RECOVERY OF PERENNIAL VEGETATION IN GHOST TOWNS OF THE MOJAVE DESERT

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NATURAL RECOVERY VERSUS ACTIVE RESTORATION

- Is natural recovery (passive restoration) viable in Mojave Desert plant assemblages? How fast does natural recovery occur?

- The choice of natural recovery versus active restoration allows management

DISTURBANCE RECOVERY SITES

We measured compaction recovery in 7 ghost towns, 4 WWII Army camps, and one research site in various years, yielding 32 site-time combinations.
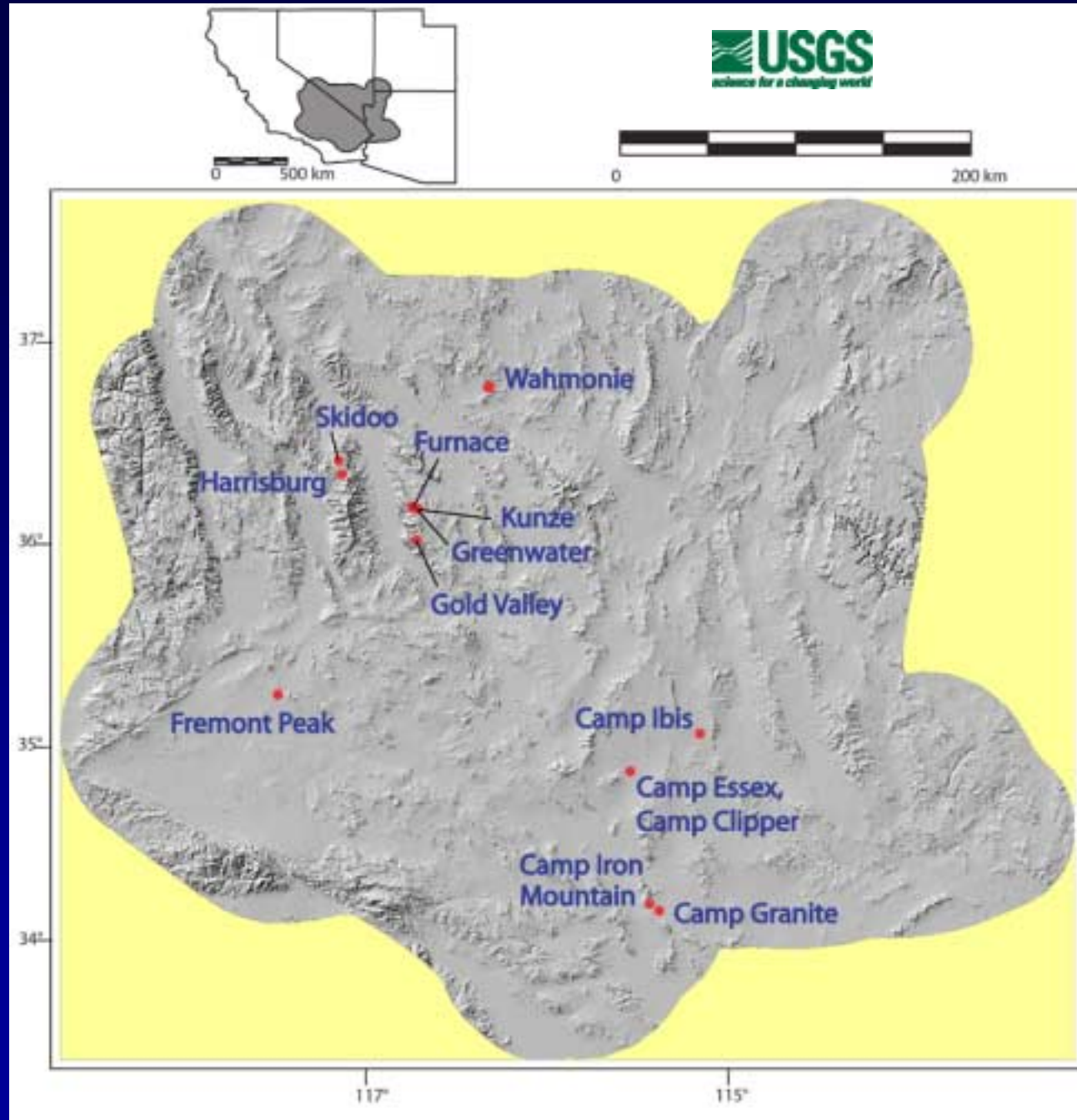
Kunze, 1906

GREENWATER TIMES AND
POST OFFICE,
GREENWATER CAL. 1906.

Kunze, 1984

Skidoo townsite, 1916

Skidoo townsite, 1999

RECOVERY RATES FROM SEVERE SOIL COMPACTION

- Recovery estimates were based on soil penetration depth, indexed to compaction in active roads and undisturbed sites

- Other soil measurements were also made, including bulk density, penetration resistance, and shear stress

- Field soil compaction is difficult to measure in the Mojave Desert owing to high gravel contents

COMPACTION RECOVERY
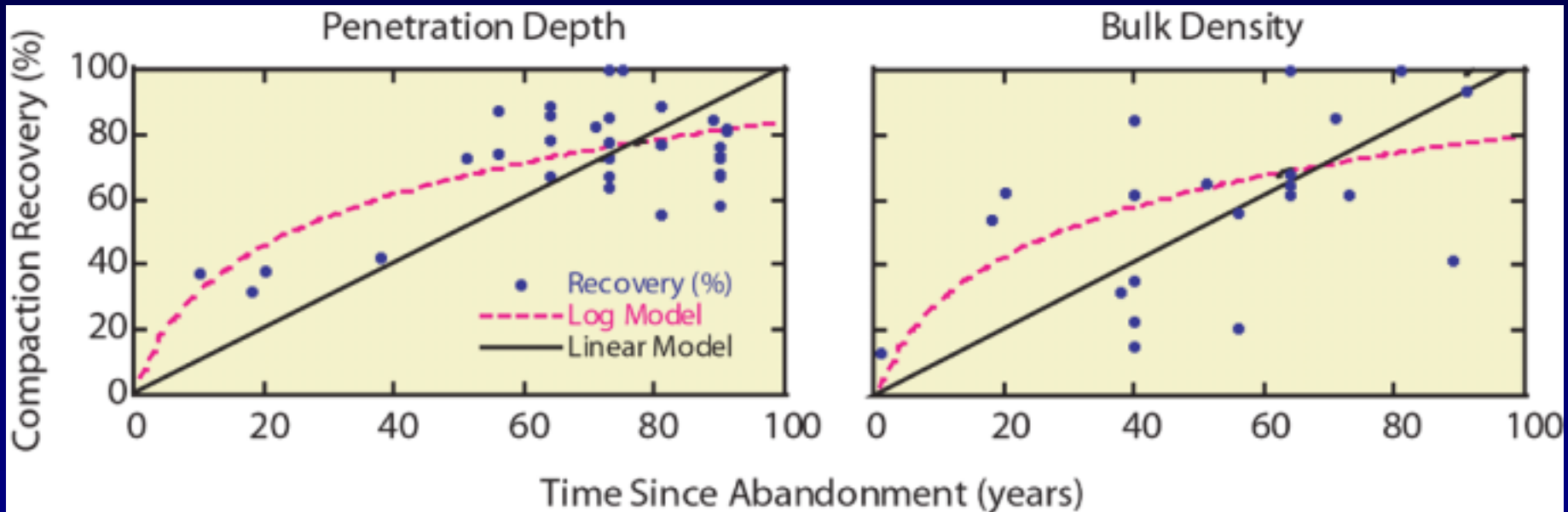
For penetration depth, a logarithmic type model appears to best represent the data. Bulk density has more scatter and there is no significant difference between the logarithmic and linear models.

# RECOVERY APPEARS TO FOLLOW WETTING-DRYING CYCLES
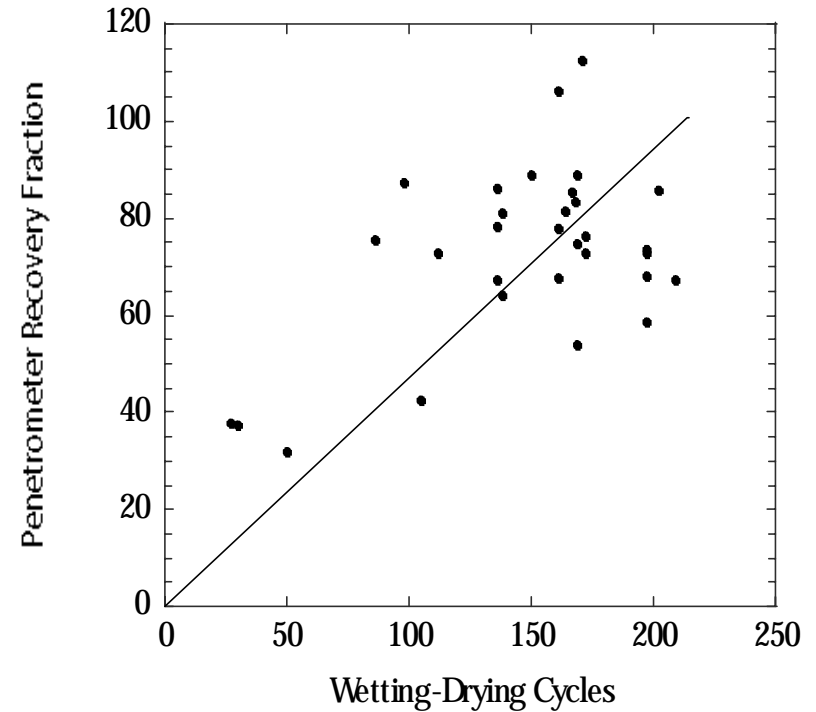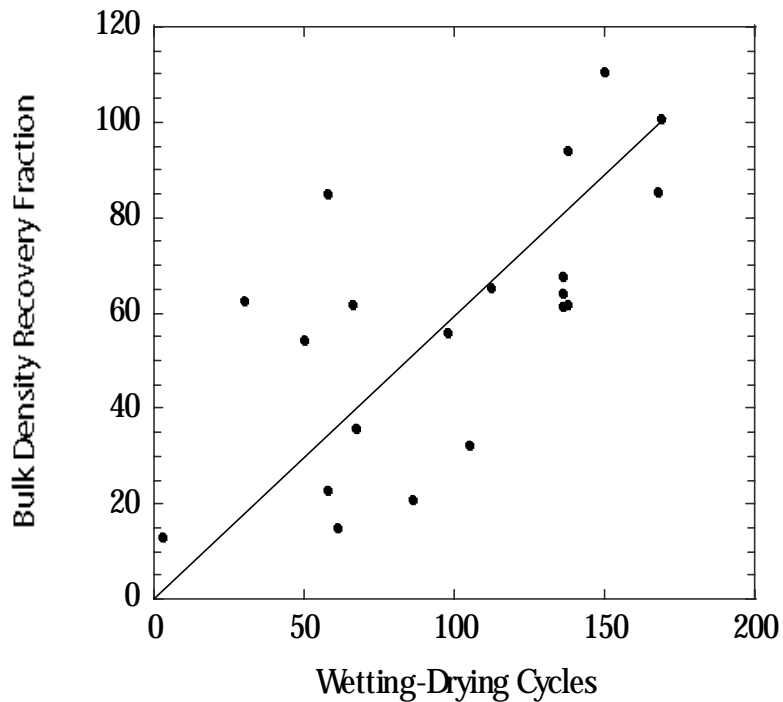
RECOVERY OF TOTAL VEGETATION COVER

- Restoration of total vegetation cover vegetation cover irrespective of species of species composition is an important important measure of protection from wind protection from wind and water erosion as water erosion as well as wildlife habitat. wildlife habitat.

- Is the recovery function linear or linear or curvilinear? This affects the affects the decision for active restoration active restoration versus natural recovery.
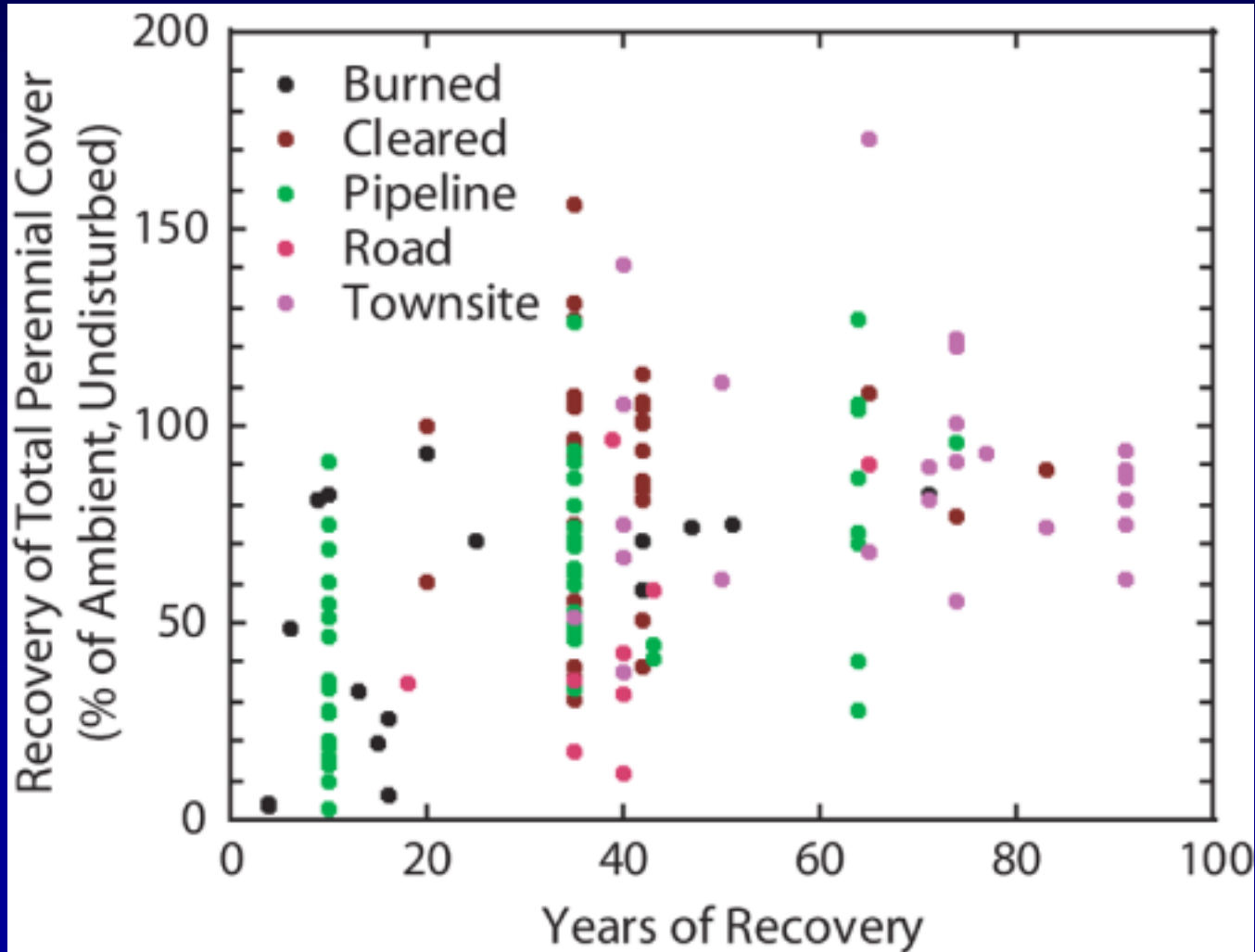
RECOVERY OF TOTAL COVER
(irrespective of species composition)

Six plots had >100% recovery. Using the linear model (r = 0.66), total cover is restored on average in 88 years. The log model (r = 0.42) may more realistically depict recovery of total cover, but it asymptotically approaches 100% recovery. An intermediate time, such as 85% recovery, is more meaningful ($T_{85\%}$ = 67 years).
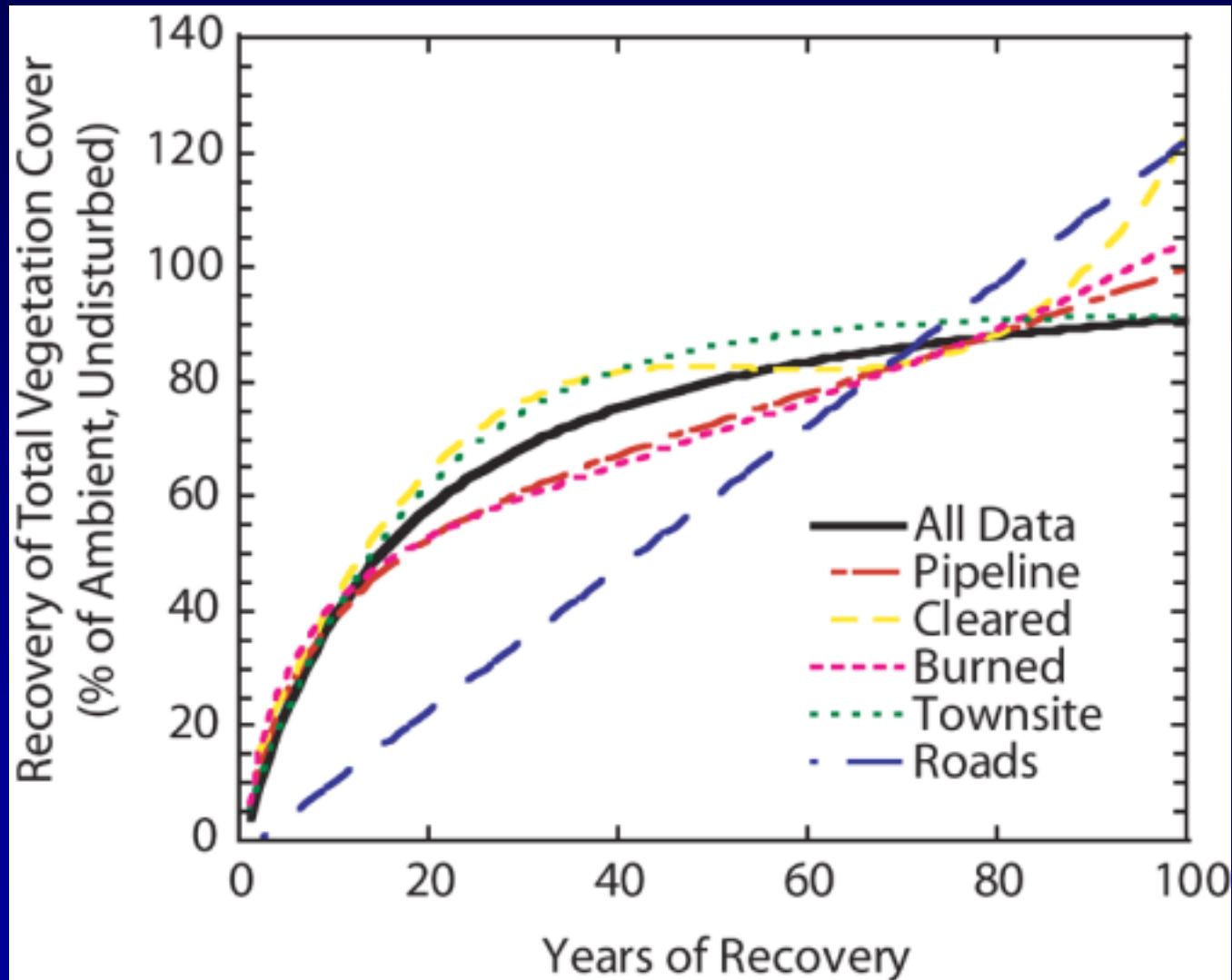

Linear Model, y=1.13 x

Log Model, y = 53 · log(x)- 1.9
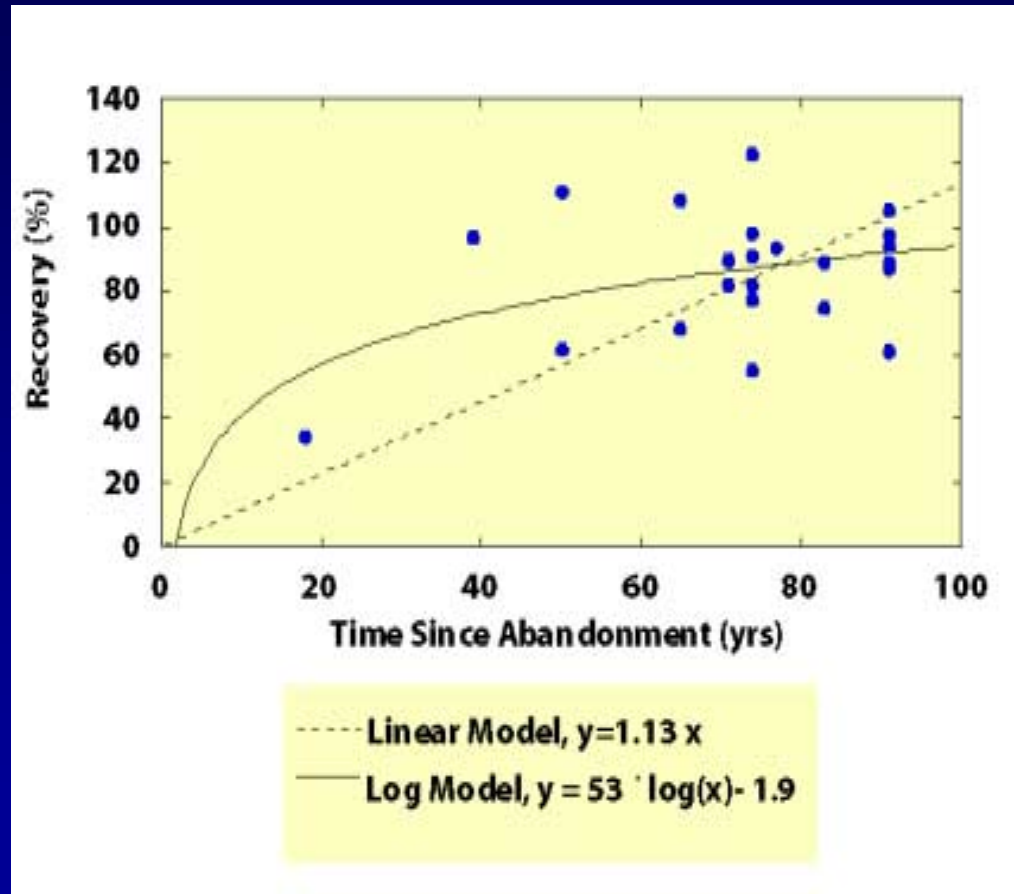
RECOVERY OF TOTAL PERENNIAL VEGETATION COVER
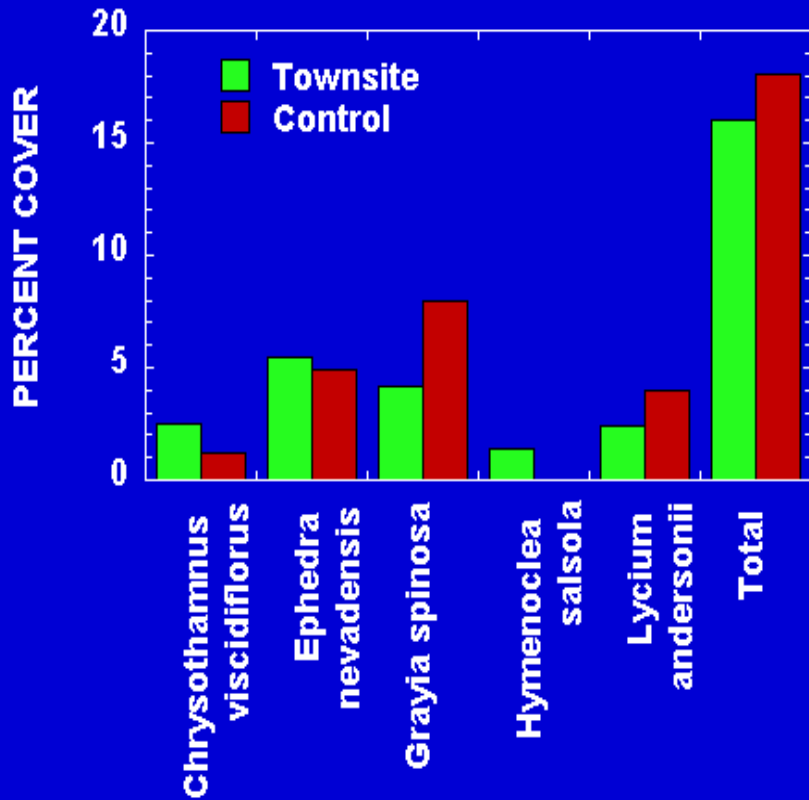## (n = 134 observations)

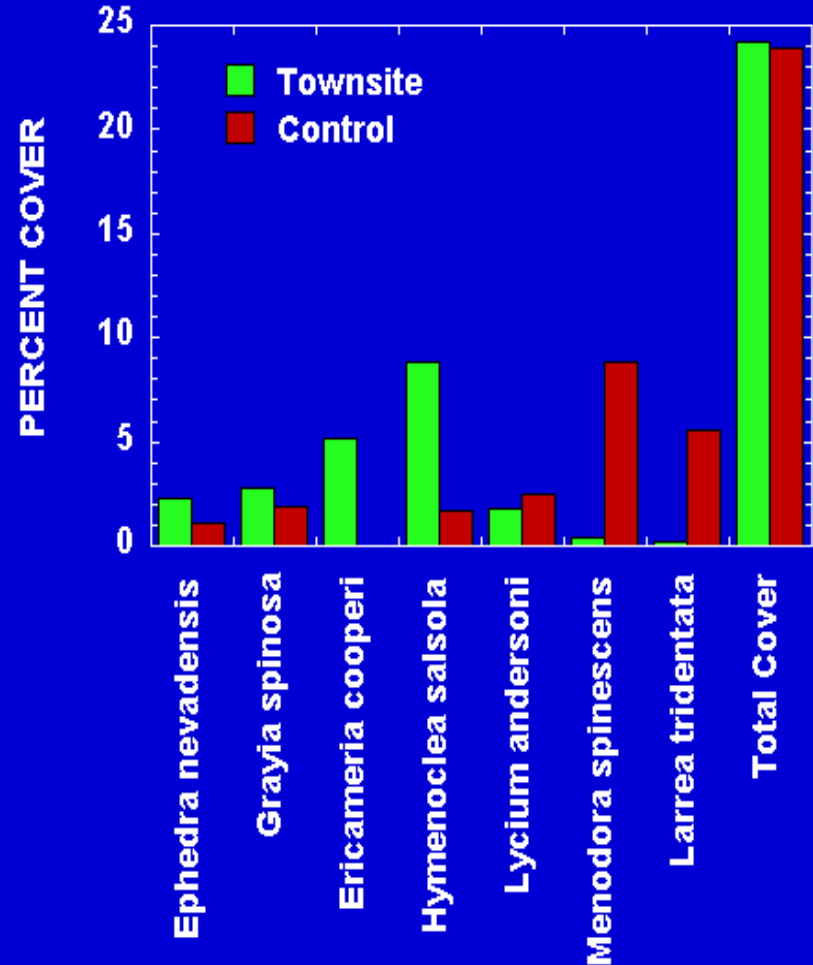# RECOVERY OF TOTAL PERENNIAL VEGETATION COVER
(6 treatments, n = 134 observations)

RECOVERY OF SPECIES COMPOSITION

Harrisburg Townsite (91 years)

Greenwater Townsite (92 years)

ACTIVE RESTORATION STRATEGIES:
Lessons from Natural Recovery

- Soil compaction may not significantly affect significantly affect vegetation reestablishment vegetation reestablishment at all sites. all sites. Ripping of compacted soils on low compacted soils on low slopes may cause may cause more ecosystem harm than good. than good.

- Use "early successional species" in seed species" in seed mixes (*e.g., Hymenoclea* <