comprehensive in the types of models considered and analytic in terms of comparing the models to assessment needs.

A CONCEPTUAL FRAMEWORK FOR ASSESSING CLIMATE CHANGE IMPACTS TO FORESTS

It is useful to have a conceptual framework of climate change impacts on forests. This framework should facilitate the exchange of information among researchers studying different levels of biological organization and among researchers and policy analysts. This framework should also provide general guidance to program managers, individual researchers, and data management groups, so that information needs at different biological scales are generally known and can be considered when designing research studies. We do not suggest that one large, centralized modeling effort or data base be attempted. Rather, modeling research should be conducted independently at various levels of biological organization and for different purposes.

Because no one model encompasses all of the processes of importance or all of the biological levels of interest, the conceptual framework includes models that operate at different scales (Fig. 1). Global models provide the climate conditions for the region and smaller scales. Regional models provide the natural and policy constraints for the landscape. The landscape biological interactions result in changes in reflectance, evapotranspiration, land cover, and vegetation distribution for the region. Landscape properties determine migration patterns, climate and water constraints, natural disturbance regimes, and management effects that have direct impacts on forest communities. Species composition, size and age distribution, biomass, and numbers of trees are derived from community processes and do affect landscape dynamics. Community properties that influence individual trees include costs (e.g., from predator activities), constraints (e.g., light) and benefits (e.g., symbiotic activities). Individual tree models provide carbon and nitrogen fluxes, leaf area information, and