BURGER, J. C., M. A. PÄTTEN, J. T. ROTENBERY and R. A. REDAK, University of California, Riverside, CA 92521 USA. Patterns and processes of arthropod community succession after a fire.

We surveyed arthropods after a disturbance by fire in southern California coastal sage scrub to investigate: (1) The degree to which arthropods had recolonized burned sites, (2) the pattern of post-fire succession across arthropod orders and guilds, and (3) the relative strength of patterns of recolonization among arthropod orders, families and guilds. We sampled vegetation and collected arthropods from 12 burned and 12 unburned sites using pitfall traps, malaise traps, and vacuum samples beginning three years after a fire. Arthropods were collected at three-month intervals over the course of two years and were subsequently counted and identified to family and guild. We associated families with the following guilds: Detritivore, herbivore, parasitoid, pollinator, predator, scavenger, and hematovore or vertebrate parasite. We found no significant difference between burned and unburned sites at the level of order or family, but burned sites had a distinct and predictable guild structure. Scavengers were most abundant and detritivores were among the least abundant in burned sites, whereas detritivores were significantly more dominant in undisturbed sites. This study supports results of an earlier study and strongly suggests that arthropod recolonization follows similar rules that vegetational succession does, as represented by changes in the importance of different functional groups or guilds at a site over time. In addition, results support the hypothesis that regional processes determine overall community structure, but local processes (such as disturbance by fire) determine the presence or absence of specific members of a community.

BURKART, G., W. WURTSBAUGH, B. FLEENOR and C. LUECKE.

The way in which nutrients are transported into and through a lake may influence the availability of nutrients in the outflow. When the temperature of an inflow falls below that of the lake surface water, the inflow can plunge below the thermocline, delivering water and nutrients to the metalimnion. At higher inflow temperatures, however, the inflow will deliver water and nutrients directly to the epilimnion. For these two scenarios, depth-specific residence times and biological processes may lead to differences in the availability of nutrients in the outflow stream. We added water mass (NaBr and rhodamine) and biologically-active ($^{15}$N) tracers to two mountain lakes to outflow streams: The importance of inflow hydrodynamics and in-lake processes.

While it is well known that resources play an important role in the development and maintenance of community structure, most theoretical and empirical objectives can be met with long rotations (ca. 260 years). Certain objectives can be met at shorter rotations (80 to 150 years) when treatments of thinning and canopy tree retention are applied. Alternatives examined include retention of 15% cover of live tree canopy at each harvest in combination with artificial thinning between harvests. Thinning from below can expedite the development of large live and dead trees, and canopy height diversity without diminishing wood quantity or quality. Proportional thinning retains understory stems, thereby expediting the recruitment of shade-tolerant trees. A possible drawback to proportional thinning is the diminished production of clean-bole wood at rotations of 150- and 260-years. It is concluded that most wood quantity, wood quality and ecological objectives can be met with long rotations (ca 260 years). Certain objectives can be met at shorter rotations (80 to 150 years) when treatments of thinning and canopy tree retention are applied.

BUSING, R. T. and S. L. GARMAN. Forestry Sciences Lab, Corvallis, OR 97331 USA. Ecological characteristics and long-term wood production in Douglas-fir forests.

Whether wood production, wood quality and ecological characteristics can be compatible objectives in the management of harvested forest stands is explored through simulation of various silvicultural regimes. Long-term production of high-quality merchantable wood and the level of certain ecological indicators are simulated for coniferous forests of the Pacific Northwest using the ZELIG model. Short rotations (<50 years) produce the least amount of high-quality wood over the multi-century simulation period. They also fail to generate ecological attributes resembling those of old forest stands. Production of high quality wood is high under all rotations of 80 years or more; however, most ecological indicators require longer rotations unless alternatives to clearcutting are applied. Alternatives examined include retention of 15% cover of live tree canopy at each harvest in combination with artificial thinning between harvests. Thinning from below can expedite the development of large live and dead trees, and canopy height diversity without diminishing wood quantity or quality. Proportional thinning retains understory stems, thereby expediting the recruitment of shade-tolerant trees. A possible drawback to proportional thinning is the diminished production of clean-bole wood at rotations of 150- and 260-years. It is concluded that most wood quantity, wood quality and ecological objectives can be met with long rotations (ca 260 years). Certain objectives can be met at shorter rotations (80 to 150 years) when treatments of thinning and canopy tree retention are applied.

BUTNOR, J. USDA Forest Service, Research Triangle Park, NC 27709. Comparison and standardization of four soil CO$_2$ evolution measurement techniques under laboratory and field conditions.

Accurate carbon budget models require quantification of component processes including soil CO$_2$ efflux. Larger scale modeling efforts typically utilize data collected from different experiments, often using different techniques. Appropriate uses of data sets require a knowledge of the particular biases of each system in reference to a "ground truth". We compared two commercially available soil respiration systems, the Li-Cor 6400-09 and the Pritchard Systems SRC-1 (both closed chamber designs) and two custom-designed systems. The custom systems studied were the A.C.E.S. (automated carbon efflux system) which utilized an open chamber design and a closed method that uses the Li-6262 IRGA. In the field, we observed differences among the techniques as high as 50%. To make analytical assessments of the measurement techniques, we developed artificial efflux tanks, in which the CO$_2$ efflux could be controlled and used as a standard. These efflux generators were built from aquarium tanks and comprised of a pressure equilibrated footspace, with mixing fans. Three different types of diffusive soil media (gravel, sand or powdered clay) were suspended above the footspace. Standard gases were circulated through the footspace creating a diffusion gradient across the soil medium. We found that each measurement technique had a bias that could be corrected for, but the direction and magnitude of the correction differed. When these calibrations were used to correct field data, we were better able to assess the amount of variation in the biological system.

BUTZLER, J. M. and J. CHASE. University of Pittsburgh, Pittsburgh, PA 15260, USA. The variability of nutrients and the effects on a pond food web.

While it is well known that resources play an important role in the development and maintenance of community structure, most theoretical and empirical objectives can be met with long rotations (ca. 260 years). Certain objectives can be met at shorter rotations (80 to 150 years) when treatments of thinning and canopy tree retention are applied. Alternatives examined include retention of 15% cover of live tree canopy at each harvest in combination with artificial thinning between harvests. Thinning from below can expedite the development of large live and dead trees, and canopy height diversity without diminishing wood quantity or quality. Proportional thinning retains understory stems, thereby expediting the recruitment of shade-tolerant trees. A possible drawback to proportional thinning is the diminished production of clean-bole wood at rotations of 150- and 260-years. It is concluded that most wood quantity, wood quality and ecological objectives can be met with long rotations (ca 260 years). Certain objectives can be met at shorter rotations (80 to 150 years) when treatments of thinning and canopy tree retention are applied.
COMMUNICATING & ADVANCING ECOLOGY

The ECOLOGICAL SOCIETY OF AMERICA

85th ANNUAL MEETING

AUGUST 6–10 2000 SNOWBIRD, UTAH

Pre-Annual Meeting LTER All Scientists Meeting
August 2–4, 2000 — Snowbird, Utah