HARDNESS OF WATER

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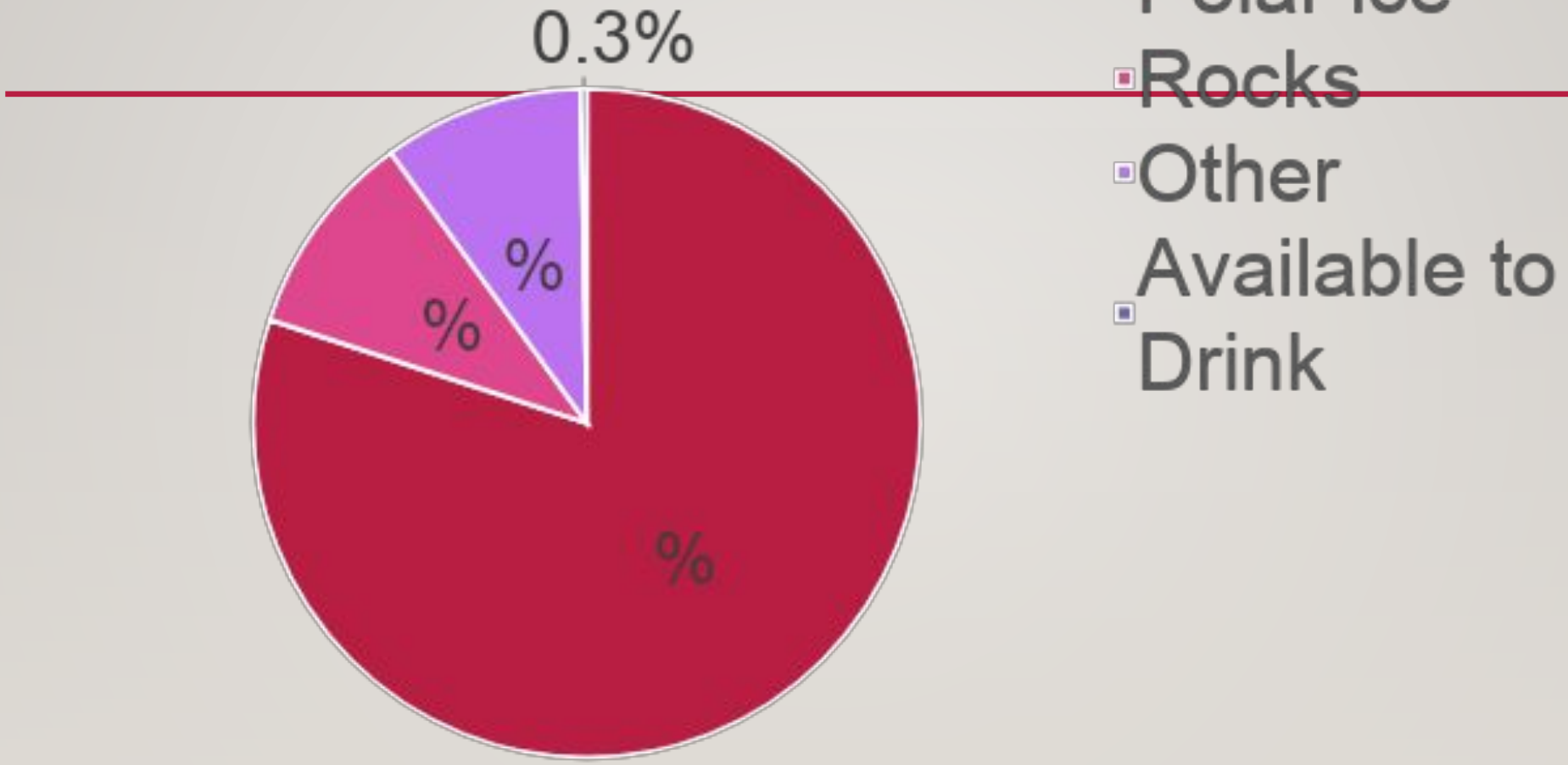
WATER

Distribution Of 3% Water Other Than Saline



TEMPORARY OR CARBONATE OR ALKALINE HARDNESS

Effect of heat

$$Ca(HCO_3)_2 \square CaCO_3\downarrow + H_2O + CO_2$$

$$Mg(HCO_3)_2 \square Mg(OH)_2\downarrow + CO_2$$

Action of Soap on Hard water

$$2C_{17}H_{35}COONa + CaCl_2 \square (C_{17}H_{35}COO)_2Ca\downarrow + 2NaCl$$

$$2C_{17}H_{35}COONa + MgSO_4 \square (C_{17}H_{35}COO)_2Mg\downarrow + Na_2SO_4$$

PERMANENT OR NON CARBONATE OR NON ALKALLINE HARDNESS

$CaSO_4$, $MgCl_2$, $MgSO_4$, $Mg(NO_3)_2$ $CaCl_2$
NO Effect of Heat(Boiling)

UNITS OF HARDNESS

Parts per million

1 ppm=1part of CaCO3equivalent hardness in 10^6 parts of water

Milligarms per litre(mg/l)

1mg/litre=1mg of CaCO3 in 10^6 mg of water

1ppm

DIFFERENCES BETWEEN TEMPORARY HARDNESS AND PERMANENT HARDNESS.

Temporary Hardness	Permanent Hardness
It is due to bicarbonates of Ca++, Mg++,Fe+++ etc	It is due to Chlorides Sulphates Nitrates of Ca++,Mg++,Fe+++ etc.
It is known as carbonate or alkaline hardness	It is known as non carbonate or non alkaline hardness
Temporary hardness leads to formation of loose deposits of carbonate and hydroxide of Ca++and Mg++ respectively When used in boilers.	Permanent hardness leads to formation of adherent scales.
Temporary hardness can be removed by simple technique such as boiling and filtering	Permanent hardness requires chemical treatment

HARDNESS

$$\frac{\text{MASS OF HARDNESS CAUSING SUBSTANCE X CHEMICAL EQUIVALENT OF } CaCO_3(50)}{\text{CHEMICAL EQUIVALENT OF HARDNESS CAUSING SUBSTANCE}}$$

LINK TO YOUTUBE VIDEO

- http://youtu.be/g0Yj5-zdIc0?hd=1

- https://h5p.org/node/965834
- https://h5p.org/node/975025?feed_me=nps
- https://sites.google.com/view/mayabhat/home?authuser=1