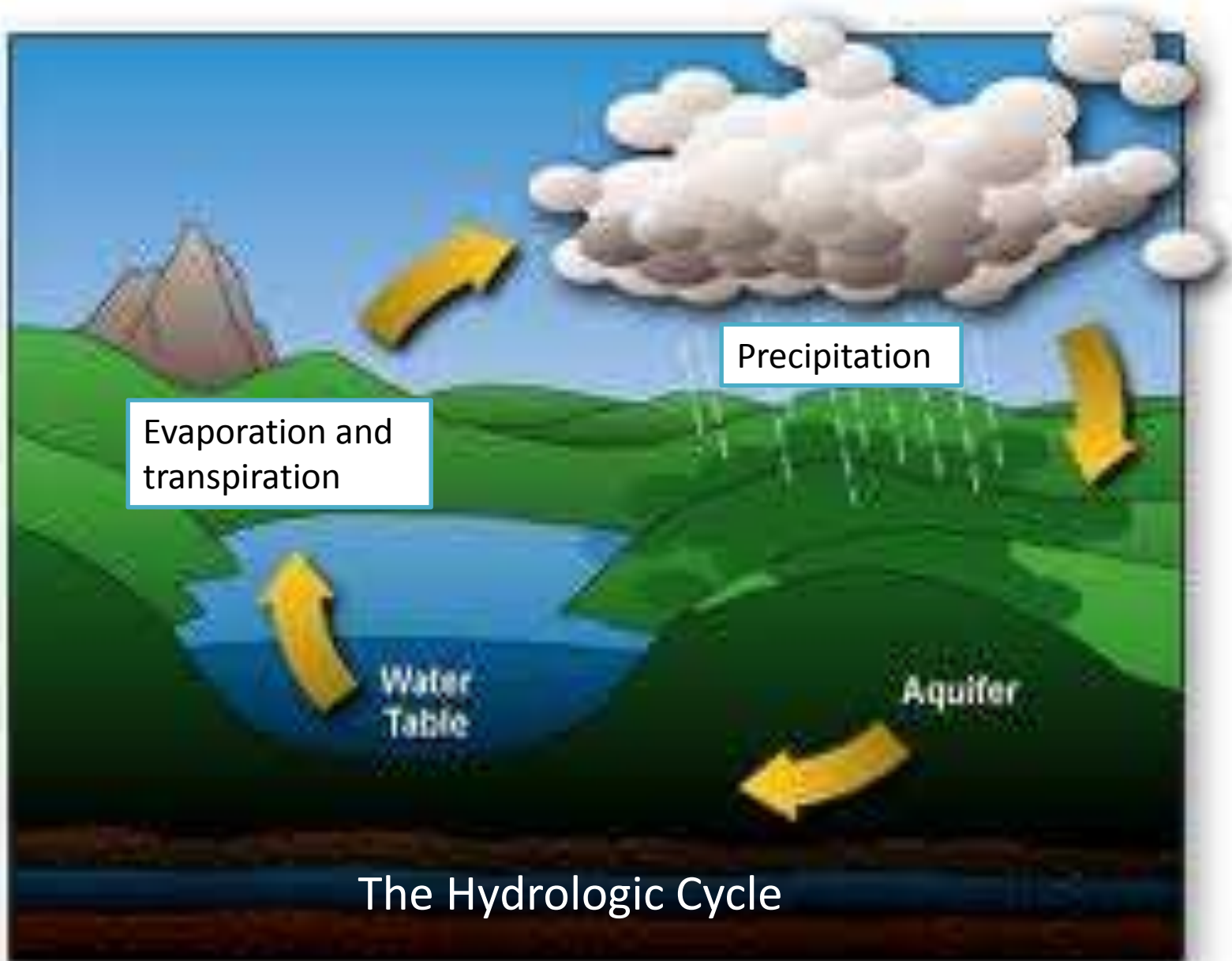


How could we possibly change the Hydrologic Cycle on an Island as big as Vancouver Island?

Do you think for a moment that humans altering the Hydrologic Cycle would also change the Weather?





Ice recedes 13,000 -10,000
years ago

Glacial deposits



Topography affected by earth movement

Melt-water erosion and accretion

Groundwater at surface



Historically large areas of
Vancouver Island were covered
with lakes, wetlands, swamps and
streams

Seasonally the
land was saturated





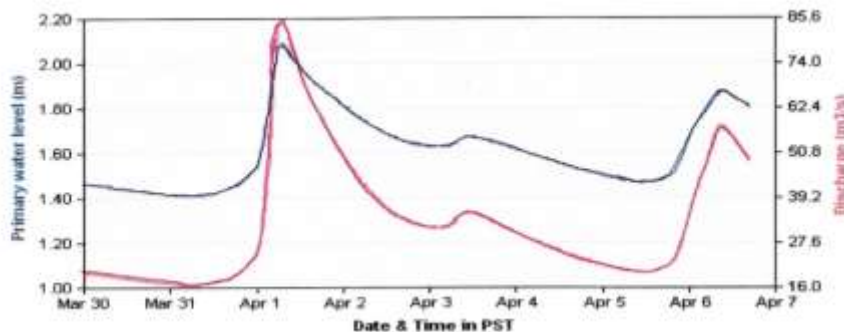
The pioneers
started to change
the hydrology in the
mid to 1800's



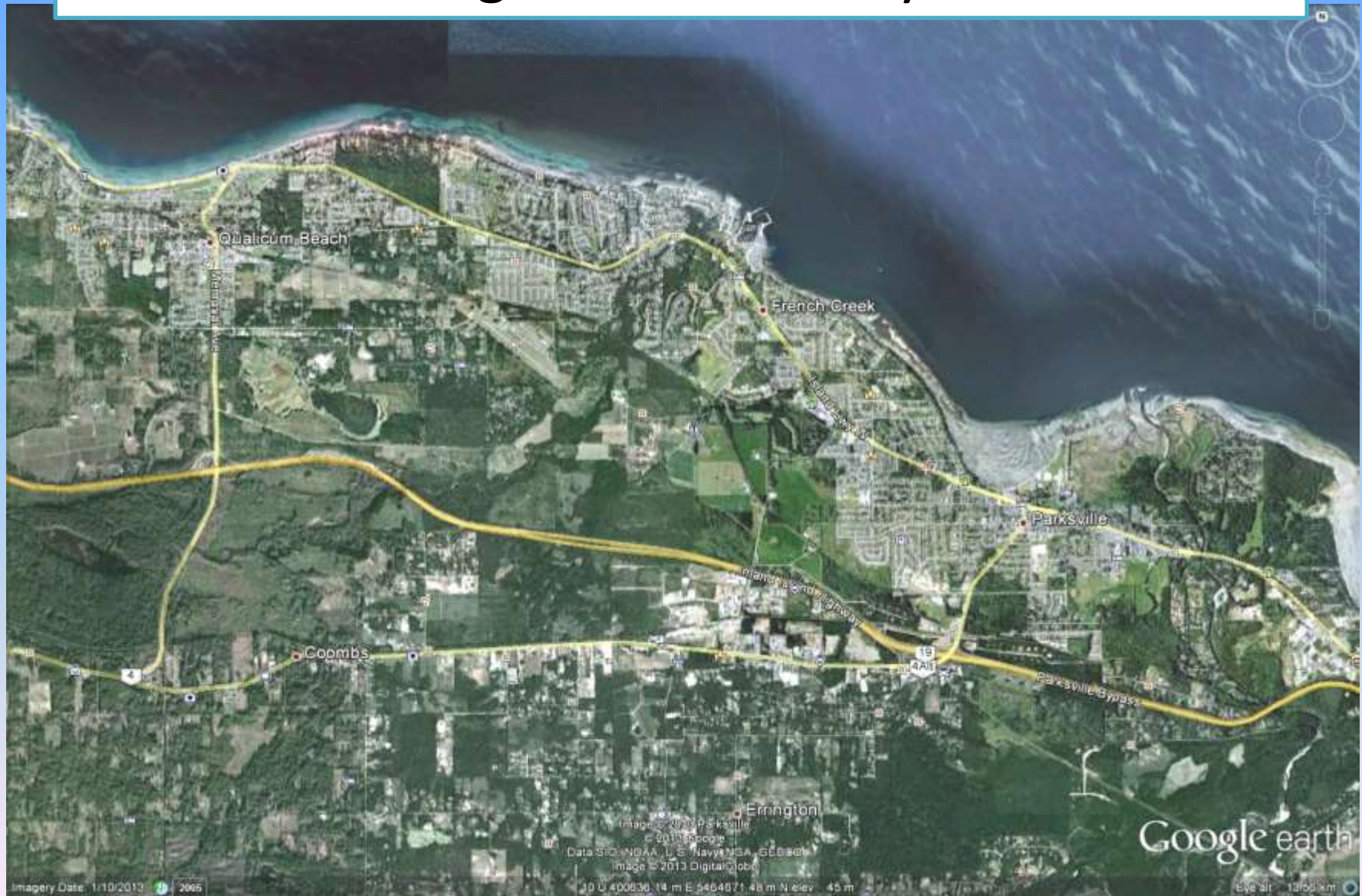
**RAPID DRAINING
ELIMINATES LARGE
VOLUMES OF WATER FROM
THE HYDROLOGIC CYCLE**

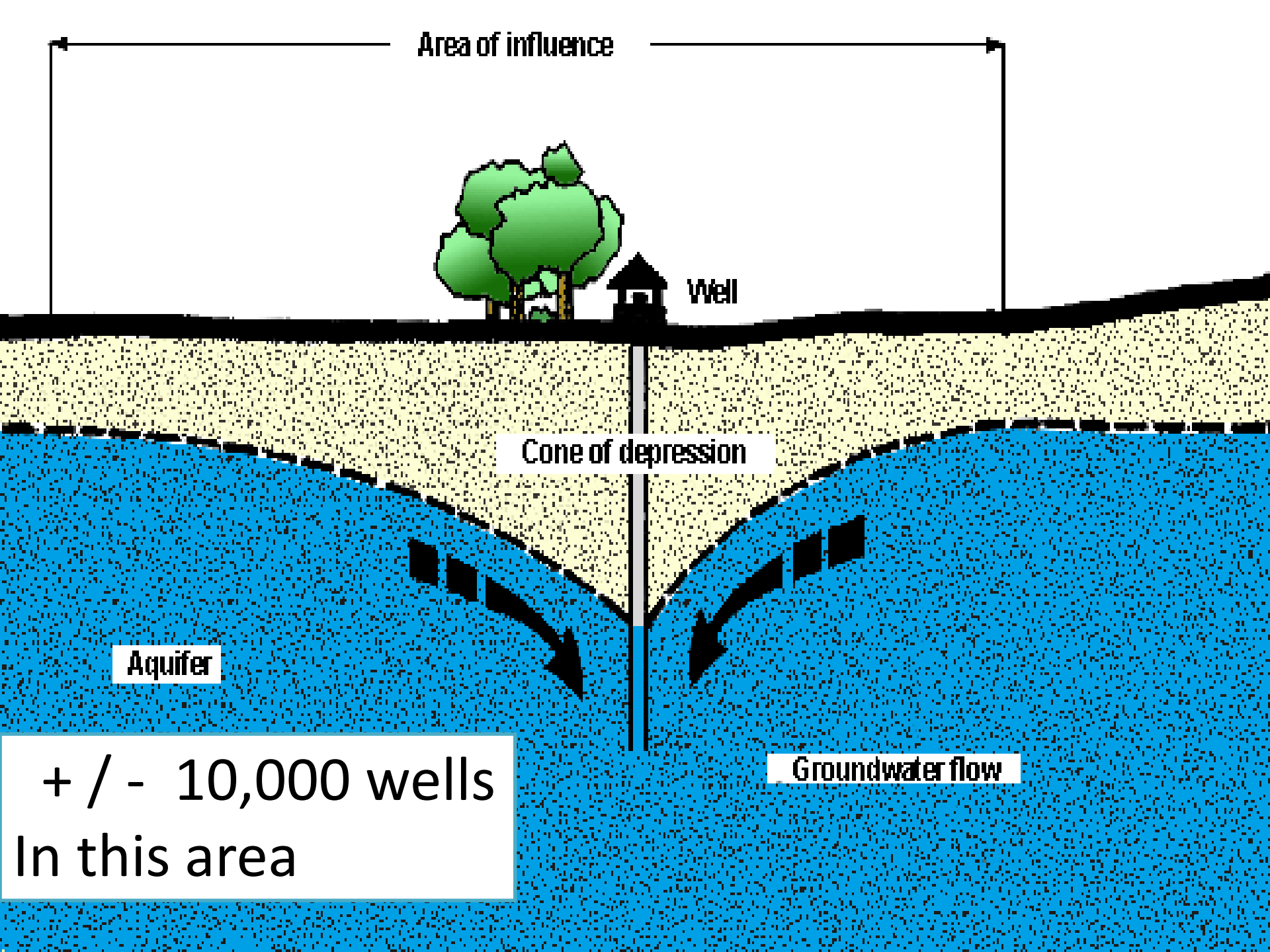


ENGLISHMAN RIVER STORM FLOW



The hydrology on the east coast of Vancouver Island has changed considerably





Area of influence

Well

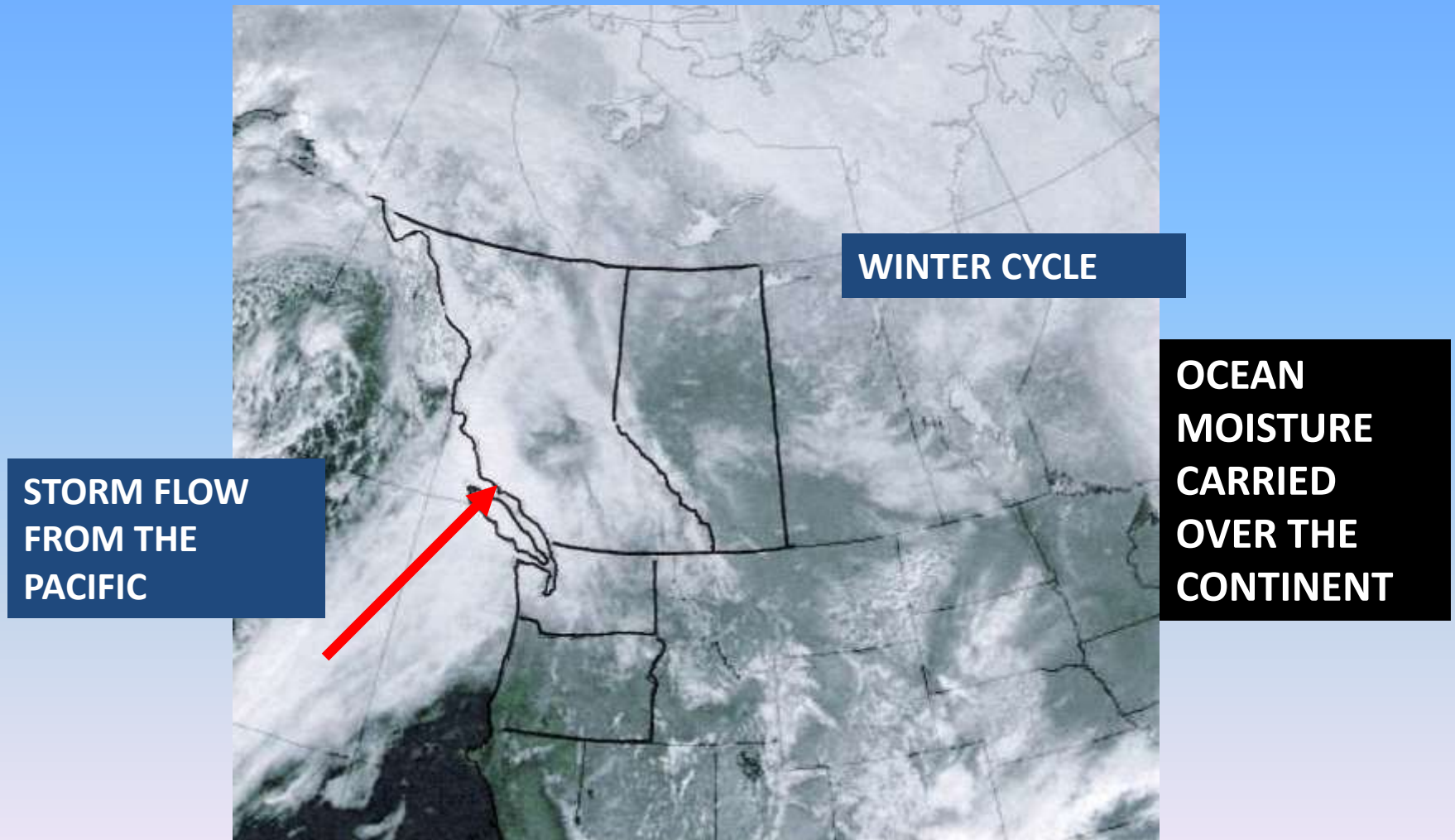
Cone of depression

Aquifer

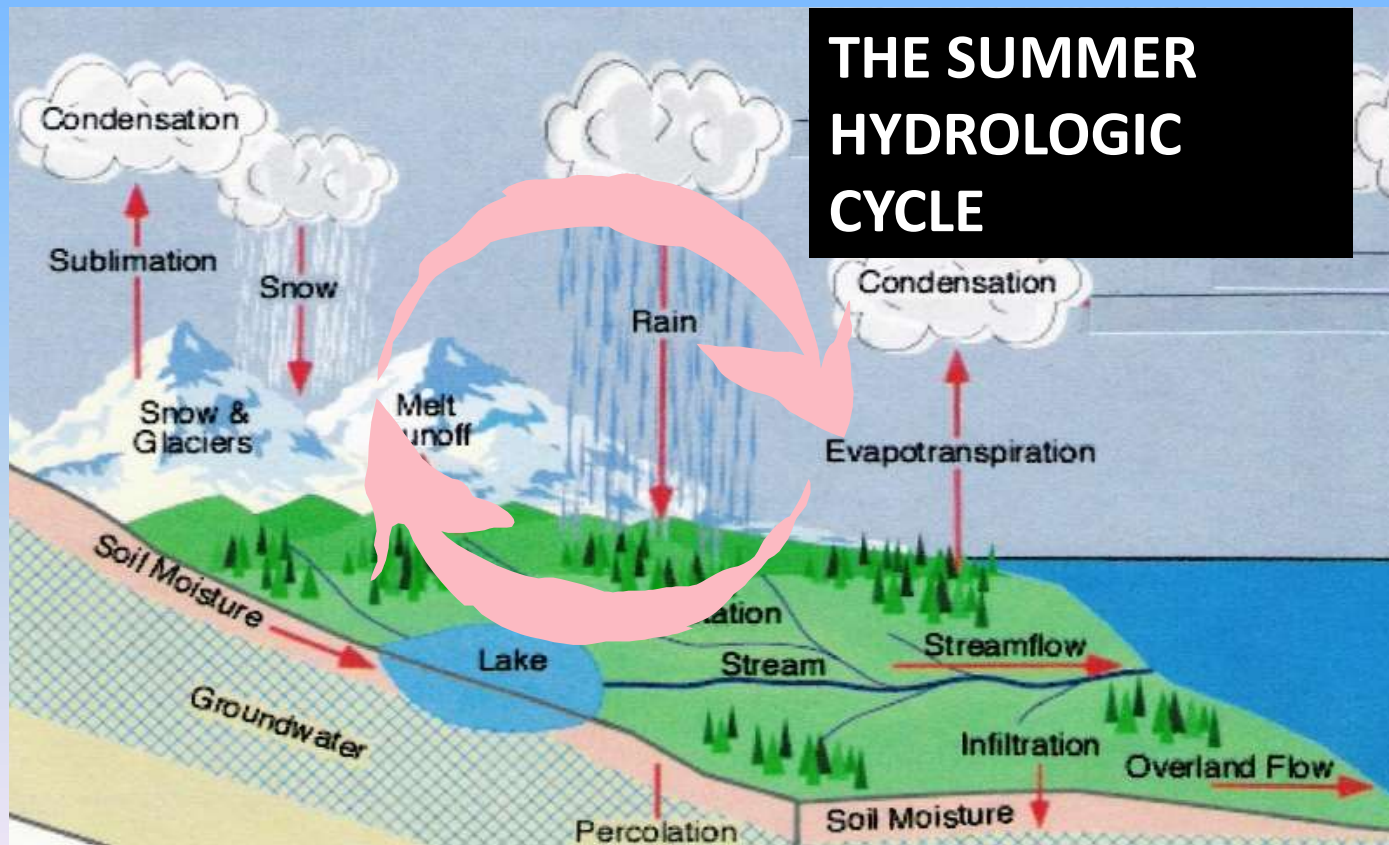
Groundwater flow

+ / - 10,000 wells
In this area

WINTER CLIMATIC CYCLES ARE ON A LARGE SCALE



**THE LAND SURFACE MUST HAVE SUFFICIENT
AVAILABLE MOISTURE DURING THE SUMMER;
TO CREATE PRECIPITATION**



Water sources on East Vancouver Island



Surface water
Groundwater
Aquifers
Mixture

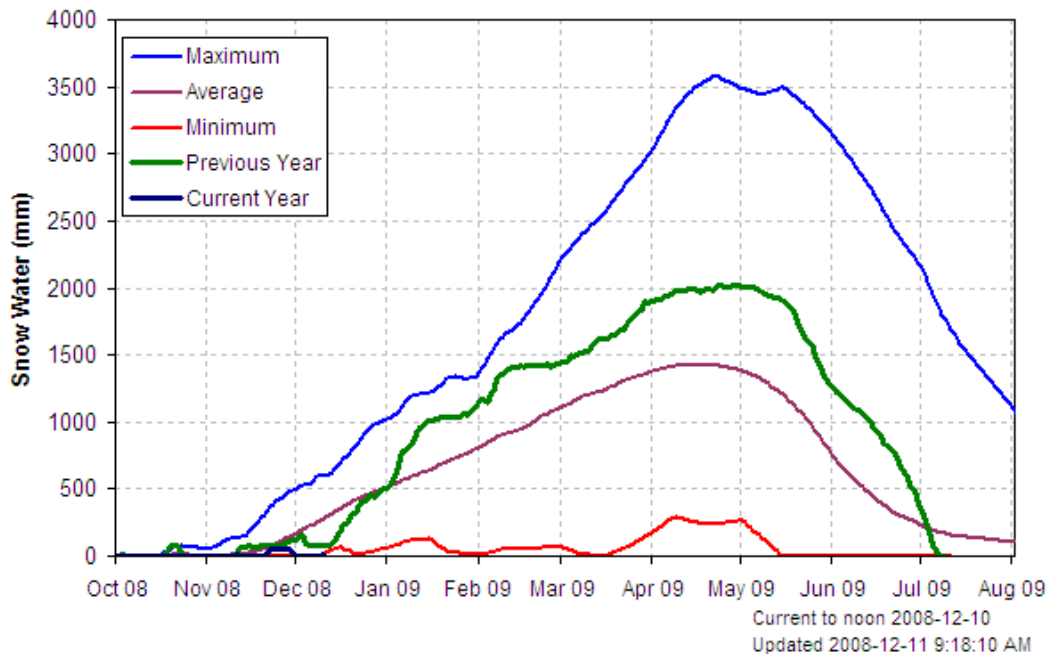
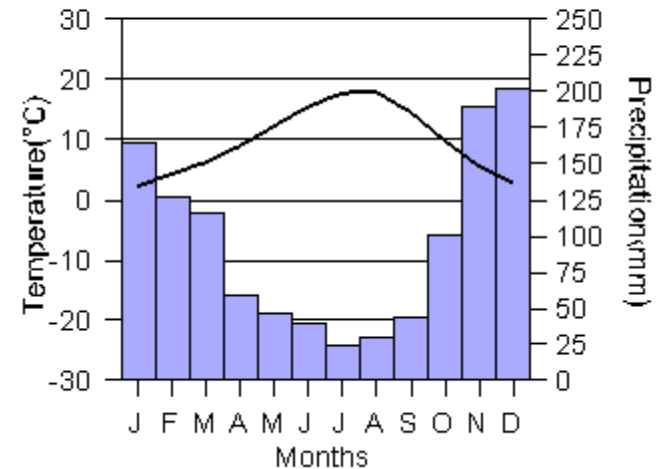
Precipitation
80 cms -150
each year



Variable precipitation and snowpack

Climograph

Nanaimo, B.C.



**Snow Pillow
Data 2008-2009
Jump Creek -
3B23P**

Human's impact on the seasonal availability of water

Deforestation

Land-clearing

Draining

Infiltration loss

Water extraction

Development



Balancing demand from surface and groundwater sources

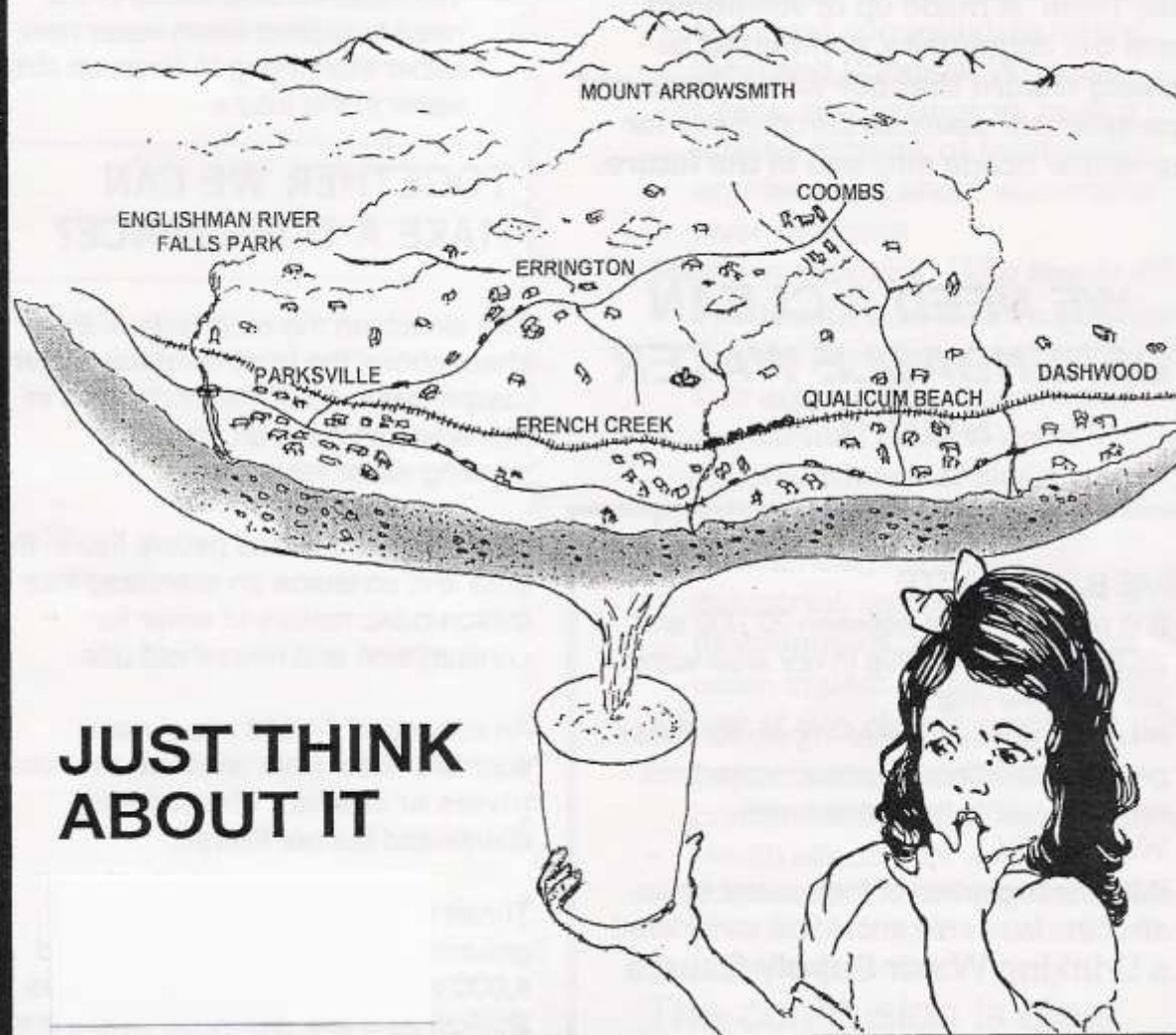
Winter surplus



Summer
shortage



DRINKING WATER SOURCE PROTECTION



Qualicum Swimming Pool

Approximately the amount
of family use in one year



Positive proof of global warming.



**18th
Century**

1900

1950

1970

1980

1990

2006

Human activity changes the earth's hydrologic cycles, causing extremes of heat, cold, drought, and excessive precipitation

An immense amount of thermal energy is transported throughout the hydrologic cycle

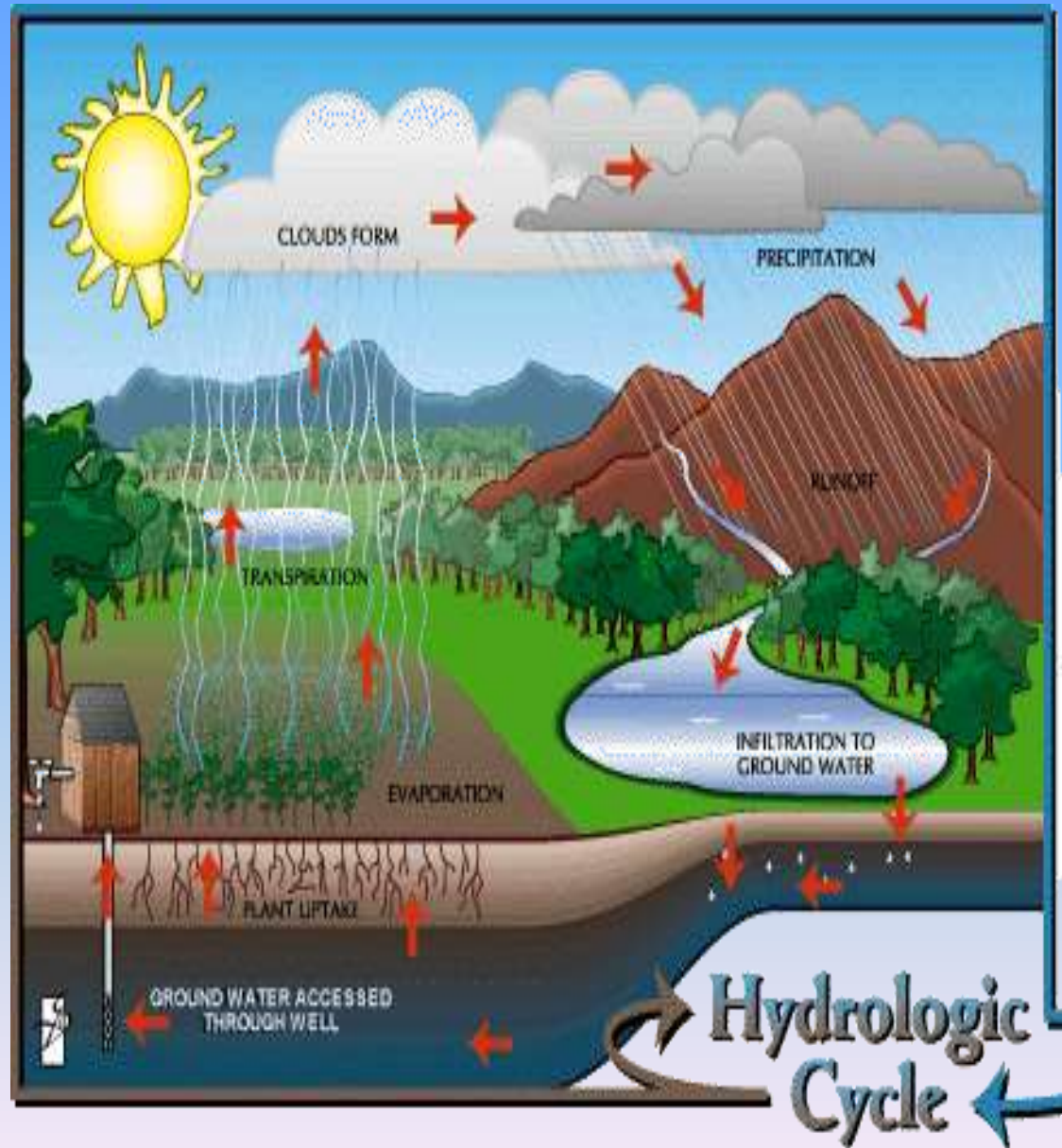
Water as a gas;
Humidity
cloud

Water H₂O as a liquid:
Rain *dew*
stream
ground-
water *river*
lake *sea*
ocean

Water as a solid:
Snow
ice

**T
h
e
r
m
a
l

E
n
e
r
g
y**

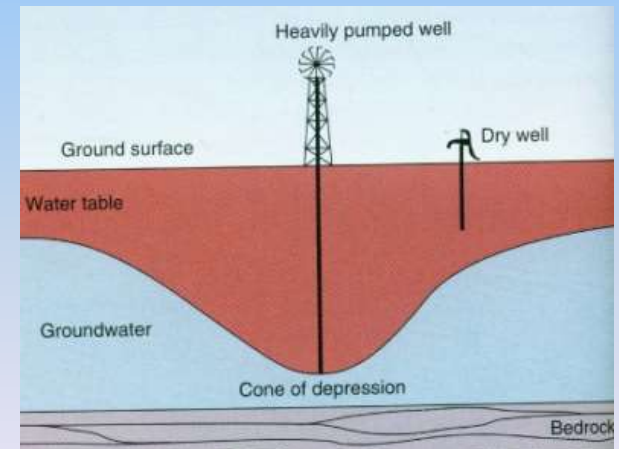


Some of the human activities that affect the hydrologic cycle

Draining water



Pumping water



Removing trees



Altering land



Why will extreme climatic events become more frequent?

As groundwater or oil and gas is pumped from wells, and surface water is diverted or drained from the land (dewatering), areas of the earth become arid and dry. Lowering water tables causes the trees and lush succulent vegetation to die off, this in turn results in a reduced evapotranspiration and a diminishing hydrologic cycle.



T I M E

The amount of succulent vegetation declines as water levels go down

The amount of clouds diminishes as the hydrologic cycle is reduced

The land is drained and wells are drilled deeper to reach the groundwater or oil

The water table declines as the water in the aquifer is used faster than the recharge rate

1860 1880 1900 1920 1940 1960 1980 2000 2020
Timeline

DECLINING HYDROLOGIC CYCLE

- LESS AVAILABLE MOISTURE
- NOMINAL EVAPOTRANSPIRATION
- NOT AS MUCH PRECIPITATION
- Results in:
- EVEN LESS AVAILABLE MOISTURE
- MINIMAL EVAPOTRANSPIRATION
- NO PRECIPITATION



LESS:

**CLOUDS
RAIN
STREAMS
FISH
PLANTS
TREES**

The compounding effects of de-watering the land cause more extreme climatic conditions

Very hot dry air--- passing over water or wetland -----create big storm



With few clouds the sun heats up the dry earth, minimal amount of vegetation causes hot winds to speed up

The volume of hot dry air rapidly evaporates moisture, and the thermal energy of the warm moist air causes extreme turbulence

Localised intense storms with high winds and extreme rainfall

Hot winds

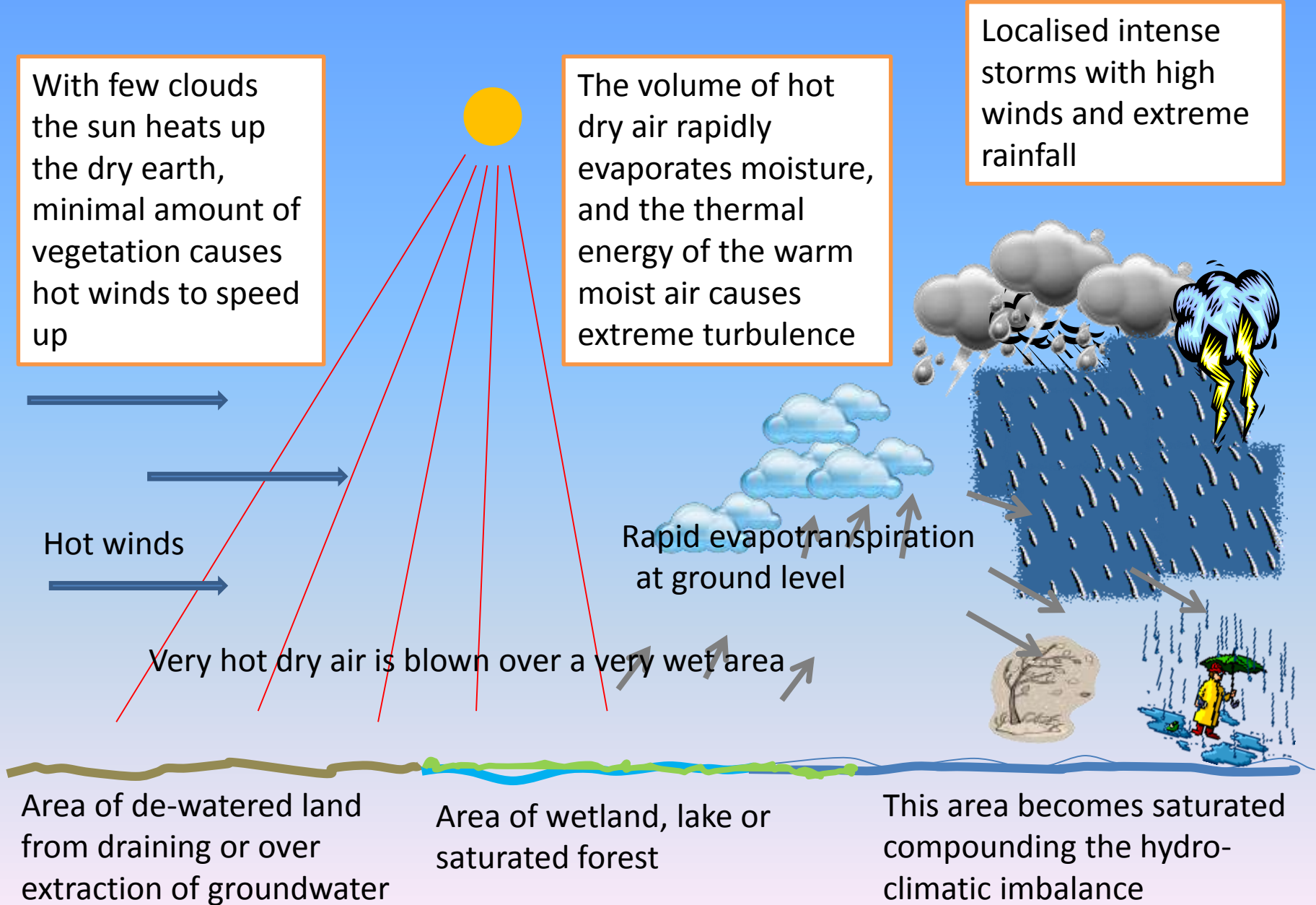
Rapid evapotranspiration at ground level

Very hot dry air is blown over a very wet area

Area of de-watered land from draining or over extraction of groundwater

Area of wetland, lake or saturated forest

This area becomes saturated compounding the hydro-climatic imbalance



Temperature high 28 C Low 18 C
Humidity high
No wind

Summer 1870

Lots of clouds

Significant
evapotranspiration

Heavily forested

Flowing rivers
and creeks

Cross section

Small lake

Water table
at surface



Temperature high 30 C Low 16 C
Humidity moderate
Some wind

Summer 1920

Less clouds

Some
evapotranspiration

Partial clearing

Small creek

Cross section

Pond

Hand dug well



Temperature high 32 C Low 15 C
Humidity low
Windy

Summer 1960

Some clouds

Very little
evapotranspiration

Cleared forests

Seasonal creek

Irrigated farmland

Seasonal wetland

Cross section

Shallow well

Water table dropping



Temperature high 36 C Low 12 C
Humidity low
Windy

Summer 2010

Few clouds

Very little
evapotranspiration

No forests

Development

Dry creek
bed

Cross section

Deep wells

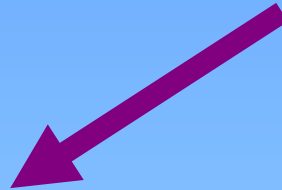
Groundwater
depleted

Low water table

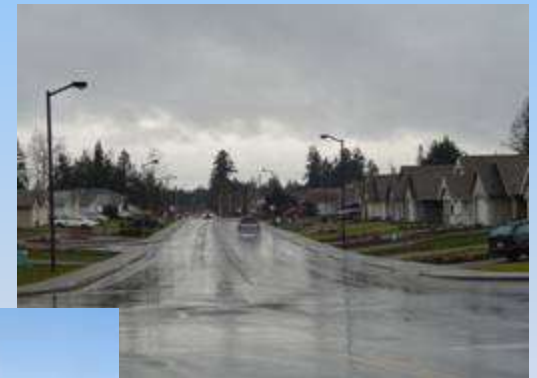


WHAT IS CAUSING THE CHANGE IN REGIONAL CLIMATE PATTERNS ?

WE CAN MAKE
THE
CONNECTIONS



- DRAINING WATER OFF THE LAND
- OVER EXTRACTING GROUNDWATER
- CREATING LARGE IMPERVIOUS SURFACES
- DEFORESTATION



How can we improve the local hydrologic cycle ?

STOP DRAINING WATER OFF THE LAND

STOP OVER EXTRACTING GROUNDWATER

STOP CREATING LARGE IMPERVIOUS SURFACES

STOP DEFORESTATION PLANT TREES

A serene landscape photograph capturing a sunset over a calm body of water. The sky is filled with soft, colorful clouds in shades of pink, orange, and purple, with the sun's glow visible on the horizon. In the distance, a range of mountains is silhouetted against the bright sky. The foreground features dark, out-of-focus reeds and plants, adding depth to the scene. A black rectangular box is centered in the lower half of the image, containing the text "Thank You for Watching" in a white, elegant script font.

Thank You for Watching

Trevor Wicks

Trentec Innovations
www.innovationbc.com



2013

<http://youtu.be/nart20E3EMk>

Like Human's Cause Climate Change