

2019

ENVIRONMENTAL STATISTICS COMPENDIUM



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CONTENTS

Foreword	1
Explanatory Notes	2
Measuring Units Conversion Table	2
Contributors	3

1 POPULATION AND HOUSING **4**

NTR	Note to Reader	5
Table 1.1	Population and Population Density, 2014-2018	6
Chart 1.1	Population Density, 2014-2018	6
Table 1.2	Number of Households by Type of Dwelling, 2010 and 2016	7
Table 1.3	Households by Size of Household, 2010 and 2016	7
Table 1.4	Private Dwelling Units by Type of Tenure, 2010 and 2016	8
Table 1.5	Private Dwelling Units by Number of Bedrooms, 2010 and 2016	8

2 TOURISM **9**

NTR	Note to Reader	10
Table 2.1	Air Passenger Arrivals, Cruise Ship Arrivals, Average Length of Stay, Tourism Intensity Rate and Penetration Ratio, 2014-2018	12
Chart 2.1	Growth in Air Passengers, Cruise Ship Passengers and Total Visitors, 2014-2018	13
Chart 2.2	Air Passengers to Residents, Cruise Ship Passengers to Residents and Visitor to Residents Ratios, 2014-2018	13
Chart 2.3	Tourism Intensity Rate, 2014-2018	14
Chart 2.4	Tourism Density and Penetration Ratios, 2014-2018	14
Table 2.2	Air Passenger Arrivals by Country of Origin, 2014-2018	15
Table 2.3	Visitors by Intended Type of Accommodation, 2014-2018	15
Table 2.4	Number of Tourist Properties, Occupancy Rate and Number of Rooms per km ² , 2014-2018	16
Chart 2.5	Number of Hotel Rooms Available, 2014-2018	16
Chart 2.6	Occupancy Rate, 2014-2018	17
Table 2.5	Visitor Expenditure and Number Employed in Tourism, 2014-2018	17

3 ENVIRONMENTAL HEALTH AND WEATHER **18**

Table 3.1	Reported Cases of Environmentally-Related Diseases by Sex, 2014-2018	19
Chart 3.1	Percentage Change in Reported Cases of Environmentally-Related Diseases by Sex and Total, 2014-2018	20
Chart 3.2	Reported Cases of Environmentally-Related Diseases by Cause, 2018	20
Table 3.2	Total Number of Inches of Rainfall and Rain Days, 2014-2018	21
Chart 3.3	Total Number of Inches of Rainfall and Rain Days, 2014-2018	22
Table 3.3	Mean Daily Maximum, Minimum and Daily Air Temperature, 2014-2018	23
Chart 3.4	Mean Daily Maximum, Minimum and Daily Air Temperature, 2014-2018	24
Table 3.4	Mean Relative Humidity, 2014-2018	25
Chart 3.5	Mean Relative Humidity, 2014-2018	26

4	NATURAL AND ENVIRONMENTAL DISASTERS	27
NTR	Note to Reader	27
Table 4.1	Natural Disasters, 2018	28
Table 4.2	Incidences of Fire by Type, 2014-2018	28
Chart 4.1	Total Incidences of Fires, 2014-2018	29
5	ENERGY, MINERALS AND TRANSPORT	30
Table 5.1	Value of Imported Fuel by Type, 2016-2018	31
Table 5.2	Value of Imported Mineral Fuels, Mineral Oils and Related Products Consumed by Type, 2016-2018	32
Table 5.3	Electricity Consumption by Type of Consumer, 2014-2018	33
Table 5.4	Growth in Electricity Consumption by Type of Consumer, 2014-2018	33
Chart 5.1	Growth in Electricity Consumption by Type of Consumer and Total Consumption.	34
Table 5.5	Percentage of Total Electricity Consumption by Type of Consumer, 2014-2018	34
Table 5.6	Registered Road Vehicles, 2014-2018	35
Chart 5.2	Percentage Change in Registered Road Vehicles, 2014-2018	36
6	AGRICULTURE	37
Table 6.1	Imported Fertilizers by Type, 2016-2018	38
Chart 6.1	Imported Fertilizers by Type, 2018	38
Table 6.2	Imported Pesticides by Type, 2016-2018	39
Chart 6.2	Imported Pesticides by Type, 2018	39
7	LAND USE	40
Table 7.1	Land Use, 2018	41
Table 7.2.1	Land Use by Parish, City and Town in Acres, 2018	42
Table 7.2.2	Land Use by Parish, City and Town in Acres, 2018	43
Map 7.1	Land Use Survey, 2018	44
8	COASTAL AND MARINE RESOURCES	45
Table 8.1	Total and Protected Marine Area, 2018	46
Chart 8.1	Protected Marine Area as a Percentage of Total Marine Area, 2018	46
Table 8.2	Marine Protected Areas by Category and Area, 2018	47
Table 8.3.1	Marine Protected Areas Around Bermuda, 2018	48
Table 8.3.2	Marine Protected Areas Around Bermuda, 2018	49
Map 8.1	Marine Protected Areas, 2018	50
Table 8.4	Quantity of Fish Landings by Type, 2014-2018	51
Table 8.5	Total Catch by Hours at Sea, Average Catch of Fishing Area and Number of Registered Fishermen, 2014-2018	52
Chart 8.2	Growth in Total Catch and Total Hours at Sea, 2014-2018	53
Chart 8.3	Number of Registered Fishermen, 2014-2018	53
Table 8.6	Number of Households and Population of Coastal Areas for Census Years 1980, 1991, 2000, 2010 and 2016	54
Chart 8.4	Number of Households and Population of Coastal Areas for Census Years 1980, 1991, 2000, 2010 and 2016	54

9	BIODIVERSITY	55
NTR	Note to Reader	56
Table 9.1	Protected Areas, 2018	57
Chart 9.1	Protected Land Area as a Percentage of Total Land Area, 2018	57
Chart 9.2	Protected Water Area as a Percentage of Total Water Area, 2018	58
Table 9.2	Protected Areas by Category and Area, 2018	59
Map 9.1	Terrestrial Protection Areas Including Marine Parks, 2018	60
10	FORESTRY	61
NTR	Note to Reader	62
Table 10.1	Protected Forest Area as a Percentage of Total Land Area, 2018	63
Chart 10.1	Protected Forest Area as a Percentage of Total Land Area, 2018	63
11	AIR	64
Table 11.1	Annual Air Emissions from Tynes Bay Waste to Energy Incinerator, 2014-2018	65
Table 11.2	Average Concentrations for Ambient Air Monitoring Sites, 2016-2018	66
Table 11.3	Maximum Concentrations for Ambient Air Monitoring Sites, 2016-2018	67
Figure 11.1	24-hour Average PM ₁₀ Concentration, 2018	68
12	WASTE	69
NTR	Note to Reader	70
Table 12.1	Generation of Waste by Source, 2014-2018	71
Chart 12.1	Estimated Export of Recyclable Waste, 2018	71
Table 12.2	Management of Waste, 2014-2018	72
Table 12.3	Management of Special Waste, 2014-2018	72
Table 12.4	Management of Waste by Type, 2010, 2012, 2014 and 2016	73
13	WATER	74
NTR	Note to Reader	75
Table 13.1	Renewable Freshwater Resources, 2014-2018	75
Map 13.1	Water Resources Protection Areas, 2018	76
	ANNEX	77
	Terrestrial Protection Areas Including Marine Parks	
	Map Key	78
	Map 01	79
	Map 02	80
	Map 03	81
	Map 04	82
	Map 05	83
	Map 06	84
	Map 07	85
	Map 08	86
	Map 09	87
	Map 10	88

FOREWORD

The Department of Statistics is pleased to release its tenth issue of the “*Environmental Statistics Compendium*”. In alignment with the Department’s mission to collect, process and analyze relevant statistical information; this publication reflects the collation of existing data sourced from stakeholders and awareness about issues affecting Bermuda’s environment.

Additionally, the delivery of this report supports the combined efforts of the United Nations Statistics Division and the Caribbean Community to strengthen capacity and harmonize the compilation of social, gender and environmental statistics and indicators.

The Environmental Statistics Compendium is structured into thirteen (13) sections which include:

- 1.** Population and Housing
- 2.** Tourism
- 3.** Environmental Health and Weather
- 4.** Natural and Environmental Disasters
- 5.** Energy, Minerals and Transport
- 6.** Agriculture
- 7.** Land Use
- 8.** Coastal and Marine Resources
- 9.** Biodiversity
- 10.** Forestry
- 11.** Air
- 12.** Waste
- 13.** Water

The figures in the Environmental Statistics Compendium are mainly totals for calendar months for the period 2014 to 2018.

The Department acknowledges the continued support of all subject-area experts and stakeholders who committed to providing the statistical data and information needed to compile and publish this report.

Melinda Williams
Director
Department of Statistics

December 2019

EXPLANATORY NOTES

-	Not applicable	km	Kilometer
..	Not available	km ²	Square kilometer
**	Less than one percent	kWh	Kilowatt-hour
r	Revised figure	mio m ³ /y	Million cubic meters per year
e	Estimated figure	mT	Metric tonnes
—	Nil or negligible	No.	Number
'000	Thousands	µg/m ³	Microgram
°	Degrees	NO ₂	Nitrogen Dioxide
%	Percent	SO ₂	Sulfur Dioxide
\$	Bermuda dollar	ppb	Parts per billion
F	Fahrenheit	TSP	Total Suspended Particles
ha	Hectare	PM ₁₀ /PM _{2.5}	Fine Particulate Matter
kg	Kilograms	mg/nm ³	Milligrams per cubic meter
≧	Axis scale has a discontinuity	NTR	Note to Reader

Note: In some tables, figures may not add to totals due to rounding.

MEASURING UNITS CONVERSION TABLE

METRIC		IMPERIAL	IMPERIAL	METRIC
LENGTH				
1 millimetre (mm)		0.03937 inch (in)	1 inch (in)	2.54 centimetre (cm)
1 centimetre (cm)	10 mm	0.3937 inch	1 yard (yd)	0.9144 metre (m)
1 metre (m)	100 cm	1.0936 yards (yds)	1 mile	1.6093 kilometre (km)
1 kilometre (km)	1,000 m	0.6214 mile		
AREA				
1 square meter (m ²)	10,000 cm ²		1 acre	4,046.9 square meter (m ²)
1 hectare (ha)	10,000 m ²	2.4712 acres	1 acre	0.4047 hectare (ha)
1 square kilometer (km ²)	100 ha	0.3861 square mile (mile ²)	1 square mile (mile ²)	2.59 square kilometer(km ²)
MASS				
1 kilogram (kg)	1,000 grams (g)	2.2046 pounds (lbs)	1 pound (lb)	16 ounces (oz)
1 metric tonne (mT)	1,000 kg	0.9842 ton	1 ton	2,240 lbs
				0.4536 kg
				1.016 metric tonne (mT)
TEMPERATURE				
1 degree Celsius (°C)		33.8 degrees Fahrenheit (°F)	1 degree Fahrenheit (°F)	-17.2 degrees Celsius (°C)

CONTRIBUTORS

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Bermuda Fire and Rescue Services
Bermuda Hospitals Board
Bermuda Tourism Authority
Department of Environmental and Natural Resources, Marine Management Section
Department of Environmental Protection
Department of Health
Department of Planning
Department of Statistics
Department of Works and Engineering - Waste and Enforcement Section
The Bermuda Business Development Agency
The Bermuda Weather Service
Transport Control Department

POPULATION AND HOUSING

The Population and Housing Section contains information on the number of persons in Bermuda and the type of households they occupied.

Population

- In 2018, the population of Bermuda was projected to be 63,973 persons, a 0.3% increase from the 63,779 persons counted in the 2016 Population and Housing Census (Table 1.1).
- Population projections were used to estimate the population for 2014 - 2015 and 2017 - 2018. A Population and Housing Census was conducted in 2016.

Households

- During the period 2010 to 2016, there was a 4.7% increase in the total number of households (Table 1.2).
- In 2016, over one-third (35.4%) of the households were two-apartment dwellings (Table 1.2).
- One-person households accounted for 34.1% of the total households in Bermuda in 2016 (Table 1.3).
- The average size of a household continued to drop from 2.39 persons in 2010 to 2.26 persons in 2016 (Table 1.3).
- Home ownership fell 1.7 percentage points over the seven-year period 2010-2016 to 47.1% (Table 1.4).
- In 2016, private dwelling units with two bedrooms accounted for over one-third (36.0%) of households in Bermuda (Table 1.5).
- The average number of persons per bedroom was 1.07 persons in 2016 (Table 1.5).

NOTE TO READER

Group Dwelling Unit: where the occupants live collectively for disciplinary, health, custodial, work or other reasons and share the cooking, sleeping and/or sanitary facilities with other households. Generally, group dwellings are available primarily to selected persons, not the general population. They differ from institutions in that occupants movements to and from the premises are less restricted. Examples of group dwellings include hotel staff quarters, nurses' hostels, transitional housing, police barracks and rooming houses catering for six or more paying guest as well as Mid-Atlantic Wellness Institute group homes catering to any number of clients.

Household: a person or group of persons living together in a dwelling unit.

Population Density: a measure of the average population per unit of land area. It is calculated by dividing the de jure civilian non-institutional population by the total land area. Bermuda's land area as of 2008 was 21.01 square miles and as of 2016 was 20.68 square miles (source: Department of Land Title and Registration 26 January, 2018).

$$\text{Population Density} = \frac{\text{De Jure Civilian Non-Institutional Population}}{\text{Total Land Area}}$$

Private Dwelling Unit: a room or group of rooms used, or intended to be used, for living purposes. It must be capable of permanent human habitation and must have its own:

- separate access to the street or common landing or staircase, and,
- cooking, living, sleeping and sanitary facilities which the occupants of the dwelling do not have to share with any persons other than their own household members.

From a structural perspective, a private dwelling may be contained within a one-unit dwelling, a house comprising two or more apartments, an apartment building, or within part of a building which is used for residential as well as business or other purposes.

Source: Department of Statistics

Table 1.1
POPULATION AND POPULATION DENSITY, 2014-2018

Year	Population	Population Density (per km ²)
2014	61,777 ¹	1,137 ⁴
2015	61,735 ¹	1,136 ⁴
2016	63,779 ²	1,191 ⁵
2017	63,892 ³	1,193 ⁵
2018	63,973 ³	1,194 ⁵

Sources: Department of Statistics, Department of Planning and the Land Title and Registration Office

¹ Based on Bermuda's Population Projections 2010-2020.

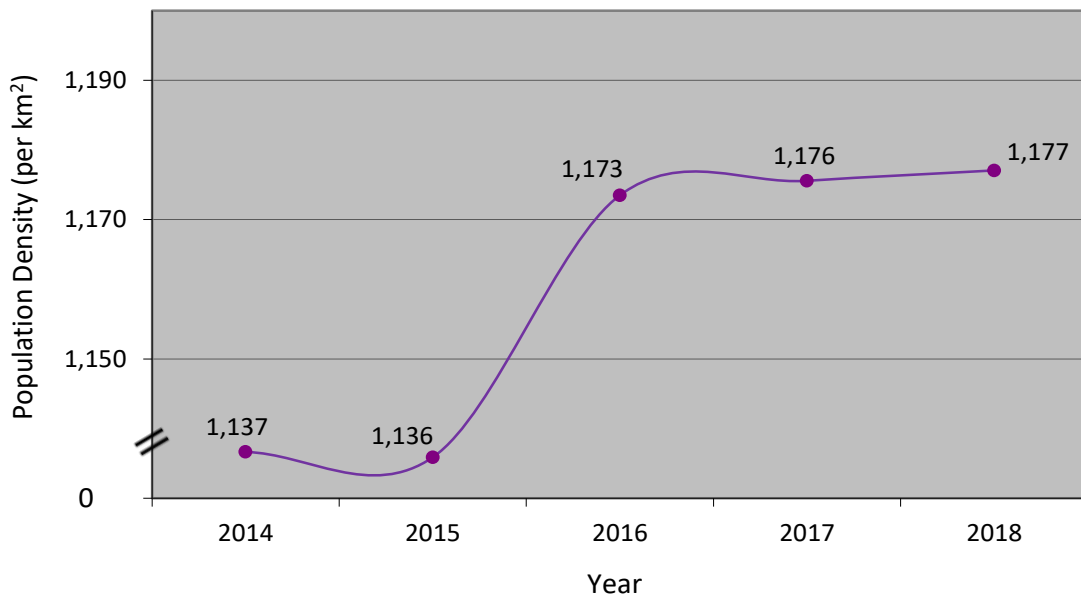
² Based on the 2016 Population and Housing Census.

³ Based on Bermuda's Population Projections 2016-2026.

⁴ Bermuda's land area as of 2008 was 54.35 km² (21.01 square miles) Department of Planning.

⁵ Bermuda's land area as of 2016 was 53.56 km² (20.68 square miles) Land Title and Registration Office.

Chart 1.1
POPULATION DENSITY, 2014-2018



Source: Department of Statistics

The 2013-2015 figures are based on Bermuda's Population Projections 2010-2020.

The 2016 figure is based on the 2016 Population and Housing Census.

The 2017 figure onward is based on Bermuda's Population Projections 2016-2026.

Table 1.2
NUMBER OF HOUSEHOLDS BY TYPE OF DWELLING, 2010 AND 2016

Type of Dwelling	Number		Percentage Distribution	
	2010	2016	2010	2016
Total	26,923 ¹	28,192	100.0 ²	100.0
Undivided private house (cottage)	6,280	6,767	24.3	24.0
Two apartments	8,870	9,972	34.4	35.4
Three apartments	4,639	4,849	18.0	17.2
Four or more apartments	5,024	5,253	19.5	18.6
Group dwellings	696	751	2.7	2.7
Residential/commercial premises	281	577	1.1	2.1
Other/not stated	27	23	**	**

Sources: 2010 and 2016 Population and Housing Censuses

¹ Includes 1,106 households for which there is no data by type of dwelling.

² The denominator for percentage distribution is 25,817 (26,923 - 1,106).

Table 1.3
HOUSEHOLDS BY SIZE OF HOUSEHOLD, 2010 AND 2016

Persons in Household	Number		Percentage Distribution	
	2010	2016	2010	2016
Total households	26,923	28,192	100.0	100.0
Average size of household	2.39	2.26		
One	7,341	9,611	29.3	34.1
Two	7,902	8,841	31.5	31.4
Three	4,498	4,802	17.9	17.0
Four	3,536	3,317	14.1	11.8
Five	1,234	1,141	4.9	4.0
Six	385	329	1.5	1.2
Seven	112	99	**	**
Eight	52	35	**	**
More than eight	34	17	**	**

Sources: 2010 and 2016 Population and Housing Censuses

Table 1.4
PRIVATE DWELLING UNITS BY TYPE OF TENURE, 2010 AND 2016

Type of Tenure	Number		Percentage Distribution	
	2010	2016	2010	2016
Total	26,200 r ¹	27,418	100.0 ²	100.0
Own	12,238	13,267	48.8 r	47.1
Rent	11,719	13,006	46.7 r	46.1
Rent Free	1,004	1,134	4.0 r	4.0
Other/Not Stated	133 r	11	** r	2.8

Sources: 2010 and 2016 Population and Housing Censuses

¹ Includes 1,106 households for which there is no data by type of tenure.

² The denominator for percentage distribution is 25,094 (26,200 - 1,106).

Table 1.5
PRIVATE DWELLING UNITS BY NUMBER OF BEDROOMS, 2010 AND 2016

Type of Household	Number		Percentage Distribution	
	2010	2016	2010	2016
Total	26,200 r ¹	27,418	100.0 ⁶	100.0
Average number of bedrooms per household	2.15 ²	2.14 ⁴		
Average number of persons per bedroom	1.13 ³	1.07 ⁵		
None (studio)	790	1,145	3.2	4.2
One	6,101	6,469	24.4	23.6
Two	8,944	9,857	35.8	36.0
Three	7,473	7,928	29.9	28.9
Four or more	1,645	2,018	6.6	7.4
Not Stated	141	1	**	**

Sources: 2010 and 2016 Population and Housing Censuses

¹ Includes 1,106 households for which there is no data by type of dwelling.

² The calculation is 53,544 bedrooms ÷ 24,953 households.

³ The calculation is 60,503 persons ÷ 53,544 bedrooms.

⁴ The calculation is 58,604 bedrooms ÷ 27,417 households.

⁵ The calculation is 62,668 persons ÷ 58,604 bedrooms.

⁶ The denominator for percentage distribution is 24,953 (26,200 - 1,106 - 141).

TOURISM

Bermuda's tourism industry is the second largest source of revenue to the economy, only following international business.

Visitor Arrivals

- The total number of visitors to Bermuda increased by 11.4 percent from 687,625 in 2017 to 766,226 in 2018 (Table 2.1).
- Air passenger arrivals increased 4.6 percent from 2017 to 2018 (Table 2.1).
- Cruise ship passenger arrivals increased 15.9 percent from 418,049 in 2017 to 484,339 in 2018 (Table 2.1).
- In 2018, the average length of stay for air passengers decreased to 5.9 days (Table 2.1).

Air Passengers

- Air passenger arrivals from the United States increased 8.2 percent from 2017 to 2018 (Table 2.2).
- In 2018, air passengers from the United States accounted for 76.1 percent (214,499) of the total number of air visitors in 2018 (Table 2.2).
- Over the five-year period, 2014 to 2018, hotel properties remained the most popular/used accommodation type as more than two-thirds (68.5%) of all air passengers stayed at hotel properties (Table 2.3).

Tourist Properties

- The total number of tourist properties (41) in Bermuda decreased by 2.4 percent from 2017 to 2018 (Table 2.4).
- The total number of rooms available decreased by 0.2 percent from 2,409 rooms in 2017 to 2,404 rooms in 2018 (Table 2.4).
- There was a 0.2 percent decrease in the total number of beds from 5,120 in 2017 to 5,110 in 2018 (Table 2.4).

Section Cont'd.

Visitor Expenditure

- Visitor expenditure increased over the period 2014 to 2018 with the largest increase in absolute terms occurring between 2017 (\$468.0 million) and 2018 (\$544.2 million), a \$76.2 million increase (Table 2.5).
- In 2018, there were 4,547 persons directly employed in the tourism industry; an increase of 4.0 percent over 2017. Males accounted for 2,786 persons compared to 1,761 females (Table 2.5).

NOTE TO READER

Air Passenger Arrivals: includes all stay-over (overnight) visitors. It does not, however, include cruise passenger and yacht arrivals.

Average Length of Stay: intended length of stay or number of nights spent, unless otherwise stated.

Estimated Electricity Consumption by Tourists: a more direct tourism pressure indicator. It is estimated as the national daily per capita electricity consumption times the number of tourist arrivals by the average length of stay, per 1 million population.

Index of Social Pressure or Ratio of Tourists (or Visitors) to the Local Population: measures the number of tourists (or visitors) to one resident of the country at any given point in time.

Number of Hotel Rooms per km²: commonly accessible indirect proxy to measure tourism's imprint on the physical environment. It is the number of hotel rooms available divided by the total land area (53.56 km²).

Occupancy Rate: is calculated by dividing the monthly or yearly sum of room nights utilized by the number of room nights available for use, then multiplying the quotient by 100 to express as a percentage.

Tourism: the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes.

Note to Reader Cont'd.

Tourism Density Ratio (TDR): ratio attempts to show the density of tourist in the country at any one time on average. Its value is limited by the fact that tourists flows are seasonal and tourism activity tends to be concentrated in specific geographical areas. (*Caribbean Tourism Organization*) Tourism Density Ratio is calculated as:

$$\text{Tourism Density Ratio} = \frac{\text{Number of visitors} * \text{average length of stay}}{\text{land area (53.56 km}^2\text{)} * 365}$$

Tourism Expenditure: the total expenditure made by a visitor or on behalf of a visitor for and during his/her stay at a destination.

Tourism Intensity Rate (TIR): the indicator 'arrivals/population' provides an estimate of tourism intensity in the country of reference. This indicator is calculated by World Tourism Organization (UNWTO) based on the available basic data on inbound and domestic tourism, which can be either the number of visitors or the number of tourists. (*UNWTO Methodological Notes to the Tourism Statistics Database at http://cf.cda.unwto.org/sites/all/files/pdf/2015_meth_notes_eng_0.pdf*) Tourism Intensity Rate is calculated as:

$$\text{Tourist Intensity Rate} = \text{Number of visitors}/1,000 \text{ population}/\text{land area (53.56 km}^2\text{)}$$

Tourism Penetration Ratio (TPR): the penetration ratio quantifies the average number of tourist arrivals by air, per thousand local inhabitants, in the country at any one time. (*modified Caribbean Tourism Organization definition*) Tourist Penetration Ratio is calculated as:

$$\text{Tourism Penetration Ratio} = \frac{\text{Average length of Stay} * \text{number of air visitors} * 1,000}{365 * \text{mid-year population estimates}}$$

Tourist: a person traveling to and staying in places outside his or her usual environment for not more than one consecutive year but who stays for more than 24 hours in a destination for leisure, business and other purposes.

Visitor: any person traveling to a place other than his/her usual environment for less than twelve months and whose main purpose of visit is other than the exercise of an activity remunerated from within the place visited.

Source: CARICOM Environment Program

Table 2.1
AIR PASSENGER ARRIVALS, CRUISE SHIP ARRIVALS, AVERAGE LENGTH OF STAY, TOURISM
INTENSITY RATE AND PENETRATION RATIO, 2014-2018

Indicator	Year				
	2014	2015	2016	2017	2018
Total visitors ¹	580,260	597,212	642,395	687,625	766,226
Percentage change (%)	**	+2.9	+7.6	+7.0	+11.4
Air passengers	224,380	219,814	244,491	269,576	281,887
Percentage change (%)	-5.1	-2.0	+11.2	+10.2	+4.6
Average length of stay for air passengers ²	6.3	6.3	6.0	6.3	5.9
Air passengers to residents ratio	3.6	3.6	3.8	4.2	4.4
Tourism density ratio	71.3	69.8	75.0	86.9	85.1
Cruise ship passengers	355,880	377,398	397,904	418,049	484,339
Percentage change (%)	+4.7	+6.1	+5.4	+5.1	+15.9
Cruise ship passengers to residents ratio	5.8	6.1	6.2	6.5	7.6
Cruise ship arrivals	126	132	139	161	171
Percentage change (%)	**	+4.8	+5.3	+15.8	+6.2
Population	61,777 ³	61,735 ³	63,779 ⁵	63,892 ⁷	63,973 ⁷
Visitors to residents ratio	9.4	9.7	10.1	10.8	12.0
Land area km ²	54.35 ⁴	54.35 ⁴	53.56 ⁶	53.56	53.56
Tourism intensity rate	172.2	177.2	187.4	200.6	233.6
Tourism penetration ratio	62.7	61.5	63.0	72.8	71.2

Sources: Bermuda Tourism Authority, Department of Statistics, Department of Planning and the Land Title and Registration Office.

¹ Does not include yacht passengers.

² Bermuda Tourism Authority.

³ Bermuda's Population Projections 2010-2020.

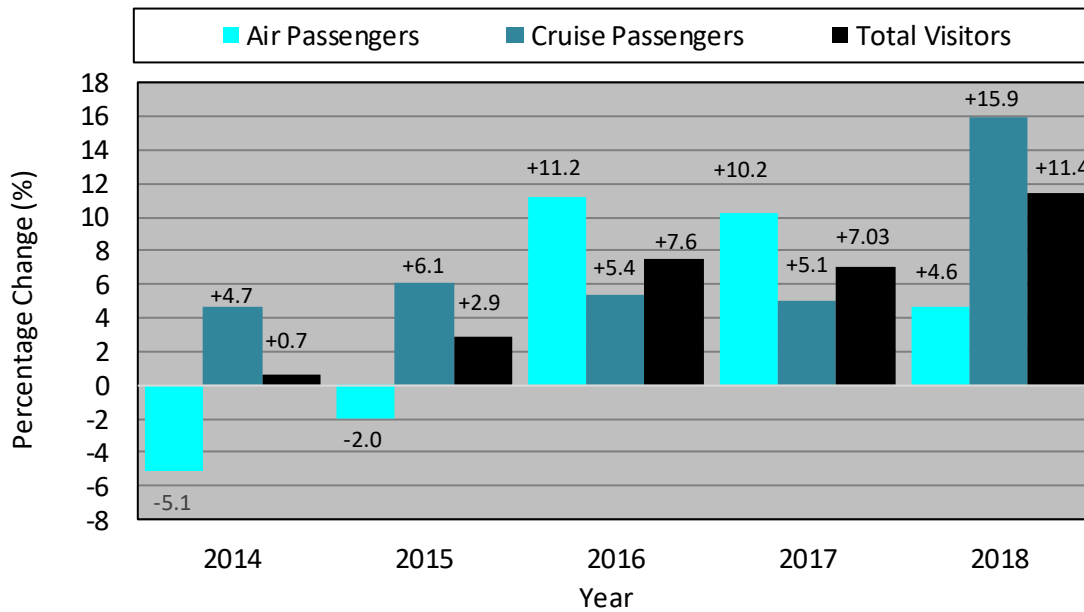
⁴ Bermuda's land area as of 2008 was 54.35 km² (21.01 square miles) Department of Planning.

⁵ 2016 Population and Housing Census.

⁶ Bermuda's land area as of 2016 was 53.56 km² (20.68 square miles) Land Title and Registration Office.

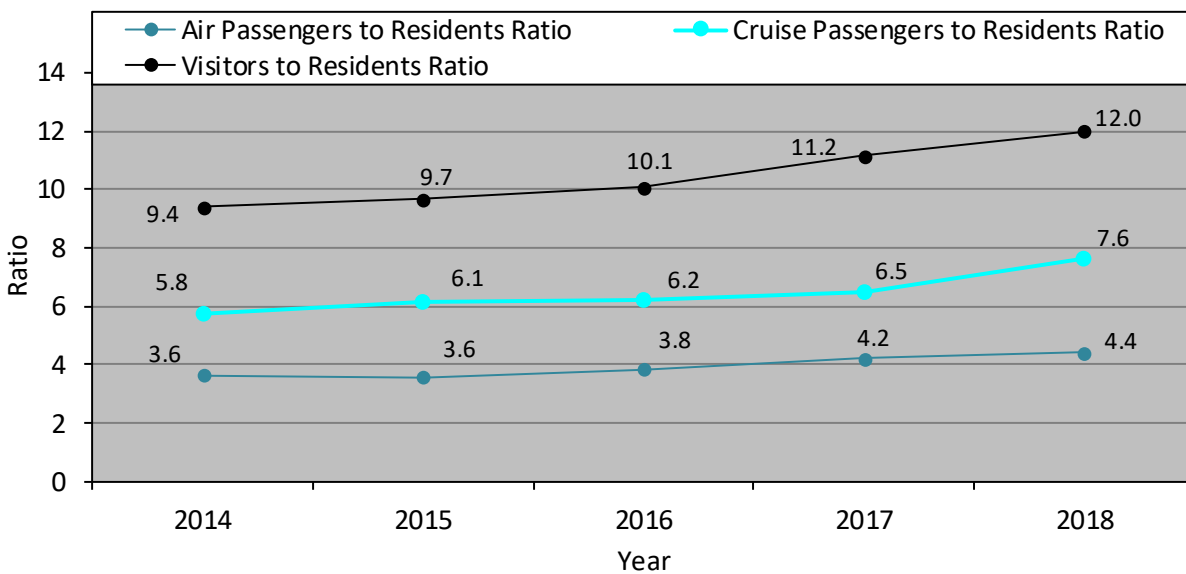
⁷ Bermuda's Population Projections 2016-2026.

Chart 2.1
GROWTH IN AIR PASSENGERS, CRUISE SHIP PASSENGERS AND TOTAL VISITORS, 2014-2018



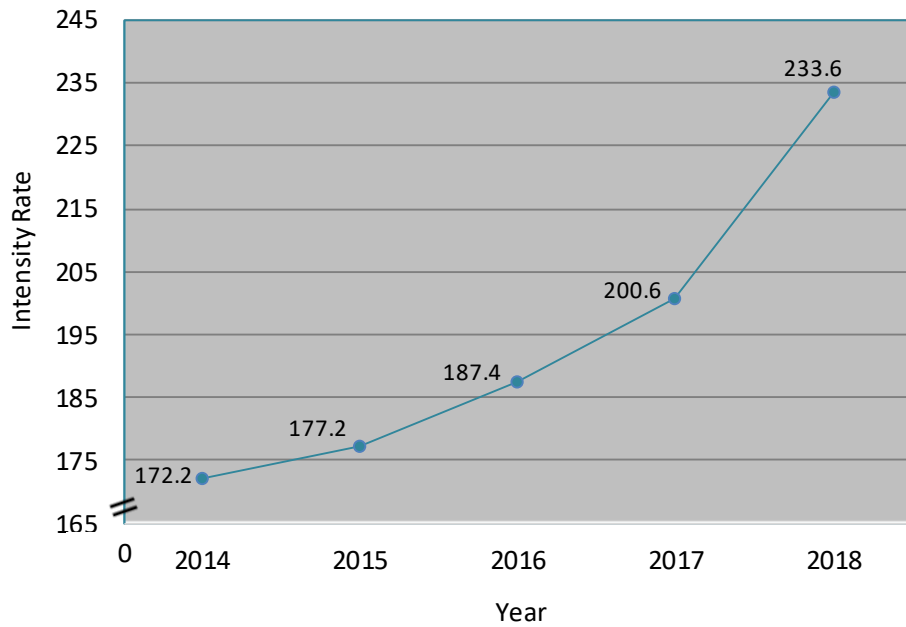
Sources: Bermuda Tourism Authority and Department of Statistics

Chart 2.2
AIR PASSENGERS TO RESIDENTS, CRUISE SHIP PASSENGERS TO RESIDENTS AND VISITOR TO RESIDENTS RATIO, 2014-2018



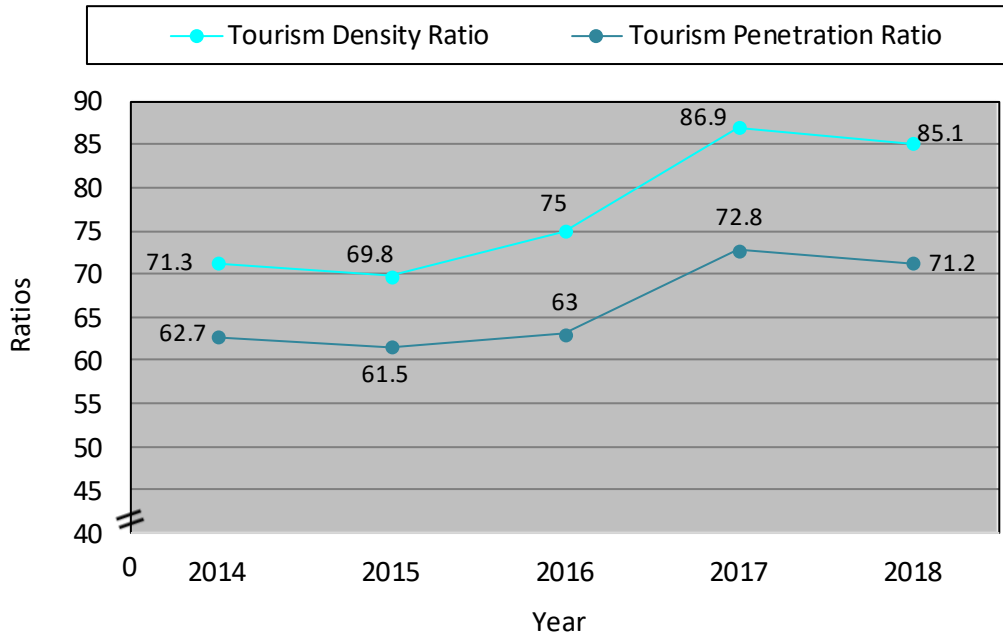
Sources: Bermuda Tourism Authority and Department of Statistics

Chart 2.3
TOURISM INTENSITY RATE, 2014-2018



Sources: Bermuda Tourism Authority and Department of Statistics

Chart 2.4
TOURISM DENSITY AND PENETRATION RATIOS, 2014-2018



Sources: Bermuda Tourism Authority and Department of Statistics

Table 2.2
AIR PASSENGER ARRIVALS BY COUNTRY OF ORIGIN, 2014-2018

Country of Origin	Year				
	2014	2015	2016	2017	2018
Total	224,380	219,814	244,491	269,576	281,887
United States	159,382	157,158	182,896	198,259	214,499
Canada	29,162	24,986	23,744	27,416	27,638
United Kingdom	22,179	22,511	21,738	22,997	20,955
Other	13,657	15,159	16,113	20,904	18,795

Source: Bermuda Tourism Authority

Table 2.3
AIR PASSENGERS BY INTENDED TYPE OF ACCOMMODATION, 2014-2018

Type of Accommodation	Year				
	2014	2015	2016	2017	2018
Total	224,380	219,814	244,491	269,534	281,887
Hotels or similar ¹	153,758	152,176	171,472	179,257	192,963
Friends and Relatives/Rental House or Apt. ²	61,705	57,501	54,362	66,194	69,382
Bed and Breakfast/Guest House ³	7,023	5,575	10,646	10,252	10,939
Other ⁴	1,894	4,562	8,011	13,831	8,603

Source: Bermuda Tourism Authority

¹ Includes resort hotels, small hotels, cottage colonies and clubs.

² Includes private homes.

³ Includes housekeeping accommodations, guest houses and bed and breakfast.

⁴ Includes not stated.

Table 2.4
NUMBER OF TOURIST PROPERTIES, OCCUPANCY RATE AND NUMBER OF ROOMS
PER KM², 2014-2018

Item	Year				
	2014	2015	2016	2017	2018
Number of properties	45	42	42	42	41
Total number of rooms available	2,415	2,334	2,334	2,409	2,404
Total number of beds	5,018	4,852	4,866	5,120	5,110
Total number of room nights sold	330,393
Occupancy rate (%) ¹	53.4	52.6	57.7	63.1	63.7
Number of rooms per km ²	44.4 ²	43.0 ²	43.0 ²	45.0 ³	44.9 ³

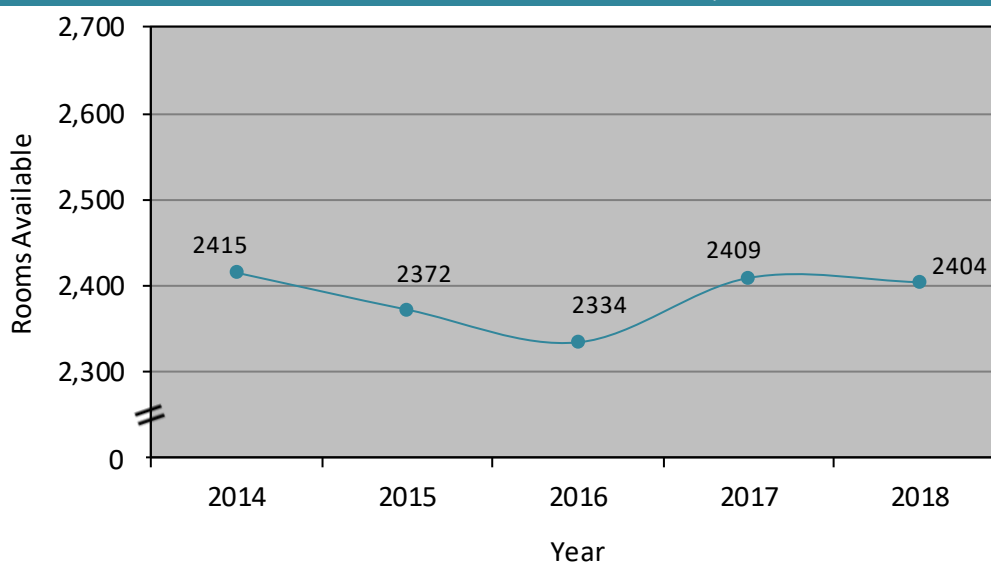
Sources: Bermuda Tourism Authority, Department of Planning and the Land Title and Registration Office

¹ Occupancy rate is only reported by the Bermuda Hotel Association which accounts for approximately 50% of the total properties and 80% of the total number of rooms and beds available. This figure is sourced from the Visitor Profile Report produced by the Bermuda Tourism Authority.

² Bermuda's land area as of 2008 was 54.35 km² (21.01 square miles) Department of Planning.

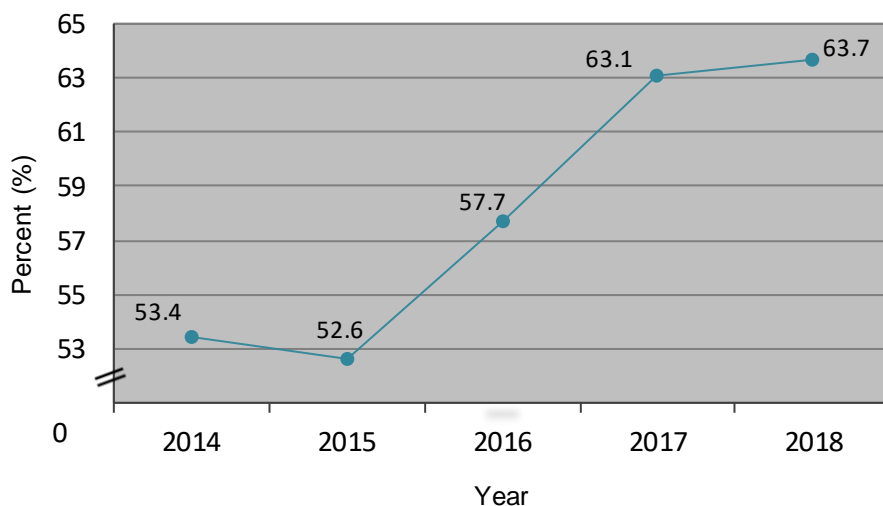
³ Bermuda's land area as of 2016 was 53.56 km² (20.68 square miles) The Land Title and Registration Office.

Chart 2.5
NUMBER OF HOTEL ROOMS AVAILABLE, 2014-2018



Source: Bermuda Tourism Authority

Chart 2.6
OCCUPANCY RATE, 2014-2018



Source: Bermuda Tourism Authority

Table 2.5
VISITOR EXPENDITURE AND NUMBER EMPLOYED IN TOURISM, 2014-2018

Item	Year				
	2014	2015	2016	2017	2018
Visitor expenditure (in US\$'000) ¹	327,900	335,600	398,200	468,000	544,180
Expenditure on same-day visits	52,700	62,200	65,500	65,400	130,670
Expenditure on accommodation, meals and drinks, shopping, entertainment, etc.	275,200	273,400	332,800	402,700	413,510
Total directly employed in tourism ²					
Total	4,120	4,012	4,127	4,371	4,547
Male	2,485	2,396	2,480	2,649	2,786
Female	1,635	1,616	1,647	1,722	1,761

¹ Source: Bermuda Tourism Authority.

² Includes hotels, restaurants, cafés and bars.

ENVIRONMENTAL HEALTH AND WEATHER

The Environmental Health and Weather Section contains information concerning environmentally-related diseases as well as weather data for Bermuda.

Environmental Health

- In 2018, there were 5,568 reported cases of environmentally-related diseases in Bermuda, with males accounting for less than half (44.1%) (Table 3.1).
- Respiratory diseases accounted for 4,833 (86.8%) of the total reported cases in 2018 (Table 3.1).
- In 2018, females accounted for the largest proportion (55.9%) of environmentally-related diseases (Table 3.1).

Weather

- Total rainfall in Bermuda increased by 4.8% over the period 2017 to 2018 (Table 3.2).
- In 2018, the month with the most rain days (20) was March while the least (6) was recorded in May (Table 3.2).
- August had the highest mean air temperatures during 2018 with an average daily air temperature of 82.0°F. The lowest mean air temperature during the same year was recorded in March (64.0°F) (Table 3.3).
- Over the five-year period, 2014 to 2018, the average daily air temperature reported was 72.9°F. The average daily maximum air temperature was 76.6° while the average daily minimum was 68.9°F for the same period (Table 3.3).
- In 2018, June had the highest average humidity (80.9%), while the lowest was recorded in March (69.8%). The average relative humidity for the five-year period, 2014 to 2018, was 74.5% (Table 3.4).

Table 3.1
REPORTED CASES OF ENVIRONMENTALLY-RELATED DISEASES BY SEX, 2014-2018

Cause	Sex	Year				
		2014	2015	2016	2017	2018
Gastroenteritis ^{1, 2}	Total	584	682	466	446	529
	Male	230	309	202	187	234
	Female	354	373	264	259	295
Malaria (imported)	Total	2	2	—	1	3
	Male	2	2	—	1	3
	Female	—	—	—	—	—
Dengue (imported)	Total	—	2	—	—	—
	Male	—	2	—	—	—
	Female	—	—	—	—	—
Accidental pesticide	Total	2	1	1	1	4
	Male	1	1	—	—	3
	Female	1	—	1	1	1
Poisoning	Total	22	48	69	96	66
	Male	12	24	30	46	34
	Female	10	24	39	50	32
Diarrhea	Total	126	134	116	96	133
	Male	51	53	51	42	49
	Female	75	81	65	54	84
Respiratory diseases (all) ³	Total	5,311	5,367	5,224	4,927	4,833
	Male	2,442	2,492	2,380	2,317	2,133
	Female	2,869	2,875	2,844	2,610	2,700
Acute bronchitis	Total	368	384	370	407	420
	Male	139	144	137	159	169
	Female	229	240	233	248	251
Chronic sinusitis	Total	111	99	126	88	113
	Male	28	30	37	30	40
	Female	83	69	89	58	73
Other	Total	4,832	4,884	4,728	4,132	4,300
	Male	2,275	2,318	2,206	1,828	1,924
	Female	2,557	2,566	2,522	2,304	2,376
TOTAL CASES, all causes	Total	6,045 ²	6,232	5,877	5,567	5,568
	Male	2,736 ²	2,879	2,664	2,593	2,456
	Female	3,309 ²	3,353	3,213	2,974	3,112
Percentage change (%)	Total	-4.5	+3.1	-5.7	-5.3	**
	Male	-3.6	+5.2	-7.4	-2.7	-5.3
	Female	-5.3	+1.3	-4.2	-7.4	+4.6

Sources: Department of Health and Bermuda Hospitals Board

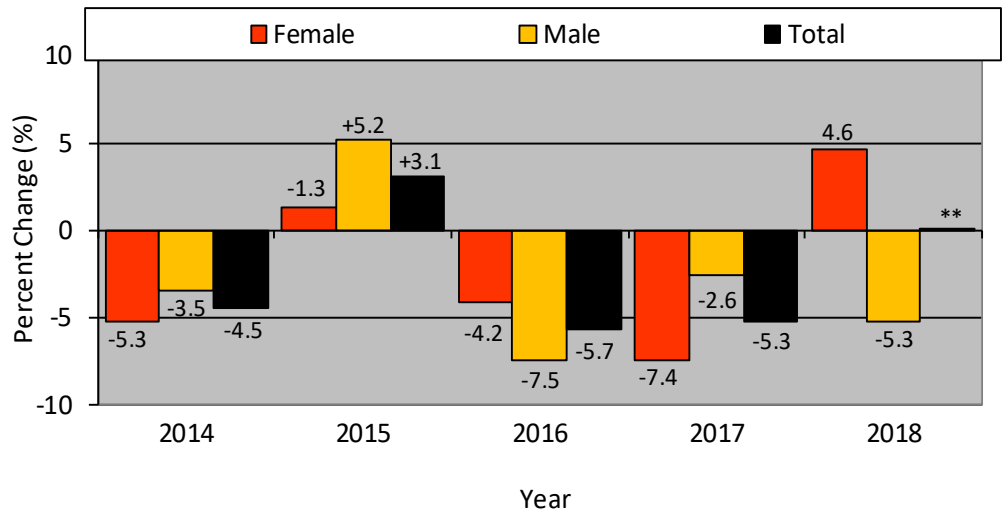
¹ Includes inpatient discharges and emergency encounters.

² Includes cases that may have been inadvertently coded as non-infectious gastroenteritis.

³ Respiratory diseases (all) includes acute bronchitis, chronic sinusitis, asthma, pneumonia, etc.

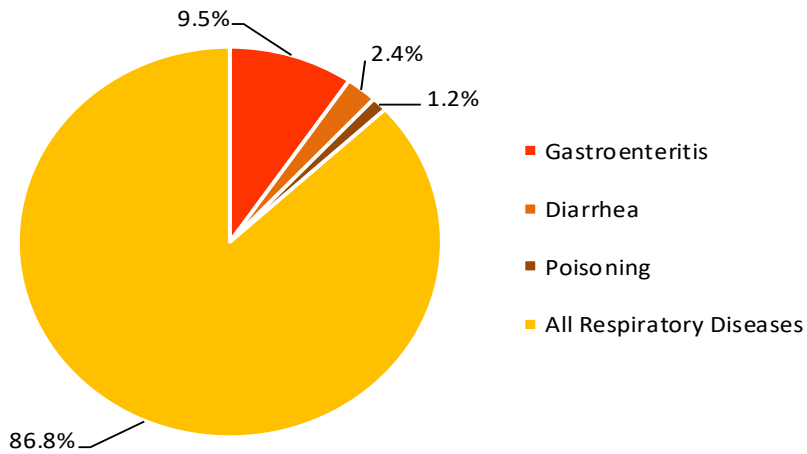
Note: The Poisoning category has been revised from 2013-2016 to reflect applicable International Classification of Diseases (ICD-9) codes.

Chart 3.1
PERCENTAGE CHANGE IN REPORTED CASES OF ENVIRONMENTALLY-RELATED DISEASES BY SEX AND TOTAL, 2014-2018



Sources: Department of Health and Bermuda Hospitals Board

Chart 3.2
REPORTED CASES OF ENVIRONMENTALLY-RELATED DISEASES BY CAUSE, 2018¹



Sources: Department of Health and Bermuda Hospitals Board

¹ Excludes Accidental Pesticide (0.07%)

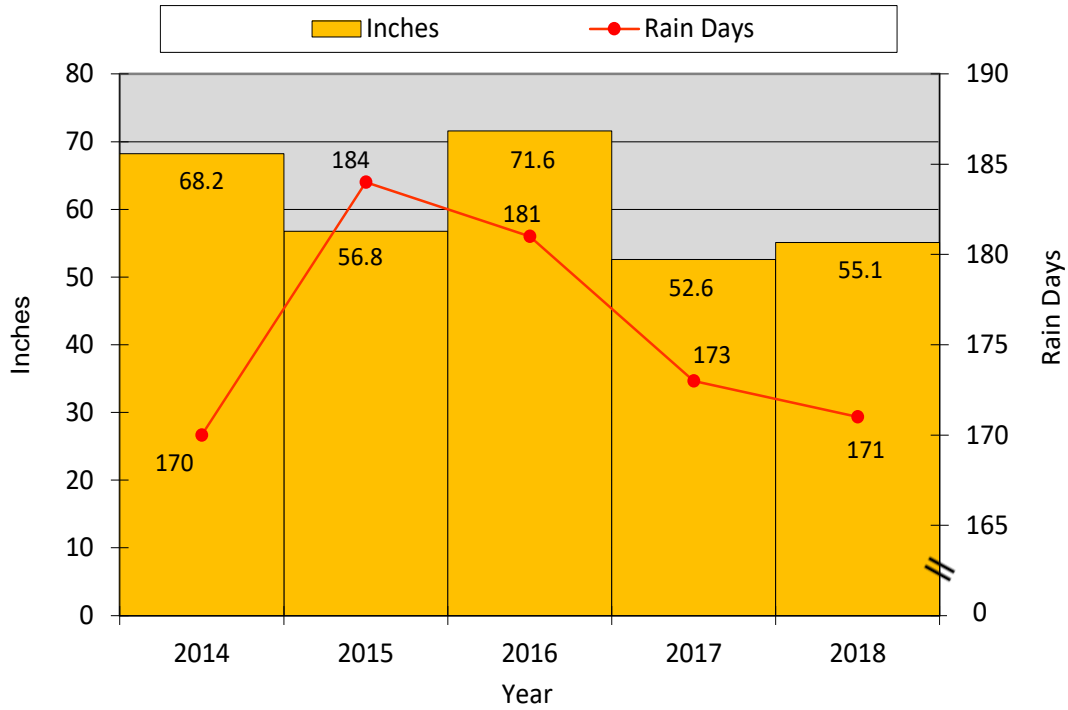
¹ Excludes Malaria (0.05%)

Table 3.2
TOTAL NUMBER OF INCHES OF RAINFALL AND RAIN DAYS, 2014-2018

Year		Month												Total
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
2014	Inches	6.2	8.1	4.8	1.9	3.0	2.6	4.0	14.1	4.1	7.4	8.9	3.1	68.2
	Rain Days	18	13	19	8	6	11	13	21	14	13	17	17	170
2015	Inches	4.0	9.2	2.9	4.0	1.2	3.0	8.9	5.6	5.0	6.1	2.9	4.1	56.8
	Rain Days	19	19	17	14	8	8	20	14	17	20	17	11	184
2016	Inches	6.9	5.5	7.7	2.9	6.6	5.0	4.1	3.3	11.8	10.7	3.5	3.6	71.6
	Rain Days	24	18	16	16	11	16	10	15	17	13	12	13	181
2017	Inches	9.7	3.8	2.8	0.7	0.8	4.8	5.6	5.6	4.0	6.4	3.6	4.8	52.6
	Rain Days	15	13	16	8	10	18	17	15	13	16	15	17	173
2018	Inches	3.8	2.9	7.6	3.6	2.7	5.8	3.7	3.2	6.8	3.3	8.2	3.5	55.1
	Rain Days	16	12	20	10	6	16	16	14	15	12	19	15	171

Source: The Bermuda Weather Service

Chart 3.3
TOTAL NUMBER OF INCHES OF RAINFALL AND RAIN DAYS, 2014-2018



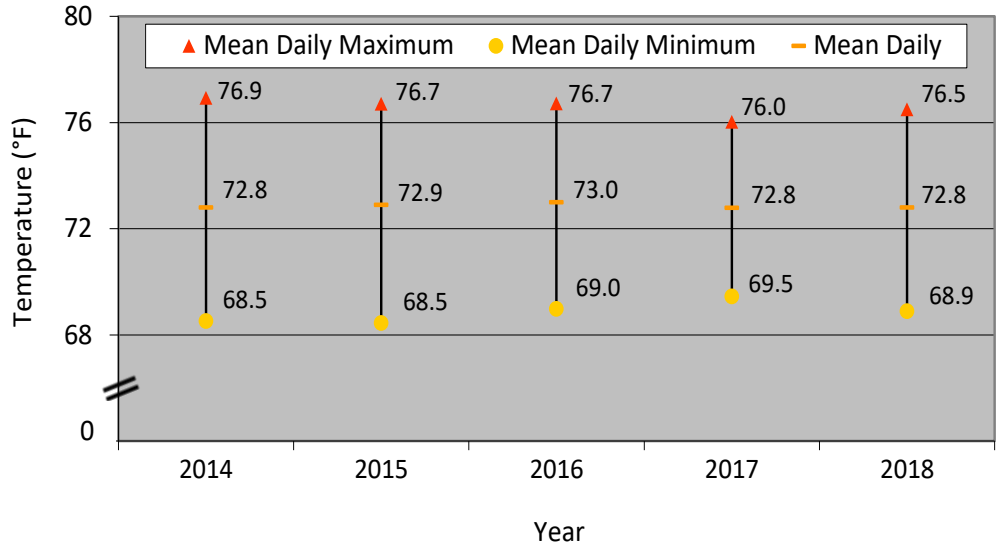
Source: The Bermuda Weather Service

Table 3.3
MEAN DAILY MAXIMUM, MINIMUM AND DAILY AIR TEMPERATURE, 2014-2018

Year		Month											(°F)	
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Averag
2014	Mean Daily Max.	70.5	71.7	70.0	72.2	74.8	80.0	83.8	84.0	85.5	81.4	75.8	73.4	76.9
	Mean Daily Min.	63.0	63.5	61.8	65.5	66.8	71.7	76.7	74.9	75.2	71.6	66.6	65.0	68.5
	Mean Daily	67.0	67.7	66.0	68.7	70.7	75.8	80.2	79.8	80.2	76.5	71.7	69.3	72.8
2015	Mean Daily Max.	70.6	67.7	68.9	71.7	75.4	82.1	85.8	85.3	84.4	79.9	75.3	73.4	76.7
	Mean Daily Min.	61.9	58.5	60.6	63.6	68.5	74.6	71.1	77.9	77.1	72.7	68.7	66.2	68.5
	Mean Daily	66.6	63.4	64.8	67.8	71.6	78.2	81.4	81.7	80.7	76.5	72.1	70.0	72.9
2016	Mean Daily Max.	70.4	69.4	71.2	71.6	76.9	80.6	85.4	86.5	84.8	79.9	72.7	71.2	76.7
	Mean Daily Min.	62.6	61.1	63.1	63.8	69.5	73.5	77.9	78.2	76.8	72.8	65.0	63.5	69.0
	Mean Daily	66.6	65.6	67.6	67.9	73.3	76.9	81.5	82.3	81.2	76.4	69.2	67.5	73.0
2017	Mean Daily Max.	69.4	68.9	67.0	71.9	68.7	82.2	85.6	86.4	84.2	79.6	76.1	72.4	76.0
	Mean Daily Min.	61.8	60.4	58.8	64.4	76.8	74.3	77.4	78.3	77.3	71.7	67.8	64.4	69.5
	Mean Daily	65.9	64.9	62.9	67.9	72.3	78.1	81.7	82.5	80.8	75.9	72.0	68.6	72.8
2018	Mean Daily Max.	68.8	70.9	67.8	72.3	78.3	81.5	83.4	85.8	84.7	79.2	75.1	70.7	76.5
	Mean Daily Min.	61.5	63.9	59.0	64.4	70.6	74.2	75.9	78.2	76.1	71.7	68.0	63.3	68.9
	Mean Daily	65.4	67.1	64.0	68.4	74.2	77.8	79.7	82.0	80.6	75.6	71.7	67.5	72.8

Source: The Bermuda Weather Service

Chart 3.4
MEAN DAILY MAXIMUM, MINIMUM AND DAILY AIR
TEMPERATURE, 2014-2018



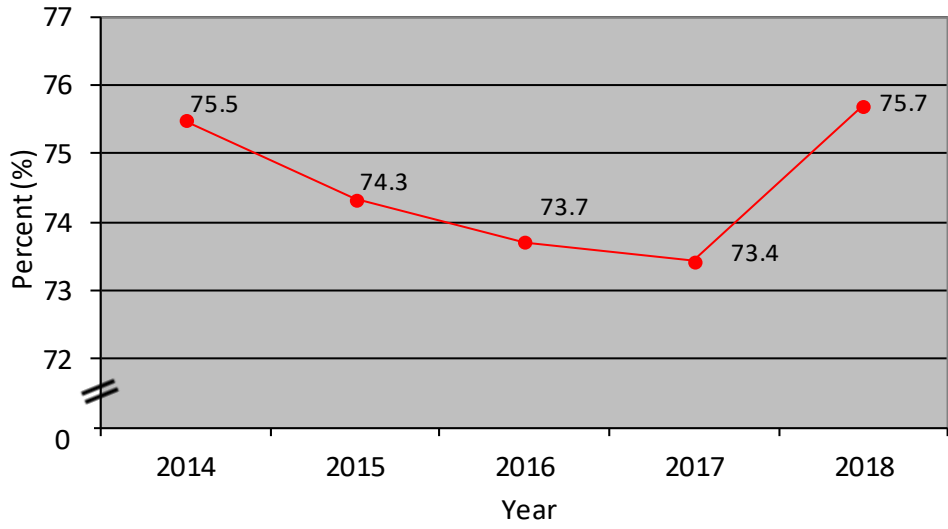
Source: The Bermuda Weather Service

Table 3.4
MEAN RELATIVE HUMIDITY, 2014-2018

Year	Month												(%) Yearly Average
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
2014	74.8	77.9	69.5	71.9	68.6	76.8	76.1	82.6	81.5	77.4	77.3	71.5	75.5
2015	70.2	70.8	69.6	74.2	73.5	79.2	75.7	76.6	76.0	76.9	71.3	77.9	74.3
2016	72.3	73.8	74.9	71.6	80.2	79.4	77.4	73.8	74.9	70.7	64.3	71.2	73.7
2017	74.3	69.9	66.4	71.0	74.2	78.2	76.1	74.3	73.4	74.0	77.2	72.1	73.4
2018	73.1	78.3	69.8	78.1	79.7	80.9	80.4	75.5	75.2	70.0	75.7	71.1	75.7

Source: The Bermuda Weather Service

Chart 3.5
MEAN RELATIVE HUMIDITY, 2014-2018



Source: The Bermuda Weather Service

NATURAL AND ENVIRONMENTAL DISASTERS

Occurrences of natural and environmental disasters are very rare in Bermuda.

Hurricanes

- There were no hurricanes that affected Bermuda in 2018. The last hurricane to hit Bermuda was in October 2016.

Fires

- In 2018, there were 2,102 reported incidences of fire in Bermuda. This represented a 3.4% increase from the 2,033 reported incidences in 2017 (Table 4.2).
- In 2018, the majority of fires (52.8%) were classified as "Structural" fires (Table 4.2).

NOTE TO READER

Natural Disaster: a natural event which overwhelms local capacity, necessitating a request for national or international assistance, or is recognized as such by a multilateral agency, or by at least two sources, such as national, regional or international assistance groups and the media. There are two types: sudden-impact disasters e.g. earthquakes; or those that develop gradually, e.g. drought.

Types of Disaster: Avalanches, floods, earthquakes, hurricanes, torrential rains, volcanic eruptions, droughts, landslides, mudslides, fires, blizzards, tsunamis, etc.

Source: CARICOM Environment Programme

Table 4.1
NATURAL DISASTERS, 2018

Item	
Type of disaster	—
Date started	—
Total casualties:	—
of which: dead	—
Total population affected	—
Damage (\$ million)	—

Source: The Bermuda Business Development Agency

Table 4.2
INCIDENCES OF FIRE BY TYPE, 2014-2018

Year	Total	Type					
		Minor Incidents ¹	Structure ²	Island Fires	Vehicle	Boat Fires	Other ³
2014	1,804	512	629	..	28	..	635
2015	1,875	318	933	..	26	..	598
2016	2,033	298	1,069	..	18	..	648
2017	2,033	337	1,049	..	18	..	629
2018	2,102	384	1,109	..	15	..	594

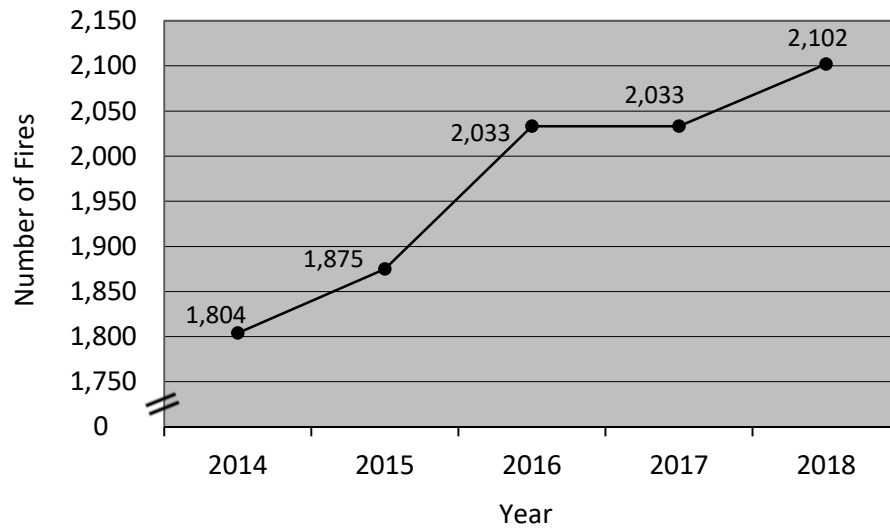
Source: Bermuda Fire and Rescue Service

¹ Includes brush, trash, gas cylinder leaks, oil spills, floodings, pole fires, etc.

² Includes false alarms.

³ Reflects the activities of the Crash and Fire Rescue Service in other emergency duties such as Airport Operations Division incidents, foreign object debris checks, hot refuel, aircraft standby, etc.

Chart 4.1
TOTAL INCIDENCES OF FIRES, 2014-2018



Source: Bermuda Fire and Rescue Service

ENERGY, MINERALS AND TRANSPORT

The Energy, Minerals and Transport Section comprises information on the types of fuels imported to Bermuda such as gasoline, diesel and propane. It also contains statistics on electricity consumption by type of consumer and the types of vehicles on Bermuda's roads.

Fuel

- In 2018, the value of imported petroleum oils and oils from bituminous minerals, other than crude imported into Bermuda, was \$125.8 million, an increase of 22.7 percent from the total value imported in 2017 (Table 5.1).
- The quantity of gas oils (diesel) decreased to 37.1 million kg in 2018, a decrease of 47.0 percent over the previous year (Table 5.1).
- Both the value and quantity of Kerosene & other medium oils (not including gas oils) increased from 2017 to 2018, with the value increasing more rapidly. More specifically, the quantity nearly doubled while the value almost tripled during the same period.(Table 5.1).

Mineral Fuels

- In 2018, the value of imported mineral fuels, mineral oils and related products jumped to \$232.5 million. This is a 117.6% increase from the \$106.8 million imported in 2017 (Table 5.2).

Electricity

- Total electricity consumption in 2018 dropped to approximately 568 million kWh from 585 million kWh in 2017. The commercial sector accounted for just under half (48.4%) of all electricity consumed in Bermuda (Table 5.3).

Transport

- In 2018, there were 49,047 registered road vehicles in Bermuda. Private cars accounted for nearly half (45.2%) of this total, while just over one-third (35.6%) were motorcycles and scooters (Table 5.6).

Table 5.1
VALUE OF IMPORTED FUEL¹ BY TYPE, 2016-2018

Type	2016		2017		2018	
	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)
Total	85,309,737 r	179,000,631 r	102,503,736 r	226,371,307 r	125,771,352	224,051,499
Percentage change (%)	-20.7 r	-14.2 r	+20.1 r	+26.5 r	+22.7	-1.0
Light oils and preparations (i.e. motor spirits)	20,267,822 r	25,771,646 r	16,070,815 r	18,204,666 r	21,151,146	21,472,971
Gas oils (diesel)	12,269,082 r	17,739,040 r	39,203,843 r	69,961,446 r	26,399,712	37,088,222
Gas oils (heavy atmospheric)	5,359,260 r	6,089,588 r	2,015 r	213 r	-	-
Kerosene and other medium oils (not including gas oils)	16,131,727 r	27,556,714 r	8,237,528 r	15,387,924 r	21,034,479	30,170,302
Fuel oils not elsewhere specified	28,269,783 r	100,768,690 r	35,144,801 r	122,073,991 r	54,250,523	134,601,158
Other lubricating oils and grease, etc.	3,012,063 r	1,074,953 r	3,723,735 r	733,046 r	2,916,711	713,767
Other waste oils	13,498 r	1,918 r	120,999 r	10,021 r	18,781	5,080

Source: Department of Statistics

¹ Petroleum oils and oils obtained from bituminous minerals, other than crude.

Table 5.2
VALUE OF IMPORTED MINERAL FUELS, MINERAL OILS AND RELATED PRODUCTS CONSUMED BY TYPE, 2016-2018

Type	2016		2017		2018	
	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)
Total	87,852,823 r	205,580,828 r	106,840,391 r	232,510,172 r	232,509,812	240,463,839
Percentage change (%)	-20.0 r	-6.8 r	+21.6 r	+13.1 r	+21.5	+3.4
Coal, briquettes	22,247 r	10,575 r	97,505 r	5,666 r	36,956	15,921
Lignite	—	—	—	—	214	18
Peat	82,033 r	65,706 r	486,080 r	46,951 r	158,333	43,432
Coke and semi coke	75,602 r	48,912 r	48,082 r	30,049 r	82,437	49,623
Coal gas, water gas	—	—	—	—	2,027	50
Tar distilled	781 r	2,000 r	4,603 r	4,470 r	—	—
Oils and other products	16,949 r	3,494 r	49,347 r	615 r	3,275	702
Pitch and pitch coke	—	—	167 r	16 r	—	—
Petroleum oils	—	—	—	—	—	—
Petroleum oils other than crude	85,323,235 r	179,002,549 r	102,503,736 r	226,371,307 r	125,771,352	224,051,499
Petroleum gases & other gaseous hydrocarbons	1,843,895 r	25,518,042 r	2,614,178 r	4,389,752 r	3,215,651	15,538,081
Petroleum jelly	40,131 r	5,969 r	76,129 r	5,433 r	41,681	5,221
Petroleum coke	42,037 r	4,337 r	184,523 r	32,402 r	42,648	3,628
Other bitumen and asphalt	47,103 r	117,655 r	162,106 r	331,730 r	38,040	67,341
Bituminous mixtures	358,810 r	801,589 r	613,935 r	1,291,781 r	426,205	688,323
Electrical energy	—	—	—	—	—	—

Source: Department of Statistics

Table 5.3
ELECTRICITY CONSUMPTION BY TYPE OF CONSUMER, 2014-2018

Year	Total (‘000 kWh)	Type		
		Residential (‘000 kWh)	Commercial (‘000 kWh)	Other ¹ (‘000 kWh)
2014	577,365	235,523	291,350	50,492
2015	590,427	245,498	290,552	54,377
2016	585,774	245,105	286,588	54,081
2017	584,518	245,124	284,866	54,528
2018	567,827	240,302	274,770	52,755

Source: Ascendant Group Limited

¹ Includes street lighting paid by Parish Councils and sales to Government for offices, distillation plant, etc.

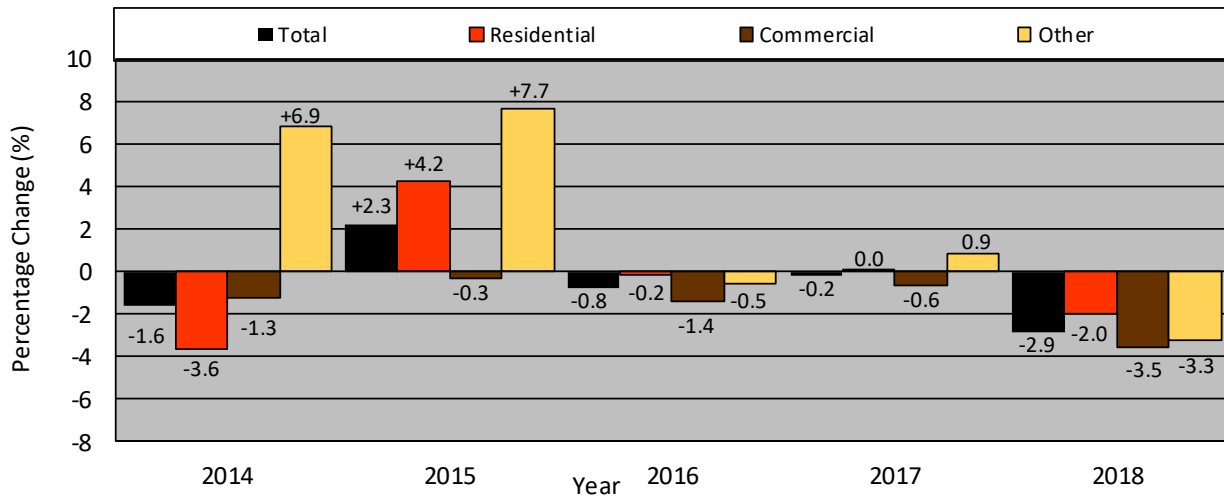
Table 5.4
GROWTH IN ELECTRICITY CONSUMPTION BY TYPE OF CONSUMER, 2014-2018

Year	Growth Electricity Consumptio	Type		
		Residential Percentage	Commercial Percentage	Other ¹ Percentage
2014	-1.6	-3.6	-1.3	+6.9
2015	+2.2	+4.2	**	+7.7
2016	**	**	-1.4	**
2017	**	**	**	**
2018	-2.9	-2.0	-3.5	-3.3

Source: Ascendant Group Limited

¹ Includes street lighting paid by Parish Councils and sales to Government for offices, distillation plant, etc.

Chart 5.1
GROWTH IN ELECTRICITY CONSUMPTION BY TYPE OF CONSUMER AND
TOTAL CONSUMPTION, 2014-2018



Source: Ascendant Group Limited

Table 5.5
PERCENTAGE OF TOTAL ELECTRICITY CONSUMPTION BY TYPE OF CONSUMER, 2014-2018

Year	Total	Type		
		Residential Percentage	Commercial Percentage	Other ¹ Percentage
2014	100	40.8	50.5	8.8
2015	100	41.6	49.2	9.2
2016	100	41.8	48.9	9.2
2017	100	41.9	48.7	9.3
2018	100	42.3	48.4	9.3

Source: Ascendant Group Limited

¹ Includes street lighting paid by Parish Councils and sales to Government for offices, distillation plant, etc.

Table 5.6
REGISTERED ROAD VEHICLES¹, 2014-2018

Type	Year				
	2014	2015	2016	2017	2018
Total	46,625	47,092	47,482	49,019	49,047
Percentage change (%)	**	+1.0	**	+3.2	**
Private Cars	21,464	21,607	21,709	22,046	22,151
Buses, Minibuses & Limousines	190	208	225	250	258
Taxis	576	564	553	555	557
Trucks	3,620	3,583	3,624	3,742	3,762
Trailers	290	280	288	258	276
Farm Tractors	29	29	26	26	27
Ambulances & Fire Engines	46	45	46	47	48
Military Vehicles	31	33	36	42	49
Tractors & Tractor Trailers	338	319	262	254	241
Light Private Cars	80	76	73	71	63
Auxiliary Cycles ²	4,196	4,074	3,933	3,925	3,547
Motor Cycles & Scooters	15,134	15,659	16,116	17,148	17,438
Construction Vehicles ³	53	53	51	45	47
Government Private (GP) Vehicles ⁴	254	244	241	272	246
Other ⁵	324	318	299	338	337

Source: Transport Control Department

¹ Number of vehicles for which a valid license was in effect as of 31st December.

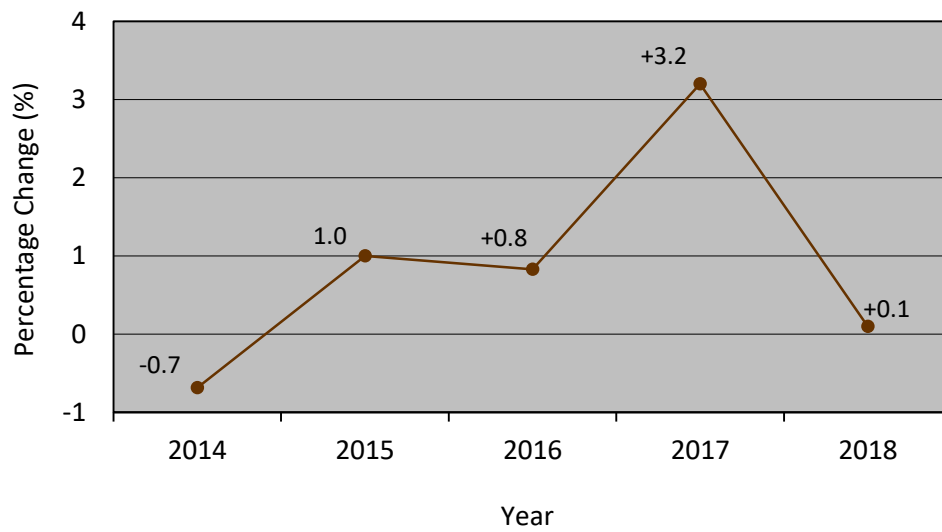
² Includes livery cycles.

³ Includes cement mixers.

⁴ Includes cars (classes A-H) and minibuses.

⁵ Includes classic cars, community service vehicles, doctors' cars, garbage trucks, hearses, instructional

Chart 5.2
PERCENTAGE CHANGE IN REGISTERED ROAD VEHICLES, 2014-2018



Source: Transport Control Department

AGRICULTURE

The Agriculture Section includes tables and charts on the importation of fertilizers and pesticides to Bermuda.

Fertilizers and Pesticides

In 2018:

- the value of fertilizers imported into Bermuda totaled nearly \$639 thousand for 284,394 kg, a 29.4% decrease from 2017 (Table 6.1).
- other fertilizers accounted for over half (50.7%) of the total value of fertilizers imported to Bermuda (Table 6.1).
- the total value of pesticides imported into Bermuda fell significantly to approximately \$2.0 million for 380,933 kg, a 30.3% decrease from 2017 (Table 6.2).
- insecticides accounted for nearly one-third (32.7%) of the total value of imported pesticides (Table 6.2).

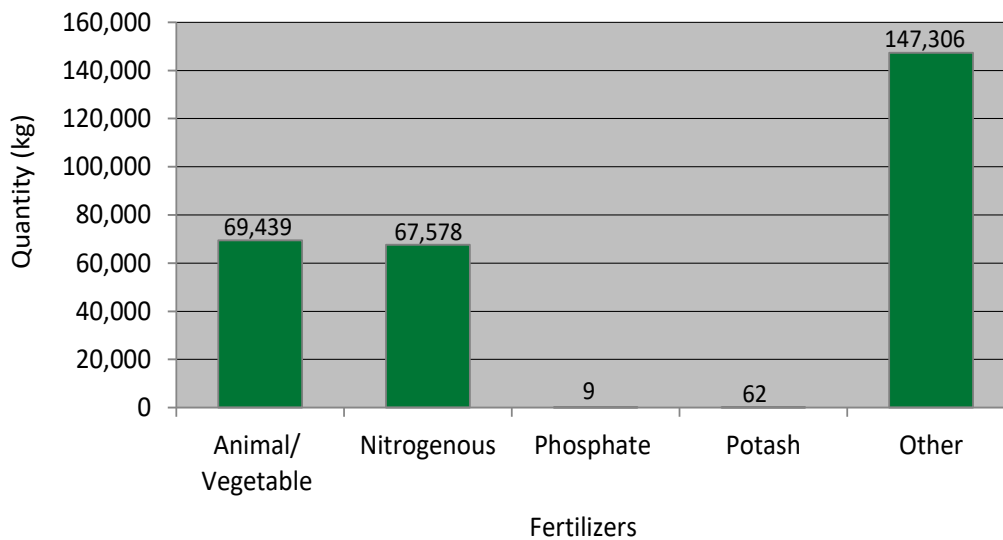
Table 6.1
IMPORTED FERTILIZERS BY TYPE, 2016-2018

Category	2016		2017		2018	
	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)
Total	542,467 r	308,926 r	905,296 r	226,284 r	638,810	284,394
Percentage change (%)	-10.7 r	+13.5	+66.9	-26.8 r	-29.4	+25.7
Animal/Vegetable fertilizers	207,392 r	118,003 r	155,703 r	49,108 r	150,552	69,439
Nitrogenous fertilizers	85,964 r	30,513 r	85,013 r	29,098 r	153,880	67,578
Phosphate fertilizers	1,218 r	1,150 r	6,721 r	1,935 r	9,680	9
Potash fertilizers	2,497 r	34 r	158 r	50 r	716	62
Other fertilizers ¹	245,396 r	159,226 r	657,701 r	146,093 r	323,982	147,306

Source: Department of Statistics

¹ Other fertilizers include mixtures of two or three of the fertilizing elements nitrogen, phosphorus or potassium.

Chart 6.1
IMPORTED FERTILIZERS BY TYPE, 2018



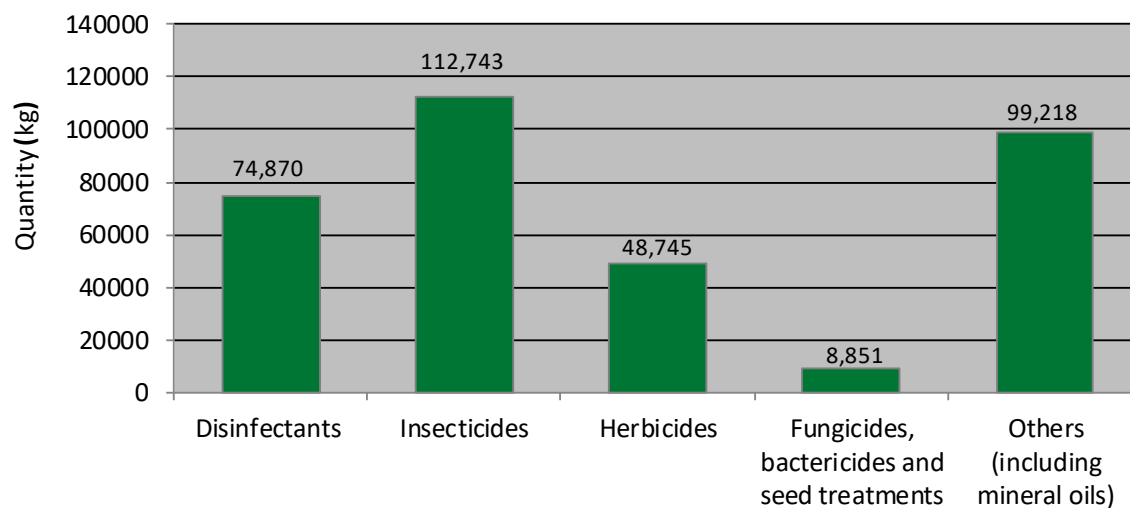
Source: Department of Statistics

Table 6.2
IMPORTED PESTICIDES BY TYPE, 2016-2018

Category	2016		2017		2018	
	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)	Value (\$)	Quantity (kg)
Total	2,030,515 r	662,897 r	2,816,075 r	378,677 r	1,963,623	344,427
Percentage change (%)	+1.5 r	+18.1 r	+38.7 r	-42.9 r	-30.3	-9.0
Disinfectants	503,487 r	306,014 r	1,064,364 r	91,826 r	623,956	74,870
Insecticides	1,055,895 r	167,397 r	848,090 r	114,094 r	769,367	112,743
Herbicides	247,771 r	42,137 r	297,809 r	52,154 r	279,645	48,745
Fungicides, bactericides and seed treatments	65,051 r	66,807 r	299,155 r	41,097 r	75,096	8,851
Others (including mineral oils)	158,311 r	80,542 r	306,657 r	79,506 r	215,559	99,218

Source: Department of Statistics

Chart 6.2
IMPORTED PESTICIDES BY TYPE, 2018



Source: Department of Statistics

LAND USE

The data in the Land Use Section was collected in 2001 and 2016, respectively by the Department of Planning and has not been updated.

Land Use

- Residential properties occupied 46.7 percent of all land in Bermuda, covering roughly 6,210 acres of land (Table 7.1).
- Nearly 4,335 acres were dedicated to open space land use which is comprised of nature reserves, rural areas, golf courses, recreational spaces and other open spaces. This represents about one-third (33.3%) of Bermuda's land (Table 7.1).
- Land used for commercial purposes (such as retail and office space) accounted for 2.0 percent of all occupied land space in Bermuda (Table 7.1).

Parishes

- A comparison of land use by parish showed that St. George's holds the largest share of land (2,162.7 acres) and Pembroke has the least (1,170.3 acres) (Table 7.2.1).

Municipalities

- Among the two municipalities, the City of Hamilton occupies the least amount of land in Bermuda (176.3 acres) and the Town of St. George holds the most (341.0 acres) (Table 7.2.1).

Note: The Land Use Section uses data collected from the Department of Planning, Land Use Survey 2001 and 2016, respectively. In some tables, figures will not be comparable.

Table 7.1
LAND USE, 2018

Main Use	Sub-Category	Total Area (Acres)	Percentage Distribution
Total		13,268.7	100.0
Residential	Total	5,983.9	44.9
	Housing	5,799.5	43.7
	Condos	162.3	1.2
	Institutional	22.2	**
Open space	Total	4,416.8	33.3
	Nature reserve	1,258.1	9.5
	Rural	1,162.8	8.8
	Other	946.2	7.1
	Golf courses	808.8	6.1
	Recreation	240.9	1.8
Utilities	Total	734.3	4.1
	Airport	548.4	4.1
	Waste	67.1	**
	Transport	44.0	**
	BELCO	38.0	**
	Docks	36.8	**
Institutional	Total	524.0	1.9
	Education	254.2	1.9
	Religious	87.5	**
	Government	64.0	**
	Police	59.1	**
	Hospital	30.3	**
	Prison	16.8	**
	Social	12.2	**
Tourism	Total	332.3	2.5
	Cottage colonies	204.7	1.5
	Hotels	127.6	1.0
Industrial	Total	321.6	1.5
	General	200.4	1.5
	Light industrial	64.4	**
	Quarry	56.8	**
Vacant	Total	119.9	**
	Vacant land	610.3	4.6
	Vacant buildings	119.9	**
Commercial	Total	99.5	**
	Retail	126.2	1.0
	Office	63.0	**
	Mixed-use	36.5	**

Source: Department of Planning, Land Use Survey 2001

The 2001 Land Use Survey was based on the 1997 digital survey of the islands, whose coastline was probably taken at the high water mark hence the discrepancy in total area which now stands at 13,430.39 acres (low time mark) in 2007 as a result of the more accurate 2003 Topographic Mapping Database.

Table 7.2.1
LAND USE BY PARISH, CITY AND TOWN IN ACRES, 2018

Main Use / Sub-Category	Parish/Town/City										
	St. George's	Town of St. George	Hamilton	Smith's	Devonshire	Pembroke	The City of Hamilton	Paget	Warwick	South- ampton	Sandy's
Total	2,162.7	341.0	1,312.2	1,216.3	1,221.4	1,170.3	176.3	1,303.0	1,415.4	1,511.7	1,438.4
Residential	450.3	98.6	585.4	709.7	562.4	758.1	27.4	803.6	707.0	610.7	669.5
Housing	444.2	95.9	570.1	696.0	527.2	742.8	25.7	780.0	686.2	586.1	645.4
Condos	6.1	2.7	15.3	10.6	28.0	11.9	—	21.8	20.8	24.6	20.4
Institutional	—	—	—	3.1	7.2	3.5	1.7	1.8	—	—	3.7
Open space	715.6	138.8	611.3	432.7	499.3	132.3	7.9	296.8	584.8	614.4	383.0
Nature reserve	296.4	8.4	156.2	106.0	163.7	74.0	6.4	70.3	164.5	104.3	107.8
Other	218.9	30.2	167.9	75.3	57.0	25.4	1.5	59.3	65.3	121.7	124.0
Golf courses	139.5	79.7	127.7	—	76.6	—	—	10.8	171.0	198.1	5.4
Recreation	36.0	—	9.1	24.8	35.4	27.3	—	4.2	53.4	16.9	33.9
Rural	24.9	20.4	150.4	226.6	166.6	5.7	—	152.2	130.7	173.5	111.9
Utilities	606.2	9.4	10.8	6.7	23.5	23.5	26.4	—	—	4.7	20.2
Airport	548.4	—	—	—	—	—	—	—	—	—	—
Waste	37.0	2.4	10.8	—	14.1	—	—	—	—	—	2.7
Transport	10.2	3.2	—	—	5.0	3.2	16.1	—	—	3.3	2.5
Docks	6.5	3.7	—	—	—	—	10.3	—	—	—	15.1
BELCO	4.1	—	—	6.7	4.4	20.3	—	—	—	1.4	—
Institutional	48.1	33.9	13.0	15.8	72.6	96.2	29.9	66.4	54.6	30.7	60.6
Education	27.3	20.4	8.9	11.3	36.0	47.8	4.4	27.9	28.0	17.0	25.3
Police	15.5	0.5	—	—	9.3	1.3	1.1	—	9.0	6.8	15.4
Religious	2.3	10.0	4.1	4.5	5.0	15.7	6.6	10.3	10.3	6.9	11.9
Prison	1.5	—	—	—	—	2.8	5.3	4.6	2.6	—	—
Government	1.5	2.9	—	—	11.0	25.5	12.5	8.9	—	—	1.2
Hospital	—	—	—	—	11.3	—	—	14.7	—	—	3.2
Social	—	—	—	—	—	3.2	—	—	4.7	—	3.7

Source: Department of Planning, Land Use Survey 2001

The 2001 Land Use Survey was based on the 1997 digital survey of the islands, whose coastline was probably taken at the high water mark hence the discrepancy in total area which now stands at 13,430.4 acres (low time mark) in 2007 as a result of the more accurate 2003 Topographic Mapping Database.

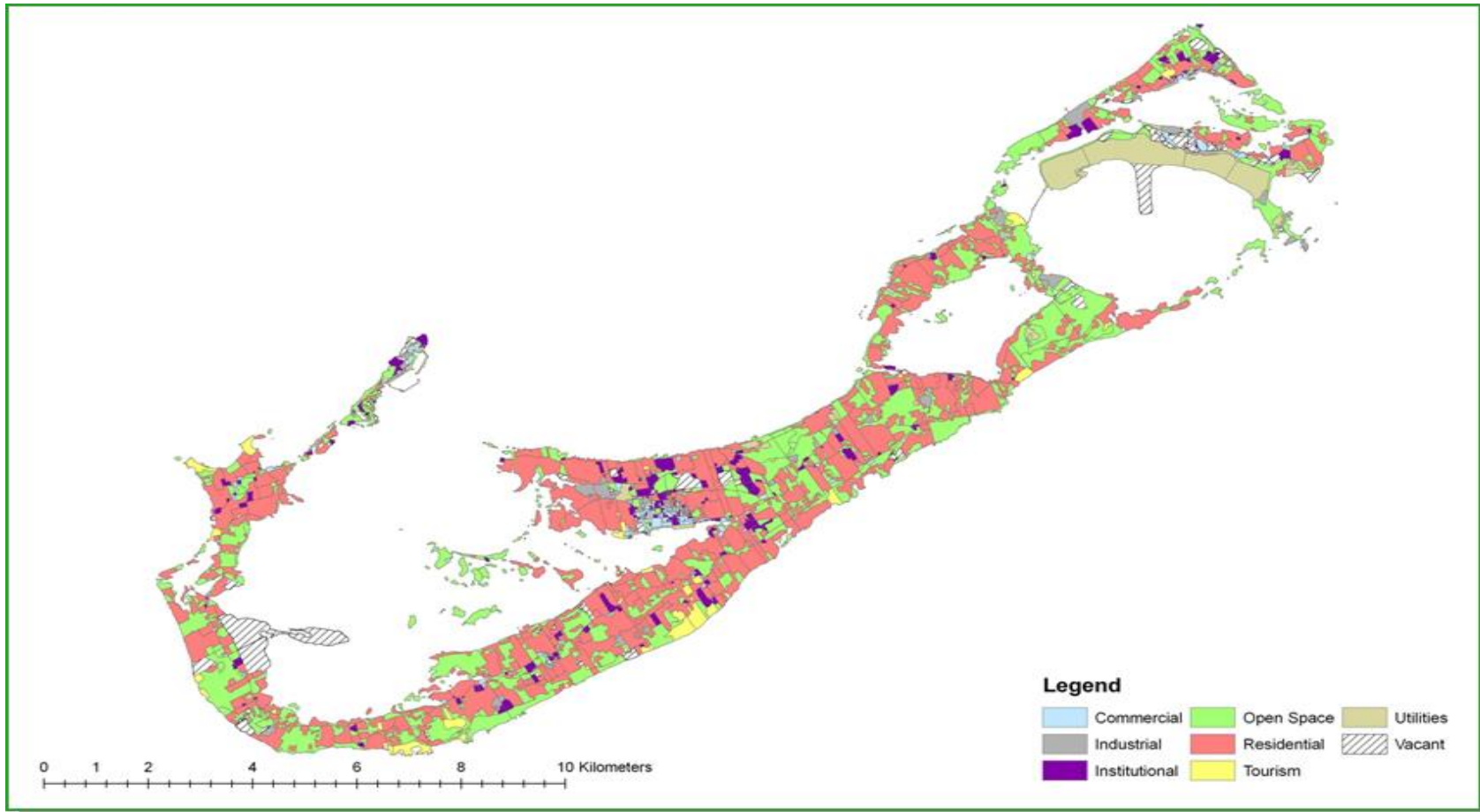
Table 7.2.2
LAND USE BY PARISH, CITY AND TOWN IN ACRES, 2018

Main Use / Sub-Category	Parish/Town/City										
	St. George's	Town of St. George	Hamilton	Smith's	Devonshire	Pembroke	The City of Hamilton	Paget	Warwick	South- ampton	Sandy's
Tourism	4.0	10.2	18.7	15.3	14.2	15.7	—	112.1	8.7	88.7	44.7
Cottage colonies	4.0	10.2	18.7	15.3	14.2	3.0	—	62.4	8.7	23.6	44.7
Hotels	—	—	—	—	—	12.7	—	49.8	—	65.2	—
Industrial	99.6	8.9	47.5	21.1	18.9	55.6	12.3	4.1	18.0	21.8	13.9
General	66.6	1.3	11.5	9.5	11.3	52.9	6.0	0.7	7.8	18.9	13.9
Light industrial	33.0	7.6	—	—	7.5	2.7	6.4	3.4	1.0	2.9	—
Quarry	—	—	36.0	11.6	—	—	—	—	9.2	—	—
Vacant	206.5	29.1	14.0	12.2	19.5	60.5	3.6	3.1	30.8	130.2	219.4
Vacant land	155.4	10.3	—	12.2	19.5	60.5	3.6	—	21.3	130.2	197.1
Vacant buildings	51.2	18.8	14.0	—	—	—	—	3.1	9.5	—	22.3
Commercial	32.5	10.6	11.01	2.9	10.8	27.2	66.8	16.4	9.1	10.2	27.0
Office	19.0	—	—	—	4.2	15.1	16.9	6.6	—	—	—
Retail	13.5	6.3	11.01	2.9	6.6	12.1	17.7	9.8	9.1	10.2	27.0
Mixed-use	—	4.3	—	—	—	—	32.2	—	—	—	—

Source: Department of Planning, Land Use Survey 2001

The 2001 Land Use Survey was based on the 1997 digital survey of the islands, whose coastline was probably taken at the high water mark hence the discrepancy in total area which now stands at 13,430.4 acres (low time mark) in 2007 as a result of the more accurate 2003 Topographic Mapping Database.

Map 7.1
LAND USE SURVEY, 2018



Source: Department of Planning

COASTAL AND MARINE RESOURCES

This Section includes information on various marine areas by name, location, activities permitted in these areas and the date they were established in Bermuda. It also provides information about Bermuda's fishing industry.

Marine Protected Areas by Category and Area

- Bermuda's total marine area covers 4,236.1 km², of which 7.0% or 294.7 km² is classified as protected area (Table 8.1 and Chart 8.1).
- There are 29 protected dive sites located in Bermuda covering an area of 13.7 km² (Table 8.2).
- A total of 12 marine parks have been established in Bermuda covering an area of 1.86 km² (Table 8.2).
- There are two fisheries seasonal protected areas that measure 153.4 km² (Table 8.2).
- Two coral reef preserves occupy a total of 131.1 km² (Table 8.2).

Fisheries

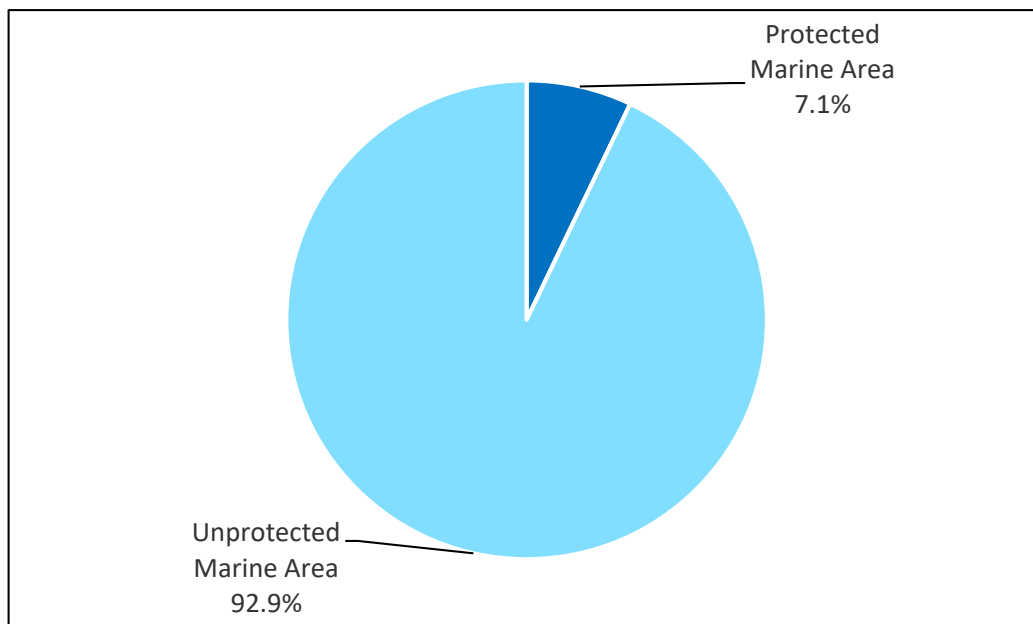
- Fish landings, excluding bait and shellfish, totaled 295.5 metric tonnes (mT) in 2018, a decrease of 7.9% from 2017 (Table 8.4).
- Although the tuna and pelagic group remained the most popular catch at 133.9 mT, there was a decrease of 11.6% from 2017.
- In 2018, 315 registered fishermen spent a total of 72,231 hours at sea. There was a 3.1% decrease in registered fishermen which accounted for 1,788 less hours spent at sea (Table 8.5).

**Table 8.1
TOTAL AND PROTECTED MARINE AREA, 2018**

Indicator	
Total land and marine area (km ²)	4,289.7
Total marine area (km ²)	4,236.1
Protected marine area (km ²)	294.7
Protected marine area as a % of total marine area	7.1
Protected marine area as a % of total land and marine area	6.9

Source: Department of Planning

**Chart 8.1
PROTECTED MARINE AREA AS A PERCENTAGE OF TOTAL
MARINE AREA, 2018**



Source: Department of Planning

Table 8.2
MARINE PROTECTED AREAS BY CATEGORY AND AREA, 2018

Marine Protected Areas	Area (km ²)	Areas	
		Protected Dive Sites	(km ²)
Coral Reef Preserves			
Subtotal	131.1	Subtotal	13.7
<i>North Shore Coral Reef Preserve</i>	126.3	North Rock	3.1
<i>South Shore Coral Reef Preserve</i>	4.8	SW Breaker	1.1
		Eastern Blue Cut	1.1
Fisheries Seasonal Protected Areas		Pelinaion	0.8
Subtotal	153.4	Hermes	0.8
<i>South Western Area</i>	114.7	Constellation	0.8
<i>North Eastern Area</i>	38.7	Cristobal Colon	0.3
		NE Breaker	0.3
Marine Parks		Taunton	0.3
Subtotal	1.9	Aristo	0.3
<i>Castle Island Marine Park</i>	0.7	Mills Breaker	0.3
<i>South Shore Marine Park</i>	0.4	Cathedral	0.3
<i>Cooper's Island Marine Park</i>	0.3	Kate	0.3
<i>Walsingham Marine Park</i>	0.2	Tarpon Hole	0.3
<i>John's Smiths Bay Marine Park</i>	0.1	Marie Celeste	0.3
<i>Tobacco Bay Marine Park</i>	0.1	North Carolina	0.3
<i>Spittal Pond Marine Park</i>	0.1	Airplane	0.3
<i>Church Bay Marine Park</i>	0.0	Blanche King	0.3
<i>Astwood Bay Marine Park</i>	0.0	Darlington	0.3
<i>Shelly Bay Marine Park</i>	0.0	L'Herminie	0.3
<i>Daniel's Head Marine Park</i>	0.0	Lartington	0.3
<i>Somerset Long Bay Marine Park</i>	0.0	Montana	0.3
		Snake Pit	0.3
		Hog Breaker	0.3
		Caraquet	0.3
		Madiana	0.3
		Commissioner's Point	0.1
		Xing Da	0.1
		Vixen	0.0

Marine Protected Areas	Area (km ²)
Merged marine protected areas (no overlaps) ¹	294.7
Territorial area (net) ²	4,236.1

Source: Department of Planning

¹ Total marine protected area does not equal to the sum of the sub-totals as it excludes any overlapping areas (5.26 km²)

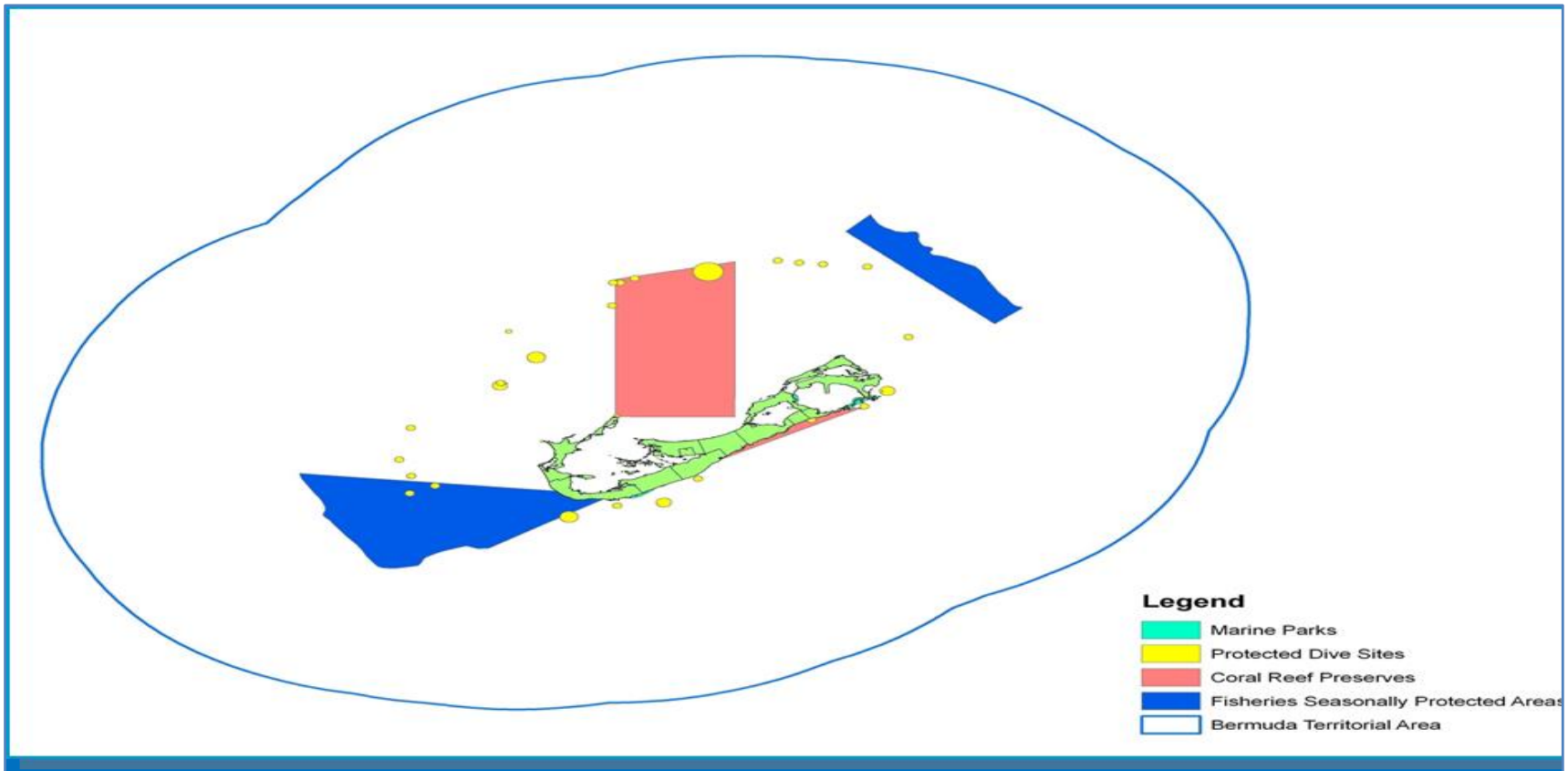
² Territorial area (net) means total water area and does not include the land area of 54.35 km².

Table 8.3.1 MARINE PROTECTED AREAS AROUND BERMUDA, 2018				
Marine Protected Area/ No-Take Reserve	Year Established	Anchoring Permitted?	Scuba Diving Permitted?	No-Take Reserve?
North Shore Coral Reef Preserve	1966	Yes	Yes	Line fishing is permitted throughout this Preserve, as is lobster diving and spear fishing provided they are within the limits of the prevailing fisheries regulations. It is an offence to remove, damage or be in possession of plants or animals, whether dead or alive, which are attached to the coast, the seabed or any reef in this preserve.
South Shore Coral Reef Preserve	1966	Yes	Yes	Line fishing is permitted throughout this Preserve, as is lobster diving and spear fishing provided they are within the limits of the prevailing fisheries regulations. It is an offence to remove, damage or be in possession of plants or animals, whether dead or alive, which are attached to the coast, the seabed or any reef in this preserve.
Vixen (Wreck)	1973	No	Yes	Yes
The Eastern Area	Established in 1974 but in 1990 the area was expanded to the current size.	Yes	Yes	Seasonally protected area, no fishing from 1 May to 31 August. First act (1974) stated no fishing between 1 May and 15 August. This was amended in 1975 to 24 May and 15 August, in 1976 it was amended to 1 May and 15 August, in 1990 it was amended to 1 May and 30 September and finally in 1993 it was amended to 1 May and 31 August. Trolling for pelagic species is permitted seaward of the 30 fathom depth contour and shore fishing is also permitted.
The South Western Area	Established in 1974 but in 1990 the area was expanded to the current size.	Yes	Yes	Seasonally protected area, no fishing from 1 May to 31 August. First act (1974) stated no fishing between 1 May and 15 August. This was amended in 1975 to 24 May and 15 August, in 1976 it was amended to 1 May and 15 August, in 1990 it was amended to 1 May and 30 September and finally in 1993 it was amended to 1 May and 31 August. Trolling for pelagic species is permitted seaward of the 30 fathom depth contour and shore fishing is also permitted.

Table 8.3.2 MARINE PROTECTED AREAS AROUND BERMUDA, 2018				
Marine Protected Area/ No-Take Reserve	Year Established	Anchoring Permitted?	Scuba Diving Permitted?	No-Take Reserve?
Constellation (Wreck)	1988	No	Yes	Yes
South West Breaker Area	1988	No	Yes	Yes
Eastern Blue Cut	1989	No	Yes	Yes
Pelinaion and Rita Zovetta Wrecks)	1989	No	Yes	Yes
Kate (Wreck)	1989	No	Yes	Yes
Hermes and Minnie Bressleur	1989	No	Yes	Yes
North Rock	1990	No	Yes	Yes
The North Eastern Area	1990	Yes	Yes	Seasonally protected area, no fishing from 1 May to 31 August. Initially there was no fishing between 1 May and 30 September, but in 1993 this was amended to 1 May and 31 August. Trolling for pelagic species is permitted seaward of the 30 fathom depth contour and shore fishing is also permitted.
	It was merged in 2005 with the Eastern Area and redesigned.			
Walsingham Marine Reserve	1991	No	Yes	Yes
Commissioner's Pt. Area	1996	No	Yes	Yes
Xing Da (Wreck)	1997	No	Yes	Yes
Cristobal Colon (Wreck)	2000	No	Yes	Yes
North East Breaker	2000	No	Yes	Yes
Taunton (Wreck)	2000	No	Yes	Yes
Aristo (Wreck)	2000	No	Yes	Yes
Mills Breaker	2000	No	Yes	Yes
The Cathedral	2000	No	Yes	Yes
Tarpon Hole	2000	No	Yes	Yes
Marie Celeste (Wreck)	2000	No	Yes	Yes
North Carolina (Wreck)	2000	No	Yes	Yes
Airplane (Wreck)	2000	No	Yes	Yes
Blanche King (Wreck)	2000	No	Yes	Yes
Darlington (Wreck)	2000	No	Yes	Yes
L'Herminie (Wreck)	2000	No	Yes	Yes
Lartington (Wreck)	2000	No	Yes	Yes
Montana (Wreck)	2000	No	Yes	Yes
Snake Pit	2000	No	Yes	Yes
Hog Breaker	2000	No	Yes	Yes
Caraquet (Wreck)	2000	No	Yes	Yes
Madiana (Wreck)	2000	No	Yes	Yes

Source: Department of Environmental Protection

Map 8.1
MARINE PROTECTED AREAS, 2018



0 5 10 20 30 40 50 Kilometers

Source: Department of Planning

Table 8.4
QUANTITY OF FISH LANDINGS BY TYPE, 2014-2018

Species Group (mT)	Year				
	2014	2015	2016	2017	2018
Total including bait and shellfish	408.2	402.3	394.0	385.0	353.8
Percentage change (%)	-10.8	-1.5	-2.1	-2.3	-8.1
Total fish	333.6	333.1	331.9	320.7	295.5
Tuna and pelagic	122.5	136.4	142.8	151.5	133.9
Groupers	77.4	70.8	64.0	45.1	55.2
Jacks and related species	55.8	58.4	53.2	41.0	40.7
Snappers	39.5	39.7	47.9	53.5	42.1
Miscellaneous	33.9	24.0	18.8	25.2	20.6
Sharks	4.4	3.9	5.2	4.4	3.1
Bait	31.5	31.5	37.9	35.5	32.2
Shellfish ¹	43.1	37.7	33.1	28.8	26.2

Source: Department of Environmental and Natural Resources, Marine Management Section

¹ Shellfish includes spiny lobster.

Table 8.5
TOTAL CATCH BY HOURS AT SEA, AVERAGE CATCH OF FISHING AREA AND
NUMBER OF REGISTERED FISHERMEN, 2014-2018

Indicators	Year				
	2014	2015	2016	2017	2018
Total catch ¹ (mT)	408.2	402.3	394	385	353.8
Percentage change (%)	-10.8	-1.5	-2.1	-2.3	-8.1
Average catch of fishing area ² (mT per km ²)	0.1	0.1	0.1	0.1	0.1
Total hours at sea	76,335	77,112	67,709	74,019	72,231
Percentage change (%)	-9.2	+1.0	-12.2	+9.3	-2.4
Total number of licences ³	178	183	176	174	168
Percentage change (%)	-7.3	+2.8	-3.8	-1.1	-3.4
Total hours at sea per licence	474	421	385	425	430
Percentage change (%)	8.2	-11.2	-8.6	+10.4	+1.2
Total registered fishermen	293	300	277	325	315
Percentage change (%)	-7.0	+2.4	-7.7	+17.3	-3.1

Source: Department of Environmental and Natural Resources, Marine Management Section

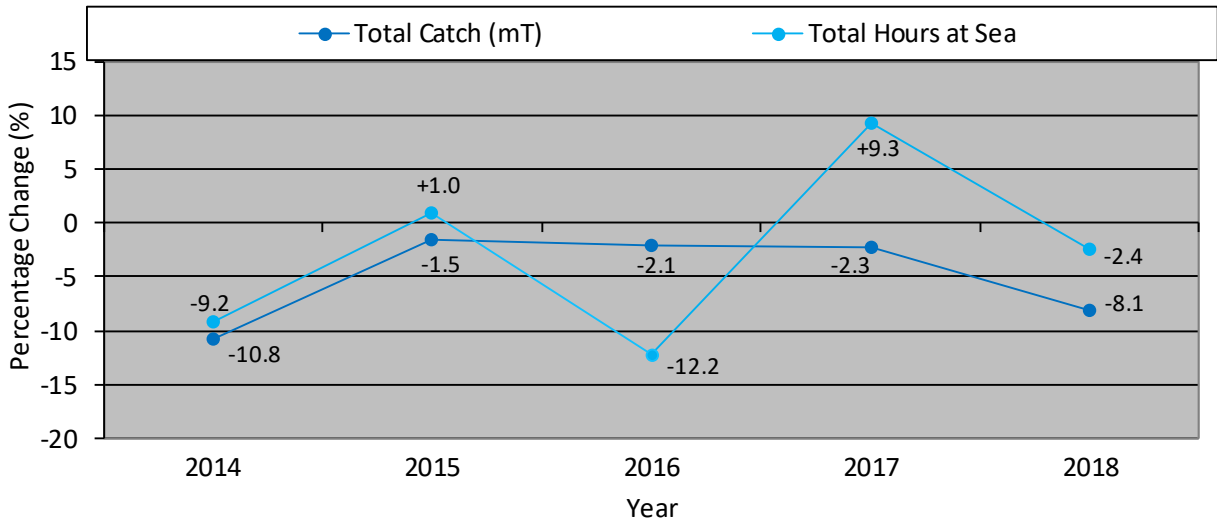
¹ Total catch include fish landings in addition to bait and lobster catches.

² Total fishing area is estimated as 4,236.1 km² (Department of Planning, see Table 8.1). Fishing area includes the fisheries seasonal protected areas (153.4 km²) which are closed between May 1st and August 31st.

Computation: Average catch of fishing area = Total catch (mT) / Total estimated fishing area of 4,236.1 km².

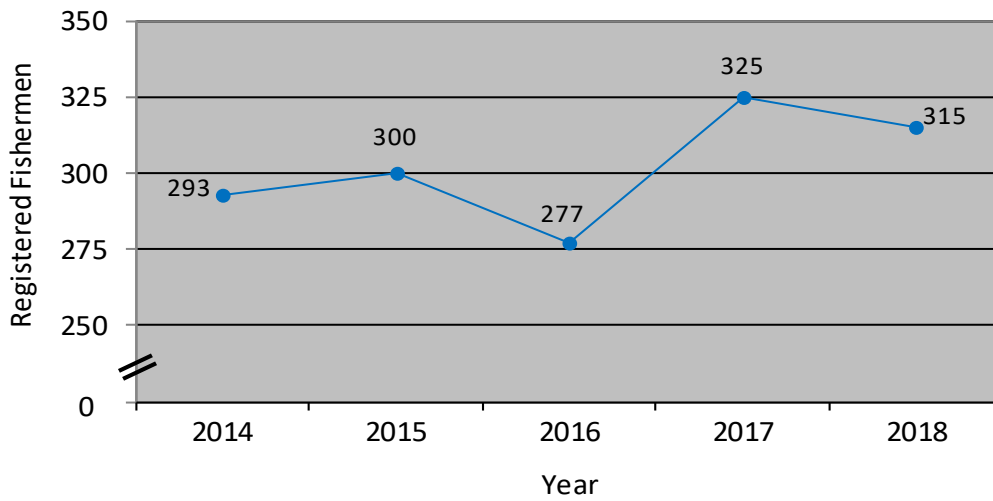
³ Some licences have a smaller ancillary vessel attached.

Chart 8.2
GROWTH IN TOTAL CATCH AND TOTAL HOURS AT SEA, 2014-2018



Source: Department of Environmental Protection, Marine Resources Section

Chart 8.3
NUMBER OF REGISTERED FISHERMEN, 2014-2018



Source: Department of Environmental Protection, Marine Resources Section

Table 8.6
NUMBER OF HOUSEHOLDS AND POPULATION OF COASTAL AREAS FOR CENSUS YEARS
1980, 1991, 2000, 2010 AND 2016

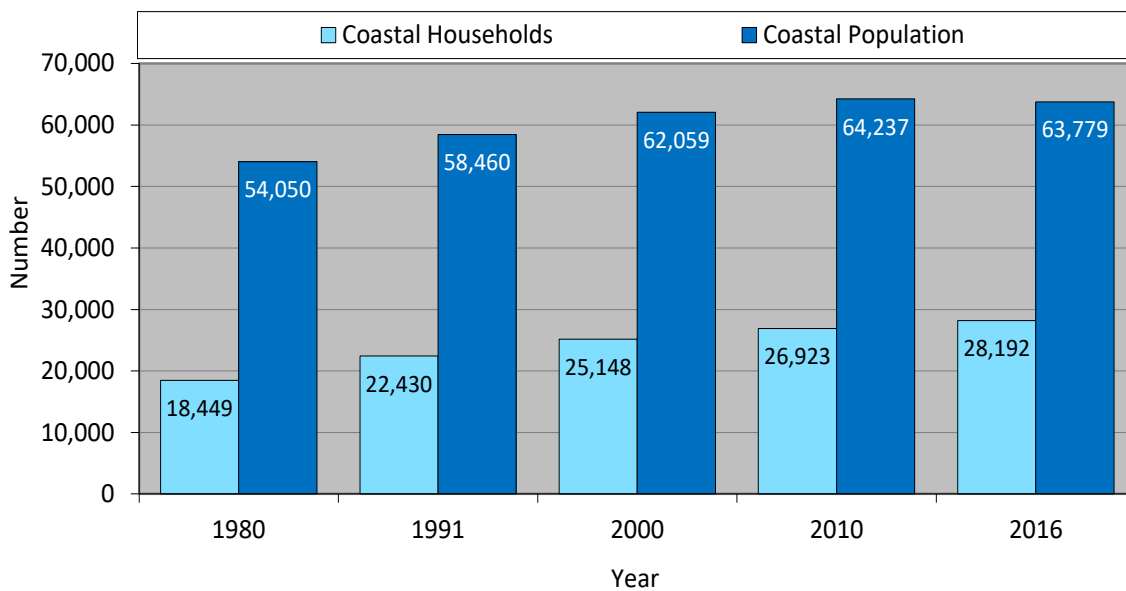
Indicators	Census Years				
	1980	1991	2000	2010	2016
Number of households in coastal areas	18,449	22,430	25,148	26,923	28,192
Ten-year growth rate (%)	..	+21.6	+12.1	+7.1	+4.7
Population in coastal areas ¹	54,050	58,460	62,059	64,237	63,779
Ten-year growth rate (%)	..	+8.2	+6.2	+3.5	**

Sources: 1980 to 2016 Population and Housing Censuses

¹ Does not include the non-sheltered and institutionalized populations.

Note: Bermuda measures 1 mile at its widest point. Based on the standard definition of coastal area, the entire island will be considered coastal.

Chart 8.4
NUMBER OF HOUSEHOLDS AND POPULATION OF COASTAL AREAS FOR CENSUS YEARS
1980, 1991, 2000, 2010 AND 2016



Sources: 1980 to 2016 Population and Housing Censuses

BIODIVERSITY

The Biodiversity Section contains information on the protected land areas in Bermuda such as; protected coastal reserves, protected open space, historical cove areas and parks.

Protected Area: Land and Water

- Bermuda's protected area, inclusive of land and water, totals 319.7 km². This represents 7.45 percent of the total area (6.87% water and 0.58% land) (Table 9.1).
- As a proportion of the total land area (53.56 km²), protected land area represents 46.5 percent or 24.9 km². Protected water area represents 7.0 percent of 294.7 km² of the total water area (Table 9.1).

NOTE TO READER

Biodiversity: the range of genetic differences, species differences, and ecosystem differences in a given area.

Land Area: is the total surface area of the country less that area covered by inland waters.

Protected Area: legally established land or water area under either public or private ownership that is regulated and managed to achieve specific conservation objectives. A protected area, as adopted by the International Union for Conservation of Nature (IUCN), is defined as an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, natural and associated cultural resources and managed through legal or other effective means.

Category Ia: Strict Nature Reserve

Category Ib: Wilderness Area

Category II: National Park

Category III: National Monument

Category IV: Habitat/Species Management Area

Category V: Protected Landscape/Seascape

Category VI: Managed Resource Protected Area

Total Area: Total area (of country) including area under inland water bodies, but excluding off-shore territorial waters (= total land area + water).

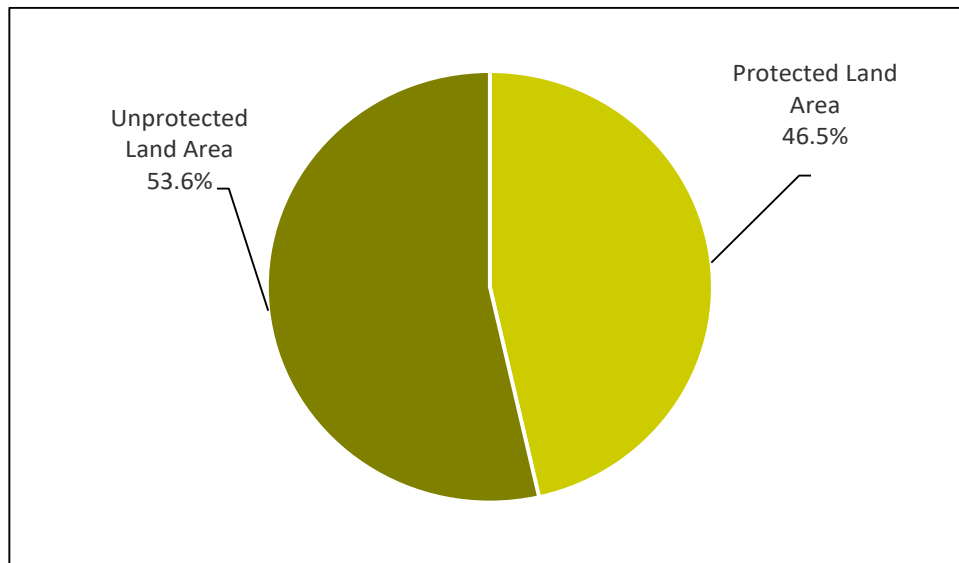
Source: CARICOM Environment Programme

**Table 9.1
PROTECTED AREAS, 2018**

Category	
Total area (km ²)	4,289.7
Total land area (low tide mark) (km ²)	53.6
Total water area (km ²)	4,236.1
Protected land area (km ²)	24.9
Protected land area as a % of total land area	46.5
Protected land area as a % of total area	**
Protected water area (km ²)	294.7
Protected water area as a % of total water area	7.1
Protected water area as a % of total area	6.9
Total protected area (land and water) (km ²)	319.6
Total protected area as a % of total area	7.5

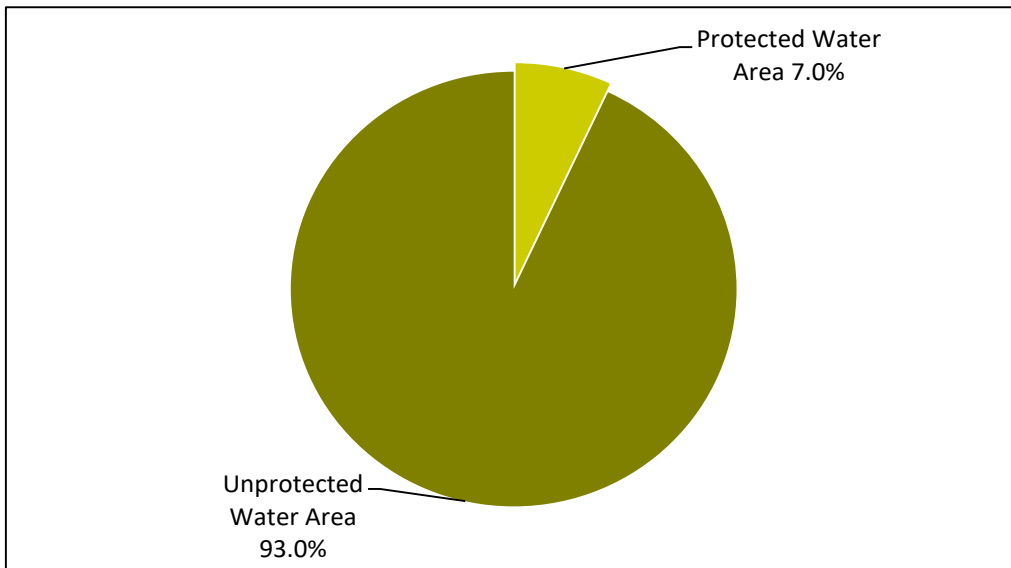
Source: Department of Planning

**Chart 9.1
PROTECTED LAND AREA AS A PERCENTAGE OF TOTAL LAND AREA, 2018**



Source: Department of Planning

Chart 9.2
PROTECTED WATER AREA AS A PERCENTAGE OF TOTAL WATER AREA, 2018



Source: Department of Planning

Table 9.2
PROTECTED AREAS BY CATEGORY AND AREA, 2018

Protected Area Category	Acres	km ²
Conservation base zones		
Open space reserve	1,298.1	5.3
Recreation	963.9	3.9
Park	884.6	3.6
Coastal reserve	823.3	3.3
Nature reserve	770.1	3.1
Sub-total	4,740.0	19.2
Conservation areas		
Woodland reserve	983.9	4.0
Agricultural reserve	731.6	3.0
Sub-total	1,715.5	6.9
Cave protection area	1,107.2	4.5
Historic protection area	201.1	**
Conservation base zone and conservation areas (no overlap)	6,156.8	24.9
Overlapping area	1,670.1	6.8
Total terrestrial area (low tide mark)	13,430.4	53.6
Water resources protection area ²	4,000.6	16.2

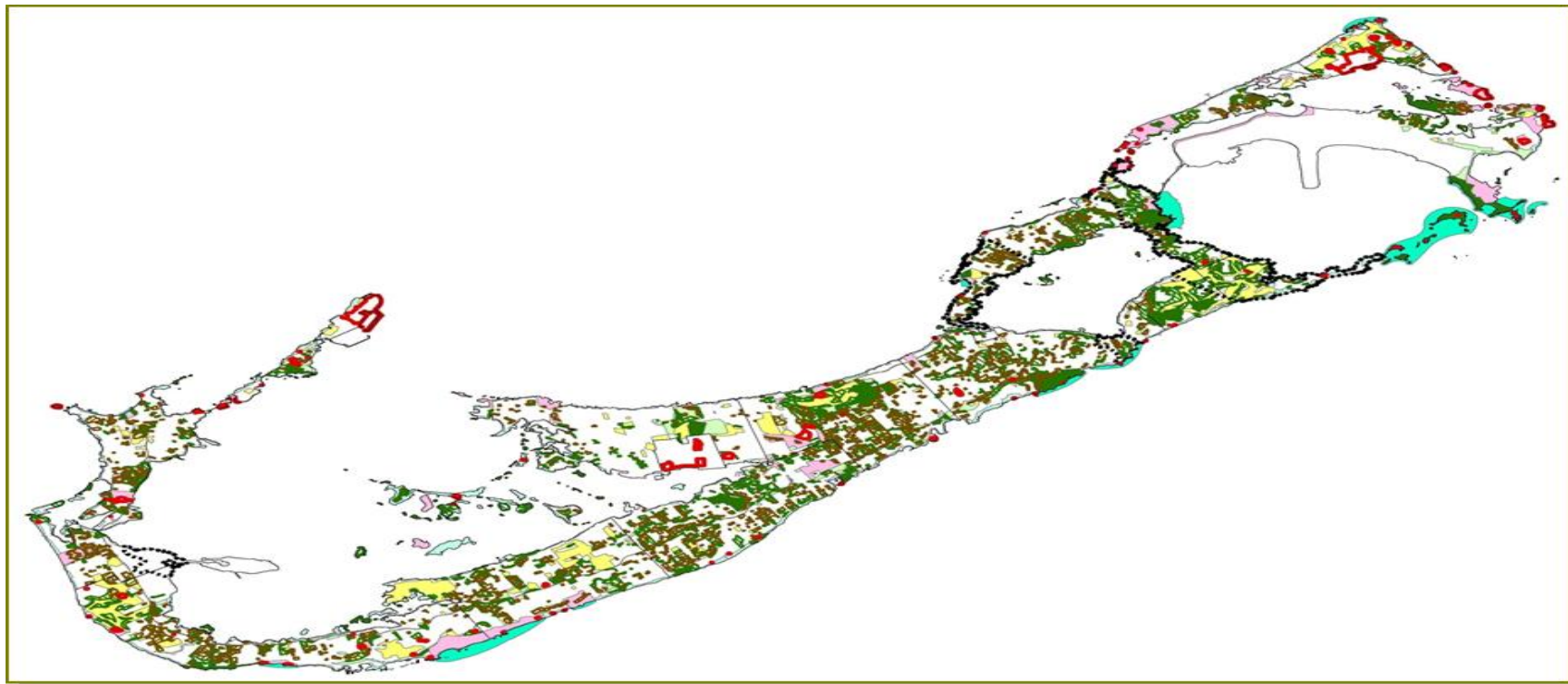
Source: Bermuda Plan 2008, Department of Planning

¹ Total protected area does not equal to the sum of the sub-totals as it excludes any overlapping areas (6.8 km²) to avoid double counting.

² The Water Resources Protection Area is not considered as a "protected area" and hence has not been included in the 24.9 km² of protected area but is contained in the total terrestrial area of 53.6 km².

Note: 1 km² = 247.1 acres

Map 9.1
TERRESTRIAL PROTECTION AREAS INCLUDING MARINE PARKS, 2018



0 2.5 5 10 Kilometers

Legend

- | | | | |
|--------------------------|----------------------|----------------|--------------------|
| Historic Protection Area | Agricultural Reserve | Nature Reserve | Coastal Reserve |
| Cave Protection Area | Woodland Reserve | Park | Open Space Reserve |
| | Recreation | Marine Parks | |

Source: Department of Planning

FORESTRY

The Forestry Section of the Environmental Statistics Compendium includes a table and chart with information on the forest area in Bermuda.

Forestry

- In 2018 Bermuda's total forest area was 4.2 km². This represents 7.8% of Bermuda's total land area and is inclusive of woodland reserves (Table 10.1).

NOTE TO READER

Forest: land under forestry or no land use, spanning more than 0.005 km² (0.5 hectares); with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. Please include mangroves and forests on wetlands according to the above height and canopy coverage.

Land Area: is the land area excluding area under inland or tidal water bodies.

Protected Area: a protected area, as adopted by the International Union for Conservation of Nature (IUCN), is defined as an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, natural and associated cultural resources and managed through legal or other effective

Total Area: total area (of country) including area under inland water bodies, but excluding offshore territorial waters (= total land area + water).

Source: CARICOM Environment Program

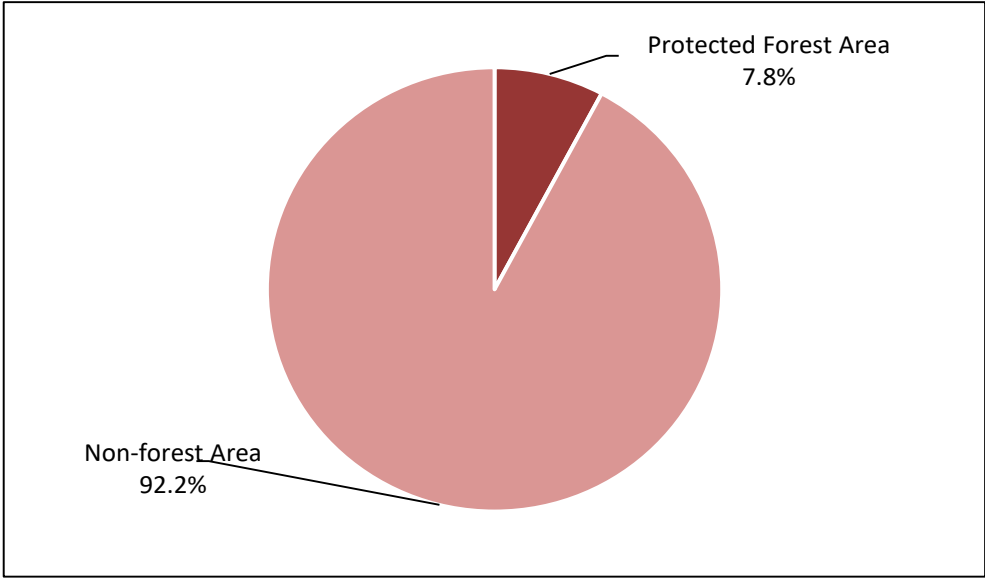
**Table 10.1
PROTECTED FOREST AREA AS A PERCENTAGE OF TOTAL LAND AREA, 2018**

Protected Area Category	Area km ²
Total forest area	4.2 ¹
Total land area	53.6
Protected forest area as a % of total forest area	100.0
Protected forest area as a % of total land area	7.8

Source: Department of Planning

¹ This includes woodland reserves.

**Chart 10.1
PROTECTED FOREST AREA AS A PERCENTAGE OF TOTAL LAND AREA, 2018**



Source: Department of Planning

AIR

The air quality in Bermuda is a valued part of its natural resources.

Air Emissions

- In 2018, the highest concentrated pollutant of air emissions from Tynes Bay waste to energy incinerator was NO₂ (8.5 mg/Nm³). All pollutants decreased from their previous year levels (Table 11.1).

Air Concentrations

- Bermuda contains five ambient air monitoring sites that are located across the island (Table 11.2).
- The maximum daily concentrations for the ambient air monitoring sites recorded pollutant concentration levels below Bermuda's limit, except for the pollutant PM₁₀ (Table 11.3).

Table 11.1
ANNUAL AIR EMISSIONS FROM TYNES BAY WASTE TO ENERGY
INCINERATOR, 2014-2018

Pollutant	Year				
	2014	2015 ¹	2016	2017	2018
VOCs (mg/Nm3)	**	**	**	2.0	**
NO2 (mg/Nm3)	258.1	259.3	274.4	242.9	8.5
SO2 (mg/Nm3)	29.0	52.6	36.5	43.8	1.7
Lead (mg/Nm3)	**	**	**	**	**
Particulate Matter (mg/Nm3)	2.5	11.9	3.9	8.1	2.8

Source: Department of Environmental Protection

¹ One field of the 3-field Electrostatic Precipitator exhaust abatement system was down during testing.

Note: The data is captured through isokinetic sampling over a two day period each year and is reported normalised to 11% oxygen.

Table 11.2
AVERAGE CONCENTRATIONS FOR AMBIENT AIR MONITORING SITES, 2016-2018

	Pollutants	Units	Bermuda Limit (Clean Air Regulations 1993)	2016					2017					2018				
				Prospect	East Broadway	Cemetery Lane (BDA#1) (Belco-Operated ISO14001)	Langton Hill (BDA#2) (Belco-Operated ISO14001)	BIOS	Prospect	East Broadway	Cemetery Lane (BDA#1) (Belco-Operated ISO14001)	Langton Hill (BDA#2) (Belco-Operated ISO14001)	BIOS	Prospect	East Broadway	Cemetery Lane (BDA#1) (Belco-Operated ISO14001)	Langton Hill (BDA#2) (Belco-Operated ISO14001)	BIOS
Hourly	NO ₂	µg/m ³	400	15.8	15.0	15.0	8.4	-	21.6	11.7	14.0	6.0	-	18.9	10.8	19.5	17.8	-
	SO ₂	µg/m ³	450	9.4	4.5	12.2	9.3	-	2.1	5.5	9.6	9.5	-	1.1	10.3	8.9	2.8	-
	PM ₁₀	µg/m ³	-	-	28.0	-	-	-	-	25.5	-	-	-	-	33.8	4.3	5.2	-
	PM _{2.5}	µg/m ³	-	7.6	-	-	-	-	6.0	8.4	-	-	-	6.1	10.6	14.2	13.1	-
	TSP	µg/m ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Hour	NO ₂	µg/m ³	200	15.8	15.0	15.0	8.3	-	21.6	11.7	14.0	6.0	-	18.1	10.6	9.1	2.6	-
	SO ₂	µg/m ³	150	9.4	4.5	12.1	9.3	-	2.1	5.5	9.7	9.6	-	1.3	10.3	4.3	5.1	-
	PM ₁₀	µg/m ³	50	16.8	31.7	16.7	16.0	26.8	19.2	32.7	16.1	13.8	-	16.2	22.1	14.3	13.0	14.6
	PM _{2.5}	µg/m ³	-	7.5	-	-	-	-	6.0	8.0	-	-	-	6.0	10.0	-	-	-
	TSP	µg/m ³	100	26.8	32.3	43.1	58.9	-	19.4	34.5	31.1	31.0	-	16.3	27.3	-	-	-
1-year	NO ₂	µg/m ³	60	15.6	-	15.0	8.4	-	21.4	-	14.0	6.0	-	18.5	-	19.5	17.8	-
	SO ₂	µg/m ³	30	9.7	-	12.2	9.3	-	2.1	-	9.6	9.5	-	1.3	-	8.9	2.8	-
	PM ₁₀	µg/m ³	30	15.4	29.8	16.8	16.2	24.3	20.9	34.8	16.0	13.8	-	18.8	13.9 [†]	14.3	13.0	17.4
	PM _{2.5}	µg/m ³	-	7.5	-	-	-	-	5.9	-	-	-	-	6.0	-	-	-	-
	TSP	µg/m ³	60	24.2	31.4	43.1	58.9	-	21.1	36.4	31.1	31.0	-	19.5	29.5	-	-	-

Source: Department of Environmental Protection

- Not Required or Not determined as part of the current protocols.

Note: Amount in red shows that the limit according to the 1993 Clean Air Regulation was exceeded.

Note: East Broadway monitoring station had a new PM-2.5 sensor installed in November 2017.

† - The second PM-10 BAM-1020 sensor operated at East Broadway station, which is considered a US EPA Federal Equivalent Method, demonstrated an exceedance of the annual average PM-10 concentration at 33.8µg/m³.

Table 11.3
MAXIMUM CONCENTRATIONS FOR AMBIENT AIR MONITORING SITES, 2016-2018

Pollutants	Bermuda Limit (Clean Air Regulations 1993)	2016					2017					2018					
		Prospect	East Broadway	Cemetery Lane (BDA#1) (Belco-Operated ISO14001)	Langton Hill (BDA#2) (Belco-Operated ISO14001)	BIOS	Prospect	East Broadway	Cemetery Lane (BDA#1) (Belco-Operated ISO14001)	Langton Hill (BDA#2) (Belco-Operated ISO14001)	BIOS	Prospect	East Broadway	Cemetery Lane (BDA#1) (Belco-Operated ISO14001)	Langton Hill (BDA#2) (Belco-Operated ISO14001)	BIOS	
Hourly	NO ₂ μg/m ³	400	99.5	100.4	266.3	144.9	-	62.8	87.6	280.5	122.3	-	85.3	84.3	298.2	114.7	-
	SO ₂ μg/m ³	450	109.3	65.8	244.1	253.0	-	120.2	39.3	174.8	286.9	-	27.7	73.2	71.9	270.6	-
	PM ₁₀ μg/m ³	-	-	122.0	76.8	99.7	-	-	178.0	-	-	-	-	262.0	98.7	224.3	-
	PM _{2.5} μg/m ³	-	49.1	-	-	-	-	35.2	43.0	-	-	-	129.5	-	-	-	-
	TSP μg/m ³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24-Hour	NO ₂ μg/m ³	200	38.4	46.1	136.4	138.3	-	36.5	48.7	133.2	57.2	-	65.3	43.2	95.1	34.7	-
	SO ₂ μg/m ³	150	52.9	10.5	91.8	128.3	-	31.4	34.1	73.0	129.2	-	7.9	27.9	25.2	50.3	-
	PM ₁₀ μg/m ³	50	37.7	98.2	62.4	73.3	60.9	46.9	71.3	74.6	55.6	49.0	62.7	87.0	75.7	38.3	85.5
	PM _{2.5} μg/m ³	-	27.6	-	-	-	-	15.0	12.0	-	-	-	24.0	-	-	-	-
	TSP μg/m ³	100	64.0	54.4	130.6	153.1	-	57.1	82.0	75.2	110.4	-	73.0	66.7	41.7	35.7	-
Total number of exceedances of the limits set in the Clean Air Regulations 1993 over each year			0	3	9	20	2	0	5†	4	3	0	1	1†	1	0	1

Source: Department of Environmental Protection

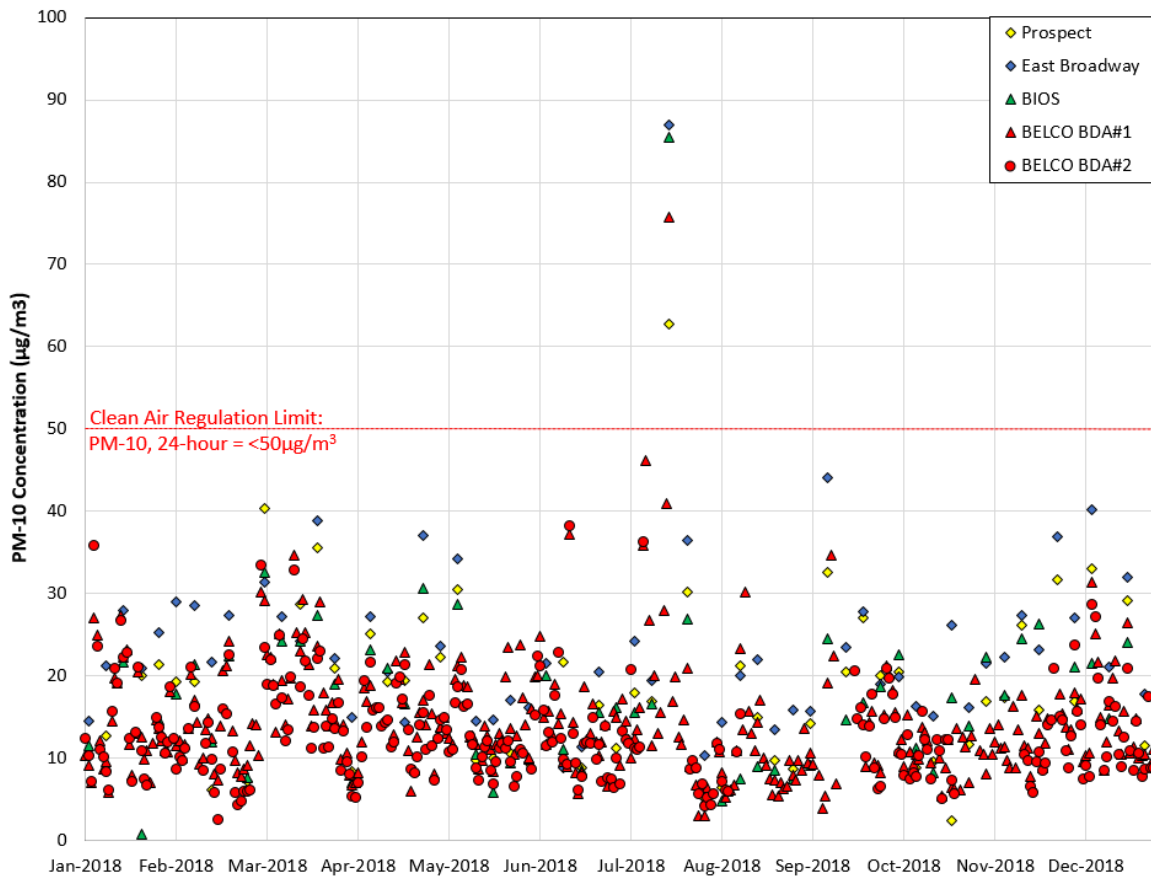
- Not determined as part of the current protocols.

Note: Amounts in red show that the limit according to the 1993 Clean Air Regulation was exceeded.

* 10 of the 17 exceedances occurred before calibration highlighted a problem with the instruments.

† A second PM₁₀ sensor at East Broadway that uses a US EPA Federal Equivalent Method records data every hour and identified a total of 10 exceedances of 24-hour PM₁₀ over 2017.

Figure 11.1
24-HOUR AVERAGE PM₁₀ CONCENTRATION, 2018



Source: Department of Environmental Protection

WASTE

The Waste Section comprises of information regarding the generation and disposal of solid waste in Bermuda.

- In 2017, the amount of waste totaled 95,700 mT. This represents an increase of 6.6% over the 89,800 mT of waste in 2016 (Table 12.1).
- In 2017, 6,600 mT of waste was recycled, 118,000 mT was composted, 66,600 mT was incinerated to generate electricity and 10,000 mT was land-filled (Table 12.2).
- There were 80 container loads of materials recycled in 2017. Eight container loads of special waste items were processed and exported for the United States recycling market (Chart 12.1).
- Bermuda exported 530,000 pounds of hazardous waste in 2017 (Table 12.3).

NOTE TO READER

Household Waste: this is waste that comes from a private dwelling, being a dwelling that is not considered as commercial premises; or waste from premises operated by a charity registered under the Charities Act 1978.

Waste: this is any article or substance (including scrap metal or other surplus arising from the application of a process) which is not liquid and either requires to be disposed of as being unwanted, broken, worn out, contaminated or otherwise spoilt or useless, or in relation to a particular person, has been discarded by.

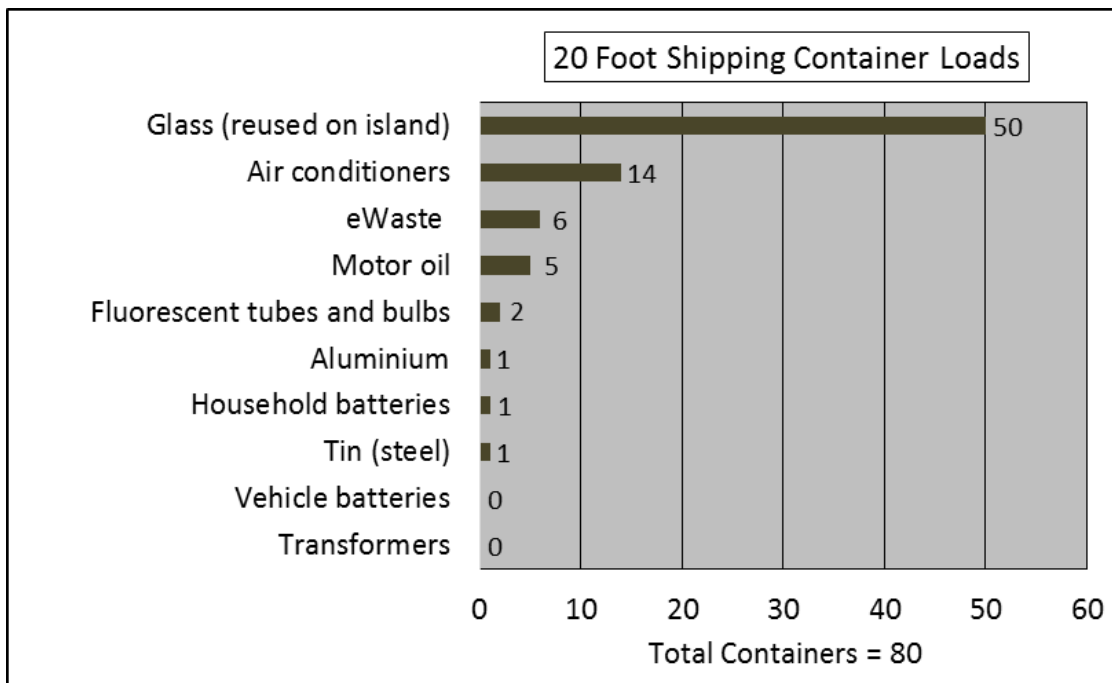
These definitions are taken from the Waste and Litter Control Act, 1987

Table 12.1
GENERATION OF WASTE BY SOURCE, 2014-2018

Indicator (1,000 mT)	Year				
	2014	2015	2016	2017	2018
Total amount of waste	85.2	83.6	89.8	95.7	..
Waste from households	28.4	27.9	29.9	31.9	..
Waste from other origins	56.8	55.7	59.9	63.8	..

Source: Department of Works and Engineering, Waste and Enforcement Section

Chart 12.1
ESTIMATED EXPORT OF RECYCLABLE WASTE, 2018



Source: Department of Works and Engineering, Waste and Enforcement Section

Note: Motor oil, fluorescent tubes and bulbs, household batteries and transformers are special waste items and processed for the USA recycling market.

Table 12.2
MANAGEMENT OF WASTE, 2014-2018

Indicator (1,000 mT)	Year				
	2014	2015	2016	2017	2018
Total amount of waste	85.2	83.6	89.8	95.7	..
Amounts going to:					
Recycling	1.0	1.6 e	1.6 e	1.0	..
Composting	18.0 e	18.0 e	18.0 e	18.0 e	..
Incineration	55.6	54.0	60.2	66.6	..
Landfilling	10.0 e	10.0 e	10.0 e	10.0 e	..

Source: Department of Works and Engineering, Waste and Enforcement Section

Table 12.3
MANAGEMENT OF SPECIAL WASTE, 2014-2018

Indicator (1,000 lbs)	Year				
	2014	2015 e	2016 e	2017 e	2018 e
Total	615.0	668.9	600.0	530.0	..
Stock of hazardous waste at the end of the year	88.0	20.6	20.6	15.6	..
Stock of hazardous waste at the beginning of the year	115.0	88.0	20.6	20.6	..
Hazardous waste generated during the year	588.0	601.5	600.0	525.0	..
Hazardous waste exported during the year:					
Recycling	376.0	401.0	400.0	310.0	..
Incineration	5.0	6.6	10.0	5.0	..
Landfilling	234.0	261.5	190.0	215.0	..

Source: Department of Works and Engineering, Waste and Enforcement Section

Table 12.4
MANAGEMENT OF WASTE BY TYPE, 2012, 2014, 2016, 2017 AND 2018

Indicator	Year				
	2012 e	2014 e	2016 e	2017	2018
Total (%)	100.0	100.0	100.0	100.0	..
Paper, paperboard	29.0	29.0	29.0	27.0	..
Textiles	17.0	17.0	17.0	4.0	..
Plastics	13.0	13.0	13.0	19.0	..
Glass	9.0	9.0	9.0	13.0	..
Metals	6.0	6.0	6.0	5.0	..
Other inorganic material	9.0	9.0	9.0	8.0	..
Organic material	17.0	17.0	17.0	24.0	..

Source: Department of Works and Engineering, Waste and Enforcement Section

Between 2006 and 2016, the Waste Management Section of the Ministry of Public Works conducted a waste audit every two years.

WATER

Water is an essential ingredient for all life and is used in the production of almost all goods. It is therefore vital to monitor the state of water resources and to ensure sustainable use of this important commodity.

- In 2018, the total volume of precipitation in Bermuda was 75.0 mio m³/y (Table 13.1). This represents a 3.3% increase over the level received in 2017.

NOTE TO READER

Actual Evapotranspiration: total actual volume of evaporation from the ground, wetlands, natural water bodies and transpiration of plants.

Internal Flow: total volume of river run-off and groundwater generated over the period of a year, in natural conditions, exclusively by precipitation into a territory. It is equal to the precipitation less actual evapotranspiration.

Precipitation: total volume of atmospheric wet precipitation (rain, dew, etc.) falling on the territory of the country over one year.

Regular Freshwater Resources 95.00% of the Time: a portion of the total freshwater resource that can be depended on for annual water development during 19 out of 20 consecutive years, or at least 95.00% of the years included in longer consecutive periods. This item yields information about the average annual long-term availability of freshwater for use in human activities.

Renewable Freshwater Resources: equal internal flow plus any inflow of surface and groundwaters.

Sources: United Nations Statistics Division (UNSD) and United Nations Environment Programme (UNEP)

Table 13.1
RENEWABLE FRESHWATER RESOURCES, 2014-2018

Category (mio m3/y)	Year				
	2014 ¹	2015 ¹	2016 ²	2017 ²	2018 ²
Precipitation	94.2	78.4	98.8	72.6 r	75.0
Actual evapotranspiration	64.0	53.3	67.2	49.4	51.7
Internal flow	30.1	25.1	31.6	23.2	23.3
Renewable freshwater resources	4.4	3.7	4.7	3.4	3.6
Regular freshwater resources 95.00% of the time	2.6	2.6	2.6	2.6	2.6

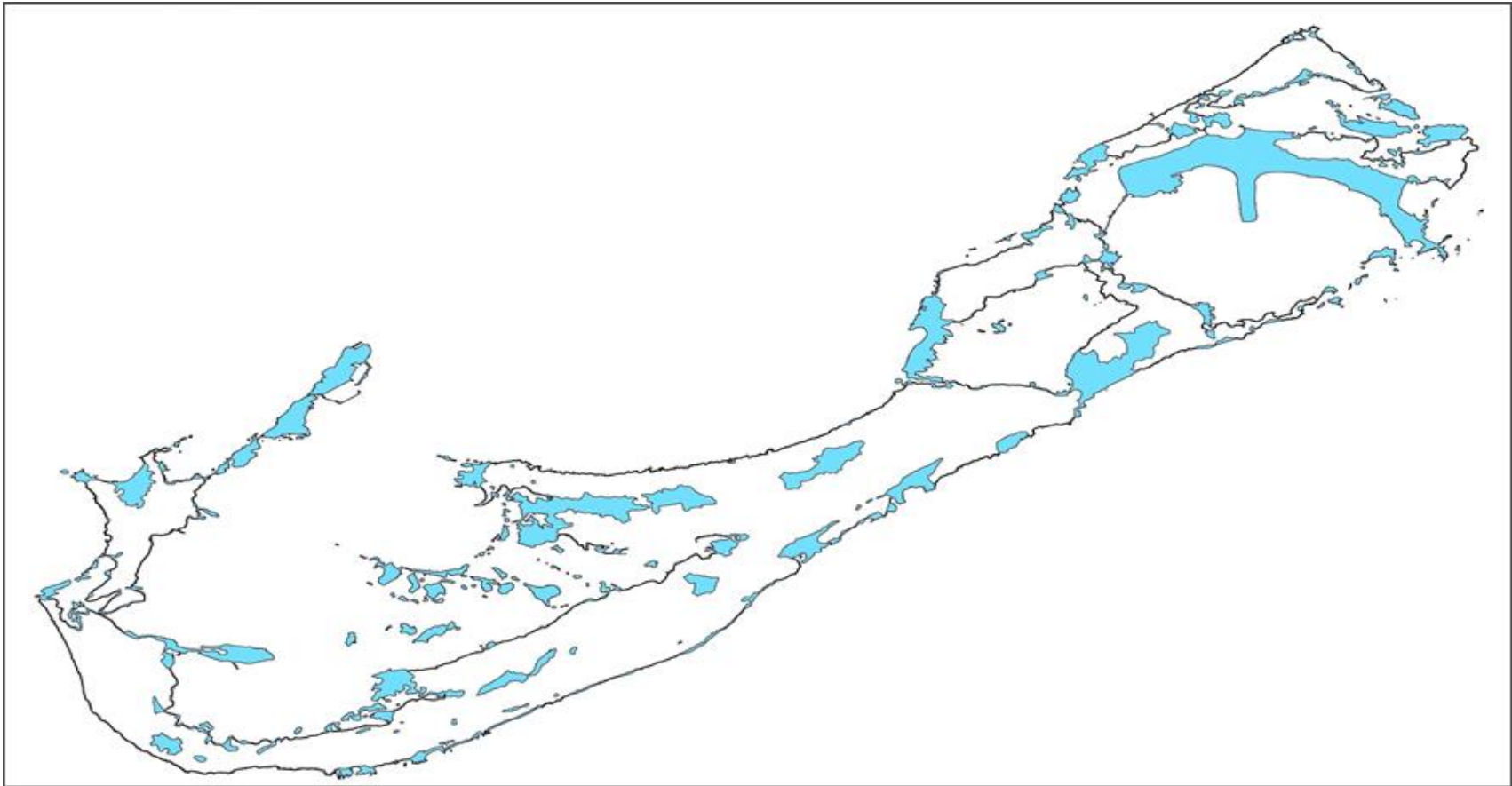
Source: Department of Environmental Protection

Source: Department of Environment and Natural Resources

(1) Bermuda is frost-free; precipitation consists of rainfall only. Precipitation = annual rainfall in m (from BWS), multiplied by land area of 54.35 sq. km. (PRIOR TO 2016)


(2) Bermuda is frost-free; precipitation consists of rainfall only. Precipitation = annual rainfall in m (from BWS), multiplied by land area of 53.56 sq. km. (FROM 2016 to 2018)

Map 13.1
WATER RESOURCES PROTECTION AREAS, 2018



0 2.5 5 10 Kilometers

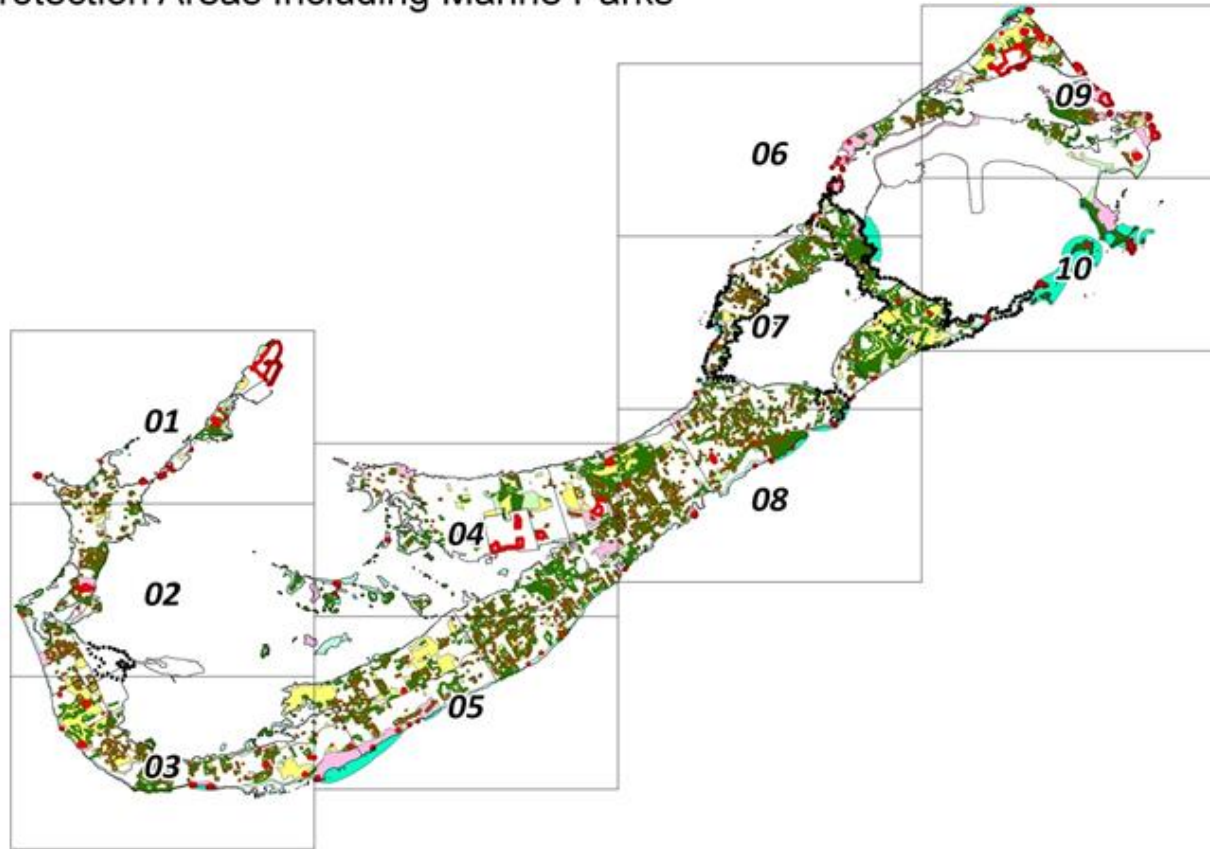
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 Water Resources Protection Area

Source: Department of Planning

ANNEX

Terrestrial Protection Areas Including Marine Parks

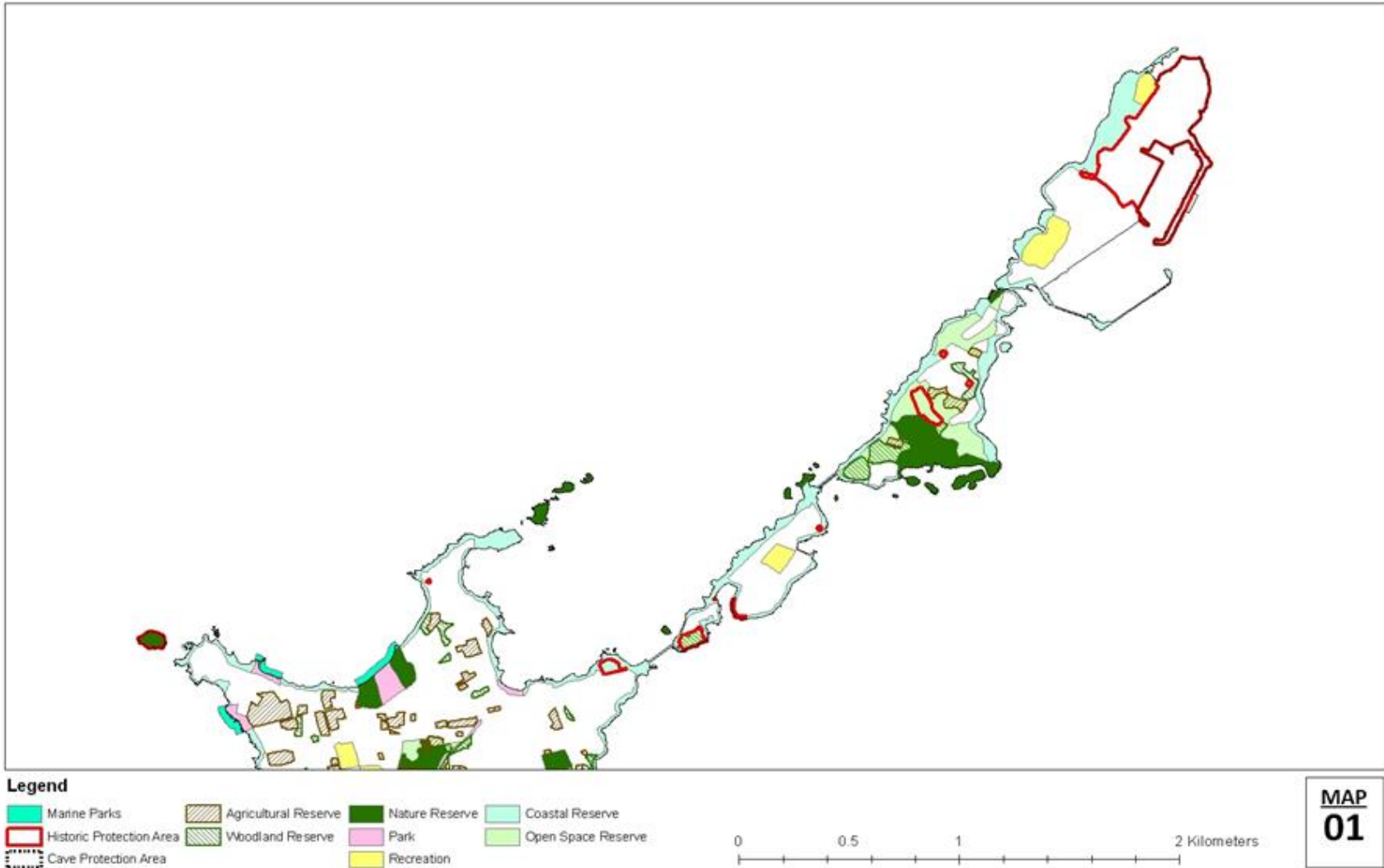


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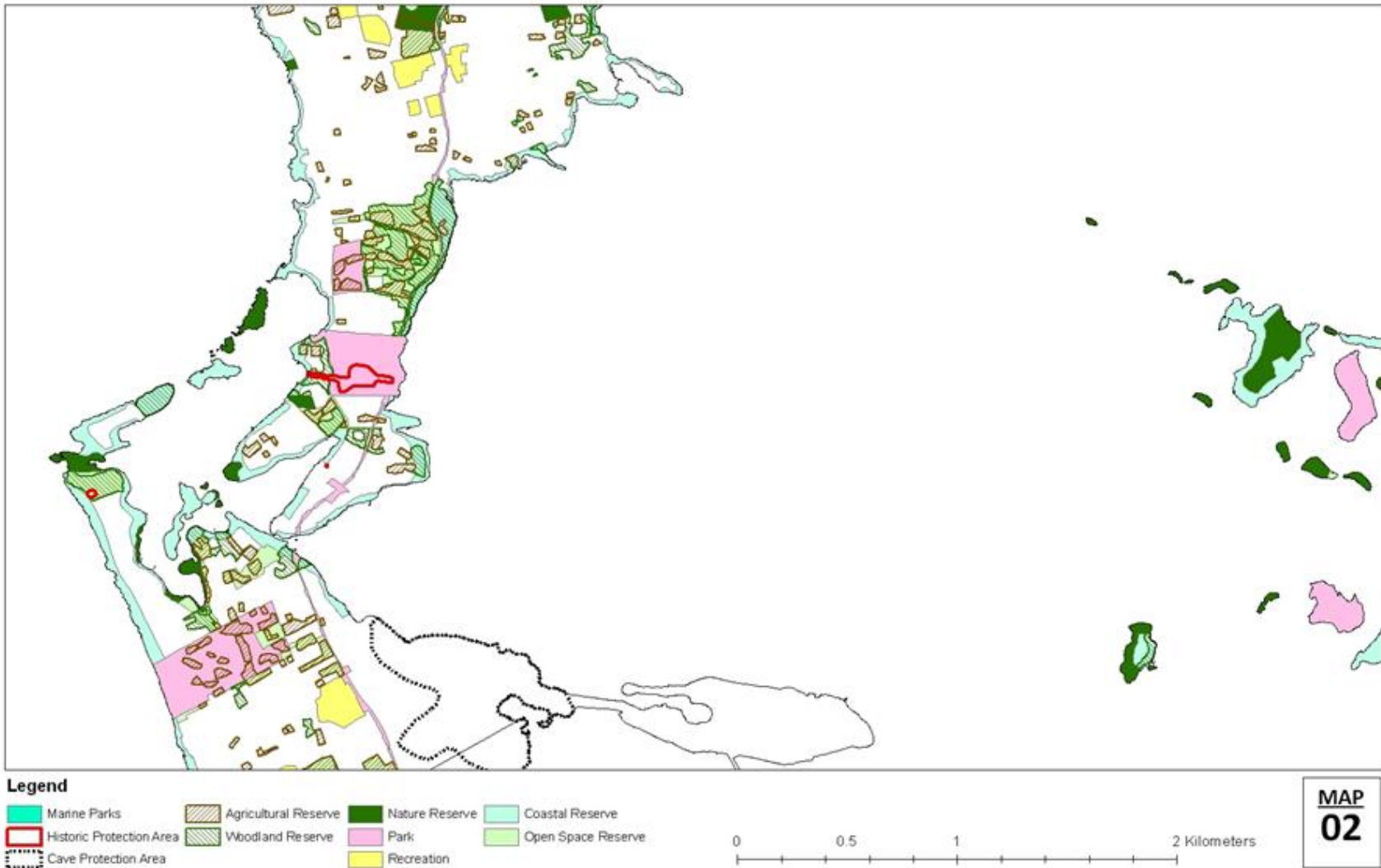
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|--------------------------|----------------------|----------------|--------------------|
| Historic Protection Area | Agricultural Reserve | Nature Reserve | Coastal Reserve |
| Cave Protection Area | Woodland Reserve | Park | Open Space Reserve |
| | Recreation | Marine Parks | |



Source: Department of Planning



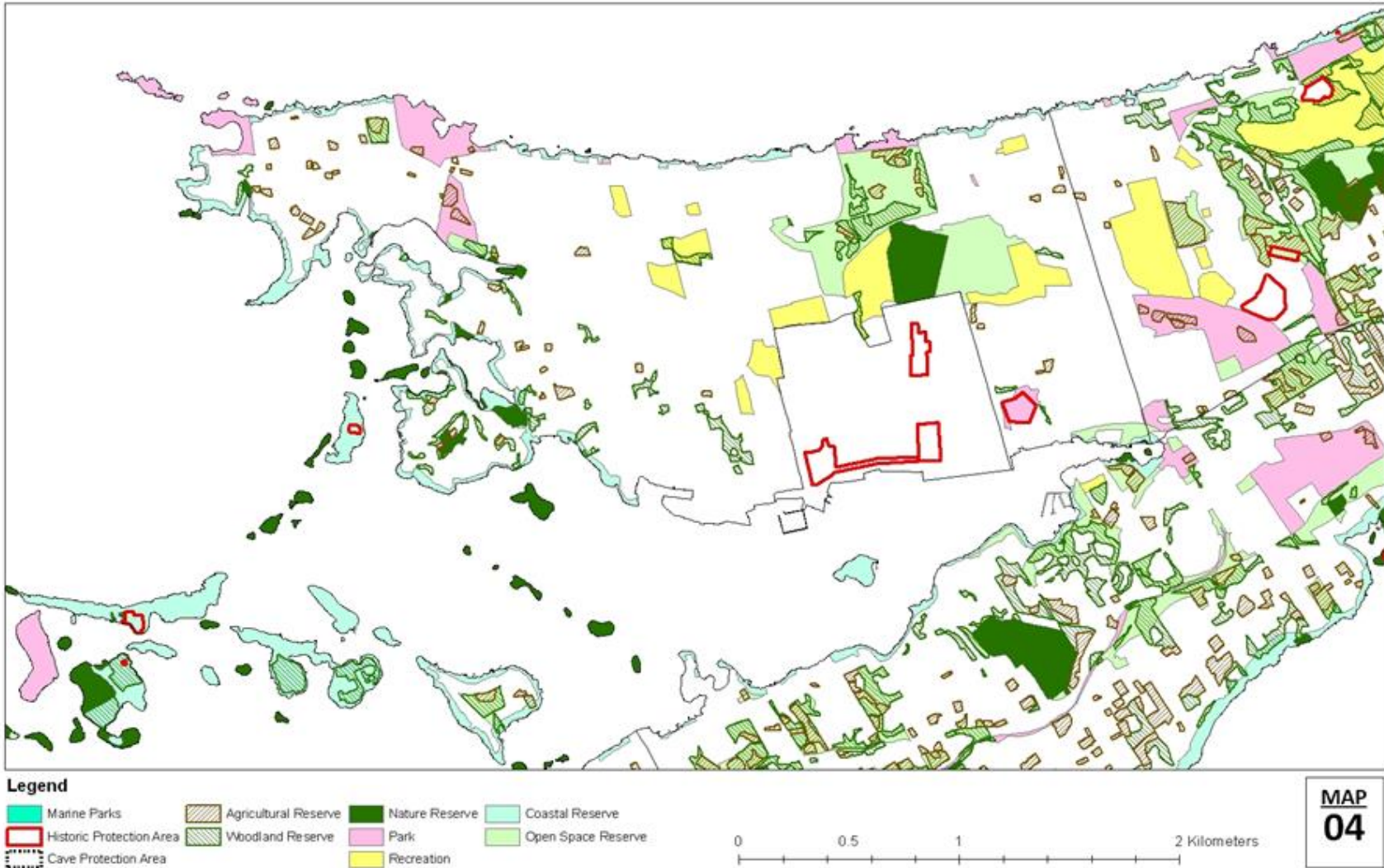
Source: Department of Planning



Source: Department of Planning



Source: Department of Planning



Source: Department of Planning



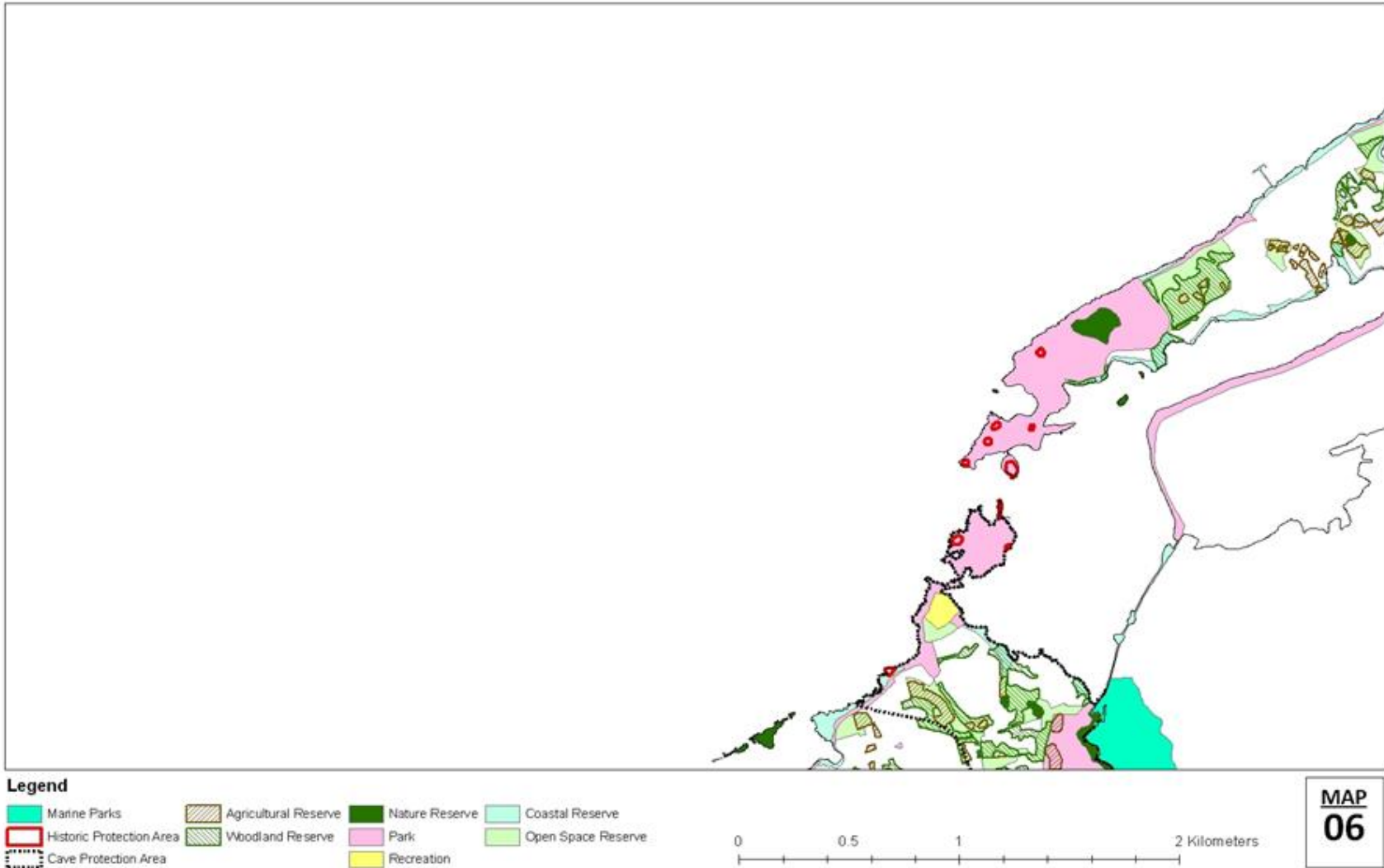
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|--------------------------|----------------------|----------------|--------------------|
| Marine Parks | Agricultural Reserve | Nature Reserve | Coastal Reserve |
| Historic Protection Area | Woodland Reserve | Park | Open Space Reserve |
| Cave Protection Area | Recreation | | |

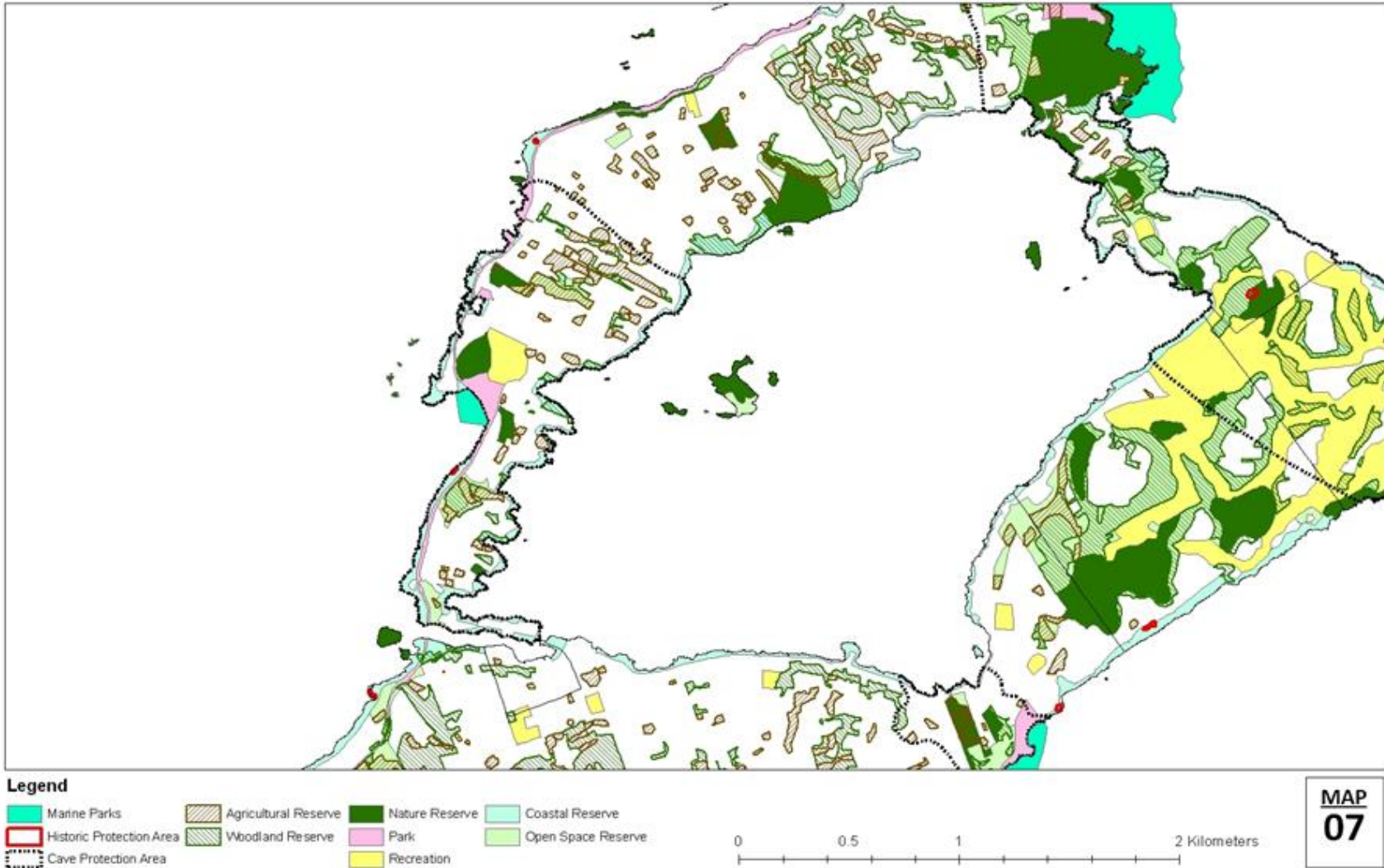


**MAP
05**

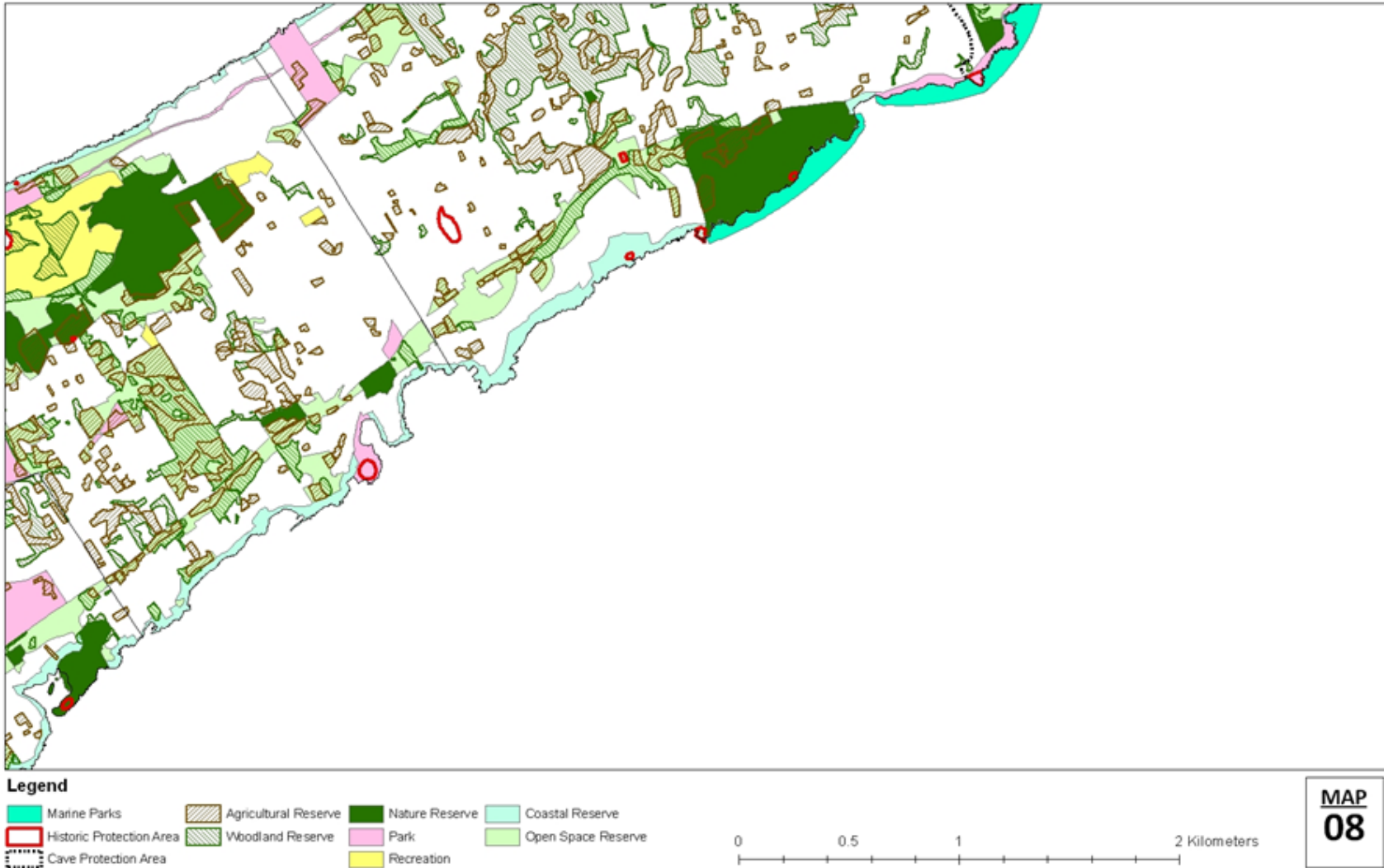
Source: Department of Planning



Source: Department of Planning



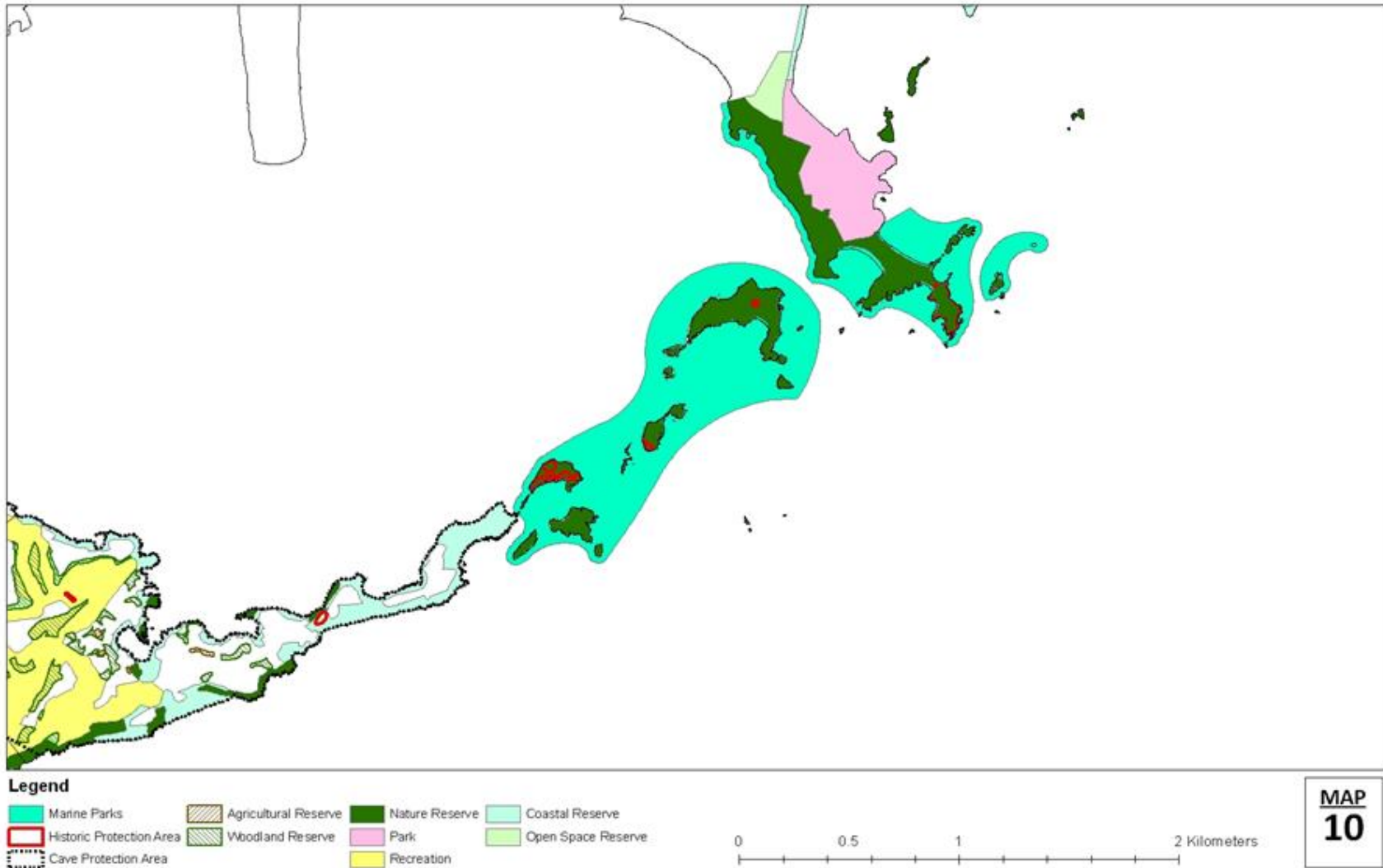
Source: Department of Planning



Source: Department of Planning



Source: Department of Planning



Source: Department of Planning



GOVERNMENT OF BERMUDA
Cabinet Office

Department of Statistics