Module 8

Photodocumentation

8.1 Purpose

This SHIM Module describes how to develop a photo-document which characterizes SHIM activities and sites in the project watershed. This record is intended to augment data collected during the inventory program, and is useful in verifying field and site conditions.

8.2 Final Products

Completed photo-documentation of SHIM in-stream habitat, fish and riparian inventories should generate the following products:

Digital photograph files of all watercourse reaches, fish habitat features, riparian land cover and representative captured fish in the project watercourse.

Photographs should be labelled with date, time, site location, watershed, and characteristics of the equipment (lens, f stop)

Completed photograph fields in the Site Card and Fish Collection Form.

8.3 Introduction

Photodocumentation standards for B.C. are detailed in *A Guide to Photodocumentation for Aquatic Inventories (RIC, 1996)*. The equipment required for this module includes:

Camera (35mm single lens reflex (SLR) or digital) with a wide angle (28mm to 35mm lens);

Slide or print film (200, 400, 800 ASA).   Type of film should be judged given the site conditions;

Scanner for digitizing photographs (or digital photos) is required. High digital resolution (>300dpi) is needed for photograph import into various maps and documents.

8.4 Inventory Procedure

8.4.1 Site Photography

Photograph information should be documented on the Site Card or Fish Collection Form (see SHIM Module 6).   The following photographs of a study area are required:

- Riparian Inventory: One landscape (long horizontal axis) photograph of the left bank transect from the right bank bankfull margin, one landscape photograph of the right bank transect from the left bank bankfull margin, and a minimum of two discretionary landscape photographs of representative stand conditions or features (i.e., bank slumping, invasive species, etc.) must be taken.

- In-stream habitat inventory: One upstream-oriented and one downstream-oriented landscape (long horizontal axis) photograph must be taken at a representative location of each reach to show general stream characteristics including channel morphology, riparian vegetation, and fish habitat features. More than two photographs may be taken of a single reach at the discretion of the field staff. Photographs of reaches are recorded on the Site Card.

- Fish habitat features: One landscape (long horizontal axis) photograph must be taken of each fish habitat feature assigned a NID during the in-stream habitat inventory. The photograph should be taken from an angle that provides the best visual representation of the feature. More than one photograph may be taken of a single habitat feature at the discretion of the field staff. Photographs of fish habitat features are recorded on the Site Card.

- Fish: One landscape (long horizontal axis) representative photograph of each fish species collected must be taken and documented. Representative photographs of any fish that the crew is unable to identify, or of any diseased or parasitized fish must also be photographed. The quality of these photographs should enable verification of fish species identifications. Each photograph must include an object of scale, such as a ruler, to indicate the relative size of the fish. More than one photograph may be taken of each fish species at the discretion of the field staff. Photographs of fish are recorded on the Fish Collection Form.

The following information must be recorded for each photograph:

- roll number (roll #) – the film roll number corresponding to each photograph.
- frame number (frame #) – the negative frame number corresponding to each photograph.
- focal length (foc. lg.) – The focal length of the lens used to take each photograph, recorded in millimetres.
- date (date) – the date (day/month/year).
- direction (dir.) – the general direction of each photograph with respect to the site from which the photograph was taken, i.e., Up (upstream), Dn (downstream), XS (across the stream) or Bd (towards the stream bed).
- location – the location of the photograph must be determined using available mapping or a GPS unit, expressed as a UTM.
- comments – any relevant comments about the photograph should be recorded. These should be descriptive enough and concise enough to provide a caption for the photograph.

8.5 Reporting

Agency partners should be consulted at the initiation of the project to determine if reporting requirements have changed for photodocumentation.

8.5.1 Required Inventory Data

The mandatory inventory data products for the Photodocumentation Review are:

1.   Photograph Information including:

- roll number
- frame number
- focal length
- date
- direction
- location
- comments

2.   Digital Photograph Files

A digital copy of all photographs is required. The CD must be referenced using the Project Code and labelled using the standards given in *A Guide to Photodocumentation for Aquatic Inventories (RIC, 1996)*.   The following requirements apply to data storage and presentation:

- Scanning hardware requirements – at least 24bit, capable of 16 million true colours. A flatbed scanner with minimum 2400dpi and 600spi is suggested;

- File type – tagged information format file (TIFF) is required (ver. 6 preferred, ver. 5 acceptable; PC format). TIFF (ver. 5) will be much more portable to slightly older programs, however some improvements have been made for version 6, and can be read by most current software. See http://home.earthlink.net/~ritter/tiff/ for more information regarding TIFF file formats. (High resolution gif, jpeg files may also be suitable. Please contact agency partners for support);

- Colour files are required;

- Resolution – Resolution requirements for slides is 1200 dpi, and for photographs (4"x6") is greater than 300 dpi.

- Scaling – Photographs must be scaled at 100%.

- Labelling – Digital images must be labelled using whiteboards (this will not work with post processing of images) or a software/graphics package to label the image before it is stored on CD (see example below)
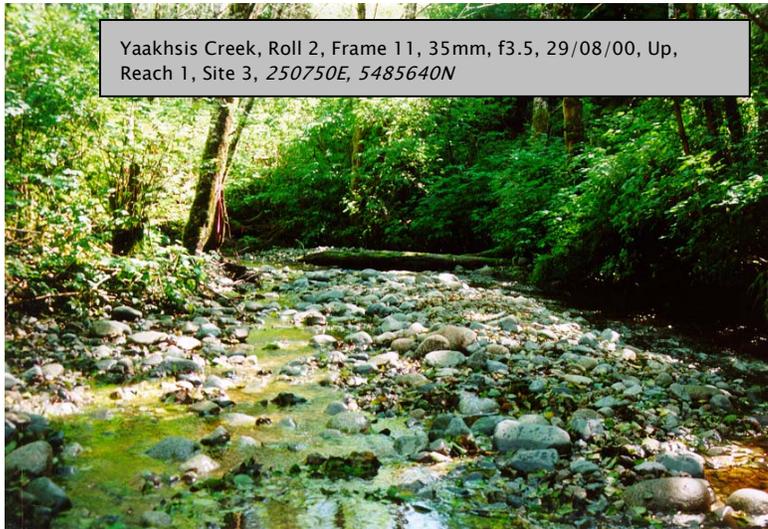
Further information is available at http://www.infomedia.net/scan/The-Scan-FAQ.html

Yaakhsis Creek, Roll 2, Frame 11, 35mm, f3.5, 29/08/00, Up, Reach 1, Site 3, *250750E, 5485640N*

Figure 8.1: Example SHIM documented photograph. Yaakhsis Creek, Hesquiaht Harbour, Aug. 29, 2000.

8.5.2 Required Map Products

There are no mandatory **map** products for Photodocumentation Module.

8.6 References Cited

Tips and Techniques of Image Scanning: http://www.infomedia.net/scan/The-Scan-FAQ.html

Resources Inventory Committee. 1996. A Guide to Photodocumentation for Aquatic Inventories.

The Unofficial TIFF Homepage: http://home.earthlink.net/~ritter/tiff/

Module 9

SHIM Data Deliverables and Data Management

9.1 Data Collection and Processing

All SHIM projects must conform to current mapping standards outlined in the SHIM Mapping Procedures Guide (2001) and Resource Inventory Committee standards for GPS (2002). Stream mapping must be undertaken using resource grade GPS receiver systems that have been approved by the SHIM mapping committee. At present only a limited number of receivers have proven capable of meeting the ±5m horizontal accuracy levels desired for SHIM mapping projects. Acceptable GPS models may change as new technology comes onto the market and a current listing of acceptable systems should be obtained from the SHIM mapping committee before initiating the project. Currently the only GPS receiver that has been fully approved for stream mapping work with an accompanying customized SHIM Data Dictionary is the Trimble Pathfinder Pro XR. While the Leica GS50 GPS receiver is also considered of suitable accuracy, at present the SHIM Data Dictionary is not compatible with this receiver and would require major re-structuring. Most data collected with lower end GPS systems will lack the spatial accuracy necessary for inclusion in SHIM projects; however, this information may be useful for other planning purposes and we do not discourage its collection. Acquiring some environmental data (even if crude) is still much better than having no information at all.

The SHIM Data Dictionary (Version 24) represents the currently accepted standard for collecting map data and this file can be obtained and downloaded free (ddf format) from the SHIM mapping committee for use with the Trimble GPS units. Previous SHIM protocols outlined in earlier *draft* SHIM manuals involved manual data entry into Excel spreadsheets for incorporation into Access databases. These protocols are no longer current, and have been superseded by more efficient applications using the GPS data

dictionaries. Collected mapping data should be initially stored within GPS unit data recorders. Raw GPS data should then be downloaded on a daily basis if possible into Pathfinder Office software, differentially corrected and converted into ArcView shapefiles. Raw GPS data should be interpreted and corrected within ArcView, using the customized SHIM Data Dictionary Tool (ddtool-b4f.avx) that can be downloaded free from the SHIM website (http://www.shim.bc.ca/). Common point and polygon features must be linked to their associated stream line through a unique identifier field. Instructions and ArcView procedures for ensuring that feature points are correctly linked to unique stream identifiers are also included within the SHIM Data Dictionary Tool.

9.2 Qualifications

At least one person on each SHIM mapping team must act as a Data Manager and have completed a RIC certified GPS course in resource mapping. Acceptable training programs are offered by several agencies, contacts for which can be obtained from the SHIM mapping committee. The Data Manager is responsible for training field operators in SHIM procedures and must provide documentation of protocols implemented to quality assure (QA) data collection/interpretation and maintain overall quality control (QC) of the project.

9.3 Deliverables

SHIM data should be delivered on a CD-ROM in the following directory structure:

Stream Name Folder

- Photo Subfolder
- Raw GPS Data Subfolder
- Corrected GPS DataSubfolder (if data was post-processed)
- Processed GPS Data Subfolder
- Metadata Subfolder
- SHIM map Subfolder

A single winzip file containing folder and subfolder data should be created for each stream surveyed. Be sure to select the 'Save Extra Folder Info' option for the winzip file. For older versions of Winzip (i.e., prior to version 7.0) the

"Recurse Folder" option should also be selected.   The required subfolders should contain the following information:

9.3.1 Photo Subfolder

- Digitized images of all photos taken (jpg format). File naming based on photo point number (e.g., 4135.jpg). Preferred file size for jpg images is approximately 100kb with an accepted maximum size of 200kb.
- A single summary table (Word format) listing all photos taken of the stream with identifying photo numbers, date of photo capture, description of features photographed and photo orientation

Photo Summary Table				
Stream Name	Photo point number	Date (d/m/y)	Feature	Direction (up/down or X stream)

*All jpg photo images must be hotlinked to the photo_point shapefile present in the processed GPS data subfolder.   To do this involves a series of programming steps within ArcView that are outlined in the appendix at the end of this module.

9.3.2 Raw GPS Data Subfolder

- Raw GPS data files (in Trimble's .ssf file format) for all SHIM mapped stream features (points, lines and polygons).

9.3.3 Corrected GPS Data Subfolder

- Raw GPS data files (in Trimble's .cor file format) for all SHIM mapped stream features. Submit only if GPS data were differentially corrected through post-processing and not through real time corrections. Reference stations used for post-processing

data must be validated by the Geo-Spatial Reference Unit of the BC Ministry of Sustainable Resource Management. A listing of currently validated stations and services can be obtained from the Base Mapping and Geomatics Services Branch at:

http://home.gdbc.gov.bc.ca/gsr/specifications/resource_gps/validations/base_val.htm

9.3.4 Processed GPS Data Subfolder

Corrected ArcView shapefiles of all mapped stream features. This includes the associated dbf, sbn, shx, sbx and shp files for each feature with file names consistent with the feature types used in the SHIM data dictionary. The line, point and polygon files that should be included as part of a SHIM mapping project include:

- stream_line.shp – line feature delineating the stream centreline. **Required** for all SHIM mapping projects.
- end_point.shp – point feature depicting termination of stream segment mapping. Must contain completed comment field providing explanation for why mapping stopped at this point. **Required** for all SHIM mapping projects.
- wetland.shp – line feature delineating the extent of wetlands adjacent to the stream. **Recommended** but not required.
- cross-section.shp
- culvert.shp
- discharge.shp
- enhancement.shp
- erosion.shp
- fish_habitat.shp
- fish_sample.shp
- modification.shp
- obstruction.shp
- photo_point.shp
- tree_Wildlife.shp
- wildlife.shp
- waterbody.shp
- water_sample.shp

point features depicting various constructions, habitats, conditions or activities at distinct locations along the stream length.

- riparian_hab.shp – polygon feature delineating the riparian habitats adjacent to the stream corridor. **Recommended** but not required.

Complete stream files are created in ArcView by merging the corrected points, lines or polygons from individual mapped stream segments into a single composite file for each feature type. Each shapefile must be associated with the parent stream using a unique identifier (denoted by the shared key_id field in the SHIM Data Dictionary).

GPS data files (in Trimble .ssf or .cor formats) are originally converted into ArcView shapefiles using the "Export Utility" in Pathfinder Office. When exporting these files into ArcView make sure that the "Export Setup Properties" in the Trimble Office software are set to "Features – Export all Feat
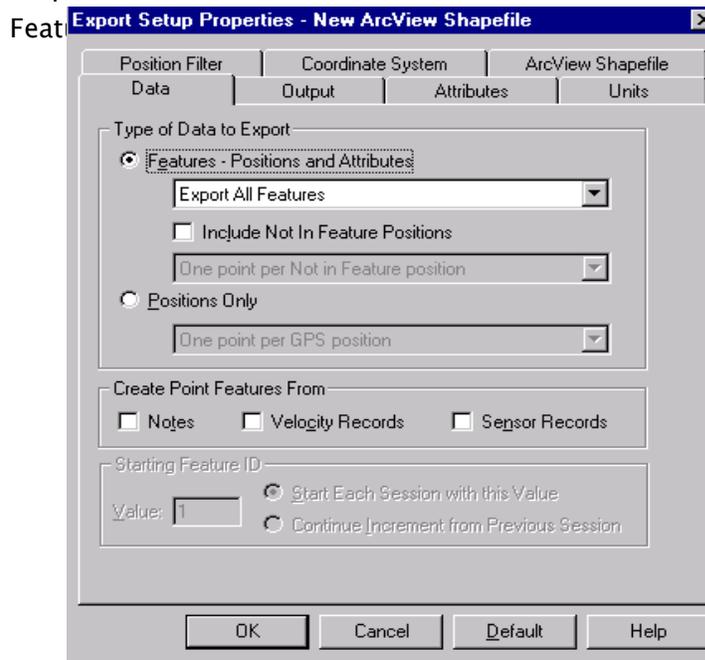
The "Coordinate System and Zone" for export should be set to "UTM, NAD 1983," with the appropriate UTM zone selected for your mapped area.
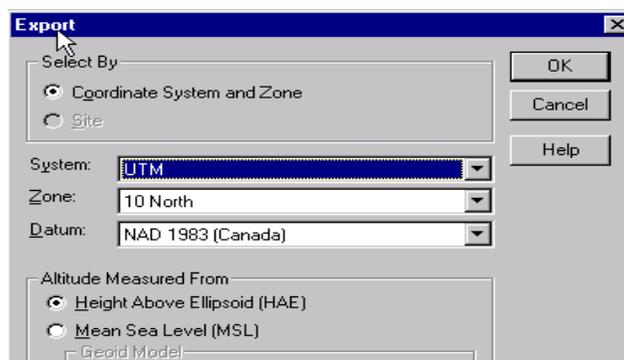
All ArcView shape files must contain descriptive metadata fields that can be simultaneously exported from Pathfinder Office with the Data Dictionary information. To ensure that relevant metadata is linked to the SHIM shapefiles the following configuration settings must be toggled on within the Export Utilities function in Pathfinder office:

Attributes Tab

- All Feature Types: PDOP, Correction Status, Receiver Type, Date Recorded, Time Recorded, Data File Name, Total Positions, Filtered Positions, Data Dictionary Name (earlier versions of Pathfinder Office may not allow this last option)
- Point Features: Horizontal Precision, Standard Deviation, Postition
- Line Features: Ave. Horizontal Precision, Worst Horizontal Precision
- Area Features: Ave. Horizontal Precision, Worst Horizontal Precision
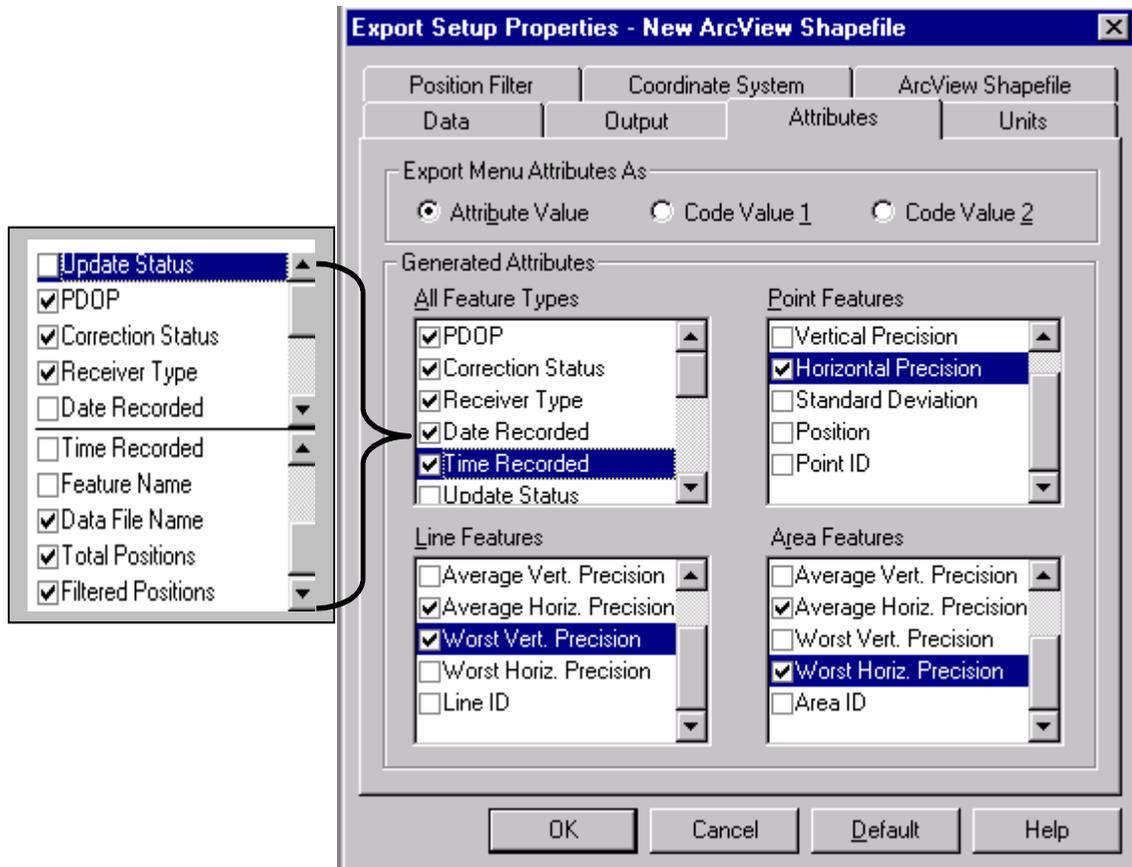
Position Filter Tab

- Minimum Satellites: 3D (4 or more)
- Maximum PDOP: 8
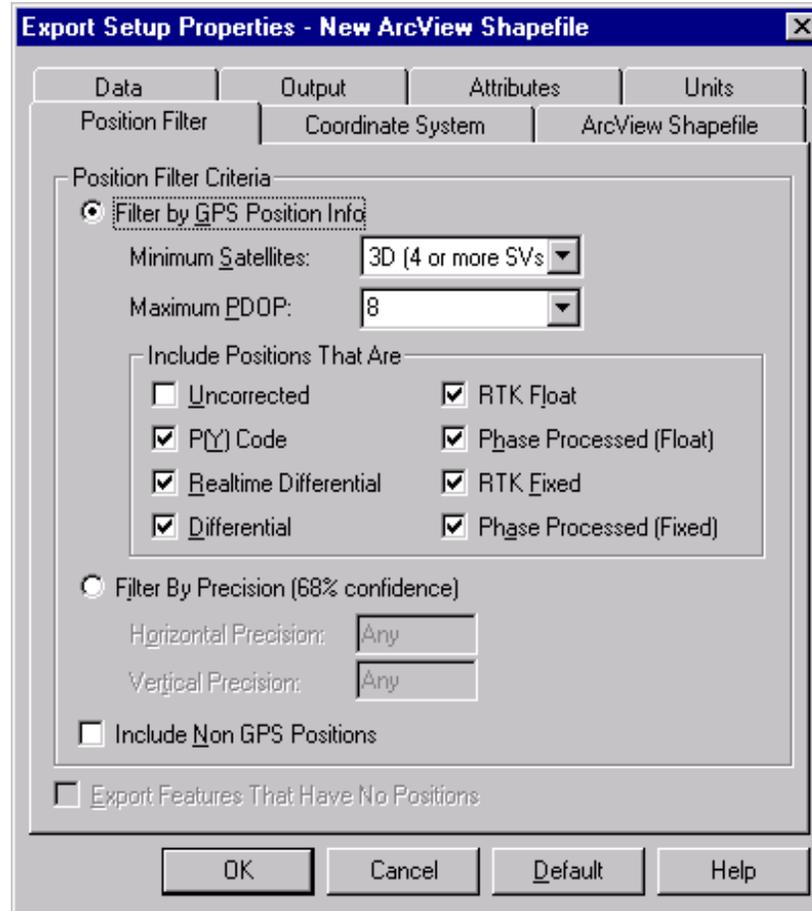
A text file is created during the export process that lists the configuration settings used for export. This file should be included in the project deliverables as a method of QA/QC.

9.3.5 Metadata Subfolder

- All text files created during export processing from Pathfinder Office to ArcView that show configuration settings
- A single summary table (Word format) for the mapped stream describing: mapping organization, crew and qualifications, GPS and GIS systems used and target accuracies, specific location of mapping, the extent of stream mapping (i.e., mainstem and tribs), date of mapping, SHIM procedures used (i.e., field methods and

data dictionary versions), protocols used for quality control/assurance

---

Stream Summary Table

Creek Name:
General Location:

Agency:

Data Manager:
Manager Qualifications:

Mapping Crew:
Crew Qualifications:

GPS receiver used:
GPS refererence stations:
Target accuracy:
GPS software used (Name, Version):
GIS software used (Name, Version):

Mapping start point (UTM Zone/Easting/Northing):
Mapping end points (UTM Zone/Easting/Northing):

Mainstem fully mapped (Y/N):
If No, why not:
All tributaries entry points mapped (Y/N):
If No, why not:
All tributaries fully mapped (Y/N):
If No, why not:
Explain any gaps in continuity of stream line work
(e.g., stream subterranean, landowner difficulties, etc.):

Date mapping completed:

SHIM Field Manual Version:
SHIM Data Dictionary Version:

Standard SHIM QA/QC protocols followed (Y/N):
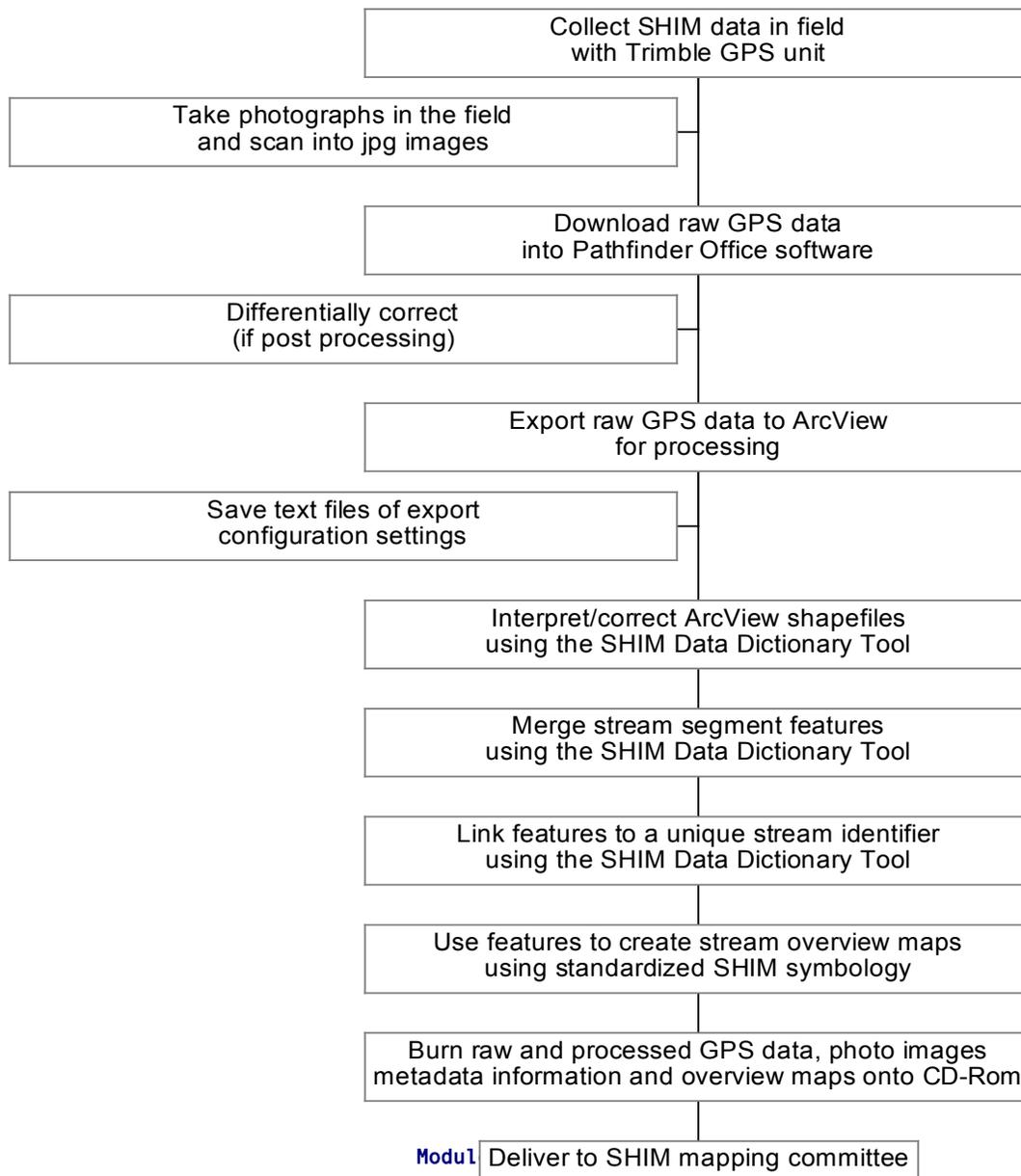**If No, describe deviations in protocol:**

Comments:

9.3.6 SHIM Map Subfolder

- A finalized map (in either eps or doc format) showing all stream features labelled using standardized SHIM symbology and colour schemes.

Map symbol templates (in ArcView avl format) for each SHIM feature can be downloaded from the SHIM website for use in creating these maps. Stream maps should be presented at a 1:20,000 scale for general overview purposes.

9.4 Flowchart of the SHIM Data Management Process

```
                    ┌─────────────────────────────────┐
                    │   Collect SHIM data in field    │
                    │     with Trimble GPS unit       │
                    └─────────────────────────────────┘
    ┌──────────────────────────────────┐
    │  Take photographs in the field   │
    │     and scan into jpg images     │
    └──────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │     Download raw GPS data        │
                    │   into Pathfinder Office software│
                    └─────────────────────────────────┘
    ┌──────────────────────────────────┐
    │      Differentially correct      │
    │       (if post processing)       │
    └──────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │   Export raw GPS data to ArcView │
                    │         for processing           │
                    └─────────────────────────────────┘
    ┌──────────────────────────────────┐
    │     Save text files of export    │
    │     configuration settings       │
    └──────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │  Interpret/correct ArcView shapefiles │
                    │ using the SHIM Data Dictionary Tool   │
                    └─────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │    Merge stream segment features │
                    │ using the SHIM Data Dictionary Tool │
                    └─────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │ Link features to a unique stream identifier │
                    │ using the SHIM Data Dictionary Tool │
                    └─────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │ Use features to create stream overview maps │
                    │ using standardized SHIM symbology │
                    └─────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │ Burn raw and processed GPS data, photo images │
                    │ metadata information and overview maps onto CD-Rom │
                    └─────────────────────────────────┘
                    ┌─────────────────────────────────┐
                    │ Deliver to SHIM mapping committee │
                    └─────────────────────────────────┘
```

Appendum: Hotlinking JPG Images to ArcView Shapefiles

1. Open the photo_point theme in the View window and add a new field within
    its attribute table ⊞ (name the new field photo_id1, photo_id2, and
    photo_id3).

    These fields will store the image pathway that will be accessed by the hotlink
    tool.

    Up to 3 photo images can be linked by this method to any single photo
    location point.

2. Enter for each record in this field the full pathway to locate the jpg image on
    the appropriate disk or drive (e.g., d:/elk_creek/photos/1230.jpg). The drive
    designation may have to be adjusted by varied users of this data as CD-ROM
    drive letters are inconsistent, and users may also choose to store the images
    on their hard drives.
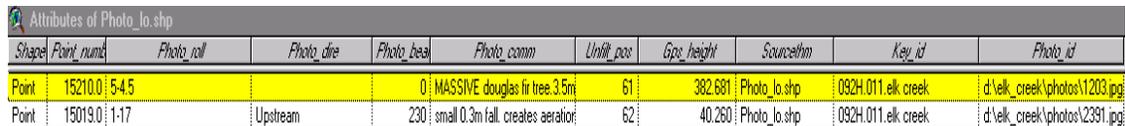
Shape	Point_numb	Photo_roll	Photo_dire	Photo_bea	Photo_comm	Unfilt_pos	Gps_height	Sourcethm	Key_id	Photo_id
Point	15210.0	5-4.5		0	MASSIVE douglas fir tree.3.5m	61	382.681	Photo_lo.shp	092H.011.elk creek	d:\elk_creek\photos\1203.jpg
Point	15019.0	1-17	Upstream	230	small 0.3m fall. creates aeration	62	40.260	Photo_lo.shp	092H.011.elk creek	d:\elk_creek\photos\2391.jpg

    Photo_id
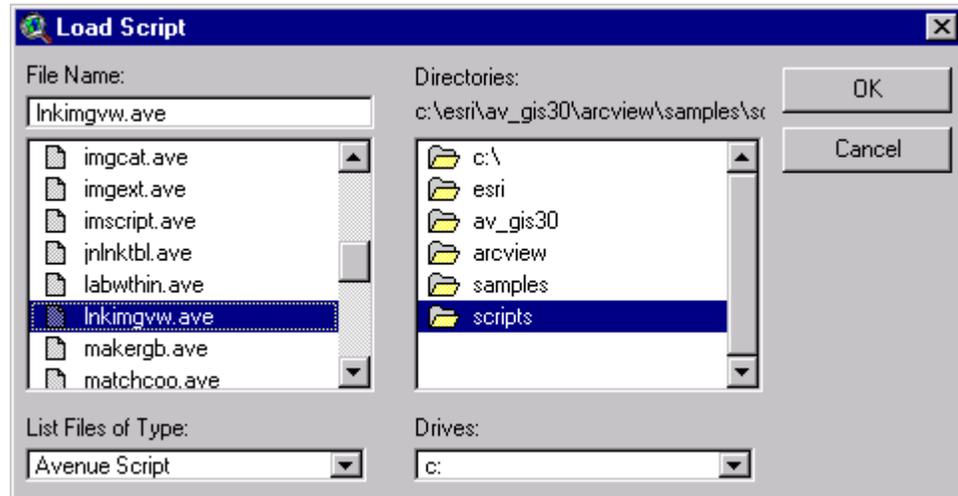   d:\elk_creek\photos\1203.jpg
    d:\elk_creek\photos\2391.jpg

3. Define the user script to allow hotlinking of the jpg images
    - Create a new script in the Project window:

      Untitled
      New   Open   Run
      Script1
      Views
      Tables
      Charts
      Layouts
      Scripts

- Select the "Load Text File" in the Script Properties dialog
- Navigate to the file
  c:\esri\av_gis30\arcview\samples\scripts\lnkmgvw.ave within the
  standard ArcView program

- Download the script (shown partially below)

```
Script1
' Name:   View.HotLinkImage
'
' Title:  Hotlinks an image to display in a View
'
' Topics:  Views, Images
'
' Description:  A hotlink script that can be used in place of Link.ImageFile
' to display an image as a theme in a View document rather than in an
' ImageWin. Some images will display faster and have better display quality
' when displayed as themes in Views.
'
```

- Select the "Script Properties" dialog and rename the script to
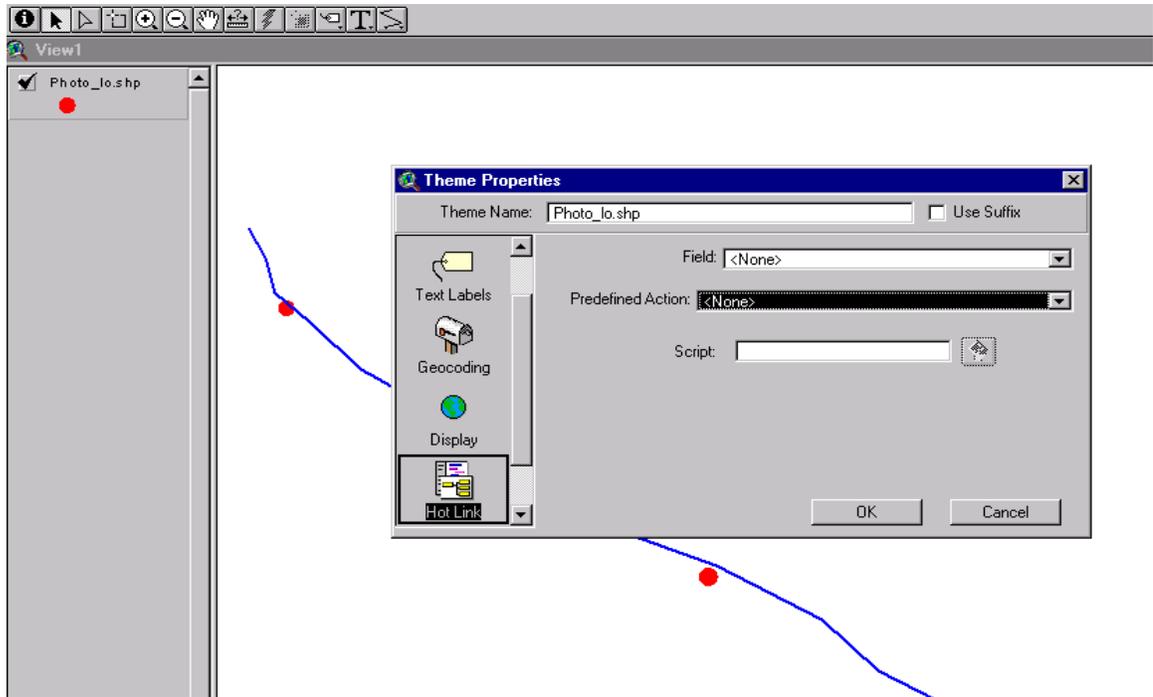 View.HotlinkImage

```
View.HotlinkImage
' Name:   View.HotLinkImage
'
' Title:  Hotlinks an image to display in a View
'
' Topics:  Views, Images
'
' Description:  A hotlink script that can be used in place of Link.ImageFile
' to display an image as a theme in a View document rather than in an
' ImageWin. Some images will display faster and have better display quality
' when displayed as themes in Views.
'
```

- Select the "Script Compile" option in the Script window and compile the script

4. Define the theme's Hot Link properties

- Open the "Theme Properties" dialog for the photo_point shapefile in the View window and scroll to the Hot Link panel
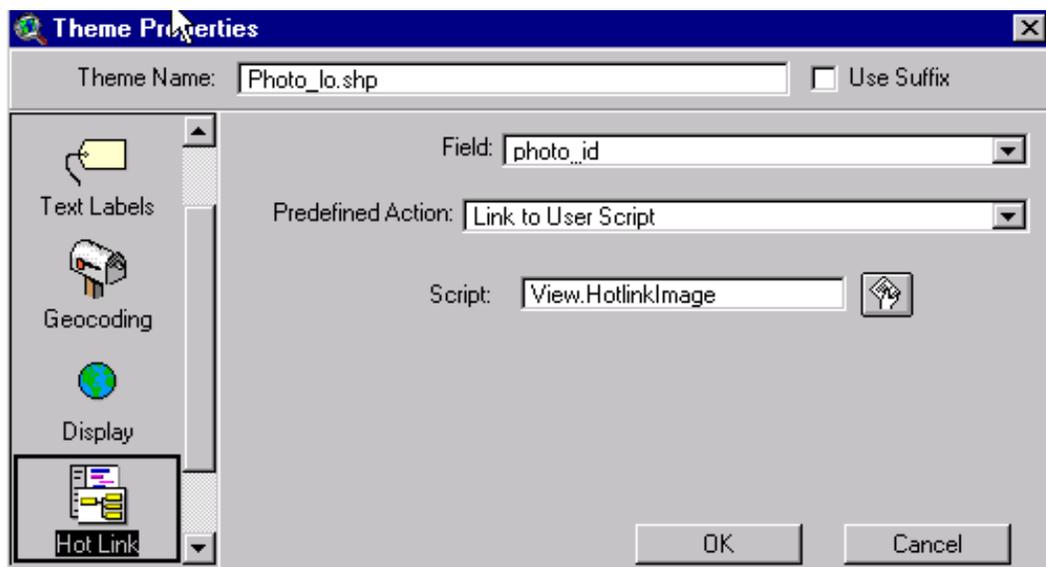

- Within the Hot Link properties options select:

Field = photo_id

Predefined Action = Link to User Script

Script = View.HotLinkImage

5. Use the Hot Link tool to view and edit jpg images

- Select the Extensions option under the File properties menu.
- Toggle on the JPEG (JFIF) Image Support option under Available Extensions.
- jpg images associated with the photo_point shapefile can now be viewed simply by clicking on a photo point with the Hotlink tool found in the View window. This will bring up a full sized image in its own ArcView window, with full ArcView editing and printing functionality.
- Switch between different field names (i.e., photo_id1, photo_id2, and photo_id3) in the Theme Properties Hotlink Field if there is more than one photo linked to the point.