



The status and distribution of large waterbirds in the Tonle Sap Biosphere Reserve, 2010 update

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Table of Contents

<i>Acknowledgements</i>	i
<i>Acronyms</i>	i
<i>ខ្លឹមសារសង្ខេប</i>	1
<i>Summary</i>	6
<i>Introduction</i>	9
Scope of the report	9
Data	10
Structure of the species accounts.....	11
<i>Species Accounts</i>	11
Lesser Adjutant	11
Greater Adjutant	13
Painted Stork	15
Milky Stork	17
Asian Openbill	18
Black-headed Ibis.....	20
Spot-billed Pelican	21
Oriental Darter	23
Black-necked Stork	25
Woolly-necked Stork	25
White-shouldered Ibis.....	26
<i>Discussion</i>	27
<i>References</i>	31
<i>Map Section</i>	32

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The cover photo was made by Eleanor Briggs. Maps were produced by Phu Chandy of the WCS Cambodia GIS unit.

Acronyms

ATT	Ang Trapeang Thmor
BCA	Biodiversity Conservation Area
BFCA	Bengal Florican Conservation Area
BTC	Boeung Tonle Chhmar
CA	Core Area
CI	Conservation International
FiA	Fisheries Administration
IUCN	International Union for the Conservation of Nature
MIST	Management Information SysTem
MoE	Ministry of Environment
TSBR	Tonle Sap Biosphere Reserve
TSCP	Tonle Sap Conservation Project
WCS	Wildlife Conservation Society

ខ្លឹមសារសង្ខេប

របាយការណ៍នេះរៀបរាប់បន្ថែមនូវព័ត៌មានថ្មីៗប្រចាំឆ្នាំស្តីពីស្ថានភាព និងរបាយការណ៍មុនៗដូចជាសត្វស្លាបទឹក ធំៗនៅក្នុង និងជុំវិញតំបន់បំបន្ថយជីវមណ្ឌលបឹងទន្លេសាប ។ របាយការណ៍មុនៗបានរៀបរាប់លម្អិតស្តីពីការពិនិត្យឡើងវិញលើប្រវត្តិនៃស្ថានភាព និងរបាយការណ៍មុនៗដូចជាសត្វស្លាបទឹកធំៗមកដល់ត្រីមាសខែកក្កដា ឆ្នាំ២០០៨ និងរបាយការណ៍បន្ថែមប្រចាំឆ្នាំចាប់ពីខែកក្កដា ឆ្នាំ២០០៨ ដល់ខែមិថុនា ឆ្នាំ២០០៩ ។ រីឯរបាយការណ៍ថ្មីនេះរៀបរាប់អំពីព័ត៌មានដែលប្រមូលក្នុងចន្លោះខែកក្កដា ឆ្នាំ២០០៩ ដល់ខែមិថុនា ឆ្នាំ២០១០ តាមរយៈការងារពិនិត្យតាមដានយ៉ាងទៀងទាត់នៅក្នុង និងជុំវិញតំបន់ទីជម្រកសំខាន់ៗជាច្រើន ជាពិសេសតំបន់ស្នួលព្រែកទាស់ បឹងទន្លេឆ្មារ ស្ទឹងសែន ដែលស្ថិតនៅក្នុងព្រៃលិចទឹកបឹងទន្លេសាប ហើយតំបន់វាលស្រងែ និងតំបន់អភិរក្សសត្វឱប(BFCAs) ដែលមានទីតាំងស្ថិតនៅតំបន់វាលស្មៅទំនាបលិចទឹកដែលស្ថិតនៅជាប់នឹងតំបន់ព្រៃលិចទឹក ។ របាយការណ៍នេះនឹងពិនិត្យមើលទៅលើប្រភេទសត្វស្លាបទឹកធំៗសំខាន់ៗដូចជា៖ ត្រដក់តូច (*Leptoptilos javanicus*) ត្រដក់ធំ (*Leptoptilos dubius*) រនាឈពណ៌ (*Mycteria leucocephala*) រនាឈស (*Mycteria cinerea*) ក្រៀលខ្យង (*Anostomus oscitans*) ត្រយ៉ង់ខ្លួនស (*Threskiornis melanogaster*) ទុងប្រផេះ (*Pelecanus philippensis*) ស្មៅព្យ (*Anhinga melanogaster*) ដំបងក្រព្យង វីអង្កត់ខ្មៅ (*Ephippiorhynchus asiaticus*) កុកពាក់អំបោះ វីសត្វកសរ (*Ciconia episcopus*) និងត្រយ៉ង់ចំកំស (*Pseudibis davisoni*) ។

គោលបំណងសំខាន់ៗនៃការពិនិត្យតាមដានប្រចាំឆ្នាំនេះមានដូចជា៖

- ១) ដើម្បីស្វែងយល់ឱ្យកាន់តែប្រសើរឡើងនូវវត្តមានតាមរដូវកាល និងរបាយរបស់សត្វស្លាបទឹកសំខាន់ៗនៅក្នុងតំបន់បំបន្ថយជីវមណ្ឌលបឹងទន្លេសាប (TSBR)
- ២) ដើម្បីធ្វើការវាយតម្លៃនូវសារៈសំខាន់តំបន់ការពារ និងតំបន់មិនមែនជាតំបន់ការពារ ដែលជាទីកន្លែងរកចំណីសំរាប់សត្វស្លាបដែលមិនពេញនៅក្នុងតំបន់បឹងទន្លេសាប និងតំបន់រកចំណីរបស់ពួកវានៅមុន និងក្រោយរដូវពេញកូន
- ៣) ដើម្បីធ្វើការកំណត់នូវការប្រមូលផ្តុំគ្នាខុសប្រក្រតី ដែលអាចបង្ហាញឱ្យដឹងពីវត្តមានបន្ទាយពេញកូន ដែលមានក្រៅពីតំបន់ព្រែកទាស់

- ៤) ដើម្បីធ្វើការកំណត់នូវវត្តមាននៃការគ្របដណ្តប់ទិន្នន័យ និងតម្រូវការនៃការសិក្សាស្រាវជ្រាវ និងអង្កេតតាមដាន ដែលត្រូវអនុវត្តបន្ថែមទៀត
- ៥) ដើម្បីធ្វើការកំណត់អំពីកត្តាគំរាមកំហែងនានា ដែលប្រភេទសត្វទាំងអស់នោះកំពុងប្រឈមមុខ នៅក្នុងតំបន់ បំប៉ននីយជីវមណ្ឌលបឹងទន្លេសាប ក្រៅពីតំបន់បន្ទាយពងកូននៅព្រែកទាស់

១. វត្តមាន និងរបាយការណ៍ប្រភេទ

វត្តមានរបស់ប្រភេទទាំងអស់នោះ ជាទូទៅពិនិត្យឃើញថាមានលក្ខណៈប្រហាក់ប្រហែលនឹងការសិក្សាស្រាវជ្រាវ ដែលបានរកឃើញនៅឆ្នាំមុនៗ ប៉ុន្តែបច្ចុប្បន្ននេះយើងទទួលបានព័ត៌មានលម្អិតបន្ថែមទៀត ជាពិសេសសំរាប់ព័ត៌មាន តំបន់ស្នួលបឹងទន្លេសាប និងតំបន់ស្នួលស្ទឹងសែន ដែលការប្រមូលទិន្នន័យបានកើនឡើងការរាប់ចំនួនសត្វច្រើនជាងឆ្នាំ មុនៗ តាមរយៈការកើនឡើងការងាររបស់ក្រុមល្បាត ។

បំប៉ននីយជីវមណ្ឌលបឹងទន្លេសាបជាតំបន់ពងកូនសំខាន់បំផុត សំរាប់ប្រភេទសត្វដែលពងកូនជាបន្ទាយ

តំបន់ស្នួលព្រែកទាស់ គឺជាបន្ទាយពងកូនសំខាន់បំផុតសំរាប់ប្រភេទសត្វស្លាបទឹកធំៗ ៨ ប្រភេទ ។ ក្រៅពីតំបន់នេះ នៅមានមួយ រឺពីរតំបន់ទៀតក៏សំខាន់ផងដែរ សំរាប់ប្រភេទសត្វស្លាប និងសត្វត្រដក់តូចៗ សត្វស្លាបភាគច្រើនបាន ប្រមូលផ្តុំនៅតាមបន្ទាយពងកូននៅរដូវបន្តពូជ ហើយសំរាប់ប្រភេទដែលមិនទាន់បន្តពូជ គេសង្កេតឃើញមាននៅរាយ ប៉ាយជុំវិញតំបន់បឹងទន្លេសាប (ឧទាហរណ៍ ត្រដក់តូច) រឺនៅតាមតំបន់រកចំណីសំខាន់ៗមួយចំនួន (ឧទាហរណ៍ ទុងប្រផេះ) ។ ការផ្លាស់ទីរបស់សត្វទាំងនោះបន្ទាប់ពីរដូវពងកូន មានការប្រែប្រួលខ្លាំងអាស្រ័យទៅតាមប្រភេទសត្វ នីមួយៗ ។ សត្វស្លាប ទុងប្រផេះ និងចង្កៀលខ្យង បង្ហាញខ្លួនស្របពេលដូចគ្នានៅក្នុងតំបន់ទំនាបលិចទឹក ហើយចំនួន មួយផ្នែកតូចនៃប្រភេទសត្វទាំងនេះ ហាក់បីដូចជារស់នៅពេញមួយឆ្នាំនៅក្នុងតំបន់ទំនាបលិចទឹកនេះតែម្តង ។ រីឯសត្វ ត្រដក់តូច និងត្រដក់ធំ ពួកវាក៏ចូលចិត្តរស់នៅតំបន់ទំនាបលិចទឹកនេះច្រើនបង្អួចផងដែរ ប៉ុន្តែពួកវាមួយចំនួនតូចក៏រស់ នៅពេញមួយឆ្នាំនៅក្នុងតំបន់ទំនាបលិចទឹកនេះផងដែរ ។ ចំពោះសត្វរនាសពណ៌ និងត្រយ៉ង់ខ្លួនស ពួកវាហាក់បីដូចជា បំណាស់ចេញពីតំបន់ទំនាបលិចទឹកយ៉ាងលឿននៅពេលដែលកម្ពស់ទឹកកើនឡើង ទោះជាយ៉ាងនេះក្តី នៅចុងរដូវទឹកជំនន់ វត្តមានរបស់សត្វត្រយ៉ង់ខ្លួនសមួយចំនួនតូច ត្រូវបានគេឃើញស្ថិតនៅផ្នែកខាងត្បូងឈៀងខាងកើតនៃតំបន់ទំនាបលិច ទឹក ។ ចំណែកឯសត្វរនាស (ដែលចំនួនរបស់ពួកវាមានតិចជាងគេ) ការបំណាស់ទីរបស់ពួកវាក៏នៅមិនទាន់ដឹង ច្បាស់នៅឡើយ ។ ព័ត៌មានលម្អិតសំរាប់ប្រភេទសត្វនីមួយៗក៏បានបង្ហាញផងដែរនៅក្នុងរបាយការណ៍នេះ ។

ប្រភេទដែលមិនពេញលេញជាបន្ទាយ ដែលពេញលេញនៅក្នុងតំបន់បំប៉ននីយជីវមណ្ឌលបឹងទន្លេសាប ប៉ុន្តែមានកំណត់ត្រាតិចតួច

មានសត្វស្លាបបីប្រភេទនៅក្នុងក្រុមនេះ ។ នៅកំឡុងពេលធ្វើការសិក្សាស្រាវជ្រាវ សត្វកស វីកុកពាក់អំបោះ និងអង្កត់ខ្មៅ ត្រូវបានគេសង្កេតឃើញមានចំនួនតិចនៅតំបន់ដែលជាប់វាលទំនាបលិចទឹក ហើយចំនួនរបស់ពួកវាមានវត្តមានច្រើននៅរដូវប្រាំង ។ សត្វទាំងពីរប្រភេទនេះពេញលេញ វិធានពេញលេញក្នុងតំបន់នេះក្នុងចំនួនតិច ។ នៅក្នុងឆ្នាំនេះសត្វត្រយ៉ង់ចំកំស ត្រូវបានគេកត់ត្រាមានវត្តមាននៅខែមីនា នៅតំបន់វាលស្រែដំរី ដែលស្ថិតនៅខាងត្បូងឈៀងខាងកើតនៃវាលទំនាបលិចទឹកបឹងទន្លេសាប ។ ប្រភេទទាំងនេះប្រហែលជាពេញលេញនៅក្នុងតំបន់បំប៉ននីយជីវមណ្ឌលបឹងទន្លេសាបផងដែរ ប៉ុន្តែមានក្នុងចំនួនតិច ។

២. សារៈសំខាន់នៃតំបន់

ទិន្នន័យបានបង្ហាញឱ្យដឹងថា **តំបន់ស្នូលបឹងទន្លេសាប** គឺជាតំបន់សំខាន់សំរាប់ការរកចំណីនៅរដូវប្រាំង និងដើមរដូវវស្សារបស់ប្រភេទសត្វស្លាបទឹកធំៗភាគច្រើន ដែលពេញលេញជាបន្ទាយនៅតំបន់បំប៉ននីយជីវមណ្ឌលបឹងទន្លេសាប និងសំរាប់ប្រភេទភាគច្រើននៅក្រោយរដូវបន្តពូជដូចជា សត្វត្រដក់តូច រនាសពណ៌ ចង្កៀលខ្យង ទុងប្រផេះ និងស្មោញជាដើម ។ **តំបន់ស្នូលស្ទឹងសែន** ហាក់ដូចជាត្រូវបានប្រើប្រាស់ដោយហ្វូងសត្វស្លាបទឹកនៅរដូវវស្សាច្រើនជាងរដូវប្រាំង ។ កំណត់ត្រាទិន្នន័យមួយចំនួនដែលប្រមូលបាននៅក្នុងរដូវមិនពេញលេញនៅក្បែរតំបន់វាលស្រែដំរី ហាក់បីដូចជាបង្ហាញឱ្យដឹងថា ជាទូទៅនៅផ្នែកខាងត្បូងឈៀងខាងកើតនៃតំបន់នេះ អាចជាទីជម្រកដ៏សំខាន់មួយសំរាប់ប្រភេទសត្វស្លាបទឹកធំសំខាន់ៗទាំងនេះ ។ **តំបន់បារាយ** មានវត្តមានគួរឱ្យកត់សម្គាល់របស់ប្រភេទសត្វស្លាបទឹកសំខាន់ៗទាំងនេះ បានផ្លាស់ទីមកនៅដើមរដូវប្រាំង និងរដូវវស្សា ។ បច្ចុប្បន្នតំបន់នេះក៏សំខាន់ខ្លាំងផងដែរ សំរាប់វត្តមានសត្វអង្កត់ខ្មៅនៅក្នុងតំបន់បំប៉ននីយជីវមណ្ឌលបឹងទន្លេសាប ដែលក្នុងឆ្នាំនេះរាល់កំណត់ត្រាទាំងអស់ ត្រូវបានគេប្រមូលមកពីតំបន់នេះតែមួយគត់ក្នុងនោះមានមួយកន្លែងទំនងជាតំបន់ពេញលេញរបស់វា ។ នៅផ្នែកខាងត្បូងឈៀងខាងកើត ក៏នៅតែបន្តជាកន្លែងតែមួយគត់នៃតំបន់វាលទំនាបលិចទឹក ដែលវត្តមានរបស់សត្វត្រយ៉ង់ចំកំស ត្រូវបានគេប្រទះឃើញ ។ **តំបន់ព្រែកទាល់** ប្រាកដណាស់តំបន់នេះគឺជា តំបន់ទីជម្រកពេញលេញដ៏មានសារៈសំខាន់បំផុត ហើយក៏ជាទីជម្រកដ៏សំខាន់បំផុតសំរាប់ក្រុមសត្វទុងប្រផេះ ស្មោញ និងត្រដក់តូចមួយចំនួន ដែលពួកវាវាស់នៅក្នុងតំបន់នេះស្ទើរតែពេញមួយឆ្នាំ ។

៣. ការប្រមូលផ្តុំគ្នារបស់សត្វស្លាបទឹកធំៗក្រុមទាំងអស់កំណត់ពីវត្តមាននៃបន្ទាយពេញលេញរបស់ពួកវា

តំបន់បឹងទន្លេសាប គួរតែត្រូវបានធ្វើការសិក្សាស្រាវជ្រាវតាមដាន ដើម្បីពិនិត្យស្វែងរកសំបុកពេញលេញរបស់សត្វស្លាបសំខាន់ៗដូចជា (តំបន់មាត់ខ្លា) ដែលធ្លាប់មានបន្ទាយពេញលេញនៅទីនោះកាលពីមុន ។ និងមានរបាយការណ៍មួយចំនួនបាន

បង្ហាញឱ្យដឹងពីចំនួនខ្ពស់នៃកំណត់ត្រាទិន្នន័យដែលបានធ្វើឡើងក្នុងរដូវពេញវិញ្ញាណក្ខន្ធ២០១០ (ដែលរួមមានសត្វត្រជក់ទាំង ពីរប្រភេទ-ត្រជក់តូច និងត្រជក់ធំ) និងកូនសត្វត្រជក់តូចត្រូវបានគេប្រទះឃើញនៅក្នុងភូមិក្បែរតំបន់នោះ។ តំបន់**ដីរ នាត** ដែលជាកន្លែងធ្លាប់មានសត្វស្មោញ និងត្រជក់តូចពងកូនជារៀងរាល់ឆ្នាំនោះឥឡូវក្នុងឆ្នាំនេះ គឺពុំមានទិន្នន័យ ពីការពងកូនរបស់ពួកវាទៀតទេ។

ការប្រមូលផ្តុំទាំងមុន និងក្រោយរដូវពេញវិញ្ញាណក្ខន្ធនៃសត្វស្មោញនៅក្នុងតំបន់ស្នួលស្ទឹងសែន ក៏អាចបង្ហាញឱ្យដឹងថា ប្រហែលជាមានបន្ទាយពងកូនតូចៗនៅក្បែរនោះ និងយកល្អគួរតែធ្វើការសិក្សាស្រាវជ្រាវ និងតាមដានព័ត៌មានរបស់ ពួកវាដែលអាចរាយការណ៍ដោយប្រជាជនរស់នៅក្បែរតំបន់នោះ។

៤. ការខ្វះខាតនៃការសិក្សាស្រាវជ្រាវ

ការពង្រឹងសកម្មភាពចុះល្បាត និងអនុវត្តកម្មវិធី MIST នៅក្នុងតំបន់ស្នួលទាំងបី បានបំពេញភារកិច្ចនៃការ កត់ត្រាទិន្នន័យភាគច្រើន ដែលពីមុនពុំទាន់មានប្រព័ន្ធគ្រប់គ្រងទិន្នន័យច្បាស់លាស់ទេ។ ដោយរួមបញ្ចូលជាមួយនឹងការ ពិនិត្យតាមដានដែលកំពុងបន្តនៅតំបន់អភិរក្សសត្វឱប ទាំងនេះមានន័យថា តំបន់សំខាន់ៗដែលគេស្គាល់ភាគច្រើនស្ថិត នៅផ្នែកខាងជើង ខាងកើត ខាងត្បូងឈៀងខាងកើត គឺត្រូវបានធ្វើការស្រាវជ្រាវស្ទើរគ្រប់ទីកន្លែងរួចមកហើយ។ ទោះជាយ៉ាងណាក៏ដោយមានការស្រាវជ្រាវតិចតួចនៅឡើយនៅ**ផ្នែកខាងលិចនៃតំបន់វាលទំនាបលិចទឹក**។ នាពេលថ្មីៗ នេះ រដ្ឋបាលជលផល និងអង្គការអភិរក្សអន្តរជាតិ បានអនុវត្តកម្មវិធីមីស (MIST) នៅក្នុងតំបន់**អភិរក្សត្រីមេពូជ កំពង់ប្រាក់** និងតំបន់អភិរក្សជីវចម្រុះនៅក្នុងខេត្តពោធិសាត់ ដែលនេះជាការងារដ៏ល្អមួយក្នុងការជួយផ្តល់ព័ត៌មាន បន្ថែមស្តីពីស្ថានភាពបំណាច់ទីរបស់សត្វស្លាបទឹកធំៗនៅក្នុងតំបន់បឹងទន្លេសាប លើសពីនេះទៅទៀតវាក៏ជាការល្អផងដែរ ប្រសិនបើមន្ត្រីឧទ្យានុរក្សនៅតំបន់ដីរនាត អាចកត់ត្រាប្រមូលព័ត៌មានទាំងនេះថែមទៀតពីតំបន់នេះ។ នៅផ្នែកខាង ត្បូងឈៀងខាងកើតនៃតំបន់វាលទំនាបលិចទឹក ទោះបីជាតំបន់នេះជាផ្នែករបស់តំបន់ស្នួលស្ទឹងសែន តំបន់បារាយ (តំបន់អភិរក្សសត្វឱប) និងតំបន់វាលស្រងែក៏ដោយ ប៉ុន្តែតំបន់ទាំងនេះនៅហាក់បីដូចជាមិនទាន់ត្រូវបានការពារ និង ធ្វើការសិក្សាស្រាវជ្រាវឱ្យបានជាក់លាក់នៅឡើយទេ។ ការបណ្តុះបណ្តាលមន្ត្រីឧទ្យានុរក្សឱ្យចេះប្រមូលទិន្នន័យសត្វ ស្លាបទឹកធំៗនៅក្នុងតំបន់អភិរក្សជីវចម្រុះព្រៃកោះ នឹងកាន់តែសំខាន់ និងល្អប្រសើរបំផុតសំរាប់ការសិក្សាស្រាវជ្រាវ នេះ។ ការសិក្សាស្រាវជ្រាវបន្ថែមក្នុងរដូវវស្សានៅតាមតំបន់ទាំងនេះ ជាពិសេសនៅតាមតំបន់ខាងក្រៅតំបន់ការពារ ប្រហែលអាចជាតំបន់ដែលវត្តមានសត្វត្រជក់ចំណាស់ និងអាចធ្វើឱ្យយើងដឹងពីតំបន់សំខាន់ៗដទៃទៀតដែលអាចជា ទីជម្រកសំខាន់របស់ប្រភេទសត្វស្លាបទឹកដែលកំពុងទទួលរងគ្រោះថ្នាក់ជាសកល។

៥. ការគំរាមកំហែង

កត្តាគំរាមកំហែងចម្បងនានាទៅលើសត្វស្លាបទឹកធំៗខាងលើនេះ ត្រូវបានសង្ខេបនៅក្នុងរបាយការណ៍នេះ ។ នេះមិនមែនមានន័យថារបាយការណ៍នេះ បានរៀបរាប់លម្អិតគ្រប់បញ្ហាទាំងអស់នោះទេ ប៉ុន្តែវាអាចឱ្យយើងដឹងបញ្ហាគំរាមកំហែងចម្បងខ្លះៗដែលយើងបានជួបក្នុងពេលសិក្សាស្រាវជ្រាវកន្លងមក ។ មានការបាត់បង់ច្រើនចំពោះការអភិវឌ្ឍន៍ដែលគ្មានការគ្រប់គ្រងច្បាស់លាស់ ដែលកំពុងបន្តអនុវត្តនៅតាមតំបន់នានាក្បែរវាលទំនាបលិចទឹកដែលបំផ្លាញនូវជម្រកសត្វសំខាន់ៗជាច្រើន និងអាចមានផលប៉ះពាល់ជាអវិជ្ជមានដល់ប្រព័ន្ធអេកូឡូស៊ីដូចជា ការសាងសង់ទំនប់ និងការកសាងបណ្តាញធារាសាស្ត្រដែលរាំងស្ទះដល់ចរន្តទឹកហូរ និងការផ្លាស់ទីរបស់ត្រី និងការប្រើប្រាស់ច្រើនហួសហេតុនូវសារធាតុគីមីដែលអាចបំពុលបរិស្ថាន និងសំលាប់នូវសារពាង្គកាយមានជីវិតជាច្រើន ។ ការកើនឡើងទំនាក់ទំនងរវាងមនុស្សនិងសត្វ គឺមិនបានផ្តល់ផលប្រយោជន៍ដល់សត្វនោះទេ ហើយជាលទ្ធផលការគំរាមកំហែងដោយសារការបរាជ័យអាចនឹងមានការកើនឡើង ។ ថ្មីៗនេះរាជរដ្ឋាភិបាលកម្ពុជា បានដាក់ចេញនូវបទបញ្ជាដើម្បីជំរុញឱ្យមានការពង្រឹងការការពារតំបន់វាលទំនាបលិចទឹកនៅជុំវិញបឹងទន្លេសាបឡើងវិញ ដែលគេសង្ឃឹមថាបទបញ្ជានេះនឹងមានប្រសិទ្ធភាពគ្រប់គ្រាន់ក្នុងការលុបចេញ និងទប់ស្កាត់រាល់សកម្មភាពបំផ្លាញបំផ្លាញនានា ដែលបានកើតមានឡើងយ៉ាងអនាធិបតេយ្យនៅក្នុងកំឡុងពេល ៥ឆ្នាំកន្លងមកនេះ ។

សកម្មភាពវិនាសនៅតាមបន្ទាយពងកូន ដោយសកម្មភាពចរាចរណ៍ត្រូវបានធ្វើដំណើរឆ្លងកាត់ និងការនេសាទ រួមទាំងការនេសាទពេលយប់ដោយប្រើប្រាស់ពិលឆ្កុះនៅក្បែរបន្ទាយពងកូន នៅក្នុងឆ្នាំនេះបានប៉ះពាល់ដល់បន្ទាយពងកូនរបស់សត្វស្លាប ។ នៅក្នុងរបាយការណ៍ឆ្នាំមុន បានរៀបរាប់ពីការ**បំពុលសត្វ និងការប្រមូលពងសត្វ** នៅក្នុងតំបន់ស្នួលបឹងទន្លេឆ្មារ ។ រីឯការរាយការណ៍អំពីកូនសត្វត្រងក់ ពីភូមិមួយនៅភាគខាងជើងក្បែរតំបន់ស្នួលក៏បានបង្ហាញឱ្យដឹងពីការវិនាសដែលនៅតែកើតមានឡើងនៅក្នុងតំបន់នោះផងដែរ ។ សកម្មភាពគំរាមកំហែងបែបនេះទំនងជាអាចកើតមាននៅទីកន្លែងជាច្រើនផ្សេងទៀតផងដែរ ។ សកម្មភាព**នេសាទខុសច្បាប់ជាច្រើន** បានកើតមានឡើងជាដដែលៗនៅពេញតំបន់ទំនាបលិចទឹក សូម្បីតែតំបន់ស្នួលព្រែកទាល់ក៏ទទួលរងការវិនាសដោយសកម្មភាពបំផ្លាញទាំងនេះផងដែរ ។

សកម្មភាព**បរាជ័យសត្វ**ដោយកាំភ្លើង ច្បួក មង រឺអង្កប់ មិនត្រូវបានគេរាយការណ៍ញឹកញាប់នោះទេ ប៉ុន្តែប្រភេទសត្វស្លាបទឹកជាច្រើនរាប់បញ្ចូលទាំងប្រភេទដែលមាននៅក្នុងរបាយការណ៍នេះ នៅតែឃើញមានដាក់លក់នៅតាមទីផ្សារក្នុងភូមិ និងទីប្រជុំជននៅជុំវិញតំបន់បឹងទន្លេសាប ។

នៅមានការងារជាច្រើនពុំទាន់ត្រូវបានធ្វើឡើងដើម្បីពង្រឹងការងារគ្រប់គ្រង និងត្រួតពិនិត្យទៅលើសកម្មភាពបំផ្លាញបំផ្លាញទាំងនោះនៅឡើយទេ ។

Summary

This report is an annual update of the seasonal status and distribution of large waterbirds in and around the Tonle Sap Biosphere Reserve (TSBR). Preceding reports are a full historical review up to July 2008 and the annual update for the period July 2008 – June 2009. This review examines records collected from July 2009 to June 2010 through regular monitoring work in and around several key sites, in particular Prek Toal, Boeung Tonle Chhmar and Stung Sen Core Areas within the inner flooded forest zone, and Veal Srongai and the Bengal Florican Conservation Areas (BFCAs) located in floodplain grasslands bordering on the flooded forest zone. The review covers Lesser Adjutant (*Leptoptilos javanicus*), Greater Adjutant (*Leptoptilos dubius*), Painted Stork (*Mycteria leucocephala*), Milky Stork (*Mycteria cinerea*), Asian Openbill (*Anastomus oscitans*), Black-headed Ibis (*Threskiornis melanocephalus*), Spot-billed Pelican (*Pelecanus philippensis*), Oriental Darter (*Anhinga melanogaster*), Black-necked Stork (*Ephippiorhynchus asiaticus*), Woolly-necked Stork (*Ciconia episcopus*) and White-shouldered Ibis (*Pseudibis davisoni*).

The main objectives of the annual review are:

- 1) To get a better understanding of seasonality of occurrence and abundance in the TSBR
- 2) To assess the significance of the protected and unprotected areas as feeding sites for non-, pre- or post-breeding birds
- 3) To highlight unusual bird aggregations that may indicate the presence of colonies other than those in Prek Toal
- 4) To identify gaps in data coverage and further survey or monitoring needs
- 5) To highlight threats faced within the TSBR away from the main colony site at Prek Toal

1. Seasonality of occurrence and abundance

The pattern of occurrence for all species was generally similar to that found during the previous reviews, but more data are now available, especially for the Boeung Tonle Chhmar and Stung Sen Core Areas, where patrol effort had increased significantly resulting in many more sightings than in previous years.

Colonial species for which the TSBR is a major breeding area

The main colonies for the eight species in this group are at Prek Toal Core Area, with one or two other sites for Oriental Darters and Lesser Adjutants. Most birds are concentrated at the colonies during the breeding season, with non-breeders either scattered around the lake (e.g. Lesser Adjutant) or concentrated at a few key feeding sites (e.g. Spot-billed Pelican). The pattern of movements after the breeding season varies strongly depending on the species. Oriental Darter, Spot-billed Pelicans and Asian Openbills show the most affinity with the inner floodplain and a significant part of these populations likely remain in the floodplain throughout the year. Lesser and Greater Adjutants are intermediate, favouring the inner floodplain but less confined to inundated areas, but also with part of the population remaining in the floodplain throughout the year. Painted Storks and Black-headed Ibis seem to move out of the floodplain fairly rapidly as water levels rise, although a small part of the Black-headed Ibis population has been seen in the southeastern corner of the floodplain late in the flood season. The movements of the

small Milky Stork population are still unclear. A detailed review for each species is presented in the text.

Non-colonial species which breed in the TSBR but with few records so far

There are three species in this group. In the study period Woolly-necked Stork and Black-necked Stork were found mainly in the outer floodplain and almost exclusively in the dry season. Both also breed, or have bred, in very small numbers. This year White-shouldered Ibis were only recorded in March from Veal Srongai, in the southeastern corner of the floodplain. They likely breed in the TSBR in low numbers.

2. Significance of sites

The data confirm that **Boeung Tonle Chhmar** is an important feeding site in the dry season and early wet season for many large waterbirds that breed colonially in the TSBR and for post-breeding flocks of Lesser Adjutants, Painted Storks, Asian Openbills, Spot-billed Pelicans and Oriental Darters. The **Stung Sen Core Area** seemed to be mostly visited by waterbirds in the non-breeding season. This coupled with records from the non-breeding period in nearby **Veal Srongai** seems to indicate that this general area in the southeastern floodplain may contain significant numbers of several threatened species during this period. The **Baray** area has significant numbers of colonial breeding species moving through in the early dry season and early wet season. It is also currently the most important known site for Black-necked Stork in the TSBR, with all records coming only from here this year and one potential attempt at breeding reported. The southeastern corner also continues to be the only part of the floodplain where White-shouldered Ibis are found. **Prek Toal** is of course the most important breeding site, but it also has significant numbers of Spot-billed Pelican, Oriental Darter and Lesser Adjutant staying in the area throughout much of the year.

3. Large aggregations that may indicate presence of a breeding colony

The **Boeung Tonle Chhmar** area deserves some specific searches during the breeding season to check for nesting birds, as the area (including Moat Khla) has had breeding colonies in the past, there were several reports of high numbers of birds in the 2010 breeding season (including both species of Adjutant) and Lesser Adjutant chicks were found in a village nearby. No data was obtained from **Dey Roneath** this year, where both Oriental Darters and Lesser Adjutants may be attempting to breed each year.

The post- and pre-breeding aggregations of Oriental Darters at **Stung Sen CA** could also indicate a small colony nearby and it is worth conducting searches and following up on any local reports in this area.

4. Gaps in coverage

The enhanced patrolling and implementation of MIST in all Core Areas has closed previous gaps in data from these sites. Together with the ongoing monitoring of the BFCAs this means that many of the known key sites in the north, east and southeast are fairly well covered. However, data from the **western side of the floodplain** is as yet scarce. The FiA and Conservation International have recently started implementing MIST at the Kampong Prak Fish Sanctuary and Biodiversity Protection Area in Pursat which will partly fill the gap, but it would be good to have rangers collecting and reporting information from such areas as Dey Roneath as well. The **southeastern corner** of the

floodplain, although partly covered by Stung Sen Core Area, Baray BFCAs and Veal Strongai, still seems to hold as yet undisclosed secrets. Training rangers to collect information while working in the **Prey Kohs** Biodiversity Conservation Area would be very useful. Conducting additional surveys during the wet season in this general area, but away from the well monitored sites might pinpoint the main location of the White-shouldered Ibis population and help build an understanding about the broader importance of this area for a wide variety of threatened waterbirds.

5. Threats

The main threats are summarized here. It is not in the purview of this report to go into detail on the issues mentioned. **Uncontrolled developments in the outer floodplain** are destroying much important habitat and may also have negative impacts on the overall ecosystem as dams and irrigation channels obstruct water flow and fish migration, while heavy use of chemicals may pollute the environment and kill many living organisms. The increased contact between people and wildlife is not to the benefit of wildlife and hunting pressure may be increasing as a result. The national government has recently taken steps to enhance the protection of the floodplain and it is the hope that these will be sufficiently strong and well regulated so as to cancel out the destructive trend witnessed over the past five years.

Disturbances to colonies by motorboat traffic and fishing activities, including night fishing with spotlights, in close proximity to colonies affected Oriental Darters this season. In last year's report the use of **poisons** and **egg collection** within the Boeung Tonle Chhmar Core Area was mentioned. The report of Adjutant chicks in a village to the north of the CA indicates that at least the persecution of breeding birds is still occurring. Such practices are also likely to occur elsewhere. A lot of **illegal fishing** practices are routinely employed throughout the floodplain and even Prek Toal is not exempt from such destructive methods.

Incidents of **hunting** with guns, spears, nets or traps are not often reported but many species of waterbirds, including the ones treated in this report are still sold at markets in villages and towns around the lake.

There is yet a lot of work to be done to get the extensive application of destructive practices under control.

Introduction

Scope of the report

This report provides an overview of the distribution of waterbirds in the Tonle Sap Biosphere Reserve (TSBR) for the period July 2009 – June 2010. Similar reports have been made for the periods 07/08 and 08/09. The species reviewed are shown in Table 1. The colonies in the Prek Toal Core Area are for most species the only breeding site known in the TSBR and have been monitored for around one decade now (Goes 2005, Clements *et al.* 2007, Sun Visal *et al.* 2010).

Table 1. Species reviewed in this report

Species	IUCN Global Threat Category [^]	Bred at Prek Toal 2009/10?
Lesser Adjutant (<i>Leptoptilos javanicus</i>)	Vulnerable	Yes
Greater Adjutant (<i>Leptoptilos dubius</i>)	Endangered	Yes
Painted Stork (<i>Mycteria leucocephala</i>)	Near-threatened	Yes
Milky Stork (<i>Mycteria cinerea</i>)	Vulnerable	Yes
Asian Openbill (<i>Anastomus oscitans</i>)	Least Concern	Yes
Black-headed Ibis (<i>Threskiornis melanocephalus</i>)	Near-threatened	Yes
Spot-billed Pelican (<i>Pelecanus philippensis</i>)	Near-threatened	Yes
Oriental Darter (<i>Anhinga melanogaster</i>)	Near-threatened	Yes
Black-necked Stork (<i>Ephippiorhynchus asiaticus</i>)	Near-threatened	No
Woolly-necked Stork (<i>Ciconia episcopus</i>)	Least Concern	Yes
White-shouldered Ibis (<i>Pseudibis davisoni</i>)	Critically Endangered	No

[^]BirdLife International (2010)

The main objectives for conducting this annual review for the above species are:

- 1) To monitor seasonality of occurrence and abundance in the TSBR
- 2) To monitor the significance of particular sites for non-, pre- or post-breeding birds
- 3) To highlight unusual bird aggregations during the breeding season that may indicate the presence of colonies other than those in Prek Toal
- 4) To identify gaps in data coverage and further survey or monitoring needs
- 5) To highlight threats faced within the TSBR away from the main colony site at Prek Toal

Other monitoring reports in this series of annual reports for the Tonle Sap Conservation Project address the status of other species, e.g. Bengal Floricans (van Zalinge *et al.* 2010a), Sarus Cranes *Grus antigone* (van Zalinge *et al.* 2010b) and the multi-species breeding colonies at Prek Toal (Sun Visal *et al.* 2010).

Data

Most of the data used in this report are from long-term monitoring work at sites where conservation work is being implemented. This includes the TSBR Core Areas and the BFCAs. These sites are located in the eastern and northern floodplain. MIST, a system of data collection from patrols, is now being implemented in all the Core Areas allowing us to look at the seasonal use of these sites by the target species.

Such continuous monitoring of the sites over time will give us a much better understanding of seasonal patterns and allow us to see trends in the numbers of birds using the Core Areas. Only MIST data from Prek Toal has been used, as the colony monitoring data are reported separately (Sun Visal *et al.* 2010) – we do however present the population estimate from this monitoring data to provide an indication of the number of birds present at Prek Toal in the breeding season. In 2007, through aerial mapping of the entire colony, the total Prek Toal breeding population for all species (except Black-headed Ibis) was estimated, however, in subsequent years only partial estimates of the colony could be generated as the ground-based counts provide incomplete coverage of the Core Area. The trend in this partial estimate is used as an index for the status of the colony as a whole.

Due to changes to the protected area system in the floodplain grasslands that took place in February 2010, the former Veal Srongai Integrated Farming and Biodiversity Area (IFBA) is now no longer protected and patrolled. However the area was visited in March 2010 and records from this trip have been included along with patrol data from July-December 2009. All other IFBAs remain protected and are now termed Bengal Florican Conservation Areas (BFCAs). Within the Baray-Chong Doung and Stoung-Chikraeng BFCAs data on target species are collected by patrol teams during continuous monthly patrols. Additional data have also been used from the Asian Waterfowl Census for Preah Net Preah, an otherwise little visited grassland site in Banteay Meanchey province.

For a better understanding of bird movements around the Tonle Sap Lake as a whole it would be helpful to receive records from the southern/western side of the lake in the future. Conservational International (CI) provided initial records for the Kampong Prak Fish Sanctuary and Biodiversity Protection Area in Pursat and have recently started implementing MIST at this site and hopefully any future versions of this report will include records from this area. Due to a lack of time before finalizing this report any CI records used are mentioned in the text only and have not been incorporated in the maps and graphs.

Patrol effort

Through the examination of monthly patrol effort data collected by MIST, such as the number of patrol days and the total kilometers travelled, for both the 2008/09 and the 09/10 seasons it became clear that patrol effort more than doubled in Boeung Tonle Chhmar and quadrupled in Stung Sen CA. This has provided us with much more data to work with in 09/10 and a better picture emerges of waterbird distribution. However, there were some variations in coverage. In Boeung Tonle Chhmar patrol effort was much lower in April and May, while in Stung Sen CA relatively few patrols were conducted in July. The BFCAs in the floodplain grasslands are only patrolled a third as much in the months of July-December as they are in the months of January-June, due to access

difficulties. As mentioned earlier, Veal Srongai was only visited in seven months of the year.

Structure of the species accounts

Each species account starts with a brief update on breeding status in the TSBR obtained from the colony monitoring work, when applicable (see also Sun Visal *et al.* 2010). For species with many records an overview is first given by means of a chart. For all species a map has been made that shows the distribution of records (maps can be found in the map section at the end of the report) and detailed data are presented for sites where the species has been recorded regularly. The site records are followed by a review and/or comments on the significance of the data.

As the non-breeding season overlaps to a great extent with the flood or wet period, these terms are often interchanged throughout the text in the report. Although Chong Doung BFCA is officially separate from the Baray BFCA, in this report we often simply refer to both BFCAs and the surrounding area as the Baray grasslands.

Species Accounts

Lesser Adjutant

Leptoptilos javanicus

Breeding in the TSBR

In 2010, 312 breeding pairs were counted in Prek Toal, with birds nesting from approximately January to June. The estimate is however only a portion of the total Prek Toal breeding population, as the full size of the colony cannot be properly counted. Small groups of 1-10 birds are also found in Prek Toal during the non-breeding season (June-October), while the number of sightings and group sizes increased substantially in November and December, indicating the arrival of nesting birds.

Small colonies are found from time to time away from Prek Toal, but these tend to be abandoned quickly due to human disturbance. This year four Lesser Adjutant chicks were found in a village in Prolay commune, Stoung district, just to the north of Boeung Tonle Chhmar. Villagers reported that they came from the “flooded forest”. It is likely they came from somewhere near to Boeung Tonle Chhmar, where “Adjutant” colonies have occurred in the past (see Map 1) and where there were many breeding season records (see below).

Overview of other TSBR distribution records

There were 185 records away from Prek Toal. These are summarized in the chart below and Map 1 in the Map Section at the end of the report.

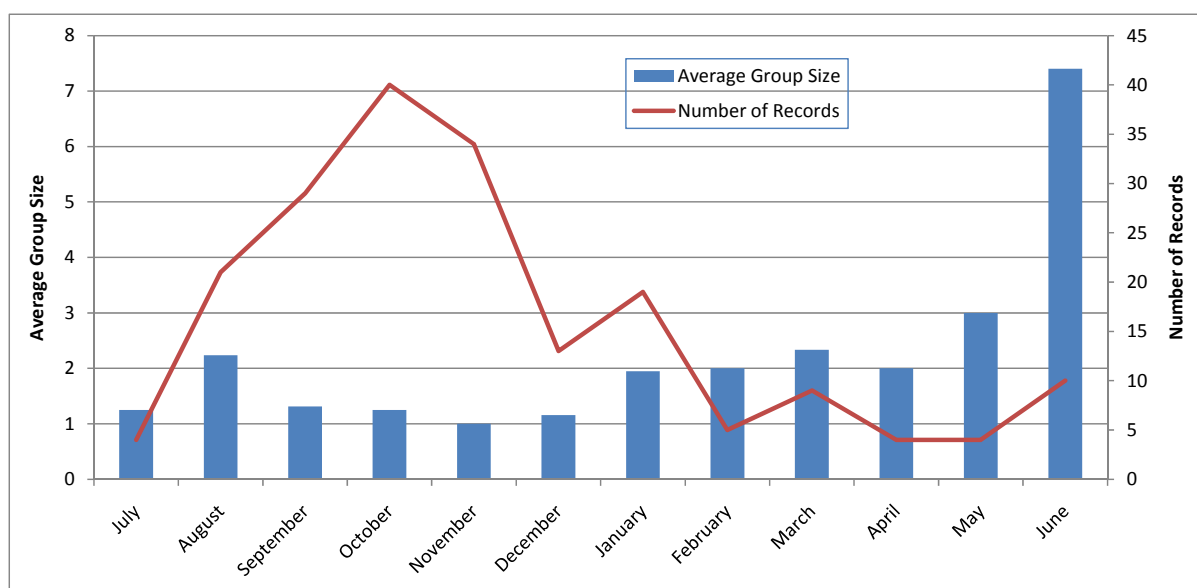


Figure 1. Graph showing monthly data on average group size of Lesser Adjutants per record (sighting) and the number of records per month.

Site records

Boeung Tonle Chhmar Core Area

There were 33 records from Boeung Tonle Chhmar (17% of total) two-thirds of which were from within the breeding season, but with sightings occurring in all months. For all months the majority of records are of single birds and small groups of 2-6. However, on the 19th of June a group of 53 Lesser Adjutants was seen.

Stung Sen Core Area

There were 139 records from Stung Sen Core Area (72% of total) of which almost 90% were from the non-breeding season, with the number of records peaking in October. No large pre- or post-breeding aggregations were observed and group size ranged from 1-4 birds. No sightings were made in July 2009 and from April-June 2010.

Floodplain grasslands

The grasslands accounted for 11% of total sightings of which 65% were from the breeding season. Lesser Adjutants were especially seen in wetter grasslands in the southeastern section of the floodplain and almost throughout the year, including the flood period of August-November, except October. There were nine records in total from Veal Srongai (even though this site was only monitored in seven months), seven records from Baray, and four sightings from Stoung-Chikraeng (all from January). Most sightings were of singles and pairs although some groups of 4-11 birds were encountered and a single large group of twenty birds was seen in Veal Srongai in August.

Review and Comments

The three core areas are important sites for Lesser Adjutants. Prek Toal is the country's most important breeding site, but individuals and small groups are also encountered in the non-breeding season. Boeung Tonle Chhmar had individuals and small groups present throughout the year and it appears to be an especially important feeding site

when water levels are low and for post-breeding flocks, *e.g.* the 53 seen in June 2010, which is the largest aggregation ever recorded from Boeung Tonle Chhmar and largest flock seen in the TSBR away from Prek Toal since 2002. The Stung Sen CA is mainly used in the non-breeding season as a wet-season refuge with many sightings of individuals and small groups being made from August to January, with a clear peak in October (the month of highest water levels). Also in the southeast, the combination of Veal Srongai and Baray grasslands had records throughout most of the year.

The data confirm that a substantial number of Lesser Adjutants remain in the lake's floodplain throughout the year. However, in the wet season as resources become less concentrated, they will normally spread out as individuals or small groups. Beyond the TSBR Lesser Adjutants have also been seen at slightly higher elevations close to the floodplain during the flood period in a mixed landscape of open deciduous forest with grassland and agriculture in Kampong Thom (Son Virak 2009a and 2009b), at Ang Trapeang Thmor in Banteay Meanchey, which has a similar landscape as well as being a major wetland area close to the Tonle Sap floodplain (Ngin Kamsan *et al.* 2010) and six were recorded from Boeung Prek Lapouv in the Mekong Delta in July 2010 (Seng Kim Hout in litt.). A past aerial survey of waterbirds in northern Cambodia conducted in September 2001 found Lesser Adjutants spread widely within dry deciduous forest habitat in this region (Barzen 2003). Lesser Adjutants are known to also occur here in the dry season and breeding has been reported in Preah Vihear from September-February (Clements *et al.* 2009). The degree in which birds from northern forests intermingle with those from the Tonle Sap is still unknown.

Greater Adjutant

Leptoptilos dubius

Breeding in the TSBR

In 2010, 126 breeding pairs were estimated in Prek Toal, with the breeding season running from January to June. This is however only a portion of the total Prek Toal breeding population, as the full size of the colony cannot be properly assessed. No Greater Adjutants were recorded in Prek Toal in the non-breeding season, except in November and December, immediately prior to the breeding season.

Overview of distribution records

There were 29 records, including four from Prek Toal. These are summarized in the chart below and Map 2.

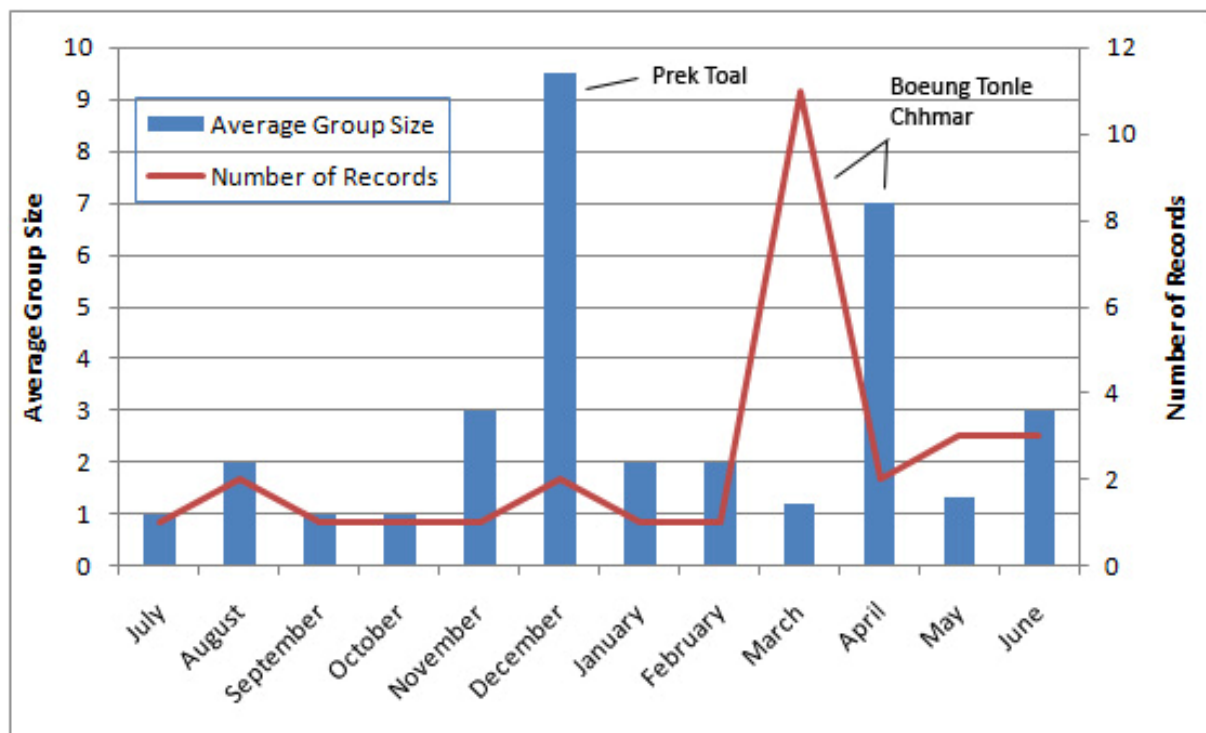


Figure 2. Graph showing monthly data on average group size of Greater Adjutants per record (sighting) and the number of records per month.

Site records

Boeung Tonle Chhmar Core Area

There were twenty records from July 2009 and March-June 2010. Most are records of single birds, occasionally small groups of 2-3, one group of twelve birds in April and one record of six in June.

Stung Sen Core Area

There were four records, all singles and one group of three within the flood season period of August-October.

Floodplain grasslands

There was a single record of a pair seen in January in Stoung-Chikraeng.

Review and Comments

The Greater Adjutant is a relatively difficult species to identify as it closely resembles the more common Lesser Adjutant. Nonetheless the data obtained from rangers in the TSBR are in line with the general pattern of movements and distribution indicated in earlier versions of this report. The 2010 data shows Boeung Tonle Chhmar to be particularly important in the period of low water levels. There is also the possibility that some birds breed in the vicinity. However, no large post-breeding aggregations of 30-90 birds were found in Boeng Tonle Chhmar or any other site as was occasionally witnessed six years ago and earlier (van Zalinge *et al.* 2008). Records from Stung Sen CA from August-October show that some Greater Adjutants will remain in the floodplain during the flood period. A few Greater Adjutants were recorded at Ang Trapeang Thmor from July-October

(Ngin Kamsan *et al.* 2010) and eight birds were seen in Boeung Prek Lapouv in July (Seng Kim Hout in litt.), suggesting, as with Lesser Adjutant, that some birds migrate beyond the floodplain during the wet season. However, the total population must number several hundred birds and it is still unclear what their dispersal patterns are like in the non-breeding season.

Painted Stork

Mycteria leucocephala

Breeding in the TSBR

In 2007, through aerial mapping of the entire colony, the total size of the breeding population at Prek Toal was estimated at 3,121 pairs (Clements *et al.* 2007). The partial estimate of the colony in 2010 is of 2,419 nesting pairs (the actual colony may be as much as twice this size). Painted Storks breed from approximately January to June. In the non-breeding season Painted Storks were only recorded at Prek Toal in December, as birds started to arrive for breeding.

Overview of other TSBR distribution records

There were 72 records away from Prek Toal. These are summarized in the chart below and Map 3.

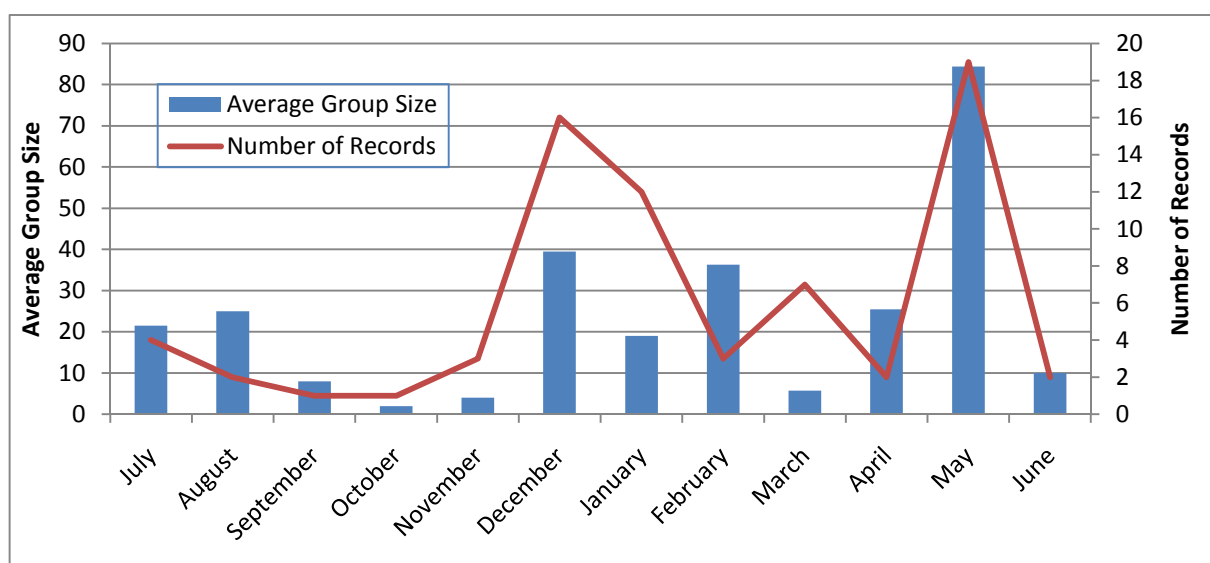


Figure 3. Graph showing monthly average group size of Painted Storks and the number of records per month.

Site Records

Boeung Tonle Chhmar Core Area

There were 27 records from Boeung Tonle Chhmar (38% of total records). Of these 78% were from within the breeding season of January-June. However, there were almost no records until April, with two sightings, one of a group of 50 birds, and May, when

numbers increased substantially with 18 records and an average group size of 89. The largest group seen in May was estimated at 700 birds. The non-breeding season records were single sightings of small groups of 2-3 birds in both October and November and four records from December of medium sized groups of 21-26 birds.

Stung Sen Core Area

The Stung Sen CA does not seem to be used much by Painted Storks. There were only two records, one of a group of 7 in May and a group of 10 in June.

Floodplain grasslands

There were 42 records from floodplain grasslands (58% of total records). These were split almost evenly between the breeding and non-breeding season. In the non-breeding season 57% of sightings were from December with other records coming from November and July-September. Within the breeding season January-February were the busiest months, followed by March, but with no records from April and May and a single record in June. Most records came from the Baray area, including Chong Doung, with 70% of all records from grasslands. Veal Srongai had 21% of grassland records, while there were only three records from Stoung-Chikraeng this year and one record from Preah Net Preah (this site was only visited once). The largest groups were encountered in December, particularly in the southeast. This includes a group of over hundred birds in Baray plus another of 68 and two groups of 45 and 64 in Veal Srongai. Groups of 35-65 were also encountered in January and February and a group of fifty birds was seen in July.

Review

Two peak periods were observed. There is a peak from December-February within the grasslands, especially the wetter grasslands of Baray and Veal Srongai in the southeastern corner of the floodplain. A second peak occurs at Boeung Tonle Chhmar in May with many large groups observed moving around the area. This influx is not paired with an increase at nearby Stoung-Chikraeng, indicating that these aggregations remain in the wetter parts of the floodplain during this month. Painted Storks seem to use Prek Toal only for breeding, and post-breeding they move fairly rapidly to other parts of the floodplain and beyond. There are fewer records of Painted Storks in the floodplain in the months of June-November with the least in September and October, when water levels reach their peak.

Comments

The 2009/10 data provides a similar picture of Painted Stork distribution and movements to earlier data (van Zalinge *et al.* 2008, van Zalinge *et al.* 2009). The peak in May at Boeung Tonle Chhmar was more pronounced this year, with very large groups observed only in this month, while last year the peak was lower and spread out from April-June. Whether the large flocks observed at Boeung Tonle Chhmar in May coincide with birds departing from colonies in Prek Toal can probably be ascertained by examining the data from colony counts in more detail and this should be attempted in future. In the last two years there have been no records of Painted Storks in February and March from Boeung Tonle Chhmar, a gap in their presence at this site which is as yet unexplained. As was the case last year, Painted Storks were frequently encountered in the grasslands, particularly wetter grasslands with many scattered ponds and especially from December-February.

The same pattern of Painted Storks becoming much scarcer in the floodplain during the wet season as floodwaters start to rise is repeated when examining current and past data. There is a known association with Ang Trapeang Thmor (ATT) where large numbers of Painted Storks arrive during the wet season (van Zalinge *et al.* 2008). Numbers peaked at ATT in August 2009 with almost 2,500 counted, and dropped to a low of 40 birds in April 2010 (Ngin Kamsan *et al.* 2010). This is still less than half the known breeding population and so many others must go elsewhere.

There were a few records of Painted Storks at slightly higher elevations close to the floodplain during the flood period in a mixed landscape of open deciduous forest with grassland and agriculture in Kampong Thom (Son Virak 2009a and 2009b) and in Pursat (V. Elliot, pers. comm.). Small groups of Painted Storks were observed in July and August 2010 in Boeung Prek Lapouv (Seng Kim Hout in litt.). There are also several records of groups of up to thirty Painted Storks visiting Xuan Thuy in the Red River Delta, Vietnam during the wet season (J. Pilgrim, J. Tordoff, Hung Le Manh, pers. comm.). Interestingly, a group of 13 Painted Storks was recorded in southern China in May 2008, the first sighting for China since the 1950s (M. Rank in litt.), perhaps indicating that they are re-establishing themselves in former territories and possibly sourced from the protected colony in Prek Toal.

Milky Stork

Mycteria cinerea

Breeding in the TSBR

In 2010 seventeen breeding pairs were estimated at Prek Toal.

Review/Comments

There have been no confirmed records in the TSBR away from Prek Toal for the last two years. Boeung Tonle Chhmar rangers reported fifteen Milky Storks in April 2010, but for now this record is regarded as unconfirmed as Milky Storks are difficult to separate from Painted Storks. Milky Storks were recorded at Ang Trapeang Thmor in most months but in low numbers, with highest counts of six in September 2009, four in May and eight in June 2010 (Ngin Kamsan *et al.* 2010). At coastal Ream National Park, Milky Storks are occasionally found, with records from various times of the year, but with highest counts in the wet season, e.g. 10+ in June 2003, up to 15 in May/June 2004, 41 in July 2002 (Watson 2007) suggesting it may be possible that a (large) proportion of the Milky Stork population in Prek Toal moves to the coast in the non-breeding season.

Asian Openbill

Anastomus oscitans

Breeding in the TSBR

The 2010 partial estimate of the breeding population at Prek Toal was 13,845 pairs. The real figure could be much higher. In 2007 the entire colony was estimated at 7,682 pairs (Clements *et al.* 2007). The breeding season is approximately from February to June. Post-breeding, from July-October, only individuals and small groups were seen at Prek Toal. Large groups were again frequently encountered from November onwards.

Overview of other TSBR distribution records

There were 705 records away from Prek Toal. These are summarized in the chart below and Map 4.

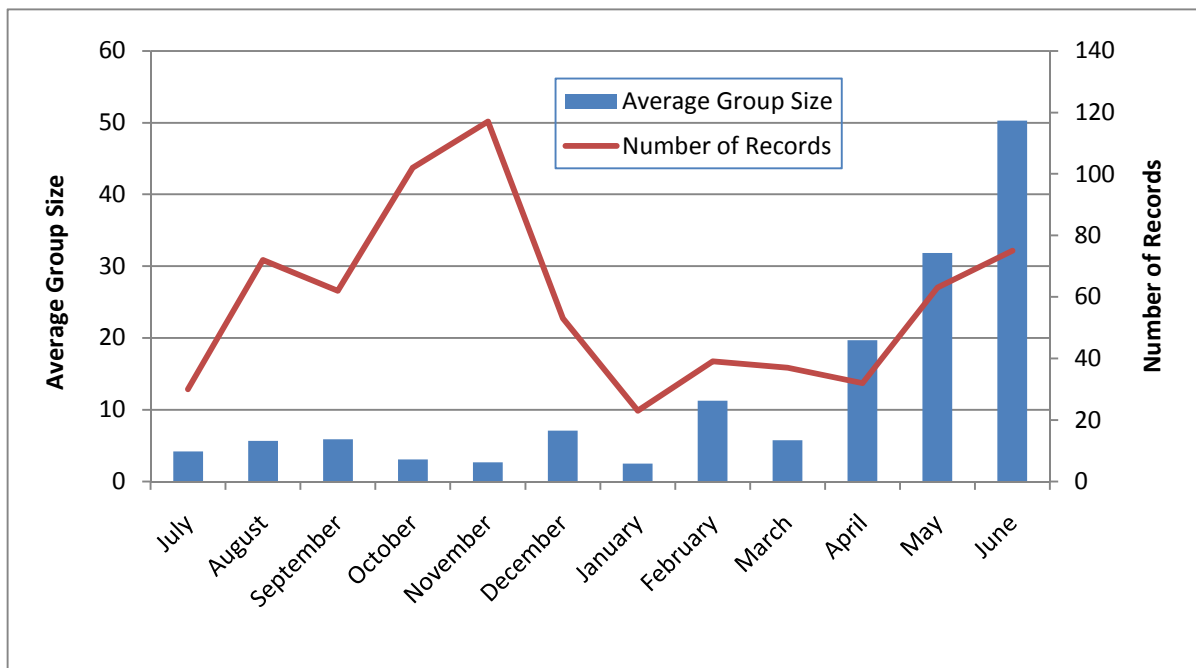


Figure 4. Graph showing monthly average group size of Asian Openbills and the number of records per month.

Site Records

Boeung Tonle Chhmar Core Area

There were 333 records from Boeung Tonle Chhmar (47% of total). Asian Openbills were present throughout the year. There were noticeable differences in group size between the non-breeding and breeding seasons. During the non-breeding season from July to January there were 113 sightings with an average of two birds per sighting while in the breeding season from February to June there were 220 sightings and the average number of birds per sighting increased to thirty. The numbers at Boeung Tonle Chhmar gradually increased in the late breeding season and when looking at average group size the increases were: 6, 16, 34 and 54 in March, April, May and June, respectively. The

maximum group encountered was estimated at 1,500 birds and was seen on the 20th of June.

Stung Sen Core Area

Asian Openbills were also recorded at Stung Sen CA throughout the year with 342 records (49% of total). Here too, differences between seasons are apparent. Within the non-breeding season there were 317 records with an average of three birds per sighting, while in the breeding season there were only 25 records with the average number of birds per sighting increasing to fifteen.

Floodplain grasslands

There were thirty records from the floodplain grassland sites, 23 from Veal Srongai and 7 from Baray. All sightings were made in the non-breeding season, which is also the wettest period, except for one sighting of ten birds in Baray in June. It must be mentioned that Veal Srongai was not patrolled from January 2010 onwards, but no Asian Openbills were observed during other work carried out here in March. Average group size during the non-breeding season was 26 in Veal Srongai and 36 in Baray. No Asian Openbills were seen in Stoung-Chikraeng.

Review

Figure 4 closely resembles the seasonal patterns observed for Lesser Adjutant and there are similarities with this species at site level. Boeung Tonle Chhmar, and likely the surrounding area, is an important dry season feeding site where numbers build up and post-breeding flocks aggregate at the end of the breeding season. The Stung Sen CA is well used in the non-breeding season and the inundated grasslands within the general vicinity (Veal Srongai, Baray) are also regularly used during this period. The Asian Openbill, a snail-eating specialist, is however more confined to inundated areas than are Lesser Adjutants.

Comments

The 2009/10 data is in line with earlier findings on Asian Openbill distribution and movements within the floodplain of the Tonle Sap lake. However, due to increased patrol effort, far more records have been coming from the Stung Sen CA and it is now clear that this area is important for Asian Openbills and many other species in the non-breeding season. Just across the lake in Kampong Prac, Pursat preliminary data also suggests many individuals and small groups occurring in the wettest months (Heng Sokrith in litt.). A very important site during the non-breeding season is Ang Trapeang Thmor where numbers peaked in August at over 8,500 (Ngin Kamsan et al. 2010). Some Asian Openbills may move to other temporarily inundated areas just outside the floodplain, with groups recorded from areas north of highway 6 in September and October (Son Virak 2009a and 2009b), while others may disperse further. For example, a sighting of around two hundred Asian Openbills was reported from Tra Su in the Vietnamese Mekong Delta in September 2008 (R. Craik pers. comm.) and there are records of up to 274 from Boeung Prek Lapouv in the non-breeding season (Seng Kim Hout in litt.).

Black-headed Ibis

Threskiornis melanocephalus

Breeding in the TSBR

Although Black-headed Ibis breed at Prek Toal from January to June, it is difficult to estimate their numbers as they mostly breed in thick scrub. A total of 111 nests were seen from counting platforms in 2010, but the real number is likely much higher. A large group of 113 Black-headed Ibis in November was the only record from Prek Toal during the non-breeding season.

Site Records (see also Map 5)

Boeung Tonle Chhmar Core Area

There were a total of five sightings, all in June, ranging from 1-6 birds.

Floodplain grasslands

All records were from the non-breeding season. There were four sightings of Black-headed Ibis in the general Veal Srongai area (including the area referred to as Krous Kraom in past reports) and five from Baray. In Veal Srongai records were from July-September. A large group of 230 birds was seen in August with a second group of 31 seen on the same day. In September there was a record of 130 birds. All sightings from Baray were from November and December with a high count of 87 and 9 birds in two separate groups on the same day in November.

Other sites

Thirty Black-headed Ibis were seen in Kampong Prak, Pursat on the 13th of June 2010.

Review/Comments

Within the TSBR, away from Prek Toal, all records were from the non-breeding season or late breeding season. Highest numbers were recorded from grasslands in the southeastern corner of the floodplain, an area with regular past records, although not from the same months in each year. Large flocks have previously been recorded in this area in June-July, but not as late as August and September. If the two sightings are added up the 261 birds seen at Veal Srongai in August 2010 would be a record for this site. At around the same time, in August and September, counts of Black-headed Ibis at Ang Trapeang Thmor peaked at around 3,500 birds, with birds having started to arrive in June (Ngin Kamsan *et al.* 2010).

Spot-billed Pelican

Pelecanus philippensis

Breeding in the TSBR

In 2007, through aerial mapping of the entire colony, the total size of the breeding population at Prek Toal was estimated at 2,592 pairs (Clements *et al.* 2007). The partial estimate of the colony in 2010 is of 1,475 nesting pairs, but the real figure could be twice as much. The breeding season lasts approximately from December to June. Small groups are encountered at Prek Toal in the non-breeding season from July to October, with numbers increasing substantially in November indicating the arrival of nesting birds.

Overview of other TSBR distribution records

There were 406 records away from Prek Toal. These are summarized in the chart below and Map 6.

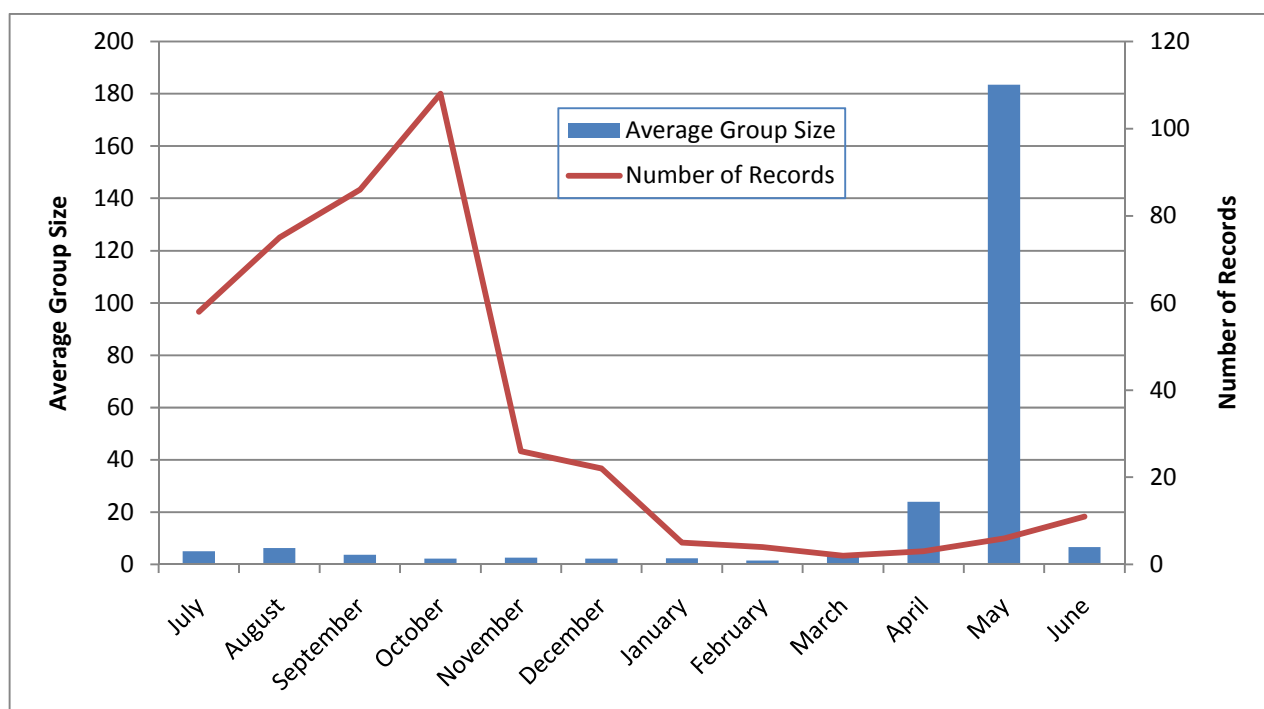


Figure 5. Graph showing monthly average group size of Spot-billed Pelicans and the number of records per month.

Site records

Boeung Tonle Chhmar Core Area

There were 134 records (33% of total) throughout the year. Most records (100) were from the non-breeding season although average group size was only three birds during this period. In the breeding season average group size increased to 37 and peaked in May, as a very large group of approximately one thousand birds was encountered in this month.

Stung Sen Core Area

There were 246 records (61% of total) from all months except April and May, of which 230 observations were from the non-breeding season. Average group size was not very different with group size being slightly lower in the breeding season at three birds per group on average and four birds per group in the non-breeding season. The largest group observed was of thirty pelicans in September. Most sightings were made in between August and October (207 records).

Floodplain grasslands

Almost all records (24/26) came from the Veal Srongai area, with one record of five birds in Baray in January and one group of eight overflying birds in Stoung-Chikraeng in June. The Veal Srongai records were all made during the non-breeding season and coincided with months of highest water levels, August-December, although there may also have been records from January and February, as was the case last year, if the site had been visited during this time. Number of records and average group size was similar for most months, with 5-7 records per month and average group sizes of 4-9, except for December for which there was only a single record of four birds.

Review

Most records came from the inner floodplain, where pelicans are recorded around the lake throughout the year. The number of Spot-billed Pelicans peaked strongly at Boeung Tonle Chhmar in May, possibly indicating dispersal of breeders from Prek Toal. In the southeastern corner, as seen from Stung Sen Core Area and Veal Srongai BFCAs, pelicans were mainly present in small groups during the non-breeding season, especially from August-October.

Comments

With a full year of data from all sites and with high patrolling effort it is now clear that Boeung Tonle Chhmar, Prek Toal and Stung Sen are all used by Spot-billed Pelicans throughout the year. A substantial portion of the population likely stays within the TSBR, spread out in small groups. The data however do seem to indicate that higher numbers occur in the southeastern corner of the lake in the vicinity of the Stung Sen CA, as has also been suggested earlier (van Zalinge *et al.* 2008, van Zalinge *et al.* 2009). Spot-billed Pelicans are present at Ang Trapeang Thmor throughout the year. There is no significant build up in numbers during the wet/non-breeding season, but for a short period almost every year in December-January numbers increase from a few hundred to close to two thousand (Ngin Kamsan *et al.* 2010). It is uncertain whether these are non-breeders or late breeders aggregating at ATT before moving on to Prek Toal. Future study at Prek Toal of the colony build up and break down during a breeding season may help answer such questions. Small numbers also turn up in the Red River Delta in Vietnam during the wet season (J. Tordoff pers. comm.) and in Boeung Prek Lapouv in the Mekong Delta (Seng Kim Hout in litt.).

Oriental Darter

Anhinga melanogaster

Breeding in the TSBR

In 2010 the total size of the breeding population at Prek Toal was 5,437 pairs, breeding from approximately September to January. Oriental Darters were frequently encountered in large numbers at Prek Toal throughout most of the non-breeding season, except for the driest period, in April (two records of 6 and 13 birds), May (no records) and June (a single record of approximately 100 birds).

Overview of other TSBR distribution records

There were 1110 records away from Prek Toal. These are summarized in Figure 6 below and Map 7 in the Map Section.

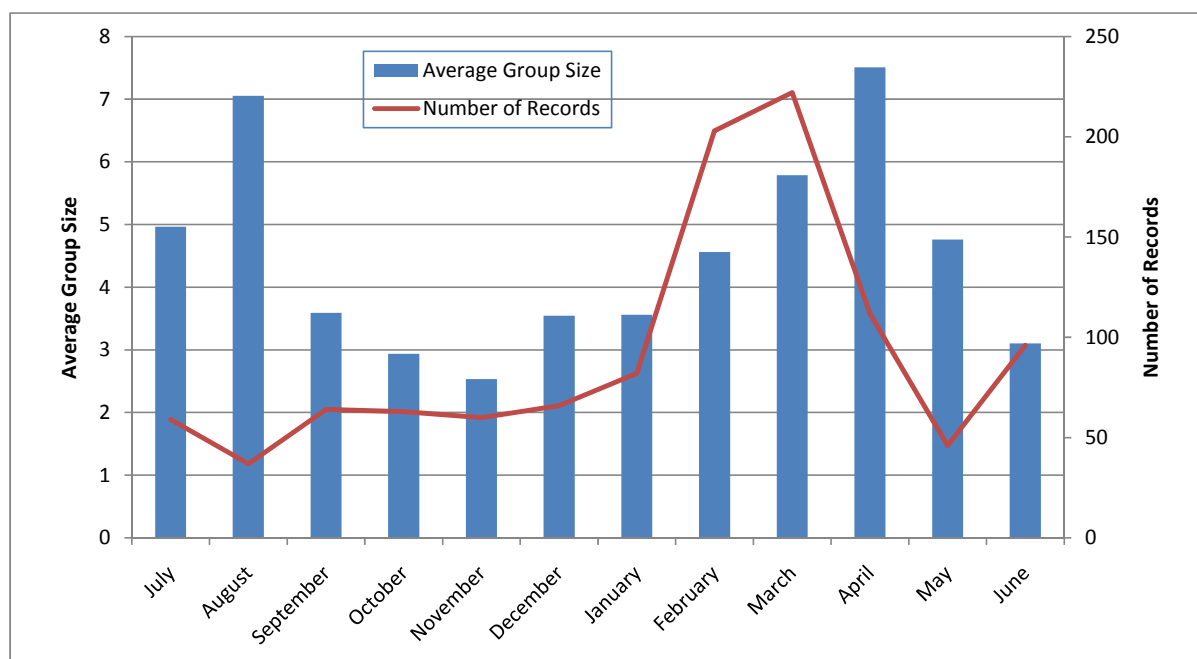


Figure 6. Graph showing monthly average group size of Oriental Darters and the number of records per month.

Site Records

Boeung Tonle Chhmar Core Area

There were 813 records (73% of total) of Oriental Darter and they were present throughout the year. Seventy percent of records came from the non-breeding season. There was a clear post-breeding build up in numbers at Boeung Tonle Chhmar, with the number of records peaking in February and March (42% of BTC records came from these two months) and with larger groups being encountered more often in the three months following the breeding season. The largest group encountered in Boeung Tonle Chhmar was of approximately sixty birds, in April.

Stung Sen Core Area

Oriental Darters were present in all months and were recorded 281 times (25% of total records). As with Boeung Tonle Chhmar, almost 70% of records were from the non-breeding season. Although there was no strong increase in the number of records in February and March, these months did contain the largest groups found in Stung Sen, with a high count of 40 birds in February. Just ahead and at the start of the breeding season a few large groups were seen in August (maximum of 27 birds) and September (maximum of 20).

Floodplain grasslands

There were 16 records from floodplain grasslands. Seven from Baray, five from Veal Srongai, three from Stoung-Chikraeng and one from Preah Net Preah. Except for the record from Preah Net Preah all sightings were made from March to June. Most sightings were of singles, pairs and small groups of three. The Preah Net Preah record in January and one record from Baray in March were of a group of seven birds.

Review

Oriental Darters are birds of the inner floodplain, with significant numbers found within the three core areas throughout the year. Of these the Prek Toal area is undoubtedly the most significant, with breeding colonies and high numbers throughout most of the non-breeding season. Boeung Tonle Chhmar had many records throughout the year and substantial post-breeding influxes as did Stung Sen CA, although not as marked as in BTC. Interestingly, there seemed to be some pre-breeding aggregation within the Stung Sen CA in August and early September, which was not apparent in BTC. Only a few records came from the outer floodplain (somewhat surprisingly in the periods of lowest water levels). It may be that Oriental Darters need to search in a wider area for food during this time.

Comments

The 2009/10 data reveal much more clearly than before the distribution of Oriental Darters at the monitored sites, and allows for some extrapolation based on these results. Starting at the end of the breeding season a strong spike in numbers occurs at Boeung Tonle Chhmar, numbers also increase in Stung Sen and probably throughout the inner floodplain¹. Dey Roneath was not surveyed again this year. As the driest months approach the population spreads out with individuals or small groups seen across the floodplain even in outer parts. Just before the breeding season some pre-breeding aggregation occurs, *e.g.* at sites such as Stung Sen CA. During the breeding season many birds are clustered at Prek Toal, and possibly other still largely unknown breeding sites such as Dey Roneath, or are spread out across the floodplain and beyond. The population of Oriental Darters at Ang Trapeang Thmor is not large and no sudden influxes have been observed at any time of year (Ngin Kamsan *et al.* 2010). Oriental Darters have also been recorded in the Mekong Delta in the breeding season from September to January/February with an average of 24 birds seen each month in 09/10 in Boeung Prek Lapouv (Seng Kim Hout in litt.) and 200 seen in Tra Su, Vietnam in September 2008 (R. Craik pers. comm.).

¹ In January 2009 a count conducted in Dey Roneath (Pursat) recorded approximately 1,500 Darters

Black-necked Stork

Ephippiorhynchus asiaticus

Breeding in the TSBR

Although no further Black-necked Storks have bred at Prek Toal since a single pair in 2004 and 2005 (Sun Visal 2005), an unconfirmed case of breeding was reported from Baray BFCA by local people. Patrol rangers did not find the nest until it had already been predated and the adults had disappeared. Photographs of the nest were shared with experts and it was judged very similar to that of Black-necked Stork, but other storks could not be excluded (G. Sundar pers. comm.).

Site records (see also Map 8)

Floodplain grasslands

All records came from Baray. Seven of the eleven records were made in March due to an enhanced presence of project personnel during this month. The other records came from January, February, May and June. Seven sightings were of individuals, two sightings were of pairs and two of groups of three.

Comments

Black-necked Storks were encountered more frequently in Baray than last year and not at other grassland sites, such as Stoung-Chikraeng. It is difficult to say if the increase at one site was a result of the decrease at the other. There is a distinct possibility that there will be further attempts to breed in Baray in future and effort should be put into ensuring any further attempt at breeding is successful. The absence of records from Boeung Tonle Chhmar, where Black-necked Storks have not been seen since 1998, and from Stung Sen CA, where there was a single record last year, supports the view that Black-necked Storks only infrequently make use of the innermost floodplain.

Woolly-necked Stork

Ciconia episcopus

Breeding in the TSBR

One pair of Woolly-necked Storks is recorded breeding at Prek Toal each year.

Site records (see also Map 9 in Map Section)

Boeung Tonle Chhmar

A single bird was seen in December.

Floodplain grasslands

There were 18 records from the floodplain grasslands. Most of these are from the period November-April, but there is also one record of three birds in September from Veal Srongai. Baray had ten records, Veal Srongai five and Stoung-Chikraeng three. Eleven records were of singles and pairs. The largest group observed contained seven birds.

Comments

The 2009/10 data are in line with earlier findings reflecting a preference by Woolly-necked Storks for floodplain grasslands and timing their visit mostly to the dry season.

White-shouldered Ibis

Pseudibis davisoni

Site records

Floodplain grasslands

Only three White-shouldered Ibis were seen at Veal Srongai on the 23rd of March.

Comments

A single sighting is a little disappointing, but records from the TSBR have always been sparse for this Critically Endangered species. They have also always come from the south-eastern corner of the floodplain at the end of the dry season/early wet season and it is believed that a breeding population exists somewhere in this area (R. Timmins pers. comm.). It is recommended that initial surveys are done in this area in the wet season as the area is most accessible then.

Discussion

This review had five main objectives:

- 1) To get a better understanding of seasonality of occurrence and abundance in the TSBR
- 2) To assess the significance of the conservation- and other areas, as feeding sites for non-, pre- or post-breeding birds
- 3) To highlight unusual bird aggregations during the breeding season that may indicate the presence of colonies other than those in Prek Toal
- 4) To identify gaps in data coverage and further survey or monitoring needs
- 5) To highlight threats faced within the TSBR away from the main colony site at Prek Toal

The conclusions are treated in turn below.

1. Seasonality of occurrence and abundance

The pattern of occurrence for all species in 09/10 was generally similar to that found during the two previous reviews (van Zalinge *et al.* 2008, van Zalinge *et al.* 2009), but more detail is now available, especially for the Boeung Tonle Chhmar and Stung Sen Core Areas, with high levels of patrolling conducted this year and continuous data available.

Largely non-colonial breeders

There are three species in this group. **Woolly-necked Stork** and **Black-necked Stork** were found mainly in small numbers in the southeastern floodplain grasslands and almost exclusively in the dry season. There have been very few breeding records for these species. **White-shouldered Ibis** were only recorded in March from Veal Srongai. It is believed that a small population resides in the southeastern corner of the floodplain the entire year.

Colonial breeders

The main colonies for the eight species in this group are at Prek Toal Core Area, with one or two other sites suspected to exist for Oriental Darters and Lesser Adjutants. Most birds are concentrated at the colonies during the breeding season, with non-breeders either scattered around the lake or concentrated at a few key feeding sites.

Asian Openbills, **Spot-billed Pelican** and **Oriental Darter** are mostly birds of the inner floodplain and were rarely recorded in the outer floodplain during the dry season. They are found within the TSBR throughout the year, although a part of each population ranges more widely beyond the floodplain after breeding. All three species are especially common in the southeastern corner of the floodplain during their respective non-breeding seasons. The populations of Asian Openbills and Oriental Darters have been rapidly increasing over the last decade and they are now reasonably abundant in the TSBR. The population of Spot-billed Pelican has increased only slightly, but they are not uncommon within the TSBR.

Very few records of **Black-headed Ibis** came from areas of the TSBR away from Prek Toal but small groups were present in the outer southeastern corner of the floodplain for brief periods during intermediate water levels (slightly damp ground to shallow water). Black-headed Ibis are believed to especially migrate along two routes in the non-breeding season. Several thousand spend the wet season at Ang Trapeang Thmor (just beyond the floodplain to the north of Prek Toal), while within the TSBR most records, with a maximum of 260 birds, were from floodplain grasslands in the southeastern corner from July-September and November-December. It is not yet certain if some Black-headed Ibis that take this southerly route will remain in this part of the floodplain or whether they all leave the TSBR during the period of peak flooding.

Large numbers of **Painted Storks** flock to the TSBR in the dry season. Most come to breed at Prek Toal, but a substantial number of non-breeders are found in grasslands in the early and mid dry season and may later move closer to the lake during the driest periods, some reappearing again in floodplain grasslands and agricultural areas in June and July. They are normally not recorded within the floodplain in the months of high water levels from August-October. During this period many move to ATT, while others disperse more widely.

There were no records of **Milky Stork** away from Prek Toal in either 08/09 or 09/10. Small numbers seem to occur at Ang Trapeang Thmor throughout the year. It is as yet uncertain where the Prek Toal breeders move to in the non-breeding season.

There were few records of **Greater Adjutant** away from Prek Toal, but there have been sightings from the Stung Sen Core Area at the height of the floods, confirming the presence of this rare species in the floodplain at all times of the year. No large flocks have been reported in May-July from previous hotspots in the southeast, but the area was only infrequently visited during these months. As with the Greater- at least a part of the **Lesser Adjutant** population stays within the floodplain the entire year. They generally occur at low densities, but larger flocks were sometimes found making use of temporary feeding opportunities. They range widely, but generally avoid outer/dry parts of the floodplain from March-May.

2. Significance of sites

The data confirm that **Boeung Tonle Chhmar** is an important feeding site in the dry season and early wet season for many large waterbirds that breed colonially in the TSBR and for post-breeding flocks of Lesser Adjutants, Painted Storks, Asian Openbills, Spot-billed Pelicans and Oriental Darters. The **Stung Sen Core Area** seemed to be mostly visited by waterbirds in the non-breeding season. This coupled with records from the non-breeding period in nearby **Veal Srongai** seems to indicate that this general area in the southeastern floodplain may contain significant numbers of several key species during this period. The southeastern corner also continues to be the only part of the floodplain where White-shouldered Ibis are found. The **Baray** area has significant numbers of colonial breeding species moving through in the early dry season and early wet season. It is also currently the most important known site for Black-necked Stork in the TSBR, with all records coming only from here this year and one potential attempt at breeding reported. **Prek Toal** is of course the most important breeding site, but it also has significant numbers of Spot-billed Pelican, Oriental Darter and Lesser Adjutant staying in the area throughout much of the year.

3. Large aggregations that may indicate presence of a breeding colony

The **Boeung Tonle Chhmar** area deserves some specific searches during the breeding season to check for nesting birds, as the area (including Moat Khla) has had breeding colonies in the past, several reports of high numbers of birds in the 2010 breeding season and Lesser Adjutant chicks were found this year in a village nearby.

The post- and pre-breeding aggregations of Oriental Darters at **Stung Sen CA** could also indicate a small colony nearby and it is worth conducting searches and following up local reports in this area.

4. Gaps in coverage

The enhanced patrolling and implementation of MIST in all Core Areas has closed previous gaps in data from these sites. Together with the ongoing monitoring of the BFCAs this means that many of the known key sites in the north, east and southeast are fairly well covered. However, there is still very little data coming from the **western side of the floodplain** and it would be good to have rangers collecting and reporting information from such areas as **Dey Roneath**, also as both Oriental Darters and Lesser Adjutants may be breeding here. The **southeastern corner** of the floodplain, although partly covered by Stung Sen Core Area, Baray BFCAs and Veal Srongai, still seems to hold as yet undisclosed secrets. Training rangers to collect information in the **Prey Kohs** Biodiversity Conservation Area would be very useful. Conducting additional surveys during the wet season in this general area, but away from the well monitored sites might pinpoint the main location of the White-shouldered Ibis population and help build an understanding about the seeming importance of this area for a wide variety of threatened waterbirds.

The data reviewed in this report are collected by rangers, not professional ornithologists. This group of species presents lower identification challenges than almost any other taxonomic group in Cambodia, but nonetheless errors are possible, and it is important that effort is spent on maintaining data quality. This should involve regular refresher courses and assessments of the identification skills and quality of data recording among the staff.

5. Threats

The main threats are summarized here. It is not in the scope of this report to go into detail on the issues mentioned. There are worries that **uncontrolled developments in the outer floodplain** are destroying much important habitat and may also have negative impacts on the overall ecosystem as dams and irrigation channels obstruct water flow and fish migration, while heavy use of chemicals may pollute the environment and kill many living organisms. The increased contact between people and wildlife is not to the benefit of wildlife and hunting pressure may be increasing as a result. The national government has recently taken steps to enhance the protection of the floodplain and it is the hope that these will be sufficiently strong and well regulated so as to cancel out the destructive trend witnessed over the past five years.

The decline in the number of Oriental Darter nests at Prek Toal this year was reportedly due to an increase in the frequency of **disturbances to colonies** from motorboat traffic and fishing activities, including night fishing with spotlights, in close proximity to Oriental Darter colonies this season. In last year's report the use of **poisons** and **egg collection**

within the Boeung Tonle Chhmar Core Area was mentioned. The report of Adjutant chicks in a village to the north of BTC indicates that at least the persecution of breeding birds is still ongoing. Such practices are also likely to occur elsewhere. A lot of **illegal fishing** practices are routinely employed throughout the floodplain and even Prek Toal is not exempt from such destructive methods (Allebone-Webb and Clements 2010).

Incidents of **hunting** with guns, spears, nets or traps are not often reported but many species of waterbirds, including the ones treated in this report are still sold at markets in villages and towns around the lake (A. Yang, pers. comm.).

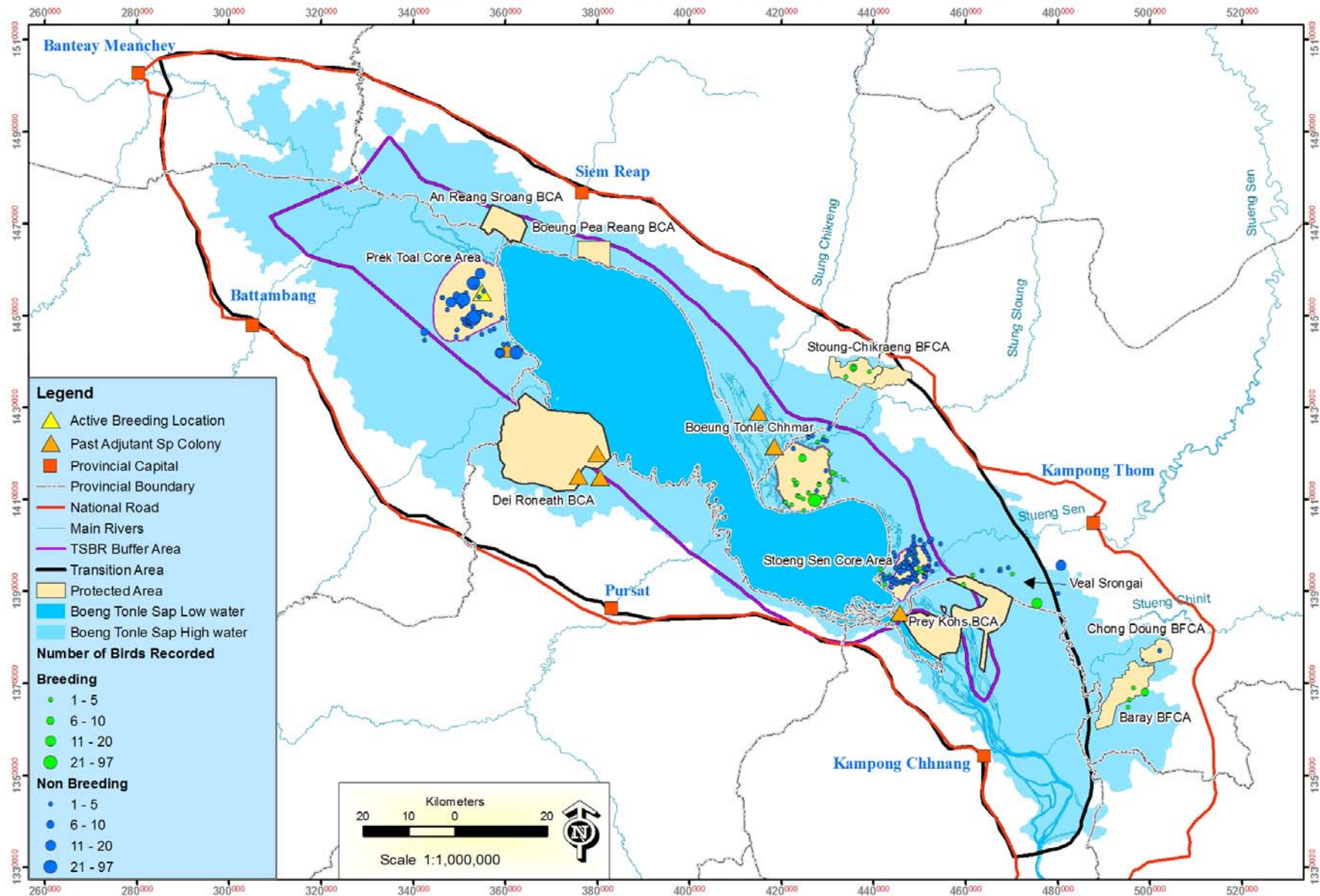
There is yet a lot of work to be done to get the extensive application of destructive practices under control.

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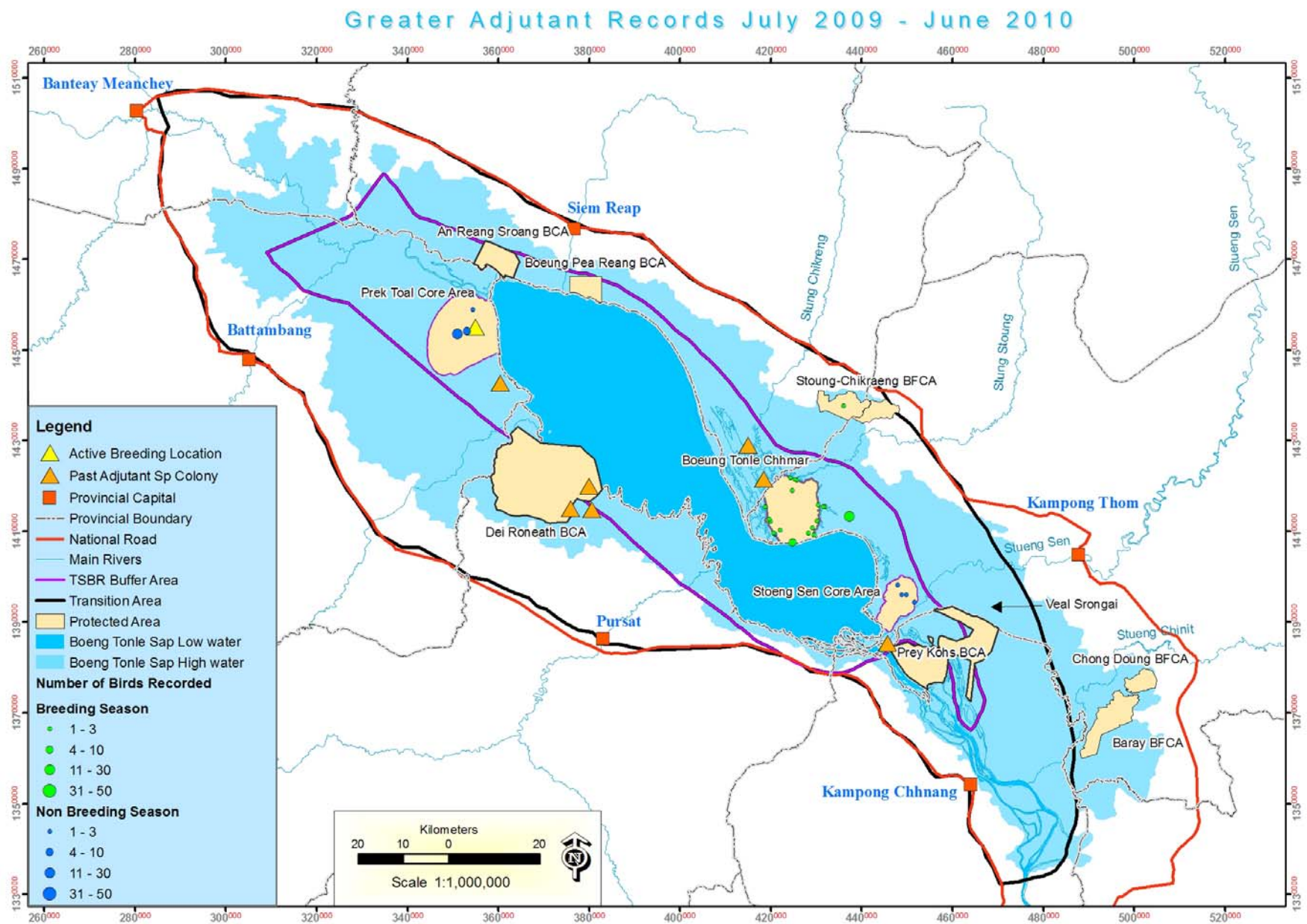
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Map Section

Lesser Adjutant Records July 2009 - June 2010

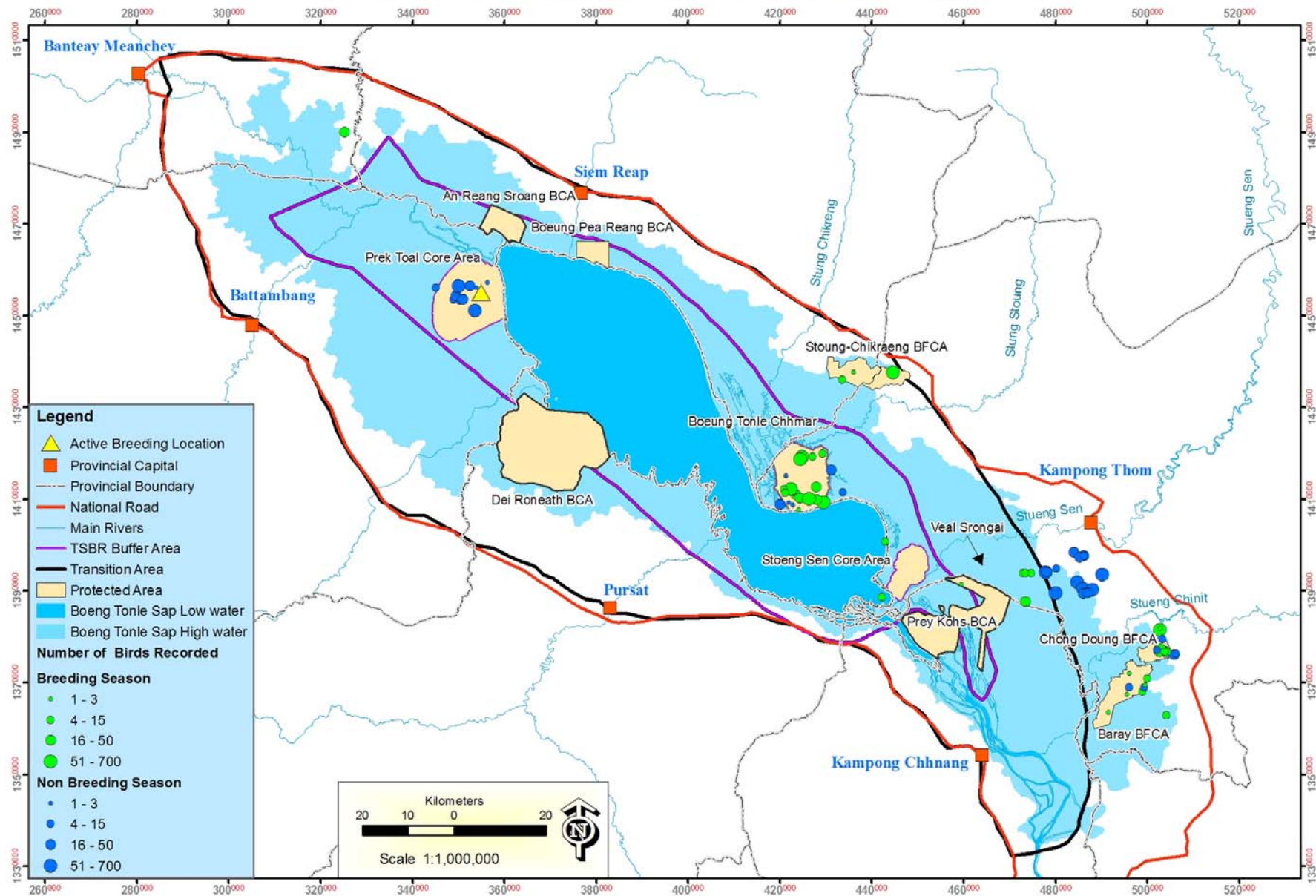


Map 1. Lesser Adjutant records in 09/10



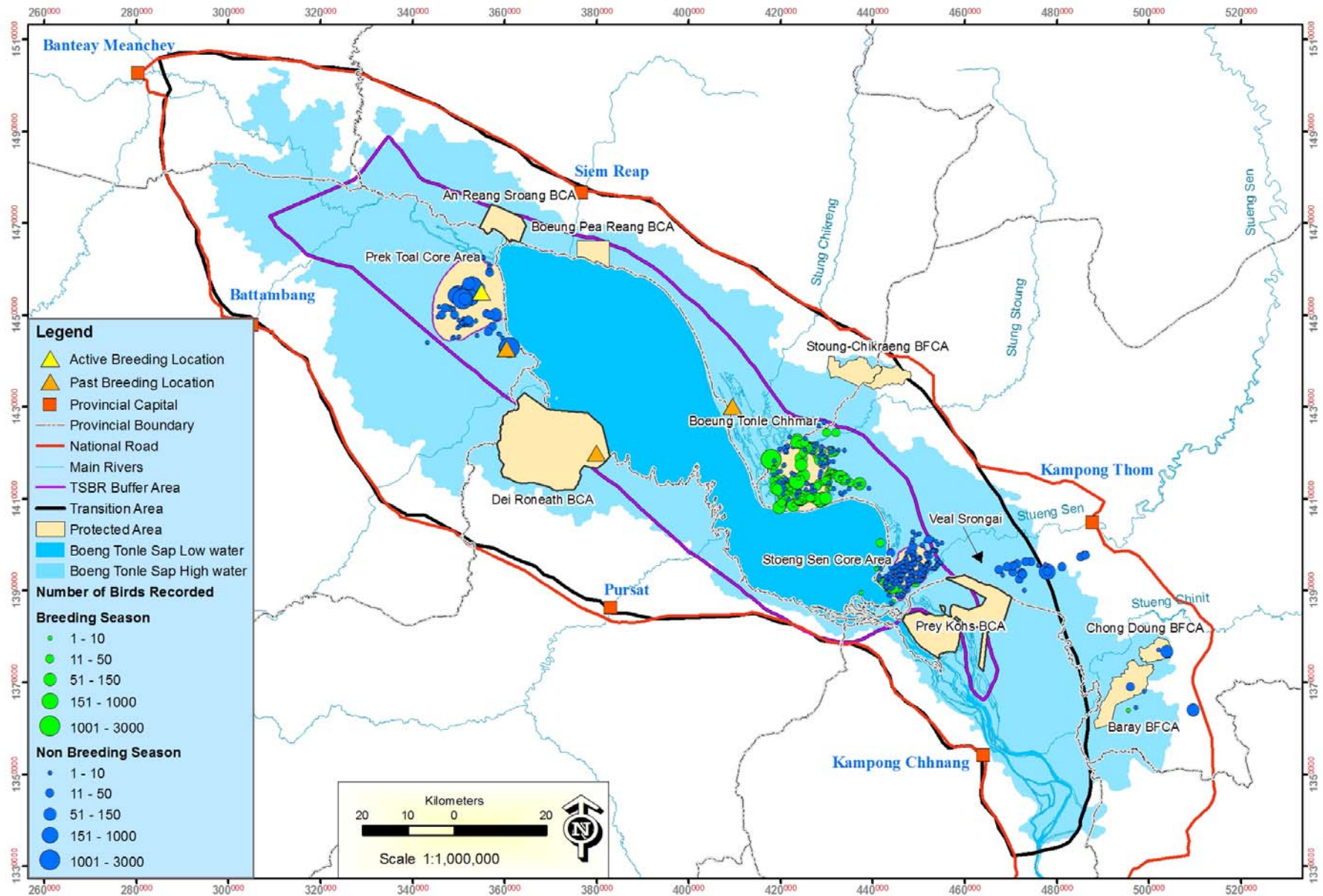
Map 2. Greater Adjutant records in 09/10

Painted Stork Records July 2009 - June 2010



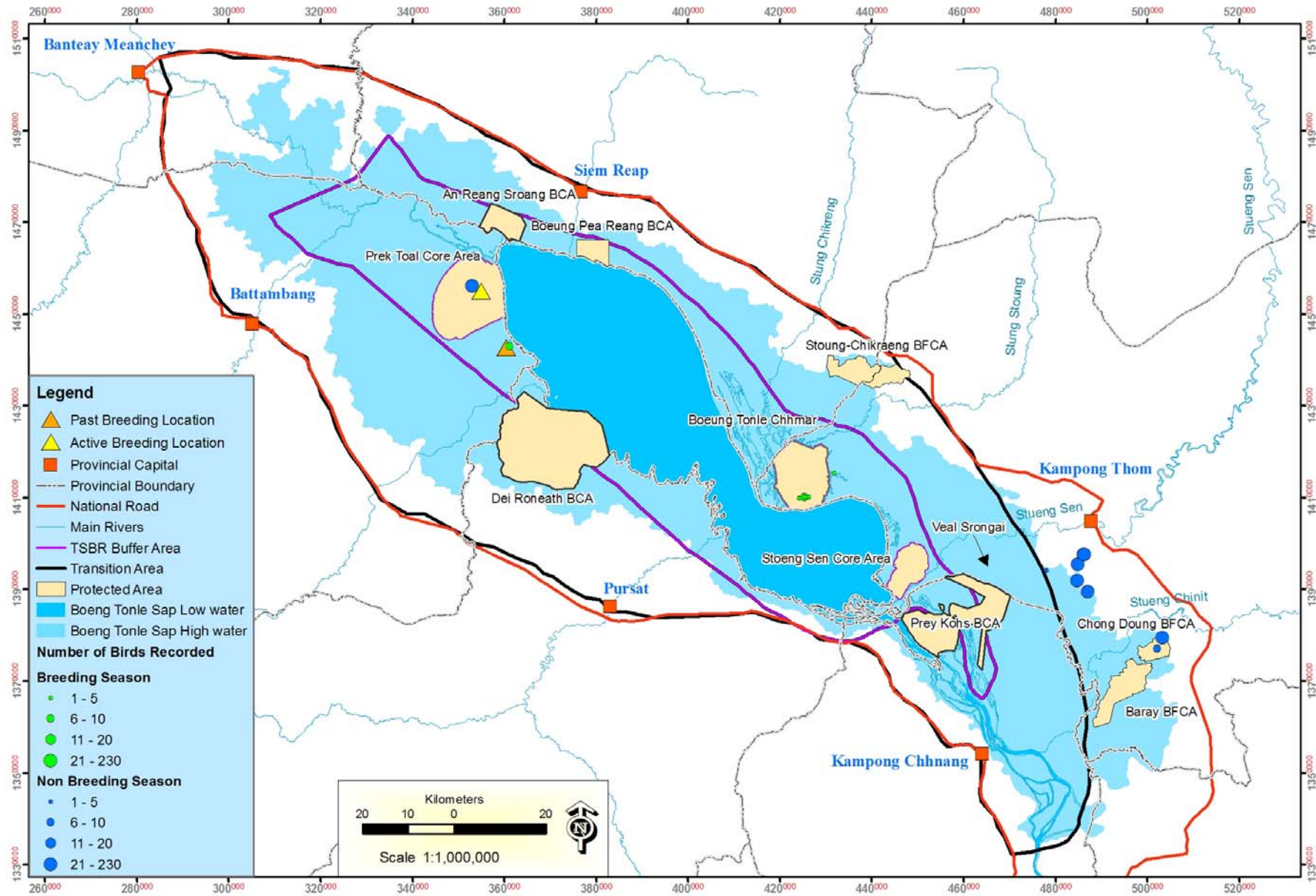
Map 3. Painted Stork records in 09/10

Asian Openbill Records July 2009 - June 2010



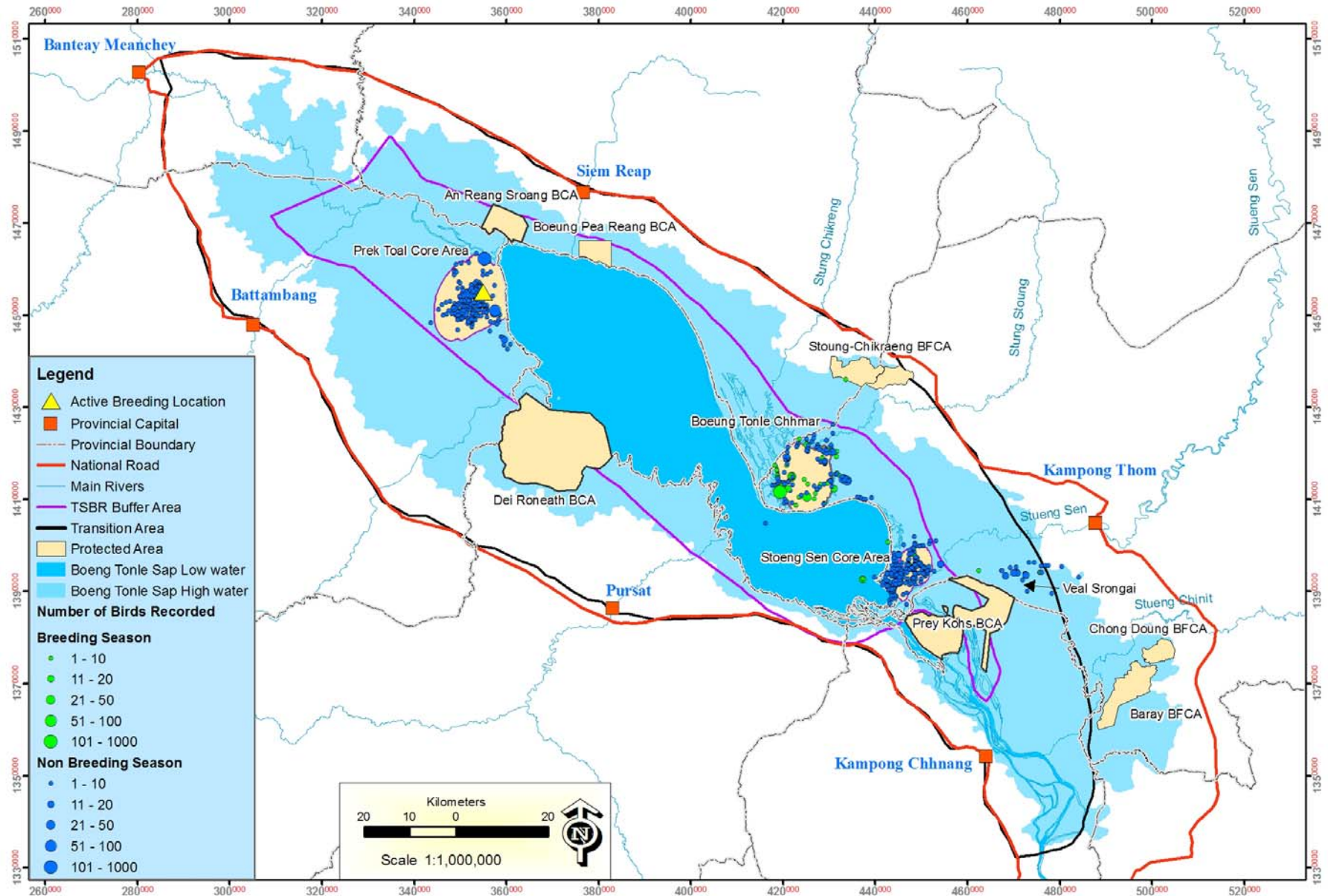
Map 4. Asian Openbill records in 09/10

Black-headed Ibis Records July 2009 - June 2010



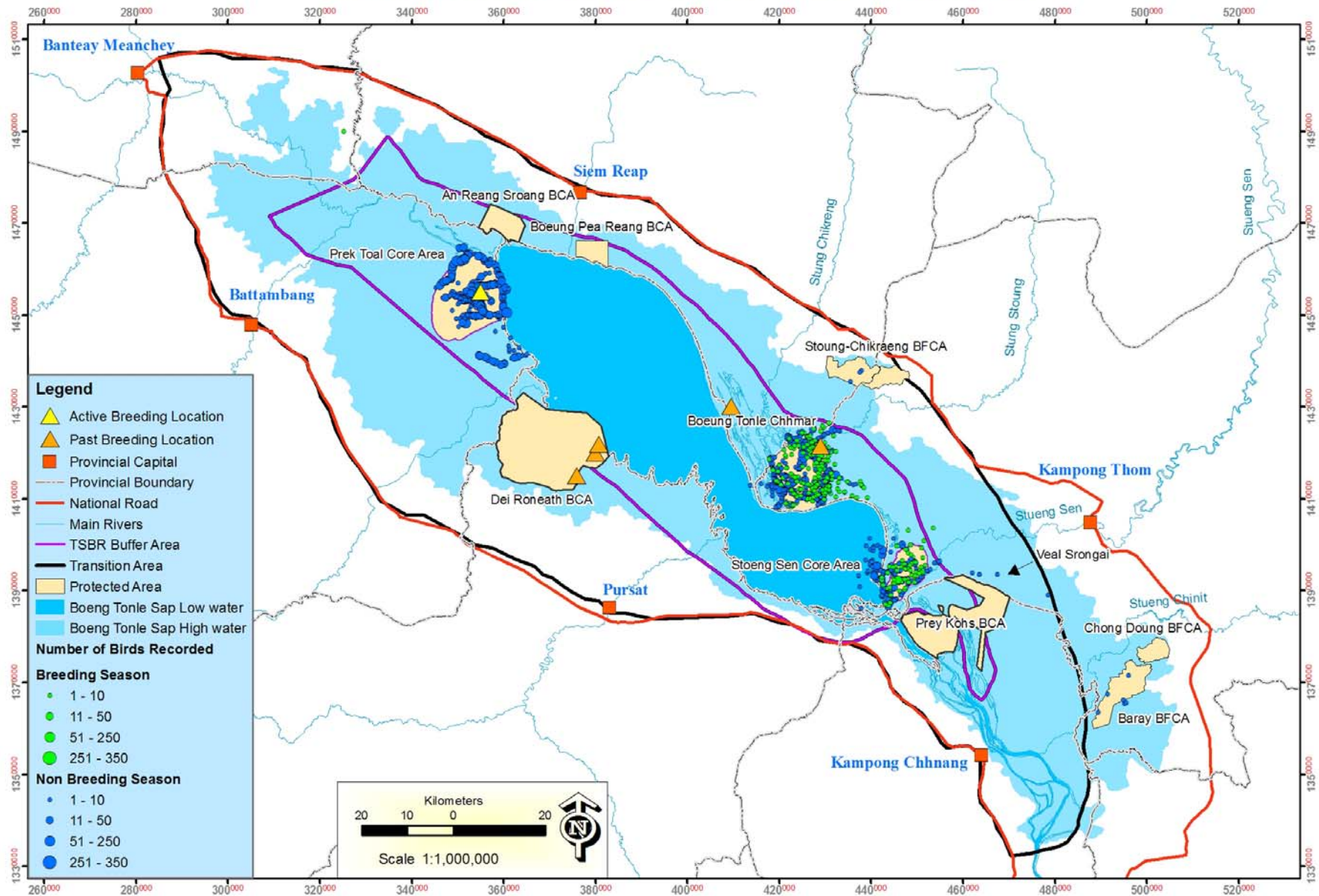
Map 5. Black-headed Ibis records in 09/10

Spot billed Pelican Records July 2009 - June 2010



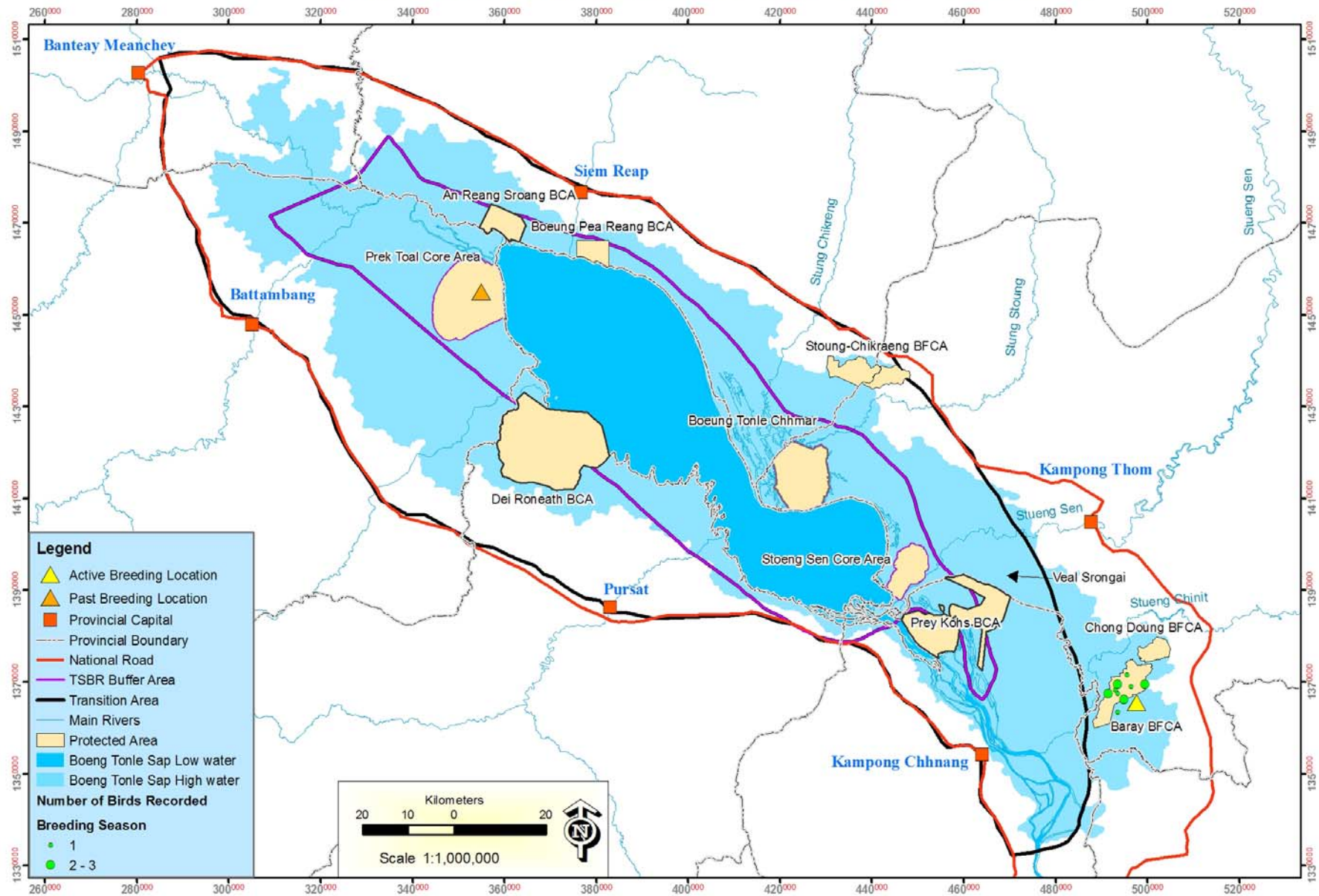
Map 6. Spot-billed Pelican records in 09/10

Oriental Darter Records July 2009 - June 2010



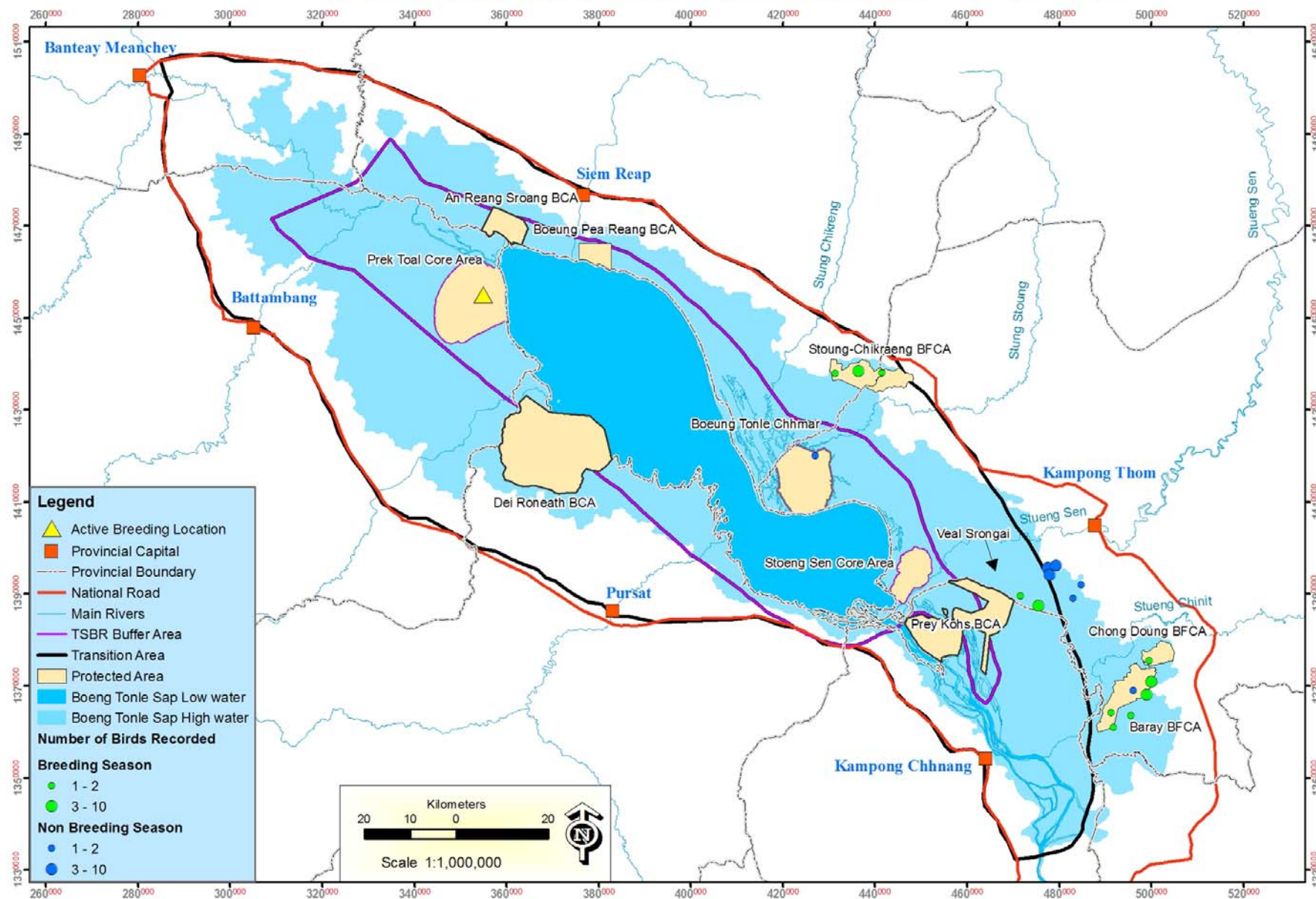
Map 7. Oriental Darter records in 09/10

Black-necked Stork Records July 2009 - June 2010



Map 8. Black-necked Stork records in 09/10

Woolly-necked Stork Records July 2009 - June 2010



Map 9. Woolly-necked Stork records in 09/10