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## Stressor - vs Effects-Based Monitoring

It is helpful to differentiate between two approaches in environmental monitoring: monitoring of *stressors*, and monitoring of *effects*.

In the context of an effluent discharge, stressors are typically specific chemicals that may cause undesirable effects on specific receptors (i.e., organisms that are exposed to these stressors). Stressor-based monitoring typically predict the *risk* of effects, based on comparing the observed concentration of the stressor with the concentration known or considered to produce those effects.

Advantages: because of their predictive and stressor-specific nature, stressor-based monitoring can assess potential effects that have not already occurred, and typically incorporate safety margins (in calculations and comparisons against effects thresholds) favouring precaution.

Disadvantages: stressor-based assessments may be unrealistic, as safety margins sometimes compound unrealistically – assessments can reflect the worst case of the worst case of the worst case. Also effects thresholds are typically generic rather than site-specific, and are prone to selection bias – they consider only stressors known in advance to be relevant, and may therefore miss unknown stressors.

In contrast, effects-based monitoring is observational – it accurately reflects what is actually occurring in the environment.

Advantages: effects-based monitoring examines the effects of the entire effluent, not individual constituents, and integrates other factors, unrelated to effluent, that may contribute to or diminish effects.

Disadvantages: these other factors may confound identification of the actual cause of any observed effects, and, crucially, effects may only be assessed once they already have occurred – it is a responsive, rather than a predictive, approach.

Most monitoring programs incorporate both stressor-based and effects-based endpoints.



**Lichens and Club Moss**  
Source: George Brinson  
( click to enlarge )

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