

Community Dynamics

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Contents

Section 1: Communities, Disturbance, and Succession

The definition of an ecological community. The roles of fire and succession in lodgepole pine forests of Yellowstone. Mechanisms of succession. How spatial variation in disturbance regimes affects communities.

- Ecological Communities: Species and Relationships
- Map: Yellowstone National Park
- How Communities Change
- Fire in Yellowstone
- Simulating Succession in Yellowstone
- What Processes Drive Succession?
- Three Conceptual Models of Succession
- Summary of Facilitation, Inhibition, and Tolerance
- Do Conceptual Models Apply to Real Communities?
- Disturbance and Non-equilibrium Dynamics
- Section Summary
- Ask Your Instructor

Section 2: Food Chains and Indirect Effects

Investigation of trophic cascades and interactions among wolves, elk and aspen in Yellowstone. Discussion of predation risk. Introduction to ecosystem engineers.

- Herbivores, Predators, and Ecosystem Engineers
- Investigating Food Chains in Yellowstone
- Top-Down Control
- Trophic Cascades
- Reintroducing Wolves to Yellowstone
- Behavioral Cascades
- Predation Risk and the Ecology of Fear
- Ecosystem Engineers: Another Indirect Player
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Section 3: Top-Down vs. Bottom-Up Control

Top-down versus bottom-up control, including application to trophic cascades. Bottom-up forces in streams and lakes. Factors determining food-chain length.

- An Introduction to Ecological Theory

- Top-Down Control
- Bottom-Up Control
- What Determines Food-Chain Length?
- Top-Down vs. Bottom-Up: A False Dichotomy?
- Section Summary
- Ask Your Instructor

Section 4: Community Stability

How resistance, return time, and resilience affect the recovery of a disturbed community. Discussion of exotic species and stability, exemplified by lake trout in Yellowstone Lake. The stability-diversity hypothesis. Dominant and keystone species.

- Components of Stability
- Resistance, Return Time, and Resilience
- Alternative Stable States
- Change Without Disturbance
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- Keystone and Dominant Species
- Community Importance and Total Impact
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