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GIS-Assisted Spatial Data Management for Corps of Engineers Real Estate Activities

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Evelyn Lopez

November 2002

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Preface

This report was prepared as part of the Geospatial Technology Research and Development Program Work Unit 33181, GIS-Assisted Spatial Data Management for CE Real Estate Activities. Research was conducted by the Environmental Laboratory (EL), U.S. Army Engineer Research and Development Center (ERDC). The research was sponsored by Headquarters, U.S. Army Corps of Engineers (HQUSACE), and was carried out during the period October 1998 to September 2001.

This report was prepared by Dr. Linda Peyman Dove, Mr. Mark R. Graves, and Ms. Evelyn Lopez, Environmental Characterization Branch (ESB), EL. Dr. Rose Kress was principal investigator for this project. She was active in the development of the Cadastre Real Estate database design and Geographical Information System (GIS) Real Estate Workshops. Ms. Nancy Towne, ERDC, Information Technology Laboratory (ITL), was instrumental in the development of the Cadastre Real Estate database design and incorporated the design into the Spatial Data Standards (SDS) versions 2.0 and 2.3 (to be released Sept 03). Mr. Randall Mayne, Fort Worth District, served as a partner in this research. He provided technical expertise in developing the Cadastre Real Estate database design, provided a prototype GIS data set of cadastral real estate and ancillary data for Lake of the Pines, Texas, and coordinated a GIS Real Estate workshop at the Fort Worth District.

The study was under the general supervision of Mr. Harold W. West, Chief, ESB; Dr. Dave Tazik, Chief, Ecosystem Evaluation and Engineering Division, EL; and Dr. Edwin A. Theriot, Acting Director, EL. The HQUSACE technical monitors were Mr. M. K. Miles and Ms. Nancy Blyler. Reviews were provided by Mr. Harold W. West and Mr. Scott Bourne, ESB.

At the time of publication of this report, Director of ERDC was Dr. James R. Houston. Commander and Executive Director was COL John W. Morris III, EN.

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1 Introduction

Currently the U.S. Army Corps of Engineers (CE) relies primarily on hard-copy paper maps and documents to manage real estate assets. It is now widely understood that real estate data are fundamentally geospatial and that there is great advantage to managing and maintaining cadastral information in a geographic information system (GIS). Such a shift in data management would increase efficiency for storing, retrieving, processing, and editing information by all users and would make cadastral real estate data more readily available throughout the Corps and to the public. Research funded under the Corps Civil Works Research and Development Geospatial Technologies Program was initiated to avoid the development of numerous incompatible real estate GIS solutions within the Corps.

This report summarizes the results of research to develop and demonstrate a GIS-assisted approach to meet the spatial data management and analysis demands of the Corps real estate activities. The research resulted in the following products:

- a. A Cadastre Real Estate GIS database design that is compliant with the CADD/GIS Technology Center Spatial Data Standards (SDS) (Information Technology Laboratory (ITL) 2002).
- b. A Cadastre Real Estate GIS Software Tool¹ that populates the SDS compliant Cadastre Real Estate GIS database by linking to the non-spatial Real Estate Management Information System (REMIS). The SDS Geodatabase Builder is used to develop the SDS compliant Cadastre Real Estate personal geodatabase in the object-oriented ArcInfo 8 environment.
- c. Implementation of a Cadastre Real Estate GIS at a Corps project.
- d. Technology transfer.

A document is also being developed on issues related to data conversion, such as converting hard-copy paper maps and digital real estate data to a GIS format. The document will be posted on the technology transfer Web site when completed.

¹ A preliminary version of the software tool was initiated in Work Unit 33179, linking Existing Corporate Information Systems to GIS, but the software tool was completed, tested, and documented in this work unit (Work Unit 33181).

2 A Cadastre Real Estate GIS Database Design

The Cadastre Real Estate GIS database design was developed to be part of an Enterprise GIS implementation. Figure 1 illustrates the components considered in the database design, which addresses the needs of not only the Corps' Real Estate Division, but of all business programs that utilize cadastral real estate data. The activities that are conducted by the business programs, such as Navigation, Flood Control, and Real Estate, determine the geospatial and tabular data included in the database design. The geospatial and tabular data must use a spatial data standard to provide uniformity among offices. The SDS is the Corps of Engineers official spatial data standard.

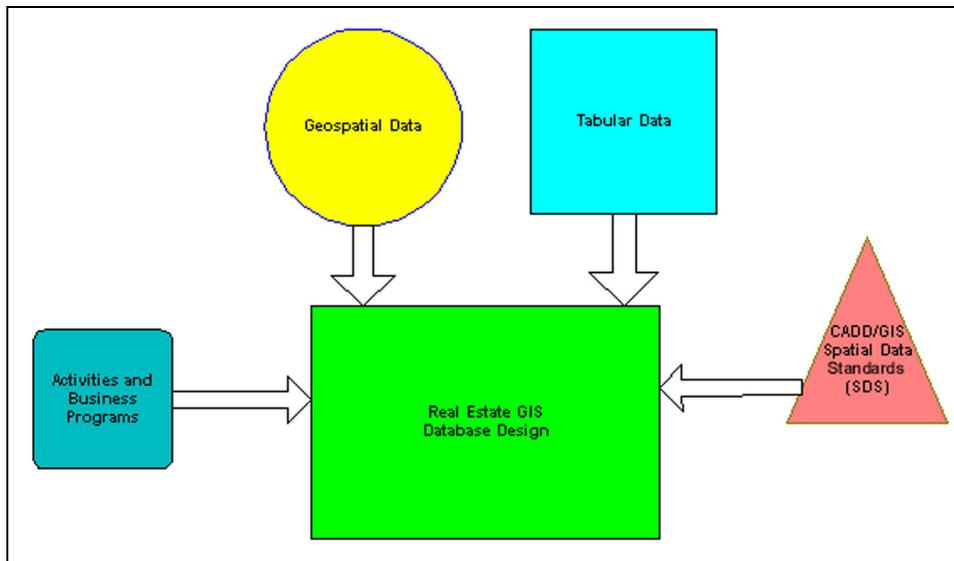


Figure 1. Components considered when developing the Cadastre Real Estate GIS database design

Business Programs

The Real Estate GIS database design was developed by examining the needs of all business practices within the Corps that utilize real estate data. Input from Corps Project, District, Division, and Headquarters offices was solicited through workshops, e-mail distributions, and focus groups. A real estate GIS needs assessment report developed for the Rock Island District was also utilized (Stanley Consultants 1999). The intent was to develop a design that would address the needs of most programs and users by determining the theme and attributes needed to describe the real estate cadastral data.

Real Estate Geospatial and Tabular Data

The database incorporates both geospatial and tabular data (Figure 2). Geospatial features are geographically referenced to a real-world location (the spatial part of the database). Each geospatial feature has an “attached” attribute table containing pertinent data (the tabular or non-spatial part of the database).

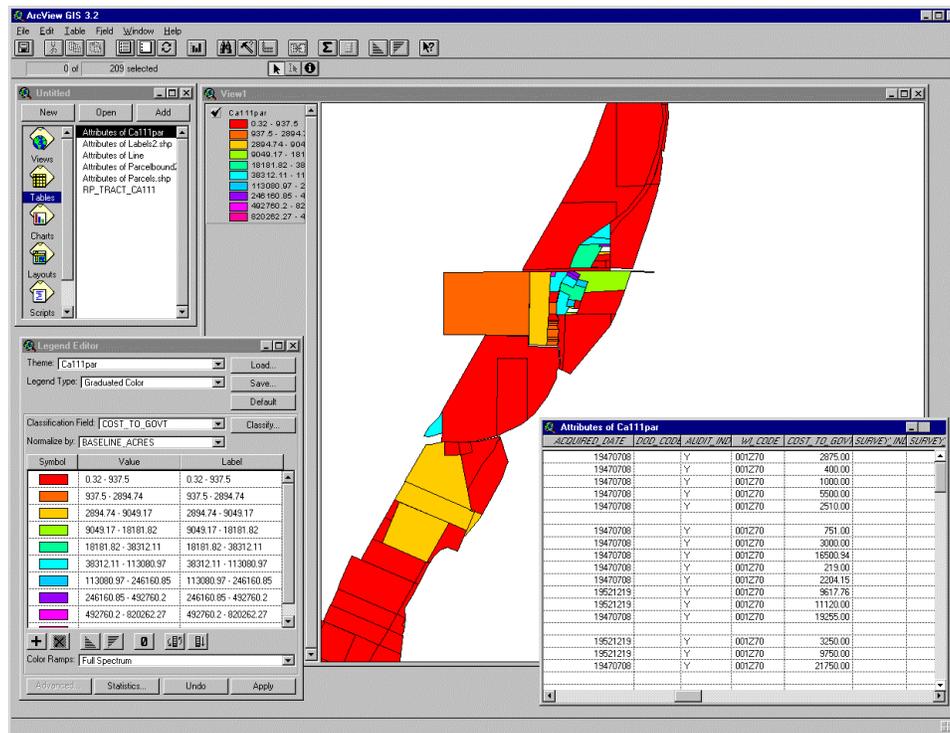


Figure 2. Sample view of the database, showing the geospatial and tabular data

The geospatial data must be developed from existing hard-copy maps or from other sources, such as existing CAD (computer-aided design) files. There are

various options available for converting the data to digital GIS files, such as digitizing, scanning and heads-up digitizing, and using coordinate geometry. A white paper being prepared as part of this project will address the advantages and disadvantages of the different techniques.

The majority of the tabular data came from the existing Real Estate Management Information System (REMIS), created by the Corps to manage the Corps real estate holdings. It is a non-spatial database. A robust set of attributes to address the needs of most of the users was selected from various tables in the REMIS database and incorporated into the database design. This does not replace the REMIS database but allows the efficient use of the existing non-spatial REMIS database in a geospatial environment.

CADD/GIS Technology Center Spatial Data Standards

The SDS, which provides a standard for GIS implementation at Army Corps of Engineers Civil Works activities; U.S. Air Force, Army, and Navy installations; and state and local governments, was used in the development of the Cadastre Real Estate GIS database. The SDS provides standard table formats, such as data types for the fields, lengths of field values, and domains, for the themes proposed for the GIS. This provides uniformity between Corps offices, so that similar information is available in the same format.

Prior to this study, the SDS did not contain tables to fully address cadastral real estate needs, so the necessary real estate spatial data tables were developed. Initially, draft versions were developed based on input from a broad range of Corps personnel, workshops, existing studies within and outside the Corps, and real estate documents. A draft database design was presented at a workshop at the Fort Worth District. Workshop participants, including individuals from diverse professional areas and levels within the Corps, provided a review and revision of the design. A revised version was distributed for review throughout the Corps, as well as to other agencies involved in cadastral and database standards development. The draft design was initially incorporated into the SDS version 2.0, but has since been updated in the SDS version 2.3 (to be released Sept 03).

There are six tables in the SDS version 2.3 (to be released Sept 03). The themes for the six tables are listed below.

- a. *Acquisition Tracts*, which includes all tract boundaries for all land acquired by fee or less-than-fee transactions. Fee acquisitions are lands that the Corps has purchased, while less-than-fee acquisitions are lands that the Corps has purchased the right to use via, for example, easements, leases, or permits.
- b. *Outgrants*, which includes the outside boundary or point location of all land outgrants. An outgrant is Corps-owned land that is leased to

another party; examples of outgrants include easement, licenses, and permits.

- c. *Disposals*, which includes the outside boundary of all disposed land. Disposed land includes land that the Corps sells or transfers to another party.
- d. *Encroachments*, which includes the outside boundary or point location of all encroachments. An encroachment involves the unintentional use of Corps land by another party.
- e. *Fee Boundaries*, which includes the outside boundary of all land acquired by fee.
- f. *Deed Information*, which includes the deed attributes for the tracts only. This table links to the deed_id attribute in the parcel_acquisition_area table.

The SDS Data Model presents information by entity set, entity class, entity type, attribute tables, and domain tables (Information Technology Laboratory 2002). For the Cadastre Real Estate GIS database design, the entity set name is “cadastre” and the entity class name is “real estate.” The entity type name, attribute table name, and domain table names depend on the entity set and entity class.

Appendix A gives the new SDS tables for the Cadastre Real Estate GIS database themes. Each table contains fields for the name, type, and length of the attribute; the name of any domain tables used for the attribute; the name of the REMIS table where the attribute is located; the name of the attribute as it appears in the REMIS table; and the definition of the attribute.

3 A Cadastre Real Estate GIS Software Tool

A software tool was written to automate the generation of a Cadastre Real Estate GIS. This tool utilizes the ArcGIS 8.2 software (ESRI 2002) and updates a SDS compliant personal geodatabase. Detailed instructions for this tool are found in Appendix B. The tool performs the following tasks:

- a.* Allows the addition of the geographic features (e.g. tracts, outgrant boundaries, disposal boundaries, encroachment boundaries, and fee boundaries) from existing ArcInfo shapefiles or coverages to the geodatabase.
- b.* Links the geodatabase to the REMIS Oracle database to retrieve the appropriate records to populate the SDS-compliant Cadastre Real Estate tables in the personal geodatabase. This tool provides a one-way link to REMIS; it does not make changes, updates, or deletions to the REMIS database. REMIS users will continue to enter and modify data using the existing REMIS interface.
- c.* Allows the user to manually input attribute data into the tables (e.g. for attributes that are not in the REMIS database or are not populated in the REMIS database).
- d.* Populates the area and perimeter attributes based on the geospatial data.
- e.* Deletes records (not the features) in the personal geodatabase tables that no longer exist in the REMIS Oracle database.

4 Implementation of a Cadastre Real Estate GIS at a Corps Lake

The Fort Worth District, Corps of Engineers, has been a partner in the Cadastre Real Estate GIS project. Lake of the Pines, Texas, served as a prototype site at which the SDS-compliant Cadastre Real Estate GIS database design was implemented using the software tool.

Data Conversion

Prior to their involvement in this research, the Fort Worth District had converted their hard-copy segment maps for Lake of the Pines to a digital format. This was done by first scanning the segment maps, generating a raster image. A global positioning system (GPS) was used to locate survey monuments along the project boundary so that the monuments could be used to georeference the scanned segment maps. The georeferenced maps were then displayed on a computer screen, and heads-up digitizing was used to develop a vector coverage of the tract boundaries. Each tract was assigned a project identification and tract number. An ArcView shapefile was then developed from the coverage and used in conjunction with the Cadastre Real Estate GIS software tool to generate a fully functional personal geodatabase for Lake of the Pines.

Data conversion has been completed for fee and less-than-fee tracts, outgrants, and fee boundaries. It has not been completed for encroachments or disposals, so feature datasets for these two themes are not complete.

Geodatabase Development

The software tool was used to create a Cadastre Real Estate geodatabase for Lake of the Pines. The geodatabase structure is illustrated in Figure 3, with the geodatabase encompassing the entire Fort Worth District. The feature dataset includes all cadastre data within the district, while the feature classes represent

Geodatabase: Fort Worth

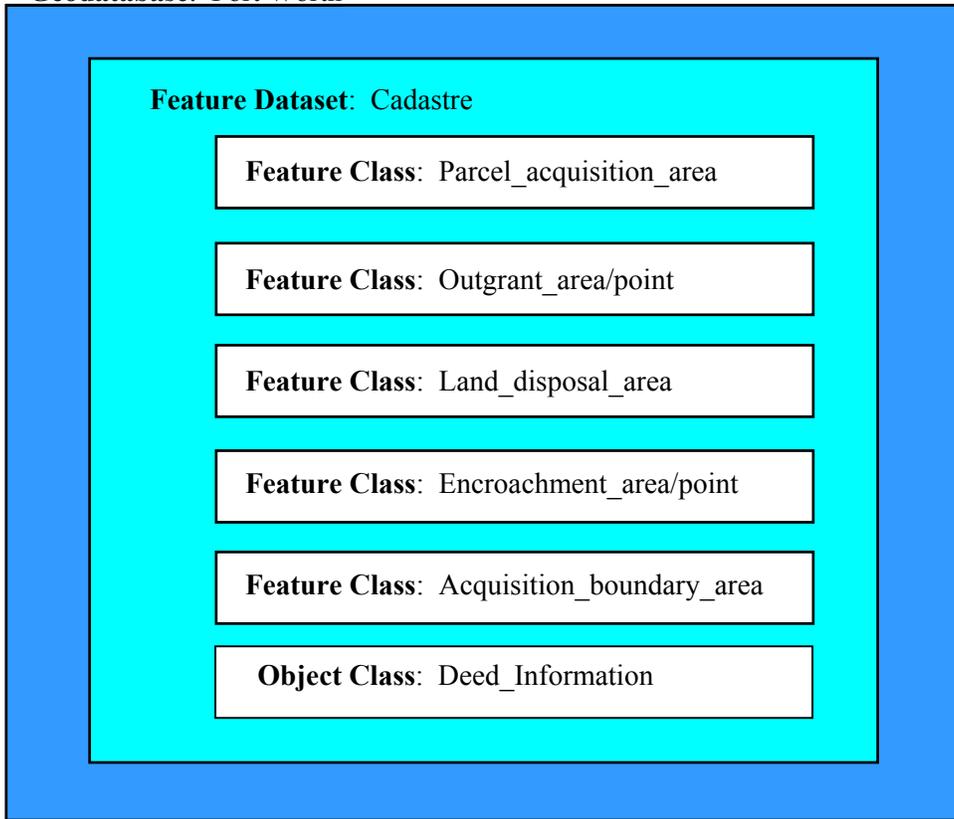


Figure 3. Personal geodatabase structure for cadastre real estate data

themes of cadastre real estate data, such as parcel_acquisition_area (fee and less-than-fee tracts), outgrant_area/point (outgrants), land_disposal_area (disposals), encroachment_area/point (encroachments), acquisition_boundary_area (fee boundaries), and deed_information.

The software tool allowed the geospatial data from the ArcView shapefiles to be incorporated into the parcel_acquisition_area, outgrant_area/point, encroachment_area/point, acquisition_boundary_area feature classes, and the object class deed_information. It also made a link to the REMIS database to populate the attributes in the feature classes and the object class.

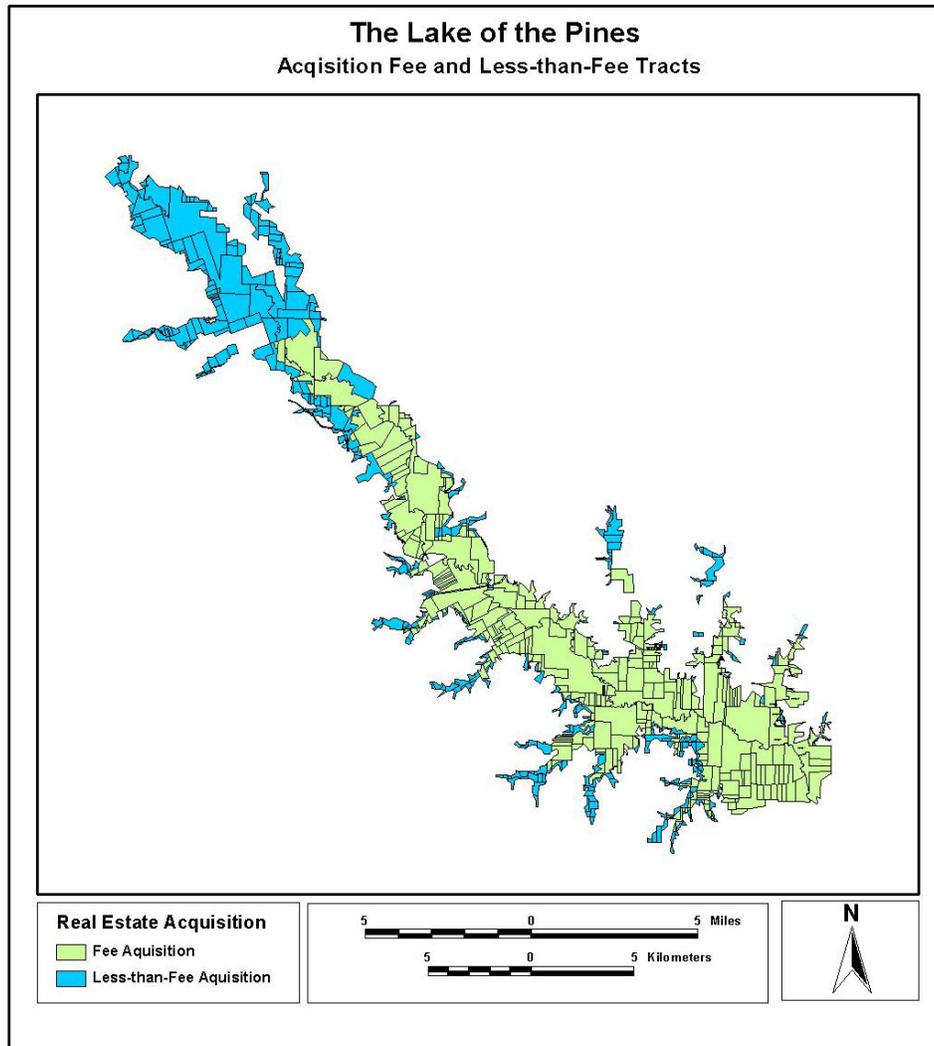


Figure 4. Tracts acquired by fee and less-than-fee (parcel_acquisition_area) for Lake of the Pines, TX

Figure 4 shows the fee and less-than-fee tracts (parcel_acquisition_area) for Lake of the Pines. The ability to query and display tracts based on the type of acquisition allows more efficient and effective management opportunities. For example, if a change in water management is being studied for a lake, the GIS can be used to determine how the affected tracts were acquired. If they were acquired by less-than-fee, the type of easement can be determined.

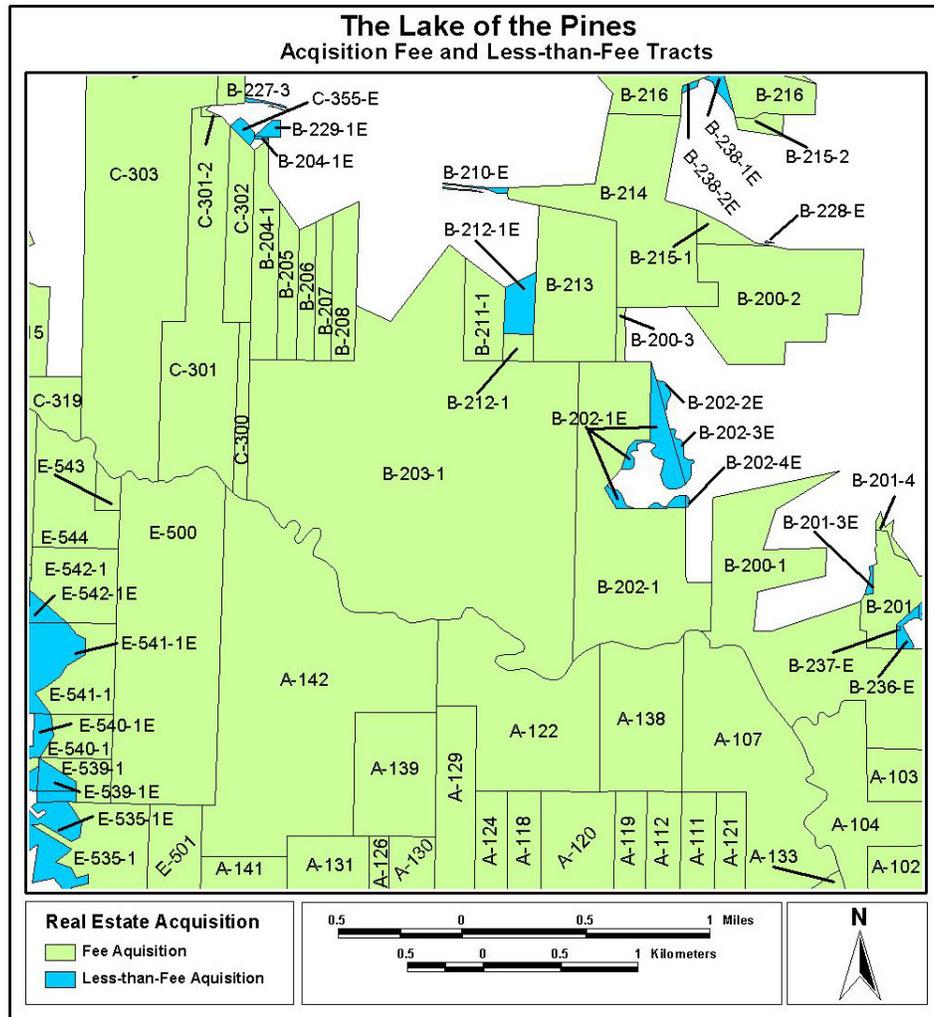


Figure 5. Blowup of one area of Lake of the Pines showing tracts labeled with the tract number and color coded depending on whether acquired by fee or less-than-fee

Areas of interest can be displayed in greater detail and labeled or color coded based on attribute values. For example, Figure 5 shows a blowup of one area of Lake of the Pines, with the tracts labeled by tract number and displayed in color according to whether they were purchased by fee or less-than-fee.

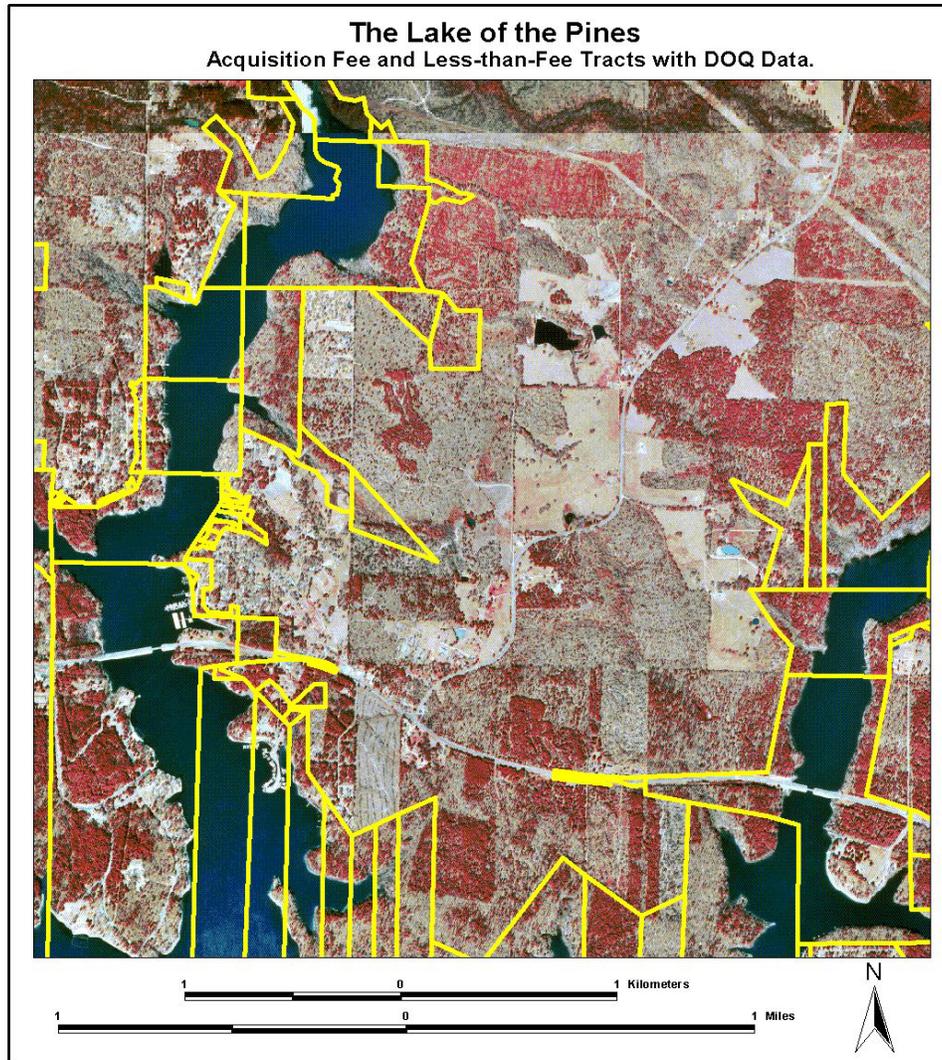


Figure 6. Project boundary tracts (shown with a solid line), with DOQ data displayed in background

By utilizing the tract maps with other data, such as digital orthographic quadrangles (DOQs), tasks such as locating tracts becomes significantly easier. For example, in Figure 6, the boundary tracts for Lake of the Pines are shown with a solid line and can be used with the DOQs to aid in maintaining project boundaries and checking for encroachments.

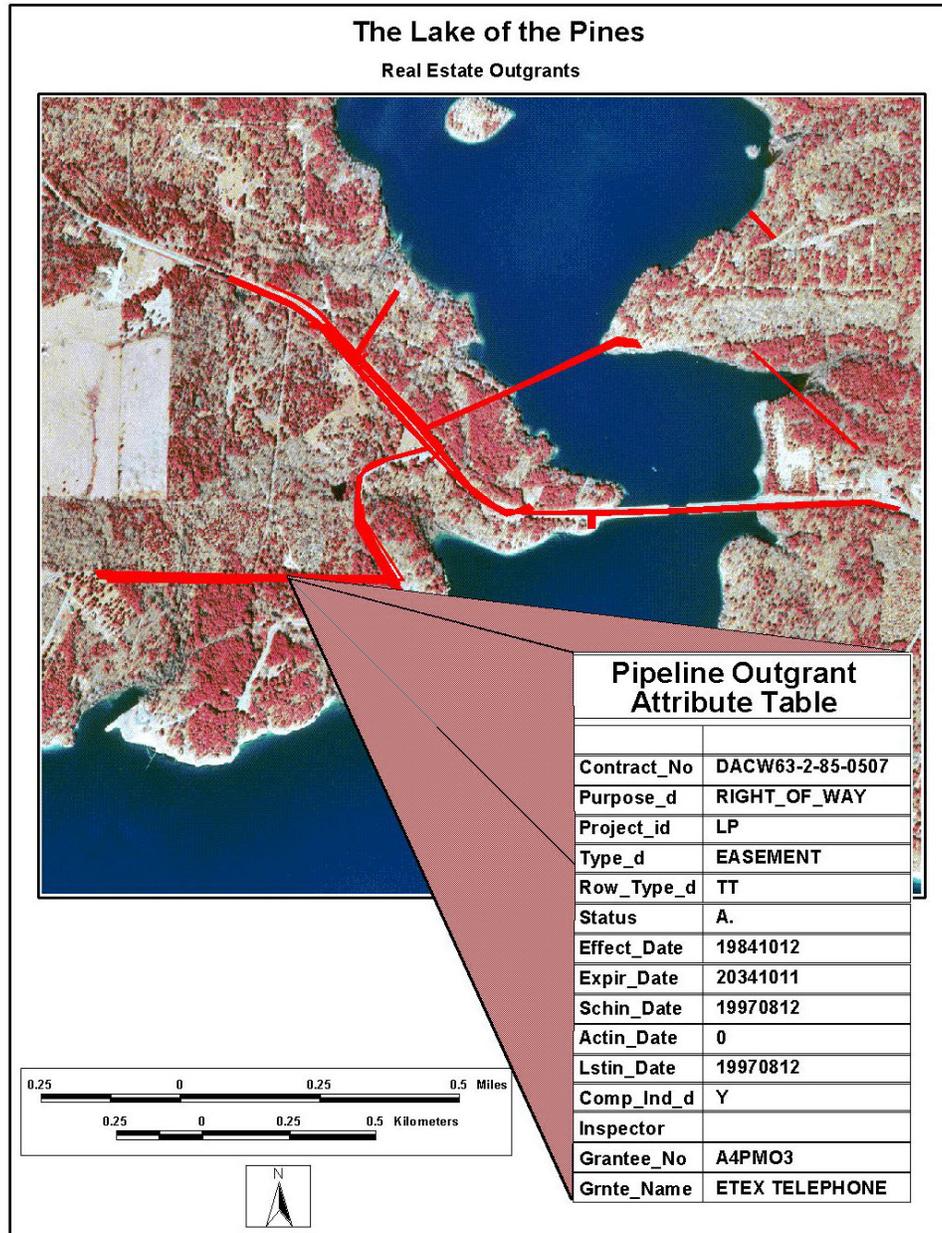


Figure 7. A portion of the outgrants for Lake of the Pines, TX

Figure 7 shows a portion of the outgrants for Lake of the Pines. Information about each outgrant can be displayed on the screen, showing tabular data such as the type of outgrant (easement, permit, etc.), status (active, inactive, terminated), effective and expiration dates, and grantee name.

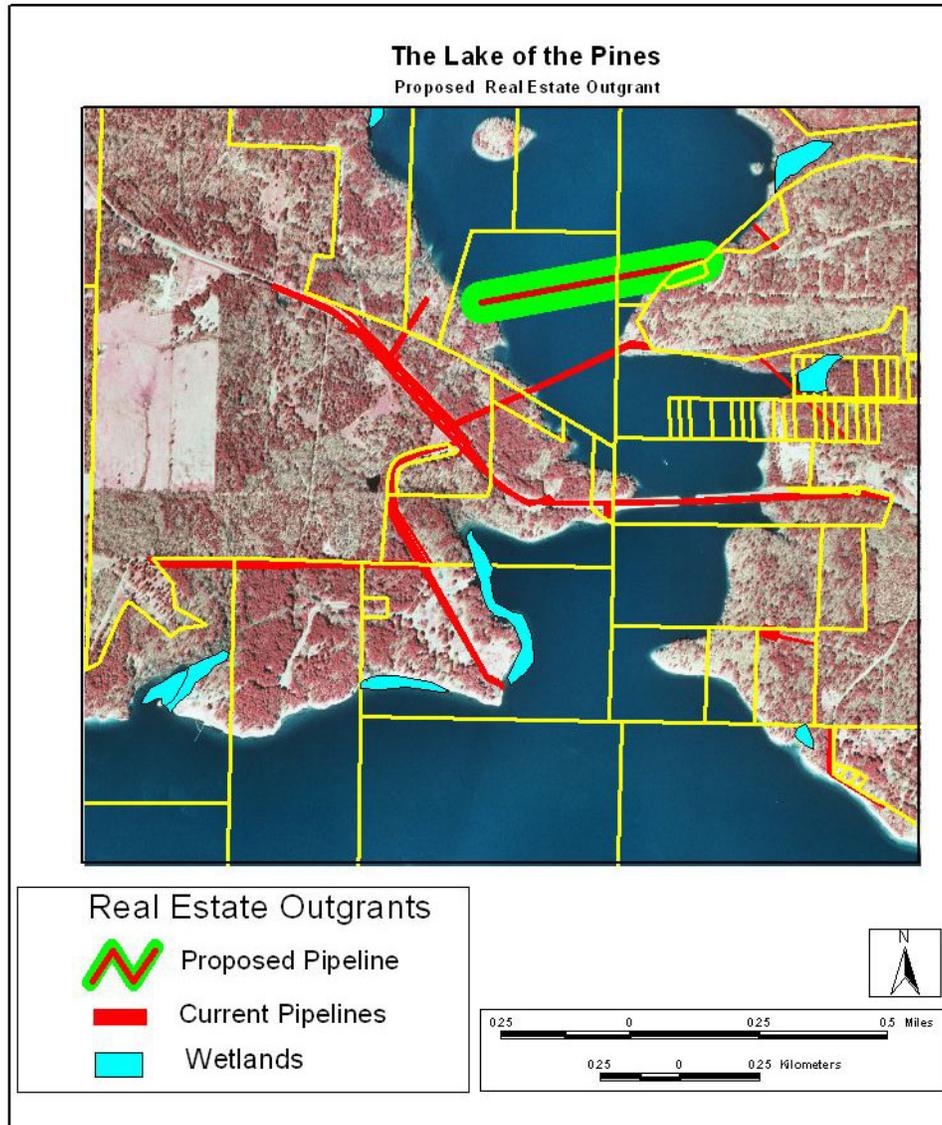


Figure 8. Proposed outgrant displayed with existing outgrant and DOQ data

The business practice of issuing an outgrant can be streamlined by having the ability to display a proposed outgrant with existing outgrants, as well as other types of infrastructure and environmental data. For example, if the project receives a request for an outgrant for a gas pipeline, the proposed pipeline can be input into the GIS. Buffers can be drawn around the proposed pipeline to determine if the pipeline construction area will impact the surrounding area or if the proposed pipeline conflicts with existing outgrants. Figure 8 shows a proposed pipeline with a 200-foot buffer. This allows the project manager to address problems with the request at an early stage when changes in location can be made before time and resources are expended. The existing outgrants can also be queried to determine if the requester already has active, inactive, or terminated outgrants. If the requestor already has outgrants, queries such as the compliance

status and expiration dates of those outgrants can be made and displayed graphically.

Having ready digital access to cadastral real estate data offers many possibilities to improve the way the data can be used. The ability to view and query the data in a geospatial arena can streamline decision making. The added benefit of utilizing real estate data with data such as environmental, infrastructure, or remotely sensed imagery further enhances the spatial analysis process necessary to make effective and efficient decisions.

The incorporation of cadastre real estate data was a first step in this initiative, however; it has become apparent that the addition of real property data, such as buildings, roads, picnic sites, and campsites, would also provide opportunities to improve the management of the Corps resources.

5 Technology Transfer

This report, the software tool, and the instructions to install and utilize the tool have been placed on a Web site, which can be accessed at <http://www.wes.army.mil/el/gdaf>. On the Geospatial Data Analysis Facility home page, click “PRODUCTS.” On the Products page, click on the Real Estate icon.

6 Future Direction

This research has provided a GIS-assisted approach in the transition to a cadastre real estate GIS environment. This research was developed with the consideration of related projects, such as the National Integrated Land System (NILS) project, which is a collaboration between the Bureau of Land Management (BLM) and the U.S. Forest Service to produce a common data model and tool sets for managing cadastral and land record data (more information is available at <http://www-a.blm.gov/nils>). The NILS and its partners are working with ESRI to produce the data model and related applications based on ArcGIS Version 8.x object-oriented technology.

The research conducted was also developed in the object-oriented ArcGIS 8 software so that it would be compatible with these software models and applications developed by ESRI and the NILS project. These products are not publicly available to date, except for the ArcGIS Parcel Data Model, which is available in conceptual form. Most of the products should be available within the next year. The capabilities of models and applications and their effects on business practices related to cadastral real estate have not been assessed. Assessing these products in conjunction with the database design and software tools developed should be the next step in moving Corps of Engineers real estate data into a GIS environment.

Another step in this research process should be directed at incorporating real property into the process. The incorporation of real property such as picnic shelters, picnic tables, and fences into a GIS environment would be useful for inventory and other business purposes.

References

- Environmental Systems Research Institute, Inc. (2001). "Arc/Info (computer program)," Redlands, CA.
- Information Technology Laboratory. (2002). "CADD/GIS Technology Center Spatial Data Standard, Version 2.2." U.S. Army Engineer Research and Development Center, Vicksburg, MS.
- Stanley Consultants. (1999). "Real estate geographic information system needs assessment," U.S. Army Engineer District, Rock Island, Rock Island, IL.

Appendix A

New Tables Added to SDS Versions 2.0 and 2.3 (to be released Sept 03)

Table 1. Acquisition Fee and Less-Than-Fee Tracts

ENTITY SET NAME

cadastre

ENTITY CLASS NAME

cadastre_real_estate

TABLE NAME

Cdrelacq

TABLE LONG NAME

Parcel_Acquisition_Area

TABLE TYPE

Graphic

VERSION

2.3

STD

SDS

TABLE DEFINITION This table contains information about parcel acquisitions (fee and less-than-fee).

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMISS TABLE | REMISS ATTRIBUTE | DEFINITION |
|------------------|-------------|---------------|---------------|---------------------|---------------------------------------|--|
| Datalink | I | | | | | Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field. |
| Paracq_id | C | 20 | rp_tract | | concatenation of tract_no and proj_id | Primary Key. A unique, user-defined identifier for each record or instance of an entity (*REMIS LINK - concatenate tract_no and proj_id). |
| Map_id | I | | | | | Foreign Key. Used to link the record to the appropriate map. |
| Meta_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable feature-level metadata record(s). |
| Media_id | C | 20 | | | | Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other digital media. |
| Coord_id | C | 20 | | | | Foreign Key. Used to link the record to the appropriate point coordinate record(s). |
| Bndacq_id | C | 20 | rp_tract | | proj_id | FOREIGN KEY - Links the record to CDRELBND through primary key BNDACQ_ID |
| Parcl_name | C | 32 | rp_tract | | tract_no | Identifying name or number for a parcel (equivalent to tract_no in REMIS) |
| Project_id | C | 50 | rp_tract | | proj_id | Foreign Key. Used to link the record to the applicable PROJECT record from the RP_PROJECT table in REMIS. |
| acq_est_d | C | 16 | d_acqest | rp_tract | us_acq_estate_cat | Type of acquisition |
| Acqrd_date | I | | | rp_tract | acquired_date | The date the tract was acquired. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915) |
| rp_purp_d | C | 16 | d_prpurp | rp_tract | purpose | Project purpose |
| Remarks | C | 240 | rp_tract | rp_tract | remarks | General comments |
| Narrative | C | 240 | | | | General narrative |
| State_d | C | 16 | d_states | rp_county_area | state | State Code |
| County_id | C | 50 | | rp_county_area | county_name | FOREIGN KEY - Links the record to CMGENCNT through primary key COUNTY_ID. |
| Area_size | D | | | | | Size of area as computed from GIS. |
| Area_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Easement_d | C | 16 | d_easmnt | rp_tract | easement_type_code | The type of easement |

(continued)

Table 1. (concluded)

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------|------|--------|----------|--------------------|---|--|
| Legal_area | D | | | rp_county_area | concatenation of county_rural_acres, county_urban_acres, rural_adjust_acres, and urban_adjust_acres | Size of area as computed from legal data. Changed from decimal to single type to be compatible with the type in ArcCatalog. |
| Lgarea_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Perim | D | | | | | The distance around the boundary of the area, zone, or subject item in linear units. |
| Perim_u_d | C | 16 | d_uom | | | The unit of measure for length |
| grid_value | R | | | | | A numeric identification of a raster element in an image or grid that represents the feature. |
| instlin_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable INSTALLATION record from the RP_PROJECT table in REMIS. |
| facil_id | C | 20 | | | | Foreign Key. Used to link the record to the Facility Record. |
| User_flag | C | 20 | | | | An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data. |
| Juris_d | C | 16 | d_juris | | | The code that represents the type of jurisdiction. |
| file_no | C | 16 | | | | The code that represents the number of the file. |
| Dist_name | C | 16 | | rem_rp_title | div_dist | Designator for Division/District. |
| Method | C | 15 | | rem_rp_tract | method_of_accomplishment | Method of Accomplishment |
| Owner_id | C | 50 | | Rem_ownership_prof | rp_owner_id | Grantor (owner from whom the Corps purchased the tract of land) |
| City | C | 20 | | Rem_rp_location | city | City or Town of Parcel Location |
| Cost | D | | | Rem_rp_tract | acquired_cost | Corps purchase price for tract |
| Deed_id | C | 20 | | rem_rp_tract | Concatenation of proj_id and tract_no | Foreign Key. Used to link the record to the applicable DEED record from the DEED_INFORMATION table. Value is the concatenation of PROJECT_ID and PARCL_NAME attributes. |
| Status_d | C | 16 | d_prstat | Rem_rp_tract | rp_status_ind | Status of Parcel (acquired, cancelled, disposed, excessed, expired, to be acquired, or surplus) |

Table 2. Outgrants

ENTITY SET NAME

cadastre

ENTITY CLASS NAME

cadastre_real_estate

TABLE NAME

cdrelout

TABLE LONG NAME

outgrant_area or outgrant_point

TABLE TYPE

Graphic

VERSION

2.3

STD

SDS

TABLE DEFINITION This table contains information about outgrants.

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------------|-------------|---------------|---------------|-----------------------|---|--|
| Datalink | I | | | | | Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field. |
| Outgrmt_id | C | 30 | | outgrant | concatenation of contract_number, mod_number, and outgrant_status | Primary Key. A unique, user-defined identifier for each record or instance of an entity. |
| map_id | I | | | | | Foreign Key. Used to link the record to the appropriate map. |
| Meta_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable feature-level metadata record(s). |
| Media_id | C | 20 | | | | Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other digital media. |
| Project_id | C | 50 | | outgrant | proj_id | Foreign Key. Used to link the record to the applicable PROJECT record from the RP_PROJECT table in REMIS. |
| Contract_no | C | 22 | | outgrant | contract_number | Identifier to the outgrant contract number |
| Purpose_d | C | 16 | d_ogtpur | outgrant | purpose category | Outgrant purpose |
| Type_d | C | 16 | d_ogttyp | outgrant | type category | Outgrant type |
| row_type_d | C | 16 | d_ogtrow | outgrant | r_o_w_type | ROW type |
| Out_status | C | 16 | | outgrant | outgrant_status | Status of outgrant (eg. terminated, active, inactive) |
| Effect_dat | I | | | outgrant | effective_date | Date outgrant is effective. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| Expir_dat | I | | | outgrant | expiration_date | Date outgrant expires. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| Schin_date | I | | | compliance_inspection | scheduled_inspect_date | Date for scheduled inspection. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| Actin_date | I | | | compliance_inspection | actual_inspect_date | Date inspection actually took place. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| Istin_date | I | | | compliance_inspection | last_inspect_date | Date of previous inspection. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| Comp_ind_d | C | 16 | d_boolean | compliance_inspection | compliance_ind | Indicates if the grantee is in compliance |
| Inspector | C | 20 | | compliance_inspection | inspector | Inspector |
| Grantee_no | C | 9 | | outgrant | grantee_id | Grantee number |
| Grnte_name | C | 60 | | addressee | addr_name | Grantee name |
| Remarks | C | 240 | | outgrant | remarks | General comments |

(continued)

Table 2. (Concluded)

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------|------|--------|--------|-------------|------------------|--|
| Narrative | C | 240 | | | | General narrative |
| Legal_area | D | | | outgrant | total_land_acres | Size of area as computed from legal data. Changed from decimal to single type to be compatible with the type in ArcCatalog. |
| Lgarea_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Coord_id | C | 20 | | | | Foreign Key. Used to link the record to the appropriate point coordinate record(s). |
| Coord_x | D | | | | | The x component of individual coordinate point. |
| Facil_id | C | 20 | | | | Foreign Key. Used to link the record to the Facility Record. |
| Grid_value | R | | | | | A numeric identification of a raster element in an image or grid that represents the feature. |
| Instln_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable INSTALLATION record from the RP_PROJECT table in REMIS. |
| Area_size | D | | | | | The size of the area, zone, or polygon in square units. |
| Area_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Coord_y | D | | | | | The y component of individual coordinate point. |
| Coord_z | D | | | | | The z component of individual coordinate point. |
| Perim | D | | | | | The distance around the boundary of the area, zone, or subject item in linear units. |
| Perim_u_d | C | 16 | d_uom | | | The unit of measure for length |
| User_flag | C | 20 | | | | An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data. |

Table 3. Disposals

ENTITY SET NAME

cadastre

ENTITY CLASS NAME

cadastre_real_estate

TABLE NAME

cdreldsp

TABLE LONG NAME

Land_Disposal_Area

TABLE TYPE

Graphic

VERSION

2.3

STD

SDS

TABLE DEFINITION This table describes the attributes needed for disposals.

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMISS TABLE | REMISS ATTRIBUTE | DEFINITION |
|------------------|-------------|---------------|---------------|---------------------|-------------------------|--|
| Datalink | I | | | | | Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field. |
| Dispacq_id | C | 30 | | Disp_unit | disp_unit_id | Primary Key. A unique, user-defined identifier for each record or instance of an entity. |
| Map_id | I | | | | | Foreign Key. Used to link the record to the appropriate map. |
| meta_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable feature-level metadata record(s). |
| Media_id | C | 20 | | | | Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other digital media. |
| Project_id | C | 50 | | Disp_unit | proj_id | Foreign Key. Used to link the record to the applicable PROJECT record from the RP_PROJECT table in REMIS. |
| Disp_ind_d | C | 16 | d_disind | Disp_unit | disposed_ind | disposal indicator |
| Record_d | C | 16 | d_rectyp | Disp_unit | record_type | Record type |
| displ_date | I | | | | | The date of disposal. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915) |
| Remarks | C | 240 | | Disp_unit | remarks | General comments |
| Narrative | C | 240 | | | | General narrative |
| legal_area | R | | | Disp_unit | excess_acres | The size of legal area, zone, or polygon in square units. |
| lgarea_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| area_size | D | | | | | Size of area as computed from GIS. |
| area_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Coord_id | C | 20 | | | | Foreign Key. Used to link the record to the appropriate point coordinate record(s). |
| Perim | D | | | | | The distance around the boundary of the area, zone, or subject item in linear units. |
| Perim_u_d | C | 16 | d_uom | | | The unit of measure for length |
| Grid_value | R | | | | | A numeric identification of a raster element in an image or grid that represents the feature. |
| Instln_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable INSTALLATION record from the RP_PROJECT table in REMIS. |
| facil_id | C | 20 | | | | Foreign Key. Used to link the record to the Facility Record. |
| user_flag | C | 20 | | | | An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data. |

Table 4. Encroachments

ENTITY SET NAME

cadastre

ENTITY CLASS NAME

cadastre_real_estate

TABLE NAME

cdrelenc

TABLE LONG NAME

Encroachment_area or
Encroachment_point

TABLE TYPE

Graphic

VERSION

2.3

STD

SDS

TABLE DEFINITION This table contains information about encroachments.

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------------|-------------|---------------|---------------|--------------------|---|--|
| Datalink | I | | | | | Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field. |
| Enchr_id | C | 30 | | Encroachment_item | concatenation of proj_id, wi_code, and enc_itm_number | Primary Key. A unique, user-defined identifier for each record or instance of an entity. |
| Map_id | I | | | | | Foreign Key. Used to link the record to the appropriate map. |
| meta_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable feature-level metadata record(s). |
| Media_id | C | 20 | | | | Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other digital media. |
| Coord_id | C | 20 | | | | Foreign Key. Used to link the record to the appropriate point coordinate record(s). |
| Coord_x | D | | | | | The x component of individual coordinate point. |
| Coord_y | D | | | | | The y component of individual coordinate point. |
| Coord_z | D | | | | | The z component of individual coordinate point. |
| project_id | C | 50 | | Encroachment_item | proj_id | Foreign Key. Used to link the record to the applicable PROJECT record from the RP_PROJECT table in REMIS. |
| wi_code | C | 6 | | Encroachment_item | wi_code | Work Item Code |
| Enc_itm_no | R | | | Encroachment_item | enc_itm_number | Work Item Number |
| enchroachno | C | 9 | | Encroachment_item | encroacher_id | Unique identified for encroachment |
| rpt_by_cat | C | 16 | | Encroachment_item | reported_by_category | Who reported the encroachment (e.g. park ranger, neighbor, etc.) |
| Type_cat_d | C | 16 | d_tycat | Encroachment_item | type_category | Kind of encroachment |
| Revr_ind_d | C | 16 | d_boolean | Encroachment_item | reverse_ind | No means they are encroaching on COE land; Yes means COE encroaching on someone's land |
| finalres_d | C | 16 | d_firres | Encroachment_item | final_res_category | How resolution was resolved |
| Reptd_date | I | | | Encroachment_item | reported_date | Date encroachment was reported. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| Res_date | I | | | Encroachment_item | res_date | Resolution Date. Format for date is YYYYMMDD (i.e., September 15, 1994 = 19940915). |
| | | | | | | (continued) |

Table 4. (Concluded)

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------|------|--------|--------|-------------|-----------------|--|
| Narrative | C | 240 | | | | General narrative. |
| legal_area | D | | | | | Size of area as computed from legal data. Changed from decimal to single type to be compatible with the type in ArcCatalog. |
| lgarea_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| address_id | C | 50 | | | | FOREIGN KEY - Links the record to CMGENADD through primary key ADDRESS_ID. |
| Poc_id | C | 50 | | | | FOREIGN KEY - Links the record to CMGENPOC through primary key POC_ID. |
| Area_size | D | | | | | The size of the area, zone, or polygon in square units. |
| Area_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Perim | D | | | | | The distance around the boundary of the area, zone, or subject item in linear units. |
| Perim_u_d | C | 16 | d_uom | | | The unit of measure for length |
| Instln_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable INSTALLATION record. |
| facil_id | C | 20 | | | | Foreign Key. Used to link the record to the Facility Record. |
| User_flag | C | 20 | | | | An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data. |
| Grid_value | R | | | | | A numeric identification of a raster element in an image or grid that represents the feature. |

Table 5. Fee Boundaries

ENTITY SET NAME

cadastre

ENTITY CLASS NAME

cadastre_real_estate

TABLE NAME

cdrelbnd

TABLE LONG NAME

Acquisition_Boundary_Area

TABLE TYPE

Graphic

VERSION

2.3

STD

SDS

TABLE DEFINITION This table contains information about parcel/fee acquisition boundaries.

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------------|-------------|---------------|---------------|--------------------|------------------------|--|
| Datalink | I | | | | | Graphic Key. A system-generated integer that is used to link the record to graphic entities. Do not populate this field. |
| Bndacq_id | C | 20 | | rp_project | proj_id | Primary Key. A unique, user-defined identifier for each record or instance of an entity. |
| Map_id | I | | | | | Foreign Key. Used to link the record to the appropriate map. |
| Meta_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable feature-level metadata record(s). |
| Media_id | C | 20 | | | | Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, audio, scanned documents, drawings, and other digital media. |
| Coord_id | C | 20 | | | | Foreign Key. Used to link the record to the appropriate point coordinate record(s). |
| Project_id | C | 50 | | rp_project | proj_id | Foreign Key. Used to link the record to the applicable PROJECT record from the RP_PROJECT table in REMIS. |
| Remarks | C | 240 | | rp_project | remarks | General comments |
| Narrative | C | 240 | | | | General narrative |
| Area_size | D | | | | | Size of area as computed from GIS. |
| Area_u_d | C | 16 | d_uom | | | The unit of measure for area. |
| Perim | D | | | | | The distance around the boundary of the area, zone, or subject item in linear units. |
| Perim_u_d | C | 16 | d_uom | | | The unit of measure for length |
| Grid_value | R | | | | | A numeric identification of a raster element in an image or grid that represents the feature. |
| Instln_id | C | 20 | | | | Foreign Key. Used to link the record to the applicable INSTALLATION record from the RP_PROJECT table in REMIS. |
| Facil_id | C | 20 | | | | Foreign Key. Used to link the record to the Facility Record. |
| User_flag | C | 20 | | | | An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data. |

Table 6. Deed Information

ENTITY SET NAME

cadastre

ENTITY CLASS NAME

cadastre_real_estate

TABLE NAME

Deed_Information

TABLE TYPE

Non-Graphic

VERSION

2.3

STD

SDS

TABLE DEFINITION This table contains information about the tracts' deed information.

| ATTRIBUTE | TYPE | LENGTH | DOMAIN | REMIS TABLE | REMIS ATTRIBUTE | DEFINITION |
|------------------|-------------|---------------|---------------|--------------------|---------------------------------------|---|
| Deed_id | C | 20 | | Rem_rp_tract | Concatenation of proj_id and tract_no | Links back to the DEED_ID attribute in the Parcel_acquisition_area table. |
| Project_id | C | 50 | | Rem_rp_tract | Proj_id | Project ID. |
| Parcl_name | C | 32 | | Rem_rp_tract | Tract_no | Tract number. |
| Deed_date | I | | | Rem_rp_title | Instrument_date | Date deed was signed. |
| Deed_page | C | 10 | | Rem_rp_title | Page_no | Deed page. |
| Deed_parcl | C | 10 | | Rem_rp_title | Parcel_no | County Land Tax Record number. |
| Deed_recd | I | | | Rem_rp_title | Instrument_rec_date | Date deed was recorded in county. |
| Deed_book | C | 10 | | Rem_rp_title | Book_no | Deed book. |
| Remarks | C | 240 | | Rem_rp_title | Remarks | General comments. |
| Title_id | I | | | Rem_rp_title | Title_id | Unique identifier in RP_TITLE table in REMIS. |

Appendix B Instructions for Using the Cadastre Real Estate GIS Software Tool

Software Requirements

- a. ESRI ArcGIS 8.2 desktop software (either ArcView 8.2, ArcEditor 8.2, or Arc/Info 8.2).
- b. Microsoft ODBC Driver for Oracle Version 2.573 (to connect to the REMIS database).
- c. Oracle 8.x Client software (to set up the ODBC connection to the Oracle database).
- d. Microsoft Windows NT Version 4, Windows 2000, or Windows XP.
- e. License Manager and keycodes from ESRI (if concurrent users will be using the ESRI ArcInfo 8 software).

Hardware Requirements

Suggested Hardware Configuration for ArcGIS Desktop on Windows NT / Windows 2000 / Windows XP - Intel Platforms

For best performance, use an appropriately configured PC:

- a. Windows NT service pack 6a, Windows 2000 service pack 2, Windows XP Home Edition, or Windows XP Professional Edition
- b. PC with a fast Pentium chip (450 Mhz minimum; 650Mhz or higher recommended)
- c. 128MB RAM minimum (256MB RAM recommended)
- d. Fast hard drive

- e. True color monitor with a minimum of 16MB video card
- f. Paging File (Swap Space) at a minimum of 300MB.

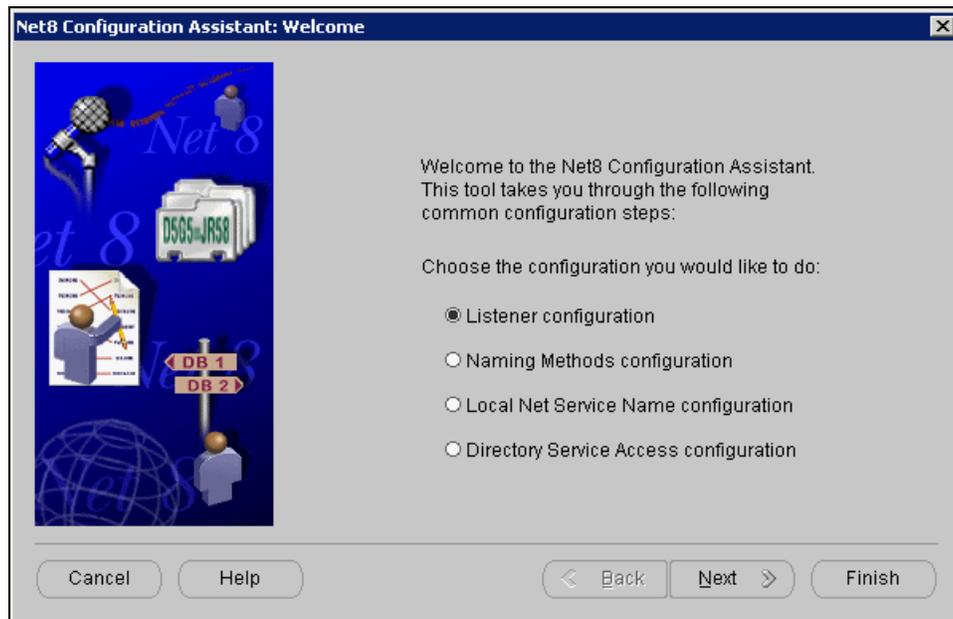
(ESRI, 2002)

STEP 1: Set up Oracle Services for ODBC connection

1. You must have Oracle Desktop installed on your system.
2. Use Oracle Net 8 Configuration Assistant on your local machine to set up the Listener, the Service Name, and the Naming Methods.

In the examples below, Net8 Configuration Assistant from Oracle version 8.1.7 is being used. Note the appearance of the screens or options presented may vary in later versions of Oracle. Enter Net8 Configuration Assistant:

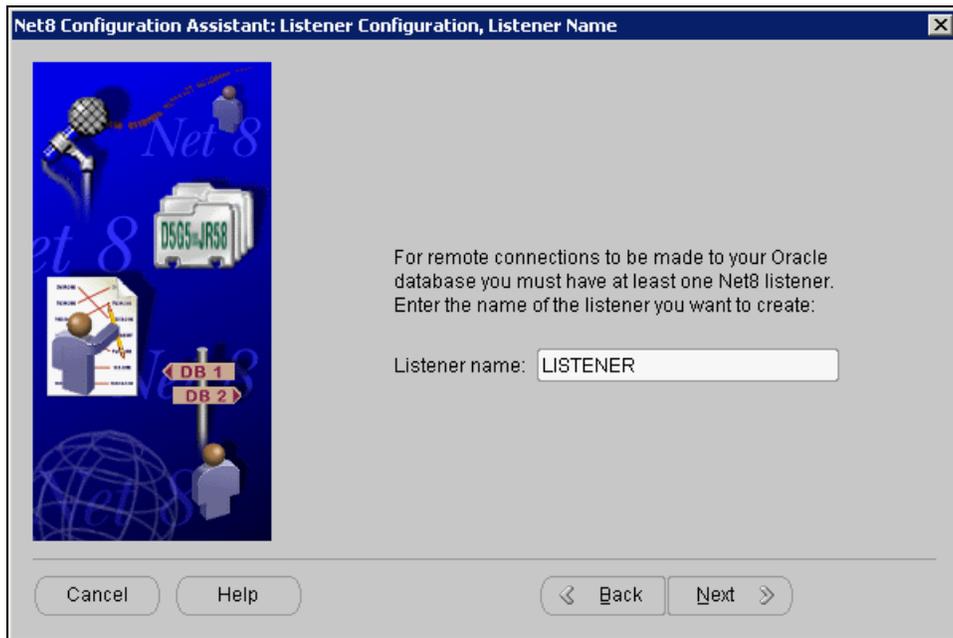
To setup the Listener, choose the option *Listener Configuration*:



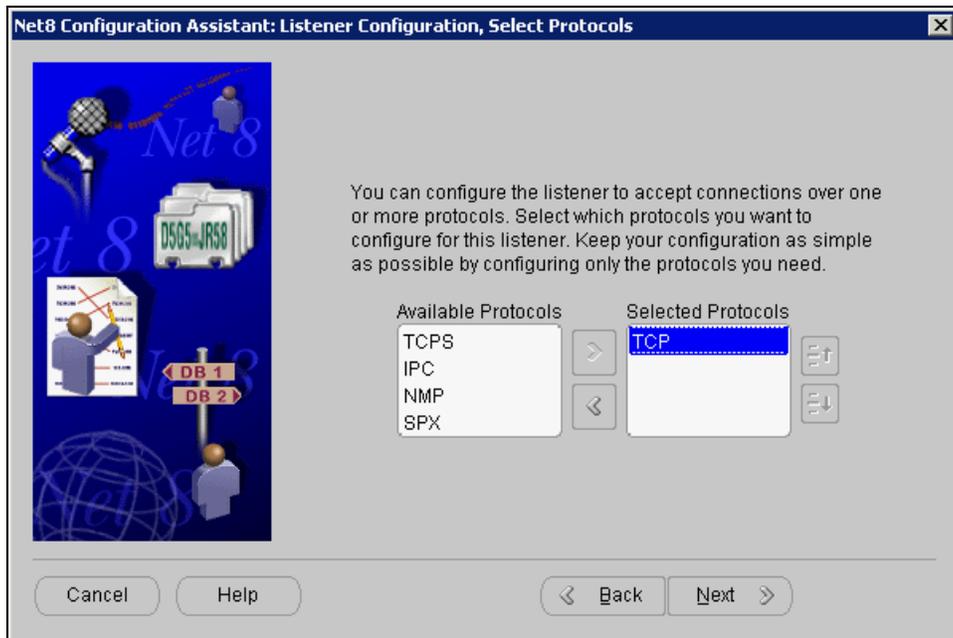
Then choose *Add* to add the new listener if none exists.



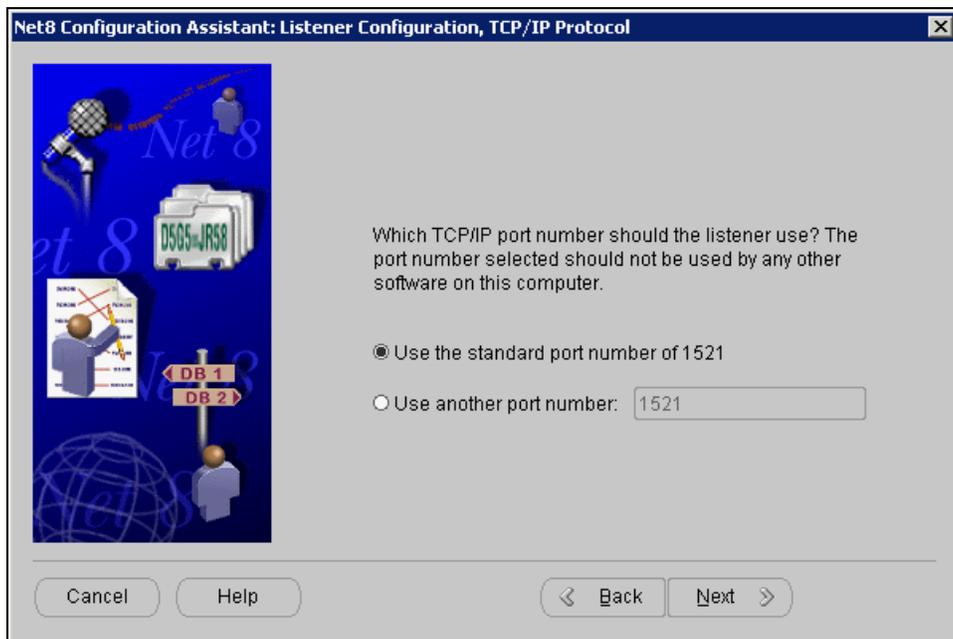
Type in the name of the Listener.



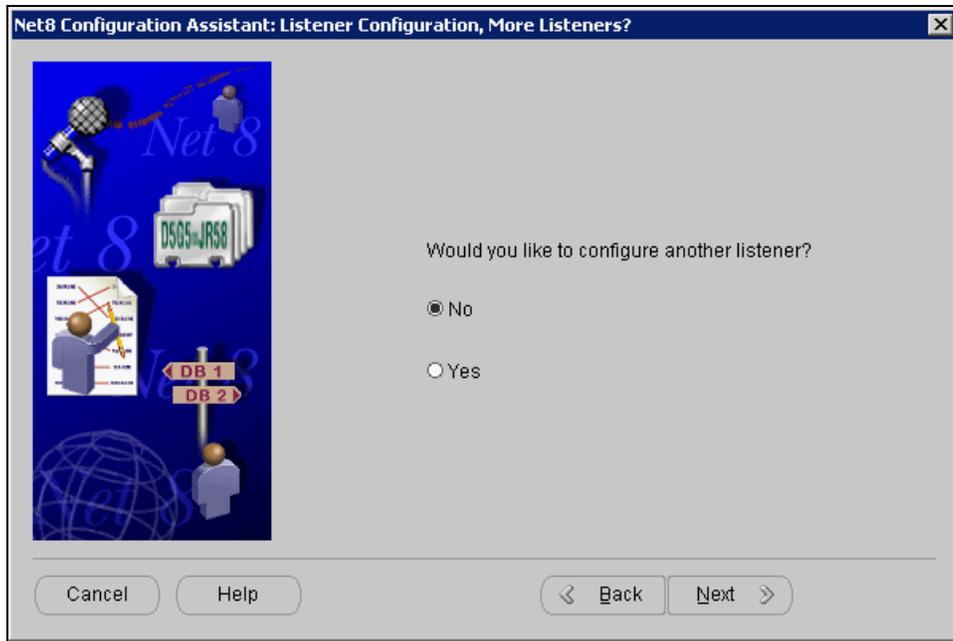
Choose a connection protocol and click *Next*.



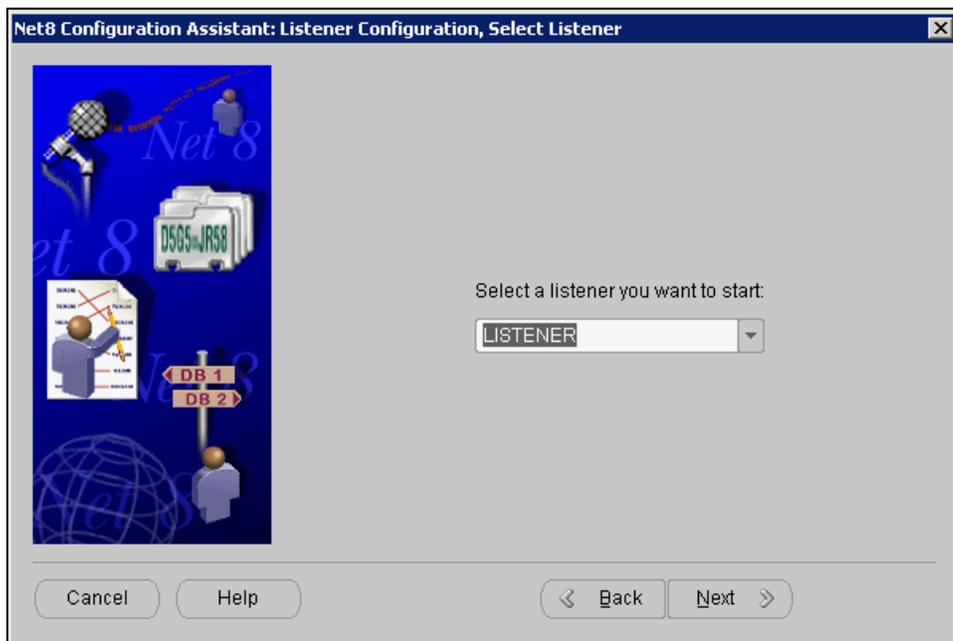
Select the default port number or use another port number for the listener. Click *Next*.



Click *Next* again.



To start the listener, select it from the list and click *Next*.

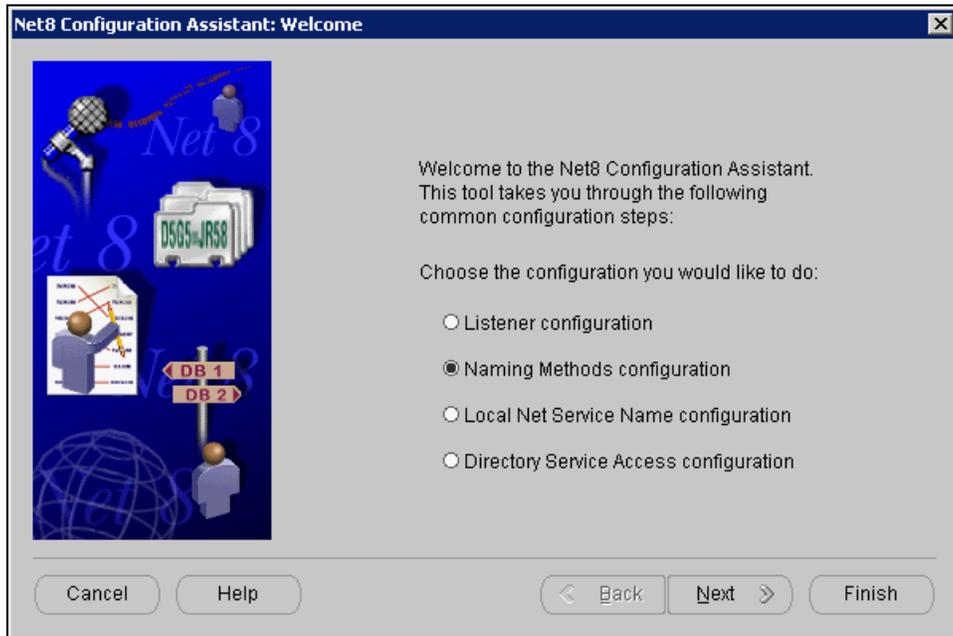


Click *Next* again.

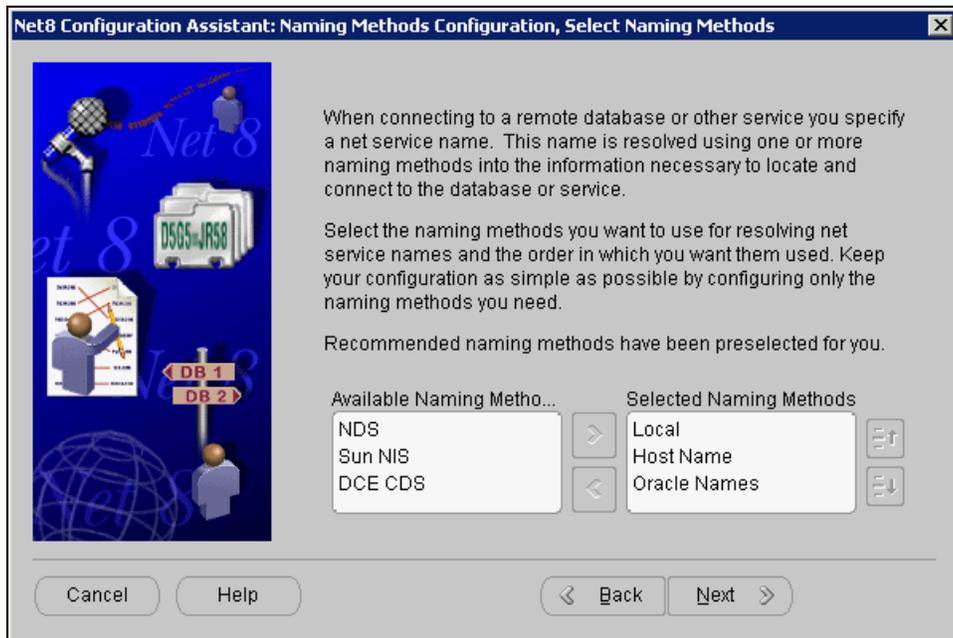


In the next screen click *Finish*.

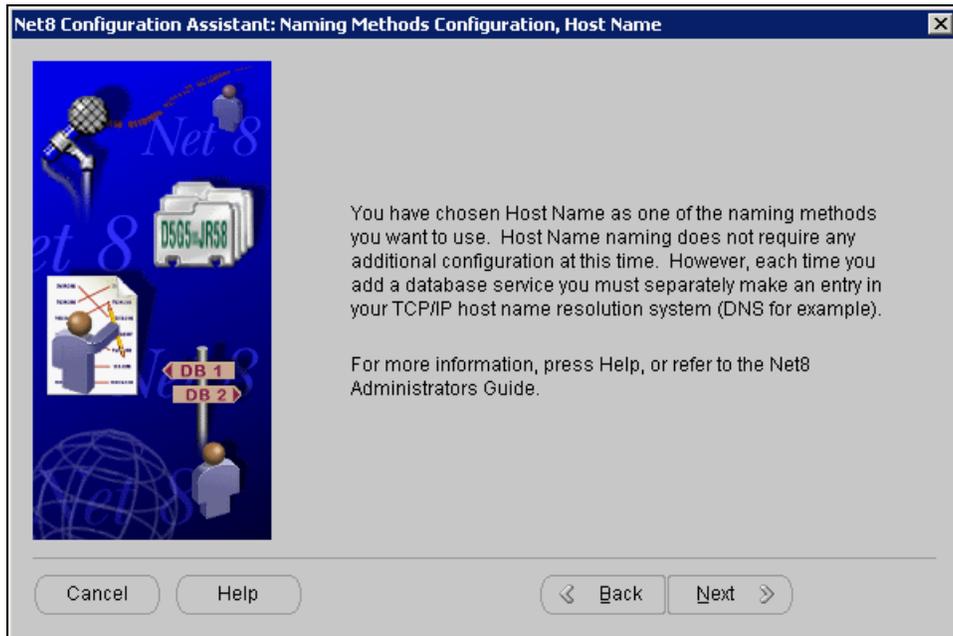
To setup the Naming Methods choose the *Naming Methods configuration* option:



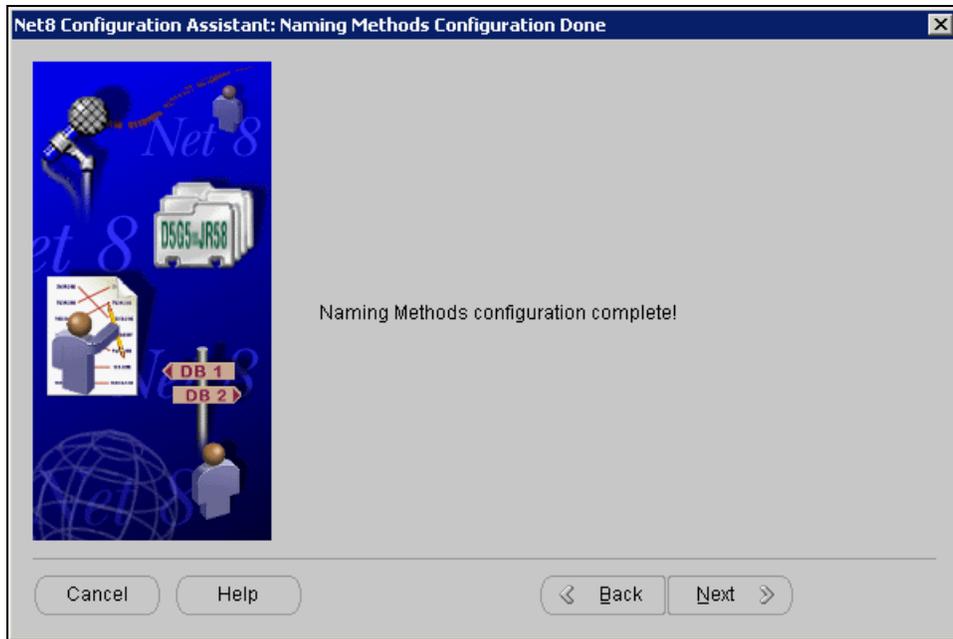
Select *Local*, *Host Name*, and *Oracle Names* Naming Methods. Click *Next*.



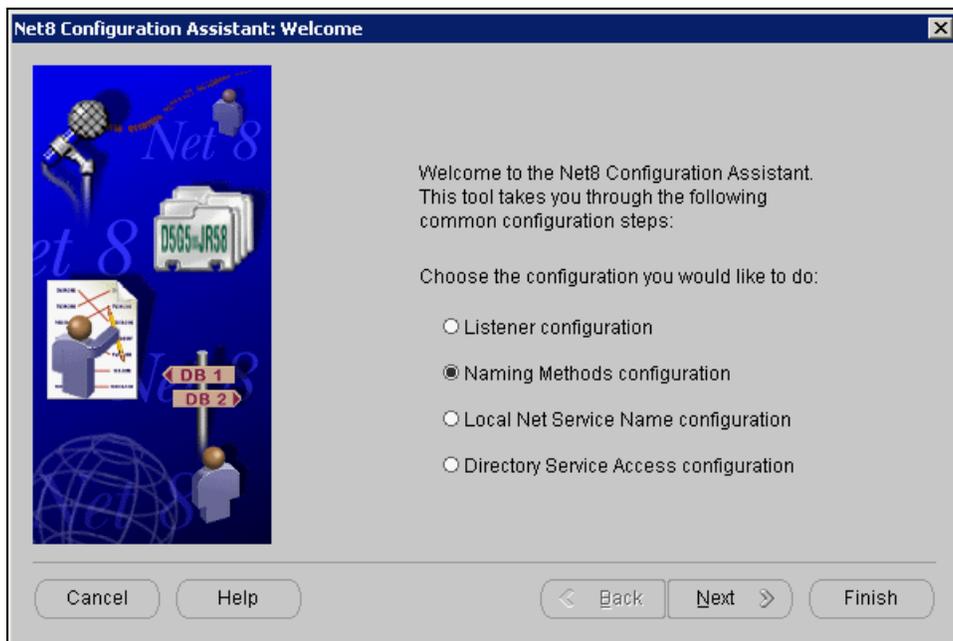
Click *Next* again.



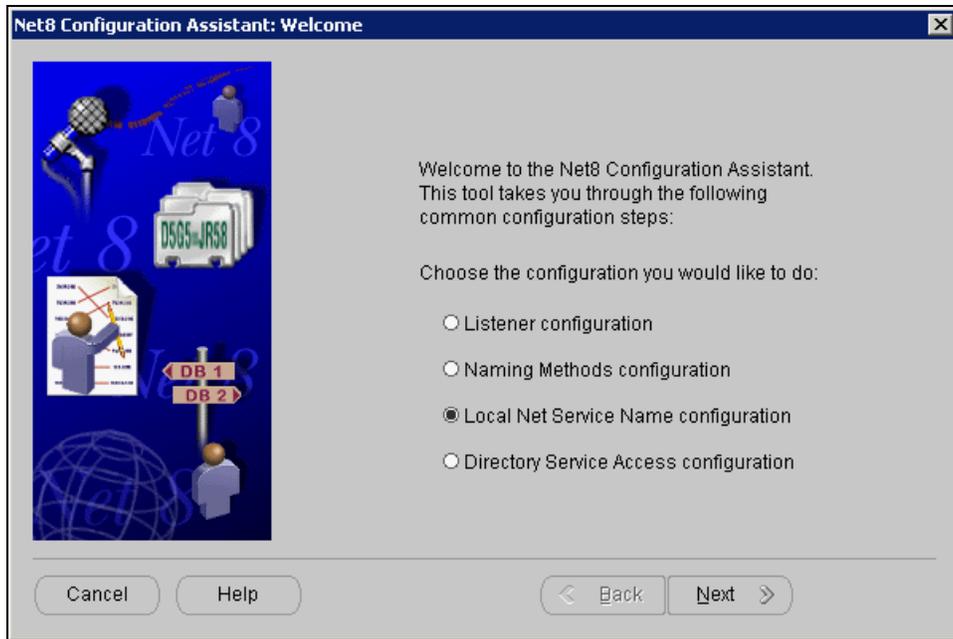
Click *Next*.



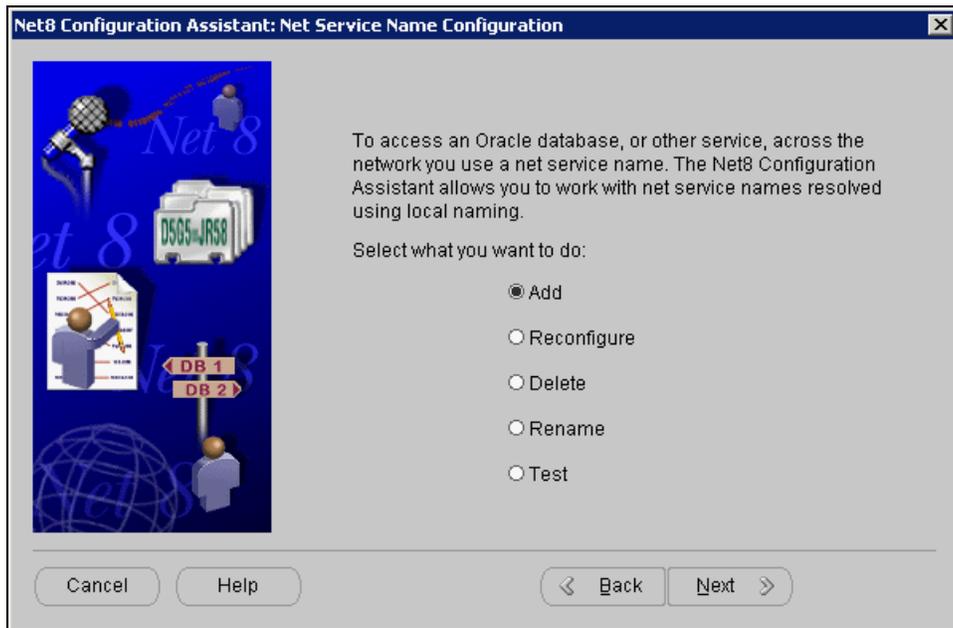
Click *Finish*.



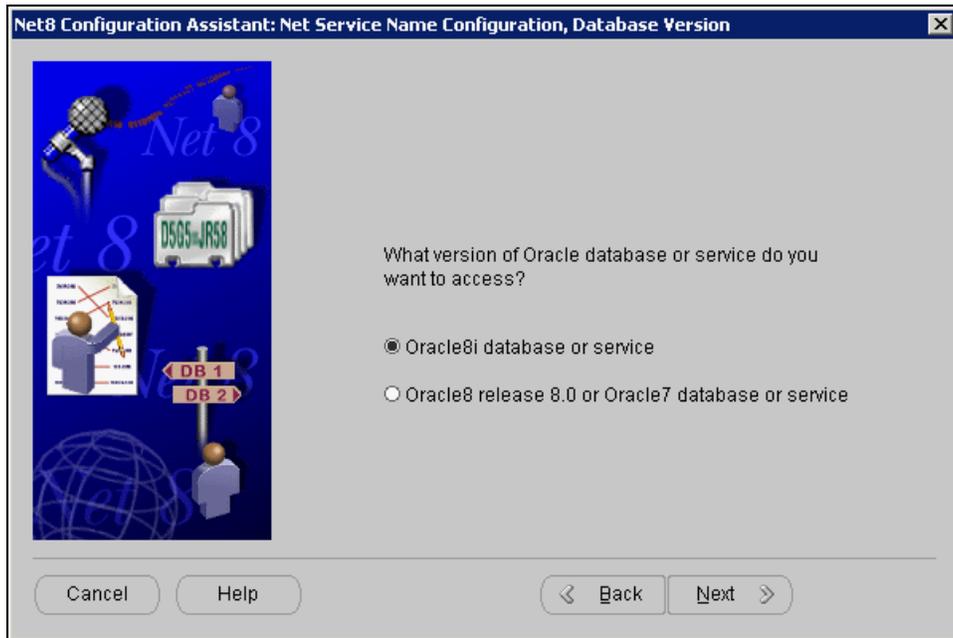
To setup the Service Name choose the *Local Net Service Name configuration* option:



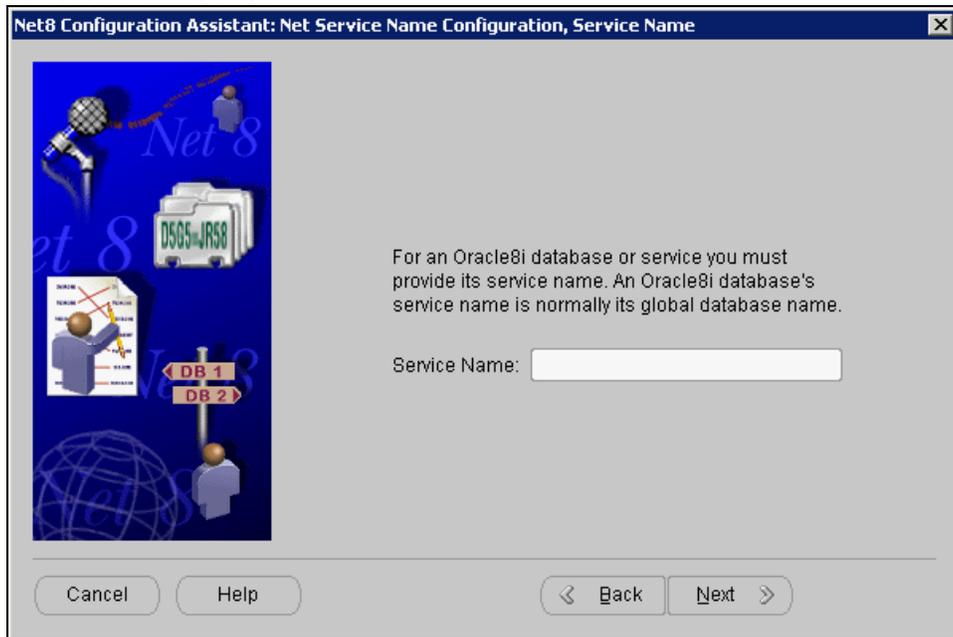
Select Add New Service.



Choose the version of Oracle you are using.

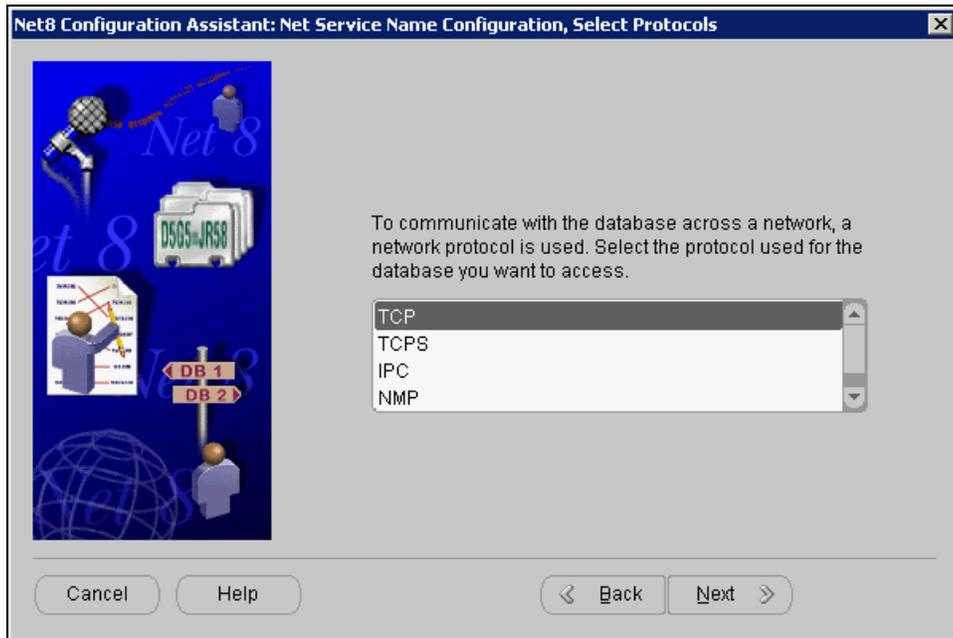


Write the database name you want to access. If you don't know it, contact your database administrator.



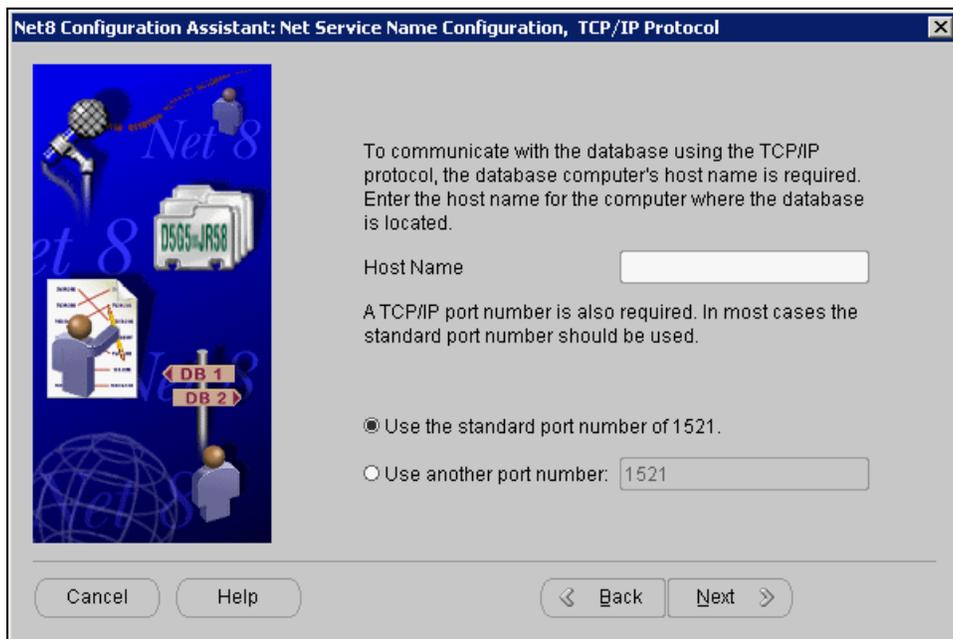
Click the *Next* button.

Make sure *TCP/IP (Internet Protocol)* is selected.

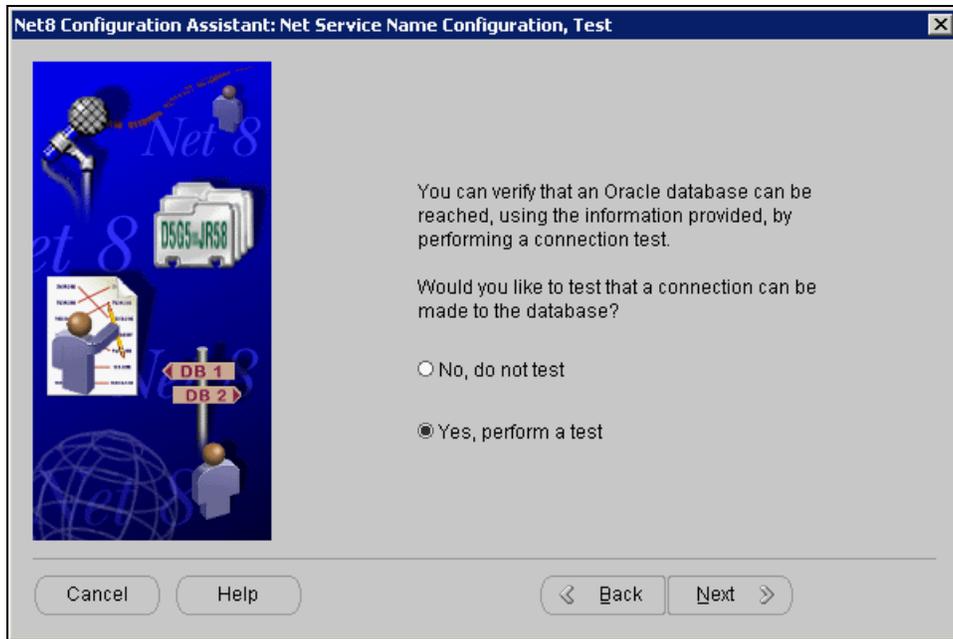


Click *Next*.

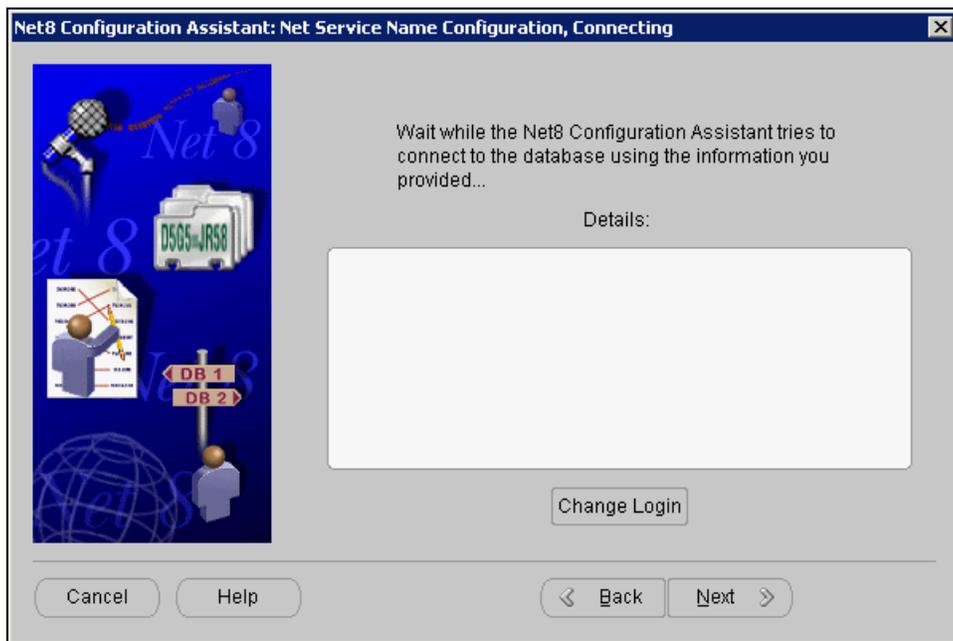
Enter the IP address or the name of the server to which you wish to connect.
Leave the Port number at the default value of 1521.



Click the *Next* button.

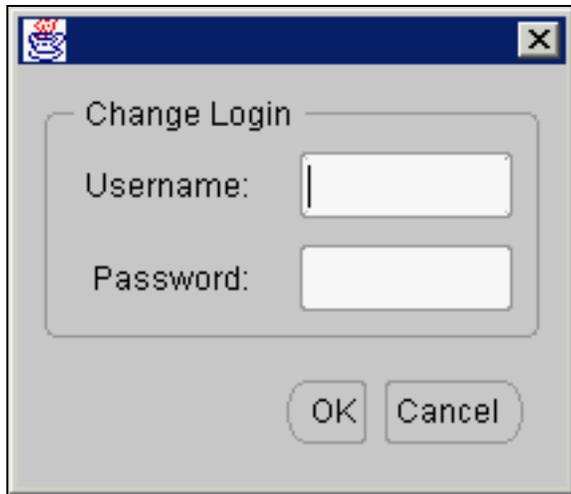


Click the *Yes, perform test* button to test your connection to the Oracle server.

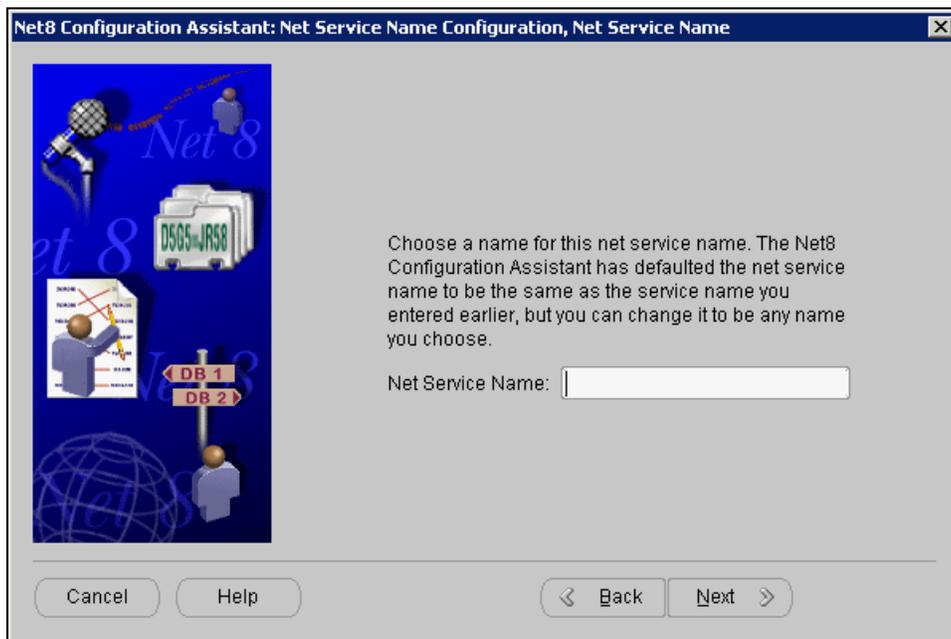


If you need to change the *Username* and *Password* click on *Change Login*.

Enter an appropriate *Username* and *Password* for the database you are connecting to and click the *OK* button.

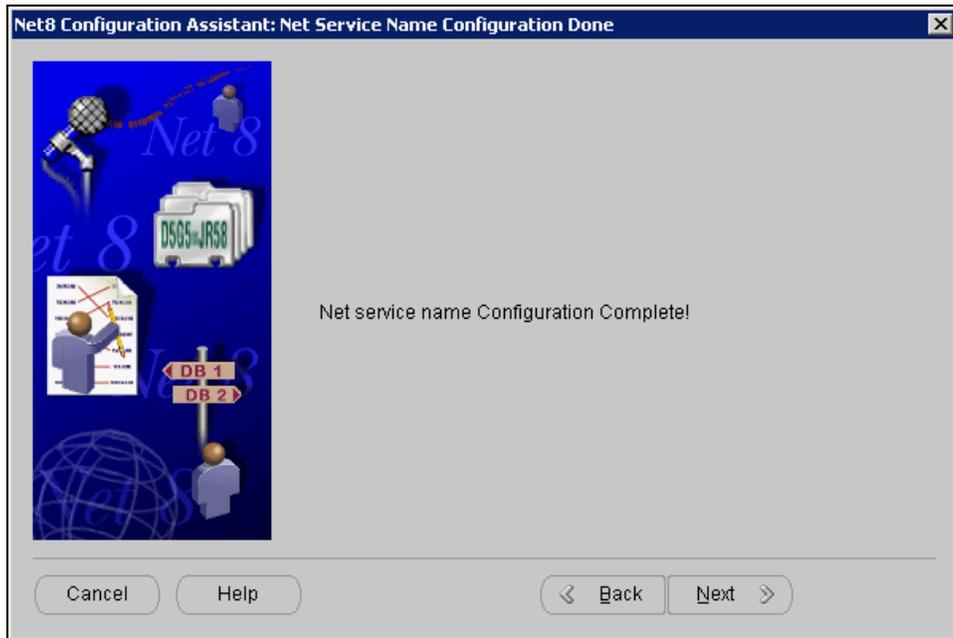


After clicking the *Next* button, enter the Net Service Name for this service.

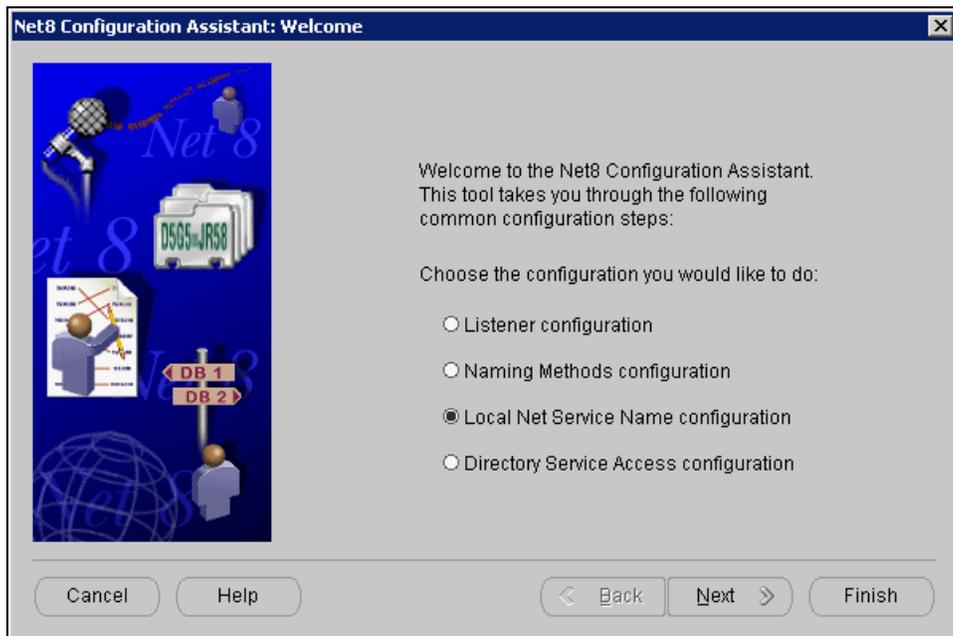


Then click the *Next* button.

The following screen appears:



Click the *Next* button.

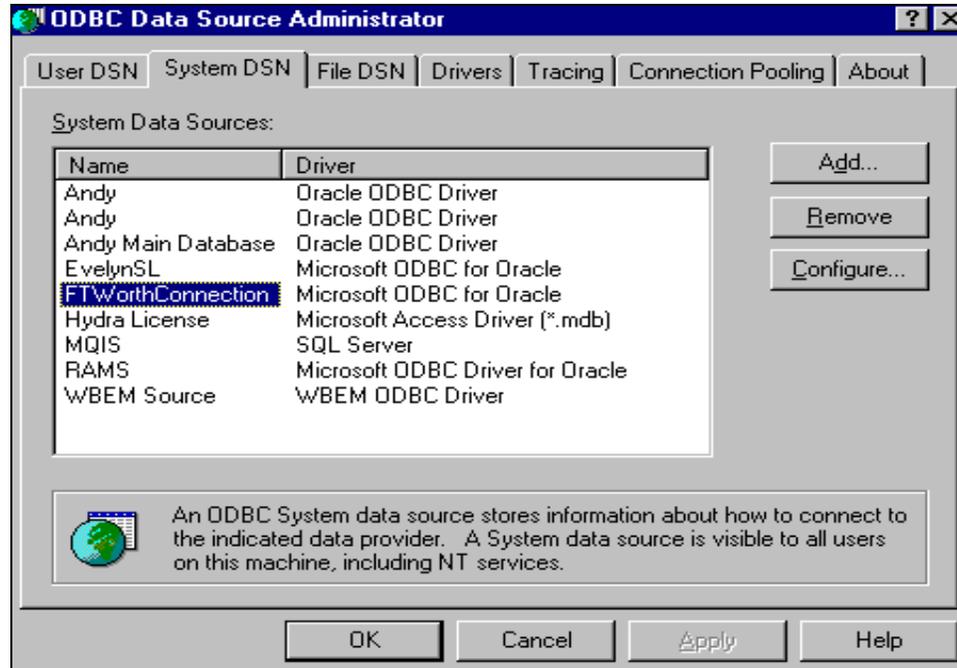


Then click the *Finish* button.

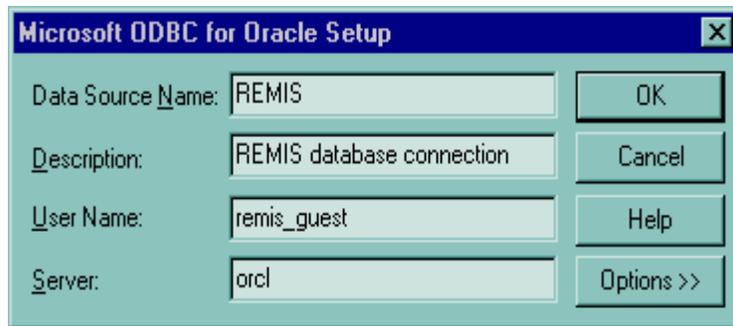
Now you are ready to enter the Windows Control Panel and set up your ODBC connection environment using the service you just created.

Step 2: Create an Open Database Connection (ODBC) Data Source to the REMIS Oracle Database

1. From the *Start* menu, select *Settings* and *Control Panel*.
2. Double-click the *ODBC Data Sources* icon.
3. Select the *System DSN* tab.



4. Press the *Add* button.
5. Select the *Microsoft ODBC for Oracle* driver and press *Finish*.
6. Enter the desired connection name in the text box beside *Data Source Name*. Press the Tab key to move to the next entry box. Enter the description of the connection, the user name, and the server where the Oracle tables reside. Select *OK* when finished.



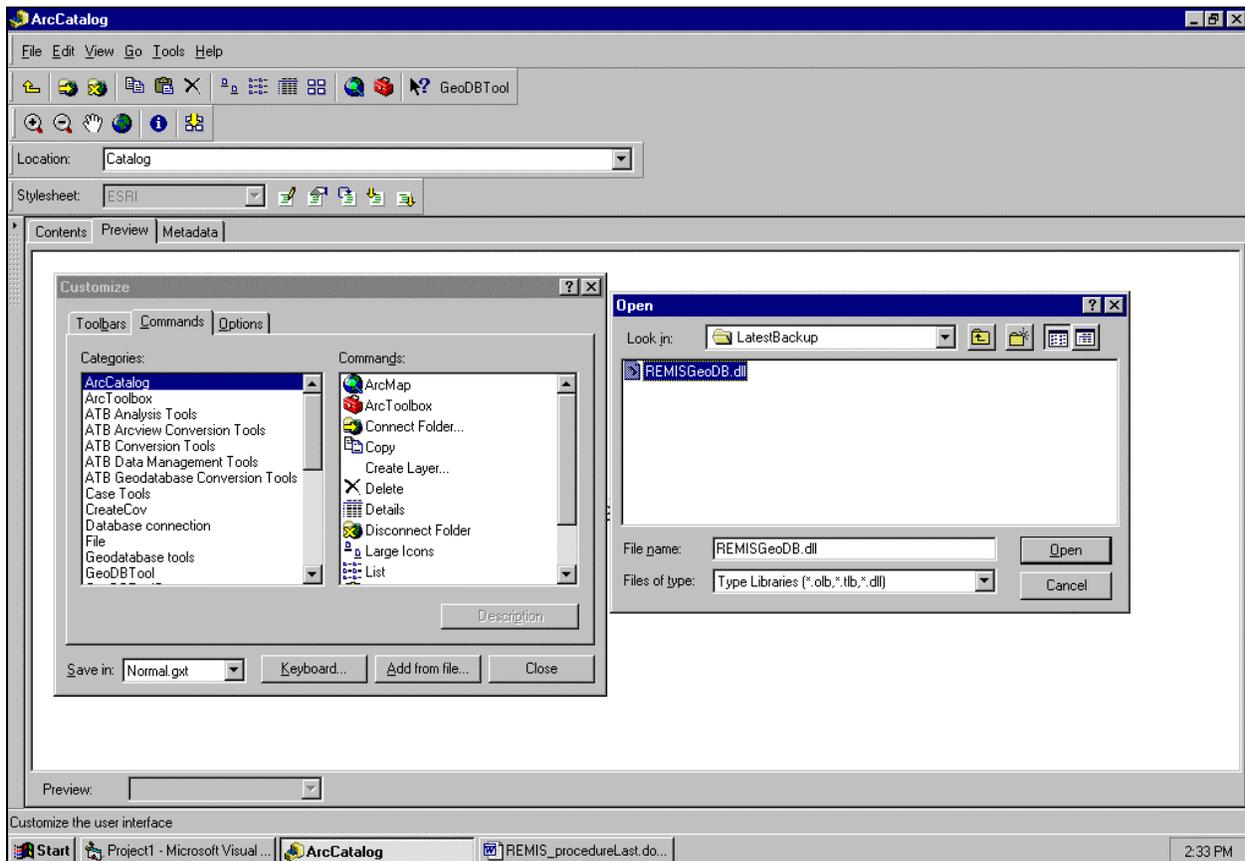
7. Press *OK* to exit the ODBC Administrator.

Step 3: Add the Cadastre Real Estate GIS Tool to the Toolbar

This step can be implemented in ArcCatalog or ArcMap. Follow the steps listed below for the preferred option. If ArcMap is used, you will have the option to save the tool either for a specific file or globally (in the normal.mxt template) meaning that every file loaded or every new file created will have the tool accessible. If ArcCatalog is used, the tool will be saved automatically in the normal.gxt file.

Using ArcCatalog

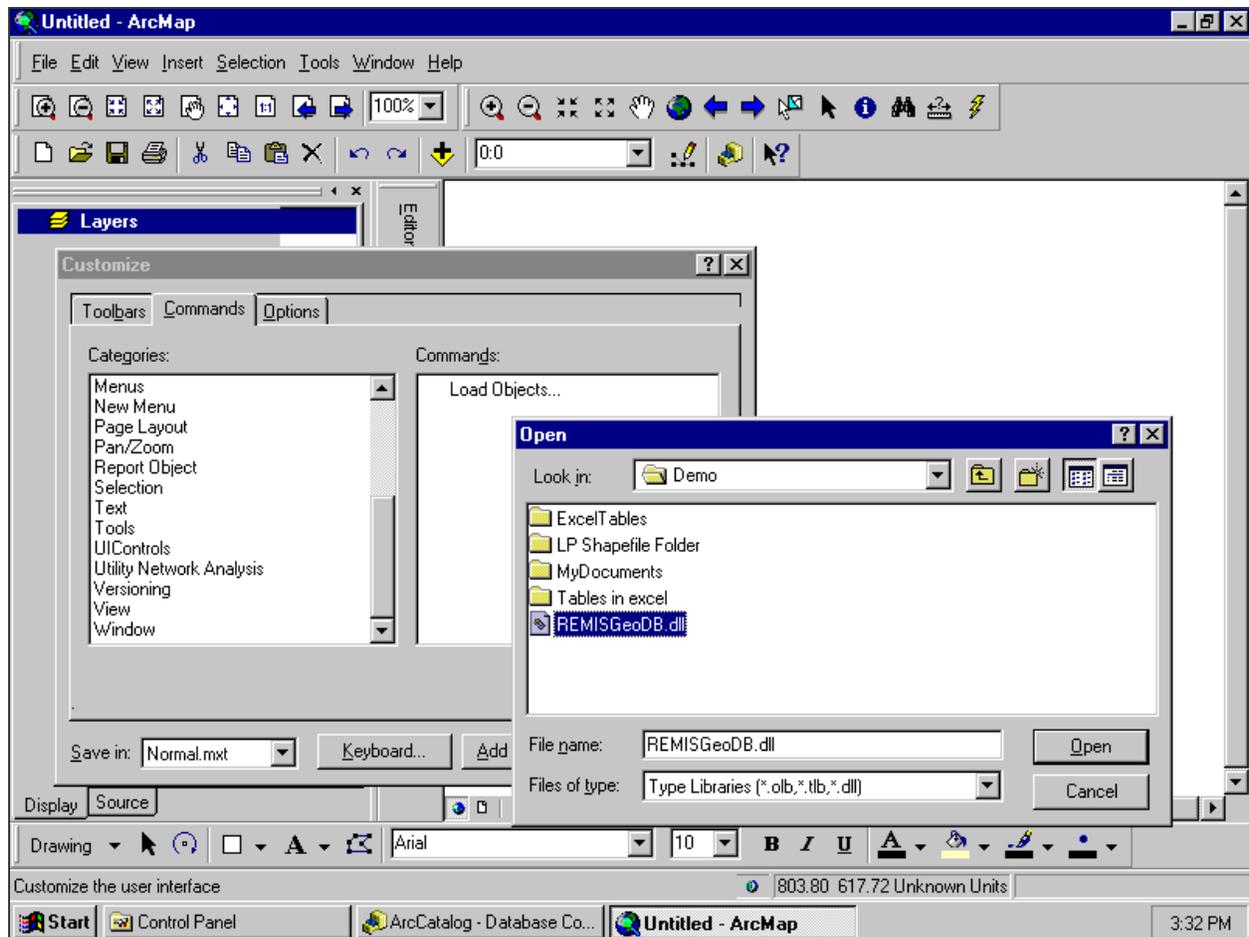
1. Start ArcCatalog.
2. Select *Tools* menu.
3. Go to *Customize, Commands, and Add from file.*
4. Select the library file *REMISGeoDB.dll*.



5. An Added Objects box will appear with the *REGeoClass* listed. Press the *OK* button.
6. In the *Commands* tab, choose *GeoDBToolCategory* from the Categories list.
7. Drag the *GeoDBTool* from the Commands window to the toolbar.
8. Close the Customize window.

Using ArcMap

1. Start ArcMap.
2. Select *Tools* menu.
3. Go to *Customize, Commands, and Add from file*.
4. At the bottom of the screen, indicate if you want to add the tool to the current opened file or to the general template (normal.mxt).
5. Select the library file *REMISGeoDB.dll*.

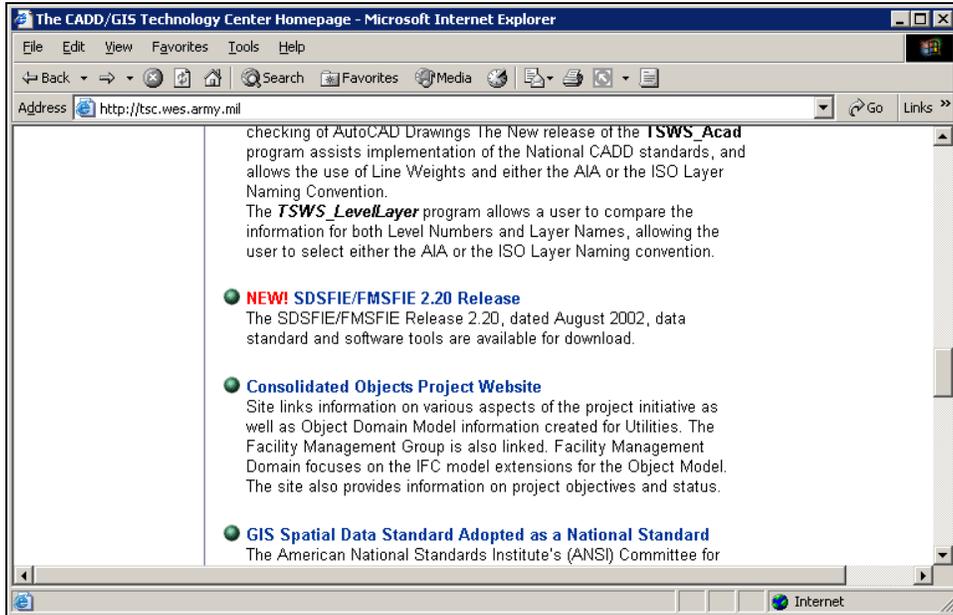


6. An Added Objects box will appear with the *REGeoClass* listed. Press the *OK* button.
7. In the *Commands* tab, choose *GeoDBToolCategory* from the Categories list.
8. Drag the *GeoDBTool* from the Commands window to the toolbar.
9. Close the Customize window.

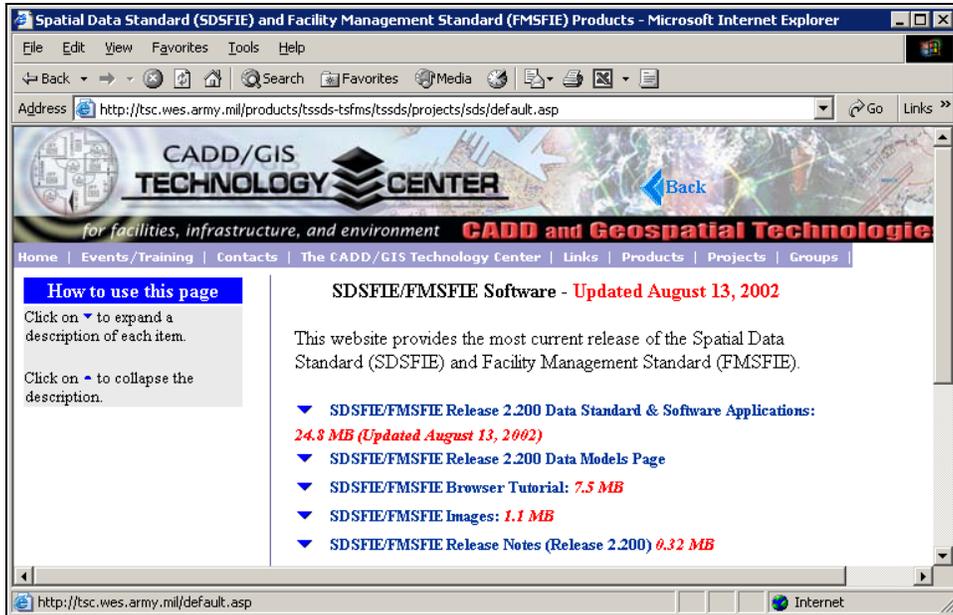
Step 4: Initialize a Personal Geodatabase

To create a personal geodatabase, download the SDSFIE/FMSFIE application from the CADD/GIS Center. The URL to access the application is located at: <http://tsc.wes.army.mil>. Documentation on how to use the Geodatabase Builder is at <http://tsc.wes.army.mil/News/Geodatabase/Geodatabase.asp>

Scroll down the screen and click on *NEW! SDSFIE/FMSFIE Release*.



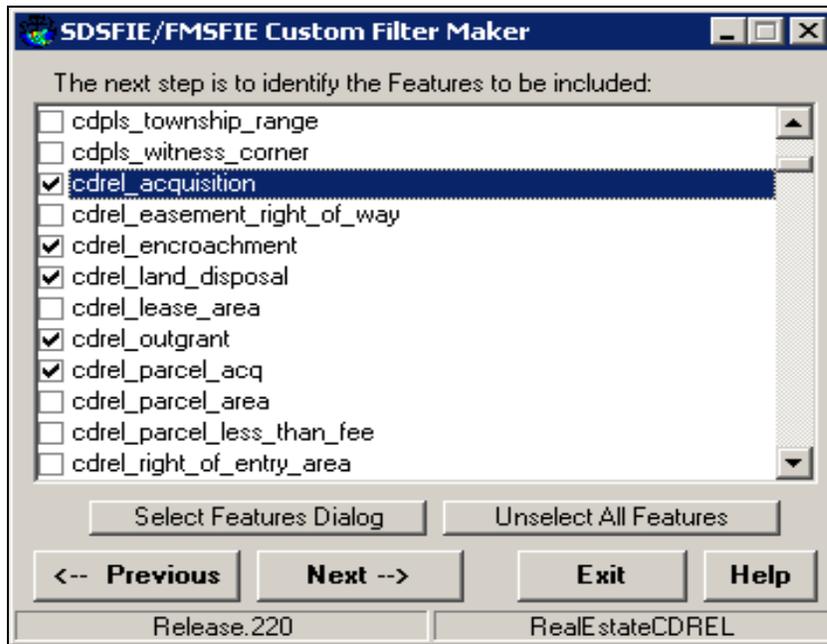
Then click on the option *SDSFIE/FMSFIE Release Data Standard and Software applications*.



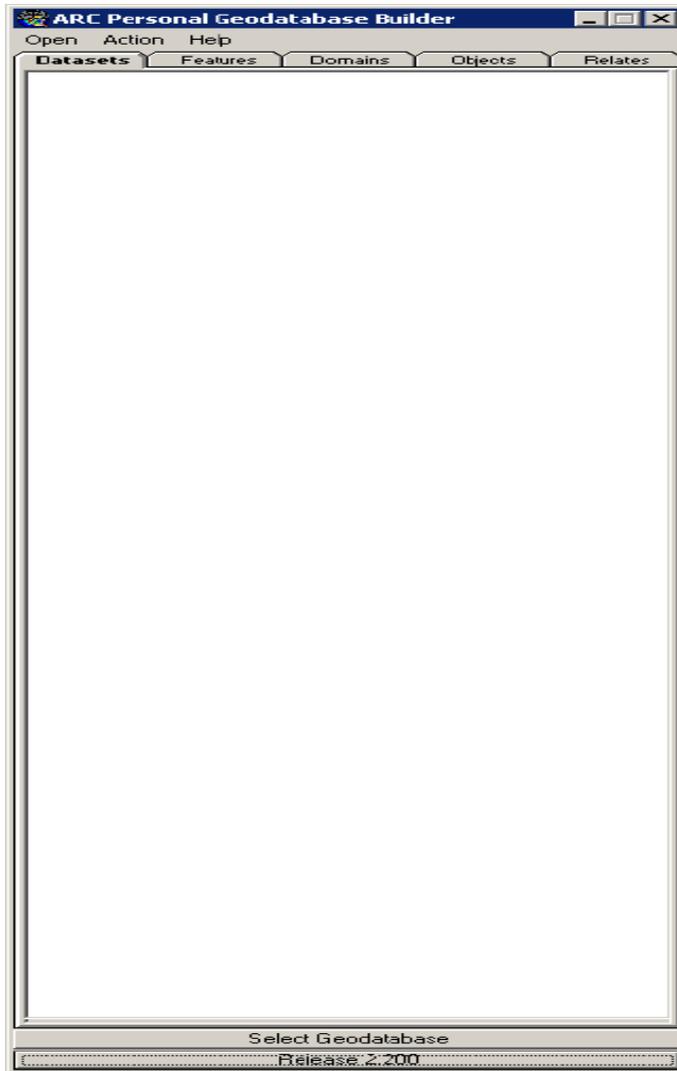
Then download the application.

The following instructions should help in the usage of the application:

1. After installing the SDS application, use the *Filter Maker* application included in the standard to select the Cadastre entity classes necessary in the personal geodatabase. They are:
 - a. cdrel_acquisition
 - b. cdrel_encroachment
 - c. cdrel_land_disposal
 - d. cdrel_outgrant
 - e. cdrel_parcel_acq

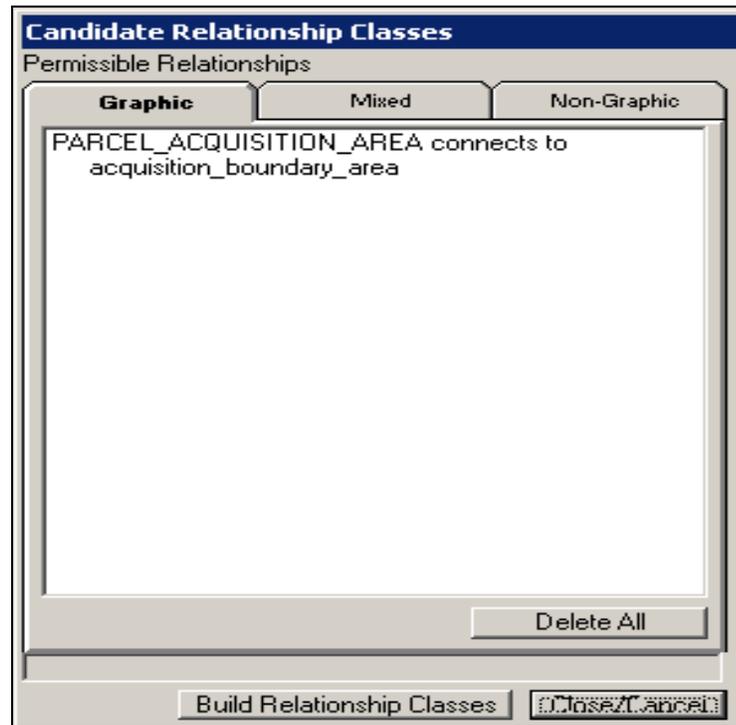


2. Access the *Geodatabase Builder* application to create the personal geodatabase and its components. The *Geodatabase Builder* needs to be installed in the same system where the ArcGIS application is installed.



After naming the geodatabase, select the filter created for the creation of the geodatabase components.

3. Build the *relationship classes* necessary for the personal geodatabase.



Step 5: Populate the Cadastre Geodatabase with GIS Geospatial Data

A. X and Y Domains

The spatial domain is best described as the allowable coordinate range for x,y coordinates, m (measure) values, and z values. The precision describes the number of system units per one unit of measure. A spatial reference with a precision of 1 will store integer values, while a precision of 1,000 will store three decimal places. Once the spatial reference for a feature dataset or stand-alone feature class has been set, only the coordinate system can be modified; the spatial domain is fixed.

If adding a new coordinate outside a geodatabase x,y domain in ArcMap returns the error:

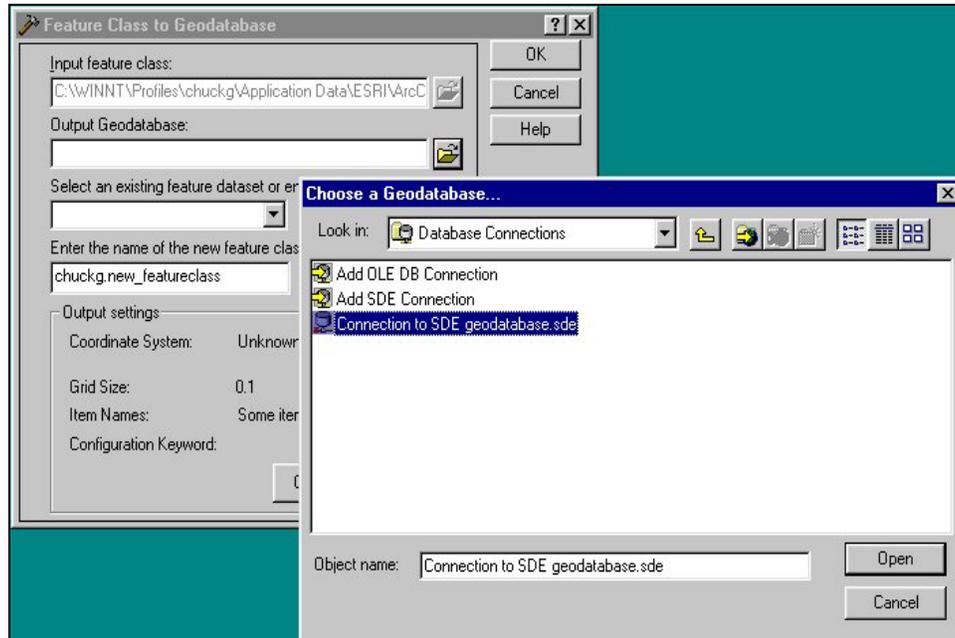
**“The Create Feature task could not be completed.
The coordinates or measures are out of bound.”**

the cause is that coordinates of the added feature are beyond the extents of the feature class x,y domain. Geodatabase feature coordinates *must* fall within the

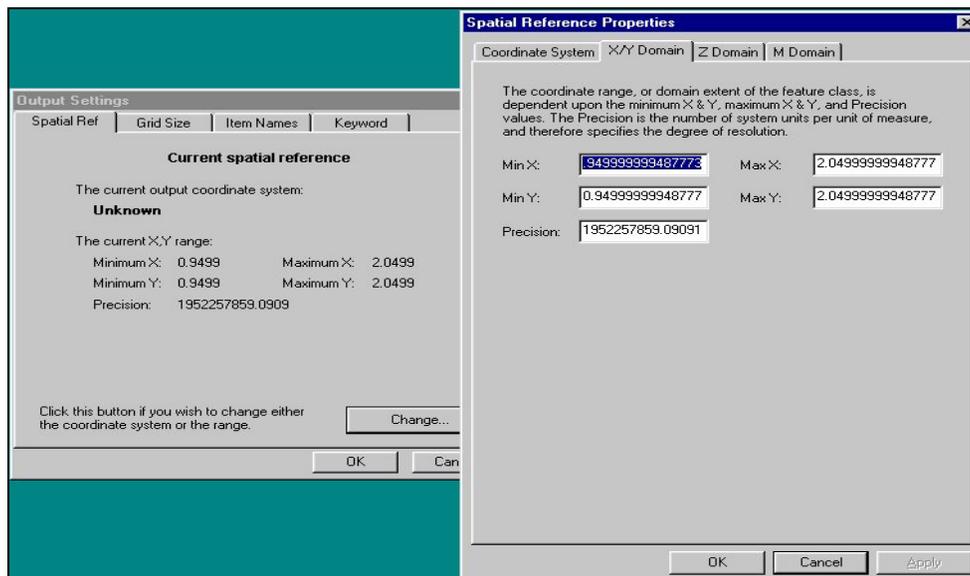
feature class x,y domain extent. The x,y domain is set when the data set or stand-alone feature class is created. It cannot be updated after creation.

Solution

1. Right-click the problem feature class from ArcCatalog and click *Export and Geodatabase to Geodatabase*.
2. Navigate to the output Geodatabase location and type the name of the new feature class.



3. Click *Change Settings*, the *Spatial Ref* tab and *Change*.



4. Click the *X/Y Domain* tab and update the extents to accommodate the new data you wish to add.
5. Click *OK* on the three dialog boxes to initiate the export.
6. If using an SDE Geodatabase, right-click the new feature class to register it as versioned before returning to ArcMap to edit.
7. Verify the new feature class extents in ArcMap by right-clicking on *Feature Class*, *Choose Properties*, and the *Source* tab.

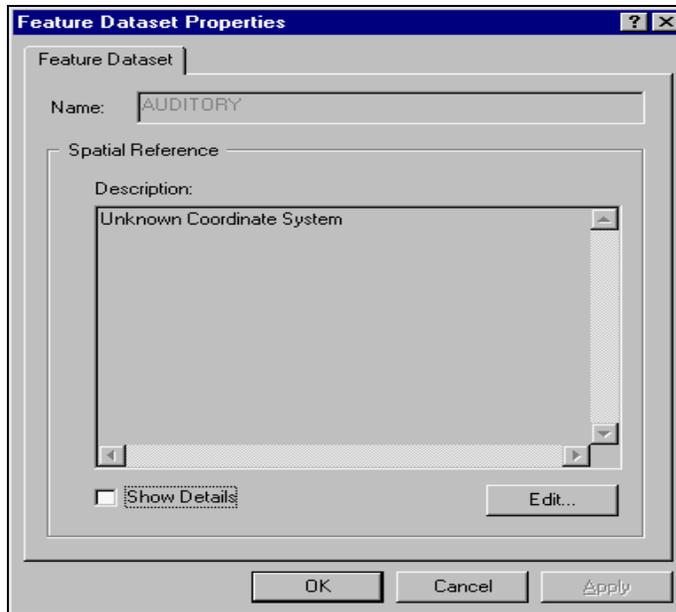
All feature classes in a feature data set possess the X/Y domain of the feature data set. If your original feature class is in a feature data set, the new feature class cannot reside in the original feature data set. It must be created as a stand-alone feature class or a feature class in a feature data set with extents that go far enough to encompass the new coordinates.

B. Coordinate Systems

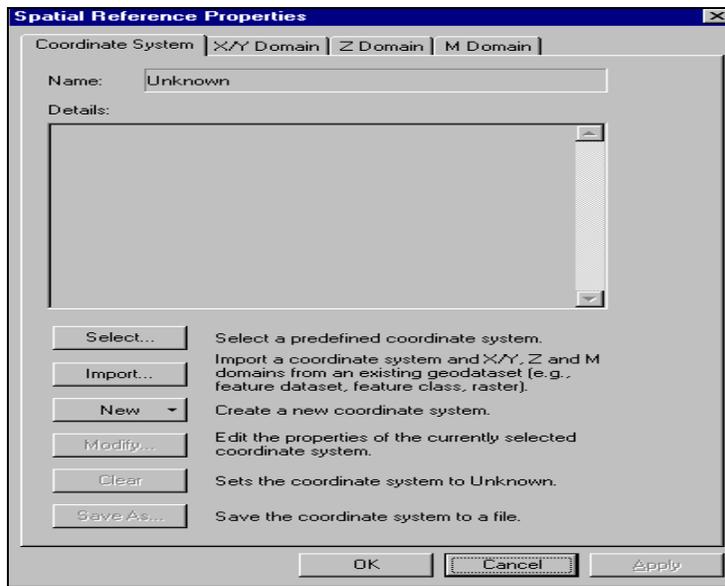
There are two types of coordinate systems: geographic and projected. Geographic coordinate systems use latitude and longitude coordinates on a spherical model of the earth's surface. Projected coordinate systems use a mathematical conversion to transform latitude and longitude coordinates that fall on the earth's three-dimensional surface to a two-dimensional surface.

To choose a coordinate system in ArcCatalog:

1. Start ArcCatalog.
2. Choose the coordinate system by doing the following steps:
 - (a) Right-click on the feature data set.
 - (b) Select the option *Properties*.
 - (c) Click *Edit*.



- (d) Click the *Select* button to select a predefined coordinate system or select the *New* button to create a new coordinate system. Navigate to the spatial reference you want to use. Click the *Add* button.
- (e) After the addition is done, click the *Apply* button.

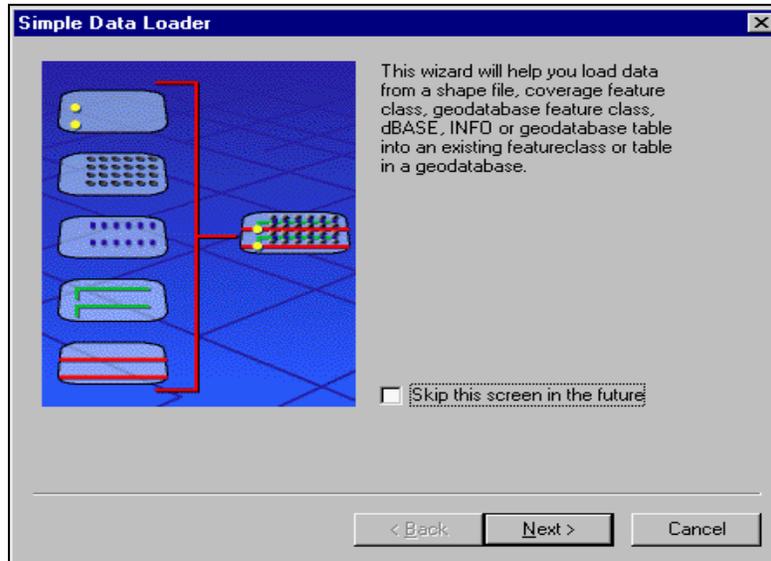


- (f) To see the details of your new dataset's spatial reference, check *Show Details*.
- (g) Click *Apply* again and the *OK* button.
- (h) Refresh the geodatabase by clicking on the geodatabase and press the *F5*

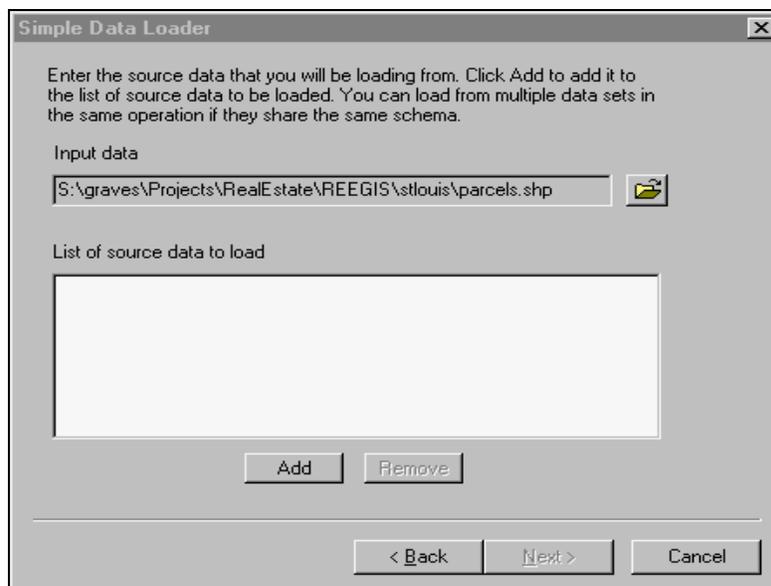
key.

C. Migrating a shapefile and/or coverage to an SDS personal geodatabase

1. In the ArcCatalog tree, right-click the table or feature class that you want to load data into and click *Load Data*.
2. Click *Next* on the introductory panel.

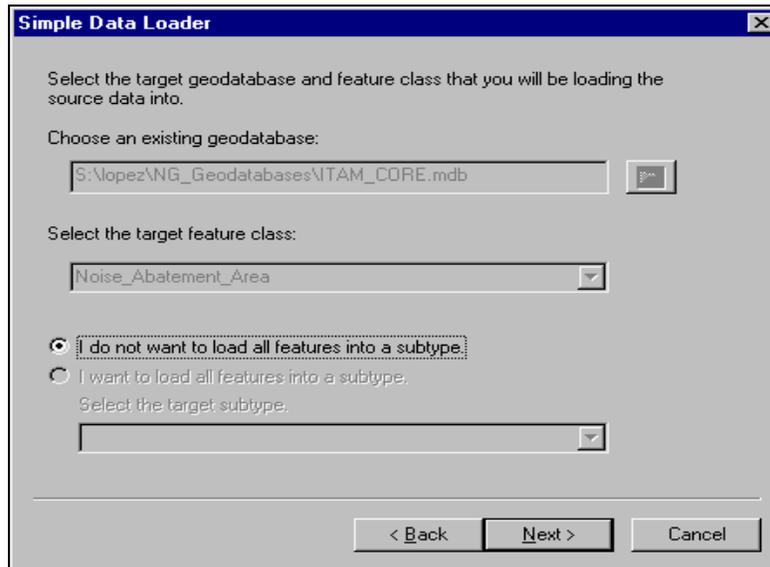


3. Browse to the input feature class or table.

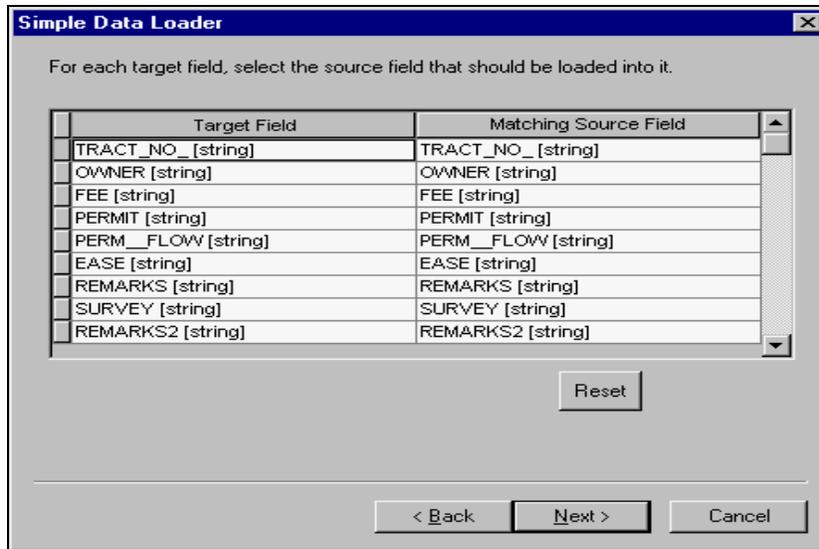


4. Click *Add* to add it to the list of source data.

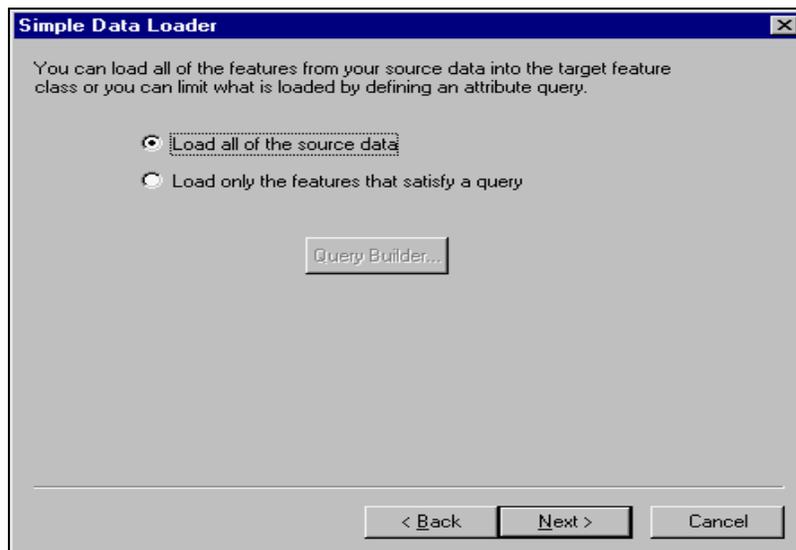
5. Repeat steps 3 and 4 until you have specified all of the source data.
6. Click *Next*.
7. If you don't want to load data into a specific subtype of the target, click the first option, and then skip to step 10 (*ArcInfo and ArcEditor only*).



8. If you want to load data into a specific subtype, click the second option (*ArcInfo and ArcEditor only*).
9. Click the dropdown arrow and click the subtype you want to load the source data into.
10. Click *Next*.
11. To match a source field with a field in the target feature class or table, click the dropdown arrow in the Matching Source Field list and click the field from the source data that you want to match to the target field.

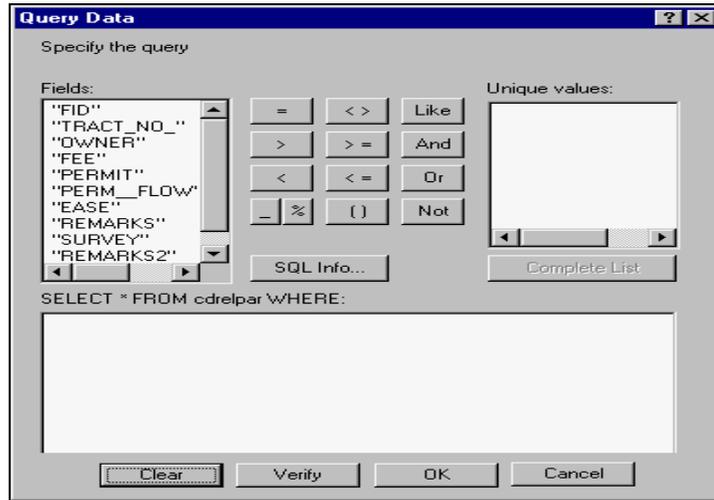


12. Repeat step 11 until you have matched all the fields you want to load from your source data to the target fields.
13. If you don't want data from a field in the source data to be loaded into the target data, leave the Matching Source Field blank.
14. Click *Next*.
15. If you want to load all of the source data, click the first option and then skip to step 20.

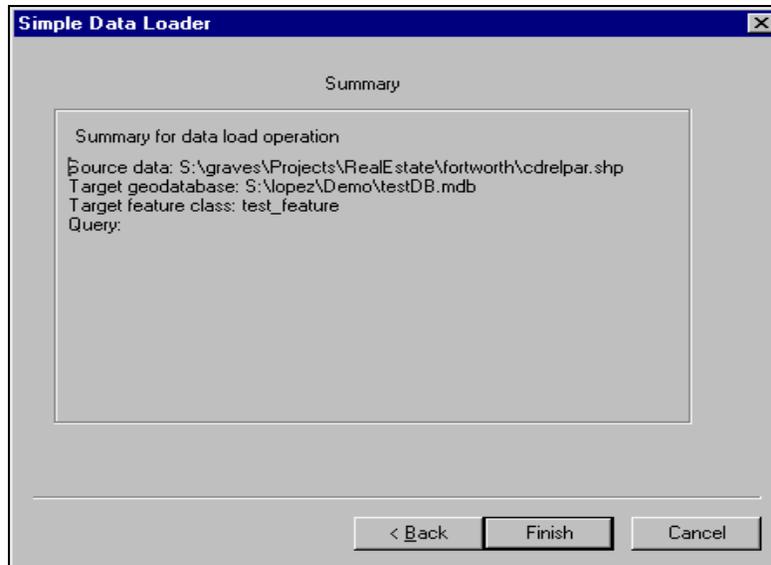


16. If you want to use an attribute query to limit the features from the source data loaded into the target, click the second option.
17. Click *Query Builder* to open the Query Builder dialog box.

- Use the Query Builder to create a query to limit the features or rows from the source data that are going to be loaded into the target.



- Click *OK*.
- Click *Next*.
- Review the options you have specified for loading your data. If you want to change something, you can go back through the wizard by clicking *Back*.



- When satisfied with your options, click *Finish* to load your data.

Notes: If you choose to load data into a specific subtype, you won't be able to match a field from the source data to the subtype field in the target data; the subtype field will be automatically populated.

When matching fields, you can browse the source data's field values to help

you correctly match the source and target fields.

23. The following fields in each Cadastre table need to be populated for each polygon:

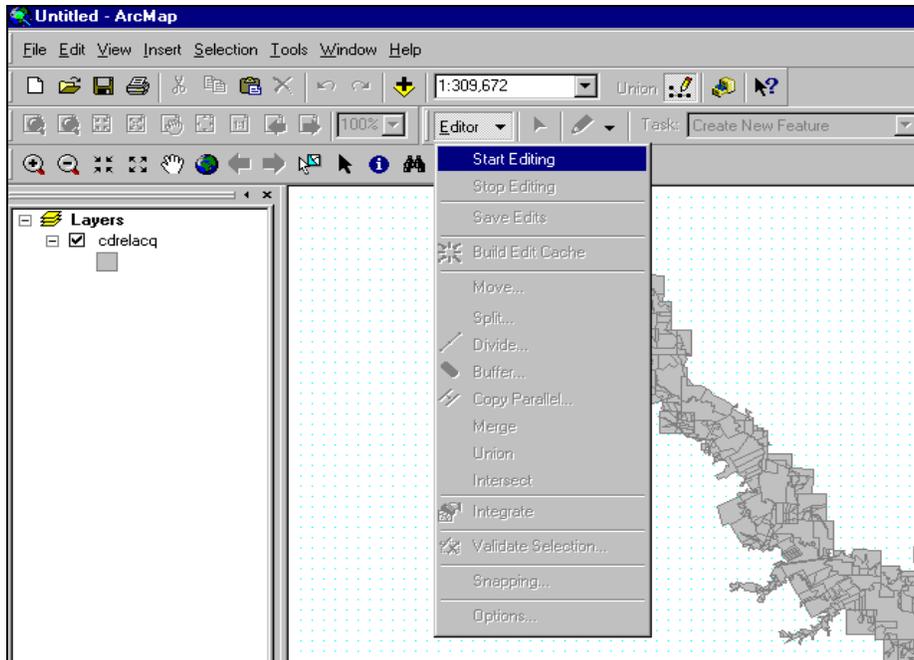
| <u>Cadastre Table</u> | <u>Fields</u> |
|----------------------------------|---|
| Parcel_acquisition_area | PROJECT_ID and PARCL_NAME |
| Acquisition_boundary_area | PROJECT_ID |
| Land_disposal_area | PROJECT_ID and DISPACQ_ID |
| Encroachment_area | PROJECT_ID, WI_CODE, and ENC_ITM_NO |
| Outgrant_area | PROJECT_ID, CONTRCT_NO, OUT_STATUS |
| Encroachment_point | PROJECT_ID, WI_CODE, and ENC_ITM_NO |
| Outgrant_point | PROJECT_ID, CONTRCT_NO, and OUT_STATUS |

24. If some of these fields are not populated, you will need to update them manually using ArcMap. To access ArcMap from ArcCatalog, click on the icon in the tool bar that looks like the following:



To populate the fields in ArcMap:

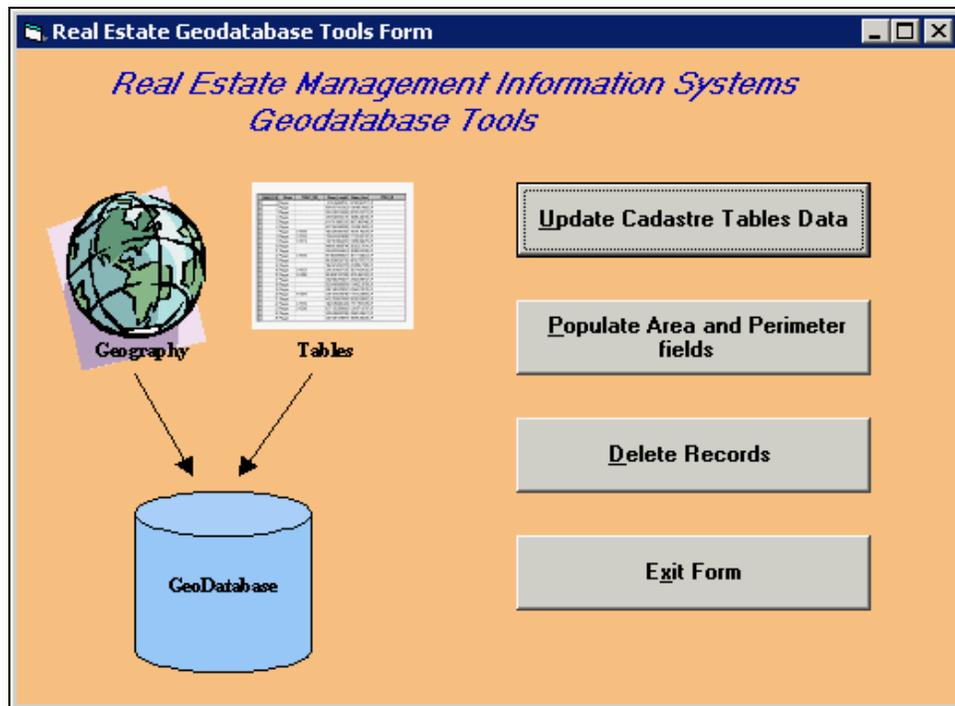
- a.* In ArcCatalog, click on the feature class (tables with polygons) and drag it to the ArcMap grid window. Repeat this step for each one of the feature classes.
- b.* Use the Editor Tool.



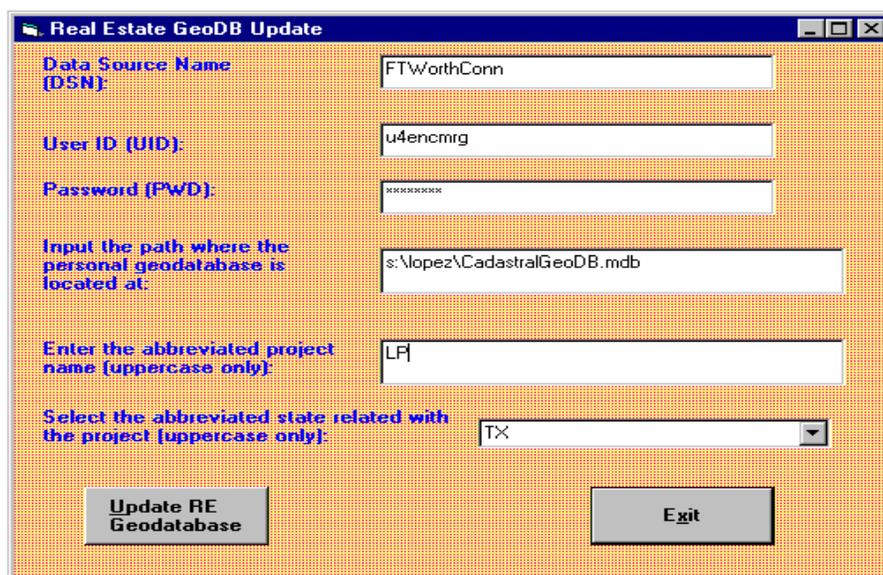
- c. Click on Start Editing.
- d. Right click on the layer and select *Open Attribute Table*.
- e. Start typing the values for the necessary fields.
- f. After editing the fields, choose *Save Edits* and then *Stop Editing* in the Editor Tool. You do not have to save the file in ArcMap as long as *Save Edits* was selected before going back to ArcCatalog.
- g. When finished, exit ArcMap and return to ArcCatalog.
- h. In ArcCatalog, refresh the database to see the changes done in ArcMap.

Step 6: Update Cadastre Tables Data

The command *Update Cadastre Tables Data* imports the REMIS Oracle Database data to the corresponding fields in the Cadastre tables.



1. The following form appears. You will need to coordinate with the REMIS database administrator at the District to obtain the necessary access information, and the ODBC connection must have been properly configured (as described earlier in this document).

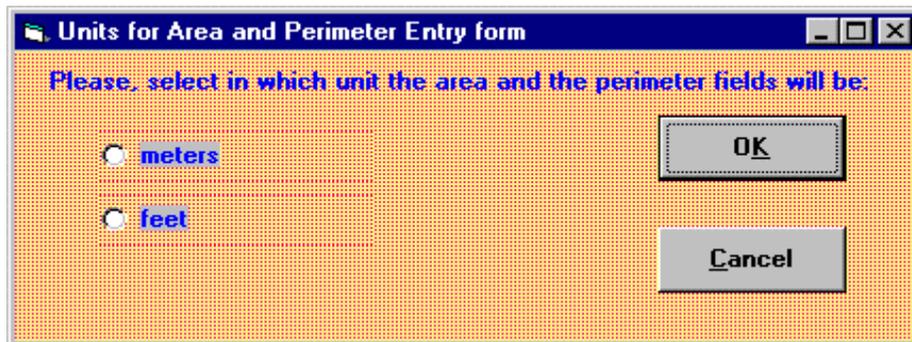


2. Select the *Update RE Geodatabase* button after the information is entered to start the update of the Cadastre tables.
3. A window will appear informing you which tables are being updated.
4. Refresh the database by clicking on the geodatabase and then pressing the *F5* key.

Step 7: Populate Area and Perimeter Fields

The command *Populate Area and Perimeter fields* populates the area and perimeter fields of the polygons with feet/square-feet or meters/square-meters units.

1. Select the desired unit of measure for the area and perimeter fields.
2. Press *OK*. When the updating of the fields with the unit is done, a label will appear notifying you that the update is finished.



Step 8: Delete Records

The command *Delete Records* deletes those records (only the records not the features) from the Cadastre feature classes that no longer exist in the REMIS Oracle Database.

1. A form appears with fields that you need to complete with information to allow the connection to the REMIS Oracle Database and with the project id and which state the project is located in.

The screenshot shows a window titled "Real Estate Cadastral Records Deletion Form". The window has a blue title bar and an orange background. It contains several input fields and two buttons. The fields are: "Data Source Name (DSN):" with the value "FTWorthConnection"; "User ID (UID):" with the value "u4encmrg"; "Password [PWD]:" with the value "XXXXXXXX"; "Input the path where the personal geodatabase is located at:" with the value "s:\lopez\RemisDB.mdb"; "Enter the abbreviated project name (uppercase only):" with the value "LF"; and "Select the abbreviated state related with the project (uppercase only):" with a dropdown menu showing "TX". At the bottom of the form are two buttons: "Delete Records" and "Exit".

2. Select the *Delete Records* button after the information is entered to start the deletion of the records that no longer exist in the REMIS Oracle Database.
3. A List Box form appears, informing the user about the deletion routine.
4. Refresh the database by clicking on the geodatabase and then pressing the *F5* key.

Step 9: Exit the Cadastre Real Estate Geodatabase Tool

1. Close all forms when you are ready to exit the geodatabase.
2. The command *Exit Form* in the form will close the Geodatabase Tools form and the program.

Final Notes about the Tool

After the GeoDBTool button is clicked once, it becomes disabled. To enable the button again, do the following:

1. Click on the *Tools* menu.
2. Select *Customize*. The GeoDBTool becomes enabled again.
3. Close the Customize Window.
4. If you want to take the button out of the tool bar, click on it and drag it anywhere in the screen. This will make the button disappear.

Another way to enable it is by exiting ArcCatalog (or ArcMap) and then open the applications again.

5. If you want to see the values in the domain fields (_d fields) in ArcCatalog or ArcMap when you view the table, you need to make sure that the option “Display coded value domain and subtype descriptions.” is unchecked. See the ESRI documentation about this at:
<http://supportesri.com/search/KbDocument.asp?dbid=21400>

REPORT DOCUMENTATION PAGE

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| 14. ABSTRACT This report summarizes the research results to develop and demonstrate a geographic information system (GIS) assisted approach to meet the spatial data management and analysis demands of the Corps real estate activities. The report includes an overview of the cadastre Real Estate GIS database design that is compliant with the CADD/GIS Technology Center Spatial Data Standards and the cadastre Real Estate GIS software tool that implements the SDS-compliant cadastre real estate GIS database design in the object-oriented ArcInfo 8 software and that populates the database by linking to the non-spatial Real Estate Management Information System (REMIS). A test implementation of a cadastre Real Estate GIS at Lake of the Pines, Texas, is also presented. | | | | | | | | | | | | | | | | | |
| 15. SUBJECT TERMS <table style="width: 100%; border: none;"> <tr> <td style="width: 25%;">Geodatabase</td> <td style="width: 25%;">Real Estate Management Information System</td> <td style="width: 25%;">Spatial Data</td> <td style="width: 25%;"></td> </tr> <tr> <td>Cadastral</td> <td>Geographic information system</td> <td>Standards</td> <td></td> </tr> <tr> <td>Cadastre</td> <td>GIS</td> <td>Real estate</td> <td></td> </tr> </table> | | | | | | Geodatabase | Real Estate Management Information System | Spatial Data | | Cadastral | Geographic information system | Standards | | Cadastre | GIS | Real estate | |
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| Cadastral | Geographic information system | Standards | | | | | | | | | | | | | | | |
| Cadastre | GIS | Real estate | | | | | | | | | | | | | | | |
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