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|--|---|----------------------|--|------------|---------------|--|---------------|--|-------------------|
| | Type of information | | | | | | | | |
| | missing info | | | | | | | | |
| | Criterion not used; please specify reason in comment | | | | | | | | |
| | Criterion used, Measured | M | | | | | | | |
| | Criterion used, Estimated | E | | | | | | | |
| | Criterion used, Field inspection | FI | | | | | | | |
| | Criterion used, Expert judgement | EX | | | | | | | |
| | Alternative criterion used, please specify in comment | | | | | | | | |
| REFCOND-Guidance "Suggested template" | France | Spain | Cyprus | | Greece | | Italy | | Portugal |
| High status or reference conditions is a state in the present or in the past corresponding to very low pressure, without the effects of major industrialisation, urbanisation and intensification of agriculture, and with only very minor modification of physico-chemistry, hydromorphology and biology. | | | | | | | | | |
| Suggestion for GIG | | | | | | | | | |
| Totally unaffected sites do not exist anymore (at least due to the world wide atmospheric deposition). As "close-to-pristine" state is unlikely to be encountered, (except perhaps in some national parks), the concept of "pristine state" is not relevant in practice for the definition of reference conditions for the Mediterranean GIG. | Agree | Agree | agree | | Agree | | agree | | Agree |
| If an historic database has to be used, this should be from a time period without intensive industries, hydraulic engineering and agriculture. | not used | not used | not used | | not used | | not used | | not used |
| Selection criteria for reference sites are based on « anthropic pressures », that must be « null or very low » ; the problem is to define a very low pressure level that leads to insignificant or very low impact at the ecosystem level. « Insignificant impact » could be understood as « hardly distinguishable from natural (spatial and temporal) variability » at the level of the biological elements. A first validation of « very low impact » should be assessed at the level of abiotic parameters (physico-chemistry and hydro-morphology). | Agree | Agree | agree | | M | | agree | | Agree |
| In the first stage, biological elements are not considered as selection criteria. | OK | OK | agree | | EX | | agree | | OK |
| In the second stage, those sites whose aquatic communities exhibit statistically low biological values are carefully checked for pressures, and dubious sites are eliminated. The checking process must consider possible errors in evaluating the pressures, and in sampling methods for biological communities. | OK | OK | OK | | FI | | | | |
| If, after checking, no significant pressure or possible error is encountered, these sites are considered as representative of the type's natural variability. | OK | OK | OK | | EX | | OK | OK | OK |
| However, any samples falling outside the range of "good ecological status" should not be included in the calculation of the reference value for the biological quality element considered. | OK | OK | M | | M | | M | | OK |
| Impacts on rivers or within the catchment should not affect the original characteristics, so that the aquatic community is only altered minimally. Type-specific communities and conditions should be represented. | OK | OK | M | | M | | M | | OK |
| A river stretch that is considered for the selection of a reference site must be situated within one national type. It must have biological populations representative of the type. | OK | OK | M | | M | | M | | OK for most sites |
| Pressures likely to affect the reference site must be evaluated at the three relevant spatial scales : the catchment of the site, the reach scale (i.e. the water body), and the reference site itself. | | | | | M | measures derived from GIS (CORINE land-cover). Local measures are also available for a 1km reach at least for the buffer corridor in all cases. Always, in field inspection are carried out for a stretch of more than 500 upstream and 500 m downstream the sampling site. All the sites are characterized by natural land use, not always represented by coniferous, broadleaf forest, being, "mediterranean macchia" and sometimes heath in | | The catchment measures are usually derived from GIS (CORINE land-cover). GIS measures are also available for a 1km reach for the buffer corridor in most cases. Always, in field inspection are carried out for a stretch of 500 upstream the sampling site. All the sites are characterized by natural land use, not always represented by forest, being "mediterranean macchia" very common in the studied area. | |
| Proposed minimum length for the river reaches are: > 1 km for small rivers (stream order 1- 3), > 5 km for medium-size r. (stream order 4 - 5), > 10 km for large rivers (stream order > 6). | OK | OK | M | | alternat crit | a) Site scale between 1000 (in field) and b) a distance starting from a point of 500 m downstream of the sampling site to the headwaters by the use of GIS | M | reach scale between 500 (in field) and 1000m (GIS) | OK |
| | | Between 5 and 15 km. | reach scale between 500 (in field) and 3000m (GIS) | other crit | | | alternat crit | reach scale between 500 (in field) and 1000m (GIS) | |
| For each pressure criteria, two thresholds are defined : | OK | OK | OK | | | | OK | | OK |
| a « reference » threshold, below which a site is considered as « probably reference » ; | OK | OK | OK | | OK | | OK | | OK |
| a « rejection » threshold, corresponding to a high probability of significant impact, above which a site is eliminated | OK | OK | OK | | OK | | OK | | OK |
| Sites that have all criteria below the reference threshold are considered as reference sites; sites having most criteria below the reference threshold and only some parameters between the reference and rejection threshold are « possible reference sites ». For these sites, only a few possible pressures (i.e less than 10% of the criteria) should exceed the reference threshold level. If a site exceeds the rejection threshold on any one criterion it should be eliminated. These sites should be retained only after carefully checking the cumulative effects of the pressures using local expertise | OK | OK | OK | | | | OK | | OK |
| Impacts on rivers or within the catchment area should have only local effects to be considered in Reference State. | OK | OK | M | | M | | M | | OK |

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| Substances mentioned in Annex X and/or in annex VIII of the WFD should have concentrations at least below the limits of detection of the most advanced analytical techniques in general use | not checked - data available for only 25% of the sites | Not available data for all sites | not checked | the catchment is very natural. Synthetic pollutants are not expected in Reference sites | OK | | not checked | the catchment is very natural. Synthetic pollutants are not expected in Reference sites | Not Checked |
| Measured values of other anthropogenic, synthetic substances should be below quality objectives or near natural background concentrations, except for those from atmospheric sources. | idem | Not available data for all sites | not checked | the catchment is very natural. Synthetic pollutants are not expected in Reference sites | OK | | not checked | the catchment is very natural. Synthetic pollutants are not expected in Reference sites | Not Checked |
| The impact of atmospheric pollution on reference river stretches must not be detectable (e.g. depletion of the aquatic community due to acidification) | OK | OK | EX | | EX | | EX | | OK |
| Spec. non-synthetic pollutants | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | |
| Natural background level/load (see reference above) | | | | | | | | | |
| Suggestion for GIG | | | | | | | | | |
| Only minor impairments of the physical and chemical conditions, this means: Near-natural background values– if this can be estimated; if not, the limit of detection (quantitative) can be used tentatively. | not checked - data available for only 25% of the sites | Not available data for all sites | M | the catchment is very natural. non-Synthetic pollutants are not expected in Reference sites; % O2, NH4, NO3, BOD5, Total P were measured | M | | M | the catchment is very natural. non-Synthetic pollutants are not expected in Reference sites; % O2, NH4, NO3, BOD5, Total P were measured | Not Checked |
| No known discharge of specific non-synthetic pollutants upstream in the river. | OK | OK | EX | | FI | | EX | | OK, M -FI |
| <i>If no chemical data are available, the following criteria can be used to validate the very low level of general toxic pressures :</i> | | | | | | | | | |
| - For small streams : no known toxic pollution discharge. | OK | OK | EX | | M | | EX | | OK, M -FI |
| - For larger streams and rivers : no suspected toxic pollution discharge; if (actual or ancient) toxic pollution sources exist in the basin, ratio PEC / PNEC < 1. | no data available | Not available data for all sites | not checked | | no information | | no t checked | | Not Checked |
| In agricultural areas, sites with a known pollution risk by pesticides (according to existing risk maps) are avoided. | OK | OK | OK | Reference sites are located in very natural areas (not agricultural) | not used | | OK | Reference sites are located in very natural areas (not agricultural), with the exception of some sites in north apennines, where anyway only low impact agriculture is present (i.e. pasture) | OK, EX-FI |
| Diffuse source pollution | | | | | | | | | |
| Land-use intensification: Agriculture, forestry | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | |
| Pre-intensive agriculture or impacts compatible with pressures pre-dating any recent land-use intensification. Pressures pre-dating any recent intensification in airborne inputs that could lead to water acidification. | | | | | | | | | |
| Suggestion for GIG | | | | | | | | | |
| The share of anthropogenic land use in the catchment area (agriculture, afforestation) must be small and shows only local effects. In the case of type-specific floodplains, lateral and vertical connectivity has to be maintained. The reference sites must have a wide riparian buffer zone with type specific riparian vegetation. | | | M | GIS data and riparian measures derived from SE_RHS (CARAVAGGIO) method | M | GIS data and riparian measures derived from SE_RHS method | M | Riparian measures derived from SE_RHS method and CORINE land cover. | E |
| The land use upstream of the reference site must comply with the following criteria (<i>land use definition see lines 26-29</i>) | | | | | | | | | |
| Intensive agriculture : <20% of the catchment area as reference threshold. Rejection threshold : > 50% of intensive agriculture in the catchment. However, in flat lowlands agricultural landscapes, sites with 20% to 50% of intensive agriculture can be considered only if : | | | M | GIS data; 0% agriculture in most of the sites. In two sites around 12% (vineyards & arable land mainly) | M | GIS data; 0% agriculture in most of the sites. | M | GIS data; 0% agriculture in most of two sites. In some sites a 10% of low impacting agriculture was measured. | M |
| 1) there is no significant risk of soil erosion | OK | OK | EX | | M | | EX | | M |
| 2) the valley floors are mainly occupied by low intensity agricultural area (mainly pastures) and /or semi-natural areas, and riparian corridors are globally preserved at the reach and site scales. (See <i>Riparian vegetation criteria line 98</i>) | OK | OK | M | derived from RHS and IFF application | M | Data derived from SE_RHS method | M | derived from SE_RHS and IFF application | M |
| Between 20%and 50% of intensive agriculture, a validation with physico-chemical parameters at the site scale is strongly recommended. | OK | OK | | | OK | | OK | no catchments with those conditions | M |
| See separate table for chemical reference values. | | | | | | | | | |
| Cattle breeding: only non-intensive (outdoor) cattle breeding; < 1.25 animal (cattle) units per ha of the catchment area. | OK | not considered | E | | M | | E | | E |

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| <u>Vineyards, orchards</u> : < 1% of the catchment area, and not situated in the riparian zone. | | | | In two sites this criterion was not followed. 4.3% vineyards but considered as low agricultural impact. Riparian vegetation is always present and cultivations are far from sampling site. | M | | | | |
| Irrigated fields ≤ 10% | OK | < 15 % | M | | M | | M | 0% | E |
| | not considered | OK | M | 0% | M | | M | 0% | M |
| Forestry : < 30% tree plantations (coniferous, Eucalyptus..). | not considered | not considered | M | 0% | M | | M | 0% | not considered |
| If tree plantations > 30% in the catchment, even with no sign of acidification, the riparian corridor must be protected and composed of the type specific natural vegetation. See Riparian vegetation criteria | OK | OK | OK | | M | | OK | | not considered |
| Acidification : no sign of acidification due to coniferous plantation (on siliceous bedrock). | OK | not considered | OK | | M | | OK | | OK |
| pH > 6. If pH < 6 , it is necessary to determine if the site is naturally acid. | OK | not considered | M | | M | | M | | OK |
| Eutrophication : no sign of plant proliferation (macrophytes, algae). | OK | | M | | FI | | M | | FI |
| Eutrophication : if possible validate with chemical values | OK | OK | M | | M | | M | | FI |
| See separate table for chemical reference values. | | | | | | | | | |
| Riparian zone vegetation | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | |
| Having adjacent natural vegetation appropriate to the type and geographical location of the river. | | | | | | | | | |
| Suggestion for GIG | | | | | | | | | |
| definition of the riparian zone: the minimum width of the riparian zone (or corridor) to be considered is 30m for small streams (order 1-3), 50m for medium size rivers (order 4 - 5) and 100 m for larger rivers (order ≥ 6) | | | | derived from RHS and IFF application. When riparian vegetation < 30m is due to natural conditions. | M | | alternat crit | derived from SE_RHS and IFF application. Riparian vegetation can be < 30m due to natural conditions. In the area the most occurring vegetation type is "mediterranean macchia". | |
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| At the reach scale: | | | | | | | | | |
| In agricultural landscape (Intensive agriculture between 20% and 50%), intensive agriculture land cover < 10% of the reach. Riparian corridor land use > 90% semi natural or low intensity agricultural areas. | OK | OK | | Reference sitare not situated in agricultural landscape | not used | Reference site are not situated in agricultural landscape | | Reference site are usually not situated in agricultural landscape | FI - E |
| In non agricultural landscape (Intensive agriculture < 20%): valley floor and riparian corridor occupied by semi natural or low intensity agricultural areas. | OK | OK | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | FI - E |
| Artificial areas : < 10% of the reach. | OK | OK | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | FI - E |
| | | | | | | | | | |
| At the site scale : | | | | | | | | | |
| The riparian zone of the site is entirely bordered by the type specific natural vegetation or semi-natural land cover, with the possible exception of access to the river site. <i>(land use definition see lines 26-29).</i> | OK | OK | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | FI |
| Riparian vegetation zone continuity: uninterrupted or with few interruptions (access to the site). | OK | OK. QBR index > 75 | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | FI |
| The lateral connectivity between river and riparian corridor is maintained along the site. | OK | OK. QBR index > 75 | E | | M | From SE_RHS | M | from SE_RHS | FI |
| No direct impact of cattle trampling. | not considered | not considered | M | | M | From SE_RHS | M | from SE_RHS | FI |
| Morphological alterations | | | | | | | | | |
| River morphology | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | |
| Level of direct morphological alteration, e.g. artificial instream and bank structures, river profiles, and lateral connectivity compatible with ecosystem adaptation and recovery to a level of biodiversity and ecological functioning equivalent to unmodified, natural water bodies | | | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | |
| Suggestion for GIG | | | | | | | | | |
| The type-specific hydromorphological conditions are maintained (including the elements mentioned in annex V of the WFD), leading to the conservation of all types of associated physical habitats. | OK | OK. 4th. Part of QBR index = 25 | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | OK, FI |
| The natural morphological dynamic is maintained, with no or very minor anthropogenic influence. Slightly altered morphological conditions have a high potential to return to natural flow conditions without human action in near future . | OK | OK | M | from SE_RHS (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS | OK, FI |

[illegible]

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| At the reach scale: | | Fulfilment of env. flows (20-30% of the nat. flow regime) | | | M | From SE_RHS | M | from SE_RHS data | EX | |
| Only very minor reductions in flow level changes having no more than very minor effects on the quality elements. | | | M | from SE_RHS data (CARAVAGGIO) | M | | | | | |
| No significant water abstraction in the reach. The cumulative effect of water regulation and abstraction at the basin and reach scales is < 20% of low flow discharge. | | | M | from SE_RHS data (CARAVAGGIO) | From SE_RHS | M | from SE_RHS data | EX | | |
| | | OK | | | | | | | | |
| River flow regulation | | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | | |
| Levels of regulation resulting in only very minor reductions in flow levels or lake level changes having no more than very minor effects on the quality elements. Flow regulation that has the potential to recover to natural flow in near future | | | | | | | | | | |
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| Suggestion for GIG | | | | | | | | | | |
| At the basin scale: | | | | | | | | | | |
| No dams which significantly modify the natural hydrological flow regime (flow regulation) : e.g. suppression of frequent floods (<5 years) with anomalous development of vegetation in the channel, or low flow alteration (< to + or - 20% modification of the natural monthlv minimum flow discharge). | | OK | OK | FI | | FI | | | E | |
| The total storage capacity of the reservoirs in the catchment is < 5% of the mean annual discharge at the site. | | | OK | FI | | FI | | | Not Considered | |
| No change of the natural (type specific) annual flow characteristics (seasonality of high and low flow) | | OK | not considered | FI | | | FI | Some changes observed in dry summers at two sites | OK | |
| | | | | | | | | | | |
| At the reach scale | | | | | | | | | | |
| No by-passed section with residual flow (legal minimum discharge) | | OK | OK | M | from SE_RHS data (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS data | FI |
| No significant hydropower peaking effect (ratio Q hydropeaking / Q baseflow < 2) | | OK | OK | M | from SE_RHS data (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS data | FI |
| Absence of flow regulation (dam) on the reach itself. | | OK | OK | M | from SE_RHS data (CARAVAGGIO) | M | From SE_RHS | M | from SE_RHS data | FI |
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| Biological pressures | | | | | | | | | | |
| Introductions of alien species | | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | | |
| Introductions compatible with very minor impairment of the indigenous biota by introduction of fish, crustacea, mussels or any other kind of plants and animals. | | | | | | | | | | |
| No impairment by invasive plant or animal species. | | | | | | | | | | |
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| Suggestion for GIG | | | | | | | | | | |
| NB: the issue is: to give a sound definition of 'alien species' and 'type-specific species' and to make clear if the one can shift into the other, and if so on what conditions. We consider this as an item that should be discussed and solved on a European level. | | | | | | | | | | |
| Proposed definition of alien species : non indigenous species recently introduced (i.e. during the XXth century) or in early stage of dissemination in the river reach, not known to present a risk of being invasive. | | | | | | | | | | |
| Proposed definition of invasive species : alien species in stage of active colonisation, which are quantitatively predominant in their respective community, and whose development significantly alter the composition and abundance of the type specific communities. These species, by direct or indirect effects, can induce a risk of extinction of indigenous biota, and alter the global ecosystem functioning. | | | | | | | | | | |
| At the site scale, no invasive species, but alien species which are not at the invasive stage are tolerated. | | OK | OK | OK | | EX | | EX | | Not Considered |
| | | | | | | | | | | |
| Fisheries and aquaculture | | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | | |
| Fishing operations should allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends. | | | | | | | | | | |
| Stocking of non indigenous fish should not significantly affect the structure and functioning of the ecosystem. | | | | | | | | | | |
| No impact from fish farming. | | | | | | | | | | |
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| Suggestion for GIG | | | | | | | | | | |
| No intensive (commercial) fishery. | | OK | OK | FI | | FI | | FI | | FI |
| Fisheries, fish management and / or aquaculture plants which have no significant impact on fish populations are tolerated, i. e. the type specific fish population is maintained (for alien species, see line 184) | | OK | OK | FI | | FI | | FI | | FI |
| Fishing or stocking of fish is limited, and must have no impact on the ecosystem functioning. | | | not considered | FI | | FI | | FI | | FI |
| No or very limited direct pollution by aquaculture plants. | | OK | not considered | FI | | FI | | FI | | FI |
| | | | | | | | | | | |
| Biomanipulation | | | | | | | | | | |
| REFCOND-Guidance | | | | | | | | | | |

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| No biomanipulation. | | | EX | | | | |
| Suggestion for GIG | | | | | | | |
| No biomanipulation. | OK | not considered | EX | | EX | EX | OK |
| Other pressures | | | | | | | |
| Recreation uses | | | | | | | |
| REFCOND-Guidance | | | | | | | |
| No intensive use of reference sites for recreation purposes (no intensive camping, swimming, boating, etc.) | | | FI | | | | |
| Suggestion for GIG | | | | | | | |
| No nearby intensive recreational use at the site scale: No regular bathing activities or motor boating. Occasional recreational uses (such as camping, swimming, boating, etc.) should lead to no or very minor impairment of the ecosystem. | OK | OK | FI | | FI | FI | FI |
| | | | | | | | |