Solutions

Each answer shows the steps, then the **result**.

2.1

- Breaking a habitat into small, isolated pieces

2.2

- Any two: habitat destruction, pollution, overexploitation, invasive species, climate change

2.3

- To connect isolated habitat fragments so animals can move between them

2.4

- zone of physiological stress: it survives but grows or reproduces poorly, because it cannot maintain homeostasis easily
- outside the range of tolerance: it cannot survive (zone of intolerance)

2.5

- any two of: hydrocarbons in the oil are toxic and kill organisms; oil coats birds' feathers and mammals' fur, so they lose insulation and buoyancy; animals swallow oil while cleaning themselves
- economic: fishing grounds close and tourists stay away from oiled beaches, so fishing and tourism incomes fall

3.1 B

- isolating small populations and limiting movement

3.2

(a)

- Any two: smaller isolated populations, reduced gene flow, higher extinction risk, blocked migration

(b)

- Build a wildlife corridor or crossing

3.3

- Corridors let animals move between fragments, increasing gene flow and immigration and lowering extinction risk, effectively linking the patches into a larger habitat

3.4

Reduced movement or gene flow between patches with a explained consequence such as reduced mate/resource access; a feasible connection or crossing design suited to the organism; compare a relevant measured outcome, such as verified crossings, over a stated period.

3.5

(a)

- an oxygen sag curve
- decomposers (bacteria) break down the organic matter in the sewage and use up dissolved oxygen in respiration faster than it is replaced (high biological oxygen demand)

(b)

- from about 1 km to about 20 km downstream (where the curve is below 6 mg L^{-1})

(c)

- the organic matter has been used up, so less oxygen is consumed, while oxygen dissolves from the air and is released by photosynthesis

3.6

(a)

- nitrates and phosphates wash into the river and the Gulf, causing an algal bloom (eutrophication)
- the algae die and decomposers break them down, using up dissolved oxygen
- the water becomes hypoxic, so fish and other animals that cannot leave die

(b)

- for example: rising ocean temperature makes corals expel their algae (bleaching), so they lose their food and may die; or sediment runoff blocks the light the algae need; or destructive fishing such as blast fishing breaks the reef structure

3.7 B

- bacteria convert it to methylmercury, which is absorbed and bioaccumulates in fish, then biomagnifies up the food chain