

The true story of a boy and the rediscovery
of an extinct bird after 325 years of oblivion.



RARE BIRD



STUDYGUIDE

One of the rarest birds
in the world in the
path of a hurricane.



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NOTES FOR TEACHERS

Enclosed is a DVD of **Rare Bird** (81 minutes long) and a PDF study guide for students with a corresponding teachers guide and answer key for study questions. Please use the following material in any way you feel will suit your curriculum. You may show the film in whole or part, discuss the questions before or after. You may also use our web site www.rarebirdfilm.com, or feel free to integrate your own curriculum elements into discussion of Rare Bird. The DVD can be skipped or shown solely in chapters. The beginning of the guide is background information about the Film, and supporting information and statistics on related topics. The second part of the guide are activities, study questions, and possible discussion topics and or essay questions. I am sure that the film and activities can be easily adapted for different grade levels.

FILM SYNOPSIS

RARE BIRD (TRT 81min.) A 15 year old boy discovers a bird believed extinct for over 300 years. Like the myth of the phoenix, the Cahow bird is resurrected on the island paradise of Bermuda. Threatened by humans, invasive species, and DDT, it has been on the brink of extinction for over 4 centuries. This against all odds story takes a dramatic turn, when the bird faces a greater threat: global warming. Ravaged by a recent hurricane what will David do to save the species once again from oblivion? Rare Bird is their tale of hope, inspiration and commitment to the future of all species. It is both a miracle and a mystery, and will keep you riveted as the destiny of an “extinct” species plays out in a race against time.

STUDY GUIDE BRIEF

RARE BIRD is a documentary detailing the achievements of Bermuda’s living museum project on Nonsuch and the surrounding islands, home of Bermuda’s famous endemic bird, the endangered Cahow. It tells the inspiring story of rediscovery and human commitment which saved a bird species from the brink of oblivion over 300 years after it was considered extinct, and the continuing commitment with which conservationist fight to save the endangered population from the ravages of global warming which threaten to destroy their only nesting islands. Nonsuch is Bermuda’s environmental example to the world and deserves such recognition. This documentary will demonstrate the importance of preserving a bio diverse planet, capture the essence of optimism in the Cahow’s example of endangered survival, warn people of the threat of global warming and of the value of a global and long term perspective.



BACKGROUND - ENDANGERED SPECIES INFO

General Statistics for Endangered Species

(Data current as of 05/16/2005) FROM ROYAL SOCIETY FOR THE PROTECTION OF BIRDS

How many species in the United States are listed as threatened and endangered or proposed for listing as threatened or endangered?

- 389 U.S. species of animals are listed.
- 599 U.S. species of plants are listed.
- 21 U.S. species of animals are currently proposed for listing.
- 0 U.S. species of plants are currently proposed for listing.

How many listed species have designated critical habitat?

- 478 U.S. species have designated critical habitat.

How many candidate species are there?

- 141 species of animals are candidate species.
- 145 species of plants are candidate species.

How many habitat conservation plans (HCPs) have been approved?

- 483 habitat conservation plans have been approved.

How many listed species have approved recovery plans?

- 1031 species have approved recovery plans.



Threatened and endangered species

There are currently 9702 known species of birds living on Earth. Today the survival of many of these species is threatened for a variety of reasons, mostly man-made. Over the 530 million years of life on Earth, there have been five major extinctions of species, the last of which saw the demise of the dinosaurs 65 million years ago.

Each of these were caused by a biological or physical change of global proportions. Currently, we are in the early stages of the sixth mass extinction. This time it is caused by the relentless and unchecked actions and expansion of mankind. According to some estimates, the current extinction rates already parallel those recorded during the dinosaur extinction.

Birds vary naturally in their numbers depending on where they live and how high up the food chain they are. The probability of a bird going extinct by chance depends on its population size and range, with the average natural lifespan of a species being 4 million years.

The most numerous bird in the world is the Red-Billed Quelea, which numbers 1,500 million individuals and is found over extensive tracts of Africa. Species like this are very secure. At the other extreme are birds endemic to islands, where the whole population of perhaps a few hundred is restricted to one or two islands only. Such species are very vulnerable to any changes in their environment, and hence to sudden extinctions.

The most numerous bird in the world is the Red-Billed Quelea, which numbers 1,500 million individuals.

A bird species can be considered threatened if there is a rapid decline in its population size, the population is small or fluctuating, or the range of the species is small or fragmented. The threatened species are categorised in the following groups by the International Union for Conservation of Nature (IUCN), depending on how great is the danger from extinction.

- **Critically Endangered Species** face an extremely high risk of extinction in the wild in the immediate future. *(50% chance of going extinct in 5 years)*
- **Endangered Species** face a very high risk of extinction in the wild in the near future. *(20% chance of going extinct in 20 years)*
- **Vulnerable Species** face a high risk of extinction in the wild in medium term. *(10% chance of going extinct in 100 years)*

There is a small number of species thought to be threatened, about which not enough is known to allow them to be categorised. In addition, a large number of species are considered borderline, so that small changes in their circumstance can result in inclusion in one of the above three categories, and hence close monitoring of these near-threatened species is needed.

These criteria can be applied on any scale ranging from a single village to the whole world. Hence, a globally endangered species is in danger of total extinction as a species. A locally or regionally endangered species is in danger of disappearing from a given area, regardless of how abundant or rare it is elsewhere. For instance, the Cirl Bunting is threatened in the UK, but is not in Europe as a whole or in the rest of the world.

The IUCN publishes a list of globally threatened (*that is critically endangered, endangered and vulnerable*) animals every few years. Despite the conservation efforts that have successfully rescued some species, this list is continually increasing, partly because of improved knowledge of the population size of many species and partly because an increasing number of bird species around the world are in danger. The number of bird species considered threatened worldwide in 2002 was 1,192, with another 79 believed to qualify. A further 733 species could easily become listed as vulnerable. This means that a total of 2004 species of birds, or about 20% of all the birds in the world, are at some risk of global extinction. This list does not include vast numbers of island endemics, which are not officially under threat, but which nevertheless are vulnerable to chance events such as hurricanes because of their low numbers and restricted distribution. (3/03)

<http://www.rspb.org.uk/birds/advice/endangeredspecies/index.asp>

Dodo

The dodo was a large fat flightless bird the size of a turkey that lived on the island of Mauritius in the Indian Ocean. Sailors visiting Mauritius in the 16th and 17th centuries found the birds an easy victim, and slaughtered them in large numbers. This slaughter was exacerbated by predation of both eggs and chicks by the cats, rats, pigs and monkeys that were brought to the island by the early French settlers. Being a ground nesting bird, the nests were easy prey. The dodo became extinct in 1662.

Great auk

The largest of the auks, a flightless, penguin-like bird was widespread throughout the north Atlantic. It is thought that they were never very abundant in any part of their range. Hunting pressure from people reduced the population and distribution continuously over the centuries, and there are reports of Icelandic ships full of carcasses of great auks. In later years collectors of rare specimens finally caused the extermination of the species on 3rd June 1844, when the last two surviving birds were killed for a collection.

Passenger pigeon

In the 19th century the passenger pigeon was one of the most abundant birds in the world. It inhabited the forests and plains of North America, where they could be seen in flocks 6km long and 1km wide. As the Great Plains were inhabited and the forests where the pigeons nested were cut down to make way for farmland, the flocks were broken up and their numbers reduced. In addition, hundreds of thousands were slaughtered every year. Since passenger pigeons could only live and breed successfully in large flocks, the combination of these two factors soon sealed its fate. By the 1890's only a handful of birds remained, and the last individual died in Cincinnati Zoo on 1st September 1914.

Threatened birds worldwide

Bird species are considered to be threatened on a global scale if there are not sufficient numbers of them to survive as a species. The critical population size is affected by a large number of biological and ecological factors and can differ greatly from one species to another.

On the world scale, the most important threat to birds is habitat loss and alteration. Forest habitat is most at threat, with 65% of the threatened species dependent on this habitat.

Bald ibis

This critically endangered species is declining rapidly and is the subject of a conservation programme started in the early 1990s by RSPB, BirdLife International and Moroccan conservation organisations. SEO, the Spanish BirdLife partner, is becoming increasingly involved in the project.

Following an all time population low in 1997, wardening and conservation measures have helped the numbers recover to 300 individuals, which includes 66 breeding pairs. These birds in Morocco represent the entire world population. The species has been declining for a long time, primarily due to hunting pressure (it was considered a delicacy), climatic changes, expansion and intensification of agriculture, and collectors of rare specimens. Probably the most endangered species in the world at present, Spix's Macaw was reduced to one male bird in the wild.

The Middle Eastern population persisted until the late 1980s, but is now thought to be extinct. The remaining four Moroccan colonies are protected within the Souss-Massa national park, but there are concerns about the impacts of the rapidly increasing human population in Morocco, and holiday developments that would have serious effect on the main feeding grounds of the birds.

California condor

In the 1980s only twelve of these birds remained in the wild. Taken into captivity, they have bred successfully and in 1994 the captive population stood at 85 birds. The re-introduction programme started with the release of the first young birds in 1992. Today, over 70 birds live successfully in the wild half in Grand Canyon, half in central California. The first egg by the re-introduced birds was laid in Grand Canyon in 2001, although it was not successful. It will remain critically endangered for some time to come.

Bald eagle

Americas national bird is still comparatively rare, but its numbers are once again increasing. It was once persecuted by shooting and has also suffered from pesticide poisoning and habitat destruction. Today it is no longer considered to be under threat from extinction, and in 1998 was officially removed from the endangered list.

Spix's Macaw

Probably the most endangered species in the world at present, Spix's macaw was reduced to one male bird in the wild and a handful in captivity, many of them in private collections. The wild male has not been seen since 2000, and in 2001 the species was declared extinct in the wild. Although a handful of birds survive in captivity, there are currently no plans for a captive breeding programme to reintroduce them.

Island Endemic Birds

Some birds which are found only on particular island groups or single islands are considered vulnerable because all of the individuals of the species are concentrated in a small area. As a result, their population size can never be very high, and a natural catastrophe such as a hurricane can easily wipe out a whole species overnight. Indeed, the hurricane that hit the island of Kauai in the Hawaiian Islands in 1992, is believed to have caused the extinction of two species of endemic birds.

The plight of many island birds has been further heightened by habitat loss, which on many islands has pushed the birds onto marginal habitat where they find existence very difficult. Any further change in their habitat can have sudden and devastating effects. Only a small proportion of all island birds are categorised as under threat from extinction, but their precarious situation is well illustrated by the fact that almost half (44%) of all threatened species and one third of near-threatened species are found on islands.

Many New Zealand birds cannot fly and as humans settled in the islands bringing dogs, cats and rats into the birds habitat, they were easy prey. Many of them now exist only in very small nature reserves on offshore islands and inaccessible mountain areas, which are cat and rat free. Among others, Takahe and Kakapo have fared very badly. The Takahe still survives in the wild in very small numbers in remote mountain areas, while the handful of surviving Kakapo, a flightless parrot, have been translocated to offshore islands where they are safe from predators.

The Seychelles magpie robin suffered from loss of its native woodland habitat and from predation by introduced cats and rats, which by 1965 had reduced the population to 12 birds on one island only. The international magpie robin recovery programme led by the RSPB and BirdLife International has been successful, and the population is now increasing. Predator eradication, habitat restoration and re-introduction to other islands increased the world population to 23 individuals on one island by 1991. In 2002 the population stood at 115 individuals on four islands. (2003)

And the declines continue...

Despite an increased awareness of the threats birds are facing, and the precarious position of one fifth of all bird species in the world, there has been a big increase rather than a decrease in the threats to birds and their habitats in recent years. Since 1960 habitat loss and degradation has greatly accelerated, resulting in sharp declines of many common bird species and pushing the rarer species to even more marginal habitat and closer to extinction all over the world.

Logging, overgrazing, drainage and intensive agriculture are among the widespread causes of loss or degradation of habitat, and often result in widespread erosion of topsoil. These can have a serious impact on bird populations. Tropical forests are still being cut down at an alarming rate.

Every year an area of tropical rainforest the size of England and Wales is lost. It is estimated that, at present rate of destruction, by 2040 there will be virtually no untouched rainforest left in the world. Removal of the rainforest, which recycles a large proportion of carbon dioxide in the atmosphere, will in turn contribute to global climate change. Logging, overgrazing, drainage and intensive agriculture are among the widespread causes of loss or degradation of habitat

Temperate old growth forests do not fare much better, with few woods safe from logging. Many marine areas are affected by overfishing, which, through removal of the birds food supply, is causing concern for the survival of seabird colonies.

In Europe 38% of all bird species are considered to be at risk. Continuing agricultural intensification is the main reason for the current declines. In Britain there has been a major decrease in numbers of many birds once thought common, such as Corn Bunting, Skylark, Yellowhammer and Song Thrush.

Since birds are good environmental indicators, the declines in the bird populations have serious implications on the health of the environment Europe-wide, and its suitability for humans as well as birds.

CAHOW AND THE ISLE OF DEVILS

QUOTES FROM SETTLERS

“The Cahow is a bird of the night for all the day she lies hid in the holes in the rocks, where they and their young are also taken with as much ease as may be, but in the night if you but whoop and hollow, they will light upon you, that with your hands you may chuse the fat and leaue the leane: those they haue only in winter.” *Captain John Smith 1624*

“The first night that I anchored in the bay, I sent a small boat to an inlet to look for water, but none was found. At dusk such a shrieking and din filled the air that fear seized us. Only one variety of bird makes this noise, but the concerted yell is terrible and standing out from it were individual voices shouting diselo, diselo (tell'em tell'em.) One seaman said to me, “What is the devil trying to tell me, Out with it! Lets hear what it is!” I replied, “A,la! These are the devils reported to be about Bermuda.”



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“One Venturilla a negro was sent on shore with lantern and axe to cut a piece of cedar. The moment he landed and entered the bush, he set up such a yell, that I shouted: “The devil’s carrying off the negro! Everybody ashore!” The men jumped into a boat and rushed to the spot where the negro was brandishing his lantern and his fists against the birds, and mingling his yells with theirs. The birds meanwhile attracted by the light dashed against him so that he could not keep clear of them even with a club. Neither could the men of the relief party. More than 500 birds were brought off to the ship that night, and having gone through hot water and been plucked proved to be very fat and fine. Thereafter a capture was made every evening. The birds were so plentiful that 4000 could be taken in a single bag. The men relished them enough to eat them all the time, and when we left we brought away more than 1000 well dried and salted for the voyage. *Diego Ramires, Captain of a Spanish Galleon driven by a storm into Bermuda waters in 1603*

“A kinde of webbe-footed Fowle there is, of the bigness of an English greene Plover or Sea Mewe, which all the summer we saw not and in the darkest nights of November and December (for in the night they only feed) they would come forth, but not fly far from home, and hovering in the air and over the sea made a strange hollow and harsh howling. Their colour is inclining to russet with white bellies as are likewise the long feathers of their wings Russet and white, these gather themselves together and breed in those islands which are high and so far alone into the sea that the wild hogges cannot swim over to them and there in the ground they have their burrows like conies in a warren and so brought in the loose mould though not so deep; which birds with a light bough in a dark night... were caught.

I have been at the taking of three hundred in an hour and we might have laden our boats. Our men found a pretty way to take them which was by standing in the rocks or sands by the sea side and hollowing laughing and making the strangest out cry that possibly they could, with the noise there of the birds would come flocking to that place, and settle upon the very arms and head of him that so cried and still creepe nearer and nearer, answering the noise themselves; by which our men would weigh them by their hand and which weighed heaviest they took for the best and let the others alone, and so our men would take twenty dozen



in two hours of the chiefest of them; and they were good and well relished fowle fat and full as a partridge.... There were thousands of these birds and two or three islands full of their burrows... which birds for their blindness (for they see weakly in the day) and for their cry and whooting we called them sea owle, they will bite cruelly with their crooked bills.

William Strachey's Narrative 1610

“There is Fowle in great number upon the islands where they breed that there hath beene taken in teo or three houres, a thousand at the least: the bird being of the bignes of a good Pidgeon, and layeth then dayly although men sit down amongst them: that there hath beene taken up in one morning by Sir Thomas Gates men one thousand of Egges: and Sir George Somers men coming a little distance of time after them, have stayed there whilst they came and layed their eggs amongst them, that they brought away as many more with them; with many young birds very fat and sweet. Another sea fowle there is that liveth in little holes in the ground, like unto Coney holes and are in great numbers, exceeding good meate very fat and sweet those we had in the winter and their eggs are white and and of that bignesse that they are not to be known from these egges. The other bird egges are speckled and of a different colour: there are also great store and plenty of herons and those so familiar and tame, that we beat them downe from trees with stones and staves: but such were young herons: besides many white herons, without so much as a blacke or grey feather on them, that a man walking in the woods with a stick and whistling to them, they will come and gaze on you so near that you may strike and kill many of them with your stick and with singing and hollowing you may do the like. *Sea Venture crew man Silvanus Jourdan 1610*

“Every cabin had pots and kettles full of birds boiling and others roasting on spits while the living wild birds walked among the people in the cabins, making their strange noises as though begging to be taken.” *Reverend Lewis Hughes*

BERMUDA LAND DEVELOPMENT STATISTICS

Extracts from the Draft State of the Environment Report (*due for completion in May 2005*)

Extracts from Chapter 6: Land Use and Open Space

Bermuda’s economic success has resulted in increasing development pressure on its limited land resources particularly on those areas that are not yet developed. Set against this trend is the desire to retain sufficient open space to provide for the psychological well-being of residents, to preserve the amenity of the Island and to conserve biodiversity. The land use planning system in Bermuda tries to achieve a balance between the competing forces of development and conservation needs to ensure that land resources are used efficiently and valued open spaces are protected.

Bermuda’s total land resources amount to over 13,200 acres (5,370 ha). Over 30% of this land is owned by Government, either directly or through various quangos. In 2000/01, the Bermuda Government’s Department of Planning undertook a Land Use Survey to analyse existing land uses on the Island. The survey found that two-thirds of Bermuda is covered by land uses that involve some form of built development. Residential development consumes almost 45% of the Island and is by far the most extensive use. Employment uses including commercial, industrial and tourism account for 7% of total land area.

Utilities amount to about 6% and vacant/derelict land together amount to about 12% of Bermuda's land area. Vacant/derelict land is one of the most significant categories as it comprises land that could be made available for redevelopment/re-use.

According to the 2000/01 Land Use Survey, one third of Bermuda is categorised as open space. This includes natural areas such as woodland and marshes, golf courses, parks, and other areas in recreational use as well as land in cultivation.

The increase in residential land over the last 30 years (between 1970/71 and 2000/01) has been directly proportional to the decrease in open space over the same period (see *Figures 6.4 and 6.5 attached*). The loss of open space can be attributed to Bermuda's growing population and number of households and the increased pressure to develop land, including open spaces, for residential purposes.

In addition to the Land Use Survey 2000/01 which provides a broad measure of available open space, in 2001 the Department of Planning also prepared an inventory of all current open space resources in Bermuda. According to the Open Space Survey 2001, open space resources amount to 2,543 acres or nearly 20% of Bermuda's land area. Half of this land is protected as National Park or through ownership by a protective agency or an agreement. Other parks and open space amount to 1,000 acres (40% of open space resources) most of which is golf course. Sports pitches and play spaces comprise less than 250 acres or 10% of open space.

Open space resources are not distributed evenly throughout Bermuda. The central parishes have only half of the open space resources enjoyed by the eastern and western parishes.

Extracts from Chapter 8: Agriculture and Plant Protection

Since the peak in 1921, there has been a gradual decline in the amount of agricultural land in commercial cultivation. Whereas in 1921, there were some 3,000 acres of agricultural land, by 2000 this figure had dropped to 380 acres. This decline in agricultural land has been accompanied by a concomitant increase in Bermuda's population which has put pressure on the agriculture industry, as landowners have sought to develop their agricultural land for other purposes, particularly new residences and private lawns.



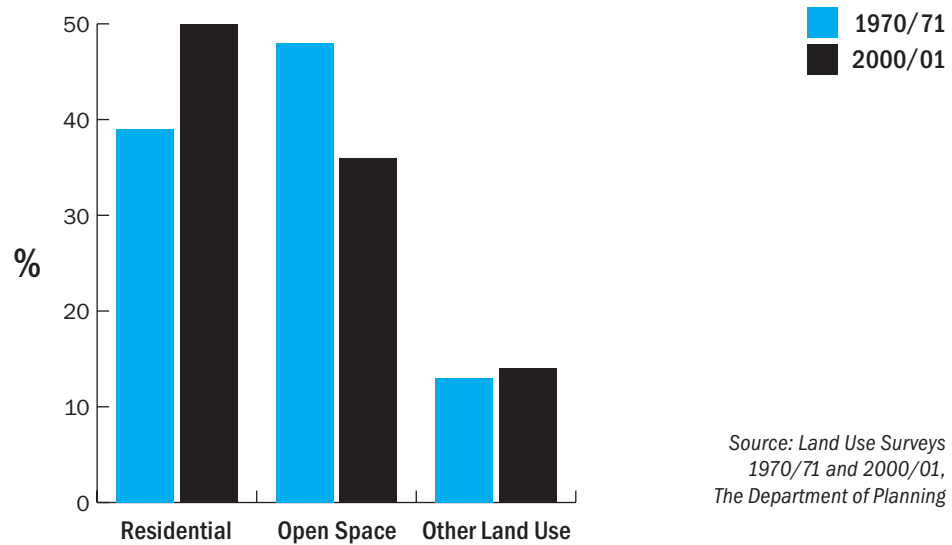
Bermuda 1600s



Bermuda 2000

Not only is the amount of agricultural land decreasing but so is the average size of the individual agricultural parcels of land. These parcels have become fragmented over time, particularly over the last 50 years due to development pressures. In 1987, just under 66% of agricultural fields were less than 1 acre in size and 36% of all fields were 0.5 acres or less. In 2001, 90% of agricultural fields were less than 1 acre while the number of fields 0.5 acres or less had increased to 74%.

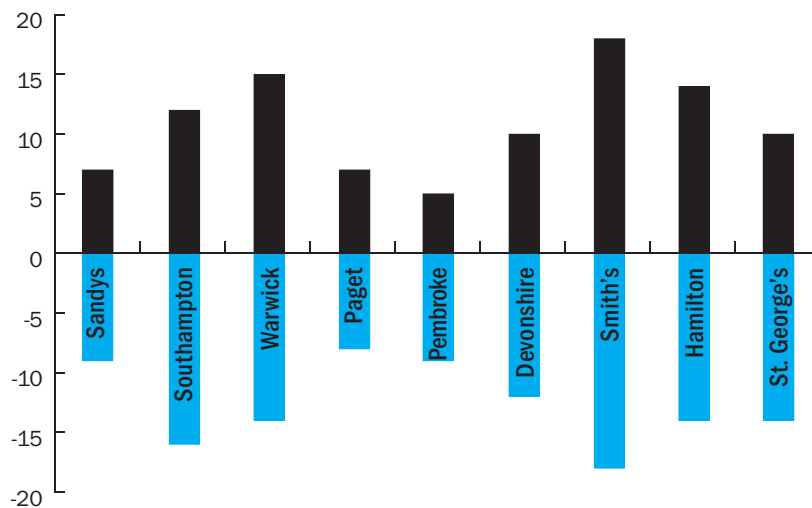
**Land use change in Bermuda
1970/71 to 2000/01
(as a percentage)**



Source: Land Use Surveys
1970/71 and 2000/01,
The Department of Planning

**Differences in percentages of
land used for Residential and
Open Space by Parish between
1970/01 and 2000/01**

■ Residential
■ Open Space



Source: Land Use Surveys
1970/71 and 2000/01,
The Department of Planning

BACKGROUND INFO ON GLOBAL WARMING

Climate; FROM the US EPA
Epa.gov

An Introduction

According to the National Academy of Sciences, the Earth's surface temperature has risen by about 1 degree Fahrenheit in the past century, with accelerated warming during the past two decades. There is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities. Human activities have altered the chemical composition of the atmosphere through the buildup of greenhouse gases – primarily carbon dioxide, methane, and nitrous oxide. The heat-trapping property of these gases is undisputed although uncertainties exist about exactly how earth's climate responds to them.



Our Changing Atmosphere

Energy from the sun drives the earth's weather and climate, and heats the earth's surface; in turn, the earth radiates energy back into space. Atmospheric greenhouse gases (water vapor, carbon dioxide, and other gases) trap some of the outgoing energy, retaining heat somewhat like the glass panels of a greenhouse. Without this natural "greenhouse effect," temperatures would be much lower than they are now, and life as known today would not be possible. Instead, thanks to greenhouse gases, the earth's average temperature is a more hospitable 60°F. However, problems may arise when the atmospheric concentration of greenhouse gases increases.

Since the beginning of the industrial revolution, atmospheric concentrations of carbon dioxide have increased nearly 30%, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15%. These increases have enhanced the heat-trapping capability of the earth's atmosphere. Sulfate aerosols, a common air pollutant, cool the atmosphere by reflecting light back into space; however, sulfates are short-lived in the atmosphere and vary regionally.

Why are greenhouse gas concentrations increasing? Scientists generally believe that the combustion of fossil fuels and other human activities are the primary reason for the increased concentration of carbon dioxide. Plant respiration and the decomposition of organic matter release more than 10 times the CO₂ released by human activities; but these releases have generally been in balance during the centuries leading up to the industrial revolution with carbon dioxide absorbed by terrestrial vegetation and the oceans.

What has changed in the last few hundred years is the additional release of carbon dioxide by human activities. Fossil fuels burned to run cars and trucks, heat homes and businesses, and power factories are responsible for about 98% of U.S. carbon dioxide emissions, 24% of methane emissions, and 18% of nitrous oxide emissions. Increased agriculture, deforestation, landfills, industrial production, and mining also contribute a significant share of emissions. In 1997, the United States emitted about one-fifth of total global greenhouse gases.

Estimating future emissions is difficult, because it depends on demographic, economic, technological, policy, and institutional developments. Several emissions scenarios have been developed based on differing projections of these underlying factors. For example, by 2100, in the absence of emissions control policies, carbon dioxide concentrations are projected to be 30-150% higher than today's levels.

Changing Climate

Global mean surface temperatures have increased 0.5-1.0°F since the late 19th century. The 20th century's 10 warmest years all occurred in the last 15 years of the century. Of these, 1998 was the warmest year on record. The snow cover in the Northern Hemisphere and floating ice in the Arctic Ocean have decreased. Globally, sea level has risen 4-8 inches over the past century. Worldwide precipitation over land has increased by about one percent. The frequency of extreme rainfall events has increased throughout much of the United States.

Increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise 1-4.5°F (0.6-2.5°C) in the next fifty years, and 2.2-10°F (1.4-5.8°C) in the next century, with significant regional variation. Evaporation will increase as the climate warms, which will increase average global precipitation. Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. Sea level is likely to rise two feet along most of the U.S. coast.

Calculations of climate change for specific areas are much less reliable than global ones, and it is unclear whether regional climate will become more variable.

Impacts

Rising global temperatures are expected to raise sea level, and change precipitation and other local climate conditions. Changing regional climate could alter forests, crop yields, and water supplies. It could also affect human health, animals, and many types of ecosystems. Deserts may expand into existing rangelands, and features of some of our National Parks may be permanently altered.

Most of the United States is expected to warm, although sulfates may limit warming in some areas. Scientists currently are unable to determine which parts of the United States will become wetter or drier, but there is likely to be an overall trend toward increased precipitation and evaporation, more intense rainstorms, and drier soils.

Unfortunately, many of the potentially most important impacts depend upon whether rainfall increases or decreases, which can not be reliably projected for specific areas.

FACTS

The United States is home to only 4 percent of the world's population but consumes 26 percent of the world's energy. The United States would not sign the Kyoto agreement, an international agreement to reduce Carbon dioxide emissions. It is time for change at a grassroots level.

- The Cahow, *Pterodroma cahow*, is Bermuda's only endemic bird; it is found nowhere else in the world.
- A Cahow can live from 30-35 years. The cahow lays only one egg a year, and there is a 40 per cent hatch failure.
- There were once millions of Cahows nesting in Bermuda. The evidence of this is the plethora of fossils discovered all over the island.
- The decline and believed extinction of the Cahow was a direct result of the human colonisation of the island by the British in 1609. Colonisation brought the introduction of previously foreign species, pigs, cats and rats which all preyed on the cahow. The pigs, cats, rats and people are estimated to have consumed between 250 and 4000 Cahows a night, leading to its "extinction" in 10-12 years.
- In 1616 the first legislation for conservation of the Cahow was enacted to "prevent the spoil and havoc" of the bird.
- In 1620 the Cahow was nevertheless believed to be extinct.
- In 1951 18 nesting pairs were discovered, and today there are 70, a far cry from the millions living prior to the 1600's
- Extinction is irreversible
- Extinction is a natural process, at the estimated historical rate of 1 bird species every 100 years.
- In the last 200 years the rate of extinction has been 40 times greater than the historical rate of extinction in bird species. In other species it is 100 to 1000 times greater. This increased rate of extinction is the result of humanity's unsustainable impact on the world.
- 1 bird in 8 could be extinct in the next century. 1200 bird species could become extinct in the next 100 years. 630 additional species could be near extinction.
- The best way to preserve or increase the numbers of a bird species is to preserve the bird's natural habitat.
- The importance of a bio diverse planet is not only the preservation of endangered species like the Cahow, but also the preservation of our own species. We are dependent on a bio diverse planet.

(Facts from: www.birdlife.net)



CHAPTER OUTLINE

SECTIONS:

1 - INTRO

- Opening introduction of a story about man (*David Wingate*) and a Bird (*Cahow*).

2 - OPENING

- Meet David and understand his role as main character. A glimpse into his awkward but inspired childhood.

3 - BIRD INTRO: NOCTURNAL BIRD- RELATIONSHIP TO STARS

- The Cahow only breeds in Bermuda and is nocturnal on the nesting grounds. The bird returns to the island by mapping the stars as a chick.

4 - HISTORY 1: BERMUDA FOUNDING HISTORY- ISLE OF DEVILS AND EXTINCTION

- Location and history of Bermuda explained. Known as the Isle of Devils because of the Cahow's mysterious calls. British settlers survived a rat plague and famine by feeding on Cahow, leading to the thought extinction of the Cahow and the first conservation legislation in the world first enacted on 1616 in Bermuda by proclamation.

5 - DETECTIVE STORY THROUGH REDISCOVERY

- Cahow strikes the St. Davids lighthouse in 1935 the year David was born but not rediscovered until 1951, their fates entwined.

6 - LONGTAIL & THE BAFFLER

- After the rediscovery, the Cahow faces a borderline survival crisis, the baffler is created to prevent nest site competition with another species of bird, the longtail.

7 - REVELATION: BIRD OF THE WIND/NAT HISTORY ONE

- David mystified by mystery bird until he gets marooned on an island and understands the Cahow is a bird of the wind.

8 - ENVIRONMENT STORY- NONSUCH INTRO

- David envisions, Nonsuch as the ultimate home and salvation of the Cahow.

9 - PERSONAL STORY- SCRAPBOOK SCENE

- David and daughter Karen reflect on growing up on Nonsuch.

10 - CAHOW- NATURAL HISTORY TWO

- Cahow biology, How Cahows are like humans, and how David feels they are his children.

11 - DDT & RATS 2

- A new global crisis threatens the cahow in the 1960s.

12 - DEATH OF ANITA- DAVID PERSONAL STORY 2

- David suffers personal crisis.

13 - NONSUCH: ANIMALS

- David builds his Nonsuch by bringing animals to his sanctuary in preparation for the Cahow.

14 - SUCCESSION

- Jeremy takes over from David and begins tagging and thinking toward the future and moving the birds to Nonsuch.

15 - FLYING & GLOBAL WARMING

- The Cahow population grows enough to glimpse the bird flying in the wild but a new and global threat effects the Cahow, rising sea levels and increased hurricane threaten their survival in the immediate future.

16 - FABIAN

- David and Jeremy's worst fears come true, Bermuda is hit with the worst hurricane in living memory.

17 - TRANSLOCATION

- Jeremy implements his long-term and risky plan to move birds to the new island - immediately.

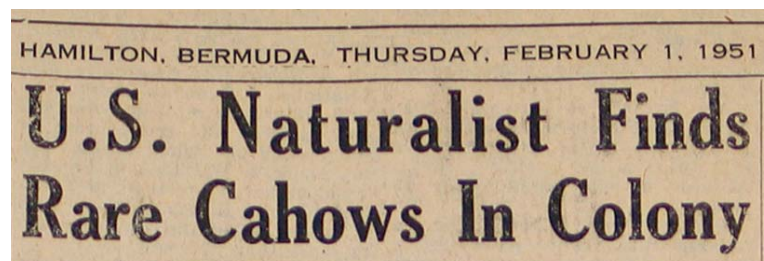
18 - PIPSQUEEK

- A chick is abandoned and is rehabbed.

19 - FLEDGING

- The first generation of chicks on Nonsuch fledge along with Pipsqueek.

20 - END



Quotes

“And when we say the dinosaurs are extinct that is absolutely not true they are still alive and well there are thousands of species of them, we now call them birds.” *Jeremy Madeiros*

“There was one particular cave that had a nice soil talis in it and in a few minutes I felt and found a skull and various wing bones, so I climbed out of the cave into the sun light to look at these bones and thought oh how I wonder what this bird looked like when it had flesh and blood on its bones and feathers, and I looked up and at the entrance to the cave looked up and over castle harbour. In the distance I could see the castle harbour islands shimmering on the horizon. The hair went up on the back of my neck and “I wonder if they are still out there.” *David Wingate*

“The night became overcast and showers fell at intervals. Shortly after nine o'clock a group of cahows flitted about each bird glimpsed in a twinkling against the dark sky. Our watchers had by this time dispersed to their several stations. Each member saw birds and David Wingate the youngest heard the single soft note more often than the rest of us.” *Robert Cushman Murphy*
quoted after the rediscovery

“It's almost as if you had a dinosaur that was suddenly rediscovered somewhere in some remote valley somewhere. It was considered so improbable that a bird that is so legendary like the cahow that the story of its extinction was part of the thing that made it so unusual that for it to be suddenly to be rediscovered again after all this time, it was so unexpected it was as if suddenly a pterodactyl had been discovered circling over a valley in Africa somewhere. It did make world news and if you still think about it I still find it absolutely amazing that a bird as large as the cahow did survive for that length of time even one hundred years ago this was one of the most densely populated islands on earth.” *Jeremy Madeiros*

“I would often be all alone out here on one of these little islands and there was this sense that as the sunset and darkness overtook you that you were going back 350 years in time, because in day time because in daytime there was nothing to indicate that the cahow survived then at soon as it was too dark to see, just too dark to see which was always very frustrating that would be when you would first hear the call of the cahow and you would have to be right beside the nest to see anything at all. It was the ghost bird. It would come in from the ocean and in the darkness you would think you saw something you would think you heard something but 9 times out of 10 it would be that intangible.” *David Wingate*

“It would it's like the fitting of a major strategic piece back into a jigsaw puzzle. Nonsuch island is based on just that; it is like taking a giant ecological puzzle and each species represents a piece. With one piece by itself you can't make heads or tails of it, but when you start adding pieces together you suddenly realize that for example the palmetto palm needs a particular bird to spread its seed so when you put those two together you get better germination. The olive wood needs the absence of rats which eats all the seeds and once you take out the piece that doesn't belong in that puzzle and put in the piece that does belong all of a sudden the whole puzzle starts to make sense. With Nonsuch a lot of the pieces are back in place we get new insights every year unexpected things, how putting several different species plants together enhances the growth of all of them because they add certain nutrients to the soil or change the soil chemistry. Bringing the cahow back after more than 300 years reintroducing the cahow back to Nonsuch island is going to be one of the major pieces of the puzzle.”

Jeremy Madeiros



RARE BIRD

STUDYGUIDE

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“Let’s face it we are in an era of threatened biodiversity we are in one of the greatest mass extinctions that has ever happened in the history of the earth and its primarily because of one species, man. I think the fact that the cahow is coming back in spite of natural disasters like hurricanes and in spite of the effects of man is a real indication of hope for other species that are perhaps in the same boat.” *Jeremy Madeiros.*

“The cahow is a real success story, it is illuminating in many regards and people will learn from many of the techniques and some of the lessons that have been learned in that regard. It is also in the global picture its significant in it highlights the need for long-term commitment. The conservation ethos needs to become very much the fabric of a global community if we want to keep these endangered species.” *Jack Ward*

“Life on earth provides us with our oxygen, our food, our everything and we are a product of our environment, it is our salvation.”
Jack Ward

“Simply as a result of motivated self interest we as human beings we should be very concerned as to what happens to these species because of what happens to them is going to happen us. We eat the same food from the same sources, we breathe the same air we drink the same water we live in the same environment so if there is some chemical that is effecting the toads in ponds if there is some pesticide which is effecting the eggshells of a cahow or other birds those are things that will be in our bodies as well. If we want to live in an unpolluted environment we really need to take notice of the lessons these species are teaching us.” *Jeremy Madeiros*



VOCAB

EXTINCT: *n.* no longer existing, obsolete.

ENDANGERED SPECIES: *n.* A species whose existence is in critical danger from one or more threats; close to extinction.

GLOBAL WARMING: *n.* Global warming is the gradual increase in global temperatures caused by the emission of gases that trap the sun's heat in the Earth's atmosphere. Gases that contribute to global warming include carbon dioxide, methane, nitrous oxides, chlorofluorocarbons (CFCs), and halocarbons (*the replacements for CFCs*). The carbon dioxide emissions are primarily caused by the use of fossil fuels for energy.

PETREL: *n.* a small sea bird with black and white plumage

PROCELLARIIFORM: *n.* Procellariiformes (*from the Latin procella, a storm*) is an order of birds formerly called Tubinares and still called tubenoses in English.

HURRICANE: *n.* a severe tropical cyclone usually with heavy rains and winds moving a 73-136 knots (*12 on the Beaufort scale*)

CAHOW: *n.* An endemic Bermuda petrel, thought extinct but rediscovered in 1951

AUDUBON SHEARWATER: *n.* A close relative of the petrel species, also a small sea bird with black and white plumage.

HABITAT: *n.* Natural home of a plant or animal.

SPECIES: *n.* A class of things having common characteristics; group of animals or plants within a genus (*kind or sort*)

ENVIRONMENT: *n.* surroundings; surrounding objects or conditions

SUSTAINABLE DEVELOPMENT: *n.* Development that meets the needs and aspirations of the current generation without compromising the ability to meet those of future generations



TEST QUESTIONS

- 1. WHO REDISCOVERED THE CAHOW?**
ROBERT CUSHMAN MURPHY, LOUIS MOWBRAY, AND DAVID WINGATE
- 2. WHICH OF THE FOLLOWING ANIMALS ARE NOT ON NONSUCH?**
 - A. LONGTAIL
 - B. HERON
 - C. SKINK
 - D. DOG

D
- 3. HOW MANY CAHOWS ARE THERE NOW?**
70 PAIRS IN THE FILM, 2006= 75 IN 2006
- 4. HOW MANY DO YOU THINK THERE WILL BE BY 2020?**
- 5. HOW DO CAHOWS IMPRINT?**
CAHOWS IMPRINT BY FIXING A MAP OF THE STARS IN THEIR MINDS BEFORE THEY FLEDGE AND USE THE STARS TO FIND THEIR WAY BACK WHEN MATURE.
- 6. WHY WAS BERMUDA NAMED THE ISLE OF DEVILS?**
BERMUDA WAS THOUGHT TO BE HAUNTED BY EVIL SPIRITS BECAUSE OF THE TREACHEROUS REEFS AND THE NOCTURNAL CALLS OF THE CAHOW- WHICH WAS BELIEVED TO BE DEVIL SPIRITS.
- 7. HOW DID THE CAHOW BECOME EXTINCT?**
THE CAHOW BECAME EXTINCT SOON AFTER SETTLEMENT BECAUSE THEY HAD NO EVOLVED DEFENSES AGAINST MAMMAL PREDATORS AND WERE EASILY HUNTED BY RATS, HUMANS, DOGS AND CATS
- 8. HOW MANY CAHOWS WERE THERE BEFORE HUMAN SETTLEMENT?**
THEY ESTIMATE A MILLION BIRDS BASED ON FOSSIL RECORDS
- 9. WHY DID BERMUDA CREATE THE FIRST CONSERVATION LAWS IN THE WORLD?**
THE CONSERVATION LEGISLATION WAS PROCLAIMED IN 1616- THE FIRST IN THE WORLD BECAUSE THEY NOTICED THE RAPID DECLINE OF TURTLES AND CAHOWS THEIR MAIN FOOD SOURCE AND ATTEMPTED TO PROTECT THEM FOR SUSTAINABILITY
- 10. WHY IS THE CAHOW NOCTURNAL?**
THE CAHOW IS NOCTURNAL TO PROTECT THEMSELVES FROM PREDATORS LIKE BIRDS OF PREY WHEN THEY ARE AT THEIR MOST VULNERABLE, ON LAND AND NESTING

11. WHY DID PEOPLE TAKE SO LONG TO REALISE THE CAHOW WAS STILL ALIVE?

FOR FOUR REASONS: THERE WAS NO LIVING KNOWLEDGE OF THE CAHOW, NO DRAWINGS ETC, THERE WAS A MIX UP BETWEEN THE CAHOW AND THE AUDUBON SHEARWATER WHERE MANY THOUGHT THEY MAY HAVE BEEN THE SAME SPECIES, NO ONE COULD BELIEVE IT COULD STILL BE ALIVE AFTER 300 YEARS, THE COMMUNITY AND THE WORLD WERE DISTRACTED BY WORLD WAR I AND II.

12. WHO WAS ROBERT CUSHMAN MURPHY?

ROBERT CUSHMAN MURPHY WAS CURATOR OF BIRDS AT THE AMERICAN MUSEUM OF NATURAL HISTORY IN NEW YORK, USA.

13. WHAT DID EACH OF THE LOUIS MOWBRAY'S CONTRIBUTE TO THE REDISCOVERY OF THE CAHOW

LOUIS MOWBRAY I DISCOVERED THE CAHOW FOSSILS IN THE CRYSTAL CAVE AND LOUIS MOWBRAY II REDISCOVERED THE CAHOW IN 1951, AND LOUIS MOWBRAY III APPEARED IN RARE BIRD

14. WHAT DID ROBERT CUSHMAN MURPHY SAY ABOUT DAVID WINGATE AFTER THE REDISCOVERY IN JANUARY 1951?

ROBERT CUSHMAN MURPHY DESCRIBED DAVID AS " HE HEARD THE SOFT NOTE MORE OFTEN THAN THE REST OF US."

15. HOW OLD WAS DAVID WINGATE DURING THE REDISCOVERY?

AGE 15 YEARS

16. WHY WAS REDISCOVERY THE EASY PART?

BECAUSE THEY FOUND SO FEW BIRDS AND THE SPECIES WAS ON THE PRECIPICE OF EXTINCTION- AND WAS BEING PREYED ON BY LONGTAILS.

17. HOW MANY PAIRS OF CAHOWS WERE REDISCOVERED AT FIRST IN 1951?

7 PAIRS

18. HOW MANY DID THEY FIND THREE YEARS LATER?

THEY FOUND 11 MORE PAIRS MAKING 18 IN TOTAL

19. WHAT IS A BAFFLER AND HOW DOES IT WORK?

THE BAFFLER IS A PIECE OF WOOD WITH A FIXED HOLE SIZE DESIGNED TO ALLOW THE CAHOW ENTRY BUT TO EXCLUDE THE LONGTAIL WHICH IS A LARGER BIRD.

20. WHY DID THEY NEED THE BAFFLER?

THEY NEEDED THE BAFFLER TO MAKE THE ENTERANCE TO THE CAHOW BURROW EXCLUSIVE TO CAHOWS AND PROTECT THE CHICK FROM NEST COMPETITION WITH THE LONGTAIL WHICH IS A BIGGER BIRD AND WOULD KILL THE CAHOW.



21. WHY DO YOU THINK THEY NEEDED TO CREATE ARTIFICIAL BURROWS?

THEY NEEDED TO CREATE ARTIFICIAL BURROWS TO PROVIDE HOUSING FOR THE POPULATION AS IT EXPANDED AS THERE WAS LIMITED SUITABLE NATURAL NEST SITES ON THE ROCKY ISLANDS AS IT IS SUB OPTIMAL HABITAT.

22. WHY WAS THE CAHOW CALLED A BIRD OF THE WIND?

THE CAHOW IS A BIRD OF THE WIND BECAUSE THEY LOVE TO FLY IN STORMY WINDY WEATHER

23. WHEN WAS NONSUCH DECLARED A NATURE RESERVE?

1961

24. HOW LONG DO CAHOW EGGS TAKE TO HATCH?

51 DAYS

25. WHEN DO THE BIRDS NEST IN BERMUDA?

NOVEMBER THROUGH MAY/JUNE

26. HOW MANY EGGS DO THEY LAY A YEAR?

ONE EGG A YEAR

27. HOW MANY SUCCEED IN HATCHING?

50 %

28. OF THOSE THAT HATCH HOW MANY OF THE CHICKS RETURN?

1/3

29. WHAT PESTICIDE EFFECTED THE CAHOW'S REPRODUCTION?

DDT

30. WHAT HAPPENED WHEN THE NASA BASE IN BERMUDA WAS BUILT?

THE BUILDING SITE ATTRACTED RATS AND THEY SWARMED A NEARBY ISLAND KILLING THE CAHOW POPULATION

31. WHAT IS A HOLISTIC VIEW OF THE ENVIRONMENT?

EVERY ELEMENT (PLANT OR ANIMAL) EFFECTS EVERY OTHER ELEMENT- EVERY SPECIES IS INTERRELATED AND DEPENDENT ON EVERY OTHER SPECIES

32. HOW AND WHY DID DAVID GET THE WHITE EYED VIREO TO NONSUCH ISLAND?

THE WHITE EYED VIREO IS A NATIVE BERMUDA SPECIES SO HE WANTED TO HAVE THE VIREO ON NONSUCH BUT THEIR WINGS WERE TOO SMALL TO MAKE THE WATER CROSSING SO DAVID CAPTURED SOME AND BROUGHT THEM OUT TO NONSUCH.

33. WHY ARE TOADS A THREAT TO THE CAHOW?

TOADS LIKE TO BURROW AND THEY HAVE POSION GLANDS ON THEIR BACKS. THERE IS A POSSIBILITY THAT THE TOADS COULD GO INTO A CAHOW BURROW AND ACCIDENTLY POISON A CAHOW OR ITS CHICK.

34. HOW MANY TOADS HAVE THEY REMOVED FROM NONSUCH?

1,500

35. HOW MANY TURTLES HATCHED ON NONSUCH IN THE 60'S?

16,000

36. WHAT KIND OF TURTLES?

GREEN TURTLES

37. WHY IS AS DAVID SAYS, "CONTINUITY OF THE ESSENCE?"

CONSERVATION IS A LONG TERM COMMITMENT AND VISION AND TRUE BENEFITS ARE ONLY REALISED IN THE LONG TERM THEREFORE IT IS VITAL THAT CONSERVATION IDEALS AND PRACTISES ARE PASSED ON FROM GENERATION TO GENERATION

38. HOW MUCH WILL SEA LEVEL RISE IN THE NEXT 50 YEARS?

DAVID ESTIMATES 7.5 FEET

39. NAME THE ANIMALS DISCUSSED IN THE FILM THAT LIVE ON NONSUCH?

YELLOW CROWNED NIGHT HERON, WHITE EYED VIREO, CAHOW, GREEN TURTLE, SKINK, TOAD, LONGTAIL

40. HOW MANY OF THE CAHOW BURROWS WERE DESTROYED BECAUSE OF HURRICANE FABIAN?

60 %

41. WHY IS TRANSLOCATION NECESSARY?

TRANSLOCATION IS NECESSARY BECAUSE OF GLOBAL WARMING, WHICH CONTRIBUTES TO SEA LEVEL RISE AND INCREASED HURRICANE ACTIVITY WHICH DESTROYS THE SMALL NESTING ISLANDS.

42. HOW DO YOUNG CAHOWS FIND NONSUCH WHEN THEY RETURN TO BREED?

YOUNG CAHOWS RETURN TO THE BREEDING GROUND BY FOLLOWING THE STARS, WHEN THEY FLEDGED THEY MAPPED OUT THE STARS AT THAT TIME OF YEAR AND ARE ABLE TO RETURN MANY YEARS LATER.

43. WHY IS THE CAHOW A CANARY IN THE COAL MINE?

THE CAHOW DISPLAYED WARNING SIGNS OF THE EFFECT OF MAN AND DEVELOPMENT ON OTHER SPECIES AND THE ENVIRONMENT VERY EARLY ON (1600'S) AND ALSO GAVE RISE TO MANS CONSCIOUSNESS ABOUT THE ENVIRONMENT

44. HOW DID JEREMY BEGIN WORKING WITH THE CAHOW?

JERREMY APPRENTICED UNDER DAVID IN THE 1980'S AS PART OF THE PARKS DEPT APPRENTICESHIP PROGRAM



45. HOW LONG DO CAHOWS TAKE TO MATURE AFTER FLEDGING AND BEFORE THEY RETURN TO BERMUDA TO BREED?

THEY ARE NOT SURE BUT BELIEVE IT TO BE 4 -5 YEARS.

46. HOW DOES JEREMY DESCRIBE THE CURRENT RATE OF EXTINCTION?

JEREMY SAYS THE RATE OF EXTINCTION IS 5000 TIMES GREATER THAN ANY OTHER MASS EXTINCTION

47. HOW LONG BEFORE FLEDGING ARE THE CAHOW CHICKS TRANSLOCATED?

18 - 20 DAYS

48. WHY IS THE CAHOW AS JEREMY SAYS "AN EXAMPLE TO THE WORLD."?

THE CAHOW IS AN EXAMPLE OF HOW LONG TERM CONSERVATION WORKS AND CAN SAVE A SPECIES FROM EXTINCTION - THE RECOVERY OF THE CAHOW BEGAN BEFORE MOST CONSERVATION PROJECTS IN THE WORLD.

49. HOW MANY PAIRS DO THEY NEED TO START A COLONY ON NONSUCH?

TWO TO THREE PAIRS

50. WHEN DID FABIAN HIT BERMUDA AND HOW FAST WERE THE WINDS?

SEPTEMBER 5TH 2003 , SUSTAINED 120 MPH FOR 5 HRS GUSTING TO 145 MPH

51. WHO IS NICK CARLISE?

NICK CARLISE IS AN EXPERT ON PETREL CONSERVATION FROM AUSTRALIA WHO PIONEERED THE TRANSLOCATION TECHNIQUE AND HELPED JEREMY IN BERMUDA

52. HOW OFTEN HAS BERMUDA HAD HURRICANES IN RECENT YEARS?

EVERY 4 YEARS

53. WHEN WAS HURRICANE FELIX?

1995

54. WHAT DOES NONSUCH MEAN?

UNPARALLELED - THERE IS NO ISLAND LIKE IT IN THE ENTIRE REALM

55. WHY IS NONSUCH ISLAND THE PERFECT ISLAND FOR THE CAHOW?

BECAUSE IT IS THE LARGEST, MOST ISOLATED ISLAND IN THE NEAR VICINITY OF THE ENDANGERED CAHOW ISLANDS, AND IT HAD THE MOST TOPOGRAPHICALLY DIVERSE ENVIRONMENT.

56. WHAT DOES PTERODROMA MEAN?

WINGED RUNNER



57. HOW FAST DO CAHOWS FLY?

30 -50 MPH

58. WHERE DO THE CAHOWS SLEEP?

ON THE WING (IN FLIGHT) OR ON THE WATER IF IT IS CALM

59. WHY DOES JEREMY TAG THE BIRDS?

IN ORDER TO CONFIRM INDIVIDUALS – CONFIRM THAT THEY MATE FOR LIFE AND RETURN TO THE SAME NEST ALSO TO ESTABLISH FAMILY TREES AND TRACK THE PROGRESS OF TRANSLOCATION, AS WELL AS SUCCESS RATES.

60. WHAT WAS FOUND IN THE CRYSTAL CAVE AND WHAT WAS THE SIGNIFICANCE?

FOSSILS OF CAHOWS- IT PROVED THAT THE CAHOW WAS A DISTINCT SPECIES AND THAT IT WAS ABUNDANT ON BERMUDA GAVE THE FIRST IDEA AS TO THE LOOK AND SIZE OF THE BIRD AND WAS USED TO COMPARE TO THE RECENT SPECIMENS TO PROVE THE CAHOW HAD SURVIVED.

61. WHAT YEAR WAS THE FIRST CAHOW FOUND, WHAT ELSE HAPPENED IN THAT YEAR?

1935 - THE YEAR DAVID WAS BORN

62. WHEN DID DAVID RETIRE?

2000, AT AGE 65 A REQUIREMENT OF THE GOVERNEMENT



TOPICS FOR DISCUSSION/ESSAY QUESTIONS

1. IN BERMUDA A HOT TOPIC OF LAND USE IS OPEN SPACE, WHAT ARE BERMUDA'S OPEN SPACE RESTRICTIONS? (EG: ARABLE LAND) DO YOU AGREE OF DISAGREE WITH THE CURRENT POLICY ON THIS MATTER? WHAT ARE OUR OPTIONS FOR SUSTAINABLE DEVELOPMENT?
2. IF THE CAHOW HAD NEVER EXISTED HOW WOULD OUR LIFE IN BERMUDA BE DIFFERENT?
3. HOW DID THE PESTICIDE DDT EFFECT BIRDS ALL OVER THE WORLD?
4. WHAT QUALIFIES A TYPE OF ANIMAL AS ITS OWN DISTINCT SPECIES? CONSIDER THE CAHOW AND ITS CLOSE RELATIVES.
5. RESEARCH THE LIFE OF ROBERT CUSHMAN MURPHY, WHAT MADE HIS LIFE'S WORK INTERESTING AND VALUABLE?
6. IN RARE BIRD WHAT THEMES REOCCUR? HOW ARE THEMES AND MEANING IN GENERAL CONSTRUCTED THROUGH THE USE OF MUSIC, EDITING AND NARRATION?
7. DISCUSS THE ROLE OF EDITING IN STORYTELLING AND THE IDEA OF OBJECTIVE TRUTH AS IT RELATES TO DOCUMENTARY.
8. WHY DID THE FILMMAKERS DECIDE TO USE ANIMATION IN RARE BIRD? DESCRIBE THE EFFECT AND PURPOSE OF THESE ANIMATIONS.
9. FIND A REVIEW OF RARE BIRD, WHAT DO PEOPLE THINK OF THE FILM? DO YOU AGREE OR DISAGREE? HOW WOULD YOU REVIEW THE FILM?
10. DISCUSS THE FUTURE OF SPECIES ON OUR PLANET AND THE IMPACT OF GLOBAL WARMING.
11. WHY DID ISLAND DWELLING BIRDS LIKE THE DODO AND THE CAHOW BECOME EXTINCT OR NEARLY EXTINCT? EXPLORE JEREMY MADEIROS' COMMENT THAT THE CAHOW IS LIKE AN "EXILED RACE RETURNING TO ITS HOMELAND."
12. READ SAMUEL COLERIDGE'S POEM " THE ANCIENT MARINER" AND DISCUSS THE THEMES IN THAT POEM AND HOW IT RELATES TO THE STORY OF THE CAHOW IN RARE BIRD.

EXTRA CREDIT

DO MORE RESEARCH ABOUT THE GREEN TURTLE PROJECT. WHY HAVENT THEY RETURNED, WHAT WAS DISCOVERED AFTER THE HATCHLINGS WERE HATCHED IN THE 60'S AND 70'S? IS THERE STIILL HOPE FOR THEIR RETURN?



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