration of new regions, and new efficiencies of identifying and archiving are accelerating the discovery of species and expansion of known diversity.

发现多样性

由于物种是生物多样性的度量，所以发现和命名一个新物种会增加已知的生物多样性，而一个老物种的灭绝则减少已知的生物多样性。几千年的探索和两个世纪的命名物种，加上已经灭绝的物种，可能已经降低了发现新物种的机会。然而，新的技术、对新区域的探索、识别和归档的新效率正在加速着物种的发现和对已知多样性的扩充。

More new than old

CeDAMar Discovering that wholly new species outnumber known ones exemplifies the acceleration of discovery. During three cruises of several months each, Census Antarctic scientists, trawling the depths of the remote Southern Ocean, found more new than already known species among the animals they brought on board.

Photo caption: Southern Ocean isopods. *Acanthaspidia* left, and *Munna* right. W. Broekeland © 2005.

比老物种更多的新物种

CeDAMar 发现的新物种数目超过已知物种的数目体现了物种发现的加速度。在几个月之内每个月进行的三个航次中，南极调查的科学家们在遥远的南大洋深处拖网，在所获得的动物中他们发现了比已知物种更多的新物种。

照片标题：南大洋等足类*Acanthaspidia* 左，*Munna* 右. W. Broekeland © 2005.

Squat lobsters

CenSeam Scientists have found an abundance of squat lobsters inhabiting the seamount chains north of New Zealand. These creatures, when sitting on the ocean floor, often tuck their tails beneath them and assume a squatting position. Investigators have identified more than 611 species of Galatheoidea,

including some new ones, in the
Indo-Pacific Ocean alone.

Photo caption: Diverse Galatheids and Chirostylids.
R. Webber and T. Papa © 2006,
specimens not to scale.

东方扁虾
CenSeam 科学家们已经发现大量的东方扁虾栖息在新西兰北部的海山山脉。这些生物坐在海底的时候经常隐藏起尾部，呈现一种蹲坐的姿势。调查者们在印度-太平洋海域已经识别了超过611种铠甲虾，包括一些新的种类。

照片标题：各种铠甲虾和柱螯虾. R. Webber and T. Papa © 2006, 样品不按比例。

Komoki in Antarctic waters
CeDAMar Komokiacea or 'komoki'
dominate deep-sea foraminifera,
protozoans with false feet
used for locomotion and food collection.
In the Weddell Sea, where
ice crushed the ship of Antarctic explorer
Shackleton in 1915, Census polar researchers
found 59 komoki and komoki-like species,
at least 42 unknown to science.

Photo caption: A new species of komoki of the
genus *Ipoa* found in the Weddell Sea. A.
Gooday, National Oceanography Centre,
Southampton, UK © 2006.

南极水域的Komoki
CeDAMar Komokiacea 或者 'komoki'在深海有孔虫类中占优势，是一类用伪足运动和捕食的原生动物。在威德尔海，1915年南极探险船沙克尔顿在那里曾被海冰压垮过，极地调查者们发现了59种komoki和类似komoki的物种，其中至少42种在科学上是未知的。

照片标题：*Ipoa*属的komoki一新种，发现于威德尔海 A. Gooday, National Oceanography Centre, Southampton, UK © 2006.

Doubling zooplankton
CMarZ Census zooplankton researchers
discovered 3 new genera and 31 new
species of copepods and mysids, small
crustaceans, in Southeast Asian,
Australian, and New Zealand

waters. Analysis of collections from biodiversity hotspots, the deep sea, and other unexplored regions is on track to double the number of known zooplankton species.

Photo caption: *Valdiviella insignis*, one of many copepod species being studied by Census scientists. R. Hopcroft, University of Alaska Fairbanks © 2006.

加倍的浮游动物

CMarZ 浮游动物调查的研究者们在东南亚、澳大利亚和新西兰水域发现了小型甲壳动物桡足类和糠虾的3个新属和31个新种。对生物多样性热点地区所采集样品的分析表明，深海和其他未调查过的区域，正在使已知浮游动物的物种数目加倍。

照片标题：*Valdiviella insignis*, 普查的科学家们正在研究的桡足类中的一种，R. Hopcroft, University of Alaska Fairbanks © 2006.

A squid that chews

MAR-ECO Among the 80,000 organisms, encompassing 354 families, genera, and species that Census deep sea investigators collected from the Mid-Atlantic Ridge was the reference specimen or holotype for a new species of squid: *Promachoteuthis sloani*. Although collection easily damages the soft cephalopods, the hard beaks are unique to each species, including that of the new squid, which looks quite capable of chewing its food.

Photo caption: *P. sloani.* MAR-ECO/R. Young © 2006.

咀嚼的乌贼

MAR-ECO 深海的调查者们在中大西洋海脊采集了80000种生物，包括 354科、属和种，其中一个乌贼新种*Promachoteuthis sloani*可以作为参考标本或模式标本。尽管采集过程很容易损伤柔软的头足类动物，但每一种类，包括乌贼新种，都有其各自独特的坚硬嘴部，能够咀嚼食物。

照片标题：*P. sloani.* MAR-ECO/R. Young © 2006.

Furry crabs

ChEss Near Easter Island, Census vent explorers discovered a crab so unusual it warranted a whole new family designation, Kiwaidae. Beyond adding a new family to the wealth of known biodiversity, its discovery added a new genus, *Kiwa*, named for the mythological Polynesian goddess of shellfish. Its furry or hairy appearance justified its species name *hirsuta*.

Photo caption: *Kiwa hirsuta*, the Yeti crab. Ifremer/ A. Fifis © 2006.

毛蟹

ChEss 在复活节岛附近，进行热液出口调查的研究者们发现了一种不同寻常的蟹，可以定为一个新科：Kiwaidae。除了向已知的生物多样性增加了一个新科外，这一发现还增加了一个新属*Kiwa*。它多毛的外表证明其种名为*hirsuta*。

照片标题：*Kiwa hirsuta*, 雪人蟹. Ifremer/A. Fifis © 2006.

Macro Microbe

COMARGE The protozoan that Census explorers of the continental margins discovered in the Nazare Canyon off Portugal differs from the usual protozoans seen swimming in a drop of water under a microscope. The single cell of this fragile new species of *Xenophyophore*, found at 4,300 m depth, is enclosed within a plate-like shell, 1 cm in diameter, composed of mineral grains.

Photo caption: *Xenophyophore* in sediment. A. Gooday, National Oceanography Centre, Southampton, UK © 2006.

巨大的微生物

COMARGE 陆架边缘的调查者们在葡萄牙Nazare峡谷发现的原生动物与通常在显微镜下观察到的在水滴中游动的原生动物不同。*Xenophyophore*这种易碎的单细胞新物种发现于4300米深处，附着在片状的贝壳内部，直径1厘米，由矿物颗粒组成。

照片标题：沉积物中的 *Xenophyophore* A. Gooday, National Oceanography

Centre, Southampton, UK © 2006.

CHARTING DISTRIBUTION
New and extended techniques let scientists collect and tag creatures in order to follow their movements. Marine animals themselves are recruited as oceanographers, mapping their travels in the world's oceans. With their help, the Census is meeting the challenge of picturing the present and shifting distribution of global marine life.

绘制分布图

新的、发展的技术让科学家们能够采集和标记生物，以跟踪他们的运动。当海洋学家们绘制它们在世界海洋中的运动路线时，海洋动物自身会得到恢复。在他们的帮助下，海洋生物普查正在描绘全球海洋生物分布格局的现状和变化状况。

Wider ranges

ArcOD/MAR-ECO When studying distribution, the surprise of finding a species in a new place is as exciting as the discovery of a new species. A species in a new place may indicate the species adapted, the environment changed, or the area was seriously undersampled. During 2006, counts rose to 31 species in the Arctic outside their known range, plus 60 species never before seen over the Mid-Atlantic Ridge between Iceland and the Azores.

Photo caption: A new larvacean species found in the Canada Basin (left), R. Hopcroft, University of Alaska Fairbanks © 2006 and an unidentified Arctic deep sea sponge, B. Bluhm/I. MacDonald, NOAA © 2006.

更广的范围

ArcOD/MAR-ECO 在进行分布研究时，发现一个新纪录种和发现一个新物种同样令人兴奋。一个新纪录种的发现可能表示该物种适应了这个地方、这个地方的环境发生了变化，或者以前对这个地方的采样严重不足。2006年，在北极发现新纪录的物种数目增加到31种，在冰岛和亚述尔群岛之间的中大西洋海脊发现的以前从未见过的物种增加到60种。

照片标题：发现于加拿大海盆的一种新的幼形动物种类（左），R. Hopcroft, University of Alaska Fairbanks © 2006 和一种未经确认的北极深海海绵 B. Bluhm/I. MacDonald, NOAA © 2006.

A nightly commute
MAR-ECO At dusk above the Mid-Atlantic Ridge, Census researchers encountered a rush hour when animals rise to the surface to feed, as if returning home for supper, and measured the traffic precisely. Using the world's first long-term, full ocean-depth echo sounder, the scientists observed a daily vertical commute of up to 400 m (higher than the Eiffel Tower) between the twilight or mesopelagic zone, about 500 m down, and the surface layer, where sunlight and photosynthesis prepared food.

Photo caption: 18 hours of data from an upward-Looking echo sounder moored 1,000 m deep near the Mid-Atlantic Ridge showing plankton and fish in light blue rising about 9 pm and descending about 6 am. MAR-ECO © 2006.

夜间的通勤
MAR-ECO 在黄昏的中大西洋海脊之上，普查的研究者们遇到了一次动物们集中上升到表层捕食的高峰时间，正如回家晚餐而正好考验交通一样。利用世界上第一个长期的、全海洋深度的回声音响器，科学家们发现动物们在海洋中层500米之下到表层之间有一个每天的向上400米（高于埃菲尔铁塔）的垂直区间运动，在这个区域通过光照和光合作用产生食物。

照片标题：固定在中大西洋海脊附近1000米深处回声音响器的18小时的数据显示浮游生物和鱼类在下午9点上升，上午6点下降。MAR-ECO © 2006.

Needles in haystacks
CeDAMar The span from schools of countless herring down to single animals of a species among thousands collected typifies the range of scale challenging Census' charting. The rich diversity of the isopod crustaceans includes common species and others rarely observed. In its exploration of Antarctic seas, the figurative haystack, Census researchers found

many new species, especially isopod species, represented by only a single animal, the figurative needle, among thousands of specimens collected.

Photo caption: Southern Ocean isopod, *Munnopsis*, W. Broekeland © 2005.

大海捞针

CeDAMar 从成群的不计其数的鲱鱼到所采集到的数千个物种中单个的动物，其不同的尺度范围给普查的制图提出了挑战。等足甲壳类丰富的多样性包括常见种和稀有种。对南极海域的考察就象大海捞针一样，普查的研究者们在所采集的数千样品中发现了许多新物种，尤其是等足类，有时只有一个动物个体。

照片标题：南大洋等足类*Munnopsis*, W. Broekeland © 2005.

Most complete registry

GoMA During 2006, experts in the Gulf of Maine released the first nearly comprehensive list of known species in this ecosystem, numbering 3,317, more than twice the number on prior lists. Researchers continuously refine and add to the registry, which includes marine life from microscopic phytoplankton up to right whales and from seasonal migrants to year-round residents.

Photo caption: *Anarhichas lupus*, the Atlantic wolffish. M. McKee, P. Auster, Naval Undersea Research Center © 2006.

最完全的登记

GoMA 2006年，缅因湾的专家们发布了首个该生态系统已知物种的近乎完整的目录，共3317种，比以前名录上物种数目的两倍还多。研究者们不断地精炼，并填加到目录中，其中的生物包括从微小的浮游植物到鲸鱼，从季节性迁移到常年栖息的种类。

照片标题：大西洋狼鱼 *Anarhichas lupus*. M. McKee, P. Auster, Naval Undersea Research Center © 2006.

Salmon cellphone coverage extended

POST When 2,600 fish left rivers during the early summer of 2006

for a career in the North Pacific, they carried tiny acoustic transmitters. These could be detected for years by the Census using an array of 252 receivers on the continental shelf, reaching outward from shore and stretching along the Pacific migration route to over 2,000 km in 2006. When a fish passes an acoustic receiver, its unique identity is stored and later transmitted to a visiting ship, telling the fish's survival and location. The Census Pacific shelf listening array achieved more than 95 percent success in tracking salmon, sturgeon, and other fish engaged as Census correspondents.

Photo captions:
Acoustic receivers ready to be deployed to the ocean bottom to track migrating fish. POST © 2006.
Tagged salmon are released into the Pacific Ocean. POST © 2006.

鲑鱼无线信号覆盖范围扩大

POST 2006年夏初，2600条鱼携带着微小的声音传导器离开河流进入北太平洋。通过使用安装在陆架上的一个由252个接收器组成的阵列，普查的研究者们在多年的时间内都能够探测到它们。2006年的迁移路线超过2000公里，从近岸向外延伸并沿太平洋扩展。当一条鱼经过一个声音接收器时，它独特的特性便被储存，随后被传输到调查船上，以断定鱼的存活和位置。海洋生物普查的太平洋陆架收听阵列在跟踪鲑鱼、鲟鱼和其它有关鱼类的成功率达到95%以上。

照片标题：右上：准备安装在海底跟踪鱼类迁移的声学接收器，POST © 2006.
右：标记的鲑鱼被放入太平洋。 POST © 2006.

Dams and survival

POST Soon after salmon leave a river for the ocean, many perish. For decades people have wondered if salmon that have struggled to reach the river mouth through many dams might be less likely to survive in the open ocean than those that enjoyed youth in a free-fl owing river. Initial

counts suggest that survival of stocks
leaving dammed rivers is comparable
to those leaving rivers without dams.

Photo caption: Salmon being tagged. POST
© 2006.

水坝和存活

POST 鲑鱼离开河流进入大海后不久，许多个体便会死亡。数十年来，人们一直怀疑与鲑鱼幼体所适应的没有流动的河流相比，那些努力通过许多水坝最终到达河口的鲑鱼，可能较不适应在开放的海洋中生存。初步的计算显示鲑鱼离开有水坝的河流后其存活量与离开没有水坝的河流的存活量相似。

照片标题：正在被标记的鲑鱼 POST © 2006.

Researchers World Wide

Photo captions:
CoML Participants at a Scientific Steering
Committee meeting in Reykjavik, Iceland.
J. Ausubel © 2006.
TOPP Field biologists download information
from tags retrieved from seals. J. Bradley,
www.bradleyphotographic.com © 2006.
CReefs Teams that discovered scores of
new species on the French Frigate Shoals,
Hawaii. NWHIMNM © 2006.

全球的研究者们

照片标题:
CoML 科学指导委员会的参加者们在冰岛的雷克雅未克聚会。J. Ausubel © 2006
TOPP 野外的生物学家们从海豹带回的标签上下载信息。J. Bradley,
www.bradleyphotographic.com © 2006.
CReefs 在夏威夷的French Frigate 浅滩发现了许多新物种的研究团队。NWHIMNM © 2006.

ASSESSING ABUNDANCE
Although every living individual will never be counted, rational
appraisal of hazards and effective management requires not anecdotes
but the reliable data the Census obtains. Such new technology
as that employed to observe island-sized schools of herring
plus novel mining of historical and data archives advanced
the global network toward a reliable census by 2010.

评估丰度

尽管永远不可能计数每一个活着的个体，但合理地评价危险和有效的管理需要海洋生物普查计划所获得的可靠的数据。可用来观测岛屿大小的鲱鱼群等新技术加上新的历史和数据档案采集技术推动着全球网络向2010年完成一个可靠的海洋生物普查计划迈进。

Proportion of protected coral reefs
FMAP/CReefs Analysts in the Census network concerned with the future of marine animal populations compiled the first-ever global assessment of the extent, effectiveness, and omissions of coral reefs as Marine Protected Areas. Contributing to and using the Proportion of protected coral reefs Census' information system, they found that less than two percent of coral reefs worldwide are protected from extraction, poaching, and other major threats. They built their worldwide database of protected areas for 102 countries, including satellite imagery of reefs.

Photo caption: Coral reefs in marine protected areas off the coast of East Africa. Satellite imagery, S. Andréfouët, © 2006.

受保护的珊瑚礁的比例
FMAP/CReefs 关心海洋动物种群未来的普查网络分析家们编辑了第一个对海洋保护区内珊瑚礁的范围、效力和忽略程度的全球评估报告。通过使用普查的信息系统，他们发现全球范围内只有不到2%的珊瑚礁被保护免于获取、偷猎和其它重大的威胁。他们为102个国家的保护区建立了全球数据库，包括珊瑚礁的卫星图像。

照片标题：东非沿海海洋保护区内的珊瑚礁，卫星图像， S. Andréfouët, © 2006.

Degradation and recovery in estuaries
HMAP In archives such as taxes on salt to cure fish, Census historians reconstructed the changing abundance of marine life in 12 estuaries and coastal seas around the world. In archives from Roman times in the

Adriatic Sea, the medieval era in Northern Europe, to Colonial times in North America and Australia, they confirmed the fears that exploitation and habitat destruction depleted 90 percent of important species. They also confirmed the elimination of 65 percent of seagrass and wetland habitat, a 10 to 1,000-fold degradation of water quality, and accelerated species invasions. More happily, they also found signs of transitions from degradation to recovery where conservation was implemented during the 20th century.

Photo caption: A sponge yard along the docks in Nassau, Bahamas, c.1904, when harvesting largely eliminated the sponge population. Library of Congress, Prints & Photographs Division, Detroit Publishing Company Collection, LC-USZ62–114276.

河口的退化和恢复

HMAP 根据从盐税到鱼类加工等档案，普查的历史学家们重建了全球12个河口和沿海的海洋生物的丰度变化。在从亚得里亚海罗马时代、北欧中世纪到北美和澳大利亚殖民时期的档案中，他们证实了开发和栖息地破坏使90%的重要物种衰竭。他们也证实了65%的海草和湿地栖息地的消失，水质的10-1000倍的退化，以及物种入侵的加速。幸运的是，他们也发现了20世纪实施保护的地区呈现了从退化向恢复过渡的迹象。

照片标题：巴哈马群岛拿骚码头的一块海绵地c.1904，当时的收割大量地去除了海绵种群. Library of Congress, Prints & Photographs Division, Detroit Publishing Company Collection, LC-USZ62–114276.

Absent in space

MAR-ECO Absence is the lower limit of abundance. Census researchers discovered that 70 percent of the world's oceans are shark free. In an extensive study of the vast abyss below 3,000 m, deep-sea scientists found sharks were almost entirely absent and

sought physiological and other explanations. Although many sharks live down to 1,500 m, they fail to colonize deeper, putting them more easily within reach of fisheries and thus endangered status.

Photo caption: Great white shark*, Carcharodon carcharias,* Scott Anderson© 2006.

空间上的缺乏

MAR-ECO 丰度的下限是缺乏。普查的研究者们发现全球海洋70%的水域没有鲨鱼。在对一个3000米以下的巨大深渊的研究中，深海科学家们发现几乎完全没有鲨鱼，他们在寻找生理学方面和其他方面的解释。尽管许多鲨鱼生活在深达1500米的水层，但它们不能在更深处生存，这使得它们更容易受渔业的影响，因而处于濒危状态。

照片标题：大白鲨*Carcharodon carcharias,* Scott Anderson© 2006.

Assessing abundance demands efficiency

CReefs Expanding knowledge of diversity with a new species requires one specimen, charting distribution requires several, but counting abundance demands examining many. During 3 explorations of coral reefs, Census experts expedited determination of many of the 1 to 9 million species of animals that inhabit reefs, using new molecular techniques allowing rapid processing of large samples.

Photo caption: Anemone crab with striped eye stalks collected during a Census expedition off Hawaii. A. Collins, NOAA © 2006. Courtesy of NWHIMNM.

评估丰度需要效率

CReefs 扩大一个新物种多样性的知识需要一个样品，绘制分布图需要几个样品，而计算丰度却需要检查许多样品。在对珊瑚礁进行的3次调查中，普查的专家们利用能够快速处理大量样品的新的分子技术，快速测定了栖息在珊瑚礁内的1-9百万动物物种中的许多种类。

照片标题：带条纹眼柄的葵蟹，于一次普查期间采自夏威夷沿海。A. Collins, NOAA © 2006. Courtesy of NWHIMNM.

Assessing abundance demands efficiency
CMarZ The Census zooplankton team performed the first DNA barcoding of plankton on a ship underway, telescoping what formerly took years of work into just three weeks, an approach that may revolutionize pushing the boundaries of knowledge.

Photo captions:
Barcode (detail, expanded horizontally) of the frigate tuna, *Auxis thazard*. FishBol © 2006.
Vials of copepods ready for sequencing. M.D. Allison, WHOl © 2006.

评估丰度需要效率
CMarZ 进行浮游动物普查的团队在航行中的调查船上完成了第一个浮游生物DNA条形码的编码工作，将以前需要多年才能完成的工作压缩到仅仅三个星期。这种方法可能从根本上突破知识的边界。

照片标题：金枪鱼*Auxis thazard*的条形码 FishBol © 2006.
准备进行测序的桡足类样品M.D. Allison, WHOl © 2006.

Scarce in time
MAR-ECO Although energetic exploration by the Census may uncover species long unseen, the appearance of a longtime absentee may be a clue to rising abundance. An expedition to the Mid-Atlantic Ridge, for example, captured 300 fish species. Several fishes captured had not been seen since a1910 expedition, and others considered rare were found common. The change in abundancecould reflect removal of predators or limited sampling in the past.

Photo caption: A proposed new species of eel pout of the genus *Lycodonus* collected on the Mid-Atlantic Ridge. P.R. Møller © 2006.

时间上的缺乏

MAR-ECO 海洋生物普查可以发现长期缺失的物种，这种长期缺失物种的出现可能暗示着该物种丰度的增加。例如，在中大西洋海脊的一次调查中捕获了300种鱼类。有几种被捕获的鱼类自1910年的一次调查之后就没再被发现，而有些被认为是稀有种的鱼类最后被认为是常见种。这种丰度上的变化可能反映了上层捕食者被去除或者过去采集的样品有限。

照片标题：被建议为*Lycodonus*属的一个绵鳚新种，采自中大西洋海脊。P.R. Møller © 2006.

Building and accessing the marine life database

OBIS During 2006 the linking of 143 databases multiplied the number of records in the Census' information system 2.5 times—from 4,000,000 in 2004 to more than 10,000,000. During 2006 the number of species encompassed and mapped rose from 40,000 Building and accessing the marine life database to 75,000. The library of short DNA sequences, or barcodes for identifying marine animals, grew past 4,000, including 2,000 fish. Holes in the Census data base also Clearly define the unknown ocean.

Photo caption:OBIS © 2006.

建设和访问海洋生物数据库

OBIS 2006年连接的143个数据库，使海洋生物普查信息系统的记录数量增加了2.5倍----从2004年的400万到超过1000万。2006年数据库中所包括的物种数量从4万上升到7.5万。用于识别海洋动物的短DNA序列或条形码超过4000条，其中包括2000种鱼类。海洋生物普查在数据库方面的突破也清楚地阐明了未知的海洋。

照片标题：OBIS © 2006.