

NINH BINH PROVINCIAL PEOPLE'S COMMITTEE

REPORT

**ON IMPLEMENTATION OF THE REQUESTS BY THE
UNESCO WORLD HERITAGE COMMITTEE RELATING TO
THE TRANG AN LANDSCAPE COMPLEX PROPERTY,
(NINH BINH PROVINCE, VIETNAM)**

Viet Nam, November 2015

Executive Summary

This report presents a response from the State Party of Vietnam to requests made by the World Heritage Committee on the inscription of the Trang An Landscape Complex to the World Heritage List at the 38th session of the World Heritage Committee on 25th June 2014 (38 COM 8B.14).

1. Regarding continued support to archaeological research and publication:

In May 2015, the Management Board coordinated with Vietnam Institute of Archaeology to survey, test-pit and excavate 12 new sites within the Trang An Scenic area. In June 2015, the Management Board signed a cooperative agreement with the University of Cambridge and Queen's University Belfast in the United Kingdom for a comprehensive new program of archaeological and palaeo-environmental research during the five-year period (2015-2020). The first survey of this program will be conducted in December 2015.

2. Regarding revision and implementation of the property management plan:

The draft plan submitted with the nomination dossier has been completely revised to identify the factors affecting the property and present the vision, purposes and objectives of management and the actions that will be deployed in practice. The revised plan includes comprehensive provisions for management of archaeological sites and research, and tourism management. The provisions of the plan are firmly grounded on the principles of the World Heritage Convention and take account of all the relevant laws and regulations of Vietnam and Ninh Binh Province on the protection and management of cultural and natural heritage.

The management plan has been agreed by the Ministry of Culture, Sports and Tourism, approved by Ninh Binh Provincial People's Committee. The plan presents a vision to the year 2030, encompassing action plans covering the first 5-year period 2016-2020. The management plan is under continual review and will be formally revised after five years. The revision will take account of updated archaeological and tourist information and changing circumstances.

3. Regarding modification of the boundary of the property:

The entire property boundary has been thoroughly checked and revised to better reflect the areas and attributes of the Outstanding Universal Value and ensure an appropriate surrounding buffer zone. The main principles of the revision include: (1) Adding natural karst landscape and caves of archaeological significance, and isolated towers at the margin of the property that manifest the final stages of the geomorphic evolution; (2) Using the natural features for defining the boundary such as slope topography, rivers and streams; (3) Using canals and rural roads to mark the boundary where natural features are unavailable; and (4) Excluding areas that have been significantly modified by inappropriate human activities and exploitation.

The net result is a minor modification to the boundary of the property that adds approximately 54 hectares (almost 1%) to the total area that is now 6,226 hectares (the former inscribed area was 6,172 hectares). Fundamentally, there is no change to the boundary of the buffer zone that is delimited by the natural features, including major rivers at the northern, northeastern, western and southwestern margins of the property. Extension of the property boundary, however, has reduced the area of the buffer zone to 6,026 hectares (compared to the original 6,080 hectares).

Introduction

At the 38th session of the World Heritage Committee on 25th June 2014, the Trang An Landscape Complex was inscribed on to the World Heritage List as a mixed cultural and natural property (38 COM 8B.14). This inscription is an honor for the State Party of Vietnam in general and the Ninh Binh Province in particular. In awarding World Heritage status to Trang An, the Committee made several requests to the State Party. Accordingly, the Ninh Binh Provincial People's Committee has collaborated with the Vietnam Ministry of Culture, Sports and Tourism, the Vietnam National Commission for UNESCO and the Vietnam National Council for Cultural Heritage to direct and instruct the Management Board of the Trang An Landscape Complex to respond fully to all the Committee's requests. The Board has taken advice from relevant Government agencies and from domestic and international experts in preparing its response to the requests. Respectfully, the State Party has the pleasure of presenting the results of this work below.

1. Results of implementing the requests of the World Heritage Committee

1.1. In terms of archaeological research, the Committee requested the State Party to: *"Provide continued support for ongoing archaeological research and publication"*.

In May 2015, the Management Board coordinated with Vietnam Institute of Archaeology to survey, test-pit and excavate 12 sites in elevated parts of a valley of Trang An Scenic area. The objective of this work is to improve the understanding of the way that human-environment interaction was manifested in later periods of settlement in Tràng An, particularly regarding from evidence in the Hoa Lu Ancient Capital during the 10th century.

In June 2015 (following discussion among key stake-holders) the Management Board signed a cooperative agreement with the University of Cambridge and Queen's University Belfast in the United Kingdom for a new comprehensive program of archaeological and palaeo-environmental research in Tràng An. This work will explore and further elucidate the impact of changing sea-levels on prehistoric settlement in the Tràng An massif. Data arising from this study will not only further highlight the cultural and natural heritage values of the property, it will integrate them in climate-change models for assessing the impact of sea-level change on both past and present human settlement in Vietnam and throughout Southeast Asia.

This program of research will be conducted over a five-year period (2015-2020) supported by a projected total funding of c.£1 million. Of this, £300,000 has been invested by the private Xuan Truong Enterprise so that key research can commence from March 2016. In July 2015, an application was made to the Arts and Humanities Research Council (AHRC) of the UK for an additional £728,000. As of November 2015, this application (set out in full in Annex 3 of the management plan) has successfully moved to an advanced stage of funding assessment and a final decision is anticipated before the end of 2015. Availability of this very substantial funding will allow continued work with the Vietnam Institute of Archaeology, and further formal research linkages between the Management Board and the Vietnam Institute of Geosciences and Mineral Resources, and several universities in the UK. This research program, will create an exceptional environment for scholarship and intellectual exchange, in mutual pursuit of a deeper understanding and dissemination (through academic and public channels) of the cultural and natural OUV of Trang An.

In December 2015, experts from the UK and Vietnam will conduct the first archaeological survey season of this research program, which will expand through excavation, radiocarbon dating, artefact study and GIS terrain-mapping in 2016.

1.2. In terms of revision and implementation of the property management plan, the Committee requested the State Party to: *(1) Submit a revised management plan and zoning plan to the World Heritage Centre, which includes a tourism management plan; (2) Update the archaeological management plan as new information becomes available; (3) Ensure effective implementation of the tourism section of the management plan, including its measures for preventing overcrowding and environmental impacts; (4) Revise the property management plan to incorporate the archaeological and tourism sections and updates it as necessary; and (5) Submit to the World Heritage Centre, by 1 December 2015, a copy of the gazetted property management plan including its section on tourism and a report on progress made in undertaking the recommended work.*

The draft plan submitted with the nomination dossier has been completely revised under the guidance of the Ministry of Culture, Sports and Tourism and the Vietnam National Commission for UNESCO, as well as through consultation with domestic and foreign experts, including from IUCN and ICOMOS. The revised plan comprehensively defines the factors affecting the property, and it presents the vision, purposes and objectives of management and the actions that will be deployed in practice. This plan includes a zoning plan as following: (1) a natural zone that has priority for protection; (2) a cultural zone that has priority for protection; (3) a zone for conservation/sustainable use; (4) a zone for tourism purposes; and (5) a residential zone. Each has its own management policy with different levels of protection, management and use.

The provisions of the plan are firmly grounded in the principles of the World Heritage Convention and take account of all the relevant laws and regulations of Vietnam and the Ninh Binh Province on the heritage protection and management.

The revised plan includes a comprehensive tourism management plan, which consists of provisions relating to management of human uses and activities under the headings eco-tourism (VII.3.1); recreation (VII.3.2), privately owned accommodation (VII.3.3) and cultural/religious tourism (VII.3.4). These are complemented by provisions for visitor centers (VII.4.1), interpretation (VII.4.2) and visitor safety (VII.4.4), within the context of facilities and services. Aspects of the provisions for research, staff capacity and training, and public-private partnerships are also relevant to tourism management. In combination, these provisions create a very comprehensive tourism management plan for the property. The tourism management plan includes detailed consideration of overcrowding, and measures to ensure that environmental, social and management carrying capacity are not exceeded. Additionally, the revised plan makes comprehensive provision for archaeological research and management, which will be updated as new information becomes available. Preparation of the plan has involved wide consultation with all key stakeholders including local residents, communes and wards; tourism enterprises in the property; and institutions, unions and relevant authorities in Ninh Binh Province. Significantly, in an attempt to consult a wide variety of the domestic and foreign experts and the World Heritage Advisory Bodies, in September 2015, the Ninh Binh Provincial People's Committee organized an international consultative conference on the property management plan. IUCN and ICOMOS representatives participated in the conference and

visited Trang An. Full account was taken of the recommendations from the conference in revising the management plan.

This plan has a vision to the year 2030, encompassing a series of action plans the first of which covers the 5-year period of 2016-2020. The management plan will be kept under continual review and will be formally revised after 5 years. This revision will take account of updated archaeological and tourist information and changing circumstances

The revised management plan has been agreed by the Ministry of Culture, Sports and Tourism, and approved by Ninh Binh Provincial People's Committee.

1.3. In terms of the modification of the boundary of the property, the Committee requested the State Party to: "Modify the boundary of the property to better reflect the areas and attributes of the Outstanding Universal Value and ensure an appropriate surrounding buffer zone".

Based on guidance for defining the property boundary in the World Heritage Operational Guidelines, the Ninh Binh Provincial People's Committee assigned the Trang An Management Board in coordination with the domestic and foreign consultants to thoroughly and comprehensively check and revise the property boundary according to the following principles: (1) Adding natural karst landscape and caves of archaeological significance, and especially isolated towers at the margin of the property that manifest the final stages of the geomorphic evolution; (2) Using the natural features for defining the boundary such as slope topography, rivers and streams; (3) Using canals and rural roads to mark the boundary where natural features are unavailable; and (4) Excluding areas that have been significantly modified by inappropriate human activities and exploitation such as former rock quarry sites, and residential and commercial sites near the gateways to the property such as the Tam Coc wharf and a hotel site in Bich Dong.

As a result, there has been a minor modification to the boundary of the property that adds approximately 54 hectares (almost 1%) to the total area of the property that is now 6,226 hectares (the original inscribed area was 6,172 hectares).

Fundamentally, there is no change to the boundary of the buffer zone that is delimited by the natural features, including major rivers at the northern, northeastern, western and southwestern margins of the property. Extension of the property boundary, however, has reduced the area of the buffer zone to 6,026 hectares (compared to the original 6,080 hectares).

With a sense of responsibility for stewardship of a priceless heritage of the Vietnam nation and of all humankind, the authorities and people of Ninh Binh Province will continue their commitment to protection and management of the property to World Heritage standards in order to hand over the site intact to the future generations. Simultaneously, the property's role in serving the purposes of sustainable socio-economic development and improvement in the the livelihoods of the local communities will be respected and promoted.

NINH BINH PROVINCIAL PEOPLE'S COMMITTEE



THE MANAGEMENT PLAN FOR **TRANG AN** LANDSCAPE COMPLEX

NINH BINH
11/2015

NINH BINH PROVINCIAL PEOPLE'S COMMITTEE

**THE MANAGEMENT PLAN FOR
TRANG AN LANDSCAPE COMPLEX, NINH BÌNH
PROVINCE, VIET NAM**

(For the period 2016-2020, vision 2030)

*(Promulgated with Decision No. 1261/QĐ-UBND dated November 16th 2015 by
the Ninh Binh Provincial People's Committee)*

Ninh Binh, November 2015

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Preface

Trang An Landscape Complex was recognized as a World Cultural and Natural Heritage by the World Heritage Committee of UNESCO at its 38th session in June 25th 2014. This recognition is a great pride and honour for the Vietnamese people in general and the Ninh Binh people in particular.

In recent years, in collaboration with the UNESCO, domestic and international advisory bodies, research institutions and scientists, the Government of Viet Nam has identified management and conservation objectives as well as promoted the outstanding universal values of a World Heritage Site in general and Trang An in particular. We have also worked to ensure the heritage integrity and authenticity to preserve and transmit to the future generations; at the same time, we are making efforts to bring the property to the world, attract tourists and researchers from different regions to visit and study about heritage so as to bring socio-economic benefits to the localities.

The plan is prepared with the guidance from Cultural Heritage Department of Ministry of Culture, Sports and Tourism, National Cultural Heritage Committee as well as domestic and overseas experts, including representatives from ICOMOS and IUCN. On the basis of inheriting the previous draft of management plan, as well as carefully considering the provisions and requirements of the World Heritage Operational Guidelines and relevant laws of Viet Nam, the revised management plan has comprehensively identified the visions and basic guiding principles for protection and management, objectives as well as appropriate actions for protection, sustainable use, conservation and promotion of values, especially addressing issues of tourism and archeology management. The plan has identified about 40 factors that have impacts on the property and need interventions. Each factor is systematically presented through a brief explanation about each issue (how, where and when), objectives (which objective will be obtained), actions (addressing solution/measures) and effective assessment measures.

This plan will be the important scientific and legal foundation for Ninh Binh authorities and other stakeholders to make policy and take actions, as well as improve and refine their management practices for better protection in the coming years. Moreover, the Trang An Landscape Complex Management Plan has formed a legal basis for the implementation of international commitments in the protection, conservation, restoration, introduction, presentation and transmission its heritage values to the future generations, as in the spirit of the World Heritage Convention.



Dr. Đặng Thị Bích Liên

Deputy Minister of Culture, Sports and Tourism

Foreword

The Trang An Landscape Complex is located at the southern margin of the Red River Delta in Ninh Binh Province of North Vietnam, approximately 90km southeast of the national capital city, Hanoi. The property covers 6,226 hectares and is surrounded by a buffer zone of some 6,026 hectares. The property occupies a 250 million year-old limestone massif, which is surrounded by four rivers: Hoang Long River in the north; Chanh River in the east; He River in the south and Ben Dang River in the west. The boundary of the property largely follows natural elements in the landscape, tracing the abrupt break of slope along the outer margin of the Trang An limestone massif. Consequently, the property contains essentially all the outstanding natural karst landscape and its associated cultural heritage.

On 25th June 2014, the Trang An Landscape Complex was recognized as a mixed cultural and natural World Heritage site by UNESCO. It is the first mixed site in Vietnam and Southeast Asia to be awarded World Heritage status. Trang An is an outstanding place in Southeast Asia and the World for demonstrating early human interaction with the natural landscape and adaptation to major environmental changes over a period of more than 30,000 years, from around 1,200 to 33,000 years ago.

The Trang An Landscape Complex is as a link between the past and the present, between the history and landscape as well as between nature and people. It is a storehouse of golden traits of national history and human tradition, bequeathed by our ancestors over thousands of generations. It also protects the first capital of the Great Viet Nation in the 10th century and was a royal step-over place of the Tran dynasty during the resistance against Yuan invaders in the 13th century. As such, it contains many nationally significant historic and religious relics, monuments and sites, manifesting cultural and natural values that together mix, sublimate and raise the Outstanding Universal Value of the property.

The very long and continuous human history is closely associated with the recent geological evolution of the Trang An limestone massif. The landscape is composed of an array of cone towers with craggy cliffs rising up to 200m above the surrounding land surface and water level, creating one of the most beautiful and spectacular natural environments of its kind in the world. Trang An is also as a classic example of a limestone tower karst landscape in the final stages of geomorphological evolution under a humid tropical climate, and is considered a model against which other similar world localities may be identified and compared.

Trang An is a very special place where culture encounters the wonder, mystery and magnificence of the natural world and is transformed by it. The beauty of Trang An has inspired writers, poets and religious leaders over the centuries. An ancestor of the Buddhist Truc Lam Dhyana school, King Tran Nhan Tong (13th century), praised Trang An as follows;

. . . an array of mountains here looks like an impressive strip of Phi Van Mountain with coincidental and adjoining peaks, being as beautiful as flying clusters of clouds that have strange caves and rocks, tortuous rivers and twinkling silver water inside.

The King also wrote the following poem:

An Autumn Sunset in Vu Lam

The bridge is reflected like a painting on the stream,

The setting sun draws a bright line on the riverside cliff.

The red leaves falling on thousands of silent mountains,

The fog encloses as in a dream, the bell rings from far away.

Another famous poet, Cao Ba Quat (19th century), was affected by the superb beauty of the area and composed this poem:

On the way to Ninh Binh

Transparent blue river winding like the silk belt of a pretty girl,

Green mountains as snail-like cups that make a man drunk.

Enjoying boundless fresh air and the bright moon together,

Just afraid the poet will refuse to return home.

The inscription of Trang An on the World Heritage List is a great honour for the authorities and people of Ninh Binh Province, who pledge themselves to protect and manage the cultural and natural values, and to hand over the intact site to future generations. Completion of this management plan at the request of World Heritage Committee is regarded as an important step in this process. The plan has been prepared with assistance from the Ministry of Culture, Sport and Tourism and the Vietnam National Commission for UNESCO, and has benefitted from input by domestic and foreign experts, including from the International Union for Conservation of Nature (IUCN) and the International Council on Monuments and Sites (ICOMOS).

The plan comprehensively identifies the factors affecting the property and sets out the vision, goals and objectives of management along with details on management actions to be undertaken. For management purposes, the property is divided into five zones, each having its own management policy, which allows for varying levels of protection, management and appropriate use. The provisions of the plan are firmly grounded on the principles of the World Heritage Convention and take account of all the relevant laws and regulations of Vietnam and Ninh Binh Province. The plan is also conforms to the strategic objectives of several national and provincial master plans that have relevance for the property. During preparation the plan there was wide consultation with all key stakeholders, including residents of local hamlets, communes and wards, owners of enterprises conducting business in the property, and authorities in all relevant departments, institutions and unions of Ninh Binh Province. The plan has a vision to the year 2030, encompassing an action plan covering the first 5-year period of 2016-2020. The plan will be kept under continual review and at five-year intervals will be formally reviewed and revised to take account of changing circumstances and new knowledge.

This management plan has been officially ratified and will take effect from 30th November 2015. The Ninh Binh Province People's Committee assigns the Management Board of the Trang An Landscape Complex to be responsible for managing the property, with full decision-

making powers. The Committee will ensure that the Board has sufficient capacity and human and financial resources to protect and manage the property in accordance with World Heritage standards. The Management Board is representative of all key stakeholders and works closely with the UNESCO World Heritage Centre and its Advisory Bodies, the National Council for Cultural Heritage, the Bureau of Cultural Heritage, the Ministry of Culture, Sport and Tourism, the Vietnam National Commission for UNESCO, and all relevant ministries, departments, research institutes, business organizations, representatives of local communities and the people in general.

It is recognised that implementation of the management plan is the responsibility of not only the Management Board and some professional management agencies but also of all of us, especially the leaders and authorities at all levels in Ninh Binh Province. We are honoured and privileged to be the guardians of Trang An as an outstanding mixed cultural and natural heritage site of international significance, offered by nature and built, preserved and passed down by our ancestors.



Đinh Văn Diển

Chairman of Ninh Binh Province People's Committee

Vision

The Trang An Landscape Complex has become a leading World Heritage property recognised nationally and internationally as a place where:

- outstanding cultural and natural heritage values of the Trang An karst landscape are respected, protected and promoted to the highest standards;
- protection, management and sustainable development of the property receive strong commitment and support from the governing authorities of Vietnam and Ninh Binh Province, from key stakeholders in the business, commerce and education sectors and from local communities;
- residents of the property and other local people are employed and actively engaged in management of the property and share equitably in the many benefits deriving from it;
- new knowledge continues to be obtained from on-going archaeological and geological research and is effectively applied to management; and
- the property, in close harmony with other heritage designations within the province and other provinces of North Vietnam, effectively contributes to the conservation and sustainable development of the nation.

Guiding principles

- The World Heritage status of Trang An is greatly honoured by the citizens of Vietnam and Ninh Binh province, who proudly accept responsibility for protection and management of the outstanding universal value of the property on behalf of the people of the world.
- Human history is intimately connected to the landscape in Trang An, and both cultural and natural values of the property are protected in perpetuity.
- Successful attainment of management goals and objectives is best achieved by fostering active and on-going co-operation among government authorities, research institutions, business enterprises and local communities.
- The rights, privileges and traditional livelihoods of residents are recognised and fully respected, and all local people have an opportunity to engage in management of the property and derive benefit from it, thereby improving their standard of living and quality of life.
- Tourists, pilgrims and all other domestic and foreign visitors are welcomed into the property to enjoy and benefit from its cultural, natural and aesthetic values, on the understanding that they must respect and help protect those values without causing harmful effects.

Part I. Introduction

I.1. Background and planning process

This plan is the first comprehensive management plan for the Trang An Landscape Complex (Trang An) World Heritage property. It replaces a draft management plan included in the World Heritage nomination dossier. The World Heritage Committee, in its decision to inscribe the property on the World Heritage List in 2014, requested that the draft management plan be revised and that a copy of the gazetted plan be submitted to the World Heritage Centre by 1 December 2015 for adoption by the Committee at its 40th session in 2016.

The plan has been prepared by the Trang An Landscape Complex Management Board, with advice from domestic and international experts. In September 2015 the Board convened an international workshop to review the draft plan, in which representatives of ICOMOS and IUCN participated. The plan takes full account of the advice from the workshop. The plan has also been consulted with all key stakeholders including provincial and national government agencies, research institutions, business leaders, the local community and residents in the property.

In preparing the plan, careful consideration has been given to the requirements of the *World Heritage Operational Guidelines*, and guidance from the principal technical documents and manuals of the UNESCO World Heritage Centre and the Advisory Bodies (*see Bibliography*).

The *Guidelines* (para. I.B.6) note that the World Heritage Convention: *aims at the identification, protection, conservation, presentation and transmission to future generations of cultural and natural heritage of Outstanding Universal Value.*

The *Guidelines* (para. I.C) also note that States Parties to the Convention are: *encouraged to ensure participation of a wide variety of stakeholders and have a responsibility to adopt policies to give the heritage a function in the life of the community; integrate heritage protection into comprehensive planning programmes; develop scientific and technical studies to identify actions that would counteract dangers that threaten heritage; and use educational and information programmes to strengthen appreciation and respect by their peoples of the cultural and natural heritage, among others things.*

Regarding protection and management, the *Guidelines* (para. II.F.97) stress that: *all properties must have adequate long-term legislative, regulatory, institutional and/or traditional protection and management to ensure their safeguarding. Protection should also include adequately delineated boundaries. The Guidelines* (para.II.F.108) further note that properties should have *an appropriate management plan. It is recognized that an effective management system depends on the type, characteristics and needs of the property and it's cultural and natural context, and may vary according to different cultural perspectives, the resources available and other factors* (para.II.F.110). Significantly, the *Guidelines* (para. II.F.119) note that *World Heritage properties may support a variety of on-going and proposed uses that are ecologically and culturally sustainable and which may contribute to the quality of life of communities concerned.*

I.2. Purpose and scope of the plan

This plan establishes the foundation for protection, management and sustainable use of the Trang An Landscape Complex World Heritage property for the five year period 2016 to 2020. Its purpose is to ensure that the outstanding cultural and natural values and attributes of the property are managed effectively to World Heritage standards. Allied to this is the need to ensure the conditions of integrity and authenticity of the property are maintained in the long term. The plan provides a framework for collective decision-making by the governing authorities and all key stakeholders in achieving shared management objectives, expectations and benefits, and for minimising any damage to the property from current or potential pressures and threats.

The plan covers all objectives and actions relating to protection, management, sustainable use, monitoring and promotion of the property. It describes the international significance of the property and its OUV, outlines the legal and regulatory framework, provides for internal zoning of the property according to different management requirements, and highlights the pressures, threats and management challenges. The principal section of the plan is a comprehensive listing of management objectives, policies and actions - in effect it is a management action plan. This identifies approximately 40 factors affecting the property that require attention and/or intervention from the management authority, addressing in turn: protection of cultural and natural heritage; management of human uses and activities; services, facilities and infrastructure for visitors and residents; management support and services; management of the buffer zone and plan review and revision. Each of the factors is treated systematically through a brief explanation of the issue [how, when and where it occurs]; the relevant management policies and objectives [what achievements are sought]; a series of actions [how the objectives will be achieved] and measures to evaluate the effectiveness of management [how successful the actions are in achieving the objectives]. Action that takes place within this management framework, and on a growing base of shared knowledge and skills, will enable the governing authority to improve and refine its management responses to changing circumstances over time.

I.3. Status, administration and use of the plan

This management plan is a legal document prepared in accordance with provisions of the national Law on Cultural Heritage and the Decision No.150 QD-UBND (5 March 2012) of the Ninh Binh Province People's Committee, which established the Trang An Landscape Complex Management Board. The plan is legally binding on the Government and the Board, and no part of the plan can be revoked or substantially changed without Government approval. Within the property, the plan takes precedence over all other plans that apply to the area, including master plans for the property and for the Hoa Lu Ancient Capital respectively, the details of which are found below. Close collaboration among the relevant agencies has ensured consistency in developing the provisions of the master plans and the management plan.

The Management Board is a single, dedicated and independent agency with full decision-making authority under delegation from the Government and Provincial authorities. It is mandated to exercise within the property the powers under several national laws, such as the Law on Cultural Heritage, the Law on Forest Development and Protection and the Law on Tourism, among others. The Board includes representatives of key agencies and stakeholders and has extensive powers, resources and responsibilities for policy development, management planning and implementation, supervision of tourist and other business operations, public

relations, promotion and advocacy, research and monitoring, education and training and collaboration with local communities and residents. The Board has close functional links with national ministries and provincial departments, with relevant research institutes, commercial and business organisations, and with local community leaders and representatives. The Board is well resourced with professional staff and funding to fully implement the provisions of the management plan. More details of the organisational structure and the administration of the property are included below in Section II.4 and VII.5.1 of this plan.

Officially, the plan is valid for five years from the date of its approval. However, its measures are constantly under review and revision to respond to growing knowledge and changing circumstances, while management priorities may vary over time depending on demands and the availability of resources.

I.4. Relationship between the management plan and related master plans

Provisions within this management plan must be consistent with those of several national and provincial master plans, and with such plans that apply to the World Heritage property or areas within it (See Annex 1 that shows the general relationship between master plans and management plans). Close collaboration and extensive consultation has been undertaken by the Trang An Management Board and relevant other agencies to ensure that the provisions of this plan and those of the master plans are complementary and not conflicting.

I.4.1. Socio-economic Development Master Plans

The country, each province and each economic sector is required to prepare a Socio-economic Development Master Plan, usually for a 10-20 year period, together with a strategic environmental impact assessment. Such plans assess the current socio-economic situation, forecast development trends, conduct a SWOT analysis and set targets to be achieved during the forthcoming period. They also suggest measures to be implemented and the human and financial resources required to achieve the targets. Master plans are usually prepared by a research institution, e.g. Institute for Strategy and Policy on Planning and Investment under the Ministry of Planning and Investment or similar institutions under relevant ministries, then passed on to different ministries or equivalent organisations for comments before being approved by the relevant competent bodies. Thus, the national socio-economic master plan or that of each economic sector will be approved by the Central Communist Party and National Assembly, while those of each province will be approved by the Prime Minister, pursuant to the Law on Government Organisation and other relevant laws, e.g. the Law on Cultural Heritage and the Law on Construction, according to Government Decree No. 92/2006/ND-CP (September 7th 2006) regarding the preparation, approval and management of socio-economic development master plans, and Decree No. 04/2008/ND-CP (January 11th 2008) revising some articles of the above-mentioned Decree, other legal documents and at the request of the concerned provincial authority.

The main provincial/district Socio-economic Development Master Plans of direct relevance to Trang An are as follows:

- Master Plan for Socio-economic Development of Ninh Binh Province (2010-2020): This comprehensive plan prepared by the Department of Planning and Investment provides a general outline and directions for development of the economy, environment, society and culture; for increasing living standards of people; and for promoting environment-friendly business activities.
- Master Plan for Tourism Development of Ninh Binh Province (2010-2020): Prepared by the Department of Culture, Sport and Tourism, and under Resolution No.15-NQ/TU (July 13th 2009) of the Ninh Binh Province Communist Party on *Tourism Development to 2020 (vision 2030)*, this plan is intended to develop the tourism sector of Ninh Binh in a sustainable manner focussed on protection of natural resources and environment, and preserving and promoting cultural traditions. It includes guidelines for conservation of natural and cultural resources and development of local community-based tourism within the province and in Trang An (Annex 2).
- Master Plan for Socio-economic Development of Hoa Lu District (2010-2015, vision to 2020): This refers to development of communes in the heritage core zone with a focus on eco-tourism and cultural tourism; strengthening the economic basis of local industries, tourism and services; and promoting appropriate tourism development and services.

1.4.2. Land Use and Development Master Plans

Within the framework of the approved socio-economic master plans, plans are prepared for smaller areas (e.g. districts or communes) within each province. A major part of these plans deals with land and resource development and land use arrangements, so the Ministry of Construction is usually in charge of such assignments. The same is true with regard to master plans for conservation and promotion of protected areas such as National Parks and World Heritage Areas, with planning usually conducted by the Institute for Urban and Rural Architecture and Planning within the Ministry of Construction. The province or the authorities in charge of such protected areas are the beneficiaries but, again, final approval is by the Prime Minister. The authorities prepare a management plan to ensure targets and objectives set forth in the master plans are achieved. The two Master Plans of this category relevant to Trang An are as follows:

1.4.3. The Master Plan for the Trang An Landscape Complex

The Ministry of Construction has developed a master plan for conservation and promotion of the Trang An Landscape Complex. To ensure harmony between the master plan and the property management plan, there has been active collaboration between the Ministry and the Trang An Landscape Complex Management Board regarding the spirit, principles and objectives of management, and the heritage significance of the property, including the World Heritage Committee's requirements and recommendations.

The Trang An Master Plan (Annex 3) has both a short-term (10-year) and long-term (20-year) vision. It recognises the important relevant national laws and international legal instruments, such as the World Heritage Convention, and it promotes cultural and natural heritage values, while seeking an appropriate balance between conservation and sustainable development. The master plan is required to be consistent with the overall development strategy of the country and the province, must take account of related plans such as property management plans, and should be linked to appropriate education policies and scientific research programmes.

The Trang An Master Plan has several main goals:

- Protection of cultural and natural heritage;
- Providing a policy basis for management and promotion of the property;
- Linking heritage conservation with socio-economic development; and
- Establishing a framework for development, investment and fundraising in support of the property.

Among the more specific objectives of the master plan are:

- To make proposals for comprehensive protection of the property and associated tourism development;
- To control construction projects and infrastructure development in order to avoid any damage to cultural and natural heritage values;
- To provide opportunity for appropriate development and assist in obtaining funding, including from foreign investors; and
- To raise the conservation awareness of the local people, and to increase their standard of living, especially through the benefits of tourism.

1.4.4. Master Plan for the Hoa Lu Ancient Capital

The Master Plan for the Hoa Lu Ancient Capital (2000-2015) was approved by the Prime Minister of Vietnam in 2003. It includes the following main projects:

- Investment for construction of major entrance gates for improved protection and promotion of the landscape and historic/cultural values and increased security of the area;
- Restoration and maintenance, as appropriate, of historic/cultural relics;
- Creation of spaces at the Dinh and Le King Temples for commemorative festivals and other cultural activities;
- Construction of surrounding canals to enhance preservation and restoration of relics through improved drainage; and
- Dredging of major bordering waterways for increased protection of the landscape and environment.

Part II. Identification and description of the property

II.1. Location

The Trang An Landscape Complex property is situated in Ninh Binh Province of the Socialist Republic of Viet Nam (Figure 1). The property, which is centred on the co-ordinates N 20°15'24" E 105°53'47", is located 90 km south of the city of Hanoi, and 8 km west of Ninh Binh City. It occupies part of 12 Communes of the Gia Vien, Hoa Lu and Nho Quan Districts, in Tam Diep Town and Ninh Binh Town (Figure 2).



Figure 1: Location map of Ninh Binh province in Vietnam

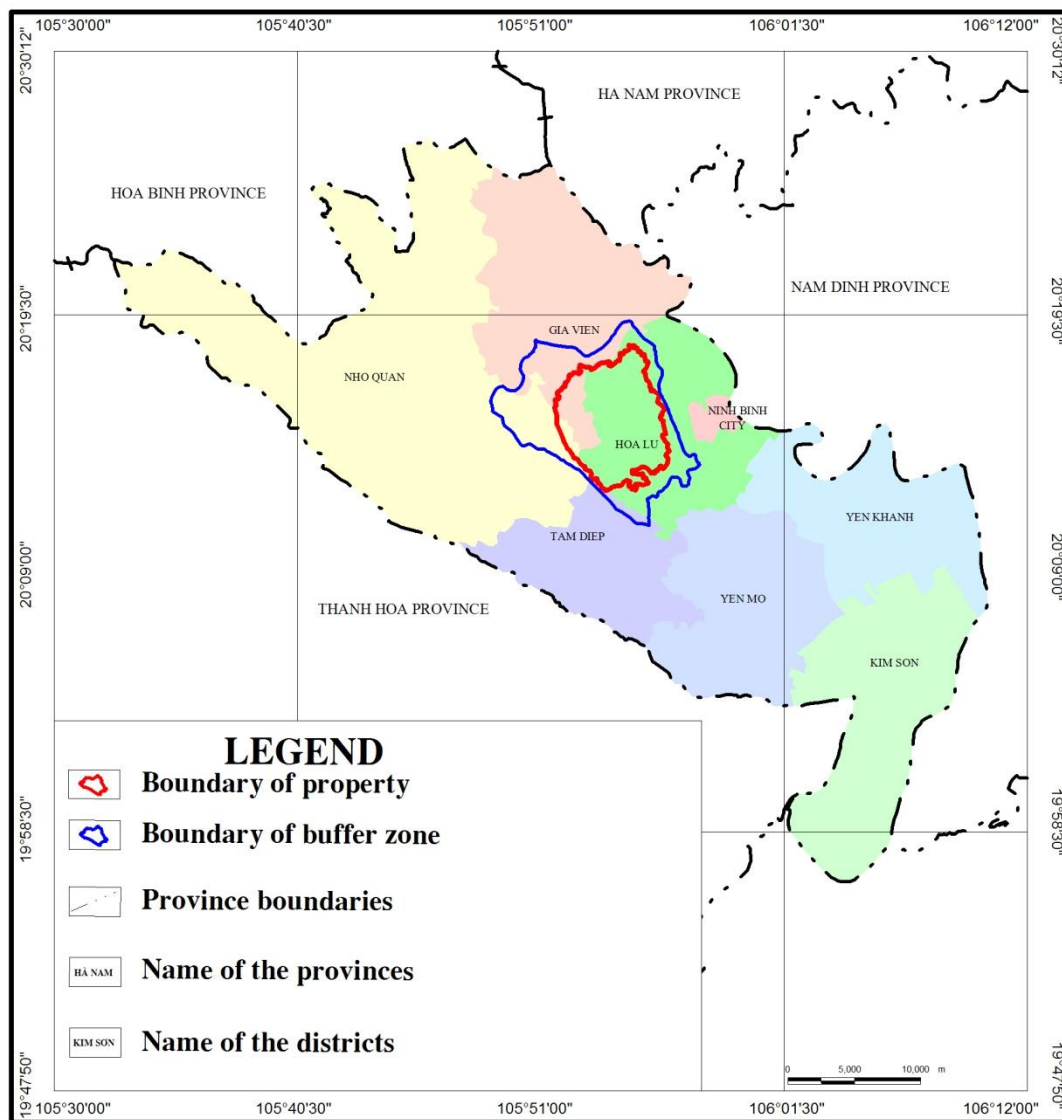


Figure 2: Location map of Trảng An landscape complex in Ninh Bình province

II.2. Size and geographical scope of the property and buffer zone

The property covers an area of 6,226 ha and is surrounded by a buffer zone of 6,026 ha (Figure 3). The property extends over almost the entire Trang An limestone massif, which comprises the Bai Dinh Hills rising to 187m asl in the northwest, the Dong Tam-Son Ha and Tam Coc-Bich Dong Ranges up to 162m high in the south and southeast, the Truong Yen Range in the southeast and northeast including the 246m high Cot Co Mountain the highest summit in the region, and the Trang An Range in the north rising to 198m asl. Interspersed throughout these karst ranges is a network of linear, arc-shaped and circular, seasonally-flooded valleys forming an intricate system of wetlands interconnected by a myriad of subterranean caverns and streams. The three main rivers in the property are the Sao Khe, Ngo Dong and Den Voi Rivers. Forest vegetation forms an extensive cover over the limestone terrain, and bordering the waterways in some parts are fields and gardens among small villages where people live mostly on subsistence agriculture.

The buffer zone surrounding the property contains some small villages linked by rural roads and canals, but primarily consists of rice paddy fields and gardens of subsistence farmers. The river network here is well developed with Hoang Long River to the north, Chanh River to the east, He River to the south, and Ben Dang River to the west. A system of highways and provincial roads surrounds the property.

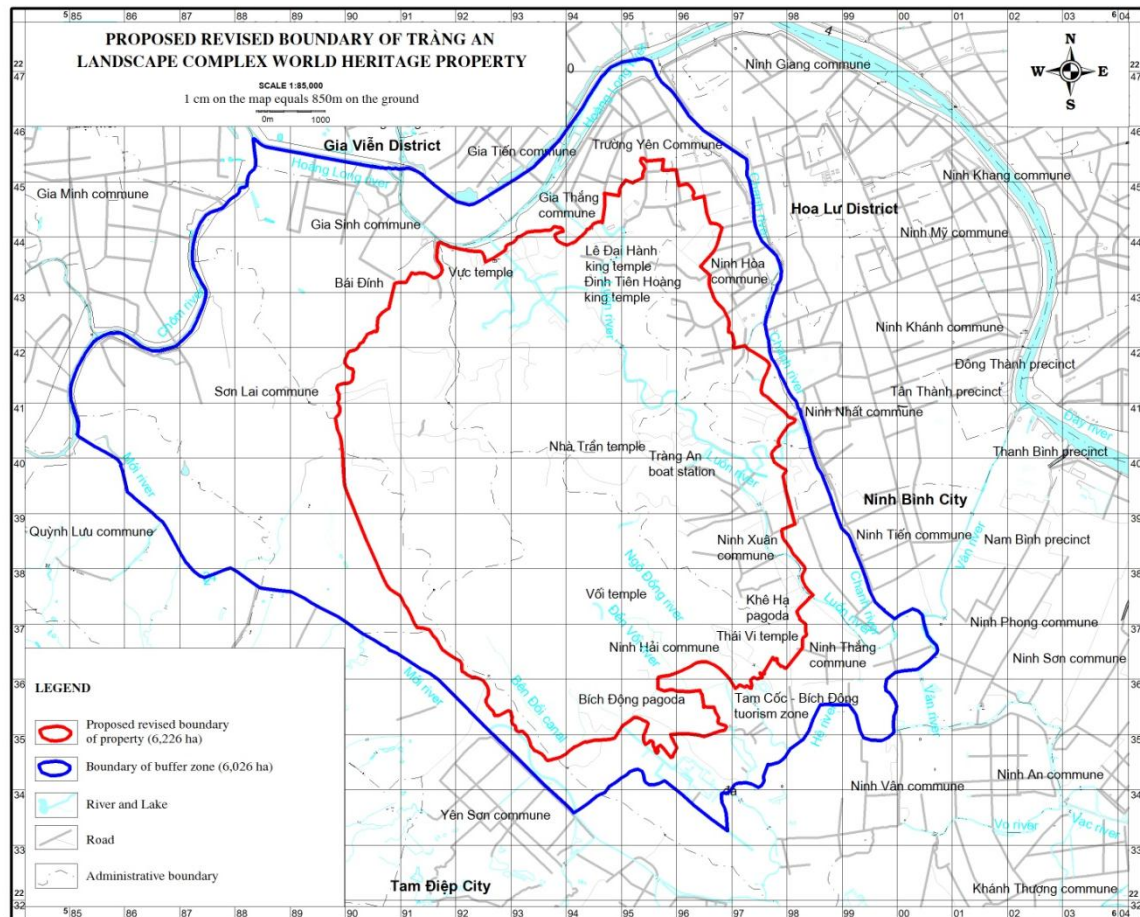


Figure 3: Map of property and buffer zone boundaries

II.3. Protection status and history of protection

The Trang An Landscape Complex contains several contiguous officially designated protected areas, covering in total 4,114 ha or 66% of the World Heritage property, as follows (Figure 4):

- Hoa Lu Ancient Capital: Officially recognised as an Historic and Architectural Monument, it is 315 ha and was inscribed as National Heritage in 1962. In May 2012 it was approved by the Prime Minister of Vietnam as a site of Special National Heritage under the national Law on Cultural Heritage 2001 amended 2009. This status recognises it as the location of a key event in the nation's history, the establishment of the first capital, and its links to the heroes who influenced the historical evolution of the nation. It also signifies the site as a special monument in the architectural development of Vietnam. The site also contains many temples, pagodas, mausoleums, steles and caves classified by the Government as National Relics.

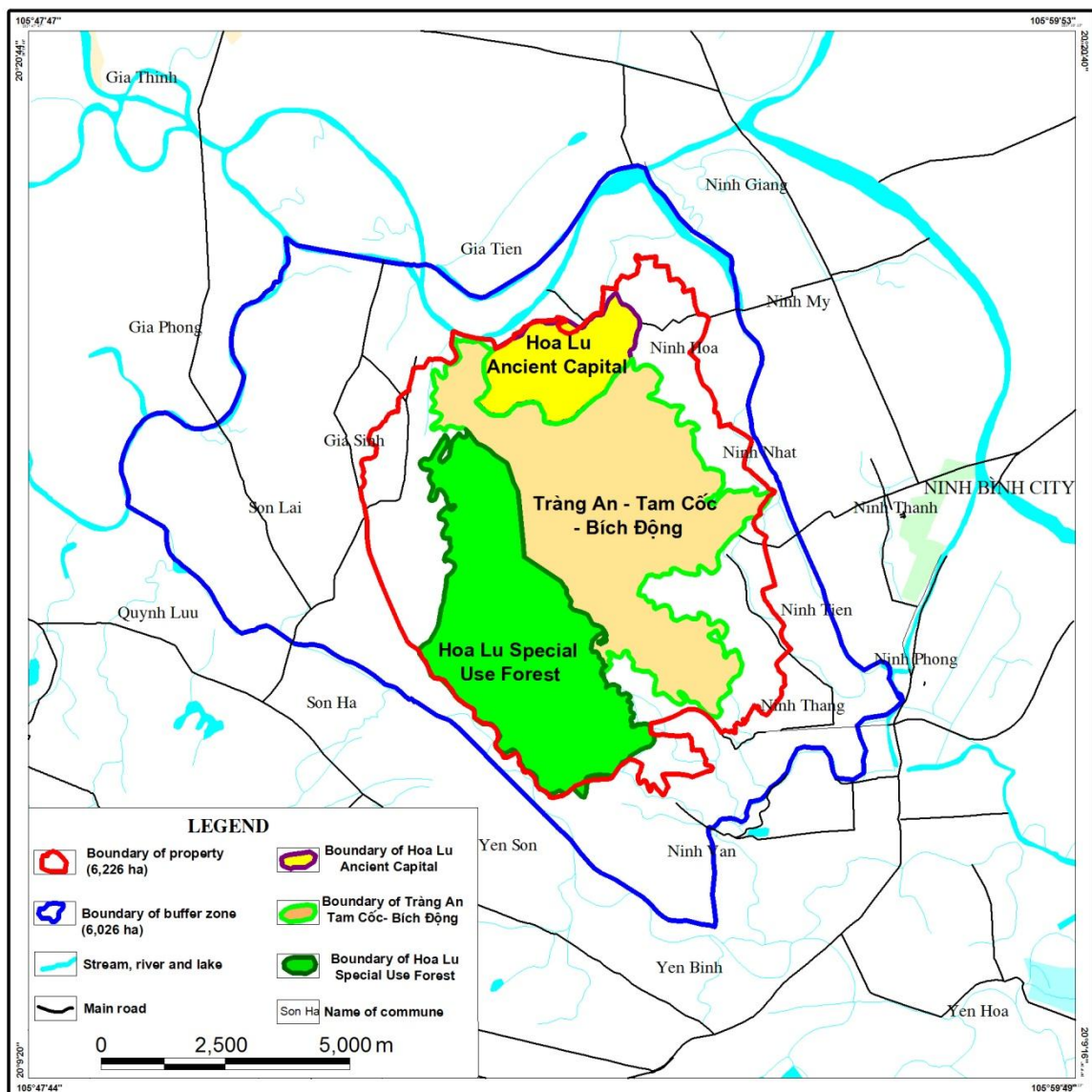


Figure 4: Map showing boundaries of the three protected areas

- Trang An-Tam Coc-Bich Dong Scenic Area: Its inscription as National Heritage was approved by the Prime Minister of Vietnam in May 2012. It was formed from amalgamation of two former National Heritage sites: Tam Coc-Bich Dong Scenic Area of 350 ha, inscribed in 1994, and Trang An Scenic Area of 1,949 ha, inscribed in 2011. Its national status recognises the area as bearing special national values in combining natural landscape and architectural monuments, and as a natural area comprising geological and geomorphological features of national and international significance. The area also contains several temples, cave-pagodas, steles and mountains that are classified as National Relics.
- Hoa Lu Special-Use Forest: Is 1,500 ha in size and was designated in 2005 under the national Law on Forest Protection and Management 2004, at the recommendation of the Ninh Binh Provincial People's Committee. This is a multi-purpose area for conservation of natural ecosystems and biodiversity, protection of historical and cultural relics and landscapes, scientific research, and for recreation and tourism.

Land within the property outside these three officially protected areas covers 2,112 ha (or 34% of the property). This land is also strictly protected by national protection laws, as recognised by the legal mandate given to the Trang An Landscape Complex Management Board on its establishment in 2012.

II.4. Ownership, administration and management authority

The Trang An Landscape Complex is owned by the Government of the Socialist Republic of Vietnam and controlled by the Ninh Binh Provincial People's Committee. Management of the property is conducted by the Trang An Landscape Management Board, which was established by the Provincial People's Committee in March 2012, and is representative of all key stakeholders. The People's Committee has oversight of the Board while policy and technical guidance is provided by the Ministry of Culture, Sports and Tourism.

In addition to its primary day-to-day management role, the Board is responsible for monitoring the state of conservation of the cultural heritage and the natural environment, surveillance and mitigation of threats, management of tourist activities and services, and promotion of the property. Under the Board, there is a department directly in charge of the Hoa Lu Ancient Capital. A local private company, the Xuan Truong Enterprise, has been granted authority for some aspects of conservation, restoration and tourism management in the Trang An-Tam Coc-Bich Dong Scenic Area for a period of 70 years.

II.5. Social and economic setting

The Trang An Landscape Complex is set within Ninh Binh Province in the Red River Delta of North Vietnam. The province is approximately 1,378.1 km² in area and has almost one million (927,000 as of 2013) inhabitants, the majority of whom are of Viet/Kinh and Muong ethnicities. The administrative centre of the province is Ninh Binh City, a rapidly growing urban area with a population of about 160,000 as of 2014. The province has a rich history and culture and is endowed with many natural areas, and tourism is the principal economic activity. In 2013 the province received 4.4 million tourists, including 521,000 foreigners, generating c.897 billion VND (\$US43 million) in revenue. In 2014 the figures were 4.7 million tourists, 600,000 foreigners and 942 billion VND (\$US 45 million) respectively. It is estimated that in 2015 six million tourists will visit the province, generating c.\$US70 million in revenue, with around 10 thousand employees in the tourist industry. There are more than 280 accommodation providers (as of end of 2014) in the province offering about 400 standard rooms. The main natural tourist attractions, apart from Trang An, are: the 22,200ha Cuc Phuong National Park, an intact forest with several rare and endemic mammal species, including the *Trachypithecus delacouri* (Delacour's langur or White-rumped Black Leaf Monkey), one of the five world's most endangered primates; the Van Long Nature Reserve, a 3,000ha limestone massif similar to Trang An and also home to the above mentioned monkey; and the Kenh Ga Hot Springs. Among the most important cultural centres are the Hoa Lu Ancient Capital in Trang An with many temples and pagodas; the Bai Dinh Pagoda situated in the buffer zone of Trang An (the ancient cave pagoda is inside the property), which is the largest complex of Buddhist temples in Southeast Asia; and the Phat Diem Cathedral, a Roman Catholic religious centre designed and built during 1875-1898 by Vietnamese bishop Phero Tran Luc and his followers, which combines oriental pagodas and a Gothic church. These temples and pagodas host several important festivals that each year draw hundreds of thousands of pilgrims for worship and celebration. Ninh Binh is famous for its local food, especially meat from wild mountain goats and fermented pork roll, and also for traditional

village handicrafts, such as lace embroidery, sea grass weaving, basketry and stone carving. Located close to Hanoi Capital and at the centre of the Red River Delta provinces, Ninh Binh has advantages for developing the construction material industry (cement, stone, and brick). Other industries include fertilizer and garment manufacture. Revenue from industries in 2010 was c.3,250 billion VND (\$US 150 million). Subsistence farming and gardening remain commonplace throughout the province and rice paddies are ubiquitous. There are approximately 14,000 residents in the property and 21,119 in the buffer zone, most of whom are farmers and fisher folk.

II.6. Human history and culture

Knowledge of the ancient inhabitants of Trang An, their culture and relationship to the landscape, comes primarily from prehistoric archaeological investigations that have taken place within the Trang An massif. This work, undertaken by Vietnamese and international teams, has painted a picture of human activity in the property, particularly from the Late Pleistocene to the Mid-Holocene (from c.30,000 to 5,000 years ago). This window of understanding, though, forms only part of a grander sweep of time and human-environment interaction to be found in this landscape extending forwards into the historical period - with the founding of the Hoa Lu Ancient Capital in the 10th Century - and probably backwards, with strong potential for the recovery of pre-30,000 year lying at depth within interior caves, such as Hang Trong (and based on recovery of deposits at other points in the nearby local landscape, e.g. at the sites of Nui Ba and Dong Giao).

Changing sea-levels have shaped human evolution and history in Southeast Asia, and continue to impact on the lives of people living in the region today: sea-levels here are rising 3 times faster than the global average. The Pleistocene groups living in the Trang An landscape were required to adapt to major changes in climatic, geographical and environmental conditions over the last 30,000 years, especially during the massive inundation of coastal lowlands that accompanied deglaciation at higher latitudes during the period from the end of the Last Glacial Maximum (c.26,000-19,000 years ago) until the Mid-Holocene high-stand, when regional sea-levels exceeded modern values by 3-5m. The main episodes of early occupation and settlement were as follows:

30,000-7,000 years BP: Last Glacial Maximum and marine regression

During this period Trang An lay 60-100km from the coast. Occupation within the massif focused on the collection of a staple resource: land snails. This was supplemented through the hunting of a range of terrestrial and riverine animals, including pigs, deer, monkey and squirrels, fish and turtles. Some exploitation of riverine molluscs is also indicated, but sparingly so at sites from the massif interior. Links to the coast are indicated through the presence of pierced sea shells starting c.14,000 years ago. There is, however, no substantive evidence that people were bringing coastal foods back to the massif at this time, or even as the sea began to encroach across the plains beyond Trang An; indeed there are archaeological indications that groups first intensified their existing economy here during the first millennia of the Holocene, before incorporating marine resources, which they did comparatively late. The types of stone tools that were used were predominately made of silicified limestone and were technologically simple but highly adaptable flakes and cobble-based industries.

7,000-4,000 years BP: Peak of the mid-Holocene marine transgression/high-stand

By this time the sea had reached the western flanks of the Trang An massif. Ancient people who continued to occupy the massif were now practising a mixed terrestrial-maritime economy. Quantities of marine molluscs, crustaceans and fish now appear in archaeological deposits from sites in the interior of the massif as well as at rock-shelters along its margins. Chipped stone tool technology continues in use but coarse corded-ware pottery and polished jade artefacts begin to appear alongside it, marking a technological shift towards durable receptacles and cooking ware, as well as status trade goods.

4,000-1,500 years BP: A period of marine regression

In the period following the Mid-Holocene high-stand, as water levels receded towards modern conditions, the ancient communities living in and around the Trang An massif appear to have expanded the locations of caves being visited, but the scale of occupational deposits suggests visits may have been less frequent. Groups now favoured open-air sites on dunes or coastal mud flats, where settlement contributed to the clearing of vegetation from coastal plains. The interior of the massif was still used for hunting but the people predominantly focused on collecting land snails, and riverine resources (bivalves and crustaceans). Fully-ground tools made of basalt, schist and shell appeared. Ceramic vessels consisted mainly hard, fine and cord-impressed wares. Separate population groups may have emerged at this time, utilizing different parts of the massif and the surrounding lowland landscape.

2nd Century BC to 10th Century AD

Vietnam was under Chinese domination during this period. The communities living in the vicinity of Trang An continually strived against Han incursions from the north. In AD 938 the Han were defeated, closing out 1,000 years of occupation and warfare in Vietnam. In the wake of civil conflicts that ensued after the Han were expelled, the district and settlement of Hoa Lu (now part of Trang An) rose to become the first national capital of a fledgling independent Vietnam and was named Dai Co Viet (Great Viet Land). In AD 1010 the capital was moved to what is now the city of Hanoi, while the old citadel of Hoa Lu was preserved.

13th to 20th Centuries

Trang An remained an important economic, cultural and religious centre for the new national government. During the war against the Mongol invaders in AD 1285 the Viet forces assembled in the Trang An area, from where they drove the enemy out of the country. In 1788, during the war of resistance against the Chinese Qing, communities in the Trang An area worked in the construction of local defensive ramparts for the Vietnamese army. During the 19th century the nationally dominant Nguyen Dynasty was responsible for important developments in the society and economy of this part of the country, especially through improvements in drainage, irrigation, water-based transport and agriculture, which fostered trade and the development of local handicrafts (such as stone art, embroidery, silk weaving and wood-working). Between the 1970s and 1990s, the various communes and districts that surround the massif, and Ninh Binh Province itself, took shape and became as we know them today.

The people, culture and human-environment interaction

Based on current archaeological evidence, early human use of Trang An was probably seasonal, likely occurring under wet conditions at times of the peak in availability of one

reliable food staple, land snails. Among other foods, riverine resources were particularly favoured, including freshwater crabs, fish, turtles and (in small quantities) riverine molluscs and mussels. Mammals, probably taken opportunistically, included deer, pig, monkey and squirrel. It is an indication of the vitality of this landscape that remains of leopard, a top predator, were also recovered. There are also clear indications that nuts and fruits were being collected, and that food was being cooked. Most pre-historic tools were made from locally available limestone. These industries were predominantly flake-based, representing a local facies of the Hoabinhian techno-complex found in this part of Vietnam and in other parts of mainland Southeast Asia. By c.5500 years BP, at times of inundation by the sea, sites at lower altitudes and around the perimeter of the massif reveal a rise in maritime resources. Ceramics, principally examples of the local Da But tradition, are first found *in situ* at this time, along with evidence of hearth architecture in the form of soil casts of a tripod structure. Potsherds recovered from this time were probably used for cooking rather than storage, and were fabricated from local clays.

Faunal analysis, macro-botanical and palynological (pollen) studies, together with innovative geochemical procedures, including X-ray fluorescence, magnetic susceptibility, plant carbon isotope and lipids and changes in shell oxygen isotopes, combined with geomorphic history, allow for some degree of palaeo-environmental reconstruction. When tied to the archaeology, the palaeo-environmental record makes it possible to recover vital information about lost environments, their evolutionary history and diversity and how humans adapted to the changes after the last glacial. For example, the occurrences in the Trang An caves of *Canarium* spp., a genus of canopy tree from dry seasonal forests in mainland Southeast Asia, and *Celtis* spp., a temperate arboreal species, reveal much about the cooler local climate that existed during inter-stadials and the ameliorating conditions of the Pleistocene-Holocene transition.

A 10.3m core extracted from a sedimentary basin near to the Hoa Lu Ancient Capital will appreciably enhance our understanding of the environmental and vegetation history in the vicinity of the massif. This is the first of a planned transect of cores that will extend to the modern coast, providing unprecedented detail into the sequence of landscape change during the post-glacial period. Further research is set to refine the property's archaeological chronology through pioneering extraction of radiocarbon dates from land snail shells; landscape and settlement modelling, using Geographic Information Systems, will refine and extend our understanding of how human-environment interaction in Trang An has evolved through time; whilst detailed artefactual analysis (stone tools) will furnish insights into technological change through time. The first tranche of funding for this work, which is to be undertaken jointly between national and international institutions, is already in place and fits within a wider programme of research that will establish, for the first time, a clear understanding of the long-term impact that changing sea-levels have on early human cultural and economic development.

II.7. Geological history and landforms

The Trang An limestone massif originated as sedimentary deposits in the ancient Tethys Ocean. From about 230 Ma, these consolidated sediments were uplifted and the massif became terrestrial. The mountain-building phases occurred as pulses alternating with tectonic planation periods. The landscape we see today is considered to have been formed since the Pliocene Epoch, about 5.3 Ma, in humid tropical, monsoonal conditions.

The Quaternary geological evolution of Trang An has two major components - neotectonic movements and marine transgression/regression as a consequence of glacial and interglacial periods.

II.7.1. Neotectonic movements

Trang An was deeply affected by the Red River Fault, which compressed and sheared toward the northwest and stretched toward the southeast as a consequence of collision between the Indian and Eurasian tectonic plates. In the Oligocene-Miocene phase intense uplift created a horst structure with a northwest-southeast trending sinistral fault system and a northeast-southwest trending dextral fault system. These faults have strongly influenced the pattern of karst towers and depressions in the landscape today. In the Pliocene-Quaternary phase uplifting was general, but the east-northeast sector was submerged as it was affected by activity in the Red River Delta and the East Sea.

II.7.2. Marine transgression and regression

The general sequence of sea level fluctuations is as follows:

- Phu My transgression - corresponding to an Early Pleistocene interglacial. It was followed by a glacio-eustatic regression ending c. 870 ka BP, found only by means of boreholes.
- Yen Mo transgression - in the Middle Pleistocene c. 870-350 ka BP, followed by the Hai Duong regression c. 350-130 ka BP. Some uplifted caves, pediments and abrasion terraces at 40-60m asl may have been formed at this time.
- Cat Lam, Bim Son and Vinh Phuc transgressions - three short consecutive transgressions in the Upper Pleistocene 130-30 ka BP, recognised by uplifted caves, pediments and abrasion terraces at altitudes of 30-40m asl, 20-30m asl and 10-15m asl, respectively.
- Last Glacial Maximum - caused lowering of sea level to c. 120m below the present day level. It was immediately followed by the Dong Da (Flandrian) transgression, which reached its maximum in the Middle Holocene 7,000-4,000 years BP. Oyster shells found in caves as high as 8.9m asl, and wave-cut terraces and sea notches ca. 4-5m asl are considered to have formed at this time and were later uplifted.
- Quang Xuong transgression - occurred in the Late Holocene 2,500-1,500 years BP forming caves and sea notches at ca. 1.5-2.0m asl, and was followed by regression during the period 1,500-500 years BP. Stories tell that during the reign of Kings Dinh and Le, about 1,000 years ago, all the karst valleys in Trang An were drowned and the main transportation was by waterway, giving evidence that Trang An was very recently submerged and then uplifted on land as it is today.

II.7.3. Landforms and landscape

Geomorphic processes such as faulting, rockfall, runoff and mechanical erosion, dissolution and karstification have created a dramatic humid tropical tower karst landscape. An intersecting system of faults has dissected the massif into cells, and promoted the formation of enclosed depressions at fault intersections. Younger depressions are smaller and shallower, while more mature ones are deeper and wider with steeper cliffs, and those at the margins of the massif are interconnected, forming long valleys extending 3-4km, primarily in a northwest-southeast direction. Some of the outstanding karst landforms are as follows:

- Peak cluster-closed depressions - the youngest stage of karst landforms, comprising interconnected karst cones surrounding closed depressions, with little surface water, and 40-50° slopes, all forest covered. More mature forms with deeper depressions are found at the margins of the massif and covering the greatest proportion of the massif, some standing as cones and towers isolated from the ranges.
- Re-worked peak cluster-valley landforms - at the margins of the massif are long, wide valleys with flat floors almost at the present water table, separated by narrow sheer-sided ridges. In the southeast, the depressions and interconnected accumulation plains were previously several times invaded by the sea, forming lagoons. The current system of waterways, including subterranean passages, is an inheritance of ancient stream channels flowing to the sea, the majority of which later became the wetlands and rice paddy fields of today.
- Isolated towers on plains - towers are extensively developed on the edge of the massif, standing on accumulative and corrosion plains, representing the mature stage in the sequence of karst landscape evolution.
- Corrosion notches - these are a common feature of Trang An, mostly at 0.5-4.0m asl, but also at higher altitudes. Marine notches are symmetrical in shape and usually have oysters associated with them. Some are compound forms reflecting small fluctuations in sea level. Smaller and smoother notches without oyster shells are freshwater (swamp) notches.
- Caves - are of two forms; water caves at the current local erosion base level, and fossil caves at higher elevations. Caves can be dated from the age and altitude of the corresponding sea level terraces. Thus, those at less than 2m asl formed in the Late Holocene, caves at 2-9m asl formed in the Early-Middle Holocene, caves at 10-30m asl formed in the Late Pleistocene and caves at 40-60m formed in the Early-Middle Pleistocene, while those at higher elevations up to 145m asl probably formed earlier under continental conditions. Many of these caves were occupied by ancient people.

II.8. Plants and animals

II.8.1. Plants

The Trang An Landscape Complex has a very rich diversity of plants, classified into 14 geographical factors as follows:

- *Endemic Northern factor*: includes species found only in the Northern administrative boundary, i.e. from Ninh Binh northward. There are 33 species of this factor, belonging to 22 families, which accounts for 5.72% of total species of the phylum. Families with many species of this factor are: Acanthaceae, annonaceae, Asckepiadaceae, of which there are 3 species of each families, and Balsaminaceae, Elaeocarpaceae, Fabaceae, Tiliaceae, Verbenaceae, of which there are two species of each families, and one species for each of the remaining families.
- *Endemic Vietnamese factor*: includes species found only in Vietnam. There are 18 species of this factor, belonging to 16 families, which accounts for 3.12% of all species of the phylum. Families that have many species of this factor are Anacardiaceae and Myrsinaceae, of which there are two species of each family and one species for each of the other families.
- *Indochinese factor*: includes species found in the territory of three countries - Vietnam, Laos and Cambodia. This factor has 74 species of 52 families, which accounts for 12.82%

of the total phylum. Families that have the most species are Fabaceae (5 species), followed by Lauraceae (4 species), Moraceae and Strerculiaceae (3 species for each family). Twelve other families, each of which has two species, are Anacardoaceae, Araceae, Connaraceae, Cururbitaceae, Euphorbiaceae, Marsileaceae, Polypodiaceae, Rosaceae, Rutaceae, Sapindaceae, Verbenaceae and Zinggiberaceae.

- *Malaysian factor*: includes species found in Indochina and mainland Malaysia. This factor has nine species of nine families, which accounts for 1.56% the total species of the phylum. Each family has one species.
- *Himalayan factor*: includes the species living in India, the southern part of the Himalayas, South China, Burma, Thailand, Laos, Cambodia and Vietnam. This factor has 57 species of 36 families, which accounts for 9.88% of total species of the phylum. Families having the most species of this factor are: Moraceae (eight species), followed by Orchidaceae (four), Asteraceae, Cucurbitaceae, Euphorbiaceae, Poaceae, (three species for each family), and Celastraceae, Fabaceae, Meliaceae, Malvaceae, (two species each family).
- *Malaysian factor*: includes the species found on the islands of Malaysia, Indonesia, Philippines, and the Malaysia Peninsula. This factor has 16 species of 15 families, which accounts for 2.77% of total species of the phylum. Families having the most species of this factor are: Moraceae (two species), and each of the other families has one species.
- *Tropical Asian factor*: includes species found in tropical Asia. This factor has 52 species of 31 families, which accounts for 9.01% of total species of the phylum. Families having the most species of this factor are Poaceae (10 species), followed by Asteraceae (eight species), Moraceae (four species), Araceae, Euphorbiaceae, Fabaceae, Myrtaceae, each of which has three species, and Rubiaceae, Sterculiaceae, Vitaceae, each of which has two species.
- *Tropical factor*: includes species found in tropical Asia, Africa and the Oceanic islands. This factor has six species of six families, which accounts for 1.04% of total species of the phylum. Each of the families has only one species.
- *Neotropical and intertropical factors*: includes species found across the entire tropical belt of the world. This factor has 21 species of 17 families, which accounts for 3.64% of total species of the phylum. Families having the most species of this factor are Fabaceae (three species), followed by the Asteraceae, Dryopteridaceae, Euphorbiaceae, Rutaceae, each of which has two species, and the other families have one species.
- *East Asian factor*: includes species found in Japan, Korea, East of China, North Laos and North Vietnam. This factor has 14 families of 20 species, which accounts for 3.47% of total species of the phylum. Families having the most species of this factor are Fabaceae (three species), followed by the Asteraceae, Dryopteridaceae, Euphorbiaceae, Rutaceae, each of which has two species, and each of the other families has one species.
- *Asian factor*: includes species found throughout Asia. This factor has 18 species of 12 families, which accounts for 3.12% of total species of the phylum. Families having the most species of this factor are Poaceae (four species), followed by Asteraceae (three species), and another 10 families, each of which has one species.
- *Temperate Northern factor*: includes species found in northern temperate regions, i.e. North Asia, Europe and North America. This factor has one species of one family, which accounts for 0.17% of total species of the phylum. It is Polygonum hydropiper of the Polygonaceae family.
- *Widely distributed factor*: includes species found throughout the world. This factor has 11 species of nine families, which accounts for 1.91% of total species phylum. Families having the most species of this factor are: Asteraceae (two species), Poaceae (two species) and seven other families, each of which has one species.

- *Present day immigration and/or introduction factor*: This factor has 11 species of eight factors, which accounts for 1.91% of total species of the phylum. Families having the most species of this factor are Asteraceae (four species), and other families, each of which has one species.
- *Unidentified factor*: This factor has 39.69% of the total 229 species of the phylum. Since scientific names have not been identified and there are insufficient data to identify the distribution area, the species have not been arranged into any geographic factors.

The factor that accounts for the greatest proportion in the Trang An flora system is the Indo-China factor (12.82%), followed by South Himalayan (9.88%) and Tropical Asian (9.01%). The endemic factors, themselves, including the North Vietnam endemic factor and the Vietnam endemic factor, account for 8.84% of total species of the phylum.

II.8.2. Animals and birds

According to research and survey by the Forest Investigation and Planning Institute (FIPI) and the Ninh Binh Forest Protection Department, the karst biotic communities in Trang An comprise more than 200 fauna species, many of which are listed in the Red Book of Vietnam e.g.: Sơn dương (*Rupicapra*, genus *Rupicapra*, family *Bovidae*); Báo gấm (*Neofelis nebulosa*, genus *Neofelis*, family *Felidae*); Phượng hoàng (*Chinese phoenix*, *Buceros bicornis*, genus *Buceros*, family *Bucerotidae*); Khỉ (monkey), Cầy (family *Viverrinae*); Tê (genus *Manis*, family *Manidae*); Tắc kè (*Gekko gekko*, genus *Gekko*, family *Gekkonidae*); Rái cá (Otter, *Lutrinae*, family *Mustelidae*); Mèo rừng (Wildcat, *Felis silvestris*, genus *Felis*, family *Felidae*); Sáo (family *Sturnidae*); and Vẹt (Parrot, ordo *Psittaciformes*).

The aquatic biotic communities contain about 30 planktonic species and 40 benthos species, also including some listed in Vietnam's Red Book, such as the *Mauremys caspica* turtle (*Ocaciiasinensis*). Land animals have not been adequately inventoried, but local people, and even tourists, can still see herds of monkey, chamois, colour changing dog, pangolin, gecko, otter, wild cat, python, snake, squirrel, bird such as flute, parrot, cuckoo, stork, especially land phoenix, which is a rare bird species endemic of the area.

Vertebrate species include fish, reptile, amphibian, bird and mammal; some are listed in Vietnam's Red Book, of which the most notable species is the serpent with crest on the head, and Phoenix. Among invertebrate species the most popular are Arthropoda, Annelida and especially mollusca, of which some are listed in Vietnam's Red Book e.g. *Troides helema*, *Graphium antiphates*, *Lambroptera curius*, *Potamiscus cucphuonggenis*, *Stenomelania reevel*, and *limnaea swinhoer*.

Part III. Legal framework

The Trang An Landscape Complex, and its cultural and natural values and attributes, are extremely well protected within a comprehensive national and provincial legislative framework. There are four primary national legal statutes applying to protection and use of the property. These laws include extensive measures providing for identification, recognition, protection, preservation, management, research, monitoring, reporting, and promotion of the cultural and natural values and attributes of the property. They also include enforcement measures for specifying violations and illegal activities and for the discipline and prosecution of offences.

Additionally, there is a very comprehensive and wide-ranging series of National and Provincial Government Decrees, Decisions, Resolutions and Instructions relating to protection and use of the Trang An property. These apply to: cultural heritage protection and preservation; protection of archaeological sites and preservation of archaeological resources; biodiversity conservation; environmental protection; use and protection of natural resources; ecotourism and other commercial activities; and administration and management, among others. The specific application can be determined from the long title of these instruments in the list below.

III.1. National protection legislation

At the national level, the property is protected by the comprehensive legal system of Vietnam, including the following principal laws:

III.1.1. Law on Cultural Heritage 2001 (amended 2009)

Administered by the Ministry of Culture, Sports and Tourism, this is the principal law for protection and promotion of tangible and intangible cultural heritage resources. Among its key provisions are: establishment of historical-cultural sites and scenic landscapes; classification of relics, landscapes and beauty spots; specification of the rights and responsibilities of organisations and individuals for cultural heritage; regulation of archaeological survey, research and excavation; and the proper handling of artefacts, relics, antiquities and treasures. Measures for unified State management of cultural heritage are identified including, planning and policy development, implementation of regulations, provision of resources, conduct of research, education and training and international cooperation. The law has extensive enforcement measures, specifying violations and illegal activities and providing for discipline under internal procedures or prosecution under civil or criminal codes.

III.1.2. Law on Forest Protection and Development 2004

This national law, administered by the Ministry of Agriculture and Rural Development, governs the protection, development and use of the country's forests. It establishes owners' rights and obligations, including the State's role and responsibilities in policy-making, planning, funding, protection, management, production and restoration, among others. The law also specifies the principles for development and organisation of Special-Use Forests, which may be designated as national parks, nature reserves, landscape protection areas and scientific and experimental forests, among others. Thus, the Hoa Lu Special-Use Forest in

Trang An is divided into three management zones - for strict protection, ecological restoration and a service-administration, respectively.

III.1.3. Law on Environmental Protection 2005 (replaced 2014)

Administered by the Ministry of Natural Resources and Environment, this law has the principal purpose of providing the policies, measures, resources and activities for environmental protection. It covers: environmental standards; environmental impact assessment; conservation and rational use of natural resources; production and business services including agriculture, mineral resources and tourism; protection of rivers; waste management and pollution; and environmental monitoring and information. The law also includes provision for establishing nature conservation zones over areas of regional, national or international heritage significance, protection of biodiversity and rare and endangered species, protection of natural landscapes and the sustainable use of natural resources, including renewable energy production. Extensive powers are included for handling of violations, and for compensation for any damage caused by environmental pollution and degradation.

III.1.4. Law on Tourism 2005

This law, administered by the Ministry of Culture, Sports and Tourism, [provides for tourism activities and resources, and for the rights and obligations of tourists, and organisations and individuals doing tourism business. The law is soundly based on environmental and conservation principles, and many of its provisions are directly relevant to protection and management of Trang An. It stresses the need to develop sustainable tourism consistent with master plans and that ensure harmony between socio-economic development and environmental protection. The law establishes the rights of local communities to participate in and benefit from tourist activities, and to be responsible for preserving tourist resources, and nurturing the local cultural identity, while maintaining security, safety, social order and environmental sanitation. Prohibited acts specified in the law include constructing tourism projects that do not comply with approved plans, and damaging tourism resources and the environment. Regarding the establishment of tourist resorts, spots and routes, there is a requirement that tourist resources be protected in the management of resorts, and that landscapes and environment be protected along tourist routes.

III.2. National, Provincial and Heritage Site Decrees and Decisions

III.2.1. National Decrees and Decisions

- Decree No.98/2010/NĐ-CP of the Government dated September 21st 2010 on detailing the implementation of several articles of the Law on Cultural Heritage and the amended Law on Cultural Heritage;
- Decree No.06/2008/NĐ-CP of the Government dated January 16th 2008 on sanctioning administrative violations in commercial activities;
- Decree No.107/2007/NĐ-CP of the Government dated June 25th 2007 on detailing and guiding the implementation of several articles of the Law on Housing;
- Decree No.149/2007/NĐ-CP of the Government dated October 9th 2007 on sanctioning administrative violations in tourism;

- Decree No.15/2012/NĐ-CP of the Government dated March 9th 2012 on detailing several articles of the Law on Minerals;
- Decree No.150/2005/NĐ-CP of the Government dated December 12th 2005 on sanctioning administrative violations in social security;
- Decree No.23/2006/NĐ-CP of the Government dated March 3rd 2006 on the implementation of the Law on Forest Protection and Development;
- Decree No.80/2006/NĐ-CP of the Government dated August 9th 2006 on detailing and guiding the implementation of several articles of the Law on Environment protection;
- Decree No.81/2006/NĐ-CP of the Government dated August 9th 2006 on sanctioning violations in environment protection;
- Decision No.82/2003/QĐ-TTg dated April 29th 2003 by the Prime Minister approving the master plan on Conservation, restoration and promotion of the Hoa Lu Ancient Capital Historic and Architectural Monument for the 2000-2015 period;
- Decision No.1183/QĐ-TTg dated August 30th 2012 by the Prime Minister approving the National strategy on coping with climate change in the 2012-2015 period;
- Decision No.105/QĐ-TTg dated July 21st 2008 by the Prime Minister approving the Master plan on investigation, exploration and use of minerals for cement production in Vietnam by 2020;
- Decision No.108/2005/QĐ-TTg dated May 16th 2005 by the Prime Minister approving the master zoning of cement industry by 2010, with a vision by 2020;
- Decision No.186/2006/QĐ-TTg dated August 14th 2006 by the Prime Minister promulgating the Regulations on forest management;
- Decision No.1706/2001/QĐ-BVHTT dated July 24th 2001 by the Ministry of Culture and Information (currently Ministry of Culture, Sports and Tourism) approving the master plan on Conservation and promotion of historic-cultural relics and scenic landscapes by 2020;
- Decision No.05/2003/QĐ-BVHTT dated February 06th 2003 by the Minister of Culture, Sports and Tourism promulgating Regulations on Conservation and restoration of historic-cultural heritages and scenic landscapes;
- Decision No.02/2003/QĐ-BTNMT dated July 29th 2003 by the Minister of Natural Resources and Environment promulgating Regulations on environment protection in tourism;
- Decision No.313-VH/VP dated April 28th 1962 by the now Ministry of Culture, Sports and Tourism recognizing the Hoa Lu Ancient Capital historic-cultural relics as national heritage;
- Decision No.321-QĐ/BT dated December 12th 1994 by the now Ministry of Culture, Sports and Tourism recognizing the Tam Cốc-Bích Động Scenic Landscape as national heritage;
- Decision No.3531/QĐ-BVHTTDL dated November 1st 2011 by the Ministry of Culture, Sports and Tourism recognizing the Trang An ecological zone as national heritage;
- Decision No.38/2005/QĐ-BNN dated July 6th 2005 by the Ministry of Agriculture and Rural Development promulgating technical and economic norms for planting and restoring forests and forest protection;
- Decision No.548/QĐ-TTg dated May 10th 2012 by the Prime Minister recognizing the Hoa Lu Ancient Capital Historic and Architectural Monument and the Trang An-Tam Coc-Bich Dong Scenic Landscape as special national monuments.
- Instruction No.18/CT-BVHTTDL dated February 6th 2012 by the Minister of Culture, Sports and Tourism on implementing “Vietnam’s Tourism Development Strategy by 2020

and vision by 2030”.

III.2.2. Provincial Decrees and Decisions

- Decision No.150/QĐ-UBND dated March 5th 2012 by the Ninh Binh Provincial People’s Committee on the establishment of the Trang An Landscape Complex Management Board under the direct supervision by the Ninh Binh Provincial People’s Committee;
- Decision No.06/2012/QĐ-UBND dated April 10th 2012 by the Ninh Binh Provincial People’s Committee promulgating Regulations on functions, responsibilities, authority, organizational structure and staffing of the Trang An Landscape Complex Management Board;
- Decision No.2063/QĐ-UBND dated September 04th 2007 by the Ninh Binh Provincial People’s Committee approving changes in the Trang An Scenic Landscape investment project by Xuan Truong Corporation;
- Decision No.728/QĐ-UBND dated April 09th 2008 by the Ninh Binh Provincial People’s Committee authorizing Xuan Truong Corporation the management, protection and promotion of the Trang An Scenic Landscape;
- Decision No.350/QĐ-UBND dated May 18th 2012 by the Ninh Binh Provincial People’s Committee authorizing Xuan Truong Corporation the management and promotion of the Tam Coc-Bich Dong Scenic Landscape;
- Decision No.432/QĐ-UBND dated March 29th 1996 by the Ninh Binh Provincial People’s Committee on setting up the Management Board of the Hoa Lu Special-use Primary forest;
- Decision No.2556/2005/QĐ-UBND dated November 18th 2005 by the Ninh Binh Provincial People’s Committee promulgating regulations on management, protection and exploitation of special-use primary forests;
- Decision No.2267/QĐ-UB dated November 06th 2001 by the Ninh Binh Provincial People’s Committee approving Master plan on transportation development of Ninh Binh by 2010 and with vision by 2020;
- Resolution No.15-NQ/TU dated July 13th 2009 by the Ninh Binh Province’s Communist Party Committee on tourism development by 2020 and with vision by 2030;
- Resolution No.15/NQ-HĐND dated August 12th 2011 by the Ninh Binh Province’s Communist Party Committee approving the Master Plan for socio-economic development of Ninh Binh province up to 2020;
- Instruction No.20-CT/UBND dated September 3rd 1994 by the Ninh Binh Provincial People’s Committee on protecting wild birds, beast and forest;
- Instruction No.07/2011-CT/UBND dated September 30th 2011 by the Ninh Binh Provincial People’s Committee on strengthening state management of mineral exploitation in Ninh Binh province;
- Decision No.2908/QĐ-UBND dated December 26th 2007 by the Ninh Binh Provincial People’s Committee on planning raw material areas for mining industry in Ninh Binh province.

III.2.3. Heritage Site Decisions

The property is also protected by a legal system for heritage sites issued by the Ninh Binh provincial authority, including:

- Decision No.2115/QĐ-UBND dated September 3rd 2004 and No.577/QĐ-UBND dated June 8th 2009 by the Ninh Binh Provincial People's Committee approving the detailed Plan of protection, restoration and promotion of the Hoa Lu Ancient Capital's important protected areas;
- Official Letter No.522/UBND-VP4 dated June 21st 2007 by the Ninh Binh Provincial People's Committee on strengthening management of the Trang An Landscape Complex;
- Archive No.213/UBND-VP9 dated October 30th 2012 by the Ninh Binh Provincial People's Committee on zoning of the protected areas of the Trang An Landscape Complex.
- Decision No.83/QĐ-UBND dated January 21st 2015 by the Ninh Binh Provincial People's Committee promulgating temporary regulation on construction management within the Trang An Landscape Complex;
- Decision No.26/2015/QĐ-UBND dated August 24th 2015 by the Ninh Binh Provincial People's Committee promulgating rules on collaboration in resource management and environment protection within the Trang An Landscape Complex World Cultural and Natural Heritage.

III.3. Legal protection and management of archaeological sites and resources

The following extracts from the Regulation for Archaeological Excavation No. 86/2008/QĐ-BVHTTDL (30 December 2008, Ministry of Culture, Sport and Tourism) serve to exemplify the scope and clarity of definition applied under these legal articles.

Clause 5 includes among a list of prohibited archaeological activities (e.g. pertaining to excavating without a permit from the Ministry of Culture, Sport and Tourism, illegal exchange, trading and transporting of archaeological artefacts) that it is prohibited to:

- Obstruct the archaeological management, protection, research, exploration and excavation by unauthorized organization and/or individual; and
- Exploit archaeological research, exploration and excavation where this is in violation of the national interest or may cause damage to natural resources, the environment and the health and well-being of the populous.

Clause 15 itemises the responsibilities of organizations and individuals when they are conducting archaeological exploration and excavation, and includes e.g. the following:

- Archaeological exploration and excavation must be undertaken in accordance with the content of the issued permit; any changes to such provisions must be made through a written request and only actioned after written approval from the permit-granting institution;
- Permit-holders are required to present timely preliminary reports to be lodged within an excavation file;
- Archaeological artefacts and associated excavation files are to be held by the institution named in the permit as being responsible for artefact preservation and conservation;
- Efforts must be made to ensure against any negative impact on the natural environment where the archaeological excavation takes place.

Clause 19 defines the protection, management and processing of an archaeological site at the end of exploration and excavation, and includes among its provisions the following:

- At the conclusion of a programme of archaeological exploration and excavation the permit-holding institution is responsible for instigating a plan of protection and management of the archaeological site(s) in question, this will include:
 - ✓ *Applying measures to preserve architectural ruins, artefacts and/or other archaeological vestiges that cannot be curated away from the site(s);*
 - ✓ *Back-filling of excavated trenches to the level of the previous land-surface, unless it is deemed necessary to keep an excavation open for research or on- site exhibition;*
 - ✓ *The use of markers to define the position of excavated trench(es): and the placing of signage clearly displaying the name and co-ordinates of the site, and the year(s) of excavation.*

In the event that the excavated site attains sufficient recognition for it to be considered an historical cultural relic, the Provincial Department of Culture, Sport and Tourism who owns the archaeological site will be in charge of preparing the file for such classification in accordance with the law.

Part IV. Significance and values of the property

The Trang An Landscape Complex is of global significance as an outstanding humid tropical tower karst landscape in the final stages of geomorphic evolution. It is composed of a variety of classical karst cones and towers and a network of enclosed depressions inter-connected by an intricate system of subterranean waterways, some of which are navigable by small boats. The area is unique in having been invaded by the sea several times in the recent geological past but is now emergent on land. The blend of towering mountains draped in natural rain forest, with huge internal basins containing quietly flowing waters, creates an extraordinarily beautiful and tranquil landscape.

Archaeological deposits in many caves throughout the property reveal a regionally significant, continuous sequence of human occupation and utilization spanning more than 30,000 years. There is convincing evidence showing how early human groups adapted to changing landscapes in the massif, including some of the most extreme climatic and environmental changes in the planet's recent history. The story of human-environment inter-relationship is extended into historic times with the establishment of Hoa Lu, the first political capital of an independent Vietnam nation, which exploited the strategic advantage offered by the karst mountain landscape.

IV.1. World Heritage Outstanding Universal Values

The Trang An Landscape Complex is a mixed cultural and natural World Heritage property, inscribed on the World Heritage List under three criteria (abbreviated from the full citation) as follows:

Criterion (v): An outstanding example of traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.

Trang An is an outstanding locale within Southeast Asia, and significant in the wider world, for demonstrating the way early humans interacted with the natural landscape and adapted to major changes in environment over a period of more than 30,000 years. The long cultural history is closely associated with geological evolution of the Trang An limestone massif in late Pleistocene and Holocene times, when the inhabitants endured some of the most turbulent climatic and environmental changes in Earth history, including repeated submergence of the landscape due to oscillating sea levels. Within the one compact landscape there are many sites covering multiple periods and functions, comprising a unique early human settlement system. The Hoa Lu Ancient Capital is an outstanding and exceptionally well-preserved archaeological record of life during the crucial 10th Century period in Vietnamese history. It demonstrates continuity in the intimate relationship between this landscape and its inhabitants, whose roots extend deep into pre-history.

Criterion (vii): Contains superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance.

The tower karst landscape of Trang An is one of the most beautiful and awe-inspiring areas of its kind anywhere on Earth. Dominating the landscape is a spectacular array of forest-mantled

limestone rock towers up to 200m high, which are linked in places by sharp ridges enclosing deep depressions filled by waterways that are inter-connected by a myriad of subterranean cave passages. These features all contribute to a multi-sensory visitor experience that is heightened by the aesthetics of contrasting colours, among the deep green tropical rainforests, grey-white limestone rocks and cliffs, blue-green waters and the brilliant blue of the sky. The dramatic mountains, secretive caves and sacred places in Trang An have inspired people through countless generations. It is a place where culture encounters the wonder, mystery and magnificence of the natural world and is transformed by it.

Criterion (viii): An outstanding example representing major stages of Earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features.

Trang An is a superb geological property that displays more clearly than any other place on Earth the final stages of tower karst landscape evolution in a humid tropical environment. Deep dissection of an uplifted limestone massif during a period of five million years has produced a series of classical karst landforms, including towers, cones, enclosed depressions (cockpits), interior-draining valleys (poljes), foot caves and subterranean cave passages containing speleothems. The presence of transitional forms between 'fengcong' karst with ridges connecting towers, and 'fenglin' karst where towers stand isolated on alluvial/colluvial plains, is an extremely significant feature of the property. Trang An is unusual in being an autogenic (rain-fed only) karst system. Former fluctuations of sea level are evidenced by an altitudinal series of erosion notches in cliffs, with associated caves, wave-cut platforms, beach deposits and marine shell layers.

IV.2. Biological, environmental and socio-economic values

IV.2.1. Biological values

Trang An is located in the humid tropical region of North Vietnam and has four distinct seasons - spring, summer, autumn and winter. There are two major biotic communities - terrestrial and aquatic. The natural vegetation of Trang An is rainforest on karst mountains with shrubs, grasses and wetland plants in the lowlands, swampy depressions and water courses in between the karst mountains. The dense vegetation cover and the rich biodiversity of the biotic communities greatly contribute to the scenic and aesthetic value of the property.

According to research and survey by the Forest Investigation and Planning Institute (FIPI) and the Ninh Binh Forest Protection Department, the karst biotic communities in Trang An comprise more than 600 flora species (belonging to 384 genera and 134 families) and 200 fauna species, many of which are listed in the Red Book of Vietnam. More than 310 terrestrial plant species (*Viridiplantae* or *Chloroplastida*) have been inventoried including such rare species as: Tuế đá vôi (the limestone *Cycas revoluta*); Sưa (*Dalbergia tonkinensis* Prain - a woody plant belonging to the family *Fabaceae*); Lát (*Chukrasia tabularis* - a woody plant belonging to genus *Chukrasia*, family *Meliaceae*); Nghiến (*Burretiodendron hsienmu* - a woody plant belonging to genus *Burretiodendron*, family *Malvaceae*); Phong lan (family *Orchidaceae*); Hoài sơn (*Dioscorea hamiltonii* - genus *Dioscorea*, family *Dioscoreaceae*); Kim ngân (genus *Lonicera*, family *Caprifoliaceae*); Bách bộ (*Stemona tuberosa* - genus *Stemona*, family *Stemonaceae*); and rau Sắng (*Melientha suavis* - genus *Melientha*, family *Opiliaceae*). Ten species are listed in Vietnam's Red Book and seven species are recorded for the first time in Vietnam, including: Sủi hoa vàng (*Alstonia scholaris* - genus *Alstonia*, family

Apocynaceae); Mã đầu linh (*Aristolochia kaempferi* Willd, family *Aristolochiaceae*); Sao hải nam (*Hopea hainanensis* - genus *Hopea*, family *Dipterocarpaceae*) or Tầm cốt phong (*Aristolochia mollissima* Hance). Many vascular terrestrial plant species (311 of 240 genera and 105 families) have been found and inventoried as having medicinal capability, including: Bình vôi (genus *Stephania*, family *Menispermaceae*); Vương tùng (*Araucaria columnaris*, family *Araucariaceae*); Kim ngân (genus *Lonicera*, family *Caprifoliaceae*); Hoàng nàn (*Strychnos Wallichiana*, Strud ex DC., family *Mã tiền Longaniaceae*); Mài núi (*Dioscorea hamiltonii* - genus *Dioscorea*, family *Dioscoreaceae*); Huyết giác (genus *Dracaena*, family *Ruscaceae* (Tóc tiên (*Dracaenaceae*))); and Bách bộ (*Stemona tuberosa*, genus *Stemona*, family *Stemonaceae*).

Trang An also features very abundant terrestrial faunal communities including many rare species, such as: Sơn dương (*Rupicapra*, genus *Rupicapra*, family *Bovidae*); Báo gấm (*Neofelis nebulosa*, genus *Neofelis*, family *Felidae*); Phụng hoàng (*Chinese phoenix*, *Buceros bicornis*, genus *Buceros*, family *Bucerotidae*); Khỉ (monkey), Cây (family *Viverrinae*); Tê (genus *Manis*, family *Manidae*); Tắc kè (*Gekko gekko*, genus *Gekko*, family *Gekkonidae*); Rái cá (Otter, *Lutrinae*, family *Mustelidae*); Mèo rừng (Wildcat, *Felis silvestris*, genus *Felis*, family *Felidae*); Sáo (family *Sturnidae*); and Vẹt (Parrot, ordo *Psittaciformes*).

The aquatic biotic communities contain about 30 planktonic species and 40 benthos species, also including some listed in Vietnam's Red Book, such as the *Mauremys caspica* turtle (*Ocaciiasinensis*).

It is noteworthy that, being in a special geographical position at the junction of many floral and faunal flows, Trang An is a convergence of many eco-systems and species, with a particularly rich biodiversity, typical of the karst ecosystems of Vietnam. Biodiversity is a significant component of the outstanding landscape of Trang An, and makes an important contribution to eco-tourism and scientific research. Do Van Cac et al. (2000) established the list of plants in Trang An as follows:

Table 1. Major plant communities in Trang An

Order	Family	Genus	Species	Percentage of total species (%)
Phylum <i>Equisetophyta</i> (ngành Cỏ thấp bút)	1	1	1	0.17
Phylum <i>Polypodiophyta</i> (ngành Dương xỉ)	17	25	36	6.24
Phylum <i>Pinophyta</i> (ngành Thông)	2	2	4	0.69
Phylum <i>Magnoliophyta</i> (ngành Ngọc lan), of which:	114	356	536	92.90
+ Class <i>Magnoliopsida</i> (lớp Ngọc lan)	88	269	419	72.62
+ Class <i>Liliopsida</i> (lớp Hành)	26	87	117	20.28
Total	134	384	577	100.00

These data reveal that *Magnoliophyta*, which accounts for 92.9% of the plant species, is the most important component in the Trang An flora, while the next most important are *Magnoliopsida* and *Liliopsida*.

In terms of diversity of species in a family, there are eight families that have more than 10 species:

- Poaceae: 34 genera, 39 species
- Asteraceae: 25 genera, 31 species
- Fabaceae: 18 genera, 34 species
- Moraceae: 6 genera, 27 species
- Euphorbiaceae: 16 genera, 26 species
- Rubiaceae: 11 genera, 17 species
- Rutaceae: 8 genera, 11 species
- Cyperaceae: 5 genera, 11 species

The main terrestrial plant types are:

- Herbaceous (Ct): 212 species (36.74% of the total)
- Shrub (Bu): 93 species (16.12%)
- Small trees (Gn): 92 species (15.95%)
- Herb vines (Dt): 73 species (12.65%)
- Average trees (Gt): 34 species (5.89%)
- Creeping shrubs (Bt): 33 species (5.72%)
- Rugged vines (Dg): 23 species (3.99%)
- Large trees (Gal): 17 species (2.94%)

Additionally, there are 42 species of aquatic plants, which account for 28.7% and 14 sub-species of plants, which account for 2.43% of all plant species at Hoa Lu. Thus, plants in the study area mainly belong to the group of herbaceous, shrubs and vines (75.22%). Ten species of plants are listed in Vietnam's Red Book of rare and endangered plants, as follows:

Table 2. Plant species listed in the Vietnam Red Book

Vietnamese name	Scientific name	Endangered degree*
Nghiến	<i>Brurretiodedron tonkinense</i> (A. Chev). Kosterm.	V
Lát hoa	<i>Chukrasia tabularis</i> A.Juss.	K
Bồ an Bắc Bộ	<i>Colona poilanei</i> Gagnep	E
Săng	<i>Melientha suavis</i> Pierre	K
Vương tùng	<i>Murraya tetramera</i> Huang	T
Mã tiền tán	<i>Strychnos umbellata</i> (Lour.) Merr	V
Bồ cập núi	<i>Tournefortia montana</i> Lour	T
Bách bộ đá	<i>Stemona saxorum</i> Gagnep.	E
Tuế lá rộng	<i>Cycas balansae</i> Warb.	R
Bồ cốt toái	<i>Drynaria fortunei</i> (Kuntze) Smith	T

* E: Endangered; R: Rare; V: Vulnerable; T: Threat; K: Inaccurate

There are seven species of plants endemic to Trang An:

- *Alstonia* aff. *henryi* Tsiang
- *Aristolochia hainanensis* Merr.
- *Aristolochia mollissima* Hance.
- *Caesalpinia* aff. *Metcalf Magnifoliolata*
- Chun et L.Chen aff. *corallina* Diospyros.
- *Euonymus* aff. *oxyphyllus* Miq.
- *Eurycorymbus cavaleriei* (Le 'vl.) Rehd.et Hand - Mazz.

IV.2.2. Resource values

Timber: The Hoa Lu Special Use Forest, within the Trang An Landscape Complex, is a secondary or regenerating forest comprising mostly tall scrub and grassland. There are 92 timber species among the 32 families of *Magnoliophyta*, which accounts for 15.94% of all species. Among these there are some species of rare wood such as *Chukrasia tabularis*, and some other species of high economic value such as *Burretiodendron tonkinense*, but no large trees remain. The others are mostly among the miscellaneous woody species of such families as *Moraceae*, *Euphorbiaceae*, *Rubiaceae*, and *Ulmaceae*, among many others.

Firewood: Wood for use in domestic fires has been taken in low quantities in the past. Electricity, gas and other fuels are now replacing fires in homes so there is a diminishing demand for firewood and collection is now largely limited to storm-damaged vegetation.

Medicinal plants: According to research by Do Van Cac (2000), 311 species have been found and collected in Trang An that can be used for drugs, among which are 240 genera and 105 families. Compared with a total of 577 species of 384 genera and 134 families of *Tracheophyta* discovered here, it is noteworthy that medicinal plants occupy an important position in species composition in the entire phylum. Among the 311 species of medicinal plants, two notable species of *Aristolochiaceae* have been found - *Aristolochia hainanensis* and *Aristolochia mollissima* - both of which are first recorded (as endemic) in the flora system of Vietnam. Most of the 311 species of medicinal plants are recorded as having been used in the practice of traditional medicine, for the treatment of many common ailments such as arthritic, gastrointestinal, respiratory, hepatic, renal, and skin diseases. A number of precious medicinal plants are regularly present on the market such as: *Stephania Sinica*, *Murraya tetramera*, *Lonicera dasystyla*, *Strychnos cliffichii*, *Dioscorea Glabra*, *D. persimilis*, *Dracaena Cambodiana*, and *Stremona tuberosa*.

Limestone: Small volumes of limestone in the property have been quarried by village stone-working industries for decorative purposes and carving. Today, the extraction of stone from the property is prohibited, the quarries are being closed and stone is sourced from elsewhere.

IV.2.3. Environmental values

The Trang An Limestone Massif is mostly rain-fed, i.e. it doesn't receive water either from the surrounding rivers and streams. Rather, drainage from the massif discharges naturally to them. The property does not experience annual floods, erosion and/or siltation from surrounding rivers and streams. Therefore, the water bodies within the property remain clear and clean, except where localised human activities may be occurring, such as small-scale dredging of waterways, infrastructure construction and agricultural uses. Thus, the largely natural waters of Trang An are an extremely valuable resource for human consumption and

for agricultural uses (rice growing in particular). Because of the difficulty of access, human activities within the property have been insignificant in the past, becoming more influential only in the last 10-15 years. Therefore, the vegetation cover of the property remains intact, the air is generally fresh and clean, and the temperature remains equable - Trang An is noticeably cooler than Ninh Binh city during summer time. Trang An can be considered a “refuge island” where people, while escaping from the stressful urban areas, can come to refresh themselves in a clean and green environment.

IV.2.5. Social and economic values

Trang An plays a significant role in the lives of the residents of the property, and also provides benefits to local communities of the surrounding areas and to the province as a whole. Traditional livelihoods are respected and encouraged in the context of management of the World Heritage values. The great majority of the residents in the property are engaged in subsistence gardening (especially paddy rice cultivation), farming and fishing. There are forestry and agriculture promotion clubs in the villages of the buffer zone. The Fund for Conservation of Nature gives financial assistance to more than 700 households, and models for effective cultivation of rice, vegetables and orchids are being tested, while goat herding and honeybee keeping are encouraged.

Many local people are also directly employed in several ways within the property, as forest rangers, security officers, maintenance staff, and boat operators - most of the latter being women, who also act as visitor guides and custodians of the property.

Eco-tourism contributes substantially to the local society and economy. Currently, some 2,600 family-owned sampans provide the principal means of access for visitors to the property. Income earned from these boats is sufficient to support about five people, so virtually all of the residents in the property benefit from boat operations. Local people also derive income from small stalls and shops selling souvenirs, food and drink, and there is opportunity for the selling of handicrafts, and for traditional cultural performances. Four private eco-tourism resorts are authorised to operate in the property. Within villages inside the property there are several small hotels and guest-houses, along with home-stay and farm-stay premises. These income-earning opportunities help alleviate poverty in the community as well as strengthening the local economy.

Trang An is also important in the religious life of not only the local communities but also those who come from far away. Religious pilgrims make up the largest proportion of visitors to the property, especially during the festivals held throughout the year when visitor numbers may reach 20,000 per day.

As a major tourist attraction, Trang An also has a central role in social and economic development of the Ninh Binh Province. The province is a major regional tourism centre in Vietnam, and in the five years from 2007 the number of visitors to the province grew at a rate of approximately 25% per annum. The revenue generated from tourism increased from 2007 to 2011 at an annual growth rate of 60.5%. The province expects to host about six million tourists in 2015, including one million international visitors. After this time, the annual growth rate in visitor numbers is expected to be around 10%. Trang An has benefitted from tourism investment and today, together with the renowned Bai Dinh pagoda situated in the buffer zone, the property is the most popular tourist destination in the province.

Part V. Protection designations, management zoning and boundary revision

V.1. Revision of the property and buffer zone boundaries

In its decision to inscribe Trang An on the World Heritage List (38 COM 8B.14), the World Heritage Committee requested the State Party of Viet Nam to modify the boundary of the property to better reflect the areas and attributes of Outstanding Universal Value (OUV) and ensure an appropriate surrounding buffer zone.

Consequently, the Trang An Management Board has undertaken a careful and comprehensive revision of the boundaries. The boundary revision process has involved a thorough examination of the full length of the boundary, using the following principles for delimiting the property:

- Ensuring that all the attributes of OUV are included, especially all caves of known or potential archaeological significance and as much as possible of the natural karst terrain, including isolated towers at the margins of the property that manifest the final stages of geomorphic evolution of the limestone massif.
- Using natural features for defining the boundary wherever possible, such as the base of slope at the outer extent of the massif, catchment (watershed) boundaries, ridgelines and rivers.
- Using canals or rural roads to mark the boundary where natural features are unavailable.
- Excluding areas that have been significantly modified by inappropriate human activities and exploitation, such as former rock quarry sites.
- Excluding some residential and commercial sites, especially near the gateways to the property.

In practice, the boundary modification has resulted in a net increase in the size of the property by 54 ha (approximately 1%) to a total area of 6,226 hectares, as is shown in the map in Part II above. This has included the following main changes:

- Extension of the north-western sector of the property to include Bai Dinh Mountain, which is the natural setting for an ancient pagoda. This complements the Hoa Lu Ancient Capital already included in the property, and also adds more natural karst mountain landscape to the property.
- Extension of the southern boundary of the property to include a substantial mountain area, part of which was reserved earlier for utilization in stone handicraft production. This area is now closed to future quarrying and stone will be sourced from outside the province. Also opportunities have been provided for stone workers and their families to gain new skills and find alternative employment.
- Small expansion of the north-eastern sector of the property to encompass more of the isolated towers emerging from the surrounding corrosion plain, thus better demonstrating the end point in tower-karst development of the limestone massif.
- Reduction of the property at the north margin to exclude an old rock quarry close to the Hoang Long River.
- Reduction of the property around the Tam Coc boat wharf to exclude private homes, hotels and commercial businesses (shops and restaurants etc.), and a hotel site in Bich-Dong.

No significant changes were made to the boundary of the buffer zone. The buffer zone completely surrounds the property and its boundary mostly follows natural features, in this case rivers and streams along the Northern, Northeastern, Western and Southwestern margins. An exception is the Southern boundary which separates the buffer zone from the existing limestone quarrying (both for cement and small-scale handicraft production). The boundary in this part of the buffer zone follows a ridge line of the limestone mountain range. With the changes made to the property boundary, a small area of the buffer zone has been added to the property, so it is slightly reduced in area and now covers a total of 6,026 hectares, again as shown in the map (Figure 5). For more details see the accompanying report on the revised boundary of the property.

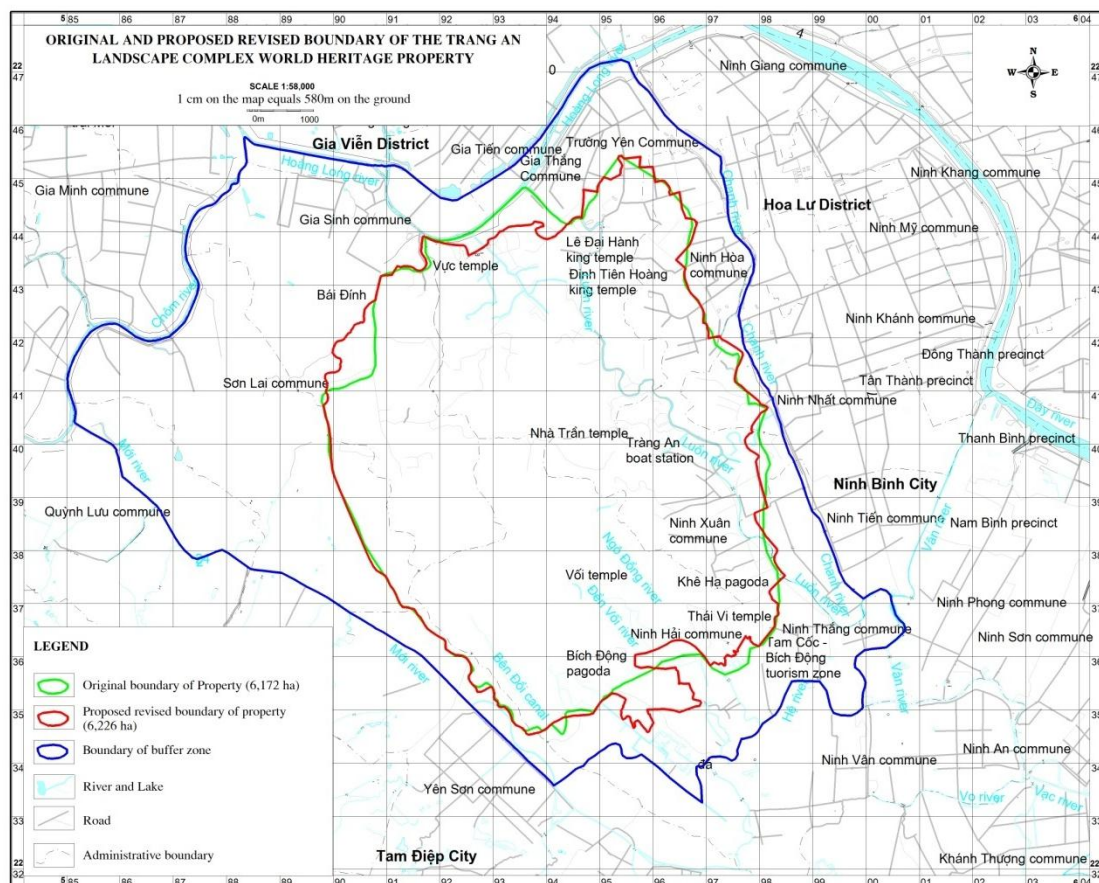


Figure 5: Map showing the revised proposed boundary

V.2. Protected Areas

The Trang An Landscape Complex includes two protected areas declared as Special National Heritage - the Historic and Architectural Monument of the Hoa Lu Ancient Capital, and the Trang An-Tam Coc-Bich Dong Scenic Landscape. A further protected area in the property is the Hoa Lu Special-Use Forest.

V.2.1. Hoa Lu Ancient Capital

The Hoa Lu Ancient Capital was established as a National Monument by the Prime Minister

of Vietnam by Decision 82/2003/QĐ-TTg on April 29th 2003. Subsequently, the Prime Minister declared the site to be Special National Heritage according to Decision No.548/QĐ-TTg on May 10th 2012. This Decision was in compliance with Article 29, Items 3a and 3b, of the Law on Cultural Heritage:

“3a. The monument and location are attached to a key event marking a breakthrough in the nation’s history, or to the nation’s heroes who had a tremendous influence on the historical evolution of the nation.

3b. An architectural-artistic monument, architectural complex, master urban architecture and residence, which has special values marking key milestones in the architectural development of Vietnam”.

The site covers an area of 314.95 hectares. Responsibility for managing the site was assigned to the Trang An Landscape Complex Management Board in 2012. Under the Board, the Centre for Conservation of the Historic and Architectural Monument Hoa Lu Ancient Capital is the unit responsible for daily management of the site. The management rights and responsibilities, including supervising investment projects, undertaking research, and managing tourist activities and services are detailed in Part VII of this management plan.

The cultural legacy of Hoa Lu

Significant urban development in the form of the ancient capital arose in the 10th Century, which marks a transformative period in the history of Viet Nam: a transition from a thousand years of domination by Chinese rulers to the creation of an independent nation - the Dai Co Viet ('Great Viet Land'). In AD 968, in the wake of civil war that immediately followed independence, the northeast margin of the Trang An massif was chosen to be the site of the nation's new capital - Hoa Lu. The decision to situate the capital here not only lay in the fact that it was within the centre of power of the Dinh King, it owed much to the location's transitional position in the landscape. Namely, that it sat between the coastal planes, which were populated by the Viet peoples; the mountains and upland valleys, populated by the country's ethnic groups; and between the cultures along the Ma and Hong rivers. Most visibly, the site also exploited the substantial strategic potential offered by the immediate karst landscape.

Relationships between settlement and the landscape

As previously explained, geomorphologically this north-eastern part of the Trang An massif, consisting of isolated karst towers on the base level corrosion plain and rampart-like ridges, is representative of the classic final stages of the karst evolution process. During mid- (c. 7000 to 4000 BP) and later (c. 2500 to 1500 BP) Holocene, this area continued to be affected by water-level fluctuations, alternating between riverine, lagoon and swampy environments.

In defining the territory of the new capital, the Dinh dynasty took particular advantage of the outstanding defensive opportunities afforded through connecting isolated tower karst landforms (namely the Cho, Che, Co, Thanh Lau, Dam and Canh Han mountains) to the nearby cone karst mountain ranges of the Chu Ma, Ma Yen, Mon Mang and Hang Hoby means of a system of ramparts. Ten such sections of rampart were built with a total length of c. 3 km, defining and enclosing two internal 'valley-like' spaces that when combined covered an area of c. 300 ha. The main administrative complex of buildings was constructed within

this space, with most of the general population residing in communities outside the citadel ramparts, and retreating there only during periods of conflict. The capital was built to take advantage, not only of the locale's natural dominant landforms, but also its hydrology (utilising and managing the natural drainage system of tributaries from the nearby Hoang Long River), and its existing network of natural caverns and passages through the limestone, with these providing strategic points of access into the citadel and to the interior of Trang An - as testified by the discovery of contemporary sites within the massif. This long-held tradition of using the natural features of the Trang An landscape is today appropriately reflected in the predominately water-borne, passage that tourists take through the property.

Archaeological evidence from the Hoa Lu Ancient Capital

Although the place of the Hoa Lu has always been especially prominent in Viet Nam's written history, it was not until the 1960s that systematic archaeological investigation began in the citadel precinct. To-date, three archaeological excavations as well as several phases of test-excavation, covering a total area of c. 2000 square metres, have been undertaken. While this represents only a very small proportion of the total enclosed area, a great abundance of architectural features - including stretches of the citadel ramparts foundations, courtyards, palace floors and evidence of Buddhist shrines - as well as many thousands of artefacts have already been recovered. The analysis of these finds has significantly contributed to expanding and diversifying existing written accounts of the site and towards furthering knowledge of how it was embedded within its landscape. For example, excavation has revealed in exquisite detail the innovative construction method used to prepare the ground before raising the enclosing ramparts and laying the foundations of buildings: using bamboo and wood to create platforms and stabilise against the effects of subsidence within what was a naturally marshy landscape. Indeed, it is these predominantly water-logged conditions that have inadvertently provided the ideal depositional environment to preserve such organic remains, adding to the overall geo- cultural importance and authenticity of this locale.

Drawing on the existing evidence, the Hoa Lu Ancient Capital represents an outstanding and exceptionally well-preserved archaeological record of life during the crucial 10th Century period in Vietnamese history. It is a record that demonstrates continuity in the intimate relationship between this landscape and its inhabitants, whose roots extend deep into prehistory. As part of its research programme, the Trang An Management Board will be show-casing the ancient capital to the general public; presenting it in the context of the many archaeological discoveries that have been made, and with respect to further archaeological initiatives that will supplement and extend that knowledge.

Built structures in the Hoa Lu Ancient Capital

The site contains many buildings and other structures associated with the succession of ruling royal dynasties, such as palaces, citadels, tombs and steles, along with religious structures, including temples, pagodas, and shrines. The resident kings often creatively and strategically utilized the mountain and riverine topography in locating and constructing their buildings. A detailed account of the history, character and use of existing built structures, together with notes on associated festivals, is included in Annex 4 to this plan.

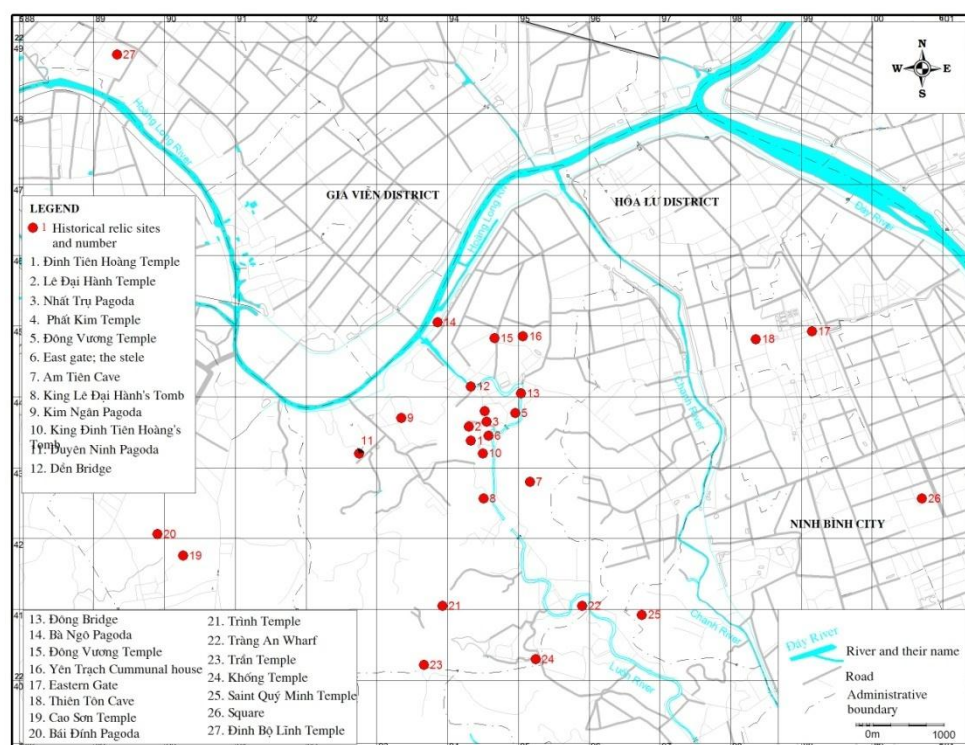


Figure 6: Monuments and relics of Hoa Lu Ancient Capital

V.2.2. Trang An-Tam Coc-Bich Dong Scenic Landscape

This is a combination of two national heritage areas: the Tam Coc-Bich Dong Scenic Landscape and the Trang An Scenic Landscape, covering a total of 2,299.4 ha. It was classified as a Special National Heritage according to Decision No.548/QĐ-TTg, on 10th May 2012, by the Prime Minister of Vietnam, based upon its recognition under Article 29 of the Law on Cultural Heritage as a:

“Scenic landscape or natural area which is a combination between natural landscape and architectural/artistic monument bearing the nation’s special values or a natural area bearing famous typical geological, geomorphological, biodiversity or ecological values of Vietnam and the world”.

The area was under the direct control of the Ninh Binh Provincial Department of Culture, Sports and Tourism before being handed over to the Trang An Landscape Complex Management Board in 2012. Since 2005, the Xuan Truong Enterprise, a private business based in Ninh Binh, has been assigned to manage heritage conservation, tourism and promotion operations in the Trang An area for a period of 70 years, under supervision from the Board and in accordance with management plan provisions. The company has a range of well-qualified administrative, professional and service operations staff, including a business team, ticket office staff, security guards, rangers and boat operators. It also cooperates with national and international agencies and research institutes.

The area has many cultural and historic monuments, including Dot Pagoda (or Trinh Temple), which worships two generals of the Dinh Dynasty, the so-called Two Saints - Ta Thanh Tru

and Huu Thanh Tru; Tran Temple (or Noi Lam Temple or Vung Tham Temple), which worships Saint Quy Minh; and Khong Temple, which worships a Dinh commando entitled Dinh Cong Tiet che. Other archeological relics include sites at Boi Cave, Trong Cave, Cho Stone Roof, and Ong Hay Stone Roof. Several of these monuments and relics are classified either as national or provincial heritage.

Trang An-Tam Coc-Bich Dong Scenic Landscape links the Trang An cave assemblage and the Bich Dong Pagoda cave system and monuments, which are situated with the districts of Hoa Lu, Gia Vien, Nho Quan and Ninh Binh City of Ninh Binh Province.

Trang An Cave Assemblage

The Trang An Cave assemblage includes about 100 known caves and cave passages, many of which are perennially flooded. They are diversified in morphology and types and are grouped into closely associated clusters. Each cave is decorated with speleothems (stalactites and stalagmites) resulting from the dissolution and deposition of limestone. Traces of sea regression and transgression periods are demonstrated clearly through local erosion notches at various levels and the linking of caves. Some caves have numerous branches and floors. Several prominent examples are:

- *Dia Linh Cave* (Hang Địa Linh): The cave is dissected into three branches. It is generally 2-2.5m deep and 3m high with a maximum height of 7-8m. When lit, the ceiling displays beautiful colours.
- *Dark Cave* (Hang Tối): This is a small, narrow and very dark cave, from which it gets its name. The cave is 320m long, 1.4m deep and 1-6m high. In many locations, the cave has a triangular cross-section, and is only wide enough for the passage of a small bamboo boat. There are two large spaces called “màn vóc” because the ceiling is covered by stalactites which give the appearance of large nets. There is also a small dead-end alley, called *Mistake Alley* because people frequently became stuck in it.
- *Bright Cave* (Hang Sáng): This cave is 120m long, 1.5m deep and 1-2m high. It is very spacious and airy, with sufficient light for tourists to admire the stalactites.
- *Brewery Cave* (Hang Nấu Rượu): This cave is so named because in the past local people found ceramic jars and bottles of wine inside the cave. According to legend, King Dinh used to use this cave as a distillery. The cave is 250m long, 1.5-2m deep and 3-5m high. It is the highest and most airy cave, with the purest water, and is the most convenient to travel by boat.
- *Three Drips Cave* (Hang Ba Giọt): This cave is 156m long, 1.5-2m deep and 1.5-2.5m high. At the entrance of the cave lies a partly submerged block, which has the appearance of a floating turtle.

Tam Coc-Bich Dong cave system and monuments

The Tam Coc-Bich Dong area, located within Hoa Lu Karst Mountain Complex, is well-known for its spectacular landscape and the harmonious blend between natural features (including Ngo Dong River, Ca Cave, Hai Cave, Ba Cave) and architectural structures (including Thai Vi Temple, which commemorates kings of the Tran Dynasty, and Bich Dong Pagoda). The presence of three main caves gives Tam Coc its name:

- *Ca Cave* (Hang Cỏ), also called *Outside Cave* or *Giant Cave*: is 180m in long, about 30m

wide, and 5m high. Stalactites are better developed here than in the other two caves because water cannot reach its high ceiling even during the flood season so the stalactites are not as subject to erosion.

- *Hai Cave (Hang Hai)*, also known as *Middle Cave*, is 90m in length. The entrance is 30m wide and the cave narrows toward the middle. The cave is approximately 3.5m high with a ceiling decorated with well-developed stalactites.
- *Ba Cave (Hang Ba)*, known also as *Small Cave*, is 80m long. The entrance is about 20m wide and the cave widens inside to about 30m. The cave is less than 3m high and is regularly flooded during high rainfalls so the stalactites are eroded.

Bich Dong Pagoda is skillfully constructed in harmony with the natural landscape, with most buildings attached to cliffs and caves. The pagoda is composed of three buildings at different levels. The ancient people erected a Buddha statue within a dark cave and built towers on the cliffs, in an effort to make the pagoda more sacred.

According to inscriptions in the pagodas, historic records and legends, both the pagoda and main cave were previously called Bich Son. The pagoda was built at the time of Le Trung Hung, and was associated with the names of the abbots Tri Kien and Tri The. In 1774, as they marched through here, Lord Trinh Sam ordered Nguyen Nghiem to manage labourers over a period of eight months in order to carve the two words *Bich Dong* in the cliffs. The words, carved sharply in large basic letters, are 1.5m long. Since that time, the temple has been known as Bich Dong.

During the resistance war against the French, Bich Dong served as an important base area, and the Phan Dinh Phung arsenal was built here to produce weapons. The pagoda and the cave were also used to contain food, print propaganda materials, and to train troops and local guerrillas.

The Trang An-Tam Coc-Bich Dong Scenic Landscape is located not far from Hoa Lu Ancient Capital, so is within the cultural space of Co Do Hoa Lu traditional festival, which takes place from 6th to 8th March (lunar) annually. The main festival here is held at Tran Temple (in Ninh Hai, Hoa Lu District) on 18th March (lunar) every year to commemorate the Holy Quy Minh Great King. Uniquely, this festival takes place in Sao Khe River, which lies beside the Trang An Highway. This festival is closely associated with the travel itinerary at Trang An caves during spring, which ends with mountain climbing and worshiping at Tran Temple.

V.2.3. Hoa Lu Special-Use Forest

Located mostly on the western half of the Trang An Limestone Massif, this area of 1,500 ha has an essentially natural forest and scrub cover on the uplands while rice paddy fields occupy some of the lower wetlands. The area features mostly karst cones and ramparts, implying an earlier stage of geomorphologic evolution compared to the more evolved karst towers on the eastern half. It is, therefore, even more rugged and less accessible than the latter, implying a better state of conservation, especially in terms of biodiversity values.

The Hoa Lu Special-Use Forest was set up to help protect the natural and biodiversity values of the area, supporting at the same time the Hoa Lu Ancient Capital and the Trang An-Tam Coc-Bich Dong Scenic Landscape, on the basis of:

- Decision No.432/QĐ-UBND dated March 29th 1996 by the Ninh Binh Provincial People's Committee on setting up the Management Board of the Hoa Lu Special-use Primary forest;
- Decision No.2556/2005/QĐ-UBND dated November 18th 2005 by the Ninh Binh Provincial People's Committee promulgating regulations on management, protection and exploitation of special-use primary forests;

The area has been managed by a Forest Management Board since 1996, but it is now also under the authority of the Trang An Landscape Complex Management Board. Management prescriptions applying to the area are included in Part VII of this management plan.

This is a multiple-purpose protected area, divided into three sub-zones: strictly protected zone; ecological restoration zone; and service/administrative zone. The area is protected under the national Law on Forest Protection and Management 2004, which contains extensive measures for protection and management. The law specifies prohibited acts such as: deforestation and illegal exploitation; illegal hunting, captive breeding and slaughtering of wild animals; illegal collection of animal and plant specimens; destroying forest resources and ecosystems; violations of regulations on fires; and illegal environmental activities. There are measures for prosecuting illegal acts and violations of regulations, together with penalties and compensation requirements. Eco-tourism development is subject to strict requirements for preventing adverse effects on the protection and utility of the forest and landscape. Scientific research and experimentation are encouraged.

V.3. Internal Management Zones

Zoning is intended as a general framework for guiding the Management Board in setting priorities for management intervention. Zoning allows for a wide range of uses and levels of protection, and can provide many associated benefits:

- it helps establish an appropriate balance between protection and sustainable development of the property and its resources;
- it gives a clearer understanding of what natural and cultural values are protected in the property and where they are located;
- it provides a better understanding of the distribution of various opportunities in the property;
- it assists in the control the spread of undesirable impacts; and
- it can be useful for either dispersing or concentrating visitors.

While giving flexibility to the Management Board, all management intervention must ultimately take account of the protection requirements provided under the principal legislation. Also, this internal management zoning scheme has been prepared in conformity with the equivalent scheme in the Master Plan applying to the property, which is prepared by the Ministry of Construction.

The property is sub-divided into five management zones established according to differing types of use and varying approaches to protection appropriate to those uses. Care is taken to ensure that the activities of one zone do not infringe on those of the other zones. Although each zone has its own management prescription, the objectives and policies applying in the various zones complement one another and the overall management objectives of the

property.

The zones are for use by the management authority only. The boundaries of the zones, though plotted on large-scale maps and plans, are not legal or official cadastral boundaries, but instead are informal and unsurveyed. Also, rather than sharply differentiating between adjoining zones, the boundaries may be somewhat permeable, and they may change over time depending on changing circumstances or new information. The following outline provides a brief explanation of the management zones and their associated objectives and policies, while their spatial extent is illustrated in Figure 6.

V.3.1. Zone 1: Protected natural zone

This comprises areas of natural vegetation and landscape, focused on the central part of the massif and including much of the Hoa Lu Special-Use Forest protected area. The zone is physically inaccessible as it is composed of mostly limestone ridges, ramparts with sharp, steep scarps, densely covered with primary forest. Thus it is strictly protected from visitor access (with limited permission for research) and facilities development is prohibited. No exploitation or extraction of resources is permitted. Management intervention is generally limited to surveillance, monitoring, survey, experimentation and research, fire prevention and control, control of alien species, weeds and pests, and ecological restoration. The zone covers 3,355 ha or 53.90% of the property.

Objectives

1. To protect the environment, ecosystems and biodiversity of the area in their natural state.
2. To avoid human disturbance and damage.
3. To restore where possible areas affected by human activities and impacts.
4. To minimise management intervention.

Policies

1. Visitor access and use is prohibited and all entry to the area is by permit only.
2. No visitor facilities and services, or other infrastructure development, are permitted.
3. Any application for resource use and extraction will be refused.
4. The natural environment will be monitored for condition and trend, human-induced changes will be mitigated and undesirable elements will be eliminated or controlled.

V.3.2. Zone 2: Protected cultural zone

The zone covers 345.6 ha or 5.55% of the property including Hoa Lu Ancient Capital and other historic monuments and Archaeological cave sites.

Hoa Lu Ancient Capital and other historic monuments

Covering 315 ha or 5.06% of the property, this sub-zone comprises the officially designated and protected Hoa Lu Ancient Capital, and other isolated monuments and relics (temples, pagodas, steles etc.) found throughout the property. All historic monuments and relics are strictly preserved and protected. Reconstruction and restoration are permissible, and research is encouraged. Visitors use and limited facilities development are permitted but strictly

regulated to ensure there is no damage, destruction or loss of historic values and attributes. Most use is for worship and respectful celebration and, therefore, benign in its impact.

Archaeological cave sites

This sub-zone consists of the many archaeologically significant cave (and non-cave) sites, including all identified, tested and excavated sites as well as potentially important sites. Use is restricted to research and investigation under permit. This sub-zone covers 30.6 ha or 0.49% of the property.

Objectives

1. To preserve and protect all historic structures such as temples, pagodas and steles in their original state.
2. To repair damage to the most significant monuments and relics as far as possible.
3. To protect archaeological sites from damage or loss.
4. To maximise the benefit of research and education from the cultural heritage of the area.

Policies

1. The most significant built structures and historic sites will be inventoried and assessed for requirements of protection, conservation and restoration.
2. Any reconstruction or restoration will maintain the integrity and authenticity of the monuments and relics.
3. Visitor access to all archaeologically significant caves will be prohibited.
4. Research will be encouraged in accordance with the property research plan.

V.3.3. Zone 3: Conservation/sustainable use zone

This comprises at present the land and waterway areas not included in other zones, i.e. mostly paddy rice field and wet lands. Protection is the principal conservation objective, but limited visitor use and facilities development is allowed provided there is no adverse impact on the natural and cultural values. Traditional subsistence use of natural resources such as paddy rice cultivation, aquaculture and gardening may continue here. The zone also includes some unassessed areas, which may later be more appropriately assigned to one of the other zones. The paddy rice field and wet land covers 2,086 ha or 33.50% while water bodies account for 318.80 ha or 5.12% of the property.

Objectives

1. To protect the landscape, including waterways, in a natural state as far as possible.
2. To restore damaged and modified areas as far as possible.
3. To assess currently unsurveyed areas and consider reassigning them to other zones.
4. To permit traditional subsistence use of natural resources.

Policies

1. The state of conservation of the area will be monitored and assessed.
2. Environmental restoration projects will be conducted where necessary.

3. Visitor use will be allowed but restricted.
4. Traditional human uses of the area and its resources will be monitored and regulated as appropriate, and expansion of these uses will not be allowed.

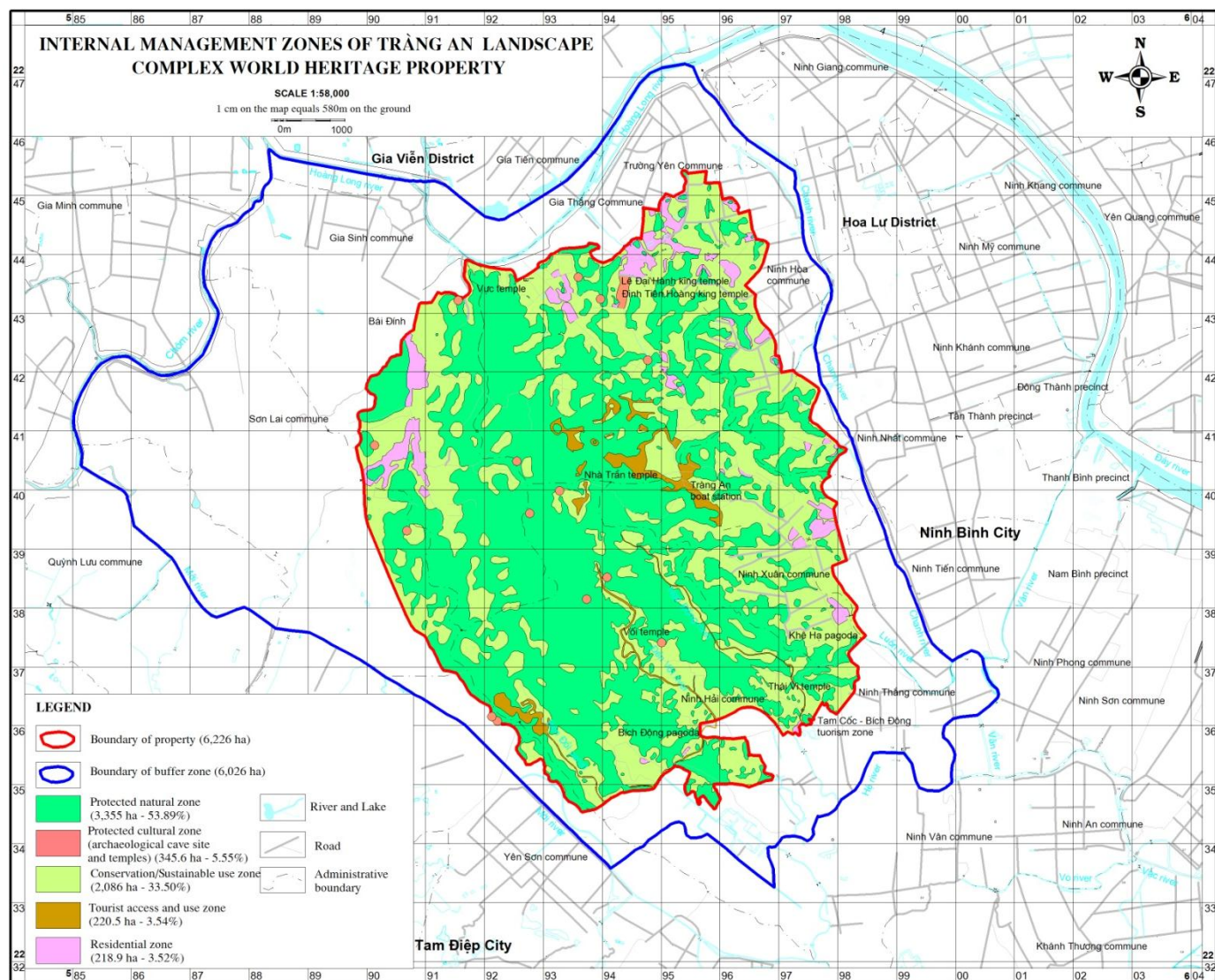


Figure 7: Internal zoning plan of Tràng An Landscape Complex

V.3.4. Zone 4: Tourist access and use zone

This zone is managed primarily for visitor access and use. It includes car parks (with associated souvenir and food stalls and toilets), gateways and visitor centres, boat wharves, waterways and cave passages for boat use, constructed paths, and facilities such as toilets, shelters, and stalls selling food, drink, handicrafts and souvenirs. Also included in this zone are privately operated eco-tourist resorts and the roads or waterways giving access to them. This zone covers 220.50 ha or 3.54 % of the property.

Objectives

1. To allow and facilitate tourist visitor access and appropriate activities.
2. To maximise the visitor enjoyment and appreciation of the area, and ensure their safety and security.
3. To provide benefits to the local community from visitor use.
4. To allow the operation of existing resorts and monitor their use and impact.

Policies

1. Monitoring of visitor numbers, impact assessments and satisfaction surveys will be used to assess the environmental, social and management carrying capacity of the area as a basis for imposition of any controls on numbers and activities of tourists.
2. The zone will be restricted to areas currently used or intended for visitor use.
3. Any damaging impact from visitor use will be avoided and violations will be penalised.
4. Private resort owners will be required to operate within the provisions of their leases and licences and any violations will be addressed as appropriate.

V.3.5. Zone 5: Residential zone

This zone is primarily focussed on villages and other residential areas, together with closely associated gardens, and orchards. Roads transecting the property and internal rural roads and canals are also included. Appropriate uses and developments here include private residences, outer farm buildings, small hotels and guest houses, shops and other small businesses. Transport infrastructure and services such as embankments, bridges, tunnels, amenity and landscape plantings and parking lots are evident. The delimitation of this zone is agreed with the Ministry of Construction. This zone covers 218.90 ha or 3.52% of the property.

Objectives

1. To permit the retention of existing residences and allow for natural demographic growth but avoid any unwarranted expansion.
2. To ensure that subsistence use of resources has no immediate or incremental undesirable effect on the cultural and natural heritage.
3. To monitor residential uses to ensure compliance with laws, regulations and policies and to penalise any violations or illegal activities.
4. To assess the situation of some residents or communities and consider their possible relocation outside the property.
5. To minimise the number of roads in the area and avoid any detrimental impact from road construction, use and maintenance.

Policies

1. Any application for new residential construction will be carefully assessed and if appropriate declined.
2. Existing residences will be monitored and assessed to ensure compliance with appropriate standards and conditions.
3. Opportunities for assisting residents to locate outside the property will be explored.
4. Further construction of transport infrastructure will be allowed for safety and operational considerations but otherwise not permitted.

Part VI. State of conservation and factors affecting the property

VI.1. State of conservation of the property

There are three different types of heritage values and attributes requiring conservation in the Trang An Landscape Complex property: archaeological sites and resources; historic structures and relics; and natural landscape and resources, especially geological heritage.

Archaeological sites are primarily located in caves and remain in a remarkably good state of conservation, essentially undisturbed by human, animal or other agency - a rarity in the Southeast Asia region where so many sites have been modified, exploited or destroyed. The original condition of the sites gives assurance of the authenticity of the cultural record. Knowledge of the range, scope and significance of the archaeological resources comes from analysis to date of 14 of some 30 caves known to have cultural occupation layers. Painstaking, scholarly research over a period of more than a decade, using sophisticated state-of-the-art analytical techniques, has provided a comprehensive and widely reported catalogue of evidence revealing how early humans interacted with the landscape. Moreover, the high degree of integrity in the geological and sedimentological records of the landscape has permitted an unprecedented account of changing environmental and ecological conditions to which the inhabitants of the area had to respond and adapt. The archaeological sites and resources are not completely immune from disturbance and damage. Natural processes such as weathering, erosion and decay can affect the integrity of the sites. The impact of even a few visitors in caves can be significant, causing physical damage and fluctuation in moisture and temperature levels. Illegal and/or irresponsible acts could result in damage and potentially in the loss of invaluable and irreplaceable material.

The historic structures and relics are for the most part intact and well preserved. The cultural significance of the property is widely recognised, and its historic attributes have been protected and promoted over a long period. Systematic archaeological investigations in the Hoa Lu citadel precinct beginning in the 1960s have revealed many architectural features, including citadel ramparts, building foundations, courtyards, palace floors and evidence of Buddhist shrines, while many thousands of artefacts have been recovered. Conservation intervention has included detailed research, survey and inventory, archaeological excavation and careful collection, curation and documentation of artefacts. Some damaged sites and structures have been faithfully reconstructed or restored, and illegal or inappropriate structures removed. Traditional festivals dating back over many generations have been preserved and revitalized, thus contributing to the retention of traditional practices and to the preservation of the intangible cultural heritage values of the property. On-going management intervention, including more research and improved staff capability, is required to address both natural and human-induced changes and impacts, and thus ensure the conservation of the built historic heritage in the long term.

The environment and biodiversity over the greater part of the property are largely in a natural state and unaffected by human development or disturbance. There are many national and provincial laws and regulations applying to the protection of the natural environment and resources. An extensive buffer zone completely surrounds the property, to assist in preventing impacts from external sources. The rugged terrain hinders access and settlement by people. Exploitation of limestone resources has been forbidden for decades. Local communities have for a long time used gas as an energy source, thereby lessening the demand for firewood. The

extent of forest cover in Trang An increased from 20% in 1999 to almost 30% in 2011, and an area of about 2,925 ha has been identified for forest restoration. None of the rivers inside or surrounding the property suffers from pollution. Some dredging of major rivers surrounding the property has occurred to enhance water quality, reduce flooding and facilitate water-borne transport. River beds and floodplains have been restored in places. Within the property there has been sluicing and minor widening of a few of the cave passages used by sampans for tourist access, largely in the interests of visitor safety. Subsistence agriculture has negligible impact on natural values and tourist impacts are under strict surveillance and control. The local communities are actively engaged in management operations and are among the most effective custodians of the property, while educational, training and awareness raising programmes have targeted the local people. Notwithstanding the current favourable status of the natural environment, the management authority must remain vigilant in the face of a number of development and environmental pressures, and burgeoning tourism in particular.

VI.2.Factors affecting the property

The most important factors affecting the property are as follows:

VI.2.1. Development Factors

Exploitation of rock material

Limestone quarrying for cement production is currently occurring outside the buffer zone to the southeast of the property, extracting some three million tons of rock per annum from an area of 19.5 ha subject to a mining licence. Additionally, five individuals are licensed to extract small quantities of limestone for construction and handicraft production from an adjacent area of 20 ha within the buffer zone. The physical removal of rock is not directly impacting the property, but there is potential for impact from dust and other pollutants, noise from blasting and traffic disruption on roads. There are provisions in the Law on Environmental Protection and the Law on Minerals to suspend or stop mining operations if there is impact on the property. Mining is conducted under an EIA, which identifies potential impacts from noise pollution, dust production and contamination of waterways. To minimise noise levels the company is required to conduct low-volume blasting in a small number of bore holes. Dust problems are ameliorated because the quarries are situated at a lower altitude than much of the property and the prevailing winds carry dust away from the property. The flow of both surface and ground water in the mining area is away from the property, so there is no pollution of water in the property from mining operations. Negotiations are underway to restrict the 218 ha area in the buffer zone subject to mineral exploration licence, and the medium term plan of the Government is to close the quarries and re-locate the cement factory, which may allow extension of the protected area. Currently, the small privately-worked quarries for stone crafts are being shut down and stone is now sourced from elsewhere in the region.

Agriculture

Some farmers allow cattle to stray in the property and they can disturb archaeological and historic sites as well as natural areas. Awareness programs are used to reduce these impacts. There are small numbers of semi-domesticated goats roaming the property but there is no evidence they have a detrimental environmental effect. Rice stubble is burned at the end of the annual growing season and this creates localised smoke pollution for a few weeks. The use of

chemical fertilisers, herbicides and pesticides is growing and this will need close monitoring to avoid undesirable pollution of soils, streams and groundwater.

Land clearance, watershed erosion and dredging of waterways

There has been some minor pollution and increased sedimentation in rivers from residences and agricultural land, and from past illegal logging activities. Improved waste management is a key element in the Government environmental management measures, and the availability of alternative energy sources is progressively reducing the demand for firewood. Minor land clearance and dredging has occurred in some areas during waterway maintenance. Attention is being given to avoiding riverbank alteration and to effective processing and uses of the sludge from rivers, such as in landscaping and amenity tree planting, without adversely affecting the environment.

Population growth, urbanisation and transport infrastructure development

Natural population increase and migration could potentially put considerable pressure on the property and buffer zone. Rapid urban growth in the nearby Ninh Binh City is creating an increased demand for land for hotel, business and residential construction and road network development. There is no immediate threat to the property. However, the Ninh Binh authorities are intending to issue regulations to limit civil construction in and around the property. There are plans to relocate some residents from inside the property to areas in and beyond the buffer zone.

Roads inside the property

There is a total of approximately 25 km of roads in the property. One main road transects the property, connecting Ninh Binh City with the entrance to the Trang An Scenic Landscape and the Hoa Lu Ancient Capital. Several small rural roads in the property are mainly for residential use or access to private resorts. Work is underway for remedial and amenity landscaping and tree planting along all existing road routes. No more roads will be constructed in the property.

Tourism growth

Trang An receives about one million tourist visitors annually and this number is expected to double by 2020. Several characteristics of tourist use contribute to minimising environmental impact, including: a short (3-month) annual peak visitor season, when pilgrims visit at festival time, with relatively few visitors over the remaining 9-month period; confinement of visits to a well-defined linear network of waterways, with a large proportion of the property receiving no or few visitors; transport of visitors almost exclusively in small traditional-style sampans rowed by guides, with only a few minor roads giving access to resorts; the predominance of day-time visits, with little use of overnight accommodation; a focus on passive activities such as sight-seeing, walking, cycling, religious celebration and cultural appreciation; and access to the property via only four main gateways, each of which has facilities and services that are culturally sensitive and of high or reasonable standard. Measures to avoid overcrowding and environmental damage include: limits on the number of boat tickets sold daily at peak times; diversification of visitor opportunities to include walking and cycling trails, and cultural and study tours; limitation of the expansion of facilities and increase in boat numbers; improvements in visitor safety and security; and intensified monitoring of visitor use and satisfaction to determine optimum levels of social carrying capacity and the adequacy of

management infrastructure and facilities. Although current levels of tourist are within the existing management capacity, the anticipated steady increase in numbers will require careful vigilance, comprehensive planning and enhanced capability for management intervention to minimise any increased incidence of environmental or social impact.

VI.2.2. Environmental factors

Air and water pollution and climate change

Currently, only background levels of air pollution occur. Water pollution is localised, intermittent and restricted in extent, rather than problematic. There is no obvious evidence of negative impacts from long-term changes in the weather and climate.

Introduced species and feral animals

No problem or pest species of introduced plants and animals are recorded in the property. The introduced Yellow snail is common but has not reached problem levels. Small numbers of buffalo are released to graze in harvested rice paddies and on riverbanks. A small and stable population of semi-domesticated goats roams the property. At current levels, goats appear to have no adverse affect on the forest vegetation, but this situation needs careful monitoring.

Lampenflora growth in caves

The temporary lighting system in caves throughout the property, using lights with tungsten filament bulbs, is out-dated, inefficient and unsafe. It is also causing the growth of unwanted plants known as lampenflora (algae, mosses, ferns etc.) on cave walls and ceilings, which displaces the natural micro-flora and alters the natural cave ecosystems. The Management Board is currently examining replacement of the entire system with modern LED-type lighting, which will not only help to eliminate the lampenflora problem; it will also improve the aesthetic qualities in the caves and thus enhance the experience of visitors.

Natural disasters - flooding, earthquake and wildfires

High water levels occur in the property especially during the rainy season from July to September. To date, flooding has not caused any major damage or loss of natural or cultural values. However, prolonged flooding can potentially adversely affect building structure and fabric, transport infrastructure, and archaeological sites. Sudden floods from storms with a rapid increase of water level in caves can present a hazard to visitors and requires contingency safety and evacuation planning. Trang An lies in a regional fault zone and earthquakes are not uncommon. The heavily jointed substrate is susceptible to collapse and rockfalls are present throughout the property. Potential rock collapse in or at the entrance to cave passages is a serious hazard for visitors. An earthquake safety plan has been prepared that includes measures for risk reduction and response. Forest fires are a threat, especially in the dry season, but to date no serious wild or human-induced fires have occurred. The Management Board has a plan to co-ordinate with local fire-fighters, forest rangers and local residents to respond to fires in a timely manner.

Measures to deal with all the above, and some other, factors affecting the property are included in the following Part VII of this management plan.

Part VII. Management objectives, policies and actions

VII.1. Protection of cultural heritage

VII.1.1. Pre-historic archaeological sites, resources and artefacts

Explanation

Archaeological heritage is defined by ICOMOS (*Charter for the Protection and Management of the Archaeological Heritage*, 1990: Article 1) as being “that part of the material heritage in respect of which archaeological methods provide primary information. It comprises all vestiges of human existence and consists of places relating to all manifestations of human activity, abandoned structures, and remains of all kinds (including subterranean and underwater sites), together with all the portable cultural material associated with them”.

The cultural OUV of the Tràng An Landscape Complex rests on its regionally unique archaeological heritage. Whereas most Southeast Asian archaeological sites comprise insular and isolated repositories of past humanity, in Tràng An, the number of sites and their state of preservation gives unprecedented access to what has been called a ‘landscape of human interaction and adaptation’ (Tràng An Nomination Document p.81), one that has evolved through cycles of coastal inundation and regression. The World Heritage community considers early human sites to be valuable storehouses of knowledge about the foundations and diversity of human life and social behaviour and, increasingly, of human adaptation in response to environmental and climatic change¹. For these reasons particular and dedicated provision is to be made for the management of Tràng An’s archaeological heritage.

Prehistoric sites in Trang An date from about 30,000 to 4000 years ago. Mostly they belong to the Palaeolithic and Neolithic, when humans lived inside caves and rock shelters. These sites have been discovered and studied only over the past ten years. To date, 30 of the almost 100 known caves in the property have been found to contain archaeological remains (See Table 2, Supplementary Report to the Nomination Dossier). There are almost certainly other archaeological caves awaiting discovery. These archaeological resources consist primarily of midden deposits with sea shells, snail shells, animal teeth and bones, and stone working tools from the continental conditions of the last ice age, and with pottery and occasional human remains deposited during the millennia after the last ice age.

Most of the archaeological cave sites are located in remote, isolated places which are difficult to access so their protection has been a relatively simple matter. However, as the sites become better known and tourist numbers increase then management of the sites will be of greater concern.

Included among the key issues and questions for management are:

- How to protect excavated pits from collapsing, especially where culture-bearing deposits lay within loose shell middens.
- How to manage the archiving, storage, curation and display of recovered artefacts.

¹ <http://whc.unesco.org/en/heads/>

- Whether to close all caves once research has been concluded or to leave some open for students and closely regulated tourist visits (see Action 14 below).
- How to protect the archaeological caves from human disturbance, damage and loss.
- How to promote the values of archaeological cave sites to tourist visitors, educators and students, and to the wider general public away from the sites themselves, e.g. through visitor centre displays and exhibitions.

Objectives

1. To ensure that archaeological sites, as a valuable and non-renewable cultural resource, are appropriately and robustly protected, rigorously investigated to the highest scientific standards and accessibly disseminated to all defined audiences;
2. To establish Tràng An through its archaeological policy and management as a model of integrated socio-economic, scientific and touristic integration under World Heritage.

Actions

1. Archaeological investigation in Tràng An will continue to be subject to protection afforded under Vietnamese law, notably through the Regulation for Archaeological Excavation No. 86/2008/QĐ-BVHTTDL (30 December 2008, Ministry of Culture, Sport and Tourism): specifically Clauses #5 on prohibited activities; #15 on the conduct of archaeological exploration and excavation; and #19 on protection, management and processing of sites at the end of excavation (see Part III.3 for details). Standardised systems will be established for assemblage of reference collections, creation of databases and recording of excavations.
2. In accordance with ICOMOS (Article 4, 1990) archaeological survey will be a basic obligation in the protection and management of Tràng An's archaeological heritage. This will involve regularly monitoring the status of existing sites and identification of new ones.
3. Monitoring will include the instigation of appropriate measures to maintain and enhance site integrity against physical damage (e.g. erosion), bioturbation (e.g. termite infestation) and, where relevant, human damage (e.g. littering or graffiti). It will also include the assessment of the safety of site access and on-site infrastructure (such as stairways). All monitoring visits will be documented and filed in a central register held with the Management Board.
4. Consideration will be given to establishing, in addition, a casual monitoring system so that anyone - workers, guides or visitors - can report perceived problems to the Board, enhancing primary monitoring and having the added advantage of encouraging wider involvement and participation in the maintenance and protection of cultural heritage.
5. The scientific investigation of archaeological sites will continue to emphasise non-destructive techniques and excavations of limited areal extent to minimise site impact (Article 5, 1990).
6. International collaboration in line with Article 9 (1990) and UNESCO (New Delhi Conference: Resolutions - Appendix 1: Recommendation on the international principles applicable to archaeological excavations, Article 15 (1956: 42) is already at the heart of archaeological (and other scientific) investigation within Tràng An. These relationships will continue to bring the best possible combination of expertise to bear on the study and protection of archaeological and related resources within the property.
7. All excavation and site study by international teams will be undertaken with the involvement of Vietnamese archaeologists or other local specialists as appropriate. This will ensure that Vietnamese cultural heritage interests are always foremost, while also

- encouraging the sharing of ideas, techniques and perspectives.
8. Research access will be granted on the understanding that the publication of results will come within a reasonable agreed-upon time-frame.
 9. Parallel publication of research in English- and Vietnamese-language journals will be encouraged.
 10. Emphasis will also be placed on the conservation of archaeological heritage *in situ*, so far as this is feasible and appropriate. No site will be exposed or left exposed after archaeological field investigation if appropriate subsequent management measures cannot be guaranteed - e.g. the back-filling of archaeological excavations or shoring against trench collapse (Article 6, 1990). All material used in on-site conservation activities will continue to be locally sourced, in line with ICOMOS recommendations (Cleere 2015).
 11. Long-term conservation and curation of all artefactual and documentary records from site investigation (and site monitoring) will be handled through a central facility to be established within Tràng An (see UNESCO Article 10, 1956). This will operate under the guidance of, and through agreement with, local and national museums and scientific institutions, and where appropriate international consultants. Particular attention will be given to: the cataloguing, packaging and storage of material; the control of stores to promote an environment that enhances and ensures the best possible preservation; the conservation of artefacts prior to archiving; and checking the performance of the storage facility.
 12. In accordance with Article 7 (1990) and Article 12 (1956), which underline the importance of conveying information about archaeological heritage to the general public in order to promote understanding about this shared resource and the need for its protection, the Management Board already ensures regular television interviews are made by archaeological experts working in the property. The existing static display of archaeological material in the Trang An visitor centre is small and outdated in style and presentation. This display will be greatly improved and modernised (also in line with the latest recommendations from ICOMOS - Cleere 2015). Similar displays will be established at other visitor centres (as noted in Part VII.4.1). Additional measures planned include: short informational videos about the property's cultural heritage; live-feeds and commentary to be screened in the visitor centres during archaeological excavations; brochures and booklets; and web-site communications.
 13. Further to these Articles, for those with particular interest, provision will be made for their involvement under supervision as volunteers in either the conservation of an archaeological site (e.g. building shoring) or potentially with excavation itself.
 14. Access to sites for research will be by permit only, issued by the Management Board. Public access to archaeological sites will be prohibited for the duration of this management plan. Consideration may be given later to allowing access to a selected few sites for students and other visitors, provided that the research is concluded and the sites are made safe, and codes of conduct would be strictly imposed and carefully monitored.
 15. In 2016 a new phase of archaeological research will begin in the property. This is being jointly funded through the Management Board and the Xuan Truong Enterprise. Additional international research council backing is also being sought through Queen's University, Belfast (see Annex 5). Funding for three doctoral positions and one post-doctoral position (to be based at the universities of Queen's and Cambridge, UK) is already in place. All of these three posts will be advertised internationally and, therefore, open to qualified Vietnamese candidates. Principal participating institutions will be (in Vietnam) the Institute of Geoscience and Mineral Resources, Vietnam National Institute of Archaeology, and (in the UK) Queen's University, Belfast, the University of Cambridge and Bournemouth University.

Evaluation measures

Qualitative and quantitative measures will include:

1. Compiled records demonstrating systematic cataloguing and clear monitoring of all cultural (and geo-culturally) sensitive locales within the property's boundaries.
2. The level of interest generated by static displays and presentations on archaeological (and related ecological etc.) heritage. This will be read e.g. through visitor numbers and through feed-back mechanisms such as website hits.
3. Evidence of research applications to the Management Board by national researchers (and international scholars) during the next five years.
4. Demonstrable recognition of Tràng An's archaeological heritage management and research strategy first at national level (e.g. through numbers of television and newspaper reports/interviews, as well as scholarly output, also potentially through involvement in consultation studies for government departments), then internationally: with representation at regional or international policy meetings on economic development and heritage/ecological sustainability.
5. Results of monitoring programmes.

VII.1.2. Later Prehistoric and historic sites and monuments

Explanation

Later sites and monuments in the property date from about 4000 to 1000 years ago, with particular emphasis on the Historic period, when humans began living mainly within inter-montane basins, on the surrounding plains, along rivers and on the coast, building houses, villages, and later fortresses, temples and other types of religious structures. These sites and monuments did not form part of the archaeological case for inscription; however, as stated in the **Supplementary Report to the Nomination** (Feb. 2014) they form an essential expression of the unbroken cultural legacy of this property, connecting the remote past to the present-day. They are, therefore, considered by the Management Board, to be of outstanding value and represent an equally important element of its cultural management responsibilities.

Current status

There are many standing historic structures in the property, primarily temples, pagodas and shrines. They are found scattered throughout the core and buffer zones of the property but are mainly concentrated in the vicinity of the Hoa Lu Ancient Capital, as described in detail elsewhere in the plan. Most structures are currently in use and some are permanently occupied by priests and guardians. Such structures are mainly constructed from wood and stone by local craftsmen using traditional methods. Maintenance and conservation are generally undertaken by the local community, and no method of central control, recording or monitoring has been developed to date.

Temples are filled with statuary, some of which has been replaced when it has deteriorated with age. Worn or broken architectural elements have usually been replaced rather than repaired. Applied decoration that has aged has often been over-painted rather than cleaned and maintained. The standard of maintenance work has tended to vary greatly. Some is of high quality with high-grade materials being used, while in other cases the workmanship has been

of poor quality and using cheaper materials. The method and degree of intervention into original building fabrics could, in some places, be regarded as excessive and inappropriate where replacement has occurred without using the same materials, particularly where concrete has been used.

The local tradition of repair and maintenance is considered valid and forms a valuable part of the cultural heritage. Now that the property has World Heritage status, however, there is a greater need to reconcile traditional approaches to conservation with international views on the standards of authenticity of historic structures. Local traditional customs of conservation will be honoured though, in keeping with current ICOMOS recommendations for the preservation of historic sites and monuments (Cleere 2015, Annex 5), the Board will actively encourage conservation of sites and monuments in their current (rather than renovated or restored) state.

Objectives

1. To secure the future of those historic standing structures of significance to the cultural heritage of the property.
2. To adopt best-practice approaches, methods and techniques in conservation and restoration of historic structures, taking account of both local traditions and international standards. Where appropriate, emphasis will be placed on conserving relics in their current state (rather than fabricating replacements or implementing extensive renovation unless such is deemed absolutely necessary for reasons of safety or structural integrity of the site or monument).
3. To retain the traditional skills of craftsmen in the local communities and enhance their capabilities through appropriate training.
4. To establish and maintain records and databases necessary for reporting accurately on the state of conservation of historic, as well as prehistoric, heritage in the property.
5. To provide the necessary staff capacity and capability for historic heritage conservation and management.

Actions

1. All archaeological monuments and other historic structures will be located and mapped.
2. The condition of said monuments and structures will be assessed and their priority for conservation intervention will be established.
3. Local communities will be consulted in order to ensure an appropriate approach to conservation and acceptable level of craftsmanship (Cleere 2015, Annex 5).
4. The Board will assist local communities to obtain the necessary funding for conservation and maintenance work, and will support training and skill development programmes for local craftsmen.
5. A central digital archive will be developed to record structures before and after conservation interventions.
6. Consideration will be given to establishing a museum, or similar storage and archival facility, to house, catalogue and preserve samples of original materials removed from structures at the time of restoration.
7. Training in cultural heritage management and conservation will be given priority in the staff training programme (discussed further in Part VII.5.2). Training will emphasise methods and technologies for protection, preservation, interventive and passive conservation, cataloguing, archiving, database development, condition surveying and monitoring.

Evaluation

1. Records of inventories and assessments.
2. Records of conservation and maintenance works undertaken.
3. Progress in database development.
4. Results of community consultations and community and staff training programmes.

VII.1.3. Hoa Lu Ancient Capital

Explanation

The Hoa Lu Ancient Capital has long been recognized by the Government of Vietnam as a national historic heritage site. It is famous as the first capital of the Vietnamese feudal nation through two dynasties, Dinh and Le, over a period of 42 years. Hoa Lu relinquished its role as the capital when in 1010 Ly Cong Uan ascended the throne, established the Ly Dynasty and moved the capital to Thang Long, now modern-day Ha Noi. Many historic sites and monuments are preserved here, such as royal palaces, temples, pagodas and shrines, along with the remnant walls of a rampart system that took advantage of the natural karst topography to enhance the Capital's defensive capabilities. Associated with these sites and structures are several traditional festivals, most of which are maintained and celebrated in memory of the heroes that created the country and died fighting to protect it.

There is a strong modern community presence in the vicinity of the Hoa Lu Ancient Capital. This area of the property is home to several thousand permanent residents, most of whom are involved in subsistence gardening and animal husbandry while some own small tourist businesses. The site is also among the most popular visitor destinations in the property, especially during the festival season.

Prior to 2012, the Hoa Lu Ancient Capital was separately managed by the Department of Culture, Sport and Tourism of Ninh Binh Province. In 2012 this management unit was placed under the control of the Management Board. There is an official master plan for the protection of the capital, the provisions of which are consistent with this management plan.

Most of the main historical sites and monuments in the property have long been under the custodianship of a caretaker, and they are preserved and used sustainably. To date there have been few problems with management of these historic sites and monuments, but as visitor numbers increase there will be a need to carefully monitor and manage issues such as physical damage and loss, littering, waste management and overcrowding. Attention must also be paid to the needs of preservation, protection and conservation of structures and fabric of the monuments (as discussed in Part VII.1.2 above), and to the importance of on-going research and documentation.

Objectives

1. To protect, manage and conserve the historic sites and monuments of the Hoa Lu Ancient Capital in a manner that is in-keeping with their national heritage designation and presentation to the global community within the Trang An World Heritage property.
2. To undertake any renovation or restoration in ways that retains the authenticity of the sites and monuments with respect to use, architectural style, structure and fabric.

3. To prioritise the use of historic sites and monuments for traditional worship ceremonies and festivals, while allowing regulated and monitored tourist access to avoid undesirable physical impacts and overcrowding.
4. To allow normal demographic growth and current visitor use, but monitor the trends in population, sustainable resource use activities, infrastructure development and tourist activities to avoid or mitigate any undesirable impacts.
5. To maintain traditional lifestyles, religious beliefs and livelihoods of the local residents.

Actions

1. Conservation of sites and historic structures will be conducted as outlined in Part VII.1.2 above, and archaeological and historical research with relation to these will also be continued.
2. Visitor regulations will be applied along with monitoring of visitor use, and intervention will occur to remove or minimise any discernible undesirable impacts.
3. Consultation and co-operation will be maintained with members of the local communities to encourage their involvement and support in conservation and management of the historic as well as prehistoric heritage of Trang An.
4. Educational, interpretive and promotional materials will be prepared to increase knowledge of the later periods of settlement and interaction with the property's landscape and to raise awareness of its historic heritage values.

Evaluation measures

1. Records of conservation works undertaken.
2. Results of visitor monitoring and recording of any incidents of impacts or illegal activities.
3. Record and results of local community consultations.
4. Number of interpretive materials prepared and record of any tangible results of the public awareness projects.

VII.2. Protection of natural heritage

VII.2.1. Scenery and aesthetics

Explanation

The scenic and aesthetic qualities of the Trang An Landscape Complex meet the standards of criterion (vii) under the World Heritage Convention. The property presents a spectacular topography and landscape, with towering karst mountains; natural forests and wetlands; clean and quietly flowing waters; a patchwork of rice paddies and gardens; temples, pagodas and other traditional religious edifices; small villages and roadways and canals. Some elements, including telecommunication towers, power lines and unsightly buildings interrupt the natural scenery and affect the aesthetic values. Actual and potential threats include noise and dust from neighbouring mining activities and cement production; movement of heavy vehicles on a main highway through the property; a host of small, often temporary, shops and stalls serving the tourist visitors; excess light from residences, shops and signs and unnatural lighting in caves; and short-term construction activities.

Licensed mining areas have been excluded from the property and buffer zone and the

Management Board is co-operating with the mining companies to put in place a series of safeguards to minimise impacts. The Board also has the support of the Provincial People's Committee to confine factory development to the buffer zone or beyond, and to restrict the scale of industrial activities in the vicinity of the property.

The highway that transects the property carries a considerable volume of traffic but amenity tree planting and landscaping of road margins has markedly reduced the visual and noise impacts. Attempts are being made to improve the standard and appearance of shops, hotels houses and parking areas along roadsides and at the major gateways. Communication towers and power lines are to be replaced, re-sited or removed. The old, unsafe and ecologically damaging cave lighting system will be completely replaced by a modern and sophisticated LED-based system.

Objectives

1. To maintain the outstanding scenic and aesthetic qualities and values of the property to World Heritage standards.
2. To remove any existing structures and reduce the impacts of any activities that harm the aesthetic and scenic values, and prevent any new harmful developments.

Actions

1. Undertake an inventory and assessment of elements considered to have detrimental impact on scenery and aesthetics, and take appropriate corrective action to minimise impacts.
2. Monitor new developments in the property and buffer zone that might impact on scenery or aesthetic appeal of the property.
3. Complete the installation of the new cave lighting system during 2016.
4. Work with the appropriate authorities to improve road construction, maintenance and vehicle use.
5. Work with appropriate companies to remove and/or relocate telecommunication and power infrastructure and services thus reducing their visual impact.
6. Continue to co-operate with mining companies to implement impact reduction measures.
7. Consider the option of relocating the main car park of Trang An boat wharf to the buffer zone and introducing an electric-powered vehicle transit system.

Evaluation measures

1. Records of inventories and assessments and use of corrective measures.
2. Results of consultation with mining companies and communication and power infrastructure providers.

VII.2.2. Geological features, landforms and resources

Explanation

The Trang An Landscape Complex property meets the standards of criterion (viii) under the World Heritage Convention, as a globally outstanding limestone tower-karst landscape at the final stages of geomorphic evolution in a humid tropical environment. Its classical landform features include 200m-high towers, depressions (polje), erosion notches and other marine

features on cliff walls revealing former stands of sea level, and a network of waterways including subterranean cave passages through mountain ranges connecting water-filled depressions.

As a rule, geological elements in the landscape are resilient and largely immune from human damage or loss, and the geological landscape of Trang An is essentially in its natural state. There has been extraction of limestone from some small quarries, particularly in residential areas, for stone crafts, local building and roading projects. Minor enlargement of some cave passages has occurred to allow for emergency evacuation of visitors at times of sudden flooding, and sediment has been sluiced from some passages where natural drainage has been impeded by modifications to the hydrological system outside the property. Fill from the sluicing operations has been used in landscaping. A few caves and rock shelters are used to for temporary storage of agricultural products after harvest. There has been minor damage to cave speleothems (i.e. calcium carbonate features such as stalactites and stalagmites).

Objectives

1. To protect the geological features and landforms of the property in their natural state.
2. To prohibit any activities that cause damage or loss, except where they are undertaken for approved management purposes such as residential and visitor safety.

Actions

1. Undertake regular monitoring to observe the condition of the geological elements in the landscape and report any unnatural or undesirable conditions.
2. Complete the closure and rehabilitation of all remaining rock quarries and not authorize any other quarries.
3. Inspect and regulate the use of caves and rock shelters by local residents to ensure it causes no damage.

Evaluation measures

1. Number of monitoring and inspection reports and their resulting records.
2. Number of quarry closures and rehabilitation projects.

VII.2.3. Waterways and water quality

Explanation

Surface water covers about 339 ha or some 5% of the total property. All water in the property is from rainfall, and the wetlands release water to groundwater reservoirs and river systems in surrounding areas. Currently, water in the wetlands of the inter-montane depressions is very clean due to the continuous flow, and to isolation from external water sources. There is some acidic stagnant water in a few areas where circulation is restricted.

The only significant potential sources of pollution are local villages and farms and from tourist activities. The greatest concerns are in the Hoa Lu Ancient Capital area, which is the largest concentration of inhabitants in the property. Most of the households here are subsistence farmers or conducting tourist services. Waste is mainly in the form of biodegradable organic

substances. Small quantities of herbicides and pesticides are used in farming, but this has had no discernible harmful effect on water quality to date. Use of toxic chemicals and artificial fertilisers is increasing, however, and is a cause for some concern. Virtually all tourist visitors are transported in small boats rowed by management staff who can monitor and control any polluting behaviours such as littering. Public toilets are a potential source of pollutants and require careful management. There is some use of petrol-driven motor boats by management staff for maintenance and emergency purposes.

Objectives

1. Protect waterways in the property in a natural state.
2. Remove or control any existing sources of pollution and prevent any developments that might potentially impact water quality.

Actions

1. Survey and monitor water quality on a regular basis throughout the property, report any polluting events, and take immediate preventive measures as required.
2. Provide advice to raise awareness of local residents about the laws and regulations on the use and treatment of water, and the ways of avoiding pollution.
3. Assist authorities to monitor the use of chemicals in farming practice and its effect on water quality.
4. Progressively replace public toilets with eco-friendly containment and discharge systems.
5. Control littering by visitors through education and the provision of waste containers.
6. Work with the local responsible authorities and agencies in matters of water quality monitoring and measurement, the reticulation and use of water, and the treatment of waste water and sewage.

Evaluation measures

1. Number of monitoring programmes and results.
2. Number of incidents of pollution or potentially harmful reduction in water quality.
3. Results of toilet replacement programme.

VII.2.4. Natural hazards

Explanation

Natural hazards to people and property are the high-magnitude, low-frequency events such as high-intensity storms, damaging winds, flooding, drought, rock fall and landslide, earthquake, and wildfires (addressed elsewhere in this plan). Such events cannot generally be avoided but they can be anticipated, and their effects can be predicted and reduced to avoid or reduce their impact on people's lives and livelihoods. Flooding and landslide/rock fall present the main problems in Trang An.

There is no risk of flooding from external rivers as the property is hydrologically isolated from them. The main flooding risk is from localized heavy rainfall during the rainy season (July-September) - but this is a rare occurrence and has little impact apart from restricting movement of people. A sudden rise in water levels in cave passages could potentially strand some tourist

boats, and requires the availability of evacuation measures. The tower landscape in Trang An is actively eroding and rock falls and landslides from mountain cliffs are of some concern for houses or other structures built at the base of cliffs or beneath over-hanging rock, and for trails, waterways and cave passages used regularly by visitors. Trang An is in an active fault zone and low-intensity earthquakes are reasonably common, and these could trigger rockfalls.

Objectives

1. To identify and minimise the risks from natural hazards to people and property.
2. To undertake remedial action and rescue as necessary should any damaging or destructive events occur.

Actions

1. In collaboration with the Department of Natural Resources and Environment, undertake a survey of the property to identify any existing or potential hazardous areas, such as flood-prone localities, cave passages and unstable slopes that might produce rock falls or landslides.
2. Avoid any known rock fall hazard localities in the siting of management and visitor facilities.
3. Consider the installation of pumps to allow draining of flood-prone areas at times of emergency.
4. Should a damaging or harmful event occur, take remedial action and rescue operations as necessary, and compile a record of them.
5. Encourage the removal of residential and commercial buildings from hazardous locations, and prevent any development in such areas.
6. Ensure the safety of all trails and erect warning signs for residents and visitors in known hazardous locations.
7. Establish a hazard warning system, and provide emergency equipment and supplies in strategic locations.

Evaluation measures

1. Completion of hazard inventory.
2. Records of reports on injuries or deaths, or damage to property from hazardous events.
3. Records of emergencies and responses.
4. Progress in installing the hazard warning system.

VII.2.5. Biodiversity - plants, animals & ecosystems

Explanation

For the most part, the plants, animals and ecosystems of Trang An remain in a natural, though not original, state. The property occupies a limestone massif, relatively isolated from the surrounding countryside and is unsuitable for permanent settlement on account of the rugged terrain. Residential areas are small and confined to the margins of the massif. The great majority of the property is uninhabited. A significant proportion of the property is set aside for protection within the Hoa Lu Special-Use Forest, a multiple-use area dedicated primarily to nature conservation. For management purposes, a large part of the property is zoned for strict

protection of the natural state. The biological diversity, which includes some endemics and other important species and communities, has been described in detail in Part IV of this plan.

The natural forest cover has been subject to some minor modification in the past through fires, timber extraction, grazing by feral animals, and subsistence hunting and plant gathering. Construction for residential and tourism development has had localized impacts, as had roading, but these are strictly limited and regulated today. Tourism, in particular, has very little impact on the natural values of the property as visitors are carried by small non-motorized boats accompanied by guides, and there are only a few walking trails. Tourist infrastructure is localized and low-key. There are no problems with littering or waste production. Some cave ecosystems have been affected by minor lampenflora growth due to installation of lights.

Objectives

1. To protect the flora, fauna and ecosystems of the property in a natural state consistent with World Heritage standards.
2. To prevent or control any elements or activities having detrimental impact on the natural values and attributes of the property.

Actions

1. Strictly apply protection laws, regulations and management provisions.
2. Prohibit and penalise as appropriate any illegal acts, such as large-scale hunting or timber extraction, or other activities that cause damage or loss.
3. Minimise undesirable impacts of weeds, pests and feral animals through regular monitoring and remedial management intervention where necessary.
4. Monitor and carefully control impacts on water bodies from runoff of toxic chemicals used in gardening and farming, or wastes from residential areas.
5. Replace the existing cave lighting with a modern system to minimise the growth of lampenflora (Annex 6).
6. Rehabilitate as far as possible and within the limits of available resources any damage or harm to natural plant communities, animals and their habitats.
7. Raise the awareness of local residents and tourists about the need for biological protection through signs and other interpretation materials.

Evaluation measures

1. Record of illegal and damaging events and activities, and of penalties.
2. Results of monitoring.
3. Records from management intervention projects.
4. Completion of installation of the new cave lighting system.

VII.2.6. Introduced weeds, pests and feral animals

Explanation

According to published surveys and research, the most common foreign biota in the vicinity of Trang An are the Mara tree, yellow snail and red-eared turtle:

- The Mara tree (Ox Mara, Mai Duong, *Mimosa pigra* L.) produces seeds that are distributed by water. They propagate and establish quickly and are almost impossible to eradicate.
- Yellow Snail (*Pomacea canaliculata*) originated from Central and South America and were introduced to Vietnam in 1985-1988. They have become one of the most harmful agriculture pests in the country.
- Red-eared turtle (red-eared slider or red-eared terrapin, *Trachemy scripta elegans*) appeared in Vietnam about a decade ago. It is a voracious omnivore that proliferates rapidly and seriously depletes other aquatic biota.

Yellow snails have been seen in Trang An but have not reached problem levels. The other two alien species are not known to be in the property, probably on account of the hydrological isolation of the Trang An water bodies.

Small herds of semi-wild buffalo and goats are the only feral animals in the property. Buffalo are released to graze in harvested rice paddies and on riverbanks. They are of no concern to the natural vegetation. Goats roam freely on lower slopes of mountains, eating a wide range of plants. Fortunately, they are few in number and localized in distribution, so are not considered to be a problem, but this situation needs careful monitoring.

Objectives

1. To protect the property from the introduction of alien pest species of biota.
2. To eradicate and/or control any pest species that becomes established in the property.
3. To prevent any harmful impacts from feral farm animals on natural vegetation.

Actions

1. Conduct periodic surveys to identify any introduction of undesirable or problem species, and count numbers of feral animals, record their distribution and assess their impacts.
2. Immediately implement control/eradication programmes if introductions occur, and conduct culling operations if problems arise with feral animals.
3. Control the spread of the yellow snail through periodic campaigns to collect snails and eggs in areas of highest infestation.
4. Provide information and advice about pests to the local community and to tourists, and encourage them to prevent introductions and report any they see.
5. Conduct occasional campaigns to advise local farmers of the potential problems, and encourage them to improve their animal husbandry practices.

Evaluation measures

1. Results of surveys and records of new introductions.
2. Measurement of the number and frequency of use of control measures, and their effectiveness for improving vegetation and ecosystem condition.
3. Evidence of co-operation from local farmers.

VII.2.7. Fire management

Explanation

Fire is dangerous and can have a catastrophic impact on communities and on protected areas. Fire precautions, therefore, are a mandatory requirement in plans for development, management and protection of natural and cultural heritage. Major fires, both wild fires and human-induced fires, are unprecedented in Trang An forests but could potentially occur in the dry season. Accidental fires could also occur at resorts, in shrines and temples where fires are often lit in worship ceremonies, in tourist service areas (car parks and restaurants) and in heavily populated residential areas such as Hoa Lu.

Objectives

To suppress wild fires, prevent accidental fires and minimize the losses to property and human life from fires.

Actions

1. Allow wild fires to burn provided they do not present a threat to human life, buildings or services infrastructure.
2. Conduct campaigns to raise public awareness about fire and its consequences.
3. Strictly adhere to legal requirements regarding fires. With assistance from the appropriate authorities, develop and adopt specific regulations on fire safety, and promulgate them to residents, and hotel and resort owners.
4. Provide and maintain fire fighting equipment at strategic locations throughout the property, especially in high-use tourist areas.
5. Periodically conduct exercises in fire prevention, fire protection and evacuation of people, especially in highly vulnerable areas such as the forests, temples, shrines, restaurants and hotels.

Evaluation measures

1. Number of public awareness campaigns and exercises held.
2. Inventories of fire equipment provision and maintenance schedules.
3. Records of wild and accidental fire occurrence.

VII.2.8. Environmental impact assessment, rehabilitation and restoration

Explanation

According to the Law on Environment Protection, projects on conservation and development at all scales must have an environmental impact assessment. Small-scale projects must commit to protecting the environment, while large-scale ones must be examined with respect to requirement on environmental rehabilitation, among other things. They must then be consulted with local communities, ratified and deposited with the authorities. Projects at a macroscopic or strategic scale of the country or region must conduct strategic environmental impact assessments. For instance, the master plan on construction in the World Cultural and Natural Heritage property of the Trang An Landscape Complex and its vicinity (prepared and submitted by the Ministry of Construction and approved by the Prime Minister) must be accompanied by an environmental impact assessment. That master plan, itself, must be placed within the master plan on socio-economic development of Ninh Binh Province. Therefore, specific investment projects on conservation and development in Trang An listed in the master

plans will be evaluated on their environmental impacts, or must be committed to protecting the environment, before being implemented.

Objectives

1. To require that all investment projects for construction, embellishment, restoration, conservation and promotion in the property comply with the legal requirements for environmental impact assessment.
2. To ensure that all stakeholders in the property, including local resident, are fully aware of the need to obey environmental laws and impact assessment requirements.

Actions

1. Examine all relevant projects for their compliance with environmental impact assessment requirements, and prohibit any that fail.
2. Incorporate the requirements for environmental impact assessment of projects into community awareness-raising programmes.
3. Conduct inspections to ensure compliance, and prosecute offenders.

Evaluation measures

1. Monitoring and inspection records.
2. Records of approved/non-approved projects, and of penalties and prosecutions.

VII.2.9. Climate change impacts - existing and potential

Explanation

Climate change is a very topical subject in Vietnam, frequently mentioned in the mass media. The country is deploying a National Target Program on a comprehensive response to climate change, the common objective of which is to raise a full and widespread appreciation of the issues, and to introduce and encourage the application of comprehensive response measures, including adaptation and reduction. Ninh Binh Province in general and Trang An in particular are among the targets of this programme.

Although this concept of changing global climate is fairly abstract and still much disputed, it is generally understood that humans, ecological systems and habitats are encountering atmospheric warming, rising sea level, more extreme climatic events like rains, storms, floods, heat waves, droughts, and vice versa, and unusual cold humid weather occurring more frequently and intensively. These phenomena, including the implications for an increase in natural disasters, need to be taken into account in the management of the Trang An property.

The manifestation of climate change is forecast to be worse if humankind does not take immediate remedial action. Some solutions are being strongly encouraged world-wide, but whether they are all appropriate to Vietnam, or to Trang An, is a matter for careful consideration - for example, the measures to reduce the greenhouse gases. National and global strategies may not necessarily apply locally. Moreover, as a natural “island” in a “sea” of developed land, Trang An has much to contribute to ameliorating the effects of climate change - such as the absorption of CO² by an expanse of forest vegetation. Trang An can, thus, be

something of a model in strategies to reduce greenhouse gases.

Objectives

1. To ensure that Trang An takes a full, active and responsible part in the National Target Program in a response to climate change.
2. To reduce, and/or adapt to, any significant manifestation of climate change in the property.

Actions

1. Recognise and adopt government and local authority guidelines and policies on climate change reduction and adaptation, and promote these to the local community as appropriate. Make the Trang An contribution to climate change programmes more widely known.
2. Intervene as appropriate in the event of any obvious climatic change impacts in the property.
3. Forbid any activities contributing to climate change in the property.
4. Contribute appropriately to the UNESCO World Heritage programme on climate change.

Evaluation measures

1. Results of monitoring and recording of extreme and unusual weather events or other ecosystem conditions in the property that might be the result of changing climate.
2. Record of contributions to the National Target Programme and to the UNESCO World Heritage programme on climate change.

VII.3. Management of human uses and activities (tourism management plan)

Scope

Within this management plan, the tourism plan consists of provisions relating to management of human uses and activities under the headings eco-tourism (VII.3.1); recreation (VII.3.2), privately owned accommodation (VII.3.3) and cultural/religious tourism (VII.3.4). These are complemented by provisions for visitor centres VII.4.1), interpretation, (VII.4.2) and visitor safety (VII.4.4), within the context of facilities and services. Aspects of the provisions for research, staff capacity and training, and public-private partnerships are also relevant to tourism management. In combination, these provisions create a very comprehensive tourism management plan for the property.

Terminology

- Eco-tourism includes nature-based visitor activities, involving appreciation and enjoyment of the natural environment. In Trang the main activity is sight-seeing (from row boats) and bird-watching, with associated photography/sketching/painting.
- Cultural/religious tourism is focused on visitor appreciation of cultural values and features, and worship and festival celebration by pilgrims. These activities are centred on palaces, temples, pagodas and shrines and often occur annually at prescribed times.
- Recreation includes low-impact leisure activities, which in the property are currently limited to walking and cycling.

- Overcrowding refers to the concentration of large numbers of visitors, at a particular locality or time, which may exceed the management capacity of staff and infrastructure, and/or the environmental and social carrying capacity, thereby causing undesirable environmental or social impact.
- Environmental carrying capacity refers to the maximum number of visitors that can be accommodated without causing unacceptable change or physical damage to natural elements of air, water, rock, soil and vegetation, or disturbance and behavioural impact on animals and birds.
- Social carrying capacity refers to the maximum number of visitors that can be accommodated without individuals impacting on other visitors and diminishing their expectations, enjoyment and degree of satisfaction.

Note: Experts agree that, because tourism carrying capacity depends on so many variables, there are no standard values that apply and it is notoriously difficult to quantify. Often it is judgement call based on the experience of managing visitors and their activities at a particular locality over a long period.

VII.3.1. Eco-tourism

Explanation

Trang An, along with the Bai Dinh pagoda in the buffer zone, is the most popular tourist destination in Ninh Binh Province. Most tourists are from within Vietnam while increasing numbers of people are drawn from the South and East Asia region and elsewhere. Currently, approximately one million tourists visit Trang An each year, but the number of visitors is growing steadily and is anticipated to reach two million/year by 2020. Large numbers of visitors can exceed the capacity of management staff and infrastructure or result in overcrowding and cause environmental damage or have social impacts.

In large measure, tourist use in Trang An is eco-tourism, i.e. nature-based tourism focused on appreciation and enjoyment of the natural world. Particular features of tourist use of Trang An include:

- a short (3-month) peak visitor season with relatively few visitors at other times;
- virtually all access is by row boat so visits are mostly confined to waterways serviced by five boat wharves;
- local guides (row boat operators) accompany the majority of visits,
- day-time visits predominate with limited facilities available for overnight stays; and
- the focus is on passive activities such as sight-seeing, walking, cycling, religious celebration and cultural appreciation.

These characteristics, however, can have a varied influence in terms of pressures and impacts. Concentration of visitors in time and in space can lead to overcrowding and put strains on facilities, while long periods of low visitation, and the predominance of short-term daytime visits for passive nature-based activities can be beneficial in managing even large numbers of people without detrimental impact. Vigilance and careful management intervention are required to ensure that tourists enjoy their visit to Trang An while their numbers and activities are maintained within the limits of management facilities and the environmental and social

carrying capacity of the property.

Given the very uneven numbers of people visiting the park during the year, it is important that priority for management intervention be directed at the peak visitor season when facilities will be under greatest pressure and overcrowding is more likely to occur. Currently, there are approximately one million visitors annually, with some 70% arriving in the 3-month peak season (when regular visitors are joined by large numbers of pilgrims celebrating festivals) and 30% on the low season. Existing visitor numbers do not create any serious problems for facilities or overcrowding impacts, apart from the few main festival days when queues may occur for toilets and boats, and the number of tickets issued may have to be restricted. From current experience, total visitor numbers are expected to rise to two million per annum by 2020, which would mean that 1.4 million could arrive in the peak season. How can this number of people be accommodated and managed during the peak season without exceeding the carrying capacity of the property? And what is the optimum number of boats required?

Currently there are about 700,000 visitors during the 90-day peak period, or on average almost 8,000 per day, though in practice there is a considerable range in daily numbers. This requires the equivalent of 2,000 four-person boats to provide each visitor with a boat trip. Thus, the existing 2,600 boats are sufficient to cope with average visitor days, while on very busy days some boats make two trips to cope with the higher demand. By 2020 there could be 1.4 million visitors in the same 90 day period, or about 15,500 per day on average. For single boat trips this would require about 3,800 boats. However, fewer boats would be required if boats take two trips daily.

Clearly, it would be prudent management to increase the number of boats operating in the property. From current experience, it is estimated that 3,000 boats would be the optimum requirement to cope with the expected increase in peak visitor use by the year 2020. Assuming two trips per boat, this would provide for up to 6,000 boat trips per day, allowing the transport of about 25,000 visitors on the very busiest festival days of the year. From experience to date, the Board is confident that it can provide the necessary staff and facilities to manage this level of visitation, while at the same time avoiding any undesirable harmful environmental and social impacts from overcrowding. The Management Board has, therefore, determined that during the 5-year lifetime of this management plan, no more than 3,000 boats will be made available. The situation will be monitored continually and adjustments will be made to meet any unforeseen problems and impacts.

While giving priority to carefully regulating tourist use of the property, the Board will also work with the provincial tourism authorities and operators to ease the pressure on the Trang An by promoting other surrounding visitor attractions, such as the Van Long Nature Reserve, Cuc Phuong National Park, Red River Plain Biosphere Reserve and Phat Diem stone church.

Objectives

1. To fully observe the provisions and requirements of applicable national and provincial tourism laws, regulations, strategies and plans.
2. To welcome tourist visitors to Trang An, provide them with access to cultural and natural features and ensure that their experience is enjoyable, informative and safe.
3. To provide the necessary facilities and services required to satisfy the needs of visitors and optimise the benefit they derive from the visit.
4. To ensure that tourist operations and visitor behaviour are compatible with the primary

requirement to prevent harmful impacts on the cultural and natural values and attributes of the property.

Actions

1. Limit the number of boats licensed to operate at each wharf of the major gateways, and during the next five-year period place a cap on the total number of authorised boats at 3,000.
2. Count visitor numbers on a daily basis throughout the year at the major gateways and regularly monitor popular tourist routes and destinations at peak visitor times to check for overcrowded conditions.
3. Conduct surveys of the natural environment and of visitor satisfaction during the peak visitor season to identify any impacts.
4. Impose controls, such as limits on boat operations and sale of tickets, if there is any evidence that visitor numbers are exceeding the desired conditions and carrying capacity.
5. Establish standards of respect for cultural and natural features, codes of conduct and penalties for violations, and make all visitors aware of these through documents, signs and verbal means.
6. Undertake patrols by rangers especially during peak visitor periods, to ensure maintenance of standards and compliance with rules for protection of cultural and natural features, and to report any violations, which will be penalised.
7. Require boat operators to encourage necessary standards of behaviour among visitors and report any unacceptable conduct.
8. Rigorously adopt visitor safety standards (see Sect.VII.4.4.) at all times.
9. Place limits on development of visitor facilities infrastructure, all allow any new developments only after careful consideration of the need and full assessment of environmental and social consequences.
10. Require owners of private retail facilities such as shops, cafes, restaurants and souvenir and handicraft stalls to meet acceptable building codes, and observe high standards of cleanliness and hygiene.
11. Collaborate with authorities and operators to promote a regional tourism strategy that eases the visitor pressure on the property.

Evaluation measures

1. Results of environmental and social surveys.
2. Records from impact monitoring and assessment of damage to cultural and natural features,
3. Records of the incidence of overcrowding, and subsequent imposition of controls on numbers and operations.
4. Records of violations and penalties for improper or illegal activities by visitors and operators.

VII.3.2. Recreation

Explanation

Currently, there is relatively little recreational use of the Trang An property and only a limited range of facilities is provided. Interest in recreational activities, such as walking, hiking and cycling, is slowly and steadily increasing, however. There are a few paved walking trails for

visitor use. Cycling trails, which in part use the rural roads in the property, are of limited length. There are no dedicated hiking trails. Existing trails have limited facilities such as toilets, waste containers, information signs and shelters. There is no demand for adventure sports, such as climbing, kayaking and para-gliding, and these are considered to be inappropriate activities in the property.

Objectives

1. To encourage appropriate recreational activities and to provide sufficient facilities and services to meet the demand.
2. To ensure that all recreational activities observe the principal requirement to protect the cultural and natural values of the property.

Actions

1. Carefully monitor existing recreational activities to ensure compliance with protection requirements.
2. Provide essential facilities such as toilets and shelters, and services such as rubbish collection, to meet the demand.
3. Ensure that recreational uses do not have a detrimental impact on the primary cultural and natural values of the property, and do not infringe upon the activities of other legitimate visitors.
4. Refuse to authorise those recreational uses or activities considered to be contrary to the values and protection objectives of the property.

Evaluation measures

1. Results of compliance monitoring.
2. Number of reports of harm to cultural and natural values, or of disturbance to other visitors.

VII.3.3. Privately owned accommodation facilities

Explanation

Most tourist use of the property involves day visits and there are few facilities for overnight accommodation. Some privately owned and operated accommodation exists including resorts, guest houses and home/farm-stays. In total, these can accommodate up to approximately 500 overnight guests

There are four private eco-tourist resorts in the property:

1. Thien Ha and But Cave resort, operated by the Ngoi Sao Company;
2. Thach Bich-Thung Nang resort, operated by the Bich Dong Travel Service;
3. Thung Nham resort, operated by the Doanh Sinh Company; and
4. Ninh Binh Tourism Village, operated by the Anh Nguyen Company.

These are small resorts, each providing no more than 50 guest rooms, primarily devoted to bird watching and related nature-based interests and activities. Most are accessed by water but there are some short roads. Private resorts are operated under a licence to the Management Board,

which requires strict observance of prescribed conditions and adherence to laws or regulations imposed by State agencies. Any building work, repair or reconstruction must be appraised to ensure it has no detrimental effects, approved by the Management Board and carried out in full accordance with relevant laws, regulations and plans, including the Trang An Master Plan. No further resort development is envisaged within the property.

The Management Board provides one small guest house with an associated workroom for scientists, while individual families operate guest houses and home and farm stays. These are few in number and mainly located within the villages. There are a few guest houses for VIP accommodation at temples and pagodas. Private guest houses are subject to health/hygiene conditions, and to building codes that impose height restrictions, among others.

Objectives

1. To limit the supply of overnight tourist accommodation in private resorts, guest houses and family homes to existing levels.
2. To provide accommodation and associated work rooms for scientists conducting approved research projects, and for Management Board and other authorised staff undertaking management related activities.
3. To regulate private resorts and other accommodation facilities in accordance with relevant laws and plans including the property master plan and management plan.
4. To require any new building, repair, reconstruction or change of use to be subject to appraisal and impact assessment, and be approved by the Management Board.

Actions

1. Issue all private resort owners with operational licences that require strict observance of observance of all laws, regulations and plans applying to them.
2. Monitor and inspect compliance with relevant laws, regulations and plans, penalise offences and prosecute illegal actions or activities.
3. Assess new building structures and architecture, and major repairs, restoration, alteration or change of use for their cultural or environmental impact and harmful effects. Exercise approval rights of the Management Board and of other relevant State agencies.

Evaluation measures

1. Monitoring and inspection records.
2. Records of penalties and prosecutions.

VII.3.4. Cultural and religious tourism and festivals

Explanation

Visits for cultural appreciation and religious festivals are among the most prominent activities in the property. They have provided indispensable spiritual food for people, not just from the local community but from all over Vietnam and elsewhere, for many generations. Such activities also celebrate the political and social history of the country and they are a major contributor to preservation of intangible cultural heritage, such as traditional song, dance, drama, ceremonies and clothing. They focus on the many historically significant royal palaces,

temples and pagodas. The main annual traditional festivals are the Tran Temple festival, Thai Vi Temple festival, and the Dinh King and Le King festivals, while there are several others. Every year thousands of pilgrims also visit the modern Bai Dinh pagoda complex in the buffer zone - recognised as the largest spiritual Buddhism Complex in Southeast Asia. The major cultural and religious festivals and activities are all traditional and fundamentally healthy, but there are a few others based on superstition that should be questioned. Despite minor overcrowding on a few days during some festival events, overall the management of festivals at the current scale is under control and not a cause for concern. Some limits may be required in future. The number of visitors to the Hoa Lu Ancient Capital is not expected to increase significantly in future, as the new Bai Dinh Pagoda in the buffer zone has become the principal focus of cultural and religious tourism in the region.

Objectives

1. To encourage and support cultural visits, and the holding of recognized traditional festivals and related activities in the property.
2. To monitor the numbers of participants and any social impact issues such as overcrowding, and introduce controls if necessary.

Actions

1. Co-operate with festival organizers and provide the necessary infrastructure and services.
2. Keep festivals under continual surveillance to observe any undesirable social or physical impacts, and control any problems that may arise.

Evaluation measures

1. Record of the number of festival events, including number of participants.
2. Record of any impacts.

VII.3.5. Sustainable development of society and resources

Explanation

This section of the plan deals with subsistence agriculture and farming, fishing and the use of timber and plants, and their contribution to sustainable social and economic development of the local people. For many generations most of the residents of the property have made their livelihood through subsistence agriculture (rice growing and gardening mainly), and fishing. Only a few people take part in gathering forest products, such as firewood and medicinal plants. Increasing opportunities for employment and cash income resulting from progressive development of the province and the Trang An property have reduced the reliance on subsistence living and substantially increased the living standards of residents. Within the property, local people are involved in boat rowing, visitor guiding, maintenance works, security and surveillance, and providing tourism services such as accommodation houses, restaurants and shops. Subsistence uses of resources contribute significantly to the sustainable development of the local communities, and are consistent with the principles of sustainable development adopted under the World Heritage Convention. At their present scale, they present no problems for management or threats to the natural and cultural values of the property. In fact, paddy rice cultivation is considered to contribute significantly to conservation

of soil and water resources. However, management is alert to the problems and impacts that might arise from expansion of these activities or changes in technology and practice, and will introduce controls if required. Increasing use of artificial fertilisers, pesticides and herbicides in farming practice, for example, is of some concern. There is also a need to consider the social consequences for families where the women, in particular, are drawn from the home and fields by work in the property.

Objectives

1. To allow continuation of traditional subsistence uses of natural resources at present scales and levels of activity, and recognize their contribution to sustainable social and economic development.
2. To ensure that subsistence use of resources has no immediate or incremental undesirable effect on the cultural and natural heritage of the property.
3. To monitor activities on a continuing basis and introduce controls if the need arises.
4. To offer employment opportunities as a substitute or supplement to these resource uses, while being conscious of the consequences for traditional family life and livelihoods.

Actions

1. Keep subsistence farming, fishing and plant uses by local people under continuing surveillance; carefully monitor the use of toxic chemicals in agriculture.
2. Assess the need for limits on plant gathering; consider controls and penalties for illegal activities if necessary.
3. Raise the awareness of residents about the primary importance of protecting the natural values of the property, and engage them in management roles and activities.

Evaluation measures

1. Results of monitoring.
2. Results of assessment of plant gathering activities.
3. Records of penalties and prosecutions for any illegal activities.

VII.3.6. Villages and other residential areas

Explanation

Approximately 14,000 people reside in the property, largely in Hoa Lu Ancient Capital and occupying some small villages on the eastern, southern and north-western margins, accounting for a total residential area of about 220 ha or 3.5% of the property. For the purposes of management, this residential zone also includes roads transecting the property and internal rural roads and canals. Land use and development here include private residences, farm buildings, small hotels and guest houses, shops and other small businesses. Transport infrastructure and services such as embankments, bridges, tunnels, amenity and landscape plantings and parking lots are evident here also.

With the recognition of Trang An as a World Heritage site, the overall long-term plan is to control population numbers, allow only natural demographic growth, minimise migration into the property, and encourage the re-settlement of people outside the property. Accordingly, in

the long-term, it is anticipated that the number of inhabitants in the property will remain stable or increase slightly and slowly. Also, all construction of houses, roads, and bridges, and the drainage, communication and power reticulation networks will be subject to the provisions of the master plan for the property prepared by the Ministry of Construction and approved by the Prime Minister. This plan, in conjunction with the property management plan, will promote conservation and development of the residential areas in ways that contribute to socio-economic development of the province, while recognising the priority of protecting the World Heritage values of the property.

Objectives

1. To permit the retention of existing residences and associated infrastructure but avoid any unwarranted or unauthorised expansion.
2. To monitor residential uses to ensure compliance with laws, regulations and policies and to penalise any violations or illegal activities.
3. To continue to assess the situation of some residents or communities and consider their possible relocation outside the property.
4. To minimise the number of roads in the area and avoid any detrimental impact from road construction and maintenance.

Actions

1. Carefully assess any application for new residential construction and decline those adjudged to be unwarranted or inappropriate.
2. Monitor and assess existing residences to ensure compliance with appropriate standards and conditions, such as height and use restrictions.
3. Continue to explore opportunities for relocation of residents outside the property.
4. Allow further construction of transport infrastructure for safety and operational considerations only, but otherwise prohibit them.

Evaluation measures

1. Results of construction applications.
2. Numbers of unauthorised developments and activities, and numbers of prosecutions.
3. Census of population and records of the numbers of re-settled residents.

VII.3.7. Extractive industries

Explanation

This section considers mining, cement production and stone crafts. Prior to being inscribed on the World Heritage List, a site at the southern sector of the Trang An limestone massif was planned to serve the cement industry and small-scale stone-working home crafts. During compilation of the dossier, and as a result of intensive discussion, the licensed area for the cement industry was excluded from the buffer zone of the property. Also, an alternative more distant quarrying site for stoneworkers was found in Ninh Thang commune to allow closure of some small quarries in the buffer zone. These changes have allowed a minor extension of the property boundary (see Part VI.2.1 above), thus increasing protection for a larger area of the massif and providing local residents with more opportunities to benefit from tourist activities.

Meanwhile, limestone quarrying and cement production operations are required to comply with remedial measures, such as dust and noise reduction, drainage controls, safe operation of heavy vehicles and quarry rehabilitation, as ratified in the exploitation plan, including reporting on environmental impact assessment to the Government and People's Committee of Ninh Binh Province. The Trang An landscape Complex Management Board is authorised to monitor the industrial activity and to supervise the remedial measures, which are intended to minimise threats and harmful impacts on the OUV of the property.

Objectives

1. To ensure that limestone quarrying for cement production has minimal impact on the World Heritage values of the property.
2. To undertake monitoring and supervision of legally prescribed impact reduction measures, as prescribed in the exploitation plan.
3. To co-operate with the cement companies in seeking further ways of reducing the threats and impacts to the property from their operations.

Actions

1. Maintain a monitoring regime over the regulatory measures that apply to quarrying, and cement production, and report any breaches in observance of the regulations to the relevant authorities.
2. Remedy any evidence of undesirable impacts as expeditiously as possible.
3. Arrange regular discussions between the Board and the cement companies to promote the values of the property, to encourage their co-operation in observing the regulations and requirements in respect of environmental impact, and to investigate further ways of reducing the threats to the property.

Evaluation measures

1. Records and results of the monitoring regime.
2. Record of non-compliance with regulations and prosecutions.

VII.3.8. Commercial forestry and timber production

Explanation

There are no commercial forestry operations in the property, with the exception of some very small-scale operations in a few dry valleys on the western margins, which are intended to be closed as soon as possible. Some commercial timber production occurs at a locality beyond the western buffer zone but it presents no threat to the property. The limestone massif is not favourable for timber production because the rugged terrain is unsuited to planting and harvesting and for the movement of heavy vehicles. Nor is there an economically significant volume of timber trees in the property. Most of the flat land in the property is devoted to rice production, which is a protected land use. Moreover, a large area of the property is protected within the Hoa Lu Special Use Forest where logging and other industrial forest-product exploitation are forbidden.

Objective

To prohibit any commercial forestry in the property, and to arrange for the closure of the existing small-scale operations.

Actions

1. Hold discussions as soon as possible with key stakeholders to propose the Ninh Binh People's Committee to arrange for the closure of the existing timber production operations.
2. Refuse any applications for commercial timber production, and prosecute any illegal operations.

Evaluation measures

1. Closure of the existing forestry operations.
2. Records of applications and prosecutions.

VII.4. Infrastructure, facilities and services for visitors and residents

VII.4.1. Visitor centres

Explanation

There are five main gateways providing visitors with access to the property - Hoa Lu, Trang An wharf, Tam Coc wharf, Bich Dong/Sunshine Valley wharf, and Galaxy Grotto wharf. Each of these has car/bus parking facilities, toilets, ticket office and (except Hoa Lu) a boat wharf. At the gateway entrance to the Trang An Scenic Area there is a substantial visitor centre, comprising a ticket office, boat wharf, large community hall with display area, VIP reception rooms, a staff office, restaurant, toilets and souvenir stalls. This visitor centre was recently constructed and the main buildings are in a traditional architectural style. A large car/bus parking area is situated nearby, which also contains a range of shops and souvenir and handicraft stalls. Its location across a main highway from the entrance presents some management problems and safety concerns. Information signs are provided and the surrounding areas are sympathetically landscaped with trees and shrubs.

The Management Board regards visitor centres as a vital component of the infrastructure available for visitors. Visitor centres are considered to be important in providing visitors with a friendly welcome, an orderly arrival and a favourable first impression of the property. They also give management the opportunity to present key information about the property and its values, to stress the needs for protection, to give instruction about expected standards of behaviour, and to enhance the overall visitor experience.

The lack of visitor centres at main gateways other than at Trang An Scenic Area is acknowledged as a significant gap in the provision of visitor facilities in the property, and their establishment, with support from concessionaires and tourism operators, is under consideration by the Management Board. Though they are intended to be modest in size and scope, any newly constructed centres will be designed and oriented appropriately according to the opportunities available for visitors to experience the particular natural and cultural features of the locality. Apart from the absence of visitor centres, the Board also recognises that there are

some deficiencies in the facilities currently provided. The static display area at the Trang An Centre, for example, is rudimentary and outdated, and the Board will give priority to replacing it with a modern, high-quality facility, and will consider adding a small museum. Similar display and interpretation facilities will be incorporated into the other planned new visitor centres. Some residential and commercial areas and facilities at gateways are not of sufficient standard and the Board will work with owners and operators to improve them.

Objectives

1. To provide, modern, well designed, adequately equipped and efficiently operated visitor centres of high technical and professional standard at the main gateway to the property.
2. To improve the existing visitor centre at the entrance to the Trang An Scenic Area, especially through the addition of a modern and effective display area, possibly with an associate museum.

Actions

1. When resources allow, improve the visitor centre at the Trang An Scenic Area by replacing the display area with new interpretation and education facilities, and possibly a small museum. Give consideration to shifting the existing car/bus park to a more convenient and safer location in the buffer zone.
2. Plan for the establishment of visitor centres at the other four main gateways to the property, in consultation with owners and operators of tourist facilities.
3. Operate the visitor centres either under direction of the Board, or through licence agreements or concessions monitored and supervised by the Board.
4. Encourage, and support where possible, private land and business owners and operators to upgrade residences, businesses and facilities in the vicinity of the visitor centres.

Evaluation measures

1. A record of progress in establishing and improving the visitor centres.
2. Records from monitoring the use and operation of visitor centres.
3. Feedback from visitor experiences.

VII.4.2. Education and interpretation

Explanation

There is much to teach and learn about Trang An. It has global recognition for its outstanding cultural and natural values and attributes that demonstrate special interrelationships between pre-historic people and their changing environment over a period of more than 30,000 years. It also retains significant hallmarks of the political and religious history of the independent nation of Viet Nam. Additionally, Trang An is located in close proximity to the nation's capital of Hanoi in the centre of North Vietnam, and there are several beauty spots, historic relics and cultural heritage sites in the surrounding area (such as Cuc Phuong National Park, Van Long wetland natural reserve, World Biosphere Reserve of the Red River plain and Phat Diem stone church). Trang An is, therefore, strategically located and well equipped as an important educational centre and study site for schools and higher education institutes.

Interpretation is considered to be a very important adjunct to visitor management in the property for raising awareness and respect for the property and its outstanding cultural and natural values and attributes. The Board intends to develop and progressively implement a comprehensive interpretation plan, which will contain a series of appropriate themes, use a wide range of media and presentation methods, establish appropriate facilities and provide effective resources and services. The principal aims of the plan will be to orient visitors to the property, influence their behaviour and enhance their experience through providing new information and knowledge in stimulating and enjoyable ways. Much of the plan will focus on facilities and services at visitor centres - displays, museums, audio-visual facilities etc. A second focus will be on signage and information panels which visitors will encounter while in the property. Personal interpretation services are already provided through the boat rowers who also act as guides, and these may be expanded through the introduction of guided (or self-guided) culture and nature walks.

Objectives

1. To promote Trang An as an important site for education and encourage educational institutions to use it for studies.
2. To develop and implement a comprehensive interpretation plan for the property.

Actions

1. Welcome the use of the property for educational purposes and activities, and allow them to occur subject to normal protection requirements.
2. Promote the educational use of Trang An with relevant education authorities and institutions, especially for studies in the subjects of pre-history, history, culture, religion, natural landscapes, geology, geomorphology and heritage conservation. Encourage the education authorities to include Trang An in school curricula.
3. Progressively develop and implement the property interpretation plan.
4. Enhance staff capacity and capability in educational studies and interpretation through training and skill development, and supplement these with appropriate resources.

Evaluation measures

1. Number of requests for educational visits and uses.
2. Results and feed-back from consultation with education authorities and institutions.
3. Measurement of increased staffing and capability in education and interpretation.

VII.4.3. Promotion and marketing

Explanation

Promotion and marketing are important tools for the Management Board in protecting the property, in raising awareness, support and funding from the general public, and from the commercial and business sectors in particular. The Board intends to run active promotional campaigns through the full range of media available - print, photographic, film, electronic, voice etc. The property already has its own web site and the use of internet social media sites will be considered. Other promotional devices will include labeled clothing (hats, T-shirts etc.), badges, banners, flags and posters. Promotional publications - books, pamphlets, brochures,

post cards, maps and photos - will be produced. Special awareness campaigns and competitions, targeted at students and youth in particular, will be held. Sponsorship arrangements will be sought with major companies such as Vietnam Airlines. The official World Heritage emblem will be used for identifying and promoting the property, in accordance with principles and rules of the Operational Guidelines.

The Board also recognizes the value of providing access to the property for commercial photographers and film makers. Commercially produced documentaries, for example, can make a significant contribution to awareness raising and promotion, while film projects could have positive spin-off for local community through their involvement and the provision of goods and services.

Marketing will target the tourism sector in particular, through collaboration with tourist agencies and authorities and through briefings and co-operation with tourism operators.

Objectives

1. To raise awareness of the status, significance and values of the property among the general public, and the business sector in particular, through an active and diversified promotion program.
2. To seek sponsorship support from commercial enterprises and encourage commercial photography and film making.
3. To market the property appropriately through collaboration and co-operation with local and national agencies and operators in the tourism sector.

Actions

1. Develop media-based promotional projects and maintain a dedicated web site for the property.
2. Actively explore opportunities for business sponsorship and support.
3. Encourage commercial photography and film making in support of the property.
4. Collaborate actively with tourism sector agencies.

Evaluation measures

1. Number and results of promotional projects conducted.
2. Number of major sponsorships arranged and photographic projects conducted.
3. Results of the marketing program.

VII.4.4. Visitor safety

Explanation

Large numbers of visitors enter the property annually and many thousands each day at some times of the year. The property is in a remote area without urban facilities. Many visitors are unfamiliar with this type of environment and may not be well prepared or equipped for it. Some may be elderly and/or in poor health, some will be parents with small children. Visitors may encounter some natural hazards, e.g. falling rocks or flooding; other water hazards (e.g. drowning), or may risk head injury from low ceilings while travelling through confined cave

passages. Injuries (or worse situations) may require first-aid and possible evacuation. The Management Board and its staff are responsible for the safety of visitors at all times. This requires knowing the hazards, assessing the risks, reducing or eliminating the hazards and providing adequate safety services and facilities.

Objectives

1. To ensure that all visitors are safe and secure at all times everywhere in the property.
2. To provide the necessary facilities and services to minimise the risks and to respond effectively to incidents and accidents.

Actions

1. Assess the degree of hazard risk through regular survey and inspection, and mitigate or avoid any known hazards.
2. Maintain all visitor facilities and routes (trails, waterways, cave passages etc.) in a safe condition.
3. Station rangers along key access routes to monitor safety conditions, record breaches of rules, report (by radio or phone) any incidents and accidents, and assist those requiring help.
4. Establish well equipped and fully maintained first-aid stations at key point on popular tourist routes, and make available rescue equipment and capability in cases of emergency.
5. Establish and enforce boat-handling rules limiting the number of passengers per boat, requiring use of life jackets and requesting proper behaviour.
6. Provide first-aid training for boat operators, who will be required carry basic first-aid supplies.
7. Advise visitors about safety requirements through appropriate signs, information brochures and verbal messages from boat operators.
8. Report all incidents and accidents and record them in a register.

Evaluation measures

1. Record of the number and results of safety surveys, inspections and assessments.
2. Record of the number and severity of incidents and accidents.

VII.4.5. Transport routes - roads, waterways and aircraft use

Explanation

At present, road access to Trang An is primarily from the nearby gateway city of Ninh Binh. Roads within the property include a main road transecting the property, which links Ninh Binh city to the Hoa Lu Ancient Capital and the Bai Dinh pagoda complex. This road was constructed during the past 10 years. There are some minor roads at other gateways and giving access to private resorts and villages. Roads in the property meet the national standards of design and construction. They are primarily intended for access by residents and visitors, but also importantly for coping with incidents, such as forest fires and storms and other emergencies. Heavy vehicles and long-haul traffic use routes that largely by-pass the property. The Management Board is not responsible for road construction or maintenance. However, it co-operates with the relevant agencies in such matters, to ensure that high roading standards

are maintained and there are no developments or impacts that might be detrimental to protection of the property. To date, considerable effort has been made in amenity planting of trees and shrubs on roadsides to minimise noise, dust, and runoff and to reduce the visual impacts.

Waterways are predominantly wetlands and small streams, some of which connect valleys through cave passages, and are suitable for the small boats rowed by local people. There are a few drainage and irrigation canals, some of which are historic, used primarily in agriculture. There is no commercial traffic on canals.

There is no connection to the property by aircraft and none is intended. Helicopters may be employed for emergency evacuation and, along with light aircraft, might be used occasionally for aerial photography to promote the property, or to conduct surveillance operations and surveys for research and other management purposes. The use of drones in the property will not normally be permitted. The Board has strict regulations governing the use of aircraft covering aspects of noise, disturbance to birdlife, residents and visitors, and permissible times and altitudes of flights in the interests of air space control and safety.

Objectives

To ensure that construction, maintenance and use of roads, waterways and airways in the property have no adverse effects on the protection of cultural and natural values, or on residents and visitors.

Actions

1. Require the highest national standards in construction and maintenance of roads, and undertake landscaping of existing roads to minimise physical and visual impacts.
2. Prohibit the further development of roads in the property unless they are required by the Board for management, including emergency purposes.
3. Promote with relevant authorities the safe use of roads, including appropriate lighting and signage.
4. Maintain waterways in a safe manner and install adequate lighting in cave passages.
5. Prohibit aircraft use in the property unless under permit from the Board for special purposes or for emergencies, and request aircraft authorities to impose conditions on over-flights to minimise noise impacts.

Evaluation measures

1. Number of road incidents and accidents.
2. Progress with roadside amenity and landscaping projects and with cave lighting project.
3. Number requests for aircraft uses.

VII.4.6. Power and telecommunication services and infrastructure

Explanation

Currently, electricity and telecommunication services are provided to populated communes, most of which are situated either at the margins of the property or in a few interior localities.

Most of the property does not have access to electricity or radio telemetry, and cell phone coverage is weak and intermittent. Some electricity lines, radio engineering and mobile networks have been installed along the key roads and waterways, and there are a few towers on mountain ridges. Cave passages have lighting installed. The Board's intention is to remove or replace unsightly infrastructure, provide modern service as and where required, and encourage the establishment of small generating stations using solar energy, or adopt satellite reception technology. Power and communication services are considered important, especially for security and emergency purposes. Such services are primarily the responsibility of the Electricity Corporation and Post and Telecommunications Department, who are required to comply with the relevant master plan regarding locating and installing poles, stations and the subterranean wire networks. The Board will co-operate with the authorities in these matters to ensure that developments are consistent with provisions of the property management plan.

Objectives

To support the reticulation of essential electricity and communication services and infrastructure in the property provided that this does not have adverse environmental or aesthetic impact.

Actions

1. Existing services considered redundant, substandard or poorly sited will be removed or appropriately replaced and re-located.
2. All requirements of relevant master plans and regulations will be enforced.
3. The Board will collaborate with relevant authorities to plan and install a modern, efficient, safe and environmentally compatible electricity and communication network in the property.
4. The existing cave lighting system will be replaced and modernized.

Evaluation measures

1. Record of removal and installation of new systems.
2. Numbers of emergency or security events requiring services.

VII.5. Management support and services

VII.5.1. Management Board, staff and equipment

The Trang An Landscape Complex Management Board has primary responsibility for all aspects of day-to-day management of the property. The Board was established on May 5th 2012, and its organizational structure is stipulated in Decision No. 06/2012/QĐ-UBND of 4th October 2014, by the Ninh Binh Provincial People's Committee (Figure 8).

The internal structure of the Board is as follows:

- Board of Directors includes one Director and two Vice-Directors. The current director was formerly Director of the Provincial Department of Culture, Sport and Tourism.
- Administrative Office has a staff of 12 persons. The office is a working unit to assist the Director in general management and co-ordination of the activities of the Board.

- Division of Specific Task/Study is a research group currently comprising 10 persons. It is intended to increase the number of research staff especially in the areas of history, archeology, cultural heritage and geology.
- Project Management Division currently has a staff of 14 persons. Its primary task is to undertake repair, restoration and promotion activities.
- Department of Promotion and International Cooperation currently has a staff of six persons, including some who are fluent in foreign languages and information technology. This unit is still relatively small given its current and rapidly expanding workload, and it will be enlarged in the near future.
- Department of Environmental Management: has responsibility for environmental monitoring, coordinating with relevant agencies, and mobilizing the people and resources necessary to protect natural values.
- Centre of Restoration of Historic and Cultural Relics of Hoa Lu Ancient Capital is the unit in charge of protecting and managing the historic capital. It currently has 32 staff, whose roles include ticket sales, security and guiding of visitors.

While the Board has a wide range of expertise and support from internal resources, it believes that it there would be much to be gained from the ability to call on support and expert advice from external sources, both domestic and international. Accordingly the Board plans to establish an *ad hoc* Management and Scientific Advisory Committee. This group would have a fluid membership depending on changing issues and priorities, and would operate mainly by email but also, if and when possible, through convened meetings. Members would be drawn from Government agencies and research institutes, from private individuals, and from among the members of World Heritage Advisory Bodies such as ICOMOS and IUCN.

Objectives

To manage the Trang An Landscape Complex property to World Heritage standards.

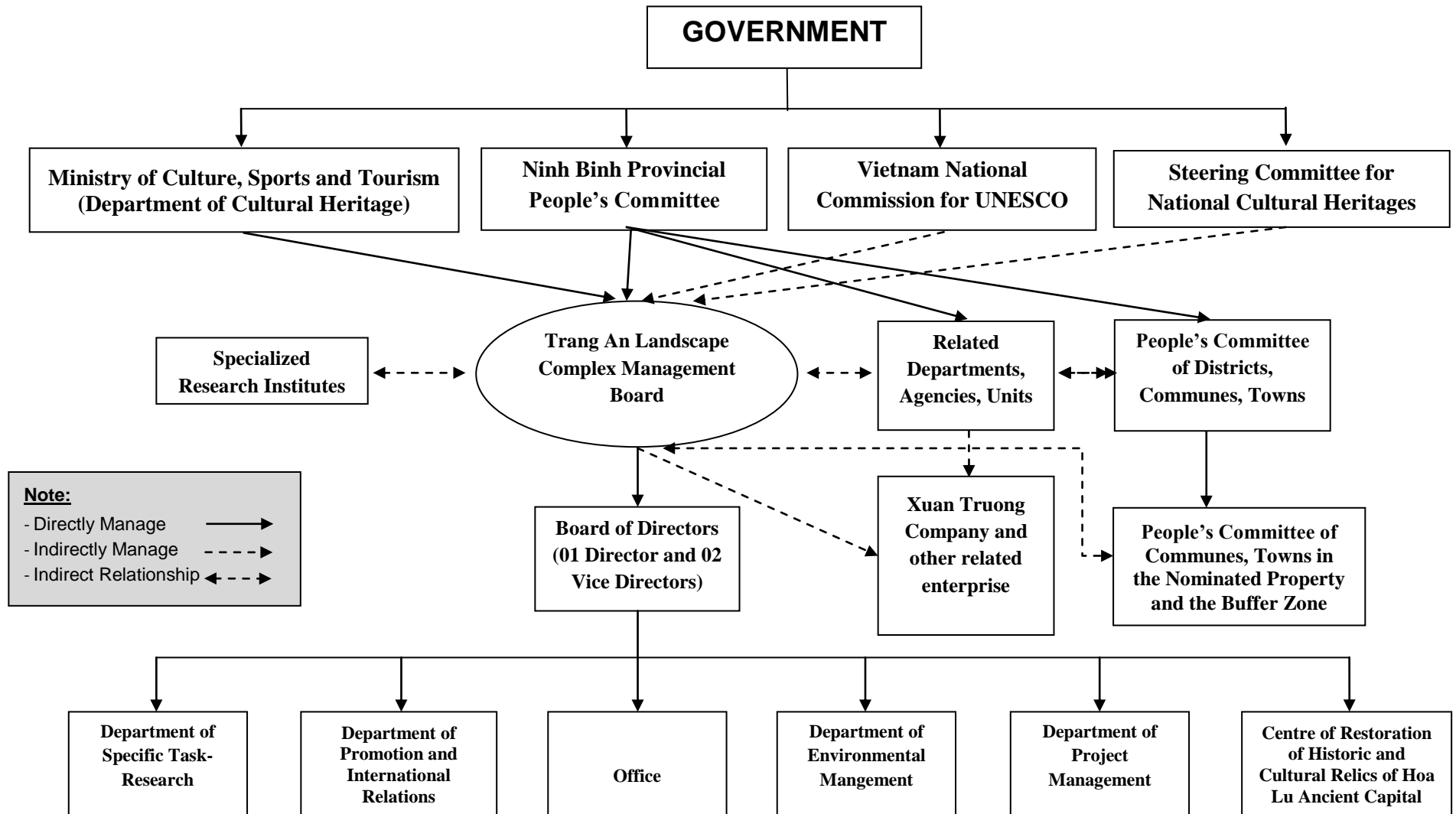
Actions

1. Effectively conduct the assigned work of all departments, as required by the legal mandate from the provincial authorities.
2. Provide the necessary staff and resources to fully implement the provisions of the management plan.
3. Pursue opportunities for expanding staff and resources in the near future.
4. Establish an *ad hoc* Management and Scientific Advisory Committee.

VII.5.2. Staff capacity-building and training

The Management Board is newly created so inevitably there is some inexperience in managing the recently established World Heritage property. The managers, however, are recruited from senior ranks in the provincial Department of Culture, Sports and Tourism and related Government agencies. The managers and staff are well qualified and several are undertaking further studies. At present, the total number of staff is 84, with the following levels of education qualification: six M.Sc.; 55 B.Sc.; eight college level; 13 intermediate level and two elementary level. Two current vice-directors are working towards their PhD and several other staff are undertaking Masters studies.

Figure 8: Organization structure chart of Trang An Landscape Complex Management Board



The Board recognises the importance of further improving the capacity and capability of staff. It will encourage and support staff members to undertake relevant studies and other specialist courses with a view to improving their professional skills and specialist knowledge. Priority will be given to training and skills development in conservation and management of cultural heritage generally, and historic heritage in particular, to strengthen the work of the Centre responsible for the Hoa Lu Ancient Capital. The Board will convene its own workshops and seminars from time to time, and also actively engage in sessions, conferences, workshops and training courses in heritage conservation conducted by national and regional organisations and by the UNESCO World Heritage Centre and Advisory Bodies. Co-operation with research institutions will continue to provide valuable skill development.

Objective

To progressively build the capability and capacity of managers and staff to a level sufficient to protect and manage the property and its outstanding cultural and natural values and attributes.

Actions

1. Staff will be encouraged and supported to undertake relevant study and training courses.
2. Funding will be provided in the annual budget for staff development.
3. The Board will look for opportunities for its staff to engage in national, regional and international heritage and conservation training programmes.

Evaluation measures

1. Record of growth in numbers of appropriately qualified staff.
2. Record of annual staff development funding.
3. Record of number of courses attended annually by staff.

VII.5.3. Volunteers

Volunteers make a major contribution to the management of Trang An. Voluntary opportunities are readily available and activities are popular with the local people. Volunteers are especially prominent as guides at temples, pagodas and other religious places, particularly during the festive season. There are other volunteer activities on environmental clean-up by youth groups, mainly in villages, and in some promotional projects. Volunteers also help with research projects, including archaeological excavations in caves. The Board values this voluntary contribution to management and will encourage and support more of this work in future.

Objective

To encourage, support and reward voluntary assistance to management of the property.

Actions

1. Continue existing volunteer activities and expand them as the opportunity and need arise.
2. Conduct events each year to appropriately recognise and reward the work of volunteers.

Evaluation measures

1. Annual count of voluntary events and estimates of numbers of volunteers.
2. Record of growth in number of volunteers and activities.

VII.5.4. Research and monitoring

Largely because of its rugged and isolated terrain and difficulty of access, the Trang An limestone massif was until recently lacking in scientific study. Some State-sponsored research programs and projects were resumed after the independence of North Vietnam, especially studies of geology and mineral resources. Some archaeological research was focused mainly in Hoa Lu Ancient Capital. Over the past 10 years, there has been a significant increase in scientific interest and research and many studies have been conducted largely by joint domestic and foreign scientific teams. This work was stepped up considerably to support and inform preparation of the World Heritage nomination dossier, and gave emphasis to elucidating the geology, geomorphology, archaeology, biodiversity, history and culture.

The Board intends to conduct and support a comprehensive research programme over the next five years, and will pay particular attention to analysing and applying the results of research to new and improved management initiatives. Research planning is already well advanced and the topics to be given priority are likely to be:

- Investigation of cultural and historical values, and intangible cultural heritage.
- Archaeological survey and investigation, including research of methods and techniques for stabilizing excavations.
- Continuing research into biodiversity values of the property.
- Applying GIS (geographic information system) to heritage management.
- Social research into tourist use, and visitor expectations and satisfactions.

In 2016 a very important new phase of archaeological research will begin in the property, jointly funded by the Management Board and the Xuan Truong Enterprise. It is confidently expected that additional international research council backing will be obtained through Queen's University, Belfast (see Annex 5). Funding for three doctoral positions and one post-doctoral position (to be based at the universities of Queen's and Cambridge, UK) is already in place. All of these three posts will be advertised internationally and, therefore, open to qualified Vietnamese candidates. The principal participating institutions will be the Vietnam Institute of Geosciences and Mineral Resources, Vietnam National Institute of Archaeology, and (in the UK) Queen's University, Belfast, the University of Cambridge and Bournemouth University.

As with research, monitoring of the condition and trend of cultural and natural features was not common in the past. Monitoring became increasingly adopted in the Hoa Lu Ancient Capital after it was recognised as a national heritage site. The Board will progressively establish a comprehensive monitoring scheme over the next five years.

Objectives

1. To conduct a comprehensive research program in support of management of the property.
2. To establish and implement an extensive monitoring scheme in the property.

Actions

1. Develop a prioritised 5-year research plan, and provide budget support to implement it.
2. Seek research support from domestic and international scientific institutions.
3. Encourage and support the publication of research results and apply them as appropriate to management and protection.
4. Implement monitoring procedures, including a comprehensive recording and documentation system.
5. Explore the use of technology to support monitoring - for example the installation of cameras at key locations.

Evaluation measures

1. Progress in developing the research plan and monitoring scheme.
2. Level of financial support for research.
3. Results of research and monitoring program, including number of scientific publications, and records of management applications.

VII.5.5. Public-private partnerships and concessions

Public-private partnerships are any recognised relationship between the Board and another party such as an individual, company, trust or local community organisation. Usually partnerships will be established by a memorandum of understanding (MOU) rather than a legal instrument. Concessions are commercial partnerships between the Board and another party, usually done by lease or license involving fees. Concessions are very common arrangements in World Heritage properties, especially for tourist operations and activities. They provide an opportunity for others to conduct commercial or other operations in the property and for the Management Board to receive some financial compensation and benefit. The lease/licence arrangement with Xuan Truong Enterprise for tourism operations and some conservation activities is a significant example of a commercial concession in Trang An. Four other small-scale tourist enterprises in the property are also conducted under the same arrangement. The Board will consider adding other appropriate partnerships and concessions.

The term of leases and licences is determined by the People's Committee of Ninh Binh Province and the enterprises pay the lease directly to the People's Committee. The Management Board then benefits financially through the annual budget supplied by the People's Committee. Lease and licence arrangements also carry regulations, the observance of which is mandatory for the licence holders.

Objectives

1. To continue to administer current public-private partnership arrangements and concessions according to existing conditions.
2. To consider increasing the number of partnerships and concessions where and when appropriate.

Actions

1. Monitor and regulate existing partnerships and concessions according to their respective

terms and conditions.

2. Negotiate new concessions as and when the need or opportunity arises.

Evaluation measures

1. Record of auditing of existing partnerships and concessions.
2. Record of number of new partnerships and concessions
3. Results of periodic evaluation of financial and management benefits.

VII.5.6. Community and stakeholder relationships

Trang An has a substantial residential population. Establishment of the World Heritage site creates job opportunities and income, and the local community needs to appreciate that they gain more benefits at a joint attempt with the authorities to conserve and promote the heritage values rather than harming those values for the sake of personal interests.

The consistent policy of the provincial authorities and the Management Board is to continue to keep these villages on site, control their natural population growth and prevent any substantial immigration of people. The local community is actively engaged in a variety of traditional subsistence activities such as farming, gardening, fishing, livestock and poultry raising, handicrafts, and fine arts (stone working, wood carving, weaving etc.). Consequent upon establishment of the Trang An World Heritage site, new job opportunities have been created for the local people. At the same time it is vital that the people support the new restrictions that apply in the area. Maintaining positive and constructive relationships between the Board and the local community is, therefore, considered an important component of management. Part of that relationship-building is consulting with local people on the management plan and obtaining their support for it.

The Board has actively engaged the local people in preparing this management plan. The Board also believes that the local community can be a significant adjunct to its management capacity. Already local people play a full role in management activities - administration, boat rowing, guiding, security, maintenance works, and servicing tourist operations. The Board is further developing guidelines and regulations to engage the community in management operations.

The Board has close relationships with many stakeholders in the Government, business, commercial, scientific and educational sectors of the economy and society. Some are represented within the Board membership. These relationships will be maintained and fostered through new initiatives.

Objective

To establish strong and constructive relationships with the resident community of the property, and with other key stakeholders.

Actions

Among the actions intended over the next five years are:

1. Establish mechanisms for engaging the local community in the management and monitoring of the property and sharing in the benefits (e.g. home-stay facilities, agricultural tourism, craft-based and other special interest tourism).
2. Develop “living” historic villages in the property.
3. Conduct public awareness campaigns and support projects for community development.
4. Support festivals and activities that promote intangible cultural heritage - song, dance, drama, clothing etc.
5. Engage in active dialogue with stakeholders in the private sector through meetings, seminars, workshops, training programs and celebrations, among others.

Evaluation measures

Record of progress in implementing the above actions.

VII.5.7. Financial resources, business management and budgets

Action plan and funding of the 2000-2015 period

Funding of special projects for Trang An over the past 15 years has been very substantial (see Annex 7), amounting to almost 3,000 billion VND. Additionally, there have been a number of international sponsors for archaeological excavation, and repair and restoration of relics and monuments, such as projects for archaeological survey and excavation of cave sites undertaken by the University of Cambridge (United Kingdom).

Action plan and funding of the 2016-2020 period

In the period 2016-2020, it is expected that c.2,300 billion VND (Annex 8) will be spent on investment, repair, restoration, resettlement, research, infrastructure improvement etc. A number of international and national donors for archaeological excavation and conservation within the property have been committed e.g. the Cambridge and Queens Belfast universities (UK) in cooperation with Vietnam Institute of Archaeology, Xuan Truong Enterprise and the Management Board. In addition, for other actions within the next 5 years, including infrastructure improvement, environment protection, promotion and marketing, research, capacity building etc. it is estimated that an annual financial investment of ca. 100-130 billion VND would be mobilized from different sources, including: funds collected through the sale of boat tickets and other visitor services; project funding from national and international sources; and voluntary contributions from organizations and individuals. A broad outline of the indicative allocation of funds within the annual action plans and budget for the next five years is shown in Annex 9, the main categories/items are summarized below:

1. Infrastructure improvement

- Improving the parking system (incl. relocation of inappropriate parkings within the Property to the buffer zone) and operating electric cars
- Improving the system of shops, stop-overs, other tourist service infrastructures
- Improving public transportation, telecommunication network and other basic infrastructure components (electric, health care etc.)
- Improving the cave lighting system
- Improving the fire preventive system and conducting periodic drills

2. Protection of cultural heritage values

- Monitoring and protection of archaeological sites and artefacts
- Maintenance and restoration of historic relics
- Inventory, assessment, protection and restoration of intangible heritage values (spiritual, religious festivals etc.)
- Monitoring and assessment of impact of development activities (mineral extraction, construction etc.), of natural processes (natural disasters, climate change etc.) upon cultural heritage values

3. Protection of natural heritage values

- Monitoring and protection of geosites
- Monitoring and assessment of impact of development activities (mineral extraction, construction etc.), of natural processes (natural disasters, climate change etc.) upon natural heritage values

4. Environmental and biodiversity protection

- Monitoring and assessment of impact of development activities (mineral extraction, construction etc.), of natural processes (natural disasters, climate change etc.) upon the environment (land, water, air etc.) and biodiversity (eco-systems, flora and fauna etc.)
- Inventory and assessment of biodiversity values (species, varieties, eco-systems etc.); external species, feral animals and their impact on the environment and biodiversity values
- Improvement of regulation and mechanism for controlling hunting/gathering, feral animal activities
- Implementing environmental impact mitigation measures in regard of the present transportation and tele-communication systems

5. Tourism management

- Improving the explanatory panel system of heritage (cultural, natural, intangible etc.) values
- Improving visitor counting and controlling system at main gateways, monitoring visitor's violation; improving regulations and mechanism regarding tourism activities and tourism service providers and visitors
- Controlling of the system of hotels, restaurants, stop-overs etc. in the buffer zone, ensuring overloading
- Promoting new tourism programs, tours and forms and encouraging local participation (homestay, hiking, cycling, canoeing, religious, spiritual, adventurous etc.)
- Organizing, monitoring and assessing the effect of organizing spiritual and religious festivals
- Survey of visitors' satisfaction regarding heritage values, services etc.
- Emergency preparedness measures and drills (fire, natural disasters, traffic jams etc.), safety insurance for visitors and local residents
- Developing the system of musea, information centres, stop-overs within the property and in the buffer zone in accordance with the master plan

6. Management of sustainable development/residential areas/extractive and commercial activities

- Improving the system of regulations and mechanism for controlling construction, tourism service, extraction and commercial activities
- Promoting and implementing new, eco-friendly forms and technologies (sanitary system, garbage collection and treatment system etc.)
- Preparing and implementing population relocation options (if necessary) to the buffer zone
- Improving basic infrastructure system (electric, transportation, school, health care, telecommunication etc.) for the present residential areas

7. Promotion, marketing, awareness raising activities

- Promoting and raising awareness of local people and visitors on heritage values, regulations and requirements of UNESCO and the Government regarding protection and promotion of heritage values; protection of environment, prevention and reduction of natural disasters etc. on mass media (TV, newspapers, websites, leaflets etc.)
- Setting up and maintaining website about the property
- Preparing and implementing external programs on protection and promotion of heritage values at primary and secondary school system
- Organizing workshops, seminars at villages and residential centres on new income generating ways, encouraging local participation in the protection and promotion of heritage values
- Organizing contests (musical, art, photo etc.) on protection and promotion of heritage values
- Encouraging and mobilizing local participation in the management of the property, protection and promotion of heritage values, protection of environment

8. Management Board activities and capacity building

- Improving Management Board structure and organization
- Improving and implementing public-private partnership, mobilizing private investment, mobilizing local participation and local authority in the protection and promotion of heritage values
- Capacity building of the Management Board (long-term (PhD, MSc), short-term and continuing education (both on management and specialty)
- Improving equipment capacity for management, monitoring, research etc.
- Participating in national and international conferences, symposia, meetings on management, promotion and protection of heritage values
- Preparing and implementing joint R&D projects with national and international partners
- Revision of management plan

9. Research management

- Inventory and assessment of archaeological sites and historical relics
- Inventory and assessment of intangible cultural values
- Inventory and assessment of geoheritage values

- Inventory and assessment of biodiversity values
- Other national and international joint research projects on archaeology, geology, biodiversity, and climate change etc.
- Environmental bearing capacity assessment
- Identification, assessment of negative factors on heritage values and application of preventive and reduction measures

VII.5.8. Plan review and revision

The provisions of this management plan will be kept under continual review and the plan will be formally revised every five years. The review will take account of changing circumstances demands, and requirements and of new knowledge. Revision will include consultation with all key stakeholders, including local communities, and will be subject to official approval by the provincial authorities.

Part VIII. Buffer Zone Management Plan

Different categories of heritage in the buffer zone have been inventoried and classified in the nomination dossier and accompanying annexes. These heritage sites play an important role in supporting the outstanding values and protecting the integrity of the property. The heritage sites in the buffer zone can be categorized into key groups as follows:

- Natural landscapes e.g. isolated karst towers, rivers/streams/canals/lakes and natural forests: the Sao Khe River, Ngo Dong River, Ben Dang River (the part that flows through the buffer zone), valleys, fields, caves etc.
- Agricultural landscapes e.g. rice fields, vegetable planting areas, fruit gardens etc.
- Archaeological sites, excavated areas and other highly potential archaeological sites.
- Traditional architectural monuments.
- Traditional villages and intangible cultural heritage values.

Directions for management and conservation of these categories are:

VIII.1. Conservation of natural landscapes

The natural landscapes in the buffer zone is not much different from those within the property, in many cases they supplement the latter. Conservation of natural landscapes in the buffer zone will help reduce negative impacts on the property. Factors that may cause risks to the property can be identified as: limestone extraction for cement production and handicraft industries, construction of infrastructure, hotels and restaurants, amusement parks, civil houses, urbanization, encroachment on natural spaces etc. Additionally, forest exploitation and illegal hunting also need special consideration.

One of the key responsibilities of the Trang An Landscape Complex Management Board and local authorities is to timely develop and issue regulations on conservation of heritage sites, limiting and gradually phasing out the stone extraction in both the property and buffer zone. A master plan for management, conservation and promotion which clearly indicates conservation areas with eligible activities in detail should also be completed and issued in due time, in order to avoid massive new construction. There is also a need of a master plan for forestry development in the entire area of the property, which regulates and details actions from management, protecting, planting the forest and environment protection for ecotourism development.

VIII.2. Conservation of agricultural landscapes

The agriculture strategy of Ninh Binh province for the coming years prioritizes land use zoning, fundamental infrastructure for agricultural development, diversification of production method, restructuring crops and planting areas, zoning and management of the two-crop-rice fields according to the regulations by the Government.

In the buffer zone of the property, high priorities of the conservation strategy focus on agricultural landscape, limiting changes of land use in order to protect agricultural landscapes from the adverse impacts of urbanization. To guarantee the implementation of this strategy, the Management Board shall closely coordinate with related governmental agencies at all levels in the development of the regional socio-economic-environment master plan.

In the long term, in order to properly preserve traditional cultural values while improving the livelihoods of local people, agricultural landscapes shall be reflected in zoning in detail with in-depth research; in which areas for high productivity rice fields shall be extended, high value agricultural products shall be encouraged aiming to a productivity of 100 million VND/year/ha as specified in the Resolution of the 20th Ninh Binh provincial Communist Party Committee dated 25th November 2010.

VIII.3. Conservation of archaeological sites

In the buffer zone, there are a number of archaeological sites. In principle, these archaeological sites will be protected similarly to those located within the property as mentioned in section VII.1.1 above. Moreover, in parallel to the management and limitation of urbanization and infrastructure construction in the buffer zone, the Management Board has been regularly conducting monitoring and investigation to timely discover new archaeological sites. The Management Board has also actively raised public awareness and provided guidelines to local people what to do, who to inform of the ancient artifacts which may arise during their civil construction.

VIII.4. Conservation of traditional architectural monuments and historical relics

In the buffer zone, there are also several historic, traditional architectural - artistic relics which have been classified. The Management Board cooperates with related competent agencies in the assessment of conservation situation of these relics and proposal of appropriate measures of protection, conservation or restoration to the Ninh Binh Provincial People's Committee and relevant ministries for approval and budget allocation. In addition, the Management Board has also spent efforts in the research of these relics' values to prepare dossiers for classification of these relics at provincial and national levels.

VIII.5. Conservation of traditional villages and intangible cultural heritage values

Item 1 Article 2 Decree No. 98/2010/NĐ-CP dated 21st September 2010 by the Government on detailing and guiding the implementation of several articles of the Law on cultural heritage 2001, amended 2009 (Decree No. 98) specifies:

“Intangible cultural heritage includes:

- spoken and written languages;
- Folk literature;
- Folk performing arts;
- Social and religious customary practices
- Traditional festival
- Traditional craftwork
- Local indigenous knowledge”

In the Trang An Landscape Complex plenty of traditional festivals exist such as Hoa Lu Ancient Capital festival, Tran temple festival, Bai Dinh pagoda festival, Thai Vi temple festival etc.

Traditional crafts such as embroidery, stone carving etc. have strongly developed. The embroidery craftwork in Ninh Hai commune, Hoa Lu district takes its origin from the Tran dynasty. The embroidery products which are of high quality with the translated Vietnamese cultural values have been well known in domestic and European markets. Stone carving in Ninh Van, Hoa Lu district which has been the most typical craftwork of Ninh Binh province has also been supported by local authorities. Ninh Van carving stone products has consolidated its brand in the domestic and export markets.

These festivals and craftworks which have been actively preserved and promoted in the past time have considerably contributed to highlight the outstanding values of the property.

In addition to these strengths, there are several other intangible heritages such as traditional cultivation methods, religious cultural rituals, particularly the Buddhism ceremonies and cultural rituals in the Bai Dinh pagoda, the largest pagoda in South East Asia. In the future, the Management Board will continue cooperation with related agencies and institutions in in-depth research for identification of intangible cultural heritage in the area and propose appropriate conservation, promotion measures.

The conservation, restoration and development of traditional craftworks of typical values are specified in the Article 7 Decree No. 98:

“The State encourages the Conservation, restoration and development of traditional craftworks through following measures:

- Conduct surveys, classifications of traditional craftworks in nationwide; support the Conservation and restoration of the traditional craftworks of significant values or the ones of high risks.
- Create favorable policies for the use of traditional, local raw materials.
- Encourage and support the exercise of traditional craft skills and techniques.
- Strengthen and diversify the promotion of traditional craft products in domestic and international markets.
- Valorize and encourage teaching and transfer traditional craft techniques and skills of typical and outstanding values.
- Create tax incentives for the Conservation, restoration and development of traditional craftworks of significant values in compliance with legal regulations on taxes”.

According to these regulations and the practical development of the traditional craftworks in the heritage site, the Trang An Landscape Complex Management Board shall coordinate with related governmental agencies in the development of the appropriate policies of Conservation and promotion the significant traditional crafts in contribution to the leverage of local people's incomes and life standards, as well as in response to the visitors needs in the Trang An Landscape Complex.

Part IX. Plan Implementation

Management of the Trang An Landscape Complex is influenced by the interests, roles and responsibilities of several different stakeholders - government agencies, private businesses and local communities. Therefore, implementation of this management plan shall be based on inter-sectorial coordination in order to minimize any potential conflicts among stakeholders in the protection and sustainable use of the property.

The Trang An Landscape Complex Management Board shall lead the implementation of this management plan within a coordination framework including all relevant stakeholders. This framework is fundamental to ensuring the effectiveness and ultimate success of the management plan.

IX.1. The Role of Central Governmental Entities

IX.1.1. Ministry of Culture, Sports and Tourism

Decision No. 185/2007/NĐ-CP, dated December 25 2007 by the Prime Minister, on functions, tasks, authority and organizational structure of the Ministry of Culture, Sports and Tourism, regulates the Ministry's cultural heritage management as follows:

"a. Submit to the Prime Minister for approval:

- Plan to protect and promote the value of cultural heritage; organize and guide the implementation after being approved;
- Rank and adjustment of protected areas for special national relics;
- Suggest to United Nations Education, Science and Culture Organization (UNESCO) for recognizing Vietnam's distinguished cultural and natural heritage a World Heritage;
- Treatment plan for the property which is of tangible cultural heritage, including: historical - cultural monuments, landscapes, relics, antiques, national treasures, unless the laws and orders otherwise stated;

b. Decide according to assigned competence:

- To approve the project plan of maintenance, repair and restoration of national monuments and special national monuments under the laws; approve or agree on construction in protected areas ranked II for national monument and special national monument;
- To evaluate the project plan of maintenance, repair and restoration of national monuments, special national monuments; project of renovation, construction outside protected areas for national monuments and special national monuments but likely to adversely affect the monument in accordance with the laws;
- To license exploration, archaeological excavations.

c. To guide protection and promotion of the value of cultural heritage, traditional festivals, beliefs associated with the monuments and historical figures.

d. To chair and coordinate with relevant agencies and organizations in mobilizing, managing and using resources to protect and promote the value of cultural heritage.

e. To recognize and award honors for artisans who do meritorious work in preservation, performance, and teaching of intangible cultural heritage”.

In the process of implementing the management plan for Trang An Landscape Complex, the Ministry of Culture, Sports and Tourism, represented by the Department of Cultural Heritage, will decide issues of comprehensive planning for conservation, restoration and promotion of the heritage values; make agreements on projects of conservation and restoration for the *property*, its national monuments and social national monuments; license exploration and archaeological excavations in the property through direct request in writing to the Management Board of Trang An Landscape Complex and the agencies that coordinate exploration and excavation, and with the written agreement of Ninh Binh Province Department of Culture, Sports and Tourism; provide financial support from the national program on culture for the conservation and replenishment in a number of specific projects; monitor all relevant indicators of the conservation status of the heritage as identified in the profile of national monuments, special national monuments, and nominated heritage submitted for the World Heritage List.

The Ministry of Culture, Sports and Tourism, based on advisory assistance from the Department of Cultural Heritage and other relevant professional agencies under the Ministry, will conduct a review to approve the draft of state-level development projects and other important plans, including mining projects, construction of large roads inside the areas of the nominated heritage and the buffer zone; review the action plans, policies and the effectiveness of the management plan, when the management plan is updated at the end of the first 5-year period (2020).

IX.1.2. The Steering Committee for National Cultural Heritage

According to the regulation on organization and operation of the Steering Committee for National Cultural Heritage issued together with Decision No. 1569/QĐ-TTg dated August 19, 2010 by the Prime Minister, the Committee is an advisory body for the Prime Minister on important issues related to the protection and promotion of cultural heritage values, consulting with the Prime Minister either on request or as an independent consultant.

The Committee advises and makes recommendations to the Prime Minister on matters of science and cultural heritage in respect of major projects affecting socio-economic conditions in the Trang An Landscape Complex as requested by the Prime Minister, or by the Ministry of Culture, Sports and Tourism, or when the Committee finds the need to make proposals to the Prime Minister.

The Committee, in cooperation with the Ministry of Culture, Sports and Tourism, implements unified State management for the property.

The Committee is directly involved in helping the Trang An Landscape Complex Management Board to improve the effectiveness of its professional activities and staff training program, and to obtain professional advice in protecting and maintaining the property and its values.

IX.1.3. The Vietnam National Commission for UNESCO

According to Decision No. 194/QĐ-TTg, dated January 30, 2011 by the Prime Minister, on the consolidation of the Vietnam National Commission for UNESCO, the Commission has

functions including providing advice, and helping the Prime Minister to direct and coordinate activities of UNESCO-related ministries, ministerial-level agencies, Government-owned agencies, and People's Committees of provinces and cities directly under the Central Government.

The Commission, in cooperation with the Ministry of Culture, Sports and Tourism, the Steering Committee for National Cultural Heritage and Ninh Binh Provincial People's Committee will implement unified State management for the Trang An Landscape Complex.

The Commission will also: provide advice, support and assistance to the Trang An Landscape Complex Management Board on professional methods and techniques; direct activities of the Board in accordance with the general regulations of UNESCO; collaborate with central and local agencies in the operation and supervision of the management plan; and play a bridging role between the Management Board and international organizations, UNESCO in particular.

IX.1.4. The UNESCO Office in Hanoi, Vietnam

The UNESCO Office in Hanoi represents the UNESCO Headquarters in Vietnam.

The UNESCO Office in Hanoi will work closely with the Ministry of Culture, Sports and Tourism, the Vietnam National Commission for UNESCO and Ninh Province to promote the outstanding universal values of the Trang An World Heritage property, in order to attract the attention of local communities to participate in the protection of the property. The Office will encourage inclusion of Trang An in the "Network of World Heritage in Vietnam" to share information among the World Heritage properties and the heritage management agencies in Vietnam, and promote coordinated effort in capacity building for management and conservation of World Heritage properties.

The UNESCO Office in Hanoi will also assist in preparing project proposals for submission to the World Heritage Centre of UNESCO, and to international organizations supporting heritage protection, and will encourage the adoption of international standards in the management and conservation of the Trang An property. The Office will also coordinate with the Management Board in implementing the management action plan over the next five years in accordance with the actual conditions of the property. Another matter of concern to the Office will be organizing training workshops in the fields of management and conservation with the participation from other World Heritage properties in Vietnam and in the region.

IX.1.5. Domestic and International Research Institutions

These institutions will conduct scientific research activities, which are vital for providing a theoretical and practical basis in conservation and promotion of heritage values. Central and local research institutions can: conduct fundamental research projects in culture, history, archaeology, geology, geomorphology, and biodiversity as well as applied research on heritage methodology and technology for conservation and restoration of relics; provide consulting services, project preparation for conserving and promoting heritage; advise the State management agencies in issuing mechanisms and policies, formulating strategy and planning; and provide personnel training, and knowledge dissemination. Such institutions also collaborate with international scientific agencies and thus acquire new knowledge that can be applied to specific conditions in Trang An.

IX.2. The Role of Local Government and Agencies

IX.2.1. The Ninh Binh Provincial People's Committee

Ninh Binh Provincial People's Committee is the direct administrative and management body for the Trang An Landscape Complex. In the implementation of the management plan the Ninh Binh Provincial People's Committee will:

- Approve and monitor activities implemented by the Management Board.
- Adopt and promulgate regulations to protect the Trang An Landscape Complex, according to suggestion by the Management Board. Submit to the Prime Minister for approval the Master Plan to protect, restore and promote the values of the Trang An Landscape Complex.
- Based on proposals from the Management Board, approve or disapprove provincial development plans in the Trang An Landscape Complex, in consultation with Ministries, central agencies on State-level planning and other major planning agencies.
- Assign functions, duties and authority to the Management Board of the Trang An Landscape Complex and appoint the senior positions to the Board.
- Regulate the legal framework and the coordination mechanism between the Trang An Landscape Complex Management Board and other organizations and individuals involved in management of the property. Based on proposals from the Trang An Landscape Complex Management Board, consider and approve its action plan, and the policies of the management plan to be updated at the end of the first 5-year period (2020), and assign tasks for provincial departments and affiliated agencies to coordinate closely with the Management Board in implementing actions and policies of the management plan.

IX.2.2. The Trang An Landscape Complex Management Board

The Trang An Landscape Complex Management Board is the agency accountable for the direct management of the property on behalf of the Ninh Binh Provincial People's Committee. The Management Board shall exercise the management, protection and promotion of the heritage values of the Trang An Landscape Complex and shall be the leading agency in coordination and supervision of the implemented activities according to the site management plan.

- Support the Ninh Binh Provincial People's Committee on protection, management, restoration and promotion of the Trang An Landscape Complex.
- Cooperate with governmental agencies in the management of the businesses in the Trang An Landscape Complex according to the existing legal regulations.
- Implement the Master Plan of the Trang An Landscape Complex; develop and manage the investment projects; upgrade the tourism infrastructure and projects on protection and restoration of cultural heritage in the Trang An Landscape Complex when approved by competent governmental agencies.
- Cooperate with related governmental agencies in examining the socio-economic development projects which are related to, or might have impacts on, the Trang An Landscape Complex.
- Cooperate with other organizations and individuals at home and abroad to conduct scientific research, conservation and promotion of the cultural values, environment and natural landscape of the Trang An Landscape Complex. Implement international cooperation programs, particularly with UNESCO, enlist the cooperation and support of

international, governmental and non-governmental organizations and foreign individuals, and manage and use properly and effectively all resources in accordance with regulations.

- Convene and cooperate with competent agencies and institutions to implement research, surveys, and documentation, prepare proposals for classification of relics in the property and the buffer zone for provincial and national recognition.
- Convene and coordinate with agencies and specialized archaeological research institutes for survey and excavation in the property. Archaeological exploration and excavation will require consent and a licence from the Department of Culture, Sports and Tourism of the province in submission to the Ministry of Culture, Sports and Tourism. Organize public awareness raising and promotion activities, and exhibits of the tangible and intangible cultural values of the Trang An Landscape Complex.
- Organize research and technological applications, and establish the information data systems for the Trang An Landscape Complex.
- Supervise the provision of business services and trade in the Trang An Landscape Complex.
- Coordinate with other agencies in studies of the cultural and natural values, and the landscape and environment; through conservation and education, preserve the traditions, and identity of cultural minorities; enhance the cultural appreciation of people; and promote the cause of social and economic development and tourism services in the province.
- Implement guiding services for visitors at attractions within the Trang An Landscape complex; organize the ticket system and the distribution of revenue in compliance with the existing regulations.
- Convene and cooperate with related agencies and local authorities in the regulation, investigation, detection and sanction of violations of organizations or individuals in the Trang An Landscape Complex.
- Coordinate with governmental agencies and local authorities in the implementation of: security insurance, environmental protection, cultural landscape preservation at relics and beauty spots; and disaster preparedness, rescue and emergency support within the Trang An Landscape Complex.
- Convene, coordinate with related agencies to educate and provide information on the Trang An Landscape Complex; develop regulations on coordination management and protection of heritage; develop the regulations on tourism in the property; and develop promotional publications, information panels and signs at the heritage attractions.
- Develop a standard site-specific curriculum for guides to improve the quality of heritage interpretation; cooperate with institutions, technical centers and scientists in research of heritage values and protection measures; call for technical and financial support from both domestic and international organizations and individuals, for projects supporting ecological and community-based tourism, and heritage protection.
- Advise and support the Ninh Binh Provincial People's Committee in completing the organization structure of the Trang An Landscape Complex Management Board.
- Coordinate closely with the firefighting police and rangers on plans for ensuring immediate and effective rescue when a fire occurs.

Based on the above principles, the Trang An Landscape Complex Management Board is the agency responsible for direct management of protection, restoration and promotion of the Outstanding Universal Value of the Trang An Landscape Complex.

IX.2.3. Department of Culture, Sports and Tourism

- Convene, instruct and inspect implementation of the provisions in cultural activities and tourism; enhance the dissemination of knowledge and law; praise individuals and agencies for achievements in heritage protection and reporting the abuse of heritage on local mass media; promote and assist research, and produce sustainable tourism products.
- Coordinate with the Management Board and other relevant agencies to develop regulations to manage tourism in the property; prepare projects on tourism products; develop and organize the content of training and communication for conservation and promotion of heritage values.
- Coordinate with the Management Board in proposing to the Ministry of Culture, Sports and Tourism any licenses for archaeological exploration and excavation in the property
- Coordinate with the Management Board in proposing to the Ninh Binh Provincial People's Committee and the Ministry of Culture, Sports and Tourism the recognition and ranking of relics and monuments in the property at provincial and national levels.
- Coordinate and participate with departments, relevant agencies and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.4. Department of Construction

- Convene, instruct, evaluate and inspect the implementation of legal provisions related to construction activities, construction of tourism infrastructure, water supply and drainage infrastructure, and treatment of wastewater and garbage in the property.
- Coordinate with the Management Board and functional bodies to inspect and monitor construction activities in the property. Process illegal construction activities in the property in a strict and timely manner.
- Coordinate and participate with the Management Board and other departments and agencies in developing the legal framework and co-management mechanism for the Trang An Landscape Complex.

IX.2.5. Department of Agriculture and Rural Development

- Convene and coordinate with the Management Board to plan land use and irrigation infrastructure for agricultural production in the property and buffer zone. Conserve values of agricultural landscapes, and control changes in land uses, to prevent adverse impacts of development and urbanization.
- Coordinate with the Management Board to develop a management plan for the Hoa Lu Special Use Primary Forest within the property.
- Instruct and inspect implementation of relevant laws in afforestation and forest protection, to integrate environmental protection with forestry management.
- Coordinate and participate with departments, agencies, and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.6. Department of Natural Resources and Environment

- Implement measures relating to the state of environmental protection, and compliance, inspection and handling of environmental violation in the property. Advise the Ninh Binh Provincial People's Committee on solving environmental problems in the property. Instruct organizations and individuals to observe laws, plans and proposal relating to environment in the property.
- Coordinate and participate with departments, relevant agencies and the Management Board

in improving the legal framework and co-management mechanism for the property.

IX.2.7. Department of Transportation

- Convene, instruct, inspect and control activities of road traffic and waterways regarding environmental protection requirements in the property.
- Coordinate with functional bodies in disseminating provisions related to transportation activities in the property.
- Coordinate and participate with departments and relevant agencies, and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.8. Department of Science and Technology

- Evaluate scientific and technological applications in heritage management in accordance with the relevant law; inform, disseminate and guide organizations and individuals who participate in scientific activities for heritage protection; encourage organizations and individuals to apply scientific and technological achievements in heritage protection according to regulations.
- Coordinate with the Management Board to conduct scientific research in the property.
- Coordinate and participate with departments, relevant agencies, and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.9. Department of Education and Training

- Convene implementation of the program "Friendly Schools, Active Students" associated with the communication and education about the Trang An Landscape Complex. Instruct schools in the districts located in the property to establish a model of Club of Volunteers for heritage protection.
- Coordinate with the Management Board to implement a heritage education program in many different forms.

IX.2.10. Department of Planning and Investment

- Monitor and evaluate implementation of the management plan of the property to coordinate with the Management Board and related bodies for making proposals to the Ninh Binh provincial People's Committee to review and revise the plan to meet changing circumstances. Consult and assess investment projects and technological applications in heritage management.
- Coordinate and participate with departments, relevant agencies, and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.11. Department of Finance

- Consult the Ninh Binh Provincial People's Committee to establish the level of surcharge to be applied to heritage tourism operations, from which to provide the annual funding to help implement the management plan for the property.
- Instruct, inspect and supervise the financial status of activities in implementing the management plan.

- Coordinate and participate with departments, relevant agencies and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.12. Department of Information and Communications

- Convene, coordinate with the Trang An Landscape Complex Management Board in preparing a modern, effective and safe tele-communication infrastructure development plan in the property.
- Instruct tele-communication businesses that operate in the province develop the tele-communication infrastructure in the property in line with the latter's management plan.

IX.2.13. The Ninh Binh Provincial Public Security

- Direct the existing security force to check, control, prevent and address in timely fashion any violations of the law in the Trang An Landscape Complex.
- Coordinate with the Management Board and local authorities to guide people in observing legal provisions relating to heritage protection.
- Coordinate and participate with departments, relevant agencies and the Management Board in improving the legal framework and co-management mechanism for the property.

IX.2.14. Radio, Television and Newspapers in Ninh Binh

- Take charge of radio, television and newspapers in advocating the cultural and natural values, landscape beauty, conservation and promotion of the property.

IX.2.15. Districts and Communes in the Property and Buffer Zone

People's Committees of Districts and Communes in the property and buffer zone conduct various roles, functions and duties in heritage protection; closely collaborate with the Management Board in managing licences for new building construction and residential and commercial development; implementing an immigration/relocation program; controlling the rate of population growth; enhancing the community education and advocacy for heritage protection ; and facilitating businesses involved in eco-tourism, environmental management and vocational training. Support a community economic development model, to help the people living in the property to live sustainably and improve their quality of life. Coordinate with the Management Board and other relevant agencies to improve the legal framework and co-management mechanism for the property.

IX.3. Local Communities, Businesses and Other Socio-Political Organizations

IX.3.1. Local Communities

Local communities should be made aware of their important role in heritage protection and management, based on the many activities conducted in public awareness raising and heritage education.

[A large, in-depth questionnaire survey was conducted with 500 households in the communes

in both the proposed property and buffer zone. The results showed that 90% of the people were well informed and supported the inscription of Trang An on the World Heritage List - this reveals the impact of recent awareness raising activities.]

The roles of the local authorities at commune and village level are clearly very important. They have shown their commitment in specific heritage protection and management activities. Local authorities have also been actively engaged in aspects of monitoring and supervision of the property on behalf of the Management Board.

IX.3.2. Socio-Political and Non-Governmental Organisations

The socio-political Fatherland Front, Communist Youth League and Young Pioneers Ho Chi Minh, Women's Union, the Veterans and other social organizations play an important role in supervising and inspecting implementation of the management plan. In particular, they are active in propagating information, and mobilizing local communities in conservation and promotion of the property.

Domestic non-governmental organizations are growing in number and quality. These organizations will be valuable partners with the Management Board in research, conservation, advocacy and promotion of the property.

IX.3.3. Private Sector

Currently, five private enterprises are operating in the property: Xuan Truong Enterprise; Ngoi Sao Enterprise; Bich Dong Travel Service Company; Anh Nguyen Company; and Doanh Sinh Commercial and Business Services Company.

These firms have been very active in environmental protection and community-based eco-tourism in accordance with the social development policy of Ninh Binh province in recent years. This situation should be continued and strengthened to assist the Management Board, in achieving its protection and sustainable development objectives.

According to Decision No. 06/2012/QĐ-UBND dated 10/04/2012 by Ninh Binh Provincial People's Committee, the Trang An Landscape Complex Management Board is responsible for coordinating with other agencies to manage enterprises operating in the area of Trang An Landscape Complex. All activities of construction, repair, restoration, and promotion of heritage values of the private enterprises, must be appraised, comply with the agreement of the Management Board and they must be carried out fully in accordance with the provisions of the primary Cultural Heritage Act, and the property management plan. Private firms are required to sign their commitment to non-violation of the laws for conservation, restoration and promotion of the property.

Private companies that conduct exploitation activities in or outside the buffer zone are also subject to regulations. This especially applies to the Duyen Ha and He Duong cement companies located beyond the buffer zone south of the property, which are required to observe Article 36, Article 33 paragraph 1, 2 and 3, Article 32 paragraph 3, of the Law on Cultural Heritage 2001, amended and supplemented in 2009, as mentioned in the management plan.

IX.3.4. Travel Agencies

Travel services companies play an important role in promoting the property. They are considered important partners for the Management Board. They have the role of turning cultural and natural heritage resources into tourism products, and attracting tourists to the property.

The Department of Tourism (VNAT - Ministry of Culture, Sports and Tourism), Ninh Binh Provincial Department of Culture, Sports and Tourism, and Association of Small and Medium Enterprises are the main agencies responsible for the formulation of tourism development strategies in Ninh Binh Province. They also provide connection to major domestic and international travel companies.

Service companies, such as hotels, restaurants, transportation companies, handicraft and embroidery shops, souvenir shops and many other business enterprises, are also important stakeholders in the property.

IX.3.5. International Organizations and Donors

International organizations and donors are important partners whose professional and technical advice and financial support are important for assisting the Management Board to manage the property to the highest international standards.

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Annex 1. Comparison between socio-economic development master plan and management plan

Source: Government's Decree No. 92/2006/ND-CP of September 7, 2006 on the responsibility, formulation, approval and management of SED master plans of the country, regions, key economic zones, provinces and equivalent, districts and equivalent, economic sectors (except the construction and landuse master plans). In essence, the management plan of a region should be part of the SED master plan. It provides just more details for a shorter time frame.

Elements	Socio-economic development master plan (SED master plan)	Management plan
Compiling and approving authority	<p>SED master plan:</p> <p>a) Of the country:</p> <ul style="list-style-type: none"> - Compiled by: Government - Approved by: National Assembly <p>b) Of region, key economic zones:</p> <ul style="list-style-type: none"> - Compiled by: Ministry of Planning and Investment - Approved by: Prime Minister <p>c) Of province:</p> <ul style="list-style-type: none"> - Compiled by: Chairman of Provincial People's Committee together with People's Council - Approved by: Prime Minister <p>d) Of district:</p> <ul style="list-style-type: none"> - Compiled by: Chairman of District People's Committee together with People's Council - Approved by: Chairman of Provincial People's Committee <p>e) Of economic sectors (<i>except for construction and landuse master plans</i>):</p> <ul style="list-style-type: none"> - Compiled by: Relevant ministries - Approved by: Prime Minister <p>f) Of economic sectors within each province:</p> <ul style="list-style-type: none"> - Compiled by: Relevant provincial departments - Approved by: Chairman of Provincial People's Committee <p>g) Of specially designated areas e.g. World Heritage:</p> <ul style="list-style-type: none"> - Compiled by: Relevant ministries together with Chairman of Provincial People's 	<p><u>Compiled by:</u> Site/Property Management Board;</p> <p><u>Approved by:</u> Provincial People's Committee according to specific Decree, Decision or Resolution</p> <p><u>Approach:</u> Management objectives and intervention</p>

	<p>Committee</p> <ul style="list-style-type: none"> - Approved by: Prime Minister <p>The various master plans should be prepared in harmony with each other in a hierarchical order and with the construction and landuse master plans.</p>	
Implementing authority	The Government is responsible for the State management of the SED master plans. MPI is assigned this responsibility within the Government. The Government also assigns the responsibility for implementation of master plans to relevant ministries and people's committees.	Provincial People's Committee and Site/Property Management Board
Time frame	The SED master plan is prepared for a 10 year period with a 15-20 year vision and specified for each 5 year period (<i>The latter is called 5 year SED plan, but not master plan</i>). The SED master plan is revised after each 5 years but can also be revised partially/locally each year.	5 years
Definition/ purpose	The master plan is the reasoning of the SED of, and spacial arrangement for, appropriate socio-economic activities on a certain territory within a specific time frame. It is also defined similarly for certain economic sector (<i>This master plan should be prepared in harmony with the landuse and construction master plans</i>).	Specific objectives e.g. protection, conservation, sustainable development. Principal focus varies widely depending on objectives
Main documents	In addition to the text, the master plan also includes a set of maps which show the visioned spacial arrangement of socio-economic activities of a certain territory within a specific time frame. The set of maps includes: Administrative map, basic infrastructure map, spacial distribution of present and future population centres, towns, industrial zones etc.	Text and a set of maps showing boundaries, management zoning etc.
Contents	<p>Example of the main contents of the SED master plan of a region</p> <p>1. Define problem, analyze, assess, forecast factors and conditions for development; comparatively assess current situation, possibility of use of resources etc.</p> <p>a) Assess and forecast the potential usage of natural, economic and social factors for the development of the region.</p> <ul style="list-style-type: none"> - Geographic location, territorial relation etc. - Natural conditions, natural resources. - Population growth and distribution etc. - Infrastructure, current situation and needs etc. <p>b) Assess domestic and international factors on the SED of the region.</p> <p>c) Assess comparative advantages, opportunities and challenges.</p> <p>2. Reason objectives, visions, directions of SED.</p>	

	<ul style="list-style-type: none"> - Identify position, role and function of the region within the framework of the whole country. - Reason economic development objectives: GDP, GDP/capita, export, contribution of the region, working yield/capacity, competitiveness etc. - Reason social development objectives: job generation, unemployment, education & training, demographic growth, health care & social violence etc. - Reason environmental objectives: pollution and requirements. - Reason defense and security objectives. <p>3. Identify specific tasks for achieving set objectives. Reason development options, focuses, main products etc. Reason economic structure, investment, priority projects etc. Human resource development and solutions.</p> <p>4. Reason the general option for socio-economic arrangement of the region</p> <ul style="list-style-type: none"> - Urban, industrial zones etc. - Countryside, agriculture and forestry etc. - Identify strong and weak territories. - Identify solutions for differences between territories and zones, population layers. <p>5. Plan for infrastructure development and arrangement.</p> <ol style="list-style-type: none"> a) Reason option for communication network development. b) Tele-communication. c) Electricity. d) Water supply and irrigation. e) Social infrastructure and public welfare. <p>6. Direction for landuse planning (Forecast landuse options).</p> <p>7. Reason the list of priority projects.</p> <p>8. Reason environmental protection, identify pollution territories, zones, areas and solutions.</p> <p>9. Identify solutions.</p> <ol style="list-style-type: none"> a) Solutions for capital mobilization. b) Solutions for human resource training. c) Science and technology solutions. d) Policy and organization solutions. 	
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Annex 2. Summary of tourism master plans of Vietnam and Ninh Binh province in relation to Trang An Landscape Complex

The master plan for tourism development in Vietnam to 2010 has identified Hoa Lu - Tam Coc - Bich Dong - Trang An as important destinations in the system of national tourist areas with many favorable factors, such as a convenient transportation system.

The growth rate of tourists who come to Ha Noi and its surrounding areas, is relatively high, about more than 20% per year, much higher than the national average.

According to the master plan for tourism development of Ninh Binh Province, the province has planned for seven major tourist areas:

- Cuc Phuong National Park.
- Trang An Eco-Tourism.
- Ninh Binh City.
- Tourist sites Khenh Ga - Van Long.
- Tam Diep - Bien Son.
- Resorts Yen Dong - Yen Thang.
- Phat Diem Church - Kim Son.

Market share of tourists in Trang An eco-tourism, compared with market share of Ninh Binh Province

Period	2010-2012	2013-2015	2016-2020	2021-2025	2026-2030
Low Option	90,40%	86,00%	81,00%	77,00%	73,00%
Average Option	90,40%	88,00%	84,00%	80,00%	76,00%
High option	90,40%	89,00%	86,00%	83,00%	80,00%

Forecast of tourist visitors to Trang An

Area	Proportion	2015	2020	2025	2030
Total/area	100	3.900.000	5.000.000	6.500.000	8.000.000
Bái Đính Pagoda	65	2.535.000	3.250.000	4.225.000	5.200.000
Tràng An	15	585.000	750.000	975.000	1.200.000
Tam Cốc - Bích Động	10	390.000	500.000	650.000	800.000
Hoa Lư Ancient Capital	10	390.000	500.000	650.000	800.000

Population Projections

No.	Population at present		By 2020		By 2030	
			Population growth rate (%)	Scale (people)	Population growth rate (%)	Scale (people)
	The whole area	44.331		47.200		51.110
1	The World Heritage property	17.036	0.90	18.140	0.80	19.640
2	The buffer zone	27.295	0.90	29.060	0.80	31.470

General urban planning of Ninh Binh Province (Decision No.1266/QĐ-TTg dated 28/07/2014 of the Prime Minister approved QHC plan of Ninh Binh until 2030, with vision to 2050)

1. The existing urban area expansion.
2. Bai Dinh areas.
3. Trang An Landscape Complex.

- 3.1. Hoa Lu Ancient Capital
- 3.2. Trang An Wharf Boat - Tam Coc - Bich Dong
- 3.3. Hoa Lu Special-Use Primary Forest

4. Rural Areas.

a) Bai Dinh area:

This area is a spiritual tourism destination and will become new urban university area. Projected population in 2030 is about 20.000 people, divided into two subdivisions:

- Urban development area: projected population in 2030 is about 10,000 to 12,000 people.
- Rural zone: the new university and rural residential areas. Population forecast to 2030 is about 8,000 to 10,000 people.

b) Trang An Landscape Complex (TALC):

Hoa Lu Ancient Capital, resorts Trang An - Tam Coc - Bich Dong, Hoa Lu Special-Use Primary Forest, are protected under the Cultural Heritage Act. Population forecast to 2030 is about 15,800 people; construction land in rural residential area is 460-482 hectares; land of construction for technical and economic development will be approximately 280-300 hectares.

c) Rural areas:

Develop a tourism service centre and traditional villages; maintain the agricultural landscape, encourage high-tech agriculture. Population forecast by the year 2030 is about 68,100 people.

The area of the Lucky and Duyen Ha cement factories and the mined areas will be converted to tourist resorts when their current operations end.

Development orientation of Trang An Landscape Complex

1. Strictly protected area (no construction allowed)

- a) Scope: includes the natural landscape that needs to have particularly stringent protection (Region 1 of the partition), relic areas need strict protection (Region 2) and the conservation area overlap (Region 5). Area: 3879.87 hectares (*check*).
- b) As a strictly protected area, people are not allowed to live here, tourists are not allowed to stay overnight and construction is prohibited.

2. Area that allows limited construction and needs special control

- a) Scope: It includes an area for tourism development (Region 3), residential areas and an agricultural landscape around (Region 4). Area: 2292.13 hectares (*check*).
- b) Spatial development orientation: Being a special protected area, with residential living and tourism activities, the activities of construction of infrastructure, renovation of houses are allowed to proceed, but at a limited level and special control is needed to guarantee those activities do not affect the heritage sites.

***) For the residential areas:**

- Maintain the status quo, control the population growth and do not expand these areas.
- Maintain the existing structure of villages.

***) For tourism areas:**

- Develop tourist tours, eco-tourism and cultural tourism.
- Continue the construction of infrastructure.
- Establish a network of tourism services that follow an ecological model.

***) For natural scenery and the surrounding agricultural landscape:**

- Preserve the ecological agriculture sector, maintain agricultural production and begin and afforestation programme.

Development orientation of the buffer zone

- a) Area: 5,918 hectares
- b) Population: 27,295 people, by 2030: approximately 36,470 people in total.

***) Orientated distribution:**

- Bai Dinh area (west): is a spiritual tourism destination and a new urban area for universities.
 - + Bai Dinh Urban area: the population in 2030 will be about 10,000 to 12,000 people and

urban construction land is about 710-800 hectares.

- + Bai Dinh Rural zone: 8,000 to 10,000 people in 2030 and the construction land in the rural residential area is about 380-400 hectares. Land for technical and economic construction for urban development: 240-260 hectares.

- Truong Yen - Ninh Hoa
- Ninh Nhat - Ninh Tien
- Ninh Hai - Ninh Thang

Partition of Trang An Landscape Complex (TALC)

All parts of TALC have natural or cultural value with different peculiarities. Furthermore, the ability to exploit tourism products and activities of each part is also different.

TALC has four regions for tourism, they are: Hoa Lu Ancient Capital, Trang An Caves, Tam Coc - Bich Dong resort, and Bai Dinh Pagoda, in the buffer zone.

1. Hoa Lu Ancient Capital and the northern buffer zone

- a) Tourism resources: there are special values in this region of historical, cultural, archaeological, natural landscapes, festivals, religious beliefs, customs and traditions...
- b) Types of tourism:
 - Travel tours: visits to cultural and historical monuments and sightseeing in the landscape.
 - Cultural tourism: join the festivities and experience daily life of the local people.
- c) Road map for tours:
 - Follow the provincial highway 478 route.
 - From Hoa Lu Ancient Capital, travel to the south by waterways along the Sao Khe river through the caves and new roads of Trang An until Tam Coc - Bich Dong.
 - From Hoa Lu Ancient Capital, travel to the west by road or waterway to Bai Dinh Pagoda.

2. Trang An Caves and the eastern buffer zone

- a) Tourism resources: There are special geological, topographical, geomorphological, climatic, hydrological, ecological, and historical/cultural values and exhibits that are valuable for scientific research and tourism purposes.
- b) Types of tourism:
 - Travel tours, eco-tourism: visit the cave system to understand the geological development of the area, learn the values of wetland ecosystems and tropical forest ecosystems on limestone, enjoy the landscape, explore the mysteries and beauty of the caves and visit some monuments.
- c) Road map:
 - From the main national highway 1A in the north of Lake Unicorn, go to Ninh Xuan

commune and the marine centre Thung Ang Muong; from here, there are nine waterway routes to take tourists to visit the cave system.

3. Tam Coc - Bich Dong

- a) Tourism resources: this area has the special geological, biological, environmental, landscape, historical, and cultural values together with traditional villages.
- b) Type of tourism:
 - Travel tours, eco-tourism, cultural tourism, spiritual tourism and tourist resorts.
- c) Road map:
 - From the city of Ninh Binh, cross Van river to the reception area and Tam Coc boat wharf. The journey starts by boat along Ngo Dong river to the North and goes through Ca cave, Hai cave, Ba cave to enjoy the beauty of wetlands and evergreen forest on limestone mountains. Following that, tourists can go through Mai Trong Valley to come back to the South, through Sunshine Valley and Voi Temple, then to the marina at Thach Bich and tourists can visit Bich Dong temple here.
 - From Tam Coc wharf boat, tourists can travel by road to visit Thai Vi temple, Thien Huong cave and the ancient houses of Co Vien Lau.

4. Bai Dinh Pagoda

- a) Tourism resources: the ancient Bai Dinh Pagoda is a spiritual and cultural relic associated with the legends of King Dinh and King Le. During the war of resistance against French colonialism, the mountain that contains Bai Dinh Pagoda was a strong base to protect revolutionary organizations, state agencies, and a place to hide military provision and weapons. Located near the ancient Bai Dinh Pagoda, the new Bai Dinh Pagoda is one of the largest temples in South-East Asia.
- b) Type of tourism:
 - Spiritual tourism.
 - Cultural tourism: festivals, conferences and seminars.
- c) Road map:
 - From Hoa Lu Ancient Capital and Trang An caves, travel to the west by road or waterway to Bai Dinh Pagoda. Visitors will have a chance to worship Buddhism and admire Buddha statues, the large bronze bells and the monks here. Furthermore, a cultural park, monastic institutions, a reception area, car park, and Dam Thi Lake are being established.

External Traffic

Conveniently links with the surrounding areas by five traffic gateways.

Internal Traffic

- Consist of four main arteries.
- Traffic flows in the property and buffer zone are closely linked.

Car Parking

- four bus stations
- three boat wharves.
- eleven car parks

Waterway transportation:

- Planning nine waterway routes for tourism.

Annex 3. Summary of master plan of Trang An Landscape Complex

1. Introduction

1.1. Reasons and needs of Master plan

Located within Ninh Binh Province, Trang An Landscape Complex contains many special national monuments such as Trang An-Tam Coc-Bich Dong Scenic Area, Bai Dinh Temple, Hoa Lu Ancient Capital... Connection between those areas is the Hoa Lu Special-Use Primary Forest, limestone mountain, wetlands with lakes and river systems with a total area of 12,000 hectares. In 23 June 2014, at Doha (Qatar), with an official recognition from the World Heritage Committee of UNESCO, Trang An Scenic Landscape Complex has become the first site in Viet Nam to receive UNESCO mixed natural and cultural heritage of the world recognition. In planning the development of tourism in Viet Nam in the future, Trang An will receive investment to raise its standard to world-class standard.

In 2009, The Prime Minister has assigned the Ministry of Construction with Ninh Binh Provincial People's Committee to create a plan to develop and protect Trang An's natural and cultural value in order to build a scientific dossier to help Trang An become a World heritage site, and to turn Trang An into one of the most attractive locations for tourists in the future. On 22 October 2009, the Ministry of Construction issued the Report No.98 / TTr-BXD to the Prime Minister to approve the master plan to manage and improve Trang An tourist site until 2025. However, there were different opinions about the boundary relating with the exploitation of limestone and cement production at Ma Voi, Coi Khe (Ninh Hai, Ninh Van and Yen Son), so until now, the scheme has not been approved.

At the moment, the zoning management, protect the outstanding universal value and the management of construction activities of infrastructure at the local area have become urgent matters in order to serve the requirements of tourism development in Ninh Binh Province. For that reason, Ninh Binh Provincial People's Committee and Trang An Landscape Complex Management Board need to submit a better version of management plan of Trang An for the Prime Minister to approve in order to provide a basic for developing management plans, to preserve, restore, exploit, promote the natural and cultural value of Trang An according to the current regulations.

1.2. Type and duration of the plan

Type: Master plan of Trang An is a plan that has various requirements that associated with the conservation and promotion of natural heritage values and world culture.

Duration:

- Long-term stage: 2030
- Short-term stage: 2020.

1.3. The legal documents:

- The Venice Charter for the Conservation and Restoration of Monuments and Sites 1964;

The Burra Charter 1979.

- The Nara Document on Authenticity 1994.
- Construction Law.
- Law on Cultural Heritage.
- Tourism Law.
- Law on Environmental Protection.
- Biodiversity Law.
- Law on Protection and Development of Jungle and forest.
- Minerals Law.
- Decree No. 08/2005/ ND-CP on construction planning.

1.4. Objectives of the master plan:

- Preserving the status quo and comprehensive natural and cultural heritage values of Trang An Landscape Complex, including the unique value of nature, culture and history.
- Connecting the heritage conservation with local economic development. Promote heritage values in order to improve socio-economic development of Ninh Binh Province and Northern coastal areas of Viet Nam.
- Provide a basic establishment for the management, conservation, restoration and promotion of Trang An Landscape Complex.
- Provide a basic establishment for the deployment of future plans, investment projects and fundraising activities.

1.5. Nature of Trang An Landscape Complex (TALC)

- TALC is a natural and cultural heritage of the world. It has outstanding universal value of geology, geomorphology, landscape and culture-history.
- TALC is a national tourist resort with world-class standard and its basic features are spiritual tourism and ecology.
- Some small areas in TALC is inhabited, most of the property is uninhabited and in a natural site.

1.6. Missions of the master plan

- Review of natural areas and the boundaries of the property. Propose a plan to develop the protection and exploitation of tourism development in Ninh Binh Province, in order to help the local authorities with a basic idea for comprehensive protection of heritage value.
- Control of construction projects to prevent any damage that could affect the natural and cultural heritage of the property. The development of infrastructure inside the property for tourism, science research needs to be considered very carefully.
- Establishing suitable positions for construction projects to attract foreign investments and help the local authorities to find those kind of investments from Japan and South Korea.
- Strengthening the condition of infrastructure, improve local people's awareness of protecting nature. Improving local people's living condition and create more demands for tourism for TALC.

1.7. Approach of the plan

- The master plan of TALC is the type of specialized construction planning and is one part of the overall plan to conserve, restore, exploit and promote the value of TALC. The protection of natural and cultural heritage of TALC plays a key role and decides on improvements concerning construction projects, infrastructure development and foreign investments.
- Therefore, the management plan of TALC applies Construction Law, Urban Planning Law, Heritage Law amended in 2009, the Law on Forest Protection and Development, Biodiversity Law, the Law on Environmental Protection and Tourism Law.

Each step of the plan will be interested in the following subjects:

- TALC comprises: the aggregate value of heritage (geological, geomorphological, biological, aesthetic, historic, cultural and environmental value); the system of valleys, caves, fauna and natural landscape.
- Factors that relate to the property include: residential, economic and social development inside 6172 hectares of the property and the buffer zone; create demand for future tourism; and projects related to the conservation and promotion of TALC.
- The management plan of TALC aims to control the construction and, investment projects to serve the scientific research, tourism development, forest protection...and to avoid any negative impacts on the property by apply different rules and permissions to construct building on different zones inside the property.
- The management plan of TALC must be consistent with the overall development strategy of the country, northern coastal region and Ninh Binh Province. At the same time, the management plan must be linked with meaningful education and scientific research.

Annex 4. A brief introduction on Hoa Lu Ancient Capital

This site was classified as Special National Heritage according to Decision No.548/QĐ-TTg, 10 May 2012 by the Prime Minister of Vietnam. This decision was in compliance with Article 29, Items 3a and 3b of the Law on Cultural Heritage:

3a. The monument and location are attached to a key event marking a breakthrough in the nation's history, or to the nation's heroes who had a tremendous influence on the historical evolution of the nation.

3b. An architectural-artistic monument, architectural complex, master urban architecture and residence, which has special values marking key milestones in the architectural development of Vietnam.

The site covers an area of 314.95 ha, comprising two protected zones, 144.7 ha and 170.25 ha in size, respectively.

Hoa Lu Ancient Capital (HLAC) is a special national monument of Vietnam. In 1991, HLAC was among the first candidates selected in Vietnam for cultural World Heritage, together with Cuc Phuong National Reserve, Ha Long Bay and Perfume Pagoda.

The Prime Minister issued Decision 82/2003/QĐ-TTg on 29/4/2003, regarding the conservation and improvement of historical values of the HLAC Monument. The Decision identifies that the HLAC Monument is situated adjacent to two districts of Hoa Lu and Gia Vien and Ninh Binh City with the total area of 13.87 km², including:

- **Special protected area, 3 km²**, including the whole Inner Citadel of Hoa Lu, with such monuments as: Dinh Tien Hoang Temple, Le Dai Hanh Temple, Dinh Tien Hoang Tomb, Le Dai Hanh Tomb, Phat Kim Temple, Nhat Tru Pagoda, Vuon Thien Pagoda, Cau Den Stele, Kim Ngan Pagoda, Bim Cave, Co Am Pagoda, Duyen Ninh Pagoda, Cho Pagoda, Sao Khe River, a part of Trang An Scenic Landscape and portions of walls and the underground palace basement.
- **Buffer zone, 10.87 km²**, including the landscape on both sides of the Sao Khe River and the Trang An Complex. The monuments in this area include: Am Tien Grotto, Quan Cave, Muoi Cave, Yen Trach Temple, Ba Ngo Pagoda, Luon cave, Sinh Duoc Cave, Dia Linh Cave, Nau Ruou Cave, Ba Giot cave, Lien Hoa Grotto, Tran Temple, Khong Pagoda, Dot Pagoda and Boi Cave.
- **Directly associated monuments:** including monuments that lie outside the above-mentioned two zones but had an important role in the development of the Dinh Dynasty, such as Bai Dinh Pagoda, Eastern Gate, Southern Gate, Thien Ton Grotto, Hoa Lu Grotto, and Dinh Bo Linh Temple.

HLAC, as a designated tourist destination, is managed by the HLAC Monument Conservation Centre, under the direction of the Trang An Management Board.

Monuments in the HLAC are associated with careers of the historic people of the Dinh and Pre-Le dynasties and the early period of the Ly Dynasty (968-1010). From 968, Hoa Lu was the first capital of the feudal state of Vietnam. In 1010 after King Ly Thai To had moved the capital to Thang Long (the current city of Hanoi), Hoa Lu became known as the ancient

capital. The subsequent dynasties of Ly, Tran, Le and Nguyen renovated and built more structures including temples, tombs, pagodas and palaces.

After the Ly Dynasty moved the capital to Thang Long, other people settled in the HLAC. Therefore, a great number of architecture structures are found in residential areas, apart from the inner citadel bordered by three gates: Northern Gate, Eastern Gate and Southern Gate. Relics of the Dinh-Le Dynasties include: citadels, palaces, temples and shrines of gods. Relics built by later dynasties include tombs and temples of Dinh-Le notables.

Temple architecture

Typical representatives for the outstanding royal temple architecture Dinh Tien Hoang Temple and Le Dai Hanh Temple, which were constructed during the Ly Dynasty, and were rebuilt in the post-Le Dynasty (17th Century). Other examples are temples of gods protecting three gates into the outer citadel, inner citadel and southern citadel, including Thien Ton Grotto worshipping Thien Ton God (Eastern Gate), Cao Son Temple worshipping Cao Son God (Southern Gate), and Tran Temple worshipping Quy Minh God (Southern Gate).

Communal house architecture

Besides Dinh Tien Hoang and Le Dai Hanh Temples, villagers of all seven ancient villages of Truong Yen Commune also have communal houses to worship these two kings. Yen Thanh Communal House of Yen Thanh Ancient Village worships these two kings as tutelaries. Yen Trach Communal House in Yen Trach Ancient Village worships King Dinh Tien Hoang. Yen Ha Communal House in Yen Ha Ancient Village worships King Le Dai Hanh.

Pagoda architecture

After becoming the capital of the country, Hoa Lu progressively became a centre of Buddhism. King Dinh Tien Hoang was the first in Vietnamese history to award the position of patriarch to a Buddhist - Khuong Viet. In the 10th Century, a great number of pagodas were built, including Ba Ngo, Co Am, Duyen Ninh, Am Tien, Thap, Ban Long, Thien Ton Grotto and Hoa Son, which were built in the Dinh Dynasty; and Kim Ngan, Nhat Tru, and Dau Long, which were built in Pre-Le Dynasty. Remarkably, many pagodas were built in limestone caves. Some others are on the slopes of a mountain, or even occupy the whole mountain. Typical representatives are: Hoa Son, Thien Ton, Bich Dong, Dich Long, Bai Dinh and Linh Coc.

Together with Yen Thanh Communal House, Nhat Tru Pagoda (or One Pillar Pagoda) is situated adjacent to Le Dai Hanh Temple. It was built by Le Dai Hanh to raise community awareness about Buddhism. In front of the temple lies a stone bible pillar that still remains intact from thousands of years ago, and is regarded as the oldest stone bible in Vietnam.

Bai Dinh Pagoda includes a section of old pagodas and a section of new pagodas. The section of new pagodas comprises God Nguyen Temple, light cave worshipping Buddha, dark cave worshipping Goddess and God Cao Son Temple.

System of tombs and steles

Tombs of both King Dinh and Le were built in 1840 and renovated in 1885. Cau Don Stele is an old stele built to resemble a stone bridge over the Sao Khe River. The stele was also an

entrance into HLAC from the Dinh Dynasty. Eastern Gate Stele (or Thay Boi Cave Stele) was carved at the foot of Dam Mountain. It is named as Eastern Gate, and is the gateway of the mandarins to enter the palace.

System of temples and shrines

Various palaces worshipping Dinh-Le mandarins, princes and princesses are scattered throughout the residential area of HLAC. These palaces were the working place of Dinh-Le mandarins, and when Hoa Lu became an ancient capital, the palace was used for worship. Typical examples are Vuon Thien Palace, which worships Prince Le Long Thau who was the oldest son of King Le Dai Hanh; Dong Vuong Palace, which worships Prince Le Long Tich who was the second son of King Le Dai Hanh; and Phu Dung Palace, which worships Princess Phu Dung who was the daughter of King Dinh Tien Hoang.

Underground palace

At the Le Dai Hanh Temple in 1997, archeologists found a part of the basement of a palace that was built in the 10th century at the depth of 3.0m underground. The excavation partly revealed the image of HLAC with solid palaces and large architecture works decorated in typical styles of the Dinh-Le Dynasty.

In 2009-2010, the central area of HLAC was further excavated. The initial result revealed relics of walls built of bricks imprinted with “Dai Viet Quoc Quan Thanh Chuyen” (Bricks were used exclusively for the construction of palaces in Great Viet). Other materials representing Dinh-Le Dynasty were also found.

Natural citadels

The Hoa Lu Ancient Capital presents a significant combination of natural features and human-made structures. Throughout the history, the resident kings creatively and strategically utilized mountains and rivers for the construction of their palaces.

- **Ma Yen Mountain:** has the image of a saddle when viewed from afar. On the mountain lies the Dinh Tien Hoang Tomb, which is 150 steps above the ground. Standing on the top of the mountain, one can see the whole HLAC and the Ru Mountain Range surrounding the Dinh Tien Hoang Temple and Le Dai Hanh Temple; Phi Van Range, Kien Mountain, Cot Co Mountain and the residential area.
- **Cot Co Mountain:** At the north east of the outer citadel lies Cot Co Mountain, on which the national flag of Dai Co Viet was held. Relics of the citadel wall were excavated here.
- **Ghenh Thap Mountain:** Ghenh Thap Mountain, located in the south east, was where King Dinh Tien Hoang reviewed the marine forces. This area also has Tien Cave and Mui Cave, where the national assets were stored, and Am Tien Cave, which was used to keep tigers to execute sinners.
- **Hoang Long River:** Located in the north of HLAC, this river is associated with legends about childhood of Dinh Bo Linh. A branch of Hoang Long River, called Sao Khe River, flows through the scenic area. It is said that this river terminal was where Ly Cong Uan started the journey to move to Thang Long. Sao Khe River is a gateway leading to the Hoa Lu monuments and scenic landscapes.

HLAC is surrounded by numerous mountains, and the kings utilized the terrain to build 10 portions of walls that connect the mountains. All of the walls make up Hoa Lu Citadel covering an area of over 300 ha. The walls, which are of varying shape and size, take advantage of the rugged terrain and are intended for a military purpose. To the south of Hoa Lu Citadel is Trang An Citadel (or Southern Citadel), which is the defense core of the capital. The Hoa Lu Citadel has two connected rings: Eastern Citadel and Western Citadel, the former having more important roles. Excavations of several parts of the wall have revealed the basement made of deeply driven wooden piles. The walls were 0.45m thick, 8-10m high, and were built of bricks, reinforced by rocks, bricks and wood piles. Commonly, the bricks were 30 x 16 x 4 cm in dimension, and were printed with “Dai Viet quoc quan thanh chuyen” and “Giang Tay quan”. The walls were also covered with a thick layer of soil.

- **Eastern Citadel**, or outer citadel, is 140m wide. This citadel is located in two villages of Yen Thuong and Yen Thanh, Truong Yen Commune. The citadel comprises five sections that connect the mountain ranges to form a closed circle. This is the main palace, in the center of which are located the Dinh Temple and Le Temple.
- **Western Citadel**, or inner citadel, has the same area as the outer citadel. This citadel is located at Chi Phong Village, and also comprises five separate sections of wall that connect the mountain ranges.
- **Sao Khe River**, which flows along the citadels, was utilized as a natural tunnel and also a waterway to provide easy access to the citadel. Inside the citadels were imperial court areas and those for mandarins and soldiers. The natural citadel exists today, but the man-made citadel and the royal court remain only as relics that are currently under excavation.
- **Southern Citadel** is situated in the south of Hoa Lu, and is surrounded by mountains that protect the rear of the citadel. This Citadel was constructed in concrete. The Truong River running through Southern Citadel has a complex system of canals flowing from a series of niches. Southern Citadel was an important strategic military base, because it provided an easy exit through the waterways and subterranean cave passages in Trang An. The moats and caves in Trang An were used as a defensive system at the rear of HLAC. Traces of ancient peoples have been excavated here. In the Tran Dynasty, Boi Cave was the base for combat against the Mongolian invaders, and many artefacts dating from the Dinh, Pre-Le and Tran dynasties were found here.

Hoa Lu Ancient Town

Hoa Lu was the first urban town in Vietnamese history. In 970, Vietnam's first coins were released, marking the appearance of a financial economy under feudal centralization. According to the Dai Viet Chronicles, in 976 (or the 7th year of Thai Binh), foreign trading ships arrived here to bring gifts and establish trading relationships with Dai Co Viet. There are several remaining sites associated with the history of Hoa Lu urban town and the later Thang Long, including Cho Road, Cho Mountain, Cho Pagoda, Den Wall, Den Citadel, Den Bridge, Dong Bridge, Dong Wall and Dong Gate.

After the Ly Dynasty moved the capital to Thang Long, Hoa Lu still remained in the style of an ancient urban town. The old houses here bear the characteristics of the Northern Delta, stemming from longstanding traditions in the community.

Hoa Lu Festival

The Hoa Lu Ancient Capital hosts a number of festivals celebrating its founders and Dai Co Viet in the 10th century, especially King Dinh Tien Hoang and King Le Dai Hanh. Among the HLAC Festivals, Truong Yen Festival is the most notable. It is ranked as a national cultural heritage, and it is intended to upgrade the festival to a national-level festival. The festival takes place in the central square of HLAC and the surrounding monuments. It has an impact not only on Ninh Binh Province but also on other Dinh-Pre Le monuments in Vietnam. It commemorates the establishment and defense of the country by Vietnamese people. The festival was first organized when Hoa Lu capital became the ancient capital. It is also called “Reed Flag Festival” because it includes a performance that recreates the scene of Dinh Bo Linh playing the game of “Reed Flag Battlefield”. The name “Truong Yen Festival” is used because the performing spaces of the festival used to take place all over Truong Yen, or the present Ninh Binh.

Other festivals within the HLAC monuments include:

- Dinh Bo Linh Temple Festival from Gia Phuong Commune.
- Hoa Lu Cave Festival worshipping Dinh Bo Linh and Minh Khong God, who protects the north of Hoa Lu.
- Tran Temple Festival from the Trang An Scenic Landscape, worshipping Quy Minh God who protects the south of Hoa Lu.
- Thien Ton Cave Festival worshipping Thien Ton God, who protects the east of Hoa Lu.
- Bai Dinh Pagoda Festival, worshipping Holy Nguyen and Cao Son God, who protects the west of Hoa Lu.
- Nhat Tru Pagoda Festival.
- Kim Ngan Pagoda Festival.
- Duyen Ninh Pagoda Festival.

Renovation of monuments

Protection and restoration of architectural structures in the citadel have been promoted by means of a Master Plan implemented under Decision No.82/QD-TTg, 29 April 2003, by the Prime Minister of Vietnam. The principal purposes of the plan are: identifying the legal basis of protection and management; protecting, identifying, studying and enriching the tangible and intangible heritage values; providing the basis for detailed plans, projects, conservation measures and guidelines; and mobilising funding sources.

A detailed plan for conservation and promotion of the heritage values was approved by the Ninh Binh Provincial Peoples’ Committee in 2004. Through a National Target Programme in Culture, the Government invested in several restoration projects including: King Dinh and Le Temples 2005 & 2010; Nhat Tru Pagoda in 2005; Kinh Thien Temple in 2005; and Princess Thuc Tiet Temple 2004-5. Additional funds from other sources enabled restoration of the Thai Vi, Khe Thuong, Khe Ha and Mieu Son temples. Several other activities have been implemented including surveys, inventories, collections, research studies, media promotion and training workshops - all aimed at improved conservation, protection and management of tangible and intangible heritage values. The Hoa Lu Festival (or Reed Festival), held in Spring of every year for the worship of national heroes, involves many rituals such as water and fire worship, incense offering, reed battles, dragon dancing and contests such as rice

cooking, cock fighting, human chess, wrestling and tug-of-war.

Responsibility for managing the site was given to the Trang An Landscape Complex Management Board in 2012. Under the Board, the Centre for Conservation of the Historic and Architectural Monument Hoa Lu Ancient Capital is the unit responsible for daily management of the site. The management rights and responsibilities, including implementing the Master Plan, supervising investment projects, undertaking research, and managing tourist activities and services are detailed in Section VII of this management plan.

Annex 5. Management and research programme

By Ryan Rabett, Queens University, Belfast, UK

1. Introduction

The World Heritage nomination of the TràngAn Landscape Complex, Viet Nam: Supplementary Report (February 2014) included the following statement of intent (p19-21) for future archaeological management and research within the property:

*The management, organisation and presentation of archaeological, geological and ecological studies undertaken within the property will be the responsibility of a bespoke centre - the **Centre for Human-Environment Relations, Tràng An**- under direct authority and governance of the Tràng An Management Board. Building on existing strengths the Centre will undertake:*

- **Monitoring services**- dedicated staff will be employed to maintain and protect all identified cultural and environmental heritage within the park; including the automatic and semi-automatic environmental quality monitoring stations between the quarrying operations and the boundaries of the property;
- **Scientific research**- to be conducted at and by the Centre, with staff leading investigations into the archaeological, geological and ecological heritage within the Tràng An massif and in the area of the Hoa Lu ancient capital;
- **Regulation**- the Centre will regulate access to teams and individuals wishing to conduct scientific research within the property;
- **Hosting activities** - the Centre will have facilities to host (Vietnamese and/or international) teams and individuals carrying out research within the property; and provide a venue for scientific gatherings and colloquia;
- **Local involvement and engagement**- the provision of work and research placement, including for outstanding Ninh Bình University and other students, as well as scientific education for local community/schools; and
- **Public outreach**- through static displays and presentations on the cultural and environmental heritage of Tràng An.

The Centre's development will progress through two phases over the next ten years:

- **2014-2019.** A proportion of funds will be set aside to build and equip the TràngAn centre in its role as research field-station and cultural and environmental monitoring service. During this time, the Centre will formalise guidelines about the property's common research programme, ensuring that investigations continue to be undertaken with inter-related goals, with active collaboration in the field and with particular effort made to translate and disseminate research output into Vietnamese/English.
- **2019-2024.** During this phase, the staffing of the Centre will rise to 10-12 assessors, researchers, technicians and administrative personnel under the director (filling a diversity of roles from park monitoring, and scientific research within the property and beyond, to national and regional/international missions). The Centre will have established a reputation not only for the level of excellence in heritage management within Vietnam; but also, through its research and collaboration, it will look to have achieved status as one of the region's leading bodies assessing human-environment interaction, development and

heritage sustainability.

The management of archaeological resources will be conducted through the Centre and take the following form:

- ***Regular site inspection*** that will include the instigation of appropriate measures **to maintain and enhance site integrity** against physical damage (e.g. erosion) or bio-turbation (e.g. termite infestation).
- ***The formalisation of risk management practices.*** These will include the requirement and creation of shoring systems on open excavations. For example, the modular, joint-based shoring system has been designed specifically in response to the demands of excavations into unstable deposits - such as those into shell middens - a recurrent feature of archaeological sites in Tràng An.
- ***Access management*** will be regulated according to whether sites are identified in protected areas of Tràng An or areas that are open to varying levels of visitation by the public. Where the latter, appropriate signage, maintenance of paths and facilities and, where necessary, enclosed cordons will be established.
- ***Curation and recording*** of finds will take place within customized storage facilities at the Centre. A detailed register of all archaeological, geological and ecological sites (containing information as appropriate: on period, state of Conservation, accessibility and history of investigation) will be created and maintained. Sampling protocols and specialist analysis that is to be undertaken away from the Centre (including internationally) will be regulated and administered; and a standardised approach to recovery and recording will be established for use by researchers working within the property.
- ***Presentations*** will be made to the general public through displays and talks. While there is currently no public to sites of special scientific interest within Tràng An, specialist tours and seminars will also be arranged with advanced notice to take small numbers of people (including students) to visit active excavations and conservation work within the property and encourage interest in the property's cultural and natural heritage value.

The current draft document presents details of the procedure and funding associated with the **first phase of post-inscription development of the Centre: 2015-2019**. During this period RR will serve with the Tràng An Management Board (TAMB) as a non-stipendiary archaeological and scientific consultant. The remit of this position will be to instigate and guide research and management capacity-building within the property - in accordance with the World Heritage nomination document. The intention is that this position will be turned-over to a capable local who has received training and has gained experience up to a sufficient level within or associated with the Tràng An archaeological management and research programme so as to enable them to execute the post effectively. Funding for this area of the TAMB's activities is presented in 4.3.3.

2. Monitoring

The cultural and natural heritage monitoring programme within TràngAn will involve TAMB staff in the following matters of maintenance:

2.1 Site health and safety- scheduled inspection of site infrastructure (e.g. the metal staircase at Hang Boi) to ensure they are in good repair. For archaeological sites situated outside of public access areas inspection should be carried out every six months; for any cultural or

natural sites within public access areas, such as temple locations, inspections need to be on a bi-monthly basis. Issues of concern with respect to such places will be to ensure that access points are in good repair (e.g. hand rails are in good order and steps - such as those in the Galaxy Grotto are clean of mud to reduce the chance of people slipping). With increasing visitor numbers to these areas post-inscription, the need exists for a medical response protocol (e.g. first training for at least one key member of site/property staff at or in the vicinity of the most popular public stopping points. In the unlikely event that evacuation is necessary a suitable extraction plan will be in place. Mobile phones will ensure all staff can be in immediate contact - principal and emergency contact numbers will be issued to all staff working in the property.

2.2 Site maintenance - at six-monthly intervals staff (including at least one archaeologically knowledgeable individual (e.g. a member of property staff who has worked at an archaeological site within TràngAn) will inspect the integrity of on-site fixtures, such as shoring, fencing and lighting. The application of non-toxic wood treatment against termites will be necessary for the wooden shoring at sites like Hang Boi and Hang Trong and termite activity should be recorded and appropriate measures taken (e.g. reapplication of wood treatment or replacement of timbers) if required.

2.3 Path maintenance - at six-monthly intervals property staff will clear overhanging foliage from paths and signage in the Special Scientific Zone of the property. The paths themselves will be inspected and repaired where necessary in a low impact manner (e.g. non-toxic materials to be used). When an archaeological site becomes accessible to the public this inspection rate will increase to every three months.

2.4 Habitat and site integrity- monitors will also be charged with ensuring (in liaison with forest wardens) that illegal activities such as hunting and habitat damage do not take place within the property boundaries; any such activities will be reported immediately to the TAMB to be actioned. This element of the monitoring regime will extend to ensuring that no cultural or natural heritage sites (or potential cultural heritage sites, e.g. unexcavated caves) are looted/damaged - to include the removal of, and where necessary/possible action in response to, graffiti (as seen previously in the lower cave at Hang Boi).

3. Training and outreach

The following measures will be instigated through the TAMB to begin capacity-building in archaeology- and science-related skill-sets among property staff, and outreach to the visiting public:

3.1 On-site training- there will be a formalisation of the pre-inscription practice to involve selected (and interested) property staff in excavation and other scientific research-related activities in more than simple supportive roles. Staff will be encouraged to work with visiting specialists and learn from them both field, cataloguing and conservation methods (see Section 7). Specialists will, reciprocally, accept responsibility for ensuring that staff are included in these scientific works at a level appropriate to their ability and experience in any given field-work period (i.e. with increasing responsibility commensurate to increasing experience). It is anticipated that the most promising of these individuals (e.g. those who are more engaged with the nature of the research being undertaken) will be encouraged to form the core of the TAMB's own Monitoring, Sustainability and Research division (with this, ultimately, intended to become the basis from which the *Centre for Human-Environment Relations, Tràng An* of the nomination will be formed).

3.2 Media coverage- in addition to the presentation of static displays within the Visitor Centre and media interviews by the principal investigators of research projects undertaken within Tràng An (continuing a tradition that is already well-established), the TAMB will provide a

live video-feed within the Visitor Centre of archaeological or other scientific data-collection when specialists are working in the field. It is anticipated that this live-feed will run for two hours in the morning and two hours in the afternoon (possibly with looped video-repeats during the time in between). The objective of this is to make scientific work more accessible to the public, and in so-doing generate interest. This initiative has the secondary benefit of creating an archive record of said investigations that can be lodged with the TAMB and made available to future researchers or interested parties.

3.3 Site visits- by increasing exposure and in-direct access to scientific activities within the property (and with appropriate maintenance of the path system and site infrastructure) it is anticipated that the TAMB will in due course (and according to public interest) offer a range of site-visit options for tourists. These will include:

- 3.3.1 *Unguided but limited access* to one or more chosen site locations. For these, sites there will be increased on-site information services available, either in the form of leaflets collected at the Visitor Centre or through on-site static displays (cheapest);
- 3.3.2 *Guided access.* This package will be more costly and will include commentary by an accompanying TAMB staff-member. This will be open to smaller groups (no more than around 14 people). Site access will still be limited, but involve the capacity for question and answer;
- 3.3.3 *Specialist guided access.* This will be the most expensive of the three packages and will be for small groups only (no more than around seven people at a time). These tours will be led by an experienced scientist and will need to be pre-booked. They will include full site access - with all visitors wearing the appropriate Personal Protection Equipment (most particularly, hard-hats, appropriate clothes and shoes) and will be schooled prior to entering the site about appropriate on-site behaviour (e.g. no smoking, littering or walking close to the edge of an exposed archaeological section).

3.4 Special interest recreational visitors- As the peak period for visitors to Tràng Anis during the first three months of the year, in order to encourage visitors outside of this period and to diversify the range of interest groups, the TAMB will be encouraging small special-interest parties, such as climbers, to come and experience the natural resources that the property has to offer.

4. Scientific research -following collaboration leading to the World Heritage inscription of the majestic *Tràng An Landscape Complex*, the universities of Cambridge and Queen's (UK) together with other international institutes and local stake-holders in Tràng An will establish a dedicated Southeast Asian Archaeology & Heritage initiative to accompany the cultural and natural management programme for 2015-2019. This will expand scientific understanding of the region's past and the role of archaeology in global heritage management.

4.1 Research summary - under glacial conditions the continent of Asia extended into the Southern Hemisphere, while up to seventy-five per cent of that additional landmass - 'Sunda Land' - becomes submerged during interglacial marine inundations (or transgressions). The impact of these cycles of sea-level change on the history of human dispersal and settlement across Southeast Asia from the Palaeolithic to the Neolithic is always acknowledged to have been profound, but it is one that remains largely uncharted. In the context of the growing number of palaeo-genetic and anthropological discoveries that are only raising more questions than answers about this region's deep past, an understanding of both the complexity of dispersals and the role that Southeast Asia now clearly played in late human evolution hinge on constructing a detailed picture of the human-environment relationship that lies at the heart of the Sunda legacy. To address this, the TAMB with its collaborators and associates will combine the exceptional geological record of marine transgressions and archaeological sites that have been preserved in the

sub-coastal Trảng An massif, northern Vietnam, and which led to its inscription on the UNESCO World Heritage List in 2014. Exploiting this record, the project will provide the first dedicated study to track the way early human communities adapted to the coastal evolution of this region across the key three marine transgressions of the Late Quaternary between 59,000 and c.1500 years ago, and in so doing will provide pioneering insights into forager landscape and seascape use in the tropics.

4.2 Research programme- the programme envisaged for this five-year period will address three principal research questions of global importance to the understanding of human dispersal in prehistory. These questions have been long-standing because of the enduring absence, until now, of an appropriately detailed geo-cultural record in Southeast Asia. They also respond directly to the urgent need to contextualize an increasingly complex picture of hominin radiation, diversity and adaptive strategies that human origins research is uncovering in this geographically important part of the ancient world. From the discovery of a new diminutive human species (*Homo floresiensis*) (Morwood *et al.* 2004) and population centre for another early human species, known only as the Denisovans (Cooper & Stringer 2013), previously only found in the Siberian cave site of the same name, to precociously evidence of *Homo sapiens* (Mijares *et al.* 2010), to the recent announcement of early Palaeolithic cave art (Aubert *et al.* 2014), Southeast Asia has been challenging and transforming our understanding of human evolution over the last decade. The central questions to be addressed are as follows:

- a. How did Southeast Asian late- to post-Pleistocene communities respond to the three coastal inundations (marine transgressions) that occurred 59,000-1500 years ago; and what universal principles of human adaptation are to be found in the way they responded?
- b. Were coastlines preferentially selected by early humans; and what is the role of such transitional environments (ecotones) in human adaptation?
- c. How did early settlement systems cope with the high resource diversity and low resource accessibility that typifies environments in Southeast Asia; and are there modern lessons in economic resilience that can be learned from such strategies?

4.3 Core (in-country) funding - £60,000 per annum for the five years (2015-2019) will total of £300,000, to be allocated by the Xuan Truong Enterprise and administered through the Trảng An Management Board. This money is provided as a contribution towards the second (post-inscription) phase of archaeological research within Trảng An, with portions of the total sum allocated (on a yearly basis) to the three participating stake-holders: University of Cambridge, Queen's University, Belfast and the Trảng An Management Board. RR will be the overall Principal Investigator. Due to Vietnamese law, this budget can only be committed to on a yearly basis (and not for a five-year term). To help mitigate the issue of university under-writing that is likely to arise at both Cambridge and Queen's, the Board will provide a statement-of-intent in writing committing them to this programme of funding. The agreed (Graeme Barker [Cambridge], Ryan Rabett [Queen's], Bui Van Manh [TAMB], Paul Dingwall [World Heritage]) break-down of this money is as follows:

- 4.3.1 **University of Cambridge:£30,000 p/a** (£150,000 over 5 years) - intended to fund a single five-year post-doctoral post, or one three-year post and one 2-year post; and in each case with the intention that this should be combined with supplementary Newton Trust funding to meet the total expected cost (including 40% overheads) of the position(s) at Grade 7 of £50,000. RR will serve as mentor in the capacity of 'Visiting' or 'External Fellow' of the McDonald, and agrees to add this affiliation to project-related publications. Funding for periodic visits to Cambridge by RR will be drawn

from his (as PI) c. 50% proportion of Departmental overheads arising from the post(s). The post-holder(s) will be able to apply for D.M. McDonald funds to supplement their research costs.

4.3.2 **Queen's University, Belfast: £20,000 p/a** (£100,000) - intended to contribute towards the costs of one or more PhD studentships within the School of GAP. Most conservatively (if associated overheads are 40% and the studentship is rated for an overseas student) the predicted total per annum cost will be c. £35,000, leaving c. £15,000 per annum or less to be found by Queen's or by other means).NB: the residue of the 2012 Project: JCAG/172 (award RG69404) to undertake research in Tràng An, will be transferred from Cambridge to Queens: £19,244.40 (£14,341.65 of which is already sub-contracted to Queen's).

4.3.3 **TràngAn Management Board: £10,000 p/a** (£50,000). This total is sufficient to cover a 3-week field season of research in Tràng An per annum + partial management costs (or vice-versa). Additional funds, in the order of £3000 to £5000-equivalent, might be available through the Board's own Provincial budget. Further small-scale funding to the TAMB can also be raised under the heading of 'impact component costs' through the AHRC and NERC councils².

5. **Partner sources of research funding-** financial backing for research (and salaried research staff) will be sought for this research programme through internal university sources (e.g. the D.M. McDonald Grants and Awards scheme, University of Cambridge) and externally through national research council grant applications (e.g. to the Arts and Humanities Research Council, UK).

6. **Involvement of Vietnamese research institutes-** links will be maintained with the Institute of Archaeology, Hanoi through the Vietnamese research permit system and through staff participation in TAAP field-work periods. It is not currently anticipated that the Institute will be seeking to conduct any further independent archaeological investigation within Tràng An (NB: in 2012 such work as was undertaken by the Institute within the property was paid by the TAMB under the extraordinary circumstances of the lead-up to the UNESCO nomination bid). Close collaborative research links with the Institute of Geoscience and Mineral Resources, Hanoi are also anticipated to continue; whilst links to other professional research bodies within Viet Nam will also be sought where appropriate and upon request.

7. **Curation and conservation of materials-** it is intended that excavated or collected finds will be housed in dedicated, secure and climate-controlled facilities (possibly nearby to the Visitor's Centre to allow ready access - e.g. to change materials on display). Finds selected for specialist analysis on short-term loan at institutions within Viet Nam or abroad will be tracked from and returned to this point of storage.

8. References

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3. Mijares, A.S. *et al.* 2010. New evidence for a 67,000-year-old human presence at Callao Cave, Luzon, Philippines. *Journal of Human Evolution* 59(1): 123-32.
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²*In-country field research costs:* Average: c. £45 per person per day (or £945 for 21-day field season. Thus eight persons for 3-weeks = c. £7560. *Management costs:* TBA.

Annex 6. Cave lighting and the control of unwanted plant growth in caves in Trang An Landscape Complex, Vietnam

By Paul Williams, University of Auckland, New Zealand

The Trang An area has many caves. Recent surveys by Laumanns (ed.) (2014) have mapped 58 caves in Ninh Binh Province with a combined passage length of 13.6 km. The caves are relatively short, averaging about 235 m in length, with the longest mapped being 1226 m. Many of these are located in the core area of Trang An World Heritage property. Although caves are found from water-table level (2 - 8 m) to over 100 m elevation on hillsides, most of the caves entered by tourists are at water-table level and are accessed by boats. These are known as 'foot-caves' because of their location at the foot of limestone cliffs and towers (*Appendix Photos 1, 2*). They often penetrate right through hills to emerge in sheltered enclosed depressions on the other side. The silent subterranean boat journeys through them are a very important, very unusual, and much appreciated part of visitor experience in the World Heritage area.

I was invited to make an investigation in January, 2015, into the occurrence of unwanted plant growth around light fittings in tourist caves in Trang An caves. I undertook this with the guidance of park staff and sometimes in the company of Drs Van and Trung of the Institute of Geosciences and Mineral Resources of Vietnam. The problem was found to be similar to that encountered in many tourist caves throughout the world. Lighting in caves provides an opportunity for plants to grow in places that are normally always dark. The organisms involved are algae, cyanobacteria (blue-green algae), mosses and other plants, such as ferns (*Photos 3, 4*) that are often found around the entrances of caves. These are photosynthetic organisms that can proliferate in the interior dark zone of caves when light is available, provided the substrate material and humidity conditions are also suitable for them. Collectively these plants are known as *lampenflora* (or *lamp flora*). These growths displace natural microflora of bacteria, algae and fungi associated with moist dark places in caves, so they distort the natural ecosystem and are often considered aesthetically as well as ecologically unacceptable.

Algae are photosynthetic single celled plants that usually rely on sunlight to grow, although some algae can grow in total darkness by using chemical nutrient sources instead of sunlight, i.e. they grow *chemo-organotrophically*. Algal species can drift into caves on air currents or be introduced by percolating water, and some are carried in by cave visitors. Photosynthetic algae die in caves when there is insufficient light, but cyanobacteria are more versatile than algae and can utilize a fuller spectrum of light.

The occurrence of *lampenflora* around lights in tourist caves is regarded to be an indicator of inadequate management. The problem has been recognized at Trang An, so must be dealt with; although the incidence of *lampenflora* at Trang An is not severe. This report indicates what can be done to mitigate the problem and also considers the need for re-lighting caves to bring them up to an international standard.

This report has three sections:

- An explanation of the context and nature of the *lampenflora* problem.
- Suggestions concerning how the *lampenflora* problem might be tackled and managed.
- Recommendations for improving the tourist cave lighting system.

1. Effect of lighting on plant growth and visitor experience

When cave lighting enables lampenflora to grow, questions need to be asked about the spectral quality of light emitted by the lamps being used to illuminate the caves, the position and frequency of lamps, and the duration of lighting.

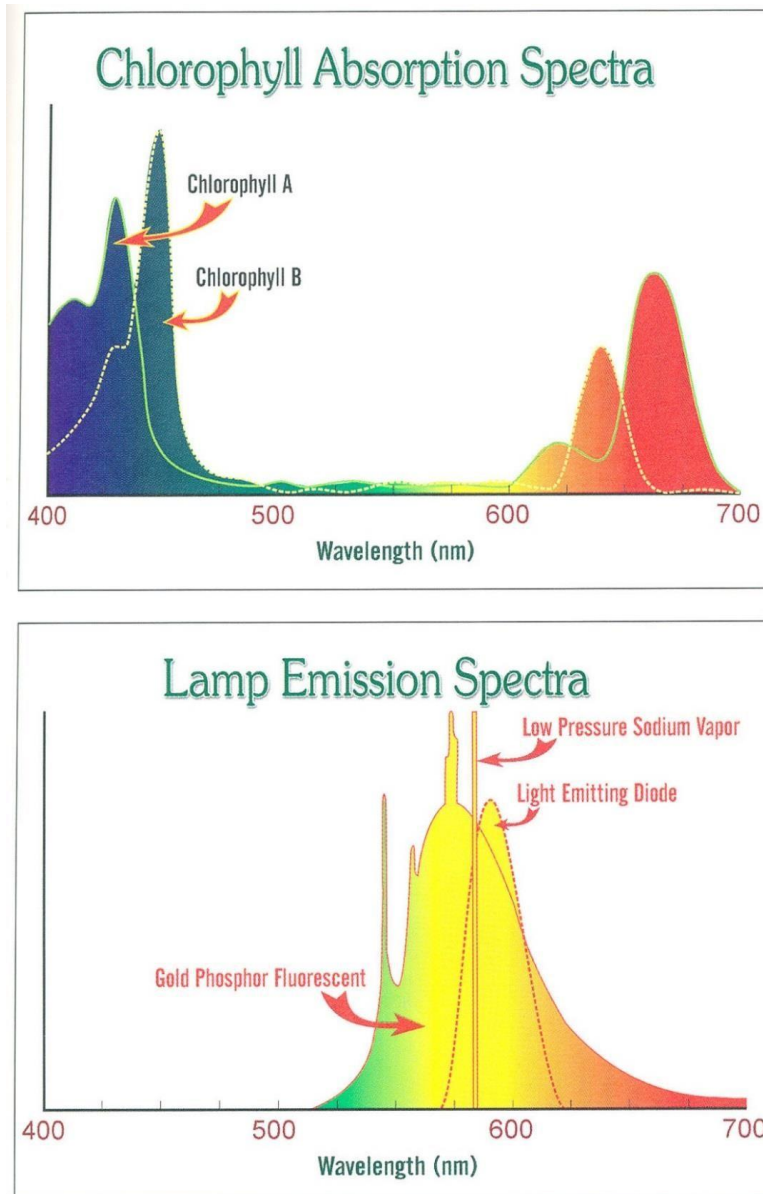


Figure 1

Upper diagram shows the absorption spectra of chlorophyll A and B in plants.

Lower diagram shows the emission spectra of lamps sometimes used to light caves. Tungsten filament domestic light bulbs were often used, but are no longer considered suitable [from Olsen 2006].

Plants contain chlorophyll which enables them to use sunlight in photosynthesis to grow. Natural light is made up of different wavelengths in a rainbow spectrum of colours. Chlorophyll absorbs light in the red (600-700 nm) (nm = nanometres) and blue (350-480 nm) wavelengths, but does not strongly absorb light in the yellow to green range. Figure 1 from Olsen (2006) illustrates the absorption spectra of plants and contrasts it with the emission spectra of lamps sometimes used to illuminate caves. From this it is clear that the best way to control unwanted plant growth in caves is to choose lamps that emit light of wavelengths that plants cannot use in photosynthesis, that is, in the yellow-green wavelengths that fit between the absorption peaks for chlorophyll.

Experience in dealing with the lampenflora problem shows that light emitting diodes (LED) are the most suitable light sources, because some are available that emit light in the 580-600 nm range. LED lights are readily available, their light can be focused, they emit little heat, and have very long bulb life (years). They operate effectively on low voltage systems (12v) which also makes them safe to maintain. White and green fluorescent lamps have also been tried for cave lighting, but these lamps are rather long and difficult to focus and emit light that many people consider not very acceptable aesthetically (Photo 10). Likewise, sodium vapour lamps emit orange light that looks unnatural underground. Tungsten filament incandescent lamps have two major disadvantages: a significant amount of light is emitted in the photosynthetically useful range and they are also inefficient with about 94% of their energy emitted as heat.

As well as selecting the most appropriate lamps, lighting design is also very important. The first consideration is the power supply (Photos 5, 6). Mains electricity is often used, but in the wet environment of flood-prone foot-caves considerable care has to be taken for safety reasons. The mains supply in Vietnam is 220 volts (Photos 8, 9). It is possible to reduce this by step-down transformers and then supply power by low voltage cables to switches and the lamps. Having 12v DC all the way would be safe, but would likely be more expensive to install. The possible options for the complex distribution of caves at Trang An need careful consideration and costing by technically qualified electricians.

Recommendation 1 concerning power supply. *Engage technically qualified electrical engineers or electricians to assess and cost possible options for the provision of power to tourist caves in the World Heritage property, taking particular account of visitor safety and equipment durability in caves liable to inundation by floodwater. Low voltage systems are preferred in caves, possibly with DC power, and should be capable of supplying LED lamps. Transmission lines to caves should be concealed from public view. Automatic switches are required to turn off lamps when there are no visitors.*

Lamp location must be chosen appropriately for aesthetic reasons, for safety reasons (especially where high voltage power is used), and so as to minimise lampenflora growth. In addition to light, lampenflora also require moisture and suitable soft substrate; so if lamp location is near dry clean rock then there will be little opportunity for lampenflora growth. Duration of lighting is also important, because no light means no photosynthesis, no heat emission and cheaper running costs. So switches/ triggers are essential to turn lights off when they are not required. Automatic monitors can be installed to turn lights on as visitors approach and turn them off as visitors pass.

From the perspective of visitors, it is very important to avoid glare from the lights (Photo 7). Without glare, the sensitivity of human eyes to light increases considerably; consequently shielded, diffuse lighting reduces the strength of lighting required, and so also reduces the light available for photosynthesis. Occasional spotlights to illuminate particular features of interest are perfectly acceptable provided they are turned off when no visitors are present.

Skilfully placed lighting also considerably enhances the visitor experience by illuminating the cave to good aesthetic advantage. This needs to be done subtly to reveal and enhance natural characteristics of cave form, displaying speleothems to advantage, lighting hidden side passages, and even underwater features. Above all, naked lights must not shine in visitors' eyes (or in the eyes of people rowing boats). Hazards such as low hanging stalactites could be illuminated or have a reflective patch. In general, lighting should reveal subtle variations in the colours of Nature rather than impose artificial multi-colour hues in a World Heritage site that

are more characteristic of a city bazar (Photos 11, 12).

2. Removing and managing lampenflora

The problem of removing lampenflora from tourist caves was investigated in detail in connection with Waitomo Glowworm Caves in New Zealand in the late 1970s. The study involved university botanists and zoologists and was carefully undertaken. It was concluded that three applications of calcium hypochlorite [$\text{Ca}(\text{ClO})_2 \cdot 2\text{H}_2\text{O}$] solution at 2 hour intervals over a six hour period produced a 100% kill of unwanted cave plants, a 2% solution (20 g/litre commercial granular swimming pool purifier) being of adequate strength for algae, but a 4% solution being required for more resistant mosses and ferns. 5% should be regarded as a maximum. Since decomposition of calcium hypochlorite can leave a slight white residue of calcium, some preference may be given to sodium hypochlorite, but the bleaching effect is similar. The solution is usually sprayed as a mist onto the lampenflora, and plants are killed and bleached within 20 minutes to 2 hours. A commercial back-pack spray as used in horticulture is suitable and convenient. Dead plants should be washed off with water.

Decomposing calcium/sodium hypochlorite releases chlorine gas which, even at low concentrations, is mildly offensive to people and dangerous at high concentrations to animals (e.g. bats) and humans. So application should only be in well ventilated passages and spray must not be inhaled or be permitted to wet skin - note the direction of air currents before spraying. A safe and effective approach is to spray initially with up to 4% solution and then, once the areas are clear of lampenflora, perform maintenance sprays around lights at lower concentrations (2 to 3%) at 6 monthly intervals. The rule should be to apply concentrations as low as possible and as infrequently as possible to achieve lampenflora-free conditions. Appropriate protective clothing should be worn when mixing and applying chemicals. Spraying is best done after the last tour of the day, in order to give chance for the chlorine smell to disperse before morning. Application should be scheduled during the low season for tourist visitation.

As an alternative to calcium/sodium hypochlorite, hydrogen peroxide (H_2O_2) is also sometimes used in up to 10% solutions, but reports of its effectiveness are mixed. Unlike chlorine bleach, the breakdown products of hydrogen peroxide (water and oxygen) are relatively harmless. However, more concentrated solutions are a danger to the user, so great care is needed when diluting and applying this chemical.

Recommendation 2 concerning lampenfloraremoval. Apply calcium or sodium hypochlorite at 2 to 4 % (20-40 grams per litre of water). Spray affected area around lamps where there is discernible green lampenflora growth. Repeat if necessary the following day. Once lampenflora growth is gone, use a maintenance spray of 2% at six monthly intervals to prevent lampenflora re-establishment. Wash off dead plant residue with water.

3. Recommendations concerning the lighting system in caves in the Trang An World Heritage complex

Caves are an important feature of Trang An. So lighting them appropriately will enhance visitor experience and enable them to appreciate more deeply the natural features of underground environments. Although lampenflora were visible in many places during my visit, the infestations were not excessive and sometimes not present at all. Galaxy Cave, for example, has no lampenflora problem. Cleaning around individual lamps will not be difficult, because

spraying is all that is required. Brushing may be needed in the few places where there are ferns and mosses, about a day or so after they were sprayed, depending on whether or not the first spraying was effective in killing them.

The main issue with the cave lighting is to improve it to a standard expected of a World Heritage site. Up to about 20 caves have lights (including ~14 around Trang An, ~3 at Tam Coc, 1 at Galaxy and perhaps in other places) and they involve different tour companies. Problems observed with lighting are found both underground and on the surface.

The first problem is the means of getting power to caves and to other facilities in the World Heritage core area. At present cables are often conspicuously visible (Photos 5, 6, 8), in at least one case being hung at a low height across a waterway (near Dai La pagoda) used by tourists. As far as possible cables should be out of sight, this being easier to achieve on the surface than in caves. The possibility of laying some cables underwater should be considered.

The second problem concerns the distribution of power and light fixtures underground. Cables are very obvious when strung along the roof or wall of a cave passage (Photo 6). This is to keep them above floodwater level and to take power to lights, but cables and fittings are particularly conspicuous if there is no attempt to hide or camouflage them (Photo 8). Lights are placed to assist visibility when rowing boats, but in general have not been located to enhance the aesthetics of the underground experience by showing the cave to best advantage. Caves at Trang An are lit mainly for practical reasons and do little to reveal the beauty and interesting natural features of the subterranean environment. Lamps are often just hung from the ceiling and their brightness has a blinding effect on both boat-rowers and visitors (Photo 7).

Just as building a large house has two aspects, firstly involving the architect to design it and, secondly, engaging the builders to construct it, so the process of lighting and re-lighting caves has two distinctly different aspects: (1) conceptualising and planning the lighting scheme required, and (2) undertaking the technical aspects of electrical wiring and light fitting by skilled, technically-qualified electricians.

As a result, two separate skills are necessary to complete the task required.

Recommendation 3 concerning cave lighting scheme. *Engage a person with prior experienced in lighting tourist caves to provide a conceptual plan, with drawings, of a lighting scheme for caves specified by the Management Board under stage 1 of the re-lighting scheme. This person should liaise with electricians engaged to install the scheme, so that the requirements of the new lighting plan are explained to them and to ensure that electrical safety and practical requirements are taken fully into consideration.*

Recommendation 4 concerning technically qualified electricians. *Because public safety is involved, technically skilled, experienced and formally certified electricians should be engaged to install the new lighting scheme in the caves as specified under the stage 1 conceptual plan.*

Some commercial operations in the World Heritage area are larger and more profitable than others, so the concession holders have different financial capacities to meet the cost of re-lighting. The smaller operations such as at Galaxy Cave will need financial and technical assistance to meet the standard required. Not everything can be done at once, so a staged process is called for. In my opinion it would be best to start with Trang An in order to set the standard, gain experience, and lead by example, and then move to Tam Coc and the other sites.

Recommendation 5 concerning financial implications. *The Management Board of Trang An World Heritage property should consider the financial implications of re-lighting caves entered by visitors and the ability of concession holders (tour operators) to meet the costs with a view to securing or providing financial assistance where appropriate and necessary.*

Recommendation 6 concerning timetable. *The Management Board of Trang An World Heritage property should prepare a timetable for completion of re-lighting all existing tourist caves and should also consider what other lighting may be required in the future in other caves.*

Consolidated list of recommendations

Recommendation 1 concerning power supply. *Engage technically qualified electrical engineers or electricians to assess and cost possible options for the provision of power to tourist caves in the World Heritage property, taking particular account of visitor safety and equipment durability in caves liable to inundation by floodwater. Low voltage systems are preferred in caves, possibly with DC power, and should be capable of supplying LED lamps. Transmission lines to caves should be concealed from public view. Automatic switches are required to turn off lamps when there are no visitors.*

Recommendation 2 concerning lampenflora removal. *Apply calcium or sodium hypochlorite at 2 to 4 % (20-40 grams per litre of water). Spray affected area around lamps where there is discernible green lampenflora growth. Repeat if necessary the following day. Once lampenflora growth is gone, use a maintenance spray of 2% at six monthly intervals to prevent lampenflora re-establishment. Wash off dead plant residue with water.*

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- 2 Olsen, R. 2006. Control of lamp flora in developed caves. *In* Hildreth-Werker, V. and Werker, J. C. (editors). *Cave Conservation and Restoration*. National Speleological Society, Huntsville Alabama, pages 343-348.

Photographic Appendix

Photos to illustrate lampenflora and lighting system problems in caves in TrangAn Landscape Complex World Heritage property



1. Toi Cave entrance at the base of a karst tower. The scale can be judged by the size of rowing boats to the left of the foot-cave entrance.



2. Foot-cave at Tam Coc



3. Green lampenflora beside light in cave. The extent of the infestation is limited by the dry rock surface.



4. Ferns growing beneath lamp in cave.



5. Power pole and lines bringing electricity to cave



6. Cave lights and power lines strung along cave wall.



7. Bare lights can dazzle visitors and people steering boats, so present a safety issue, especially when many boats are trying to pass in different directions.



8. Exposed 220 v power fittings in cave



9. Power switches in cave located above the level reached by flood water in wet season



10. White light from an exposed fluorescent tube



11. Mixed lighting colours confuse rather than enhance the visual appreciation of the cave



12. Lighting at wharf in Galaxy Cave

Annex 7. Summary of recent investment funding for the Trang An Landscape Complex

Project/activity	Source/ Implementing unit	Year	Funding (thousand VND)
Project component of Master Plan to preserve, restore and promote the values of cultural-historic relic areas in the Hoa Lu Ancient Capital, 2000 to 2015.	Department of CST of Ninh Binh	2003-9/2012	7,500,000
Project investing in building north, east, south ports into the heart of special protection area of Hoa Lu Ancient Capital.	Department of CST of Ninh Binh	2005-2010	14,653,318
Project investing in repairing, restoring historic relics of Hoa Lu Ancient Capital.	Department of CST of Ninh Binh	2005-2006	26,339,000
Project investing in repairing, restoring of Square and Festival Yard at King Dinh Tien Hoang temple and King Le Dai Hanh temple.	Department of CST of Ninh Binh	2009-2010	46,914,000
Project investing in repairing, restoring Trang An scenic/ecological area.	Xuan Truong Company	2005-2011	2,614,000,000
Project of building infrastructure Am Tiem cave area, car park and services area in the Hoa Lu-Trang An area.	Xuan Truong Company	2011-2013	1,300,848
Project of research on values of aesthetics, geology-geomorphology of Trang An.	Management Board	2012	6,669,784
Project of archaeological research, exploration and excavation on human-environment relationships in Trang An	Management Board	2012	3,817,000
Communication on heritage protection to residents in communes within Trang An.	TALC Management Board	2012	100,000
Total			2,721,293,950

Annex 8. List of investment project for the 2016-2020 period

No.	Investment project	Unit (billion VND)	To be responsible for by		
			State	Private sector	Others
1	Upgrading and restoration of Great Viet State related relics	200.000	x	x	x
2	Restoration of palaces and ramparts of the Hoa Lu Ancient Capital	120.000	x	x	
3	Upgrading King Ly Cong Uan's temple	70.000	x	x	
4	Building a thematic museum on heritage values of the Trang An Landscape Complex	40.000	x		x
5	Upgrading and restoration of the Hoa Son cave pagoda	25.000	x	x	
6	Upgrading and restoration of small, isolated relics and ancient houses	38.000	x	x	x
7	Upgrading and restoration of caves, geosites and in-situ musea	42.000	x	x	
8	Dredging of some water ways within the Trang An Scennic Landscape	530.000	x	x	
9	Infrastructure development for tourism services at Tam Coc-Bich Dong Scennic area	187.500	x	x	x
10	Local resettlement	560.000	x		x
11	Upgrading local communcation system	300.000	x		x
12	Boundary and explanatory panels	175.000	x	x	x
13	Upgrading and restoration of the Co temple	10.000	x		x
	Total	2,297.500			

Annex 9. Action plan and estimated funding for the Trang An Landscape Complex in the 2016-2020 period

No.	Categories/Items	Estimated budget (US\$)					To be responsible/paid by		
		2016	2017	2018	2019	2020	TALC MB	Private sector	Others
I	Infrastructure improvement								
	Improving the parking system (incl. relocation of inappropriate parkings within the Property to the buffer zone) and operating electric cars	454,545.5	454,545.5	227,272.7	227,272.7	227,272.7		x	
	Improving the system of shops, stop-overs, other tourist service infrastructures	454,545.5	454,545.5	227,272.7	227,272.7	227,272.7		x	
	Improving public transportation, telecommunication network and other basic infrastructure components (electric, health care etc.)	454,545.5	454,545.5	227,272.7	227,272.7	227,272.7			Provincial/ District People's Committees
	Improving the cave lighting system	454,545.5	454,545.5	227,272.7	227,272.7	227,272.7		x	
	Improving the fire preventive system and conducting periodic drills	227,272.7	227,272.7	136,363.6	136,363.6	136,363.6		x	
	Annual sub-total	2,045,454.5	2,045,454.5	1,045,454.5	1,045,454.5	1,045,454.5			
	5 year total					7,227,272.7			

II	<i>Protection of cultural heritage values</i>								
	Monitoring and protection of archaeological sites and artefacts	227,272.7	227,272.7	227,272.7	227,272.7	227,272.7	x		
	Maintenance and restoration of historic relics	454,545.5	454,545.5	454,545.5	454,545.5	454,545.5	x		
	Inventory, assessment, protection and restoration of intangible heritage values (spiritual, religious festivals etc.)	227,272.7	227,272.7	227,272.7	227,272.7	227,272.7	x		
	Monitoring and assessment of impact of development activities (mineral extraction, construction etc.), of natural processes (natural disasters, climate change etc.) upon cultural heritage values	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		
	Annual sub-total	1,000,000.0	1,000,000.0	1,000,000.0	1,000,000.0	1,000,000.0			
	5 year total					5,000,000.0			
III	<i>Protection of natural heritage values</i>								
	Monitoring and protection of geosites	136,363.6	136,363.6	136,363.6	136,363.6	136,363.6	x		
	Monitoring and assessment of impact of development activities (mineral extraction, construction etc.), of natural processes (natural disasters, climate change etc.) upon natural heritage values	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		

	Annual sub-total	227,272.7	227,272.7	227,272.7	227,272.7	227,272.7			
	5 year total					1,136,363.6			
IV	<i>Environmental and biodiversity protection</i>								
	Monitoring and assessment of impact of development activities (mineral extraction, construction etc.), of natural processes (natural disasters, climate change etc.) upon the environment (land, water, air etc.) and biodiversity (eco-systems, flora and fauna etc.)	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		
	Inventory and assessment of biodiversity values (species, varieties, eco-systems etc.); external species, feral animals and their impact on the environment and biodiversity values	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		
	Improvement of regulation and mechanism for controlling hunting/gathering, feral animal activities	45,454.5	9,090.9	9,090.9	9,090.9	9,090.9	x		
	Implementing environmental impact mitigation measures in regard of the present transportation and tele-communication systems	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1		x	
	Annual sub-total	318,181.8	281,818.2	281,818.2	281,818.2	281,818.2			
	5 year total					1,445,454.5			

V	<i>Tourism management</i>								
	Improving the explanatory panel system of heritage (cultural, natural, intangible etc.) values	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		
	Improving visitor counting and controlling system at main gateways, monitoring visitor's violation; improving regulations and mechanism regarding tourism activities and tourism service providers and visitors	90,909.1	45,454.5	22,727.3	22,727.3	22,727.3	x		
	Controlling of the system of hotels, restaurants, stop-overs etc. in the buffer zone, ensuring overloading	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		
	Promoting new tourism programs, tours and forms and encouraging local participation (homestay, hiking, cycling, canoying, religious, spiritual, adventurous etc.)	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		
	Organizing, monitoring and assessing the effect of organizing spiritual and religious festivals	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Survey of visitors' satisfaction regarding heritage values, services etc.	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		

	Emergency preparedness measures and drills (fire, natural disasters, traffic jams etc.), safety insurance for visitors and local residents	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5		x	
	Developing the system of musea, information centres, stop-overs within the property and in the buffer zone in accordance with the master plan	227,272.7	227,272.7	227,272.7	227,272.7	227,272.7		x	
	Annual sub-total	636,363.6	590,909.1	568,181.8	568,181.8	568,181.8			
	5 year total					2,931,818.2			
VI	Management of sustainable development/ residential areas/extractive and commercial activities								
	Improving the system of regulations and mechanism for controlling construction, tourism service, extraction and commercial activities	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		
	Promoting and implementing new, eco-friendly forms and technologies (sanitary system, garbage collection and treatment system etc.)	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		
	Preparing and implementing population relocation options (if necessary) to the buffer zone	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		

	Improving basic infrastructure system (electric, transportation, school, health care, tele-communication etc.) for the present residential areas	454,545.5	454,545.5	454,545.5	454,545.5	454,545.5			Provincial/ District People's Committees
	Annual sub-total	522,727.3	522,727.3	522,727.3	522,727.3	522,727.3			
	5 year total					2,613,636.4			
VII	<i>Promotion, marketing, awareness raising activities</i>								
	Promoting and raising awareness of local people and visitors on heritage values, regulations and requirements of UNESCO and the Government regarding protection and promotion of heritage values; protection of environment, prevention and reduction of natural disasters etc. on mass media (TV, newspapers, websites, leaflets etc.)	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Setting up and maintaining website about the property	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		
	Preparing and implementing external programs on protection and promotion of heritage values at primary and secondary school system	136,363.6	136,363.6	136,363.6	136,363.6	136,363.6			Department of Education and training

	Organizing workshops, seminars at villages and residential centres on new income generating ways, encouraging local participation in the protection and promotion of heritage values	136,363.6	136,363.6	136,363.6	136,363.6	136,363.6	x		
	Organizing contests (musical, art, photo etc.) on protection and promotion of heritage values	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Encouraging and mobilizing local participation in the management of the property, protection and promotion of heritage values, protection of environment	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Annual sub-total	431,818.2	431,818.2	431,818.2	431,818.2	431,818.2			
	5 year total					2,159,090.9			
VIII	<i>Management Board activities and capacity building</i>								
	Improving Management Board structure and organization	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		
	Improving public-private partnership, mobilizing private investment, local participation and local authority in the protection and promotion of heritage	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		

	Capacity building of the Management Board (long-term (PhD, MSc), short-term and continuing education (both on management and specialty)	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Improving equipment capacity for management, monitoring, research etc.	90,909.1	90,909.1	45,454.5	45,454.5	45,454.5	x		
	Participating in national and international conferences, symposia, meetings on management, promotion and protection of heritage values	90,909.1	90,909.1	90,909.1	90,909.1	90,909.1	x		
	Preparing and implementing joint R&D projects with national and international partners	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Revision of management plan	9,090.9	9,090.9	9,090.9	9,090.9	9,090.9	x		
	Annual sub-total	327,272.7	327,272.7	281,818.2	281,818.2	281,818.2			
	5 year total					1,500,000.0			
IX	Research management								
	Inventory and assessment of archaeological sites and historical relics	90,909.1	90,909.1	68,181.8	68,181.8	68,181.8	x		In cooperation with DOST, DOCST, DONRE, national and international research institutions
	Inventory and assessment of intangible cultural values	90,909.1	90,909.1	68,181.8	68,181.8	68,181.8	x		
	Inventory and assessment of geoheritage values	90,909.1	90,909.1	68,181.8	68,181.8	68,181.8	x		
	Inventory and assessment of biodiversity values	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		

	Other national and international joint research projects on archaeology, geology, biodiversity, climate change etc.	45,454.5	45,454.5	45,454.5	45,454.5	45,454.5	x		
	Environmental bearing capacity assessment	45,454.5	45,454.5	22,727.3	22,727.3	22,727.3	x		
	Identification, assessment of negative factors on heritage values and application of preventive and reduction measures	22,727.3	22,727.3	22,727.3	22,727.3	22,727.3	x		
	Annual sub-total	431,818.2	431,818.2	340,909.1	340,909.1	340,909.1			
	5 year total					1,886,363.6			
	Annual total	5,940,909.1	5,859,090.9	4,700,000.0	4,700,000.0	4,700,000.0			
	5 year total					25,900,000.0			

Annex 10. Decision on approval of the management plan for the period 2016-2020, vision to 2030

**NINH BINH PROVINCIAL
PEOPLE'S COMMITTEE**

No: 1261/QĐ-UBND

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

Ninh Binh, 16th November, 2015

DECISION

On approval of the Trang An Landscape Complex World Cultural and Natural Heritage's Management Plan for the period 2016-2020, vision to 2030

NINH BINH PROVINCIAL PEOPLE'S COMMITTEE

Pursuant to the Law on the organization of the People's Council and Committee dated 26th March, 2003;

Pursuant to Decision No.82/2003/QĐ-TTg dated 29th April 2003 by the Prime Minister approving the Master Plan of conservation, restoration and promotion of historic-cultural values of Hoa Lu Ancient Capital, Ninh Binh Province (2000-2015);

Pursuant to Decision No.548/QĐ-TTg dated 10th May 2012 by the Prime Minister approving the Hoa Lu Ancient Capital Historic and Architectural Monument and Trang An-Tam Coc-Bich Dong Scenic Area as Special National Monuments;

Pursuant to Decision No. 14/38.COM/8B by the World Heritage Committee on the revision of the Management Plan including provision of the archeological and tourism management sub-plans;

Considering the request of the Trang An Landscape Complex Management Board at Document No.48/TTr-BQLDTTA dated 11th November 2015,

DECIDES:

Article 1. To approve the Trang An Landscape Complex Management Plan for the period 2016-2020, vision 2030 (to be accompanied with the boundary revision map).

Article 2. This Decision comes into effect from 30th November 2015.

Article 3. Head of Administration Office of the Ninh Binh Provincial People's Committee; Director of the Trang An Landscape Complex Management Board, Chiefs of departments mentioned in Article IX.2, IX.3 of the Management Plan and heads of relevant agencies and businesses are responsible for the implementation of this Decision./.

Recipients:

- As Article 3;
- Ministry of Culture, Sports and Tourism;
- Standing Provincial Party Committee and People's Council;
- Chairman, Vice-chairmen of provincial people's committee;
- Archive: VT, VP5,6&9. NL./.

**FOR AND ON BEHALF OF NINH BINH
PROVINCIAL PEOPLE'S COMMITTEE
CHAIRMAN**



Dinh Van Dien

