THE CAYMAN TURTLE FARM

A case for change
The World Society for the Protection of Animals

The World Society for the Protection of Animals (WSPA) seeks to create a world where animal welfare matters and animal cruelty has ended. To achieve this vision we work directly with animals and with the people and organisations that can ensure animals are treated with respect and compassion.

We campaign effectively to combat the world’s most intense and large-scale animal suffering, bringing about lasting change by:

- helping people understand the critical importance of good animal welfare
- encouraging nations to commit to animal-friendly practices
- building the scientific case for the better treatment of animals
- encouraging a worldwide movement towards better animal welfare.

Locally, we improve animals’ lives and prevent cruelty by working directly with communities and owners. Working on the ground with local partners for greatest effect, we are active in more than 50 countries.

Globally, we introduce animals into the most pressing debates and prove the links between animal welfare and successful sustainable development. We have consultative status at the Council of Europe and special consultative status with the United Nations; we collaborate with national governments and global bodies including the World Organisation for Animal Health (OIE).
CONTENTS

4 Executive summary
5 Background: The Cayman Turtle Farm
6 Major concerns
   7 Threats to welfare
   10 Failure of conservation mandate
   13 Risks to human health
17 Overview of income generation through tourism
20 The humane solution
22 References

Written by Dr Neil D'Cruze, WSPA
With original research by:
Dr Philip Arena, Murdoch University
Dr Adam Dutton, WildCRU, University of Oxford
Ms Catrina Steedman, Emergent Disease Foundation
Mr Clifford Warwick, Emergent Disease Foundation

Cover image: Wild green turtle in its natural habitat © Michelle de Villiers
Executive summary

This document explores the serious concerns that result from the commercial production of green turtles for human consumption at the Cayman Turtle Farm. WSPA has conducted a detailed assessment and has concluded that under its current operational model the farm is:

1. Unable to meet the welfare needs of the animals under its care
2. A threat to wild turtle conservation efforts
3. A threat to human health
4. Financially unsustainable.

In summary, WSPA provides evidence for why the farm should look to end the commercial production of green turtles and briefly outlines how the facility can make the transition to humane, effective, safe and sustainable alternative practices.
Background: The Cayman Turtle Farm

For centuries wild sea turtles have been harvested to satisfy the human demand for meat and decorative objects (Frazier, 2003). A species which continues to be of particular commercial interest is the green turtle (*Chelonia mydas*) (Campbell, 2003). Despite a dramatic fall in wild populations, this species has remained a significant feature of Caymanian culture (Aiken et al., 2001); turtle stew is the national dish and native Caymanians demand for it continues (Bell et al., 2005).

The Cayman Turtle Farm (CTF) was created in 1968 as a commercial venture, originally known as ‘Mariculture Ltd’. The founding stock was taken from Ascension Island, Costa Rica, Guyana and Suriname over a 10-year period (Bell et al., 2005). In total, more than 477,000 eggs were collected along with 60 adults (Bell et al., 2005). Later more adults were collected from Mexico and Caymanian fishing vessels (Bell et al., 2005). By 1975 the farm was able to demonstrate that it could breed new eggs, hatch them and rear a turtle to maturity (Bell et al., 2005).

The farm has been owned by the Caymanian government since 1983 (Morriss, 2006). When Hurricane Michelle damaged the original turtle farm in 2001 the decision was made to create a new site, renamed ‘Boatswain’s Beach’ (rebranded as the ‘Cayman Turtle Farm’ in May 2010) (CTF, 2011). At this stage, the farm was already a tourist attraction and the site move aimed to increase numbers of foreign visitors. The Boatswain’s Beach site – still in use today – included a concrete lagoon in which visitors could swim, costing an estimated US$150 million (Morriss, 2006).

However, the mission statement of the farm clearly states that its tourism agenda is matched by a desire to promote conservation (CTF, 2012). There is a widely-held belief amongst both specialists and the public (expressed in numerous newspaper articles) that the farm is able to protect the remaining local wild turtle populations by: (1) providing an alternative and sustainable source of turtle meat for the Caymanian population (Brammer, 2011; Schabbing, 2012); and (2) by boosting the wild population through the release of captive-bred animals into the wild (Fosdick & Fosdick, 1994; Brammer, 2011; Schabbing, 2012).
Major concerns

The introduction of commercial production methods (e.g. farming and ranching) in an attempt to sustainably meet human demand for turtle meat continues to generate controversy with regards to its impact on both turtle welfare and conservation. In addition, WSPA received reports from our supporters regarding welfare conditions at the Cayman Turtle Farm throughout 2011.

Concerned for turtle welfare, WSPA undertook a detailed investigation. To gain a full appreciation of the current situation, WSPA:

1. Conducted research visits to the farm, observing, recording and collecting evidence of the conditions
2. Sought expert independent veterinary advice based on photographic evidence obtained at the farm
3. Interviewed key stakeholders to establish the range of views on the farm's activities
4. Conducted expert animal welfare-based desk-top research
5. Commissioned independent research polls looking at North American and Caymanian attitudes to the welfare and conservation concerns
6. Conducted focus groups with the Caymanian public to understand attitudes regarding turtle meat consumption.

As a result of this investigation WSPA has concluded that the Cayman Turtle Farm represents a major source of concern from an animal welfare perspective. In addition, WSPA has significant reason to believe that the farm is failing with regards to core aspects of its mission statement (specifically the promotion of turtle conservation and tourism) and may even represent a severe threat to human health. The findings of this investigation and WSPA's main areas of concern are presented in this document.
Animal welfare is a scientific discipline which incorporates applied aspects of ethology, bioethics and the concepts of suffering and wellbeing (World Veterinary Association, 2000). Welfare, including health, has many aspects and is measured by both the physical and psychological state of an animal (Webster, 2003).

Protecting the welfare of animals involves the prevention of unnecessary suffering and ensuring a good quality of life and a humane death (Brakes et al., 2004). Evidence suggests that the Cayman Turtle Farm is currently failing to meet these baseline welfare criteria.

Particular husbandry practices that represent major animal welfare concerns for the estimated 5,000 turtles currently held in captivity at the farm are listed and summarised below.

**Cannibalism** (Figs. 1, 2): Green turtles with severe wounds and injuries (including massive flipper trauma such as digit and even gross flipper loss) can be observed throughout the farm. The lesions and diseases associated with these observations are directly related to co-occupant aggression and cannibalism (Frederic Frye, pers. comms., 2011). These traits are known to occur under unsuitable captive conditions (Higgins, 2003). In the wild many potentially injurious scenarios would be significantly limited or prevented altogether by avoidance behaviour (Frederic Frye, pers. comms., 2011). Our research indicates that inadequate captive conditions and severe captive mismanagement are responsible for these injuries.

**Disease** (Fig. 3): Various diseases have been observed at the farm since its formation including chlamydiosis, grey patch disease, fibropapillomatosis and lung-eye-trachea disease (Haines et al., 1974; Homer et al., 1994; Godley, 2002). The high stress loads, sub-optimal welfare conditions and poor water hygiene associated with commercial farming were thought to be responsible (Haines et al., 1974). Grey patch disease was noted to be prevalent throughout the farm in a recent pathologist assessment (Frederic Frye, pers. comms., 2011). Consequently, it appears that despite abundant evidence of disease at the farm, little has been done to stem its source or spread.

**Captivity stress** (Fig. 4): Overt behavioural signs of maladaptive captivity stress can be observed throughout the farm in turtles of varying ages and developmental stages. Overly restrictive, deficient and inappropriate environments are likely to be responsible for the following observed behaviours: (1) hyperactivity; (2) rapid body movements; (3) boundary exploration; (4) surface congregation; and (5) frenzied feeding (Warwick, 2004; Warwick et al., 2011a). The strong presence of these maladaptive captivity-stress-related behaviours confirms that the ethological needs of these animals are not being met.
**Water quality** (Fig. 5): The responsible husbandry of green turtles requires substantial amounts of good quality water; this is fundamental to their welfare (Higgins, 2003). It is clear that many of the water-bearing enclosures at the farm are not cleaned regularly, leaving uneaten food and voided faeces that quickly contaminate the living environment. The result is a foul mix of water, debris and pathogenic microorganisms including bacteria and viruses that pose a significant threat to turtle welfare (Frederic Frye, pers. comms., 2011).

**Diet** (Fig. 6): Green turtles at the farm are fed an artificial diet composed entirely of fish food pellets, contrasting starkly with their natural adult diet of sea grass. This species shows a distinct shift from being an omnivore as a juvenile to a strict herbivore as an adult (Russell & Balazs, 2009). Currently, the full nutritional value and appropriateness of this artificial diet is not known. However, maintaining herbivorous species on a primarily animal protein diet is likely to impact negatively on their digestive physiology and welfare, as well as their resistance to disease (Frye, 2004).

**Handling** (Fig. 7): The farm allows the arbitrary and often unsupervised handling of individual turtles by members of the public. Visitors of all ages can remove turtles (of all manageable sizes) from their respective enclosures in order to pose either for photographs or novelty purposes. This type of practice elicits a severe stress response in these wild animals which can damage their immune system in the long term (Warwick et al., 2011a). Furthermore this practice can lead to significant injury, especially if the inexperienced handler should drop the struggling animal (Warwick et al., 2011b).

**Birth defects** (Fig. 8): Green turtles with congenital defects are present throughout the farm. Many of these individuals exhibit anophthalmia (absence of one or both eyes) with marked skeletal deformities (Warwick et al., 2011b). In the wild, these deformities would most likely have resulted in early natural mortality (Warwick et al., 2011b). In the farm, their blindness renders them even more susceptible to injury and disease as a result of their reduced ability to feed and avoid co-occupant aggression.
Neglect (Fig. 9): The extremely poor health and welfare of two additional critically endangered sea turtle species is a grave concern. Despite their high profile conservation status, the farm is currently keeping a number of Kemp’s ridley sea turtles (*Lepidochelys kempii*) and hawksbill turtles (*Eretmochelys imbricata*) as ‘back up’ breeding stock. One Kemp’s ridley turtle was observed with such deep and extensive damage to its flipper (a suspected cannibalism injury) that the superficial dorsal forelimb muscles were exposed. The fact that these turtles have been subjected to such neglect delivers a disturbing message about the approach of the farm to any animal in its care.

Overcrowding (Figs. 10, 11): Overcrowding is a major problem at the farm. In many enclosures this is immediately apparent or ‘overt’ as there are simply too many turtles trying to occupy the same physical space at the same time (Warwick et al., 2011a; Warwick et al., 2011b). However, turtles in the remaining enclosures may be exposed to ‘covert’ overcrowding (Warwick et al., 2011a; Warwick et al., 2011b) as (despite their spacious appearance) their enclosures do not provide the space required to express their natural behaviour. Both ‘overt’ and ‘covert’ overcrowding can lead to disease via increased captivity stress and/or extreme physical injury via cannibalism (Higgins, 2003).

Slaughter: As part of the meat production process turtles are slaughtered at the farm. After a single shot from a captive-bolt pistol the spinal cord and major blood vessels are severed and the animal is left to exsanguinate (bleed out) (Godley, 2002). The evidence and associated presumptions that the slaughter process is humane (Godley, 2002) are not unreasonable. However, based on the available descriptions, in our view the evidence is not conclusive, and more detailed observations (particularly of possible consciousness ‘post-slaughter’) are urgently needed.

Status as a non-domestic species: It has been argued that turtle farming is no different from farming any other animal for human consumption (Godley, 2002). However, unlike mammalian and avian livestock, sea turtles have never been domesticated. Consequently, they retain strong innate drive states evolved within a naturally diverse oceanic environment and lack particular pre-adaptive traits that lend themselves to sharing an environment with humans (Higgins, 2003). It is clear that the farm is unable to meet the highly specialised physiological, behavioural and nutritional requirements of these wild animals.

In summary

The welfare of captive animals is dependent on their keepers’ actions and knowledge. Where their captors intentionally confine and exploit these animals it is arguably especially onerous on those responsible for their husbandry to provide particularly considerate care.

In our view, major systematic flaws exist at the farm in both the theoretical and applied knowledge of sea turtle biology and husbandry, as well as veterinary management and the related issue of prevention and control of animal welfare problems – whether concerning mortality or physiological and behavioural health.
Failure of conservation mandate

Conservation biology is the scientific study of the nature and status of Earth’s biodiversity with the aim of protecting species, their habitats and ecosystems from excessive rates of extinction (Sahney & Benton, 2008).

The farm believes that it is able to protect the remaining local wild turtle populations by: (1) providing an alternative and sustainable source of turtle meat for the Caymanian population; and (2) restocking wild populations via wild release (also known as ‘headstarting’) (Fosdick & Fosdick, 1994; Bell et al., 2005; CTF, 2011).

However, it is difficult to consider any single threat or solution to biodiversity loss in isolation. A thorough assessment of the situation indicates that the farm’s contribution to conservation efforts may be negligible or even detrimental to wild turtle populations.

WSPA commissioned an independent piece of research by an academic based at the University of Oxford. This research included socio-economic interviews with local Caymanians and international tourists. Particular aspects of the findings that represent areas of concern are listed below.

While we cannot rule out the possibility that the farm relieves some pressure on wild stocks, there are significant reasons to believe it does not

Consumer-based evidence suggests that local Caymanians prefer wild turtle meat to farmed meat. This may be a problem that cannot be overcome – if consumers prefer illegal wild meat then it is reasonable to assume that they may be willing to pay large amounts for it or poach animals from the wild themselves when they desire it (Dutton et al., 2011).
Consumer-based evidence also suggests that in relation to other forms of protein the farmed turtle meat is very expensive for local Caymanians and is becoming increasingly more so (CayCompass, 2010; Cayman News Service, 2010a). The high cost of farmed wildlife products can damage its competitiveness and may mean that its sale is having far less impact on poaching that many people may assume (CayCompass, 2010; Dutton et al., 2011).

Recent production trends appear to suggest that there have already been significant reductions in per capita consumption of farmed turtle meat on the island (Cayman News Service, 2010b). In the past demand was significantly higher within a much smaller human population. If the recent reduction has not led to a significant increase in poaching then it is reasonable to assume that a gradual movement to no production might equally have little impact.

The demand for wild turtle meat means an incentive exists to take turtles illegally from the wild (CayCompass, 2010). Where this desire exists it seems reasonable to assert that it is not the farm which is preventing illegal poaching but the fear of capture or perhaps moral imperative; more research is needed to establish the current risk to reward ratio of poaching.

It is certain that poaching continues in the Cayman Islands (Connolly, 2011; CayCompass, 2011). However, currently there is no systematic effort to measure and monitor it over time. Without this type information it is impossible to assess what impact the farm is actually making on green turtle conservation efforts in the Cayman Islands.

**Releasing turtles into the wild is at best one part of a solution to the problems they face and is therefore likely to be an ineffective use of funds**

The Cayman Turtle Farm is the only large-scale turtle farm in existence. For many years the farm has released captive-bred turtles into the wild (Wood & Wood, 1993; Bell et al., 2005). Recent studies indicate that these turtles have survived and are making an as yet undetermined and unassessed contribution to reproductive populations in the Cayman Islands (Bell et al., 2005; Bell, et al., 2007).

Despite this limited success many conservationists have criticised ‘headstarting’ projects such as this one because without dealing with the reasons for the initial decline they can have no lasting impact (Mortimer, 1995). Marine turtle populations face a range of threats to their survival including by-catch, marine debris, habitat destruction and climate change (Lutcavage et al., 1997). Although predation by humans for consumption is a threat, it is by no means the only threat. Consequently, it can be argued that the farm is treating the symptoms of the problem rather than the cause.

**Releasing turtles into the wild may be having a negative impact on wild turtle populations due to the transmission of disease**

Releasing captive animals from farms carries the risk of transmitting diseases to wild populations (Bell et al., 2005). In Atlantic salmon (*Salmo salar*) farms, the genetic and parasitic contamination of wild salmon populations (Salmonidae) by farmed populations is thought by many to be driving severe population declines (Flemming et al., 2000; Heuch & Mo, 2001; Krkošek et al., 2007).
We do not doubt that the farm genuinely believes its actions are positively contributing to green turtle conservation efforts in the Cayman Islands. However, a detailed and impartial appraisal of the situation has highlighted that a great deal of uncertainty exists around the assumption that the actions are having the desired effect. Consequently, the true impact of the farm’s conservation efforts remains at best unclear.

It is apparent that more detailed research is required to investigate many of the aspects causing uncertainty. However, in the interim, it is WSPA’s view that given the poor welfare standards and husbandry practices at the farm it is reasonable to assume that this restocking program has the potential to introduce an increased disease and parasite burden into otherwise healthy natural populations.

In summary

We do not doubt that the farm genuinely believes its actions are positively contributing to green turtle conservation efforts in the Cayman Islands. However, a detailed and impartial appraisal of the situation has highlighted that a great deal of uncertainty exists around the assumption that the actions are having the desired effect. Consequently, the true impact of the farm’s conservation efforts remains at best unclear.

It is apparent that more detailed research is required to investigate many of the aspects causing uncertainty. However, in the interim, it is WSPA’s view that given the poor welfare standards and husbandry practices at the farm it is reasonable to assume that this restocking program has the potential to introduce an increased disease and parasite burden into otherwise healthy natural populations.
Risks to human health

The published literature indicates that human contact with sea turtles and the consumption of sea turtle products can present a threat to human health via a variety of pathogenic sources (Acuna et al., 1999; Aguirre et al., 2006; Moore et al., 2008; Magnino et al., 2009; Senko et al., 2010).

Implications for human health associated with the handling of farmed and wild-caught sea turtles or consuming turtle products (e.g. meat, eggs and organs) fall into one of three broad categories: (1) microbiological threats (bacteria, viruses, parasites and fungi); (2) macrobiological threats (macro and megaparasites); and (3) organic and inorganic toxic contaminants (biotoxins, organochlorines, and heavy metals) (Acuna et al., 1999; Aguirre et al., 2006; Moore et al., 2008; Magnino et al., 2009; Senko et al., 2010).

Following our investigation, the results of our commissioned research and subsequent expert consultation, WSPA believes that the Cayman Turtle Farm represents a potential threat to human health. The practices that represent significant human health concerns for tourists and the wider public are summarised below.

**Inappropriate captive conditions:** It is important to note that, for healthy humans, the risk of infection from wild turtles is relatively low for many pathogens (Warwick et al., 2011c); as such wild turtles should not be automatically viewed as ‘unclean’. However, studies focused on other species (e.g. Atlantic salmon) have shown that contaminants in farmed individuals can be much higher than their wild counterparts (Hites et al., 2004). Arguably the farm represents a higher risk of human infection due the fact that: (1) a large number of turtles are kept in intensive confined aquatic conditions; and (2) poor husbandry and the stressful environment can lower their ability to cope with disease (Arena et al., 2011). In combination, these factors can result in an increased presence of potential pathogens and a heightened threat to human health (Warwick et al., 2011c).

**Unclean water:** The potential threat that captive conditions at the farm may pose to human health is demonstrated by the documented presence of microbial pathogens in a number of different sea turtle enclosures. As part of our investigation we sent water samples (taken from public areas of the farm) for screening at a veterinary diagnostic laboratory. The results tested positive for the following microbiological threats:
1. **Aeromonas spp.** (Fig. 12) There are few gram-negative bacteria that rival the genus *Aeromonas* in the scope and breadth of human infections that they can cause (Janda & Abbott, 2010). Only two *Aeromonas* infections in humans (gastroenteritis and wound infections) clearly predominate in healthy people (Janda & Abbott, 2010). However, for those with underlying illnesses, Aeromonads are responsible for myriad intestinal and extraintestinal diseases and syndromes, ranging from relatively mild illnesses such as acute gastroenteritis and diarrhoea to life-threatening conditions, including septicemia, pneumonia, and myonecrosis (Janda & Abbott, 2010).

2. **Escherichia coli.** (Fig. 13) *E. coli* bacteria contribute to the normal intestinal flora in humans and animals, but they are also responsible for serious pathogenic infections (Lightfoot, 2003). *E. coli* is a common cause of food poisoning and gastroenteritis (NCEZID, 2011). The symptoms include bloody diarrhoea, elevated temperature, chills, vomiting and stomach cramping (NHS, 2011; Lightfoot, 2003). The severity of illness caused by *E. coli* depends on the strain, with some causing serious illness (NCEZID, 2011). Individuals of all ages can become infected by *E. coli*, although young children, the elderly and those with a compromised immune system are more likely to develop severe illness (NCEZID, 2011).

3. **Vibrio spp.** (Fig. 14) Vibrios are a group of bacteria most commonly found in marine or estuarine environments, many of which are considered as human pathogens (Hogan, 2010). While immunosuppressed individuals are most susceptible to *Vibrio* infections, these bacteria are capable of harming anyone (Gopal et al., 2005). Most disease-causing strains are associated with gastroenteritis, but can also infect open wounds and cause septicemia (Oliver, 2005). Infection can be fatal: one study stated that *V. vulnificus* was responsible for approximately 95 per cent of seafood-related deaths in the US (Oliver, 1989). Another potentially fatal disease caused by the *Vibrio* species is cholera, which results in intestinal symptoms such as diarrhoea and vomiting (Sarkar et al., 2005).

4. **Salmonella.** (Fig. 15) *Salmonellosis* is one of the most common and widely distributed foodborne diseases (Hardy, 2004). Millions of human cases are reported worldwide every year and the disease results in thousands of deaths (World Health Organization [WHO], 2005). In addition to acquiring infection from contaminated food, human cases have also occurred where individuals have had contact with infected animals (WHO, 2005). *Salmonella* species can cause diseases ranging from gastroenteritis to typhoid fever (Deng et al., 2003). The symptoms of infection usually appear 12–72 hours after infection and include fever, abdominal pain, diarrhoea, nausea and vomiting (Deng et al., 2003). The very young and the elderly are particularly at risk of infection (WHO, 2005).

**Handling captive turtles:** Visitors have access to several enclosures and are permitted (often without close supervision) to hold sea turtles (CTF, 2011; Warwick et al., 2011b). Independent water sampling revealed the presence of pathogenic bacterium (*Aeromonas, E. coli, Vibrio and Salmonella*) in the farm’s sea turtle ‘touch tanks’. Given the shared water facilities it is entirely reasonable to assume that bacterial agents present in any enclosure are also likely to be widely present throughout the rest of the farm (Warwick et al., 2011c). Currently, the farm fails to provide the visiting public with any information regarding the existence of such threats or any sanitising products to reduce the risk of human infection (Warwick et al., 2011c).
For healthy humans, the risk of infection from wild turtles is relatively low for many pathogens (Warwick et al., 2011c). However, intensive captive conditions at the farm can result in an increased presence of potential pathogens – as evidenced by our water sampling – and a heightening of the associated threat to human health (Warwick et al., 2011c). The potential threat that the farm poses to human health is demonstrated by the documented presence of microbial pathogens (Aeromonas, E. coli, Vibrio and Salmonella) in a number of different sea turtle enclosures.

Currently, the farm fails to provide the visiting public with any information regarding the existence of such threats or any sanitising products to reduce the risk of human infection following contact (Warwick et al., 2011c). Furthermore, currently it is unclear whether the farm conducts any detailed veterinary verification of animal health prior to consumption (Warwick et al., 2011c).

Consuming captive turtle meat: Currently, the farm sells captive-bred turtle meat to the public and local restaurants on Grand Cayman. Independent sampling revealed the presence of pathogenic bacterium Salmonella at the farm which is one of the most common and widely distributed foodborne diseases (Hardy, 2004). A formal animal health inspection procedure for reptile farms and slaughterhouses is considered crucial for controlling public health hazards (Magnino et al., 2009). However, currently it is unclear whether the farm conducts any detailed veterinary verification of animal health prior to consumption (Warwick et al., 2011c).

In summary

For healthy humans, the risk of infection from wild turtles is relatively low for many pathogens (Warwick et al., 2011c). However, intensive captive conditions at the farm can result in an increased presence of potential pathogens – as evidenced by our water sampling – and a heightening of the associated threat to human health (Warwick et al., 2011c).

The potential threat that the farm poses to human health is demonstrated by the documented presence of microbial pathogens (Aeromonas, E. coli, Vibrio and Salmonella) in a number of different sea turtle enclosures.

Currently, the farm fails to provide the visiting public with any information regarding the existence of such threats or any sanitising products to reduce the risk of human infection following contact (Warwick et al., 2011c). Furthermore, currently it is unclear whether the farm conducts any detailed veterinary verification of animal health prior to consumption (Warwick et al., 2011c).

Given the fact that many turtle-associated human diseases symptomatically resemble more common conditions (e.g. gastrointestinal disorders, norovirus and influenza) it is possible that the farm represents a currently undetected yet significant threat to human health (Warwick et al., 2011c). This threat would not necessarily be confined to the island due to the thousands of cruise liner based day-trippers that visit the farm annually.
Overview of income generation through tourism

When first established, despite the controversy which ensued, the farm’s primary source of income focused upon the international trade of turtle products (such as carved trinkets and turtle meat) (Fosdick & Fosdick 1994). However, this route to profitability was finally made impossible in 1984 when CITES ruled against the trade in sea turtles and associated products from the island (Godley, 2002).

Consequently the farm was forced to search for alternative forms of income to cover its operational costs. The economy of the Cayman Islands is highly reliant on its “twin pillars of economic development” – tourism and international finance (BEEA, 2011). Together they represent 70–80 per cent of the country’s gross domestic product (GDP) (BEEA, 2011). Therefore, in addition to the national trade in turtle meat, income generation via tourism was a logical alternative to international trade.

Today, the farm clearly affirms in its mission statement that its primary function is to help generate income through tourism (CTF, 2011). It is often referred to as ‘the premier tourism attraction’ on the island and is generally viewed as a vital source of employment and income (CTF, 2012; Ross, 1999). However, in contrast to this purported image, over the last few decades the farm’s own financial reporting suggest that it has consistently represented a significant drain on the Cayman Island economy:

- From 2001–2004 the farm underwent a major tourism-focused redevelopment into ‘Boatswain’s Beach’ at a cost of approximately US$47.5 million. Complications and excessive fees related to securing loans to fund this project have remained an ongoing source of discussion on the island (Duguay, 2007; 2009).
- In late 2004 Hurricane Ivan caused extensive damage to the farm and contributed to its existing financial difficulties through loss of assets and earnings (PWC, 2006). In response the farm received insurance compensation of approximately KYD 1.8 million. KYD 336,000 remained outstanding at the auditors balance sheet date (PWC, 2006).
- According to an independent audit performed in 2006, the farm continued to generate significant losses and experienced cash flow difficulties (PWC, 2006). As a result government financial support to the tune of US$8.8 million was sought and obtained via a loan from the Caymanian National Bank (PWC, 2006).
- Recent reports suggest that the farm remains heavily in debt with total long-term borrowings of approximately US$55.6 million (balances quoted as of June 2010 [Harrison, 2010]). Furthermore, due to the ongoing operational losses the farm also possesses an overdraft facility of approximately US$5.6 million (secured by a government guarantee [Harrison, 2010]).
Despite its apparent financial difficulties, the farm continues to attract approximately 500,000 international visitors per year (CTF, 2011). This is thought to equate to roughly one third of all visitors to the island (Cayman Island Chamber of Commerce, 2003). However, a WSPA-funded public attitude survey (focused on a general population sample of US and Canadian residents who intend to visit the Caribbean in the next five years [n =1,436]) undertaken in late 2011 indicates that the current animal welfare conditions have the potential to pile more misery onto the farm’s existing economic woes.

The top line results of this survey of US and Canadian travellers are summarised below:

- Travellers have a substantial interest in visiting facilities that provide a ‘marine animal encounter’, but this is strongly linked to their interest in animals and supporting institutions that protect their welfare.

- Travellers have far less interest in eating sea turtle meat with less than one in five indicating any likelihood to do so and only one in 20 revealing some strong propensity. Approximately two in five linked their reluctance to issues related to the treatment of sea turtles and their endangered status.

- Nine in 10 travellers would be unlikely to buy a ticket to an activity if they discovered that the animals were being mistreated. This is of even greater concern for travellers than the fair treatment of human labour or the high cost of these events.

- If the reputation for the mistreatment of animals expanded to include an entire facility or area, then the deterrent is similar: four in five travellers would either definitely not travel there or their likelihood to do so would substantially decrease.

- There is a fairly universal willingness to pay a surcharge for an attraction that seeks to improve its condition for captive animals: more than nine in 10 respondents would be likely to pay US$2 and more than eight in 10 would pay US$4.
According to its original business model, the farm was designed to generate the majority of its income through the international sale of turtle associated products. When CITES ruled against this trade, making it illegal, the farm was forced to search for an alternative way to cover its running costs.

Although international tourism appears to be a logical choice it is apparent that this income source has failed to resolve the farm's economic difficulties.

The farm has continued to generate significant losses and represents a significant drain on the island's economy.

Furthermore, a traveller-focused opinion poll demonstrates that the current poor welfare conditions at the farm have the potential to cause further economic damage to both the farm itself and the wider Cayman Islands tourist industry.
The humane solution

Replacing a defunct initiative

Historical evidence suggests that commercial sea turtle production initiatives are not viable. The Cayman Turtle Farm is the only large-scale turtle farm in existence. Two other formal attempts at commercially producing sea turtles have included a series of community-based ranches on the Torres Strait Islands in Australia and the Corail Farm on Réunion Island (Ross, 1999).

On the Torres Strait Islands, attempts at raising hatchlings of both green turtles and Hawksbill turtles were hampered by high mortality rates of juvenile turtles as a result of factors such as poor food supply, disease and parasites. As a result this project was terminated in 1980 (Ross, 1999).

Commercial turtle production at the Réunion Island facility was discontinued following unsuccessful attempts at applying for international trading privileges under CITES and continued issues with poor growth and disease (attributed to the pelletised diet) (Ciccione, 2011). In its place, the Kélonia Observatory of Marine Turtles (known as ‘Kélonia’) was established, operating with an entirely different humane and sustainable approach to sea turtle conservation.

A model for change

Kélonia now operates as a sea turtle research and education centre with a major focus on the provision of care for injured and ill sea turtles. This shift was financed by both the European Union and Regional Council, with research and development support from external organisations (Kélonia, 2008). The conversion cost less than €20 million and the facility is now run as a non-profit venture generating revenue that covers 67 per cent of its running costs. The majority of the remainder is covered by government and local authority subsidies for awareness-raising or research programs (Ciccione, 2011).
Today Kélonia is a key contributor to the research and conservation of sea turtles and receives over 100,000 visitors annually, proving it to be a successful tourist attraction (Kélonia, 2008). Visitor numbers and turnover have increased since the site’s time as the Coral Farm, with 110,000 people visiting in 2010 compared to 80,000 in 1997 (Ciccione, 2011).

Following the transition away from commercial production it is evident that turtles remain an important element of Réunion Island’s cultural inheritance. Those involved in running Kélonia believe the importance of turtles is stronger today than in the days of farming and that the status of turtles on the island is progressively improving, with the turtles remaining a driver for job creation and economic success (Ciccione, 2011).

With regards to research, the Kélonia Institute is making a positive contribution to marine turtle conservation. In collaboration with a host of national and international partners (notably the European Union) it aims to broaden the existing knowledge of turtle biology, life cycles and migratory patterns both around and beyond Réunion Island (Kélonia, 2008). Much of this research has already been published in peer reviewed format.

WSPA firmly believes that there is no humane way to commercially produce green turtles. Furthermore, following a detailed assessment, WSPA also has severe concerns regarding the potential impact of the Cayman Turtle Farm on wild sea turtle conservation efforts and human health. Consequently, WSPA is opposed to the commercial production of green turtles at the Cayman Turtle Farm and is committed to ending this inhumane practice.

Réunion Island’s Kélonia observatory provides a working example of how a facility can shift from commercial production to a more humane, sustainable and economically profitable alternative. Consequently, WSPA urges the Cayman Turtle Farm to make a similar transition to become a sea turtle research and education centre.
References


caycompass/2011/05/16/Adult-turtle-left-for-dead-by-poachers/ [Accessed 21 February 2012]


news/2010/02/05/turtle-meat-price-soars [Accessed 21 February 2012]

news/2010/03/05/turtle-meat-discount-over-say-farm-officials [Accessed 21 February 2012]


statement [Accessed 21 February 2012]

Ciccione, S. (2011) Questions to The Director: The History of Kélonia. Interviewed by Cecile Lamy [Email correspondence].

2011/09/14/Poached-sea-turtles-rescued/ [Accessed 21 February 2012]


TURTLEFARMDEBTFINANCINGREPORT.PDF [Accessed 21 February 2012]

BOATSWANSBEACHLOANEXPENDITURESFINALOCTOBER212009.PDF
[Accessed 21 February 2012]


Frye, Fredric L. Bsc, DVM, MSc, CBiol, FB, FRSM. Clinical Professor of Comparative Medicine & Pathobiology, Personal Communications, 2011.


PROVISIONOFAUDITSERVICESTOCAYMANTURTLEFARM1983LTD/CTC_09_10_C1045%20TENDER%20DOC.PDF [Accessed 21 February 2012]


