

Introduction

The Central Arizona-Phoenix Long Term Ecological Research project is initiating an experiment in the North Desert Village family housing development at Arizona State University East Campus, with the general objectives of understand feedbacks between urban landscaping (i.e., radical modification of the pre-existing Sonoran Desert), ecological and micro-climatological parameters, and human behavior.

In 2004 ASU will impose four treatments (plus a control), representative of current trends in Phoenix urban landscaping, on small neighborhoods:

- 1) The mesic treatment will consist of a mixture of exotic "high water use" vegetation and turfgrass irrigated by flood technology.
- 2) The oasis treatment will consist of a mixture of drip-irrigated, "high" and "low" water use plants and sprinkler-irrigated turfgrass.
- 3) The xeric treatment will consist of drip-irrigated, "low water use" plants without turf grass.
- 4) The native treatment will consist of Sonoran Desert vegetation with only minimal additional water inputs.
- 5) The control treatment will eventually consist of a ground cover of decomposed granite without added vegetation.

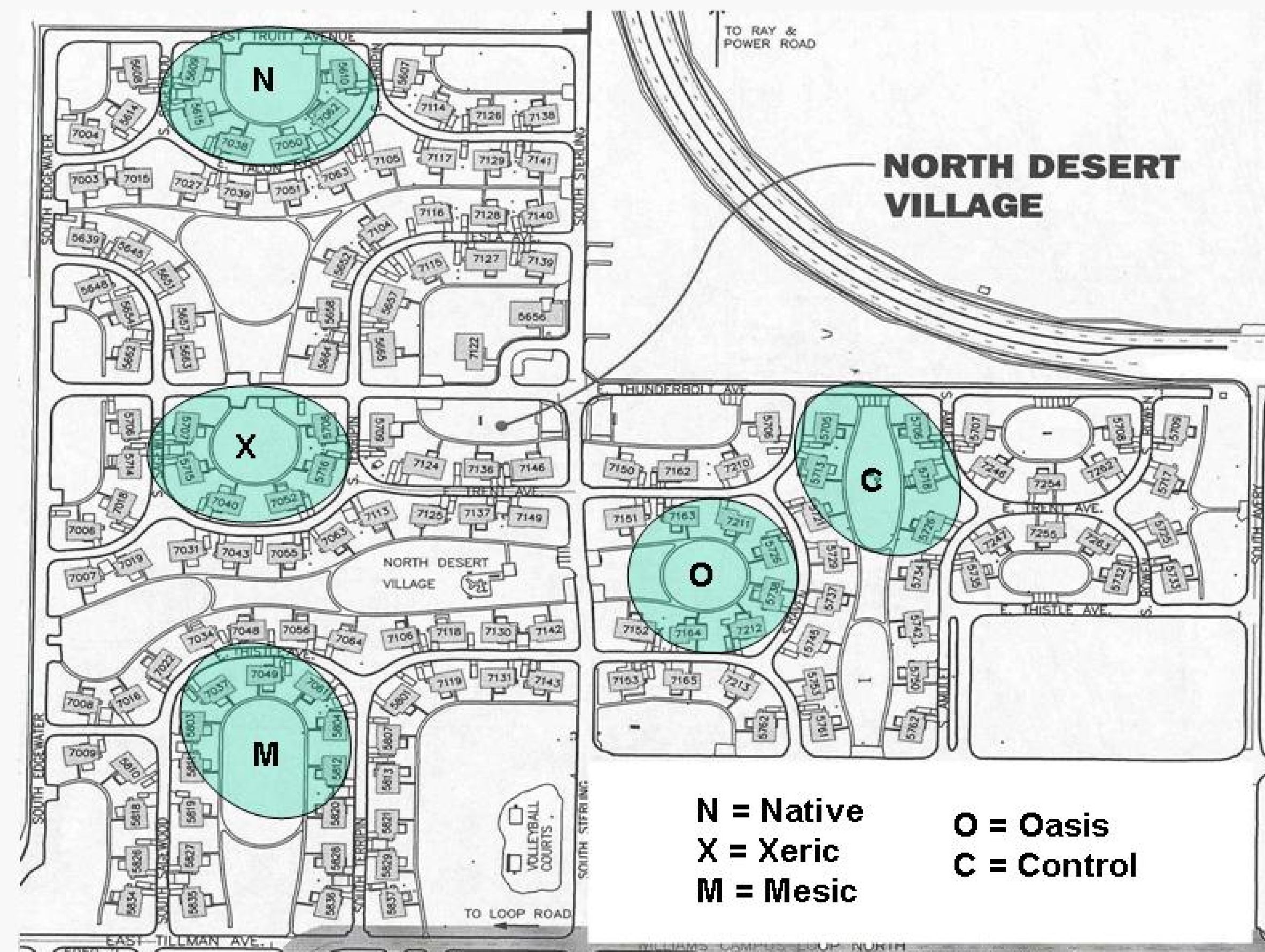


Figure 1. Map of the North Desert Village residential development at Arizona State University East campus. Shaded ovals designate study locations within the development. The University campus is to the south, a golf course to the west and north, and an airport to the north and east.



Figure 2. Pre-treatment appearance of a North Desert Village neighborhood. The common area (foreground) will be landscaped, as well as the areas immediately surrounding the houses.

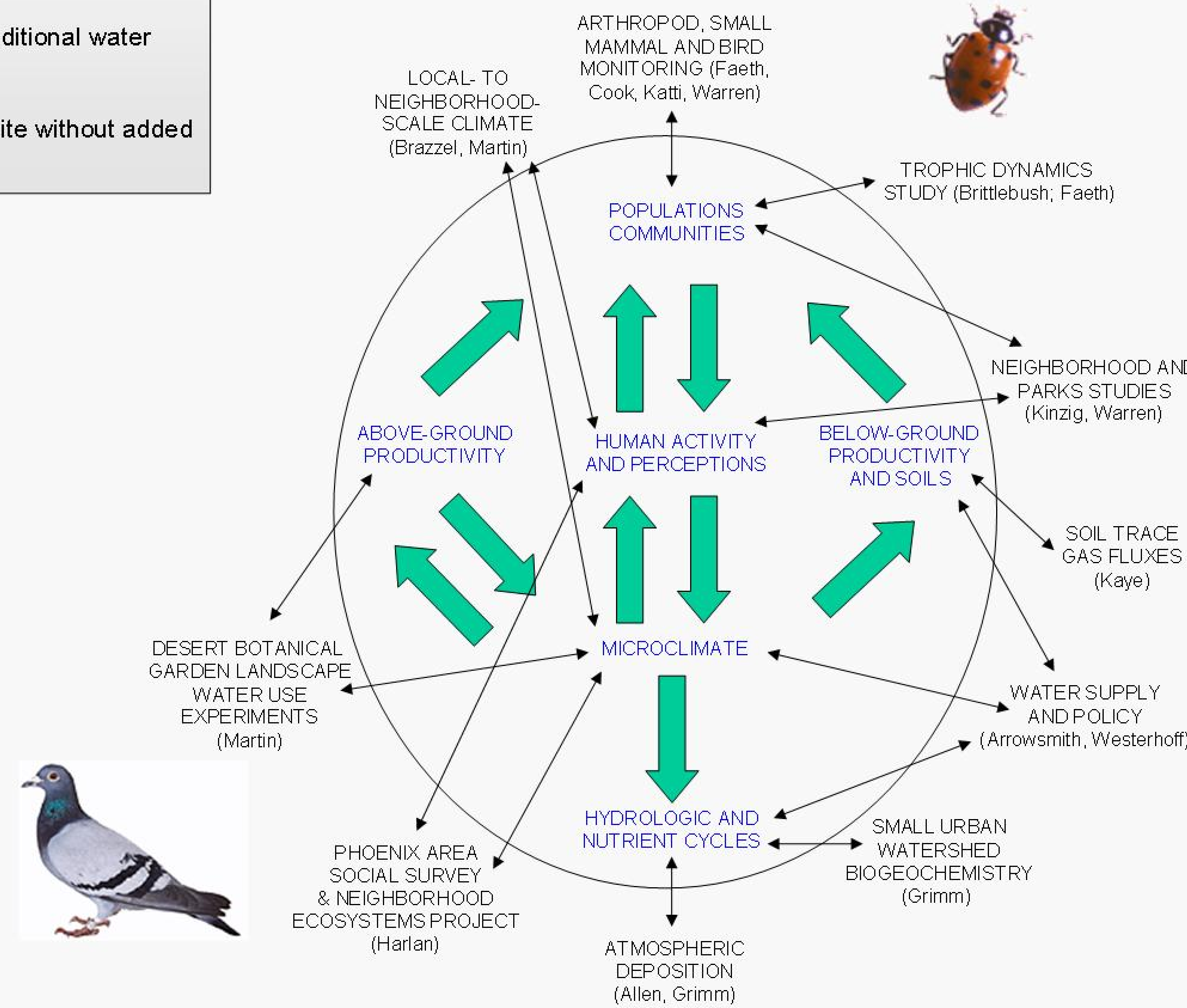


Figure 3. Conceptual model diagram of the North Desert Village "Suburbosphere" experiment. Entries in Blue, with their connecting Green arrows, indicate emphases of study within the experiment. Entries and arrows in Black represent conceptual linkages to other studies within the broader CAP-LTER, with key investigators in parentheses.

Rationale for North Desert Village Experiment

Current approaches to the study of human-environment interactions in landscapes include:

Highly replicated plot scale experiments, imitating human activities within small plots (e.g., nitrogen deposition; Inouye and Tilman 1995, Ecology 76:1872-1887).

Large scale controlled experiments, imitating or replicating human activities (e.g., application of livestock grazing; Collins et al. 1998, Science 280:745-747).

Studying natural experiments which are not controlled by the researcher (e.g., study effects of forest logging by monitoring areas harvested at different periods in the past; Turner et al. 1996, Ecological Applications 6:1150-1172.)

Conducting surveys and use historical or anthropological analyses to study human perceptions (e.g., surveys before and after restoration projects provide quantitative measures of manipulative effects; Schauman and Salisbury 1998, Landscape and Urban Planning 42: 287-295).

We believe that the approach taken in the North Desert Village study combines desirable aspects of these different approaches, including replication, experimental controls, and explicit consideration of human-environment feedbacks by the inclusion of *in situ* human subjects.

Initial Hypotheses to be Tested

Animal diversity (insects, birds, small mammals) will increase in treatments including native Sonoran Desert plants.

Above and below ground productivity will increase in the treatments, and most prominently in the mesic landscape type.

Mycorrhizal diversity will over time after landscape installation with increases in species richness and changes in community composition.

Soil nitrogen storage and turnover rates may increase with landscape water application.

Social networks will become denser in and around the landscape types most preferred by residents.

Improvements in ecological knowledge scores will be positively correlated with social network density within treatment areas.

Ecological knowledge is higher for people with a preference for native landscapes.

Recreation rates will be higher in the mesic and oasis landscape treatment areas.



Figure 4 (left). An example of a mesic yard. Note the turf grass, palm, and broadleaf trees.

Figure 5 (right). An example of an oasis yard. Note the well-defined central turf grass area, surrounded by bare soil and gravel, with drought-tolerant shrubs and trees.



Figure 6 (right). An example of a xeric yard. Note the absence of turf grass, the presence of gravel between plants, and the presence of native (e.g., ocotillo) and non-native species.

Not pictured. A native yard. This design is similar to that of a xeric yard, but includes only native Sonoran Desert plant species.

