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Invasive Alien Species in the Lower Mekong Basin

Current State of Play

Regional Species Conservation Programme

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1.0 Background

Mekong river Lao PDR © Channa Bambaradeniya/IUCN

The Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme (MWBP) aims to promote conservation and sustainable use of the biodiversity of wetlands in the Lower Mekong Basin (LMB) countries Cambodia, Lao PDR, Thailand and Viet Nam. This is a five-year (2004 – 2009), $30 million initiative led by the United Nations Development Programme (UNDP), The World Conservation Union (IUCN) and the Mekong River Commission (MRC) with support from the governments of the four countries and other key stakeholders (MWBP, 2005). Funded by the Global Environment Facility (GEF), UNDP, the Royal Netherlands Government, MRC, the Water and Nature Initiative and other donors, the programme focuses on the most critical issues for the conservation and sustainable use of natural resources in the Mekong wetlands.

A component of the programme involves the development and implementation of a strategy for the management of Invasive Alien Species (IAS) in the LMB. The CBD defines IAS as species that are introduced deliberately or unintentionally outside their natural habitats where they have the ability to establish themselves, invade, out-compete natives and take over the new environments. These species are a major threat to wetlands and livelihoods in the LMB and there is growing concern about their impacts on biodiversity and the agricultural system of these countries.

Currently there is a deficit of information on the impacts of IAS within the community, key sector groups and governments of these countries. Most often, the problem is not recognised until the invasion becomes noticeable nor has ecological, economic or social consequences. While the LMB nations have made some progress in addressing IAS, much remains to be done in terms of, implementing successful management strategies and awareness and capacity building. MWBP will devise a regional strategy to address the existing and potential impacts of IAS in the LMB. This preliminary report is the first step in moving towards developing a strategy to manage IAS issues in the LMB.

1.1 Objectives of this report

- To determine the current state of play of LMB countries in their efforts to address IAS, by preparing an inventory of presently existing IAS in each country, including information on their distribution and environmental and economic impacts in LMB.
- To gather information on existing National Strategies, Treaties, Agreements and Management Actions addressing Invasive Alien Species in each country.
- To identify local, regional and global organisations and resources that are relevant to a regional IAS strategy in LMB.
- To identify priorities on a national scale that are necessary for LMB countries to move forward in addressing IAS.
- To identify priority actions on a regional scale that will help LMB countries move forward in addressing IAS through the develoment and implementation of a regional strategy.
- To include areas and species in need of immediate attention and highlight ecosystems that may be vulnerable to IAS in LMB in the future.
- To identify major constraints to IAS management in LMB such as lack of capacity, awareness and gaps in jurisdiction.
- To provide information that would facilitate in developing a concept proposal to help source funding for a regional approach to IAS in LMB.

2.0 Status of major IAS in the LMB, their implications and management

Many IAS have been introduced into the LMB region for economic and aesthetic purposes, while several others have entered accidentally. At present, the major pathways for introduction of IAS in the region include aquaculture development, and the horticultural and ornamental fish trades (GISP, 2001). The spread of IAS in the region has been aggravated by rapid development activities such as modification of inland water systems for water management projects (i.e., dams, diversions), urbanisation, agricultural expansion and transport development projects (i.e., trans-boundary road networks, navigation channels) and aquaculture development (i.e., inland fish farming).

Based on published information, a list of major IAS in the LMB is presented below

Common Name	Scientific Name
Siam Weed	*Chromolaena odorata*
Torpedo grass , Victoria grass	*Panicum repens*
Water hyacinth	*Eichhornia crassipes*
Mauritius grass	*Brachiaria mutica*
Giant Mimosa	*Mimosa pigra*
Water lettuce	*Pistia stratiotes*
Golden Apple Snail	*Pomacea canaliculata*

Source: (GISP Database, Triet, 2000) , List of IAS in the LMB. (Annex 1)

Trachemys scripta © Channa Bambaradeniya

Cyprinus carpio © Ruchira Somaweera

2.1 Impacts of major IAS in the LMB

2.1.1 Impacts on biodiversity

IAS have caused significant and often irreversible environmental and socio-economic impacts to ecosystems and livelihoods in the LMB area. The ecological impacts of IAS on inland water ecosystems vary depending on the invading species, the extent of the invasion, and the vulnerability of the ecosystem being invaded. IAS are capable of reducing the abundance of native species by competing for resources, altering water quality, nutrient cycling and other ecosystem processes (CBD, 2003).

The Siam weed (*Chromolaena odorata*) forms dense stands preventing establishment of other species, due to aggressive competition. When dry, this weed becomes a fuel which may promote wild bushfires. The leaves are toxic because they contain high levels of nitrate, and if consumed by grazing animals may cause fatalities.

Another major aquatic weed Water hyacinth (*Eichhornia crassipes*) is widespread on freshwater wetlands of the Mekong Delta, especially in standing water. It forms dense floating mats, covering the water surface, reducing the abundance of native floating plants and other aquatic organisms by reducing the availability of sun lights and competing for nutrients (Matthews, (2004).

Giant Mimosa (*Mimosa pigra*) is one of the worst environmental weeds of the Mekong River basin (Storrs et al, 2001). This thorny shrub reproduces via buoyant seed pods that can spread long distances in flood waters and has the potential to spread through grasslands, floodplain ecosystems and pastures, converting them into unproductive scrubland. It is a serious agricultural weed in the LMB often establishing in areas along streams and canals and then invading adjacent rice fields.

Invasion of sand bars and mudflats along the Mekong River in upper Lao region by *M. pigra* has resulted in the loss of feeding and resting habitats of migratory water birds (Dubeau, 2004). In heavily infested areas, few native plants can grow under the mimosa canopy (Triet et al, 2002).

Heavy use of chemicals to control some invasives such as the Golden Apple Snail (*Pomacea canaliculata*) has lead to ecosystem pollution and is a serious threat to other aquatic organisms as well as the health of people working in the paddy fields.

In many instances there is little knowledge of baseline conditions of these inland water ecosystems prior to invasions. At the ecosystem level, more data is needed to quantify the effects of IAS on ecological processes to avoid implementation of inappropriate and unsuccessful management interventions.

2.1.2 Socio-economic impacts

Damage from aquatic invasive alien species impacts is not restricted to ecosystems; they also affect human economic interests, as many people in the LMB nations depend on inland water ecosystems for their livelihoods. Human activities to increase economic productivity and well-being have contributed to the introduction and vulnerability of these ecosystems to IAS (CBD, 2003). Impacts include decrease in fisheries and aquaculture production, decrease in the availability and accessibility of water for industries, blocking water ways and impeding transportation on water, and declines in property values (CBD, 2003, GISP, 2006).

Aquatic weeds reduce crop yields and decrease water supply by degrading water catchment areas and freshwater ecosystems. Alien water weeds affecting water use currently cost developing countries over US$100 million annually (GISP 2001). Water hyacinth (*Eichhornia crassipes*) is capable of forming dense floating mats that restrict fishing and transport, reduce the availability of water for drinking, irrigation and power generation (CBD 2003, GISP 2006, Triet 2000). *M. pigra* infested areas are inaccessible to animals and people, and interferes with stock watering, irrigation and recreational use of waterways.

Fish species have been introduced for commercial or sport fishing or more commonly, for use in aquaculture. Tilapia (*Oreochromis* spp.) provides the more rural sectors of the LMB with a cheap and readily available source of protein. Without proper management and containment facilities, the risk of escape and spread may be particularly high in aquatic environments.

The Golden Apple Snail (*Pomacea canaliculata*) was introduced to the LMB for the purposes of aquaculture to provide a high-protein food source for local consumption, as well as for export. Aquaculture of this species proved to be unsuccessful because a large number of snails escaped from the culture ponds, and found their way into ponds and rice-fields nearby. During the flood season, the snail spread more rapidly into the delta region of the Mekong River and invaded rice plantations, feeding voraciously on rice seedlings. This has resulted in massive production losses. The snail has greatly affected the crops by reducing seedling density and causing reseeding many times a year. The snail shells can cause severe injuries to people working in the field.

However, it is clear that economic benefits sometimes can be derived from some IAS such as in aquaculture. The challenge is to balance the benefits and costs, economical and ecological, to ensure sustainable use of wetlands in the LMB.

2.2 Management of IAS in LMB

Countries within the LMB region vary in their capacity to deal with IAS issues but a few management programmes have been implemented at the country level.

Siam weed is currently managed by manual slashing and chemical control using herbicides. The biological control agent caterpillar of the moth *Pareuchaetes pseudoinsulata* was introduced to Cambodia but has been unsuccessful in establishing itself. Siam weed in Thailand is being harvested due to its use as a herbal plant thus controlling the spread of the species. The Chalcid (*Branchymeria euploeae*) and tephritid gall fly (*Cecidocharef connexa*) are used for biological control of the species in Thailand,

Management of Nutria (*Myocastor coypus*) in Thailand include trying to try and popularise its meat and pelt. Baiting is sometimes used to concentrate nutria in specific locations where they can be more easily trapped or poisoned. In Vietnam control of Nutria is by prohibiting its culture, import, and transport in the whole country.

The weevil *Neochetina eichhorniae* has been established in Thailand for control of water hyacinth. In Vietnam the weevil *Neochetina bruchi* was released in 1996 to control the weed and became successfully established in this country, however the level of control it provides is unknown.

Alligator weed (*Alternanthera philoxeroide*) is now rarely found in Thailand due to effective control by the beetle (Agasicles hygrophila).

Management of the Golden Apple Snail (*Pomacea canaliculata*) is by manual collection, preventing the entrance of snails to the rice field, transplanting with old seedlings, reduction of water level in the rice field and use of chemical pesticides. In Lao PDR an integrated management approach through a combination of different techniques applied simultaneously has already demonstrated to farmers by the Agricultural Extension Center. In Thailand integrated pest management of the golden apple snail incorporates chemical and biological control methods hand-picking which is effective but extremely labour-intensive. Biological control methods have focused on using predators such as ducks or fish to minimise the snail population. All LMB nations use pesticides that not only impact non-target organisms but also endanger the health of people working in the rice fields. In Vietnam the most common method for controlling *P.canaliculata* is handpicking and also by rice-fish farming where fish are raised in the paddy-fields to control snail abundances. The project, “Integrated Golden Apple Snail Management in Rice” carried implemented by FAO in Vietnam using the common carp has proven to be highly successful (FAO, 1998).

3.0 Status of IAS in Cambodia

Known IAS in Cambodia

Common Name	Scientific Name	Initial introduction and known distribution
Siam Weed	*Chromolaena odorata*	Distribution is in open areas such as pastures and around villages and settlements, along roadsides and disturbed forests. No specific information is available on status of *C.odorata* invasion in Cambodia. Initial introduction of the Siam weed (*C odorata*) to Southeast Asia probably occurred by introduction into the Calcutta Botanic Garden.
Torpedo grass , Victoria grass	*Panicum repens*	Common weed along road sides
Water hyacinth	*Eichhornia crassipes*	Slow flowing rivers and stagnant water bodies
Giant Mimosa	*Mimosa pigra*	Mekong Delta
Common Tilapia	*Oreochromis mossambicus*	Mekong river and tributaries
Tilapia	*Oreochromis* spp.	Mekong river and tributaries
Golden Apple Snail	*Pomacea canaliculata*	Paddy fields and ponds
Bighead carp	*Aristichthys nobilis*	Mekong river
Common carp	*Cyprinus carpio*	Mekong river

Information and resources related to IAS management in Cambodia

Inventory of IAS	Global Invasive Species Programme Database
Working Group on IAS	International Chromolaena Working Group
National Strategy	Mandates not clear
Key agencies responsible for IAS	The Living Aquatic Resources Research Centre (LARReC), Ministry of Agriculture and Forestry of the Government
Existing organizations working on IAS at national level	IUCN, Mekong Wetland Biodiversity Programme (MWBP)
Existing programs on IAS	No published information
Relevant national legislation	No specific legislation to address IAS issues
Constraints in progress on IAS	Inadequate capacity and information, lack of funds
Requirements for progress on IAS	Surveys to determine current status of aquatic IAS in the country, enacting regulations, implementation of awareness programmes, national strategy for management, funding.
Bibliographic list of publications	Plant Protection Service Secretariat of the Pacific Community PEST ADVISORY LEAFLET NO. 43 (2004) - Chromolaena (Siam) Weed ASEAN Regional Centre for Biodiversity Conservation 2002. Invasive Alien Species. Biodiversity Volume 2, Number 4, Philippines. Storrs, M., Ashley, M., Tran Triet and Chin Samouth 2001. Towards the Development of Strategic Weed Management for the Lower Mekong Basin: a Report on A Training Worskshop (Juliana Hotel, Phnom Penh, Cambodia, 6-8 November 2001). Mekong River Commission and Environment Australia.
National Workshops	No information available
International W/shops	APWMTP “Towards the Development of Strategic Weed Management for the Lower Mekong Basin” Cambodia 6-8 Nov 2001

List of contacts in Cambodia

Name	Email	Organisation
Kay Pheng		Unit Chief, Ministry of Environment Attended APWMTP Training Workshop in Cambodia 2001
Keo Chamroeun		Officer, Planning Division, MAFF Attended APWMTP Training Workshop in Cambodia 2001
Hak Socheat		Programme Officer, CNMC Attended APWMTP Training Workshop in Cambodia 2001
Mao Kosal,	maokosal.mwbp@online.com.kh	National Wetlands Communication and Training Coordinator MWBP Mekong Wetlands Biodiversity Programme PO Box 1504, Phnom Penh Cambodia
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4.0 Status of IAS in Lao PDR

Known IAS in Lao PDR

Common Name	Scientific Name	Initial introduction and known distribution
Swamp grass	*Echinochloa colonum*	Lowland rice production systems
Water hyacinth	*Eichhornia crassipes*	Slow-flowing rivers, stagnant water
Barnyard grass	*Echinochloa crusgalli*	Lowland rice production systems
Giant Mimosa	*Mimosa pigra*	Upland agricultural systems in northern provinces.
Mile-a-minute	*Mikania micrantha*	Northern highland areas of Lao PDR
Croftonweed	*Ageratina adenophora*	Northern highland areas of Lao PDR
Siam Weed	*Chromolaena odorata*	In abandoned cultivation, along road sides
Golden Apple Snail	*Pomacea canaliculata*	Introduced in 1992 mainly as a source of food, this snail has now established itself in 10 of 17 provinces in Lao spreading through connecting waterways such as irrigation canals and rivers.
Bighead carp	*Aristichthys nobilis*	Mekong river
Common carp	*Cyprinus carpio*	Mekong river
Silver carp	*Hypophthalmichthys molitrix*	Mekong river

Oreochromis mossambicus © Ruchira Somaweera

Information and resources related to IAS management in Lao PDR

Inventory of IAS	Global Invasive Species Programme Database
Working Group on IAS	none
National Strategy	none
Key agencies responsible for IAS	Mandates not clear
Existing organizations working on IAS at national level	Science, Technology and Environment Agency (STEA) under the Prime Minister's Office. Ministry of Agriculture and Forestry Ministry of Public Health Quarantine inspectors at the central, provincial and district are in charge of issuing import permits, particularly phytosanitary certificates.
Existing programs on IAS	National Agricultural Research Centre and Lao International Rice Research Institute (IRRI) have initiated research experiments to test efficiency of biological controls against the Golden Apple Snail. Northern Agricultural and Forestry Research Centre and Lao IRRI have commenced several control methods against aquatic weeds.
Relevant national legislation	Decree on Prohibition of Wildlife Trade (1986) Decree on the Management & Protection of Wild Animals (1989) Decree on establishment of National Protected Areas (1993) Quarantine Legislation (1994) Forest Law (1996) Water Resources Management Law (1996) Plant Appreciation Legislation (1996) Land Law (1997) Transportation Law (1997) Environment Protection Law (1999) Pesticide Law (2000) National Environment Action Plan Bio-access draft legislation
Constraints in progress on IAS	Lack of qualified staff, financial constraint, insufficient scientific information on IAS, the lack of legal framework, low level of awareness among society on the negative impacts of alien species to the economy and the environment of the country.
Requirements for progress on IAS	Development of a National Strategy, establish a national working group to address IAS issues
Bibliographic list of publications	ASEAN Regional Centre for Biodiversity Conservation 2002. Invasive Alien Species. Biodiversity Volume 2, Number 4, Philippines. Nhoybouakong, M. & Khamphoukeo, K. 2003. Laos national profile report. In: Invasive Alien Species in South-Southeast Asia: National Reports & Directory of Resources (eds. Pallewatta, N., J.K. Reaser & A. Gutierrez). Global Invasive Species Programme, Cape Town, South Africa. Storrs, M., Ashley, M., Tran Triet and Chin Samouth 2001. Towards the Development of Strategic Weed Management for the Lower Mekong Basin: a Report on A Training Worskshop (Juliana Hotel, Phnom Penh, Cambodia, 6-8 November 2001). Mekong River Commission and Environment Australia. Douagbupha, B and Khamphoukeo, K. GOLDEN APPLE SNAIL DAMAGE AND MANAGEMENT PRACTICES IN RICE FAMERS' FIELDS IN THE LAO PDR
National Workshops	No published information
International W/shops	No published information

List of contacts in Lao PDR

Name	Email	Organisation
Monemany Nhoybouakong	Mone_mony@yahoo.com	Acting Director General, Environment Research Institute, Science Technology and Environment Agency, Prime Ministers Office. P.O.Box 2279 Vientiane Presented paper at Bangkok W/shop 2002
Khamouane Khamphoukeo	khamouane@laotel.com	Officer of the National Agricultural Research Centre, National Agriculture and Forestry Institute, Ministry of Agriculture and Forestry P.O.Box 4195 Vientiane Attended Bangkok W/shop 2002
Keomany Luanglith		Programme Officer LNMCS Attended Cambodia workshop 2001
Vongvilay Vongkhamsao		Technical Officer LNMCS Attended Cambodia workshop 2001
Tiengkham Vongsabouth		Technical Officer Dept of Agriculture Attended Cambodia workshop 2001
Viengkhong Sihalath		Technical Officer STEA Attended Cambodia workshop 2001
Niklas Mattson	niklas@laopdr.com	Component Coordinator Aquaculture of Indigenous Mekong Fish Species (AIMS) Mekong River Commission/LARReC PO Box 7035, Vientiane Lao, PDR

5.0 Status of IAS in Thailand

Known IAS in Thailand

Common Name	Scientific Name	Initial introduction and known distribution
Water hyacinth	*Eichhornia crassipes*	Introduced to Thailand from Indonesia and has since spread into ponds and lakes during the flooding seasons.
Giant water fern	*Salvinia molesta*	Tanks
Giant sensitive plant	*Mimosa pigra*	Along Mekong river
Siam weed	*Chromolaena odorata*	Found in abandoned cultivation the seeds of the weed is believed to have been unintentionally introduced into Thailand as a contaminant of ballast
Mile-a-minute	*Mikania micrantha*	Northern highland areas of Thailand
Alligatorweed	*Alternanthera philoxeroides*	Marshes and paddy fields
Velvetleaf, yellow bur-head	*Limnocharis flava*	Paddy fields
Croftonweed	*Ageratina adenophora*	Found in the northern highland areas of Thailand, the weed first entered into Thailand from Myanmar and Southern China.
Nutria	*Myocastor coypus*	Inhabits ponds, rivers, swamps and drainage canals
Golden Apple Snail	*Pomacea canaliculata*	Paddy fields, ponds and tanks
Bighead carp	*Aristichthys nobilis*	Mekong river
Goldfish	*Carassius auratus*	Ponds and tanks
Silver carp	*Hypophthalmichthys molitrix*	Mekong river
Rainbow trout	*Oncorhynchus mykiss*	No information
Mosquito fish	*Gambusia affinis*	Introduced for the biological control of mosquito larvae

Rosy wolf snail	*Euglandina rosea*	Introduced for biological control of the giant African snail.
Tilapia	*Oreochromis mossambicus*	Introduced as a protein source
Nile Perch	*Latus niloticus*	Ponds and tanks
Walking catfish	*Clarius batrachus*	Rivers and tanks
Carp	*Cyprinus carpio*	Introduced as a protein source
Giant African snail	*Achatina fulica*	Agricultural fields and home gardens
Red-eared slider terrapin	*Trachemys scripta elegans*	Tanks and marshes

Information and resources related to IAS management in Thailand

Inventory of IAS	Global Invasive Species Programme Database. 38 species in Thailand are listed on the ISSG's 100 of the Worlds Worst IAS list
Working Group on IAS	Thailand CBC Subcommittee Working Group on Alien Species under the then Ministry of Science, Technology and Environment. The working group consists of representatives of the secretaries of various ministries. Currently they have developed a work plan to control and prevent of loss of biodiversity derived from impacts of IAS. The working group and Office of Natural Resources and Policy and Planning (OEPP) jointly organised public meetings in 1996, 1997 and 2001 to stimulate further dissemination of information, sharing of lessons learned and capacity on IAS issues.
National Strategy	None
Key agencies responsible for IAS	Ministry of Science, Technology and Environment (MOSTE): Office of Environment Policy and Planning (OEPP) Ministry of Agriculture and Cooperative (MOAC): Department of Agriculture, Department of Livestock Development, Department of Fisheries, Royal Forest Department Ministry of Public Health (MOPH): Department of Medical Science, Department of Communicable Disease Control. Ministry of Commerce (MOC).
Existing organizations working on IAS at national level	IUCN (MWBP)
Existing programs on IAS	National Biological Control Research Centre (NBCRC) at Kasetsart University in collaboration with National Research Council of Thailand (NRCT) and other agencies - deals only with biological control programs. Other relevant programs expected to be identified in National Biodiversity Strategy and Action Plan 2002-06. The National Biological Control Research Center introduced 4 natural predators to control water hyacinth; mottled water hyacinth weevil (*Neochetina eichhorniae*), chevroned water hyacinth weevil (*Neochetina bruchi*), water hyacinth moth (*Sameodes albiguttalis*) and water hyacinth moth (*Xubida (Acigona) infusella*) with varying results.
Relevant national legislation	1913 Water hyacinth Eradication Act 1964 Plant Quarantine Act (revised 1999) 1975 Plant Variety Act (revised 1992) 1947 Fisheries Act.
Constraints in progress on IAS	No single or national authority that is responsible for the prevention and management of IAS.
Requirements for progress on IAS	Capacity development and funding

Bibliographic list of publications	ASEAN Regional Centre for Biodiversity Conservation 2002. Invasive Alien Species. Biodiversity Volume 2, Number 4, Philippines. Napompeth, B. Management of Invasive Alien Species in Thailand. (www.fftc.agnet.org/library/abstract/eb544) Napompeth, B. 2003. Thailand national profile report. In: Invasive Alien Species in South-Southeast Asia: National Reports & Directory of Resources (eds. Pallewatta, N., J.K. Reaser and A. Gutierrez). Global Invasive Species Programme, Cape Town, South Africa. Storrs, M., Ashley, M., Tran Triet and Chin Samouth 2001. Towards the Development of Strategic Weed Management for the Lower Mekong Basin: a Report on a Training Worskshop (Juliana Hotel, Phnom Penh, Cambodia, 6-8 November 2001). Mekong River Commission and Environment Australia. (includes list of participants from Thailand) www.onep.go.th/bdm/eng_alien Office of Natural Resources and Environmental Policy and Planning Napompeth, B.1983. Background, threat and distribution of Mimosa pigra L. in Thailand. In: Robert, G.L. and Hebeck, D.H., eds, Proceedings of the International Symposium on Mimosa pigra Management, Chiang Mai, Thailand, pp. 15-26. Napompeth, B., C. Kongsawat and N. Iamsupasit 2003. Current status on alien species management in Thailand. 20th Pacific Science Congress. 17-21 March 2003. Bangkok, Thailand. Pallewatta, N., J.K. Reaser and A. Gutierrez (eds.) 2003. Prevention and Management of Invasive Alien Species: Proceedings of a Workshop on Forging Cooperation throughout South and Southeast Asia. Global Invasive Species Programme, Cape Town, South Africa.
National Workshops	Public meetings with working group in 1996, 1997 & 2001.
International W/shops	GISP “Prevention and Management of IAS” Bangkok 14-16 Aug 2002 Workshop on Alien Invasive Species held at South and Southeast Asia Regional Session of the Global Biodiversity Forum, 1999

List of contacts in Thailand

Name	Email	Organization
Dr Banpot Napompeth	Tel 2579-3649, 2942-8252 Fax 2942-8252 agrban@ku.ac.th	Chairman, Working Group on Alien Species. National Environment Subcommittee on the CBD. NRBC. P.O.Box 9-52, Chatuchak, Bangkok. Presented paper at Bangkok workshop 2002
Tawan Chookajorn		Director Fisheries Environment Division Attended Cambodia workshop 2001
Trailbhun Mekjaroon		Royal Irrigation Department Attended Cambodia workshop 2001
Suraweth Krishnasreni	Department of Agriculture	Attended Cambodia workshop 2001
Sukanya Wisan		Office of Environmental Policy & Planning. Attended Cambodia workshop 2001

6.0 Status of IAS in Vietnam

Known IAS in Vietnam

Common Name	Scientific Name	Initial introduction and known distribution
Torpedo grass , Victoria grass	*Panicum repens*	Roadside weed
Giant Mimosa	*Mimosa pigra*	Along water edges of ponds, streams, rivers and canals, seasonally inundated grasslands
Siam Weed	*Chromolaena odorata*	Abandoned cultivations
Water hyacinth	*Eichhornia crassipes*	Widespread on freshwater wetlands of the Mekong Delta
Water lettuce	*Pistia stratiotes*	Standing waterbodies
Red-eared slider terrapin	*Trachemys scripta elegans*	Tanks, marshes, ponds
Goldfish	*Carassius auratus*	Tanks, ponds
Tilapia	*Oreochromis spp.*	Mekong river
Common carp	*Cyprinus carpio*	Mekong river
Silver carp	*Hypophthalmichthys molitrix*	Mekong river
Bighead carp	*Aristichthys nobilis*	Mekong river
Nutria	*Myocastor coypus*	Ponds, rivers, swamps
Golden Apple Snail	*Pomacea canaliculata*	Introduced in Vietnam in 1988 without undergoing quarantine as a protein rich source of food fish and duck. With the annual flooding the snail spread rapidly into the delta region of the Mekong River. Ten years after its introduction, the apple snail has established itself 57 of 61 provinces.

Achatina fulica © Ruchira Somaweera

Inventory of IAS	Inventory of environmental weeds in Mekong Delta (Ref: Triet workshop paper 2003), Global Invasive Species Programme Database
Working Group on IAS	None
National Strategy	Draft strategy prepared based on China's IAS strategy
Key agencies responsible for IAS	Ministry of Science, Technology and Environment (MOST): Nature Conservation Division National Environment Agency. Ministry of Agriculture and Rural Development (MARD): Department of Science Technology and Quality Products, Hanoi. Department of Plant Protection, Hanoi. Department of Animal Health, Hanoi. Department of Agricultural and Forestry Extension, Hanoi. Ministry of Fisheries: Fishery Resource and Environment Conservation Department, Hanoi. MONRE Specialised Ministry is responsible for management of import of alien species.
Existing organizations working on IAS at national level	IUCN (MWBP)
Existing programs on IAS	*Mimosa pigra* control: A project using a beetle (*Calosobruchus quadritatus*) as a biocontrol agent for *Mimosa pigra* was carried out at Nam Cat Tien National Park by the National Plant Protection Institute (NIPP). - Dr Nguyen Van Tuat, Director National Plant Protection Institute, Ministry of Agriculture and Rural Development, Hanoi. Another study of *Mimosa pigra* control, at Tram Chim National Park Dr Bui Cach Tuyen, Rector, University of Agriculture and Forestry, Ho Chi Minh City. Tran Triet, Faculty of Biology, Ho Chin Minh Natural Science University (management at Tram Chim and Cat Tien National Parks) Dr Pham Van Lam, Plant Protection Institute (management in Tram Chim and Cat Tien National Parks) *Myocaster coypus* project: Mr Le Hung Quoc, Director General, Department of Agriculture and Forestry Extension, Ministry of Agriculture and Rural Development, Hanoi. Golden Apple Snail: The government banned snail farming after an emergency meeting in July 1992. The National standing committee established and national control programmes carried out in 1994 and FAO project implemented 1997-98. Dr Dam Quoc Tru, Deputy Director General, Plant Protection Department, Ministry of Agriculture and Rural Development, Hanoi.

	2684 Farmer Field Schools on integrated pest management in rice was carried out in the country with 182,372 farmers attending them. FAO project “Integrated Golden Apple Snail Management in Rice” has found that rice-fish farming - where common carp are raised in the paddy-fields, is one of the best ways to control the snail. There has also been production of GIS maps of infestation and distribution of the golden apple snail across Viet Nam, as a part of this project.
Relevant national legislation	Biodiversity Action Plan 1995 National Conservation Strategy 1985 National Plan for Environment and Sustainable Development 1991
Constraints in progress on IAS	Lack of national designated committee, lack of sufficient funding, expertise and baseline information, existing legislative and institutional frameworks are weak
Requirements for progress on IAS	Surveys of IAS present, enacting regulations, scientific research, greater awareness, improved knowledge and cooperation, risk assessment, a national strategy and funding
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National Workshops	“Management and Prevention of IAS” Hanoi 7-8 Oct 2003 APWMTP “Weed Survey Techniques and Prioritisation in the Mekong Delta, Vietnam” Jan 2002 APWMTP “Strategic Weed Management in Vietnamese Wetlands: Weed Control and Occupational Health and Safety Issues” May 2001 APWMTP “Weed Management in wetlands” 6-19 May 2000 APWMTP “Vietnam Wetland Managers Training Tour to Australia” 14-21 April 2000
International w/shops	No published information

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Mr Duong Minh Tu	dmtu@hn.vnn.vn	Director, Central Plant Quarantine Laboratory, Plant Protection Department, Ministry of Agriculture and Rural Development 149 Dac Di, Dong Da, Hanoi Attended Bangkok workshop 2002. Presented paper at national workshop 2003.
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Dr Pham Anh Tuan	Tel 84-4-8273072, 8271368 Fax 84-4-8273070	Vice Director, Institute of Aquaculture, (MoFi) Dinh Bang, Tien Son, Bac Ninh. Presented paper at national workshop 2003.
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7.0 Major constraints for management of IAS in the LMB

- Lack of information on the spread and impacts of IAS in the LMB. Sharing of information, especially of scientific research on species ecology, methods of control and eradication, is required at the regional and international level. This could be implemented through a system of linked regional and national databases on IAS available in multiple languages to increase effectiveness. Fur thermore, studies are usually only conducted on those species that have an overwhelming impact on both the ecosystem and economy. Efforts should be made to research and monitor all introduced species.

- Inadequate capacity for management of specific IAS in the LMB. Capacity building should target all components in society, from government decision makers and administrators, to donors, researchers, agricultural, forestry, fisheries practitioners and the public. Among senior policy makers and line officers in the Mekong region, there is still little awareness of codes of practice and guidelines on introductions of new species (Recommendations from the Workshop on Alien Invasive Species held at South and Southeast Asia Regional Session of the Global Biodiversity Forum, 1999). Building regional capacity to assess risks, share information and strengthen networks, are essential for protecting aquaculture and other production systems and the natural ecosystems on which they depend.

- Lack of a legal framework, and gaps in existing policies and legislation to address the management of IAS in the LMB. Regional coordination of policies and practices on alien species is needed for effective national management. National policies need to be in place and communities need to be aware of IAS issues. Legislation should aim to identifying invasives and their roles and uses in society, and develop suitable limits on activities that might create invasive problems, now or in future.

- Lack of sufficient funding to implement management programmes.

8.0 Priority actions for management of IAS in the LMB region

The following actions prioritised at the national and regional level need to be elaborated through an IAS management strategy.

8.1 National priorities

The country reports illustrate the varying levels of progress of the actions taken in addressing IAS issues in the individual LMB countries The following priority actions at the country level have been gleaned from the Global Invasive Species Programme (GISP) IAS Toolkit (Wittenberg & Cock 2001) as being the main activities required for the four countries to effectively manage IAS.

- Establish an IAS National Focal Point for coordination of activities and information sharing
- Implement surveys to identify priority IAS
- Assess the scale of IAS problems and economic implications
- Identify key organizations responsible for management of IAS in the country
- Ensure that national governments are involved in the management planning process
- Develop a national strategy for and action plans for management.
- Develop an early detection and rapid response action plan as this will increase the likelihood that invasions will be addressed suc cessfully while populations are still localized.
- Identify opportunities for financial and technical support
- Encourage scientific research on IAS issues
- Build capacity within the community, research institutions, local governments and other key stake holders for action and management of IAS
- Ensure community participation and involvement
- Promote awareness of IAS issues by convening workshops, conducting publicity events and media campaigns.

8.2 Regional priorities

For successful management of IAS in the LMB nations coordination at the regional level is essential. Regional priorities have been identified as:

- Sharing of management information, establishment of IAS database for the region knowledge and lessons learned between the countries.
- Awareness raising and education regarding IAS should be given high priority in action plans
- Identifying and bridging information gaps and capacity building across the LMB countries is necessary
- Conduct regional assessment of status, trends, impacts of IAS
- Assessment of economic costs of major IAS on region wide basis
- Establish regional steering committee including national government ministries, international organizations, country representatives.
- Development and implementation of regional strategy & action plan.
- Identify opportunities for financial and technical support from international agencies an the private sector.
- Identify a selection of the major IAS in the region

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Annex 1

List of IAS in the LMB

Common name	Species name	Country
Siam Weed	*Chromolaena odorata*	Vietnam, Cambodia, Lao PDR, Thailand
Torpedo grass , Victoria grass	*Panicum repens*	Vietnam, Cambodia
Water hyacinth	*Eichhornia crassipes*	Vietnam, Cambodia, Lao PDR, Thailand
Mauritius grass	*Brachiaria mutica*	Thailand, Cambodia
Giant Mimosa	*Mimosa pigra*	Vietnam, Cambodia, Lao PDR, Thailand
Giant water fern	*Salvinia molesta*	Thailand
Water lettuce	*Pistia stratiotes*	Vietnam
Velvetleaf, yellow bur-head	*Limnocharis flava*	Thailand
Swamp grass	*Echinochloa colonum*	Lao PDR
Barnyard grass	*Echinochloa crusgalli*	Lao PDR
Mile-a-minute	*Mikania micrantha*	Lao PDR, Thailand
Croftonweed	*Ageratina adenophora*	Lao PDR, Thailand
Alligatorweed	*Alternanthera philoxeroides*	Thailand
Golden Apple Snail	*Pomacea canaliculata*	Vietnam, Cambodia, Lao PDR, Thailand
Silver carp	*Hypophthalmichthys molitrix*	Vietnam, Lao PDR, Thailand
Nile Perch	*Latus niloticus*	Thailand
Walking catfish	*Clarius batrachus*	Thailand
Nutria	*Myocastor coypus*	Vietnam, Thailand
Goldfish	*Carassius auratus*	Vietnam, Thailand
Rainbow trout	*Oncorhynchus mykiss*	Thailand
Mosquito fish	*Gambusia affinis*	Thailand
Bighead carp	*Aristichthys nobilis*	Vietnam, Cambodia, Lao PDR, Thailand
Tilapia	*Oreochromis spp.*	Vietnam, Cambodia
Giant African snail	*Achatina fulica*	Thailand
Red-eared slider terrapin	*Trachemys scripta elegans*	Vietnam, Thailand
Rosy wolf snail	*Euglandina rosea*	Thailand
Common carp	*Cyprinus carpio*	Vietnam, Cambodia, Lao PDR, Thailand

Annex 2

List of Useful Resources

Organization	Website	Comments
ASEAN Regional Conservation Biodiversity Centre (ARCBC)	http://www.arbc.org.ph	
Asian-Pacific Alien Species Database	http://www.apasd-niaes	Japan 2004
Global Invasive Species Programme (GISP)	http://www.gisp.org	Global Strategy; Toolkit; GISP newsletter, database on AIS
Invasive Species Specialist Group (ISSG)	http://www.issg.org	Aliens newsletter
Network of Aquaculture Centres in the Asia-Pacific (NACA)	http://www.enaca.org	Links to IAS database that was developed as result China workshop.
World Conservation Union (IUCN)	http://www.iucn.org	Guidelines for the prevention of biodiversity loss caused by IAS
Office of Natural Resources & Environmental Policy & Planning, Thailand	http://www.onep.go.th	
Aquatic Invasives	http://www.aapqis.org/ias/home.html	Website aiming to assist ASEAN countries in understanding aquatic invasive alien species so that the benefits from appropriate use of alien species in fisheries and aquaculture can be maximized and the risks that they pose can be managed.
Invasive Species Information Node	http://invasivespecies.nbii.gov/	Links to IAS databases, Publications, main focus is on US IAS.

IUCN
The World Conservation Union

The World Conservation Union in Asia

The IUCN Asia region covers 23 countries, stretching from Pakistan in the West to Japan in the East, Indonesia in the South to Mongolia in the North. IUCN maintains offices in Bangladesh, Cambodia, China, Lao PDR, Nepal, Pakistan, Sri Lanka, Thailand and Vietnam.The Asia Regional Office is in Bangkok, Thailand.

IUCN's nine regional thematic programmes, known collectively as the Ecosystems and Livelihoods Group (ELG), are based in two clusters: one in Colombo, Sri Lanka (biodiversity, environmental economics, marine and coastal, species), and one in Bangkok, Thailand (environmental law, forests, mountains, protected areas, wetlands and water resources). IUCN also runs a Regional Information Hub on coastal ecosystem management in a post-tsunami context out of its ELG cluster in Sri Lanka.

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