

General outline of the procedure for designing Wellhead Protection Areas (WHPA) for groundwater supply systems

PROPOSAL FOR WELLHEAD PROTECTION AREAS (WHPA)

Objective of the WHPA

Groundwater well for water supply

Description of the water supply system

Population Characteristics

Stage I: Classification according to the served population/ hydraulic behavior of the aquifer.

Classification according to the population served by the Water Supply System

CLASS 1

> 50,000 inhabitants or
 $Q > 10,000 \text{ m}^3/\text{day}$

CLASS 2

$\leq 50,000$ inhabitants and
 $Q \leq 10,000 \text{ m}^3/\text{day}$

CLASS 3

1,000 a 10,000 inh.

CLASS 4

< 1,000 inhabitants

RECLASSIFICATION

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Classification according to the hydraulic behavior of the aquifer

Porous or assimilable to porous Aquifer

Methods based on Travel Time/Distance
Zoning according to isochrones/distance
and hydrogeological criteria

Karst Aquifer

Fractured Aquifer

MMethods based on Vulnerability/Risk Analysis
Zoning according to vulnerability and hydrogeological criteria

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Conceptual model of the aquifer

Stage II: Selection of the perimeter sizing method

Porous or assimilable to porous Aquifer

CLASS 1

Distributed parameter models
Aggregated parameter models

CLASS 2

Wyssling
Jacobs y Bear

CLASS 3/4

Wyssling
Jacobs y Bear
Distance method

Karst or fractured aquifers

CLASS 1

CLASS 2

CLASS 3/4

Karst

COP

EPIK

Fractured

DISCO

Stage III: Zoning

Porous or assimilable to porous Aquifer

Obtaining hydrogeological parameters

CREATION OF AN ISOCHRONE MAP

Karst or fractured aquifers

Obtaining vulnerability parameters

CREATION OF A VULNERABILITY MAP

Theoretical zoning

Adjusts to the hydrogeological model

Practical zoning

Stage IV: Proposal of restrictions

Stage V: Proposed Perimeter. Final report.