

NSDI Cooperative Agreements Program
Participation in The National Map
CAP Final Report
“*NATIONAL MAP EXPANSION PROJECT*”

Category 6: Participation in *The National Map*

This category provides assistance to organizations that are maintaining, updating and serving data in order to participate in *The National Map*. Project participants will overcome impediments to participation or take the next steps in establishing a long-term collaboration with *The National Map*.

Cooperative Agreement Number: 04HQAG0195

Project title: The National Map Expansion Project

Project start and end dates: December, 2004 – December 2005

Lead project organization: Texas Natural Resources Information System, Texas Water Development Board

Project Lead: USGS Mapping State Liaison: Jean Parcher, Acting Chief TX. Mapping Partnership Office, US Geological Survey

Collaborating organizations

EL PASO:

1. City of El Paso and PDNMAPA
2. International Boundary and Water Commission
3. Texas Agricultural Extension Service (Texas A&M)
4. El Paso County
5. Center for Environmental Resource Management, University of Texas, El Paso
6. El Paso Water Utility
7. Rio Grande Council of Governments
8. Dept. of Geography, New Mexico State University
9. Agricultural Research and Extension Center- El Paso
10. University of Texas at El Paso
11. El Paso Water Utility
12. Metropolitan Planning Organization, City of El Paso

BROWNSVILLE:

13. LG Engineering
14. University of Texas at Brownsville
15. City of Brownsville
16. Ambiotec Group

HARLINGEN:

- 17 City of Harlingen
- 18 Texas State Technical College

EDINBURG and McALLEN:

- 19 University of Texas Pan-American (Edinburg)
- 20 South Texas College (McAllen)
- 21 J E Saenz and Assoc. (Edinburg)
- 22 S & B Infrastructure (McAllen)
- 23 Lower Rio Grande Valley Development Council (McAllen)
- 24 Hidalgo Metropolitan Planning Organization (McAllen)

Data Themes

- 1. National Hydrology Dataset (NHD)
 - i. Point Feature
 - a. Spring
 - ii. Linear Feature
 - a. Canal-Ditch
 - b. Dam-Weir
 - c. Pipeline
 - d. Stream-Rivers
 - iii. Aerial Feature
 - a. Dam-Weir
 - b. Inundation Area
 - c. Lake-Pond
 - d. Reservoir
 - e. Stream-Rivers

TABLE OF CONTENTS

Project Summary	
Overview	1
Background	1
Project Detail	2
NHD Application Virtual Tour	5
Conclusion	12
Appendix I, Survey	13
Appendix II, Survey results	18
Appendix III, Agenda and attendee list for the training sessions	25
Appendix IV, XML Decision tree	29

PROJECT SUMMARY

OVERVIEW

This report relates the results of a \$75,000 CAP grant to promote the National Map along the Texas/Mexico border. The main purpose of the project was to begin teaching people on the local level how to input data into the National Map system the basic assumption being that local data is usually more accurate, detailed and timely than data submitted from the state or federal level. Accomplishments of the project included the development of an OGC-compliant data input application and onsite training in the the two selected border locations. The project was designed and implemented as a pilot effort with the intent, depending on its success, of requesting future funding to expand it into other areas of the border and eventually throughout the state.

BACKGROUND

The Texas Natural Resources Information System (TNRIS), a division of the Texas Water Development Board, has been the state's clearinghouse and distribution center for natural resources data for more than thirty years. The TNRIS mission is to provide a "centralized information system incorporating all Texas natural resource data, socioeconomic data related to natural resources, and indexes related to that data that are collected by state agencies or other entities" (Texas Water Code, 16.021). Currently TNRIS maintains extensive publicly-accessible map and aerial imagery collections and provides access to more than three terabytes of data over the Internet. TNRIS is committed to making its Web sites accessible to all users and is noted as a state collaborator of Geospatial One-Stop at <http://www.geo-one-stop.gov/StateLinks/index.html>.

TNRIS coordinates the Strategic Mapping Program (StratMap), the Texas version of the USGS Framework Program, and USGS has been a key participant in its success. As part of an Innovative Partnership, USGS contributed to the production of the hydrography, transportation, political boundaries, elevation, and hypsography data. In addition to the cost-sharing activities, USGS contributed with in-kind work, ranging from data production to data QA/QC. As part of the National Map proof of concept, USGS selected TNRIS as one of the original pilot states, due to the availability in Texas of most National Map data layers, as well as existing partnerships with local governments. TNRIS is currently in the process of updating the 1:24,000 USGS topographic map series for Texas with updated digital information produced under the StratMap Program. In addition, TNRIS has been an Earth Science Information Center for the USGS since 1976 and distributes hard copy topographic maps to the public.

PROJECT DETAIL

TNRIS recognizes that the success of *The National Map* centers on the ability of states to effectively coordinate the gathering and integration of data from local and regional

sources. The most current and accurate data reside at their source, including cities, counties and regional entities such as councils of government; and with instruction and guidance the local "collaborators" can make these data available to the National Map.

TNRIS developed the initial pilot consisting of the creation of an ArcIMS web service delivered through an Open GIS Consortium (OGC) compliant Web Map Service (WMS) connector for two test areas along the Texas/Mexico border, the Lower Rio Grande Valley (LRGV) and El Paso. This project focused on only one of the National Map data layers, the hydrographic layer. The long-term intent, depending on future funding, is to expand this project to include other National Map data layers into other regions of the state. This current pilot project, however, is limited to NHD and is, therefore, referred to as the NHD (National Hydrographic Dataset) application.

As part of the educational-outreach element of this project, TNRIS staff created metadata and lesson plans related to data and GIS technology and incorporated them into the Geospatial One-Stop website. TNRIS partnered with local entities, including councils of government, universities, county and city governments and GIS focus groups to provide training using information available on the TNRIS website. TNRIS first sent surveys to these groups to identify the level of training needed. Then, based on information gleaned from the surveys, project staff provided customized training to the local collaborators in the two pilot areas on the use of geographic information technology and data standards to edit and update the National Map using detailed accurate and timely local data. The intent was to have Texas Strategic Mapping Program (StratMap) base data layers, initially hydrography, and related GIS data layers updated and maintained at the local level within the standards defined at the state and federal levels. The result is a common group of accurate base data layers usable at many levels from local to national and for a multitude of uses accessible to the public via the web.

The data themes included in this project (listed above) are the most common elements of NHD that occur in the two areas of the pilot study, El Paso and the Lower Rio Grande Valley. In the future, after evaluating the pilot project, we will consider the inclusion of more or all of the NHD features; i.e. gates, water intakes, artificial paths, etc. The implementation of edits to the specific NHD features can be referenced in the decision tree attached to the report as an xml document.

A key element of the project was to teach workshops in each of the pilot areas on methodologies for adding local data to the hydrographic data layer of the National Map. In preparation for the workshops and to determine the level of GIS expertise and the training needs, TNRIS mailed detailed surveys to the prospective collaborators in the two pilot areas (Appendix 1.) Then, to ensure an acceptable rate of return, project staff followed up with phone calls and emails, sometimes filling in the questionnaire while on the telephone with the respondent.

The survey results, included in Appendix II, show significant differences between the two pilot areas in regard to levels of GIS expertise and need for training. The El Paso GIS community is better networked with more GIS workstations on a LAN or WAN while the

LRGV has more isolated non-networked GIS workstations. El Paso has more GIS personnel working in each of its city offices. Both GIS communities prefer ESRI products, the highest preference being ArcGIS and the second choice Arcview 3.X. According to the survey, El Paso GIS professionals are better trained and more experienced; however, the LRGV has more and better GIS workstations (maybe because LRGV has been more successful in receiving grants to acquire them.) El Paso has fewer basic training needs and is more able than LRGV to send staff to training facilities. El Paso training needs call for advanced training, such as ArcSDE and ArcIMS, while the LRGV still needs more basic in-house training. The internet connectivity of both pilot areas is good and similar. All of the institutions surveyed have DSL, T1 or better connections to the internet. El Paso has more data and metadata already in place in their GIS systems with emphasis on water resource datasets, while the LRGV is still developing and adopting datasets for their region; their main interests are transportation and infrastructure needs. El Paso has two regional efforts that can carry GIS coordination forward: PDNMapa and PDN Watershed Council. As far as we know the LRGV has none.

Based on the above information derived from the surveys, project staff customized the training to the intended audiences, giving the LRGV pilot area a more extensive training than the one given in El Paso. The LRGV workshop was held October 11, 2005, at the South Texas Technical College in Harlingen, Texas and attracted 22 students, from city and regional offices and the private sector. The El Paso workshop was held October 13 at the University of Texas at El Paso and had 18 students, mainly from city and state offices and from the private sector (Appendix III).

In addition to providing the instruction, TNRIS made available GPS receivers to the project collaborators in the two pilot areas. These units are to be used by the collaborators on a library check out basis to assist in inputting data into the National Map. The two organizations to act as custodians of the GPS's are the Texas State Technical College in Harlingen (under the direction of Manuel Villalpando) and the University of Texas at El Paso (under the direction of Raed Al-Douri). Each institution received three Garmin eTrexVista and one Garmin GPSMap 76S. In addition, both institutions have an array of Trimble GPSs ranging from the most basic Trimble Pathfinder to a Trimble Total Station for their students to use.

Another tool developed under this grant is a web interface to do the updates as defined in the decision tree xml document. This decision tree is shown in detail in Appendix IV. This will allow the users to update features, both geometry and attribution in some cases, and attribution only for features that tend to have significant seasonal fluctuations. For details check the decision tree and the screen shot (also attached) in an xml reader. Additionally you can go to the web to see the applications at work. (<http://www.tnris.org/website/NHDapp> for the Lower Rio Grande Valley and <http://www.tnris.org/website/NHDappEP> for el Paso area.) For both instances, to prevent unauthorized use and extra load to the QA/QC personnel, the use of a login is required. The username is "xperiment" and the password is "m#dus@".

The application is divided in 4 panels; on the upper left panel is a set of tools to navigate and to update NHD. On the upper right panel is an overview map that enables the user to locate himself in reference to the state of Texas. On the lower left panel the map displays a series of vertically-integrated, scale-dependent layers including DOQs to help as a reference when retracing hydrography. The names of the data layers and additional information are found in the lower right panel.

For developing this application we developed 3 SDE NHD repositories. The first one an original copy of the NHD as provided from USGS. Some changes were made to import the Geodatabase into NHD; the metadata record was clipped to 8,000 characters and the network connectivity was lost since ArcSDE does not support records longer than 8,000 characters or geometric networks among the features. This does not present a problem for the application which mainly needs to store data and provide quick access to the NHD features for the two pilot areas. The second SDE NHD repository is an originally empty geodatabase in which we can store the updates submitted by the internet application. The third SDE NHD repository is the updated geodatabase that includes NHD as provided by USGS with the updates. The new edits and additions to this last repository will be QA/QC'ed in house at TNRIS and forwarded to the NHD office at USGS when we have a significant number of validated updates.

NHD APPLICATION VIRTUAL TOUR

It bears repeating that the crux of this project was to give local "collaborators" the tools and instruction to update the hydrology layer of the National Map with their detailed, accurate and timely local data. The basic premise is that local data are based on local knowledge and are therefore more detailed and more up to date than data from state and federal sources. The following section gives step-by step directions for providing this input.

Open your Internet Explorer and resize the window to about 2/3 of your screen size, leaving room for additional windows if needed.

Navigate to www.tnris.org/website/NHDapp

The following window will appear asking for your User Name and Password. This feature blocks unauthorized users and tries to keep a reasonable load on the QA/QC personnel.



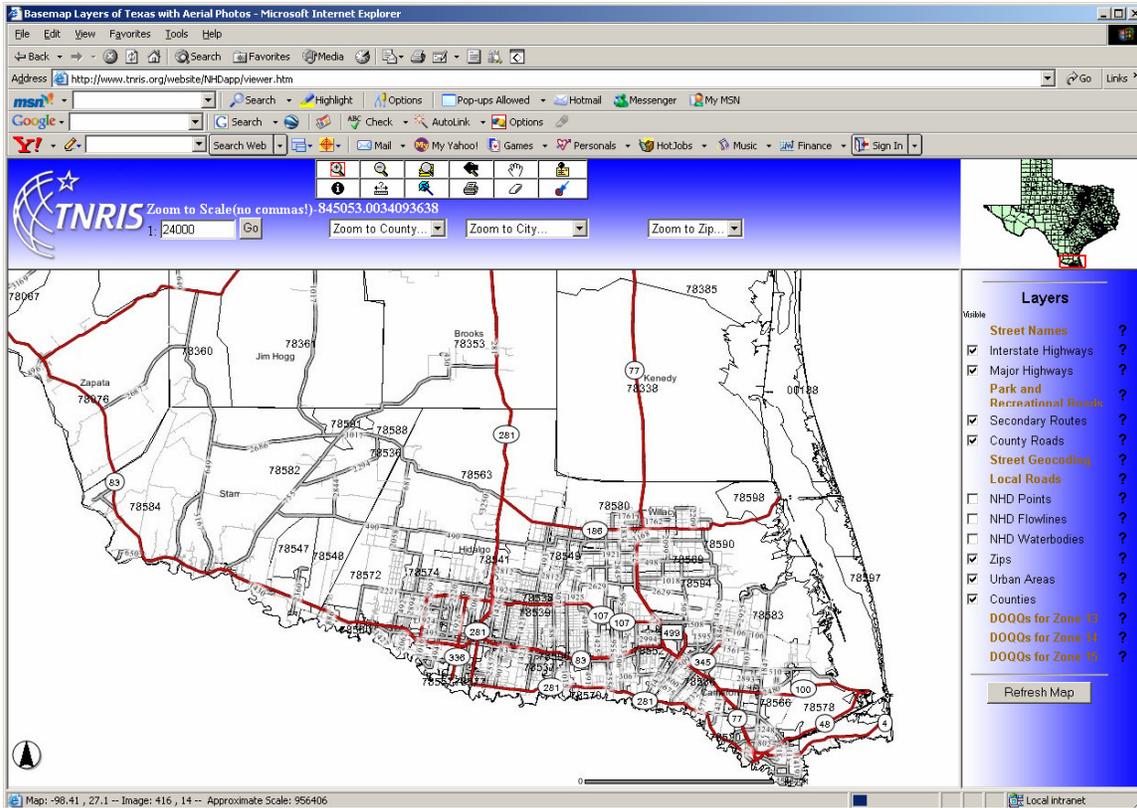
The screenshot shows a standard Windows dialog box titled "Enter Network Password". On the left side, there is a yellow key icon. To the right of the icon, the text reads "Please type your user name and password." Below this, there are two labels: "Site:" followed by the text "www.tnris.org" and "Realm:" followed by "ArclMS Network". There are two input fields: "User Name" and "Password". Below the input fields is a checkbox labeled "Save this password in your password list". At the bottom right of the dialog box are two buttons: "OK" and "Cancel".

For now use the following values for

User Name : xperiment

Password : m#dus@

You should be granted access and will see a new screen similar to the following:



You can identify the four panels described above, the tools, overview map, map and table of contents for the data layers.

Now you can navigate the pilot area in different ways. In the top center of your screen, in the upper left panel, you will find the tools that you will need to use this application.

With the  (Zoom In) tool you can define a rectangle over an area of interest, or just click on an area to get closer.

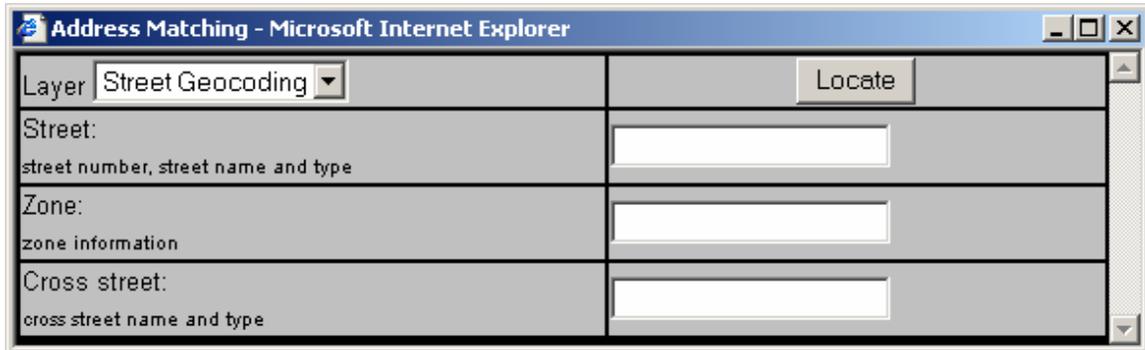
With the  (Zoom out) tool you can center the map and zoom out a preset amount or define a rectangle over an area of interest to be zoomed out so that the map extent covers the size of your display.

 (Zoom to full extent) zooms to the original full extent of the map. If lost, you can use this tool to re-initialize your map extent.

With the  (Back to last extent) you can revert to the previous zoom view.

The hand  (Pan) allows you to click and drag any point in the map to re-center your screen by panning in the desired direction.

In case you have a street address, a street crossing or just a zip code, you can use the  (Locate address) to do some geocoding on the fly and zoom into your address. A new screen will appear asking you for particulars about your address in the following format:

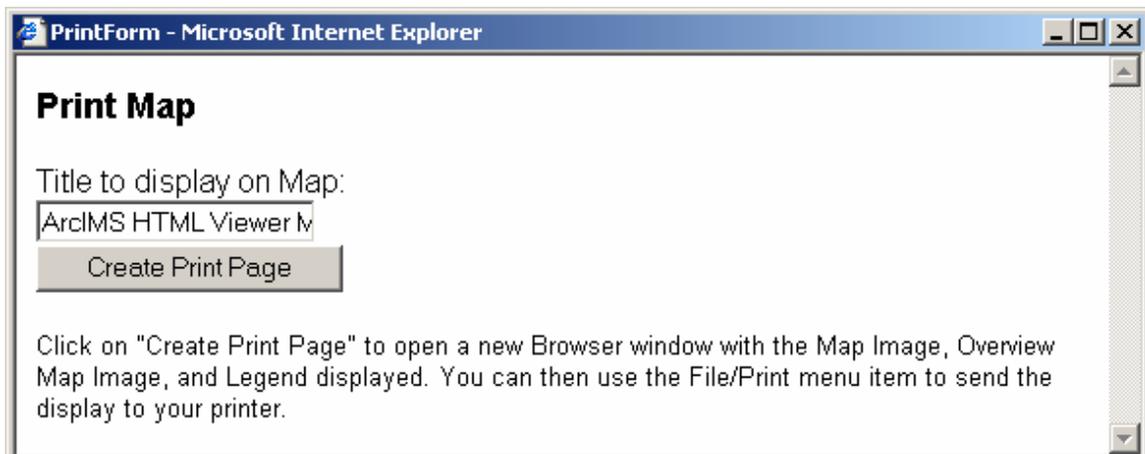


The  (Select Features for attribute update) tool allows you to select features from the National Hydrography Dataset (NHD) and make them active. A window will appear and will ask you to identify which NHD feature type you want to update.

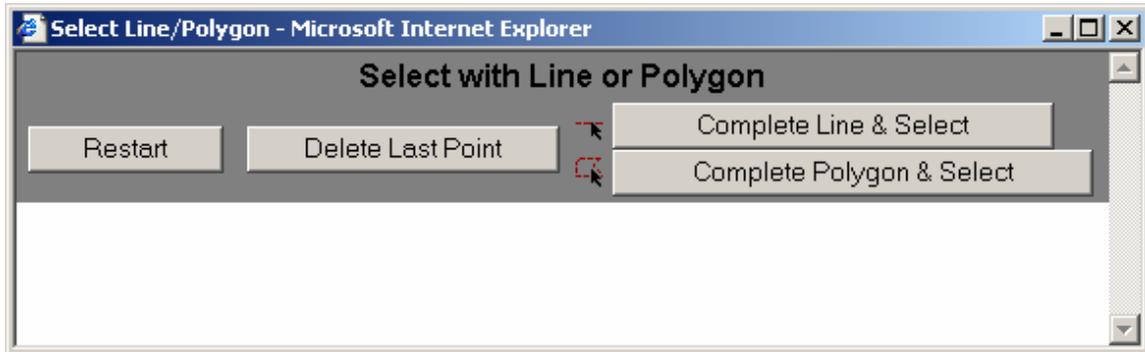


With the eraser  (Clear selection) you can de-select any selected features in the active layer.

 (Print) tool will let you create a map and send it to the printer. It will pop up a window similar to this one:



By using the  (Select by line/polygon) tool you will create the following screen:



Following the different commands you can click on the screen and create a line or a polygon, complete them and select features in the active layer

The  (Measure) tool allows you to measure distances on the screen that reflect the actual distances in feet on the ground. If you need to convert units for a particular purpose, it may be helpful to remember that: 1 ft = .333333 yard. = 0.00018939393939394 mi. = 30.48 cm. = .3048 m. = .0003048 km.

So, if you measure 300 ft and you want to know how many yards you have, you can always multiply by the above factor:

$$300 \text{ ft.} * .333333 \text{ yard} / 1 \text{ ft.} = 100 \text{ yards}$$

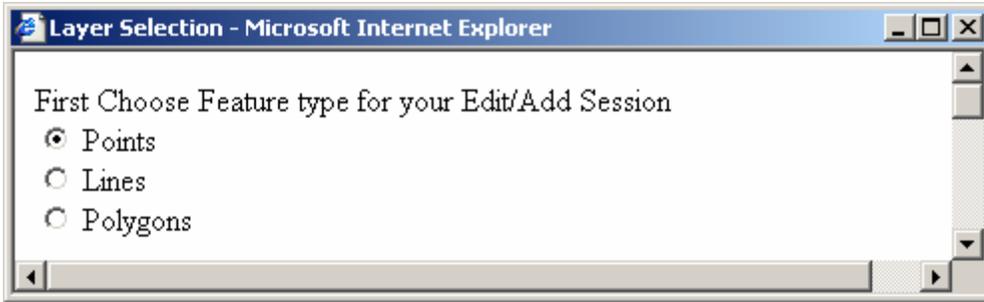
 (Identify) Allows you to identify attributes of the active feature (by default it is streets and it is scale dependent. You need to zoom in until you see the streets to be able to click with  and retrieve the attributes of the street; i.e. name, etc.)

Additional navigational tools allow you to go to an approximate target scale, zoom to a county, zoom to a city and zoom to a zip code.

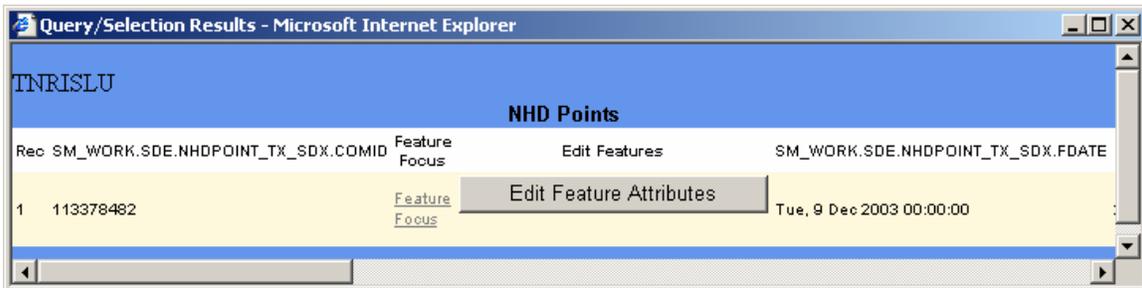
On the upper right panel of your map you have an overview map of your area of interest. Below it you will find the table of contents and in the center is the map image from the ArcIMS map service being displayed.

NHD UPDATES HELP.

Once you are in the vicinity of the feature you suspect may need updating, select the  (Select Features for attribute update) tool. In this case we will update a point feature. Select the point feature type in the following window.



Next, select your point in the map that may need updating; a new window will pop up.

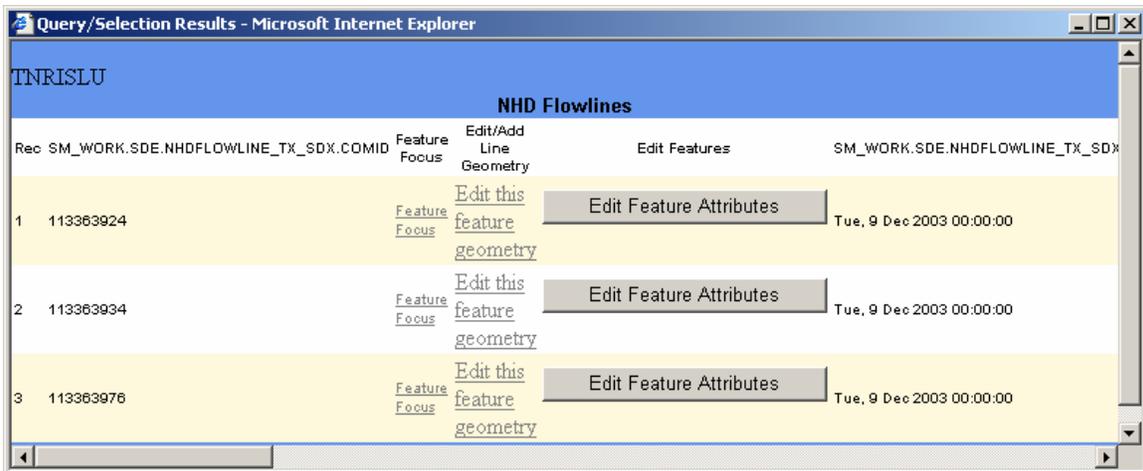


In this case the feature was last updated in December 2003. You can click “Feature Focus” to center your feature on your screen. Additionally, you can click on “Edit Feature Attributes” button to check out the attribution and possibly update it.

If you decide to update a line, select the  (Select Features for attribute update) tool. In this case we will update a line feature. Select the line feature type in the following window.

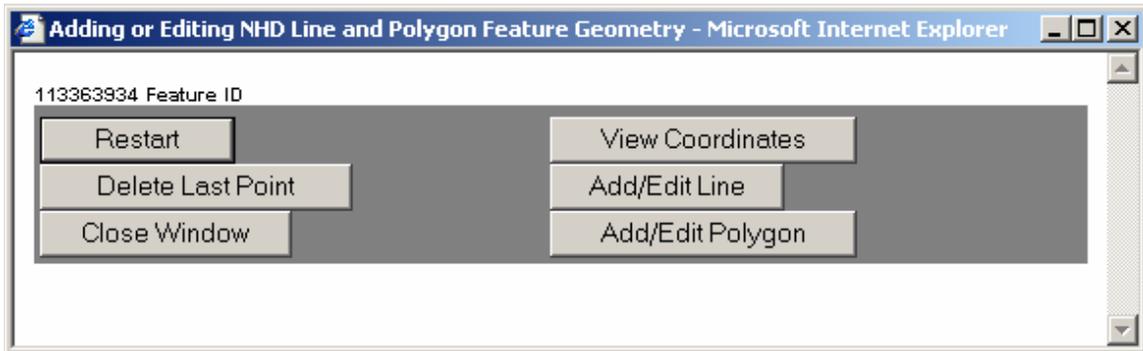


Next, select your line on the map that may need updating; a new window will pop up.

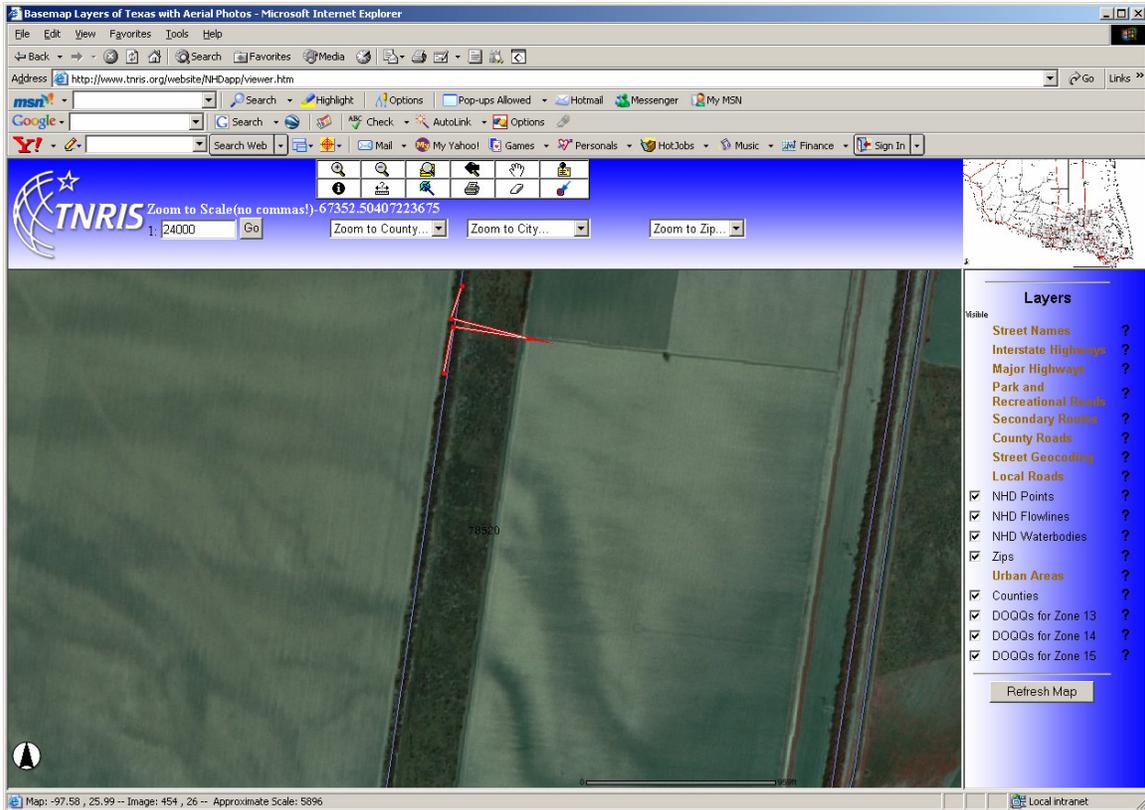


In this case, three features were selected. Click on Feature Focus to center the current feature on your screen. Notice that you now have the option to edit both the feature geometry and its attributes.

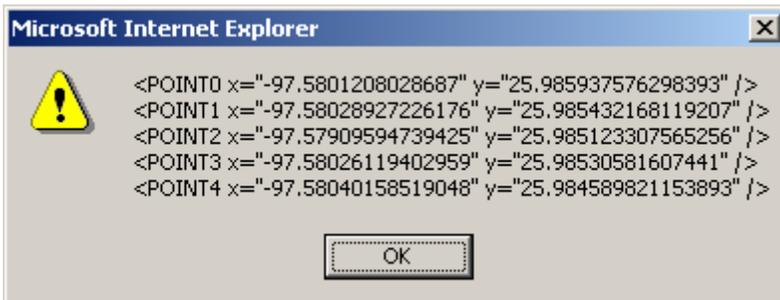
Let's explore Change the geometry of a feature (in this case, of a line). Click on "Edit this feature Geometry;" a new window will appear:



At this time, you can start adding points to modify the geometry of your line. In this example we are modifying a straight line and going around an obstruction in the flow.



When you have finished digitizing points on the screen , click on “Add/Edit Line;” a new window will appear showing your vertex coordinates.



Click OK and your edits are submitted If you need to edit attributes for the same line, click on “Edit Feature Attributes”

A similar approach can be followed to add and edit polygons or their attributes.

At this point your additions and edits will be QA/QCed in house (at TNRIS) and forwarded to the NHD office at USGS.

In Conclusion

This application has been supported by the United States Geological Survey, the Federal Geographic Data Committee and the Texas Water Development Board. Application development work was done at the Texas Natural Resources Information System.

On the process of creating the application we learned a variety of lessons:

- It is useful to tailor training to specific audiences with customized needs. The survey was helpful for making our training efforts effective.
- Planning the different aspects of the application and documenting in a decision tree was very successful. XML is a good format to document ideas since it is expandable, easy to share and flexible.
- Creating a new web-based application is no easy task. It requires a significant effort to develop and make it accessible to the public.
- In-house testing of the application was useful to identify aspects that needed to be more user-friendly.

Currently there are plans to give a presentation regarding the NHD application and its use at two conferences, Urban and Regional Information Systems Association's (URISA) 44th annual conference in Vancouver, BC - September 26-29, 2006 and the TNRIS' 16th annual GIS forum, May 4, 2006.

For more information about this project, contact the Project Manager, Dr. Charles Palmer (cpalmer@tnris.state.tx.us) or the Principal Investigator, Miguel Pavon (mpavon@tnris.state.tx.us).

APPENDIX I

SURVEY

FGDC NEEDS ASSESSMENT (SURVEY)

D. Pimentel

Texas Natural Resource Information System (TNRIS), a division of the Texas Water Development Board, has received a grant from the USGS to share data and give training to selected communities along the border. Participants should be willing/able to contribute certain GIS data updates on various base map layers to TNRIS to include in an online statewide public domain dataset. Your area has been selected for training. Ultimately the data and training will serve as a model for the development of regional GIS centers in the state. Please fill out the following survey as completely as possible so that we can better adapt the training. If you have any questions regarding this survey, please call David Pimentel at TNRIS, (512) 475-4635 or email him at: david.pimentel@twdb.state.tx.us.

Please circle one or more answers as appropriate. Other questions are open-ended and require a relatively complete answer. Thank you for your cooperation.

1. What type of GIS capability do you maintain?
 - a) None, we are just getting started
 - b) A single PC or workstation setup
 - c) 2 or more workstations not networked
 - d) A local area network of 2 or more users in one building
 - e) A wide area network of 2 or more users between 2 or more users in different buildings and/or locations in your region
 - f) Other, explain:

2. How many staff do GIS work at your facility (fulltime and part-time)?
 - a) None, we are just getting started
 - b) A single staff member
 - c) 2 –3 staff in one department
 - d) 2-3 staff in multiple departments
 - e) 4 or more staff in one or more departments
 - f) Other, explain:

3. What GIS software do you primarily use?
 - a) None, we are just getting started
 - b) ESRI, ArcView
 - c) ESRI, ArcGIS
 - d) MapInfo
 - e) Intergraph
 - f) Other (AutoCAD, Maptitude, etc.), explain:

4. **What is the level of technical training and experience of your staff?**
 - a) **We currently do not have enough in-house expertise to run a GIS.**
 - b) **We have staff who use GIS but have limited experience.**
 - c) **We have experienced full-time staff who use and maintain GIS data.**
 - d) **We have well-trained full-time GIS staff with some programming ability and extensive experience.**
 - e) **We have well trained staff, with programming ability, extensive experience with GIS applications, as well as relational database expertise and web development skills.**
 - f) **Other, explain:**

5. **Do you send staff to GIS training or conduct it in-house, and how often?**
 - a) **Do not train**
 - b) **Send to training (frequency: _____)**
 - c) **In-house training (frequency: _____)**

6. **What kind of computers do you use for GIS?**
 - a) **Desktop computers, less than 1 GB of RAM**
 - b) **Desktop computers, greater than 1 GB of RAM**
 - c) **Workstations greater than 1 GB of RAM**
 - d) **Laptops, with field use capability (specify size and speed)**
 - e) **Do not dedicate any computers to GIS**

7. **What is your level of Internet connectivity?**
 - a) **Currently do not have an internet connection**
 - b) **Dial-up connection**
 - c) **Have DSL or cable connections**
 - d) **T1 or better**

8. **What kind of data do you have, i.e. what is your core or base data?**
 - a) **Digital orthoimagery (DOQs) – what resolution?**
 - b) **Parcel data**
 - c) **Elevation data**
 - d) **Hydrographic**
 - e) **Soils and/ or geology**
 - f) **Boundaries**
 - g) **Transportation**
 - h) **Other, please be specific:**

- 9. What file format is your data in?**
- a) Geodatabase (SDE or personal)
 - b) Shapefiles
 - c) Coverages
 - d) DWG files
 - e) DGN files
 - f) Other, please be specific:
- 10. What are the main program areas your GIS supports or would support?
Please indicate all that apply, in order of priority.**
- a) Base map efforts
 - b) Transportation planning
 - c) Water planning
 - d) Environmental planning
 - e) Emergency services
 - f) Economic development
 - g) Urban/regional planning
 - h) All of the above.
 - i) Other, explain:
- 11. If TNRIS were to offer a training in your area, what are your needs for GIS training?**
- a) Basic use of GIS
 - b) ArcGIS
 - c) ArcIMS
 - d) NHD and/or use of digital floodplain data
 - e) Field collection, using portable GPS units
 - f) Geodatabase creation
 - g) How to download data from TNRIS (and other online sources) and integrate it into existing GIS
 - h) Other, please be specific:
- 12. Would the use of handheld GPS units (WAAS corrected to 3 meter accuracy) be useful in the work you do?**
- a) Yes
 - b) No
 - c) Other, explain:

13. If training is done in your region is there a location of a computer lab that could be used for onsite training and are there preferences as to training location (site and community)?

14. What GIS standards/ guidelines do you follow in maintaining your layers?

- a) None at this time
- b) FGDC
- c) ISO TC 211
- d) OGC
- e) Other, be specific:

15. Do you create and maintain metadata for your GIS layers?

- a) Yes
- b) No

**16. Do you have some type of user and/or support group for you GIS activities?
If so, what is it?**

17. Additional Comments:

APPENDIX II

SURVEY RESULTS

SURVEY RESULTS - RGValley

	1	2	3	4	5	6	7	8	COUNT	PERCENT
1. TYPE OF GIS CAPABILITY										
a. None				X					1	12
b. Single PC					X				1	12
c. 2 or more not networked									0	0
d. A LAN of 2 or more	X	X	X	X			X	X	6	72
e. A WAN of 2 or more, multiple bldgs						X			1	12
f. Other									0	0
2. STAFF DOING GIS WORK										
a. None				X					1	12
b. Single					X				1	12
c. 2 - 3 staff in one dept		X	X				X	X	4	48
d. 2 -3 staff in multiple depts.	X								1	12
e. 4 or more staff in one or more depts.						X			1	12
f. Other									0	0
3. PRIMARY GIS SOFTWARE										
a. None									0	0
b. ArcView	X		X		X				3	36
c. ArcGIS	X	X	X		X	X	X	X	7	84
d. MapInfo									0	0
e. Intergraph									0	0
f. Other - AutoCAD				X					1	12
Autodesk Land				X					1	12
ArcEditor					X				1	12
4. LEVEL OF TECHNICAL EXPERTISE										
a. Not enough to run GIS							X		1	12
b. Staff who run GIS but limited experience									1	12
c. Experienced staff who use and maintain								X	1	12
d. Well trained, experienced & some programming	X	X	X						3	36
e. Above with web development and relational db					X	X			2	24
f. Other				X					1	12
5. AMOUNT OF TRAINING										
a. Do not train	X				X				1	12
b. Send to training - as needed			X						1	12
c. In-house training - as needed		X		X		X		X	5	60
6. TYPE OF COMPUTERS USED										
a. Desktop with less than 1 GB of RAM	X								1	12
b. Desktop greater than 1GB of RAM	X			X		X	X		4	48

c. Workstations greater than 1 GB of RAM			X		X				2	24
d. Laptop with field use capability		X						X	2	24
e. None dedicated to GIS									0	0
7. LEVEL OF INTERNET CONNECTIVITY										
a. Do not have Internet connection									0	0
b. Dial up									0	0
c. DSL or cable		X							1	12
d. T1 or better	X	X	X	X	X	X	X	X	8	96
8. WHAT IS YOUR CORE DATA										
a. DOQS	X		X	X	X			X	6	72
b. Parcel	X		X		X	X	X	X	6	72
c. Elevation	X		X					X	4	48
d. Hydrographic	X		X					X	4	48
e. Soils and/ or geology								X	1	12
f. Boundaries	X		X		X	X		X	5	60
g. Transportation	X	X			X	X		X	4	48
h. Other								X	1	12
								X	1	12
								X	1	12
								X	1	12
SPECIES								X	1	12
								X	1	12
								X	1	12
9. FILE FORMAT OF DATA										
a. Geodatabase		X	X		X	X		X	6	72
b. Shapefiles		X	X	X	X	X	X	X	8	96
c. Coverages		X	X		X	X		X	6	72
d. DWG files		X	X	X	X	X		X	6	72
e. DGN files		X			X	X		X	4	48
f. Other						X			1	12
						X			1	12
10. MAIN PROGRAM AREAS OF GIS										
a. Basemap	X	X	X	X	X	X	X	X	8	96
b. Transportation	X		X	X	X	X	X	X	7	84
c. Water planning	X		X	X		X	X	X	6	72
d. Environmental planning	X		X	X		X	X		6	72
e. Emergency services	X		X	X	X	X	X	X	7	84
f. Economic development	X		X	X		X	X	X	6	72
g. Urban/regional planning	X		X	X	X	X	X	X	7	84
h. All of the above									0	0
i. Other										
RESEARCH		X							1	12
11. GIS TRAINING NEEDS										
a. Basic use of GIS			X	X	X			X	4	48

b. ArcGIS	X		X	X	X	X	X	X	7	84
c. ArcIMS	X	X	X	X	X	X	X		7	84
d. NHD and/or floodplain data			X		X	X	X	X	5	60
e. Field collection using portable GPS	X	X	X	X	X		X		6	72
f. Geodatabase creation	X	X	X		X	X	X		7	84
g. Download data from TNRIS and other sources			X	X	X		X		4	48
h. Other										
VISUAL BASIC		X							1	12
12. WOULD USE OF HANDHELD GPS BE USEFUL										
a. Yes	X	X	X	X	X	X	X	X	8	96
b. No									0	0
c. Other									0	0
13. PREFERENCE AS TO TRAINING LOCATION										
UTB	X	X						X	2	24
TSTC		X	X		X	X	X	X	6	72
STC		X		X				X	3	36
UTPA		X						X	2	24
14. GIS STANDARDS/ GUIDELINES FOLLOWED										
a. None	X	X		X	X		X	X	6	72
b. FGDC			X			X			2	24
c. ISO TC 211									0	0
d. OGC									0	0
e. Other									0	0
15. METADATA USE										
a. Yes	X		X		X	X		X	5	60
b. No		X		X			X		3	36
16. USER OR SUPPORT GROUP										
RGV Users Group	X	X	X			X		X	5	60
Consultant				X	X				2	24
NONE							X		1	12
17. ADDITIONAL COMMENTS										
TRAINING IN BASIC										
AV AND EDITS		X							1	12

SURVEY RESULTS - EL PASO

	1	2	3	4	5	6	7	8	9	COUNT	PERCENT
1. TYPE OF GIS CAPABILITY											
a. None										0	0
b. Single PC									X	1	11
c. 2 or more not networked							X			1	11
d. a LAN of 2 or more	X	X		X		X				4	44
e. a WAN of 2 or more, multiple bldgs		X	X		X			X		4	44
f. Other										0	0
2. STAFF DOING GIS WORK											
a. None										0	0
b. Single									X	1	11
c. 2 - 3 staff in one dept	X			X						2	22
d. 2 -3 staff in multiple depts.			X							1	11
e. 4 or more staff in one or more depts.		X			X	X	X	X		5	55
f. Other										0	0
3. PRIMARY GIS SOFTWARE											
a. None										0	0
b. ArcView	X	X	X				X	X	X	6	66
c. ArcGIS	X	X	X	X	X	X	X	X		8	88
d. MapInfo										0	0
e. Intergraph										0	0
f. Other - Maptitude										0	0
AutoCAD	X							X		2	22
ARC IMS			X							1	11
4. LEVEL OF TECHNICAL EXPERTISE											
a. Not enough to run GIS										0	0
b. Staff who run GIS but limited experience	X							X	X	3	33
c. Experienced staff who use and maintain	X	X		X		X		X		5	55
d. Well trained, experienced & some programming		X	X		X			X		4	44
e. Above with web development and relational db		X					X	X		3	33
f. Other										0	0
5. AMOUNT OF TRAINING											
a. Do not train	X								X	2	22
b. Send to training - as needed			X		X	X	X	X		5	55
c. In-house training - as needed	X			X	X		X	X		5	55

6. TYPE OF COMPUTERS USED												
a. Desktop with less than 1 GB of RAM	X	X			X	X					4	44
b. Desktop greater than 1GB of RAM			X	X			X		X		4	44
c. Workstations greater than 1 GB of RAM			X						X		2	22
d. Laptop with field use capability			X		X				X		3	33
e. None dedicated to GIS											0	0
7. LEVEL OF INTERNET CONNECTIVITY												
a. Do not have Internet connection											0	0
b. Dial up											0	0
c. DSL or cable									X		1	11
d. T1 or better	X	X	X	X	X	X	X	X	X	X	9	99
8. WHAT IS YOUR CORE DATA												
a. DOQS			X	X	X	X	X	X	X	X	8	88
b. Parcel	X	X		X	X		X	X			6	66
c. Elevation			X	X	X	X		X	X		6	66
d. Hydrographic	X	X	X	X	X	X		X			7	77
e. Soils and/ or geology	X	X	X	X	X	X		X			7	77
f. Boundaries	X	X	X	X	X		X	X	X		8	88
g. Transportation	X	X	X	X	X		X	X			7	77
h. Other										X	3	33
WELLS				X	X					X	1	11
AQUIFERS				X							1	11
VEGET/LANDUSE				X							1	11
CENSUS								X			1	11
RIVER DIVERSIONS									X		1	11
9. FILE FORMAT OF DATA												
a. Geodatabase			X	X		X	X	X	X		6	66
b. Shapefiles	X	X	X	X	X	X	X	X	X	X	9	99
c. Coverages	X	X	X	X	X		X	X			7	77
d. DWG files	X	X		X		X		X			5	55
e. DGN files		X									1	11
f. Other											0	0
10. MAIN PROGRAM AREAS OF GIS												
a. Basemap	X	X	X	X	X	X	X	X			9	99
b. Transportation		X			X		X	X			4	44
c. Water planning	X	X	X	X	X	X		X	X		8	88
d. Environmental planning		X	X	X		X		X			5	55
e. Emergency services		X						X	X		3	33
f. Economic development		X	X					X	X		4	44
g. Urban/regional planning		X			X		X	X			4	44
h. All of the above											0	0
i. Other - RESEARCH				X							1	11
11. GIS TRAINING NEEDS												
a. Basic use of GIS											0	0

b. ArcGIS								X	X	2	22	
c. ArcIMS	X	X	X					X	X	5	55	
d. NHD and/or floodplain data	X		X	X	X			X		5	55	
e. Field collection using portable GPS	X	X						X		3	33	
f. Geodatabase creation			X		X	X	X			4	44	
g. Download data from TNRIS and other sources					X			X	X	3	33	
h. Other - Data Conversion	X									1	11	
DEM Processing		X								1	11	
12. WOULD USE OF HANDHELD GPS BE USEFUL												
a. Yes	X	X	X	X	X	X		X	X	8	88	
b. No										0	0	
c. Other								X		1	11	
13. PREFERENCE AS TO TRAINING LOCATION												
UTEP		X		X				X	X	X	5	55
NMSU			X		X						2	22
WU											0	0
CITY								X			1	11
TAES									X	X	2	22
IBWC						X					1	11
14. GIS STANDARDS/ GUIDELINES FOLLOWED												
a. None	X							X		2	22	
b. FGDC		X	X	X	X	X	X		X	7	77	
c. ISO TC 211										0	0	
d. OGC										0	0	
e. Other										0	0	
15. METADATA USE												
a. Yes		X	X	X	X	X	X		X	7	77	
b. No	X							X		2	22	
16. USER OR SUPPORT GROUP												
PDNMAPA			X	X		X	X	X		5	55	
PDN WATERSHED COUNCIL		X	X	X			X	X		5	55	
NMGIC		X								1	11	
UTEP					X					1	11	
17. ADDITIONAL COMMENTS												
										0	0	

APPENDIX III

AGENDA AND ATTENDEE LIST FOR THE TRAINING SESSIONS

AGENDA FOR FGDC PRESENTATIONS

TOPICS

- 1. Welcoming Remarks and Introductions - Charles Palmer**
- 2. Purpose of Today's Training - Miguel Pavon**
- 3. Overview of TNRIS - Charles Palmer**
- 4. Texas National Map efforts - Erika Boghici**
 - Data development by layer**
 - Data content**
 - Keeping up with who has what**
 - Data distribution**

BREAK

- 5. FGDC "Support *The National Map*" Project - Miguel Pavon**
- 6. What is in it for you? and Regional Centers Concept - David Pimentel**
- 7. What do Valley users need and next steps (discussion) - David Pimentel**
- 8. GPS handout**
- 9. Evaluation of Morning session**

LUNCH BREAK

- 10. StratMap layers and how to access the website and download data (esp. DOQs) - Erika Boghici**
- 11. Hydro layer (NHD) training - Erika Boghici**

BREAK

Hydro layer (NHD) training (continued)

- 12. Data maintenance and update protocol (web tool) - Miguel Pavon**
- 13. Evaluation of Afternoon session**

Harlingen training on 10/11/2005

Name	Organization	Department	e-mail	phone
Gilbert Gonzalez Jr.	S.W.G.		SWGCE@Rioplexwireless.com	956 968 2194
Adam Flores	S.W.G.		SWGCE@Rioplexwireless.com	956 968 2194
Albert Castillo	City of Brownsville		lacast@cob.us	956 548 6080
Gabriel Zuniga	City of McAllen	Planning Urban Development	gzuniga@mcenet.net	
Felipe I. Hernandez	City of Weslaco			
Rob Sadler	Carson Map Co.		Rob@carsonmap.com	
Jose A. Jimenez	City of McAllen		J.jimenez@mcenet.com	
Raul Leos	City of McAllen		rleos@mcenet.com	
Jose M. Martinez	City of McAllen		jmartinez@mcenet.net	
Raul Rodriguez	City of McAllen		rrodriguez@mcenet.net	
Marbel Chio	City of McAllen		mchi@mcenet.net	
Michael Ortega	TSTC		michael.ortega@tstc.net	
Moises Garcia	TSTC		moises_garcia@yahoo.com	
Leopoldo Garza	TSTC		leogarza1984@yahoo.com	
Paul Cantu	City of Brownsville	Police Department	pcantu@cob.us	
David Gutierrez			dgutierrez78833@yahoo.com	
Raymundo Elvira	City of Mission	Engineering	missionengineering@yahoo.com	
Alex Hernandez	City of Mission	Engineering	missionengineering@yahoo.com	
Alicia Baldovinos	Harlingen Chamber EDD		abaldovinos@harlingen.com	
David Bartle	L&G Engineering		dbartle@lgengineers.com	956 371 1995
Jesus Rodriguez	City of Mission		rodriguezj77@yahoo.com	956 580 8642
Emily Pedraza	TSTC		emilypedraza@tstc.net	

El Paso training on 10/13/2005

Name	Organization	e-mail	phone
Michael Fahy	EPWU	mpfahy@epwu.org	
Jose Gramillo	EPWU	jgramillo@epwu.org	
Joshua Villalobos	TAES	jvillalobos@ag.tamu.edu	
Guillermo Martinez	TxDOT	gmarti3@dot.state.tx.us	
Lucio Santos	TxDOT	lsantos@dot.state.tx.us	
Javier Cordova	TxDOT	jcordov@dot.state.tx.us	
Haydee C. Contreras	TxDOT	hcontre@dot.state.tx.us	
Jonathan Concha	TxDOT	jconcha@dot.state.tx.us	
Irvine Johnson	EPCCHED	irving.johnson@ELPASOTEXAS.gov	
Chen-Hua Feng	EPCCHED	cheng-hua.feng@elpasotexas.gov	
Woody Irving	BOR	wirving@uc.usbr.gov	915 534 6325
Jon Yuriar	HCIA	GM@horizoncommunities.com	915 852 1811
Jesus S. Heredia	TxDOT	jheredia@dot.state.tx.us	
Javier Jaime	TPSHS	javier.jaime@dshs.state.tx.us	
Lorraine Quimiro	City of El Paso	quimirolz@elpasotexas.gov	915 834 7754
Valentin Arzola Jr.	TxDOT	varzola@dot.state.tx.us	
Martin Holguin	TxDOT	mholgui@dot.state.tx.us	
Raed Aldouri	UTEP	aldouri@geo.utep.edu	

APPENDIX IV

XML DECISION TREE

```

<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v3.0.7 NT (http://www.xmlspy.com) by Miguel A. Pavon (Texas Water Development) -->
<NHD_Online_Features_and_Editing_Options>
  <Point_Feature>
    <?not_available_at_this_time?>
    <Water_Intake-Outflow/>
    <Gate/>
    <?Options_available?>
    <Spring>
      <!--Spring/Seep is a place where water issues from the ground naturally-->
      <Attribution>
        <!--Attribution of an Existing Feature-->
        <!--Attribute/Attribute Value list-->
        <Name>Porper Name, specific name or expression<Name length="99"
type="alphanumeric">Name of the spring</Name>
        <GNIS_Identifier length="8" type="alphanumeric">The unique identifier assigned by GNIS
beginning in 1996</GNIS_Identifier>
        <Unspecified length="99" type="alphanumeric">The value is not known or not
required</Unspecified>
        </Name>
        <Texas_Name>
          <Name type="alphanumeric" variant="variant name" length="99">Name of the spring</Name>
          <Unspecified type="alphanumeric" variant="variant name" length="99">The value is not known
or not required</Unspecified>
        </Texas_Name>
        <!--Proper name, specific term or expression-->
        <Photorevision_Category>
          <Photorevised>Feature was compiled from aerial photographs and other sources as part of a
revision assignment that included field checks, if required</Photorevised>
          <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
of a revision assignment that did not include field checks</Non_Photorevised>
        </Photorevision_Category>
        <!--Weather or not a feature was added or modified as part of a photorevision assignment-->
        <Water_Characteristics>
          <Alkaline>Water shows evidence of alkali salts</Alkaline>
          <Hot>Water temperature is higher than that of a human body (98.6 degrees F.)</Hot>
          <Sulphur>Water shows evidence of sulphur contents</Sulphur>
          <Unspecified>The value is not known or not required</Unspecified>
        </Water_Characteristics>
        <!--Distinctive properties of the water-->
      </Attribution>
      <Delete>
        <!--Delete an Existing Feature-->
      </Delete>
    </Spring>
  </Point_Feature>
  <Linear_Feature>
    <?not_available_at_this_time?>
    <Artificial_Path/>
    <Connector/>
    <Gate/>
    <?Options_available?>
    <Canal-Ditch>
      <Add>
        <!--Add a new Feature-->
      </Add>
      <Attribution>
        <!--Attribution of an Existing Feature-->
        <!--Attribute/Attribute Value list-->
        <Type>
          <Aqueduct>A structure designed to transport domestic or industrial water from a supply source
to a distribution point</Aqueduct>
          <Unspecified>The value is not known or is not required</Unspecified>
        </Type>
        <!--Function or Purpose-->
        <Elevation>

```

<Elevation Maximum_Value="8848.3" Minimum_Value="-392" Length="6" Precision="1" Increment="0.1" Units="Meters">The vertical distance from a give datum</Elevation>
 <Stage>
 <Normal_Pool>The stage of an Artificially impounded water body that prevails for the greater part of the year</Normal_Pool>Height of Water Surface</Stage>
 <Not_Applicable>The attribute does not apply and therefore can not be valued</Not_Applicable>
 </Elevation>
 <Photorevision_Category>
 <Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that included field checks, if required</Photorevised>
 <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that did not include field checks</Non_Photorevised>
 </Photorevision_Category>
 </Attribution>
 <Delete>
 <!--Delete and Existing Feature-->
 </Delete>
 <Realignment>
 <!--Realignment of an Existing Features-->
 </Realignment>
 </Canal-Ditch>
 <Dam-Weir>
 <Add>
 <!--Add a new Feature-->
 </Add>
 <Attribution>
 <!--Attribution of an Existing Feature-->
 <!--Attribute/Attribute Value list-->
 <Construction_Material>
 <Nonearthen>Constructed of concrete, brick or stone</Nonearthen>
 <Earthen>Constructed of earth, or a combination of earth and rock</Earthen>Predominant material used</Construction_Material>
 <Name>Porper Name, specific name or expression<Name length="99" type="alphanumeric">Name of the Dam-Weir</Name>
 <GNIS_Identifier length="8" type="alphanumeric">The unique identifier assigned by GNIS beginning in 1996</GNIS_Identifier>
 <Unspecified length="99" type="alphanumeric">The value is not known or not required</Unspecified>
 </Name>
 <Name>Porper Name, specific name or expression<Name length="99" type="alphanumeric">Name of the spring</Name>
 <GNIS_Identifier length="8" type="alphanumeric">The unique identifier assigned by GNIS beginning in 1996</GNIS_Identifier>
 <Unspecified length="99" type="alphanumeric">The value is not known or not required</Unspecified>
 </Name>
 <Texas_Name>
 <Name type="alphanumeric" variant="variant name" length="99">Name of the spring</Name>
 <Unspecified type="alphanumeric" variant="variant name" length="99">The value is not known or not required</Unspecified>
 </Texas_Name>
 <Operational_Status>
 <Operational>Usable and intended for use</Operational>
 <Under_Construction>Construction has begun but is not completed</Under_Construction>State or Condition</Operational_Status>
 <Photorevision_Category>
 <Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that included field checks, if required</Photorevised>
 <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that did not include field checks</Non_Photorevised>
 </Photorevision_Category>
 </Attribution>
 <Delete>
 <!--Delete and Existing Feature-->
 </Delete>
 <Realignment>

```

    <!--Realignment of an Existing Features-->
  </Realignment>
</Dam-Weir>
<Pipeline>
  <Add>
    <!--Add a new Feature-->
  </Add>
  <Attribution>
    <!--Attribution of an Existing Feature-->
    <!--Attribute/Attribute Value list-->
    <Photorevision_Category>
      <Photorevised>Feature was compiled from aerial photographs and other sources as part of a
revision assignment that included field checks, if required</Photorevised>
      <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
of a revision assignment that did not include field checks</Non_Photorevised>
    </Photorevision_Category>
    <Product>
      <Water/>Principal commodity involved</Product>
    <Type>
      <Aqueduct>A structure designed to transport domestic or industrial water from a supply source
to a distribution point<!--Function or Purpose-->
    </Aqueduct>
      <General_Case>Common use</General_Case>
      <Penstock>Designed to transport domestic or industrial water from a water source to a
distribution point, often by gravity</Penstock>
      <Siphon>Designed to convey water by gravitational force, over, or under, an
abstraction</Siphon>
    </Type>
    <Relationship_to_surface>
      <At_or_Near>At or slightly above the surface</At_or_Near>
      <Elevated>Supported above the earth</Elevated>
      <Underground>Buried</Underground>
      <Underwater>Always submerged</Underwater>
      <Unspecified>The value is not known or is not required</Unspecified>Vertical location relative
to the surface</Relationship_to_surface>
    </Attribution>
  <Delete>
    <!--Delete and Existing Feature-->
  </Delete>
  <Realignment>
    <!--Realignment of an Existing Features-->
  </Realignment>
</Pipeline>
<Stream-Rivers>
  <Add>
    <!--Add a new Feature-->
  </Add>
  <Attribution>
    <!--Attribution of an Existing Feature-->
    <!--Attribute/Attribute Value list-->
    <Elevation>
      <Elevation Maximum_Value="8848.3" Minimum_Value="-392" Length="6" Precision="1"
Increment="0.1" Units="Meters">The vertical distance from a give datum</Elevation>
    <Stage>
      <Normal_Pool>The stage of an Artificially impounded water body that prevails for the
greater part of the year</Normal_Pool>Height of Water Surface</Stage>
      <Not_Applicable>The attribute does not apply and therefore can not be
valued</Not_Applicable>
    </Elevation>
    <Hydrographic_Category>
      <Intermittent>Contains Water for only part of the year, but more than just after storms and at
snowmelt</Intermittent>
      <Perennial>Contains Water throughout the year, except for infrequent periods of severe
drought</Perennial>Portion of the year the feature contains water</Hydrographic_Category>
    <Photorevision_Category>
      <Photorevised>Feature was compiled from aerial photographs and other sources as part of a
revision assignment that included field checks, if required</Photorevised>

```

```

        <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
of a revision assignment that did not include field checks</Non_Photorevised>
    </Photorevision_Category>
    <Positional_Accuracy>
        <Definite>Conditions permit the feature to be confidently positioned. Horizontal data are
confidently positioned within 0.02", at map scale, of the true ground position. Vertical data are confidently
positioned within one-half contour interval of the true ground position</Definite>
        <Indefinite>Conditions prevent the feature from being confidently positioned. Horizontal data
can not be confidently positioned within 0.02", at map scale, of the true ground position. Vertical data can not be
confidently positioned within one-half contour interval of the true ground position</Indefinite>
    <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
of a revision assignment that did not include field checks</Non_Photorevised>
    <Not_Applicable>The attribute does not apply and therefore can not be
valued</Not_Applicable>
    </Positional_Accuracy>
</Attribution>
<Delete>
    <!--Delete an Existing Feature-->
</Delete>
<Realignment>
    <!--Realignment of an Existing Features-->
</Realignment>
</Stream-Rivers>
</Linear_Feature>
<Aerial_Feature>
    <?not_available_at_this_time?>
    <Swamp-Marsh/>
    <?Options_available?>
    <Dam-Weir>
        <Add>
            <!--Add a new Feature-->
        </Add>
        <Attribution>
            <!--Attribution of an Existing Feature-->
            <!--Attribute/Attribute Value list-->
            <Construction_Material>
                <Nonearthen>Constructed of concrete, brick or stone</Nonearthen>
                <Earthen>Constructed of earth, or a combination of earth and rock</Earthen>Predominant
material used</Construction_Material>
                <Name>Porper Name, specific name or expression<Name length="99"
type="alphanumeric">Name of the Dam-Weir</Name>
                <GNIS_Identifier length="8" type="alphanumeric">The unique identifier asigned by GNIS
beginning in 1996</GNIS_Identifier>
                <Unspecified length="99" type="alphanumeric">The value is not known or not
required</Unspecified>
            </Name>
            <Texas_Name>
                <Name type="alphanumeric" variant="variant name" length="99">Name of the Dam-
Weir</Name>
                <Unspecified type="alphanumeric" variant="variant name" length="99">The value is not known
or not required</Unspecified>
            </Texas_Name>
            <Operational_Status>
                <Operational>Usable and intended for use</Operational>
                <Under_Construction>Construction has begun but is not
completed</Under_Construction>State or Condition</Operational_Status>
            <Photorevision_Category>
                <Photorevised>Feature was compiled from aerial photographs and other sources as part of a
revision assignment that included field checks, if required</Photorevised>
                <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
of a revision assignment that did not include field checks</Non_Photorevised>
            </Photorevision_Category>
        </Attribution>
    </Delete>
    <!--Delete and Existing Feature-->
</Delete>
<Realignment>

```

```

    <!--Realignment of an Existing Features-->
  </Realignment>
</Dam-Weir>
<Inundation_Area>
  <Add>
    <!--Add a new Feature-->
  </Add>
  <Attribution>
    <!--Attribution of an Existing Feature-->
  <Elevation>
    <Elevation Maximum_Value="8848.3" Minimum_Value="-392" Length="6" Precision="1"
Increment="0.1" Units="Meters">The vertical distance from a give datum</Elevation>
  <Stage>
    <Flood_Elevation>The stage of an artificially impounded water body as determined by the
highest controlling structure</Flood_Elevation>Height of Water Surface</Stage>
    <Unspecified>The value is not known or is not required</Unspecified>
  </Elevation>
  <Inundation_Control_Status>Existence of Functional Control Structures<Controlled>Structures as
Dam/Weir or Embankment, exist to controll the water and inundate specific areas</Controlled>
  <Inundation_Area_Type>Function or Purpose if inundation is controlled<Debris_Basin>Area to
catch and temporarily store debris and sediment from runoff</Debris_Basin>
  <Dewatering_Area>Area taht is seasonally drained by TVA to control
mosquitoes</Dewatering_Area>
  <Duck_Pond>Commercially developed areas, inundated for duck hunting </Duck_Pond>
  <General_Case>Common use</General_Case>
  <Percolation_Basin>Area to temporarily store excess runoff and return water to the
ground-water reservoir, also called spreading ground</Percolation_Basin>
  <Retarding_Basin>Basin in embanked area for returning the flow of flood
waters</Retarding_Basin>
  </Inundation_Area_Type>
  <Not_Controlled>No controlling structores exist. Flooding is natural and
periodic</Not_Controlled>
  </Inundation_Control_Status>
  <Name>Porper Name, specific name or expression<Name length="99"
type="alphanumeric">Name of the Inundation Area</Name>
  <GNIS_Identifier length="8" type="alphanumeric">The unique identifier asigned by GNIS
beginning in 1996</GNIS_Identifier>
  <Unspecified length="99" type="alphanumeric">The value is not known or not
required</Unspecified>
  </Name>
  <Texas_Name>
    <Name type="alphanumeric" variant="variant name" length="99">Name of the Inundation
Area</Name>
    <Unspecified type="alphanumeric" variant="variant name" length="99">The value is not known
or not required</Unspecified>
  </Texas_Name>
  <Photorevision_Category>
    <Photorevised>Feature was compiled from aerial photographs and other sources as part of a
revision assignment that included field checks, if required</Photorevised>
    <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
of a revision assignment that did not include field checks</Non_Photorevised>
  </Photorevision_Category>
  </Attribution>
  <Delete>
    <!--Delete an Existing Feature-->
  </Delete>
</Inundation_Area>
<Lake-Pond>
  <Add>
    <!--Add a new Feature-->
  </Add>
  <Attribution>
    <!--Attribution of an Existing Feature-->
  <Elevation>
    <Elevation Maximum_Value="8848.3" Minimum_Value="-392" Length="6" Precision="1"
Increment="0.1" Units="Meters">The vertical distance from a give datum</Elevation>
  <Stage>

```

<Average_Water_Elevation>The stage of a natural water body as determined by the highest controlling structure</Average_Water_Elevation>
 <Date_of_Photography>The stage that exist at the date of Photography</Date_of_Photography>
 <High_Water_Elevation>The stage that prevails when a natural water body is at or near capacity</High_Water_Elevation>
 <Normal_Pool>The stage of an artificially impounded water body that prevails for the greater part of the year</Normal_Pool>
 <Spillway_Elevation>The stage of an artificially impounded water body as determined by the spillway</Spillway_Elevation>Height of Water Surface</Stage>
 <Unspecified>The value is not known or is not required</Unspecified>
 </Elevation>
 <Hydrographic_Category>
 <Intermittent>Contains Water for only part of the year, but more than just after storms and at snowmelt</Intermittent>
 <Perennial>Contains Water throughout the year, except for infrequent periods of severe drought</Perennial>Portion of the year the feature contains water</Hydrographic_Category>
 <Photorevision_Category>
 <Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that included field checks, if required</Photorevised>
 <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that did not include field checks</Non_Photorevised>
 </Photorevision_Category>
 <Water_Characteristics>
 <Salt>The water presents high salinity</Salt>
 <Unspecified>The value is not known or is not required</Unspecified>Disctintive properties of the water</Water_Characteristics>
 </Attribution>
 <Delete>
 <!--Delete an Existing Feature-->
 </Delete>
 </Lake-Pond>
 <Reservoir>
 <Add>
 <!--Add a new Feature-->
 </Add>
 <Attribution>
 <!--Attribution of an Existing Feature-->
 <Construction_Material>
 <Nonearthen>Constructed of concrete, brick or stone</Nonearthen>
 <Earthen>Constructed of earth, or a combination of earth and rock</Earthen>
 <Unspecified>The value is not known or is not required</Unspecified>Predominant material used</Construction_Material>
 <Elevation>
 <Elevation_Maximum_Value="8848.3" Minimum_Value="-392" Length="6" Precision="1" Increment="0.1" Units="Meters">The vertical distance from a give datum</Elevation>
 <Unspecified>The value is not known or is not required</Unspecified>
 </Elevation>
 <Name>Porper Name, specific name or expression<Name length="99" type="alphanumeric">Name of the Reservoir</Name>
 <GNIS_Identifier length="8" type="alphanumeric">The unique identifier asigned by GNIS beginning in 1996</GNIS_Identifier>
 <Unspecified length="99" type="alphanumeric">The value is not known or not required</Unspecified>
 </Name>
 <Texas_Name>
 <Name type="alphanumeric" variant="variant name" length="99">Name of the Reservoir</Name>
 <Unspecified type="alphanumeric" variant="variant name" length="99">The value is not known or not required</Unspecified>
 </Texas_Name>
 <Photorevision_Category>
 <Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that included field checks, if required</Photorevised>
 <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that did not include field checks</Non_Photorevised>
 </Photorevision_Category>

<Reservoir_Type>
 <Aquaculture>For rearing of finfish, shellfish or aquatic plants</Aquaculture>
 <Decorative_Pool>For improving the aesthetic appearance of the
 landscape</Decorative_Pool>
 <Disposal>
 <Disposal_Type>
 <Tailings_Pond>Containing in aqueous form, ore and waste materials discarded in
 ore-treatment processes</Tailings_Pond>
 <Unspecified>The value is not known or is not required</Unspecified>Function or
 purpose</Disposal_Type>For disposal</Disposal>
 <Evaporator>For the natural evaporation of water to allow harvesting of mineral
 concentrates</Evaporator>
 <Swimming_pool>For swimming</Swimming_pool>
 <Treatment>
 <Treatment_type>
 <Cooling_Pond>For cooling industrial waste water</Cooling_Pond>
 <Filtration_Pond>For removing foreign elements from water</Filtration_Pond>
 <Settling_Pond>For precipitating solid matter from a liquid</Settling_Pond>
 <Sewage_Treatment_Pond>For the treatment of domestic water-born
 waste</Sewage_Treatment_Pond>Function or Purpose</Treatment_type>For treatment</Treatment>
 <Unspecified>The value is not known or is not required</Unspecified>
 <Water_Storage>For long- or short-term water storage<Cover_Status>
 <Covered/>
 <Not-Covered/>
 <Unspecified>The value is not known or is not required</Unspecified>Existence of a
 cover</Cover_Status>
 <Hydrographic_Category>
 <Intermittent>Contains Water for only part of the year, but more than just after storms
 and at snowmelt</Intermittent>
 <Perennial>Contains Water throughout the year, except for infrequent periods of
 severe drought</Perennial>
 <Unspecified>The value is not known or is not required</Unspecified>Portion of the
 year the feature contains water</Hydrographic_Category>
 </Water_Storage>Function or purpose</Reservoir_Type>
 </Attribution>
 <Delete>
 <!--Delete an Existing Feature-->
 </Delete>
 </Reservoir>
 <Stream-Rivers>
 <Add>
 <!--Add a new Feature-->
 </Add>
 <Attribution>
 <!--Attribution of an Existing Feature-->
 <!--Attribute/Attribute Value list-->
 <Elevation>
 <Elevation_Maximum_Value="8848.3" Minimum_Value="-392" Length="6" Precision="1"
 Increment="0.1" Units="Meters">The vertical distance from a give datum</Elevation>
 <Stage>
 <Normal_Pool>The stage of an Artificially impounded water body that prevails for the
 greater part of the year</Normal_Pool>Height of Water Surface</Stage>
 <Not_Applicable>The attribute does not apply and therefore can not be
 valued</Not_Applicable>
 </Elevation>
 <Hydrographic_Category>
 <Intermittent>Contains Water for only part of the year, but more than just after storms and at
 snowmelt</Intermittent>
 <Perennial>Contains Water throughout the year, except for infrequent periods of severe
 drought</Perennial>Portion of the year the feature contains water</Hydrographic_Category>
 <Photorevision_Category>
 <Photorevised>Feature was compiled from aerial photographs and other sources as part of a
 revision assignment that included field checks, if required</Photorevised>
 <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part
 of a revision assignment that did not include field checks</Non_Photorevised>
 </Photorevision_Category>
 <Positional_Accuracy>

<Definite>Conditions permit the feature to be confidently positioned. Horizontal data are confidently positioned within 0.02", at map scale, of the true ground position.</Definite>
 <Indefinite>Conditions prevent the feature from being confidently positioned. Horizontal data can not be confidently positioned within 0.02", at map scale, of the true ground position. Vertical data can not be confidently positioned within one-half contour interval of the true ground position.</Indefinite>
 <Non_Photorevised>Feature was compiled from aerial photographs and other sources as part of a revision assignment that did not include field checks.</Non_Photorevised>
 <Not_Applicable>The attribute does not apply and therefore can not be valued.</Not_Applicable>
 </Positional_Accuracy>
 </Attribution>
 <Delete>
 <!--Delete an Existing Feature-->
 </Delete>
 <Realignment>
 <!--Realignment of an Existing Features-->
 </Realignment>
 </Stream-Rivers>
 </Aerial_Feature>
 </NHD_Online_Features_and_Editing_Options>