

# Observations of disease

## Mass mortality

A fish kill involving a range of species will normally indicate an environmental problem (such as toxicity or oxygen depletion). Deaths limited to one species are more likely to be caused by an infectious agent.

## Behavioural changes

All species of aquatic animals have characteristic protection, food-gathering and breeding behaviours. Abnormal behaviour, such as a decrease in feeding, could indicate stress from disease.

Some behavioural changes can occur across groups of species, or even across different phyla. In molluscs, the only behavioural differences observed are gaping (in bivalves), being slow to close (such as in oysters) or decreased feeding (such as in abalone). Finfish often gather at water inlets or gasp for air at the surface if the water is depleted of oxygen. If irritated by skin parasites, they will scrape themselves on rocks or jump into the air; whirling or 'corkscrew' swimming could indicate disease from an infectious agent or aquatic toxins. In both finfish and crustaceans, gathering at the surface or pond edges can often be a sign of disease.



## Gross signs

Gross pathology (signs visible to the naked eye) can indicate infectious disease, but the signs vary among the phyla. While the changes listed below may indicate stress from disease, they are not necessarily pathognomonic (characteristic of specific diseases), and generally require further investigation in the laboratory.

Sign	Finfish	Crustaceans	Molluscs
changes in the colour, texture and opacity of flesh	*	*	*
tissue necrosis and lesions	*	*	*
retraction of gill margins			*
pustules present			*
external spots	*	*	
changes in surface colour	*	*	
secondary fungal/bacterial growth	*	*	
deformities and tumours	*	*	
swollen or discoloured organs or faecal castes	*	*	
white midgut line	*	*	
broken/damaged appendages		*	
erosion of shell		*	
lesions or ulcers of skin or gills	*		
haemorrhaging with associated anaemia	*		
granulomas	*		
exophthalmus (pop eye)	*		
ascites (accumulation of fluid in peritoneal cavity)	*		
petechial haemorrhages (pinpoint bleeding in skin and mucous membranes)	*		
ecchymotic haemorrhages (bleeding or bruising beneath the skin or mucous membranes)	*		
excessive mucus on gills and skin	*		
dropsy (accumulation of fluid in body tissues)	*		
protrusion of scales	*		

