

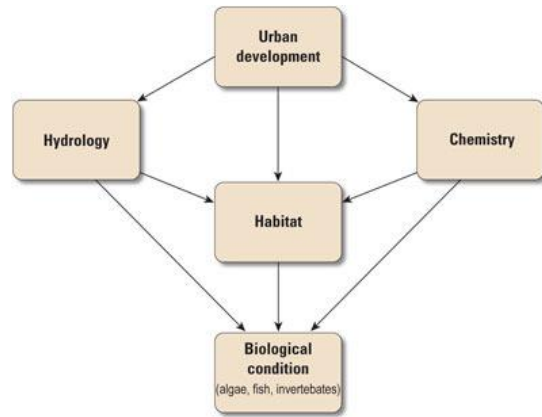
## STREAM ECOLOGY

### Urbanization

Cities are getting larger in number of people and in area.

Most of the predicted growth will happen in urban areas.

From: usgs.gov



**The urban stream syndrome**-- Urbanization has a series of direct and indirect effects that can simultaneously alter stream ecosystems. Collectively, these are referred as the urban stream syndrome. These impacts can be categorized as:

- Hydrology
  - Increased high flows, lower low flows.
  - More rapid changes in hydrograph.
- Water chemistry
  - Increased nutrients (N,P)
  - Increased contaminants
    - Much of these inputs (at least in developed nations) often come from non-point sources. For example, run-off from roads contains lots of contaminants. These are extremely hard to monitor and regulate.
- Channel structure
  - Increased width
  - Decreased complexity
- Organic matter
  - Reduced retention
- Fishes
  - Decreased sensitive species
- Invertebrates
  - Increased tolerant, decreased sensitive species
  - EPT (ephemeroptera, plecoptera, and tricoptera) are most sensitive.
- Algae
  - Changes in community
- Ecosystem Processes
  - Decreased nutrient uptake

## STREAM ECOLOGY

### Urbanization in Vancouver

- Vancouver is rapidly increasing in number of people as well as spreading.
- Spread is primarily south and east (mountains and ocean hem in development)
- The Lost Stream survey (1997) tried to use historical records to reconstruct how urbanization has impacted streams.
- Between 1860 and 1997, they estimate that 117 out of 779 streams have been completely “lost”. These streams don’t exist anymore (or exists under pavement).

