PROJECT FILES

Introduction to

Understanding and Maintaining Project Files

with

TNTmips®

TNTedit

TNTview

Before Getting Started

The Project File is a key component of the TNT products. Project Files can contain any number of objects of a variety of types (for example, raster, vector, CAD, TIN, database, text...) up to the 16 TB size limit. To your operating system, this collection of data appears as a single file. TNTmips, TNTedit, and TNTview provide the tools for you to get information about each object in a Project File and to manipulate the files in non-analytical ways, such as copying or deleting files or objects and editing object names and descriptions, in addition to their analytical capabilities. File and object access permissions are set in the File Manager process also.

Prerequisite Skills This booklet assumes you have completed the exercises in the *Displaying Geospatial Data* and *TNT Product Concepts* tutorials. The exercises in those booklets introduce essential skills and basic techniques, which are not covered again here. These prerequisites will help to provide a context and the terminology to help you better understand the concepts in this booklet.

Sample Data For the most part, this booklet does not use exercises with specific sample data to develop the topics presented. However, there is some specific data provided, and you should make a read-write copy of the PROJFILE folder in the DATA directory of your TNT products on your hard drive for use with this booklet. If you do not have access to a TNT products CD, download the data from MicroImages' web site.

More Documentation This booklet is intended only as an introduction to managing Project Files. Details of the processes discussed can be found in a variety of tutorial booklets, color plates, and Quick Guides, which are all available from MicroImages' web site (go to http://www.microimages.com/search to quickly search all available materials, or you can narrow your search to include only tutorials, Technical Guides, or Quick Guides).

TNTmips Pro, TNTmips Basic, and TNTmips Free TNTmips comes in three versions: TNTmips Pro, TNTmips Basic, and TNTmips Free. If you did not purchase the professional version (which requires a software license key), you are using TNTmips Free or TNTmips Basic, which limit the size of your project materials. All exercises in this booklet can be completed in TNTmips Free using the sample geodata provided.

Merri P. Skrdla, Ph.D., 28 May 2013

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Introduction to Project Files

A TNT Project File is a unique container for spatial geodata in raster, vector, shape, CAD, LiDAR, TIN, database, and region form. Each of these object types can have a variety of subobjects, such as georeference (all except database), color map (rasters), style (vector, CAD, TIN, shape, LiDAR, and database), pyramid (raster), and index (database) subobjects. Databases can also be subobjects of vector, shape, CAD, TIN, LiDAR and some types of raster objects. Style objects can also be main level objects. Project Files may also contain non-spatial objects, such as saved groups and layouts as well as text and script objects. For a basic discussion of objects and these object types, refer to the *TNT Product Concepts* tutorial booklet.

Most Project Files have an RVC extension. Project files created for direct, transparent use of files in external formats, such as shape and JP2 have an RLK extension. These Project Files contain the subobjects you create for the external file, such as georeference, database, and pyramid subobjects. Project Files that link to tilesets have an RVC extension.

Project Files can have an internal folder structure to better organize the many objects within. Although the Project File was designed to keep all materials for a project in a single file, you can organize your project materials however you like. Regardless of the number of objects, a Project File appears as a single file to your operating system. Most Project File management activities are done with the File Manager (Tools/File Manager) but some features are available wherever you can select objects for use. File contents can also be viewed during any selection procedure but will be filtered if your viewing options are set to selectable files only. To see all the contents of a Project File during object selection, set the *Objects of Type* or *Files* option in the Select Objects window to All.

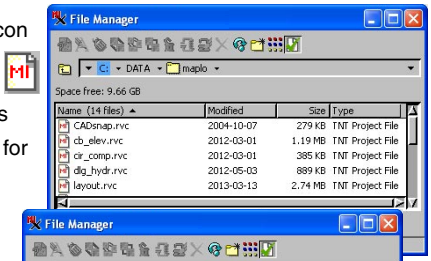
Note: The TNT products are supported on Windows (XP, Vista, and 7) and Mac (PPC and Intel), which utilize both low-high and high-low byte orders. The TNT products transparently handle byte order issues and you can use the same Project Files on both types of platforms.

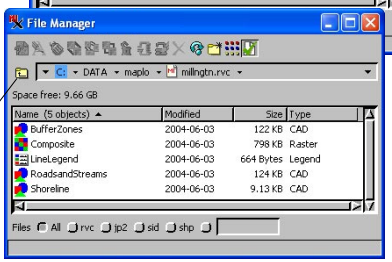
Page 4 introduces the tools and functions available in the File Manager. Page 5 presents the different object and subobject types in the TNT products. Pages 6–10 provide more detail on the tools and functions of the File Manager. Page 11 introduces Access Control Lists. Page 12 presents information on automatic link files (*.rlk). Pages 13–16 discuss Project File validity issues and page 17 discusses the Recover Project File process.

The File Manager

STEPS

- ☑ choose Tools / File Manager
- ☑ navigate to a directory where you keep data in RVC format
- ☑ click on the file icon to navigate into an RVC file
- ☑ note the contents
- ☑ click on the icon for a raster, vector, CAD, or LiDAR object and note the subobjects





Note: this icon takes you up one level in the hierarchy.

As shown, not all icons are active at the same time. Break Lock and Pack are only active at the file level and only if the file is locked or could be packed, respectively. Multi-Copy is only active at the subobject level. Link To is not available at the file level.

The Views icon provides a menu with toggle buttons. Most other icons open an additional window for their use.

The File Manager is the primary tool for discovering information about and manipulating the contents of Project Files. You choose what types of files to show in the File Manager window although you can only see the contents of RVC and RLK files.

RLK files contain the transparent links made to other file formats that can be displayed directly in the TNT products along with additional data in RVC format, such as georeference, pyramids, and databases. RLK files are named the same as the files they are linked to but have a different extension (for example, file1.jp2 and file1.rlk). You navigate into the file with the native format extension to view the contents of the RLK file.

When you click on a file or object icon, you navigate to the next level down in the Project File hierarchy. To take action, such as copying or deleting, on an object or file at the current level, click on its name or description. Double clicking on the name or description will also take you to the next level.

The icon bar near the top of the window provides access to the features of the File Manager beyond listing the files.

Know Your Object Types

TNTmips uses icons to represent each of its object types. Many of these icons are used in other processes, such as the Display process and object selection, but many are encountered only in the File Manager because they are found at the subobject level or even as subobjects of subobjects. For example, a vector object is a main level object that may have a number of subobjects, one of which is a polygon database, which has table subobjects, and each of those may have database parameters, index, and constraints subobjects. When you are viewing these latter subobjects, you have navigated four levels down in the Project File.

This organization keeps all the components associated with an individual object as a single unit. When an object is selected for any process, all of its subobjects and their subobjects are automatically selected or available without the constraint of having the same name.

Note: when you click on an object's icon in the File Manager, you navigate down one level. To select an object for some operation, click on its name or description.

STEPS

☑ continue browsing through your files or the sample data

Note: you do not need to memorize these icons; a ToolTip identifying the icon appears when you pause the mouse over an icon.

Project File

raster

vector

shape

CAD

TIN

LiDAR

database

style

region

layout

group

template

legend

SML

hyperspectral

spectral library

georeference

histogram

color map

contrast table

metadata

HyperIndex

hyperspectral sensor information

display parameters

spatial search tree

database table

database form

database parameters

database constraints

element search tree

theme map definition

thumbnails folder

frequency filter information

Project File Properties

Note: the Properties window can remain open as you navigate among your files and objects; the information is updated for each newly selected item.

STEPS

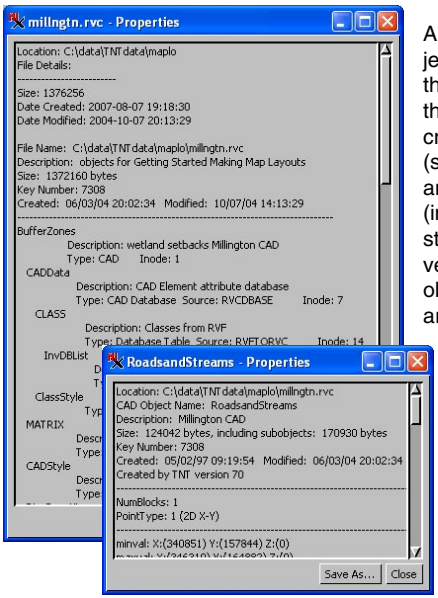
- ☑ in the File Manager* at the file or object level, click on the Properties icon
- ☑ select one object or file after another and compare information
- ☑ go to the subobject level and compare information

* The Properties are also available from the right mouse button menu in the Select Objects window.

A great deal of information about the contents of a Project File is revealed by clicking on the Info icon. This icon is available both in Project File Maintenance and in object selection windows for all processes. In Project File Maintenance, you can get information for any level of the Project File hierarchy. Some information is common for files and all object types, but much of the information is object specific. The common information is presented here, and the object specific information will be discussed later in this booklet.

When information is viewed at the file level, an overview of the file's contents is presented with all objects and their subobjects listed. At the object level, details for each object, such as cell size or number of points, lines, and polygons, are provided along with a list of subobjects. Detailed information may also be available at the subobject level, such as the complete histogram (cell value, count, area, cumulative count, and cumulative area) for histogram subobjects.

The properties for all **files** list the file name including full path, file description, the size (in bytes), its creation date/time, and the rvc file version number that created the file. The objects and subobjects in the file are also listed.

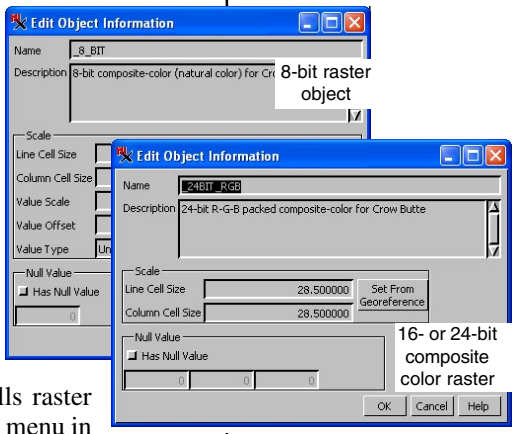


All **objects** list the object type, object name, the object description, the TNT process that created the object (source), the size with and without subobjects (in bytes), the date/time stamp(s), and the TNT version that created the object. The subobjects are also listed.

Note: Owner information for files and objects may also be present if it has been added and you have permission to view it.

Edit Button

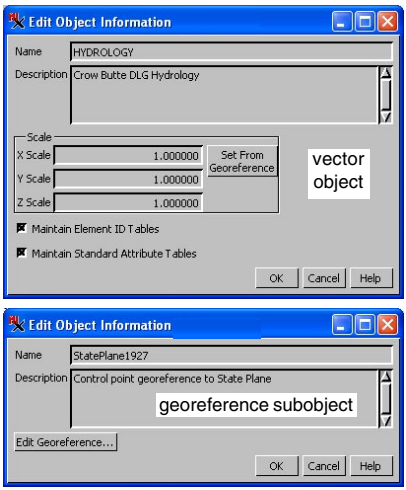
The contents of the window that opens when you click on the Edit button depend on the Project File level and the object type. At the file level, you can only change the file's description. For some object types, such as layouts or legends, you can only edit the object name and description. Many object types have additional editing features, for example cell size and null value for all raster types and scale and offset for appropriate raster types. Setting the null value here lets you specify that an existing cell value is null; it is not the equivalent of the Set Null Cells raster utility. The right mouse button menu in the Select Objects window lets you rename files and objects as well as view object properties and metadata, and add to the favorites list.



STEPS

☑ click on the Edit button for some object types not illustrated

Geometric objects let you edit X, Y, and Z scale and, for TIN objects, Z offset. Vector objects have toggles for *Maintain Element ID Tables* and *Maintain Standard Attribute Tables* so these characteristics can be set outside Import and the Editor. If you turn these toggles off for objects that already have these tables, you may want to also delete the tables because they will not be current if any editing is done. Maintaining the contents of these tables slows editing operations, which may not be noticeable unless working with large objects. You can generate the standard attributes if desired when the object is finalized.



Georeference subobjects have an Edit Georeference button that opens the Coordinate Reference System window so you can change your selection if you made an error during import or georeferencing (same as Tools/Change Coordinate Reference System).

Metadata

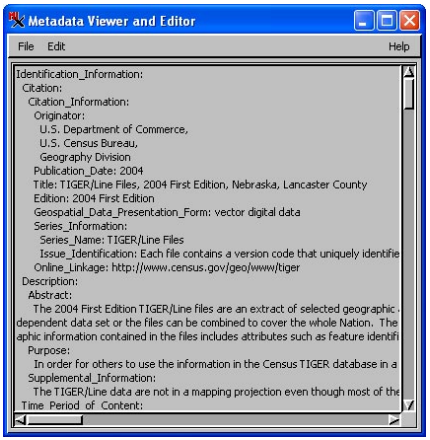
STEPS

- ☑ in the File Manager, click on the Metadata icon
- ☑ enter text or select a file to provide metadata for the object/file

The TIGER/Line files are extracts of selected geographic and cartographic information from the Census Bureau's TIGER® (Topologically Integrated Geographic Encoding and Referencing) database. The window below shows a sample of the metadata you get with 2004 TIGER/Line files. Metadata for the newer TIGER/Line shapefiles is in XML format.

Metadata is information about an object. It may be as simple as the date it was created but generally metadata provides considerably more information. The Federal Geographic Data Committee (FGDC) has developed a Content Standard for Digital Geospatial Metadata, which is presented in a 90 page document available from www.fgdc.gov/metadata/geospatial-metadata-standards. These standards were compiled to get all federal agencies to use the same words for the same data elements. The FGDC encourages the use of their standard by the private sector and all levels of government. Any data you download from a federal government agency collected after 1994 should have metadata in this form.

The TNT products store metadata as a subobject of the object the metadata refers to. You can also create metadata for a Project File. This metadata is stored as a main level object in the file. You can enter your own metadata or insert the contents of a text file or object as metadata. Thus, when you acquire data files that include metadata, you can store that information as a subobject if you click on the Metadata button in the File Manager or, in any Object Selection window, choose Edit/Insert File and select the metadata. You can then edit or add to this metadata if desired.



Metadata can also be attached using Tools/Miscellaneous/Attach Metadata, which allows you to attach the same metadata file to multiple objects. It also lets you attach the metadata as a link so you can maintain a single master metadata file and have it updated for viewing with all objects to which it is linked. TIGER/Line® files, which are prepared by the US Census Bureau, have associated metadata starting in 2003.

Copy and Multi-Copy

The Copy feature lets you copy one or more objects from a Project File to a new or existing Project File. Multiple objects are selected using shift-click and/ or ctrl-click (command-click on the Mac). When you select an object to copy , all of its subobjects and their subobjects are copied. You can also select subobjects to copy, but there are validation rules governing where subobjects can be copied. Some subobjects, such as style objects and database objects, can exist as main level objects independent of any association with other main level objects. Other subobjects, such as georeference and histogram, cannot exist as main level objects and the copy process prevents you from creating them by keeping the New Object Name field dimmed until you are at the appropriate Project File level. A georeference subobject can be copied to the subobject level but only as a subobject of a spatial object (raster, vector, shape, CAD, LiDAR, or TIN) and if not in conflict with another georeference subobject. You are also prevented from copying subobjects under objects that do not use them. For example, you cannot copy a color map or histogram to be a subobject of a vector object. Project File validation rules are discussed in more detail later in this booklet.

Often when editing or doing other processing, you accumulate several objects in a Project File and you only want the most recent one. You can copy this object to a new Project File and delete the old Project File or you can delete the unwanted objects and pack the file.

The Multi-Copy icon is only active when you are at the subobject level. This feature lets you copy a single subobject to be a subobject under multiple parent objects. The most common use for multi-copy is to copy a georeference subobject from one raster to others in the same multi-raster set, which means they are coregistered and coextensive.

STEPS

- ☑ select a main level object to copy to another Project File
- ☑ click on the Copy icon

- ☑ use the Select Object window to navigate to the directory you want to contain your copied object
- ☑ enter a name in the New File Name field and press <enter> or click OK
- ☑ accept the default name or enter a new name in the New Object Name field and press <enter> (when the field has focus) or click OK

Note: Copying a file subjects it to validation tests and removes any free space. See later exercises for more information on free space and validation. Use your operating system to copy multiple files.

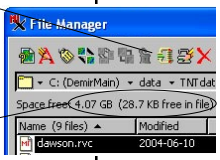
Break Lock, Pack, Refresh, Delete

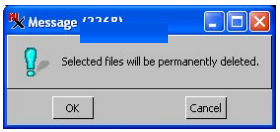
STEPS

- ☑ select different files until you find one where the Pack button is active (or delete an unnecessary object from a file)
- ☑ click on the Pack button
- ☑ note the time to pack reported in the status line at the bottom of the File Manager window and the change in free space reported for the file

Pack button is active

Free space on the drive and in a file are shown above the file/object list.





[1] Most file locking is now handled by the operating system. If the file is locked by the operating system, you will get a Project File Locked message that says "Another process is exclusively accessing this file." The Break Lock button is not active in this case; it is active only when a *.lok or *.kol file is present. Lock files are now only created by the TNT products for files accessed on **network drives** and on the **Mac**.

These four features have little in the way of user interface but are very useful tools. Project Files are read or write locked during usage to protect your data[1]. When read locked, other processes can open the file for reading but not for writing. When write locked, the file cannot be opened by other processes. The files that specify the type of lock can be left behind if program termination is abnormal, such as a power outage. Rather than having to locate these left behind and now unnecessary lock files (*.lok or *.kol) with your operating system, you can use the File Manager to unlock them. Such files can also be unlocked during selection for any process if you have turned on the *Show Unlock in Locked File Dialog* option found on the Project File tabbed panel of the General System Preferences (Tools/System/ Preferences).

Project Files grow in size as objects are added to them, but they do not automatically shrink when objects are deleted. Free space in a file will be reused as new objects are added, or you can choose to reclaim the drive space immediately by packing the Project File. Packing a Project File makes a copy of the file with the same name and deletes the original file once the copy is complete. Choosing to copy a Project File also removes any free space as noted in the previous exercise. The Pack icon is active only at the file level and only if there is free space in the file. Pack requires that you have sufficient space on the same drive for both versions of the file.

The Refresh button lets you see files that have been copied into a folder after you began viewing its contents. You can achieve the same result by moving up one level and looking in the folder again. The Delete icon lets you delete subobjects, objects, or files. You will always be asked if it is okay to delete the selected item to prevent accidental deletion.

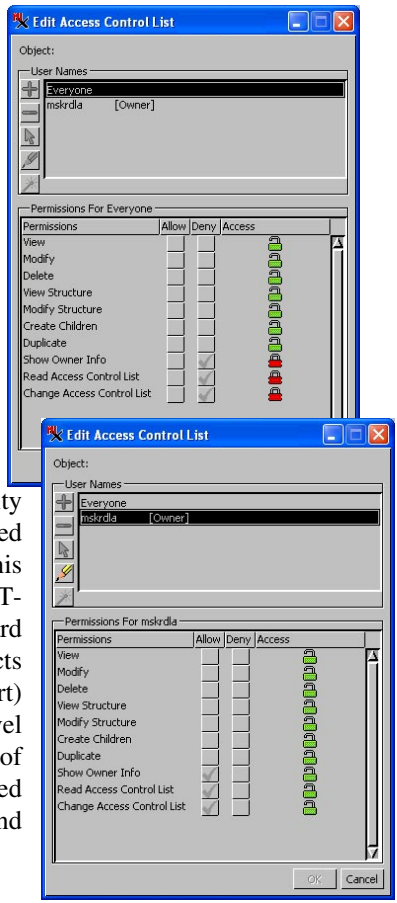
Access Control Lists

An access control list determines who can view and manipulate the contents of a file, object, or subobject. You can even control who has access to individual database tables and database fields. Thus, a specific user may be unable to view some fields in a table, be allowed to view but not change certain fields, and be able to view and change others.

STEPS

- ☑ click on the Edit Access Control List icon
- ☑ pause the cursor over the various permissions and check boxes to view ToolTips

There are three access permission states indicated by check boxes: allow, deny, and ambiguous (neither box is checked). When permissions are ambiguous for an individual user, the permissions set for "everyone" are reviewed. If permissions are still ambiguous, the permissions for each parent object are reviewed up to the file level. For example, if no permissions are set for a database field (specific user and everyone), the permissions for the table are reviewed, and if these are not set, then the permissions for the database and then the vector are reviewed. If permissions are still ambiguous, the permissions for the file are reviewed. If these permissions are also ambiguous, the action is allowed.



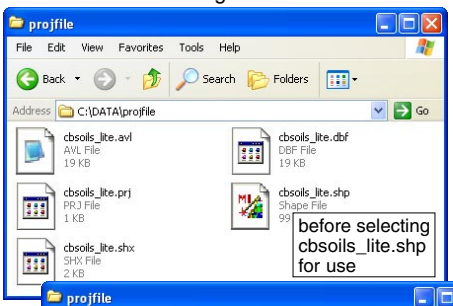
Access control is optional and need not be used unless you want to restrict access to your data. Access control lists can be viewed by all TNTmips users, but the ability to edit access control lists must be requested from MicroImages. If you do not have this option, the OK button is never active. TNTmips also uses the TNTatlas Assembly Wizard to provide file access control, which restricts the level of use (view, modify, copy/export) and the TNT products restricted to this level of use for the atlas Project Files regardless of the identity of the user. The key that created the atlas can always view, modify, copy, and export the atlas Project Files.

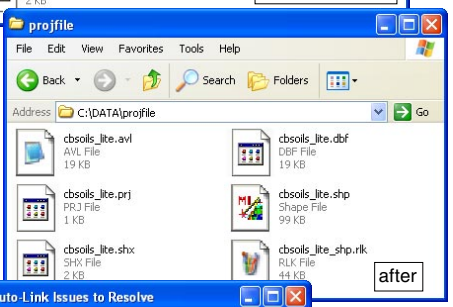
Automatic Link Files (*.rlk)

STEPS

- ☑ examine the contents of the PROJFILE folder with the sample data before using them in TNTmips
- ☑ open the shapefile in this folder in the Display process and change display parametrs
- ☑ examine the contents of the PROJFILE folder again

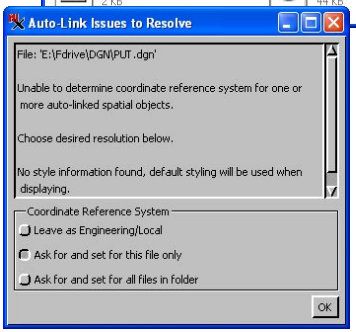
When you select a file in an external format that is supported for direct use (for example, MrSID, shapefile, or DXF), a same-named link file (*.rlk) is created automatically to contain additional information added while using the file in the TNT products. This additional information can include but is not limited to georeference and Coordinate Reference System information, styles, color maps and contrast tables, display parameters, and database tables.





You navigate into the file in external format (for example *.jp2 or *.shp) that contains the data for the main level object to see the contents of the *.rlk file. You can also locate these rlk files with your operating system. Be sure to select the *.rlk file along with the external file if you are using the File Manager or your Operating System to copy such files.

You may be prompted for a variety of information when the link is first created if expected information is not found, such as pyramids, styles, and Coordinate Reference System (CRS). For missing pyramids and CRS, you may have the opportunity to resolve the situation (by computing pyramids and supplying the CRS) or you may just be notified the information is missing (styles). For pyramids and CRSs, you can elect to apply the information to just the selected file or to all files of the same type in the folder. Mistakes made in providing coordinate system information can be corrected using Tools/Change Coordinate Reference System, which supports changing multiple objects at one time, or using the Edit button when a georeference subobject is selected in the File Manager.



There are three choices (shown above) for missing shape or CAD coordinate reference systems.

Validity of Project File Contents

The complexity of Project Files makes it necessary to define and maintain (enforce) a valid hierarchy of Project File objects. The degree of enforcement becomes more rigorous as the need for it becomes apparent. The File Manager enforces these rules during packing and file/object copying. It also color codes Project Files so you can recognize and fix any problems by choosing the object to delete rather than having it automatically handled by Recover Project File.

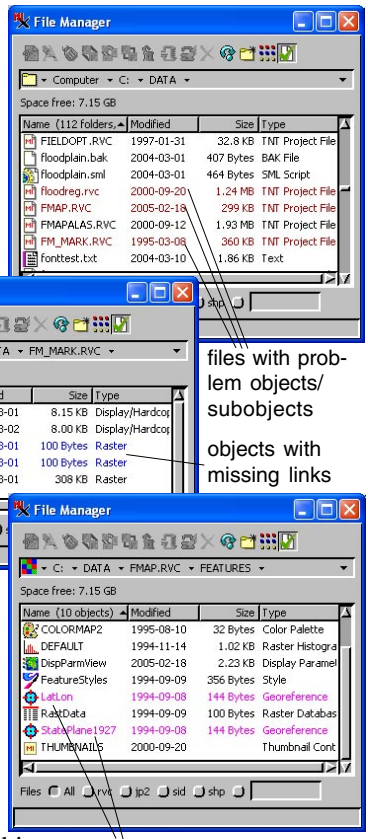
You can use the Properties window or the File Manager window to locate problem objects and subobjects. Files and objects with problem objects/subobjects are color-coded in dark red. These problems include: invalid subobjects, conflicting subobjects, and/or objects or subobjects linked to files or objects that cannot be found. The actual problem objects/subobjects are color coded in red, magenta, and blue, respectively.

Invalid and conflicting objects may be produced by older processes or manipulation outside the TNT products (for example, by SML or TNTsdk). Missing links are a result of you moving or renaming either of the file/object(s) involved in the link. Invalid subobjects are objects that do not belong under the parent object, such as a histogram for a vector object or an implied georeference for a raster object. Conflicting subobjects are valid subobjects of the parent object but only one is allowed and more than one exists.

Color coding to indicate file errors may result in longer times to update the list in the File Manager and can be turned off using the *Show file/object errors* toggle button.

STEPS

☑ be sure the color coding option is on (last button on File Manager toolbar is toggled on), then browse your data directories



files with problem objects/subobjects

objects with missing links

conflicting subobjects

Note: If you identify a process in the current version of the TNT products that produces invalid or conflicting subobjects, please let MicroImages know (tech@microimages.com).

Invalid and Conflicting Subobjects

STEPS

- ☑ browse your files for red highlight and delete invalid subobjects
- ☑ browse your files for magenta highlight, examine the conflicting subobjects and decide the one you want to keep, then delete the others

Subobjects valid for raster objects only (can have multiples):

- pyramids
- opacity masks
- color maps
- contrast tables
- tie points (mosaic)
- camera calibration
- spatial filter
- frequency filter info
- raster trend
- Hough parameters

Invalid subobjects are subobjects that are under the wrong object type. Conflicting subobjects are multiple subobjects of the same type that exist where only a singleton (one) is allowed. There is no choice to be made with invalid subobjects—they should simply be deleted. With conflicting subobjects, you may want to choose which one is retained rather than having Copy, Pack, or Recover Project File make the choice for you. These processes copy the first encountered conflicting subobject and reject those that follow because they conflict. However, you may want the last used subobject or some other if more than two, which means you should determine which subobject you want to keep and delete the others before copying or packing.

The singleton subobject types and which object types they can be associated with are listed below. If found under any other object type, these subobjects are invalid. Subobject types that are not limited in number are listed in the column at the left.

Georeference: can only be one type of georeference subobject (implied, affine, or control point); there can only be one implied or affine georeference, but multiple control point georeference subobjects; raster and hyperspectral objects cannot have implied georeference; regions can only have implied georeference.

Database: raster, shape, LiDAR, CAD, and TIN can have only one; vectors can have only one for each element type (point, line, and polygon).

Metadata: only one file [raster, vector, shape, LiDAR, CAD, TIN, database (main level only)]

Histogram: only for rasters and only one.

Null mask: only for rasters and only one.

HyperIndex: only one, raster, vector, shape, LiDAR, CAD, TIN, hyperspectral.

Style: only one under any database table (style assignment table).

Display Parameters: only one of each Display Parameters subobject type, e.g., one of each DispParmView, DispParmEdit, DispParmSurface (for raster, vector, shape, LiDAR, CAD, and TIN).

Spatial Tree: only for vectors and only one.

Quad Search Tree: vector one of each point, line, polygon, label, node; shape, LiDAR, and CAD only one; TIN only one each of point, edge, and triangle.

Linked Files/Objects and Missing Links

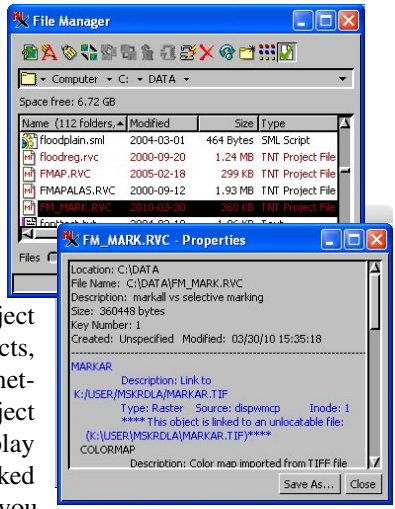
You can create links to internal objects using the Link To button in the File Manager. Links to external files are created automatically when you select a file type that is directly used by the TNT products, such as shape, GeoTIFF, and JPEG2000. You can also elect to create a link to files in many formats in the Import process.

A link created to an internal object and links made during import use existing or create new RVC files. Automatic links, which are discussed earlier in this booklet, are transparent to TNT processes and make RLK files named the same as the files linked to—the files they are linked to (for example, *.tif, *.shp, *.jp2) are the files that show in the Select Objects or File Manager windows. The RLK files can be seen using your Operating System. These files store all the new information added in TNT (some of which may not be available in the original format), such as pyramids, newly defined database tables, display parameters, and so on. It is important you do not confuse these files with lock (LOK) files when doing general drive cleanup.

Links become missing when you delete, rename, or move the files linked to. When a file is linked to, the linked file contains the image or geometric data. The file/object that contains the link has only the subobjects, or modifiers, that go with the image or geometric data (shown in blue if linked file/object missing). Therefore, there is nothing to display or process if the linked file is missing. If a linked style object has been renamed or moved, you can use the File Manager to reestablish the link. For other object types or if the linked file has been deleted, you should delete the file/object that contains the link. You cannot simply relink most object types because if you select a different object than the original, the information in the link will be invalid.

STEPS

- ☑ in the File Manager, browse your data directories to find a file with blue highlight
- ☑ navigate to the object/subobject with a missing link
- ☑ click on the Edit icon
- ☑ if editing is allowed, click on the Change Link button and select the object to link to
- ☑ if editing is not allowed, click on the Delete icon

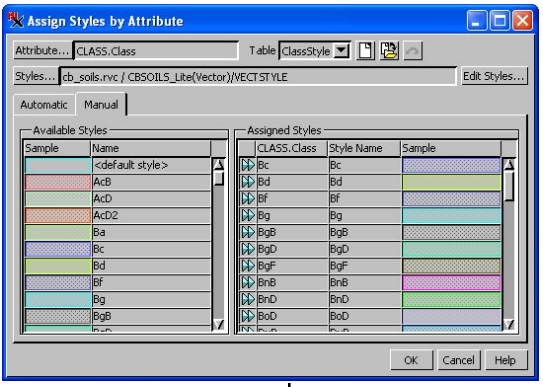


Note: if a link is contained in an RLK file and the file it is linked to is deleted, that RLK file is no longer used (or seen). If the file linked to is renamed or moved, a new RLK file is created when it is next selected.

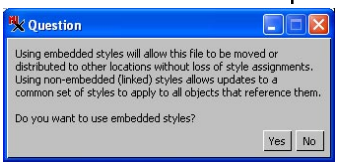
More on Missing Links: Style Objects

Vocabulary: A **style assignment table** is created when styling by attribute or theme. It specifies the drawing style to use for each attribute value or theme class.

Style objects may exist as main level objects, subobjects of a geometric object or classification raster object, or subobjects of a style assignment table beneath a geometric object. Style objects under style assignment tables created for styling by attribute can be linked or embedded style objects. Those created when styling by theme are always embedded.



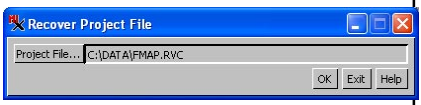
The link for style assignment tables created when styling by attribute is to the style object selected in the Assign Styles by Attribute window. If this style object is a main level object or under a vector either of which are in a different Project File than the vector object being styled, you have the option of linking to that object or embedding it when a new style assignment table is created. If the style object is in the same Project File, no embedding option is offered.



You can approach style objects as master style objects you always link to, so changes in style in the master object will be reflected in all linked objects the next time they are displayed or as style subobjects of each geometric object that uses them so they always accompany the vector when it is copied. You can, of course, mix these extremes. The first approach does not create problems as long as the master objects remain in the same location and the objects linked to them are on the same computer or network. If you intend to distribute the data on a CD or by other means that do not have access to this master location, the recipient will have missing style links unless you copy the style objects to the files containing the geometric objects before distribution.

Recovering Project Files

Tools/Recover Project File can be used to clean up your files with invalid and conflicting objects and missing links. Recover Project File also attempts to restore data in Project Files damaged in any way, such as during writing, storage, reading, or transmission, or by some aberrant TNT activity.

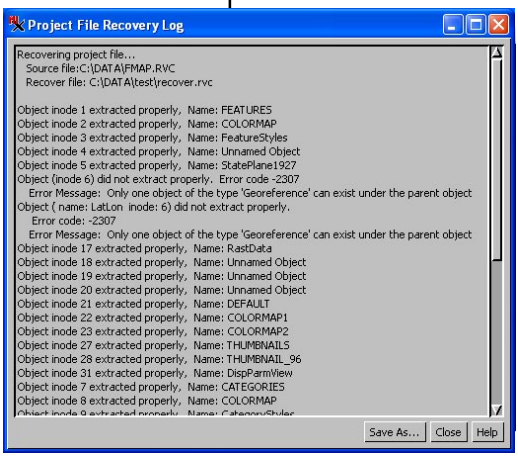


The most common kinds of file damage occur at the start or end of a file when it is read, written, or moved. The TNT products duplicate the 4-KB pointer, or index block, at the beginning and end of the Project File. When any TNT process accesses any Project File, it compares these two blocks. If they do not match, the process returns an error message to you that the Project File may be damaged and you should repair it using the Recover Project File process. This process can often determine which of the two blocks is correct by examining their contents and comparing them to the actual data they point to in the rest of the file. The recovery process can then reset both blocks.

Other signs that you should consider running Recover Project File on a particular file are messages indicating there is an Illegal Object ID or Illegal Inode Number in the file.

STEPS

- ☑ choose Tools/Recover Project File
- ☑ select a file you have found with invalid or conflicting subobjects or a file that has had recovery suggested
- ☑ click OK
- ☑ examine the Project File Recovery Log
- ☑ note objects/subobjects that were not extracted properly
- ☑ examine the contents of the output file in comparison to the input file



The first georeference subobject (StatePlane1927) of the FEATURES raster extracted properly, but the second (LatLon) did not because only one georeference subobject of this type is allowed.

Notes:

Notes:

Advanced Software for Geospatial Analysis

MicroImages, Inc. publishes a complete line of professional software for advanced geospatial data visualization, analysis, and publishing. Contact us or visit our web site for detailed product information.

TNTmips Pro TNTmips Pro is a professional system for fully integrated GIS, image analysis, CAD, TIN, desktop cartography, and geospatial database management.

TNTmips Basic TNTmips Basic is a low-cost version of TNTmips for small projects.

TNTmips Free TNTmips Free is a free version of TNTmips for students and professionals with small projects. You can download TNTmips Free from MicroImages' web site.

TNTedit TNTedit provides interactive tools to create, georeference, and edit vector, image, CAD, TIN, and relational database project materials in a wide variety of formats.

TNTview TNTview has the same powerful display features as TNTmips and is perfect for those who do not need the technical processing and preparation features of TNTmips.

TNTatlas TNTatlas lets you publish and distribute your spatial project materials on CD or DVD at low cost. TNTatlas CDs/DVDs can be used on any popular computing platform.

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