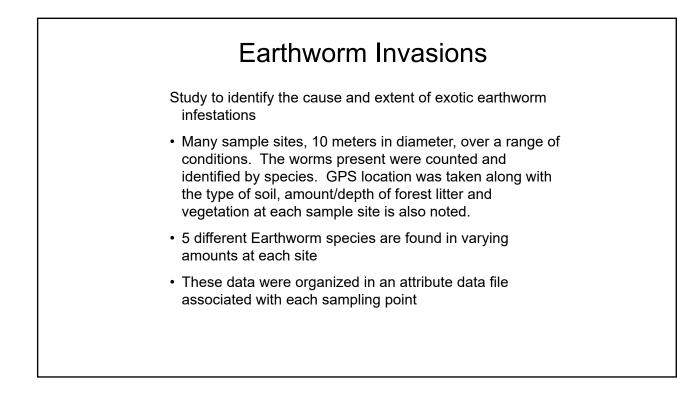
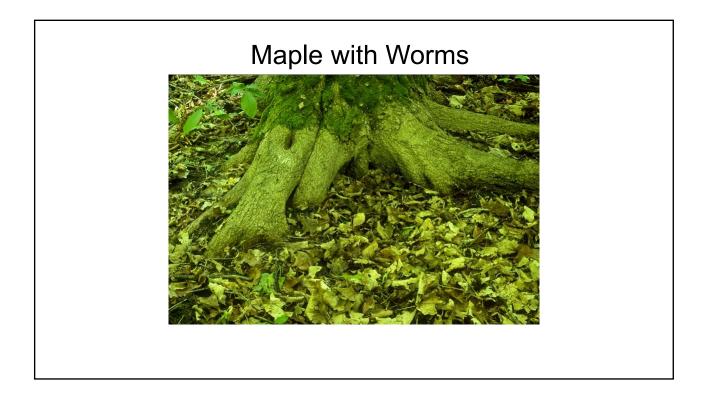
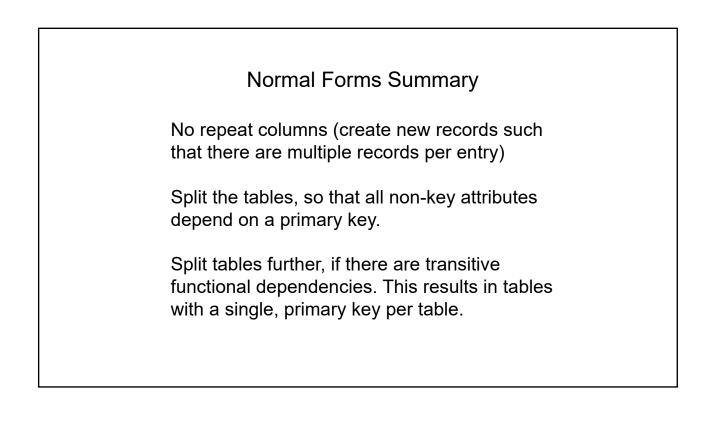
A Small Exercise in Normal Forms







| Non-normalized Form | Re | epeat column | 6 | | | |
|---------------------|---------------------------|---------------------------------|-------|-----|-----------------------|----|
| , , | | | | | | |
| Site Table | | | | | | |
| | er-Speciber | Worm Num Speci ber es 3 3 | Speci | ber | Worm Speci es 5 | |
| | | | | • | | • |
| | 12 B 13 14 C 33 | C 44 | | | | |
| | 16 B 22 | | | | | |
| | 40 B 11 | | | | | |
| | 23 A 12 | B 32 | С | 12 | Е | 24 |
| | 23 C 43 | B 31 | | | | |
| | 22 C 12 23 D 22 | D 23 E 32 | E | 12 | | |
| | <u>23 D 22</u> 11 B 44 | E 32 C 15 | D | 24 | | |



Un-normalized File

| | | | Veg- code | Vegetation | Soil | DESCRI PTION | Litter | Worm Speci es 1 | | Worm Specie s 2 | | Worm Specie s 3 | ber | Speci | | | Num ber 5 |
|---|-------|--------|--------------|------------|------|-----------------|--------|-----------------------|----|-----------------------|----|-----------------------|-----|-------|----|---|-----------------|
| 1 | 56565 | 538980 | b | Blk Spruce | 34 | Hyck | 3 | A | 12 | в | 13 | С | 44 | | | | |
| 2 | 56580 | 538952 | m | MxdHrdwd | 34 | Hyck | 3 | В | 14 | С | 33 | | | | | | |
| 3 | 56590 | 538950 | m | MxdHrdwd | 13 | Johns | 4 | С | 16 | В | 22 | | | | | | |
| 4 | 56540 | 538990 | 1 | LowHrdwd | 86 | Chero | 2 | A | 40 | В | 11 | | | | | | |
| 5 | 56567 | 538700 | 0 | Oak Sav | 4 | Sonb | 1 | G | 23 | A | 12 | В | 32 | С | 12 | E | 24 |
| 6 | 56577 | 538950 | 0 | Oak Sav | 34 | Hyck | 1 | E | 23 | С | 43 | В | 31 | | | | |
| 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 | A | 22 | С | 12 | D | 23 | E | 12 | | |
| 8 | 56527 | 538950 | j | Jack Pine | 86 | Chero | 2 | A | 23 | D | 22 | E | 32 | | | | |
| 9 | 56537 | 539100 | a | Alder | 13 | Johns | 3 | A | 11 | В | 44 | С | 15 | D | 24 | | |

| Site | East | North | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
|------|-------|--------|---|---|---|---|---|---|---|
| 1 | 56565 | | | | | | - | - | |
| 1 | | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | 56580 | 538952 | | | | | | | |
| 2 | 56580 | 538952 | | | | | | | |
| 3 | | | | | | | | | |
| 3 | 56590 | 538950 | | | | | | | |
| 4 | 56540 | 538990 | | | | | | | |
| 4 | 56540 | 538990 | | | | | | | |
| 5 | | 538700 | | | | | | | |
| 6 | 56567 | 538700 | | | | | | | |
| 5 | 56567 | 538700 | | | | | | | |
| 6 | 56567 | 538700 | | | | | | | |
| 6 | 56567 | 538700 | | | | | | | |
| 6 | | 538950 | | | | | | _ | |
| 6 | | 538950 | | | | | | | |
| 6 | | 538950 | | | | | | | |
| 7 | | 538990 | | | | | | | |
| 7 | | 538990 | | | | | | | |
| 7 | | 538990 | | | | | | | |
| 7 | | 538990 | | | | | | _ | |
| E | | 538950 | | | | | | | |
| 8 | | 538950 | | | | | | | |
| 8 | | 538950 | | | | | | | |
| 9 | | 539100 | | | | | | | |
| 9 | | 539100 | | | | | | | |
| 9 | | 539100 | | | | | | | |
| 9 | | 539100 | | | | | | | |

1st normal form – no repeat column

| repeat columns | | | | | | | DESCRI | | Worm | |
|----------------|------|-------|--------|---|------------|------|--------|--------|---------|--------|
| | Site | | North | | Vegetation | Soil | PTION | Litter | Species | Number |
| | 1 | 56565 | 538980 | | Blk Spruce | 34 | Hyck | 3 | A | 12 |
| | 1 | 56565 | 538980 | b | Blk Spruce | 34 | Hyck | 3 | В | 13 |
| | 1 | 56565 | 538980 | b | Blk Spruce | 34 | Hyck | 3 | C | 12 |
| | 2 | | 538952 | m | MxdHrdwd | 34 | Hyck | 3 | В | 14 |
| | 2 | | 538952 | m | MxdHrdwd | 34 | Hyck | 3 | C | 33 |
| | 3 | | 538950 | m | MxdHrdwd | 13 | Johns | 4 | С | 16 |
| | 3 | | 538950 | m | MxdHrdwd | 13 | Johns | 4 | В | 22 |
| | 4 | 56540 | 538990 | | LowHrdwd | 86 | Chero | 2 | A | 40 |
| | 4 | | 538990 | | LowHrdwd | 86 | Chero | 2 | В | 11 |
| | 5 | | 538700 | 0 | Oak Sav | 4 | Sonb | 1 | G | 23 |
| | 5 | | 538700 | | Oak Sav | 4 | Sonb | 1 | A | 12 |
| | 5 | 56567 | 538700 | 0 | Oak Sav | 4 | Sonb | 1 | В | 32 |
| | 5 | 56567 | 538700 | 0 | Oak Sav | 4 | Sonb | 1 | с | 12 |
| | | | | | | | | | | |
| | 5 | 56567 | 538700 | 0 | Oak Sav | 4 | Sonb | 1 | E | 24 |
| | 6 | 56577 | 538950 | 0 | Oak Sav | 34 | Hyck | 1 | E | 23 |
| | 6 | 56577 | 538950 | 0 | Oak Sav | 34 | Hyck | 1 | С | 43 |
| | 6 | 56577 | 538950 | 0 | Oak Sav | 34 | Hyck | 1 | В | 31 |
| | 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 | A | 22 |
| | 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 | С | 12 |
| | 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 | D | 23 |
| | 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 | E | 12 |
| | 8 | | 538950 | j | Jack Pine | 86 | Chero | 2 | A | 23 |
| | 8 | | 538950 | j | Jack Pine | 86 | Chero | 2 | D | 22 |
| | 8 | | 538950 | j | Jack Pine | 86 | Chero | 2 | E | 32 |
| | 9 | | 539100 | а | Alder | 13 | Johns | 3 | A | 11 |
| | 9 | | 539100 | | Alder | 13 | Johns | 3 | В | 44 |
| | 9 | | 539100 | | Alder | 13 | Johns | 3 | С | 15 |
| | 9 | 56537 | 539100 | a | Alder | 13 | Johns | 3 | D | 24 |

2nd normal form Functional Dependencies

Break up the 1st normal table. Retain the Site/Species/Count table and create a second table with eight items, using Site as the primary key and removing the dependent items from the 1st NF table

Site Table

| | | UTM | | | | | |
|------|-------|--------|---|---|---|---|---|
| Site | East | North | ? | ? | ? | ? | ? |
| 1 | 56565 | 538980 | | | | | |
| 2 | 56580 | 538952 | | | | | |
| 3 | 56590 | 538950 | | | | | |
| 4 | 56540 | 538990 | | | | | |
| 5 | 56567 | 538700 | | | | | |
| 6 | 56577 | 538950 | | | | | |
| 7 | 56597 | 538990 | | | | | |
| 8 | 56527 | 538950 | | | | | |
| 9 | 56537 | 539100 | | | | | |

Site/Species/Count Table

| Site | ? | ? |
|---------------------------------|---|---|
| 1 | | |
| 1 | | |
| 1 | | |
| 2 | | |
| 2 | | |
| 3 | | |
| 1 2 3 3 4 4 | | |
| 4 | | |
| 4 | | |
| 5 | | |
| 5 5 5 5 | | |
| 5 | | |
| | | |
| 5 | | |
| 5 | | |
| _ | | |
| 6 6 7 7 7 7 7 | | |
| 6 | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 8 | | |
| | | |
| 8 9 9 | | |
| 9 | | |
| 9 | | |
| 9 | | |

2nd normal form Functional Dependencies

Break up the 1st normal table. Retain the Site/Species/Count table and create a second table with eight items, using Site as the primary key and removing the dependent items from the 1st NF table

Site Table

| | UTM - | UTM | Veg- | | | DESCRI | |
|------|-------|--------|------|------------|------|--------|--------|
| Site | East | North | code | Vegetation | Soil | PTION | Litter |
| 1 | 56565 | 538980 | b | Blk Spruce | 34 | Hyck | 3 |
| 2 | 56580 | 538952 | m | MxdHrdwd | 34 | Hyck | 3 |
| 3 | 56590 | 538950 | m | MxdHrdwd | 13 | Johns | 4 |
| 4 | 56540 | 538990 | | LowHrdwd | 86 | Chero | 2 |
| 5 | 56567 | 538700 | 0 | Oak Sav | 4 | Sonb | 1 |
| 6 | 56577 | 538950 | 0 | Oak Sav | 34 | Hyck | 1 |
| 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 |
| 8 | 56527 | 538950 | j | Jack Pine | 86 | Chero | 2 |
| 9 | 56537 | 539100 | а | Alder | 13 | Johns | 3 |

Site/Species/Count Table

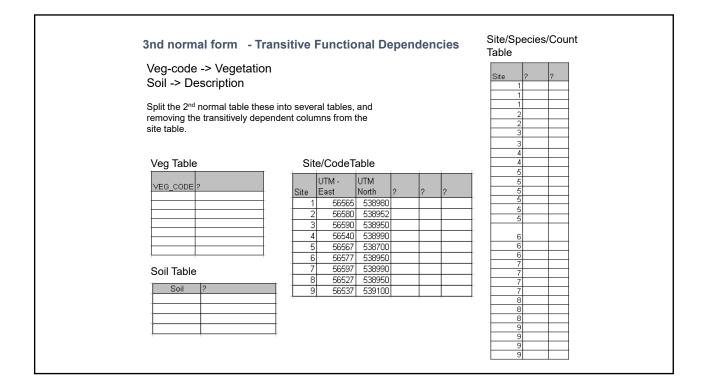
| Site | Worm Specie | Num ber |
|--|------------------|--|
| 1 | а | 12 |
| 1 | | 23 |
| 1 | b | 23 12 |
| 2 | b | 242 |
| 2 | b c d | 232 |
| 2 | d | 242 232 33 |
| 3 | b | 12 |
| 3 | d | 121 |
| 3 | e | 121 123 |
| 4 4 5 6 6 6 7 7 7 7 8 8 | а | 23 123 55 55 |
| 4 | | 123 |
| 4 | b c d | 55 |
| 5 | d | 55 |
| 5 | g | 55 |
| 6 | e | 23 |
| 6 | e C b C | 43 |
| 6 | b | 31 |
| 7 | С | 22 |
| 7 | a | 12 |
| 7 | С | 22 |
| 8 | а | 55 23 43 31 22 12 22 23 22 |
| 8 | d | |
| 8 | е | 32 |
| 9 | а | 11 |
| 9 | b | 44 15 24 |
| 9 | С | 15 |
| 9 | d | 24 |

2nd normal form Functional Dependencies,

Site -> East, North, Vegcode, Vegetation, soil, description, litter

So I make a second table with these eight items, with Site as the primary key and remove the dependent items from the 1st NF table

| | | UTM - | UTM | Veg- | | | DESCRI | |
|------------|------|-------|--------|------|------------|------|--------|--------|
| | Site | East | North | code | Vegetation | Soil | PTION | Litter |
| | 1 | 56565 | 538980 | b | Blk Spruce | 34 | Hyck | 3 |
| Cite table | 2 | 56580 | 538952 | m | MxdHrdwd | 34 | Hyck | 3 |
| Site table | 3 | 56590 | 538950 | m | MxdHrdwd | 13 | Johns | 4 |
| | 4 | 56540 | 538990 | - | LowHrdwd | 86 | Chero | 2 |
| | 5 | 56567 | 538700 | 0 | Oak Sav | 4 | Sonb | 1 |
| | 6 | 56577 | 538950 | 0 | Oak Sav | 34 | Hyck | 1 |
| | 7 | 56597 | 538990 | r | Red Pine | 13 | Johns | 2 |
| | 8 | 56527 | 538950 | j | Jack Pine | 86 | Chero | 2 |
| | 9 | 56537 | 539100 | а | Alder | 13 | Johns | 3 |
| | | | | | | | | |



| 3nd | normal fo | rm - Trar | nsitiv | e Functi | ional D | epen | den | cies |
|-----------|----------------------|------------|---------------|---------------|--------------|--------------|------|--------|
| Veg-co | de -> Vegetat | tion | Site/C Tab | | | | | |
| | Description | _ | Site | UTM - East | UTM North | Veg- code | Soil | Litter |
| So spli | t these into th | eir own | 1 | 56565 | 538980 | b | 34 | 3 |
| tables. | and remove t | he | 2 | 56580 | 538952 | m | 34 | 3 |
| | | | 3 | 56590 | 538950 | m | 13 | 4 |
| | vely depende | | 4 | 56540 | 538990 | | 86 | 2 |
| column | s from the sit | e table, | 5 | 56567 | 538700 | 0 | 4 | 1 |
| above | | | 6 | 56577 | 538950 | 0 | 34 | 1 |
| | | | 7 | 56597 | 538990 | r | 13 | 2 |
| Vegetatio | n Table | | 8 | 56527 | 538950 | | 86 | 2 |
| | | t | 9 | 56537 | 539100 | а | 13 | 3 |
| VEG_CODE | | Soil Table | 9 | | | | | |
| b | Blk Spruce | Soil | DESCR | | | | | |
| | MxdHrdwd LowHrdwd | | Hyck | | - | | | |
| | Oak Sav | 86 | Chero | | + | | | |
| r | Red Pine | | | | | | | |
| j | Jack Pine | | Sonb | | + | | | |
| a | Alder | 13 | Johns | | | | | |

| Site | /Code Table | Exotic | Earthw | orm S | Study 3r | d Normal F | orm | Site 1 | Specie | Num ber 12 | |
|------|-------------|-----------------|--------|--------|----------|------------|----------|-----------------------|--------|----------------------------------|--|
| | UTM - | UTM | Veg- | | | 1 | Site/ | 1 | В | 13 | |
| Site | East | | code | Soil | Litter | 5 | Species/ | 1 | С | 12 | |
| 1 | 56565 | 538980 | b | 34 | 3 | 1 | Count | 2 | | 14 | |
| 2 | 56580 | 538952 | m | 34 | 3 | 1 | Table | 3 | | 16 | |
| 3 | 56590 | 538950 | m | 13 | 4 | ł | | 3 | | 22 | |
| 4 | 56540 | 538990 | 1 | 86 | 2 | t | | 4 | A B | 40 | |
| 5 | 56567 | 538700 | 0 | 4 | 1 | 1 | | 5 | | 23 | |
| 6 | 56577 | 538950 | 0 | 34 | 1 | 1 | | 5 | A | 12 | |
| 7 | 56597 | 538990 | r | 13 | 2 | 1 | | 5 | | 32 | |
| 8 | 56527 | 538950 | i | 86 | 2 | 1 | | 5 | | 23 | |
| 9 | 56537 | 539100 | a | 13 | 3 | 1 | | 5 | | 24 | |
| | CODE Veg | etation | | Soil 1 | ſable | | I | 6 6 7 7 7 | C B | 23 43 31 22 12 23 | |
| | | Spruce Hrdwd | | Soi | I DES | CRIPTION | | 7 | E | 12 | |
| | | Hrdwd | | 34 | Hyck | | | 8 | | 23 | |
| | | Sav | | 86 | Cher | 0 | | 8 | | 22 32 | |
| | | Pine | | 4 | Sonb | • | | 9 | A | 11 | |
| | | Pine | - | 13 | | | | 9 | | 44 | |
| | a Alde | r | - | 13 | Joonn | 5 | _ | 9 | | 24 | |