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The Field Museum

The Field Museum is a research and educational institution with exhibits open to the public and collections that reflect the natural and cultural diversity of the world. Its work in science and education—exploring the past and present to shape a future rich with biological and cultural diversity—is organized in three centers that complement each other. Its Collections Center oversees and safeguards more than 24 million objects available to researchers, educators, and citizen scientists; the Integrative Research Center pursues scientific inquiry based on its collections, maintains world-class research on evolution, life, and culture, and works across disciplines to tackle critical questions of our times; finally, its Science Action Center puts its science and collections to work for conservation and cultural understanding. This center focuses on results on the ground, from the conservation of tropical forest expanses and restoration of nature in urban centers, to connections of people with their cultural heritage. Education is a key strategy of all three centers: they collaborate closely to bring museum science, collections, and action to its public.

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Federación de Comunidades Nativas Fronterizas del Putumayo (FECONAFROPU)

FECONAFROPU is a non-profit organization founded on 5 April 1991 and based in San Antonio del Estrecho, Loreto, Peru. It currently brings together 32 indigenous communities and annexes with a mostly indigenous population including the Ocaina, Murui, Bora, Yaguas, and Kichwa peoples, all of them located on the southern banks of the middle and lower Putumayo River, in the District of Putumayo, the Province of Maynas, and the Region of Loreto, Peru. Inhabitants of these communities farm, fish, hunt, harvest some timber, and interact with non-indigenous neighbors via the sale or exchange of their products, both in San Antonio del Estrecho and via Peruvian and Colombian traders. FECONAFROPU is affiliated with the Regional Organization of Indigenous Peoples of the Oriente (ORPIO), which is based in Iquitos.

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**Federación Indígena Kichwa del Alto Putumayo Intiruna
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FIKAPIR is a non-profit organization that was founded in 2002 and legally recognized by the Loreto Registrar Office in Iquitos in December 2010. It is headquartered in the Esperanza Indigenous Community. Its board of directors consists of a president, vice president, secretary, treasurer, spokesperson, accountant, and women's representative. FIKAPIR's jurisdiction covers the upper watershed of the Putumayo River, a trinational border area between Peru, Colombia, and Ecuador. The federation represents 27 communities (Kichwa and Huitoto), all of which are located in the District of Teniente Manuel Clavero. FIKAPIR's vision for the Alto Putumayo region is of a Kichwa population with a strong sense of identity, which jointly defends an environmental landscape with healthy natural resources and management practices that are sustainable over the long term. FIKAPIR is currently involved in processes to implement Güeppí-Sekime National Park and Huimeki Communal Reserve, protected areas established in October 2012.

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The Instituto del Bien Común (IBC) is a Peruvian non-profit association aimed at promoting conservation and sustainable use for resources and spaces held in common, such as rivers, lakes, forests, fisheries, natural protected areas, and community territories. IBC's work contributes to the well-being of Amazonian peoples, as well as that of all Peruvians. IBC promotes respect for the rights and culture of local peoples, strengthening community and municipal governance institutions, and implementing long-term plans for conservation, sustainable development, and sustainable land use. It integrates into these actions both local and scientific knowledge. IBC is known for its research and publications on the use and management of communal property in Peru, and is a major source of information on indigenous communities in the Peruvian Amazon. IBC's efforts are organized in three programs based in the Amazonian part of Peru. The Amazonas-Putumayo Large Landscape Program works with four indigenous organizations to establish and manage a three million hectare mosaic of protected and sustainable use areas. The Selva Central Norte Program is working with four indigenous organizations to enhance their capacity to sustainably manage three indigenous landscapes that include natural protected areas, areas to protect indigenous groups in voluntary isolation, and indigenous communities, with a total area of 3.5 million hectares. The ProPachitea Program is helping build the institutional framework for a broad-based and integrated management plan of the entire Pachitea River Watershed, a three million hectare area that includes natural protected areas, indigenous communities, municipal governments, and small farmers.

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**Proyecto Especial Binacional de Desarrollo Integral de la
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PEDICP is a decentralized agency of the Peruvian Ministry of Agriculture and Irrigation created in 1991 by the Peruvian-Colombian Amazonian Cooperation Treaty (TCA). The agency leads the Peruvian government's efforts to implement binational agreements since 1989 regarding the countries' shared border area of 160,500 km², recently expanded by the Plan for the Peruvian-Colombian Integrated Border Zone. PEDICP promotes the sustainable, integrated development of forests in the Putumayo, Napo, Amazon, and Yavarí watersheds through projects that support the responsible use of natural resources, protect the environment, and provide the social and economic infrastructure needed to improve the quality of life of local residents. One of the agency's primary objectives is to encourage the peaceful, sustained development of towns in the Putumayo watershed—and especially indigenous communities there—by optimizing natural resource use and developing economic opportunities that are in harmony with Amazonian cultures and ecosystems.

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**Museo de Historia Natural de la Universidad Nacional Mayor
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Founded in 1918, the Museo de Historia Natural is the principal source of information on the Peruvian flora and fauna. Its permanent exhibits are visited each year by 50,000 students, while its scientific collections—housing a million and a half plant, bird, mammal, fish, amphibian, reptile, fossil, and mineral specimens—are an invaluable resource for hundreds of Peruvian and foreign researchers. The museum's mission is to be a center of conservation, education, and research on Peru's biodiversity, highlighting the fact that Peru is one of the most biologically diverse countries on the planet, and that its economic progress depends on the conservation and sustainable use of its natural riches. The museum is part of the Universidad Nacional Mayor de San Marcos, founded in 1551.

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Centro de Ornitología y Biodiversidad (CORBIDI)

The Center for Ornithology and Biodiversity (CORBIDI) was created in Lima in 2006 to help strengthen the natural sciences in Peru. The institution carries out scientific research, trains scientists, and facilitates other scientists' and institutions' research on Peruvian biodiversity. CORBIDI's mission is to encourage conservation measures, grounded in science, that help ensure the long-term preservation of Peru's natural diversity. The organization also trains and provides support for Peruvian students in the natural sciences, and advises government and other institutions concerning policies related to the knowledge, conservation, and use of Peru's biodiversity. The institution currently has three divisions: ornithology, mammalogy, and herpetology.

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The Proyecto Especial Binacional de Desarrollo Integral de la Cuenca del Río Putumayo (PEDICP), a program of the Peruvian Ministry of Agriculture, has been working for more than two decades to promote sustainable development and to improve the quality of life of residents in one of the most remote regions of the country, along its borders with Colombia, Ecuador, and Brazil. PEDICP has made a positive impact on the region by championing binational initiatives to conserve areas along the Putumayo River. For their crucial collaboration, we are especially grateful to Pablo Soria Ruiz, Mauro Vásquez Ramírez, Luis Alberto Moya Ibáñez, and Romel Coquinche. We also thank PEDICP for loaning us boats during the different stages of the inventory, for helping request prior informed consent in Santa Mercedes, for helping prepare the campsites, and for transporting the social team between the various communities.

The Instituto del Bien Común (IBC), a Peruvian non-governmental organization, was once again a critically important partner during this inventory. Over the last ten years, the IBC team has worked tirelessly with indigenous communities in the Putumayo region. We are sincerely thankful to Richard Chase Smith and Maria Rosa Montes de Delgado. Likewise, this inventory would not have taken place without the support, coordination, logistical expertise, and constant help of IBC staff in Iquitos: Ana Rosa Sáenz Rodríguez, Andrea Campos Chung, Fredy Ferreyra Vela, Rolando Gallardo González, and Alberto Bermeo.

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The reconnaissance overflights are a vital part of the inventory, as they give us the ability to form a broad understanding of the vegetation in the study area and to decide very precisely where the campsites should be established. We are deeply indebted to the staff of AeroAndino, and particularly to the top-notch pilot Rudolf Wiedler and his assistant in Pucallpa, Flor Rojas, for all of their support. Thanks to Rudi's experience and skill flying his Pilatus plane, we were able to form a clear idea of the landscape long before entering the field.

We feel honored to have been invited by the Federación de Comunidades Nativas Fronterizas del Putumayo (FECONAFROP) to carry out this work. We thank Federation leaders Benjamín Rodríguez Grandez (president), Benito Riveira Ríos (vice president), Rocío Iracunde Calderón (secretary), and Patricia Ribeira Calderón for all of their support, and for having worked with us closely during every stage of the inventory. FECONAFROP helped facilitate the preliminary meetings needed to obtain prior informed consent, took part in the reconnaissance overflight, invited the community members who participated in the preparatory work to establish campsites, and played a key role in the social team during visits to the communities.

This work would not have been possible without the permission of the communities neighboring the study area. We are tremendously thankful to the *caciques* and other leaders of Flor de Agosto, Santa Lucía, 8 de Diciembre, Puerto Alegre, San Francisco, Ere, Puerto Limón, Soledad, Nueva Venecia, Nuevo San Juan, Puerto Arturo, Santa Mercedes, Las Colinas, Atalaya, and Campuya for having ensured that everyone attended the prior informed consent meeting in the host community of Santa Mercedes.

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The tremendous energy, hard work, and good will of 60 residents of 14 local communities was once more crucial for establishing the three inventory campsites. In addition to opening the heliports and building simple but effective field labs and dining halls for the biological team, the *tigres* helped build a trail system more than 100 km long, without which the biologists would not have been able to carry out their studies. The *tigres* were: César Ajón, Marcelo Ajón, Juan Segundo Alvarado, Meraldo Aspajo, Olmedo Aspajo, Israel Chimbo, Leonardo Chimbo, Emerson Coquinche, Héctor Coquinche, Juan Coquinche, Juval Coquinche, José Cumari, Jorge Luis Dahua, Pedro Dahua, Raúl Dávila, Francisco Germán, Julián Grefa, César Guerra, Darwin Gutiérrez, Rully Gutiérrez, Efrain Imunda, Juan Pedro Iñapi, Oscar Iñapi, Leonel Jidullama, Grimaldo Jipa, Jason Jipa, Felix Machoa, Wilson Maitahuari, Walter Malafalla, Germán Manihuari, Levy Manihuari, Pedro Manihuari, Adner Mashacuri, Herman Mashacuri, Jhon Mashacuri, María Mashacuri, Ferney Meneses, Juana Mozombite, Percy Panaijo, Fenix Papa, Blanca Pérez, Henry Pérez, Luis Pérez, Norman Pérez, Zaqueo Pérez, Eleazar Rojas, Charles Rubio, Jair Rubio, Pedro Rubio, Tilso Rubio, Alberto Siquihua, Humberto Sosa, Juan Sosa, Amable Tapullima, Chanel Tapullima, Gustavo Tapullima, Nemias Tapullima, Rubén Tapullima, Jhon Jairo Torres, and Jaime Vilchez. Their work at these remote sites was planned, coordinated, and implemented by the leaders of the advance team: Álvaro del Campo, Guillermo Knell, Aldo Villanueva, Italo Mesones, Julio Grandez, and Gonzalo Bullard. To all of them our most sincere acknowledgments and thanks.

The expedition cooks deserve a paragraph all to themselves. Our great friends Bolívar Lucitante and Norma Mendua of Ecuador's Cofan nation did everything they could to keep the team's spirits high throughout the inventory. Every day they served up not only delicious food prepared under very challenging field conditions, but also their friendly personalities, deep knowledge of the forest, and their constant, contagious smiles. To both of them: *chigatsuafe poenjá!*

We thank Aerolift for facilitating the inventory with their MI-8T helicopter, which carried team members to the remote inventory campsites. Peruvian National Police General Dario "Apache" Hurtado Cárdenas once again played a fundamental role in facilitating the logistics surrounding the helicopter rental, and took time out from his busy schedule as a general to provide support for the inventory, coordinating closely with Enrique Bernuy Becerra to ensure that no detail of the flight plans was overlooked. The Aerolift staff that helped us during the inventory included Nikolay Nikitin (deputy manager), Gilmer Coaguila (supply manager), Roberto Calderón (pilot), Ysu Morales (flight engineer), Jorge Campos (mechanic), and Dante Rodríguez (flight technician).

The list of people who helped us in San Antonio del Estrecho is long, and each of them was key for making our inventory a success. Our friend Jackson Coquinche Butuna deserves special mention for his unflagging support during all stages of the study. His wonderfully helpful character and unstoppable determination to get things done and solve problems were crucial prerequisites for achieving our goals. Cergia Maiz Álvarez ("la Paisita") of Comercializadora Susana, together with her family and staff, not only provided most of the groceries and equipment for all stages of the inventory, but also always made us feel at home. We are also grateful to Saúl Cahuaza, PEDICP's master boat driver, who never hesitated to go above and beyond what the job required to make sure we had all the support we needed during the advance logistics phase and the inventory itself. While transporting the social team to the communities it visited, Saúl also found time to help the biological team relocate our first campsite after it was flooded. Gener Pinto Dossantos, another excellent boat driver, took us to Santa Mercedes for preliminary meetings with the communities regarding prior informed consent, while Jorge Romero Grandez took on the complicated task of assuring a steady supply of gasoline. Ernesto García Gebuy helped us with HF radio communications

in the FECONAFROPU offices, and Olga Álvarez Flores loaned us her radio and kitchen utensils for the advance team. The boat drivers Segundo Alvarado Buinajima, Walter Malfaya Macahuachi, Jenry Java Gomes, and Claudio Álvarez Flores, as well as their helpers Maximiliano Álvarez Tangoa and Remberto Sosa Gutiérrez, were always standing by to satisfy our team's travel needs along the Putumayo. Roger Malafaya Macahuachi, Miguel Sevallo Sosa, Reinaldo Mallqui Quispe, and Sister Juana María G. Filiberto Lavado generously rented us their boats and motors at a time of urgent need. The El Sitio Hotel was our home in El Estrecho for several weeks.

In Santa Mercedes, the biological and social teams extend their thanks to PEDICP employees based in town—the engineers Carlos Bardales Ríos, Elvis Noriega, and Jhony Garcés Fatama, as well as Everton Quinteros and Jambre Greffa—for their hospitality and constant support. Deserving of special recognition is teacher Delia María Oliveira Greichts, who was unfailingly supportive in Santa Mercedes, especially when we had urgent communication needs. Delia also provided us with groceries, equipment, and fuel when we needed it the most. Roberto Carlos Pérez, *cacique* of the community, offered his support throughout the inventory. We are also grateful to the staff at the PNP base in Santa Mercedes, who cleaned the heliport and looked after the helicopter at night.

A large number of people helped us in Iquitos, starting with Olga Álvarez and her brother Lucho Álvarez of the ALBA travel agency, who helped simplify the complicated logistics of moving passengers and cargo between Iquitos and San Antonio del Estrecho. Orlando Soplin Ruiz, FAP Major Luis Tolmos Valdivia, and FAP technician Hugo Quiroz Sosa of the Peruvian Air Force were consistently supportive and accommodating in planning flights with their Twin Otters from Iquitos to Santa Mercedes. The staff at the Hotel Marañón and Hotel Gran Marañón in Iquitos offered generous assistance throughout the inventory and during the advance work. We thank Moisés Campos Collazos and Priscilla Abecasis Fernández of Telesistemas EIRL for renting us the HF radio and for all their help in maintaining contact between Iquitos and the inventory campsites. We are indebted to Diego Lechuga Celis and the Vicariato Apostólico of Iquitos, who allowed us to use the auditorium where we presented our preliminary results. Osvaldo Silva (bus), Armando Morey (pickup truck), and Cristian Urbina (mototaxi) ran a thousand important errands for us in Iquitos.

Serigrafía and Confecciones Chu made the always breathtaking inventory t-shirts. Teresa del Águila and her team did an excellent job of catering the presentation in Iquitos.

The following people and institutions also provided much needed support during our work: Daniel and Juan Bacigalupo of Pacífico Seguros, the staff of the Hotel Señorial in Lima, Cynthia Reátegui of Lan Perú, Milagritos Reátegui, Gloria Tamayo, Lotty Castro, and Teresa Villavicencio, who helped organize the presentation of the results at the Hotel Radisson Decapolis in Lima.

Alvaro del Campo and Corine Vriesendorp brought more than data and stories back from the Ere-Campuya-Algodón inventory; they both had leishmaniasis in their blood. They are exceedingly grateful to their phenomenal doctors Andrew Cha, Danica Milenkovic, Thomas Tamlyn, and John Flaherty, the drug Ambisome, and the wonderful treatment and advice they received at Northwestern Hospital, Mercy Hospital, and the University of Chicago. They would like to especially recognize the care, concern, and hard work provided by Jolynn Willink at The Field Museum and Sandra Rybolt at CHUBB insurance.

As he has so many times before, Jim Costello did a fast and efficient job of pulling together our written report, photos, and maps, and turning them into an elegant book. We are especially grateful for the creativity, friendship, and patience of Jim and his team in Chicago during the hard-driving process of editing and

re-editing the numerous proofs. As always, Mark Johnston and Jonathan Markel were indispensable before, during, and after the inventory, serving up maps and geographic data at a moment's notice and providing constant support in preparing the report and presentations. As she has done since our very first inventory in Loreto, Tyana Wachter played an irreplaceable role in this inventory, dedicating 200% of her time (plus overtime!) to making sure that the inventory and everyone involved in it were safe and on schedule, and solving problems whether in Chicago, Lima, Iquitos, or El Estrecho. It was also a pleasure to celebrate Tyana's birthday with her in Peru! We are also grateful to Royal Taylor, Meganne Lube, Dawn Martin, and Sarah Santarelli, who were on constant standby while we were in the field and always ready to help from Chicago.

We are deeply grateful for the support of the Field Museum's president, Richard Lariviere. And without the vision, leadership, and determination of Debby Moskovits, none of the Field Museum's 25 rapid inventories would have happened in the first place. We are proud to be a part of her team, and inspired by her unwavering commitment to conservation and well-being in the Andes-Amazon.

This inventory was made possible by financial support from blue moon fund, Thomas W. Haas Foundation, Nalco Corporation, Margaret A. Cargill Foundation, Hamill Family Foundation, The Boeing Company, and The Field Museum.

The goal of rapid inventories—biological and social—is to catalyze effective action for conservation in threatened regions of high biological and cultural diversity and uniqueness

Approach

Rapid inventories are expert surveys of the geology and biodiversity of remote forests, paired with social assessments that identify natural resource use, social organization, cultural strengths, and aspirations of local residents. After a short fieldwork period, the biological and social teams summarize their findings and develop integrated recommendations to protect the landscape and enhance the quality of life of local people.

During rapid biological inventories, scientific teams focus primarily on groups of organisms that indicate habitat type and condition and that can be surveyed quickly and accurately. These inventories do not attempt to produce an exhaustive list of species or higher taxa. Rather, the rapid surveys 1) identify the important biological communities in the site or region of interest, and 2) determine whether these communities are of outstanding quality and significance in a regional or global context.

During social inventories, scientists and local communities collaborate to identify patterns of social organization, natural resource use, and opportunities for capacity building. The teams use participant observation and semi-structured interviews to quickly evaluate the assets of these communities that can serve as points of engagement for long-term participation in conservation.





In-country scientists are central to the field teams. The experience of local experts is crucial for understanding areas with little or no history of scientific exploration. After the inventories, protection of natural communities and engagement of social networks rely on initiatives from host-country scientists and conservationists.

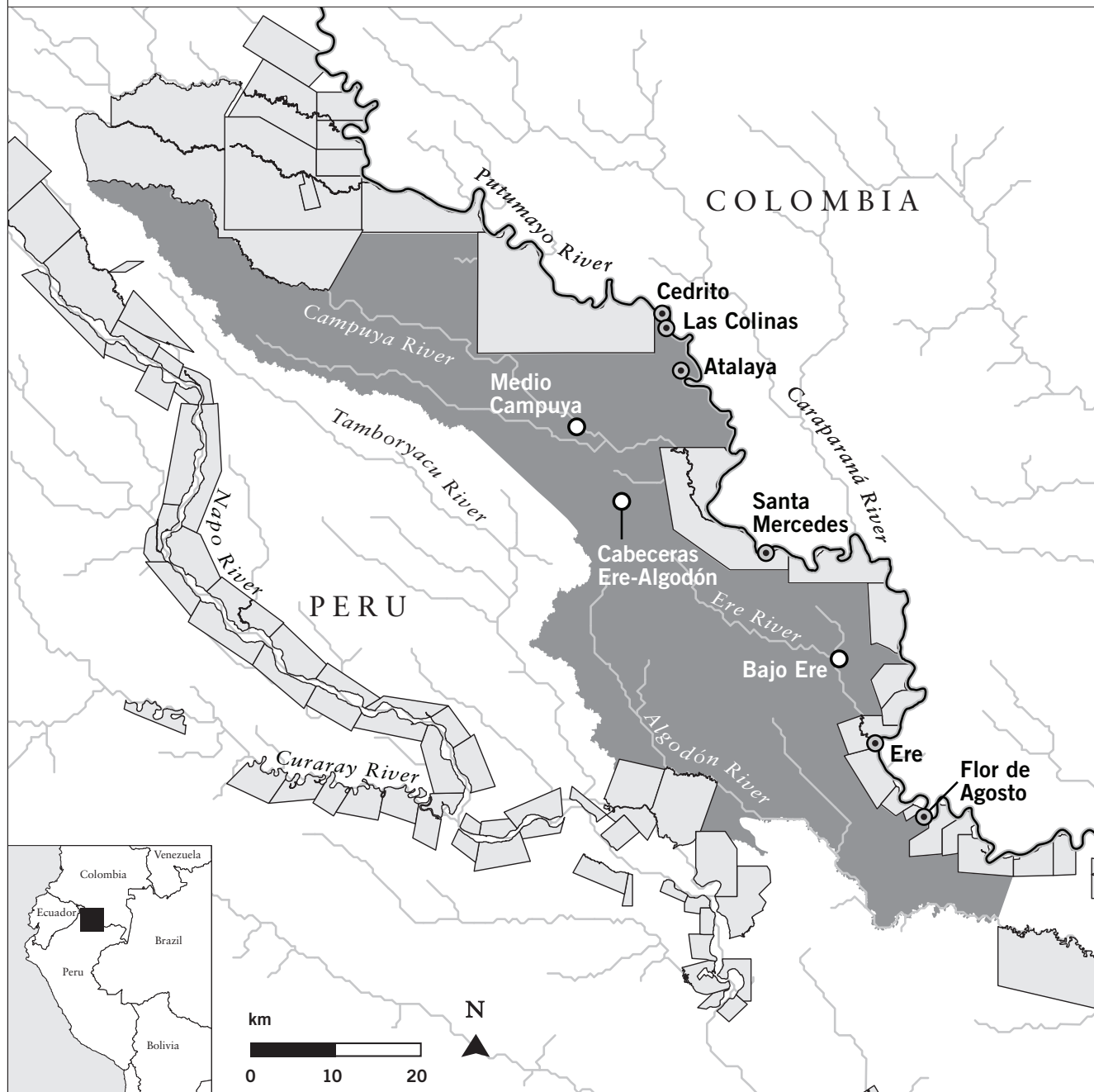
Once these rapid inventories have been completed (typically within a month), the teams relay the survey information to regional and national decision-makers who set priorities and guide conservation action in the host country.

REPORT AT A GLANCE

Dates of
fieldwork

15–31 October 2012

- | | |
|--|--|
|  Indigenous Communities |  Biological Inventory |
|  Ere-Campuya-Algodón |  Social Inventory |



REPORT AT A GLANCE

Region

The watersheds of the Ere, Campuya, and Algodón rivers, south-bank tributaries of the Putumayo River that drain the northern limits of Peru's Loreto department, harbor a vast extension of lowland forest on nutrient-poor soils. The Ere-Campuya-Algodón region (900,172 ha) has been recognized by Peru and Colombia as a binational conservation priority since 1993 (PEDICP 1993). The three watersheds provide a resource base for Kichwa and Murui¹ indigenous peoples and *mestizos* living along the Putumayo River in 17 settlements (13 officially recognized communities and 4 satellite settlements known as *anexos*). If protected, the 0.95 million-ha Ere-Campuya-Algodón area would complete a more than 21 million-ha complex of conservation areas and indigenous reserves in the Peru-Colombia-Ecuador border region (Fig. 13C).

Sites visited (Fig. 2A)

Biological team:

| | | |
|----------------------------|-----------------------|--------------------|
| Ere and Algodón watersheds | Cabeceras Ere-Algodón | 15–21 October 2012 |
| | Bajo Ere | 21–26 October 2012 |
| Campuya watershed | Medio Campuya | 26–31 October 2012 |

Social team:

| | | |
|--------------------|----------------|--------------------|
| Putumayo watershed | Flor de Agosto | 15–19 October 2012 |
| | Ere | 19–23 October 2012 |
| | Atalaya | 23–27 October 2012 |
| | Santa Mercedes | 27–31 October 2012 |

While in Atalaya, our social team also interviewed representatives from the *anexos* of Cedrito and Las Colinas.

On 31 October 2012, both inventory teams offered a public presentation of their preliminary results in Santa Mercedes to residents and leaders of several communities in the region.

Biological and geological inventory focus

Geomorphology, stratigraphy, hydrology, and soils; vegetation and flora; fishes; amphibians and reptiles; birds; medium-sized and large mammals

Social inventory focus

Social and cultural assets; historical and present-day ties among communities on both sides of the border; demography, economics, and natural resource management of the communities; ethnobotany

Principal biological results

The soils of this region are exceedingly poor in nutrients and salts. Chemically, the waters are among the purest sampled in any locality within the Amazon and Orinoco basins to date. Low upland terraces ~132–237 m above sea level (masl) dominate the landscape.

¹ The indigenous group known as Huitoto in the literature now identifies itself as Murui in this region. We use Murui throughout the text.

During the inventory **we found at least 15 species that appear to be new to science** (4 fishes and 11 plants), as well as **dozens of new records for Peru or the Putumayo River basin**. We registered approximately 1,700 species of vascular plants and vertebrates in three weeks, and estimate that 3,100–3,600 species occur in the region. Many of these species are specially adapted to poor-soil conditions. One of our most important finds was a new vegetation type: a stunted forest (known locally as a *varillal*) that grows on white-clay soils and is the first *varillal* to be reported north of the Napo River.

| | Species recorded during the inventory | Species estimated for the region |
|------------|---------------------------------------|----------------------------------|
| Plants | 1,009 | 2,000–2,500 |
| Fishes | 210 | 300 |
| Amphibians | 68 | 156 |
| Reptiles | 60 | 163 |
| Birds | 319 | 450 |
| Mammals | 43 | 71 |

Geology

The Ere-Campuya-Algodón landscape is dominated by low terraces primarily composed of sedimentary rocks that are strikingly poor in salts and nutrients. These terraces are drained by the Campuya River to the north, the Ere to the south, the headwaters of the Algodón to the west, and the broad floodplain of the Putumayo to the east. The highest points on the landscape reach little more than 200 m above sea level and are just 50–60 m higher than the water level of the Putumayo River (Fig.2B).

We encountered six formations and their sedimentary deposits exposed in the Ere-Campuya-Algodón landscape: 1) the salt- and nutrient-rich Pebas Formation, deposited in western Amazonia through much of the Miocene (5–12 mya), 2) the lower Nauta Formation (Nauta 1), deposited in the Plio-Pleistocene (5–~2 mya) and less fertile than the Pebas, 3) the upper Nauta Formation (Nauta 2, ~2 mya), much less fertile than Nauta 1, 4) the White Sands Formation, the most nutrient-poor unit, probably contemporaneous with Nauta 1, 5) Pleistocene (~2–0.1 mya) fluvial deposits, nutrient-rich along rivers with Andean headwaters and nutrient-poor elsewhere, and 6) contemporary fluvial sediments settling in modern floodplains (0–12 kya). The bulk of the landscape appears to be very poor in nutrients and corresponds to the upper or lower Nauta Formations.

Water in the streams and rivers that drain the terraces and floodplains of this region have concentrations of dissolved solids that are among the lowest of any watershed sampled to date in the Amazon and Orinoco River basins. On the eastern bank of the Campuya River, we found outcroppings of the Pebas Formation parallel to an ancient fault line. Locally known as *collpas*, these outcroppings are a critical source of salts for the animals that consume the bedrock directly or drink water that drains out of it.

REPORT AT A GLANCE

Geology (continued)

We sampled the water in a large *collpa* known as the Salado del Guacamayo (Macaw Saltlick) and found its salt content to be 200 times higher than that of nearby upland streams (Fig. 4).

The lack of bedrock and soil consolidation means that the landscape depends on forest cover to limit erosion. If forest cover were eliminated in this area, vegetation recovery would be slow due to the naturally low levels of soil nutrients, and eroded sediments would rush into streams, alter water quality, and fill floodplains. The entire landscape is susceptible to this kind of destruction.

Vegetation and flora

We found heterogeneous forests harboring a diverse community of poor-soil specialists, with floristic affinities to Colombian forests in the Putumayo and Caquetá watersheds, the Guiana Shield, and other poor-soil forests of Loreto. During 15 days in the field we recorded ~1,000 of the 2,000–2,500 species of vascular plants believed to occur in the region. We collected ~700 specimens, including 11 species potentially new to science (in the genera *Compsonura*, *Cyclanthus*, *Dilkea*, *Piper*, *Platycarpum*, *Qualea*, *Tetrameranthus*, *Vochysia*, and *Xylopia*) and several new records for the flora of Loreto (Figs. 5–6).

We identified three broad vegetation types: 1) upland terraces, 2) floodplain forests (old levees, riparian forests, and oxbow-lake forests), and 3) wetlands. We discovered a previously unknown vegetation type that we are calling a white-clay *varillal*—a stunted forest similar in structure and floristic composition to *varillales* in other parts of Loreto but different in that all other *varillales* in Loreto grow on white sand. This represents the first record of a *varillal* north of the Napo River in Peru.

Field work revealed a landscape of frequent disturbances, possibly a result of strong winds acting on unstable soils. On the high terraces, we found patches of poorly drained clay soils that support clumps of *ungurahui* palm (*Oenocarpus bataua*). We did not find high-value timber species such as big-leaf mahogany (*Swietenia macrophylla*) or red cedar (*Cedrela odorata*), but found substantial populations of less-valuable timber species such as *Cedrelinga cateniformis*, *Hymenaea courbaril*, *Platymiscium* sp., *Simarouba amara*, Lauraceae spp., *Iryanthera* spp., *Osteophloeum platyspermum*, and *Virola* spp. The area is also rich in non-timber species, including numerous palms and tree ferns (*Cyathea* spp.) used for medicinal purposes by local people. We found some evidence of small-scale illegal logging, mostly in the lower stretches of streams and rivers.

Fishes

The ichthyofauna is dominated by species typical of nutrient-poor habitats. We recorded 210 fish species in 26 sampling sites in the watersheds of the Ere, Campuya, and Algodón rivers. The fish community here includes 20 species not previously known from the Peruvian-Colombian section of the Putumayo River. We estimate 300 species for the Ere-Campuya-Algodón region. Field work revealed four species possibly new to science

| | |
|--------------------------------|---|
| | <p>(in the genera <i>Charax</i>, <i>Corydoras</i>, <i>Synbranchus</i>, and <i>Bujurquina</i>), all associated with <i>tierra firme</i> streams, as well as one species never before recorded in Peru (<i>Satanoperca daemon</i>). We found 36 fish species known to be migratory (Fig.7).</p> <p>Several of the fish species are economically important, either as food or in the ornamental pet trade, including giant arapaima (<i>Arapaima gigas</i>), <i>Brycon</i> spp., <i>Salminus iquitensis</i>, <i>Leporinus</i> spp., <i>Laemolyta taeniata</i>, <i>Anodus elongatus</i>, and <i>Potamorhina</i> spp. Although we did not see evidence of commercial extraction of ornamental fishes in the middle and upper reaches of the Ere, Campuya, and Algodón watersheds, our social team documented extraction of silver arawana (<i>Osteoglossum bicirrhosum</i>) in the oxbow lakes of the lower Ere and near the community of Flor de Agosto. During the inventory we found healthy populations of several species of cichlids and other fishes that are commercially exploited elsewhere in the Putumayo and other Amazonian rivers.</p> |
| Amphibians and reptiles | <p>Amphibian and reptile communities in the Ere-Campuya-Algodón region are in excellent condition. We recorded 128 species, of which 68 were amphibians and 60 reptiles, and estimate that the region supports a herpetofauna of 319 species (156 amphibians and 163 reptiles). This regional amphibian and reptile diversity spans most of the recorded herpetofauna of Loreto (Fig.8).</p> <p>Amphibians are represented primarily by species restricted to northwestern Amazonia (Ecuador, southern Colombia, northeastern Peru, and the northwestern portion of Brazil). These include the first Peruvian record of the Ecuador poison frog <i>Ameerega bilineata</i>, previously known only from Ecuador. We documented considerable range extensions for three other frogs: <i>Allobates insperatus</i>, <i>Chiasmocleis magnova</i>, and <i>Osteocephalus mutabor</i>.</p> <p>We found a rich reptile community with 22 lizards, 31 snakes, 3 turtles, 2 caimans, and 1 <i>Amphisbaenia</i>, or worm lizard. We found healthy populations of some species hunted for food, such as the yellow-footed tortoise (<i>Chelonoidis denticulata</i>), considered globally Vulnerable by the IUCN, and of some species considered critically endangered within Peru, such as the Schneider smooth-fronted caiman (<i>Paleosuchus trigonatus</i>) and the giant South American turtle (<i>Podocnemis expansa</i>).</p> |
| Birds | <p>We found an avifauna typical of northwestern Amazonia, with poor-soil forest specialists and healthy populations of game species. We recorded 319 species of birds in the Ere-Campuya-Algodón region, as well as 42 additional species in the community of Santa Mercedes along the Putumayo River. We estimate that the Ere, Campuya, and Algodón watersheds are host to 450 species, roughly half of the recorded avifauna of Loreto (Fig.9).</p> <p>The composition of the avifauna reflects the poor soils characteristic of the region's <i>tierra firme</i> forests. The most important records are poor-soil forest specialists:</p> |

REPORT AT A GLANCE

Birds (continued)

Helmeted Pygmy-Tyrant (*Lophotriccus galeatus*), Black-headed Antbird (*Percnostola rufifrons*), and an undescribed antwren (*Herpsilochmus* sp. nov.). This *Herpsilochmus* is in the process of being described as a new species from the Apayacu basin, and we have recorded it in past inventories in the Putumayo drainage. Here it was found only in the white-clay *varillal* of Middle Campuya, although it may be present in the entire region. The *Herpsilochmus* sp. nov. is endemic to the region bounded by the Napo and Amazon rivers on the south and the Putumayo River on the north. *Percnostola rufifrons jensoni*, which may be a distinct species (Stotz and Díaz 2011), is also restricted to this interfluvium. Other poor-soil specialists that we found include Orange-crowned Manakin (*Heterocercus aurantiivertex*), Black-throated Trogon (*Trogon rufus*), Paradise Jacamar (*Galbula dea*), Pearly Antshrike (*Megastictus margaritatus*), Citron-bellied Attila (*Attila citriniventris*), and Yellow-throated Flycatcher (*Conopias parvus*).

Most game species are well represented, including Salvin's Curassow (*Mitu salvini*), Spix's Guan (*Penelope jacquacu*), and Gray-winged Trumpeter (*Psophia crepitans*). The *collpas* or salt licks play a critical role in this region, as they provide salts and mineral nutrients in the diet of a variety of species, including macaws, parrots, parakeets, doves, and other large and medium-sized birds.

Medium-sized and large mammals

The mammal community is in excellent condition. Via direct and indirect observations, as well as interviews with local people, we recorded 43 species of medium-sized and large mammals. We estimate that 71 species occur in the Ere, Campuya, and Algodón watersheds. We found abundant populations of primates such as monk saki (*Pithecia monachus*), black-mantled tamarin (*Saguinus nigricollis*), and white-fronted capuchin (*Cebus albifrons*), as well as some mammals that are threatened by overhunting elsewhere in Loreto, including Humboldt's woolly monkey (*Lagothrix lagotricha*), Brazilian tapir (*Tapirus terrestris*), collared peccary (*Pecari tajacu*), and white-lipped peccary (*Tayassu pecari*). One of the highlights was the sighting of a bush dog (*Speothos venaticus*), a species very rarely recorded in Loreto, at the Medio Campuya campsite. Two hours from the native community of Santa Mercedes our social scientists observed a short-eared dog (*Atelocynus microtis*), making this the only one of our 11 inventories in Loreto that yielded sightings of both canids.

These watersheds harbor 34 species considered to be global or national conservation priorities, including woolly monkey, tapir, collared peccary, and jaguar (*Panthera onca*). Giant river otter (*Pteronura brasiliensis*) and Neotropical otter (*Lontra longicaudis*) are seen by local residents as competitors for fish; the frequent sightings of these species indicate that aquatic habitats in the region are in good condition. Standing forests and critical habitats such as *collpas* are essential elements for sustaining mammal populations in this region (Fig. 10).

Human communities

The human settlements in the Ere-Campuya-Algodón region are mainly located along the Putumayo River, with the exception of one satellite settlement (*anexo*) on the Campuya River. There are currently 1,144 inhabitants living in 17 settlements (13 communities and 4 *anexos*) including members of the Kichwa and Murui indigenous groups, as well as *mestizos*. Household economies are primarily subsistence in nature, supplemented with a local market of forest products, garden produce, and fish. Communities have a small-scale, rotating, and diversified agricultural system based on family gardens. These ancestral practices of using and managing natural resources have helped protect forests, lakes, and rivers, as well as maintaining a healthy source of food for residents (Fig.11).

Communities in the region have maintained strong links to the environment, as reflected in their traditional use and management of resources, and despite a long history of forced displacements and exploitation of people and natural resources (e.g., the rubber boom in the early 20th century). However, local residents continue to face challenges to their natural and cultural heritage. Colombian merchants subsidize timber extraction via a debt peonage system known as *habilito* (advance loans for a later payment with products or labor). This practice generates conflicts among communities for access to timber, and creates vicious and long-lasting cycles of loans and debt. There are also regional initiatives to open two roads between the Napo and Putumayo drainages, which would put pressure on forests (land colonization and speculation, large-scale resource extraction, erosion and sedimentation of rivers) and the lives of local people who depend on these forests.

Several social and cultural assets stand out within this complex economic and social context. We found that communities maintain 1) their traditional communal organization, 2) intercultural connections among the Murui, Kichwa, and *mestizo* populations living along the Putumayo River in Peru and Colombia, 3) strong kinship networks and a culture of reciprocity that support household economies and the distribution of resources, and 4) a profound knowledge of the surrounding forests, rivers, and wetlands, and the biodiversity they contain. These assets offer a solid foundation for long-term management and conservation of natural resources within the sizable conservation complex of indigenous lands and protected areas along either side of the Putumayo River.

Current status

The Ere, Campuya, and Algodón watersheds comprise **one of three areas along the Peru-Colombia border designated since 1993 as conservation priorities** (PEDICP 1993). In 2009, the Loreto regional government signed a law to protect the headwaters of river basins (Ordenanza Regional 020-2009-GRL-CR). Two years later, the government refined that law and identified **priority headwaters including the Ere, Campuya, and Algodón rivers** (OR 005-2013-GRL-CR). While the Ere-Campuya-Algodón region contains no oil or gas concessions, the majority (>80%) is designated as Permanent

REPORT AT A GLANCE

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|-----------------------------------|---|
| Current status (continued) | Production Forest (<i>Bosque de Producción Permanente</i> or BPPs, Law 27308, published in 2000) and thus slated for future commercial logging. The limits of the BPPs will have to be redrawn (<i>redimensionado</i>) for the Ere-Campuya-Algodón region to be set aside for conservation. |
| Principal assets for conservation | <ol style="list-style-type: none"> 01 Priority area since 1993 for binational (Peru-Colombia) conservation and for watershed conservation 02 Vast, intact forests with specialized biological and geological features: poor soils, waters of exceptional purity, and organisms adapted to these conditions 03 A critical part of a Peruvian corridor of indigenous lands and conservation areas of more than 3.2 million hectares, from the border with Brazil to the border with Ecuador (Fig.13C) 04 A critical part of a trinational (Peru-Colombia-Ecuador) corridor of indigenous reserves and conservation areas with more than 21 million hectares of protected landscapes, capable of sustaining the continuity of ecological and evolutionary processes in northern Amazonia (Fig.13C) 05 Interest and support from local residents for the creation of a legal designation that allows them to care for and manage this area over the long term 06 Native communities with extensive traditional knowledge on using and managing natural resources |
| Conservation targets | <ol style="list-style-type: none"> 01 The high-priority headwaters of the Ere, Campuya, and Algodón rivers 02 Exceedingly pure waters almost entirely devoid of salts 03 Forests growing on soils that are extremely poor in nutrients, and host to: <ul style="list-style-type: none"> – A previously unknown habitat type in the Peruvian Amazon: a stunted forest growing on white-clay soils, floristically similar to but geographically distant from the famous white-sand forests near Iquitos – A diverse flora and fauna adapted to nutrient-poor soils, including most of the amphibian and reptile species known to Loreto, at least 20 fish species never before documented for the Peru-Colombia border area, and poor-soil bird communities different from those of southern Amazonia – Extensive peat swamps along the ancient floodplain of the Putumayo River, containing important stores of carbon – Impressive <i>collpas</i> interspersed throughout the landscape, serving as critical sources of salts and other vital nutrients for mammals and birds |

| | |
|----------------------------------|---|
| | <p>04 Healthy populations of economically important species (arapaima, silver arawana, white-lipped peccary, collared peccary, and Salvin's Curassow, among others) that provide an excellent source of protein for local peoples</p> <p>05 Diversified gardens, traditional fishing techniques, and rotation systems for the management of oxbow lakes, <i>collpas</i>, and abandoned/second-growth fields that guarantee the integrity of these forests, lakes, and rivers</p> <p>06 Dynamic connections between communities on the Peruvian and Colombian sides of the border, their strong links to forest resources, and communal initiatives to patrol and monitor natural resources</p> |
| Main threats | <p>01 The proposal to build two roads to the southeast of the area—Flor de Agosto-Puerto Arica and Buena Vista-Mazán-Salvador-San Antonio del Estrecho—that threaten to deliver a broad range of negative environmental and social impacts, as documented in other parts of the Amazon (Fig. 12A–B)</p> <p>02 Large-scale dredging and small-scale artisanal gold-mining that introduces toxic mercury into waterways, the aquatic fauna, and local human residents, as well as creating social inequality and conflicts within communities</p> <p>03 The erroneous designation of the region's soils as suitable for agriculture and forestry, according to government soil maps; our rapid inventory revealed a region with extremely poor soils that are highly vulnerable to erosion and have no capacity to support large-scale agriculture or forestry</p> <p>04 Discrimination against indigenous people, and disrespect for indigenous culture</p> <p>05 Illegal activities along the Peru-Colombia border, such as drug trafficking and guerrilla activity, and a limited government presence in the region</p> |
| Principal recommendations | <p>01 Establish a conservation and sustainable use area that benefits local communities and includes the watersheds of the Ere, Campuya, and Algodón rivers. The area would protect 900,172 hectares of diverse forests growing on nutrient-poor soils, and expands the original PEDICP proposal to include the high-priority headwaters of the Campuya (Fig. 2A)</p> <p>02 Establish a system for the management and protection of the Ere, Campuya, and Algodón watersheds, in close collaboration with local communities, their institutions, and relevant government entities</p> <p>03 Maintain forest cover in these watersheds. This is critical given the nutrient-poor soils, their high susceptibility to erosion, and their incompatibility with large-scale agriculture and forestry</p> |

REPORT AT A GLANCE

Principal recommendations
(continued)

- 04 **Coordinate and integrate management** of the Ere, Campuya, and Algodón watersheds with adjacent areas **in Peru and Colombia**
- 05 **Plan and execute joint actions** between government agencies and local communities on both sides of the border **to reduce—and eventually eliminate—the illegal extraction of timber and gold** from the three watersheds and the Putumayo River

Why Ere-Campuya-Algodón?

Just north of Iquitos lies one of the richest wilderness areas on Earth. By almost any measure—trees, amphibians, birds, mammals—the forests along the Putumayo River harbor the greatest biological diversity on the planet. They are also a hotspot of cultural diversity, where indigenous groups are actively exploring new strategies to conserve their languages, customs, rivers, and forests.

Both Peru and Colombia recognize that conserving this drainage is critical. In the 1970s, Colombia began stitching together a patchwork of national parks and indigenous reserves, which now covers 16 million hectares. In Peru, conservation has gained steam over the last five years with four new national protected areas and a proposed regional conservation area spanning more than 2 million hectares.

A key piece of the conservation puzzle remains. To reach the Putumayo conservation corridor from Iquitos, one must first cross 200 km of unprotected forests in Peru—like those in the Ere, Campuya, and Algodón watersheds, currently threatened by petroleum operations, mining, logging, road-building, and unregulated hunting. Recognized as a conservation priority by the Peruvian government since 1993, the Ere-Campuya-Algodón region was subsequently—and erroneously—classified as apt for agriculture and logging. In fact, the Ere-Campuya-Algodón soils are so poor that stream water in the region has the highest purity levels recorded anywhere in the Amazon basin. These watersheds also hold world-record levels of biodiversity for plants and vertebrates, many of which are uniquely suited for life on a nutrient-starved landscape, and dozens of which are considered globally threatened.

Today, these watersheds are partially safeguarded by Murui and Kichwa indigenous communities determined to preserve the natural resources they have depended on for centuries. Linked with the Airo Pai Communal Reserve to the west and the proposed Maijuna Regional Conservation Area to the east, a new protected area in Ere-Campuya-Algodón will consolidate a major Peruvian conservation corridor in one of the most spectacular wilderness areas in the world, and will create a trinational conservation corridor along the Putumayo River of more than 21 million hectares.

Conservation in the Ere-Campuya-Algodón region

CONSERVATION TARGETS

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| | <p>01 Diverse, rare, or unique biological communities</p> <ul style="list-style-type: none"> ▪ Plant, fish, amphibian, reptile, bird, and mammal communities that rank among the most diverse on Earth, and which probably include between 30 and 100% of all species recorded in these groups to date in Loreto ▪ A vegetation type never before reported in the Amazon, with vegetation similar to that of <i>varillal</i> forests known from white-sand soils elsewhere in Loreto, but growing on white-clay soils on the floodplain of the Campuya River ▪ Vast extensions of upland and floodplain forests growing on extremely poor soils and dominated by species of plants and animals specially adapted to such conditions ▪ An extensive network of rivers, streams, and lakes with vanishingly low levels of nutrients and minerals, ranking among the poorest water bodies in the Amazon, and dominated by fish species that are specially adapted to live in such conditions <p>02 Terrestrial and aquatic ecosystems in excellent, undisturbed conditions at the three sites visited by the biological team</p> <ul style="list-style-type: none"> ▪ Intact headwaters free of anthropogenic impacts, characterized by extremely pure water, and recognized as conservation priorities by the Regional Government of Loreto ▪ Large and healthy populations of animal species that are commonly hunted in nearby communities (e.g., large primates, game birds, river turtles; see Appendix 10), indicating that large expanses of the Ere, Campuya, and Algodón watersheds are rarely visited by hunters and fishermen, and currently represent healthy sources of economically valuable animals ▪ Frequent sightings in the Ere and Campuya watersheds of one of the most threatened vertebrates in Amazonian Peru, and one of the Amazonian predators most sensitive to human impacts: giant river otter (<i>Pteronura brasiliensis</i>; Fig. 10F) |
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03 Places and natural resources that are fundamentally important to local indigenous communities

- Hundreds of useful plants that play a crucial role in maintaining the quality of life of local indigenous communities, including species used for medicine, food, building materials, handicrafts, and other traditional uses (see Appendix 9)
- Large populations of game species and the mineral licks that sustain both hunters and animal communities
- Sites in the Ere and Campuya watersheds where local communities harvest a wide range of timber and non-timber forest products (Fig. 21)

04 At least 23 species considered threatened worldwide

- Plants considered globally threatened by the IUCN (2013): *Virola surinamensis* (EN), *Couratari guianensis* (VU), *Guarea cristata* (VU), *Guarea trunciflora* (VU), *Pouteria vernicosa* (VU)
- Plants considered globally threatened by León et al. (2006): *Chelyocarpus repens* (EN), *Aptandra caudata* (VU), *Tachia lorentensis* (VU)
- Amphibians (IUCN 2013): *Atelopus spumarius* (VU)
- Reptiles (IUCN 2013): *Podocnemis sextuberculata* (VU)
- Birds (IUCN 2013): *Agamia agami* (VU), *Patagioenas subvinacea* (VU), *Pipile cumanensis* (VU)
- Terrestrial mammals (IUCN 2013): *Ateles belzebuth* (EN), *Callimico goeldii* (VU), *Dinomys branickii* (VU), *Lagothrix lagotricha* (VU), *Myrmecophaga tridactyla* (VU), *Priodontes maximus* (VU), *Tapirus terrestris* (VU), *Tayassu pecari* (VU)
- Aquatic or semi-aquatic mammals (IUCN 2013): *Pteronura brasiliensis* (VU), *Trichechus inunguis* (VU)

05 At least 18 species considered threatened in Peru (MINAG 2004)

- Plants: *Parahancornia peruviana* (VU), *Peltogyne altissima* (VU), *Tabebuia serratifolia* (VU)
- Reptiles: *Podocnemis expansa* (EN), *Melanosuchus niger* (VU)

- Birds: *Ara chloropterus* (VU), *Ara macao* (VU), *Mitu salvini* (VU)
- Mammals: *Ateles belzebuth* (EN), *Dinomys branickii* (EN), *Pteronura brasiliensis* (EN), *Trichechus inunguis* (EN), *Callicebus lucifer* (VU), *Callimico goeldii* (VU), *Lagothrix lagotricha* (VU), *Myrmecophaga tridactyla* (VU), *Prionates maximus* (VU), *Tapirus terrestris* (VU)

06 At least eight species considered threatened in Colombia

- Fishes: *Arapaima gigas* (VU), *Osteoglossum bicirrhosum* (VU), *Brachyplatystoma filamentosum* (VU), *Brachyplatystoma juruense* (VU), *Brachyplatystoma platinemum* (VU), *Pseudoplatystoma punctifer* (VU), *Pseudoplatystoma tigrinum* (VU), *Zungaro zungaro* (VU)

07 At least six species considered endemic to Loreto

- Plants: *Aptandra caudata*, *Chelyocarpus repens*, *Clidemia foliosa*, *Tachia loretensis*
- Amphibians: *Chiasmocleis magnova*, *Pristimantis padiali*

08 At least 15 species that appear to be new to science

- Plants: 11 species in the genera *Compsonura*, *Cyclanthus*, *Dilkea*, *Piper*, *Platycarpum*, *Qualea*, *Tetrameranthus*, *Vochysia*, and *Xylopia*
- Fishes: 4 species in the genera *Bujurquina*, *Charax*, *Corydoras*, and *Synbranchus*

09 Environmental services and carbon stocks

- A source of clean water for communities near the mouths of the Ere, Campuya, and Algodón rivers
- Important above-ground carbon stocks (in the form of millions of standing trees) and belowground carbon stocks (in the form of tons of peat underlying swamps in the region), typical of a well-preserved tropical forest

10 Source areas of plant and animal populations

- A source of seeds for timber trees and other useful plants
- Refuges and reproductive safe havens for game animals

ASSETS AND OPPORTUNITIES

01 **Binational conservation along the Putumayo River is a long-standing priority for Peru and Colombia:**

- Officially recognized as a priority area by the Amazon Cooperation Treaty in 1979
- Includes historical indigenous territories where indigenous residents of both countries maintain fluid cross-border communication and relationships
- Includes three long-standing conservation priorities on the Peruvian side of the border: Yaguas-Cotuhé (Pitman et al. 2011), Güeppí (Alverson et al. 2008), and Ere-Campuya-Algodón (this volume)

02 **A geologically and biologically unique region, in excellent condition and with very limited anthropogenic impacts, which includes:**

- The watersheds of the Ere, Algodón, and Campuya rivers
- Two entire watersheds that are 100% within Amazonian Peru (the Ere and Campuya), as well as the upper portion of the Algodón
- Some of the purest stream and river water ever documented in the Amazon
- Forests growing on extremely poor soils, including a vegetation type never before recorded in Amazonia: white-clay *varillal* vegetation that is unlike Loreto's celebrated white-sand *varillales*
- A large majority of the amphibians and reptiles known from the Peruvian Amazon
- 80% of the fish species recorded to date along the Peru-Colombia border
- A distinctive guild of bird species specialized on poor-soil habitats, but not present on poor soils south of the Napo River
- Large expanses of tropical peatlands on the old floodplain of the Putumayo River, which represent significant stocks of below-ground carbon
- A scattering of mineral licks throughout the landscape, which are critical sources of salt and nutrients for birds and mammals

- 03 A trinational corridor of indigenous lands and protected areas totaling more than 21 million hectares** (Fig. 13), which:
- Stretches >500 km along the Putumayo River and the Peru-Colombia border, from Colombia's Amacayacu National Park in the southeast to Ecuador's Cuyabeno Wildlife Refuge in the northwest
 - Forms a mosaic of indigenous territories, protected areas in which the sustainable use of natural resources is allowed, and strictly protected areas
 - Includes a trinational cluster of protected areas at the Peru-Ecuador-Colombia border: Cuyabeno Wildlife Refuge and Yasuní National Park in Ecuador; Güeppí-Sekime National Park, Huimeki Communal Reserve, and Airo Pai Communal Reserve in Peru; and La Paya Natural National Park in Colombia
 - Protects forests growing in an area of the highest tree diversity in the Amazon (ter Steege et al. 2006)
- 04 Strong interest among indigenous communities along the Putumayo River in a legally recognized management arrangement that allows them to protect and manage the area over the long term**, in a transparent and efficient manner that is supported by:
- Existing local initiatives to protect, monitor, and patrol the area
 - Indigenous federations with effective leadership and a clear vision for the region
 - The conscious decision of local indigenous communities to maintain small populations in order to avoid unsustainable pressures on natural resources
- 05 A strong indigenous presence with rich cultural assets**, including:
- A diverse body of traditional knowledge regarding the use and management of natural resources
 - Diversified economies in which residents can earn what they need to cover their living expenses by producing *fariña* or handicrafts
 - Women in leadership positions and actively involved in political decision-making
 - Ongoing initiatives to preserve traditional languages and customs

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| | <ul style="list-style-type: none"> ▪ Strong interest in conserving forests and medicinal plants ▪ Residents proud of keeping their communities clean and well-organized <p>06 Healthy populations of economically important animal species (arapaima, silver arawana, white-lipped peccaries, collared peccaries, curassows) that play a key role in the diet of local communities</p> <p>07 The on-the-ground presence and long-term commitment of the Proyecto Especial Binacional de Desarrollo Integral de la Cuenca del Río Putumayo (PEDICP), which currently supports community management projects</p> <p>08 The proposed creation of the new province of Putumayo and its four districts, which could provide more public funds for the Putumayo watershed and give residents of the Putumayo stronger political influence within Loreto</p> <p>09 Regional laws that protect headwater areas (Ordenanza Regional 020-2009-GRL-CR), and identify the headwaters of the Campuya, Ere, and Algodón rivers as a high conservation priority for Loreto (005-2013-GRL-CR)</p> |
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THREATS

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- 01 Roads.** The proposal to build two highways to the southeast of the area—one bordering the southeastern border of the Ere-Campuya-Algodón region (connecting Flor de Agosto with Puerto Arica) and the other approximately 40 km farther southeast, bisecting the proposed Maijuna Regional Conservation Area and the proposed Medio Putumayo Regional Conservation Area/Communal Reserve (connecting Buenavista with San Antonio del Estrecho)—threatens to bring a large number of environmental and social impacts to the region, as documented in other regions of the Amazon:
- Unregulated and out-of-control colonization along highways, which is almost always accompanied by deforestation, the construction of secondary roads, and unsustainable harvests of natural resources (bushmeat, fish, timber, etc.)
 - New routes for drug trafficking and other illegal activities
 - Strong social impacts, including increases in crime, prostitution, and alcoholism, and the emigration of young people from communities to cities
 - The creation of new ‘needs’ in the local population, leading to increased spending and more poverty
 - Large-scale land speculation
 - The disruption of animal movements and migrations
 - Negative impacts to headwaters areas
 - Dramatic changes in the hydrological dynamics of streams, with consequent impacts on aquatic plants and animals
 - The fragmentation of titled indigenous communities
- 02 Gold mining.** Gold-mining dredges and small-scale artisanal gold mining are present on the Putumayo River, causing:
- Mercury pollution and consequent poisoning of the aquatic flora and fauna, including the fish community, which is perhaps the region’s most important natural resource
 - Changes in the river bed, floodplains, and sedimentation processes due to dredging
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Threats (continued)

- 03 **Monoculture agriculture and other external development projects.** Some incentives in the region promote activities that may be unsustainable in the long term and incompatible with the Amazonian indigenous way of life (e.g., African oil palm or rice plantations, fish farming, and cattle ranching)
- 04 **Discrimination and a lack of appreciation of indigenous culture**
- 05 **Potential exploration and production of oil and gas.** Hydrocarbon concessions in Peru change frequently. During the rapid inventory, the Ere-Campuya-Algodón region overlapped with an oil and gas concession (Block 117B), but that concession was annulled in September 2013. Although geological features cast doubt on the presence of significant deposits, future exploration and production of oil and gas represent potential threats in the form of habitat destruction, road-building, and pollution of the area's pure waters
- 06 **The erroneous classification of the region as apt for agriculture and logging,** which represents a serious risk due to its extremely poor and easily erodible soils. Large-scale agriculture in the region is unlikely to be productive due to the near-total absence of nutrients in soils, and forest disturbance related to logging could have severely negative impacts, increasing soil erosion and sedimentation in rivers, and reducing the quality of the region's very pure water
- 07 A long history of booms in the region, resulting in **the common misconception that natural resources there will never become scarce**
- 08 **Conflicts between macroeconomic commercial forces and the microeconomic subsistence way of life of local communities.** Large-scale markets (of timber, gas and oil, or bushmeat) could potentially break down established patterns of reciprocity and communal work, leading to social inequalities in the local communities
- 09 **A lack of information regarding changes in the political organization of the district.** There is widespread speculation and confusion regarding the pending creation of Putumayo Province and its four districts, and uncertainty regarding the role that traditional governance structures in local communities

(e.g., indigenous federations and *caciques* in indigenous communities) will play in the new province and districts

- 10 **Illegal activities along the border, such as drug trafficking and guerrilla operations**, exacerbated by the sparse and scattered presence of government authorities in the region
- 11 **Changing regional climate**. Over the last seven years (in 2005 and 2010) the region has suffered two severe dry spells and experienced more frequent extreme weather events. These changes in the regional climate highlight the urgency for creating protected areas whose standing forests represent a key mechanism for slowing climate change and mitigating its effects
- 12 **Unregulated hunting and fishing by local residents and outsiders**, for local and regional markets

RECOMMENDATIONS

Our rapid inventory of the human and biological communities of the Ere, Campuya, and Algodón watersheds revealed an area almost completely covered by extremely nutrient-poor soils and harboring a diverse, well-preserved flora and fauna. This landscape is drained by streams and rivers whose waters are among the purest in Amazonia. Local residents are mostly indigenous—Kichwa and Murui—and have a strong interest in new strategies to protect the natural resources upon which their cultures, traditions, and subsistence are based. In spite of a long history of oppression and exploitation, including the genocide that took place during the rubber boom, residents of the Putumayo basin maintain traditional practices of reciprocity and communal support, as well as strong links to the environment.

PROTECTION AND MANAGEMENT

- 01 **Establish a conservation and sustainable use area that benefits local communities and protects the watersheds of three rivers: the Ere, Campuya, and Algodón. The area will protect 900,172 hectares of diverse forests growing on extremely nutrient-poor soils. As a large storehouse of carbon, the conservation area will help mitigate the impacts of climate change**
 - The borders of the Ere-Campuya-Algodón conservation and sustainable use area should follow the natural features of the watersheds and respect the borders of titled and untitled indigenous territories as well as requests for extensions (from the Yabuyanós indigenous community to the Santa Lucía indigenous community). The borders of the new area should also match the borders of the proposed Maijuna Regional Conservation Area and the proposed Medio Putumayo Regional Conservation Area/Communal Reserve
 - Given the fragility of the soils and their key role in maintaining water quality, the headwaters of the Ere, Algodón, and Campuya rivers should be zoned as strictly protected
 - Based on the maps of current use by local residents, the lower watersheds of the Ere and Campuya rivers should be zoned for sustainable use to maintain the subsistence and quality of life of local populations, and to support small-scale commercial activities via natural resource management plans
 - Complete the land titling process for the Atalaya native community, in order to complete the process of legalizing land tenure in the region
- 02 **Establish a system to manage and protect the Ere-Campuya-Algodón region with the close involvement of local communities, their organizations, and the relevant government bodies**
 - Strengthen and extend existing initiatives in various communities to manage, monitor, and patrol natural resources
 - Improve the mapping of natural resource use by local residents in order to zone the Ere-Campuya-Algodón conservation and sustainable use area and adjacent lands inside communities

- Respect and promote communal regulations concerning the use of natural resources

03 Establish mechanisms to promote the protection and sustainable use of the Ere-Campuya-Algodón region over the short and medium terms

- Create a work group including government organizations, non-governmental organizations, indigenous federations, and other stakeholders to push for the establishment of the area. Once the group is created, help design strategies to implement Ere-Campuya-Algodón as a conservation and sustainable use area
- Seek out sustainable long-term financing sources for Ere-Campuya-Algodón and the local populations that depend on and benefit from its natural resources, considering among other options the carbon market (REDD) and other payment for environmental services markets

04 Plan and carry out joint actions between governmental agencies and local residents to reduce and eventually eliminate the illegal extraction of timber and gold in the watersheds of these three rivers and the areas where they meet the Putumayo, and to reduce the impacts of gold mining in the region

- Protect timber resources in the Ere, Campuya, and Algodón watersheds, creating a refuge and source of species that are over-harvested elsewhere in Loreto
- Create educational materials that publicize the dangerous impact of the mercury used in gold mining, the mercury contamination of river fishes, and the health consequences of eating those fish, given the high toxicity of mercury. Where possible, material recently produced for Madre de Dios should be used

05 Carry out an independent analysis of the social, environmental, and economic costs and benefits of the two proposed roads: Puerto Arica-Flor de Agosto (which poses a direct threat to the Ere-Campuya-Algodón region in the southeast) and the Buenavista-San Salvador-Estrecho road (which is ~40 km away and threatens neighboring areas such as Maijuna and the middle Putumayo)

- Summarize the costs and impacts of these projects for various stakeholders, including regional and national decision-makers and local residents
- Encourage dialogue, analysis, and debate about roads in indigenous congresses, in meetings of indigenous federations active along the Putumayo, in civil society, and in other regional and national venues

06 Ensure the active participation and involvement of indigenous federations in the planning of the region's future, taking full advantage of their traditional ecological knowledge (e.g., monitoring climate change using the ecological calendars managed by the communities)

RECOMMENDATIONS

- 07 **Strengthen the indigenous federations and their members, with a special focus on planning, zoning, and governance**
- 08 **Encourage older and more knowledgeable community members to pass down traditional knowledge to younger community members**, with the participation of schools and bilingual education programs
- 09 **Publicize the geological and biological results of the rapid inventory and incorporate the findings into regional and municipal development plans.** This is especially important because soils in the region have been erroneously classified as suitable for large-scale agriculture and logging. The rapid inventory revealed that these soils are extremely nutrient-poor, easily erodible, and totally unsuitable for large-scale extractive activity. Efforts to install large-scale agriculture and forestry in the region will not only be unsuccessful, they will also leave long-term impacts on soils in the form of erosion, sedimentation of streams and rivers, and a reduction in water quality

PERU-COLOMBIA RELATIONS AND COOPERATION

- 01 **Coordinate and integrate the management of the Ere-Campuya-Algodón conservation and sustainable use area with adjacent areas.** In Peru these include Güepipi-Sekime National Park, Huimeki Communal Reserve, Airo Pai Communal Reserve, the proposed Maijuna Regional Conservation Area, and the proposed Medio Putumayo Regional Conservation Area/Communal Reserve. In Colombia a key partner is the Predio Putumayo Indigenous Territory (Fig. 13)
- 02 **Strengthen binational coordination**
 - Focus on key stakeholders in both countries (e.g., the armed forces, indigenous populations, indigenous federations) capable of working together to address environmental and social threats
 - Bring Peruvian and Colombian environmental laws into agreement and seek coordinated strategies for implementing them (e.g., no-fishing seasons for arapaima)
 - Cooperate in the reduction of illegal activities
 - Optimize strategies for communicating and sharing information among the various stakeholders in the border region
- 03 **Support and build on existing cross-border exchanges between indigenous residents in Peru and Colombia in order to identify organic solutions to the challenges of coordinating management between the two countries** (e.g., the meeting at La Chorrera in October 2012)
- 04 **Create new opportunities for cross-border exchanges throughout the Great Indigenous Landscape along the Peru-Colombia border**, building on existing coordination and communication between indigenous residents to improve the management and protection of resources in the border region

RESEARCH

- 01 **Carry out detailed studies of the white-sand *varillales* on the floodplains of the Campuya River.** This unusual vegetation type, potentially unique to Loreto, merits in-depth mapping, soil analyses, and plant and animal inventories
- 02 **Survey plant and animal communities in regions, habitats, seasons, and taxonomic groups that have not yet been examined in the Ere-Campuya-Algodón region.** This long list includes bird communities along the Putumayo River, fishes and amphibians in palm swamps during rainy season, peatlands and blackwater vegetation on the lower Algodón, and small mammal and bat communities. Inventories in Colombian territory, just across the Putumayo River from the Ere-Campuya-Algodón area, are also a priority
- 03 **Map soils, *collpas*, and water conductivity** in the Ere-Campuya-Algodón region. All three of these maps will be crucial for effective zoning and planning of the proposed conservation and sustainable use area
- 04 **Monitor biotic and abiotic parameters** relevant to communities and managers of the proposed conservation and sustainable use area. These include but should not be limited to hunting offtake, fish harvests, large mammal densities, aquatic turtle densities, and mercury levels in food fish

