

Introduction of HMWB, MEP and GEP

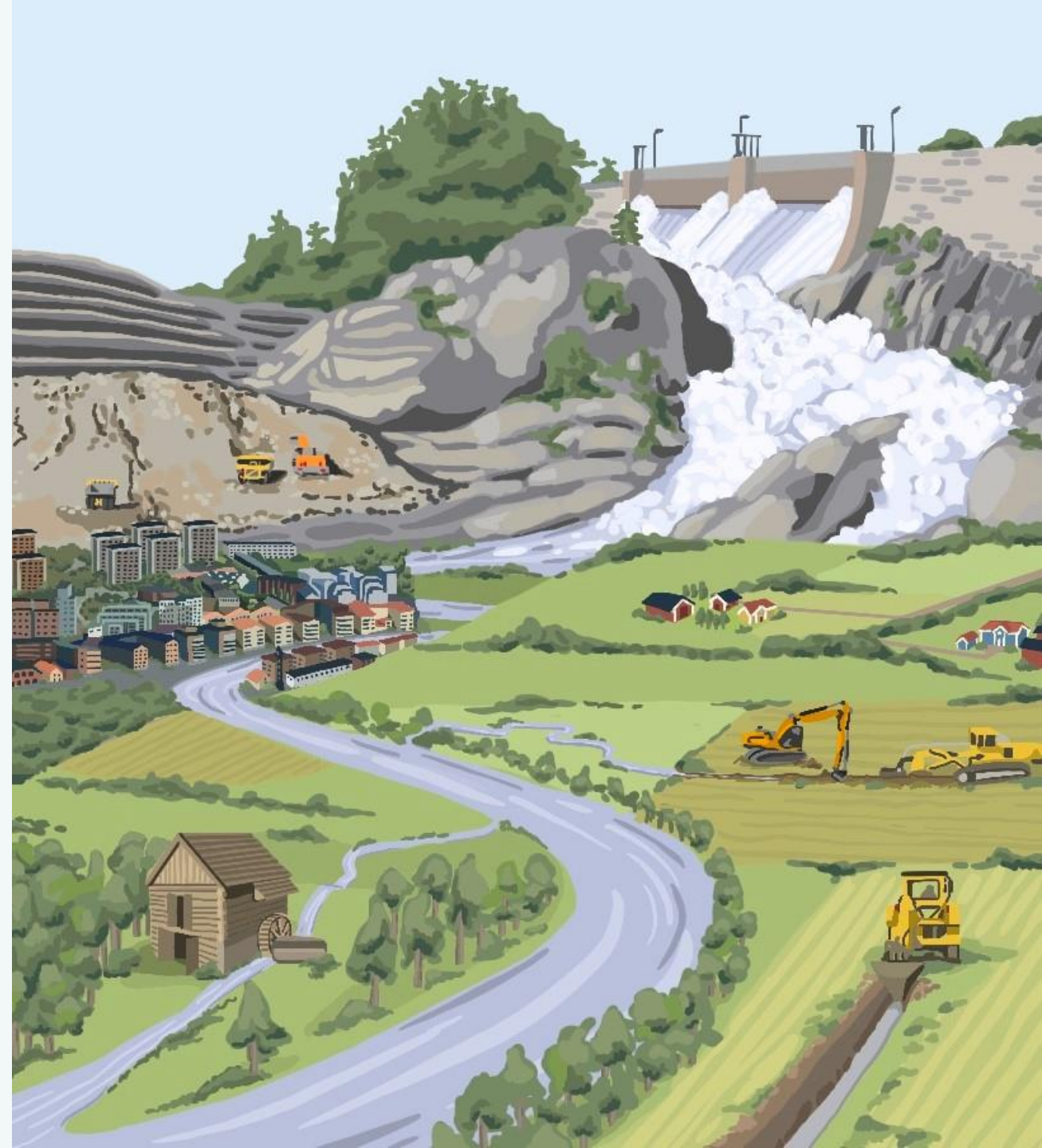
Havs
och Vatten
myndigheten



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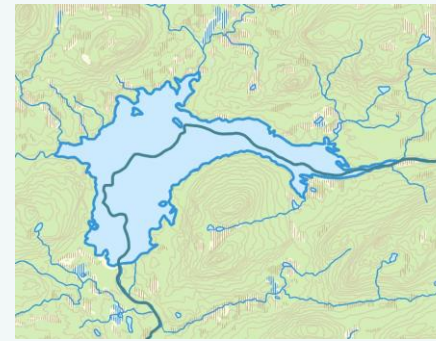
Content

- » Declare a surface water body as KMV
- » Define the ecological potential
- » Ecological continuum
- » HyMo-sensitive biology is important for defining GEP



Declare a surface water body as KMV

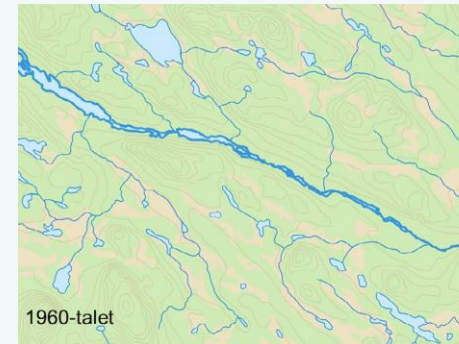
What is heavily modified water?



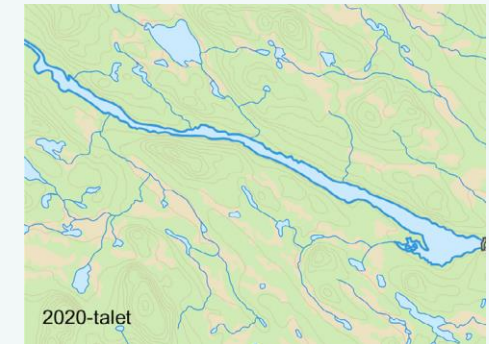
» A body of surface water that has *significantly changed physical characteristics (VÄFK)*

» Obvious VÄFK

- From river to lake
- Both morphology and hydrology are classified as unsatisfactory or poor



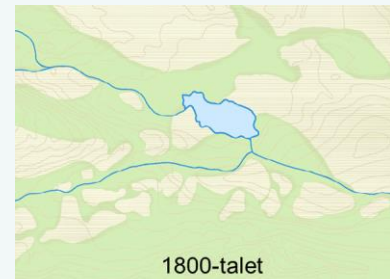
1960-talet



2020-talet

» Not obvious

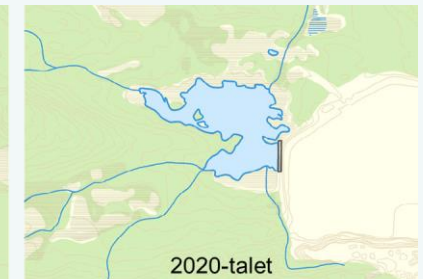
- *Endast* hydrology or morphology has been assessed
- Morphology unsatisfactory and hydrology moderate
- Morphology moderate and hydrology unsatisfactory
- Morphology moderate and hydrology moderate



1800-talet

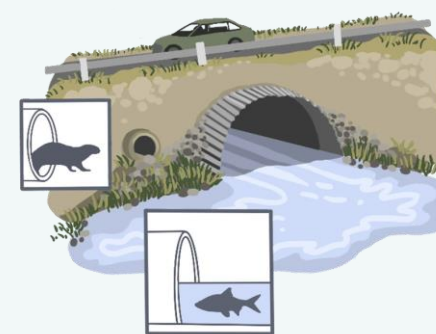


1960-talet



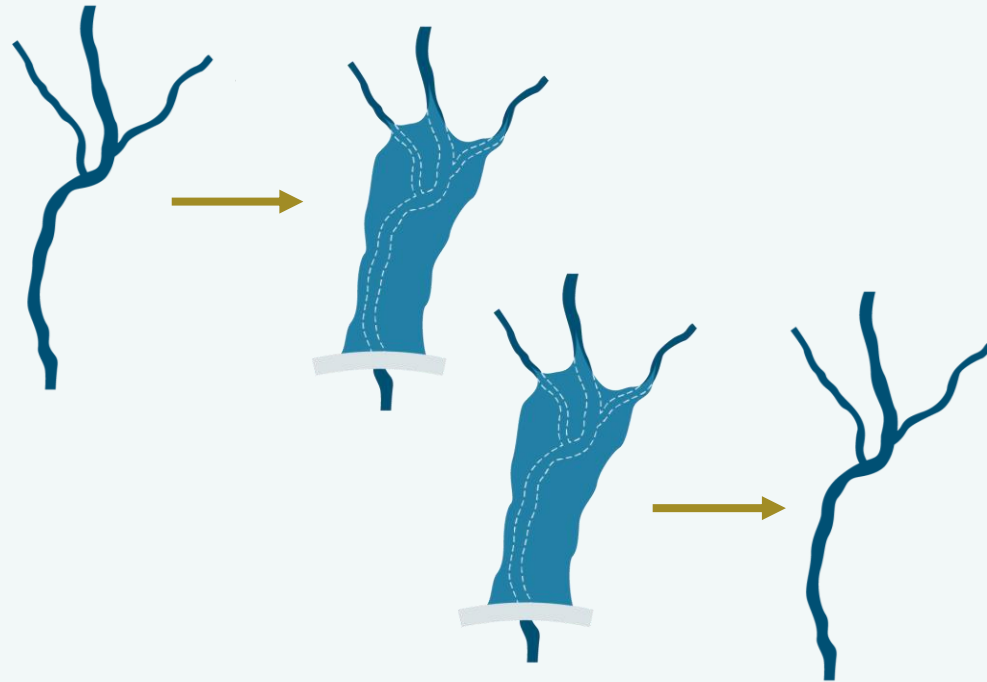
2020-talet

» Lack of connectivity ≠ VÄFK



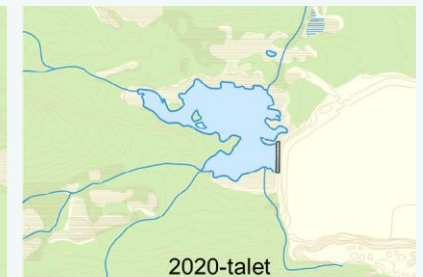
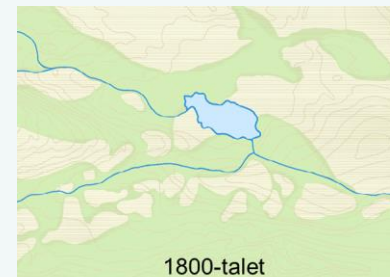
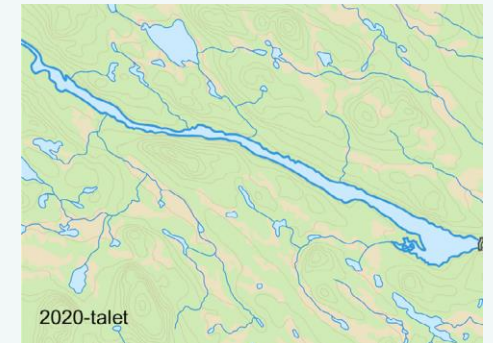
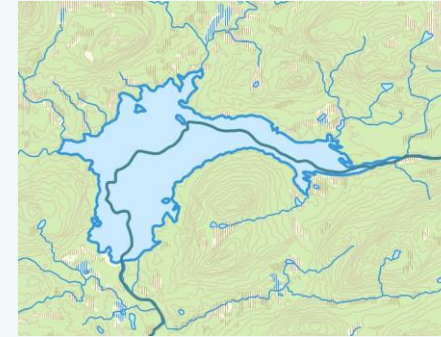
When can a body of surface water be declared KMV?

- » where a human activity has caused the surface water body to have a significant change in physical characteristics (VÄFK), i.e. major hydromorphological changes that are evident when looking at the surface water body;
- » where the improvements in hydromorphology necessary for the surface water body to achieve good ecological status (GES) have a significant negative impact on the environment as a whole or on any activity;
- » When, for technical reasons or because of high costs, it is not reasonable to achieve in any other way that is a significantly better alternative for the environment the social benefit resulting from the fact that the surface water body is heavily modified.



A KMV shall be assigned to a surface water category:

- » A river that is still a river.
- » A river that resembles a lake.
- » A lake that is still a lake.
- » A coastal water area that is still a coastal water area.



Define the ecological potential

What is ecological potential?

- » Each KMV requires a tailor-made definition of ecological potential where the ecological potential corresponds to the ecological conditions that can be achieved in each KMV. (unlike a natural surface water body where there are assessment criteria for determining ecological status).
- » This is after the need for VÄFK of the socially beneficial activity or the environment in general has been taken into account.
- » When defining ecological potential, the water authority must therefore use the quality factors for the surface water category that the surface water body currently resembles the most.
- » When the water authority defines the ecological potential of the surface water body, its maximum ecological potential, MaxEP, needs to be defined first.
- » MaxEP is the reference ratio of the heavily modified water.
- » GEP is then defined, which corresponds to an ecological state with only slight changes in relevant BQEs compared to MaxEP.
- » There is a lower limit for MaxEP and GEP regarding ecological functions and structures.

Defining ecological potential

- » The definition of ecological potential must be based on:
- » Chapter 1, Section 4 of the Water Management Ordinance, which refers to Annex V of the Water Framework Directive;
- » Chapter 2, Sections 6-8 of HVMFS 2019:25 and
- » the assessment criteria for biological, hydromorphological and physico-chemical quality elements in Annexes 1 to 5 of HVMFS 2019:25.

The table corresponds to Table 1.2.5 Definition of MEP, GEP and MEP for heavily modified or artificial water bodies in Annex V of the WFD. Annex V has been transposed into Swedish law by reference to the Water Management Ordinance both in the definition of ecological potential in Chapter 1, Section 4 of the Water Management Ordinance and in establishing quality requirements for KMV under Chapter 4, Section 4a of the Water Management Ordinance.

Factor	Biological quality	The values of the relevant biological quality elements		potential
Biological element	Hydromorphological	The hydromorphological conditions are consistent with the		How MEP.
Hydromorphological factor	Physico-chemical factors	The physico-chemical factors correspond entirely or almost entirely to the undisturbed conditions prevailing for the type of surface water body closest to the heavily modified presence concerned.		
Physico-chemical factors	General conditions	Nutrient concentrations are within the range normally associated with such undisturbed conditions.		
General conditions		The values for temperature, oxygen balance and pH correspond to those prevailing under undisturbed conditions for the type of surface water body closest to the heavily modified presence concerned.		
Specific synthetic pollutants	concentrations close to zero and at least below the detection limit using the most advanced analytical techniques in general use;	concentrations not exceeding the standards established in accordance with the procedure described in section 1.2.6, without prejudice to Directive 91/ 414/EEC and Directive 98/8/EC;	conditions under which the values for biological quality elements set out above can be achieved;	
Specific non-synthetic pollutants	Concentrations are within the range normally associated, under undisturbed conditions, with the type of surface water body closest to the art or heavily modified occurrence concerned (background levels = bgl).	Concentrations not exceeding those established in accordance with the procedure described in section 1.2.6 (1) without prejudice to Directive 91/414/EEC and Directive 98/8/EC. (< eqs)	conditions under which the values for bio logical quality elements set out above can be achieved;	

Description of the different class boundaries
(cf. Chapter 2, Section 8 of HVMFS 2019:25)

Class	Quality elements deemed not to be affected by the heavily modified nature of a body of surface water	Quality elements deemed to be affected by the heavily modified nature of a body of surface water
Maximum potential	High status	The highest ecological conditions achievable
Good potential	Good status	Light changes compared to the ecological conditions present at maximum potential
Moderate potential	Moderate status	Moderate changes compared to the ecological conditions at maximum potential
Unsatisfactory potential	Unsatisfactory status	Significant changes compared to the ecological conditions at maximum potential
Poor potential	Poor status	Serious changes compared to the ecological conditions present at maximum potential

Chapter 1, Section 4 of the Water Management Ordinance
and

Chapter 2, Sections 6-8 of HVMFS 2019:25

1 kap. 4 § vattenförvaltningsförordningen

Vid tillämpning av denna förordning för kvaliteten på ytvatten avses med

...

ekologisk potential: tillståndet hos en kraftigt modifierad eller konstgjord ytvattenförekomst, klassificerad i enlighet med bilaga V i direktiv 2000/60/EG och uttryckt såsom "maximal", "god", "måttlig", "otillfredsställande" eller "dålig". Förordning (2009:1108).

2 kap. 6 § HVMFS 2019:25

Vattenmyndigheten ska vid klassificering av ekologisk potential för en konstgjord eller kraftigt modifierad ytvattenförekomst

- använda de kvalitetsfaktorer som ska tillämpas för den ytvattenkategori som ytvattenförekomsten tilldelats i enlighet med 8 g § Havs- och vattenmyndighetens föreskrifter och allmänna råd (HVMFS 2017:20) om kartläggning och analys av ytvatten enligt vattenförvaltningsförordningen (2004:660), och
- för varje ytvattenförekomst beskriva och definiera maximal, god, måttlig, otillfredsställande och dålig ekologisk potential i enlighet med 1 kap. 4 § vattenförvaltningsförordningen (2004:660) och 7 och 8 §§ i detta kapitel. Resultatet ska dokumenteras enligt 12 § i detta kapitel.

2 kap. 7 § HVMFS 2019:25

Vattenmyndigheten ska för varje ytvattenförekomst som förklarats som konstgjord eller kraftigt modifierad utifrån biologiska kvalitetsfaktorer enligt aktuell ytvattenkategori underbygga tillhörande bedömningar med uppgifter om

- maximal ekologisk potential, det vill säga ytvattenförekomstens referensförhållande,
- vad som är god ekologisk potential för ytvattenförekomsten, och
- ytvattenförekomstens nuvarande ekologiska potential.

Resultatet ska dokumenteras enligt 12 § i detta kapitel.tel.

2 kap. 8 § HVMFS 2019:25

När vattenmyndigheten klassificerar ekologisk potential för de biologiska, hydromorfologiska och fysikalisk-kemiska kvalitetsfaktorer ska detta göras utifrån bedömningsgrunderna i bilaga 1–5 för den ytvattenkategori som den konstgjorda eller kraftigt modifierade ytvattenförekomsten bäst stämmer överens med.

När vattenmyndigheten klassificerar ekologisk potential för de kvalitetsfaktorer som inte bedöms vara påverkade av en ytvattenförekomsts konstgjorda eller kraftigt modifierade karaktär ska den klass för status som framgår i bilaga 1–5 för den bedömda kvalitetsfaktorns status ersättas med motsvarande klass för potential enligt följande

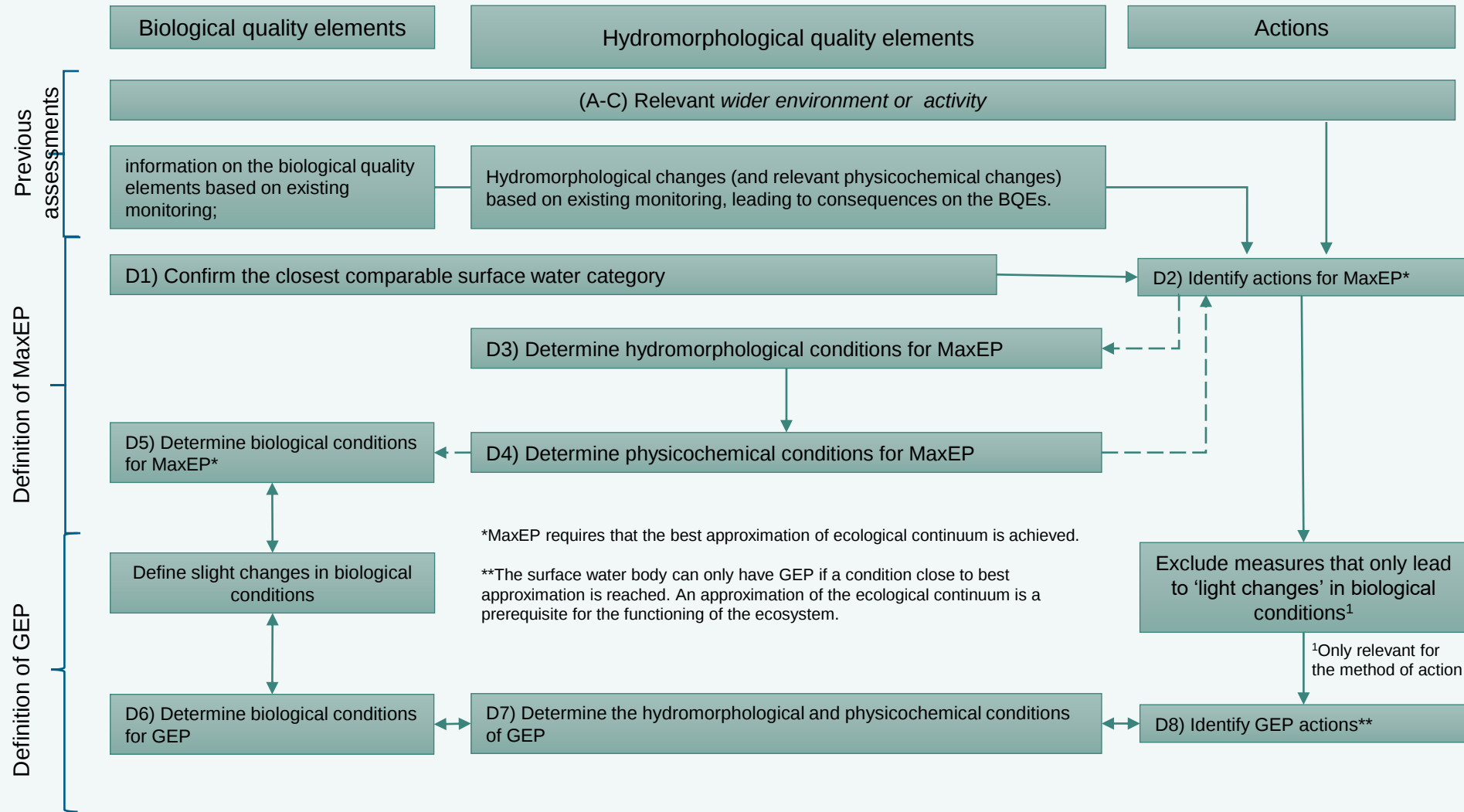
- hög status motsvarar maximal potential,
- god status motsvarar god potential,
- måttlig status motsvarar måttlig potential,
- otillfredsställande status motsvarar otillfredsställande potential, och
- dålig status motsvarar dålig potential.

När vattenmyndigheten klassificerar ekologisk potential för de kvalitetsfaktorer som bedöms vara påverkade av en ytvattenförekomsts konstgjorda eller kraftigt modifierade karaktär ska klassen som framgår i bilaga 1–5 för den bedömda kvalitetsfaktorns status ersättas med motsvarande klass för potential enligt följande

- maximal potential motsvarar de högsta ekologiska förhållanden som kan uppnås,
- god potential motsvarar lätta förändringar jämfört med de ekologiska förhållanden som föreligger vid maximal potential,
- måttlig potential motsvarar måttliga förändringar jämfört med de ekologiska förhållanden som föreligger vid maximal potential,
- otillfredsställande potential motsvarar stora förändringar jämfört med de ekologiska förhållanden som föreligger vid maximal potential, och
- dålig potential motsvarar allvarliga förändringar jämfört med de ekologiska förhållanden som föreligger vid maximal potential.

Dessa förhållanden får uppskattas genom en expertbedömning enligt 10 § i detta kapitel.

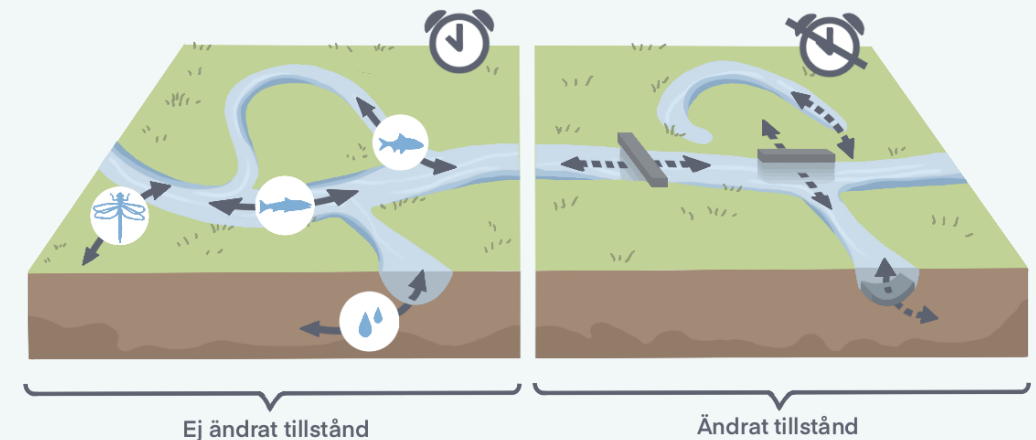
Resultatet ska dokumenteras enligt 12 § i detta kapitel.



Ecological continuum

Why are we talking about ecological continuum?

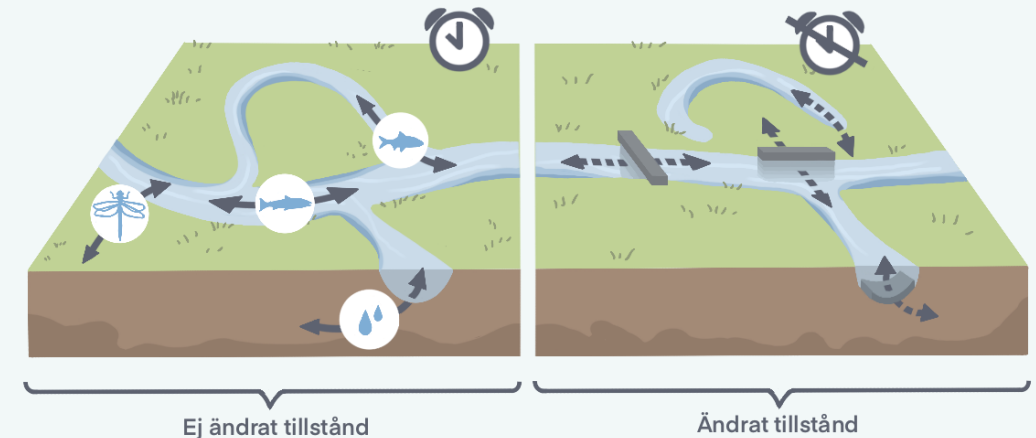
- » Include the normative definitions in English
 - Once all mitigation measures have been taken to **ensure the best approximation to ecological continuum**
 - after all mitigation measures have been taken to **ensure that conditions are practically closest to an ecologically unchanged state**



Movements in a continuum occur upstream and downstream (rivers ↔ streams), laterally (rivers ↔ floodplains) and in depth (rivers ↔ groundwaters). There is also a temporal continuum (over time).

What is ecological continuum?

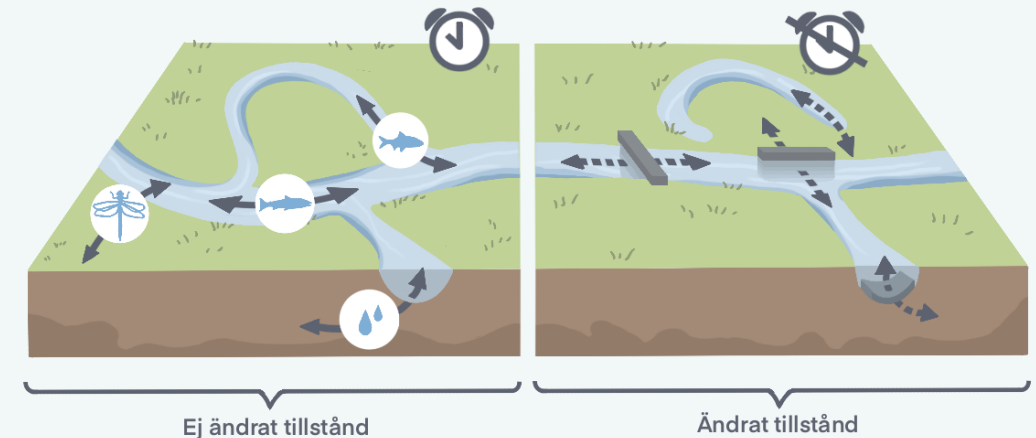
- » Movements of energy, materials and organisms in the aquatic ecosystem.
- » Ecological continuum ensures that habitats of type-specific aquatic species are interconnected in time and space so that species can complete their life cycles.
- » Fish and benthic fauna need specific habitats during different stages of their life cycle, such as spawning and nursery areas, but also areas to find food, winter or get shelter.
- » Access to all these habitats at the right time is crucial for survival and for ensuring long-term sustainability of populations.



Movements in a continuum occur upstream and downstream (rivers ↔ streams), laterally (rivers ↔ floodplains) and in depth (rivers ↔ groundwaters). There is also a temporal continuum (over time).

Best approximation of ecological continuum in relation to MaxEP

- » The definitions shall be interpreted as a requirement to ensure:
- migration of fish and other aquatic animals;
 - availability of suitable sediments for their habitats (including spawning and breeding areas); and
 - appropriate sediment transport to ensure the long-term sustainability of these habitats.



Movements in a continuum occur upstream and downstream (rivers ↔ streams), laterally (rivers ↔ floodplains) and in depth (rivers ↔ groundwaters). There is also a temporal continuum (over time).

HyMo-sensitive biology is important for defining GEP



Havs och Vatten myndigheten