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# Annual Report

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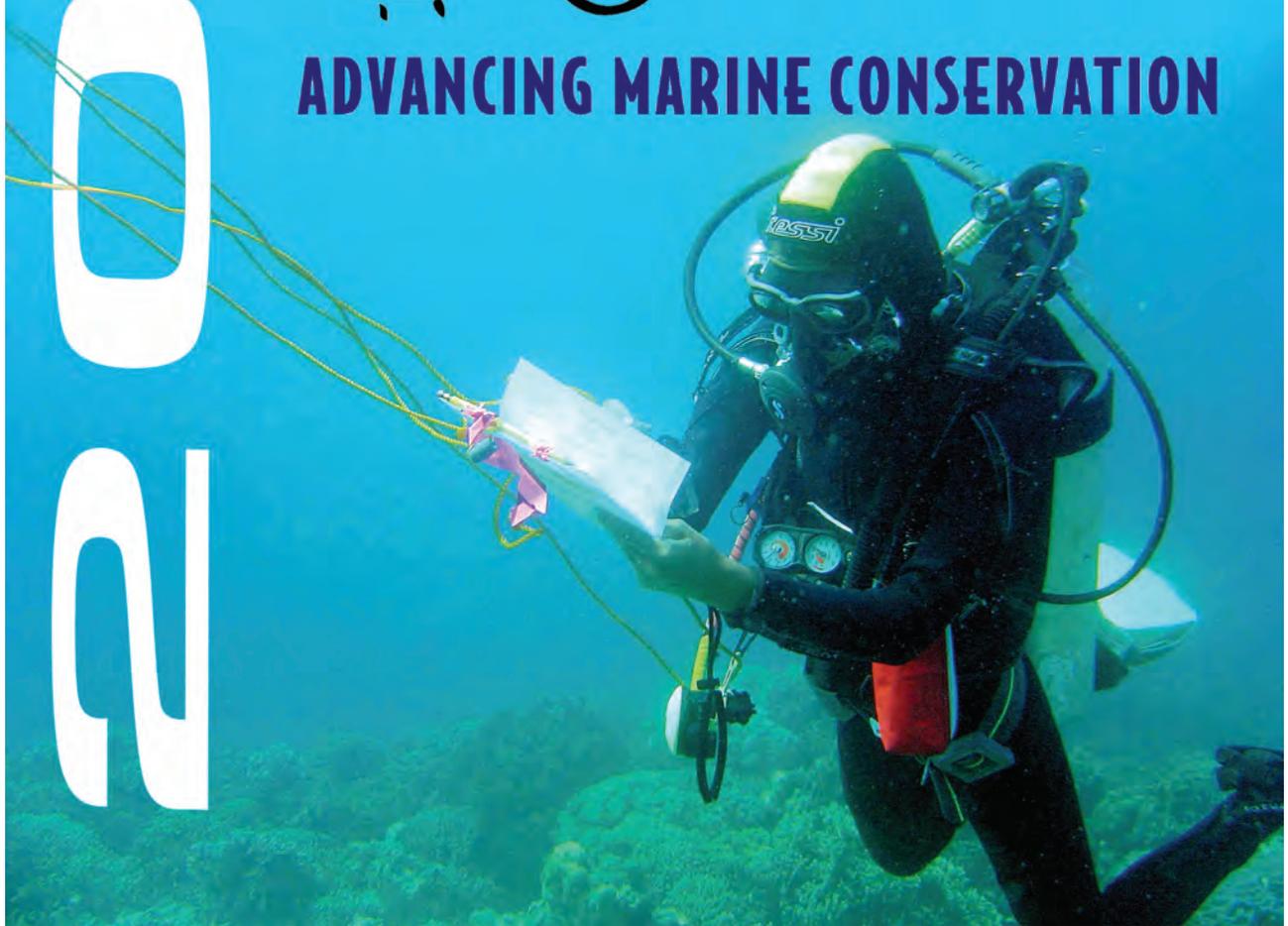


# Project Seahorse

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**ADVANCING MARINE CONSERVATION**

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Fisheries Centre  
University of British Columbia  
Vancouver, BC Canada

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## Our Vision

A world in which marine ecosystems are healthy and well-managed.

## Our Mission

Project Seahorse is an interdisciplinary and international organization committed to conservation and sustainable use of the world's coastal marine ecosystems. We engage in connected research and management at scales ranging from community initiatives to international accords. Collaborating with stakeholders and partners, we use seahorses to focus our efforts in finding marine conservation solutions.

## Our Team

We are based at the University of British Columbia (Canada), and work in partnership with the Zoological Society of London (UK) and the Shedd Aquarium (USA).

The Project Seahorse Foundation for Marine Conservation (Philippines) is an integral part of Project Seahorse. This Filipino non-governmental organization focuses its work on the island province of Bohol, and particularly on a 145-kilometre-long double barrier reef known as the Danajon Bank.

We have team members based at the University of Tasmania (Australia), McGill University (Canada), Royal Holloway College (UK), and TRAFFIC East Asia (Hong Kong). We also enjoy an excellent relationship with colleagues at the Parque Natural da Ria Formosa and the University of Algarve (Portugal) and collaborate with many other groups around the world.

This report describes the collective and individual efforts of the Project Seahorse team in 2005. It outlines progress on international and local marine conservation policy, fisheries assessments, community development initiatives, marine protected areas, seahorse research, and public outreach campaigns.

# DIRECTOR'S SUMMARY

The Project Seahorse team shares a vision of a world in which marine ecosystems are healthy and well-managed. To this end, we combine research and management in a distinctive manner, one that demands the scientific rigour of an academic unit while advancing practical marine conservation as a non-governmental organization. It's an approach that judges for the Chevron Conservation Award, the oldest private-sector conservation prize in North America, called "a win-win strategy" when they honoured us in 2005.

In these pages, you will find reports on how we again applied our research strengths to the management of living marine resources around the world. The following are just some examples of our commitments and contributions.

- We helped coastal communities in the Philippines establish two no-take marine protected areas (MPAs), bringing the total of Project Seahorse-assisted sites to 19.
- We worked with a member of the Philippines Congress on legislation to bring laws on the use of threatened species into line with an international treaty.
- We launched research in support of marine planning by some of Canada's First Nations.
- We contributed to the development of a national policy on seahorse protection in Australia.
- We mentored our alliance of 900 subsistence fishing families in the Central Philippines, proud that they were demanding the provincial government take action on illegal fishing.
- We refined our research that led to international acceptance of a universal minimum size limit for exported seahorses ... and then introduced this crucial management tool to fishers and customs inspectors.
- We discovered that imports of marine fish curios into the USA were dominated by sharks, seahorses, and pufferfishes.
- We shed light on the seahorse trade in Latin America and Vietnam, revealing that the former was substantial and the latter huge.
- We completed research on distribution of seahorses across Southeast Asia and in a Portuguese lagoon under human pressure.

We reached the end of 2005 pleased with our success and excited about the year ahead. We shall respond to demands for yet more no-take MPAs in the Philippines, renew our work with traditional medicine traders in Hong Kong, critically examine claims about the role of alternative livelihoods in reducing fishing pressure, and so much more. None of it would be possible without our partners, collaborators and donors. We thank you all for sharing our commitment to marine life.



Amanda  
Vincent

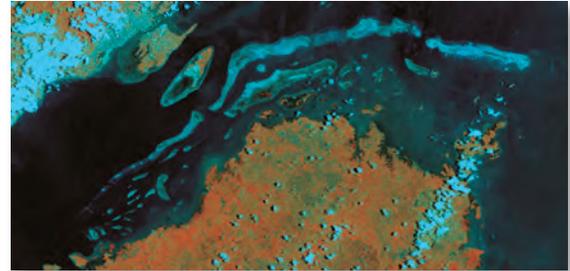
# FISHERIES MANAGEMENT



Few economic activities are as in need of change or regulation as fisheries. Tackling this problem has been the mission of Project Seahorse from the start. Our programs include significant management dimensions and a large suite of research projects. Our intention is to help protect critical areas of the ocean, limit exploitation of wildlife to sustainable levels, and develop management tools for complicated and little-studied fisheries.

## Marine Protected Areas

The dynamics, recovery, and conservation implications of no-take marine protected areas (MPAs) are attracting increasing attention from researchers around the world. Project Seahorse has contributed significantly to these ventures, having helped establish 19 MPAs on the Danajon Bank, a double barrier reef along the northern coast of the Central Philippines island province of Bohol. We also focus on the improvement of management tools for existing MPAs and site-selection criteria for future ones.



Northern Bohol and the Danajon Bank



Biologist  
Brian Cabrera

### Establishing Community-Managed MPAs

Philippines

Our biologists and community organizers made rapid progress with two new marine protected areas. In response interest from two villages, we conducted community consultations and biophysical surveys of the candidate areas. We then presented the results to community leaders and members of local chapters of a national fishers' alliance. With the help of management councils in each village, we recorded GPS coordinates, drafted municipal ordinances and submitted proposals to the municipalities for approval.

### Long-term Monitoring

Philippines

Demonstrating the benefits of MPAs is important to maintaining and fostering support for them. For the eighth consecutive year, our long-term monitoring program generated vital data on the ecological health of the Danajon Bank and the effectiveness of each area in protecting the coastal habitat of northern Bohol. Surveys were conducted with the help of international and local volunteers who completed a new training program. Our analyses of changes in fish abundance over seven years compared populations inside five MPAs and three control sites with those just outside the sites. Differences were greatest where respect for the fishing bans was strong. Groups of fish varied in their responses to protection, with the number of predatory groupers increasing as much as ten-fold. Butterflyfish, which feed almost exclusively on live coral, were also more abundant inside reserves, indicating improved habitat. We analyzed the results for use in a larger study on the value of MPAs and repackaged them for community feedback.

## Socioeconomic and biological indicators

Philippines

Our innovative three-year investigation of the effectiveness of community-based MPAs integrated the research of three Filipino PhD students who gathered data and interviewed villagers on the Danajon Bank. The connected but separate studies focused on a nested set of MPAs. We now have a richer understanding of which aspects of MPAs contribute the most to marine and human health.

**RESOURCE MANAGEMENT** The communities involved in our analysis of fish abundance, catch rate, habitat health and other measurements brought a wide range of approaches to the task. Fortunately, we found that standardizing those techniques should be possible. A final series of interviews and feedback sessions made it clear community leaders wanted to continue monitoring and evaluating activities after our studies are complete. We supplied data-collection logs and other tools they will need to improve the management of their marine protected areas.

**ECOLOGY** Three years of underwater surveys produced preliminary conclusions about the effects of protected areas on damaged reefs. While it was generally true that the oldest MPAs were in better condition, recovery is not just a function of protection time. Although the weight and size of fishes increased with time, the abundance and number of species were highest in the offshore sites, regardless of the level of protection. In addition, while herbivorous fishes showed significant recovery, carnivorous species did not. Overall, our findings showed that MPAs can help degraded reefs recover, but often in a limited and specific way. We need to carefully choose MPA sites to achieve conservation goals and adjust the expectations of MPA benefits based on what the reefs can actually provide and support.



Filipino fishers study MPAs

**ANTHROPOLOGY** A complex model of communities' working knowledge of their marine environment and strategies of allocating resources and rights has emerged from 18 months of fieldwork in two Filipino communities. We consulted interest groups, including fishers, traders, formal and informal community organizations, elders and other historians, entrepreneurs, and government agencies. Relationships of marine tenure and the setting of community boundaries were among the key factors governing the operation of MPAs and other community marine practices. Our understanding should provide theoretical and practical guidance for developing strategies on community ownership and control of marine resources.



PhD Student  
Marivic Pajaro



PhD Student  
Jonathan  
Anticamara



PhD Student  
Eulalio Guieb



Biologist  
Angelie Nellas

## Food Fish Monitoring

Philippines

A Project Seahorse team conducted a baseline study of three MPAs, each of which has shown increasing trends in fish abundance, as part of preparations for a new food fish monitoring program in 2006. With the cooperation of 90 fishers, we surveyed fishing effort, peak and lean months of fishing, gear type, and catch. Based on preliminary data, we produced a detailed map and comprehensive proposal for the monitoring program, which will investigate the “spill-over” effects of these mature MPAs.



PhD Student  
Natalie Ban

## MPA Site Selection

Canada

We are applying our considerable experience in the Philippines to the selection of protected areas in Canada, which only recently established its first no-take MPAs. By comparing scientific and stakeholder-driven approaches, we will evaluate the conservation value of each. We negotiated a research agreement with the



The north coast of British Columbia

Gitga’at First Nation, an indigenous group on the north coast of British Columbia, and conducted the first of a series of community consultations. Similar work will follow in Pacific Rim National Park on the west coast of Vancouver Island. The results will improve our understanding of MPA design and help identify ecologically and socially effective and representative marine protected areas.



Senior  
Program  
Manager  
Keith  
Martin-Smith

## Seahorse Responses to MPAs

Australia

A new collaboration with the New South Wales Department of Primary Industries and the University of Newcastle looks at the effects of MPAs on seahorses and pipefishes. We set up study sites within and outside a no-take MPA and at sites that will become MPAs over the course of the project. For the next five years we will examine population trends, growth, mortality and movement of White’s seahorse (*Hippocampus whitei*) and tiger pipefish (*Filicampus tigris*) and the effects of protection. We have already tagged more than 400 seahorses and enlisted a local dive club to help conduct regular surveys.

## Data-poor Fisheries

Philippines

Building on a comprehensive review of data gathered since 1996, we re-launched our seahorse fishery-dependent monitoring program in two sites in the Philippines. The surveys, carried out with the participation of local fishers and buyers, revealed that an active fishery had resumed within nine months of the introduction of an automatic ban on seahorse fisheries. Although the results require further study, several positive insights are already evident. First, the majority of seahorses captured exceeded the minimum size limit of 10 centimetres in height. The limit is an internationally accepted conservation tool we developed to help manage the seahorse trade. (See [Policy Challenges and Controls](#), p. 13.) Compliance may be a product of acceptance by local fishers and/or the loss of the live seahorse trade, which targeted smaller seahorses. Second, the size shift may reflect an abundance of larger seahorses, which had time to grow and reproduce during the temporary halt in collection.



Post-doctoral  
Scientist  
Denise  
McCorry

## Bycatch

Most of the world's major fisheries are overfished or on the edge of collapse. Besides protected areas, we need to ensure that fishing practices become sustainable. Some fishing fleets now discard millions of tonnes of non-target species, or bycatch, each year. Shedding light on these challenges is vital for food security, biodiversity, and ecosystem health.

## Shrimp trawling

Mexico

Of all non-selective fisheries, shrimp trawlers generate the highest rate of bycatch. Our study of the Pacific shrimp fishery of Mexico examines the ecological effects of such removals on smaller fish. We will also develop modeling tools to evaluate management options, such as net mesh size controls, reduced fishing effort, and trawl-free zones. The study design is now complete, and we are preparing to sample small species landed as bycatch in areas that see different levels of trawling. We will look for relationships between trawling effort and the population and individual characteristics of the fishes, as well as habitat and community structure.



PhD Student  
Sarah Foster

## Seahorse bycatch

Viet Nam

Our analyses of five years of seahorse bycatch in Vietnam – the first of its kind for an important seahorse source country – revealed that the spiny seahorse (*Hippocampus histrix*) and the three-spot seahorse (*H. trimaculatus*) dominated the catch. Although each boat caught only a few seahorses each night, we estimated the entire fleet takes about 50,000 seahorses each year. Catch rates and key biological parameters of seahorses varied unpredictably, but we did detect strong seasonal patterns, suggesting migration and a peak reproduction season. These results allow us to suggest fisheries management measures, such as closed seasons, to reduce bycatch.

# SOCIAL INTEGRATION



We recognized long ago the need to marry the biological and socioeconomic considerations of marine conservation. Fishers and merchants are included in our planning and research as a matter of principle and practicality, and we are now exploring the contribution of women to fisheries.

## Capacity Building

Our ultimate goal is to find our services no longer in demand. To hasten that day, we are exchanging the knowledge and skills we have acquired over the years with the communities and local governments that have the most to gain from advancing marine conservation and management.



Biologist  
Hazel Panes

## MPA Establishment and Management

Philippines

Over the course of the summer, we organized two management planning workshops for a pair of MPAs we helped establish in 2004. In the Sinandigan barangay (village) we drew up a three-year plan with assistance from the municipality of Ubay, the federal Bureau of Fisheries and Aquatic Resources, local people's organizations and non-governmental groups. The MPA plan was integrated into Sinandigan's official development plan, and budget resources dedicated to its implementation. Meanwhile, Saguisay barangay in Carlos P. Garcia formalized a management plan in preparation for incorporation into its development plan.

Because establishing a protected area is only the first step of a long-term marine conservation strategy, we revised and re-introduced a program we designed in 1999 to increase community involvement. Participatory marine sanctuary monitoring will ensure a two-way flow of information and technology between fishers and MPA

managers. We are giving community volunteers the skills and tools they need to monitor their MPAs, conduct analyses, and identify opportunities for improvement.



Making an MPA official

## Community Organizing

Philippines

The role of KAMADA, the alliance of small-scale fishers we helped found several years ago, has never been more central, or its reputation more encouraging. Working closely with Project Seahorse, members provided crucial support to the creation of two new marine protected areas. They also helped the Coastal Law



KAMADA takes to the air

Enforcement Council and other non-governmental organizations in Bohol gather intelligence and enforce marine resource laws. We were also pleased to see a new chapter founded in the village of Jandayan Sur on Jandayan Island.

The alliance's financial management capacity has improved dramatically. Members now take part in development planning and budgeting, for example. The educational focus has shifted from basic organization to fisheries management, MPA establishment and management, law enforcement and livelihood development – modules that have already been tested in several villages. Among the most promising of KAMADA's new endeavours is a pilot fishery registry, a novel approach to fisheries management that could bring about a new era of compliance and active participation in local marine conservation.

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## Municipalities and MPAs

Philippines

Municipalities are responsible for managing the inshore waters of the Philippines, as well as supporting communities with marine protected areas and other coastal resource initiatives. Most municipalities, however, are less experienced at managing MPAs than are their constituent villages. The Training Needs Assessment, executed in the summer, revealed that previous MPA-related training had not always translated to productive field-level activities. We are looking into ways how to develop municipal MPA management capacity with more pragmatic, hands-on mentoring program.



Social Development Coordinator  
Wilson Barbon

## Marine Products Trade

Philippines

Each new MPA has the potential to affect legal or perceived rights, such as individual or community use and ownership of marine resources. The effects on the people involved depend on (a) how and where marine products are found, (b) how they move along trade routes, and (c) how the flow and value of goods might be affected by changes in extraction and ownership. We began addressing this problem by tracking trade through the many layers of merchants. We hope to contribute to the development of market structures that are environmentally and socially responsible.



Marine resources in the marketplace

## Women in Fisheries

Philippines

The role of women in small-scale coastal fisheries has been largely overlooked. We do know women are actively involved, sometimes landing a high proportion of a community's catch. They also process and market catches, and their income may even allow men to keep fishing when it is no longer profitable. Yet women seldom take part in managing fisheries, even when the decisions disproportionately affect their catch. Empowering women might influence pressures on marine resources, both directly in fishing effort and indirectly through changes in family economics and size. We are planning to carry out and apply research on the role of gender in the management of reef ecosystems in the Central Philippines, where we will catalyze the creation of an alliance of women in fishing. With the help of the alliance, we will explore opportunities and limitations for women in fishing and weave the results back into coastal management. We merely await funding to launch these ventures.

# TRADE MANAGEMENT



Sustainable community management of marine resources, including non-food products, must be matched with changes in demand from consumers. Project Seahorse has a long history of highlighting and addressing the economic pressures on marine resources at the regional, national, and global levels.

## International Trade

We welcomed the adoption of an international regulatory regime for marine fishes of commercial value – first for seahorses and then for several other species. No less important is the development of effective trade management tools. By continuing our analyses and research, we are playing a key role in the global effort to ensure this new era in marine conservation meets its goals.

### Policy Challenges and Controls

Canada

Building on tremendous strides made over the preceding three years, our team continued to develop and support international policy tools that benefit the marine environment in general and seahorses in particular. That work led to a powerful new instrument, an Appendix II listing by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), to manage trade in marine fishes of commercial importance. This year was the first for which the CITES regulations were in effect for an entire calendar year. All but four of the convention's 169 signatory nations are now obliged to ensure their exports are sustainable and legally sourced, do not harm wild populations, and respect welfare concerns. The four dissenting Parties – Indonesia, Japan, Norway, and the Republic of Korea – are exempt from the regulations only when trading with each other.

We are now working to ensure these policy changes produce concrete results. To help exporting nations avoid harming wild populations, we offered technical and management advice and a taxonomic guide. Meanwhile, importers drew on our expertise to assess the reliability of export permits and the sustainability of sources. Project Seahorse also carried out new research to refine the CITES-recommended minimum size for seahorses in trade (see [Management Recommendations](#), p. 14).

By year's end, CITES Parties were filing reports on the 2004 seahorse trade. Our preliminary analysis suggests the need for a stronger reporting process as the data for this first year appear to be incomplete. Officially declared exports of 16.14 tonnes of dried seahorses and derivatives and 324,400 whole animals – and similar amounts of imports – represent a small portion of the trade inferred from other surveys. In 2005, just 34 jurisdictions reported exporting seahorses, while 26 reported imports; most of the latter in Europe or East Asia. More analysis will help guide our work in international trade and our support for CITES Parties.

## Management Recommendations

Canada

When the listing of seahorses by CITES took effect in May 2004, the convention's Animals Committee recommended exporting countries apply a 10-centimetre height minimum size limit (MSL) for all seahorses. The limit, developed by Project Seahorse, was a pragmatic way to regulate exports of large volumes of similar-looking species for which adequate population, fisheries and trade data are lacking. But CITES members also understood the MSL was just one means of moving toward sustainable trade, and would need to be reviewed and integrated with other conservation measures.

Recognizing that the MSL represented a rare opportunity to assess and adapt management for an entire genus of fishes threatened by global trade, a team of seven Project Seahorse researchers took on the task. We obtained more accurate information on size at maturity of seahorses in trade and developed a method to measure the length of curved seahorses. We then refined the size limit in light of new information on the trade and investigated consequent changes. Our team measured 1,639 seahorses representing 14 species in the dried trade in Hong Kong, Taiwan, and Vancouver and in the live trade in Los Angeles.



Surveying the seahorse market

Meanwhile, our biologists wrote and reviewed assessments of the conservation status of ten species of syngnathids for the IUCN – World Conservation Union's "Red List" of species at risk, including four seahorses, three pipehorses, both sea dragons and the sculptured sea moth. We also submitted a case study on the endangered South African seahorse (*Hippocampus capensis*) to a forthcoming IUCN report on marine species at risk.

## Global Trade Analysis

Canada and Australia

An update of the last comprehensive seahorse trade analysis, published by Project Seahorse nine years ago, continued through 2005. Primary papers are being drafted for research we carried out in Malaysia, Thailand, and South Asia. We compared data collected in the field with official import and export reports filed with CITES by member states. Our analysis shows that Thailand and India provided a majority of dried seahorse exports, largely for the traditional Chinese medicine market. We will continue to pay close attention as more CITES signatories report seahorse trade activity.

Our analysis of the Australian trade in seahorses and other syngnathids was accepted for publication. While Australia has the highest recorded diversity of syngnathids, it is not a major trade source or destination, with the exceptions of pipehorses and sea dragons. We are concerned about the trade in pipehorses, caught as trawl bycatch in Queensland, and are working with government authorities to improve our knowledge of catch levels and implement precautionary management measures. The trade in sea dragons, however, is probably sustainable as only a few individuals are taken from the wild and their offspring are raised in captivity for subsequent sale.



Research  
Assistant  
Candace  
Picco

## Traditional Chinese Medicine Trade

Hong Kong

Our Marine Medicinals Conservation Program played a central role in tracking and influencing the East Asian trade in seahorses, pipefishes and pipehorses through our Hong Kong office. Most interesting were discrepancies in dried seahorse numbers revealed by a comparison of official government reports of trade activity among China, Taiwan and other neighboring states. While reported imports to Taiwan showed little change in 2005, trade volume for the same species in Hong Kong, the world's largest trading hub for such products, fell to about half that of previous years.

The reduction may be a result of the CITES listing in May 2004. For example, a prohibition in the Philippines on the collection of CITES-listed species is reflected in the absence of dried seahorses in Hong Kong's reports of imports from the Philippines. Other sources, however, may have stepped in to fill the demand with products not certified under CITES. We speculate that Thailand and other Southeast Asian nations may be supplying China through jurisdictions where trade controls are less stringent. We brought the issue to the attention of Hong Kong's Agriculture, Fisheries and Conservation Department (AFCD) and the Customs and Excise Department. Both agreed to conduct an investigation. The AFCD also reported it plans to raise the issue with its counterparts in the adjacent province of Guangdong, through which the majority of the dried seahorses pass. We will continue to work with enforcement agencies to map out illegal trade trends and routes.



Marine  
Medicinals  
Program  
Officer  
Samuel Lee

# Seahorses in Aquarium Trade

Improving the sustainability of the live aquarium trade, which represents a significant pressure on seahorses, other coral reef fish and invertebrate populations, is an essential part of our mission. We are working to understand the relative contribution of each region to the live trade in seahorses, evaluate their conservation benefits and provide guidance to public aquariums and hobbyists.



Associate  
Director  
Heather  
Koldewey

## Ornamental Trade

UK

We continued to cooperate closely with the Marine Aquarium Council (MAC) and its “reef to retail” certification scheme, which promotes sustainable livelihoods for communities involved in the collection of wild species. We supplied information and advice to the MAC Standards and Certification Advisory Committee and helped promote the organization in Europe. With the assistance of marine ornamental wholesalers in Los Angeles and the Long Beach Aquarium, we coordinated an assessment of the minimum size limit for seahorses. And our base at the London Zoo Aquarium took custody of all live seahorses seized at Heathrow Airport by government agents. We rehabilitated more than 300 seized seahorses representing two species, relocating all *Hippocampus fuscus* to the Omaha Zoo (USA) and distributing the *H. reidi* to 10 aquariums in the UK, Spain and Kuwait.

## Aquaculture

UK

Our new global review of seahorse aquaculture entails documenting the history and status of operations around the world. We are producing a unified reference source for seahorse aquaculture and improved understanding of the factors contributing to successful culturing techniques. Responses to a questionnaire distributed to 98 individuals and organizations involved in seahorse aquaculture in 28 countries are being analyzed.



Examining an aquaculture operation in Mexico

## Public Aquariums

UK

Considerable advances in the husbandry of seahorses have taken place since we convened the first workshop for aquarium professionals in 1998. We have now completed a thorough revision of the Syngnathidae husbandry manual, which has attracted input from around the world since its publication in 2002. An inventory of species held in public aquariums is also complete. European public aquarium representatives participated in a regional collection planning workshop to prioritize seahorse species for conservation breeding programs.

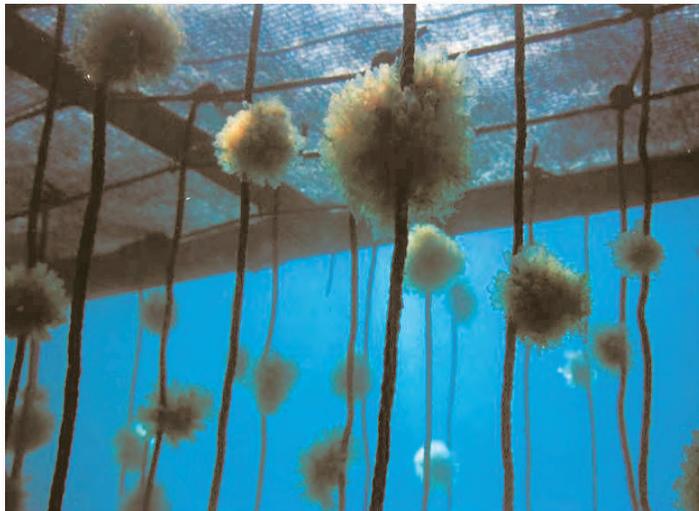
## Non-food Fisheries

Canada

A global review of the scale, scope and consequences of the extraction of marine organisms for non-food uses made significant strides this year. Our research shows that more than 1,500 species are caught for aquariums, as many as 1,000 are valued in various systems of traditional medicine, and thousands more attract the attention of the pharmaceutical industry. Algae, sponges, jellyfish, molluscs and crustaceans are important to the biotechnology, pharmacology and, to a lesser extent, traditional medicine and the aquarium trades.



Research  
Assistant  
Bob Hunt



Millions of tonnes of algae are farmed each year

The size and value of the fisheries vary widely. The production of hydrocolloids (agar, carrageenan and other texture-enhancing additives) and the agriculture industry consume 1.5 million tonnes of red and brown algae each year. Upwards of 30 million fish are traded annually for use in aquariums. Yields for species screened by drug manufacturers, in contrast,

may only total a few hundred grams. The hydrocolloid industry alone generates US\$600 million a year, the aquarium industry approximately US\$100 million and production of a blood-clotting agent derived from horseshoe crabs US\$50 million. The traditional medicine, aquarium and curio markets, meanwhile, supply an important source of income for small-scale fishers.

Along with demand come environmental costs. Certain algal beds in the Americas and Europe, and some medicinal species within the Asia-Pacific region, have been overexploited, while a decline in migrating coastal birds has been linked to horseshoe crab overfishing. In response, resource managers have introduced gear restrictions, protected areas and cultivated alternatives. But little is known about the biology or ecology of many non-food fisheries and effective management is often non-existent. These findings should be incorporated into larger reviews of illegal, unreported and unregulated fishing and will appear in several peer-reviewed publications in 2006.

# SEAHORSE CONSERVATION



Sustainable trade and marine resource programs are not designed in a vacuum. Even the most committed conservation and development managers will come up short without a solid understanding of the behaviour and ecology of the wildlife involved.

## Life history

Our research into the life history, population dynamics and genetics of seahorses and other species continues to expand in the search for better conservation strategies. Along the way, we are enhancing our understanding of some of the ocean's most fascinating creatures, species that can also rally support for larger campaigns to protect the world's ocean ecosystems.



PhD Student  
Siân Morgan

### Ecology of juveniles

Philippines

Three years of research on Cataban, an island on the Danajon Bank, have produced significant insights into the ecology of seahorses at different phases of their life history, and several papers are in preparation for the scientific press. The juvenile phase of the tiger-tailed seahorse (*Hippocampus comes*), which appears to involve an extended free-floating period, carries important implications for the species' ability to recolonize previously depleted areas. We also explored the behavioural potential of newborn seahorses, juvenile habitat use, and adult movement patterns.



*Hippocampus abdominalis* by Melissa Rushby



PhD Student  
Kerrie  
O'Donnell

### Reproductive behaviour and ecology

Philippines

All CITES Parties that export seahorses must produce “non-detriment findings” to ensure trade is sustainable. The minimum size limit we developed should help establish sustainable seahorse fisheries, but it is not intended to replace more precise, long-term management tools. Those must be built on a thorough understanding of the behavior and ecology of seahorses. We embarked this year on a new field-based study of the longevity, growth, reproduction, and habitat shifts of seahorses now fished in the Philippines. The research will produce quantitative models that estimate the viability of seahorse populations under various management schemes.

## Fisheries management implications

Portugal

Our long-term monitoring site in Ria Formosa, a lagoon on the south coast of Portugal, yielded important data on a variety of ecological issues and attracted considerable attention from the scientific press and popular media. Studies of the responses of seahorses to exploitation and possible conservation strategies led to the publication of several papers on life history, identification techniques and the utility of implantable tags in population surveys. We also used our findings to refine the minimum size limit for the international seahorse trade, taking into account the risk of extinction, probability of decline, and long-term cumulative catch rate (see [Trade Management](#), p. 13). In addition, we conducted an assessment of the effects of fishing on seahorse populations and their habitats. Results are now being reviewed for publication.



Research Associate  
Janelle Curtis

## Seahorse genetics

Europe and Australia



Sampling aboard ship

As part of a study of the mating strategies of the two European seahorses, *Hippocampus hippocampus* and *H. guttulatus*, we are comparing genetics of the two species. We collected samples from more than 600 individuals, most during field trips to Portugal and France, with others supplied by collaborating individuals and institutions from around the Mediterranean. Much of the work involved the development of laboratory techniques to permit genetic analysis. By year's end, we had successfully isolated DNA from *H. guttulatus* individuals from across the species' range. Trials using individuals imported from Ria Formosa to study the effects of sex ratios on mating strategies are being carried out at the London Zoo Aquarium.



PhD Student  
Lucy Woodall

Meanwhile, in collaboration with Seahorse Australia and the Zoological Museum in Zürich, we assessed the parentage of broods from big-bellied seahorses (*H. abdominalis*) in aquaculture. Held in high densities, these seahorses have been observed performing courtship behaviours with many partners in rapid succession. However, our genetic tests show that each brood is still the result of mating between a single female and a single male.



Research  
Associate  
Sara Lourie

## Taxonomy and Biogeography

Canada

Project Seahorse maintains the world's largest seahorse specimen collection, which is housed in the Redpath Museum at McGill University in Montreal and allows us to help researchers identify their syngnathid photographs and specimens. We are also continuing to conduct research into the geographic patterns of seahorse distribution. This year we published a paper that explores the factors affecting deep-water versus shallow-water species that could have implications for population management.

## Growth, Mortality and Movement

Australia

We added a second site this year to our long-running study of seahorses in Sydney Harbour. Similar to our established site at Clifton Gardens, seahorses at Balmoral Beach live on a net enclosing a swimming area. We used mark-recapture techniques to estimate the seahorse population living on the Balmoral net at about 260 animals – a remarkably high number for a habitat only about 400 metres long. At Clifton Gardens we have now gathered enough information to provide first estimates of growth, mortality and lifespan of the big-bellied seahorse and White's seahorse in the wild. In August 2005 we resighted a male White's seahorse that we first tagged in January 2003 and in all that time the seahorse had grown less than 2 millimetres. The data from our studies are helping local authorities plan and manage their marine habitats.

## Other Syngnathids

Australia and Spain

In collaboration with the University of Barcelona we continued our study of the ecology of weedy sea dragons (*Phyllopteryx taeniolatus*) in Australia. These fascinating animals, with extraordinary colour patterns and



Weedy sea dragons

appendages, are icons for marine conservation in Australia and around the world through display in public aquariums. We applied the same marking techniques we use with seahorses to look at their population parameters. It appears that these animals are reasonably long-lived and have limited home ranges, often being found on the same area of rocky reef survey after survey. We also observed courtship in which pairs of sea dragons “mirrored” each other's actions.



## Reversing Declines

When it comes to species at risk, a description that fits many populations of seahorses, the ultimate goal of all conservation research is healthy populations. Getting there means knowing where, when and how those species react to each of the conservation tools at our disposal.

### Dispersal Patterns

Portugal and Canada

The movement of seahorses between populations, which can be separated by up to 10 kilometres, is among the most challenging aspects of life history. Project Seahorse is tackling the job by taking advantage of the fact that, although adult seahorses are faithful to their home territory, juveniles can disperse widely while in their earliest, free-floating phase. Minerals and other elements suspended in the water form deposits in the growing earbones of the young seahorses. This creates a permanent record of the chemistry of the waters where the animal spent its first days. If the innermost layers of the earbone of an adult collected at one site have the chemical composition of another, the seahorse was born at the second site.

The research is complicated by the tiny size of the earbones, typically only 60 to 80 micrometres in diameter. After months of experimentation, we successfully extracted the earbones of juvenile specimens of the European seahorse *Hippocampus guttulatus*, the first time it has been done with individual larval fish. Our task in the coming year is to carry out the chemical analysis of earbones from individuals collected in four locations along the southern coast of Portugal. This promising new technique may help determine where and how far apart to site marine protected areas for maximum effectiveness.



Post-doctoral  
Fellow  
Jean Marcus

### Rapid Assessment Program

Philippines

The four-year-old Rapid Assessment Program trains Filipino fishers to document the status of seahorse populations with minimal supervision from biologists. The goal is improved community engagement in marine conservation and enhanced data-gathering capacities. As part of the ongoing refinement of the program we compiled written and photographic records of surveys by one biologist and four trained fishers in six provinces. The review produced a comprehensive assessment of the process, including the selection and training of the fishers, interaction with the host communities and reaction of the fishers.



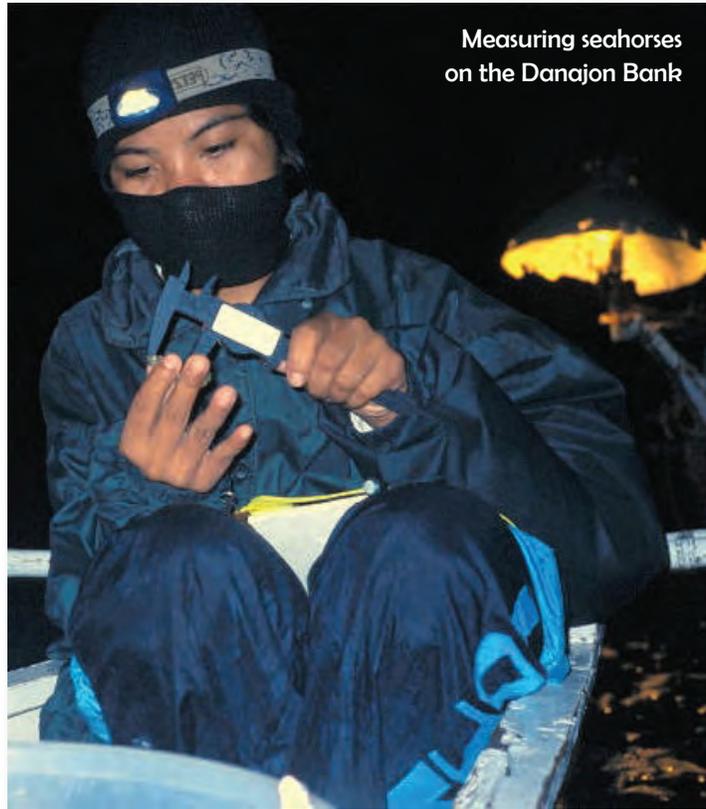
Biologist  
Fermina  
Genson

## Long-term Seahorse Fishery Monitoring

Philippines

We stopped gathering catch landing data for the Central Philippines seahorse fishery in 2004 when the practice was banned by the federal government (see [Resource Managers and Policy Makers, p. 24](#)). Following reports of widescale seahorse collection efforts on the Danajon Bank, however, we relaunched our long-term monitoring program, with provisions for confidentiality, and trained new local assistants to gather the necessary data. Our surveys recorded a total of 5,170 seahorses landed in the barangays of Handumon on Jandayan

Island and Guindacpan in Talibon, with 98.9% of the catches consisting of the tiger-tail seahorse (*Hippocampus comes*). This suggests the Danajon seahorse fishery continues to supply the international market, despite the federal ban. We are now recording the impacts of the new regulatory environment on seahorse populations and the fishery. We also analyzed data on long-term seahorse monitoring within the one MPA and short-term monitoring at two others and three nearby fishing grounds. We found that while seahorse numbers did not increase substantially within the protected areas, they were generally larger than at fished sites.



Measuring seahorses  
on the Danajon Bank

## Population Change

Australia

Our study of severe seahorse population declines in southern Tasmania was published in 2005. Continued monitoring has shown that the populations have recovered slightly at one site but remained low at others. Working with the Australian Maritime College in Launceston, we expanded our monitoring to encompass the whole state of Tasmania to determine the extent of the changes. We are also working with local agencies on the causes of seahorse declines. In Queensland, we contributed to a briefing document, *Looking After Protected Species in Queensland*, that helps commercial fishers avoid or minimize syngnathid catches.

# OUTREACH & EDUCATION



After all the numbers have been analyzed and the management recommendations made, we must keep every interested party engaged in our work. Community leaders, merchants, government officials and non-governmental organizations, including our partners, sponsors, and donors, all require customized feedback. But our approach is consistent: include each stakeholder in the exchange of information and evolution of each project from the beginning.

## Resource Extractors

Philippines

The enthusiastic participation of fishers is essential to the design of effective management tools. In 2005, we conducted community feedback sessions in seven coastal villages along the Danajon Bank to keep fishers and their families informed about the status of MPAs and our seahorse and food fish research. Support for our activities is strongest in communities with the oldest and best enforced MPAs. Communities associated with the newer MPAs are concerned about possible conflicts between marine conservation efforts and other activities, from plans for a nearby resort to coral-turning for abalone extraction. Our community outreach efforts proved particularly useful in barangays where some fishers had not been apprised of the ban on seahorse fishing.



Information,  
Communication  
& Education  
Officer  
Mia Apurado

## TCM Traders and Users

Hong Kong



Dried seahorses on sale in Hong Kong

Traders in Hong Kong now are generally well aware of and have adapted to the new regulatory regime associated with the CITES listing, thanks to our outreach efforts and ongoing liaison efforts with the Agriculture, Fisheries and Conservation Department. In 2005, we produced a four-page newsletter on the seahorse trade, but did not have to print it. Instead, the Hong Kong Chinese Medicine Merchants Association, a long-established Project Seahorse partner, incorporated the newsletter into its biennial anniversary report. Some 4,000 copies were distributed to members of the TCM communities in various locations and events.



Philippines  
Director  
Amado  
Blanco

## Resource Managers and Policy Makers

Philippines

Persistent advocacy of sustainable use of marine resources reached the halls of Congress in 2005, with the introduction of a bill to amend the Philippines Fisheries Code. The current code outlaws fishing for seahorses and other species listed on Appendix II of CITES even though the CITES designation specifically allows for sustainable collection of listed species. We provided Congressman Roberto Cajés of Bohol with the information his staff needed to craft the bill, which is a copy of one formulated by Project Seahorse and KAMADA, the alliance of Danajon Bank fishers.

At our urging, the Bohol municipality of Getafe endorsed the Cajés amendment, and we have encouraged other municipalities to follow suit. Our policy and advocacy team also inspired an association of environmental lawyers to draw up legislation promoting the ecosystem-based management of Danajon Bank, and one local legislator made a commitment to introduce it. We also worked with Fisheries Improved for Sustainable Harvest Project (FISH), a coastal resource management effort funded by the United States Agency for International Development in partnership with the Department of Agriculture's Bureau of Fisheries and Aquatic Resources. Our team contributed eight reports to a profile of Danajon Bank and joined the Danajon Bank Fisheries Management Planning Technical Working Group.

## Public Aquariums

UK

The Syngnathidae listserv remains the primary means of communication for public aquarium professionals working with syngnathids. In 2005, the list grew by about 40 per cent to 284 members. The majority of discussions concerned disease treatments, husbandry, exchanges of captive-bred animals, and the dissemination of seahorse-related information. We continue to provide advice, images and information for new syngnathid exhibits, graphics and special events at several aquariums, including the Point Defiance Aquarium (USA) and The Deep (UK), and the new American Zoo and Aquarium Association curriculum guide on seahorses. Annual reports on seahorse programs were submitted to the European Union of Aquarium Curators, European Association of Zoos and Aquariums and British and Irish Federation of Zoos and Aquariums.

## Public Communications

Canada

Our communications team continued to produce and distribute a regular newsletter and expanded our website, which attracted more than 7,000 unique visitors seeking information on seahorses and our programs in a typical month. Media coverage of our Ria Formosa studies appeared in several Portuguese publications and a 30-minute television documentary, "Cavalos do Mar." Our work was also highlighted in wide variety of international magazines, including Sport Diver, which, along with Guylian Chocolates, sponsored the "Seahorses of the World" photo competition (see [page 28](#)).

# OPERATIONS & ADMINISTRATION

The first year of our second strategic plan (2005-2009) introduced several new research programs and the consequent need to secure new sources beyond our current 18 corporate, governmental and non-governmental partners, sponsors and donors. In addition to the new administrative challenges, our international headquarters staff in Vancouver oversaw the team's third relocation in four years, this time to a permanent home in the recently completed Aquatic Ecosystem Research Laboratory at the heart of the University of British Columbia campus. The new, energy-efficient building puts at our disposal a well-equipped research lab and a state-of-the-art multimedia immersion lab that can simulate a wide variety of marine environments.

Operations in the Philippines continued from the now-familiar offices in Cebu. Realizing the value of balancing work and recreational activities, the Project Seahorse Foundation for Marine Conservation (PSF) celebrated its second anniversary in January by taking part in a coastal cleanup, an exercise that improved the relationship between our staff and the communities in which we conduct our research and development work. We reviewed and modified the Foundation's financial and personnel policies, and assembled manuals to guide and strengthen operations.



Operations Director (UBC)  
Jorma Neuvonen



Administrative and Financial Officer (PSF)  
Lourdes Labrada



Operations Assistant (UBC)  
Shannon Charney



Comm. Coordinator (UBC)  
Geoff Gilliard  
(From March)



Comm. Coordinator (UBC)  
James Hrynyshyn  
(To April)



ZSL Projects Officer (ZSL)  
Sophie Oliver



Admin. Assistant (UBC)  
Heidi Shuter



Admin. and Finance Assistant (PSF)  
Desiree Palana

# PUBLICATIONS

## Refereed Journals

Baum, J.K. and A.C.J. Vincent (2005). Magnitude and inferred impacts of the seahorse trade in Latin America. *Environmental Conservation*. First published online DOI: 10.1017/S0376892905002481

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Teske P.R., H. Hamilton, P.J. Palsbøll, C-K. Choo, H. Gabr, S.A. Lourie, M. Santos, A. Sreepada, M.I. Cherry and C.A. Matthee (2005). Molecular evidence for long-distance colonization in an Indo-Pacific seahorse lineage. *Marine Ecology Progress Series* 286, 249-260.

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## Non-refereed Publications

### Books

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Guieb, E. III R. (2005). "Minsan Pa: Mga Pagtalunton sa Pagitan ng Pamamaalam at Pagdating (Minsan Pa: Peregrinations between Departures and Arrivals)." In the 15th Annual Circle Citations for Distinguished Achievement in Film for 2004 (eds. The Film Desk of the Young Critics' Circle). University of the Philippines, Diliman, Quezon City. pp. 5-7.



### Technical bulletins

Moreau, M.-A. (2005). Organizing workshops and preparing subsequent proceedings. Project Seahorse Technical Report No. 9. Version 1.0. Project Seahorse, Fisheries Centre, University of British Columbia. 38 pp.

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# Seahorses of the World Photo Competition

Project Seahorse and sponsors Guylian Chocolates and *Sport Diver* magazine named Sam Taylor of Queensland, Australia the Grand Prize winner of the Seahorses of the World photo contest. Mr. Taylor has won a

week-long dive expedition for two on Australia's Great Barrier Reef, courtesy of Mike Ball Dive Expeditions.

Judges said his photo of two *Hippocampus bargibanti*, taken at

Milne Bay, Papua New Guinea, was notable for its composition and focus, as well as for capturing such a tiny seahorse species among open coral polyps.

Second place was awarded to Melissa Rushby of Nelson Bay, Australia. Her photo of *Hippocampus abdominalis* (see [page 18](#)) was taken off Base Island, near Sydney, Australia. She wins an underwater housing for an Olympus 5060 digital camera courtesy of Light & Motion.



"The Golden Couple" by Sam Taylor

The contest attracted 388 photos from 232 entrants from around the world. Project Seahorse will use the photos for educational outreach efforts and study.



"Yellow Seahorse" by Peter Ryngaert



"Hairy Seahorse" by Eric Riesch

# THE TEAM

Amanda Vincent	Project Director and Co-founder
Heather Koldewey	Associate Director and Co-founder
Amado Blanco	National Director, Project Seahorse Foundation (PSF), Philippines
Jonathan Anticamera	Biologist and PhD Student
Rosemarie (Mia) Apurado	Information, Communication & Education Officer, PSF
Perfecto (Pert) Auxilio	Community Organizer, PSF
Natalie Ban	Geographer and Biologist, PhD Student
Wilson John Barbon	Senior Social Development Officer, PSF
Alfie Bartolo	Messenger, PSF
Erwin Brunio	Policy Research and Advocacy Officer, PSF
Brian Cabrera	Habitat Biologist, PSF
Shannon Charney	Operations Assistant
Mary Cashman	Biologist and PhD Student
Janelle Curtis	Research Associate
Sarah Foster	Biologist and PhD Student
Geralde Sucano	Local Community Organizer, PSF
Brian Giles	Biologist and Consultant
Geoff Gilliard	Communications Coordinator (from April)
Fermina Genson	Field Biologist, PSF
Eulalio (Eli) Guieb	Anthropologist and PhD Student
James Hrynyshyn	Communications Coordinator (to April)
Bob Hunt	Biologist, Research Assistant
Lourdes Labrada	Administrative and Financial Officer, PSF
Samuel K. H. Lee	Marine Medicinals Program Officer
Sara Lourie	Research Associate
Anna Magera	Directed Studies Student and Field Researcher
Jean Marcus	Post-doctoral Fellow
Keith Martin-Smith	Senior Program Manager
Denise McCorry	Post-doctoral Scientist
Angela McCue	Wildlife Trade Analyst
Alen Mondido	Community Organizer, PSF
Sian Morgan	Biologist and PhD Student
Angelie (Angie) Nellas	Field Biologist, PSF
Jorma Neuvonen	Operations Director
Rebecca Ng	Field Researcher
Kerrie O'Donnell	Biologist and PhD Student
Sophie Oliver	ZSL Projects Coordinator
Marivic Pajaro	Biologist and PhD Student
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Hazel Panes	MPA Biologist, PSF
Candace Picco	Research Assistant
Heidi Shuter	Administrative Assistant
Auguis Silverio	Local Community Organizer, PSF
Armi May Torrechilla	Fisheries Biologist, PSF
Lucy Woodall	Biologist, PhD Student

# PARTNERS



The [University of British Columbia Fisheries Centre](http://www.fisheries.ubc.ca) serves as the international base for Project Seahorse and provides administrative and logistical support. Project Director Amanda Vincent is a member of the UBC faculty and holds the Canada Research Chair in Marine Conservation. [[www.fisheries.ubc.ca](http://www.fisheries.ubc.ca)]



The [Zoological Society of London](http://www.zsl.org) coordinates our European research and aquariums network from offices at the London Zoo, where Project Associate Director Heather Koldewey is senior aquarium curator. [[www.zsl.org](http://www.zsl.org)]



The [John G. Shedd Aquarium](http://www.shedd.org) and Project Seahorse are engaged in an award-winning and innovative partnership that has supported and advanced marine conservation since 1998. This venture marries the research and field management skills of Project Seahorse with the education and husbandry excellence of Shedd, to the benefit of both. Shedd supports a variety of programs, including core operations. [[www.shedd.org](http://www.shedd.org)]

# COLLABORATORS



The [University of Tasmania](http://www.utas.edu.au), a leading centre for temperate marine research in Australia, hosts Senior Program Manager Keith Martin-Smith. [[www.utas.edu.au](http://www.utas.edu.au)]



Royal Holloway hosts PhD Student Lucy Woodall, who is studying population genetics, taxonomy, and parentage in two species of European seahorses.



TRAFFIC East Asia and Project Seahorse share responsibility for the Marine Medicinals Program, which is based in Hong Kong.

# MAJOR DONORS & SPONSORS



[Chocolaterie Guylian](http://www.guylian-choc.com) of Belgium is a major sustaining sponsor of our research and marine conservation projects around the world. [[www.guylian-choc.com](http://www.guylian-choc.com)]



The [International Development Research Centre of Canada](http://www.idrc.ca) [[www.idrc.ca](http://www.idrc.ca)] and the [John D. and Catherine T. MacArthur Foundation, USA](http://www.macfound.org), [[www.macfound.org](http://www.macfound.org)] support our integrated marine protected areas program.

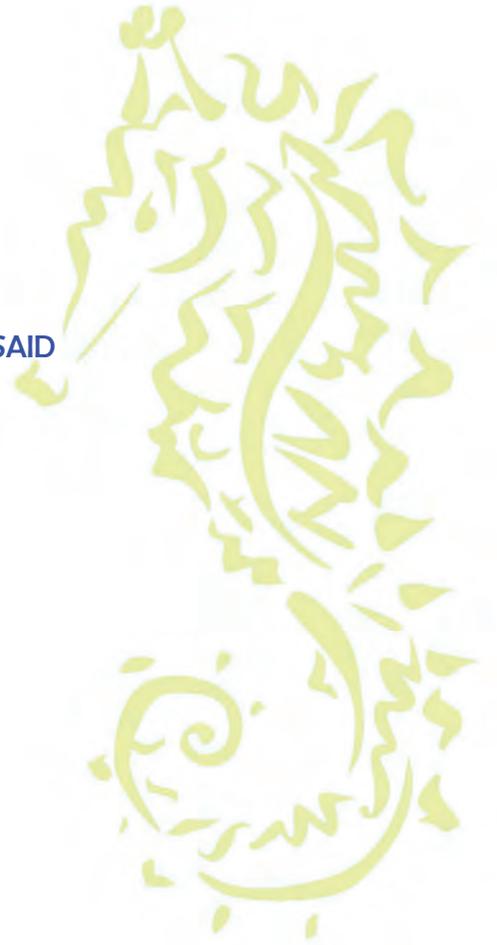


The [Canada Foundation for Innovation](http://www.innovation.ca) [[www.innovation.ca](http://www.innovation.ca)] and the [British Columbia Knowledge Development Fund](http://www.aved.gov.bc.ca/bckdf) [[www.aved.gov.bc.ca/bckdf](http://www.aved.gov.bc.ca/bckdf)] supply infrastructure in the form of computers, laboratory, image and field equipment.

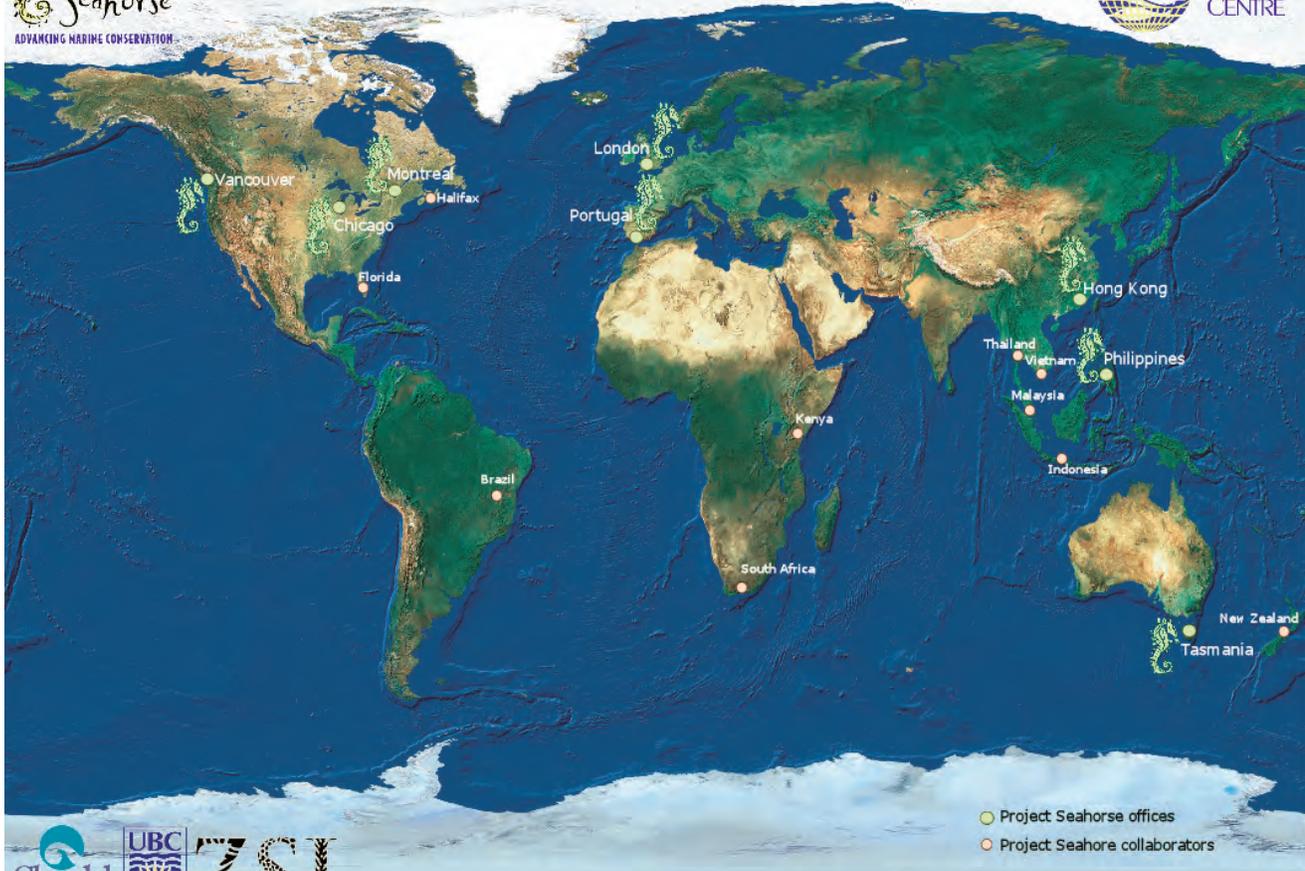
# DONORS

We would also like to thank the following for their generous support in 2005:

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Fisheries for Improved Sustainable Harvest (The FISH Project), USAID  
Foundation of the Philippines Environment, Philippines  
Government of Switzerland  
Mountain Equipment Co-operative Environment Fund, Canada  
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Ocean Management Research Network, Canada  
Percy R. Gardiner Foundation, Canada  
Pew Fellows Program in Marine Conservation, USA  
PFK Family Foundation, USA  
Point Defiance Zoo and Aquarium, USA  
Project Aware, USA and the PADI Foundation  
SeaWorld & Busch Gardens Conservation Fund, USA  
Social Sciences and Humanities Research Council, Canada  
Taiwan Council of Agriculture, Forestry Bureau  
TD Friends of the Environment, Canada  
Toronto Zoo, Canada  
Whitley Fund for Nature, UK



Special thanks to EQUES, Debbie Mason, Pat Cronin, Tim Mather, Michael Totten, Karen Campbell, Diane Bienvenue, and the Dallas Zoo. And to the many others who have contributed to our project over the years.



**Saving seahorses means saving the seas**

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