

Vegetation Monitoring and Reporting

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PlatformB

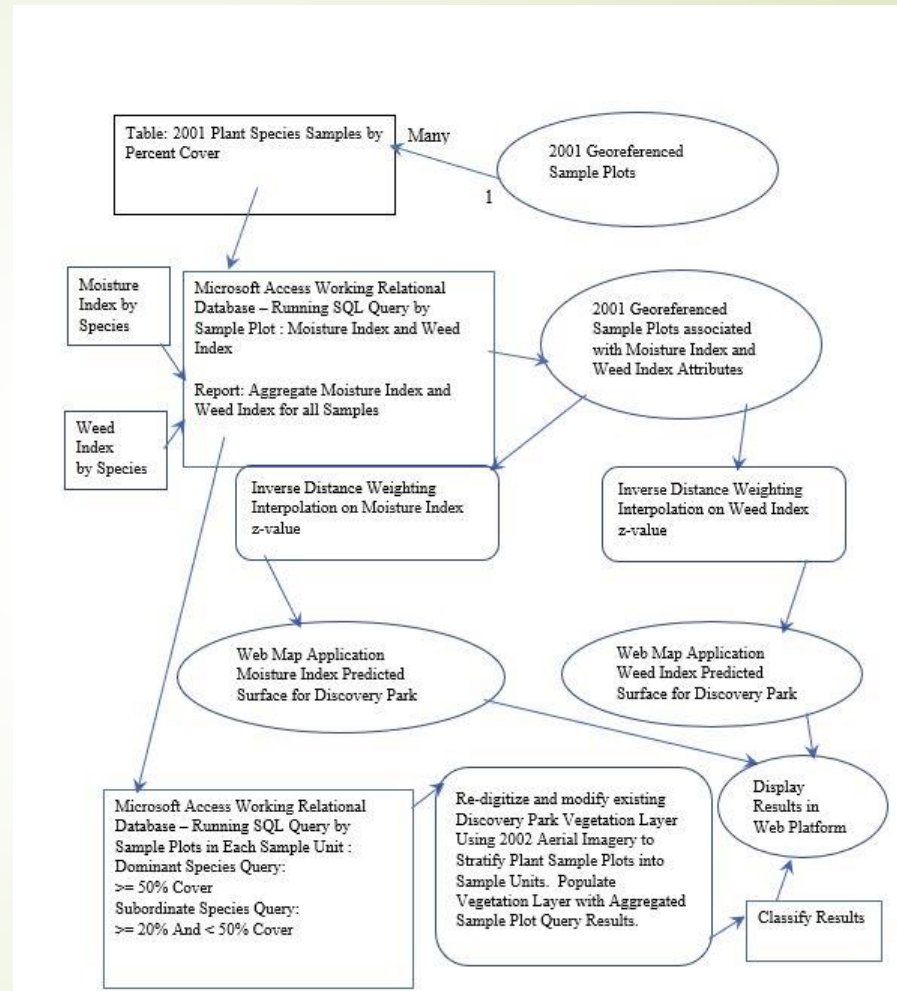


Vegetation Monitoring and Reporting

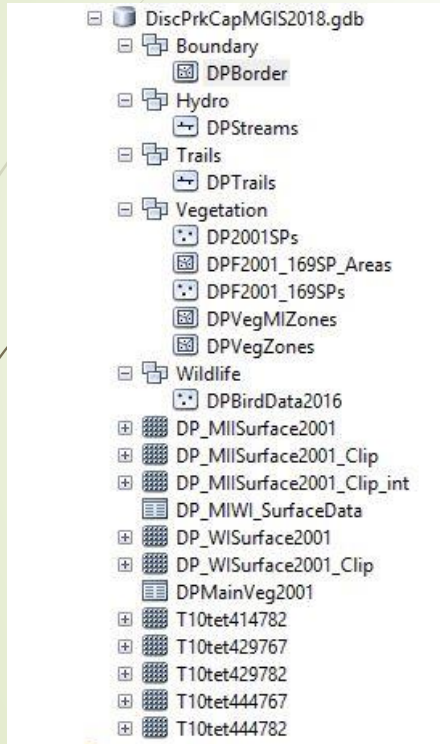
Work activity for Discovery Park:

1. Provide raster file of the vegetation weed index surface;
2. Provide raster file of the vegetation moisture index surface;
and
3. Provide a plant community feature class.

Workflow



Geodatabase



CHIEF DATA SOURCES

ICF - Jon Walker

Seattle Audubon Society - Jenn Lang

Friends of Discovery Park – Garrett Esperum

ArcMap - Relates

The screenshot shows the ArcMap interface with a map of a forested area. A 'Relate' dialog box is open, allowing the user to create a relationship between a feature class and a table. The dialog box contains the following text and options:

Relate lets you associate data with the layer. The associated data isn't appended into this layer's attribute table like it is in a join. Instead you can access the related data when you work with this layer's attributes or vice versa.

Establishing a relate is particularly useful if there is a 1-to-many or many-to-many association between the layer and the related data.

1. Choose the field in this layer that the relate will be based on:
plot

2. Choose the table or layer to relate to this layer, or load from disk:
DPMMainVeg2001

3. Choose the field in the related table or layer to base the relate on:
Plot

4. Choose a name for the relate:
Relate2

Buttons: About related data, OK, Cancel

The background map shows a forested area with several yellow circular markers representing sample plots. The 'Table Of Contents' on the left shows the following layers:

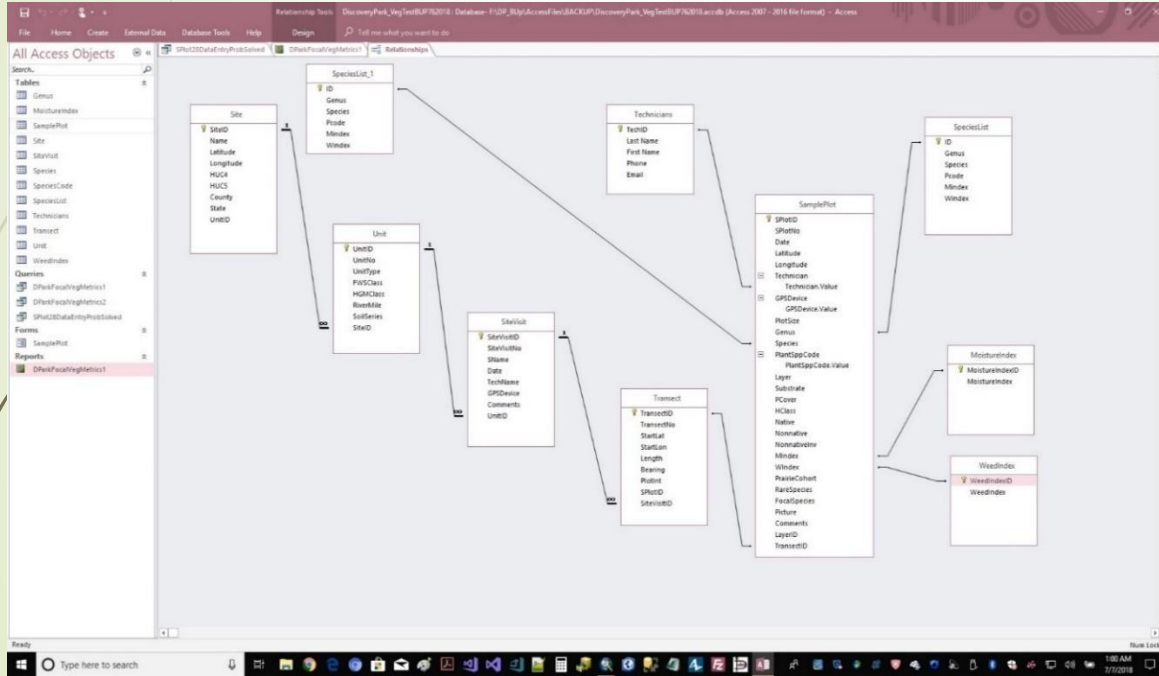
- SampleSize30
 - FrRenton Computers Data Recover
 - Vegetation
 - NDP2001SP1
 - DPMMainVeg2001
 - World Imagery

The 'Table' view at the bottom shows the following data:

ComStruc	ComType	VegMgmtZone	VegCode	Species	TreeStruc	CrownClass	PercentCov	EstAge	Health	Nativity	RegDecayClass
H4275	H03	8	15	na	B	10	<Nub>	na	na	na	na
H4275	H03	8	40	URTRID	<Nub>	H	10	<Nub>	na	N	na
H4275	H03	8	30	RUBSPE	<Nub>	S	50	<Nub>	na	N	na
H4275	H03	8	30	RUBSRI	<Nub>	S	10	<Nub>	na	N	na
H4275	H03	8	30	RUBURS	<Nub>	S	25	<Nub>	na	N	na
H4275	H03	8	30	OEMCER	<Nub>	S	15	<Nub>	na	N	na
H4275	H03	8	30	PRULAU	<Nub>	S	1	<Nub>	na	I	na
H4275	H03	8	40	PRALAU	<Nub>	H	1	<Nub>	na	I	na
H4275	H03	8	40	POLMUN	<Nub>	H	20	<Nub>	na	N	na
H4275	H03	8	40	ATHFL	<Nub>	H	5	<Nub>	na	N	na
H4275	H03	8	70	na	<Nub>	na	2	<Nub>	na	na	2
H4275	H03	8	11	SALURR	<Nub>	na	60	<Nub>	na	na	na
H4275	H03	8	30	HEDHEL	<Nub>	S	40	<Nub>	na	I	na

Relate 2001
Sample Plot
Feature Class to
2001 Plant
Sample Records
Table on Plot
Field

Microsoft Access Database



Entity Relationships

Microsoft Access Database

The screenshot displays the Microsoft Access interface with a table named 'SpeciesList' open. The table has the following columns: ID, Genus, Species, Pcode, Mindex, and Windex. The data is as follows:

ID	Genus	Species	Pcode	Mindex	Windex
1	Abies	amabilis	ABIAMM	4	1
2	Acer	macrophyllum	ACEMAC	4	1
3	Acer	platanoides	ACEPLA	4	3
4	Acer	cratum	ACECR	3	1
5	Acer	pseudoplatani	ACEPSE	5	3
6	Achillea	millefolium	ACHMIL	4	3
7	Agrocyclus	adamsii	AGRADA	3	3
8	Agrostis	alba	AGRAB	3	3
9	Agrostis	stolonifera	AGRSTO	3	3
10	Alnus	rubra	ALNRUB	3	1
11	Amelanchier	alnifolia	AMEALN	4	1
12	Anaphalis	margaritacea	ANAMAR	4	1
13	Anthemis	cotula	ANTCOT	4	3
14	Arbutus	menziesii	ARBMEN	5	1
15	Athyrium	filix-femina	ATHFEM	3	1
16	Berberis	nervosa	BERNER	4	1
17	Berberis	aquifolium	BERAQU	4	1
18	Bromus	spp	BROSPP	4	3
19	Bromus	sitchensis	BROSIT	5	1
20	Carex	occidentalis	CAROC	5	3
21	Carex	deverlyana	CARDEW	3	1
22	Carex	obnupta	CAROB	1	1
23	Chamerion	angustifolium	CHAAANG	4	1
24	Cirsium	arvense	CHIRAR	3	3
25	Claytonia	sibirica	CLASIB	3	1
26	Clematis	vitifolia	CLEVIT	3	5
27	Cornus	sericea	CORSER	4	1
28	Corylus	cornuta v. calif.	CORCOR	4	1
29	Cotula	spp	COTSPP	4	3
30	Crataegus	douglasii	CRATDOU	3	1
31	Cytisus	isopariensis	CYTSCO	5	5
32	Dactylis	glomerata	DACGLG	4	3
33	Daphne	laureola	DAPLAC	4	3
34	Digitalis	purpurea	DIGPUR	4	1
35	Dryopteris	expansa	DRYEXP	2	1
36	Equisetum	arvense	EQUARV	3	3
37	Equisetum	telmateia	EQUITEL	2	3
38	Eschscholzia	californica	ESCCAL	4	3
39	Festuca	arundinaceae	FESARU	4	3
40	Frangula	purshiana	FRAPUR	3	1
41	Gallium	aparinne	GALAPE	4	3
42	Gaultheria	shallon	GAUSHA	4	1
43	Geranium	robertianum	GERROB	4	1
44	Geum	macrophyllum	GEUMAC	3	1
45	Geum	macranthum	GEUMAC	1	1

Plant
Species Moisture
and Weed
Indexes

Microsoft Access Database

The screenshot displays a Microsoft Access database window titled 'DiscoveryPark_VegTestBUP702018 - Database - F:\DIP_R\B\AccessFiles\BACKUP\DiscoveryPark_VegTestBUP702018.accdb (Access 2007 - 2016 file format) - Access'. The main window shows a table named 'SamplePlot' with the following columns: SPlotID, SPlotNo, Date, Latitude, Longitude, Technician, GPSDevice, PlotSize, Genus, Species, PlantSpCode, Layer, Substrate, PCover, HClass, Native, Nonnative, and Nonnative. The table contains 44 rows of data, with the first 13 rows having a Date of 2/27/2001 and the remaining 31 rows having a Date of 2/14/2001. The data includes various plant species such as Acer, Oemleria, Rubus, Sambucus, Carex, Tellima, Polystium, Epilobium, Equisetum, Geum, Alnus, Lysichiton, Pteridium, Urtica, Adlyrium, Pseudotsuga, Prunus, and Polium.

SPlotID	SPlotNo	Date	Latitude	Longitude	Technician	GPSDevice	PlotSize	Genus	Species	PlantSpCode	Layer	Substrate	PCover	HClass	Native	Nonnative	Nonnative
1	1	2/27/2001			Jones, Chuan		706.5	Acer	macrophyllum	ACEMAC	Tree	Clay	12		<input type="checkbox"/>	<input type="checkbox"/>	
2	1	2/27/2001			Jones, Chuan		706.5	Oemleria	cerasiformis	OEMCER	Scrub-Shrub	Clay	8		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
3	1	2/27/2001			Jones, Chuan		706.5	Rubus	armenicus	RUBARM	Scrub-Shrub	Clay	20		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative H
4	1	2/27/2001			Jones, Chuan		706.5	Rubus	spectabilis	RUBSPE	Scrub-Shrub	Clay	35		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
5	1	2/27/2001			Jones, Chuan		706.5	Rubus	ursinus	RUBURS	Scrub-Shrub	Clay	35		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Native
6	1	2/27/2001			Jones, Chuan		706.5	Sambucus	racemosa	SAMRAC	Scrub-Shrub	Clay	2		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
7	1	2/27/2001			Jones, Chuan		706.5	Carex	deweyana	CARDEV	Herbaceous	Clay	5		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
8	1	2/27/2001			Jones, Chuan		706.5	Tellima	grandiflora	TELGRA	Herbaceous	Clay	15		<input type="checkbox"/>	<input type="checkbox"/>	Native
9	1	2/27/2001			Jones, Chuan		706.5	Polystium	munifolium	POLMUN	Herbaceous	Clay	8		<input type="checkbox"/>	<input type="checkbox"/>	Native
10	1	2/27/2001			Jones, Chuan		706.5	Epilobium	angustifolium	EPIANG	Herbaceous	Clay	1		<input type="checkbox"/>	<input type="checkbox"/>	Native
11	1	2/27/2001			Jones, Chuan		706.5	Equisetum	arvense	EQUIARV	Herbaceous	Clay	1		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative
12	1	2/27/2001			Jones, Chuan		706.5	Unknown	moss	UNKMOS	Herbaceous	Clay	1		<input type="checkbox"/>	<input type="checkbox"/>	Native
13	1	2/27/2001			Jones, Chuan		706.5	Geum	macrophyllum	GEUMAC	Herbaceous	Clay	1		<input type="checkbox"/>	<input type="checkbox"/>	Native
14	1	2/27/2001			Jones, Chuan		706.5	Alnus	rubra	ALNRUB	Tree	Clay	85		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
15	1	2/27/2001			Jones, Chuan		706.5	Unknown	grass	UNKGRA	Herbaceous	Clay	4		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
16	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Oemleria	cerasiformis	OEMCER	Scrub-Shrub	Duff	1		<input type="checkbox"/>	<input type="checkbox"/>	Native
17	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	liex	aquifolium	ILEAQU	Scrub-Shrub	Duff	1		<input type="checkbox"/>	<input type="checkbox"/>	Nonnative
18	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Hedera	helix	HEDHEL	Scrub-Shrub	Duff	3		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative H
19	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Rubus	spectabilis	RUBSPE	Scrub-Shrub	Duff	75		<input type="checkbox"/>	<input type="checkbox"/>	Native
20	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Polystium	munifolium	POLMUN	Herbaceous	Duff	7		<input type="checkbox"/>	<input type="checkbox"/>	Native
21	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Thuja	plicata	THUPLI	Tree	Duff	20		<input type="checkbox"/>	<input type="checkbox"/>	Native
22	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Rubus	americanus	RUBARM	Scrub-Shrub	Duff	7		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative H
23	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Alnus	rubra	ALNRUB	Tree	Duff	40		<input type="checkbox"/>	<input type="checkbox"/>	Native
24	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Lysichiton	americanus	LYSAMER	Emergent	Duff	20		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
25	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Unknown	moss	UNKMOS	Herbaceous	Duff	3		<input type="checkbox"/>	<input type="checkbox"/>	Native
26	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Equisetum	telmateia	EQUITEL	Herbaceous	Duff	4		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative
27	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Pteridium	aquilinum	PTEAQU	Herbaceous	Duff	10		<input type="checkbox"/>	<input type="checkbox"/>	Native
28	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Oenanthe	sarmentosa	OENSAR	Emergent	Duff	15		<input type="checkbox"/>	<input type="checkbox"/>	Native
29	2	2/14/2002	47.668299	-122.413262	Jones, Chuan		706.5	Urtica	dioica	URTDIO	Herbaceous	Duff	10		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
30	2	2/14/2001	47.668299	-122.413262	Jones, Chuan		706.5	Adlyrium	filix-femina	ATHFEM	Herbaceous	Duff	4		<input type="checkbox"/>	<input type="checkbox"/>	Native
31	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	liex	aquifolium	ILEAQU	Scrub-Shrub	Sand	10		<input type="checkbox"/>	<input type="checkbox"/>	Nonnative
32	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Rubus	ursinus	RUBURS	Scrub-Shrub	Sand	35		<input type="checkbox"/>	<input type="checkbox"/>	Native
33	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Rubus	spectabilis	RUBSPE	Scrub-Shrub	Sand	30		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Native
34	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Alnus	rubra	ALNRUB	Tree	Sand	85		<input type="checkbox"/>	<input type="checkbox"/>	Native
35	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Pseudotsuga	menziesii	PSEMEN	Tree	Sand	2		<input type="checkbox"/>	<input type="checkbox"/>	Native
36	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Rubus	armenicus	RUBARM	Scrub-Shrub	Sand	7		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative H
37	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Thuja	plicata	THUPLI	Tree	Sand	2		<input type="checkbox"/>	<input type="checkbox"/>	Native
38	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Hedera	helix	HEDHEL	Scrub-Shrub	Sand	12		<input type="checkbox"/>	<input checked="" type="checkbox"/>	Nonnative H
39	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Sambucus	racemosa	SAMRAC	Scrub-Shrub	Sand	7		<input type="checkbox"/>	<input type="checkbox"/>	Native
40	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Prunus	laurocerasus	PRULAU	Scrub-Shrub	Sand	5		<input type="checkbox"/>	<input type="checkbox"/>	Native
41	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Polystium	munifolium	POLMUN	Herbaceous	Sand	35		<input type="checkbox"/>	<input type="checkbox"/>	Native
42	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Tolmiea	menziesii	TOLMEN	Herbaceous	Sand	5		<input type="checkbox"/>	<input type="checkbox"/>	Native
43	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Unknown	moss	UNKMOS	Herbaceous	Sand	5		<input type="checkbox"/>	<input type="checkbox"/>	Native
44	3	2/14/2001	47.667708	-122.411699	Jones, Chuan		706.5	Oemleria	cerasiformis	OEMCER	Scrub-Shrub	Sand	30		<input type="checkbox"/>	<input type="checkbox"/>	Native

Sample Plot Table

Microsoft Access Database

The screenshot displays the Microsoft Access interface for a database named 'DiscoveryPark_VegTestBU762018'. The 'SamplePlot' form is open, showing a data entry form with the following fields and values:

Field	Value
SPlotID	1
SPlotNo	1
Date	2/27/2001
Latitude	
Longitude	
Technician	Jones, Chuan
GPSDevice	
PlotSize	706.5
Genus	Acer
Species	macrophyllum
PlantSpCode	ACEMAC
Layer	Tree
Substrate	Clay

The form also includes several dropdown menus and checkboxes, such as 'HClass', 'Native', 'Nonnative', 'NonnativeInv', 'Mindex', 'Windex', 'PrairieCohort', 'RareSpecies', 'FocalSpecies', 'Picture', and 'PCover'. The status bar at the bottom indicates 'Record: 1 of 260'.

Data Entry
Form

Microsoft Access Database

```
SELECT SamplePlot.SPlotNo,  
Sum(SamplePlot.PCover) AS PCoverTotal,  
Sum([PCover]*[MIndex]) AS MoistureIndexTotal,  
Sum([PCover]*[WIndex]) AS WeedIndTotal,  
([MoistureIndexTotal]/[PCoverTotal]) AS  
SPMoistureIndex, ([WeedIndTotal]/[PCoverTotal]) AS  
SPWeedIndex, SamplePlot.Latitude,  
SamplePlot.Longitude  
FROM SamplePlot  
GROUP BY SamplePlot.SPlotNo, SamplePlot.Latitude,  
SamplePlot.Longitude;
```

SQL Query

Microsoft Access Database

SQL Query Results

Navigation Pane

SPIndex	PCoverTotal	MoistureIndexTotal	WeedingTotal	SPMoistureIndex	SPIWeedIndex
14	134	378	134	2.820855223806	1
15	253	995	473	3.93280632411067	1.8695652173913
16	278	954	454	3.43165467625899	1.63309352517986
17	242	990	282	4.09090909090909	1.16528925619835
18	185	625	225	3.7837837837838	1.21621621621622
19	151	618	223	4.09271523178808	1.4768219205298
20	89	162	163	1.82022471910112	1.8314606741573
21	159	482	373	3.0314465408805	2.34591134968553
22	185	659	187	3.56216216216216	1.02081081081081
23	218	839	246	3.84862382321101	1.1284036097248
24	186	639	312	3.4548387096774	1.67741935482871
25	285	1039	299	3.92075471698113	1.12830188679245
26	213	785	235	3.68544600938967	1.10328638497653
27	115	359	339	3.12173913043478	2.94782606899652
28	231	839	235	3.6320346203463	1.07171661731802
29	102	404	450	3.9607843172549	4.41176470888235
30	255	973	445	3.8156862745098	1.74509803921569
31	190	741	216	3.9	1.1368421026316
32	191	734	291	3.84293193717278	1.52356020942408
33	152	575	200	3.78289473684211	1.315789473684211
34	232	886	233	3.86257510729614	1
35	150	564	442	3.76	2.94566666666667
36	208	818	328	3.93289230789231	1.57892307892308
37	332	1031	404	3.10542168674999	1.2188674587952
38	147	502	149	3.41498398693456	1.0136054217687
39	217	541	541	4.10948903109489	3.963109489031094
40	208	798	214	3.83653846153846	1.02884615384615
41	153	441	505	2.88235294117647	3.30065359477124
42	247	793	255	3.21052631578947	1.03238866396761
43	195	698	219	3.57948717948718	1.12297692307692
44	139	503	471	3.61870050597232	3.38848928066309
45	266	1086	384	4.08270676691729	1.25563909774436
46	286	997	306	3.48601398601399	1.06993006993007
47	153	547	163	3.57516339869281	1.06535947712418
48	220	824	330	3.74545454545455	1.3
49	167	643	191	3.550294011976	1.1437125748503
50	219	841	279	3.84018264040383	1.27397260273973
51	170	641	172	3.77058823529412	1.01176470588235
52	202	673	222	3.33168316831683	1.09909090909091
53	172	528	192	3.06976744186047	1.11627906976744
54	176	565	186	3.10027272727273	1.05681831831838
55	225	816	245	3.62666666666667	1.08288888888889
56	207	706	227	3.4106280193287	1.09661835748792
57	361	1502	481	4.1606648159446	1.33240997229917

Record: 1 of 57 | Filter: Search

11:27 AM 7/15/2016

Microsoft Access Database

The screenshot displays a Microsoft Access report titled 'DParkFocalVegMetrics1'. The report shows a table with 17 rows of data. The columns contain numerical values. At the bottom of the report, there are two summary statistics: 'Average Mindex' and 'Average Windex'. The page number is 'Page 1 of 1'.

146	158	622	568	3.9367088607949	3.59493670886076
147	240	888	362	3.7	1.50833333333333
148	195	696	195	3.56922076923077	1
149	117	388	319	3.31623991623992	2.72649572649573
150	200	647	406	3.235	2.03
151	117	370	321	3.16239316239316	2.74358974358974
152	109	350	291	3.21100917431193	2.6697247706422
153	203	696	343	3.42857142857143	1.68965517241379
154	171	716	423	4.18713450292398	2.47368421052632
155	99	297	223	3	2.25252525252525
156	149	589	223	3.95302013422819	1.49664429530201
157	117	474	123	4.05128205128205	1.05128205128205
158	103	311	305	3.01941747572816	2.96116504854369
159	115	351	331	3.05217391304348	2.87826086956522
160	111	455	511	4.0990990990991	4.6026036036036
161	216	792	276	3.66666666666667	1.27777777777778
162	230	900	280	3.91304347826087	1.21739130434783
163	227	971	259	4.27753303964758	1.14096916299559
164	175	628	395	3.58857142857143	2.25714285714286
165	174	624	352	3.5862068965172	2.02298850574713
166	131	575	163	4.38931297709924	1.24427480916031
167	185	758	205	4.0972972972973	1.10810810810811
168	243	998	273	4.10695588477366	1.12345679012346
169	116	370	324	3.18965517241379	2.79310344827586
170	296	1063	536	3.59121621621622	1.81081081081081

Summary Statistics:

- Average Mindex: 3.6673436409442
- Average Windex: 1.76268972828584

Page 1 of 1

Report
Informed by
SQL Query
Results

ArcMap - Spatial Analyst: Interpolation

The screenshot displays the ArcMap interface with the IDW (Inverse Distance Weighted) tool dialog box open. The dialog box is titled "IDW" and contains the following settings:

- Input point features: DPF2001_1955Ps
- Z value field: Inweedindex
- Output raster: C:\VEOC\569MGIS_CS\DP_GD_Test\Publocks\DP_CS_GDB\DirPnkCapMGIS2018.gdb\W\IndexDP
- Output cell size (optional): 20.4692146669528
- Power (optional): 2
- Search radius (optional): Variable
- Search Radius Settings:
 - Number of points: 12
 - Maximum distance: (empty)
- Input barrier polyline features (optional): (empty)

The "Output raster" section of the dialog box states: "The output interpolated surface raster. It is always a floating-point raster."

The main map area shows a satellite-style background with a color-coded interpolation result. The map features a network of red lines (likely roads or boundaries) and numerous green circular markers representing the input points. The color gradient ranges from dark green (low values) to yellow (high values). The legend in the bottom-left corner shows the following categories:

- 1 - 2
- 3 - 7
- 8 - 16
- 17 - 30
- 31 - 103
- Boundary
- DPBorder
- DP_MISurface2001
 - Value: High: 4.44063, Low: 1.01588
- DP_MISurface2001_Clip
 - Value: High: 4.44063, Low: 1.01588
- DP_MISurface2001_Clip_int
 - 1
 - 2
 - 1

The ArcToolbox on the right side of the screen is expanded to show the "Spatial Analyst Tools" > "Interpolation" > "IDW" path. The Windows taskbar at the bottom shows the system clock as 8:05 AM on 6/9/2018.

Inverse
Distance
Weighting
Tool

Weed Index
Z-factor

ArcMap – Weed Index Predicted Surface



Discovery Park Predictive Weed Surface
Based on 2001 Vegetation Sampling Data

Park Average Weed Index: 1.76

A high weed index is an indication native plants are at significant risk of being repaced by competitive exotic species



Map, data compilation, and geoprocessing completed by John Marshall - July 25, 2018

Data used to create these mapped predictive surfaces were collected in 2001. Therefore, the weed indexes displayed here do not necessarily represent present day Discovery Park site conditions.

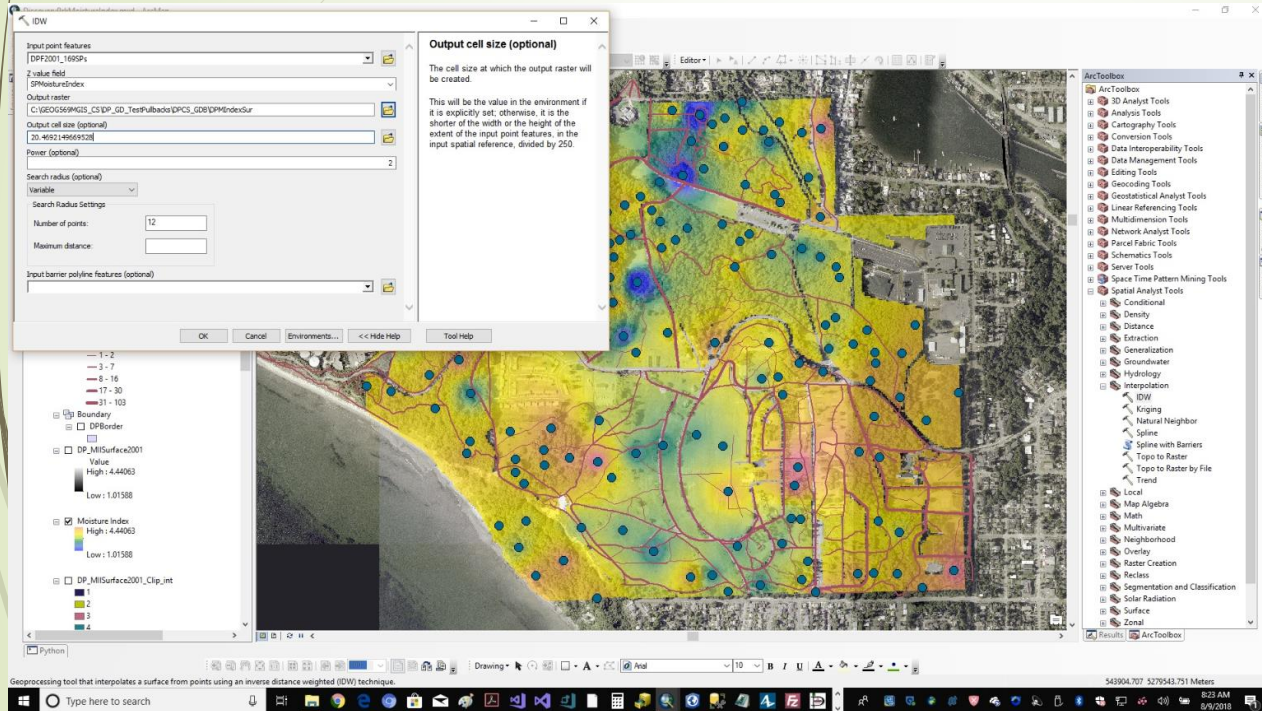
2002 Aerial Imagery - Washington State Geospatial Data Archive

Sample Plot Data - Jon Walker
ICF GIS Specialist

Weed Index Calculations -
Access database created, populated,
and query runs by John Marshall
University of Washington MGIS Student

Weed Index Surface Map for Discovery Park

ArcMap - Spatial Analyst: Interpolation



Inverse
Distance
Weighting
Tool

Moisture
Index
Z-factor

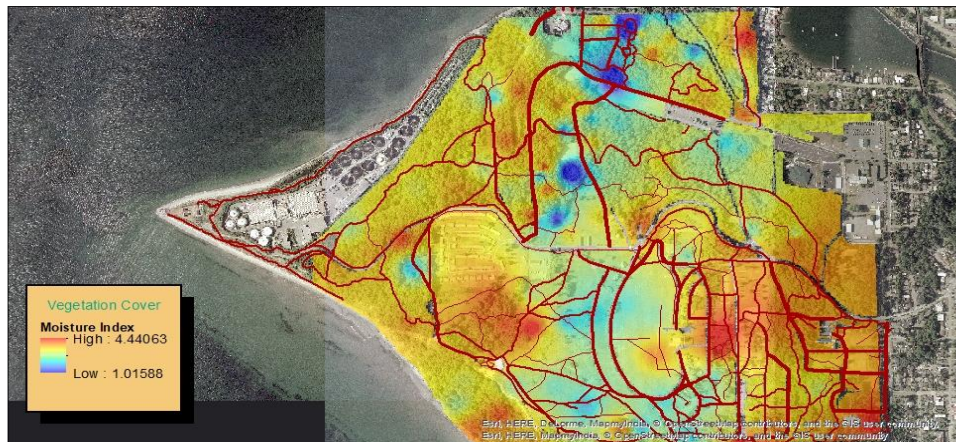
ArcMap – Moisture Index Predicted Surface



Discovery Park Predictive Moisture Surface Based on 2001 Vegetation Sampling Data

Park Average Moisture Index: 3.67

A high moisture index is an indication plants are more likely to be upland species adapted to relatively dry site conditions



Map, data compilation, and geoprocessing completed by John Marshall - July 25, 2018

Data used to create these mapped predictive surfaces were collected in 2001. Therefore, the moisture indexes displayed here do not necessarily represent present day Discovery Park site conditions.

2002 Aerial Imagery - Washington State Geospatial Data Archive

Sample Plot Data - Jon Walker
ICF GIS Specialist

Moisture Index Calculations -
Access database created, populated,
and query runs by John Marshall
University of Washington MGIS Student

Moisture
Index Surface
Map for
Discovery
Park

ArcMap – Re-Digitizing and Editing Vegetation Feature Class

The screenshot shows the ArcMap interface with a map of Discovery Park. A green polygon is digitized on the map. The Table window displays the following data:

PARKNAME	PMA	Shape_Leng	Shape_L_e_1	SampleA	SampleB	SampleC	SampleD	SampleE	SampleF	SampleG	SampleH	DominantSpecies	SubordinateSpecies	Shape_Length	
Discovery Park	310	996.672152	2263.594494	39	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	2	Cytisus scoparius-Agrostis	No subordinates	2318.037804
Discovery Park	310	454.485229	1020.539492	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	3	No Sample Data	No Sample Data	1020.539492
Discovery Park	310	1027.921014	2272.261764	19	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	4	Alnus incana-Rubus spectabilis	No subordinates	1900.165574
Discovery Park	310	1132.355628	2563.434286	157	164	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	5	Acer macrophyllum	Oemleria cerasiformis-Rubus	2612.464439
Discovery Park	310	725.598433	1864.655538	116	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	6	No dominants	Penstemonia menziesii-Acer	1864.655538
Discovery Park	310	398.122297	891.140071	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	7	No Sample Data	No Sample Data	891.140071
Discovery Park	310	895.95458	1981.462173	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	8	No Sample Data	No Sample Data	2025.488897
Discovery Park	310	1676.879247	4767.168592	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	9	No Sample Data	No Sample Data	4767.168592

The Create Features window shows the following fields:

- DPF2001_1695Ps
- DPF2001_0995Ps
- DPTrails
- DPTrails
- Park Vegetation Zones
- Park Vegetation Zones

ADD FIELDS

- SampleA
- SampleB
- SampleC
- SampleD
- SampleE
- SampleF
- SampleG
- SampUnitNo

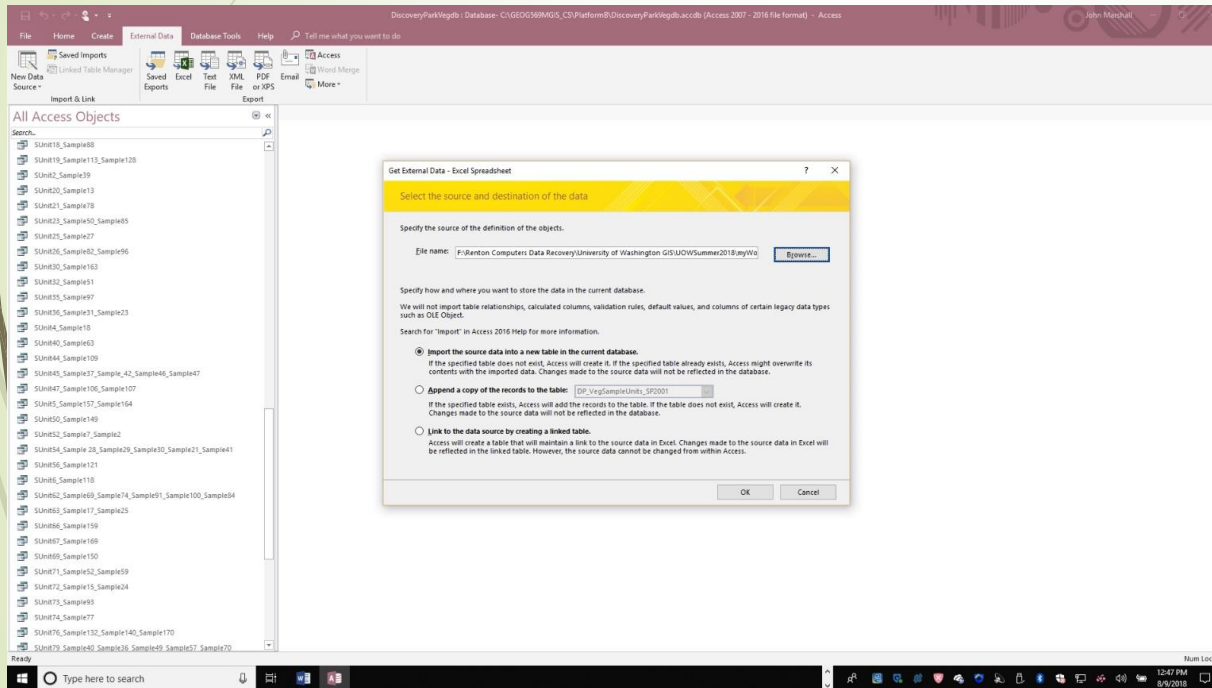
Transferring Data Between Feature Class Attribute Tables into Microsoft Access Database

The screenshot displays a Windows desktop environment with three overlapping windows. The top-left window is a Microsoft Excel spreadsheet titled 'Book1 - Excel' with a standard ribbon and a grid of cells. The top-right window is a Windows Explorer file browser showing a folder named 'shapefiles' containing several files, including 'DP2001SP_169.dbf'. The bottom window is another Microsoft Excel spreadsheet titled 'DP2001SP_169 - Excel' displaying a data table with the following columns: ID, SPlotNo, PCoverTota, MoistureIn, WeedInTot, SPMoisture, SPWeedIn, Latitude, and Longitude. The table contains 27 rows of data.

ID	SPlotNo	PCoverTota	MoistureIn	WeedInTot	SPMoisture	SPWeedIn	Latitude	Longitude
1.0000000000	2.0000000000	220.0000000000	625.0000000000	270.0000000000	2.8490909091	1.2277272727	47.6682990000	-122.4132620000
2.0000000000	3.0000000000	270.0000000000	1005.0000000000	376.0000000000	3.7222222222	1.3925925259	47.6677080000	-122.4116900000
3.0000000000	4.0000000000	257.0000000000	993.0000000000	411.0000000000	3.86381322957	1.5992217988	47.6680670000	-122.4161920000
4.0000000000	5.0000000000	10.0000000000	10.0000000000	10.0000000000	1.0000000000	1.0000000000	47.6679190000	-122.4150270000
5.0000000000	6.0000000000	229.0000000000	795.0000000000	335.0000000000	3.4798253275	1.4628209007	47.6678300000	-122.4139830000
6.0000000000	7.0000000000	204.0000000000	729.0000000000	206.0000000000	3.5752941176	1.60980392157	47.6674890000	-122.4123380000
7.0000000000	8.0000000000	245.0000000000	1070.0000000000	535.0000000000	4.36734693878	2.18367346939	47.6675030000	-122.4099470000
8.0000000000	9.0000000000	220.0000000000	815.0000000000	260.0000000000	3.70454545455	1.18181818182	47.6676590000	-122.4144970000
9.0000000000	10.0000000000	257.0000000000	992.0000000000	543.0000000000	3.85992217899	2.1284046693	47.6674920000	-122.4132120000
10.0000000000	11.0000000000	318.0000000000	1188.0000000000	614.0000000000	3.69641484481	1.4255292593	47.6671860000	-122.4153960000
11.0000000000	14.0000000000	134.0000000000	378.0000000000	134.0000000000	2.8208955239	1.0000000000	47.6671450000	-122.4121240000
12.0000000000	15.0000000000	58.0000000000	224.0000000000	218.0000000000	3.8620689552	3.7586206896	47.6674060000	-122.4107360000
13.0000000000	15.0000000000	195.0000000000	771.0000000000	255.0000000000	3.55384615385	1.30789230769	47.6674060000	-122.4107360000
14.0000000000	17.0000000000	242.0000000000	990.0000000000	282.0000000000	4.09090909091	1.16528925620	47.6684070000	-122.4199810000
15.0000000000	18.0000000000	185.0000000000	625.0000000000	225.0000000000	3.37837837838	1.21621621622	47.6663970000	-122.4148710000
16.0000000000	19.0000000000	151.0000000000	618.0000000000	223.0000000000	4.09271521379	1.47682119205	47.6670130000	-122.4140350000
17.0000000000	20.0000000000	89.0000000000	162.0000000000	163.0000000000	2.82022479150	1.83146067416	47.6662030000	-122.4157660000
18.0000000000	21.0000000000	159.0000000000	482.0000000000	373.0000000000	3.03144654088	2.34591194969	47.6660280000	-122.4167460000
19.0000000000	22.0000000000	185.0000000000	659.0000000000	187.0000000000	3.56216216216	1.01081081081	47.6659240000	-122.4131480000
20.0000000000	23.0000000000	218.0000000000	839.0000000000	246.0000000000	3.84862089552	1.12846036697	47.6656310000	-122.4118840000
21.0000000000	24.0000000000	186.0000000000	639.0000000000	312.0000000000	4.334587097	1.67419193484	47.6661200000	-122.4104870000
22.0000000000	25.0000000000	265.0000000000	1039.0000000000	299.0000000000	3.92075471698	1.12830188679	47.6652760000	-122.4198020000
23.0000000000	27.0000000000	115.0000000000	359.0000000000	239.0000000000	3.12173913043	2.94782606896	47.6656030000	-122.4210840000

Export Feature Class to Shapefile
Drag and Drop dbf File into Blank
Excel Worksheet

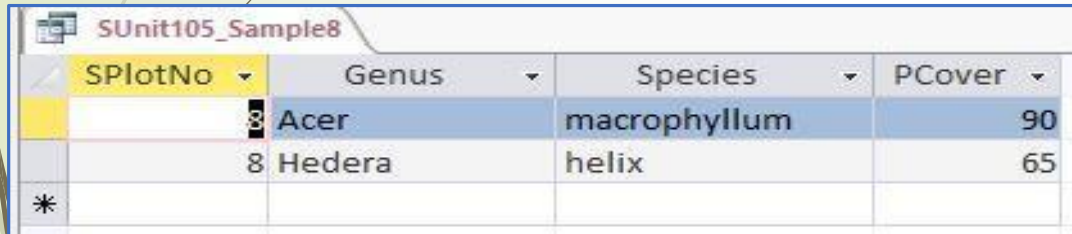
Transferring Data Between Feature Class Attribute Tables into Microsoft Access Database



Import Excel Worksheet
Into Access Database

Microsoft Access Database

```
SELECT SamplePlot.SPlotNo, SamplePlot.Genus, SamplePlot.Species,  
SamplePlot.PCover  
FROM SamplePlot  
WHERE (((SamplePlot.SPlotNo)=8) AND ((SamplePlot.PCover)>=50));
```

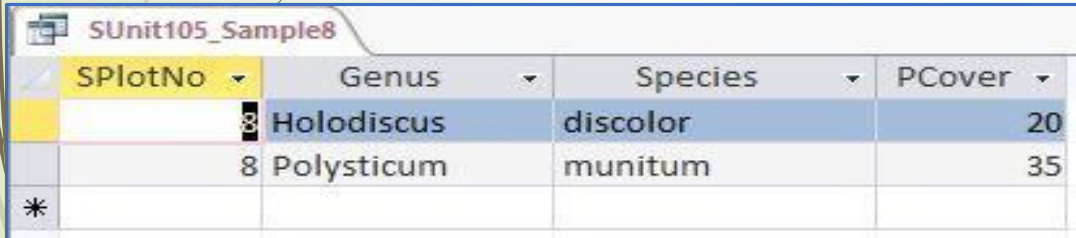


SPlotNo	Genus	Species	PCover
8	Acer	macrophyllum	90
8	Hedera	helix	65
*			

Query
Dominant
Species

Microsoft Access Database

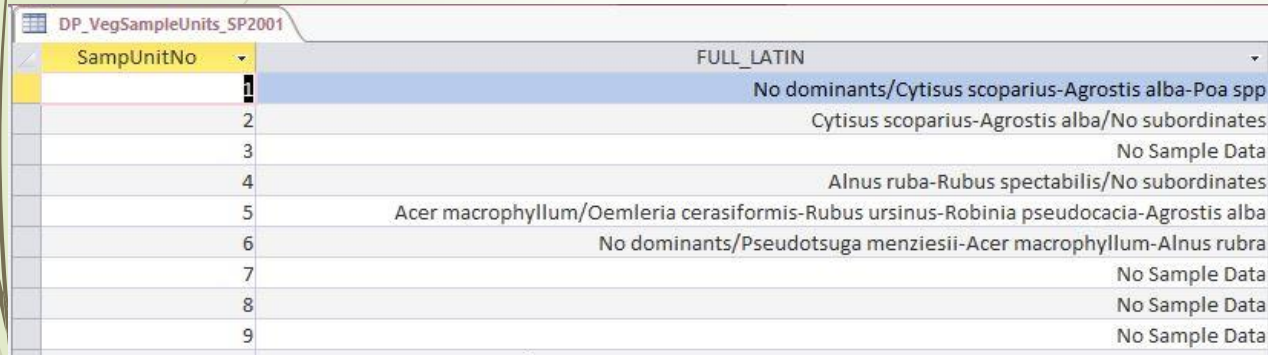
```
SELECT SamplePlot.SPlotNo, SamplePlot.Genus, SamplePlot.Species, SamplePlot.PCover
FROM SamplePlot
WHERE (((SamplePlot.SPlotNo)=8) AND ((SamplePlot.PCover)>=20 And
(SamplePlot.PCover)<50));
```



SPlotNo	Genus	Species	PCover
8	Holodiscus	discolor	20
8	Polysticum	munitum	35

Query
Subordinate
Species

Microsoft Access Database



SampUnitNo	FULL_LATIN
1	No dominants/Cytisus scoparius-Agrostis alba-Poa spp
2	Cytisus scoparius-Agrostis alba/No subordinates
3	No Sample Data
4	Alnus rubra-Rubus spectabilis/No subordinates
5	Acer macrophyllum/Oemleria cerasiformis-Rubus ursinus-Robinia pseudocacia-Agrostis alba
6	No dominants/Pseudotsuga menziesii-Acer macrophyllum-Alnus rubra
7	No Sample Data
8	No Sample Data
9	No Sample Data

Populating Sample Units
with Dominant and
Subordinate Plant
Species Associations

ArcMap – Plant Community



Discovery Park Dominant Plant Communities
Based on 2001 Vegetation Sampling Data

Discovery Park Plant Communities

Plant Community Associations Informed by 2001 Sample Plot Data
Using Query Operation in Microsoft Access Database



Map, data compilation, and geoprocessing
completed by John Marshall - July 25, 2018

Data used to create these mapped plant coverages
were collected in 2001. Therefore, the plant community
associations displayed here do not necessarily represent
present day Discovery Park site conditions.

2002 Aerial Imagery - Washington State Geospatial
Data Archive

Sample Plot Data - Jon Walker
ICF GIS Specialist

Plant Community Association Determinations -
Access database created, populated,
and query runs by John Marshall
University of Washington MGIS Student

Plant
Community
Map for
Discovery
Park

ArcMap – Plant Community Use by Birds



Discovery Park Plant Communities - One Year
Use by Birds (2015 - 2016)

Discovery Park Bird Use of Plant Communities

Seattle Audubon Society Designed and Implemented Volunteer
Bird Observations Study at Discovery Park - 50-meter Radius Observation Areas



Map, data compilation, and geoprocessing
completed by John Marshall - July 25, 2018

Data used to create these mapped plant coverages
were collected in 2001. Therefore, the plant community
associations displayed here do not necessarily represent
present day Discovery Park site conditions.

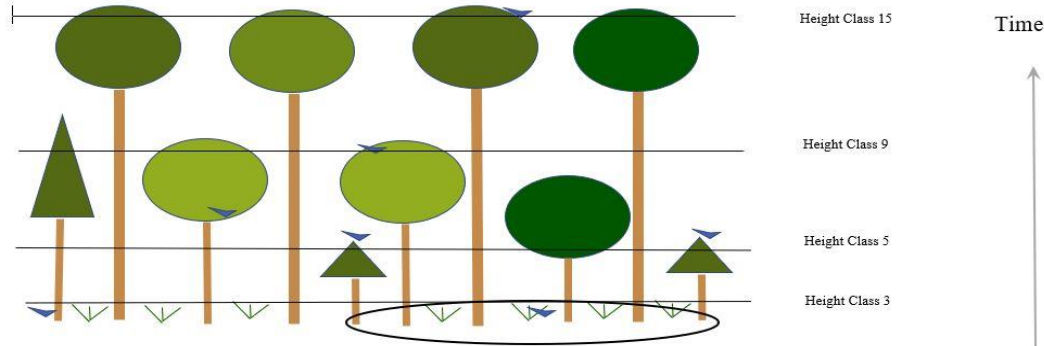
2002 Aerial Imagery - Washington State Geospatial
Data Archive

Bird Observation Stations - Seattle Audubon Society

Plant Community Association Determinations -
Access database created, populated,
and query runs by John Marshall
University of Washington MGIS Student

Plant
Community
Use by Birds
Map
(Horizontal)
for Discovery
Park

ArcMap – Plant Community Use by Birds



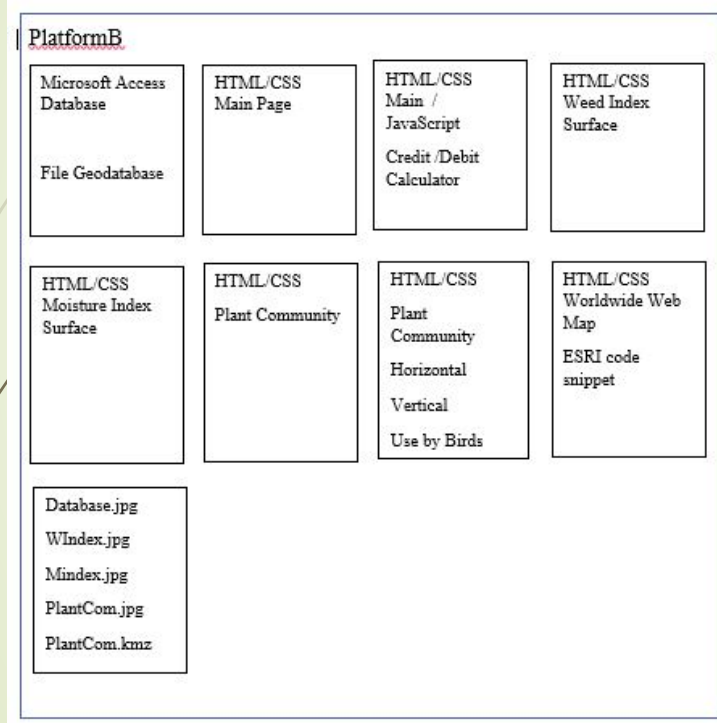
Cover Class	Mid-Point	Sample Plot 1: Trees =	Shrubs =	Herbaceous =	TTotal	STotal	HTotal	
75 – 100	87.5	87.5 x 15 = 1312.5	62.5 x 9 = 562.5	37.5 x 3 = 112.5	1312.5	637.5	112.5	
50 – 75	62.5							
25 – 50	37.5							
5 – 25	15.0							
0 – 5	2.5							
Structural Importance Score: 1312.5 + 637.5 + 112.5 = 2,062.50			Tree SIndex = 0.64			Shrub SIndex = 0.31		Herb SIndex = 0.05

VEGETATION STRUCTURAL INDEX CALCULATION

Note: Blue arrows point from TTotal, STotal, and HTotal to their respective SIndex values. A legend indicates = X, Y, Z by species + behavior.

Plant
Community
Use by Birds
Diagram
(Vertical) for
Discovery
Park

PlatformB



Non-hosted
Multi-HTML / CSS / Java Script
Web Page Platform

Conclusions

A comprehensive present day vegetation sampling effort is overdue at Discovery Park

Moisture, weed, and possibly structural vegetation indexes should be included in the monitoring metrics

Plant community associations should be updated and mapped

A relational database in an enterprise SDE environment is needed to archive, calculate, and report key vegetation metrics

Both horizontal and vertical use of vegetation by wildlife (focus on birds) should be given full consideration in monitoring decisions

References

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Smith, Katherine Manaras, William S. Keeton, Therese M. Donovan, and Brian Mitchell. 2008. Stand-Level Forest Structure and Avian Habitat: Scale Dependencies in Predicting Occurrence in a Heterogeneous Forest, FOR. SCI. 54(1):36–46.

US Army Corps of Engineers - Wetland Indicator Plant List

http://wetland-plants.usace.army.mil/nwpl_static/species/species.html?DET=001100#

US Department of Agriculture - Natural Resource Conservation Service Plant Database

<https://plants.sc.egov.usda.gov/java/>

Questions?