

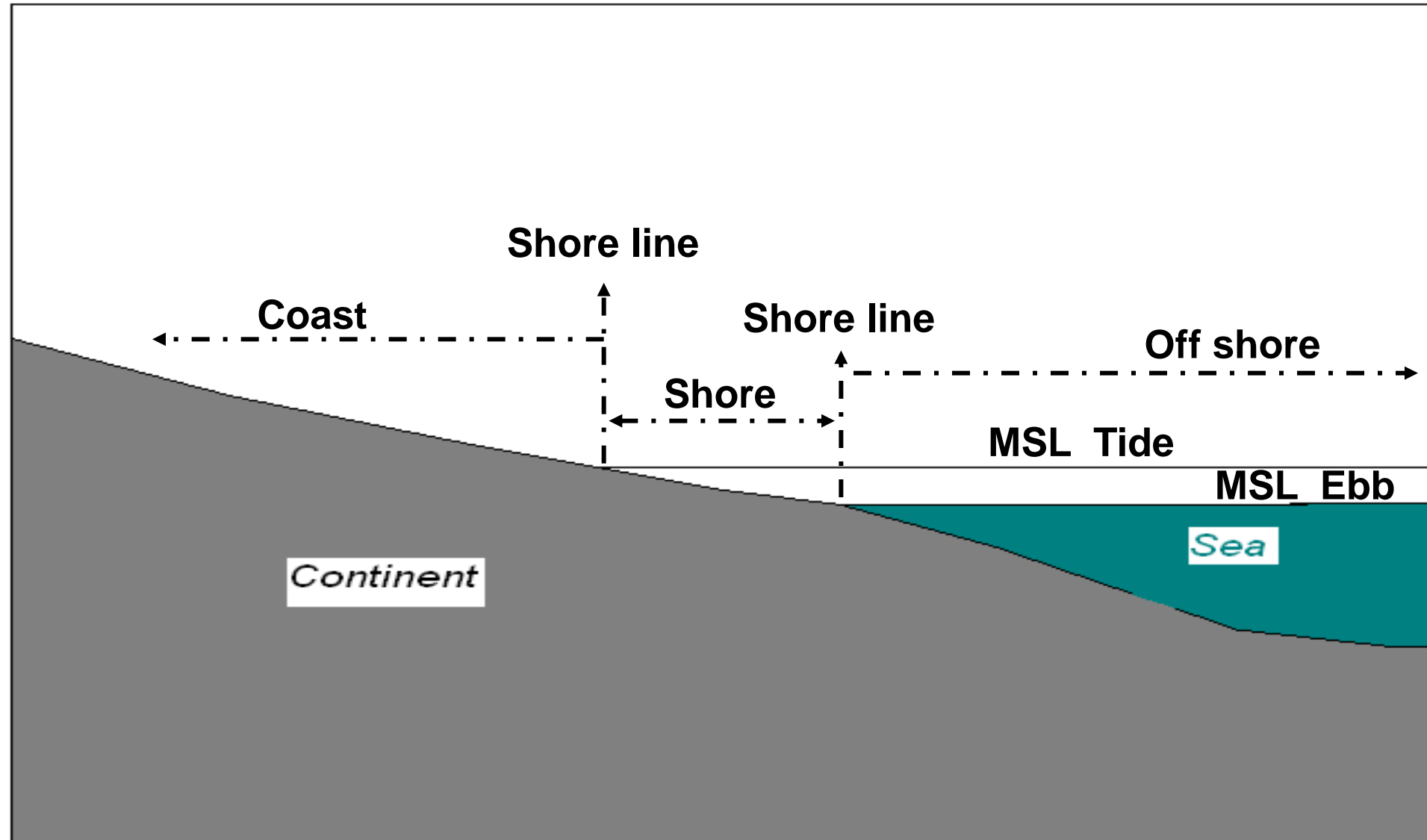
# **WATER AT COASTAL AREA**

**BY**

**DARSIHARJO, M.S., DR.**

**MANAGEMENT RESORT AND LEISURE**

# COAST $\neq$ SHORE



**SHORE LINE:  
MEETING BETWEEN SALINE WATER SURFACE  
AND CONTINENT**

**SHORE:  
SUFFUSED WATER AREA WHEN THE TIDE  
AND DRY WHEN THE EBB**

**COAST:  
AREA DO NOT AFFECT WAVE UNTIL AREA  
WHICH AFFECT MARINE WITH CERTAIN ECOLOGY**

## **FORMULA FOR TIDE TIME ESTIMATE**

$$**T1 = 4/5 Dk + 6**$$

$$**T2 = 4/5 Dk - 6**$$

## **FORMULA FOR EBB TIME ESTIMATE**

$$**E1 = 4/5 Dk**$$

$$**E2 = 4/5 Dk + 12**$$

## **EXAMPLES:**

**WHAT TIME WILL HAPPENED TIDE  
DATE OF 12 RAMADHAN**

**WHAT TIME WILL HAPPENED EBB  
DATE OF 27 SYAWAL**

**WHAT TIME WILL HAPPENED TIDE  
DATE OF 5 RAJAB**

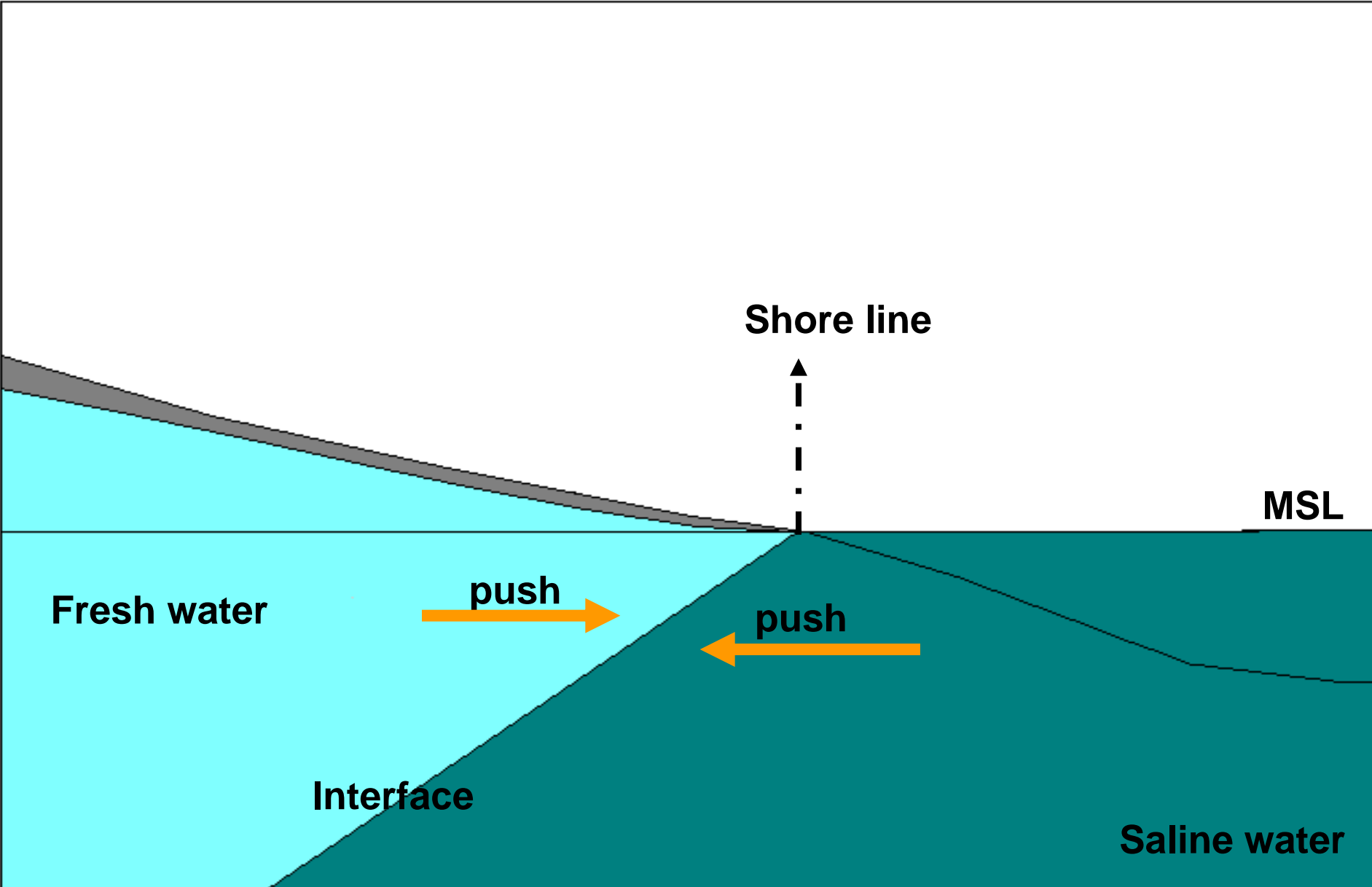
# **ZONE OF COAST AREA**

**METEOROLOGIST:  
SET BREEZE**

**GEOLOGIST:  
AREA OF HEIGHT UNDER 6 METRE**

**OCEANOGRAPHER:  
INFLUENCE TSUNAMI**

**SOCIAL SCIENTIST:  
FISHERMAN JOB**



**Shore line**

**MSL**

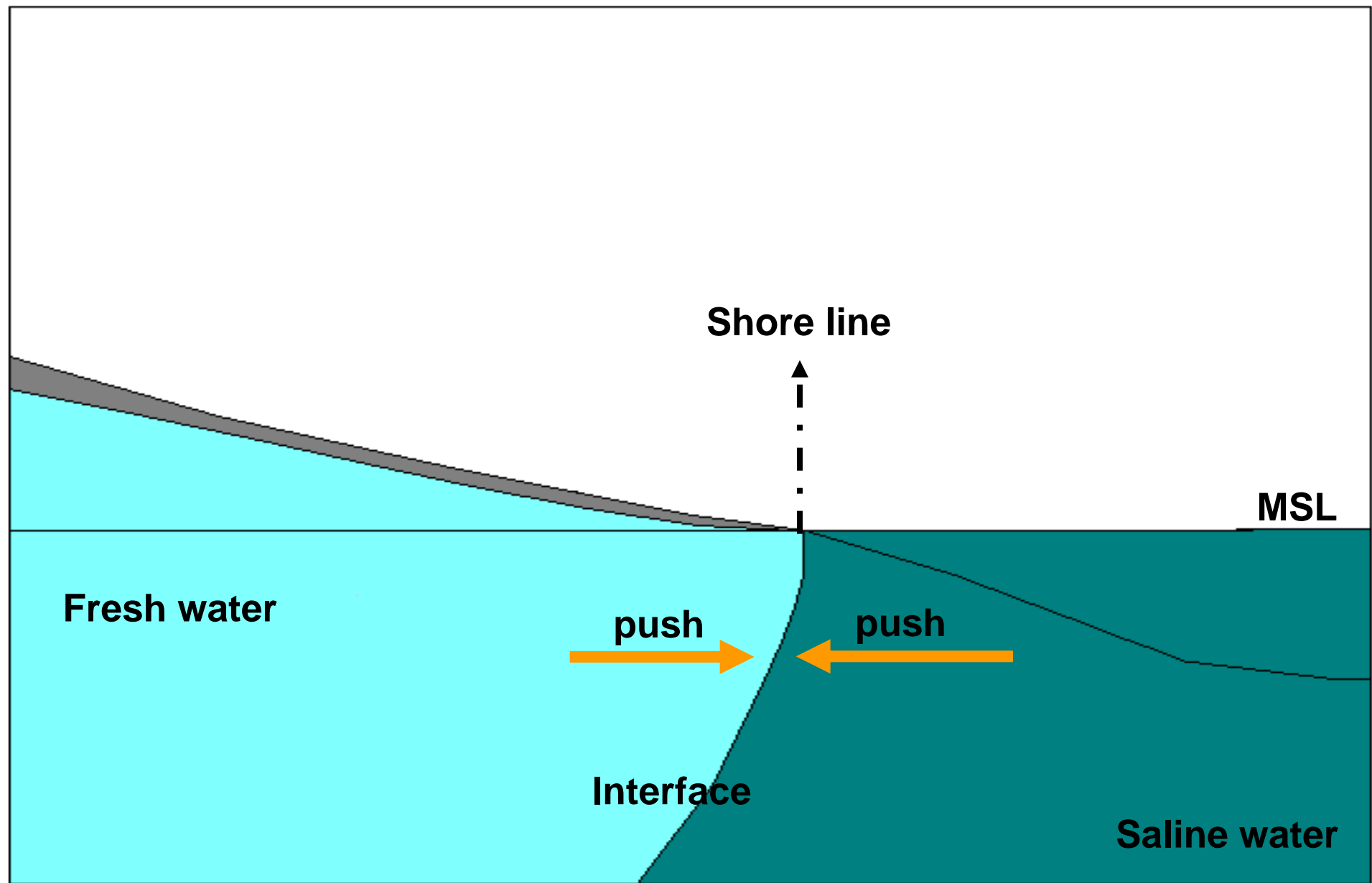
**Fresh water**

**push**

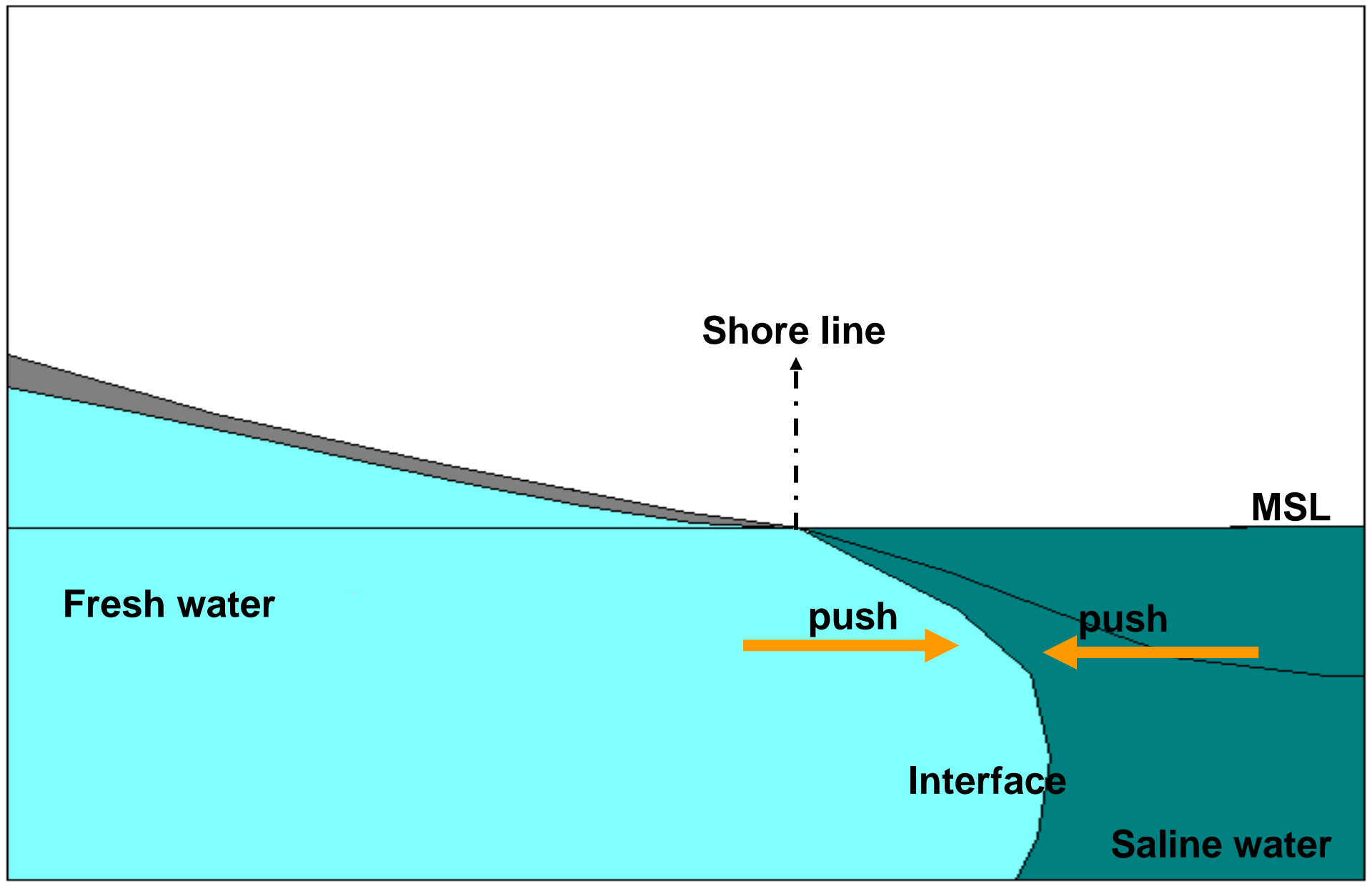
**push**

**Interface**

**Saline water**







**Shore line**

**MSL**

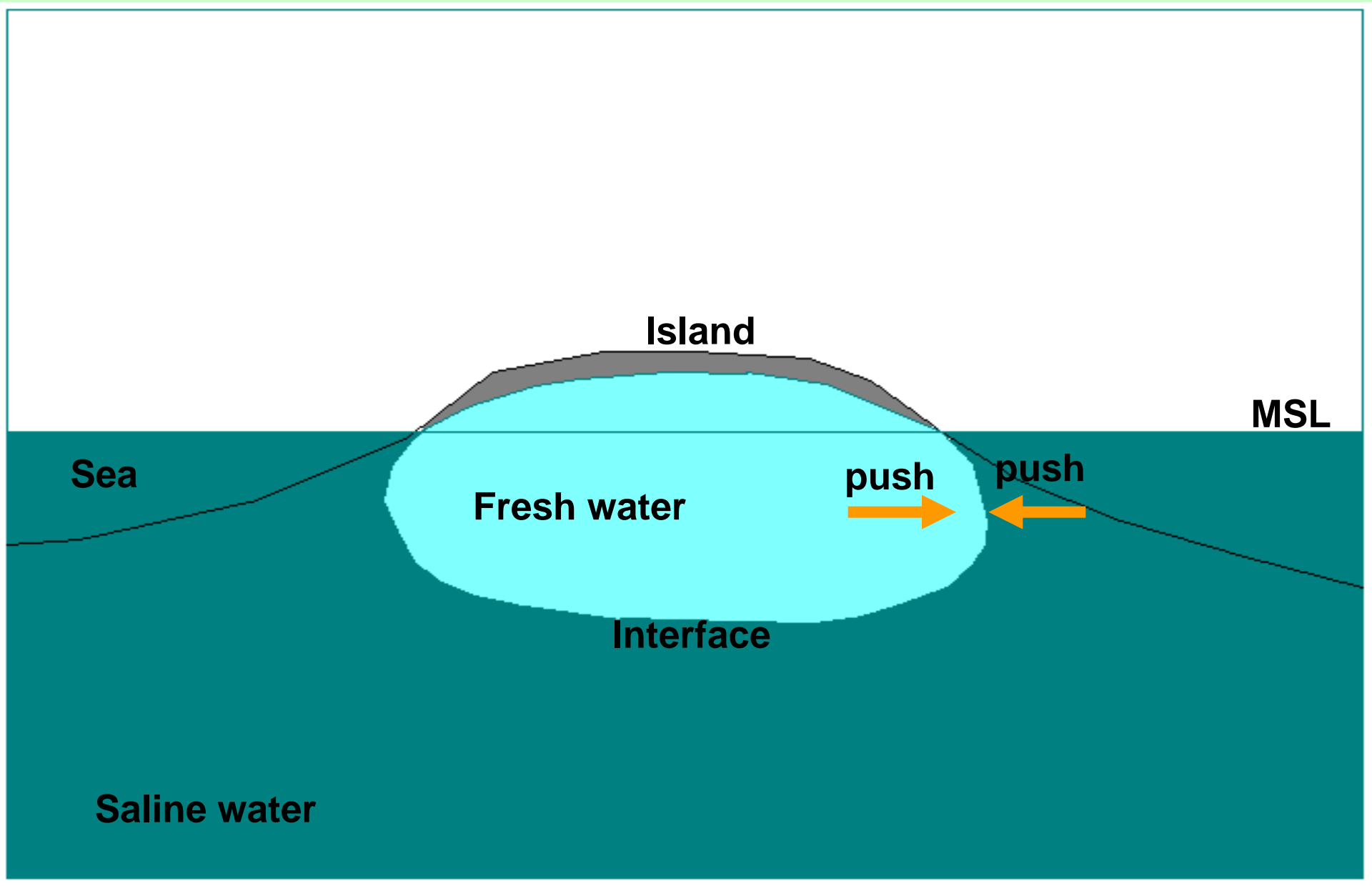
**Fresh water**

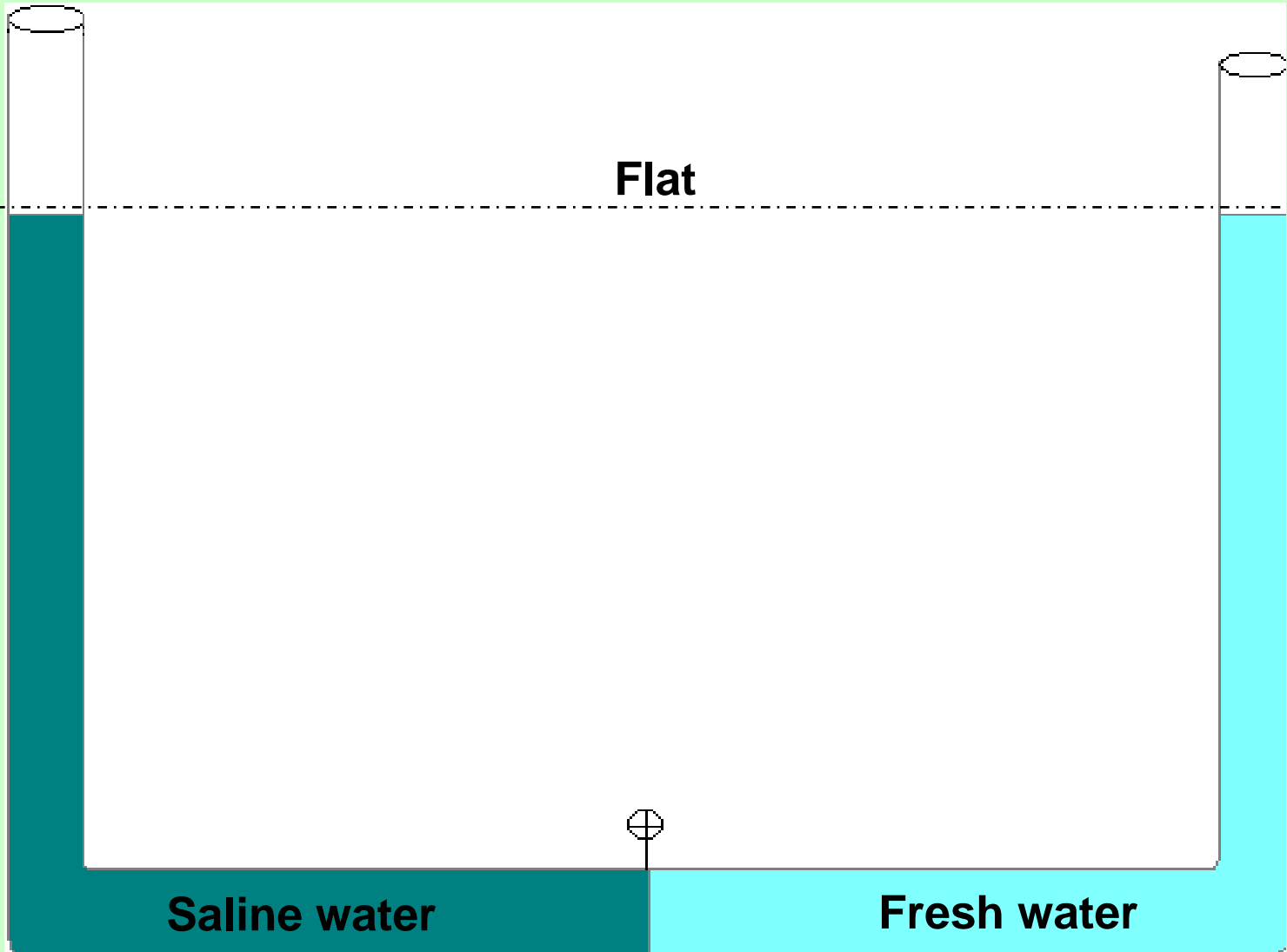
**push**

**push**

**Interface**

**Saline water**

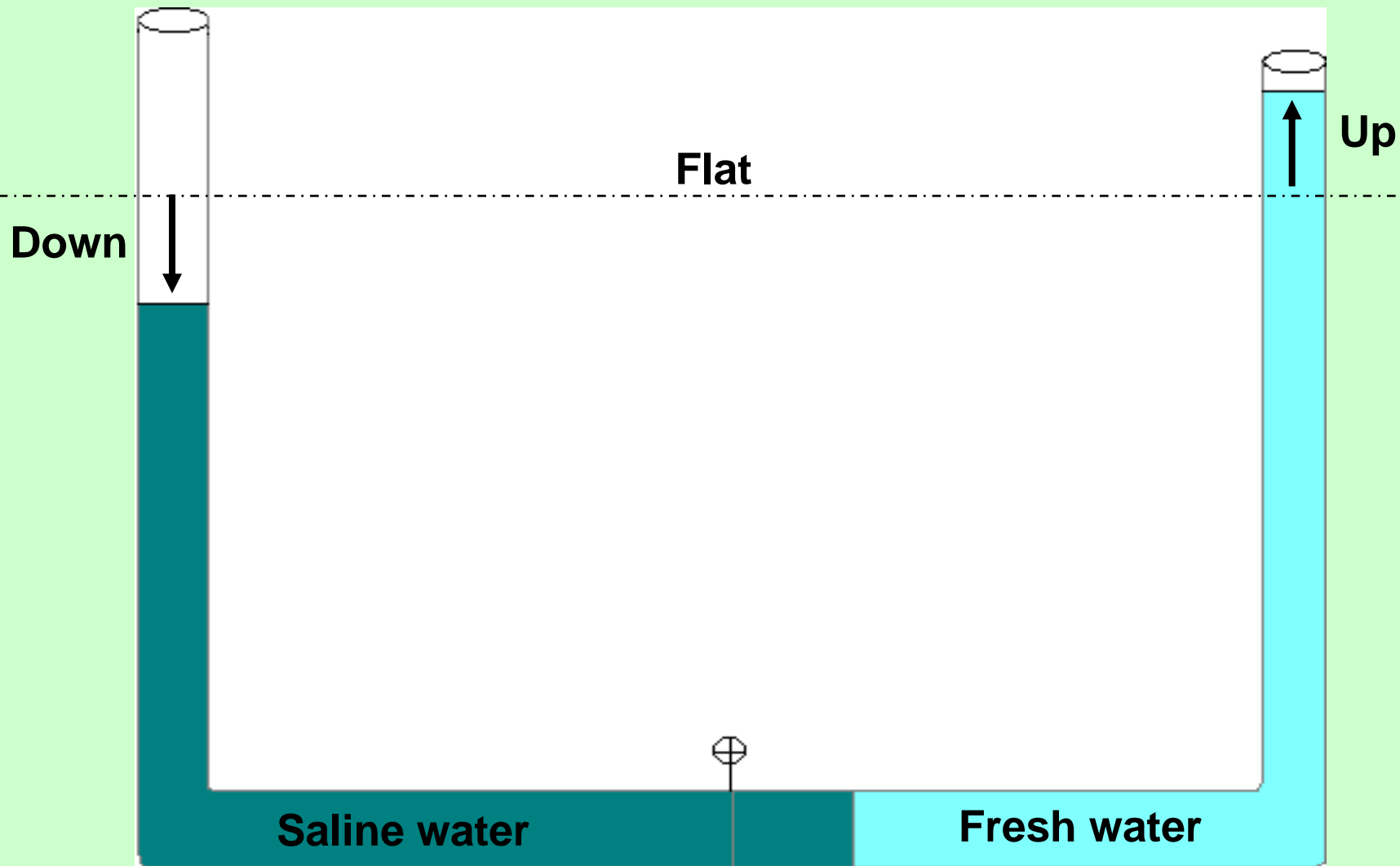


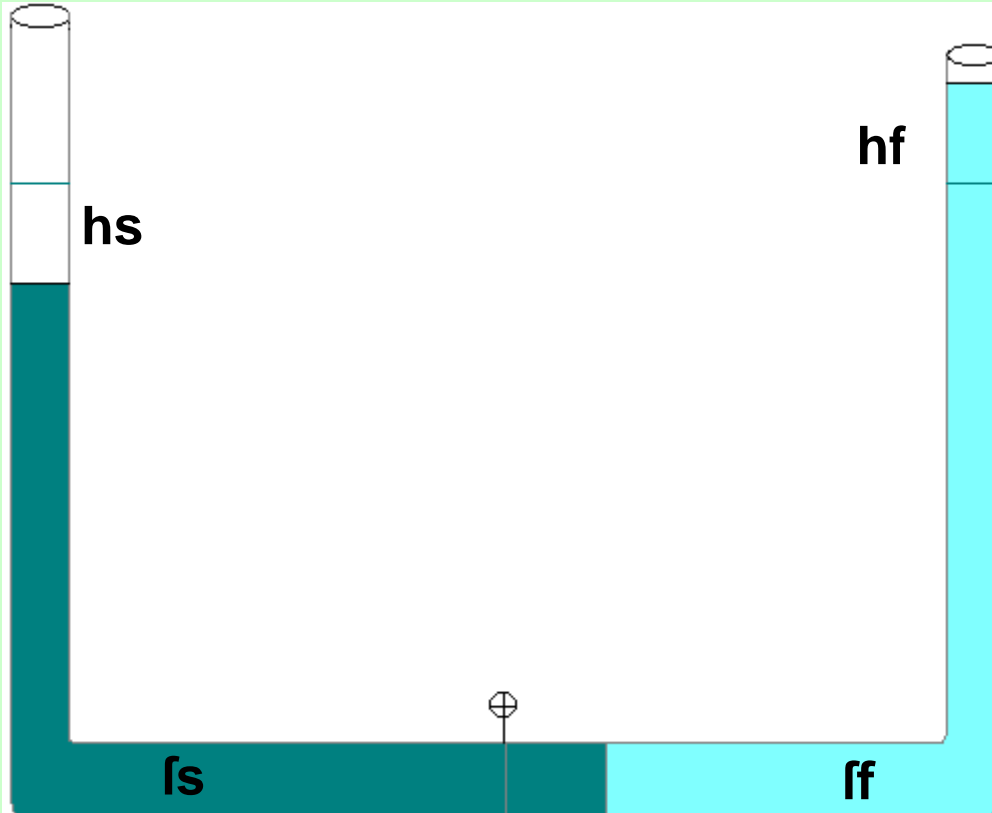


**Flat**

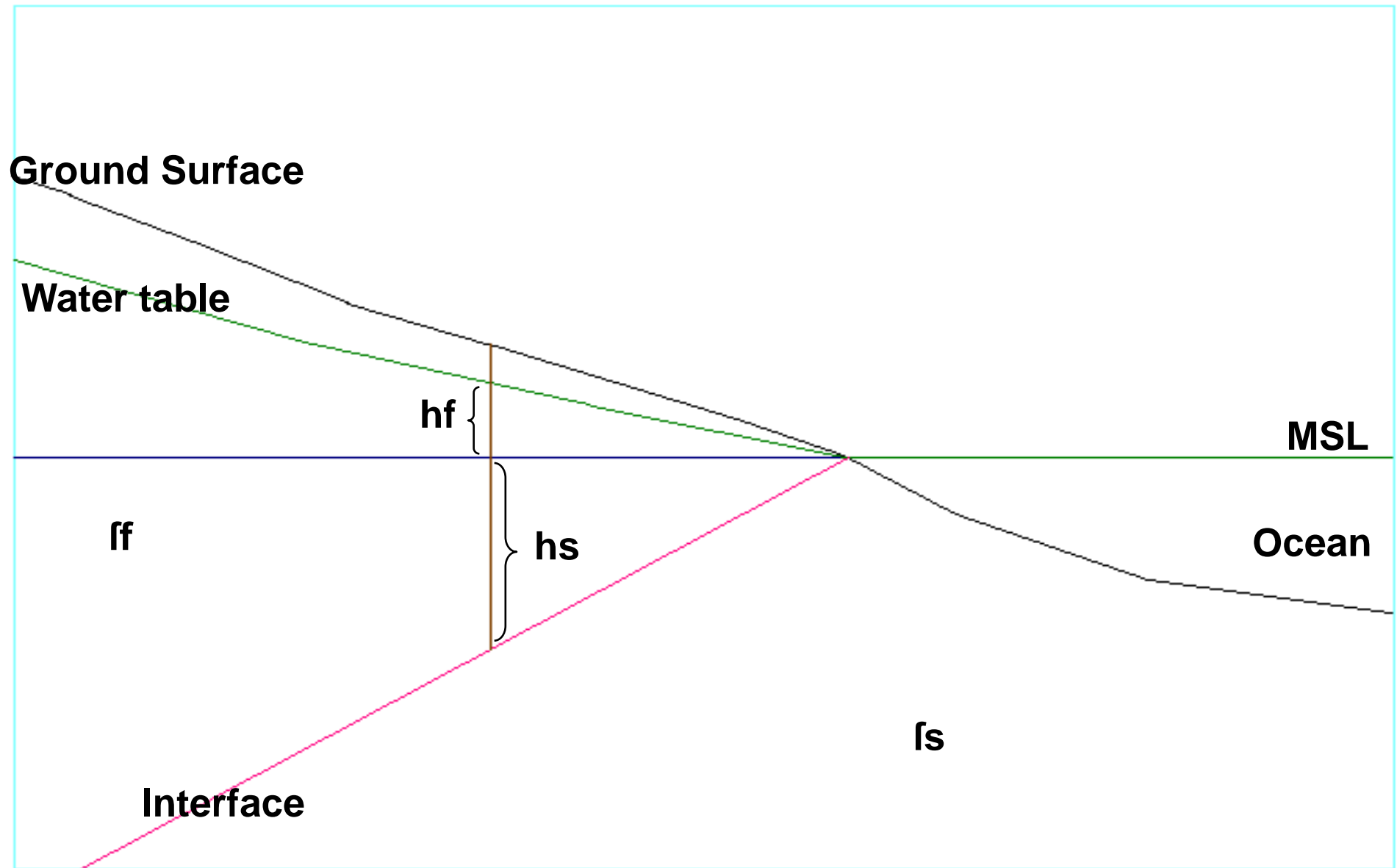
**Saline water**

**Fresh water**





$$h_s = \frac{f_f}{f_s - f_f} h_f$$



## **EXAMPLE:**

**Well A is on height 10 metre on MSL**

**Water Table depth 6 meter**

**Density fresh water 1,000**

**Density saline water 1,025**

**Question: How many depth interface ?**

**how many well depth to be salin water.**

## **CONTOH:**

**Sumur B terletak pada ketinggian 7 meter dpl**

**Kedalaman Water Table 4 meter**

**Density fresh water 1,000**

**Density saline water 1,040**

**Ditanyakan: Berapa kedalaman interface-nya?**

**Berapa kedalaman sumur agar tidak asin ?**



**Ground Surface**

**Water table**

100 m

100 m

**A**

**B**

$h_f$

**MSL**

$f_f$

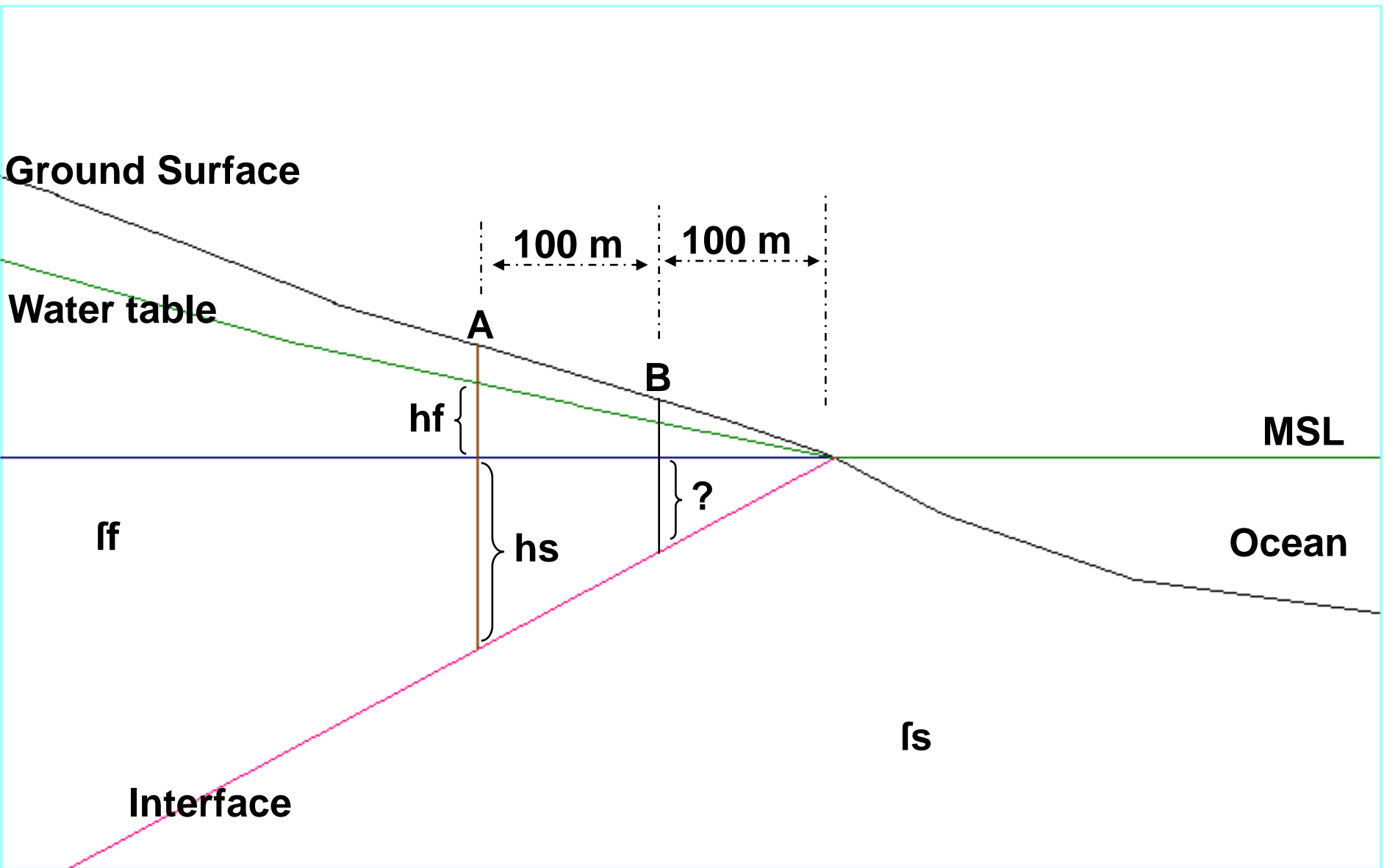
$h_s$

?

**Ocean**

$f_s$

**Interface**



## **CONTOH:**

**Sumur A terletak pada ketinggian 10 meter dpl**

**Kedalaman Water Table 6 meter**

**Density fresh water 1,000**

**Density saline water 1,025**

**Ditanyakan: Berapa kedalaman interface di  
sumur B ?**

**Berapa kedalaman sumur B agar tidak asin ?**

## **CONTOH:**

**Sumur B terletak pada ketinggian 7 meter dpl**

**Kedalaman Water Table 4 meter**

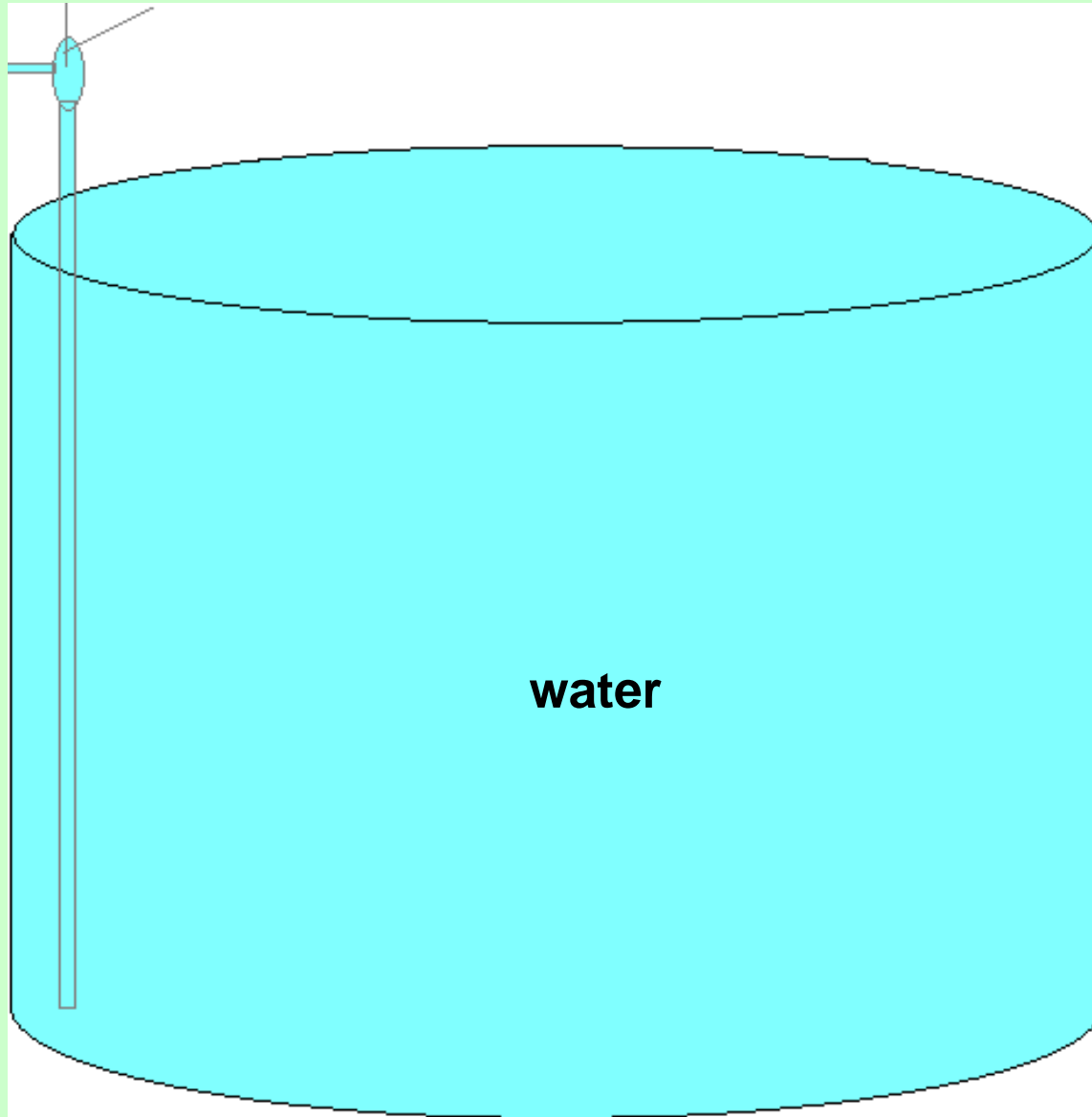
**Density fresh water 1,000**

**Density saline water 1,025**

**Ditanyakan: Berapa kedalaman interface di  
sumur A?**

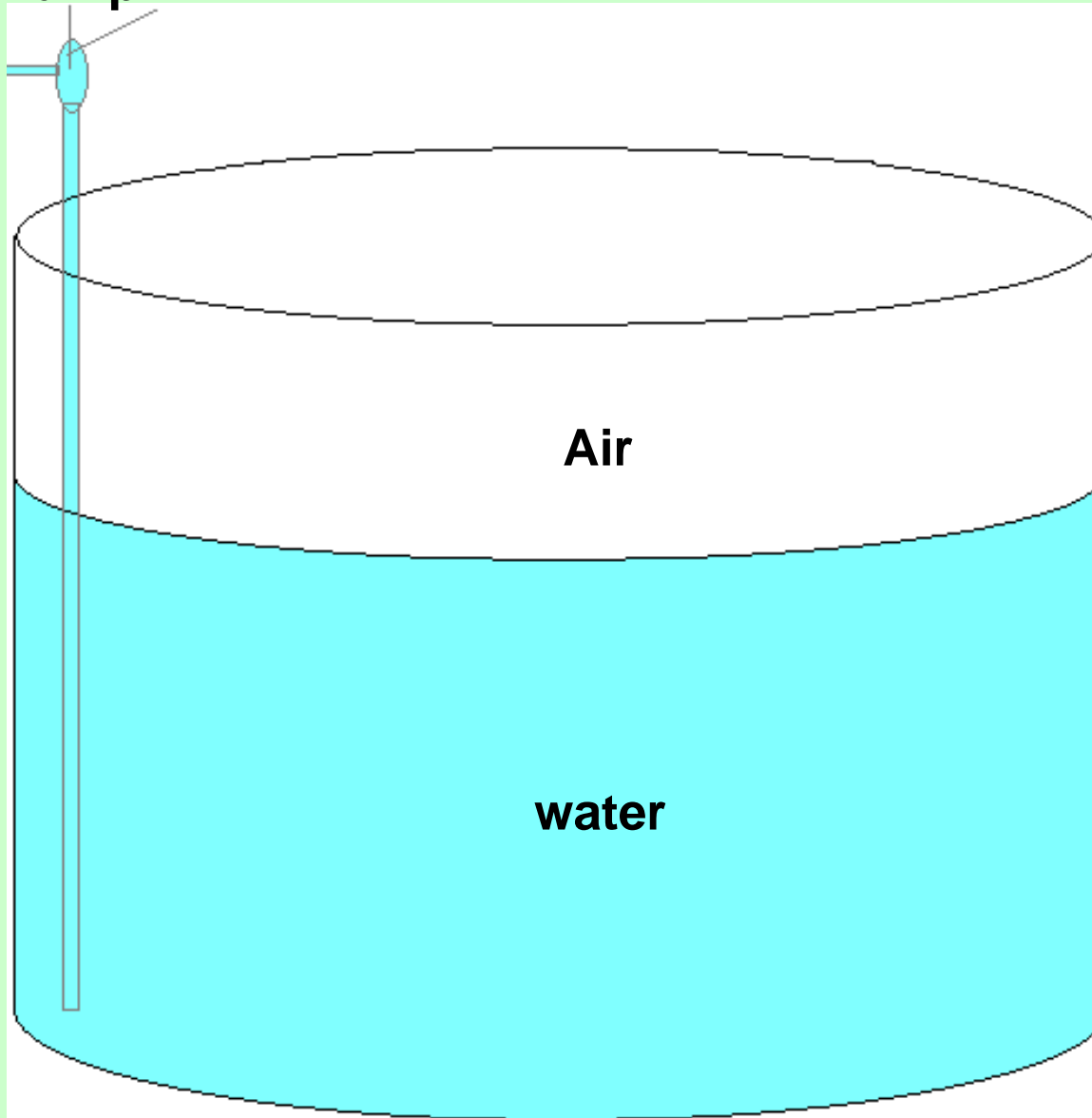
**Berapa kedalaman sumur A agar tidak asin ?**

**Pump**



**water**

**Pump**



**Air**

**water**

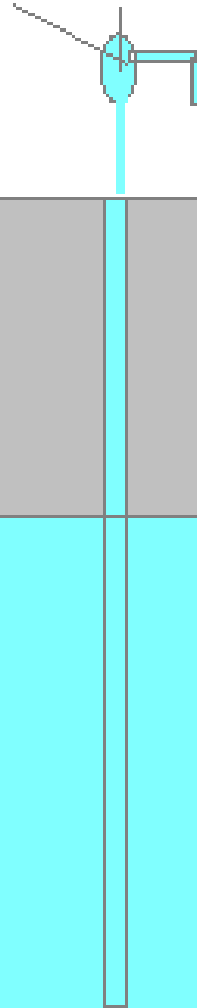
**Pump**

**Ground surface**

**Rocks**

**Water Table**

**Fresh Water**



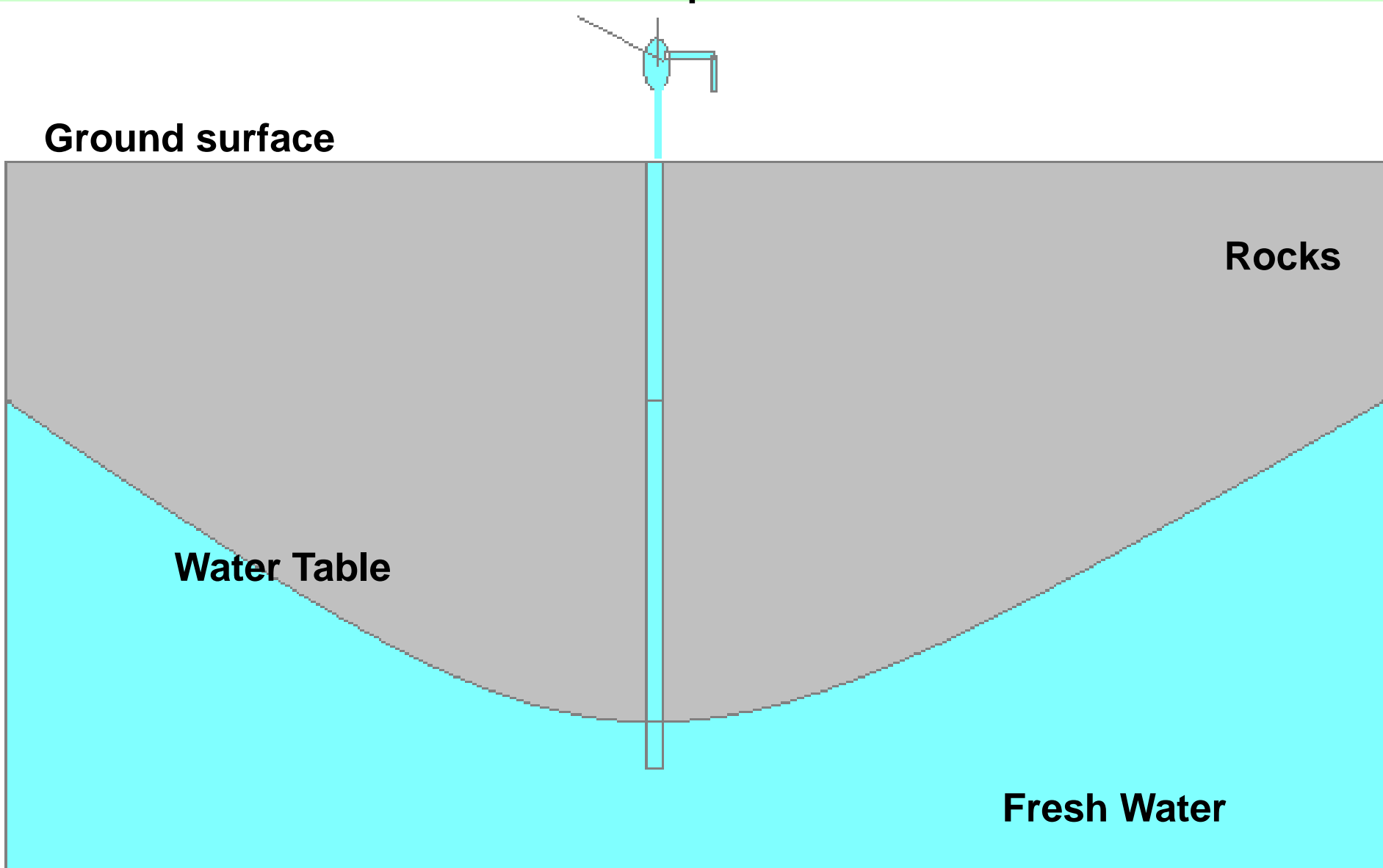
**Pump**

**Ground surface**

**Rocks**

**Water Table**

**Fresh Water**



**Pump**

**Ground surface**

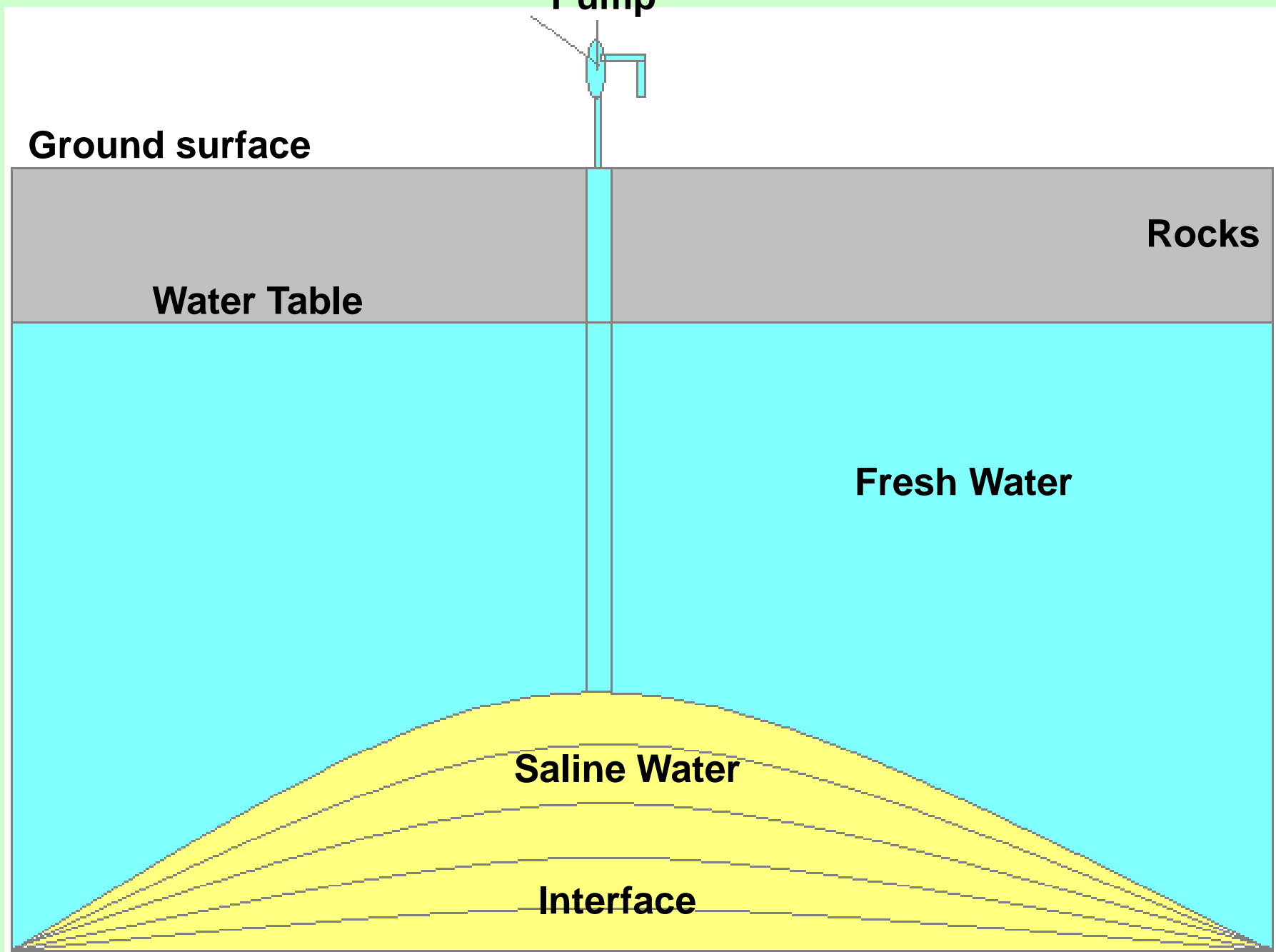
**Rocks**

**Water Table**

**Fresh Water**

**Saline Water**

**Interface**





**Pump**

**Ground surface**

**Rocks**

**Water Table**

$ff$

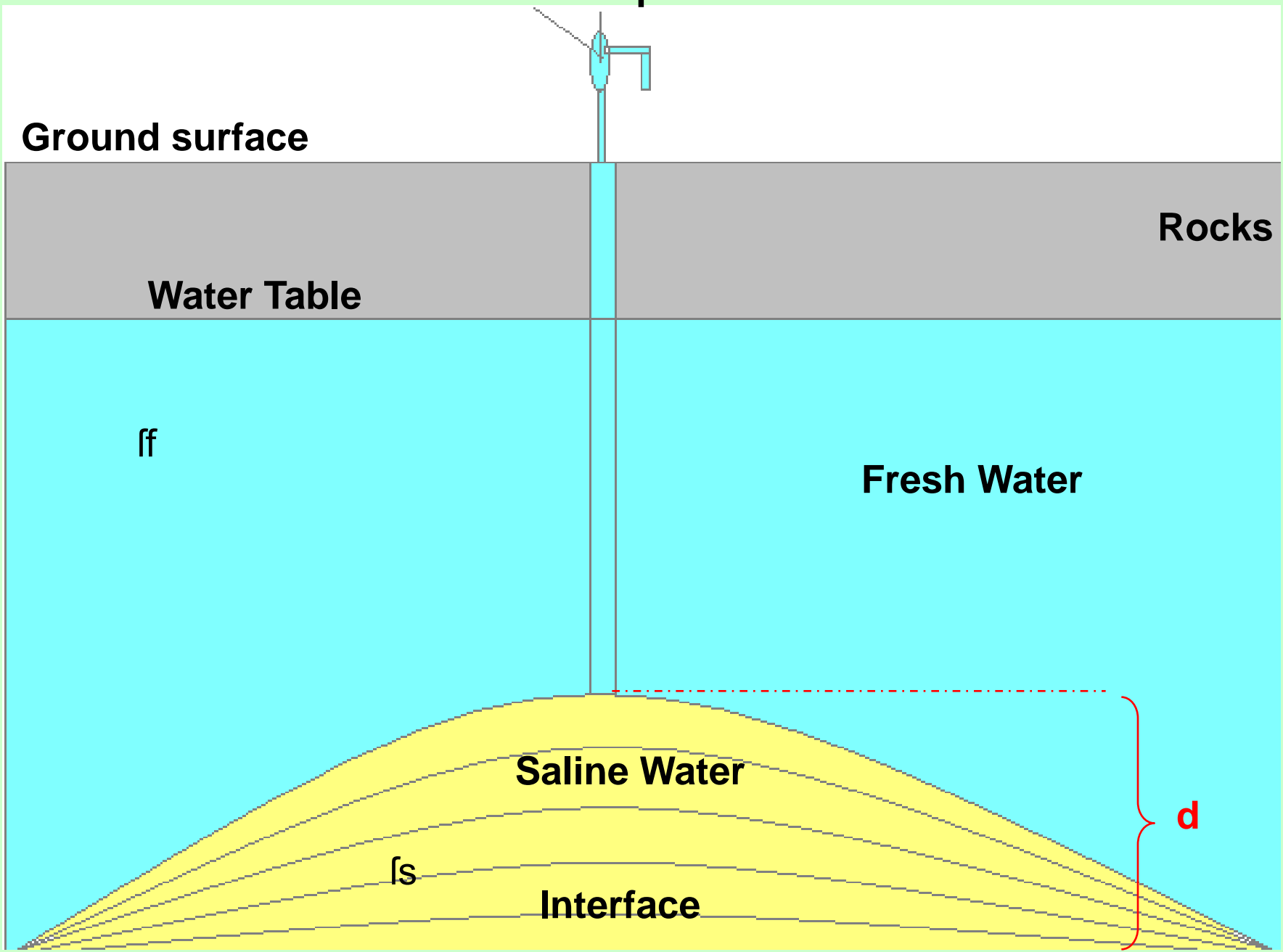
**Fresh Water**

**Saline Water**

$fs$

**Interface**

**d**



# MENGHITUNG KENAIKAN INTERFACE

$$Z = \frac{Q}{2.22/7 \cdot d \cdot K (\Delta r / ff)}$$

## KETERANGAN:

**Z** = Kenaikan Interface

**Q** = Debit pompa

**d** = Jarak antara dasar pompa dengan interface

**K** = Permeabilitas batuan

**$\Delta r$**  =  $r_s - r_f$

# MENGHITUNG DEBIT MAKSIMUM

$$Q_{\max} \leq 22/7 \cdot d^2 \cdot K (\Delta f / ff)$$

## KETERANGAN:

**Q<sub>max</sub>** = Debit maksimum

**d** = Jarak antara dasar pompa dengan interface

**K** = Permeabilitas batuan

**Δ f** = f<sub>s</sub> - f<sub>f</sub>

## DAERAH PANGANDARAN

1. Ketinggian tempat = 10 meter
2. Sumur gali (WT) 6 meter
3. Density F W 1,000
4. Density SW 1,025
5. Dasar sumur kedalamannya 80 meter
6. Permeabilitas batuan 10 meter per hari
7. Debit pompa 4000 m kubik per hari

Berapa kenaikan interface akibat pemompaan tersebut

Berapa debit maksimum yang boleh dieksploitasi ?

Berapa kamar yang boleh dibangun apabila tiap kamar bisa diisi oleh 2 orang dengan kebutuhan air rata-rata 150 liter/hari/orang