

# Worldly Wetlands



Image from gov.bc.ca/gov.

## Specific Learning Outcomes

- 5-4-01:** Use appropriate vocabulary related to their investigations of weather.
- 5-4-07:** Identify and describe components of public weather reports from a variety of sources.
- 5-4-16:** Differentiate between weather and climate.

## General Learning Outcomes

- 5-0-1a:** Formulate, with guidance, specific questions that lead to investigations.
- 5-0-2a:** Access information using a variety of sources.
- 5-0-2c:** Record information in own words and reference sources appropriately.
- 5-0-4c:** Work cooperatively with group members to carry out a plan, and troubleshoot problems as they arise.
- 5-0-4d:** Assume various roles and share responsibilities as group members.
- 5-0-5a:** Make observations that are relevant to a specific question.
- 5-0-7b:** Base conclusions on evidence rather than pre-conceived ideas or hunches.
- 5-0-8a:** Recognize that science is a way of answering questions about the world and that there are questions that science cannot answer.

## Vocabulary

wetland, weather, temperature, relative humidity, wind speed and direction, wind chill, barometric pressure, humidex, cloud cover, warm and cold fronts, amount and type of precipitation, probability of precipitation

## Summary

Students are introduced to weather and wetlands by researching public weather reports for five wetlands located around the world, identifying and recording the data for each component of the weather report.

## Materials

- *Print or project PDF of components of a public weather report, world map, definitions and each wetland description*
- *Print activity sheet for students (one page per student)*
- *Writing utensils*
- *Access to the internet*

## Procedure

### *Warm Up*

Begin by showing students the image of the public weather report example. Ask students to try to identify different components of the weather report, and explain what they think it might be telling the public about the weather.

Show the labeled public weather report example, and discuss each component with the class, defining each.

*Optional: Either provide definitions to students (see accompanying sheet) or work together as a class to create a definition and/or provide an example for each term.*

**Weather** refers to the current atmospheric conditions in a specific place and time. It is created by various combinations of water, clouds, air/wind, and temperature.

**Climate** refers to the long-term weather trend of a particular region.

**A wetland is** an area of land that holds shallow water, with a maximum depth of two metres. The water makes the soil very moist, so plants who need moist soils will grow in and around the water; this is why a wetland can not be deeper than two metres. Otherwise these kinds of plants drown and do not receive enough sunlight. The water moves slowly because there are many plants that slow the water down, absorbing some of the water like a sponge and filtering it as it moves through.

## Activity

Explain to students that you will be exploring weather and wetlands by learning about five wetland locations around the world and discover what their current weather is like. Show the map with the different wetland locations, then go through each location briefly so students are familiar with the wetlands.

Divide students into groups of four or five, where every student will be responsible to research the weather for one of the wetland locations using three different weather sources. Once the sources are found, students will then record the appropriate information for each component of the weather reports on a chart (see accompanying activity sheet). Note that some weather sources will not provide data for all of the cells in the chart, so students can write unavailable or not available in those cells.

This activity may be done in one class if students have access to the internet. However, it can also be done as homework, where student groups meet in class to agree on which location each will research, then discuss their results the following class.

**Recommended:** *If students are researching their wetland's weather on their own as homework, encourage students to record the weather information at around the same time; that way results for the same wetland from different groups are more comparable because the time the data was recorded is consistent.*

Once charts are completed, students will then come together as a group and compare the results for each location, and the possible differences between sources.

**Optional:** *This activity can be done several times throughout the year to develop students' understanding of the changing weather conditions in these five different locations, developing a classroom routine of checking the weather.*

## Wrap Up

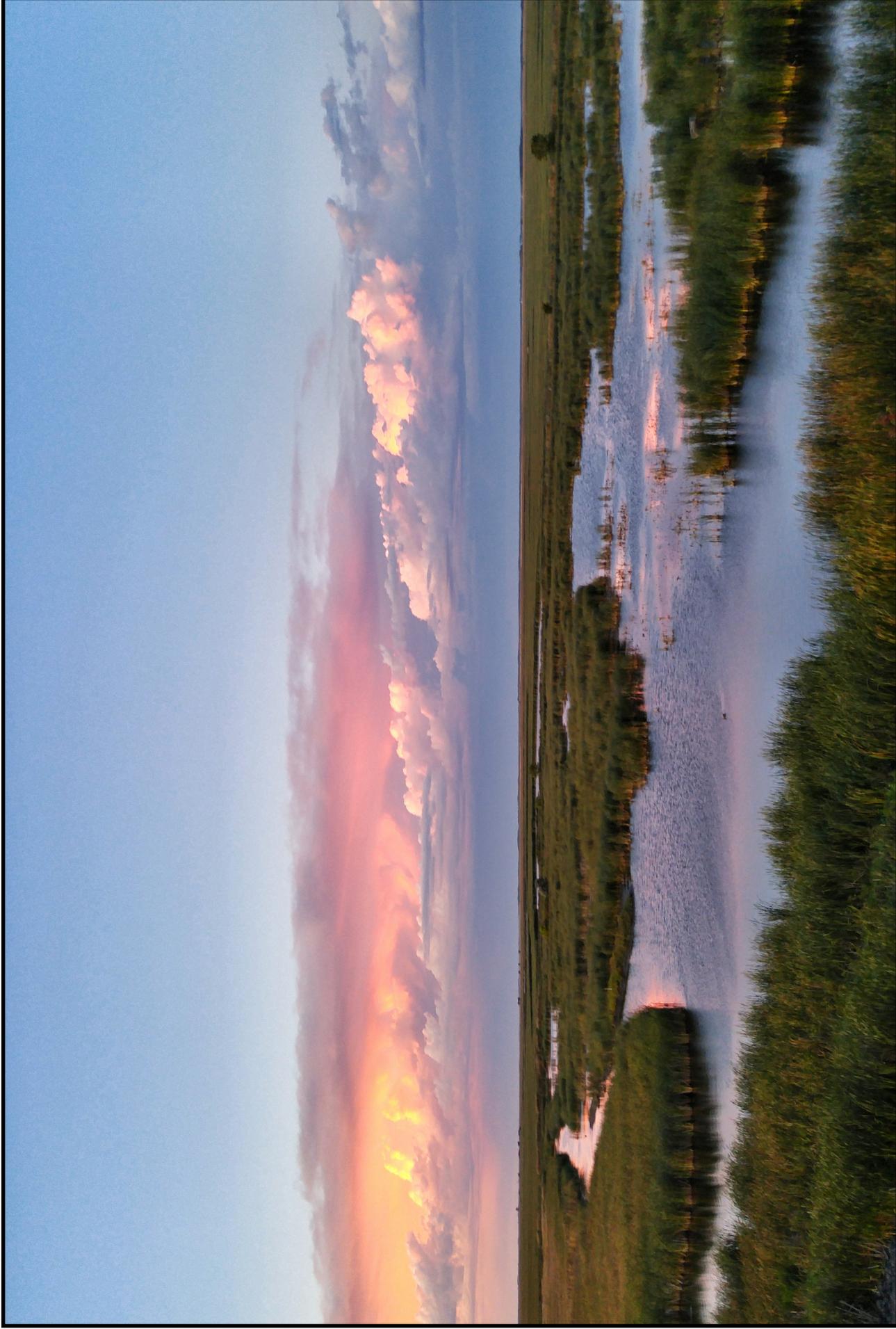
Once students have finished filling out their charts and have compared results within their groups, have groups come together as a class and share their observations.

Conclude by explaining that as a class you will be visiting one of the wetland locations you learned about: Oak Hammock Marsh. Explain that students will be exposed to the many different living things that are found in a wetland, and will be able to experience first hand the weather at Oak Hammock Marsh.

# Wetland



# Wetland



# Worldly



# Wetlands

## Example of the Components of a Public Weather Report

**Stonewall, MB** +

Overcast

**-6** °C

FEELS LIKE **-13**

**Will B.C. continue to hog all the snow from the Prairies? Details here**

**Wind gust** 29 km/h | **Humidity** 86% | **Sunrise** 8:16 AM | **Sunset** 5:05 PM | **Pressure** ↑101.8 kPa

No precipitation expected in the next 3 hours.

[More Details >>](#)

Updated on Tue Jan 23 1:09 PM

### Stonewall Short Term Forecast

Time Period	Forecast	Temp	Feels like	POP	Wind	Wind gust	Humidity
<b>Tue Afternoon</b>	Cloudy with sunny breaks	<b>-4</b> °C	-9	30%	13 km/h S	29 km/h	86%
<b>Tue Evening</b>	Cloudy with clear breaks	<b>-7</b> °C	-10	30%	8 km/h W	14 km/h	73%
<b>Tue Overnight</b>	Cloudy with clear breaks	<b>-11</b> °C	-17	30%	10 km/h S	17 km/h	62%
<b>Wed Morning</b>	A mix of sun and clouds	<b>-11</b> °C	-15	20%	9 km/h W	17 km/h	72%

Screen shot of <https://www.theweathernetwork.com/ca/weather/manitoba/stonewall> on January 23rd 2018.



# Worldly



# Wetlands

## Example of the Components of a Public Weather Report

**Location**: Stonewall, MB +

**Cloud Cover**: Overcast

**Temperature**: -6 °C

**Wind Chill or Humidex**: FEELS LIKE -13

**Precipitation Type & Amount**: No precipitation expected in the next 3 hours.

**Time of Last Update**: Updated on Tue Jan 23 1:09 PM

**Barometric Pressure**: Pressure ↑ 101.8 kPa

**Relative Humidity**: Humidity 86%

**Probability of Precipitation**: POP: 30%

**Wind Speed & Direction**: Wind: 13 km/h S

**Stonewall Short Term Forecast**

Time Period	Forecast	Temperature	Feels like	POP	Wind	Wind gust	Humidity
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Screen shot of <https://www.theweathernetwork.com/ca/weather/manitoba/stonewall> on January 23rd 2018.

Name: \_\_\_\_\_

## Key Terms for “Worldly Wetlands”

<b>Term:</b>	<b>Definition:</b>	<b>Example:</b>
<b>Weather:</b>		
<b>Wetland:</b>		
<b>Temperature :</b>		
<b>Relative Humidity:</b>		
<b>Wind Speed &amp; Direction:</b>		
<b>Wind Chill:</b>		
<b>Barometric Pressure:</b>		
<b>Humidex:</b>		
<b>Cloud Cover:</b>		
<b>Ultraviolet (UV) Index:</b>		
<b>Warm &amp; Cold Fronts:</b>		
<b>Amount and Type of Precipitation:</b>		
<b>Probability of Precipitation (POP):</b>		

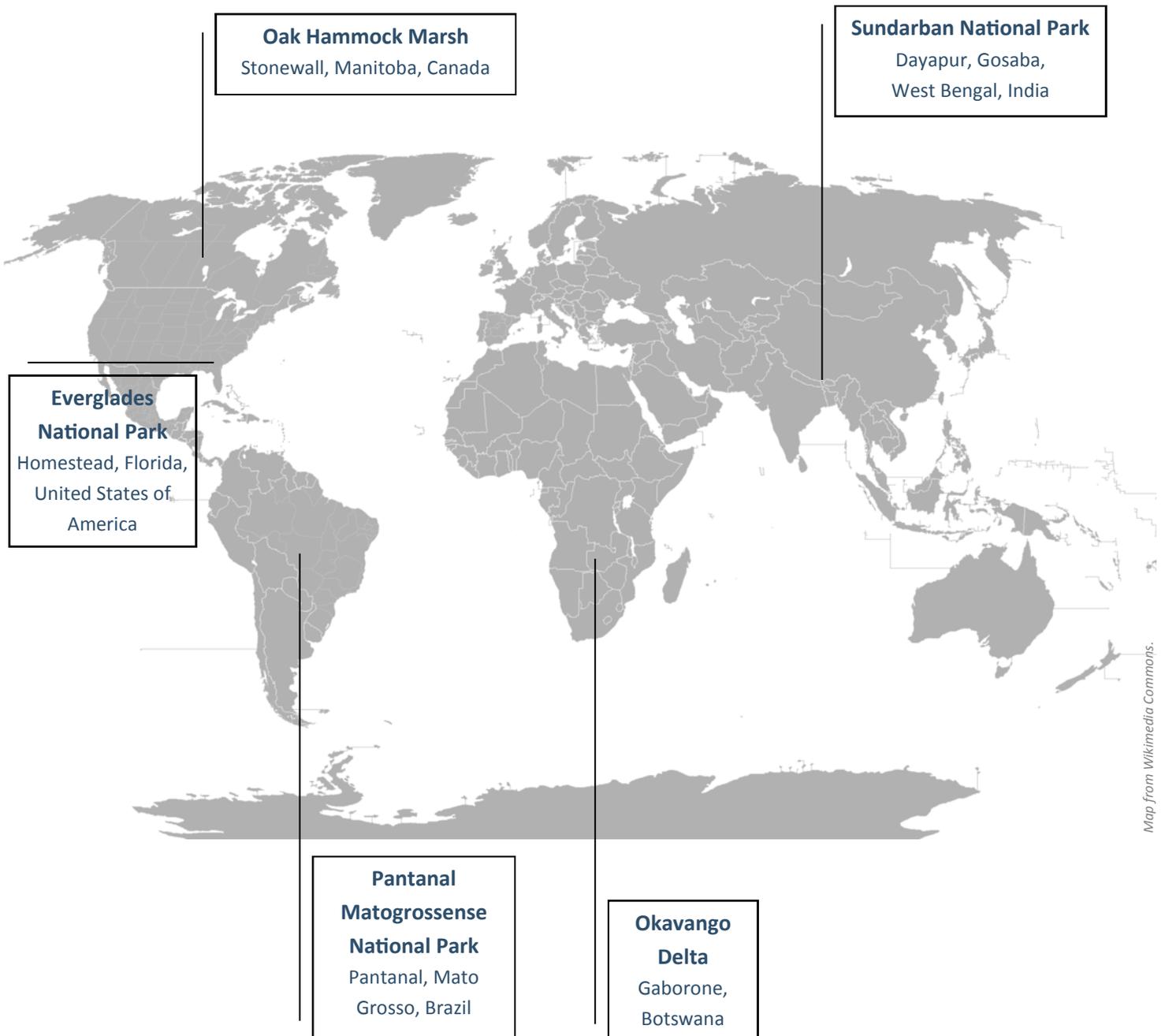
## Key Terms for “Worldly Wetlands”

<b>Term:</b>	<b>Definition:</b>	<b>Example:</b>
<b>Weather:</b>	Weather refers to the <u>current</u> atmospheric conditions in a specific place and time. It is created by various combinations of water, clouds, air/wind, and temperature.	Rain, Clear skies, snowing, windy
<b>Wetland:</b>	A wetland is an area of land that holds shallow water, with a maximum depth of two metres. The water moves slowly across the land because there are so many plants that grow in and around the water, slowing the water down, absorbing some of the water like a sponge and filtering it as it moves through.	Marsh, Pond, Bog, Fen, Mangrove, Swamp
<b>Temperature :</b>	The degree or intensity of heat present, usually expressed by a comparative scale as measured by a thermometer.	24 °C, - 34°C, 100°F
<b>Relative Humidity:</b>	The amount of water vapour (gas) present in the air, usually expressed as a percentage of the amount needed for saturation (when vapour turns into a liquid, i.e. water droplets). The higher the temperature, the higher the capacity for water vapour to be held in the air before it turns into liquid.	79% (of the vapour capacity for -6°C)
<b>Wind Speed &amp; Direction:</b>	The speed which the wind travels, and which direction it is traveling from.	17km/h S
<b>Wind Chill:</b>	A quantity expressing the lowering of the air temperature due to wind, affecting the rate of heat loss from an object or human or as perceived by an exposed person.	- 6°C Feels like -12°C
<b>Barometric Pressure:</b>	The pressure of the atmosphere usually expressed in terms of the height of a column of mercury.	↑101.9 kPa
<b>Humidex:</b>	A temperature index used by Canadian Meteorologists to describe how hot the weather feels to a person after adding the effect of heat and humidity.	22°C with 90% relative humidity equals 30°C
<b>Cloud Cover:</b>	The amount a mass of cloud is covering the sky.	Cloudy.
<b>Ultraviolet (UV) Index:</b>	An international standard for measuring the strength of sunburn-producing UV radiation at a particular time and place.	4—Moderate
<b>Warm &amp; Cold Fronts:</b>	A cold front is the transition zone where a cold air mass replaces a warmer air mass, leaving the air noticeably more colder and drier behind the cold front. A cold front generally moves from northwest to southeast.	Shown usually as a blue jagged line with a red jagged line.
<b>Amount and Type of Precipitation:</b>	The amount of rain, snow, sleet, or hail falling to the ground.	3 cm of snow.
<b>Probability of Precipitation (POP):</b>	The chance, usually expressed in a percentage, of precipitation occurring at a particular place and time.	60% chance of rain.

# Worldly Wetlands



## Locations of Featured Wetlands



# Oak Hammock Marsh Stonewall, Manitoba, Canada

Oak Hammock Marsh is a restored wetland featuring permanent freshwater ponds and marshes. The marsh is located outside the town of Stonewall in the province of Manitoba, Canada, and is considered a very important nesting location and resting stop for birds along their migration routes. The marsh's water source includes Wavey Creek and the seasonal snow melt and rain fall, creating changing water levels throughout the year. The area provides habitat to many types of wildlife, including the American Avocet and the Richardson's Ground Squirrel (pictured). Other inhabitants of the marsh include 300 species of birds, 32 species of mammals, 10 species of fish, 7 species of amphibians, 3 species of reptile, and over 230 plant species!

*For more information on Oak Hammock Marsh, visit:  
[oakhammockmarsh.ca](http://oakhammockmarsh.ca).*



Image from Google



# Everglades National Park

Homestead, Florida, United States of America

The Everglades, located on the western coast of Florida, includes subtropical upland and marine ecosystems such as freshwater marshes, mangroves, and seagrass habitats. The consistent flooding of the Everglades is created by the waters from the Kissimmee, Caloosahatchee, Myakka, and Peace Rivers. Many different species of plants and animals live in the area, including the Roseate Spoonbill and the Manatee (pictured). According to UNESCO, the Everglades provides habitat for over 400 bird species, and is one of the most significant breeding grounds in North America for wading birds, and a major migration passage. Ramsar reports that over 1000 seed-bearing plant species and 120 tree species occur in the area.

*UNESCO is the educational, scientific and cultural organization of the United Nations which aims to coordinate and cooperate internationally so that every person has access to quality education, may grow and live in a culturally rich environment, can fully benefit from scientific advances, and enjoy full freedom of expression. The Everglades are considered by UNESCO as a World Heritage Site. For more information, visit: [whc.unesco.org/en/list/76](http://whc.unesco.org/en/list/76).*



Image from Google



Photo from sandigozoo.com.



Photo from campliveoakfl.com.

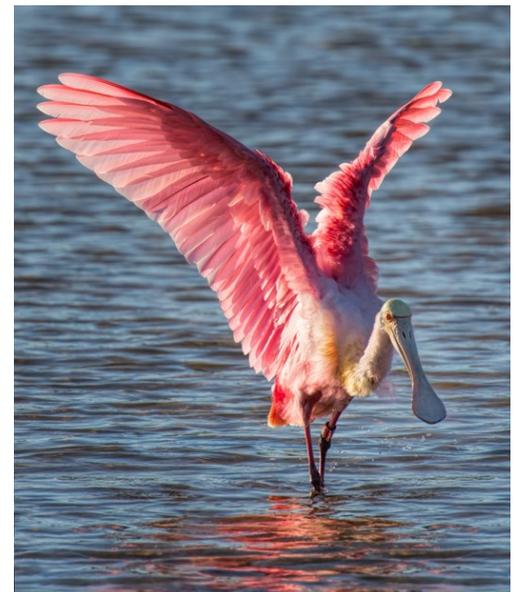


Photo from blog.martinbelan.com.



# Pantanal Matogrossense National Park

## Pantanal, Mato Grosso, Brazil

The Pantanal Matogrossense, located in the Mato Grosso province of Brazil, is part of the biggest, permanent freshwater wetland in the western hemisphere. According to Ramsar, it has some of the largest concentration of wildlife in the Neotropical region, and is considered one of the most important South American wetlands for waterfowl. The Pantanal is home to many, including the Hyacinth Macaw and the Jaguar (pictured). According to UNESCO, the Pantanal provides habitat for over 80 mammal species, 650 bird species, 50 reptiles, and 300 fish species.

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Image from Google



Photo from Wikimedia Commons.



Photo by Markus Mauthe, National Geographic



Photo from Wikimedia Commons.

# Sundarban National Park

## Dayapur, Gosaba, West Bengal, India



Image from Google

The Sundarban is a very large mangrove forest located in India's West Bengal province and across the border through Bangladesh's Khulna, Satkhira, and Bagerhat districts. The Sundarban provides habitat for many different species of plants and animals, including the Bengal Tiger and the Brown-winged Kingfisher (pictured). Fresh water is supplied from the rivers and canals inland, while the tidal creeks and open sea supply salt water to the area, resulting in fish who require both salt and fresh water. According to Ramsar, there are 289 land animal species, 219 water animal species, and 334 plant species found in the forest!



© Nicky de Battista

*Ramsar is an international convention which was first held in 1994, aiming to promote the conservation and wise use of wetlands. Sundarban is considered a wetland of international importance. For more information, visit: [rsis Ramsar.org/ris/560](http://rsis Ramsar.org/ris/560).*



Photo from by Syed Zakir Hossain from the Dhaka Tribune.



© Abu Bakar Siddik

# Okavango Delta Gaborone, Botswana

The Okavango Delta, located in Gaborone, Botswana, is an inland delta made up of various wetlands, including permanent swamps, seasonal swamps, and occasionally flooded areas. The delta is supplied with water and sediments from the Okavango River which begins in higher plains of Angola, where rainfall travels by river and floods the very flat region of the delta. This creates a range of habitats and results in high biodiversity (meaning there are many different species of plants and animals living in the delta) including the African Lion, African Buffalo, and Cattle Egrets (pictured). According to Ramsar, there are over 650 species of birds living in the Okavango Delta, along with 104 mammal species, 95 reptile and amphibian species, 68 species of fish, and 1060 plant species!



Image from Google



Image by Brendon Cremer



Image by Kelly Cheng Travel Photography

*Ramsar is an international convention which was first held in 1994, aiming to promote the conservation and wise use of wetlands. The Okavango Delta is considered a wetland of international importance. For more information, visit: [rsis.ramsar.org/ris/879](https://rsis.ramsar.org/ris/879).*



# Worldly Wetland Weather

Name: \_\_\_\_\_

Date in Location: \_\_\_\_\_ Time in Location: \_\_\_\_\_

<b>Wetland Location:</b>	<b>Source 1:</b>	<b>Source 2:</b>	<b>Source 3:</b>
<b>Temperature:</b>			
<b>Relative Humidity:</b>			
<b>Wind Speed &amp; Direction:</b>			
<b>Wind Chill:</b>			
<b>Barometric Pressure:</b>			
<b>Humidex:</b>			
<b>Cloud Cover:</b>			
<b>Ultraviolet (UV) Index:</b>			
<b>Warm &amp; Cold Fronts:</b>			
<b>Amount of Precipitation:</b>			
<b>Type of Precipitation:</b>			
<b>Probability of Precipitation (POP):</b>			



# Worldly Wetland Weather

Name: Example

Date in Location: January 23rd 2018 Time in Location: 10:55am—11:07am

Wetland Location:	Source 1:	Source 2:	Source 3:
Stonewall, Manitoba, Canada	weathernetwork.com	accuweather.com	wunderground.com
Temperature:	-6°C	-6°C	-23°F
Relative Humidity:	84%	79%	(not available)
Wind Speed & Direction:	20 km/h S	18 km/h SSE	SE
Wind Chill:	-13°C	-13°C	22°F
Barometric Pressure:	↑101.9kPa	1019.40 mb	(not available)
Humidex:	(not available)	(not available)	(not available)
Cloud Cover:	Overcast	Cloudy	Cloudy
Ultraviolet (UV) Index:	(not available)	(not available)	(not available)
Warm & Cold Fronts:	(not available)	(not available)	(not available)
Amount of Precipitation:	0%	0%	0%
Type of Precipitation:	None	None	None
Probability of Precipitation (POP):	30% snow	20% snow	20%

# Different Kinds of Weather

**Wind** - the movement of air around the world, and is a fundamental ingredient to developing weather.

**Air Mass** - a large body of air that has a similar temperature and moisture levels throughout the air body.

**Cold Front** - a cold air mass replaces a warm air mass.

**Warm Front** - a warm air mass replaces a cold air mass.

**Rain** - liquid precipitation formed by water droplets.

**Thunder & Lightening Storm** - negatively charged particles sink to the bottom of clouds and gather until a giant spark is created, followed by a loud noise (created by the increase in pressure, temperature and expansion of air).

**Fog** - water droplets mix with dust and/or air pollution, creating a cloud near the ground.

**Snow** - solid precipitation formed by ice crystals.

**Sleet** - precipitation that occurs at temperatures around 0°C which creates a slush.

**Blizzard** - blowing snow with temperatures below freezing and wind speeds of at least 70km/hour.

**Tornado** - when a warm, moist air mass and a dry air mass meet, they create instability in the atmosphere and a narrow, rotating funnel that stretches from the ground to the clouds is created, with wind speeds varying from 100 km/hour to 400 km/hour.

**Hurricane** - considered the most violent storms on earth, hurricanes (also known as typhoons or cyclones, depending on where they occur) form over warm ocean waters. Moist air rises from the water, forming storm clouds which turn into rotating bands around the “eye” (centre) of the storm. Cool air is sucked into the “eye” and wind grows in speed, reaching at least 63 km/hour to be considered a hurricane.

## The Effects of Weather

**Forest Fire** - when there is no rain for many days and the air has been very dry, forest fires can start with just a small spark, and significantly change habitats.

**Flood** - when an area experiences heavy amounts of precipitation in a short period of time, water stays in an area, significantly changing habitats.

**Drought** - when an area experiences drier-than-normal conditions, like no rainfall, this drought or lack of moisture can significantly change habitats.

**Sun Dogs** - an effect of very cold temperatures, ice crystals refract sunlight creating a bright spot on the left and/or right of the sun, creating the illusion that there are two or three suns in the sky.

# How Weather Impacts Bird Migration



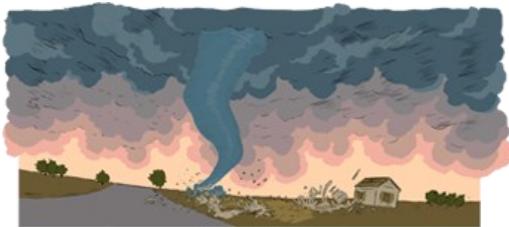
## Heavy Rain, Thunder & Lightening Storm, Fog, Sleet, Snow

- *Grounded, delayed*



## Blizzard

- *Grounded, delayed*
- *Increases chances of death*



## Warm & Cold Front

- *Impacts when the birds actually begin to migrate; they are sensitive to weather changes*



## Tornado, Hurricane

- *Grounded, delayed*
- *Blown off course (on a smaller scale for a Tornado)*
- *Use more energy to avoid*

# How the Effects of Weather Impacts Bird Migration

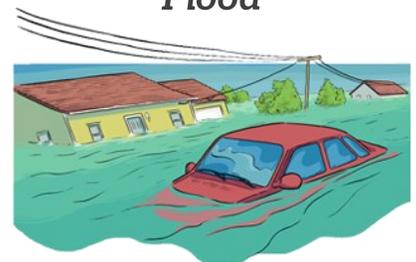
## Drought



## Forest Fire



## Flood



*Effects stop-over sights / Increases chances of death / Use more energy to avoid*

# Different Kinds of Clouds

