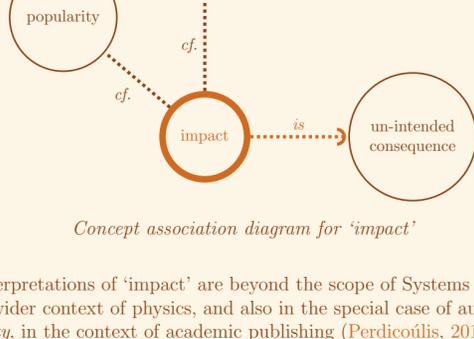


Note

Impact — from *impingere* [L], to drive something in or at: *in-* [L] into + *pangere* [L], to drive, fix — is a *strong effect* on someone or something, usually as an un-intended consequence of an intended action — akin to what is known in medicine or pharmaceuticals as a ‘side effect’.

1 Concept

In the context of Systems PlanningSM, impacts refer to the ‘side effects’ of development action (e.g. projects, plans, policies, strategies), which decrease *efficiency* (Perdicoulis, 2014c). In the particular context of environmental impacts (§ 3), these are dealt with in formal processes such as Environmental Impact Assessment (EIA) and/ or Environmental Management Systems (EMS) (Perdicoulis et al., 2012).



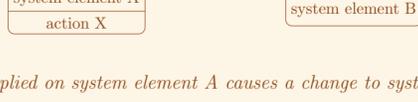
Concept association diagram for ‘impact’

NB: Alternative interpretations of ‘impact’ are beyond the scope of Systems PlanningSM — namely: (a) *collision*, in the wider context of physics, and also in the special case of automobile insurance; (b) *citation popularity*, in the context of academic publishing (Perdicoulis, 2014a, 2013d).

2 Change

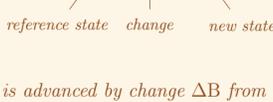
A change in a system element — e.g. due to an action or a change in an ‘upstream’ element — is intended to take place *ceteris paribus* (i.e. other things being equal) or *besides* ‘what it would have been’ (Sterman, 2000, p.152), which is precisely the sense of an ‘impact’ (§ 3.1).

2.1 Causal perspective



Action X applied on system element A causes a change to system element B

2.2 Computational perspective

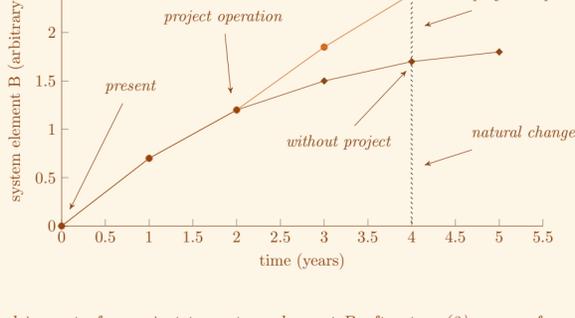


System element B is advanced by change ΔB from state B0 to state B1

3 Environmental impact

3.1 Concept refinement

The impact of an action on a system element is not just any change: referring to a chosen point in time, it is the difference between the values of [a chosen dimension of] that system element *with* and *without* that action — *ceteris paribus* (§ 2). It is realistic to expect that systems evolve ‘naturally’, and that the [value of the] selected system element may change even without ‘our action’.



The estimated impact of a project to system element B after two (2) years of project operation

3.2 Parameters

Options for the (objective or subjective) description of environmental impacts (cf. § 4.2)

CHARACTERISTIC	VALUE	ABBR.
Quality ^a	Positive/ Negative	+/-
Magnitude ^b	Low/ Moderate/ High	l/m/h
Importance ^c	High/ Moderate/ Low	H/M/L
Probability	Certain/ Probable/ Improbable	c/p/i
Temporal scale	Immediate/ Short-term/ Long-term	I/S/L
Spatial scale	Local/ Regional/ National/ Continental	l/r/n/c
Reversibility	Reversible/ Irreversible	R/I
Mitigation	Project phase/ Implementation phase/ Operation phase/ Not possible	p/i/o/n

^a Part of the classic Leopold matrix (Glasson et al., 1994, pp.98–99)

^b *idem*

^c *idem*

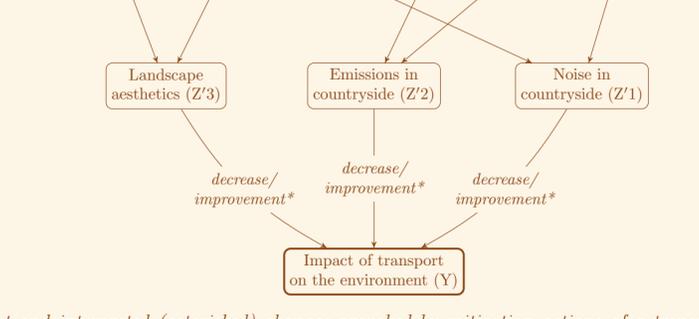
3.3 Synthesis

The characterisation of impacts is often summarised through the inclusive concept of *significance*, contemplating both its *intensity* and *context* (Canter, 1996).

e.g. *significance* ~ [magnitude, importance, temporal/ spatial scale]

4 Aggregate transmission

4.1 DCD Impact Map™



Forecast and interpreted (asterisked) changes provoked by mitigation actions of a transport plan (Perdicoulis, 2012a) — an example of EIA Light™

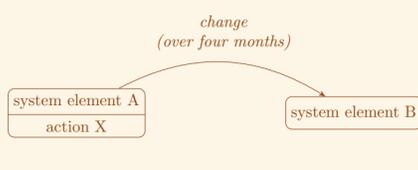
4.2 Impact matrix

Impacts as ‘one-on-one’ outcomes of project actions on system elements (key: § 3.2)

actions \ elements	Action 1	Action 2	Action 3	Action 4	Action 5	...	Action n
Element A	-1HcSrRi			-hMiLrRp			
Element B		-1HpSnIi		-mMpLnIo			
Element C			-mMpLnIo		+mLpSlRi		
...							
Element M			-hHpLnIo				

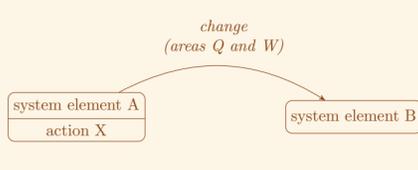
5 Additional information

5.1 Time



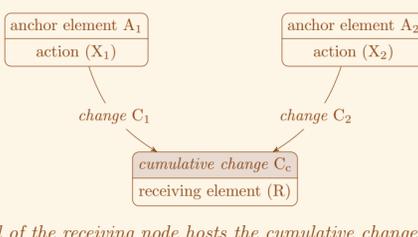
The change occurs over four months (Perdicoulis, 2010, p.74)

5.2 Space



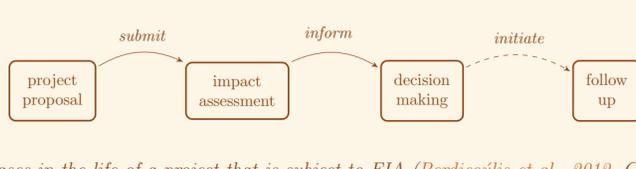
The change takes place in areas Q and W (Perdicoulis, 2012b, 2017)

5.3 Cumulative change



The upper (shaded) field of the receiving node hosts the cumulative change (Perdicoulis et al., 2014)

6 IA process



Phases in the life of a project that is subject to EIA (Perdicoulis et al., 2012, Ch. 4)

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