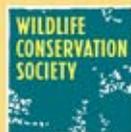




BIODIVERSITY MONITORING IN THE FLOODPLAIN OF THE TONLE SAP IN 2008-9



PREFACE

This document presents the results of annual biodiversity monitoring activities in and around the Tonle Sap lake and floodplain for the period August 2008 - June 2009. Compiled by WCS, under contract to the Tonle Sap Conservation Project and MoE, the document draws on work by a consortium of other government agencies, notably the Forestry and Fisheries Administrations, and a number of NGOs. Accurate monitoring of this kind enables conservationists to monitor the success of our programs, detect new threats as they arise and communicate the importance of the Tonle Sap ecosystem to decision-makers. It probably represents one of the most ambitious and technically rigorous programs of its kind for any ecosystem in the region and is a testament to the cooperation and dedication of the participants.

The monitoring described here focuses on populations of rare birds, partly because they form one of the most significant aspects of the biodiversity of the lake and partly because they indicate the health of the Tonle Sap ecosystem more broadly. The scope of monitoring in this unique and biologically rich area has grown over the past ten years, hand in hand with the growth of a series of on-the-ground conservation projects at key sites. There is now monitoring in place for thirteen key species, six of them globally threatened, at seven key conservation areas in the Tonle Sap Biosphere Reserve and across the wider floodplain. Most of the protocols used for the described monitoring work were printed in a reference document in 2007¹.

A parallel system of monitoring for fish, watersnakes and other aquatic species is conducted by the Fisheries Administration, Ministry of Environment and many other stakeholders, with the results published in a separate series of reports. In future it is hoped that monitoring work may be expanded to include some of the highly threatened mammal and reptile species found in the Tonle Sap ecosystem.

The first report of the four in this volume presents results from the monitoring of the breeding waterbird colonies in the Prek Toal Core Area of the Tonle Sap Biosphere Reserve. These are the largest and in some cases only known colonies in Southeast Asia for the species monitored, and they continue to remain in buoyant good health. Colonies were monitored for the following species: Greater and Lesser Adjutant, Painted and Milky Stork, Asian Openbill, Spot-billed Pelican and Oriental Darter. The number of Grey-headed Fish Eagle nests is also monitored in Prek Toal and results are briefly summarized in this report.

The second report compiles monitoring data on non-breeding waterbirds from the seven key sites: Prek Toal, Boeung Tonle Chhmar and Stueng Sen Core Areas and four Integrated Farming and Biodiversity Areas (IFBAs), as well as incidental records from other sites. The species covered here are: Greater and Lesser Adjutant, Painted, Milky, Black-necked and Woolly-necked Stork, Asian Openbill, White-shouldered and Black-headed Ibis, Spot-billed Pelican and Oriental Darter. Little is yet known about bird movements in response to the Tonle Sap's extreme annual cycle of environmental fluctuations but the monitoring of feeding birds at various sites across the floodplain helps us to better understand fluctuations in numbers and distribution.

¹ WCS (2007) *Tonle Sap Biodiversity Monitoring Protocols*. Wildlife Conservation Society, Phnom Penh, Cambodia.

The third report covers Bengal Floricans, a Critically Endangered bird for which Cambodia holds the majority of the world population. They live in the highly threatened, seasonally inundated grasslands that were once so extensive in the Tonle Sap ecosystem. Key florican populations are found in the Integrated Farming and Biodiversity Areas, a recently established network of grassland reserves and 2009 was the first year that a complete census of the number of territorial male Bengal Floricans was undertaken in these reserves. Monitoring also takes place in the areas used by this species outside the breeding season, just beyond the limits of the floodplain.

The fourth report describes the regional status of Sarus Cranes. In the late dry season cranes aggregate at a small number of wetlands, and every year since 2001 a network of NGOs and government agencies has made counts at this time of year at all key sites across both Cambodia and Vietnam. In recent years additional counts have been conducted in the early and mid dry season to clarify the complex movements that cranes make as water levels change.

The work presented here would not have been possible without financial support gratefully received from the following donors: the Tonle Sap Conservation Project which is a UNDP/GEF project, the Critical Ecosystems Partnership Fund, the Disney Wildlife Conservation Fund and a private donor who has shown great commitment to enhancing the conservation of wildlife in Cambodia.

ច្រើនទៀត។ ជាលទ្ធផលរបាយការណ៍នៃសកម្មភាពដែលបំពេញឱ្យគ្នាទៅមកនេះ ត្រូវបានបោះពុម្ពផ្សព្វផ្សាយជា បន្តបន្ទាប់។ នៅពេលអនាគត យើងសង្ឃឹមថាការងារនេះ នឹងអាចពង្រីកការសិក្សាបន្តថែមទៀត អំពីពួក ថនិកសត្វ និងសត្វល្អិត ដែលកំពុងតែទទួលរងគ្រោះកំហែងខ្លាំងជាសកល ហើយពួកវាក៏មានវត្តមានក្នុងតំបន់បឹង ទន្លេសាបនេះផងដែរ។

របាយការណ៍លើកដំបូង នៃឯកសារបោះពុម្ព ៤វគ្គ រៀបរាប់អំពីលទ្ធផលនៃការត្រួតពិនិត្យតាមដានការ បន្តពូជរបស់សត្វស្លាបទឹកនៅតាមបន្ទាយពងកូនក្នុងតំបន់ស្នួលព្រែកទាល់ នៃតំបន់បំបនិជីវៈមណ្ឌលបឹងទន្លេសាប។ នេះជាលទ្ធផលនៃការរកឃើញបន្ទាយពងកូនដ៏ធំបំផុត និងមាននៅសល់តិចតួចបំផុត នៅក្នុងតំបន់ភូមិភាគ អាស៊ីអគ្នេយ៍ សំរាប់ប្រភេទសត្វស្លាបទឹកមានដោយកម្រដែលត្រូវបានសិក្សាត្រួតពិនិត្យតាមដាននេះ។ ហើយដែល ទិជីវកដ៏សំខាន់បំផុតនេះ នឹងថែរក្សាភាពសុខសាន្តរបស់ប្រភេទសត្វស្លាបទឹកទាំងនេះឱ្យរស់នៅគង់វង្សបន្តទៀត។ ការសិក្សានេះបានត្រួតពិនិត្យតាមដាននៅតាមបន្ទាយពងកូនរបស់ប្រភេទសត្វស្លាបដូចជា ត្រដក់ធំ ត្រដក់តូច រនាលពណ៌ រនាលស ចង្កៀលខ្យង ទុងប្រផេះ និងស្នោញ។ រីឯចំនួនសំបុករបស់អកត្រីក្បាលប្រផេះក៏ត្រូវបានធ្វើ ការត្រួតពិនិត្យតាមដានក្នុងតំបន់ព្រែកទាល់ផងដែរ និងមានលទ្ធផលជាសង្ខេបនៅក្នុងរបាយការណ៍នេះ។

របាយការណ៍លើកទី២ បានប្រមូលចងក្រងទិន្នន័យនៃការត្រួតពិនិត្យតាមដានលើពួកសត្វស្លាបទឹក ដែល មិនបន្តពូជនៅតំបន់ទន្លេសាប ដែលពួកវាមានវត្តមានផងដែរនៅក្នុងតំបន់សំខាន់ៗចំនួន ០៧កន្លែងគឺ តំបន់ស្នួល ព្រែកទាល់ បឹងទន្លេឆ្មារ ស្ទឹងសែន និង៤កន្លែងទៀតក្នុងតំបន់កសិជីវចម្រុះ រួមផ្សំជាមួយការកត់ត្រានៅតាមតំបន់ ផ្សេងទៀតដែលស្ថិតនៅក្បែរតំបន់ទាំងនោះ។ ប្រភេទសត្វស្លាបទឹកដែលរស់នៅក្នុងតំបន់ទាំងនេះរួមមាន ត្រដក់ធំ ត្រដក់តូច រនាលពណ៌ រនាលស អង្កត់ខ្មៅ កុកពាក់អំបោះ(សត្វកស) ចង្កៀលខ្យង ត្រយ៉ងចំកកស ត្រយ៉ងខ្លួនស ទុងប្រផេះ និងស្នោញ។ មានការដឹងតិចតួចនៅឡើងអំពីព័ត៌មាននៃការ បំលាស់ទីរបស់ប្រភេទ សត្វស្លាប ទឹក ទាំងនោះ ក្នុងការ បកស្រាយទាក់ទងទៅនឹងការប្រែប្រួលបរិស្ថាននៃវដ្តប្រចាំឆ្នាំដ៏ធំធេងរបស់បឹងទន្លេសាប ប៉ុន្តែ ការត្រួតពិនិត្យតាមដានពីតំបន់កំណើរបស់សត្វស្លាបទឹកនៅតាមតំបន់នានាទូទាំងតំបន់វាលទំនាបលិចទឹក ជួយ យើងឱ្យដឹងកាន់តែច្បាស់អំពីការប្រែប្រួលនៃចំនួន និងរបាយរបស់សត្វស្លាបទឹកនៅក្នុងតំបន់នេះ។

របាយការណ៍លើកទី៣ រៀបរាប់អំពីសត្វខ្យីបដែលជាប្រភេទសត្វស្លាបទទួលរងគ្រោះជិតផុតពូជខ្លាំងបំផុត ហើយដែលចំនួនរបស់វានៅលើពិភពលោកគឺមានភាគច្រើនក្នុងប្រទេសកម្ពុជា។ ពួកវារស់នៅតាមតំបន់វាលស្មៅ លិចទឹកតាមរដូវ ដែលជាតំបន់លាតសន្ធឹងយ៉ាងធំក្នុងប្រព័ន្ធអេកូឡូស៊ីបឹងទន្លេសាប ហើយដែលតំបន់នេះបាន ទទួលរងការគំរាមកំហែងយ៉ាងខ្លាំង។ ចំនួនប្រមូលផ្តុំរបស់សត្វខ្យីបភាគច្រើន ត្រូវបានគេឃើញមាននៅតាមតំបន់ កសិជីវចម្រុះ ដែលជាតំបន់ថ្មីត្រូវបានបង្កើតឡើងជាបណ្តាញនៃតំបន់ការពារវាលស្មៅ។ នៅឆ្នាំ២០០៩ គឺជាឆ្នាំ ដំបូងដែលការធ្វើជំរឿនពេញលេញមួយ ត្រូវបានគេធ្វើឡើងដើម្បីរាប់ចំនួនទិជីវករបស់សត្វខ្យីបឈ្មោល

ដែលមាននៅក្នុងតំបន់នេះ ។ ការស្រាវជ្រាវត្រួតពិនិត្យតាមដានក៏ត្រូវបានធ្វើឡើងផងដែរ នៅតាមតំបន់ទីជម្រក ផ្សេងទៀតដែលមិនមែនជាតំបន់ពងកូនរបស់ពួកវា ដែលស្ថិតនៅជាយឆ្ងាយពីវាលទំនាបលិចទឹក ។

របាយការណ៍លើកទី៤ រៀបរាប់អំពីស្ថានភាពថ្នាក់តំបន់របស់សត្វក្រៀល ។ នៅចុងរដូវប្រាំង សត្វក្រៀល ប្រមូលផ្តុំនៅតាមតំបន់ដីសើមសំខាន់ៗមួយចំនួន ដែលជារៀងរាល់ឆ្នាំ ចាប់តាំងពីឆ្នាំ២០០១មក បណ្តាញអង្គការ អភិរក្សធម្មជាតិក្រៅរដ្ឋាភិបាល និងស្ថាប័នរដ្ឋាភិបាល បានរាប់សត្វក្រៀលក្នុងពេលតែមួយ នៅតាមតំបន់ប្រមូលផ្តុំ សំខាន់ៗ ទាំងនៅក្នុងប្រទេសកម្ពុជា និងប្រទេសវៀតណាម ។ ឆ្នាំថ្មីៗនេះ ការរាប់បន្ថែមច្រើនដងត្រូវបានគេធ្វើ ឡើងនៅដើម និងពាក់កណ្តាលរដូវប្រាំង ដើម្បីសិក្សាតាមដានឱ្យកាន់តែច្បាស់អំពីចលនាបំណាស់ទីខ្លាត់ខ្លែងទៅមក របស់សត្វក្រៀល ដែលការប្រែប្រួលនេះគឺអាស្រ័យទៅតាមការផ្លាស់ប្តូរនៃកំរិតកំពស់ទឹក ។

សូមផ្តោតអំណរគុណ និងដឹងគុណយ៉ាងជ្រាលជ្រៅចំពោះ គំរោងអភិរក្សបឹងទន្លេសាបUNDP/GEF មូលនិធិ Critical Ecosystem Partnership មូលនិធិអភិរក្សសត្វព្រៃDisney និងសម្បុរសជននានា ដែលបាន ជួយឧបត្ថម្ភគាំទ្រថវិកា ជំរុញឱ្យការងារដែលបានរៀបរាប់ក្នុងរបាយការណ៍នេះសម្រេចបានជោគជ័យ និងបាន បង្ហាញនូវការប្តេជ្ញាចិត្តយ៉ាងមុះមុត ដើម្បីចូលរួមចំណែកពង្រឹងការអភិរក្សសត្វព្រៃនៅក្នុងប្រទេសកម្ពុជា ។

CENSUS OF NON-BREEDING SARUS CRANES IN CAMBODIA AND VIETNAM 2009

November 2009

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SUMMARY

This report describes the results of synchronized counts of non-breeding Sarus Crane *Grus antigone* flocks in Cambodia and Vietnam in 2009. Three censuses were conducted. The most important is the late-dry season census as this count has been conducted on an annual basis since 2001. Cranes were recorded at ten of the eleven sites counted during 25-30 March 2009, with a total of 747, which is around 12% less than last year's regional count. As in previous years the bulk of the population was found at a select few sites. In order of magnitude these sites are: Ang Trapeang Thmor, Kampong Trach/Phu My, Tram Chim and Hon Chong, which together held 96% of cranes counted in the late dry season. Although it still held the largest number of cranes of all sites, the number of cranes using Ang Trapeang Thmor (ATT) in 2009 was substantially lower than last year. Construction work carried out this year meant that all the water in the reservoir was retained and the main feeding area remained heavily flooded throughout the dry season. It may well be that due to the conditions prevalent at ATT this dry season, some of the cranes bound for ATT moved to temporary alternative feeding sites not covered by the census, thereby influencing the total count.

The January count found most observed cranes to be in Cambodia. A total of 562 cranes was recorded (including Kampong Trach/Phu My, a site shared with Vietnam), which is around 38% higher than the total counted in Cambodia in January 2008. It is also the second highest total count for Cambodia since 2001 (March 2008 being the highest). In January cranes were concentrated in the Tonle Sap Grasslands, Boeung Prek Lapouv and Ang Trapeang Thmor (92%).

The February count was only conducted in Cambodia. A total of 455 cranes was counted. By this time most cranes had already moved to Ang Trapeang Thmor and Kampong Trach/Phu My, with few remaining at Boeung Prek Lapouv.

Conservation threats to several of the Cambodian sites continue to grow rapidly, primarily due to agricultural expansion and land speculation. At Ang Trapeang Thmor, a key wetland site, it is as yet unknown if there will be any impact on Sarus Cranes from irrigation channels that were built this year for the future cultivation of dry season rice downstream of the reservoir.

អត្ថបទសង្ខេប

របាយការណ៍នេះរៀបរាប់ពីលទ្ធផលនៃការធ្វើជំរឿនហ្វូងសត្វក្រៀល នៅក្នុងប្រទេសកម្ពុជា និងវៀតណាម នៅឆ្នាំ២០០៩ ដែលត្រូវបានធ្វើឡើងចំនួន ៣ដង។ នៅចុងរដូវប្រាំង គឺជាពេលវេលាដ៏សមស្រប និងប្រសើរបំផុត ដែលគេតែងតែធ្វើជំរឿនសត្វក្រៀលជាប្រភេទរាងឆ្នាំ ចាប់តាំងពីឆ្នាំ២០០១ មក។ ការរាប់សត្វក្រៀលប្រចាំតំបន់នៅឆ្នាំ នេះ គឺមានចំនួនសរុប ៧៤៧ក្បាល ដែលត្រូវបានកត់ត្រានៅតាមតំបន់រាប់សត្វចំនួន ១០កន្លែង ក្នុងចំណោមតំបន់ចំនួន ១១កន្លែង ក្នុងចន្លោះពីថ្ងៃទី ២៥ ដល់៣០ ខែមីនា ឆ្នាំ២០០៩ ហើយដែលតួលេខនេះមានតិចជាង ១២ភាគរយ បើ ប្រៀបធៀបនឹងតួលេខនៃការរាប់នៅឆ្នាំមុន។ ដូចឆ្នាំមុនៗដែរ ចំនួនសត្វក្រៀលមានវត្តមានប្រមូលផ្តុំនៅតាមតំបន់ មួយចំនួនដូចជា អាងត្រពាំងថ្ម បន្ទាប់មក កំពង់ត្រាច/ភូមិ ត្រាំ ចឹម និងហុន ចុង ដែលចំនួននៅតាមតំបន់ទាំងអស់នេះ ស្មើនឹង ៩៦ ភាគរយ នៃការធ្វើជំរឿននៅចុងរដូវប្រាំងនេះ ។

ទោះបីជាសត្វក្រៀលនៅតែមានចំនួនច្រើននៅតាមតំបន់ទាំងអស់នោះក៏ដោយ ប៉ុន្តែចំនួនសត្វក្រៀលនៅ តំបន់អាងត្រពាំងថ្មនៅឆ្នាំ២០០៩ មានការធ្លាក់ចុះច្រើនជាងឆ្នាំមុន។ មូលហេតុដែលនាំឱ្យមានការធ្លាក់ចុះនូវចំនួន ក្រៀលនៅអាងត្រពាំងថ្មនៅឆ្នាំនេះ គឺប្រហែលមកពីការស្តារប្រឡាយស្រោចស្រពសំរាប់ដំណាំស្រូវប្រាំងនៅផ្នែកខាង ក្រោមអាង ដែលនាំឱ្យមានការបិទទ្វារទឹកសំរាប់ដំណើរការសាងសង់នេះ ដែលបណ្តាលឱ្យលិចលង់យ៉ាងធ្ងន់ធ្ងរដល់ កន្លែងរកចំណីរបស់ក្រៀលពេញរដូវប្រាំងនៅឆ្នាំនេះ។ នេះប្រហែលជាមូលហេតុ នៃការផ្លាស់ប្តូរទីកន្លែងរកចំណីរបស់ សត្វក្រៀលទៅកាន់តំបន់ផ្សេងៗទៀត និងធ្វើឱ្យមានផលប៉ះពាល់ទៅលើលទ្ធផលនៃការធ្វើជំរឿនក្រៀលនៅឆ្នាំនេះ ។

សត្វក្រៀលដែលបានធ្វើជំរឿននៅខែមករា ឆ្នាំ២០០៩ ភាគច្រើនស្ថិតនៅក្នុងប្រទេសកម្ពុជា។ ចំនួនសត្វ ក្រៀលសរុប ៥៦២ ត្រូវបានកត់ត្រា រាប់បញ្ចូលទាំងកំពង់ត្រាច/ភូមិ ដែលជាតំបន់ស្ថិតនៅជាប់ប្រទេសវៀតណាម ដែលមានចំនួន ៣៨ភាគរយ ច្រើនជាងចំនួនសត្វក្រៀល កាលពីខែមករា ឆ្នាំ២០០៨។ វាគឺជាតួលេខខ្ពស់លើកទី២ ហើយសំរាប់ប្រទេសកម្ពុជា ចាប់តាំងពីឆ្នាំ២០០១ ដែលលើកទី១ នៅខែមីនា ឆ្នាំ២០០៨ ដែលមានចំនួនច្រើនជាងគេ ។ នៅខែមករា សត្វក្រៀលមានការប្រមូលផ្តុំគ្នានៅតំបន់វាលស្មៅបឹងទន្លេសាប បឹងព្រែកល្អៅ និងអាងត្រពាំងថ្ម (៩២ ភាគរយ) ។

នៅខែកុម្ភៈឆ្នាំនេះ គេបានរាប់តែនៅក្នុងប្រទេសកម្ពុជាប៉ុណ្ណោះ ដោយរាប់ឃើញមានចំនួនសរុប ៤៥៥ក្បាល ។
ចាប់ត្រឹមពីខែកុម្ភៈ សត្វក្រៀលភាគច្រើនបានផ្លាស់ប្តូរកន្លែងរកចំណីទៅកាន់តំបន់អាងត្រពាំងថ្ម និងកំពង់ត្រាច/ភូមិ
ដោយមានវត្តមានសត្វក្រៀលនៅសល់ខ្លះនៅតំបន់បឹងព្រែកល្អៅ ។

ការគំរាមកំហែងទៅលើតំបន់អភិរក្សមួយចំនួននៅប្រទេសកម្ពុជានៅតែបន្តកើនឡើងយ៉ាងខ្លាំង ដែលបញ្ហា
ចម្បងគឺបណ្តាលមកពីការពង្រីកដីធ្វើកសិកម្ម និងការរានដីយកធ្វើជាកម្មសិទ្ធិ។ អាងត្រពាំងថ្ម គឺជាតំបន់ដីសើមដ៏
សំខាន់មួយ ដែលគេនៅតែមិនទាន់ដឹងច្បាស់នៅឡើយទេ ថាតើផលប៉ះពាល់ទៅសត្វក្រៀល គឺបណ្តាលមកពីការសាង
សង់ប្រព័ន្ធប្រឡាយសំរាប់ការអភិវឌ្ឍន៍ដំណាំស្រូវប្រាំង ដែលស្ថិតនៅខាងក្រោមអាងឬយ៉ាងណានោះទេ ។

INTRODUCTION

Since 2001, a coordinated census of Sarus Cranes *Grus antigone* has been held each year in the late dry season in Cambodia and Vietnam. This is the late non-breeding season and a time when most cranes congregate at a few easily-counted locations. Coordinated by the Wildlife Conservation Society (WCS) in Cambodia and the International Crane Foundation (ICF) in Vietnam, the census aims to assess the population levels and distribution of Sarus Cranes in the region. Results from 2001-2007 for the region were summarised by Nguyen Phuc Bao Hoa *et al.* (2007) and in 2008 by van Zalinge *et al.* (2008). The current report describes the results of the dry season census in 2009. As done in 2008 for the first time, the coordinated counts were also conducted in the early and mid dry season to examine crane movements between sites within the dry season.

The Sarus Crane ranges from India to Australia and has been classified as Globally Threatened (Vulnerable) (BirdLife International, 2009). It was once distributed

throughout mainland South-East Asia, but has undergone a severe decline over the past 50 years through habitat loss and hunting, and is now restricted to parts of Cambodia, extreme southern Laos, southern Vietnam and parts of Myanmar (BirdLife International 2008). The population of Sarus Crane found in Cambodia, southern Laos and Vietnam has now largely become isolated from the nearest populations in Myanmar and although not a distinct sub-species the severity of threats to Sarus Cranes across most of their range warrants conservation strategies to focus upon preventing further extinction of such fragmented populations (Jones *et al.*, 2005). The census in Cambodia and Vietnam covers a large part of the known regional dry season distribution and so is a valuable monitoring tool. Most breeding areas of the censused population are not confirmed, but are presumably mainly in northern and eastern Cambodia. For example, fifty seven Sarus Cranes nests were found from June to August 2008 in Kulen Promtep Wildlife Sanctuary and Preah Vihear Protected Forest (Rainey *et al.*, 2008).

METHODS

Crane counts were conducted across Cambodia and Vietnam on two dates in 2009: 17-19 January (nine sites), and 25-30 March (eleven sites) as summarised in Table 1. An extra mid-season count was held in Cambodia only on 25-28 February (seven sites). The sites covered include almost all of the sites where cranes are known to occur in the dry season. For discussion, the regions covered can be separated into three broad geographical areas: the basin of the Tonle Sap Lake and River, the Mekong delta, and the deciduous forests of the northern and eastern regions.

With the exception of Koh Thom, all of the sites are within Important Bird Areas (IBAs) and meet the criteria for category A1 for Sarus Cranes, being sites that 'regularly hold significant numbers of a Globally Threatened species' (Seng Kim Hout *et al.* 2003, Tordoff *et al.* 2002). In addition, Ang Trapeang Thmor, Boeung Prek Lapouv, Kampong

Trach, Tram Chim and the Ha Tien plain (which includes the Hon Chong, Hon Dat, Phu My and Kien Luong grasslands) also qualify as IBAs under category A4(i) reserved for sites that 'hold on a regular basis $\geq 1\%$ of a biogeographic population of a congregatory waterbird species' (Tordoff 2002, Seng Kim Hout *et al.* 2003). Furthermore, Ang Trapeang Thmor and Boeung Prek Lapouv have been formally recognised for their importance as habitat for non-breeding Sarus Cranes through the designation of the Ang Trapeang Thmor Sarus Crane Conservation Area, and, recently, the Boeung Prek Lapouv Sarus Crane Conservation Area, while Tram Chim and Lo Go Xa Mat are National Parks. Most of the sites in the Tonle Sap Grasslands are now protected as Integrated Farming and Biodiversity Areas (IFBAs) under provincial authority. Lang Sen Protected Area and sites within the Ha Tien plain are also protected under provincial authority.

Table 1. Sites surveyed during the 2009 Sarus Crane census (see map for locations)

Site name	Province	Country ^x	Count 1	Count 2	Count 3	Organizations [^]
			<i>Date of Count</i>			
<i>Tonle Sap basin</i>						
Ang Trapeang Thmor SCCA ^y	Banteay Meanchey	C	18/1	28/2	28/3	FA/WCS
Tonle Sap Grasslands	Kampong Thom, Siem Reap, Banteay Meanchey	C	17-8/1 ^a	27/2 ^b	27-9/3 ^a	FA/WCS/ACCB
<i>Mekong delta</i>						
Boeung Prek Lapouv SCCA ^y	Takeo	C	18/1	27/2	28-9/3	FA/BL /WCS
Koh Thom	Kandal	C	18/1	27/2	28/3	WCS
Kampong Trach/Phu My [‡]	Kampot, Kien Giang	C/V	17-8/1	28/2	28-30/3	FA/BL/ICF
Tram Chim National Park	Dong Thap	V	17-8/1	-	28-9/3	NP
Lang Sen	Long An	V	17-8/1	-	28-9/3	ICF
Hon Chong	Kien Giang	V	-	-	28-9/3	ICF
<i>Northern/Eastern deciduous forest</i>						
Preah Vihear Protected Forest	Preah Vihear	C	17-9/1	-	28-9/3	FA/WCS
Kulen Promtep Wildlife Sanctuary	Preah Vihear	C	-	28/2	30/3	MoE/WCS
Western Siem Pang	Stung Treng	C	18/1	27/2	25/3	FA/BL

^x C - Cambodia, V - Vietnam

[^]Participating organizations/institutions: ACCB- Angkor Center for Biodiversity Conservation. BL- BirdLife International in Indochina. FA- Forestry Administration, Cambodia, ICF- International Crane Foundation. MoE- Ministry of Environment, Cambodia. NP- National Park staff, Vietnam, WCS- Wildlife Conservation Society.

^ySarus Crane Conservation Area

^a Stoung-Chikraeng and Baray IFBAs, as well as grasslands in Kruos Kraom and Preah Net Preah

^b Stoung-Chikraeng and Baray IFBAs plus Krouos Kraom

[†] Not counted because the site-based protection team reported no cranes present for many weeks prior

[‡] The Kampong Trach (Cambodia) and Phu My (Vietnam) sites are considered a single site for the purpose of the crane census and counted simultaneously due to their close proximity. Cranes move back and forth across the border each day between feeding sites.

Sarus Cranes are more consistently recorded at some sites than others, and so there were two survey approaches. ATT and Kampong Trach-Phu My and most of the sites in Vietnam are relatively small and Sarus Cranes congregate predictably in large numbers at the time of the census; in these areas coordinated surveys were carried out using teams of observers to perform synchronized counts covering the whole area. These counts were held at key times when the local population was likely to be grouped together and not moving about - such as first thing in the morning or late in the afternoon when birds are present at roost sites.

At the other sites where the location of the cranes is less predictable, the survey approach was to spend the day traveling around the area to make opportunistic crane observations. For sites where observations were made on several different days, the highest count on any single day was used, but dates, times and locations of opportunistic observations were carefully considered to avoid the possibility of multiple counts of the same individuals, as well as any other available information such as the age composition of the group that might help inform the true number of cranes present. Where there was doubt over whether an observation could be of individuals counted earlier, we were conservative in our final total to avoid over-estimating population size.

The logistical constraints of conducting a nation-wide census meant that it was not possible to conduct all the March surveys on the same date at all sites, but except for Western Siem Pang, records came from a period of only three days and we believe we have minimized the effects of double-counting through Sarus Crane movements. Areas counted on different days were sufficiently distant for it to be unlikely that individuals would have travelled from the first sites to be counted a second time.

The crane site of Kompong Trach-Phu My is situated on the Cambodia-Vietnam border, and the cranes use feeding and roosting sites on both sides. To avoid cross-border double-counting, the two teams coordinated the date and time of the census, and any observed movement of cranes across the border during the count, recorded. For clarity, a single count is presented for the whole site.

Observers were instructed to count the total number of cranes seen. Observers were also asked to record details of the activity of the cranes, such as whether they were feeding, roosting, flying overhead, etc., and basic information about the site where the cranes were observed. As the counting teams did not have telescopes it was often not possible to separate juveniles from adults.

Some supplementary records of cranes were available from other times in the dry season, and these have been mentioned where useful.

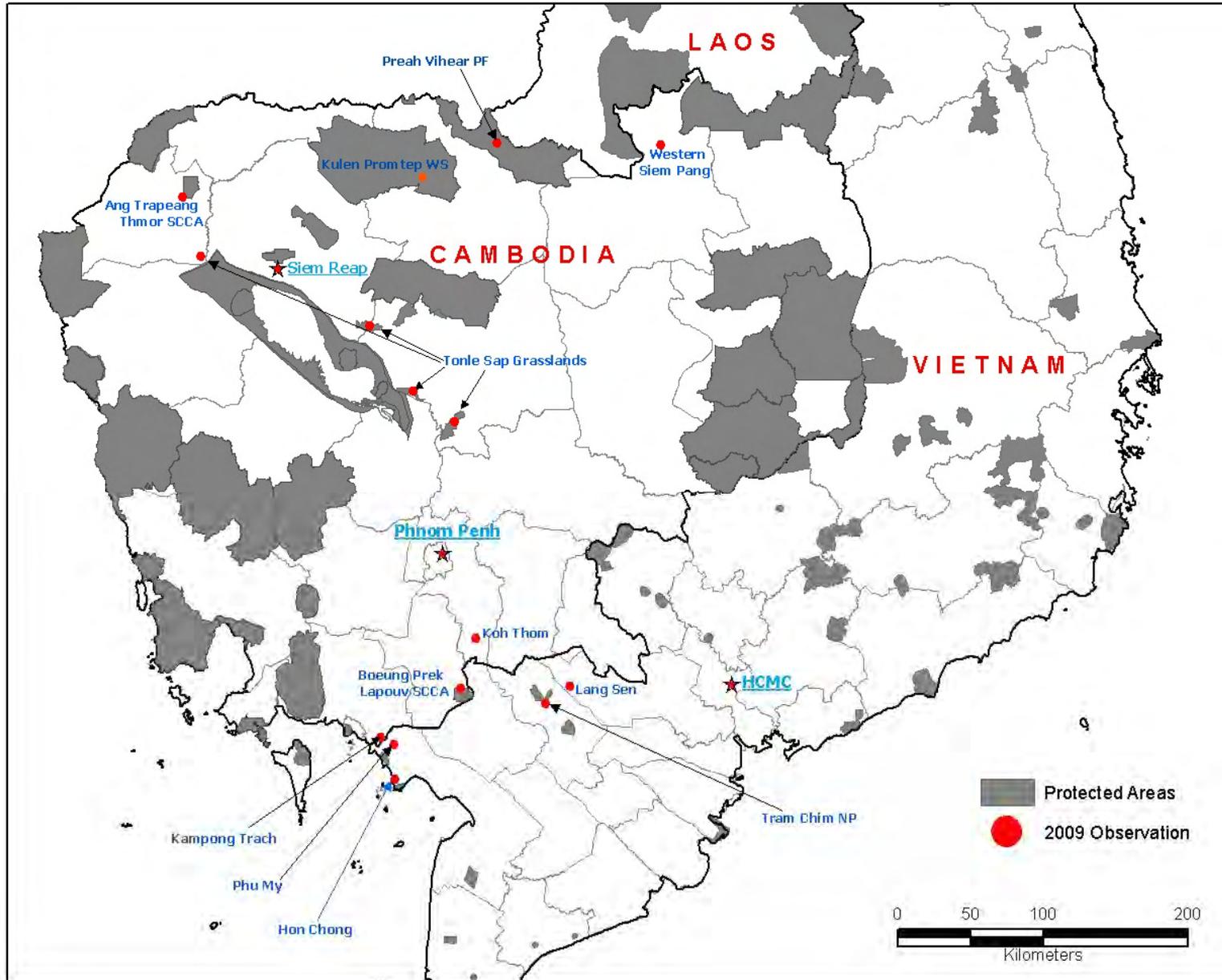


Figure 1. Map of Sarus Crane count sites in 2009

RESULTS

Table 2 shows the results of the three censuses. For a full record of site-by-site observations see Appendix 1.

The late dry season (March) count is the key result as there is a long series of past counts to compare it to. Sarus Cranes were observed at nine of the ten sites surveyed during the 2009 late dry season census, with a total of 747 cranes. The bulk of the late dry season

population was at two key sites, Ang Trapeang Thmor in north-western Cambodia and Kampong Trach/Phu My in the south along the border with Vietnam. At these sites, Sarus Cranes congregate in large flocks to feed or roost. In January most of the birds located were found at Ang Trapeang Thmor, Boeung Prek Lapouv and the Tonle Sap grasslands.

Table 2. Minimum number of Sarus Cranes present at each site during the three 2009 censuses

Site	15/1	%	27-28/2	%	25-30/3	%
Tonle Sap basin						
Ang Trapeang Thmor	147	24%	242	53%	320	43%
Tonle Sap Grasslands	206*	34%	30^	7%	47^^	6%
Mekong delta						
Tram Chim	19	3%	-	-	78	10%
Boeung Prek Lapouv	171	28%	31	7%	-	-
Kampong Trach/Phu My	49	8%	129	28%	225	30%
Hon Chong	-	-	-	-	50	7%
Lang Sen	0	-	-	-	12	2%
Koh Thom	0	-	16	4%	0	-
Northern/Eastern deciduous forests						
Preah Vihear Protected Forest	6	1%	-	-	9	2%
Kulen Promtep Wildlife Sanctuary	-	-	4	1%	4	1%
Western Siem Pang	3	<1%	3	1%	2	1%
Total	562		455		747	

* 56 in Stoung-Chikraeng, 105 in Krouos Kraom and 45 in Baray

^ Stoung-Chikraeng only

^^10 in Preah Net Preah and 37 in Stoung-Chikraeng

Tonle Sap basin

The January count at ATT was 147 cranes and the numbers increased to 242 by late February. Although the site held 43% of all cranes observed in the late dry season, with a count of 320, this was the smallest comparable count at the site since 2001. In contrast to previous years the majority of late dry season cranes counted were still feeding in rice fields below the reservoir, with only a fraction (15%) feeding in the *Eleocharis*-rich wet grasslands and other areas of the reserve. Usually the cranes will especially feed on fallen rice grains in the fields in December and January, but shift towards the seasonally inundated grasslands further into the dry season as water levels recede. However, the level of the reservoir remained very high this year throughout the dry season due to engineering works described in the Discussion, below. This resulted in the

“plong” (*Eleocharis dulcis*) grasslands that the cranes usually feed on remaining largely inundated and inaccessible to the cranes throughout this year’s dry season.

The core population in the Tonle Sap grasslands is at Stoung-Chikraeng, with 30-56 cranes counted in each of the three census periods, and similar numbers in earlier years. With the addition of unusually high counts at Baray and Kruos Kraom, the Tonle Sap area accounted for 37% of the total early dry season Cambodian population, more than in other recent censuses. The latter two flocks did not stay long; at least one was attracted to an ephemeral food source - an area of deep water rice crop, similar to the situation last year. This year a fourth Tonle Sap grassland, Preah Net Preah, was censused. Ten birds were counted in the March census (this is the period when the lowest number of cranes are

expected in the grasslands due to the very dry conditions). The February count was unfortunately canceled due to engine trouble, and although the January count did not record any birds due to difficulties in accessing the site (still flooded), local people reported large numbers (>50).

Mekong delta

As expected, no Sarus Cranes were recorded during the late March nation-wide census period at Boeung Prek Lapouv. The 18 January census count of 171 was lower than this year's peak site count of 228 on 10 January. This is slightly lower than peaks of 248-301 here during the previous four years. The final departure date in 2009 was 3 March, the latest since 2003, and which may be linked to an extended rainy season with wet conditions prevailing longer this dry season.

The Kampong Trach - Phu My site held 30% of the cranes observed in the late dry season, with a count of 225. This is a record count for this area. The numbers here, as in previous years, built up progressively through the dry season.

Tram Chim and Hon Chong had 78 and 50 cranes, respectively in the March 2009 count. In 2008 peak counts at these sites did not occur until April (van Zalinge *et al.* 2009). Lang Seng had 12 cranes in March, but none in January.

Cranes were only found at Koh Thom during the February census. A total of 16 cranes was found in an area just south of Fishing Lot 11, near to the main channel of the Mekong river.

Northern/Eastern dry forests

From 6-9 cranes were found staying in the Preah Vihear Protected Forest during the dry

season. Similar to last year, four cranes were found in Kulen Promtep Wildlife Sanctuary and 2-3 in Western Siem Pang. These are all large, forested sites and the birds are usually very scattered, so the counts are minimum numbers.

Regular crane localities not covered during the census

Unfortunately, no censuses could be undertaken this year at Lomphat Wildlife Sanctuary, an area that is known to regularly have very small numbers of non-breeding cranes. WWF staff working in Phnom Prich Wildlife Sanctuary and Mondulkiri Protected Forest said that there were no cranes in their area during the dry season and so no counts were conducted at these sites. There have also been reports of up to eight cranes in the Sre Ambel valley of Koh Kong province in the southwest of Cambodia (Goes & Davidson, 2001 and 2002; Tran Triet *et al.* 2006), but this population has not been recorded during the annual census and the area was again not included in the survey this year due to lack of available surveyors.

Recruitment

There was only one ideal opportunity to examine the ratio of adults to juveniles. During the January count at Kampong Trach all the cranes were aggregated at Anlong Pring, an area of very short grassland with a channel running through it. It was possible to approach the cranes by boat and observe them closely. 1st year juveniles can be distinguished by their brown feathered head instead of the deep red facial skin of mature birds. Twenty-nine cranes were counted of which eight were juveniles. Thus 28% of the cranes counted were 1st year juveniles, but this is too small a sample to be indicative for the whole population.

DISCUSSION

Coverage and survey quality

All the main known sites were covered during the census, but four regular minor sites in Cambodia (Sre Ambel, Mondulkiri Protected Forest, Phnom Prich Wildlife Sanctuary and Lomphat Wildlife Sanctuary) were not covered in or near the main late dry season census period.

Coverage at the Koh Thom site discovered in 2007 was improved, with exploratory visits between the main counts, but access to the Fishing Lot area still proved difficult and although cranes were found at the site again this year the number was much lower than the 40 birds seen once in 2007. There is no evidence so far that the site regularly supports significant numbers of cranes.

The addition of Preah Net Preah seems to be a valuable step towards improving the census.

Comments from the 2007 report regarding the difficulties of precise counting still hold, especially for large flocks. Numbers are probably often under-estimated, and if the level of under-estimate varies between years (due to e.g. observer differences, count timing, local movements, vegetation structure etc.) this could easily obscure gradual trends for several years. Cranes are highly mobile and opportunistic and it is impossible to get complete coverage of all occupied sites. This is perhaps the largest source of variation between annual counts, making it difficult to spot trends. Incorporating local knowledge (i.e. the high water levels at Ang Trapeang Thmor meant the *Eleocharis* grasslands were flooded this year) and regional environmental conditions³ is helpful but there remain several important sources of uncertainty. Despite this, the counts are very valuable in alerting us quickly to any major changes that might occur in crane numbers at specific sites or across the whole population, and have the potential to reveal long-term trends.

Without the use of telescopes, the annual recruitment in to the population by counting juveniles will remain unclear. Even then it

cannot be done under all circumstances. A different approach may be needed, for instance with site monitoring teams opportunistically counting the ratio of juveniles: adults among the largest flocks they encounter at the site each month.

The January count coincides with the Asian Waterfowl Census, which gives some time savings, but care needs to be taken that the two different survey objectives do not detract from one another.

Movements within the dry season

Holding complete counts at the beginning, middle and end of the dry season continues to be worthwhile as we try to piece together the complex pattern of crane movements between wetlands through the dry season. In future we hope to expand the mid-season count to include Vietnam.

This year's January count (601) was substantially higher than last year's (358). Almost all of the cranes were still in Cambodia at this time, concentrated in the Tonle Sap basin area and Boeung Prek Lapouv in the Mekong Delta. Only an additional 189 cranes were counted at the end of the dry season. Therefore it seems that cranes moved earlier to their main feeding sites this year.

From the extra January and February counts conducted in 2008 and 2009 it is clear that large numbers of Sarus Cranes use the Tonle Sap grasslands and nearby seasonal agriculture to forage for food as floodwaters recede. It is possible that a large portion of these birds then move on to Ang Trapeang Thmor (ATT) as the numbers there increase around this time, with a large influx witnessed at ATT in January or February depending on the year (Lou Vanny 2008). There are similar apparent

shifts in numbers between sites in the Mekong Delta. Large numbers of cranes are counted at Boeung Prek Lapouv (BPL) in January but often few or none in February, by which time numbers have increased sharply at Kampong Trach-Phu My, peaking in March, followed slightly later by increases at Tram

³ e.g. Correlations probably exist between annual rainfall and confinement of cranes to key wetlands

Chim and Hon Chong (van Zalinge *et al.* 2009). This does not mean that all birds move from one site to the next - far more birds arrive at ATT than are counted earlier in the Tonle Sap grasslands, and there is a great deal of overlap in the presence of cranes at sites used by Sarus Cranes in the Mekong Delta. Only tracking marked birds will definitely answer such questions about movements, but the key point for current management is that a network of protected sites is needed in order to allow flexibility in feeding movements within each dry season.

Totals compared to previous years

The total number of cranes counted has fluctuated quite strongly between years, but generally suggesting little or no overall trend (Figure 2). The apparent fluctuations could be due both to changes in absolute population size and in the proportion counted in the census. Absolute numbers may vary due to mortality and recruitment, neither of which is well studied except for data on nest

productivity in one section of the breeding population (Clements *et al.* 2007, Rainey *et al.* 2008). The proportion counted might vary depending on how many birds use uncensused wetlands in a given year - for example due to variations in rainfall/water levels or agricultural practices and other human activity.

The late dry season count of Sarus Cranes numbers in Cambodia and Vietnam in 2009 was 12% lower than in 2008 (Table 3) and 6% lower than the average since 2002 (790 birds). Numbers within the Mekong Delta were similar to last year, but within the Tonle Sap floodplain numbers had dropped by over one hundred cranes. This is mainly due to a decline in numbers at Ang Trapeang Thmor in 2009 because of exceptionally high water levels. These cranes may have been displaced to a site that was not censused, in which case the lower count in 2009 does not reflect an actual change in the overall regional population.

Table 3. Census results for 2001-2009 in Cambodia and Vietnam

		Sarus Crane Numbers in March/April									
	<i>Location</i>	<i>Year</i>	2001	2002	2003	2004	2005	2006	2007	2008	2009
	<i>Tonle Sap basin</i>		228	345	339	365	334	373	402	475	367
1	Ang Trapeang Thmor SCCA		228	345	339	365	334	373	394	439	320
2	Tonle Sap Grasslands [^]			6				0	8	36	47
	<i>Mekong delta</i>		411	527	494	417	366	391	272	371	365
3	Boueng Prek Lapeuv SCCA*		27	155	138	0	0	0	(0)	(0)	0
4	Koh Thom								4		0
5	Kampong Trach					126	56	136	131	183	225
6	Phu My				6						
7	Tram Chim National Park		48	11	61	96	82	89	125	103	78
8	Lang Sen				0	0	0	0	0	7	12
9	Kien Luong Protected Forest				29	0	0	0	0	7	
10	Hon Dat Protected Forest				2	0	0	0	0	0	
11	Hon Chong		336	361	258	195	228	166	15	71	50
	<i>Northern/Eastern forests</i>		11	0	4	2	21	43	14	6	15
12	Lo Go Sa Mat NP			0	0	0	0	0		0	
13	Yok Don NP				0	1	0	0			
14	Preah Vihear Protected Forest							12	8	0	9
15	Kulen Promtep WS		11		2			7		4	4
16	Western Siem Pang IBA					2	21	0	2	2	2
17	Lomphat WS							24	4		
18	Mondulkiri Protected Forest				2						
	<i>Regional Total</i>		650	878	837	785	721	814	692	852	747
	<i>Number of Count Sites</i>		5	6	12	12	12	16	13	12	11

* In 2007 and 2008 Boeung Prek Lapeuv was not counted in the late dry season as it was already confirmed that cranes had left the site.

[^]The Tonle Sap Grasslands actually consist of four sites: Stoung-Chikraeng, Kruos Kraom, Baray and Preah-Net-Preah. Blanks denote site not surveyed in that year. Source 2001-2007: Nguyen Phuc Bao Hoa *et al.* (2007). Source 2008: van Zalinge *et al.* (2009).

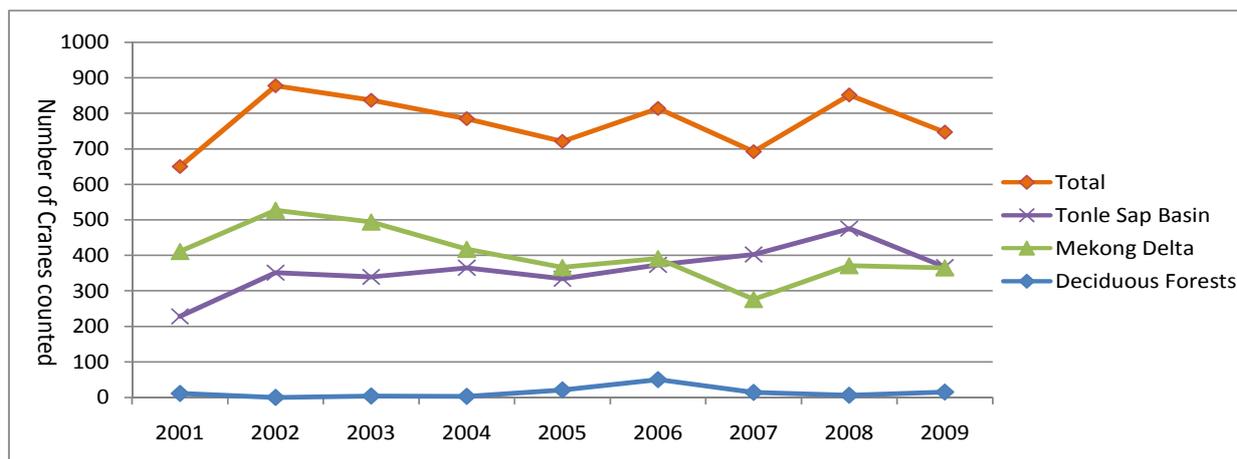


Figure 2: Chart showing number of cranes counted in Cambodia and Vietnam from 2001 – 2008 and Cambodian results for 2009. Blue line shows the percentage of total number of cranes counted in Cambodia.

Annual counts have revealed a progressive shift in numbers between the two main regions (see Table 5 and Figure 3). Numbers have declined in the delta, but increased in the Tonle Sap basin, particularly at Ang Trapeang Thmor (ATT). This may be a result of successful conservation at ATT, particularly hunting controls combined with protection of key habitat. No active habitat improvement work has been undertaken.

It is thought that intensified landuse and expansion within the wider Mekong Delta, may be causing declines in this area. For example, at Boeung Prek Lapouv recent irrigation needs for dry season crops has led to the drying out of this wetland to such a degree that cranes have left the site by the middle of the dry season. At Hon Chong, the installation of a cement production plant has caused the numbers of cranes visiting this site to decline dramatically.

Observed changes to key wetlands in 2009

At Ang Trapeang Thmor the level of the reservoir remained very high this year throughout the dry season as water was diverted into the reservoir from a second nearby and linked dam, which was being reconstructed. Furthermore the flood gates were kept closed and even the overflow mechanism was locked because of firstly, the need to harvest the wet season rice crop downstream, followed by the start of one smaller and one large irrigation channel construction project below the reservoir. This resulted in the “plong” (*Eleocharis dulcis*) sedge

beds that the cranes usually feed on remaining largely inundated and inaccessible to the cranes throughout this year’s dry season.

The smaller irrigation project is an initiative of the ECOSORN program, which aims to improve agriculture in Cambodia’s northwestern provinces and is funded by the European Union. They were looking to irrigate an area of 432 hectares. However, a larger irrigation channel construction commenced after ECOSORN’s initial work in a much larger and overlapping area. This initiative seems to be an independent project led and funded by the Ministry of Water Resources and Meteorology (MOWRAM). MOWRAM have not shared their intentions with any of the other stakeholders working in the area, but it is thought that they wish to irrigate a very large area of up to 20,000 hectares. The irrigation channels have now largely been completed and may be operational during the next dry season. It is as yet unknown how much water will be drained from the reservoir when irrigation commences and how this will affect the cranes that have been visiting ATT every dry season. The major concern is that the fall in water levels in the reservoir during the dry season will be so great that it may cause damage to the existing wetland or encourage people to expand their fields in to the newly available areas. However, it is also possible that moderately low water levels may be good for the cranes by opening larger feeding areas than under the present conditions. Close monitoring of the impacts will be required.

RECOMMENDATIONS

Continue the three censuses each year at all sites. Continue counts at Koh Thom for one more year if feasible. Try to include Preah Net Preah and several other minor sites (e.g. Lomphat Wildlife Sanctuary and Sre Ambel).

A study should be initiated on the ecology of Sarus Cranes, distribution based on changes in environmental conditions, and movement patterns between breeding and non-breeding areas. Such knowledge would help identify other important wetlands on the Sarus Crane's migration route, identify key variables that might affect Sarus Crane distribution and make it possible to integrate measurement of such variables into the monitoring program, as well as providing site managers with vital information on what resources are most important for Sarus Cranes.

Develop reliable sampling methods for counting juvenile cranes, since a full census of juveniles done at the same time as the main census seems likely to experience unacceptable errors. It may be best to set up a separate system of sample counts using telescopes at a few key sites that hold a large and mostly aggregated portion of the population, i.e. at Ang Trapeang Thmor and Kampong Trach/Phu My.

Conservation recommendations are beyond the scope of this report, but it is clearly important to assess the environmental impact of downstream irrigation projects on the Ang Trapeang Thmor wetland and implement mitigation measures if necessary.

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APPENDIX 1: LIST OF ALL CENSUS RECORDS

January Census

Landscape	Location	Site	UTM_E	UTM_N	Date	Time	Total	Adults	Juveniles	Lead Coordinators
Mekong Delta	Kampong Trach	Koh Anse	447908	1154095	18-jan-09	5:30 - 7:30	0	no data	no data	BirdLife
		Anlong Pring	448378	1156745	18-jan-09	5:30 - 7:30	29	21	8	
	Phu My	Roosting and feeding sites			18-jan-09	5:30 - 7:30	20	no data	no data	International Crane Foundation
	Boeung Prek Lapouv		501695	1185874	18-jan-09	06:15 - 07:30	86	65	21	BirdLife
			502902	1185919	18-jan-09	07:30 - 08:00	85	78	7	
	Koh Thom				18-jan-09		0			WCS Global Health Program
	Tram Chim				17&18 jan-09		19			International Crane Foundation
Lang Sen				17&18 jan-09		0			International Crane Foundation	
Tonle Sap Wetlands	Ang Trapeang Thmor	West of Kob Leav			18-jan-09		105	no data	no data	WCS
		North of Koul pond			18-jan-09		39	no data	no data	
		East of Kork Kheut			18-jan-09		3	no data	no data	
	Preah-Net-Preah				17-jan-09		0			ACCB
	Kampong Thom Grasslands	Stoung-Chikraeng			18-jan-09		56	no data	no data	WCS
		Kouk Preah Boeung Trea			18-jan-09		105	no data	no data	
		Baray			18-jan-09		45	no data	no data	
Northern Forests	Preah Vihear	Trapeang Svay Vien	524170	1562248	19-jan-09	9:34	3			WCS
		Trapeang Kron Kieng	524151	1561291	19-jan-09	9:15	3	2	1	
	Western Siem Pang	Tropeang Thork	628526	1569353	18-jan-09	12:50-17:30	3	2	1	BirdLife

February Census

Landscape	Location	Site	UTM_E	UTM_N	Date	Time	Total	Adults	Juveniles	Coordinators
Mekong Delta	Kampong Trach				28-feb-09	6-7:30	84			BirdLife
							45			
	Boeung Prek Lapouv				27-feb-09		31			BirdLife
	Koh Thom	South of main channel in to Fishing Lot #11			27-feb-09	10:30	16			WCS Global Health Program
Tonle Sap Wetlands	Ang Trapeang Thmor		318266	1519069	28-feb-09	8:43	78			WCS
		Trapeang Toich Sakbai			28-feb-09	8:24	158			
		Trapeang Run (ATT)			28-feb-09	7:35	6	5	1	
	Kampong Thom Grasslands	Stoung-Chikraeng			27-feb-09	8:22	30			WCS
		Baray			27-feb-09		0			
		Kouk Preah Boeung Trea			27-feb-09		0			
Northern Forests	Kulen Promtep	Roneam Rorlum Chrey	446530	1565638	28-feb-09	7:00	3	2	1	WCS
		Veal Poo	452021	1543215	28-feb-09	7:30	1	1		
	Western Siem Pang	Trapeang Pronoprov	632550	1571823	27-feb-09	14:25	3	2	1	BirdLife

March Census

Landscape	Location	Site	UTM_E	UTM_N	Date	Time	Total	Adults	Juveniles	Coordinators	
Mekong Delta	Kampong Trach	Koh Anse	446905	1153985	29-3-09	6:00 - 7:15	33			BirdLife	
		Koh Treak	448537	1158095	29-3-09	6:00 - 7:15	40				
	Phu My	Roosting and feeding sites			29-3-09	5:00 – 7:30	152			International Crane Foundation	
	Boeung Prek Lapouv				28 & 29-3/-9		0			BirdLife	
	Koh Thom				28-3-09		0			WCS Global Health Program	
	Tram Chim NP				28 & 29-3-09		78			International Crane Foundation	
	Lang Sen				28 & 29-3-09		12			International Crane Foundation	
	Hon Chong				28 & 29-3-09		50			International Crane Foundation	
Tonle Sap Wetlands	Ang Trapeang Thmor	Kok Samrong			28-3-09	8:25	127			WCS	
		Kok Trach Toich			28-3-09	8:40	191				
		Doem Por Takeo			28-3-09	8:00	2				
	Preah-Net-Preah				29-3-09		10			ACCB	
	Kampong Thom Grasslands	Stoung-Chikraeng				27-3-09		37			WCS
		Baray				29-3-09		0			
Veal Srongai					27-3-09		0				
Northern Forests	Kulen Promtep				30-3-09		9	9		WCS	
	Preah Vihear PF	Veal Boeung Toal	555694	1539757	28-3-09		2	2		WCS	
		Roneam Chakiev	542897	1544279	29-3-09		2	2			
Western Siem Pang	Trapeang Thlok	628477	1569396	25-3-09	10:05	2	2		BirdLife		