

Understanding the link between fertilizer and stream health

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Natural aquatic environments thrive in a fragile balance between nutrient supply and algal growth. Algae form the base of the food chain in aquatic ecosystems by utilizing sunlight and nutrients (carbon dioxide, nitrogen and phosphorus) to build algal biomass through photosynthesis. The algae then become food for other aquatic organisms including bacteria, insects, and fish. Balanced natural aquatic environments support diverse populations of beneficial organisms from algae up through fish species.

If the supply of nutrients exceeds natural conditions, a chain of complex chemical, biological and physical reactions may begin which usually degrades the natural balance of an aquatic ecosystem. Scientists refer to this process as eutrophication. **Some of the localized symptoms of eutrophication are:**

- **Daytime pH levels may reach levels greater than 9.0, leading to toxic conditions;**
- **Nighttime levels of dissolved oxygen, which fish depend on for respiration, may become critically low;**
- **Prolonged periods of depleted oxygen may occur at the end of an algal bloom caused by the decay of dead algae; and**
- **Prolific growth of filamentous nuisance algae, which degrades physical habitat and hurts beneficial algae such as diatoms.**



Filamentous algae from Chester Creek in lab beaker.



Filamentous algae covering stream bottom.

Once nutrients enter a stream, they tend to remain in the aquatic environment and can be transported to estuaries and coastal waters where eutrophication can have major impacts on highly valued recreational waters, beaches, and fisheries.

Sources of excess nutrients include septic systems, farm animals, and soil erosion, but the one most easily controlled by homeowners is the amount and type of fertilization of their lawns.

What you can do to reduce the impact of fertilization on our waterways:

1. **Select a “slow release” form of nitrogen** which takes longer to break down in the soil and is less likely to leach out in the first rain.
2. **Recycle your grass clippings.** Leaving grass clippings on your lawn can meet between 25% and 50% of your fertilizer needs.
3. **Limit the frequency of your fertilization** to once or twice a year, preferably in the fall, and avoid fertilization in the early spring.
4. **Request a fertilizer that is phosphorus-free** unless a soil test determines that phosphorus is lacking in your soil. A sample of your soil can be mailed to Penn State Extension and analyzed for a nominal charge.