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17 January 2014
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SUBMISSION TO THE REGIONAL PLANNING INTERESTS BILL 2013 COMMITTEE INQUIRY

Incorporates:

1. Cover letter from Mrs Terri Irwin
2. Additional submission containing detailed information about the properties and conservation of the Steve Irwin Wildlife Reserve as authored by Mr Barry Lyon, Senior Ranger, Australia Zoo.
3. Condensed selection of media clippings in relation to the SIWR.

Dear Committee Members

I am thrilled to have the opportunity to provide a supportive submission to your Committee in relation to the Regional Interests Planning Bill 2013.

Steve's dream, which I am fulfilling, was to be able to protect natural areas of Queensland that have high conservation values, so that we could preserve our environment for our children and future generations.

Steve and I have used the success of our wildlife documentaries and the Zoo to be able to purchase tracts of land in Queensland with said high conservation values – this is what we do to help save native species and ultimately save the planet.

Our other conservation properties include 85 000 acres in Queensland's Brigalow Belt conserving animals such as the Woma Python; and 3 500 acres on Queensland's Great Dividing Range conserving animals such as the koala

When I lost Steve, I couldn't also allow his dreams and life goals to be lost as well.

To be offered the chance to conserve a large piece of unique Queensland land to be safeguarded forever was an honour that I wanted to see maintained and enhanced.

Whilst the Bill and the supporting Draft Cape York Regional Plan go a long way to providing the perpetual protection offered by Premier Newman, it is still not in an ultimate form that guarantees no mining on the SIWR – "not now, not ever".

I invite you all to read the complementary information I have provided so that you can truly understand the uniqueness of the Reserve and the unique opportunity we have to protect

this pristine area in perpetuity. The obvious solution is to name the Steve Irwin Wildlife Reserve in the Bill and thus ensure that it has the fullest protection that the Queensland Government can provide.

I would also like to point out to the Committee that I support the submissions made by the Steve Irwin Wildlife Reserve Steering Committee, Professor Craig Franklin, Sally & John Witherspoon (the previous owners of Bertiehaugh), McColm Matsinger Lawyers and the other scientists who have conducted research at the SIWR.

Steve was universally loved by Queenslanders, Australians and millions of people across the globe. He set the precedent for making sure fellow humans cared for and respected wildlife and the environment as much as he did, and was ultimately respected for this and all his efforts.

Steve changed the world with his extreme conservation efforts and innovative ideas. He made us all love wildlife and, because of this, Steve's legacy will live on forever. This is especially true as both Bindi and Robert are keen to continue to live by Steve's ideals and promote the conservation message.

Steve once said, "It's no good being a conservationist and keeping your lips sealed tight, no matter what you might be doing physically. You've got to tell people what you're doing, so they'll pick it up too, do the same thing. As for me, I'm going to keep on doing this until I can't do it anymore, and that will be the day when I say goodbye to this world".

This opportunity provided by the Newman Government to ensure that Steve's Place – the Steve Irwin Wildlife Reserve – is preserved forever, is to be commended. To enshrine his name in the Bill would help to continue this legacy for all time.

It is up to all of us to make sure that we all do everything possible to preserve our wild areas – and to tell people that this is what we are doing because it is the right thing for the environment and the right thing for Queensland.

It is for this reason that I ask you all to look closely at the intent of the legislation and make the changes necessary to ensure that Steve's Place is preserved in the highest environmental state and that all mining is banned, for all time.

Thank you for your time and consideration in this extremely important matter.

Yours faithfully

Mrs Terri Irwin
Australia Zoo

BRIEF ON THE PROTECTION OF THE STEVE IRWIN WILDLIFE RESERVE BY PREMIER NEWMAN AND THE QUEENSLAND GOVERNMENT
January 2014

Prepared by Mrs Terri Irwin, AM and Australia Zoo to accompany our submission to the Regional Planning Interests Bill 2013.

A freshwater section of the outstanding Wenlock River.

Firstly, we would like to congratulate the Newman Government for its impending legislation which will declare the Steve Irwin Wildlife Reserve (SIWR) and the associated Wenlock River on Cape York as Queensland's first ever "strategic environment area", thus protecting this key part of Australia's natural heritage from open cut and strip mining in perpetuity.

We have provided this Brief in support of the declaration.

In combination it contains summaries of a wealth of ecological knowledge and details of management initiatives implemented since Australia Zoo and its numerous partners and associates began operations on the Reserve in 2007.

EXECUTIVE SUMMARY

Terri Irwin, AM and Australia Zoo are pleased to support the Queensland Government's proposed Regional Planning Interests Bill 2013 – in particular, its aim to provide environmental protection to the Steve Irwin Wildlife Reserve (SIWR) in perpetuity.

In 2007, the SIWR (then known as Bertiehaugh Station) was purchased under the National Reserves Program to provide a lasting environmental memorial to Steve Irwin. This living memorial would also facilitate opportunities for research, land and water management, education and tourism – benefitting the environment and the wider Queensland community.

The SIWR is located on northern Cape York and comprises 135 000 hectares of diverse tropical ecosystems which supports an exceptional range of wildlife species including 170 bird, 44 freshwater fish, 46 reptile, 23 amphibian and 24 mammal species.

The Wenlock River, which borders the SIWR, supports more species of freshwater fish than any other Australian river and provides aquatic and riparian habitat for a wealth of rare, threatened and endemic plants and animals – many of which are only found here. It is also the most important river in Queensland for the vulnerable Estuarine Crocodile, featuring the best nesting habitat in the state.

The discovery of eight previously unrecorded perennial bauxite springs has allowed for the documentation of the springs' crucial role in providing water in the dry season to water-dependent flora and fauna across the entire Reserve and surrounding areas.

Management

Strategic and pro-active management has been employed to maintain and improve healthy landscapes across the Reserve.

To date, $3 million has been spent on this key conservation area for research, weed and pest control, fire regimes, land and water management as well as species protection.

This has culminated in an increase in wildlife numbers and species, improved environmental outcomes, decrease in weeds and feral animal damage and an increasing volume of knowledge of the natural landscape due to the ongoing field work in documenting the flora and fauna on the Reserve.

Research

The Reserve incorporates a purpose-built research station which can house up to 35 researchers at any one time. This internationally acclaimed facility has promoted research work by the University of Queensland, James Cook University, Griffith University, the Queensland Museum, the Australian Tropical Herbarium, the University of Adelaide, the Australian and the Queensland Departments of Environment and Heritage Protection.

The level of support and the ability for researchers to access pristine and often never-before-seen ecology ensures a high level of interest from both national and international researchers. It is intended to grow this particular facility to incorporate many new and varied fields of research.

Current studies include: hydrological studies of the bauxite plateau and springs; pharmaceutical studies of native plants; estuarine crocodile research, other specific species studies including the Spear Tooth Shark. Ongoing mapping of the indigenous fauna and flora continues – with many new species being discovered.

Benefits

The significant environmental protection offered to the Steve Irwin Wildlife Reserve will mean that current and future benefits will continue to flow to the community, the economy and to all Queenslanders.

- Traditional Owners – working collaboratively with Australia Zoo to develop eco-tourism enterprises; further employment opportunities; and educational support in environmental work.

- Education – collaborative programs to increase knowledge of local students regarding the environment and indigenous species. Current research also holds the key to providing safety programs which will better inform local people and visitors about the dangers that crocodiles can present and strategies to prevent harm.

- Economy – businesses throughout the Cape have much to benefit through increased eco-tourism, development and sale of medicines and natural products derived from ongoing research on the Reserve, as well as further future investment from Government and business.

- Environmental outcomes – preserving the native wild fauna and flora provides significant ecological benefits, along with increased land and water management regimes. There is also

the opportunity to engage local environmentalists to increase awareness and participation in environmental activities.

- The State of Queensland benefits from the good publicity that flows from having an environmentally significant part of the state being properly managed and marketed. With the increase in wildlife documentaries that can potentially be filmed in the Reserve – there is the opportunity to showcase Queensland to the world – thus exponentially increasing local, national and international tourism opportunities.

1) INTRODUCTION

The following is a snapshot of the Steve Irwin Wildlife Reserve dedicated by the then Prime Minister John Howard and the Australian Government to Australia's world leading wildlife conservationist and educator - Steve Irwin.

In July 2007 the Steve Irwin Wildlife Reserve was set aside under the Australian Government's National Reserves Program following the usual, highly rigorous, formal assessment process.

Australia Zoo is proactively and strategically managing the land in a diverse manner to benefit both nature and the community - both of which, in any case, are inexorably linked.

2) A BRIEF OVERVIEW OF THE RESERVE

The SIWR, comprising 135 000 hectares, is located on northern Cape York, situated closer to New Guinea than to Cairns, and covers a diverse mosaic of tropical ecosystems (35 recorded to date) on the catchments of the ecologically outstanding Wenlock River and its sister river the Ducie.

Any clean, healthy river exists only because its catchment is healthy.

The extensive savannah woodlands, rainforests, swamps and billabongs and interlacing watercourses on Steve's Place are in excellent condition.

This can be explained by the almost complete absence of disturbance to the biodiversity since the beginning of time i.e. minimal vegetation removal, no agricultural or pastoral activities in close proximity to the rivers, no industrial pollution and no mining activities.

These unique features all combine in crucial linking patterns across the landscape to stabilise soils, nutrients and hydrological flows to create the robust Wenlock and Ducie River systems as we see them today.

The SIWR features exceptional biodiversity, with 170 bird, 44 freshwater fish, 46 reptile, 23 amphibian and 24 mammal (excluding microbats) species recorded to date.

A significant range of rare, threatened and endemic plants and animals has been documented, along with a number species new to science and a new 'Of Concern' ecosystem type which features a new rainforest type found only at one spring.

A research and management operations base has been established at Coolibah, the site of a small abandoned sawmill near Stone's Crossing on the Wenlock River. This accommodates up to 35 researchers and volunteers at its peak usage.

A comprehensive management strategy has been developed and implemented – which is subject to review, as appropriate.

3) KEY NATURAL VALUES

a) The Wenlock River

The Wenlock, which runs for approximately 70 kilometres along the Reserve's southern boundary, is the keystone feature of the Nature Refuge.

Spring-fed and perennial for much of its 300 kilometre length, the Wenlock flows as a life-giving artery westwards across northern Cape York Peninsula. The extensive rainforests and Nypa Palm forests that fringe its banks connect the rainforests near the east coast of the Cape with those scattered remnants on the Gulf of Carpentaria coastline.

The outstanding natural values of the Wenlock make it, by any measure, an exceptional river and one of national importance.

The Wenlock supports more species of freshwater fish than any other Australian river, is the crucial and only river nursery for the critically endangered Spear Tooth Shark in Queensland, and it provides aquatic and riparian habitat for a wealth of rare, threatened and endemic plants and animals - many of which are only found in equatorial far northern Cape York. Some are species new to science.

One of the giant rainforest trees *Pterocarpus sp* (it doesn't yet have a common name) that grows along its banks occurs only along the Wenlock and Archer Rivers.

The Wenlock system is the most important river in Queensland for the vulnerable Estuarine Crocodile, featuring the best nesting habitat in the state.

It is also extremely healthy and abundant in terms of aquatic and estuarine wildlife, including a diverse range of edible fish species.

Its mangrove communities are described by DEHP as being outstanding representative examples of their type and the river supports the largest stands of Nypa Palms in Australia (Blackman et al).

b) Relic Rainforests

Four clusters of 'Relic Rainforests', which have been listed on the National Heritage Register, occur on the Reserve.

These poorly known jungles are thought to be living museums of a rainforest type that once covered much of northern Cape York when conditions were historically wetter. They are the subject of much scientific interest and continuing investigation.

c) Bauxite Land Unit and Associated Bauxite Springs

In the latter half of 2007, Australia Zoo Rangers located eight undocumented perennial springs associated with a bauxite plateau within the Reserve.

Appearing to be a spring type not known previously, they have subsequently been the subject of significant ongoing scientific investigation.

The bauxite springs have since been found to be of outstanding ecological value, and are indeed a new type, recently classified by the Queensland Herbarium as:

> *Regional Ecosystem Type 3.10.1.d:*
> *Springs and their vegetation communities (evergreen mesophyll/notophyll rainforest) associated with the margins of tertiary remnant plateaus.*
> *VMG: Of Concern.*

The bauxite land unit on the Steve Irwin Wildlife Reserve (SIWR) is part of the broader Weipa bauxite plateau (or Weipa Province), which represents the largest area of bauxite geology in the world.

The bauxite plateau on the SIWR comprises 1.6% of the total Weipa bauxite plateau. The preservation of this area in its natural state would not significantly diminish the potential of the main bauxite areas for the resource economy.

Physical Characteristics of the SIWR Bauxite Land System

Area: Approximately 12000 hectares.

Elevation: between 60 and 74 metres above sea level – which is in contrast to much of the Weipa bauxite land system which occurs on a broad, much lower coastal plain, typically between 10 and 30 metres above sea level.

The plateau is mostly vegetated with a tall Eucalypt woodland dominated by Darwin Stringybark *Eucalyptus tetradonta*: - Regional Ecosystem 3.5.2.

This is the dominant vegetation community across the Weipa bauxite plateau and is a unique ecosystem type: - The tall woodland is structurally distinct and represents the maximum structural development of *Eucalyptus tetradonta* throughout tropical Australia (Sattler and Williams 1999). It is also floristically different from tall Eucalypt woodlands in the Northern Territory and Western Australia (Sprecht et al 1977).

A number of “Paperbark Sinks” are present towards the eastern end of the plateau.

These are formed when underlying mottled or pallid zones are washed or leached away and the ground naturally sinks.

Paperbark Sinks occur on both ferricrete and bauxite landforms and are a common feature across the Weipa Province.

The “Sinks” fill with water during the wet season. However, only a very small number hold water beyond June/July/August each dry season. (Variability is driven by the timing/intensity of the monsoon). Those few that do hold water for longer feature a higher (less permeable) clay content in the substrate but most, if not all, are dry by the end of the dry season.

Five perennial springs flow out of the southern margin of the bauxite plateau on the SIWR. Three rise within the plateau itself. All feed into the Wenlock River - either directly or via the tributaries of Ling and Nimrod Creeks.

Investigations into the Hydrology of the Bauxite Land Unit
The discovery of the unique Bauxite Springs immediately gave rise to the question – ‘Where does the water come from that feeds them?’ - particularly as no Great Artesian Basin springs were known in the area.

Field work over the ensuing five years (with the benefit of working for most of each year on-site) has yielded the following observations:

- Extensive ground truthing and examination of satellite imagery demonstrated that the perennial springs are exclusively associated with the bauxite plateau. Despite much searching, no springs were found on surrounding land forms, including adjacent and more distant ferricrete rises and plateaus.

- Spring flow in all springs was observed to slowly/steadily decrease over the dry season, to be subsequently rejuvenated each wet season. Approximately two weeks after the onset of regular (virtually daily) heavy storms, a readily observable increase in spring flow is noted.

- Water is clearly visible flowing out of the ground above a kaolin layer at Tentacle, Oasis, Fan Palm and Pitcher Plant Springs.

- No pooling of water across bauxite areas has been observed to occur during heavy rain events, although pooling does occur in adjacent areas of different geology. The bauxite layer appears to be highly permeable.

- In support of the observation above, no erosional drainage lines (eg seasonal gullies) exist on the bauxite land surface except where spring heads/streams are incised into the plateau, viz - Ling Creek and its associated springs. Thus, rainwater runoff from the plateau is virtually nonexistent - rainwater just 'disappears' into the bauxite.

The combination of these observations indicate that:

- Spring outflow occurred above a layer of thick kaolin.
- Recharge of the groundwater aquifer that feeds the springs likely occurs locally by annual wet season rainwater.
- The bauxite layer is highly permeable and demonstrates no run-off.
- Rainwater filters down into the bauxite plateau (to places unknown).
- The only locations where water is observed to exit the bauxite plateau is via the springs/spring streams.

In December 2009, Australia Zoo undertook drilling of 14 test holes across the Bauxite Plateau to further investigate geology and groundwater characteristics.

The drilling results largely conformed with regolith formation typical of bauxite/laterite formations found across the Weipa bauxite plateau.

The successive layers from the ground downward consisted of bauxite, ferricrete, a mottled zone of sandy clay, a quartz/sand layer, with water worn quartz pebbles, and a kaolin at between 15 and 17 metres deep.

Monitoring of ground water levels by both manual methods and data collected by electronic bore loggers has subsequently shown that:

- During the main part of the dry season, the aquifer is largely held in the quartz/sand band above the underlying kaolin layer.

- During the wet season, water is evident in various regolith layers, including in many locations, within the bauxite profile itself. Such findings are consistent with the deep weathering that formed these regoliths in the first place.

- Recharge of the aquifer occurs locally and relatively quickly with the onset of the annual wet season, the latter most likely providing the source for the recharge.

- Expanded hydrological studies under the direction of Dr Marc Le Planc, formerly of James Cook University, have now been undertaken.

This includes a wet season tracing experiment monitored by electronic conductivity loggers that clearly demonstrate the movement of the trace material down into the aquifer, to later exit from the nearest spring.

This has **confirmed that rain that falls on the bauxite plateau filters down into the sandy quartz aquifer, and thus that the bauxite plateau is indeed the recharge landform for the aquifer that feeds the springs.** Dr Le Blanc is currently preparing a scientific paper on this and related studies.

Water flowing out of the bauxite profile at Red Cliffs south of Weipa, clearly demonstrating an aquifer above the kaolin layer.

Summary of Hydrology Studies:

Irrefutable evidence now exists that the permeable bauxite layer is a crucial driver in mediating the unique hydrological characteristics that create the springs.

During each wet season, and the early part of the dry season, the bauxite layer serves a crucial ecological function by holding monsoon rainwater like a huge geological sponge.

The water slowly filters through cracks and fissures in the much harder ferricrete layer beneath, to join the deep aquifer held in the sandy layer.

Should the permeable bauxite layer be removed, the recharge function will no longer exist.

Our concern is that rainwater would then largely runoff the now exposed hard ferricrete layer, which along with evaporation, would see a major reduction in aquifer recharge. This would then detrimentally diminish spring outflows. Such an effect would, of course, have major flow-on

impacts, not just at the heads of the unique springs, but across the landscape and in the perennial Wenlock River itself.

The spring inflows support the Wenlock's perennial nature, and its unique ecological characteristics.

The crucial need for effective recharge of the aquifer is highlighted below:
"The bauxite springs are on the brink of survival in that even small changes in the water table may facilitate changes in the structure, function and composition of the ecosystem. The pristine condition of the springs is attributable to the current integrity of hydro-ecological processes across the region (Earth Tech 2005), where recharge areas remain in a natural state as a function of innate remoteness," DG Fell 2009.

Summary of the Special Ecological Features of the Perennial Bauxite Springs of the Steve Irwin Wildlife Reserve.

(a) Ecological Support and Connectivity

The bauxite plateau/bauxite spring connection:

- Provides the only source of freshwater for wildlife across the landscape during the hot, dry conditions of each dry season.
- Provides crucial habitat for a range of spring-dependent flora and fauna, as well as taxa that depend upon both the spring forests and adjacent woodlands for their livelihood.
- Enables connectivity between the bauxite plateau and the Wenlock River, including a corridor function for aquatic and gallery forest flora and fauna.
- Provides valuable inflow into the perennial Wenlock River.
- Drives the ecology of the Tall Stringybark Woodland ecosystem type unique to the Weipa Bauxite Plateau. This uniqueness is thought to be 'most likely due to the relationships between *E. tetradonta's* physiology, soil water availability (particularly in the dry season) and the role of the bauxite layer in mediating drainage conditions and water storage and availability.' (Pedley and Isbell 1971, Bowman and Minchin 1987).

b) Ecological Features

- One spring supports a new rainforest community type co–dominated in the canopy by the Federal and State listed (EPBCA and NCA) vulnerable and threatened tree *Calophyllum bicolor.* This spring is the only location where this rainforest type is known to occur.

- Two springs support a possible new insectivorous plant species, *Nepenthes sp,* which is being investigated by botanist Gary Wilson from the Australian Tropical Herbarium. Other potential new plant species are also being investigated.

- The springs meet all six criteria necessary to be declared as an "Important Wetland of Queensland" by the Queensland Department of Environment and Resource Management. (Blackman et al). This is an uncommon situation for freshwater wetlands.

- The springs provide crucial refugial habitat for more than 1% of the national populations of two plant species (one of the DEHM criteria), the Spearwood tree *Calophyllum bicolor* and Giant Swamp Lily *Hanguana malayanna.* (D.G. Fell 2009).

- They support three plant species listed as threatened under the Commonwealth EPBC Act and seven listed as rare or threatened under the Queensland NC Act. One fern, *Blechnum orientale,* is known in only four other locations in Queensland.

- The springs support another 14 plant species of conservation significance that occur here as disjunct populations/extensions of range.

- Species listed under the Federal EPBCA are the **Northern Quoll *Dasyurus hallucatus* – endangered;** and the **Red Goshawk *Erythrotriorchus radiates* – vulnerable.**

- Recorded spring fauna listed under the Queensland NCA comprises the **Red Goshawk *Erythrotriorchus radiatus* – endangered**; **Northern Quoll *Dasyurus hallucatus* – vulnerable;** the **Rufous Owl *Ninox rufa;* Spotted Cuscus *Spilocuscus maculatus* – vulnerable;** the **Palm Cockatoo *Probisciger aterrimus;*** and **Grey Goshawk *Accipiter novaehollandiae* - rare**.

- A further thirty-one species associated with the springs are of regional conservation significance occurring only on, or mainly on, Cape York. This combined data demonstrates that these small, groundwater-dependent communities serve as disjunct refugia and are unique habitats for a significant range of rare and threatened (as well as other) plant and wildlife species of major conservation importance.

- The springs discharge highly acidic water at the spring heads which would not be tolerated by the majority of Cape York wetland plant species. This is likely to be a significant factor in determining the assemblage of some plant species that are present.

4) MANAGEMENT AND RESEARCH

Strategic and pro–active management under the framework of a comprehensive Management Plan is being employed to maintain healthy landscapes on the Reserve.

Crucially, this too reduces management costs overall. (For example, if weeds are kept out, there is no need for costly control measures.

Knowledge of nature of any country is essential as any land manager will attest too, and we are steadily gaining such knowledge. Also, the SIWR is strategically situated to undertake a diverse range of Cape York regional research and education initiatives.

The SIWR, as a private research centre, can be highly responsive to all research opportunities and benefits from the commitment by the Irwin family to maintain the Reserve in perpetuity. Consequently, $3 million has already been expended for capital works and the management, maintenance and ongoing protection of the Reserve.

Key Points:

- The Reserve is divided into two management areas. One is a key conservation area, the other is a sub-lease under a cattle grazing operation, operated by the property's former owners, the Witherspoon family. This continues the long tradition of cattle grazing on Cape York. Grazing areas have been fenced and small turkey nest dams built for watering to keep cattle out of sensitive riparian areas. The maintenance of its significant natural values also remains a key management objective on the sub-lease. (Australia Zoo is not directly involved with this operation, other than within its role as a member of the SIWR Steering Committee, and has no financial interest).

- The Reserve is virtually weed-free with stringent weed hygiene measures in place, a rare situation for a Cape York property.

- The numbers of feral pigs, a species that occurs in plague proportions over much of Cape York, have been greatly reduced in numbers to the extent that we now regularly have trouble finding enough pigs, (which are termed 'volunteers'), to use as baits in our crocodile traps during the crocodile research program. An annual cull over the first few years was upward of a thousand, now down to approximately 300.

- The incidence of wildfire has been reduced by employing a pattern of strategic early protective burns, with numbers of key indicator wildlife species increasing as a result.

- Field work documenting the flora and fauna of the Reserve is ongoing.

Please Note: As previously mentioned, management of the Reserve is totally funded by profits from Australia Zoo.

Knowledge and Education

The Reserve has become a significant venue for learning and discovery, with research work being undertaken by the University of Queensland, James Cook University, Griffith University, the Queensland Museum, the Australian Tropical Herbarium, the University of Adelaide, the Australian and the Queensland Departments of Environment and Heritage Protection.

Professor Craig Franklin BSc (Hons) PhD is the Research Director for the Reserve.

In brief, research to date has been undertaken on:

* Arafura File Snakes.
* Bull Sharks.
* Cape York Whiptail Rays.
* Antilopine Wallaroos.
* Carnivorous plants, including Pitcher Plants and Bladderworts.
* Snails.
* Archaeology - including at the significant Jardine's Landing.
* Fire ecology.
* Bauxite landform hydrology.
* Critically endangered Spear Tooth Sharks.
* Palm Cockatoos.
* Tarantulas.
* Microbats.

A tagged Freshwater Whiptail Ray about to be released.

Current Major Studies

- The hydrology of the bauxite plateau, linked bauxite springs and Wenlock River as detailed, has involved the drilling of 14 monitoring bores and tests and measurements of spring water characteristics, water infiltration rates and groundwater recharge.

One of the unique bauxite springs that feeds the Wenlock River.

- Pharmaceutical studies of native plants on the Reserve with Griffith University. Worldwide, plants form the basis for 70% of western medicines. Potentially one of the most effective cures for many cancer types has only recently been found in the seeds of the Australian Blushwood tree of the Wet Tropics rainforests. The Reserve contains a vast array of plant species which may hold similar properties.

  This is a key project, with huge potential social and economic benefits. Australia Zoo is working on an initiative to involve the Taepethiggi people, the Traditional Owners of the Reserve, in this work and so benefit through employment, royalties and other opportunities. (A similar project on neighbouring Kaanju lands is now well advanced.)

- The Steve Irwin Wildlife Reserve is also the site for the longest running and most

comprehensive research project into estuarine crocodiles in the world, being undertaken in a partnership between Australia Zoo and the University of Queensland, under the directorship of Professor Craig Franklin and Terri Irwin, AM.

As major apex predators, crocodiles play a crucial and irreplaceable role in maintaining the stability of the food chain and thus the overall health of tropical rivers.

To manage any wildlife species properly, a sound knowledge of its biology and habits is essential.

The project is aimed at comprehensively researching the ecology of crocodiles, to maximise the safety of people and to assist in the management and conservation of crocodiles through knowledge gained about their habits and home ecosystems.

For example, one crocodile, the 14 foot Aristotle, makes regular 300 kilometre round trips down the Wenlock to the Gulf, then up the Ducie River, then after a ten kilometre hike cross country, rejoins the Wenlock.

There are now 114 crocodiles being tracked as part of this 10 year long research project.

- Research has recently started on the critically endangered Spear Tooth Shark in a joint venture with the University of Queensland and the Commonwealth Scientific an Industrial Research Organisation (CSIRO), with 60 juvenile sharks having been captured and acoustically tagged in the Wenlock.

A juvenile, critically endangered Spear tooth Shark from the Wenlock River.

Notes on preliminary research results being undertaken on Spear Tooth Sharks – Joint Research being undertaken by Dr Richard Pillans, CSIRO; and Barry Lyon, Australia Zoo/University of Queensland.

The Spear Tooth Shark *Glyphis glyphis* is listed under the EPBC Act as **critically endangered**.

Very little is known about this species, in fact no adult Spear Tooth Sharks have ever been known to have been caught.

Its only known occurrence in Queensland is in the Wenlock River and the adjacent Ducie River (in the latter only in very small numbers). It was formerly found in the Bizant River in Lakefield National Park but has not been seen there since 1983, and may have become extinct in that location.

Initial findings from recent research indicate that the Wenlock is *the only* nursery river for the Spear Tooth Shark in Queensland.

Furthermore, juvenile sharks are only being found in the dry season in a short stretch of river characterised by high turbidity and brackish, low salinity water – generally below 16 parts per thousand.

The Wenlock River is perennial, its perennial nature driven by inflow from sandstone springs in its higher reaches and bauxite springs in its middle reaches. This dry season spring flow is likely to be responsible for creating the low salinity band of water in which the juvenile *Glyphis glyphis* lives in - viz - creating the special habitat requirements of the shark.

The crucial ecological function of springs in supporting a critically endangered shark needs to be carefully considered in any land/water use activities that may affect their viability.

5) EDUCATION, COMMUNITY ENGAGEMENT AND TURTLE RESCUE FROM GHOST NETS

- Australia Zoo Reserve Rangers, who include a Taepethiggi Traditional Owner, jointly work with Aboriginal Land and Sea Rangers Units from Mapoon and Napranum communities and Kaanju, Olkola and Nesbit River (Wuntha) country.

- Australia Zoo hosts Mapoon Rangers each year for work experience at the Zoo.

- The Rangers also regularly deliver wildlife educational talks to schools on northern Cape York from Weipa and Mapoon north to Bamaga and crocodile awareness sessions for the Junior Ranger programs at Weipa and Mapoon.

- We also hold Junior Ranger camps at Coolibah Ranger base, the program being an initiative of the Queensland Government, with students to date coming from Mapoon State School. Australia Zoo is also having discussions with the Weipa, Western Cape College campus about holding regular natural history and cultural camps on the Reserve.

- Rescuing turtles from ghost nets, mostly endangered Olive Ridley turtles, along the Gulf coast is a focus of our ranger work over the summer monsoon season and we are often supported by concerned locals from the Weipa community.

An endangered Olive Ridley Turtle snared in a ghost net on the Gulf coast west of the Reserve, about to be rescued by Australia Zoo Rangers for rehabilitation. 22 out of 49 turtles were likewise rescued in February 2012, the rest had already died.

- Rio Tinto Alcan are supportive of our operations on the Reserve, and have kindly provided a large shipping container for storage. Australia Zoo Rangers have likewise provided crocodile awareness presentations for RTA staff in Weipa.

- Extensive filming for documentaries has already taken place on the Reserve, and this is very much in its infancy. Such initiatives bring economic benefits and highlight tourism and visitor opportunities.

- The Irwin wildlife documentaries have been viewed by hundreds of millions of people worldwide, and stimulated genuine global interest in nature on a scale that was previously unknown. They have showcased Australia to the world as never before, and have proved to be an inestimable stimulus for Australian tourism.

- A number of Traditional Owners have recently expressed interest in developing eco-tourism enterprises, both on the Reserve, and on the Nesbitt River on the east coast of the Cape. With its vast experience and effective marketing team, Australia Zoo is well placed to support such projects, which can provide ongoing economic and social benefits and enable people to get back on country.

- Articles on wildlife and plants written by Reserve Rangers are regularly published in the Western Cape Bulletin, the local newspaper for western Cape York.

Mapoon rangers at Stones Crossing on the Wenlock River on a visit to the Steve Irwin Wildlife Reserve.

6) CONCLUSION

As can be seen from this brief, the Steve Irwin Wildlife Reserve Nature Refuge protects an outstanding tropical landscape that is a crucial part of Australia's natural heritage and serves as an ideal natural venue for research and outdoor educational opportunities that will endure over the decades to come.

Furthermore, the Reserve is a fitting, living and practical dedication to the modest yet world-renowned Australian, Steve Irwin - an initiative by former Prime Minister John Howard, who was a great admirer of Steve's.

Terri, Bindi, Robert, the Australia Zoo team and countless associates, are totally committed to continuing Steve's legacy with the ongoing protection, management of and implementation of the diverse initiatives being undertaken within the Steve Irwin Wildlife Reserve.

More comprehensive details regarding the Steve Irwin Wildlife Reserve, its natural and cultural

values, research, education and junior ranger activities are available in the comprehensive Management Plan and various ecological reports.

Once again, Terri Irwin, Bindi Irwin, Robert Irwin and the Australia Zoo team congratulate Premier Newman and the state government on this excellent and unique initiative.

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