

Changes from Abiotic and Biotic Factors

The following resource pages provide tables outlining an abiotic or biotic change, how the ecosystems may respond and possible websites or organizations to look to for more information.

NOTE: Many of the impacts listed on the following pages appear to have mostly detrimental effects on the natural biota or ecosystem. Keep in mind, however, that humans often derive positive benefits from these same activities. For example, irrigation diversions allow agriculture to flourish in much of the west, and also may result in new riparian habitat forming along irrigation canals. The challenge to society is to find ways to minimize the impacts while retaining the benefits.

OTHER SUGGESTED RESOURCES:

- Library
- Newspaper and magazine articles
- Scientific journals
- Talk to a specialist in the area (e.g., Natural Resource Conservation Service, Utah State Geological Survey, Department of Environmental Quality, USU Extension)
- University researchers or professionals (such as consultants) working in these areas
- Watershed coordinators (lists available from Utah Division of Water Quality)

Abiotic Changes

ABIOTIC CHANGES	ECOSYSTEM RESPONSE	WEBSITES FOR MORE INFORMATION
Stream channelization: caused when stream banks are “hardened” with rip rap or “protected” by berms.	<ul style="list-style-type: none"> -Loss of habitat in the stream. -Increased velocity. -Changes in natural stream sinuosity. -Reduced fish and macroinvertebrate diversity from loss of spawning habitat, loss of macroinvertebrate habitats, or loss of flood fed side channels which are important for native fish reproduction. -Loss of riparian plants, and associated wildlife. 	http://library.wrds.uwyo.edu/wrp
Pollutants entering the system. Many activities, including industrial discharges, agricultural runoff, improper cleanup of pet waste and over-fertilization of lawns.	<ul style="list-style-type: none"> -Loss of “beneficial uses” (such as recreation, irrigation, or aquatic habitat) of our natural waters due to increased pollution. May also change color and smell of water. -Loss of pollution sensitive species, replaced by pollution tolerant species. -Often fewer species (less diversity). -Health issues for humans using water for recreation or drinking. 	Food and Agriculture Organization of the United Nations http://www.fao.org (search for pollutants, runoff, fertilizer) Duluth Streams http://www.duluthstreams.org/understanding/impact.html Environmental Protection Agency http://www.epa.gov (search for dams, irrigation, flood control)

Abiotic Changes, Continued

Resource

ABIOTIC CHANGES	ECOSYSTEM RESPONSE	WEBSITES FOR MORE INFORMATION
Development (increase an impervious surface area)	<ul style="list-style-type: none"> -More pollution from urban runoff. -Less groundwater recharge. -Higher flows and more floods during rain events. -Loss of pollution sensitive species, replaced by pollution tolerant species. 	<p>Raritan Basin Watershed Management Project http://www.raritanbasin.org (search for impervious surface area)</p> <p>Utah State University Water Quality Extension http://extension.usu.edu/waterquality (search for impervious surface area)</p>
Climate Changes: Changes in runoff (rain event, snowmelt). Changes in maximum stream flow (big snow year). Drought.	<ul style="list-style-type: none"> -Change in flows. -Loss of native fish if spawning areas silted in. -Possible bank erosion. -Change in sediment load. -Change in temperature. -Loss of habitat, impacts to coldwater fish as temperature increases, impacts to wildlife forage and cover. 	<p>Environmental Protection Agency (climate change) http://www.epa.gov/climatechange/</p>
Mining oil, gas, and coal: Changes in groundwater movement and exposure of groundwater to pollutants, disturbance of surface, release of salty or polluted water to surface.	<ul style="list-style-type: none"> -Pollution increase determined by mining operations. -Increased sediment runoff may occur from surface disturbance; water draining from mines may be extremely acidic and carry heavy metals; water discharged from coal bed methane wells can be very salty. -Loss of native fish if spawning areas silted in. -Sensitive species replaced by more tolerant species. 	<p>Environmental Protection Agency (surface coal mining activities under clean water act) http://water.epa.gov/lawsregs/guidance/wetlands/mining.cfm</p>

Biotic Changes

BIOTIC CHANGES	ECOSYSTEM RESPONSE	WEBSITE FOR MORE INFORMATION
Introduced species to a stream or riparian area.	<ul style="list-style-type: none"> -Depends on species. -Competition for food and habitat impacting native fish. -Uncontrolled growth of introduced species and other organisms. 	<p>Environmental Protection Agency http://www.epa.gov (search for invasive species)</p> <p>Utah Department of Agriculture and Foods http://ag.utah.gov (search for nuisance species)</p>
Loss of riparian area: due to land use such as logging, urban landscaping, or grazing.	<ul style="list-style-type: none"> -Loss of wildlife and bird habitat. -Increase in water temperature (reduced shading). -Increase in sediment load and pollutant runoff. -Impacts on coldwater fish as temperatures increase, loss of native fish if spawning areas are silted in. 	<p>USDA/Forest Service http://www.srs.fs.usda.gov (search for logging)</p> <p>Kansas State University http://www.ksre.ksu.edu/ (search for grazing)</p>