

## **APPENDIX B**

### **Environmental and Behavioral Descriptors and Field Forms Used to Record Observations of Wildlife Using Study Plots**

**Environmental and behavioral descriptors used to record observations of animal use.**

VEGETATION

DPS Dry prostrate shrub tundra  
MGT Moist graminoid tundra  
WGT Wet graminoid tundra  
WST Wet saline graminoid tundra  
ACE Aquatic graminoid tundra (*Carex*,  
*Eriophorum*)  
AAR Aquatic graminoid tundra  
(*Arctophila*)  
COB Coastal barrens  
BSP Barren of sand covered peat  
WTR Water  
IMP Impounded water caused by man-  
made structures  
SNI Snow/Ice  
DST Disturbed  
MTT Moist tussock tundra  
UNK Unknown/not applicable

SURFACE-FORM

HCP High-centered polygons  
LCP Low-centered polygons  
MCP Mixed high- and low-centered  
polygons  
FBT Frost-boil tundra  
STR Strangmoor and/or discontinuous  
low-centered polygons  
HUM Hummocky terrain associated  
with steep slopes  
PGO Pingo  
NPG Non-patterned ground  
RET Reticulate pattern on creek banks,  
ridges, or inactive dunes  
PNE Pond (shallow, no emergent  
vegetation)  
PWE Shallow pond/lake with *Carex* or  
*Arctophila*  
LAK Lake (too deep to wade)  
STR Stream  
FTP Flat-top polygon (low-relief high-  
centered polygon)  
PRS Peat road surface  
PRD Peat road ditch  
PRB Peat road bank  
GPS Gravel pad surface  
GPB Gravel pad bank  
GPD Gravel pad ditch

GRS Gravel road surface  
GRB Gravel road bank  
GRD Gravel road ditch  
ALL Alluvium  
OVB Overburden  
UNK Unknown/not applicable

MICROHABITAT

RIM Low-centered polygon rim or  
strangmoor ridge  
TRO Polygon trough  
BAS Polygon basin  
IWP Ice wedge pool (thermokarst pit)  
TUS Tussock  
HUM Hummock  
FRB Frost boil  
OPW Open water  
EMV Emergent vegetation  
SNI Snow/Ice  
MEW Melt water  
FLV Flat-vegetated  
FLB Flat-barren  
PPL Pipeline  
ISV Isolated vegetation  
ISL Island  
PEB Pond edge/bank  
DST Disturbed  
GRR Gravel roadside  
STK Stake (plot marker)  
UNK Unknown/not applicable

BEHAVIOR

DI Displaying  
NI Nesting/incubation  
AD Alarm/distraction  
FD Feeding  
RP Resting/preening/standing  
FS Flushed  
FL Flying  
IN Interacting (non-display)  
LD Landing  
HU Hunting  
AT Attracted from off plot (mobbing)  
TR Transport  
UN Unknown

SIGN

SC Scat  
TR Tracks  
GR Grazing  
RE Remains





## **APPENDIX C**

### **Statistical Analyses and Distributions of Selected Data**

## INFERENCEAL STATISTICAL ANALYSES

Relatively few data sets were subjected to inferential analysis due to the limited objectives of the study. As mentioned earlier, the study was not designed with the stated purpose of testing hypotheses. Thus, those data sets chosen were selected for their ability to give a broad impression of pertinent trends, and because it was possible to convert them into an appropriately testable format.

Bird use of coastal plain gravel pads was compared with that of adjacent tundra by analyzing differences between mean numbers of bird observations per day and over the summer. During the second and fourth 2-wk study periods, as well as during the summer as a whole, there was a statistically significant difference between the mean numbers of bird observations noted on gravel and tundra (Table C-1).

Similar analyses compared ponds to impoundments, and waterbodies with *Arctophila fulva* to waterbodies without *A. fulva*. In neither case did the compared habitat types differ with respect to the mean number of bird observations per time period, irrespective of the time period under consideration (Table C-1).

Coastal plain gravel pads and undisturbed tundra were also compared with respect to proportions of bird behavior observed on them over the length of the summer (Table C-2). In addition to the general conclusion that proportions of bird behavior on gravel and tundra are significantly different, several specific differences are apparent. On gravel pads, fewer observations were made of displaying, hunting, landing, and alarming/distracting behaviors than would have been expected if behavior occurred in identical proportions on gravel and tundra. Resting/preening accounted for a higher proportion of bird behavior on gravel pads than would have been expected. The large discrepancies between observed and expected frequencies in each of these five behavioral categories were enough individually to conclude that gravel pads and tundra differ with respect to bird behavior. Discrepancies in feeding and interacting behaviors were relatively less important, quantitatively.

Table C-1. Statistical analysis of bird use by habitat type. For each habitat comparison, the analysis tested for a difference between mean numbers of bird observations per day, (i.e. for 24 3-min periods), and for the entire summer, (96 3-min periods). Observations were made at each site one day per each of the 4 observational periods.

2-Wk Observational Period	Coastal Gravel Pads versus <u>Undisturbed Tundra</u>		Ponds versus <u>Impoundments</u>		Ponds/Impoundments with ARFU versus <u>Ponds/Impoundments w/o ARFU</u>	
	P	n	P	n	P	n
1	0.51	9	0.05<P<0.10	19 / 9	> 0.20	14 / 14
2	0.02 *	10	> 0.20	19 / 9	> 0.20	14 / 14
3	0.18	9	> 0.20	19 / 9	> 0.20	14 / 14
4	< 0.01 *	10	> 0.20	19 / 9	> 0.20	14 / 14
Entire Summer.	< 0.01 *	10	0.05<P<0.10	19 / 9	> 0.20	14 / 14
	(sign test)		(Mann-Whitney)		(Mann-Whitney)	

\* significant difference at alpha = 0.05.

Table C-2. Frequencies of bird behavior on gravel pads and tundra. Data are numbers of actual observations per behavioral category, and what would have been expected if behaviors had occurred in the same proportions on both types of habitat. Behaviors are ranked by their contribution to the overall chi-square statistic.

Behavior	Gravel Pads		Tundra		Chi-square Contribution
	Observed	Expected	Observed	Expected	
Displaying	27	74	63	16	172.77 *
Hunting	4	22	22	5	81.59 *
Resting / Preening	907	810	74	171	66.66 *
Landing	734	787	219	166	20.37 *
Alarming / Distracting	13	21	12	4	16.22 *
Feeding	949	910	153	192	9.64
Interacting	20	24	9	5	3.72
Other	93	100	28	21	2.74
	<u>n = 2747</u>		<u>n = 580</u>		<u>Chi-square = 373.71</u>
					df = 7
					P < 0.01

\* chi-square contributions that, alone, would have made test significant.



## DESCRIPTION OF VARIABLE DISTRIBUTIONS

In order to better describe the variability of the data concerning wildlife use of disturbed and undisturbed habitats, bivariate scatter/boxplots were generated with the computer package SYGRAPH (Wilkinson 1988:188) and are included following Fig. C-1. Each pair of plots corresponds to a specific habitat-use comparison addressed in the text, and appears in the same sequence. The individual graphs are simple scatter diagrams which plot the number of distinct species observed per two-hour interval by the average number of individuals observed per 3-minute period during that same interval. Opposite the axes, data variability is summarized by boxplots. A notational explanation of the boxplots themselves is presented in Fig. C-1.

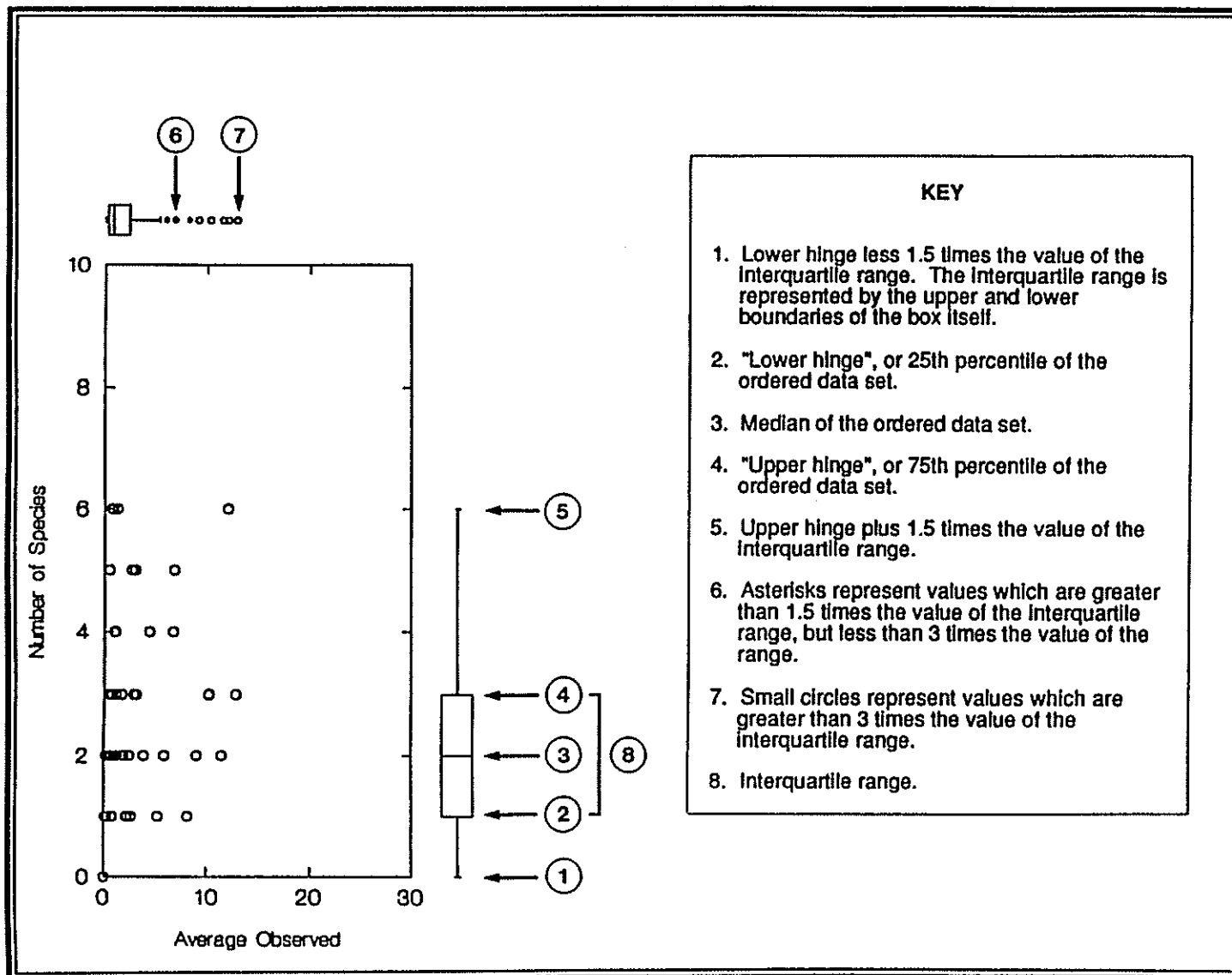
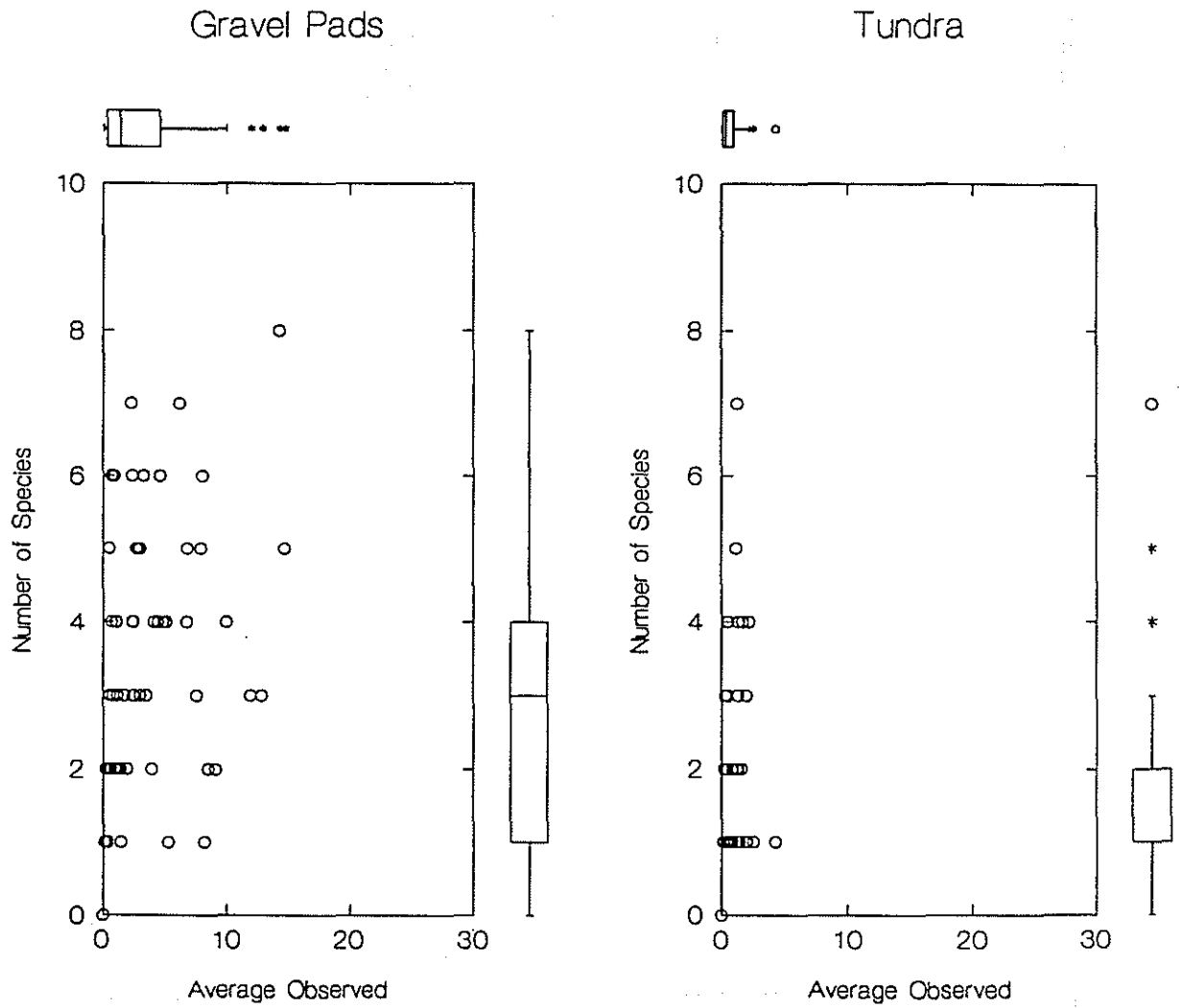
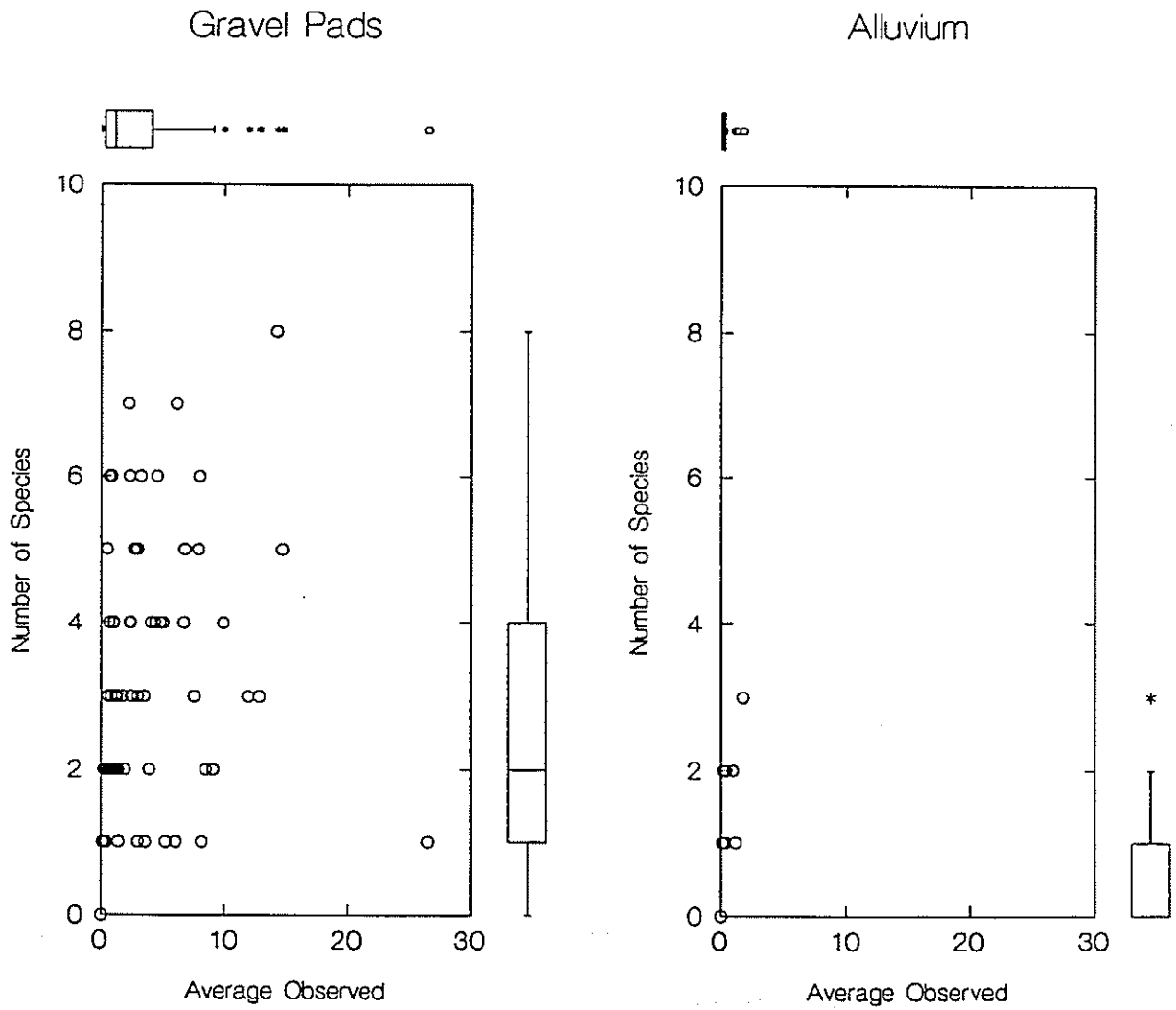


Fig. C-1. Notational key to boxplots which graphically describe the variability of data concerning wildlife use of disturbed and undisturbed habitats.

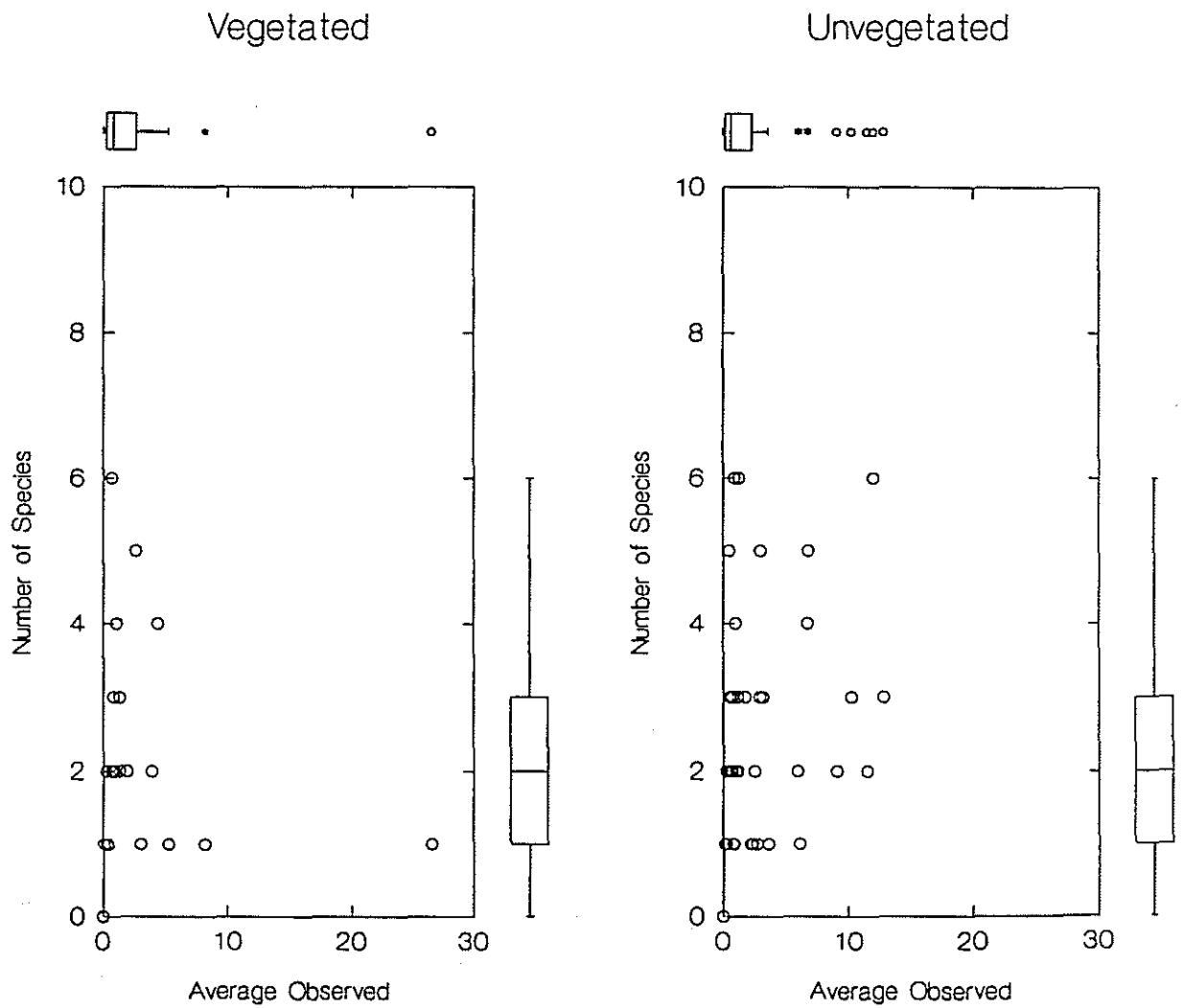
# Bird Use of Coastal Gravel Sites



# Bird Use of Coastal Gravel Pads and Alluvium

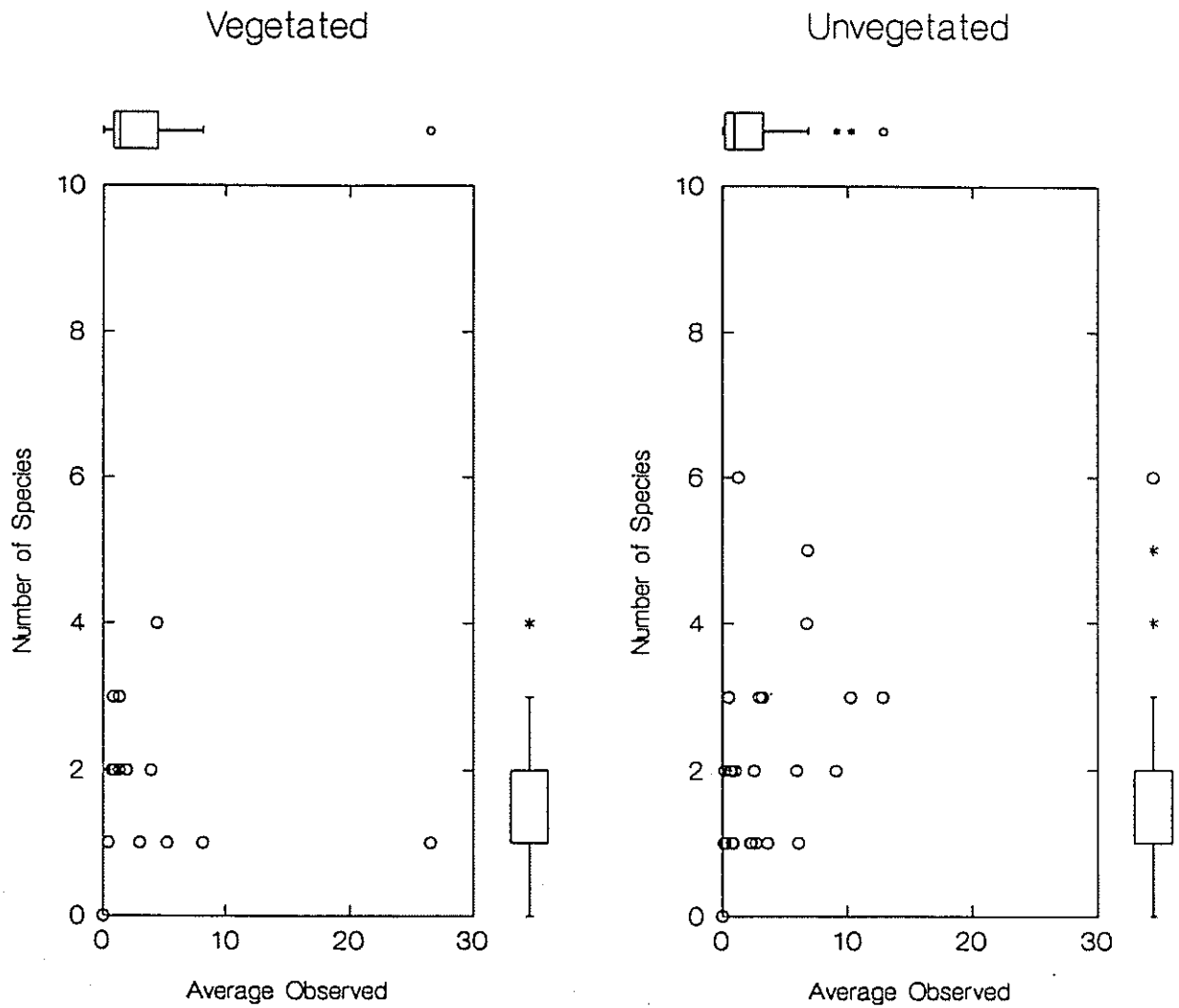


# Bird Use of Gravel Pads excluding observations on impoundments



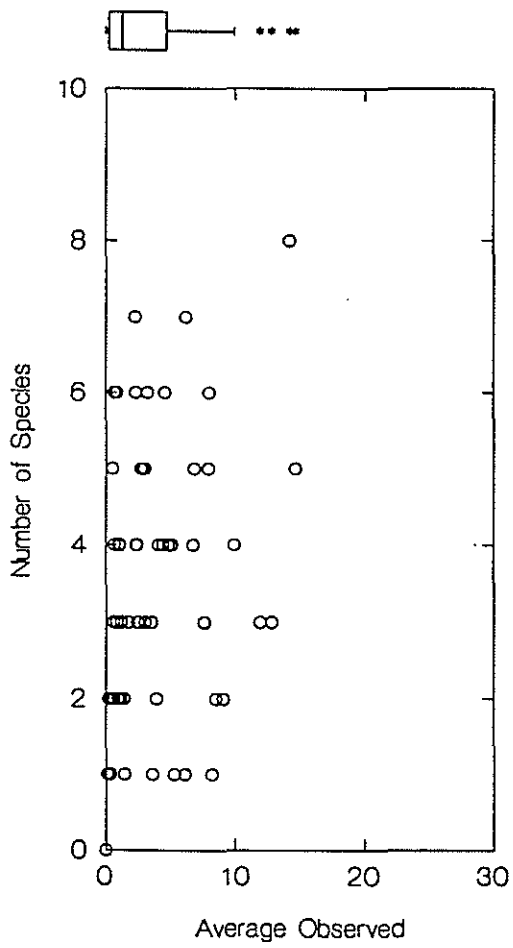
# Bird Use of Gravel Pads

from mid-July to mid-August  
excluding observations on impoundments

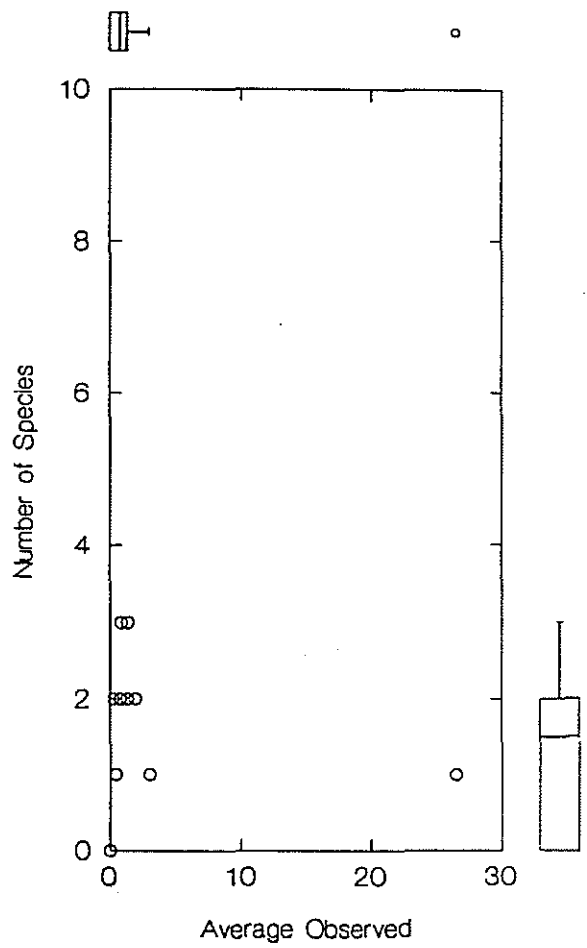


# Bird Use of Gravel Pads

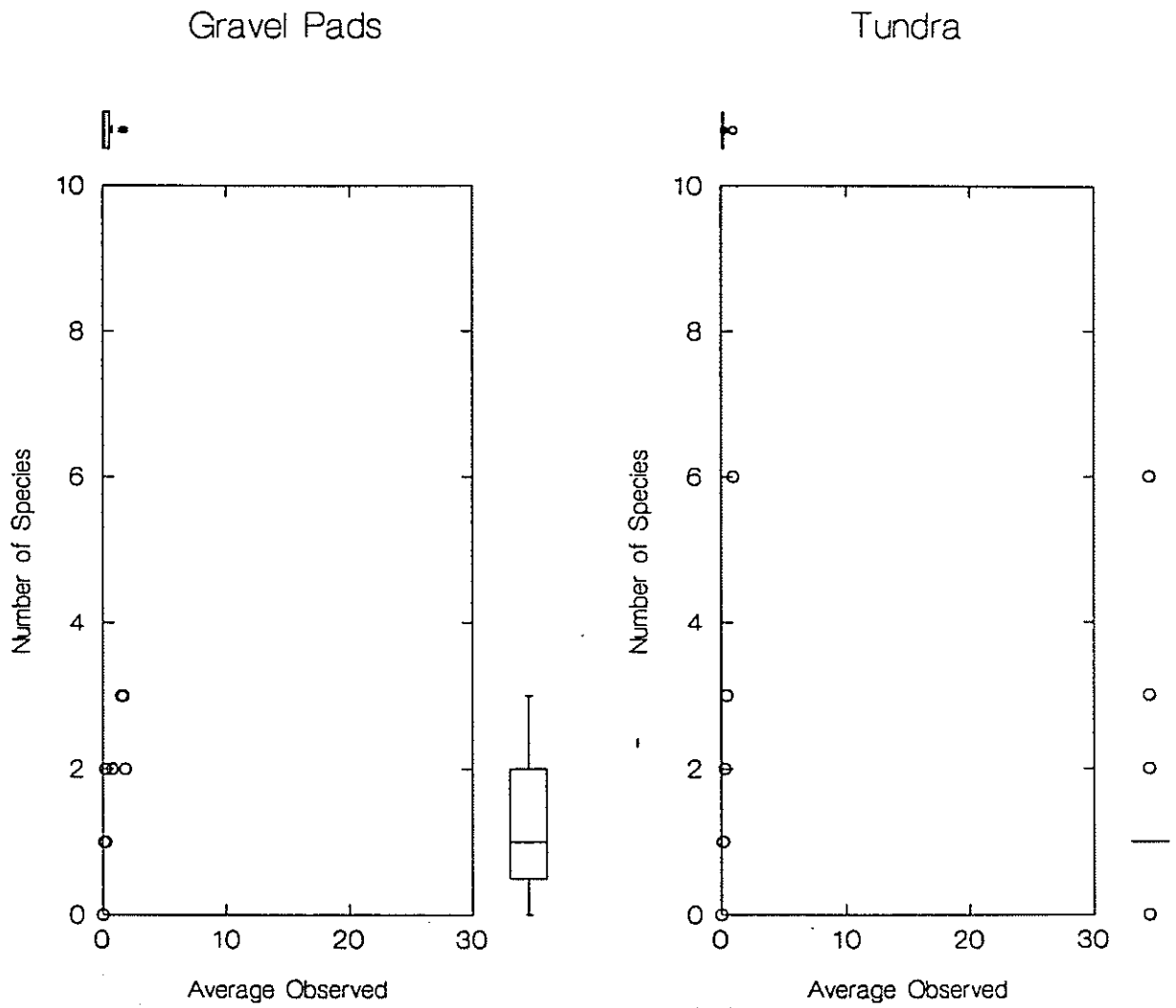
With Impoundments



Without Impoundments



# Bird Use of Foothill Gravel Pad Sites

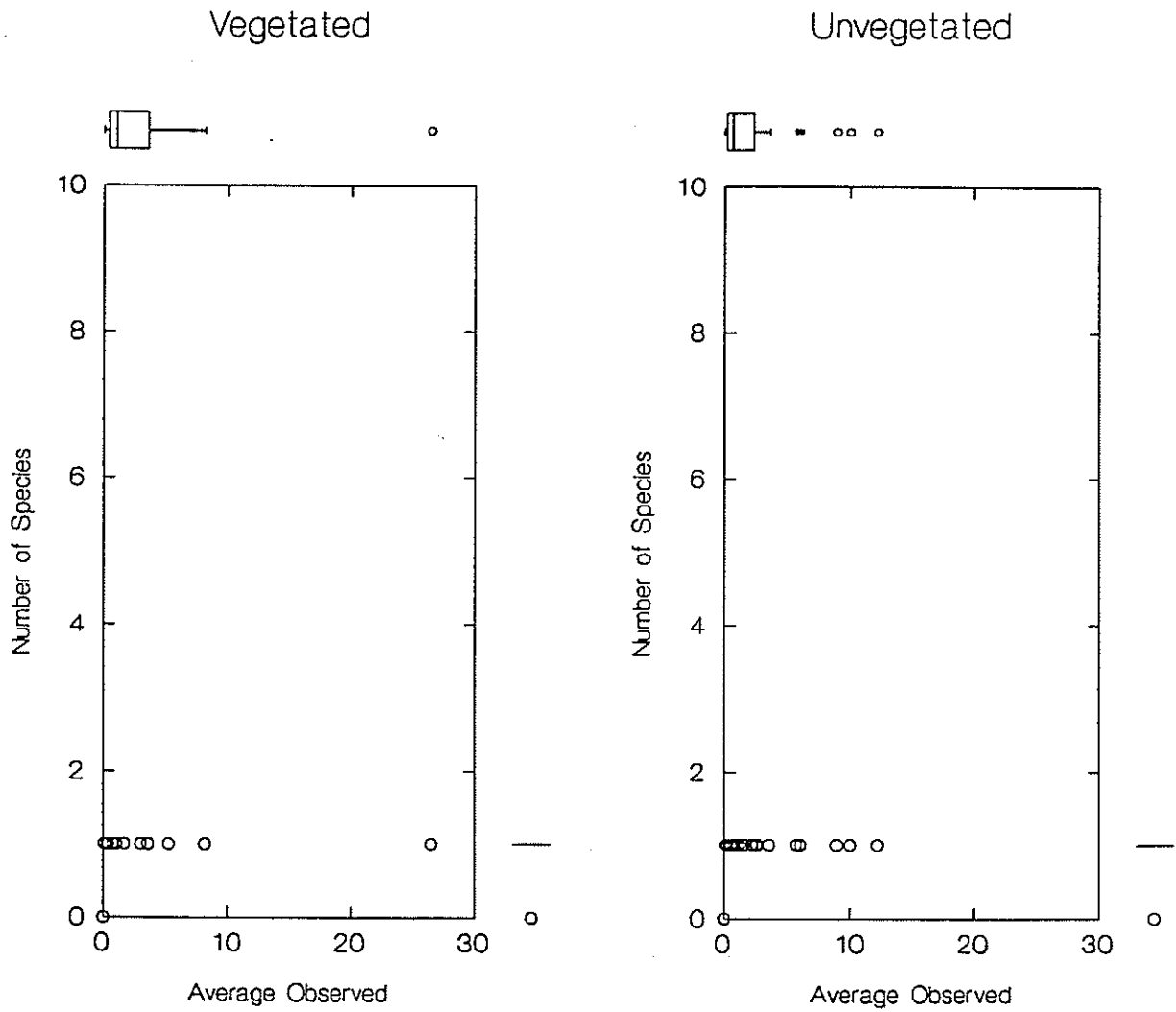




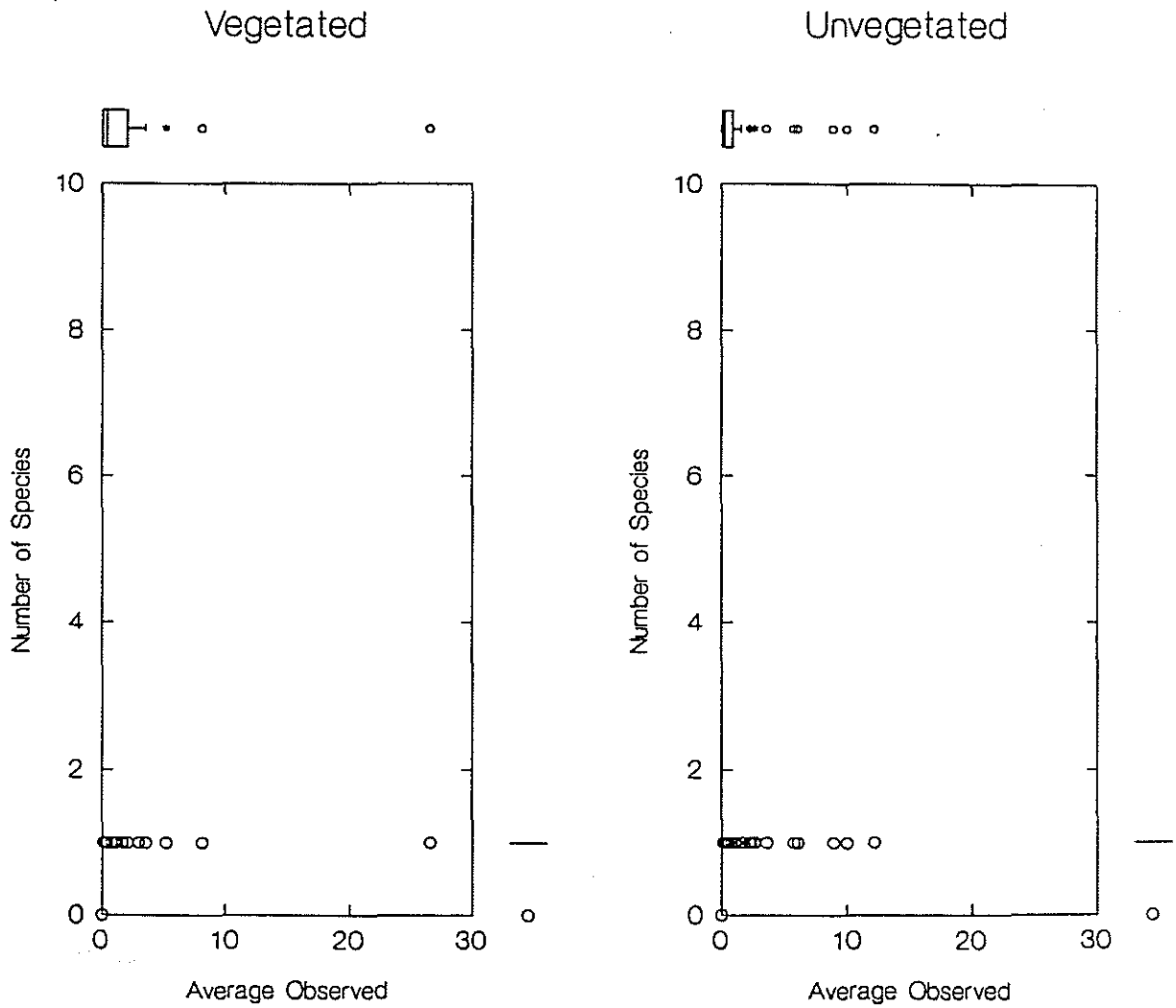


# Lapland Longspur Use of Gravel Pads

from mid-July to mid-August  
excluding observations on impoundments

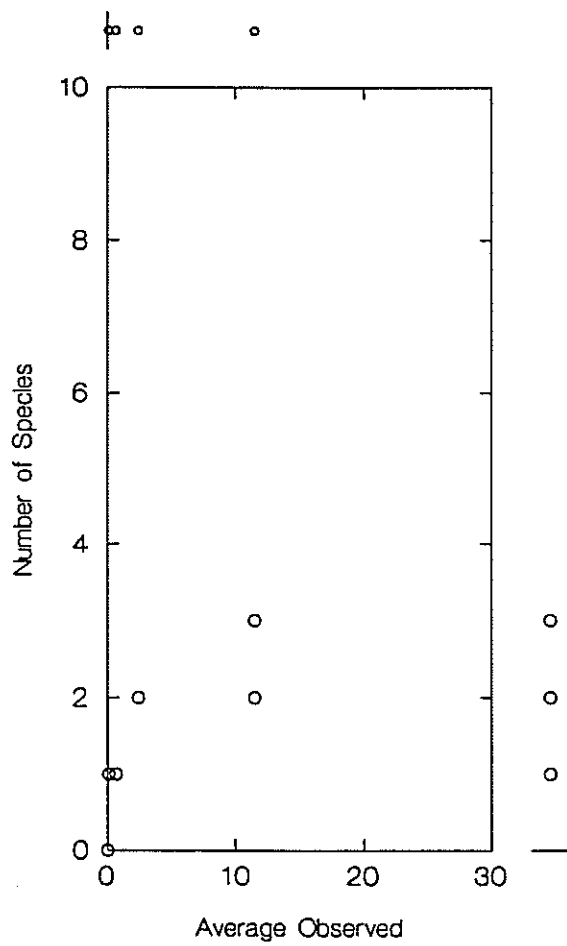


# Lapland Longspur Use of Gravel Pads excluding observations on impoundments

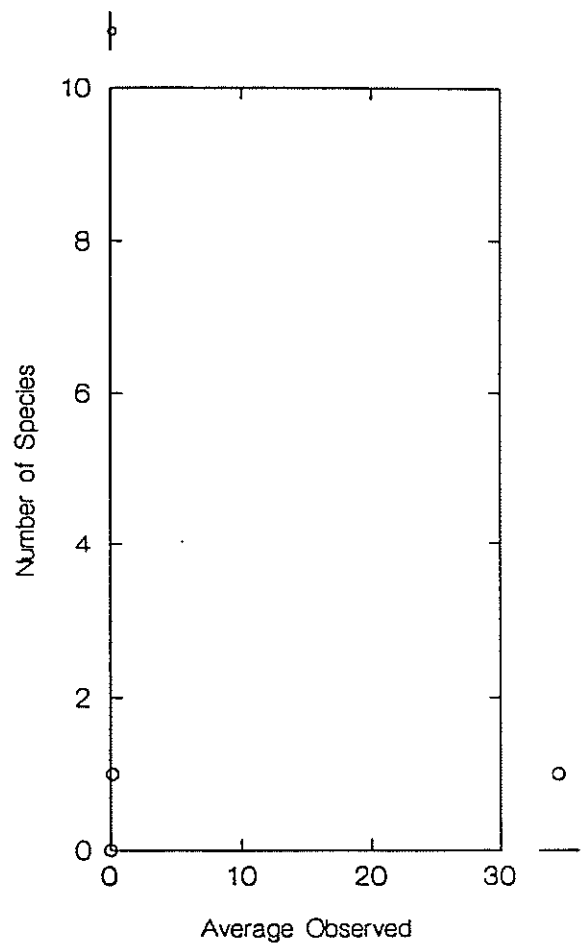


# Waterfowl Use of Coastal Gravel Pad Sites excluding observations on impoundments

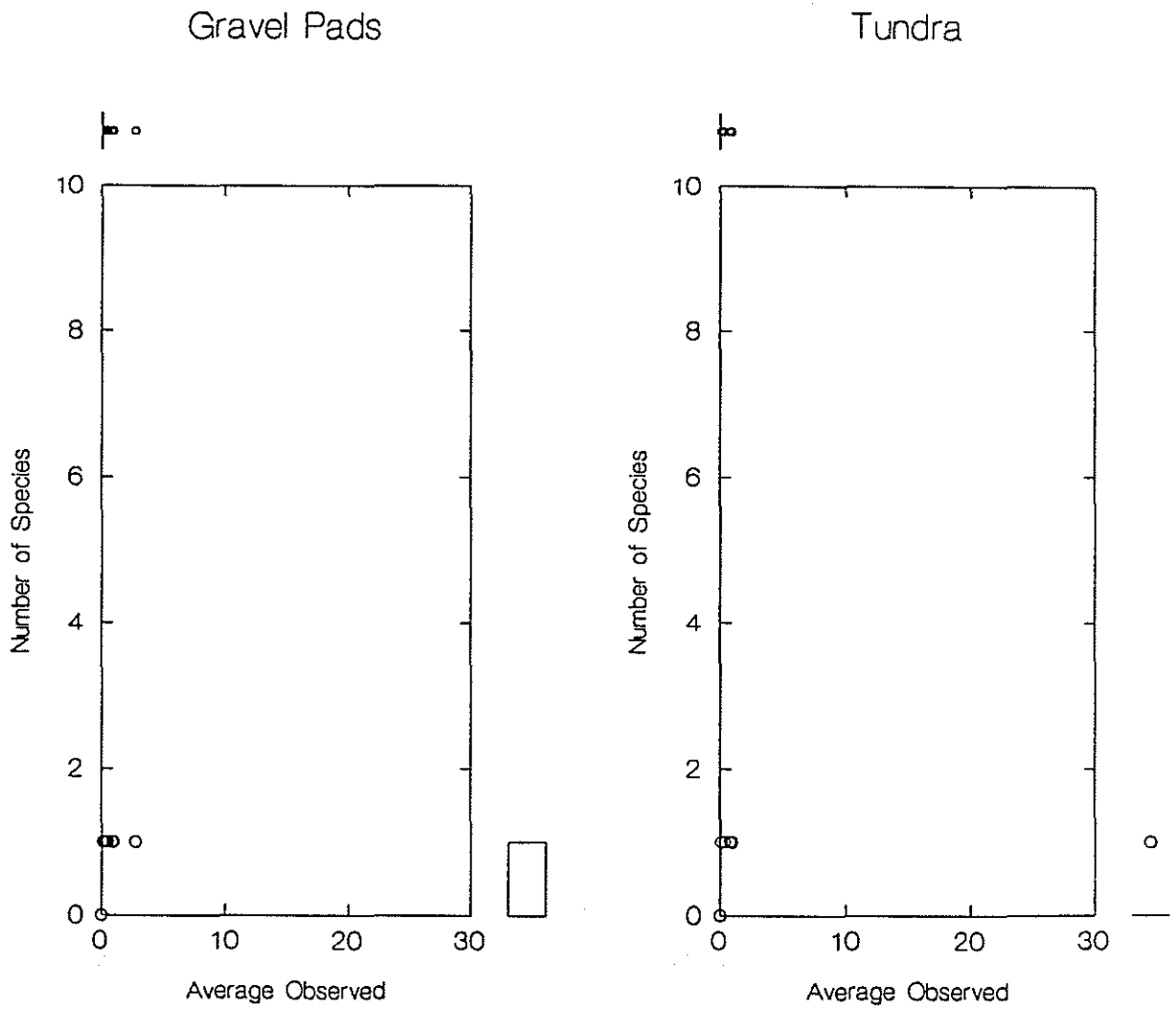
Gravel Pads



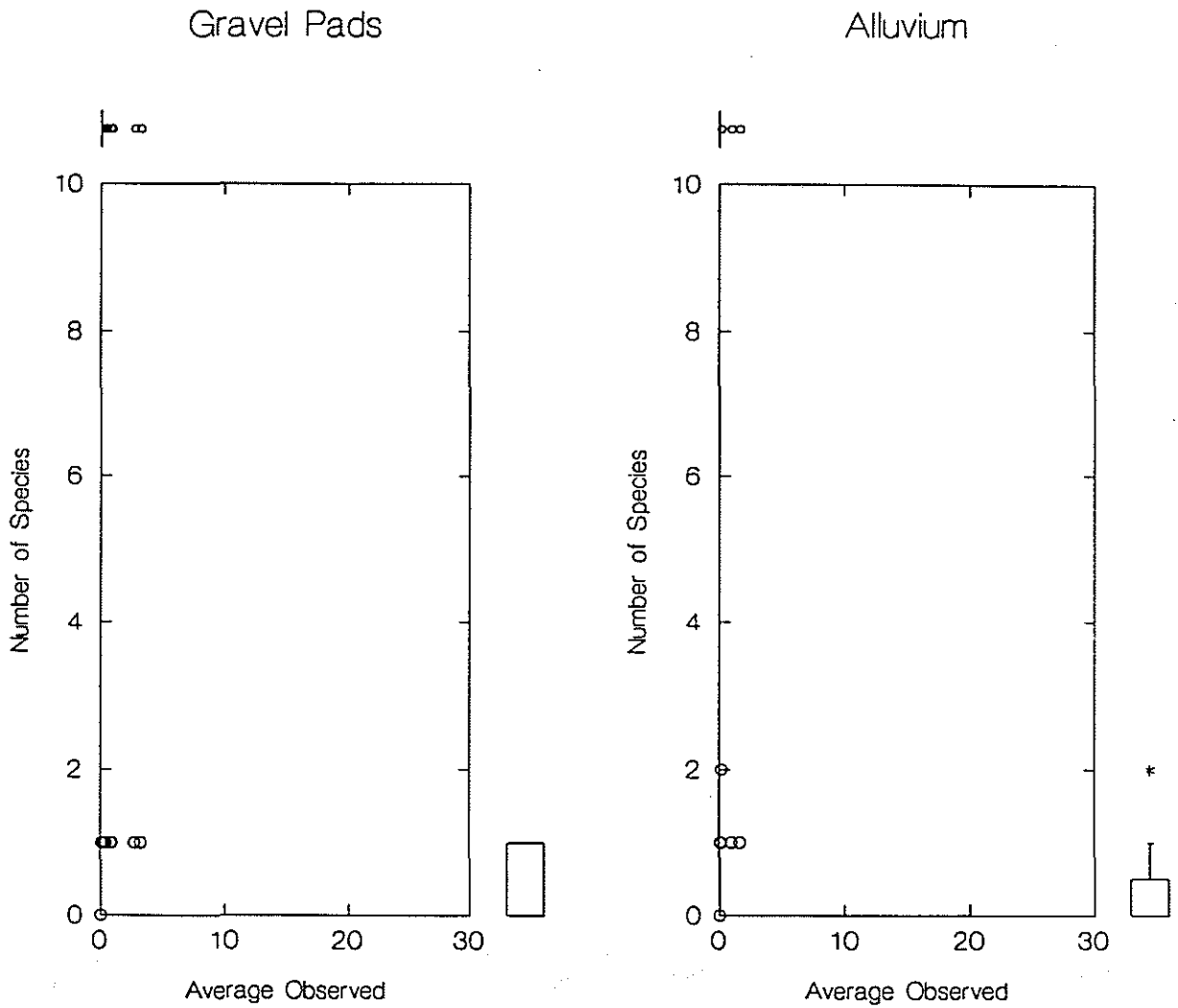
Tundra



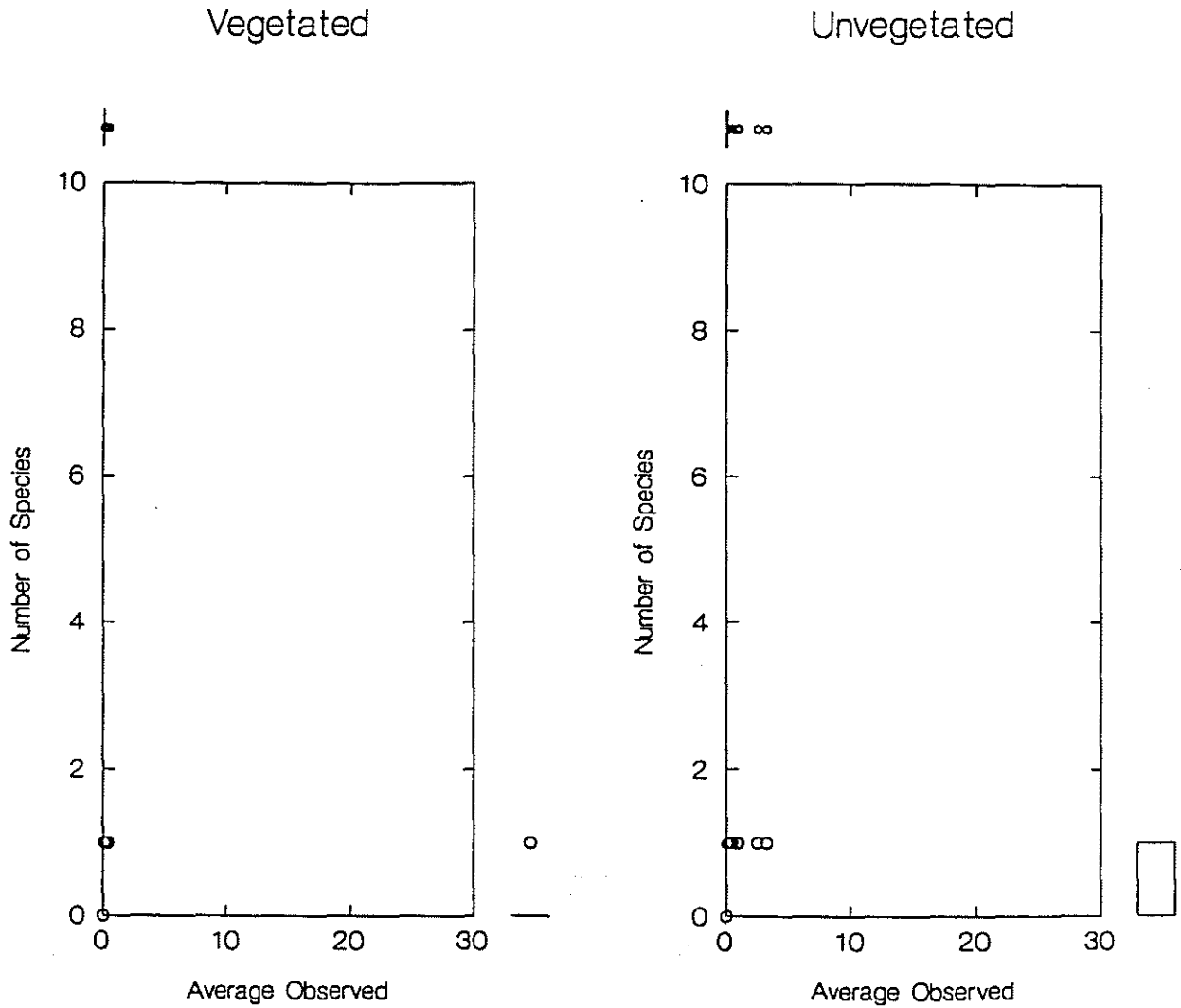
# Mammal Use of Coastal Gravel Sites



# Mammal Use of Gravel Pads and Alluvium

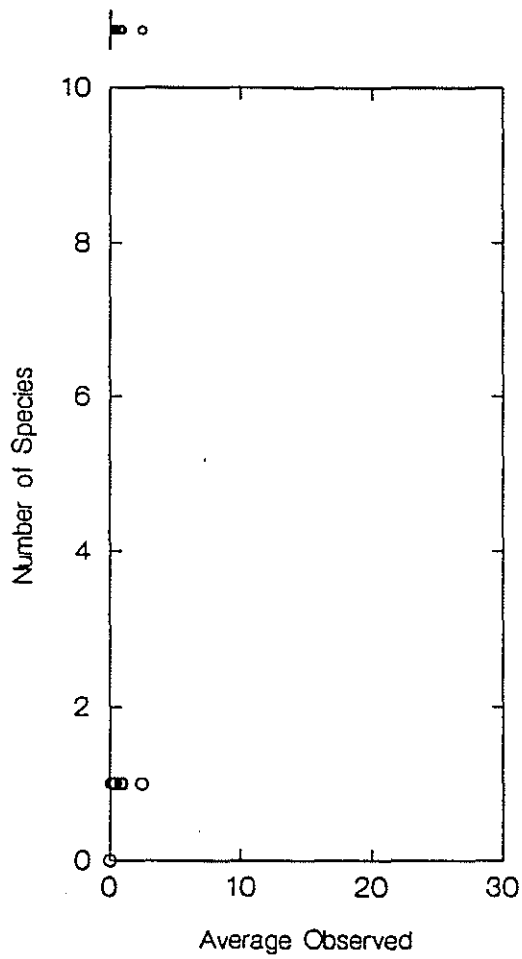


# Mammal Use of Gravel Pads excluding observations on impoundments

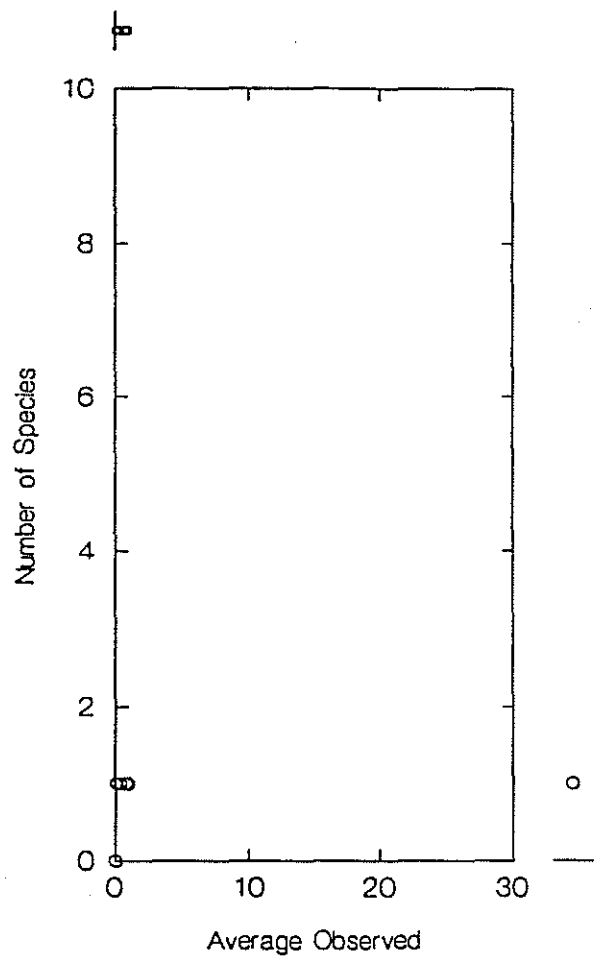


# Mammal Use of Coastal Gravel Pad Sites excluding observations on impoundments

Gravel Pads

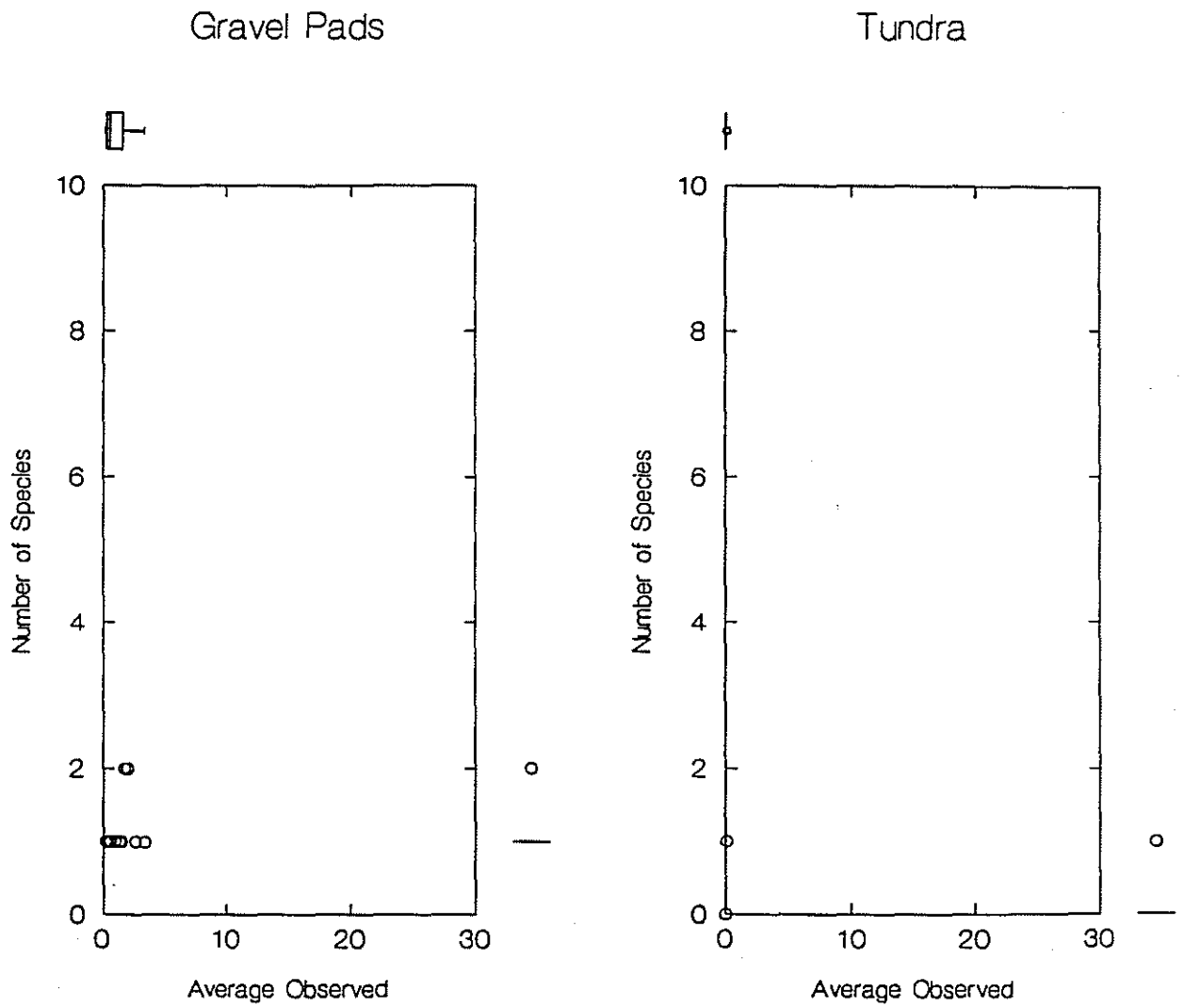


Tundra

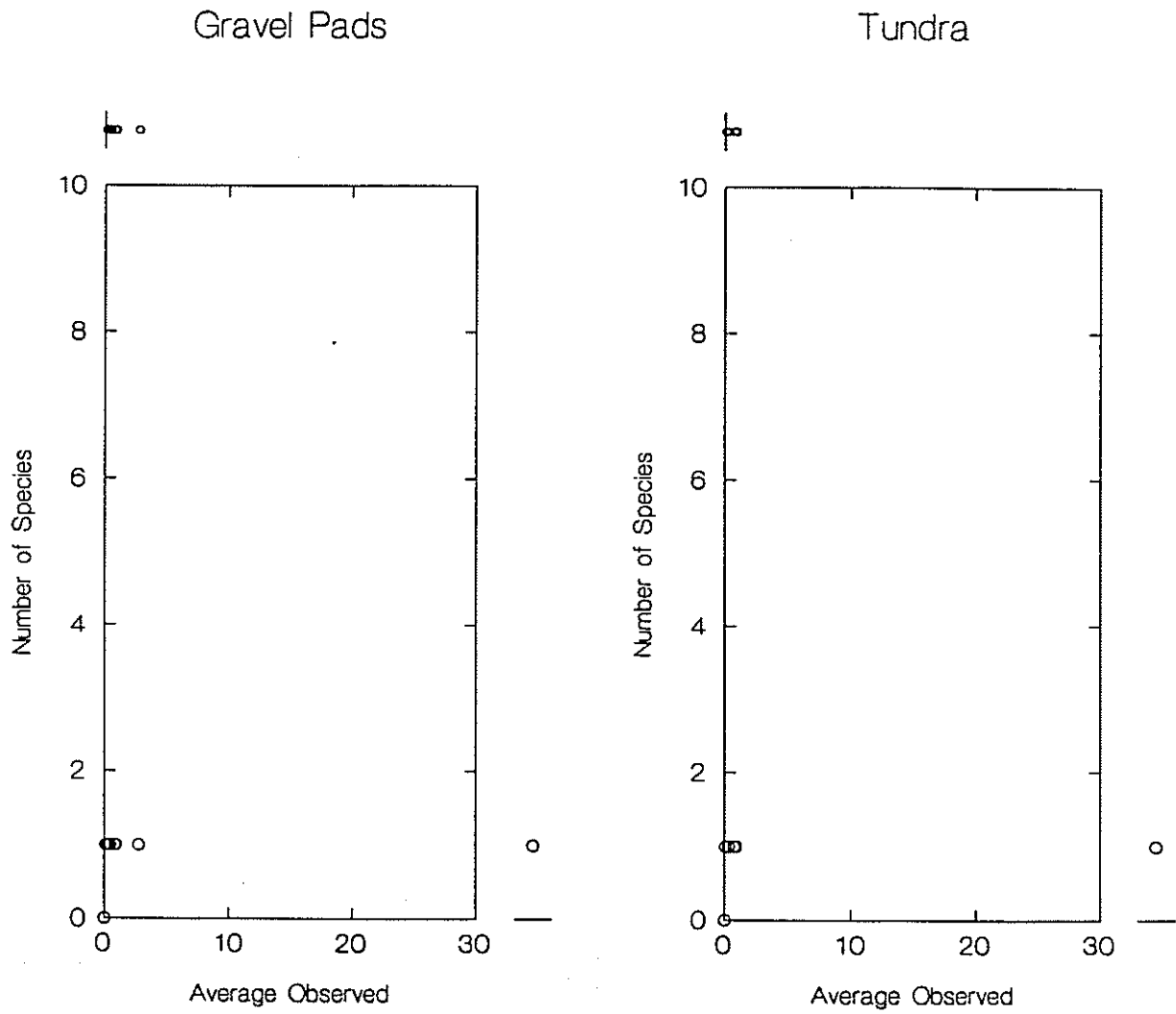




# Mammal Use of Foothill Gravel Pad Sites

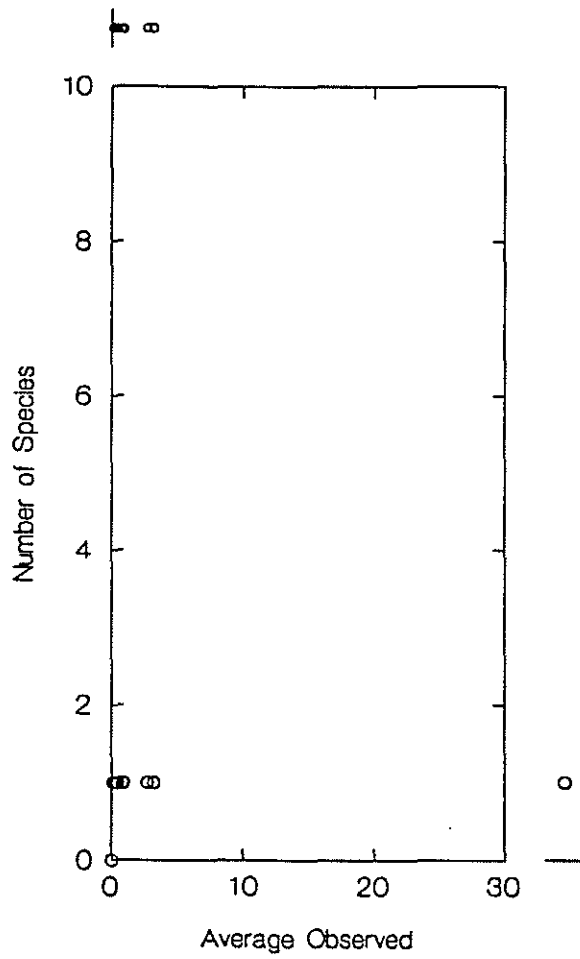


# Caribou Use of Coastal Gravel Pad Sites

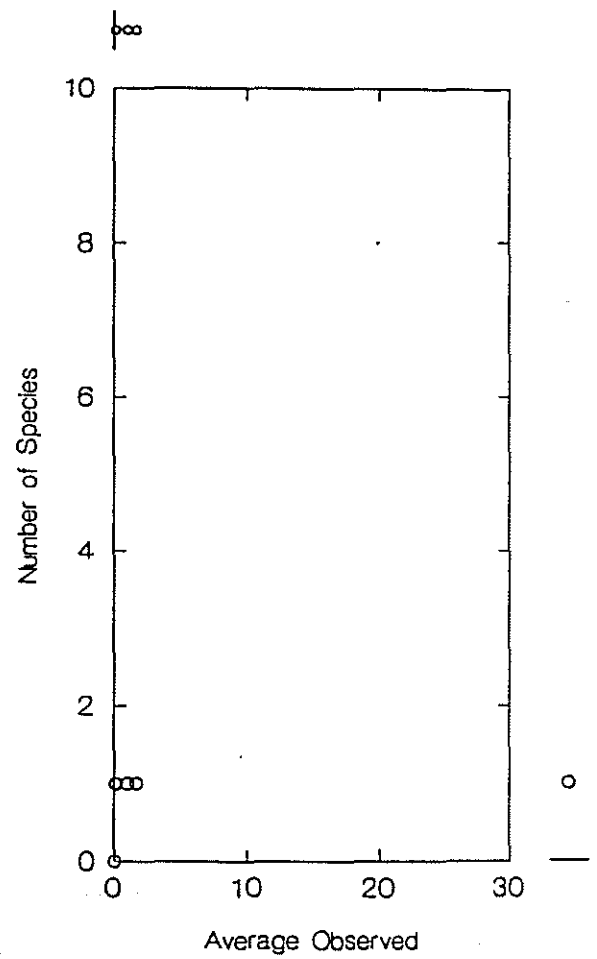


# Caribou Use of Gravel Pads and Alluvium

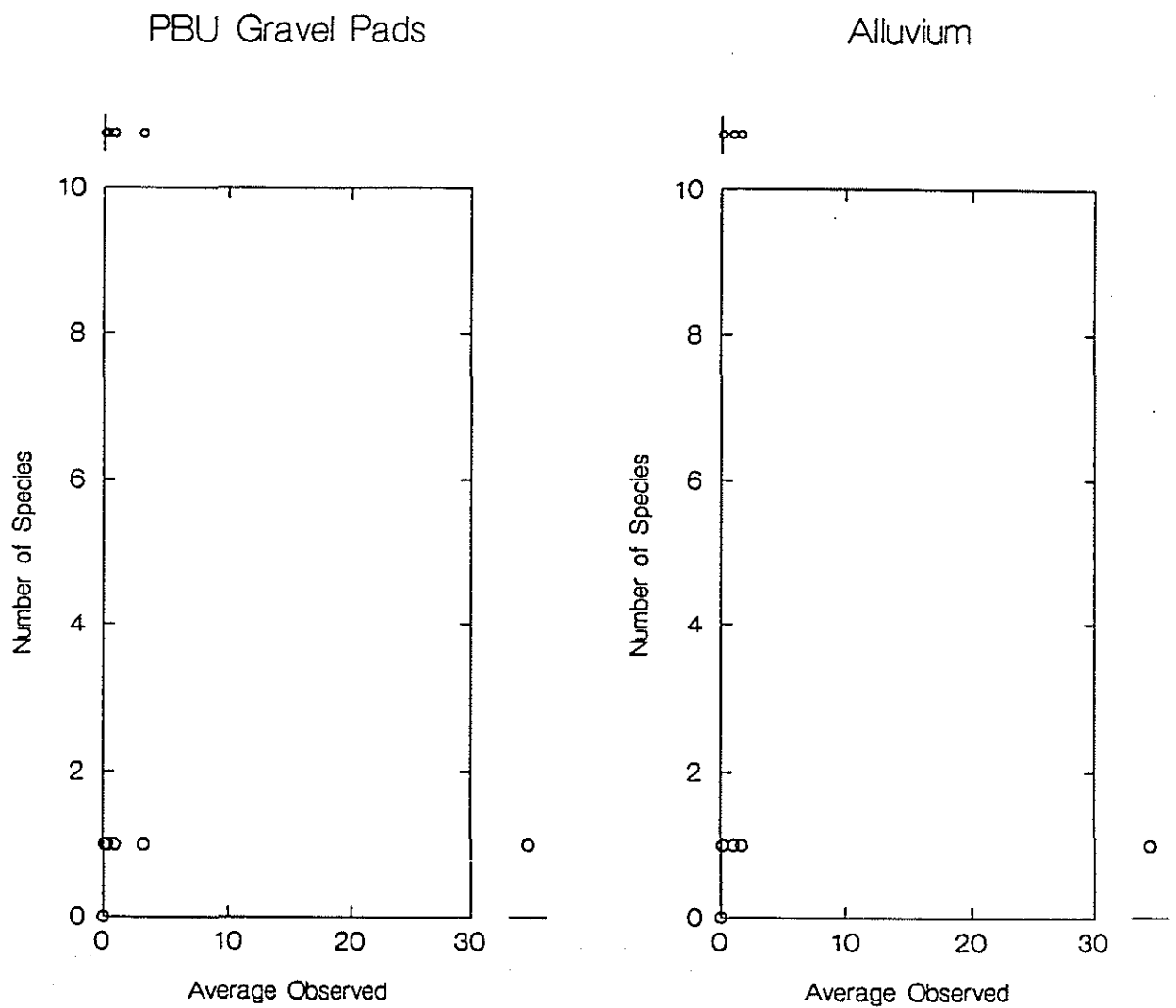
## Gravel Pads



## Alluvium

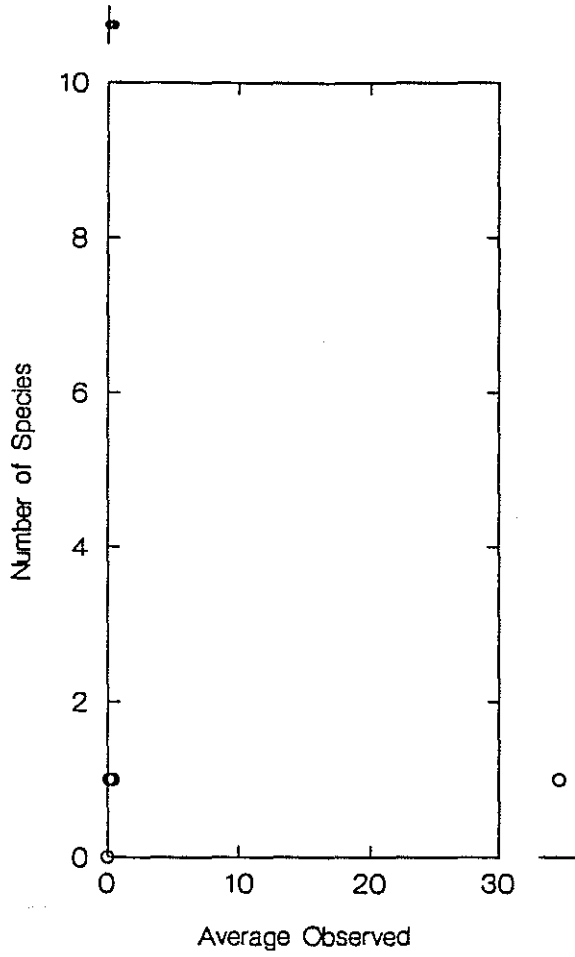


# Caribou Use of PBOC Gravel Pads and Alluvium

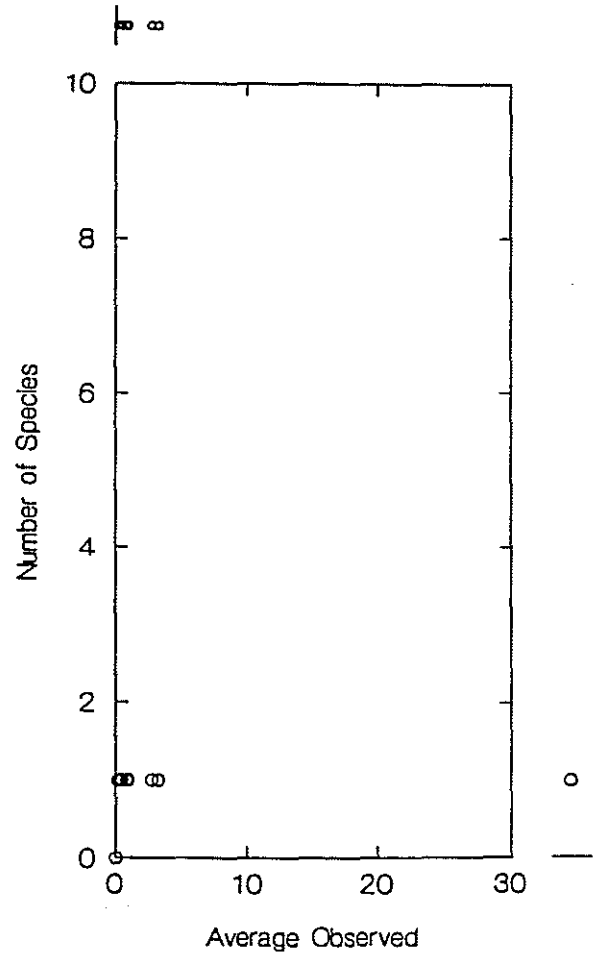


# Caribou Use of Gravel Pads

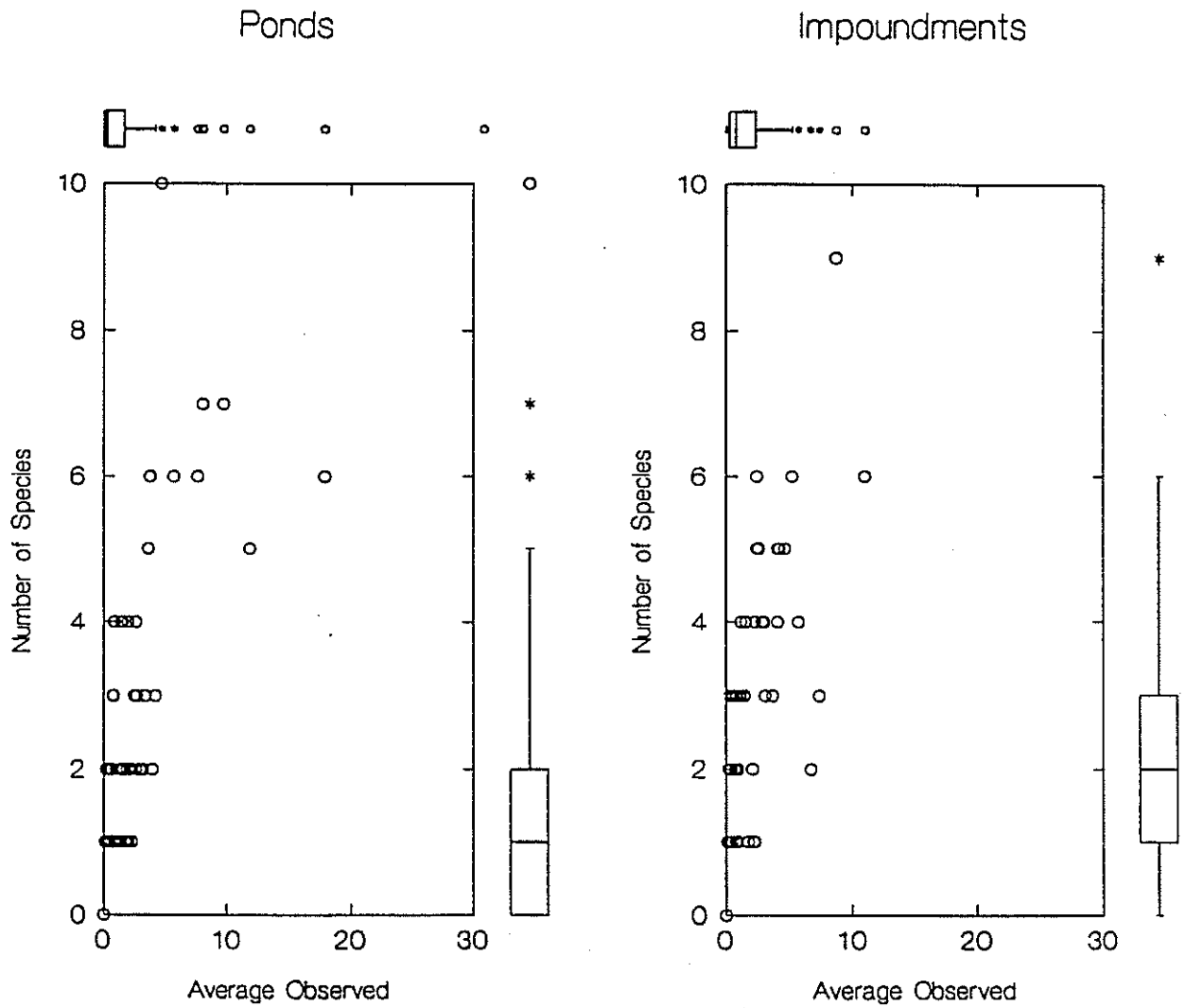
## Vegetated



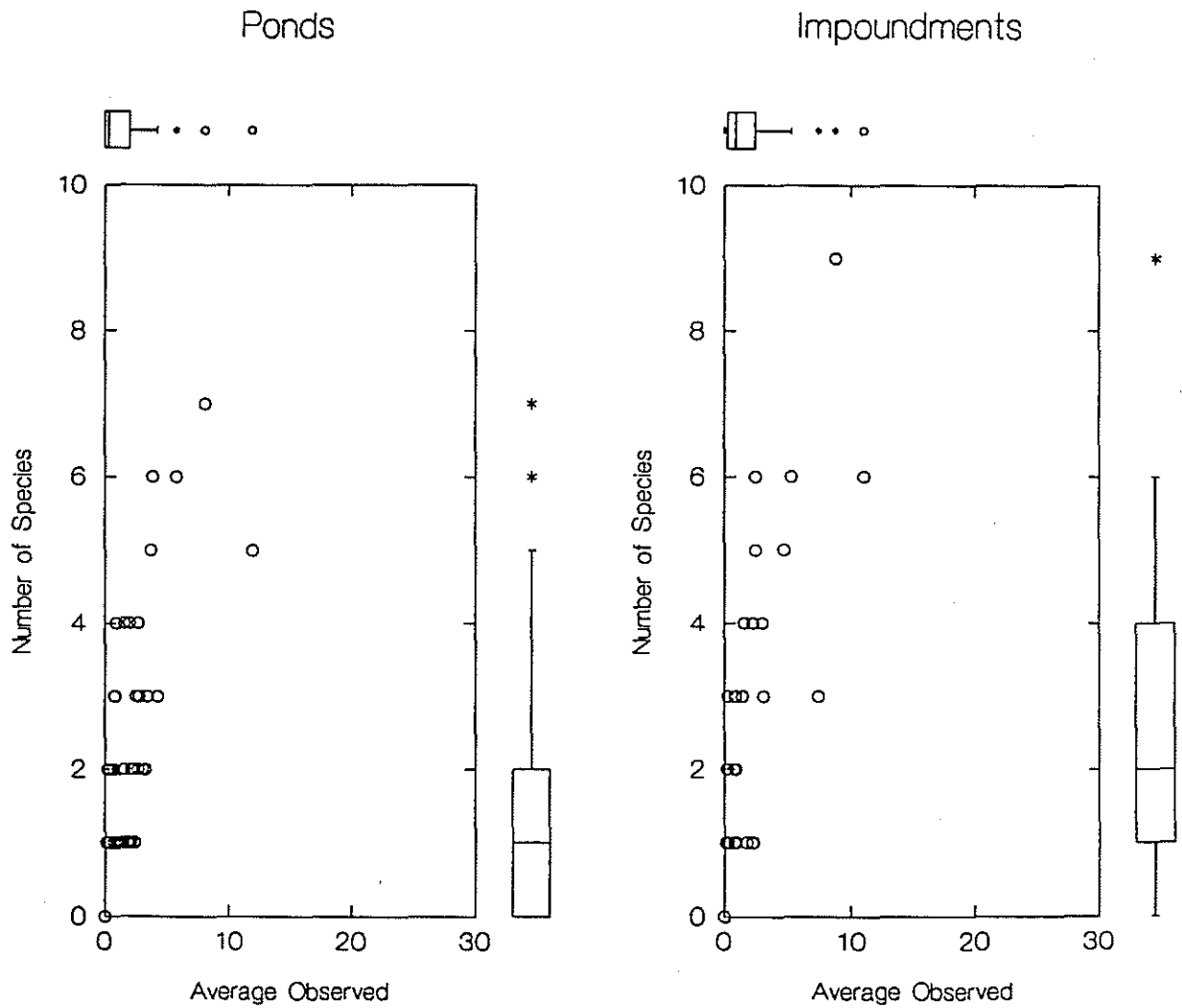
## Unvegetated



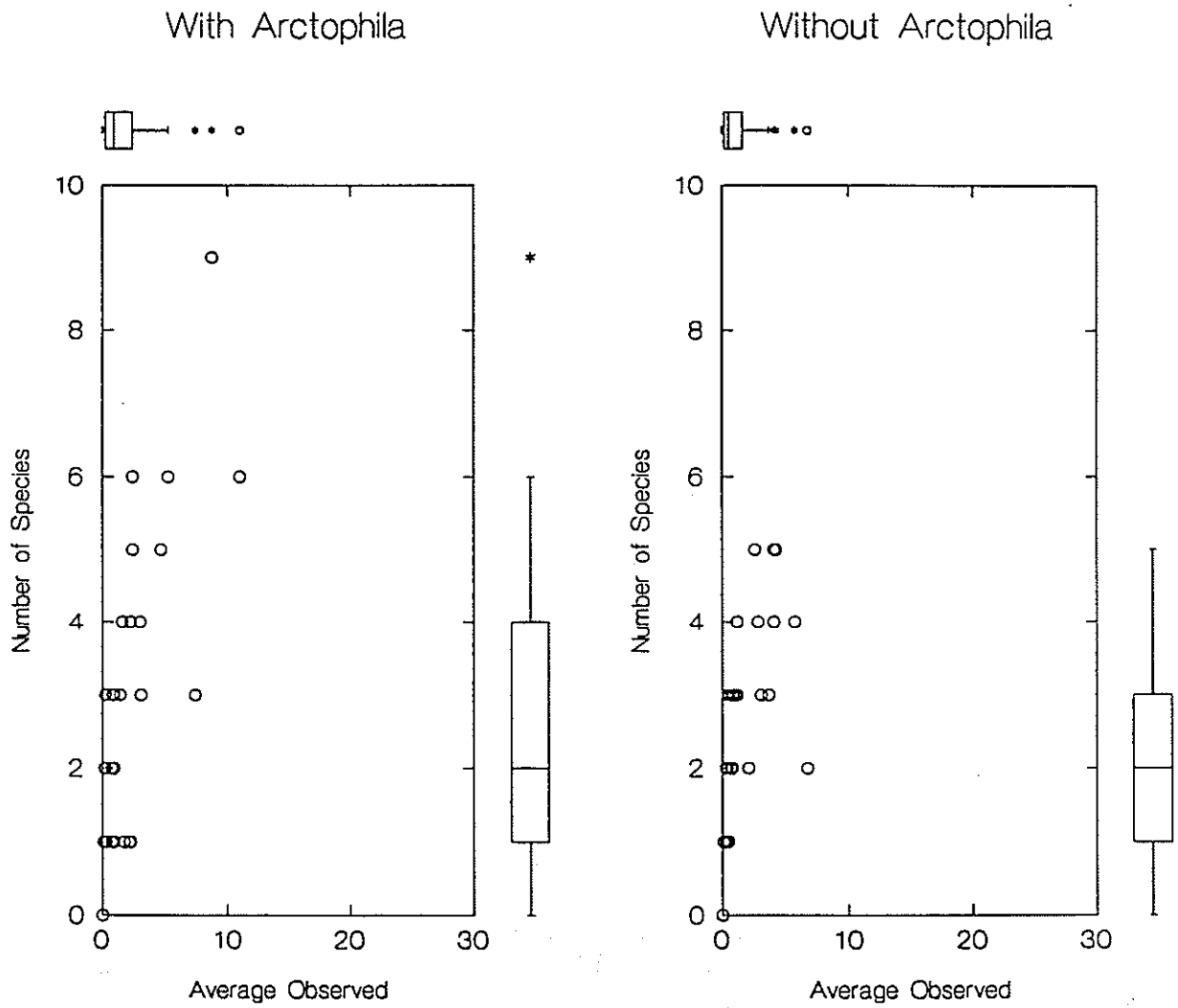
# Bird Use of Ponds and Impoundments



# Bird Use of Ponds and Impoundments (with Arctophila)

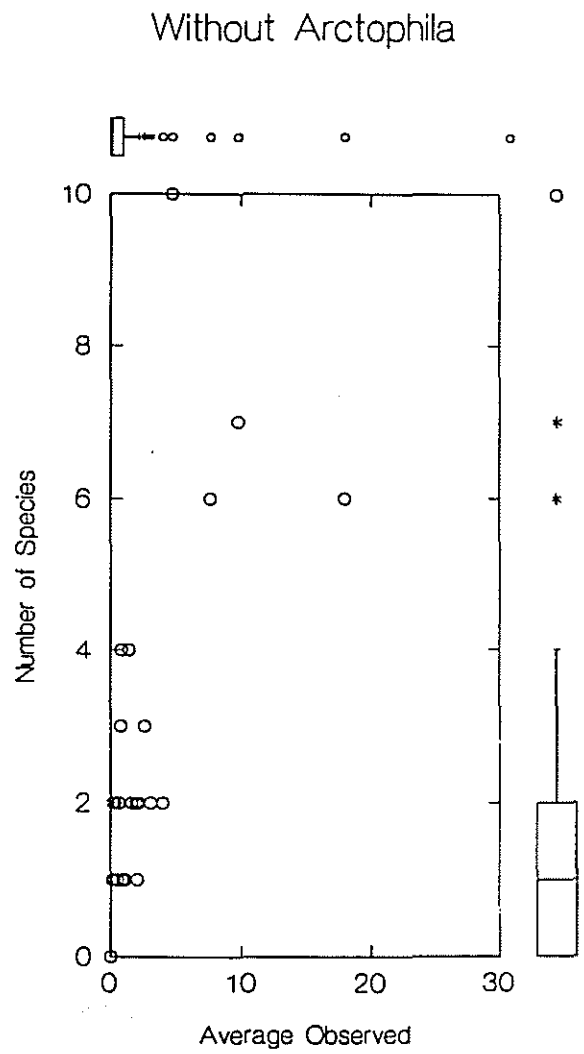
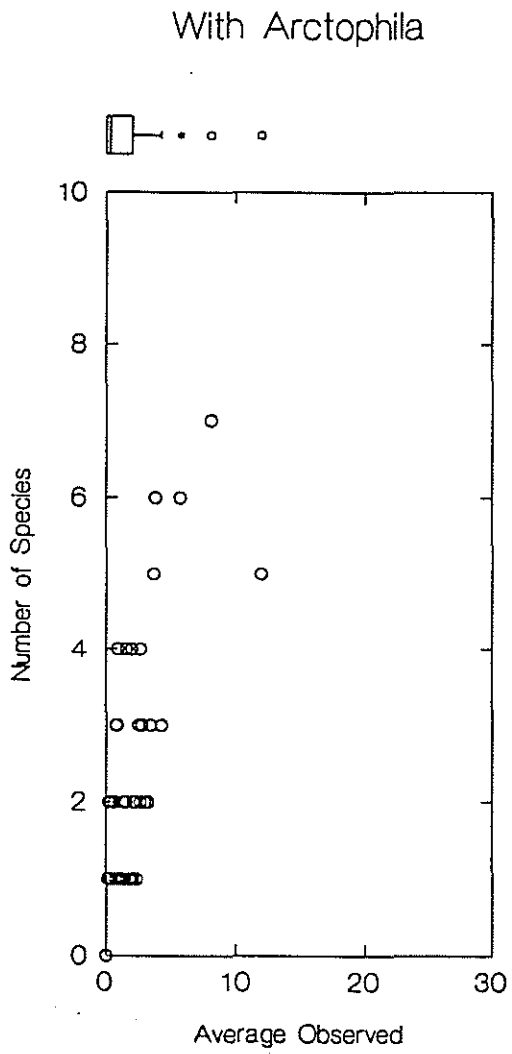


# Bird Use of Impoundments

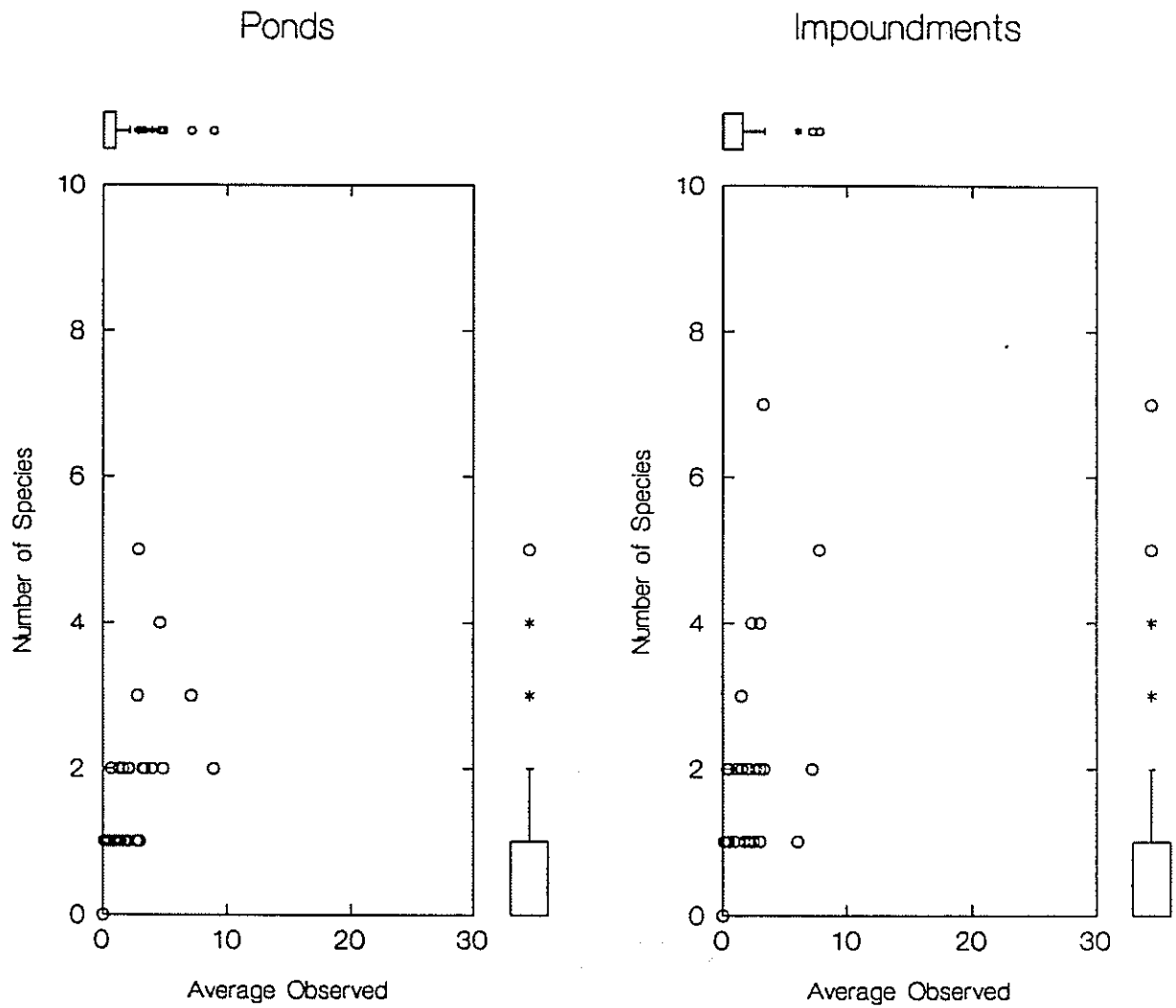




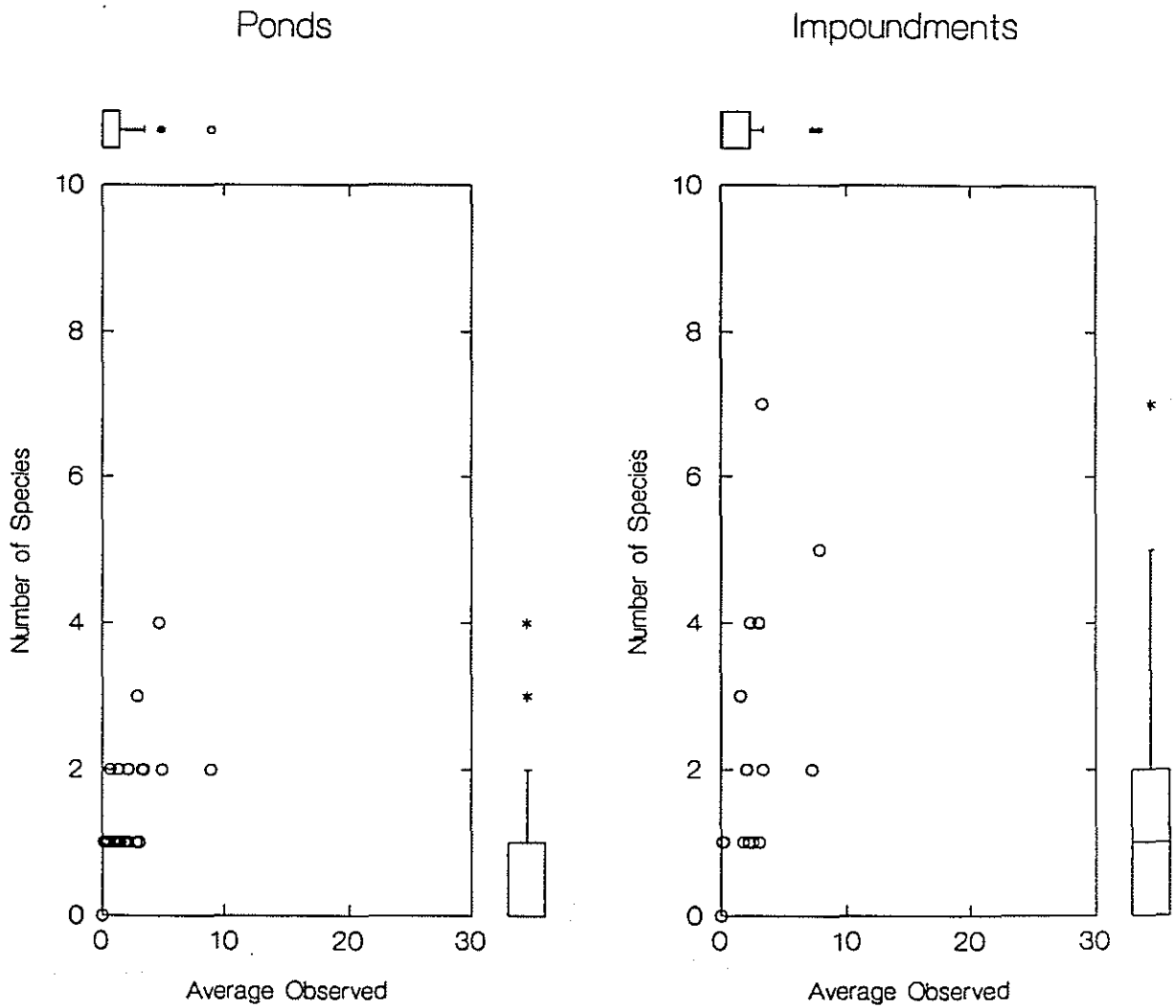
# Bird Use of Ponds



# Waterfowl Use of Ponds and Impoundments

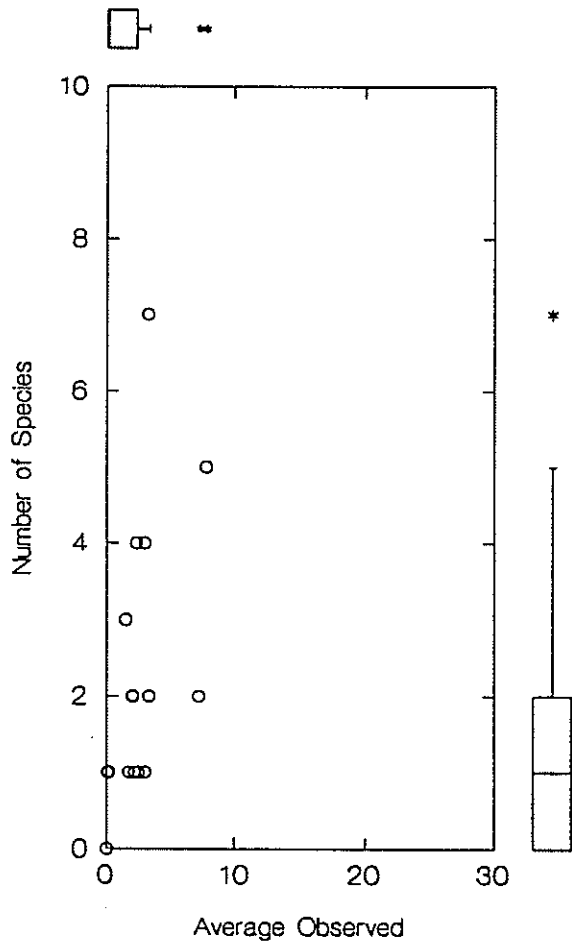


# Waterfowl Use of Ponds and Impoundments (with Arctophila)

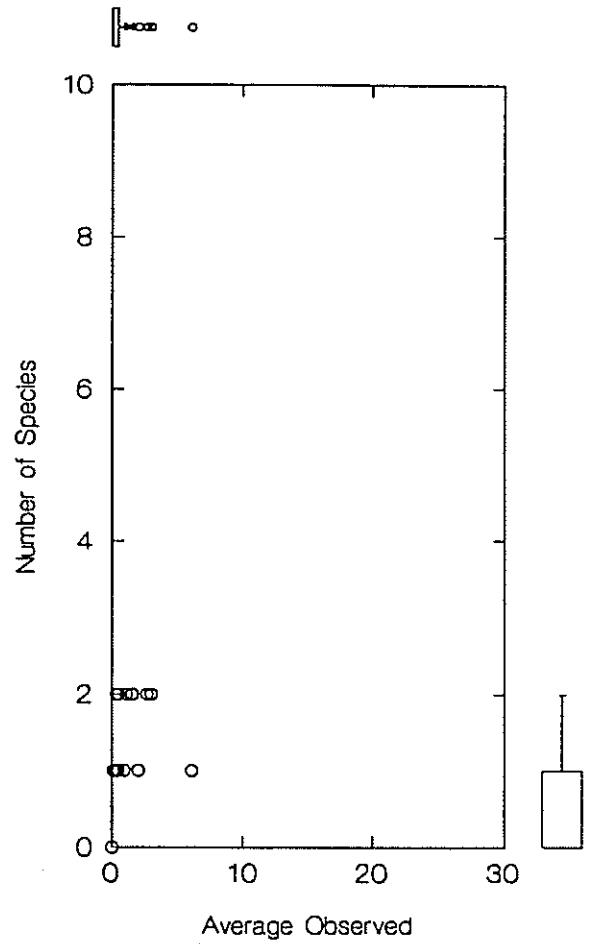


# Waterfowl Use of Impoundments

With Arctophila



Without Arctophila



# Waterfowl Use of Ponds

