GIS/CAMA Linkage Using ArcGIS

Idaho State Tax Commission

April 2004

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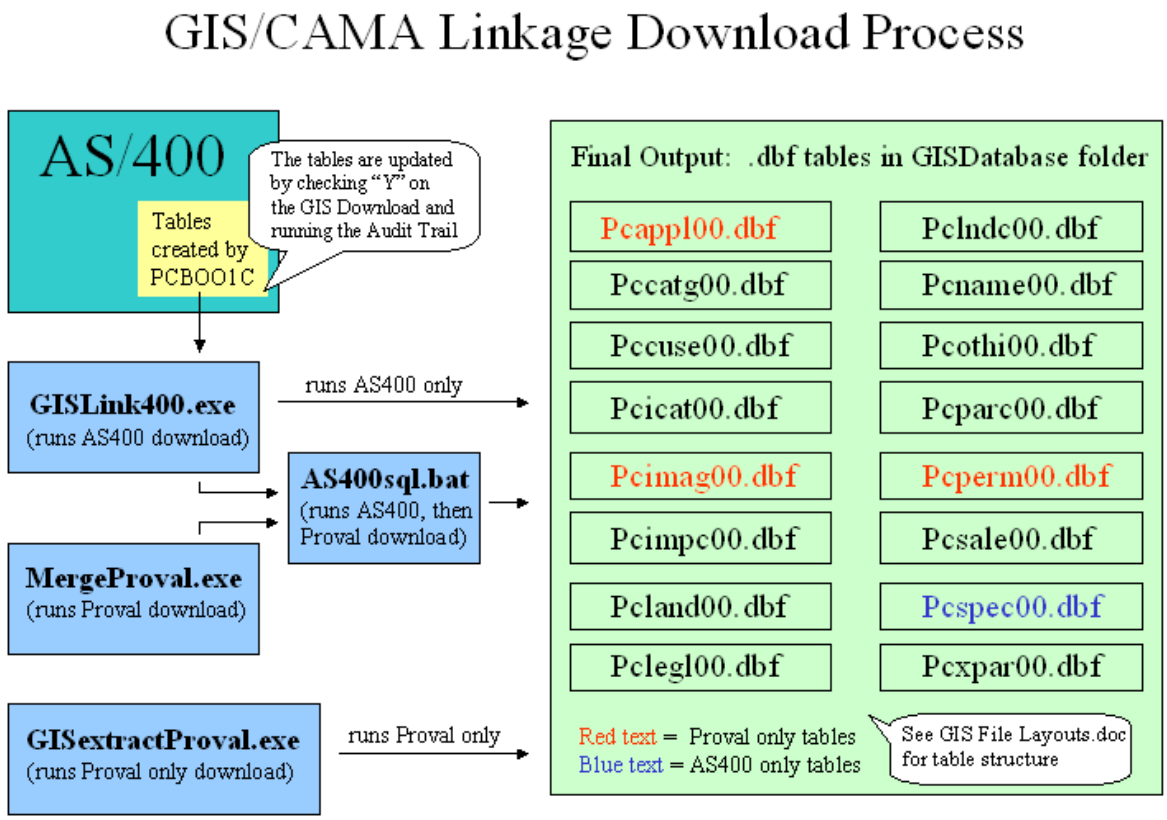
Section 1: GIS/CAMA Linkage Program

The GIS/CAMA Linkage program was designed by a programmer at the Idaho State Tax Commission through collaboration with Idaho Counties and other Tax Commission employees. Its purpose is to make AS400 and Proval data collected by the Assessor's office available in a useable format that can be used in a GIS. The output is several .dbf tables that can be joined in the GIS with parcel data to allow for querying, labeling maps with owner and acreage information, hyperlinking photos, data visualization, etc. There is a lot of additional analysis that can be done in the GIS with this data that will make the Assessor's job much easier.

The following illustration is a flowchart showing the download process of the GIS/CAMA Linkage program.



A county that only has the AS400, Proval or both can benefit from the download. An AS400 only county will get all the tables to the right except for appeals, permits and images. A Proval only county will get all the tables to the right except for special charges. A county using both the AS400 and Proval will get all the tables to the right.

The next few pages include the GIS File Layouts.doc found in the GISDatabase folder. This document shows the table structure. It includes a list of the fields and their descriptions found in each table. It also includes the table names description. For example, pcparc00.dbf is the parcel master table.

Revised 12/29/2000

* * * Files associated with Parcel Master * * *

RELATED PARCELS

PCXPAR00 P RECORD FORMAT: XPARP00 RECORD LENGTH: 88

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
XP_PAR_14	1	14	14	A	PARCEL TYPE/NUM
XP_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
XP_PAR_TYP	30	31	2	A	PARCEL TYPE
XP_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
XP_PAR_STS	44	44	1	A	PARCEL STATUS
XP_REL_14	45	58	14	A	RELATED TYPE/NUM
XP_REL_15	59	73	15	A	RELATED TYPE/NUM/STS
XP_REL_TYP	74	75	2	A	RELATED TYPE
XP_REL_NUM	76	87	12	A	RELATED CORE NUMBER
XP_REL_STS	88	88	1	A	RELATED STATUS

PARCEL MASTER

PCPARC00 P RECORD FORMAT: PARCP00 RECORD LENGTH: 345

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
PM_PAR_14	1	14	14	A	PARCEL TYPE/NUM
PM_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
PM_PAR_TYP	30	31	2	A	PARCEL TYPE
PM_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
PM_PAR_STS	44	44	1	A	PARCEL STATUS
PM_IAEXIST	45	45	1	A	I/A PARCEL EXISTS? A="I" record will contain "A" if both exist. I="A" record will contain "I" if both exist
PM_CARE_OF	46	46	1	A	LAST CARE OF
PM_MAIL_NM	47	76	30	A	MAIL NAME
PM_MAIL_A1	77	106	30	A	ADDR LINE 1
PM_MAIL_A2	107	136	30	A	ADDR LINE 2
PM_MAIL_CT	137	152	16	A	MAIL CITY
PM_MAIL_ST	153	154	2	A	MAIL STATE
PM_MAIL_ZP	155	164	10	A	MAIL ZIP CODE
PM_PROP_AD	165	206	42	A	PROPERTY ADDRESS
PM_PROP_ZP	207	209	5,00	P	PROPERTY ZIP CODE
PM_EFF_DAT	210	217	8,00	S	EFFECTIVE DATE
PM_EXP_DAT	218	225	8,00	S	EXPIRATION DATE

PM_LOCN_CD	226	228	4,00	P	LOCATION CODE
PM_PARC_CD	229	230	2	A	PARCEL CODE
PM_ZONING	231	235	5	A	ZONE
PM_DEEDCDT	236	243	8,00	S	DEED CHANGE DATE
PM_DEEDRF1	244	253	10	A	DEED REFERENCE 1
PM_DEEDRF2	254	263	10	A	DEED REFERENCE 2
PM_DEEDRF3	264	273	10	A	DEED REFERENCE 3
PM_DEEDRF4	274	283	10	A	DEED REFERENCE 4
PM_DEEDRF5	284	293	10	A	DEED REFERENCE 5
PM_LANDREC	294	295	3,00	P	#OF LAND RECS
PM_IMPRECS	296	297	3,00	P	#OF IMPROVEMENTS
PM_PI_YEAR	298	300	4,00	P	PHYSICAL INSPECTION YEAR
PM_TAXAREA	301	303	5,00	P	TAX CODE AREA
PM_TAX_KEY	304	318	15	A	TAX KEY
PM_TAXYEAR	319	321	4,00	P	TAX YEAR
PM_PAIDFLG	322	322	1	A	TAX FULLY SATISFIED
PM_TAX_AMT	323	328	11,02	P	TAX/SPECIAL CHARGE
PM_PV_AREA	329	329	1,00	P	CAMA AREA NUMBER
PM_PV_NBHD	330	336	7,00	S	CAMA NEIGHBORHOOD
PM_PV_ACRE	337	345	9,04	S	CAMA LEGAL ACREAGE

APPEALS

PCAPPL00 P RECORD FORMAT: APPEAL0 RECORD LENGTH: 169

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
AP_PAR_14	1	14	14	A	PARCEL TYPE/NUM
AP_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
AP_PAR_TYP	30	31	2	A	PARCEL TYPE
AP_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
AP_PAR_STS	44	44	1	A	PARCEL STATUS
AP_REC_NUM	45	47	3,00	S	RECORD NUMBER
AP_CHG_RSN	48	51	4	A	APPEAL CHANGE REASON
AP_GROUNDS	52	71	20	A	GROUNDS FOR APPEAL
AP_OLD_VAL	72	80	9,00	S	APPEAL PRIOR VALUE
AP_NEW_VAL	81	89	9,00	S	APPEAL NEW VALUE
AP_CHG_DAT	90	97	8,00	S	DATE OF ADJUSTMENT
AP_PET_NAM	98	133	36	A	PETITIONERS NAME
AP_FIL_DAT	134	141	8,00	S	DATE OF FILING
AP_HEAR_DT	142	149	8,00	S	DATE OF HEARING
AP_FIN_DAT	150	157	8,00	S	FINAL DATE
AP_DET_DAT	158	165	8,00	S	DETERMINATION DATE
AP_STATUS	166	169	4	A	APPEAL STATUS

LEGAL DESCRIPTION

PCLEGL00 P RECORD FORMAT: LEGAL00 RECORD LENGTH: 284

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
LG_PAR_14	1	14	14	A	PARCEL TYPE/NUM
LG_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
LG_PAR_TYP	30	31	2	A	PARCEL TYPE
LG_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
LG_PAR_STS	44	44	1	A	PARCEL STATUS
LG_LINE_1	45	84	40	A	LEGAL DESC LINE 1
LG_LINE_2	85	124	40	A	LEGAL DESC LINE 2
LG_LINE_3	125	164	40	A	LEGAL DESC LINE 3
LG_LINE_4	165	204	40	A	LEGAL DESC LINE 4
LG_LINE_5	205	244	40	A	LEGAL DESC LINE 5
LG_LINE_6	245	284	40	A	LEGAL DESC LINE 6

PARCEL NAME FILE

PCNAME00 P RECORD FORMAT: NAMEP00 RECORD LENGTH: 78

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
NM_PAR_14	1	14	14	A	PARCEL TYPE/NUM
NM_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
NM_PAR_TYP	30	31	2	A	PARCEL TYPE
NM_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
NM_PAR_STS	44	44	1	A	PARCEL STATUS
NM_REC_NUM	45	47	3,00	S	RECORD NUMBER
NM_CARE_OF	48	48	1	A	CARE OF
NM_OWNER	49	78	30	A	NAME

PARCEL CATEGORY VALUES

PCCATG00 P RECORD FORMAT: CATGP00 RECORD LENGTH: 84

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
CA_PAR_14	1	14	14	A	PARCEL TYPE/NUM
CA_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
CA_PAR_TYP	30	31	2	A	PARCEL TYPE
CA_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
CA_PAR_STS	44	44	1	A	PARCEL STATUS
CA_CAT_NUM	45	46	2,00	P	CATEGORY
CA_SHT_NUM	47	48	3,00	P	RECORD#
CA_REV_YR	49	51	4,00	P	REVIEW YEAR
CA_QNTY	52	56	9,03	P	QUANTITY
CA_UNIT	57	58	2	A	UNIT
CA_VALUE	59	63	9,00	P	VALUE
CA_HO_MRKT	64	68	9,00	P	HOMEOWNER MARKET
CA_HO_EXPT	69	73	9,00	P	HOMEOWNER EXEMPTION
CA_HO_FLAG	74	74	1	A	ELIGIBLE FOR HO EXMPT?

					Y=yes Blank=no D=Disallowed
CA_CB_MRKT	75	79	9,00	P	CIRCUIT BREAKER MARKET
CA_HS_MRKT	80	84	9,00	P	HARDSHIP MARKET

PERMITS

PCPERM00 P RECORD FORMAT: PERMIT0 RECORD LENGTH: 191

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
PE_PAR_14	1	14	14	A	PARCEL TYPE/NUM
PE_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
PE_PAR_TYP	30	31	2	A	PARCEL TYPE
PE_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
PE_PAR_STS	44	44	1	A	PARCEL STATUS
PE_REF_NUM	45	64	20	A	PERMIT REF NUMBER
PE_FLD_NUM	65	71	7,00	S	FIELD VISIT REC
PE_FIL_DAT	72	79	8,00	S	PERMIT FILING DATE
PE_CAL_DAT	80	87	8,00	S	PERMIT CALLBACK DT
PE_INACT_D	88	95	8,00	S	PERMIT INACTIVE DT
PE_CERT_DT	96	103	8,00	S	DATE CERTIFIED FOR OCCUPANCY
PE_DESCRIP	104	163	60	A	PERMIT DESCRIPTION
PE_TYPE ..	164	167	4	A	PERMIT TYPE
PE_SOURCE	168	171	4	A	PERMIT SOURCE
PE_PHONE_N	172	191	20	A	PERMIT CONTACT#

SALES

PCSALE00 P RECORD FORMAT: SALEP00 RECORD LENGTH: 65

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
SL_PAR_14	1	14	14	A	PARCEL TYPE/NUM
SL_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
SL_PAR_TYP	30	31	2	A	PARCEL TYPE
SL_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
SL_PAR_STS	44	44	1	A	PARCEL STATUS
SL_SALE_DT	45	50	6,00	S	SALE DATE
SL_VALID	51	51	1	A	VALID SALE? (Y=Valid sale, N=Not valid sale, M=Valid sale/Multiple parcel sale,

O=Not valid sale/Multiple parcel sale

Note: for multiple parcel sales, the first parcel will have Y or N, and all additional parcels will have M or O)

SL_PRICE	52	61	10,00	S	SELLING PRICE
SL_PERS_PR	62	62	1	A	PERSONNAL PROPERTY IN SALE?

SL_CONST	63	63	1	A	CONSTANT
SL_DESIG	64	65	2,00	S	SALES DESIGNATOR (1-17)

SPECIAL CHARGES

PCSPEC00 P RECORD FORMAT: SPECLP0 RECORD LENGTH: 54

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
SP_PAR_14	1	14	14	A	PARCEL TYPE/NUM
SP_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
SP_PAR_TYP	30	31	2	A	PARCEL TYPE
SP_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
SP_PAR_STS	44	44	1	A	PARCEL STATUS
SP_CODE	45	46	3,00	P	SPECIAL CODE
SP_UNITS	47	50	7,03	P	SPECIAL UNIT
SP_AMOUNT	51	54	7,02	P	SPECIAL AMOUNT

* * * Files associated with Improvements * * *

IMPROVEMENTS

PCIMPC00 P RECORD FORMAT: IMPCP00 RECORD LENGTH: 246

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
IM_PAR_14	1	14	14	A	PARCEL TYPE/NUM
IM_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
IM_PAR_TYP	30	31	2	A	PARCEL TYPE
IM_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
IM_PAR_STS	44	44	1	A	PARCEL STATUS
IM_NUMBER	45	49	5	A	IMPROVEMENT NUMBER (R01, R02, etc..)
IM_DWELL_N	50	54	5	A	DWELLING NUMBER (D=Residential dwelling, C=commercial, M=Manufactured housing)
IM_LIN_NUM	55	62	8	A	LINE NUMBER
IM_PROP_N1	63	65	5,00	P	House number 1
IM_PROP_N2	66	68	3	A	House number 2
IM_PROP_D1	69	70	2	A	Direction 1
IM_PROP_SA	71	86	16	A	Street name
IM_PROP_D2	87	88	2	A	Direction 2
IM_PROP_ZP	89	91	5,00	P	Zip code
IM_APPR_IN	92	95	4	A	Appraiser initials
IM_INSP_DT	96	103	8,00	S	Inspection date
IM_OI_ONLY	104	104	1	A	Other imp only
IM_REV_YR	105	108	4,00	S	Review year
IM_CLASS	109	112	4	A	Class

IM_USE_COD	113	116	4,00	S	Use code
IM_UNITS	117	117	1,00	S	Number of units
IM_MKT_GRD	118	121	4	A	Market grade
IM_YR_BLT	122	125	4,00	S	Year built
IM_EFF_YR	126	129	4,00	S	Effective year
IM_CONFORM	130	130	1	A	Conforming
IM_EST_VAL	131	135	9,00	P	Estimated value
IM_STORIES	136	137	2	A	Number of stories
IM_BEDROOM	138	139	2,00	S	Bedrooms
IM_BATHRM	140	143	4,02	S	Bathrooms
IM_FIREPLC	144	145	2,00	S	Fireplaces
IM_1ST_CLS	146	149	4	A	1st floor class
IM_1ST_SQF	150	153	7,00	P	1st floor square feet
IM_2ND_CLS	154	157	4	A	2nd floor class
IM_2ND_SQF	158	161	7,00	P	2nd floor square feet
IM_BAS_CLS	162	165	4	A	Basement total class
IM_BAS_SQF	166	169	7,00	P	Basement total square feet
IM_ATT_CLS	170	173	4	A	Attic total class
IM_ATT_SQF	174	177	7,00	P	Attic total square feet
IM_SIDING	178	181	4,00	S	Siding 1
IM_ROOFING	182	185	4,00	S	Roof cover 1
IM_TOT_SQF	186	189	7,00	P	TOTAL SQFT
IM_FUEL_GS	190	193	4,00	S	Gas
IM_FUEL_OI	194	197	4,00	S	Oil
IM_FUEL_EL	198	201	4,00	S	Electric
IM_FUEL_SL	202	205	4,00	S	Solid
IM_HEAT_1	206	209	4,00	S	Heating system 1
IM_HEAT_2	210	213	4,00	S	Heating system 2
IM_HEAT_3	214	217	4,00	S	Heating system 3
IM_BAS_CST	218	222	9,00	P	Main improvement base cost
IM_EXT_VAL	223	227	9,00	P	VALUE INCL
GARAGE/CARPORTS					
IM_PCT_CPT	228	229	2,02	S	Percent complete
IM_GAR1_CL	230	233	4	A	Gar/car1 class
IM_GAR1_TP	234	234	1,00	S	Gar/car1 type
IM_GAR1_SF	235	237	5,00	P	Gar/car1 area
IM_GAR2_CL	238	241	4	A	Gar/car2 class
IM_GAR2_TP	242	242	1,00	S	Gar/car2 type
IM_GAR2_SF	243	245	5,00	P	Gar/car2 area
IM_EXEMPT	246	246	1	A	Exempt improvement

IMPROVEMENT CATEGORY VALUES

PCICAT00 P RECORD FORMAT: ICATP00 RECORD LENGTH: 64

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
IC_PAR_14	1	14	14	A	PARCEL TYPE/NUM
IC_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
IC_PAR_TYP	30	31	2	A	PARCEL TYPE
IC_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
IC_PAR_STS	44	44	1	A	PARCEL STATUS
IC_CAT_NUM	45	46	2,00	P	CATEGORY
IC_SHT_NUM	47	48	3,00	P	RECORD#
IC_REV_YR	49	51	4,00	P	REVIEW YEAR
IC_QNTY	52	57	11,03	P	QUANTITY
IC_UNIT	58	59	2	A	UNIT
IC_VALUE	60	64	9,00	P	VALUE

IMPROVEMENT IMAGE FILE

PCIMAGE0 P RECORD FORMAT: IMAGE00 RECORD LENGTH: 152

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
II_PAR_14	1	14	14	A	PARCEL TYPE/NUM
II_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
II_PAR_TYP	30	31	2	A	PARCEL TYPE
II_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
II_PAR_STS	44	44	1	A	PARCEL STATUS
II_NUMBER	45	49	5	A	IMPROVEMENT
II_REC_NUM	50	52	3,00	S	RECORD NUMBER
II_IMAGE	53	152	100	A	IMAGE PATH/FILE

LAND RECORDS

PCLAND00 P RECORD FORMAT: LANDP00 RECORD LENGTH: 91

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
LD_PAR_14	1	14	14	A	PARCEL TYPE/NUM
LD_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
LD_PAR_TYP	30	31	2	A	PARCEL TYPE
LD_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
LD_PAR_STS	44	44	1	A	PARCEL STATUS
LD_CAT_NUM	45	46	2,00	S	CATEGORY
LD_LOC_NUM	47	50	4	A	LOCATION
LD_CLS_NUM	51	55	5	A	CLASS
LD_TYP_NUM	56	60	5	A	TYPE
LD_REC_NUM	61	62	3,00	P	RECORD#
LD_QNTY	63	68	11,03	P	QUANTITY
LD_UNIT	69	70	2	A	LAND UNIT
LD_VALUE	71	75	9,00	P	VALUE
LD_APPR_IN	76	79	4	A	APPRAISAL INIT
LD_APPR_DT	80	87	8,00	S	APPRAISAL DATE
LD_REV_YR	88	91	4,00	S	REVIEW YEAR

LAND CHARACTERISTICS

PCLNDC00 P RECORD FORMAT: LNDCP00 RECORD LENGTH: 91

FIELD NAME	START	END	LENGTH	TYP	DESCRIPTION
LC_PAR_14	1	14	14	A	PARCEL TYPE/NUM
LC_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
LC_PAR_TYP	30	31	2	A	PARCEL TYPE
LC_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
LC_PAR_STS	44	44	1	A	PARCEL STATUS
LC_NEIGH_T	45	45	1	A	NEIGHBORHOOD TYPE U=Urban S=Suburban R=Rural V=Recreational (Vacation)
LC_ZONING	46	50	5	A	ZONING
LC_TREND	51	51	1	A	LOT TREND S=Stable I=Improving D=Declining
LC_OFFSITE	52	52	1	A	OFFSITE
LC_PACCESS	53	53	1	A	PUBLIC ACCESS
LC_PRIVATE	54	54	1	A	PRIVATE
LC_ASPHALT	55	55	1	A	ASPHALT CONCRETE
LC_GRAVEL	56	56	1	A	GRAVEL DIRT
LC_SIDEWLK	57	57	1	A	SIDEWALKS
LC_CURBS	58	58	1	A	CURBS GUTTERS
LC_ALLEY	59	59	1	A	ALLEY
LC_TOPO	60	60	1	A	TOPOGRAPHY L=Low F=Flat/level I=Intermediate slope S=Steep slope
LC_WATER_F	61	62	1	A	WATERFRONT L=Lake R=River/creek A=Accreation B=Bluff land F=Flood plain S=Beach(sand?) G=Grade
LC_ELECT	63	63	1	A	ELECTRICITY
LC_GAS	64	64	1	A	GAS
LC_UNDER_G	65	65	1	A	UNDERGROUND ELEC/TEL
LC_CABLE	66	66	1	A	CABLE TV
LC_PUB_WTR	67	67	1	A	PUBLIC WATER
LC_PRI_WEL	68	68	1	A	PRIVATE WELL
LC_SEWER	69	69	1	A	PUBLIC SEWER

LC_SEPTIC	70	70	1	A	SEPTIC SYSTEM
LC_DIMEN_F	71	78	8,03	S	DIMENSION FF
LC_DIMEN_D	79	86	8,03	S	DIMENSION DEPTH
LC_LOCATE	87	87	1	A	LOCATION
LC_AMENIT	88	88	1	A	AMENITIES
LC_LANDSCP	89	89	1	A	LANDSCAPING
LC_VIEW	90	90	1	A	VIEW
LC_DETRIM	91	91	1	A	DETRIMENTS

OTHER IMPROVEMENTS

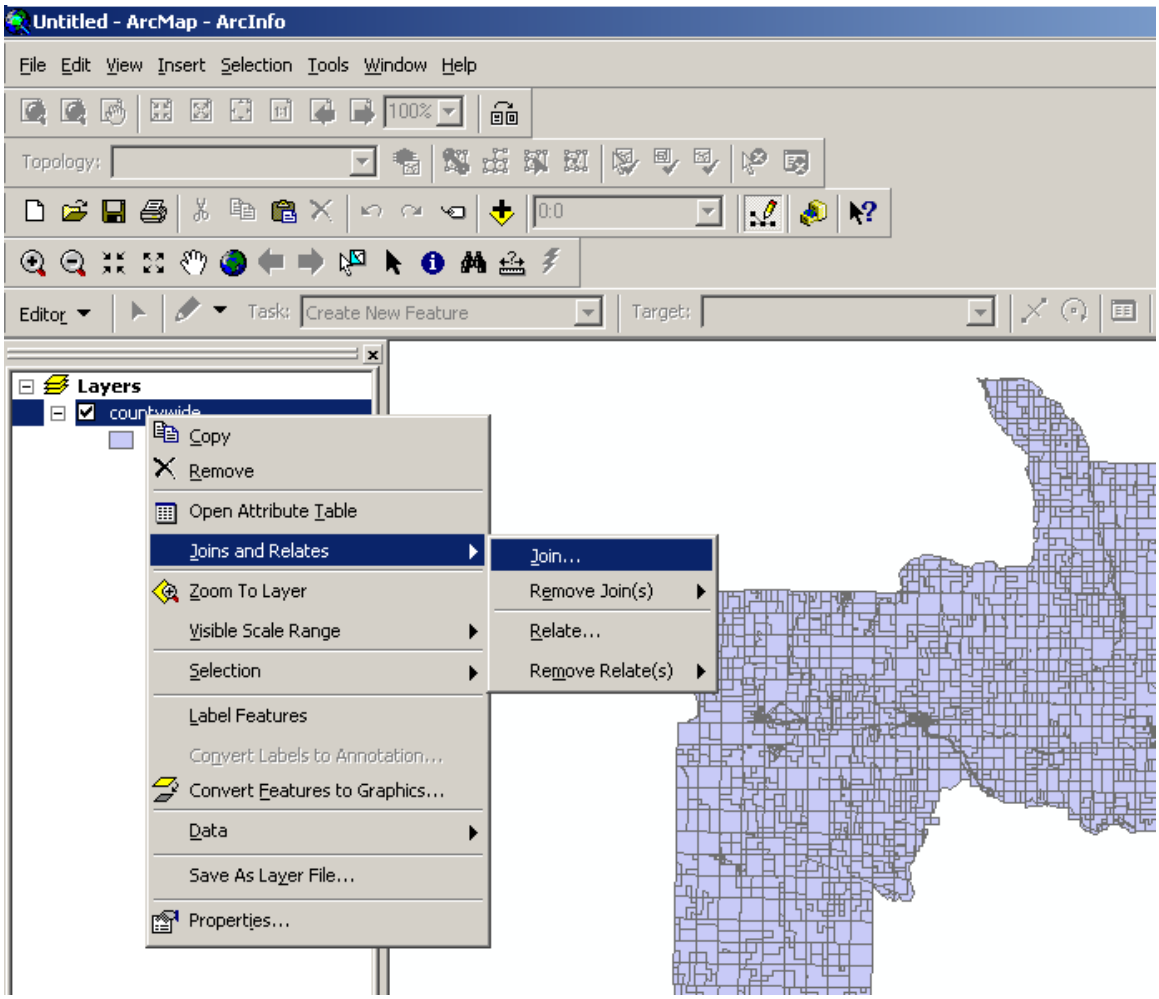
PCOTHI00 P RECORD FORMAT: OTHER00 RECORD LENGTH: 84

FIELD NAME	START	END	LENGTH/TYP		DESCRIPTION
OI_PAR_14	1	14	14	A	PARCEL TYPE/NUM
OI_PAR_15	15	29	15	A	PARCEL TYPE/NUM/STS
OI_PAR_TYP	30	31	2	A	PARCEL TYPE
OI_PAR_NUM	32	43	12	A	PARCEL CORE NUMBER
OI_PAR_STS	44	44	1	A	PARCEL STATUS
OI_NUMBER	45	49	5	A	IMPROVEMENT NUMBER (R01, R02, etc…)
OI_DWELL_N	50	54	5	A	DWELLING NUMBER
This is the improvement sequence Number: 01, 02, G01,G02, etc…)					
OI_USE_COD	55	62	8	A	USE CODE
OI_CLASS	63	66	4	A	Class
OI_TOT_SQF	67	70	7,00	P	TOTAL Sq ft
OI_YR_BLT	71	74	4,00	S	Year built
OI_BAS_CST	75	79	9,00	P	BASE COST
OI_VALUE	80	84	9,00	P	EXTENDED VALUE

Section 2: Joining/Relating CAMA tables to parcels in ArcGIS

Joining tables allows you to bring the information from any number of .dbf tables into the parcel layer table. The following are instructions to do this:

□ First, <right click> on the parcel layer inside ArcMap. <click> on **Joins and Relates** and then <click> **Join…**

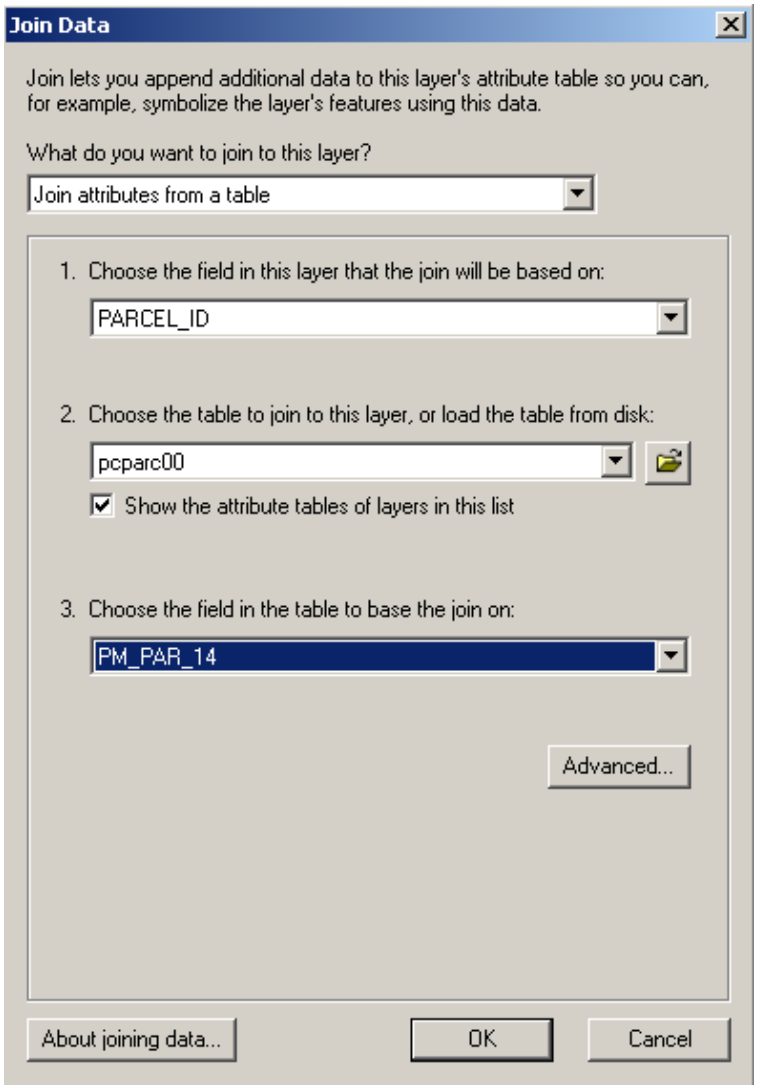


Next, this will bring up the Join Data menu. This menu allows you to fill out all the needed information to create a join. The following menu is filled out to create a join to the Parcel Master table.

□ Field 1 – select the parcel number field in the GIS database. Note: The join will be created using the unique parcel number. The fields don't have to have the same name but the field type must be the same and the parcel numbers must be the same in order to match.

□ Field 2 – select one of the .dbf tables to create the join. Refer to the GIS File Layouts.doc or previous chapter if you need to know the .dbf table name or which data is included in each table.

□ Field 3 – select the parcel number in the table you want to join. You have the choice of selecting a 14 or 15 digit parcel number depending on the PIN field in the parcel layer.



□ <Select> **OK**. This completes the join.

□ You can open up the parcel layer table in ArcMap to view the joined fields. To do this <right click> on the parcel layer and select **Open Attribute Table**.

Notice all the additional fields from the parcel master table.

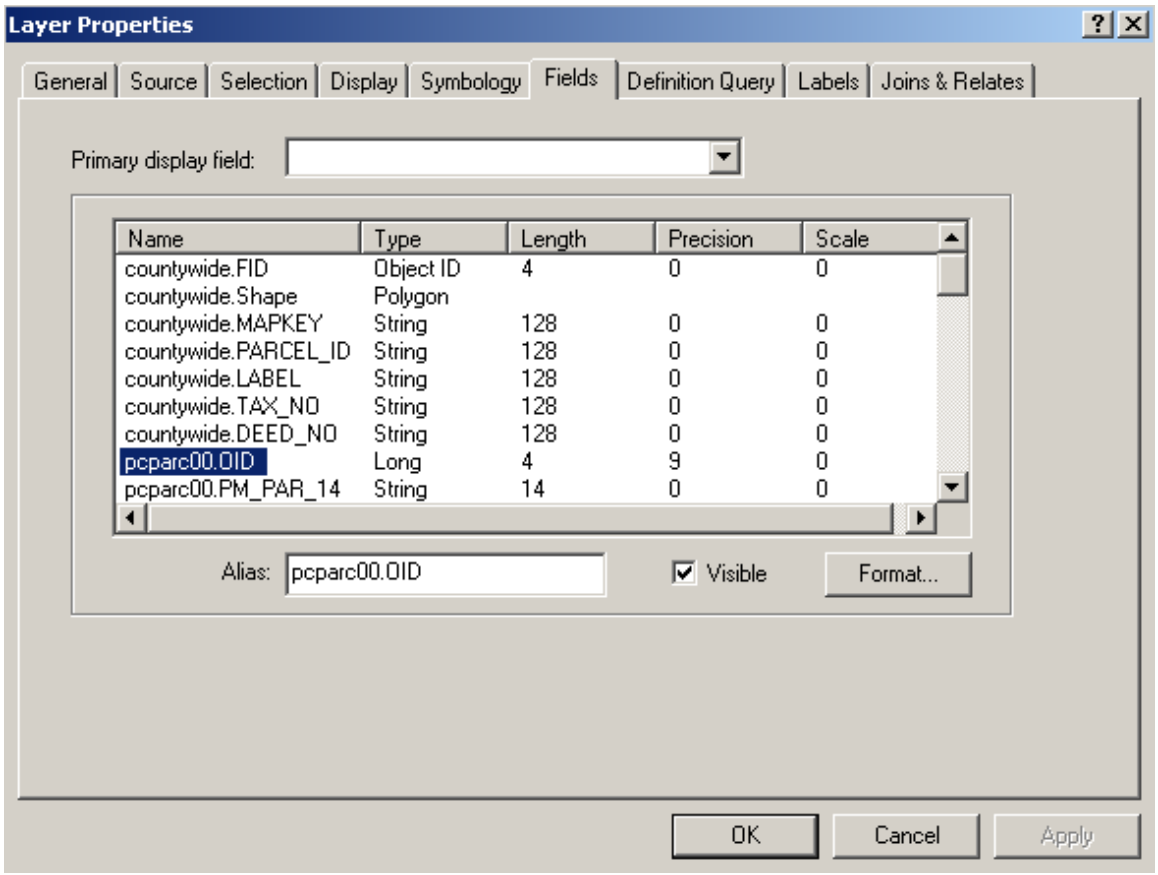
Removing unwanted fields

□ To get rid of the fields you don't want, <right click> on the parcel layer in ArcMap and select **properties**. This will bring up the Layer Properties Menu.

□ In the Layer Properties menu, <select> the **Fields** tab.

□ <Select> a field you want to remove from the list and <uncheck> the **Visible check box.** This will hide the field so that you can't see it in ArcMap. Do this for all fields you want to hide.

Note: Do not uncheck fields that are generated automatically by the software or the output file will be unusable.



The difference between a Join and a Relate

ArcMap provides two methods to associate data stored in tables with geographic features: joins and relates. When you join two tables, you append the attributes from one onto the other based on a field common to both tables. Relating tables defines a relationship between two tables—also based on a common field—but doesn't append the attributes of one to the other. Instead, you can access the related data when necessary.

You'll want to join two tables when the data in the tables has a one-to-one or a many-to-one relationship. For example, you have a Parcel layer, and you want to join a table showing the physical inspection date.

You'll want to relate two tables when the data in the tables has a one-to-many or many-to-many relationship. For example, your map displays a parcel database, and you have a table of owners. A parcel may have more than one owner, and an owner may own more than one parcel. Another example is that a parcel has many categories. If writing a query such as where are all the properties that are Category 81, then relate the two tables.

Joins and relates are reconnected whenever you open a saved project. This way, if the underlying data in your tables changes, it will be reflected in the join or relate.
When you're through using a join or relate, you can always remove it.

Note: When you convert your data into a Geodatabase then you have the option of setting up relationship classes.

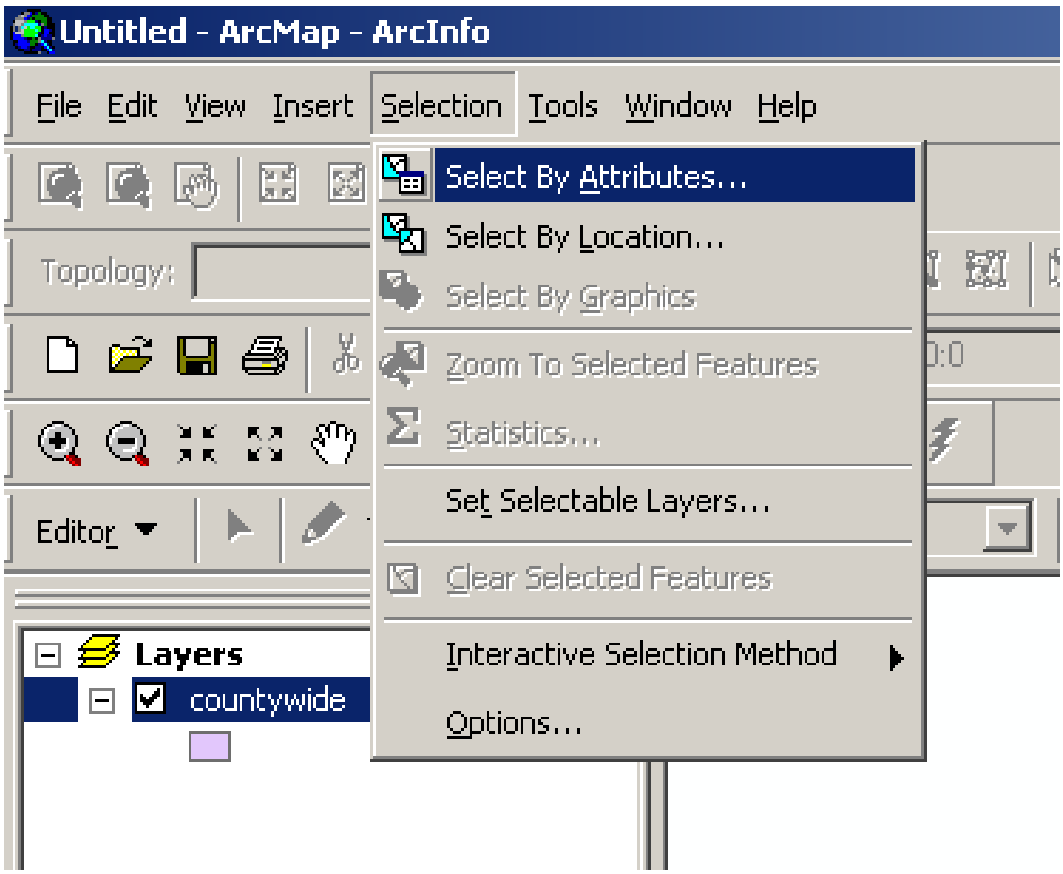
Section 3: Querying in ArcGIS

Querying allows you to get answers quickly that are otherwise very difficult or take a lot of time to figure out. You also get a spatial view or visual of your data.

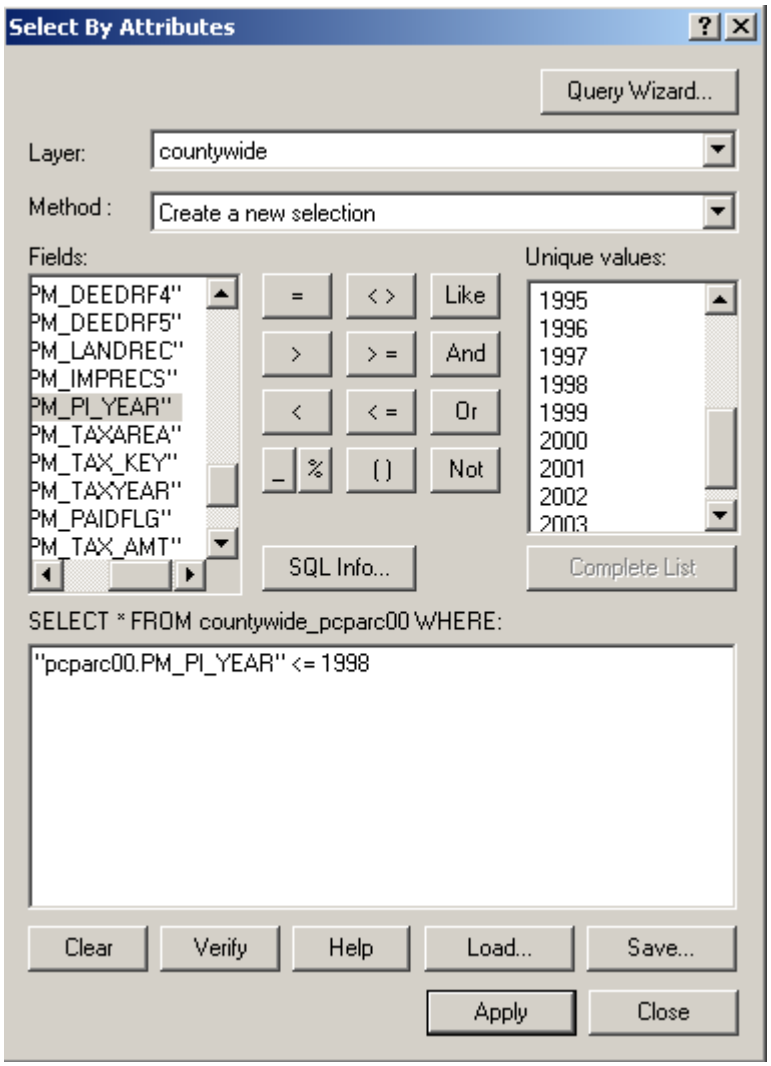
The following will demonstrate how to write queries in ArcMap: (this example will use a join)

□ Ensure that your parcel layer has been joined to the Parcel Master table.

□ First, <Select> the **Select By Attributes** option from the **Selection** pull down menu.



This will bring up the Select By Attributes Menu. You complete this menu and select apply to get query results. As you select a query field, operator and unique value a query expression is created in the bottom query expression window. You can use the tools in the menu or just type to create the expression.

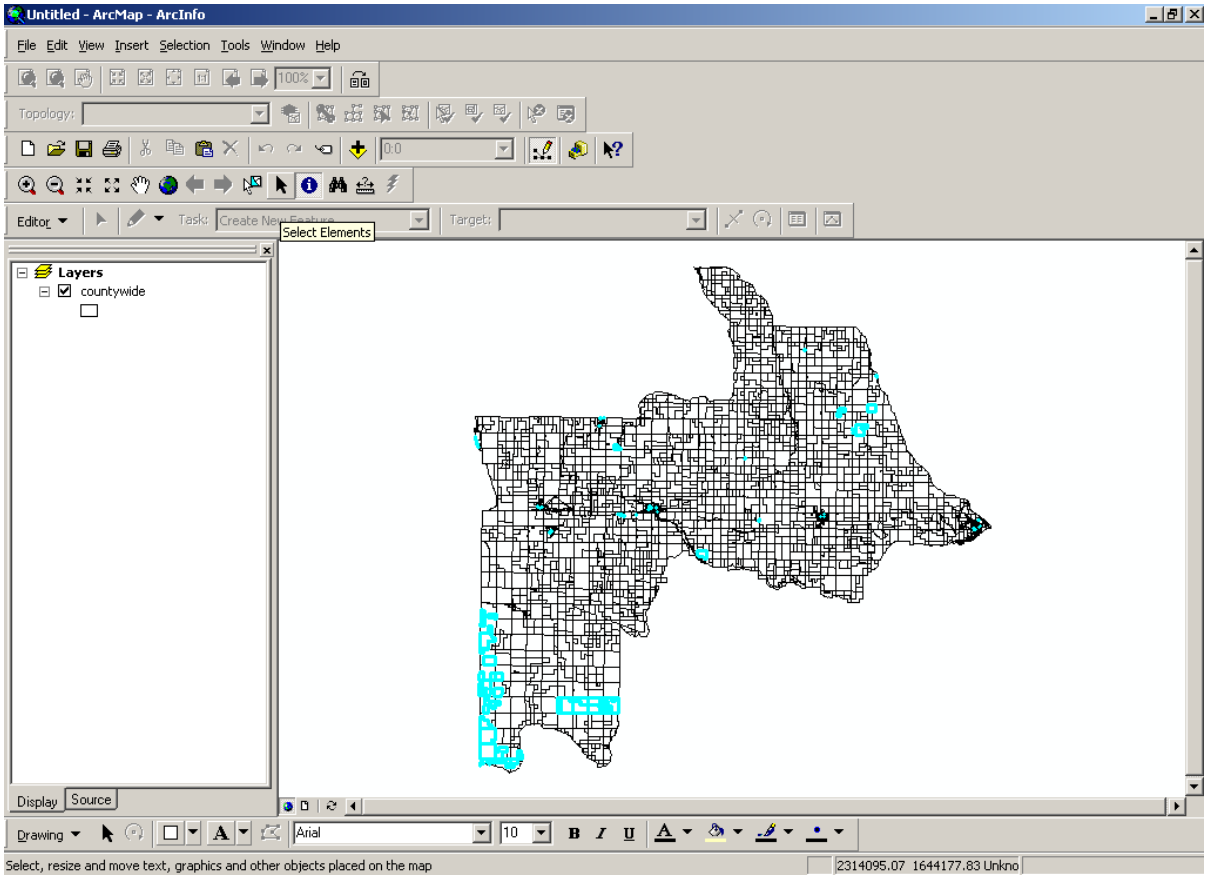


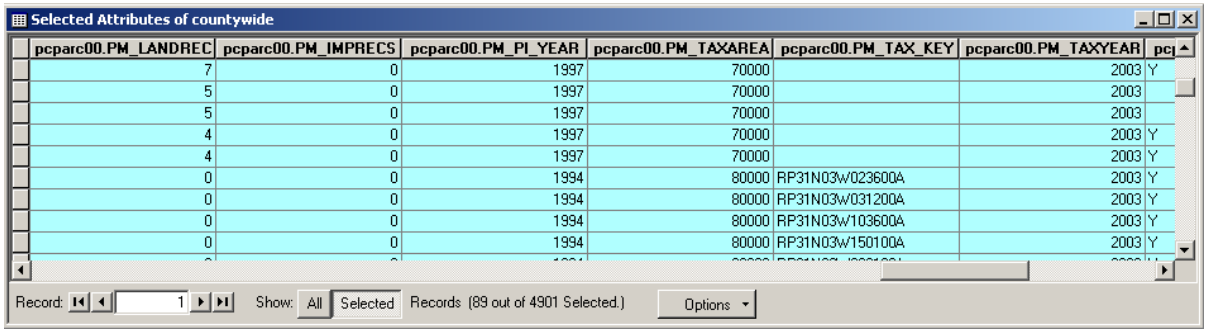
The menu above is filled out so that when you select apply, all the parcels that haven't been appraised in the last 5 years will be selected. That means that any parcels with a physical inspection date of 1998 or older will be selected. We will now go through the steps to build this query.

1. □ Ensure that your "countywide parcel layer" in the **Layer dropdown** menu is selected.
2. □ Ensure that "Create a new selection" in the **Method dropdown** menu is selected.
3. □ <Double Click> the "pcparc00.PM_PI_YEAR" in the **Fields** list so that it appears in the query expression window.

4. □ <Click> on the "<=" **operator** so that it appears in the query expression window.
5. □ <Select> "1998" from the **Unique values** list or <type> "1998" in the **query expression** window. Note: You can <Select> the **Complete List** button to ensure that all possible values are listed.
6. □ <Select> **Apply**

This completes the query and gives you results in the data view and table.





Notice the number of records selected (89) at the bottom of the table.

Additional Notes

▪ The query expression in the last example did not consider null values. Adding the following to the expression will resolve this:

"pcparc00.PM_PI_YEAR" < 1998 AND "pcparc00.PM_PI_YEAR" <> 'null'

▪ Using the **AND** operator selects parcels that must meet both criteria. All the parcels between 1 and 1998 would be selected.

▪ Using the **OR** operator selects parcels that meet one or both criteria. The result is all parcels being selected.

Relates

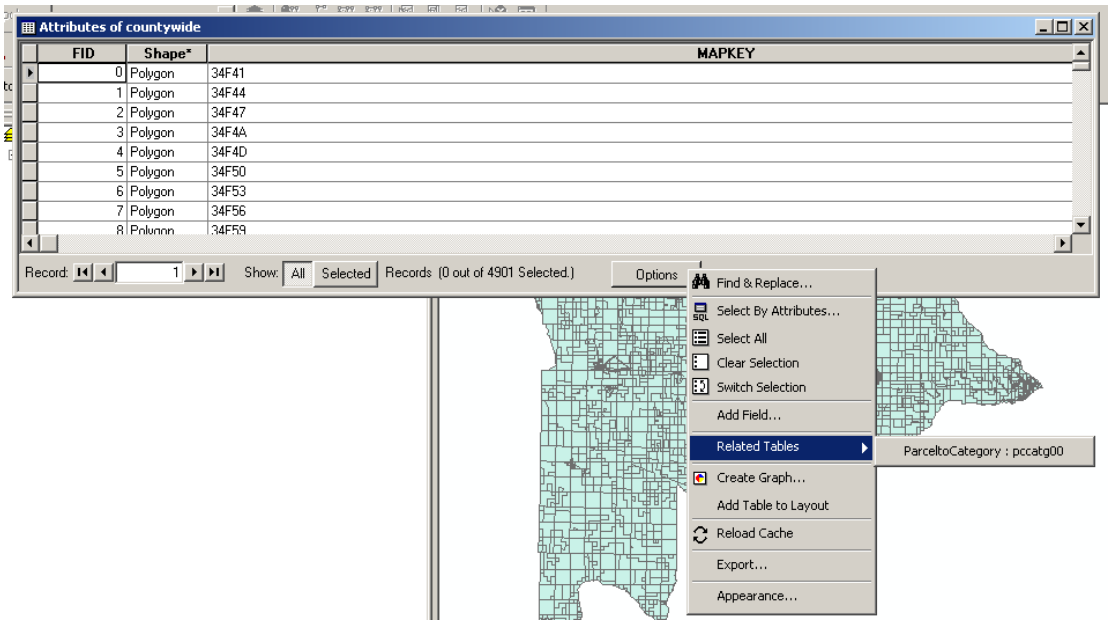
Use your knowledge of setting up a join to create a relate. Name the relate Parcelto<Tablename>. You'll notice the fields are not appended to the parcel layer. You actually need to write the query in the related table and then associate the selection back to the parcel layer.

The following are instructions on how to do this. The objective will be to locate all the category 81 parcels.

1. □ Create the relate to the categories table (pccatg00.dbf)

2. □ Open up the attribute table.

3. □ <Select> the **Options** button and <select> the **Related Table** as shown below and <select> the categories table.



4. □ With the categories table open, <select> the **Options** button and <select> the **select by attributes** option. This will open the query window.

5. □ <Create> the following query expression. "CA_CAT_NUM" = 81. <Select> **Apply** and you'll see the records highlight that were selected.

6 □ To associate the selected records to the parcel table, <select> the **Options** button and then <select> **Related Tables** and choose the countywide shapefile table. You'll see the parcels highlight that meet the selection criteria.

Sample queries

- **Table**: Parcel Master (pcparc00)
  Association: Relate (One to Many in this example)
  Query Expression: "pcparc00.PM_MAIL_NM" = 'ANDERSON, STAN A'
  Description: Selects a parcel with an owner named Stan Anderson.

- **Table**: Parcel Master (pcparc00)
  Association: Relate (One to Many in this example)
  Query Expression: "pcparc00.PM_MAIL_NM" LIKE 'ANDER%'
  Description: Selects all parcels with owners names that starts with Ander.
  Note: This query demonstrates the use of a wildcard - %.

- **Table**: Parcel Master (pcparc00)
  Association: Relate (Many to Many)
  Query Expression: "pcparc00.PM_MAIL_NM" = 'BLM' OR
  "pcparc00.PM_MAIL_NM" = 'Forest Service'
  Description: Selects parcels owned by the forest service or BLM.
  Note: This will depend on how you name federal and state ownership.

- **Table**: Improvements (pcimpc00)
  Association: Join (One to One)
  Query Expression: "pcimpc00.IM_EXEMPT" = 'Y'
  Description: Selects all properties that have an exempt improvement.

- **Table**: Permits (pcperm00)
  Association: Join (One to One)
  Query Expression: "pcperm00.PE_REF_NUM" <> 'null'
  Description: Selects all parcels with building permits.

- **Table**: Sales (pcsale00)
  Association: Join (One to One)
  Query Expression: "pcsale00.SL_PRICE" < 50000
  Description: Selects all parcels that sold for less than $50,000.

▪ **Table**: Sales (pcsale00)
Association: Join (One to One)
Query Expression: "pcsale00.SL_VALID" = 'Y' AND "pcsale00.SL_SALE_DT" >= 199901 AND "pcsale00.SL_SALE_DT" <= 200212 AND "pcsale00.SL_PRICE" >= 50000 AND "pcsale00.SL_PRICE" <= 100000
Description: Selects all parcels with valid sales during the years of 1999 to 2002 having a sales price between $50,000 and $100,000.

Things to keep in mind when querying

▪ Field type - Is it a numeric, date, text, currency, etc., field? Text fields need single quotes 'text' and numbers don't. Field types have different properties.

▪ Data Normalization – How many ways can you type BLM into the database? BLM, blm, B L M, B.L.M. They need to be typed the same or your queries will not select all BLM property. Investigate the use of **Domains** (see help in ArcMap) in some of your fields. This allows you to create a pick list instead of typing something into a field. Street types would be a perfect example.

▪ Association – Is it a one-to-one, many-to-many, one-to-many, or many-to-one relationship. This will make a difference on whether you use a join or a relate.

▪ Knowledge of data – Understand your data before you do analysis. For example, the value field in the categories table is the value for the given category. It is not total value. You could easily make the mistake of assuming this is total value and get bad results even though you wrote a perfect query.

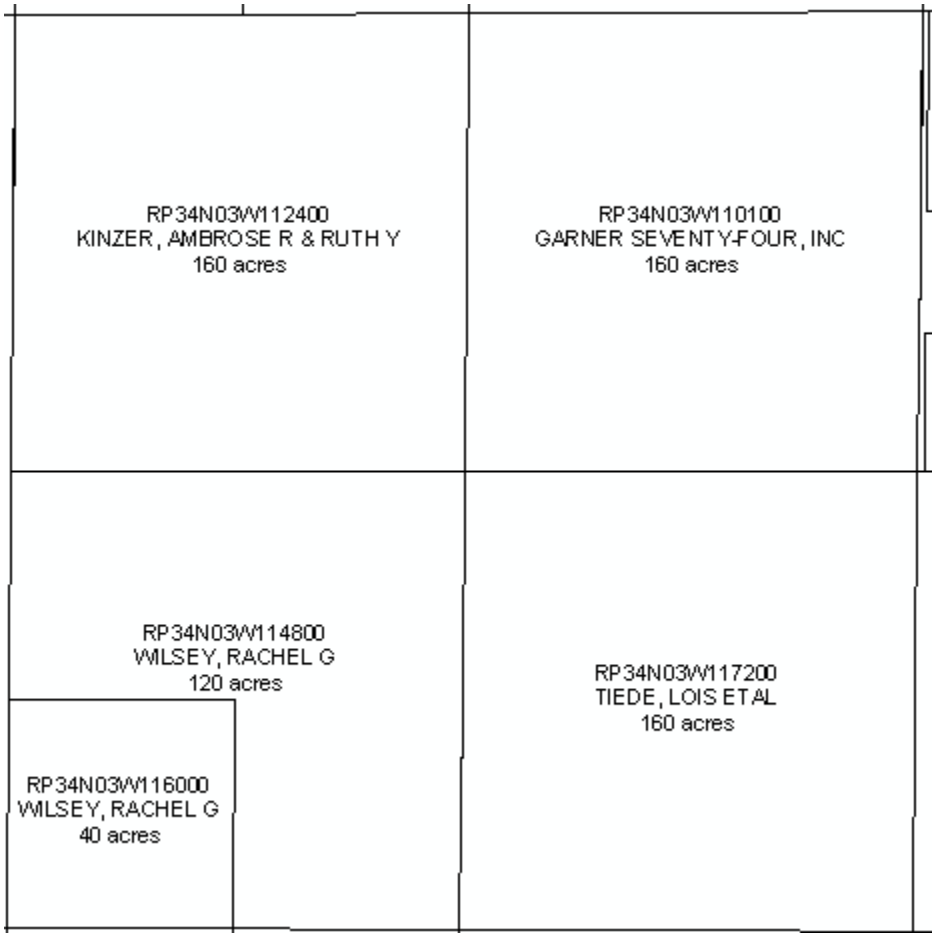
▪ Remember that junk in means junk out. If you type bad information into the database, your query results will be bad.

▪ Ensure that all your parcels have records for the joined table or you will not get a comprehensive answer on a query. You need to ensure that all the parcels in the parcel layer match the parcel numbers in the AS400 and Proval. Is your data complete in the GIS and in the AS400 and Proval?

▪ You need to think about how you are going to use the data before you organize the database.

Section 4: Labeling in ArcGIS

Another advantage of linking to the parcel master table is that you can label parcels using the owner name and acreage from the CAMA database.

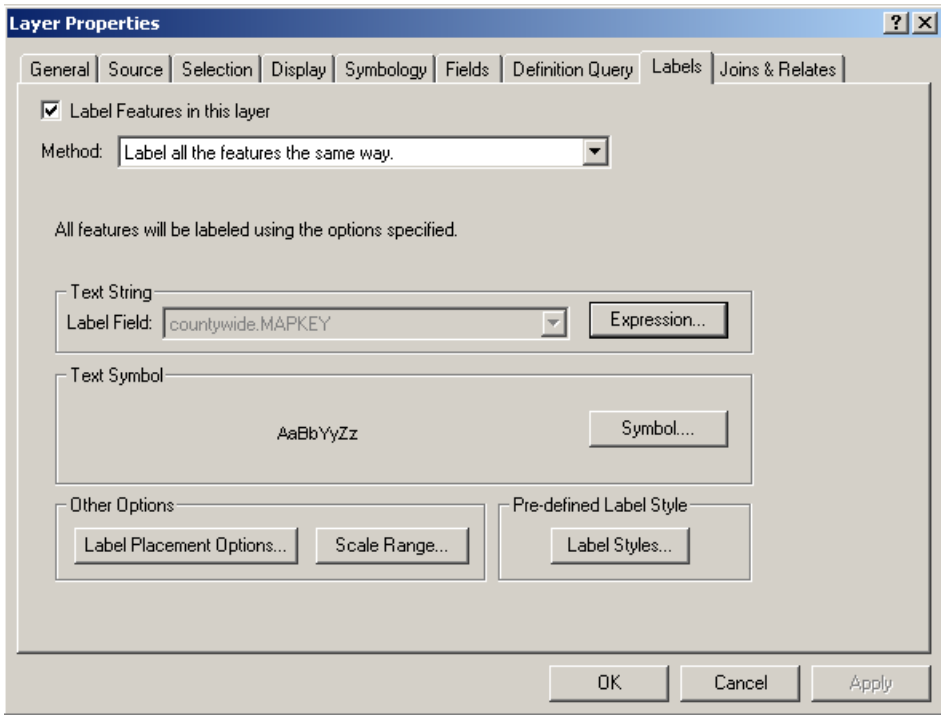


The following are instructions for doing some basic labeling. The intent of this class is not to teach labeling, but how to access the fields needed to do the labeling.

□ Ensure that your parcel layer has been joined to the Parcel Master table.

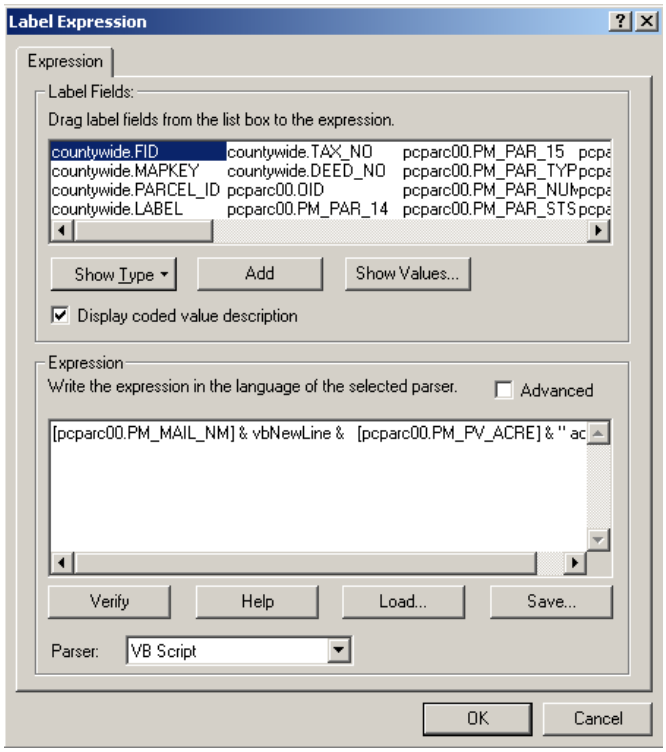
□ First, to set up labels, <right click> on the countywide parcel shapefile in ArcMap and <select> **properties**.

□ This will bring up the Layer properties menu. <Select> the **Labels** tab. This menu will allow you to set up labeling parameters.



□ <Select> the **Expression…** button. This brings up the label expression menu. <Copy & paste> or <type> the following VB Script into the **expression** window.

[pcparc00.PM_PAR_14] & vbNewLine & [pcparc00.PM_MAIL_NM] & vbNewLine & [pcparc00.PM_PV_ACRE] & " acres"

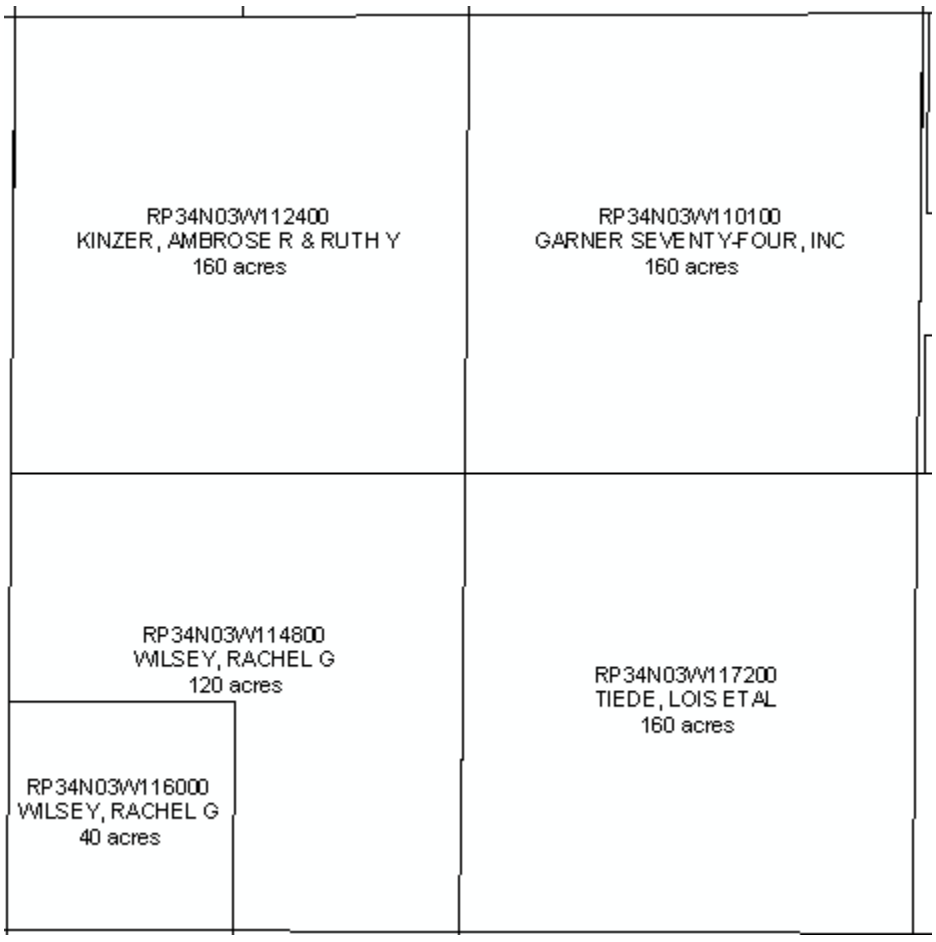


□ <Select> **OK** in the label expression window and the label properties window**.**

□ Next, to apply the labels, <zoom> into the area of a section.

□ <Right click> on the countywide parcel layer and <select> **Label Features**.

The result is a label for each parcel that centers and stacks the parcel number, owner name and acreage as shown below.



There are many other labeling parameters and scaling issues, as you can see, that will not be covered in this class.

Section 5: Using the Hyperlink to bring up Photos

The improvement image table contains a field that stores the path to photos of improvements stored on the server used in Proval. Once you join the image table to the parcel layer, you can set up a hyperlink that will allow you to click on a parcel allowing you to bring up the image. The following instructions will show you how to set up the hyperlink.

□ <Join> the **Improvement Image** (PCIMAGE0) table to the parcel layer file.

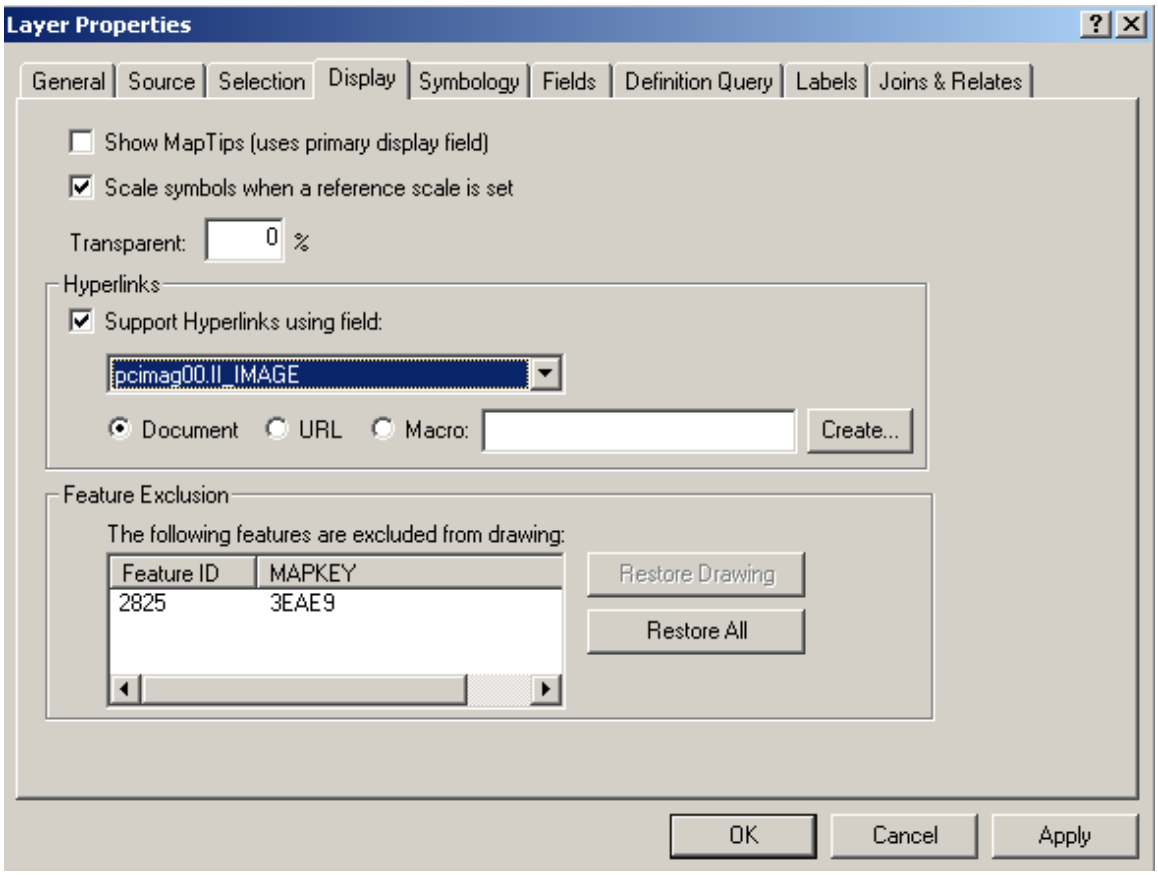
□ First, <right click> on the countywide parcel layer and <select> **Properties**.

□ Select the **Display** tab. This will bring up the menu for setting up the hyperlink.

□ <Check> the **Support Hyperlink using field** check box.

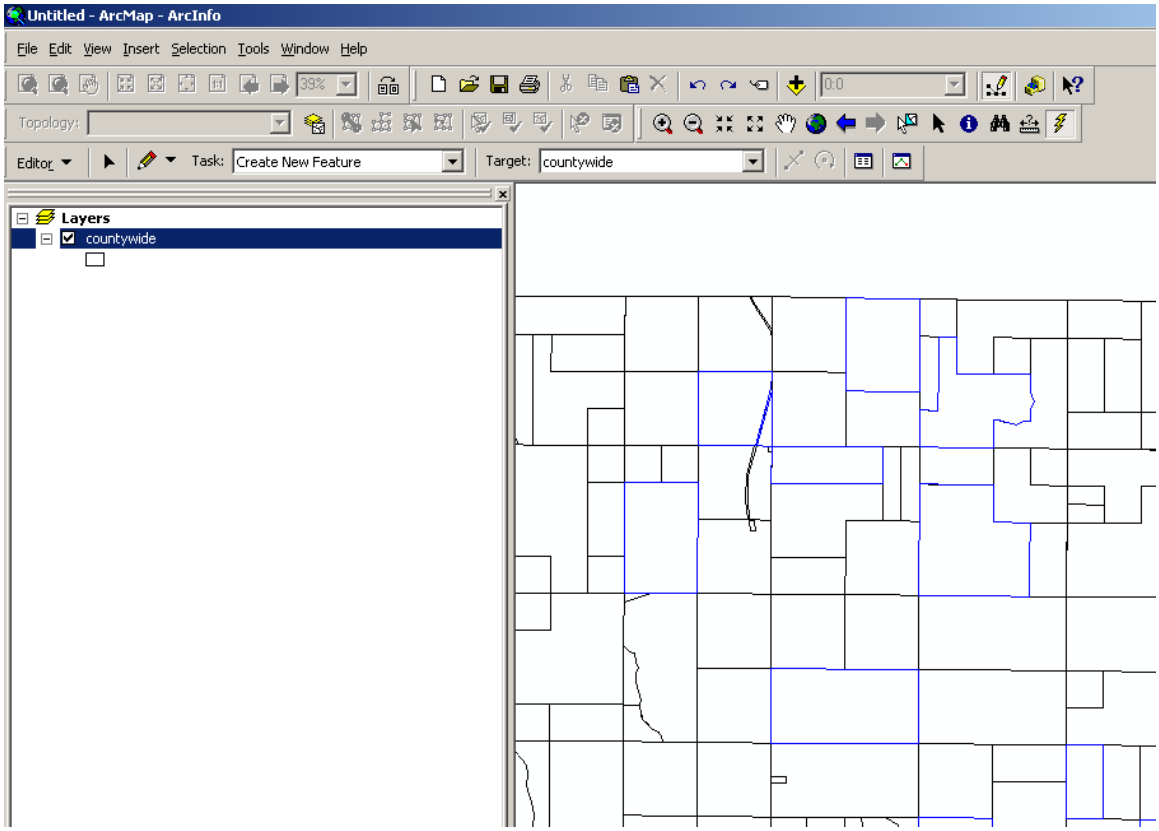
□ <Select> the "pcimag00_IMAGE" field from the **dropdown** list.

□ <Select> **OK**.



□ Next, back in the Data View, <Select> the **Hyperlink** button  found on the Tools toolbar.

Parcels that contain an image path will be highlighted in blue.



□ <Select> a parcel highlighted in blue and the image will automatically pop up.

Section 6: Visualizing CAMA Data in ArcGIS

Visualizing your data can greatly increase your knowledge about the quality and usefulness of your data. A spatial view is useful for detecting errors in your data that are otherwise difficult to detect. It's also possible to see trends and patterns in your data that help you understand what is happening. And sometimes it is just easier to organize your fieldwork when you can see your data visually. For example, one could write a query trying to locate all properties that haven't been appraised in the last 5 years. The results would be a parcel map highlighting the parcels that meet the criteria. The appraiser can visually see the properties that are close together and more effectively plan a route to get the properties appraised.

There are lots of fancy things you can do in ArcGIS to visualize data that we will not cover in this class. There is 3-D viewing, statistics, charts, spatial analysis, overlaying layers on aerial photography, etc. to make your data more meaningful. We will show just a few simple examples.

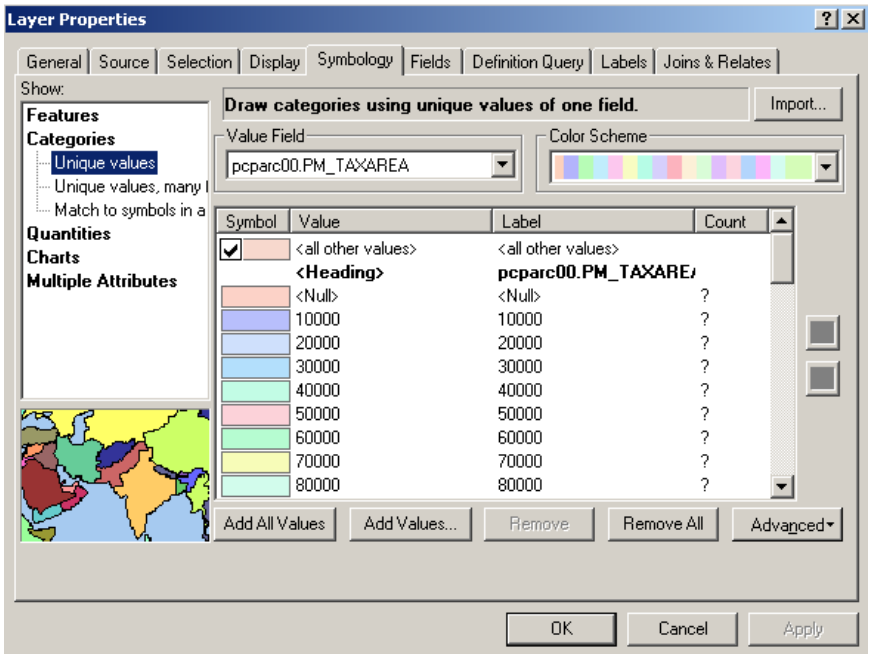
The first example is a look at color-coding parcels by the tax code number stored in the parcel master table and comparing it to the tax code area layer to verify if there are any errors. The following is instruction to color-code the parcels using the tax code area #.

□ Add you **countywide parcel** layer and the **countywide tax code area** layer in ArcMap.

□ <Join> the **Parcel Master** table to your countywide parcel layer.

□ <Right Click> on your **countywide parcel** layer and <select> **properties**.

□ <Click> on the **Symbology** tab in the Layer Properties Menu.



□ <Click> on **Categories** and then click on **Unique Values** on the left side of the window.

□ <Select> the "pcparc00.PM_TAXAREA" field in the **Value Field** dropdown list. This is the field that contains the tax code area number.

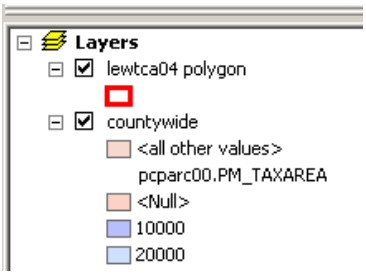
□ <Select> the **Add All Values** button at the bottom to add the unique values in the display window.

□ <Select> **OK**.

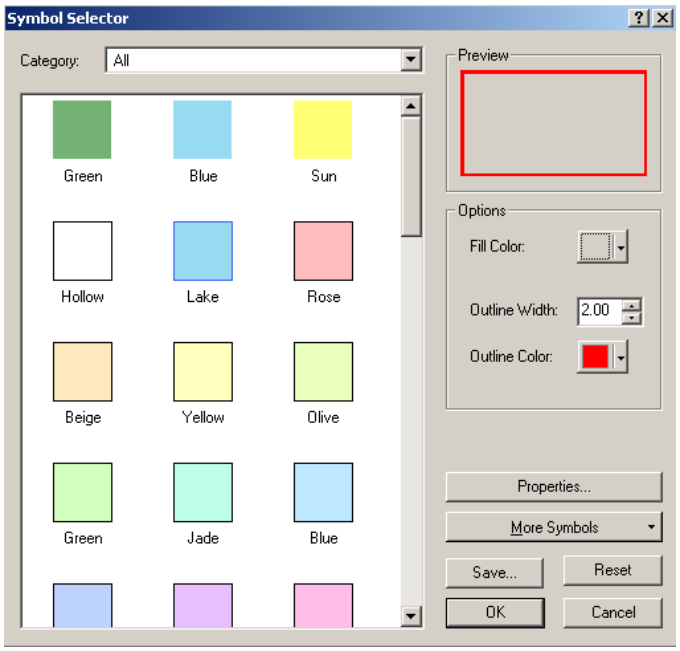
Now that you've color-coded the parcels using the tax code area number, its time to change the symbology of the tax code area layer.

□ First, <drag> the tax code area layer so it is the top layer.

□ <Click> on the **symbol** for the tax code area polygon layer. This would be the red box in the diagram below.



This will bring up the **Symbol Selector** Menu.



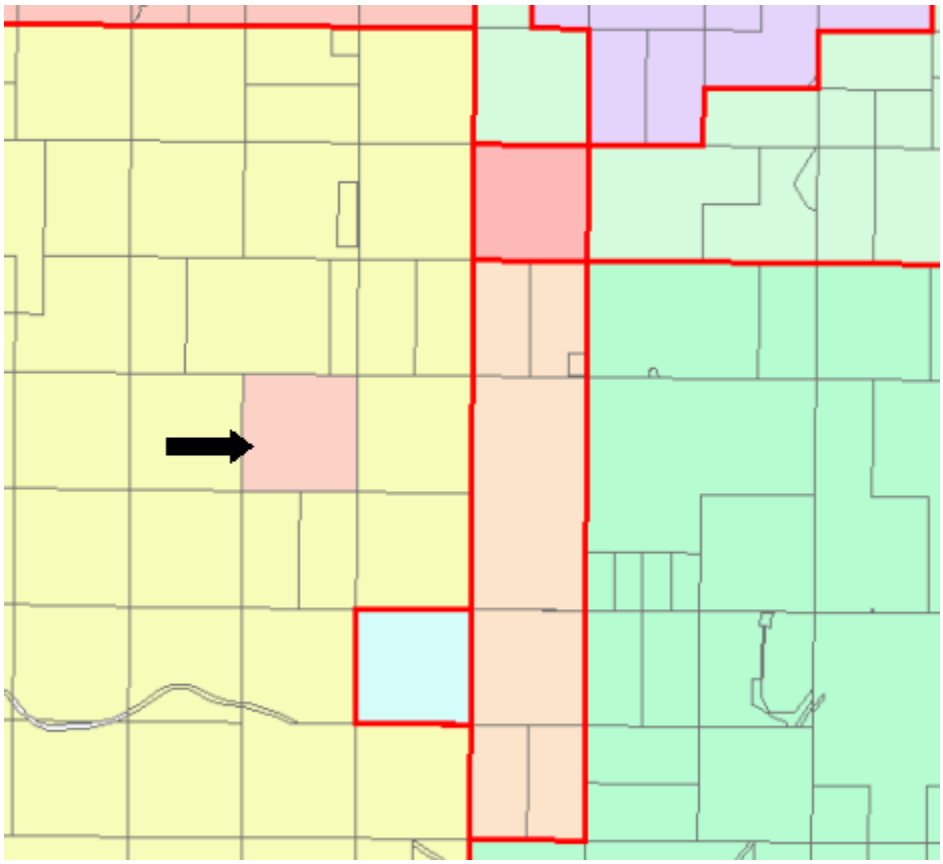
□ <Select> the **Hollow** symbol. This will allow you to see the color-coded parcel layer underneath.

□ <Click> on the **Outline Color** box and select a red color.

□ <Change> the **Outline Width** to 2.

□ <Select> **OK**.

You should now have a map that looks similar to the following.



In the following example, you'll notice the pink parcel surrounded by the yellow parcels. All the parcels in a tax code area should be the same color. The pink parcel is coded wrong in the AS400 and should be corrected. This is a very simple way of detecting errors in your data.

Note: You could easily create a neighborhood and zoning map, for example, using this technique to color code parcels.

In the next example we'll color code parcels based on total value. There is no field in any of the output .dbf tables that contains total value. There is a value field in the categories table but is dependent upon the category. We'll create a sum table in this example to get a field that contains total value that we can use in this example.

□ <open> the categories table in ArcMap. Note: You add tables the same way that you add a layer.

□ With the categories table open in ArcMap, <right click> on the name of the parcel field and <select> **Summarize**. This will open the summarize window.

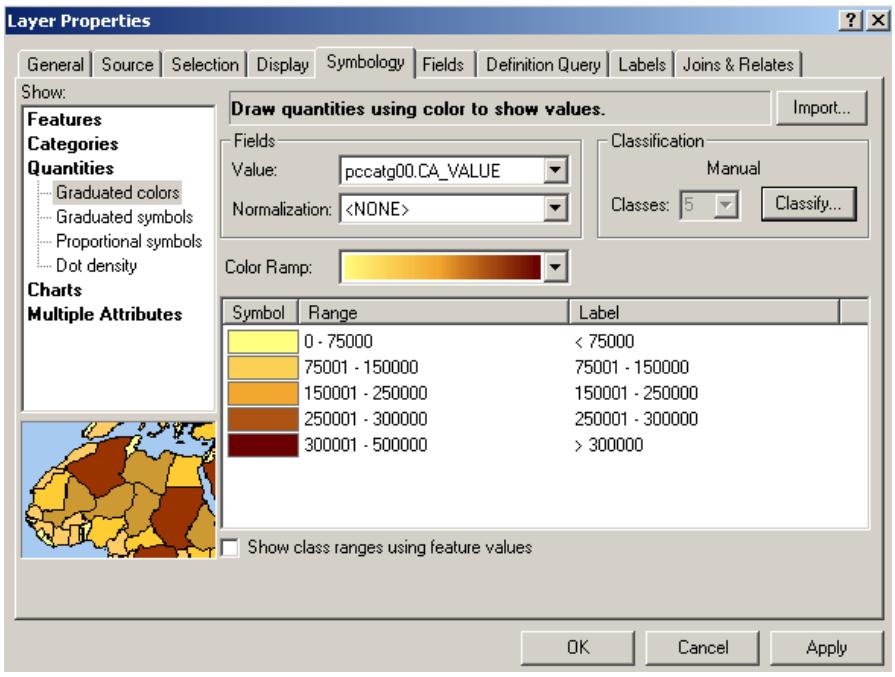
□ In option 2, in the summarize window, <check> the plus next to the value field and select sum.

□ In option 3, in the summarize window, name and save the summary of values table.

□ <Join> the **Summary of Values** table to your countywide parcel layer using the parcel number field.

□ <Right Click> on your **countywide parcel** layer and <select> **properties**.

□ <Click> on the **Symbology** tab in the Layer Properties Menu.



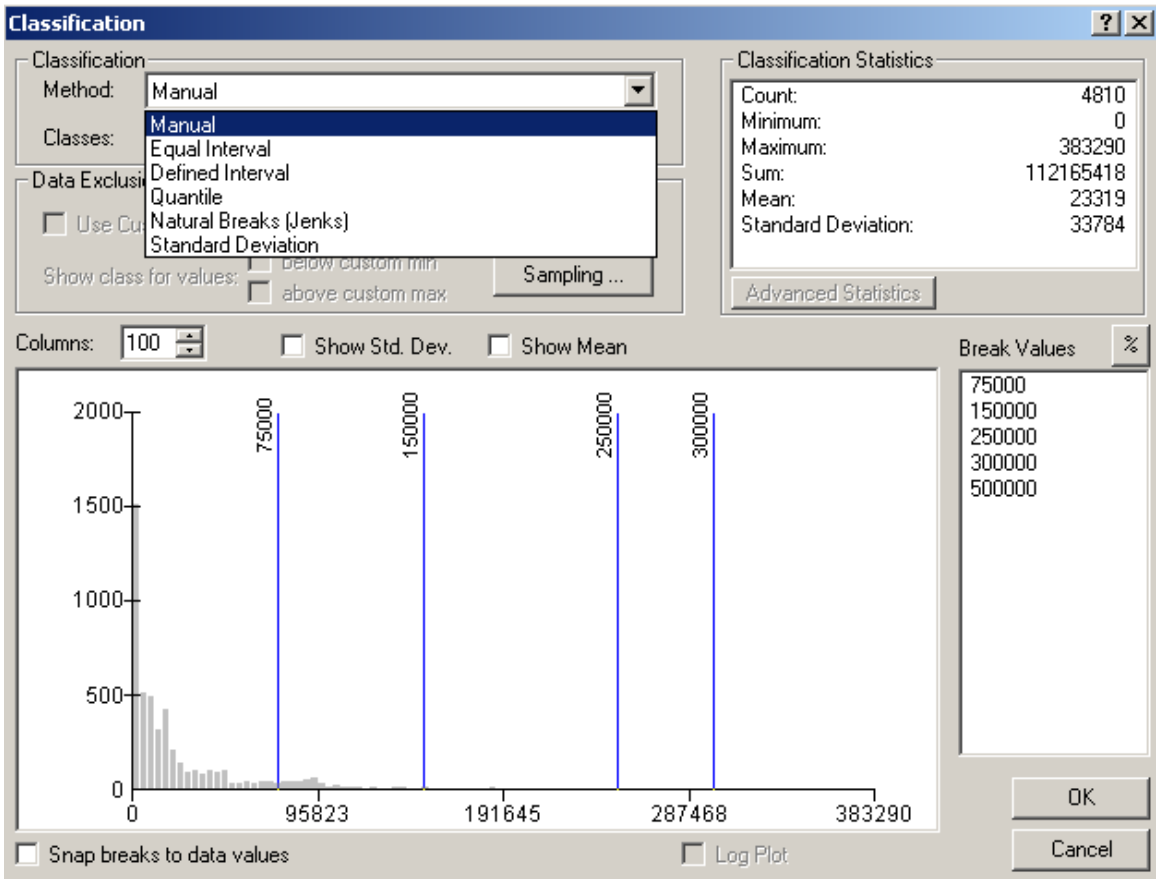
□ <Click> on **Quantities** and then click on **Graduated colors** on the left side of the window.

□ <Select> the "**Sum_Value**" field in the **Value Field** dropdown list. This is the field that contains the total value.

□ <Select> a desired color from the **Color Ramp** dropdown list.

□ <Select> the **Classify** button to define your classification.

You can choose whatever classification method you want as well as the number of classes. The following example shows 5 classes using the manual method. There are many cool things you can do here if you're familiar with statistics.

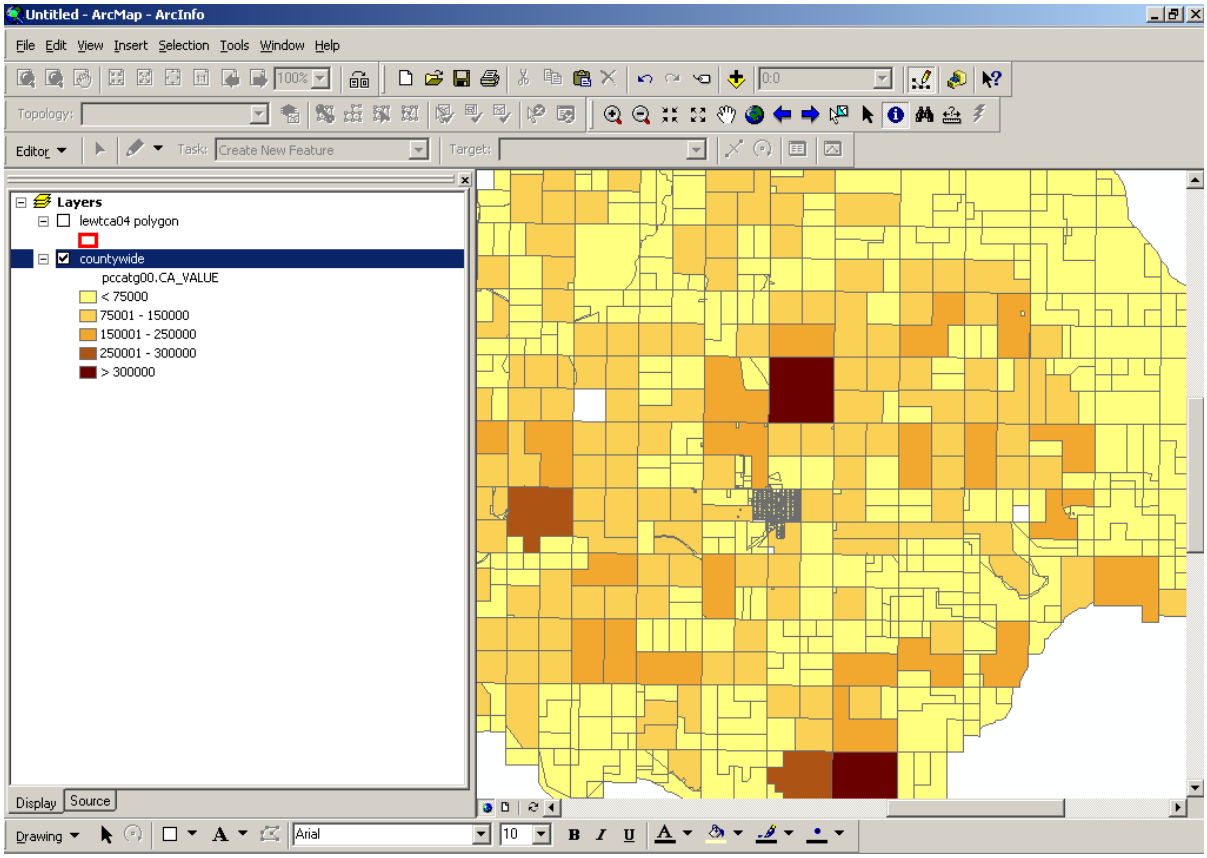


□ <Choose> your **method** and **number of classes.**

□ <Select> **OK** on the classification menu.

□ <Select> **OK** on the layer properties menu

Your parcels should now look similar to the following.



A dark brown parcel representing a value of over $300000, in a subdivision where the other parcels are a light orange representing parcels between $75,000 and $150,000 should throw up a red flag. Appraisers that are familiar with property values in the county could get a lot of meaning from such a map.

A parcel layer classified in this manner could be very useful overlaid on a flood plain layer, any hazard layer, soil layer, transportation plan, revitalization, etc.

Section 7: Making the GIS/CAMA Data Layer Available to the Public

The best way to disseminate this type of information is over the web if you wish to do so. This will free up a lot of the assessor's time when the public can access this type of information over the web. Unfortunately, this may not be an option for many counties at this time. It's just a matter of time before the public, the private sector, and other government agencies will demand your parcel data electronically and on the web.

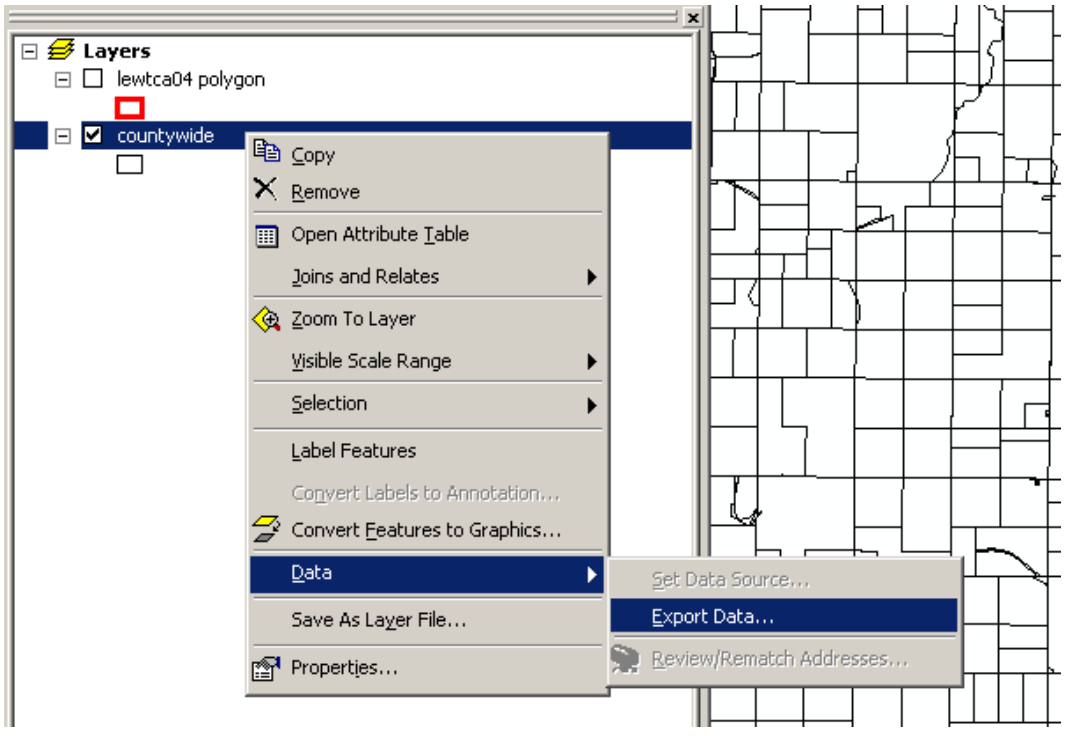
A few things need to be decided. **Pricing**? Will you develop a pricing structure or make the data available for free. **Privacy**? What data is considered private and what data is considered public. There is controversy over both issues that must be addressed soon. The last thing is making sure you have a good **disclaimer** on any data or maps you release.

This section will instruct you on how to export your parcel layer out to a shapefile with only the selected fields from several tables. The decision for you is deciding what data you consider private, whether it be the owner name and address or whether you consider everything to be public.

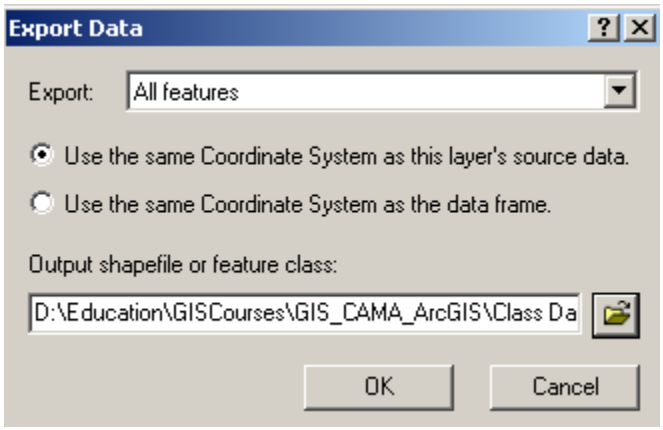
□ First, <Join> your parcel layer to the CAMA table(s) you desire information from.

□ <uncheck> all the fields you don't want distributed to the public by following the instructions at the end of Section 2. **Note: Do not uncheck fields that are generated automatically by the software or the output file will be unusable.**

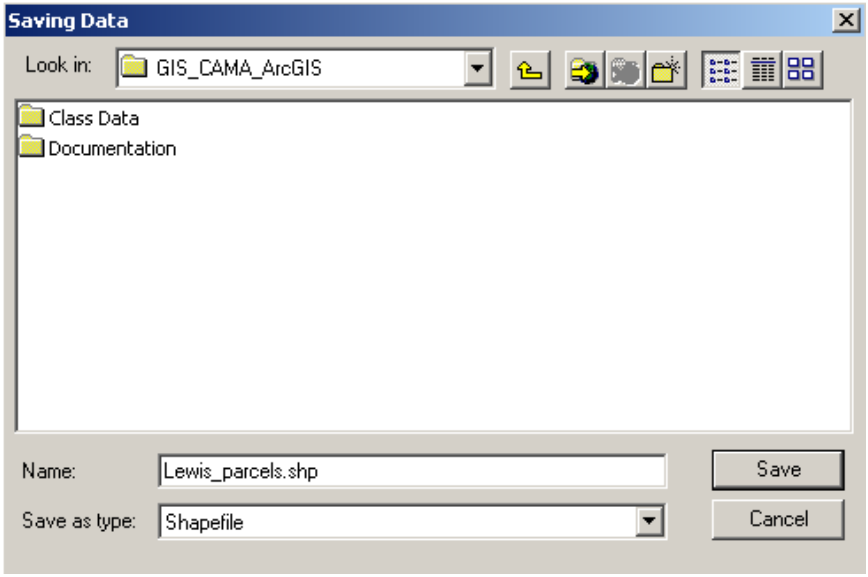
□ <Right Click> on the parcel layer and select **Data\Export Data…**



You will get the Export Data menu.



□ <Click> on the **Browse** button  . This will allow you to name the file and browse to the folder where you want to save it.



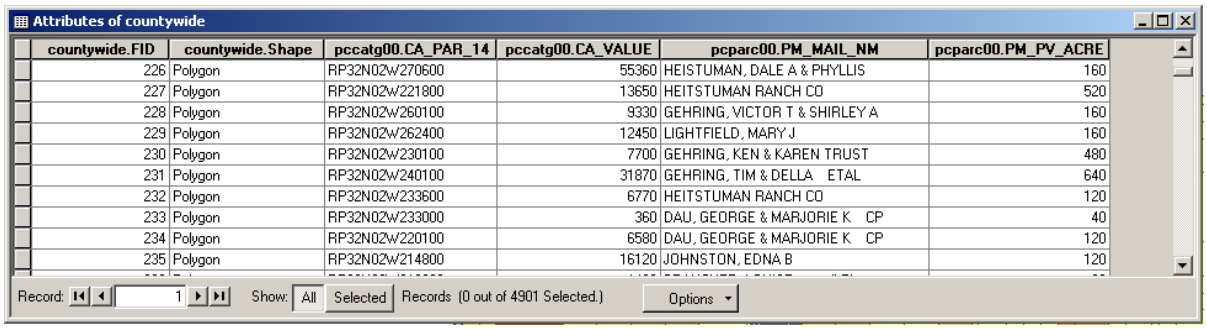
□ <Click> **Save.** This will bring you back to the export data menu.

□ <Click> **OK** in the export data menu.

This will bring up a window showing that your data is processing.

□ <Click> **YES** on the window that pops up after processing asking you if want to add the exported data to the map as a layer. We'll look at this table.

□ Open the table by <right clicking> on the parcel layer and <selecting> **Open Attribute Table.**



You should see a table that only contains the fields that you left checked. Notice that these fields are from more than one table. You can join as many tables as you need.

Remember that when you burn a shapefile to CD you need to include at least 3 files. The **.shp,** the **.dbf** and the **.shx.** The shapefile cannot be opened unless all 3 files are copied. The **.prj** file is useful as well. It defines the projection parameters. You should be sending **metadata** as well describing the accuracy, methods, contact information, purpose, etc. of the data.

Exporting just the table from a query result

You have the option of just exporting the table if somebody doesn't want the map. To do this: For example, an appraiser may just want a list of parcel and owners of all the parcels that haven't been appraised in the last five years instead of a map.

1. □ With the attribute table open in ArcMap, <select> the **Options** button and then <select> **Export**. This will open the export data window.

2. □ With the export data window open, ensure that selected records is the option selected and browse to the folder where you want to save the file and change the file name if desired.

3. □ <Select> **OK**. This will create the table with only the selected records that can be opened in Excel.

Distributing the CAMA Tables

If somebody only wants the tables, then GIS is not needed. The easiest thing to do is:

□ <open> the .dbf table in Microsoft Excel
□ <save> it as a new name as a .dbf
□ <delete> the column(s) you desire
□ <burn to CD> or <email> the .dbf table(s)