Restoration Ecology Primer

Figure slides for chapters 6-12.

How to use these slides

- Every figure in the Restoration Ecology Primer is available at high resolution in these slides for use in your presentations.
- The slides are divided into two sets: chapters 1-5 in the first set and chapters 6-12 in the second.
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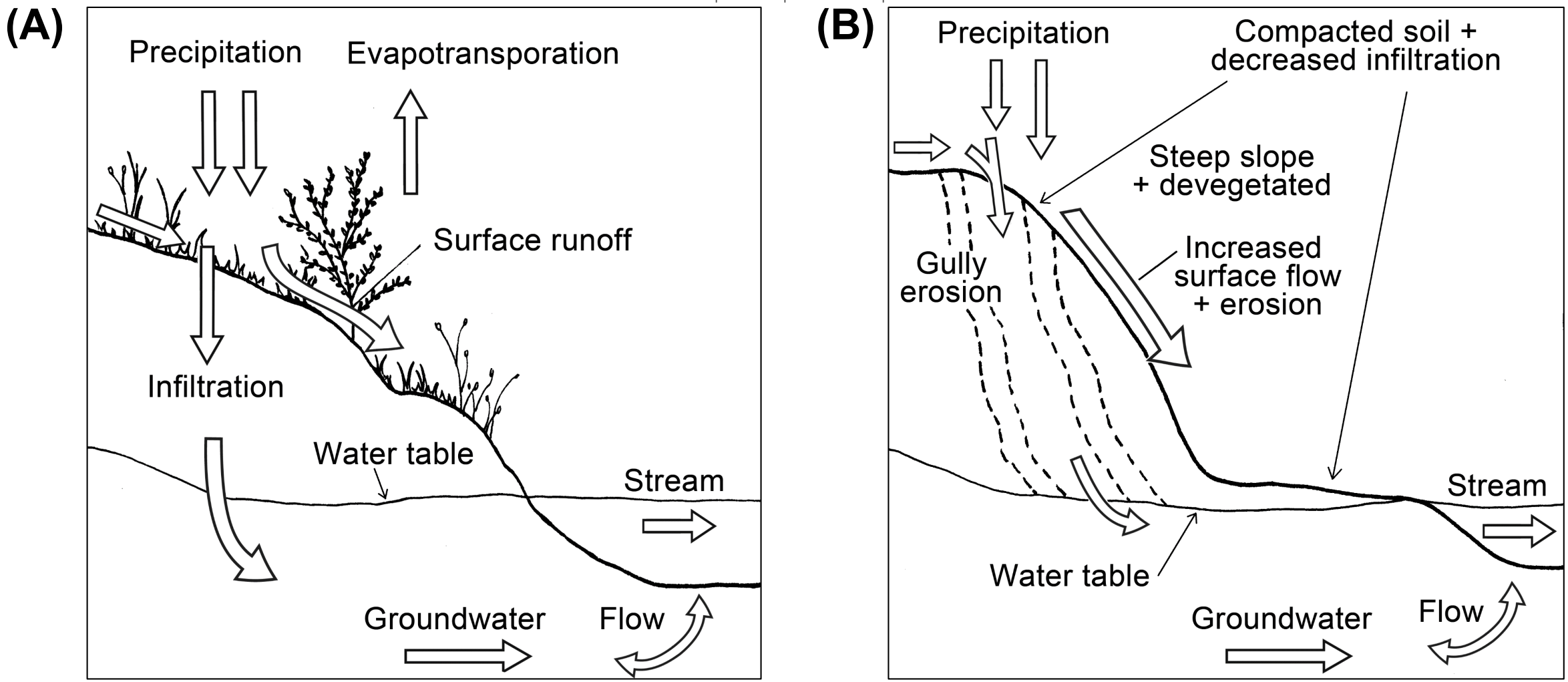


Figure 6.1. Hydrologic flow paths in (A) a natural system and (B) a disturbed system with altered topography, compacted soils and minimal vegetation. Evapotranspiration is the transfer of water from land to the atmosphere both through evaporation from the plants and soil and transpiration from plants. Drawings by M. Pastor.

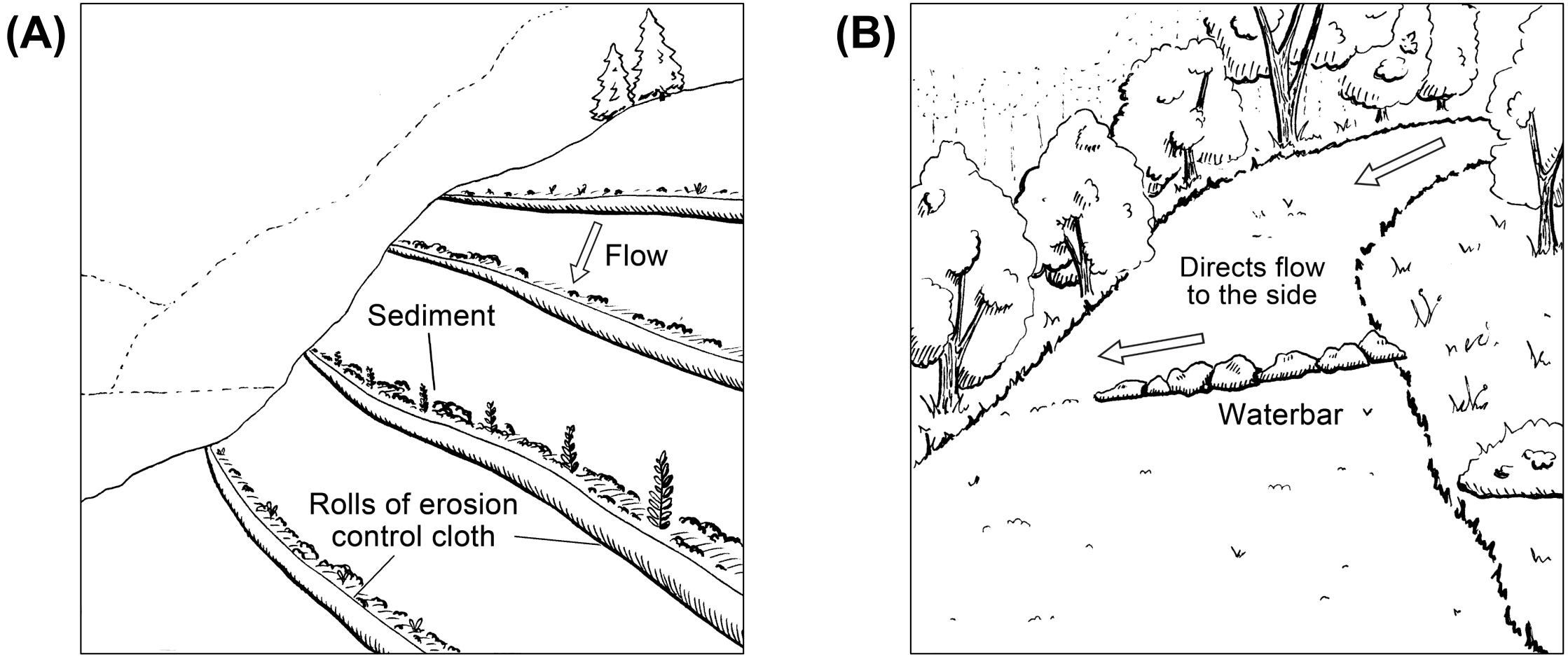


Figure 6.2. Restoration strategies to reduce erosion. (A) Rolls of erosion control cloth that serve to slow the flow and trap sediment and seeds. (B) A waterbar is used to direct flow to the side of a trail and minimize gully formation. Drawings by M. Pastor.

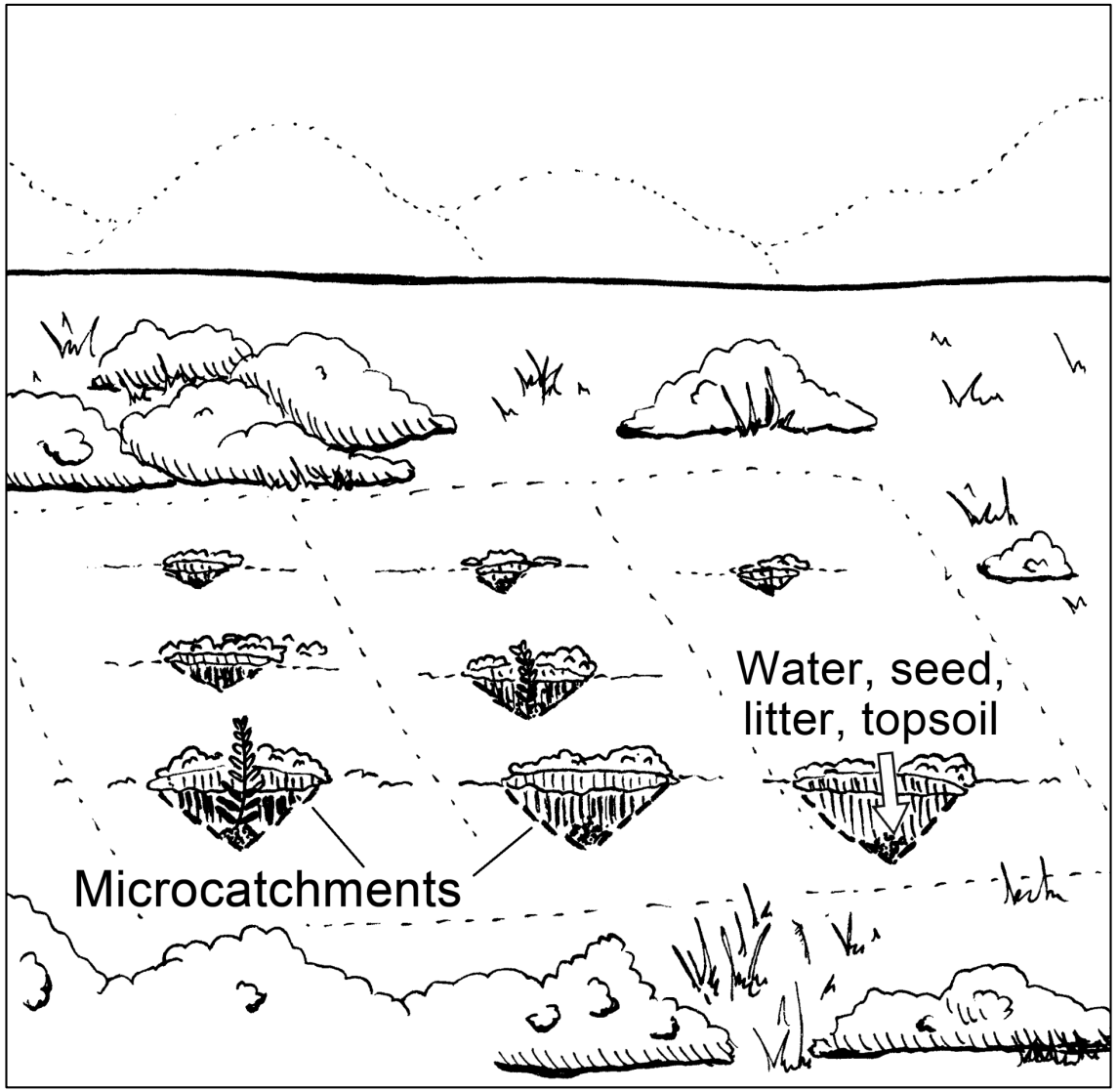
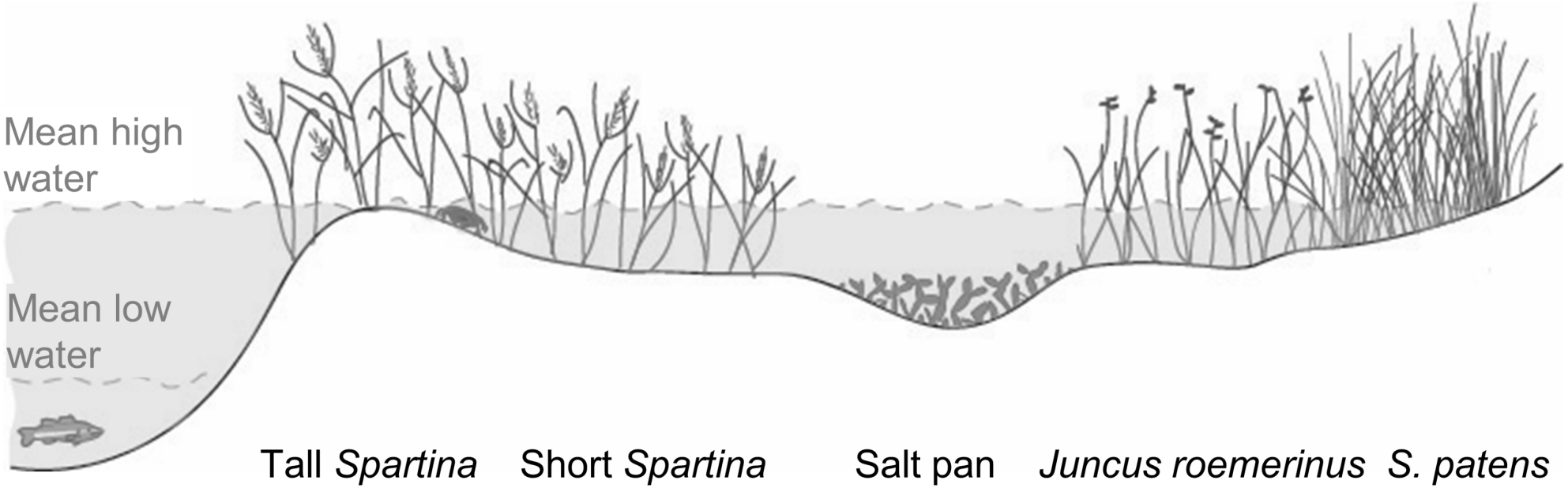


Figure 6.3. Microcatchments used to create small-scale topographic heterogeneity and concentrate water, seeds, topsoil and litter in arid systems. Drawing by M. Pastor.



	Tall *Spartina*	Short *Spartina* (*Salicornia*)	Salt pan	*Juncus roemerinus*	*S. patens*
Inundation (%)	8-100	40-80	5-15	15-40	5
Salinity (practical salinity units)	20-30	25-40	40-80	15-25	5-10

Figure 6.4. Plant distribution in a tidal salt marsh along the Atlantic Coast of the United States as a function of topography, inundation and salinity. Figure modified from Craft 2016.

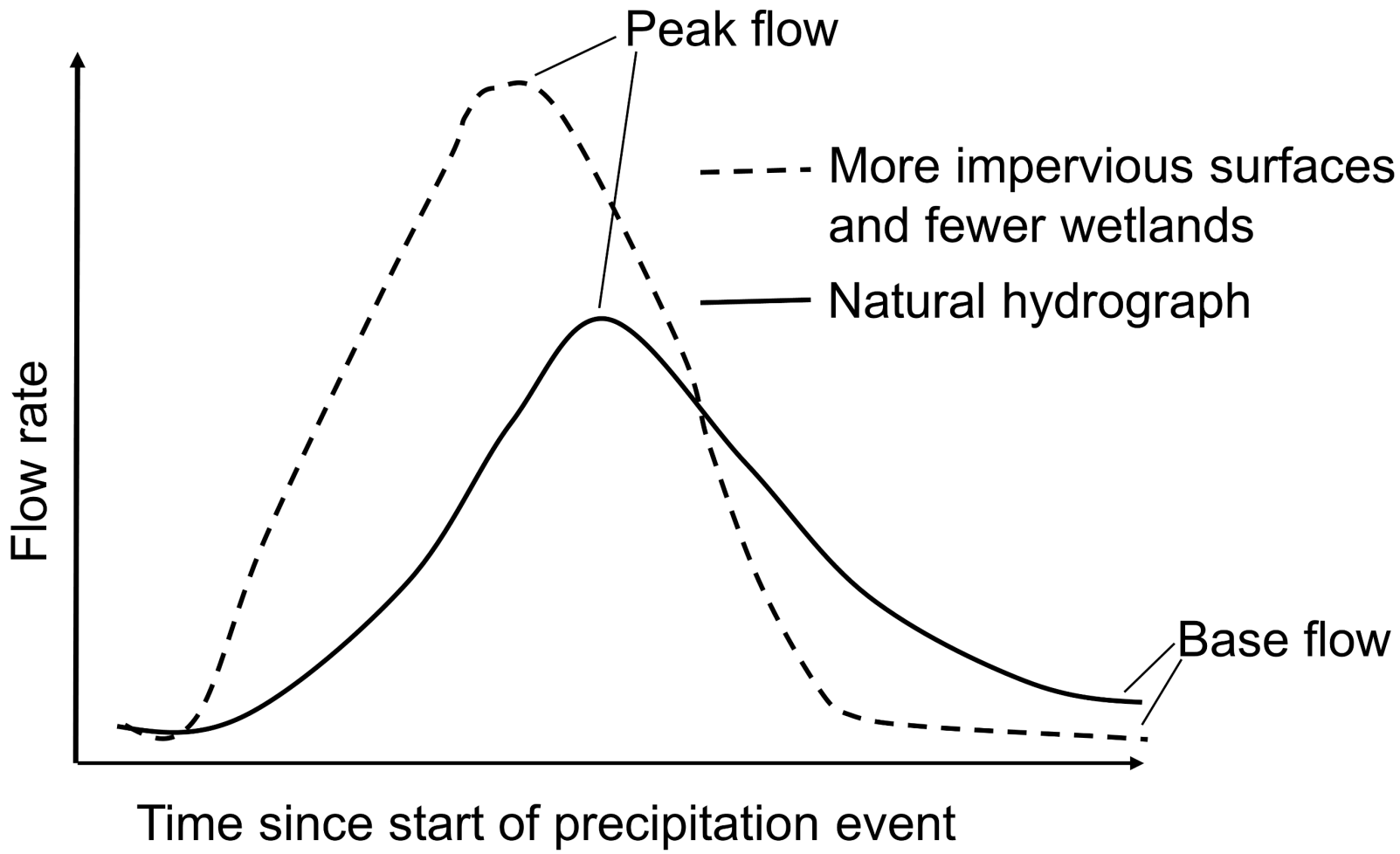


Figure 6.5. Stylized river flow regimes. Solid line shows the rise and decrease of river flow rate following a precipitation event in a natural system. Dashed line illustrates the faster rate of increase and decrease in flow rate and the greater peak flow in systems with more paved surfaces and less wetland area to slowly absorb and release water.

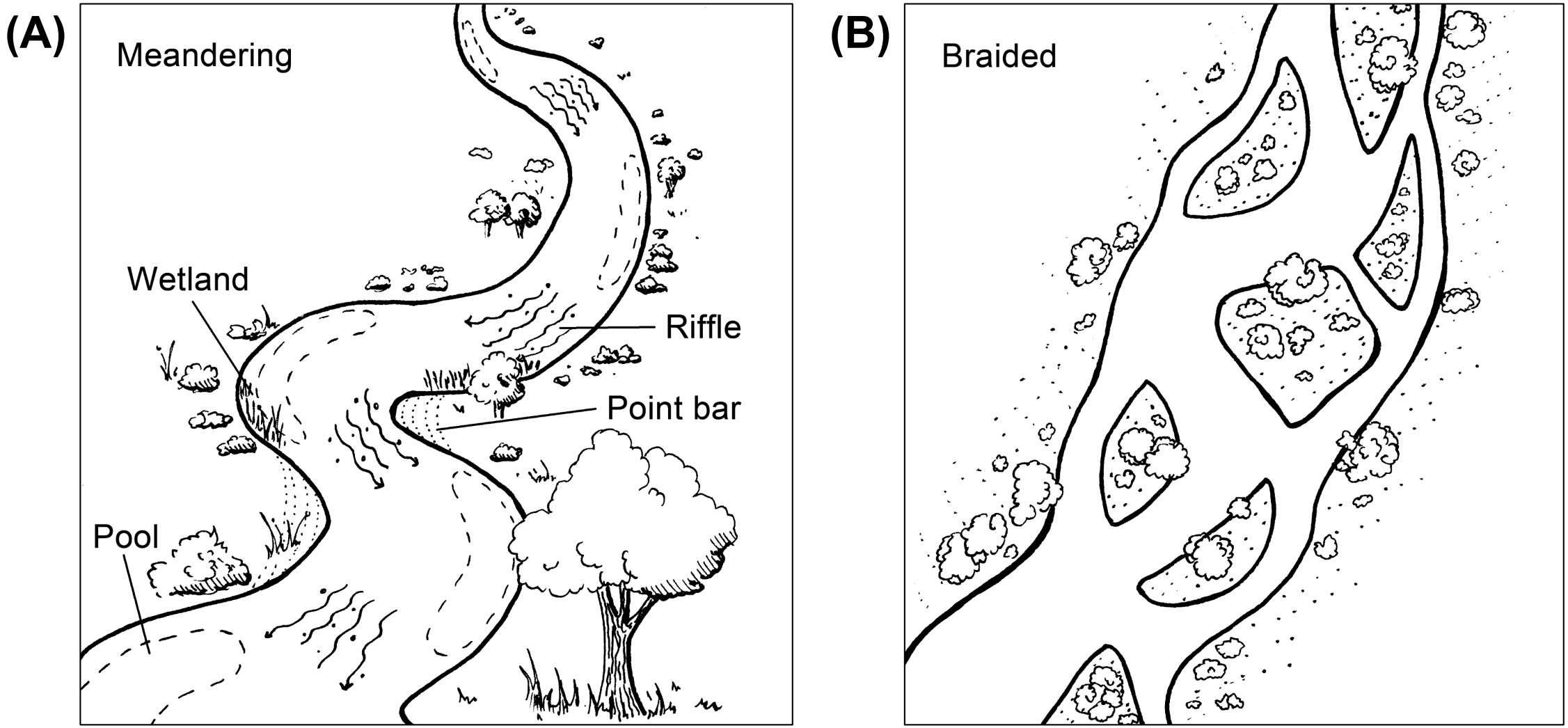


Figure 6.6. Different natural channel patterns. (A) Meandering river channel showing different habitat features. (B) Braided river with multiple channels. Drawings by M. Pastor.

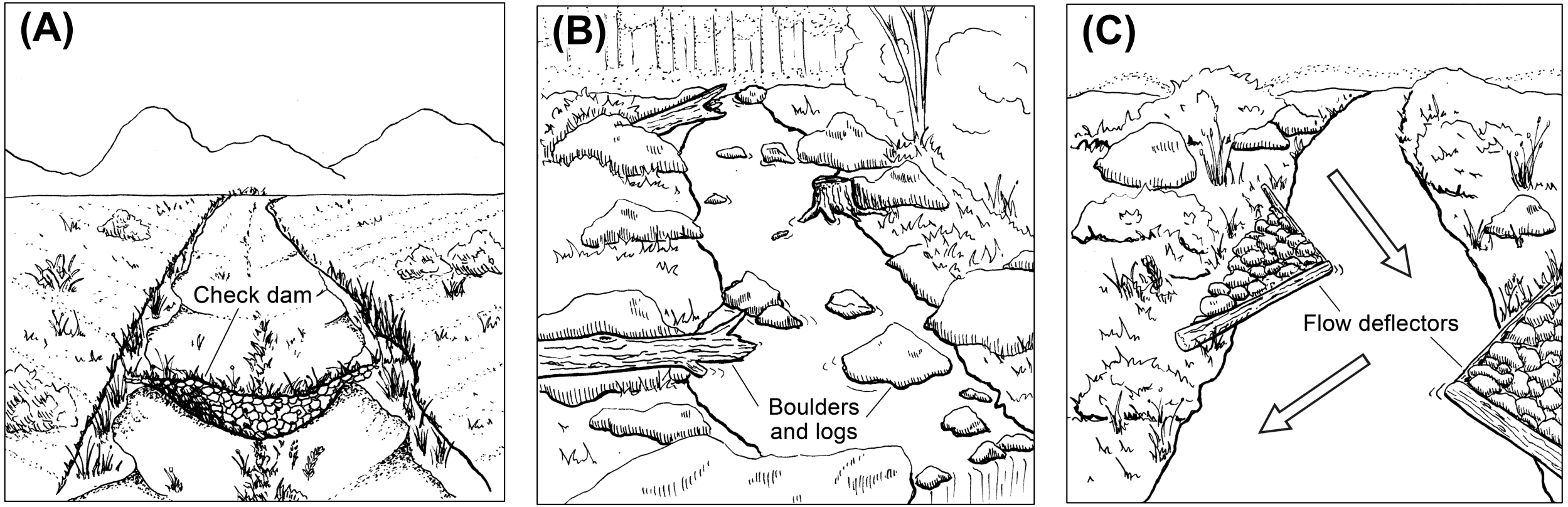


Figure 6.7. Instream restoration structures. (A) Check dam to reduce flow and channel down cutting in a seasonal stream. (B) Boulders and logs placed in rivers to slow flow and increase habitat heterogeneity. (C) Flow deflectors to increase the sinuosity of a stream. Drawings by M. Pastor.

Ch. 6 Supplemental Figure
A fish ladder at the Hiram M. Chittenden Locks in Seattle, Washington. (A) The concrete fish ladder stairs. (B) The locks, which otherwise prevent salmon from traveling upstream. (C) The fish ladder is publicly accessible. (D) A salmon acclimating to freshwater, visible in the publicly accessible viewing room. Photo credit: Josie Lesage.

Ch. 6 Supplemental Figure

Log check dams along a coastal California rivers.

Photo credit: Karen Holl

Ch. 6 Supplemental Figure

Half culvert with a natural river bottom along a coastal river in California. Photo credit: Karen Holl

Ch. 6 Supplemental Figure
Hydroseeding of a levee slope. Photo by the U.S. Army Corps of Engineers, licensed under CC BY 2.0.

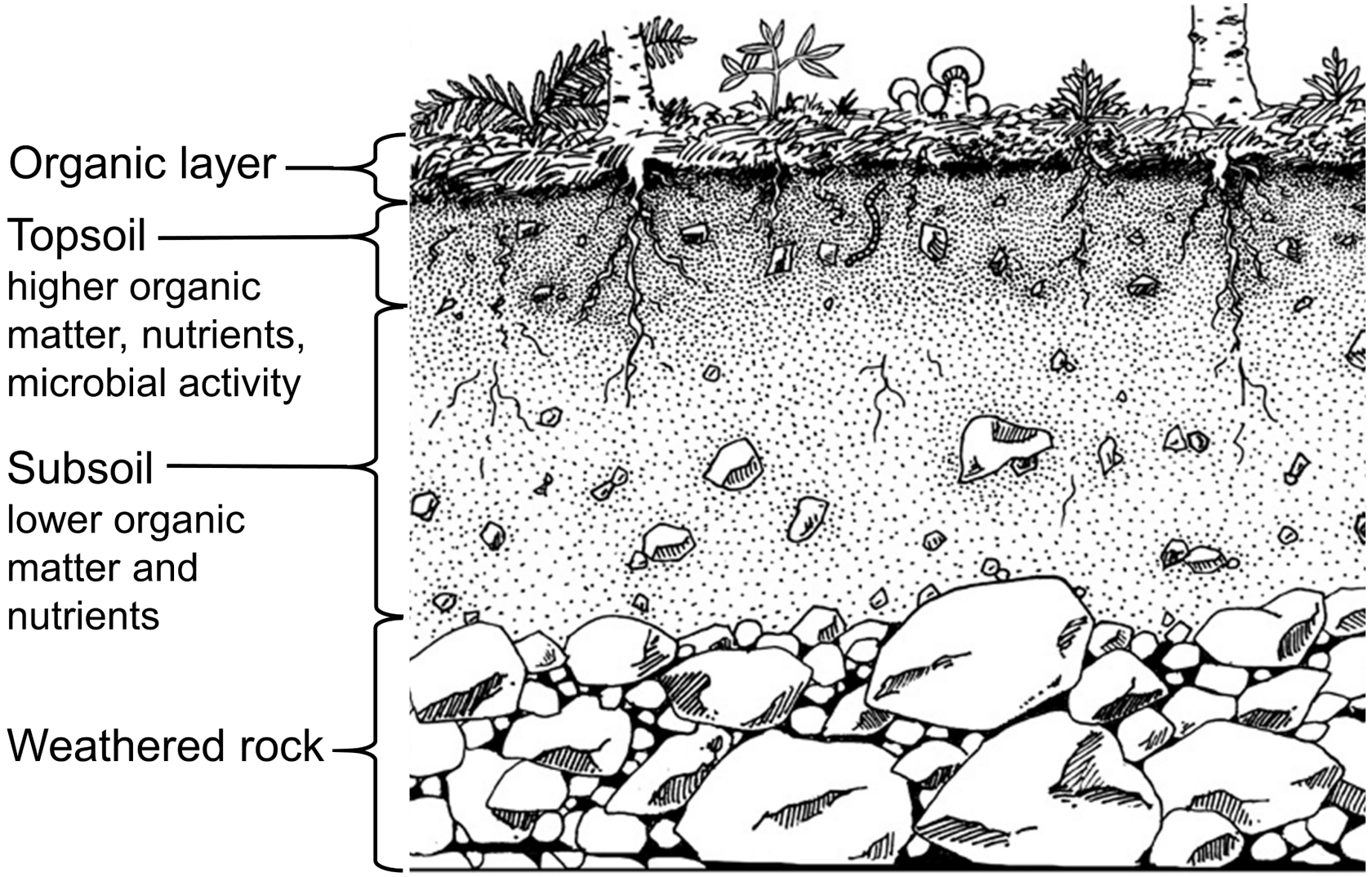


Figure 7.1. Soil layers in an intact ecosystem. The depth of the layers varies by soil type, and each general layer is often divided into sublayers.

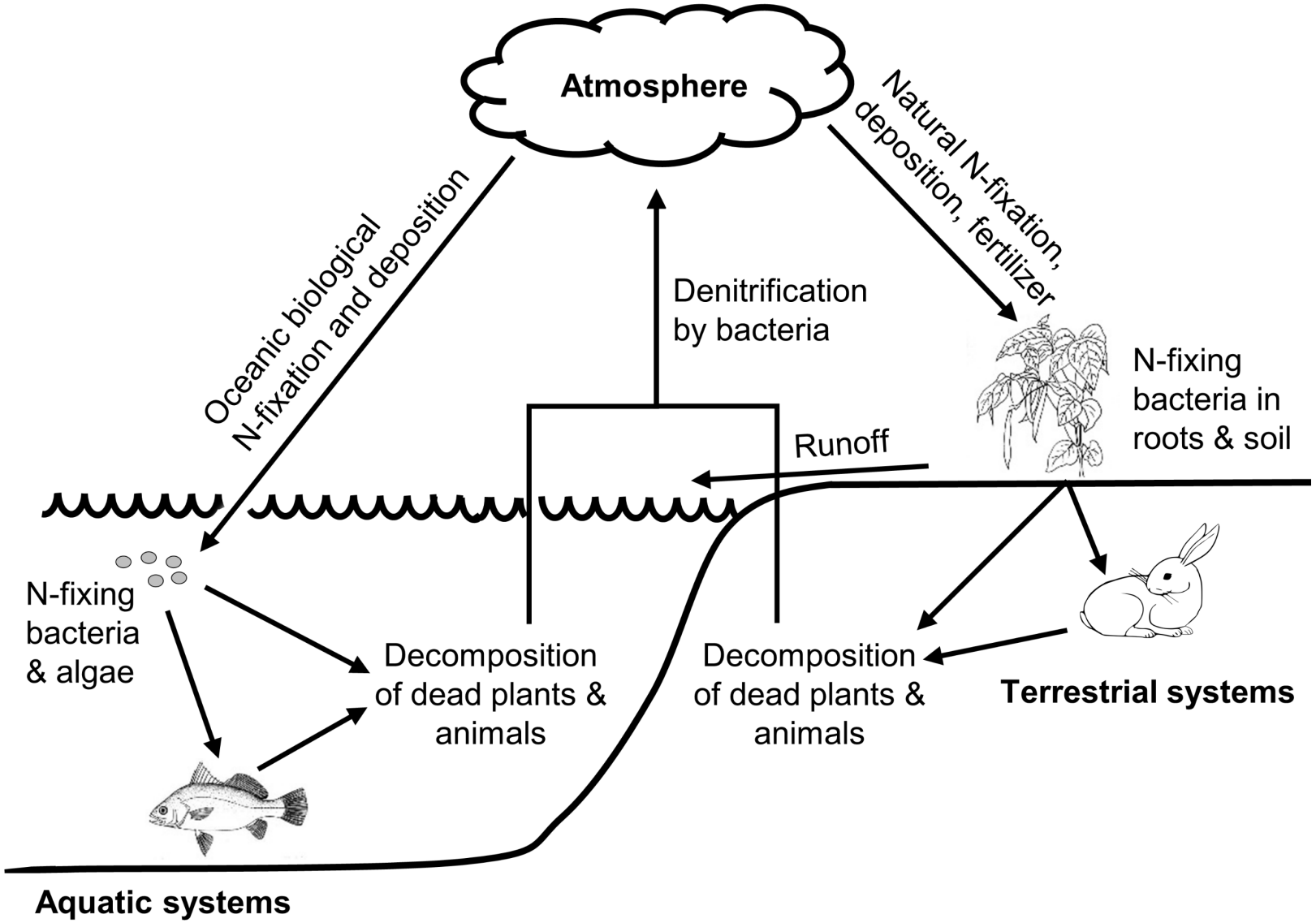


Figure 7.2. Fluxes of nitrogen between the atmosphere, land, and water. Nitrogen fixation is the transformation of nitrogen gas (N2) from the atmosphere to ammonium (NH4+). Ammonium can be transformed into nitrate (NO3−); both of these forms usable by plants and animals. Denitrification is the reverse process of transforming nitrate into nitrogen gas. Clip art licensed under Creative Commons. Figure by J. Lesage and K. Holl.

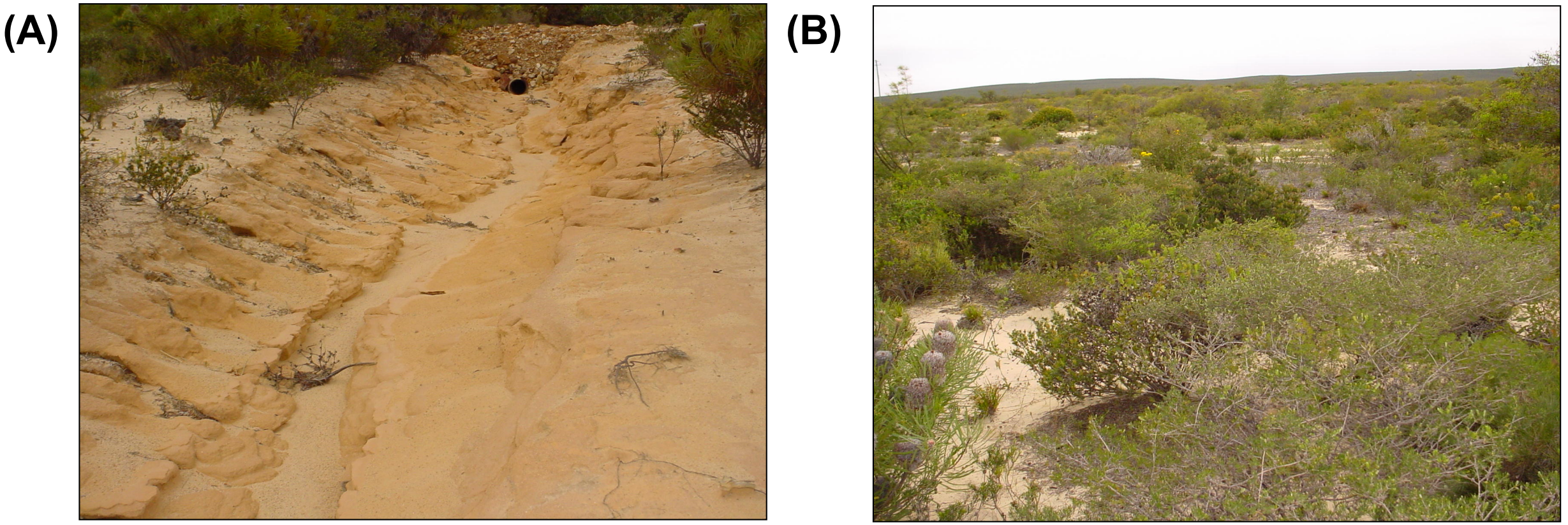


Figure 7.3. Kwongan heath restoration sites in Western Australia. Both photos show 12-yr old sites that were revegetated with a similar species mix following sand mining. (A) A site where the soil layers were mixed and a hardpan (a dense layer of soil that is largely impervious to water) formed at the surface preventing vegetation establishment. (B) A site where the soil layers were stored separately and replaced in the original sequence resulting in successful vegetation establishment. Photos by K. Holl.

Ch. 7 Supplemental Figure

A 2-meter hedgerow/buffer strip at the edge of an agricultural field. Photo by Pete Birch, licensed under CC BY 2.0.

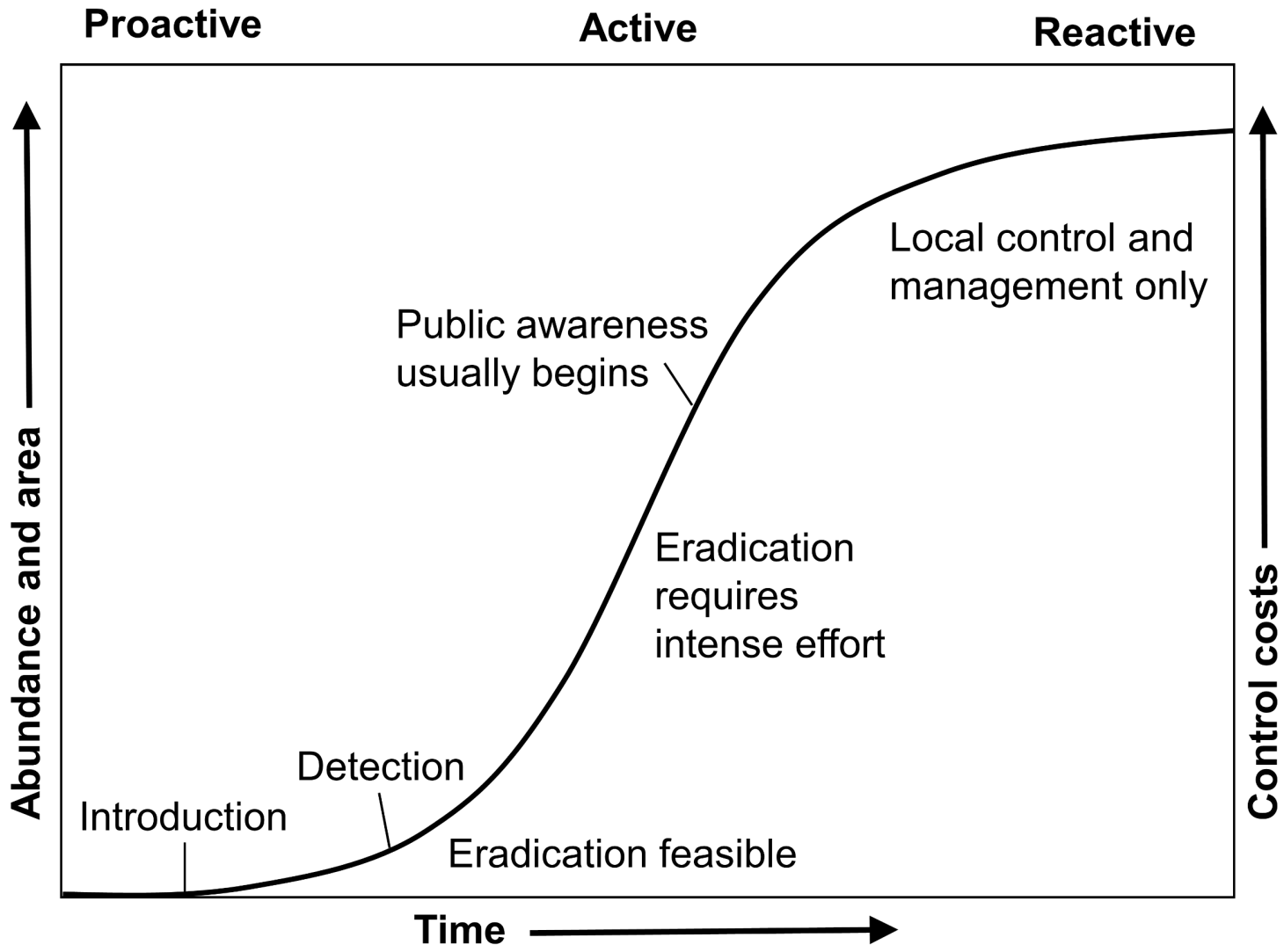


Figure 8.1. Stages of invasive species spread and control. Figure revised from Hobbs and Humphries 1995.

Ch. 8 Supplemental Figure

A warning to boaters at Lake Mead warning to prevent the spread of invasive mussels. Photo by J. N. Stuart, licensed under CC BY 2.0.

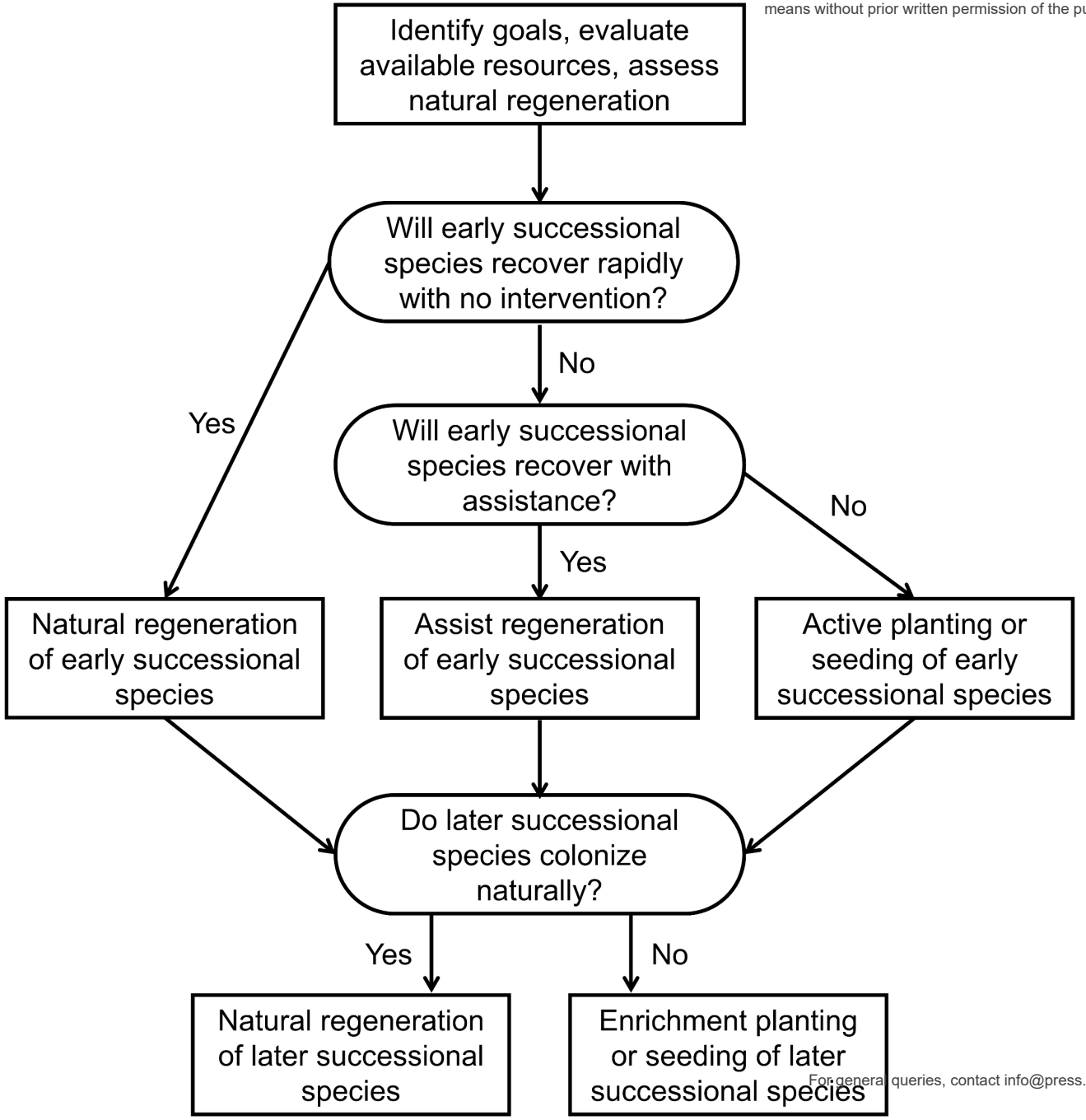


Figure 9.1. Decision tree for planning how and when to intervene to restore vegetation. Figure revised from Holl 2012.

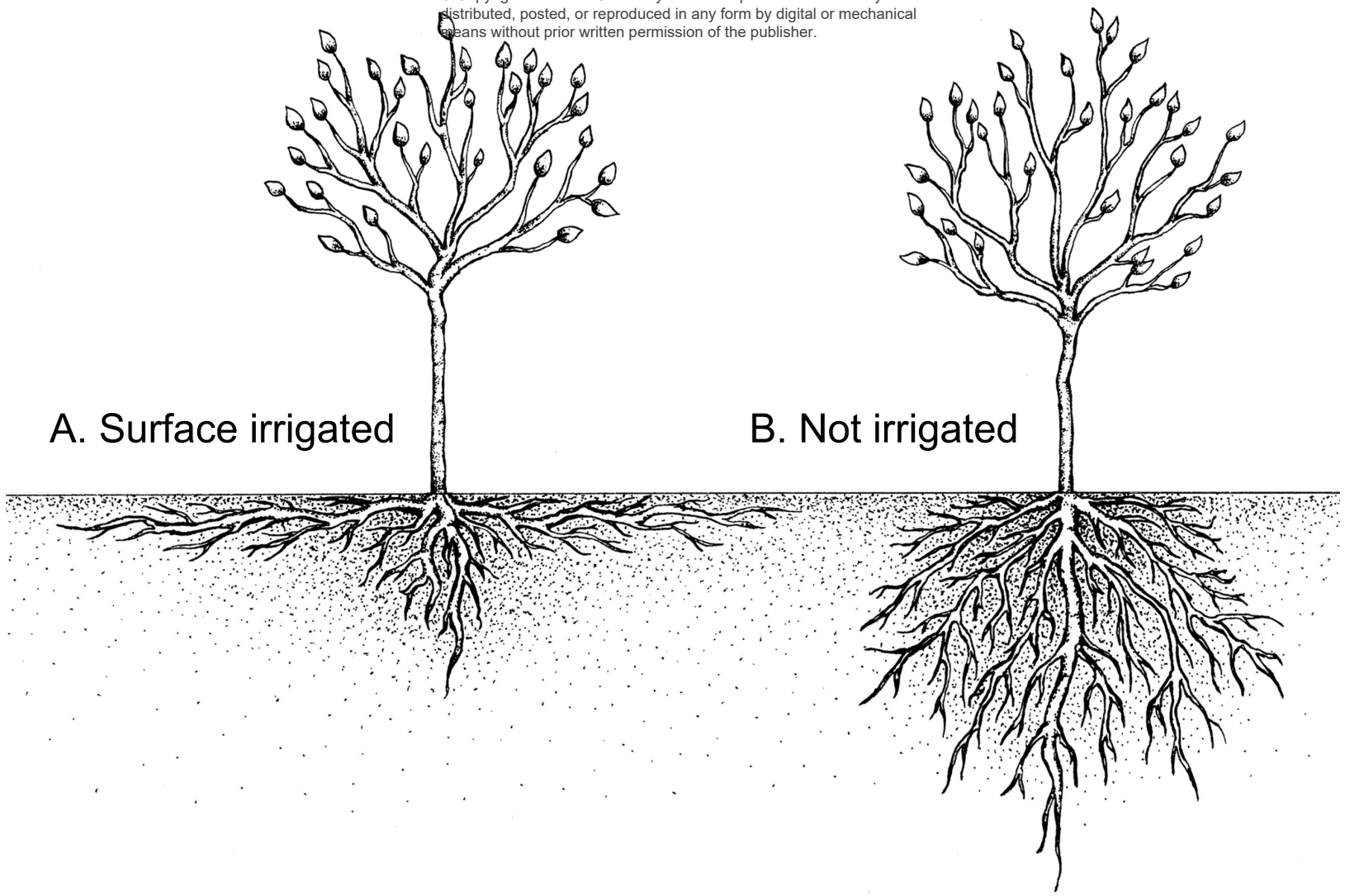


Figure 9.2. Effect of surface irrigation on root growth. (A) A small tree that was surface irrigated stimulating growth of roots near the soil surface. (B) A small tree with deeper roots typical of plants that are not irrigated or irrigated belowground, which enables them to reach deeper water sources and survive dry periods. Drawing by A.M. Baca.

Supplemental Figure Ch. 10 A fish ladder at the Hiram M. Chittenden Locks in Seattle, Washington. (A) The concrete fish ladder stairs. (B) The locks, which otherwise prevent salmon from traveling upstream. (C) The fish ladder is publicly accessible. (D) A salmon acclimating to freshwater, visible in the publicly accessible viewing room. Photo credit: Josie Lesage.

Supplemental Figure Ch. 10.
The Trans-Canada Highway passing below a wildlife bridge. Photo by daveynin, licensed under CC BY 2.0.

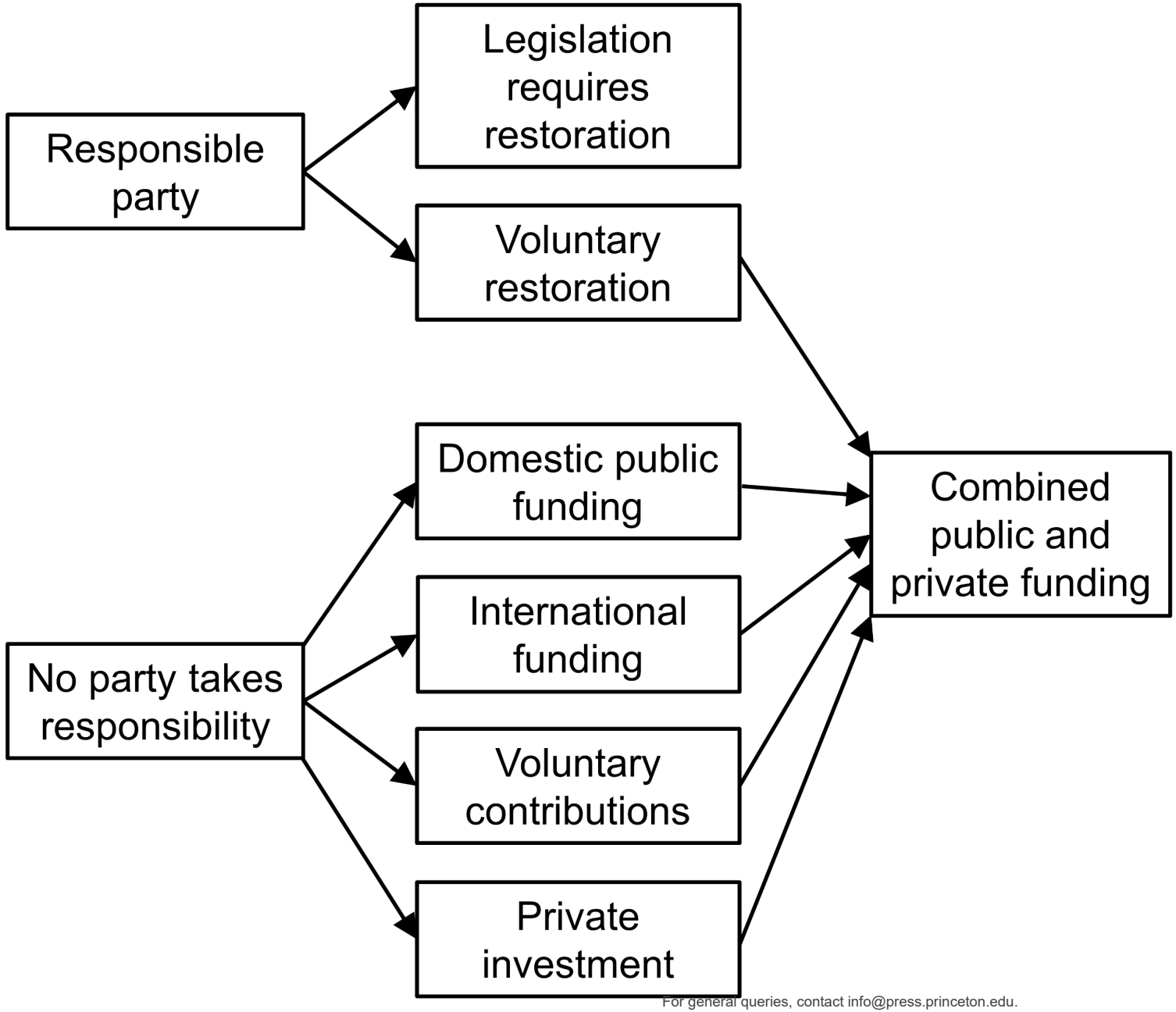


Figure 12.1. Funding sources for restoration. Examples of each type of funding are provided in the text. Modified from Holl and Howarth 2000.