Reach-Scale Effects of a Stream Logjam on Benthic Macroinvertebrate Community Composition

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BACKGROUND

Logjams are accumulations of fallen wood that span the width of a stream or river. They offer refuge from high-velocity waters and provide stable surfaces for colonization. In addition, they concentrate food resources and create numerous microhabitats.

HYPOTHESIS

- Because logjams concentrate food resources, we expected aquatic macroinvertebrate abundance, richness, and diversity to increase near the logjam and decrease further away from it.
- Logjams create numerous microhabitats downstream. Thus, for each functional feeding guild (groups of macroinvertebrates with common feeding strategies and food resources), we expect the area downstream of the logjam to exhibit a different trend in abundance when compared to upstream.

METHODS

The study was conducted summer 2010 at Cabin Creek in Superior National Forest. Surber samples were collected from 50, randomly assigned sites within a 40-m stretch centered at a logjam. Aquatic insects were identified to the genus-level and divided into functional feeding guilds.

RESULTS

Community Parameters

**Functional Feeding Guilds**

- **Scrapers**
  - Abundance:
    - Logjam: 100
    - Upstream: 50
  - Richness:
    - Logjam: 20
    - Upstream: 10
  - Diversity:
    - Logjam: 3.5
    - Upstream: 2.5

- **Collectors**
  - Abundance:
    - Logjam: 150
    - Upstream: 100
  - Richness:
    - Logjam: 30
    - Upstream: 20
  - Diversity:
    - Logjam: 4.5
    - Upstream: 3.5

- **Shredders**
  - Abundance:
    - Logjam: 200
    - Upstream: 100
  - Richness:
    - Logjam: 40
    - Upstream: 30
  - Diversity:
    - Logjam: 5.5
    - Upstream: 4.5

**DISCUSSION**

- Rather than seeing a concentration of macroinvertebrates in the immediate vicinity of the logjam, we found that community parameters and functional feeding group abundance continued to increase downstream of the logjam.
- Increased abundance of feeding guilds downstream of the logjam may reflect food resource distribution. The trend observed among scrapers, collectors and shredders suggests that logjams concentrate benthic algae and fine and coarse particulate organic matter (i.e., FPOM and CPOM) at least 20-m downstream of the logjam.
- Our data suggests that logjams exert far-reaching downstream effects and that the effects on the benthic macroinvertebrate community seen downstream are greater than those seen at the logjam itself.

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