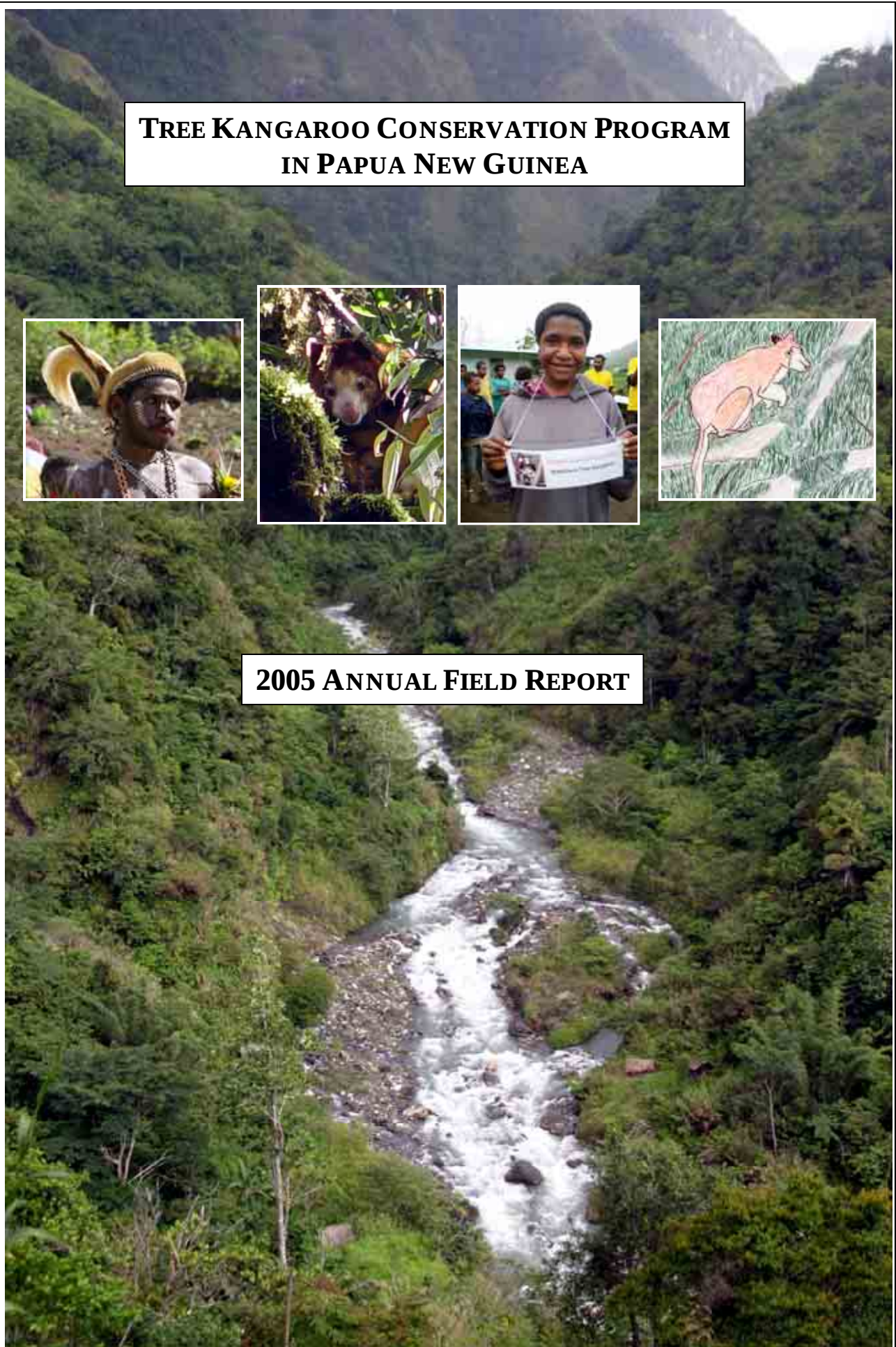


TREE KANGAROO CONSERVATION PROGRAM IN PAPUA NEW GUINEA



2005 ANNUAL FIELD REPORT





AT A GLANCE

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Mission

The Tree Kangaroo Conservation Program in Papua New Guinea is working to establish a conservation area of at least 150,000 acres on the Huon Peninsula through community-based action that includes scientific research, education, community health, and conservation outreach.

*In memory of Russell Green (1955-2005), a true friend and supporter of the
Tree Kangaroo Conservation Program. He is greatly missed.*

TREE KANGAROO CONSERVATION PROGRAM IN PAPUA NEW GUINEA



HIGHLIGHTS OF 2005

The Tree Kangaroo Conservation Program's work in Papua New Guinea (PNG) over the past nine years has made a significant contribution to habitat conservation and community self-reliance, with more than 150,000 acres of rainforest habitat on the Huon Peninsula now set aside for conservation. Through collaborative scientific research, conservation education and outreach, mapping, and community health projects the Tree Kangaroo Conservation Program (TKCP) is enabling local village landowners to make sound decisions about their future, and is serving as a model for other conservation programs worldwide. The most notable accomplishments of 2005 include:

- Completion of the final step toward formally establishing a Conservation Area: the preparation and submission of a proposal to the PNG government requesting the establishment under the PNG Conservation Areas Act (1978), the first submission of its kind for PNG.
- Radiocollaring and tracking four adult tree kangaroos (two males, two females) to continue research of home range and movements, a study launched in 2004 with the radiotracking of three adult female tree kangaroos for five months.
- The establishment of the International Bug Club, which connects seven PNG village schools to Bug Clubs in the US and provides local teachers with new methods of teaching about species conservation, biodiversity, adaptations and ecosystem niches.
- The launch of the Indigenous Mapping Project, a collaboration with the Center for the Support of Native Lands (Washington DC) and the PNG University of Technology (Lae), to help local landowners create an annotated resource-use map of their land that is built on oral history and traditional knowledge.
- The start of a community health project, "Healthy Village, Healthy Forest", to address the dire health needs in the local communities.

This report provides a background and overview of the primary accomplishments in 2005. Because of the strong support and dedication of participants and collaborators at the local, national and international levels, the TKCP is looking ahead to celebrate its 10th Anniversary in 2006 with the formal declaration of the Conservation Area and a continuing record of achievement.



BACKGROUND

Papua New Guinea, particularly the Huon Peninsula, is considered a high-priority area for conservation efforts due to the significant amount of intact rain forest, high species endemism and lack of protected areas for wildlife. Destruction of the rainforest by mining, logging, and development threatens the continued existence of Papua New Guinea's (PNG) unique fauna and flora. The rich biodiversity is PNG's greatest asset and the source of the nation's livelihood. It is estimated that close to 80% of PNG citizens rely directly on the environment for sustenance, and over 95% of the country's land remains in customary clan ownership. Consequently, the people of PNG have a unique opportunity to chart a course towards stewardship of their natural resources -- a movement that is intrinsically connected to their present and future self-sufficiency, dignity, and self-empowerment.



As a community-based program, the TKCP works with PNG village landowners and children, PNG university students and graduates, PNG government officials, PNG NGOs, and other supporting organizations. The TKCP conducts its scientific research, education projects, a health project, and conservation outreach primarily on the Huon Peninsula of PNG, in the YUS Local Level Government area of the Morobe Province. YUS is an acronym for the Yupno, Urawa and Som Rivers, the main drainages in the region. It includes portions of the Finisterre and the Sarawaged Mountain ranges, and altitudes range from sea level to over 13,000 feet. YUS is a remote area (no road access) consisting of approximately 1,500 square kilometers of forests, villages, grasslands and agricultural areas. YUS Local Level Government comprises over 100 clans in 37 villages in 13 wards. The human population of YUS is about 9,300, and at least five languages are spoken. Most people in YUS still lead a subsistence life, depending on crops from their gardens, and meat from animals that they hunt, as well as the pigs and chickens that they raise. There are still large areas of unlogged forest, some of which can be classified as pristine. The TKCP maximizes the involvement, support, and training of local landowners and villagers in all its projects. Investment in communities has fostered trust in the TKCP and its goals, and has been vital to the development of local conservation awareness.

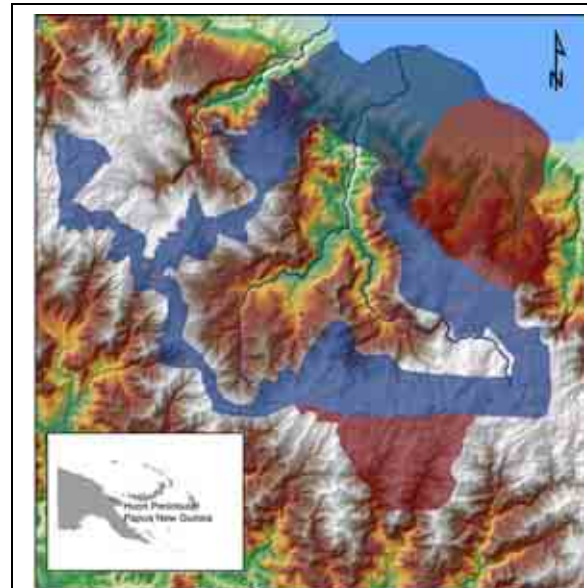


A village (left) and forest (right) on the Huon Peninsula of Papua New Guinea.

ACCOMPLISHMENTS IN 2005

CONSERVATION OUTREACH AND HABITAT PROTECTION

- **Produced and submitted proposal to formally establish the YUS Conservation Area.** A proposal was submitted in 2005 to establish the YUS Conservation Area under Papua New Guinea's Conservation Areas Act (1978), marking the first time the Act will be used in PNG and thus creating a model for establishing other protected areas in PNG. Through meetings with government officials at the local, Provincial, and National levels, as well as through collaboration with Conservation International's (CI) Melanesia Center for Biodiversity Conservation, the TKCP set the stage for the proposal review process. Mr. Ginson Saonu, former Member of Parliament for the Kabwum District, Morobe Province, worked on behalf of the TKCP to facilitate the meetings with government officials. The proposal is the culmination of the last nine years of TKCP efforts. It defines the proposed YUS Conservation Area, in terms of area, boundaries, and habitat, through TKCP-produced maps and Geographic Information System (GIS) analyses; the importance of the proposed YUS Conservation Area as a wildlife protected area is clarified through species lists compiled by the TKCP during its biodiversity surveys. The proposal was reviewed and approved by the Morobe Provincial Executive Council in February 2006. The proposal will next be reviewed by the National Executive Council, and finally the PNG Minister for Environment & Conservation. In November 2005, Dabek gave a presentation to staff at the PNG Department of Environment & Conservation, the first time the TKCP had been invited to present to different branches of the Department. The official declaration of the YUS Conservation Area (over 150,000 acres) is expected in mid 2006. The YUS Conservation Area, when formalized, will serve as a model for other potential Conservation Areas in the country.



TKCP-produced map of the proposed YUS Conservation Area. See Appendix for larger, detailed version.

- **Training for landowners in developing management strategies for the YUS Conservation Area.** CI's Melanesia Center for Biodiversity Conservation is collaborating with the TKCP for its Regional Management Plan Training Workshops. The first workshop, held in September 2005, was led by Maureen Ewai (Conservation Officer - New Britain, CI Melanesia) and TKCP staff, and was attended by 25 clan landowner representatives (representing all 13 Wards in YUS) as well as representatives of the PNG Department of Environment & Conservation and the Morobe Provincial government's Department of Mining, Natural Resources, and Environment. The purpose of this workshop was to provide the training that will enable each clan to develop regional management plans for their land



YUS landowner participants in the Management Plan Training Workshop.

they set aside for inclusion in the Conservation Area. Following the first workshop, landowner participants returned to their villages to work with their clan members in identifying resources that should be included in their management plans. The second workshop was held in December 2005, led by the TKCP, Kepslok Kumilgo (Community trainer, CI Melanesia), and a PNG Department of Environment & Conservation representative. Workshop participants, who had also attended the first workshop, were given instruction and guidance on the beginning of management plan writing. A third workshop will be held in 2006 to guide landowners in integrating the clan management plans and determining administration.

- Indigenous Mapping Project.** The TKCP's Indigenous Mapping project, a collaboration with the Center for Native Lands (Washington DC) with major funding from CI's Melanesia Center for Biodiversity Conservation, was launched in November 2005 with a 5-day workshop in Yawan village. The workshop was led by Dr. Mac Chapin (Center for Native Lands) with sessions conducted by TKCP staff, Arthur Ganubella of the Department of Environment and Conservation (Port Moresby), and Wycliffe Antonio, a cartographer/lecturer at the PNG University of Technology (Lae). Landowner representatives from 11 wards in YUS participated in this workshop; many were already involved in the TKCP's GIS mapping work, and some have been trained by the TKCP to collect GPS points to mark the boundaries of their lands. The primary outcome of the one-year Project will be a "participatory" resource-use map containing cultural information



Images from the TKCP's Indigenous Mapping Project first Workshop

Above: Dr. Mac Chapin (left) and Gabriel Porolak (right) present to clan landowners.

Left: Wycliffe Antonio (far right, green shirt) helps YUS clan landowners create sketch maps of their pledged conservation areas.

Lower left: A YUS landowner adds to the list of mapping symbols that will be used for the sketch maps

Below: Mapping symbols created by YUS clan landowners for their sketch maps.



supplied by the local communities. The indigenous maps will include: (1) natural and human-made features; (2) zones used for subsistence activities; and (3) places that have cultural/historical importance. Having concrete and visual information from the maps will enable the clan landowners to quantify the land features and cultural features that are important to them and to better delineate boundaries. This project marked the beginning of the TKCP's working relationship with the PNG University of Technology (Lae), where the second workshop will be held in February 2006 with staff cartographers and technicians, thus engaging them in conservation efforts and building local capacity for future conservation work. The project will conclude in late 2006, resulting in a published map, and the TKCP and the Center for Native Lands will provide training to participating landowners in the use of the maps.

- **Completion of PNG Landowner Law Booklet.** In 2005, a draft of the PNG Landowner Law Booklet written by collaborator Dr. Robert Horwich (Director of Community Conservation, Inc; Wisconsin) was reviewed by Martin Negai (lawyer for Morobe Governor Hon. Luther Wenge), and Gai Kula (CI Melanesia Center for Biodiversity Conservation). Horwich revised the Booklet, and the final draft will be translated to Tok Pisin in 2006 by Negai. The Booklet will be distributed to local landowners and other stakeholders in the YUS Conservation Area, and will be an especially useful resource during the process of developing and integrating the YUS Conservation Area management plans. This booklet will also be available for other PNG NGOs and landowner groups.
- **Boundary mapping of pledged conservation areas and species inventories.** The TKCP has completed mapping of the outer boundary of the YUS Conservation Area. The TKCP is now working with YUS landowners to map the boundaries of all clan pledged areas that will compose the YUS Conservation Area. In 2005, landowners from four villages were trained in the use of GPS units, and, with supervision and guidance by the TKCP, they collected the data necessary to identify the boundaries of their clan protected areas. Wycliffe Antonio, a cartographer/lecturer from the PNG University of Technology (Lae) is advising the TKCP in this project. Karau Kuna, TKCP Research Assistant, is coordinating and guiding the fieldwork, which he will use as a basis for his Honor's degree at the University of Papua New Guinea. His major advisor will be Phil Shearman, Director of the University of PNG's Remote Sensing Center, who has been a TKCP collaborator for several years. These data will be added to the TKCP's GIS database. Using these GPS data, TKCP GIS Specialist Jared Stabach will create high-resolution maps showing the boundary of the YUS Conservation Area, as well as the boundaries of each clan's pledged areas that compose it. These maps will be shared with YUS landowners as well as with local NGOs and government officials. As part of the boundary mapping fieldwork, Kuna documented sightings and evidence of specific mammal, bird, and herptile species. This information will also be added to the TKCP's GIS database so that each clan's pledged areas will also be defined according to its key species.

- **Helped stabilize and strengthen the Rainforest Habitat (Lae, PNG).** The TKCP continued to work with the University of Technology (Unitech) in Lae, Unitech Development and Consultancy Limited (Lae), Saint Louis Zoo, Melbourne Zoo, American Zoo and Aquarium Association (AZA), and Australasian Regional Association of Zoological Parks and Aquaria (ARAZPA) to help stabilize the Rainforest Habitat at the organizational level. The Rainforest Habitat is the only zoological institution in PNG and



Lisa Dabek (standing) reviews maps with TKCP mapping collaborators at the PNG University of Technology in Lae.



Grizzled tree kangaroos (*Dendrolagus inustus*) at the Rainforest Habitat, Lae. Zookeepers at the Rainforest Habitat named the joey "Lisa", demonstrating their appreciation of the TKCP's commitment to the wildlife of PNG.

houses many endemic species, thereby serving as a tremendous resource for research, conservation and environmental education in PNG. In 2005, the TKCP assisted Rainforest Habitat staff by facilitating Currumbin Sanctuary (Australia) zookeeper Brett Smith's month-long stay, funded by Saint Louis Zoo, during which he created and conducted an animal husbandry training course for Rainforest Habitat zookeepers and produced a keeper training manual in Pidgin and English. TKCP field veterinarian Dr. Holly Reed visited the Rainforest Habitat in April 2005 and provided veterinary service to animals in the collection. In November 2005, the TKCP facilitated Rainforest Habitat staff member Margaret Kanawi's participation in the International Tree Kangaroo Conference (described below). Dabek gave a speech on November 23 at the Rainforest Habitat's 10 year anniversary celebration in Lae.

SCIENTIFIC RESEARCH

- Tree kangaroo home range sizes and movements.** The TKCP continued its study of the home range sizes and movements of the Matschie's tree kangaroo at its field site Wasaunon in the Sarawaget Range in eastern YUS. This project, launched in 2004 with the radiocollaring of three adult females, is the first to GPS/radiocollar wild Matschie's tree kangaroos for an extended period, and is thus providing new information on tree kangaroo ecology (see next section). The core 2005 field research team included: TKCP staff Dabek, Glick, Kuna, Porolak, Ross; Christine McKnight, zookeeper at Minnesota Zoo (Apple Valley, MN); and Dr. Holly Reed, Head Veterinarian at Point Defiance Zoo & Aquarium (Tacoma, WA). In March/April 2005, the TKCP successfully radiocollared four new animals—two adult females, one adult male, and one juvenile male. Dr. Reed supervised all animal capture and handling. She anesthetized the adult animals for placement of the radio collar and identification microchip, collection of blood samples, hair and dung for genetic analysis, morphological measurements for age determination, collection of parasites, and a physical examination. The adult male was fitted with a GPS collar that was programmed to take a GPS position every 12 hours; data were stored in the collar, which was programmed to fall off the animal in September 2005 (after 161 days of data collection, the maximum based on the battery life of the collar). The other three tree kangaroos each were fitted with a radio collar with a VHF transmitter, 22-month battery life, and an elastic breakaway section to ensure that the collar would eventually fall off (only the GPS collars could be programmed to drop off). All four animals were tracked daily; at each tracked location, the TKCP field scientists noted the animal's activity (if visible), collected a GPS reading, and described the vegetation. Dung samples were collected opportunistically for studies of feeding ecology and genetics. Two of the four animals, a female and juvenile male (mother and son), were tracked daily for eight months (April-December), and are currently being tracked on a weekly basis. The other adult female was tracked for two months, at which time her radio collar fell off, and the adult male with the GPS collar was tracked daily for almost 5 months, at which time the GPS collar stopped emitting a VHF signal. Unfortunately because of this malfunction the GPS collar could not be recovered after it



Field Veterinarian Dr. Holly Reed (right) examines a tree kangaroo during the radio collar fitting while zookeeper Christine McKnight (left) assists by monitoring the anesthesia. Gabriel Porolak (center) holds the radio collar that will be attached.



Left: Radiocollared tree kangaroo ascends a tree.

Right: After locating a radiocollared tree kangaroo, TKCP In-country Field Scientist Gabriel Porolak collects a GPS point.

dropped off the animal. During the eight months of daily tracking, over 20 species of resting trees used by the Matschie's tree kangaroo were identified as well as over forty species of food plants. The adult male was observed with three different females, and had a home range that overlapped the home ranges of at least four unmonitored females in addition to the home range of one of the two radiocollared females. The home ranges of the two radiocollared females were observed to overlap, but the home ranges of the two males (one adult, one juvenile) did not. In February 2006 Gabriel Porolak (TKCP In-country Field Scientist) will enroll in a Master's Program at James Cook University (Cairns, Australia), under Dr. Andrew Krockenberger (Senior Lecturer, School of Tropical Biology) and Dabek, and use the tree kangaroo home range research for his thesis work.

- Tree kangaroo habitat identification and classification.** In 2005, TKCP GIS Specialist Jared Stabach completed his Master's degree in Environmental Science with a concentration in GIS, Remote Sensing, and Spatial Analysis at the University of Rhode Island. His thesis was titled "Utilizing Remote Sensing Technologies to Identify Matschie's Tree Kangaroo (*Dendrolagus matschiei*) Habitat", and his major advisor was Dr. Yeqiao Wang (Associate Professor, Department of Natural Resources Science). Stabach classified tree kangaroo habitat according to dominant vegetation type by integrating data collected in 2004 during the radiotracking of the three adult female tree kangaroos and satellite imagery into a Geographic Information System (GIS). Among his most notable findings: radiocollared female tree kangaroos seemed to prefer the tree species *Dacrydium nidulum*; two of the three females had overlapping home ranges, but there was no evidence that the females interacted, suggesting that maintenance of home range boundaries was minimal. This research enables the TKCP to more accurately identify critical tree kangaroo habitat and direct conservation efforts towards these areas.
- Tree kangaroo density estimates.** Dung pellet counts were conducted at the TKCP's field sites Yangorong (quarterly), and Dendawang/Sibidak (March, June, December) to continue the tree kangaroo density studies. Yangorong is near Wasaunon in the Sarawaget Range in eastern YUS, and Dendawang/Sibidak is in the Finisterre Range in western YUS. The counts were conducted by local landowners under the supervision of TKCP field scientists. The ongoing counts will enable the TKCP to identify changes in density over time (perhaps related to the elimination of hunting, season, and/or weather phenomena) within each site, and compare tree kangaroo densities between sites, which have different key tree species and different hunting histories.
- Tree kangaroo genetics research.** University of Rhode Island (URI) student T.J. McGreevy continued his Ph.D. research in 2005 under Dabek and Dr. Tom Husband (Professor, Department of Natural Resources Science, URI). All of the blood, dung, and tissue samples collected by the TKCP from 1999 to 2004 were inventoried and entered into a database by McGreevy. With the assistance of volunteer Rand Herron and research apprentices, McGreevy completed DNA extractions from all the dung samples collected in 2000 and 2001 and half of the samples collected in 2002 and 2003. The genetic analyses of wild tree kangaroos will be compared to the American Zoo and Aquarium Association (AZA) captive tree kangaroo population, will increase the accuracy of population density estimates of wild tree kangaroos, and will potentially be used to determine wild tree kangaroo population dynamics from 1999 to 2005. McGreevy is also working on refining sex-specific polymerase chain reaction (PCR) primers, which could enable sex identification from wild Matschie's tree kangaroo fecal samples. In 2005 the sex-specific primers were successfully applied to DNA extracted from Matschie's tree kangaroo blood samples and tested on DNA extracted from dung.



Above: Tree kangaroo habitat.

Below: Tree kangaroo scratch marks on a tree.



- **Tree kangaroo feeding ecology research.** The TKCP continued collaboration with Dr. David Christophel, botanist and Professor at the University of Denver, to identify Matschie's tree kangaroo food plants from fragments in dung.
- **Long-beaked echidna ecology and conservation status.** In 2005 the TKCP researched and purchased camera traps (cameras equipped with infrared triggers), which will be set up to assess local abundance and movement patterns of long-beaked echidnas. Brett Smith, zookeeper at Currumbin Sanctuary (Queensland, Australia) and long-time TKCP volunteer, will likely conduct this research for a Master's degree at the University of Queensland under Dr. Steve Johnston, Senior lecturer and Reproductive Biologist in the School of Animal Studies. Dabek, Smith, and Johnston met in December 2005 to develop a research plan. The TKCP will continue to coordinate this project with the Wildlife Conservation Society (WCS) PNG Program's radiotracking studies of long-beaked echidnas at Crater Mountain Wildlife Management Area (Eastern Highlands, PNG) to compare the ecology of long-beaked echidnas in different areas of PNG.



Long-beaked echidna at the TKCP's Wasaunon field site.

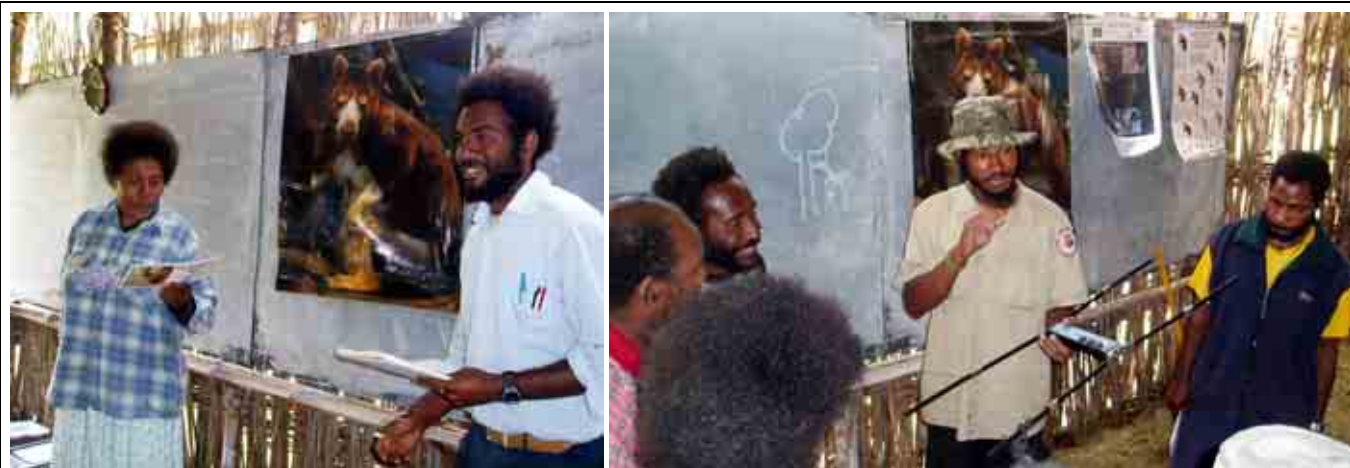
EDUCATION

- **Third Annual YUS Teacher Training Workshop for Primary and Community School Teachers.** The TKCP conducted the third annual YUS Teacher Training Workshop in Teptep village during November 2005 for a total of fourteen YUS teachers representing seven YUS schools, as well as two Primary School Inspectors. The TKCP Education Team included TKCP staff Doyle and Samandingke, and zoo educators Anne Bartin (St. Louis Zoo) and Anne Warner (Oregon Zoo). The 2005 TKCP curriculum that was presented at the workshop included a tree kangaroo education kit consisting of three topics: "What is a Tree Kangaroo?", "TKCP Research", and "Conserving the Matschie's Tree Kangaroo and YUS Forests". Teaching aids included a large poster of a Matschie's tree kangaroo, 11 laminated tree kangaroo anatomy cards to be used with the poster, an explanatory booklet based on TKCP research, and two books produced by Columbus Zoo: "Meet the Tree Kangaroos Activity and Coloring Book" and "Habitats of New Guinea Coloring and Activity Book". TKCP Field Scientist Gabriel Porolak gave a well-received lecture and demonstration to the teachers about his work in radiotracking Matschie's tree kangaroos to help teachers understand research methods and the connection between scientific research and habitat conservation. The 2005 TKCP workshop also included a PNG bat education kit, which had been created and piloted in 2004 (in collaboration with the American Zoo and Aquarium Association Bat Taxon Advisory Group) and revised by Doyle and bat educator Vicky Smith in 2005 based on teacher and student feedback. The Bat Kit was divided into four main topics, each of which contained teacher background information, activities for lessons, and patterns for the teachers to use to make their own educational materials.

At the end of the workshop, teachers prepared two lessons using the tree kangaroo and bat education curricula, and worked in teams to present the lessons to students at the Teptep Community school. By immediately applying the learned material from the workshop, teachers were better prepared for presenting the lessons to their own students. Each of the seven YUS schools received copies of the curricula and supporting materials.



2005 TKCP Education team at the YUS Annual Teacher Training Workshop (left to right): Danny Samandingke, Chris Doyle, Anne Warner, and Anne Bartin.



2005 YUS Teacher Training Workshop. Left: YUS teachers use the TKCP's Tree Kangaroo Curriculum. Right: TKCP Field Scientist Gabriel Porolak explains to teachers how he tracks radiocollared tree kangaroos.

- International Bug Club.** In March 2005 the TKCP held International Bug Club training sessions in four YUS village schools. Thirty-eight teachers from seven village schools participated in the training sessions, which were led by Woodland Park Zoo's Katie Remine (Teacher Training Coordinator) and Erin Sullivan (Invertebrate Keeper), who together created the "Bug Club" curriculum at Woodland Park Zoo in 1997. PNG Bug Clubs are modeled after Woodland Park Zoo's Bug Club, which provides children with opportunities for science-based learning about local environmental and conservation issues through the study of local insects. Samandingke and Doyle assisted in the presentation of the Bug Club Education Kits, which had been revised based on teacher feedback during a pilot run in November 2003 during the TKCP's first Annual YUS Teacher Training workshop. Each of the seven YUS village schools that participated in the 2005 training sessions received two Bug Club Kits containing microscopes, puppets, magnifying hand lenses, posters, and other teaching tools. One kit will be shared by the Research and Conservation Foundation and the Rainforest Habitat, the only zoological institution in PNG, to educate students in urban schools within the Morobe Province. In September 2005 Samandingke conducted follow-up visits to each of the seven schools that received Bug Club Kits. He inventoried each kit and asked teachers to fill out surveys indicating their usage of the materials over the past six months. The surveys were given to Remine and Sullivan in December 2005 so that they can evaluate the efficacy of kit materials and implement necessary modifications.



Erin Sullivan (left) and Katie Remine (right) show YUS teachers how to use a microscope and other materials in the International Bug Club Education Kit.

- TKCP Teacher Training scholarships.** The TKCP continued to collaborate with the YUS Local Level Government to sponsor students for teacher training at Balob Teachers College to alleviate the shortage of teachers in YUS village schools. Scholarship recipients are selected by the YUS Education Committee. The three recipients of the first scholarship graduated in November 2004 and began teaching in YUS village schools in 2005. Four students were sponsored in 2005, one of whom graduated in November and will begin teaching in 2006. In addition, the TKCP signed a MOU with Balob Teachers College (Lae) in November 2005 to ensure that the college will set aside three slots each year for scholarship recipients, and enroll them at a specified tuition.
- In-Country Education Coordinator.** In January 2005 Danny Samandingke, TKCP In-country Education Coordinator and teacher in Teptep village, attended a 2-day workshop by the Research and Conservation Foundation (RCF) in Goroka, PNG. He received training on the planning and execution of teacher training workshops,

organizing in-service visits to schools, and curriculum implementation and evaluation. Samandingke also attended a conservation education training session conducted by RCF in June 2005. During this training he received instruction on how to effectively use the Habitat Ecology Learning Program (HELP) curriculum produced by the Wildlife Conservation Society (WCS) PNG Program. Since the training he has been implementing activities and ideas from the curriculum into his student lessons. As part of his responsibilities for the TKCP, Samandingke visited YUS schools to evaluate teachers' usage of TKCP curricula, help teachers incorporate TKCP curriculum lessons into their lesson plans, and facilitate participation in the Global Youth Art Exchange by working with teachers and their students to create artwork and letters based on PNG culture and lifestyles. Samandingke also coordinated the 2005 TKCP Teacher Training scholarship application process, and made preparations for the TKCP's 2005 YUS Teacher Training Workshop and International Bug Club training sessions.



TKCP In-country Education Coordinator Danny Samandingke presents the Bat Education Curriculum at the 2005 YUS Teacher Training Workshop.

- **“Village Student Life in Papua New Guinea” DVD.** Using video footage taken by the TKCP Education team in 2003 and 2004, in February 2005 two students at the Rhode Island School of Design (Providence, Rhode Island) created short videos documenting YUS village life in PNG from the perspective of PNG students. The two videos, on DVD, were used by the TKCP as part of the lessons given to US students participating in the Global Youth Art Exchange (below).

- **“Conservation Connection: Global Youth Art Exchange”.** The goal of this ongoing exchange is to create meaningful connections that will promote the protection of habitats as well as help students in the US, PNG, and Australia develop an understanding of and respect for other cultures. 2005 was the fourth year of this exchange. In February 2005 Doyle made presentations to over 800 students at eight Rhode Island elementary and middle schools and a youth group of 25 inner-city students in the City Arts program (Providence, RI). She provided background information on PNG, the YUS community, and the surrounding environment, and asked students to create letters and artwork based on three aspects of PNG culture they found interesting. Each class of students created a binder to showcase their work. The binders of artwork as well as student art and artifacts from PNG were displayed at the Cranston Public Library (Rhode Island) during the month of March in honor of national Youth Art Month. The binders were then distributed to teachers at the 2005 YUS Teacher Training Workshop and will be used as aids when teachers instruct their students on their traditional heritage.

In October 2005 Doyle taught lessons about Matschie's tree kangaroos to 116 elementary, middle, and high school students in Washington state. These lessons were also taught by Roger Williams Park Zoo educator Chris Hitchener to approximately 70 elementary school students in Rhode Island, and by St. Louis Zoo educator Anne Bartin to 22 elementary school students in Kirkwood, Missouri. All three educators gave students background information about PNG habitats and wildlife, the scientific study of Matschie's tree kangaroos, and student life in YUS. Teaching aids and activities from the 2005 TKCP Matschie's tree kangaroo curriculum were used to teach US students. Students were asked to write letters to PNG students and create artwork based on what they learned about Matschie's tree kangaroos. US student artwork and letters were distributed to teachers at the 2005 YUS Teacher Training Workshop, and PNG student artwork was brought back to the US for distribution in 2006.



A village student enjoys the artwork and letter she received from a US student as part of the Global Youth Art Exchange.

- **Higher education for YUS teachers.** Through an anonymous donation, the TKCP sponsored Mr. Haring Qoreka, Education Officer for the YUS and Kabwum Districts (Morobe Province), in his pursuit of Higher Education at the University of Goroka. Qoreka graduated with a Bachelor of Education degree in late 2005 and returned to YUS, where his advanced education and skills will strengthen local teaching capacity and curriculum development (his area of study).

- **Participation in the YUS Education Committee.** Doyle and Samandingke were members of the YUS Education Committee, which was formed in 2004. In 2005 the Committee developed a formal application process for the TKCP Teacher Training Scholarship. In addition, to demonstrate their commitment to teacher education, the Committee agreed to match TKCP Teacher Training Scholarship money beginning in 2006 so that more students will be supported for teacher training.

- **Australian Outreach.** TKCP educators again worked in Australia in 2005 to continue to promote a respect for global cultures and the environment among students in PNG, the US, and Australia. In addition to facilitating the Global Youth Art Exchange, the TKCP educators taught lessons to 35-40 students at the Herberton State School (Queensland) from the 2005 curricula created for the Annual YUS Teacher Training Workshop in PNG. TKCP Field Scientist Gabriel Porolak, who was in Australia for the International Tree Kangaroo Conference (see below), gave a presentation about the work of PNG field scientists in which he described how and why he conducts research on wild tree kangaroos.

- **Community Healthcare Needs Assessment and Health Worker Training.** In November 2005 the TKCP initiated a Community Health project, which, in partnership with village health care workers, the district, provincial and national governments and NGOs, aims to develop and implement programs for addressing healthcare needs. TKCP volunteers Dr. Nancy Philips and Dr. Blair Brooks, both physicians at Dartmouth Hitchcock Medical Center (Lebanon, New Hampshire), joined Dabek and Porolak in PNG for this project. The goals of this initial effort were to: understand the health care system in PNG, Morobe Province, Kabwum District and YUS; define YUS area and individual village health care needs; deliver donated durable resources; and work with local health care providers to address specific patients' health needs. The Health Care team began by meeting with Dr. H. Paluma, National Director of Maternal and Child Health, in Port Moresby and Dr. L. Theo, Morobe Province Health Program Administrator, in Lae. Mr. Wape Josingau, Nursing Officer for YUS joined the team in Teptep village, and he accompanied them throughout their hiking visits to 8 villages in the region. Based on these meetings and site visits, the team identified the most urgent healthcare needs, determined goals for 2006 and is working on a strategy for meeting these goals.



A poster in Teptep village. Tok Pisin translation: Look after your forest, animals, trees, and water.



Dr. Nancy Philips and Dr. Blair Brooks gather information at a village health center.



Villagers express appreciation to Lisa Dabek and the TKCP for helping address community health needs.

COMMUNICATIONS & PUBLICATIONS

- **International Tree Kangaroo Conference.** The TKCP helped organize the November 2005 International Tree Kangaroo Conference in conjunction with the Tree Kangaroo and Mammal Group of Atherton (Australia), James Cook University (Cairns, Australia), AZA's Tree Kangaroo Species Survival Plan, and the Australasian Regional Association of Zoological Parks and Aquaria's (ARAZPA) Marsupial and Monotreme Taxon Advisory Group. The conference, held in Queensland, Australia, brought together experts to look at the status of tree kangaroo research, conservation, captive health and management, and community education in PNG, Australia, and North America. Approximately 80 people attended the conference. Participants shared current work and established priorities for tree kangaroo conservation and research for the next ten years. TKCP staff gave five presentations and a poster, and facilitated the participation of an official from the PNG Department of Environment & Conservation and a representative of the Rainforest Habitat (Lae).
- **Peer-reviewed publications.** McGreevy, Dabek, and Husband submitted a manuscript to Zoo Biology entitled "Genetic diversity comparison of captive female founder and wild Matschie's tree kangaroos (*Dendrolagus matschiei*), based on mtDNA control region sequences". McGreevy conducted this work for his Master's thesis at the University of Rhode Island. The paper has been peer-reviewed and revised, and is expected to be published in 2006. Stabach, Dabek, Wang, and Porolak submitted two manuscripts from Stabach's Master's thesis work: "A comparison of moderate resolution satellite sources to discriminate dominant forest types" to the International Journal of Remote Sensing, and "Evaluation of a GPS collar in a tropical rainforest" to the Wildlife Society Bulletin.
- **"Quest for the Tree Kangaroo" book.** Award-winning writer Sy Montgomery and photographer Dr. Nic Bishop spent three weeks in PNG with Dabek and the TKCP research team in March and April 2005. Their book "Quest for the Tree Kangaroo", for readers in grades 4-8, focuses on the TKCP's pioneering radiotelemetry research of the Matschie's tree kangaroo. The 80-page book with its stunning photos features Dabek as the central character in the true-life documentation of how the TKCP is working with local PNG people to learn more about tree kangaroos in order to protect them. Australian wildlife artist Robin Wingrave, who also joined the TKCP research team in March/April 2005, provided illustrations for the book. The book will be a part of Houghton Mifflin's Scientists in the Field Series, originated by Bishop and Montgomery, and will be published in October 2006.



Left: Nic Bishop photographs landowners in Yawan village

Right: Sy Montgomery (far right) documents a tree kangaroo capture at Wasaunon

- **Other publications about the TKCP.** In March 2005 the TKCP was pleased to facilitate Conservation International staff writer John Tidwell's visit to villages on the Huon Peninsula, where he interviewed Dabek, other TKCP staff, and local landowners for his article "Wow! Is That a 'Roo Up the Tree?" published in Conservation International's Conservation Frontlines, Summer 2005. The Woodland Park Zoo's membership magazine @thezoo published two articles about the TKCP in its Summer 2005 edition. AZA's membership magazine Communique published an article about the TKCP's International Bug Club in its November 2005 edition.

GOALS & PRIORITIES FOR 2006

CONSERVATION OUTREACH AND HABITAT PROTECTION

- Finalize YUS Conservation Area under the PNG Conservation Areas Act (1978). The proposal for the Conservation Area was submitted in 2005, and was reviewed and approved by the Provincial Executive Council in February 2006. Now that it is endorsed by the Council, it will be reviewed by the National Executive Council, and finally the PNG Minister for Environment & Conservation. Arthur Ganubella, Acting Assistant Secretary of Protected Areas in the PNG Department of Environment & Conservation, and Gai Kula, Executive Director of Conservation International's Melanesia Center for Biodiversity Conservation, have been working closely with the TKCP throughout the Conservation Area process. TKCP Community Conservation Facilitator Ginson Saonu will continue to facilitate the proposal review process, through his active contact with government officials, and will help ensure that the proposal remains a top priority on government meeting agendas. The official declaration of the YUS Conservation Area, which will exceed 150,000 acres, is anticipated in mid 2006.
- Complete Indigenous Mapping Project. The second workshop of this year-long project will be held in Lae in February 2006, conducted for participating YUS landowners by the TKCP, Mac Chapin (Center for the Support of Native Lands, Washington DC) and cartographers from the PNG University of Technology (Lae). Wycliffe Antonio, a cartographer/lecturer from the PNG University of Technology will supervise the cartography. The purpose of this workshop is for cartographers to work with landowners on producing maps from the sketch maps landowners created after the first workshop (held in November 2005). This will be the first time that the cartography staff at the PNG University of Technology will have participated in an international conservation collaboration, and will thus be a model for other conservation work in PNG through the University of Technology. During the third workshop, which will be in April 2006 after landowners have verified the maps in their villages, maps will be finalized. Following a 4-5 month production process, the maps will be printed. By the conclusion of the project, in late 2006, the landowners will have created an annotated resource use map that is built on oral history and traditional knowledge and will know how to use the map for making sound decisions regarding land management and habitat conservation.



Participants in the Indigenous Mapping Project, photographed during the first workshop in Yawan village in November 2005. These clan landowners are also participating in the management planning workshops and the boundary mapping work.

- Continue boundary mapping and species inventories to define clan-owned land areas composing the YUS Conservation Area. The TKCP has been training YUS clan landowners to use GPS units to collect the data necessary to identify the boundaries of their land areas pledged for conservation. The YUS Conservation Area will comprise these clan-owned land parcels. TKCP Field Research Assistant Karau Kuna, who assisted landowners in boundary mapping in 2005, will lead this work in 2006 and plans to use the clan mapping data for his Honor's degree at the University of PNG under TKCP collaborator Phil Shearman, Director of the University of PNG's Remote Sensing Center. As part of the mapping work, Kuna will document sightings and evidence of key species,

information that will be added to the TKCP's GIS database and used to describe each clan's pledged land. Using the GPS points collected by the landowners, TKCP GIS Specialist Jared Stabach will create high-resolution maps showing the boundary of the YUS Conservation Area, as well as the boundaries of each clan's pledged areas that compose it. These maps will be shared with landowners, to assist in the management of the YUS Conservation Area, and with the government.

- Finish and integrate clan land management plans for the YUS Conservation Area. Conservation International's Melanesia Center for Biodiversity Conservation is collaborating with the TKCP and is providing the services of Kepslok Kumilgo, Community Trainer, to lead a final workshop in 2006.
- Institute a local community organization to manage the YUS Conservation Area by working with YUS landowners, Conservation International's Melanesia Center for Biodiversity Conservation (Port Moresby, PNG), and Conservation International (Washington DC). The community organization will have an in-country staff that will manage the Conservation Area according to the management plans developed by YUS clan landowners, oversee education projects, and continue community health work. Funding for the community organization will be provided through a conservation endowment.

CAPACITY BUILDING

- Fund Gabriel Porolak (TKCP Field Scientist) as he pursues a 2-year Master of Science degree in the School of Tropical Biology at James Cook University. Porolak will begin classes in February 2006.
- Support Karau Kuna (TKCP Field Research Assistant) as he pursues his Honor's degree in the University of Papua New Guinea's School of Natural and Physical Sciences. Kuna will enroll in early 2006.
- Transition the TKCP Education Coordinator position completely to in-country by 2007. YUS resident and local teacher Danny Samandingke is currently the part time In-country TKCP Education Coordinator. The TKCP will pursue additional training for Samandingke at the University of Goroka, PNG to facilitate this transition. As he assumes greater responsibilities for continuing conservation education work in YUS, Samandingke will also be supported by Haring Qoreka, Education Officer for the YUS and Kabwum Districts (Morobe Province).

SCIENTIFIC RESEARCH

- Continue the pioneering research of the home range sizes and movements of the Matschie's tree kangaroo using radiotelemetry. Porolak (TKCP Field Scientist) is using this research for his Master's degree at James Cook University (Cairns, Australia). June 2006 will be the start of the third field season for this project, with the radiocollaring and tracking of 3-4 additional tree kangaroos for at least 5 months. Of particular interest is assessment and comparison of male and female home range sizes and overlap, as well as a determination of site fidelity, feeding habits, primary home trees, and offspring dispersal timing and patterns.



A radiocollared tree kangaroo.



Tree kangaroo habitat near a TKCP field site.

- Continue the tree kangaroo density studies by conducting quarterly dung pellet counts at Yangorong field site, and annual counts at Dendawang and Sibidak field sites. The counts are conducted by local landowners, who are supervised by TKCP field scientists. A manuscript is in preparation that details the results of the first density study (conducted at Dendawang and Sibidak). The ongoing counts will enable the TKCP to identify changes in density over time within each site, and compare tree kangaroo densities between sites, which have different key tree species and different hunting histories. In 2007 counts will be done annually to monitor these sites over the long-term.
- Host Dr. Jared Diamond, Professor of Geography at the University of California—Los Angeles and Pulitzer-Prize winning author, at two additional TKCP field sites in May 2006 to do further bird surveys in YUS. Diamond's overall goal is to survey montane bird species of the Huon Peninsula and other isolated mountain ranges, ideally from an elevation of 500 m up to 3,000 m, and to create local-language dictionaries of bird species names. In 2006 he will survey the TKCP field site Surim, at an altitude of 1100 m, and Dendawang, at 2300 m.
- Continue collaboration with the University of Denver to identify Matschie's tree kangaroo food plants from fragments in dung samples collected at TKCP field sites. Insect fragments have been found in some samples. Insects have not been previously documented as part of the wild tree kangaroo diet, so this discovery of insect fragments in tree kangaroo dung will be further examined.
- Continue tree kangaroo genetic analyses at the University of Rhode Island by PhD student TJ McGreevy using dung samples collected in PNG. In 2006 McGreevy aims to complete the 2002 to 2005 wild Matschie's tree kangaroo fecal DNA extractions, optimize the species specific polymerase chain reaction primers, refine the microsatellite primers developed for Matschie's tree kangaroo and the microsatellite primers developed from other marsupials, and optimize the sex specific primers for the analysis of wild Matschie's tree kangaroo fecal DNA extraction samples. The genetic analyses of wild collected Matschie's tree kangaroo fecal samples from Wasaunon will enhance McGreevy's ability to determine the genetic relatedness of the radiocollared wild Matschie's tree kangaroo and be integrated with the Geographic Information Systems (GIS) data that had been collected by TKCP GIS Specialist Jared Stabach to conduct a spatial analysis of wild Matschie's tree kangaroo gene flow.
- Continue study of the ecology of the long-beaked echidna. TKCP researcher and Australian zookeeper Brett Smith will likely begin a Master's degree program at the University of Queensland (Brisbane, Australia) in 2006 and use this research for his thesis project. Camera traps (cameras equipped with infrared triggers) will be used to assess local abundance of long-beaked echidnas at TKCP field sites.



Tree kangaroo (above) and long-beaked echidna (below) at the TKCP's Wasaunon field site.



EDUCATION

- Organize and conduct the fourth annual teacher workshops in YUS villages. TKCP educators from the US and PNG create new conservation education curricula for the workshops. The workshops also educate teachers about different teaching styles and teaching methods. The TKCP will continue to collaborate with staff in the Education Department of the Research and Conservation Foundation (Goroka, PNG) in developing new lessons and materials for local teachers.
- Support and monitor International Bug Clubs in PNG village schools. Bug Clubs foster a connection with nature by giving students an



Participants in the 2005 YUS Teacher Training Workshop held in Teptep village.

appreciation of the insects around them; linking Bug Clubs in the US to the PNG Bug Clubs promotes cultural awareness through a common interest in insects. The use and efficacy of the Bug Club curriculum in PNG will be monitored by the TKCP throughout 2006, and a new module for the curriculum (covering topics requested by village teachers) will be piloted during the 2006 YUS Teacher Training Workshop.

- Continue to add to the local cadre of teachers in YUS through the TKCP teacher scholarship program. In November 2006 three scholarship recipients will graduate from Balob Teachers College with Diplomas in Teaching, and will begin teaching in YUS in 2007. Three students per year will be sponsored.
- Continue the “Conservation Connection: Global Youth Art Exchange”, the TKCP’s ongoing exchange of art and ideas about conservation and ecology among students in PNG, US, and Australia. Students in each country educate each other about conservation issues (focusing on local wildlife) by writing letters and producing artwork with written descriptions (in English).

COMMUNITY HEALTH

- Submit a report of recommendations for addressing YUS village healthcare needs to the Morobe Province Health Program Administrator. This report will be forwarded to the appropriate YUS and Kabwum District officials.
- Work with the local and provincial government to address healthcare needs, including: helping to establish an immunization program in YUS that increases essential immunization rates in children and during prenatal care, establishing regular continuing education for health care workers, training additional village birth attendants, obtaining essential equipment, and providing quality health education within the schools.
- Pursue joint grant funding with the Provincial Government and local health trainer Mr. Phillip Posenau for health training.



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University of Rhode Island

- Tom Husband
- T.J. McGreevy
- Y.Q. Wang

Rhode Island School of Design

- John Terry
- Miranda Burch
- Ngendo Mukii

Rhode Island elementary and middle schools

- Ashaway Elementary
- Charlestown Elementary
- CVS Highlander
- Glen Hill Elementary
- Pennfield Elementary
- Portsmouth Middle
- Wakefield Elementary
- West Warwick Elementary

Cranston Public Library, Cranston, RI

Providence City Arts, Providence, RI

Washington state elementary and middle schools

- Bush school
- West Woodland Elementary school
- Washington Middle school

Seattle Parks Department Outdoor Opportunities after-school program

Westchester Elementary School, Kirkwood, Missouri

AZA

- Ruth Allard

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Appendix 1. Map of the proposed YUS Conservation Area.

