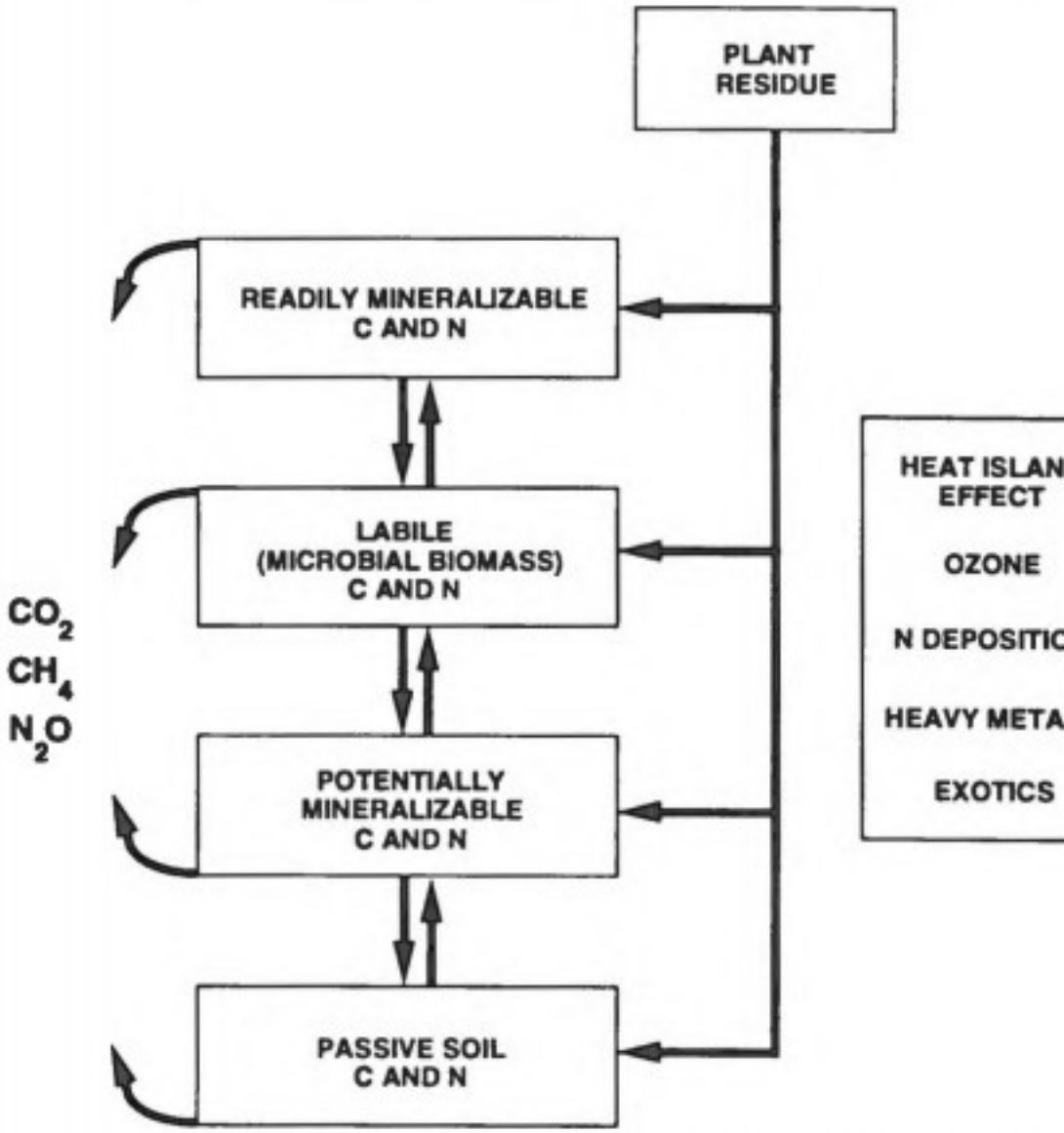

Figure 2. Conceptual model of soil C and N pools and transforma
(Adapted from Parton et al., 1988; and Jenkinson and Rayner, 1977.)

2. Air pollution, especially ozone, will damage tree leaves and reduce litter quality. This will lead to increases in passive C and decreases in the more labile pools of C in urban relative to rural soils.

To test these hypotheses we have begun to monitor soil C pools and to design and carry out field manipulation experiments. Preliminary work and results from several srudies are described below.

IV. The New York Urban-Rural Gradient Experiment (URGE)

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Soli Plot

Figure 3. The New York Metropolitan Area showing the urban-rural land use transect with nine research stands. Twenty-seven sites were established among the stands. (Adapted from Pouyat, 1992.)

"urbanization factors" are far more dramatic than variation in soils, temperature or precipitation along the transect, therefore trends with distance along the transect are attributed to urbanization.

Soil types along the transect are classified as Typic or Lithic Dystrochrepts, coarse-loamy, mixed mesic subgroups, and are well-drained, moderate to shallow sandy loams situated on gently sloping terrain (Tomes, 1974; Hill et al., 1980). Forest stands (27 total) were chosen along the transect using the following criteria: (1) location on upland sites with either Charlton or Hollis soil series (Gonick et al., 1970; Tomes, 1974), (2) oak dominated with *Quercus rubra* or *Q. velutina* as major components of the overstory, (3) minimum stand age of 70 yr, and (4) no evidence of recent disturbance. By design, our transect did not include any stands with a significant proportion of non-native tree species.

The soil C pools depicted in Figure 2 were quantified as described above. Trace gas fluxes were measured in laboratory incubations and at nine sites along the transect using field chambers. The chambers (three replicates per site) were constmcted from 16.5 cm wide by 20 cm long pieces of PVC pipe fitted with a septum and an air-tight well cap (total volume of 2 L). Samples were taken by syringe every 15 min. for 1 h on August 7 and August 8, 1992 and added to evacuated vials. Concentrations of methane, nitrous oxide and carbon dioxide were measured by gas chromatography. Rates of flux were determined by linear regression analysis of the linear section of the depletion or production curves, which was from 0 to 30 minutes.

A. P relim inary Results and Discussion

As expected. New York City produces a marked "heat island" effect (Bomstein, 1968). Annual mean temperatures over the period 1985-1991 were more than 3” C warmer in the urban core that at the rural end of the transect (Figure 4). Average annual precipitation did not differ systematically between urban and rural sites from 1985-1991 but variation in annual precipitation was higher in the urban areas than in the rural areas (Figure 5). For example, in 1989, there was greater than SO cm more precipitation in the urban core than at the rural end of the transect, primarily due to differences in summer thunderstorm activity. In the context of the conceptual models presented in Figures 1 and 2, increases in temperature should increase both NPP and decomposition rates in urban sites and should result in reductions in all soil C pools.

Heavy metal levels in soils were higher in urban forest sites than in rural forest sites (Figure 6), reflecting differences in atmospheric deposition along the transect. High levels of heavy metals can decrease