

VISUAL ASSESSMENT PROJECT PLAN (VAPP) GUIDANCE

AUGUST 2007

(Submitted as a component of a Watershed Restoration and/or Protection Plan (WRPP) developed with 319(h) funding).

PURPOSE:

The purpose of this guidance document is to provide a framework to the grantee of options that should be investigated when developing the Visual Assessment Project Plan (VAPP) for a 319(h) funded Watershed Restoration and/or Protection Plan (WRPP); rather than a prescriptive or comprehensive list. The focus should be to consider various options during the development of the Visual Assessment Project Plan (VAPP) and determine what could and/or should be conducted during the assessments. Each watershed will have common elements, and, in most cases, it is appropriate to utilize a common protocol. For 319(h) funded WRPP's it is recommended that The New Jersey Department of Environmental Protection's (Department) Volunteer Monitoring Protocol for visual assessments be utilized as the common protocol. The data sheets for this VAPP guidance document were developed after reviewing data collection sheets from several NJ volunteer monitoring groups, the Department's original "Water Watch" RATS (River Assessment Teams) volunteer monitoring programs, the Natural Resource Conservation Service's Stream Visual Assessment Protocol (SVAP) and the EPA's Rapid Bio-Assessment Protocol and Volunteer Monitoring Manual. Please keep in mind, this VAPP guidance document is New Jersey specific.

As each watershed has unique characteristics, the VAPP should be developed in conjunction with the trainers, the assessors, the Watershed Group(s) and project partners familiar with the watershed, and the NJDEP Project Manager. In some instances, visual assessments may provide the majority of the on-the-ground information relied upon for the development of the WRPP and it is envisioned that the VAPP, to the extent practicable, should be developed to provide detailed and significant information for both the Characterization and Assessment and also for the finished product - the Watershed Restoration and/or Protection Plan. For each VAPP several significant factors should be considered: a) the specific characteristics of the watershed under investigation; b) visual assessment data previously collected or other available information; c) other data gathering that will be conducted during the project (i.e. Stressor Identification); and d) how the collection of data from the VAPP will be directly tied into the development of the WRPP. The available resources may impact the ability of the assessors to conduct specific investigations, or the investigation may not be applicable to the particular watershed. In the case of the former it may be included in the WRPP that additional investigation is necessary.

This document is not intended to provide guidance regarding the methodology of the in-the-field visual assessment or for the purpose of conducting visual assessments. This guidance is specific to the development of a VAPP for funded 319(h) grants that have visual assessments as a component of the information gathering process in order to provide greater understanding of the watershed, and ultimately to be utilized in the development of the WRPP. The purpose of a WRPP will go well beyond what is described in the VAPP and to the extent that a visual assessment is utilized, the end-goal of the information needed for a WRPP should be an overarching principle.

The VAPP should be an organized description of the purpose, objectives, and methods of the visual assessments that will be conducted. The VAPP's will be submitted to the NJDEP 319 grant Project Manager for review and approval.

All VAPP's should include the following statement "If regulated pollution incidents are observed by assessors during their surveys, they will be instructed to report the pollution incident to the NJDEP hotline (1-877 WARN DEP), the 319 project manager and any other appropriate agencies".

SECTION I: Goals and Objectives:

The prerequisite for a well structured sampling plan is sufficient thought prior to actual development. The VAPP should first address the purpose for the visual assessments; this will help to drive the answers to the criteria that should be considered in the development of the VAPP. The following bulleted list provides some examples of questions that should be asked during the development of the VAPP. This is not to be considered comprehensive; please use the following discussion bullets listed below to assist in focusing your objectives. The objectives to be achieved with the VAPP should be agreed to by the project partners and discussed with your NJDEP Project Manager. Other information that may be evaluated in reference to the visual assessments include: USDA Stream Visual Assessment; Center for Watershed Protection's Unified Stream Assessment: A User's Manual; New Jersey DEP's Visual Assessment Protocol used by Americorps Watershed Ambassadors; NJDEP AMNET Physical/Habitat protocol; Delaware River Network's Integrated Assessment; The Pfankuch channel stability evaluation.

- Is the VAPP necessary to provide information for a Protection Plan? A Protection Plan may be more generic in order to provide a greater overview of conditions in the watershed. Consequently, the visual assessments should be more comprehensive, since the lack of other data will mean that much of the decisions made will rely heavily on the VAPP in comparison to areas where there is a TMDL with chemical data collected over several years. For example, in a Protection Plan the areas and overall estimated amount of intact buffer may be an important piece of information.
- Is the VAPP a component of a Restoration Plan with identified impairments? The study area where a Restoration Plan is being developed may have a lot of existing

information available which should be incorporated into the VAPP. This will provide the field assessors a greater focus on potential sources of impairments. Some examples include:

- A visual assessment with a focus on fecal coliform might differ from a visual assessment where the impairment leads to a focus on aquatic life or community.
 - If there is a biological impairment, this may increase the focus on stream velocity observations, embeddedness or substrate.
 - If there is temperature impairment then the procedure may include a more detailed identification of canopy cover or identification of even small impoundments.
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- How much time and energy can and/or will be devoted to the VAPP? This will impact what can be done in the watershed, if time and staff are limited it is even more critical to be clear as to what the field staff are looking for when they go out in the field.
 - Are the visual assessments being conducted to determine sampling locations? The criteria should be explained in detail in the VAPP. For example: access; confluence of tributary(ies); stormwater outfalls; NJDEP monitoring site that provided data for impairment status, etc.
 - Are the visual assessments being conducted to determine potential sites for restoration projects? If the objective is to identify potential restoration sites the criteria should be clearly identified in the VAPP. Will it be restricted to public property? (Homework will need to be done up front). Are there already sub-basins identified that sampling or modeling have indicated provide the greatest loads? Will these sub-basins be assessed in greater detail?
 - What has the initial mapping desk audit shown as something that should be included in the Assessments? For example are there Known Contaminated Sites, Classification Exception Areas or Currently Known Extent in the area where the assessor should be aware of soil discoloration in the riparian zone or odors or leakage?
 - Does the area include any documented habitat for Threatened and Endangered (T&E) Species? If so, then special care should be taken to be observant of sightings of the organism or signs (i.e. droppings). If the field team does not have the expertise to identify occurrences, this should be noted in the VAPP. The WRPP may include language that further investigation is required as a future action. If there is evidence of the T&E species the WRPP might include an approved Stream Corridor Protection Plan as provided for in the New Jersey Stormwater Management Rules at N.J.A.C. 7:8-4.2 (c)13, to allow for greater buffer in this area and a potential reduction in buffer in another area. There may be other management measures that would be beneficial to be included in the WRPP to assure or assist the survival of the particular species. For Restoration Plans, these areas should be noted because obtaining necessary permits in areas with T&E species will need to meet specific permit requirements, if approvable.

- If there has been preliminary identification of areas of concern through other work the VAPP should identify this. If additional work will be completed that will provide greater field information this should be identified in the VAPP. This guidance presupposes that the visual assessments conducted will be predominantly field data collection. For example, if Stressor Identification (SI) will be conducted as a component of the WRPP the VAPP should identify this and discuss the coordination between the two efforts.

The visual assessments may continue as part of a volunteer watershed monitoring initiative and may also be a component of the follow-up as indicated by several of the EPA 9 minimum components of a WRPP as listed in the 319h grant RfP:

- g. A description of interim, measurable milestones for determining whether NPS management measures or other control actions are being implemented.*
- h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made towards attaining water quality standards and, if not, the criteria for determining whether this watershed-based plan needs to be revised or, if a NPS TMDL has been established, whether the implementation plan section of the TMDL needs to be revised.*
- i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item (h) immediately above).*

Visual assessments are not specific enough to provide chemical data to determine the efficacy of a particular Best Management Practice (BMP) or Manufactured Treatment Device. The criteria that will be used to determine that the Restoration Plan has achieved its objectives and reduced the load sufficiently for the stream to achieve the Surface Water Quality Standards (SWQS) is data accepted by the NJDEP, Division of Monitoring and Standards, Water Assessment Team for their development of the New Jersey Integrated List. But it is possible that continuing visual assessments could certainly, in some instances, provide a warning that a BMP does not appear to be working or that there are issues associated with the BMP and/or maintenance. Continuing visual assessments by volunteers could provide the necessary information of whether interim management measures or other control actions were being implemented. Therefore, if there is a volunteer group that will continue to do visual assessments this should be incorporated into the VAPP and the WRPP under either (g), or (i) as identified above. If future visual assessments will be conducted the VAPP should also discuss training needs of the volunteers.

SECTION II: Maps and Desk Audit:

The amount of time utilized for initial overview of the watershed area and environmental constraints and/or features **prior to** going out in the field will directly correlate to the amount of useful information that will be obtained in the field. Some examples of GIS layers that could be utilized (and are all available on I-map) are:

- Streams/Lakes/Surface Water Quality Standards/C-1/Shellfish Classification
- Roads
- Known Contaminated Sites/Ground Water Contamination areas
- Classification Exception Areas (CEA)
- Currently Known Extent (CKE)
- NJEMS Sites
- Habitat for Threatened and Endangered Species (and what species it is). If it is habitat for bald eagle the visual assessment should look at different aspects than habitat for bog turtle. Landscape Project and Natural Heritage Sites
- Public Community Water Supply Wells/Well-Head Protection Areas
- Fish Index of Biotic Integrity
- Highlands or Pinelands Boundary; D&R Canal commission Review Zones
- Open Space
- Natural Heritage Sites
- Sewer Service
- Impervious Surface/Land Use/Land Use Change
- Soils
- Aerial Photos
- AMNET biological monitoring stations

Or other information as available:

- USGS/NJDEP water quality monitoring stations
- USGS flow gauges
- Vernal Pool Identification: Herp Atlas Volunteer Training Manual located at http://www.state.nj.us/dep/fgw/ensp/pdf/herpatlas_train_manual05.pdf may provide information that is helpful for the assessments. The Center for Remote Sensing and Spatial Analysis in conjunction with the New Jersey Division of Fish and Wildlife provide an interactive map for identified vernal pools at <http://www.dbcrrsa.rutgers.edu/ims/vernal/graphics.htm> which may be useful.

The VAPP will include GIS mapping and analysis which should be made available and utilized prior to staff going out in the field. The VAPP should clarify that the field staff will have access to and be informed of all relevant information and mapping. There is a potential for a disconnection between tasks and responsible parties, the timeframes for the GIS analysis may not match the timeframe for the field assessments. If mapping of greater detail is not available or accessible the NJDEP Office of Geographic Information Systems (<http://www.nj.gov/dep/gis/depsplash.htm>) provides an online

mapping program (I-Map) that can be utilized without intensive training or specialized software.

SECTION III: Stream Reaches and Timing Considerations:

Stream surveys of all reaches of the stream may be difficult in some areas due to topographic, safety or private property issues. Inaccessible reaches will be noted on the datasheets. The rationale as stated in Section I of the VAPP should determine if these sites will provide the necessary and critical information and are worth the additional expenditure of time and/or resources to attempt an assessment. The extent of stream reach length should be a ¼ mile in total distance. However, based on land use and land cover within the watershed, this stream reach length may be changed with the approval of the NJDEP Project Manager. As this may be the major on-the-ground information that is utilized in developing the WRPP it is recommended that as much of the stream as possible be assessed. The partnerships with the municipalities and local watershed groups and local volunteers may facilitate private property access.

Timing of the assessments should be determined based on the objectives. In order to facilitate the use of GPS to document sites, it is best to have minimal tree cover. It is also easier to assess the surrounding area or notice outfalls when vegetation is less. Optimal times for visual assessments therefore would be fall, prior to snowfall but after leaf drop, and in the early spring. If the objectives include other assessments, such as vernal ponds or identification and determination of extent of invasive species then the procedure should include either a separate event or other means to achieve all the objectives.

Photographs:

- Provide a CD of all digital photos taken.
- There should be a “most degraded” picture.
- All digital photos should have an identifier (reach id), caption to indicate reason picture was taken and date photo was taken.
- Photos should be stored in files according to the date of assessment. Then, labeled with a reach id underscore and the reason the photo was taken (i.e. 101507R001_pipe)
- There should be a “representative” photo. This is a subjective call that this particular photo best represents the stretch.
- There should be photos that illustrate and identify the issues and/or help to achieve the objectives. For example, this site is where it is recommended that biological sampling be conducted, or this site had a dry weather flow, or this site is a potential BMP site.

SECTION IV: New Jersey Electronic Data Management System:

All data collected should be reviewed and checked for accuracy. After the initial assessments, a review should be conducted to identify any problems prior to the project being completed. Entering data on the day it is collected is a standard procedure to better assure that missing information or errors are quickly noted. Once all data are examined and completed, data will be entered into an electronic database. The NJDEP, Volunteer Monitoring Program has developed a database that can be utilized. Training and support for utilizing this database is available, please contact Danielle Donkersloot at volunteermonitoring@dep.state.nj.us . Below is a discussion of the Department's Volunteer Monitoring Database. The VAPP Data Sheets attached to this guidance document will correlate well with the database.

NJDEP Volunteer Monitoring Database:

The NJDEP recognizes the challenges associated with collecting and managing data. Conducting assessments, defining the current water quality conditions and getting the numbers and scores to actually mean something to your audience can be both time consuming and frustrating. Yet, volunteer monitors want the data they collect to be translated to the public in meaningful ways. The science behind "getting the numbers to talk" is not only a challenge, but an art form.

Although there is no one magic formula to cure all the issues associated with translating and interpreting the data, NJDEP staff, a consulting firm or two, and the volunteer program coordinators from around the state, have created the first NJ public data management system. This online data management system has been designed to help alleviate the burden of data management and allow for volunteer collected data to be comparable and compatible with other available data. The system is a powerful tool for the volunteer community, as it allows registered volunteers to run simple statistics, create graphs for visual comparisons or make available for download all available data of a particular watershed, water body or geographic location. This new system allows the data to be effectively managed, analyzed and reported for use by NJDEP, other interested organizations, the general public and you!

To begin using the NJ Electronic Data Management System as a volunteer organization, you must register for an ID and PIN at: <http://www.nj.gov/dep/online> Your NJDEP Project Manager can facilitate the process.

Once you get to the web page hit the "continue" to get to the NJDEP online portal. When you get to the portal page, you need to LOGIN. It then says you will need to put in your ID and PIN. For first time users, you will need to press "Need an ID?" to bring you to the page where you can create an ID and PIN.

Training, individual group assistance and support is available. For more information,

please continue to check our website or request to be on our data system user group email list at volunteermonitoring@dep.state.nj.us

SECTION V: Quality Control:

A quality control check should be performed on 10% of the assessments conducted. Please work with your NJDEP Project Manager to determine if Americorps would be available to provide the 10% quality control check for your project.

SECTION VI: Additional Assessment Options:

There are several other options that may be applicable dependant upon your objectives and the training available to the field staff. As these other options will undoubtedly take additional time and resource commitment the rationale for undertaking these assessments should be very clear.

- Invasive species identification: This can provide important information for restoration or protection plans. Training is critical. The Department may be able to provide training with sufficient notice. When possible, invasive species monitoring is highly recommended for either a Protection Plan and/or Restoration Plan. Identification to genus/species is critical, simply noting invasive species presence is helpful but not fully sufficient. Invasive species might help indicate the true integrity of a riparian buffer, and the amount of work to restore that buffer. The effort required to eradicate the invasive species is frequently dependent upon what species is present. This will have significant impact on water quality issues, along with the determination of restoration sites, priority and applicable measures with cost. Water quality will also be affected differently related to the species present. For example Japanese knotweed (*Fallopia japonica* or *Polygonum cuspidatum*) dominates many stream corridors but it provides poor soil stabilization; or Japanese stiltgrass (*Microstegium*) which has been shown to increase nitrate in the soil rather than ammonium which can be used by native plants. Invasive species may also impact the stream biological community. An example sheet is attached.
- Vernal Pool Identification: Herp Atlas Volunteer Training Manual located at http://www.state.nj.us/dep/fgw/ensp/pdf/herpatlas_train_manual05.pdf may provide information that is helpful for the assessments. The Center for Remote Sensing and Spatial Analysis and the NJ Division of Fish and Wildlife provide a website with an interactive map for identified vernal pools at <http://www.dbcrssa.rutgers.edu/jms/vernal/graphics.htm>
- Other biological (i.e. avian) information that might help to provide information.

SECTION VII: Geographic Information System/Global Positioning System Requirements:

- If the GPS is entered into a GIS, corrections will be conducted by the same party each time. As appropriate, GPS data collected through the VAPP will also be downloaded onto base maps to map undocumented tributaries or other important areas characterized during the assessment. The GPS portion of this data should be summarized by GIS professionals. Metadata will be provided with any coverage created from the project.
- The training or expertise in using the GPS equipment should be documented. A user's manual should be provided to field staff along with extra batteries.
- Locations and features should be noted on a map and data sheets for redundancy in the event that the GPS units fail or malfunction.
- GPS coordinates should be examined for completeness and accuracy prior to data entry.
- Any incomplete information or information that appears to be inadequate or incorrect will be ground-truthed by staff to correct any problem data.
- All GPS units will be WAAS enabled with built-in calibration abilities.

SECTION VIII: Data Assessment Sheets:

The data sheets for this VAPP were developed after reviewing data collection sheets from several NJ volunteer monitoring groups, the Department's original "Water Watch" RATS (River Assessment Teams) volunteer monitoring programs, the Natural Resource Conservation Service's Stream Visual Assessment Protocol and the EPA's Rapid Bio-Assessment Protocol and Volunteer Monitoring Manual.

The manual for the data assessment sheets is available at:

<http://www.state.nj.us/dep/wms/bfbm/vm/docs/Instruction%20Manual%20for%20AmeriCorp2.pdf>

Please keep in mind, the #3 Streamside Land Use Assessment Sheet can be partially completed prior to going out in the field.

VISUAL ASSESSMENT PROJECT PLAN

#1 General Sheet

Segment ID #: _____ Water Body Name: _____

Watershed Management Area: _____ Grant Identifier: _RP# _____

County: _____

Segment Identification

Beginning at Latitude/Longitude: _____

Ending at Latitude/Longitude: _____

Survey Team: _____ Date/Time: _____

Weather: 1. Clear 2. Overcast 3. Light rain/Showers 4. Steady Rain 5. Heavy Rain 6. Snow 7. Heavy Snow Melt

Today	Last 48 Hours	Past Week

Days since last rain: _____

_____ ° F
Temperature: _____

Site Sketch: include flow direction, riffles, pools, runs, ditches, riprap, outfalls, roads, sampling locations, photo reference #, GPS reference #'s

VISUAL ASSESSMENT PROJECT PLAN

#2 Monitoring Sheet

(right and left stream bank are determined facing upstream)

Stream Width		<p>For Non-Wadable Streams:</p> <p>1. Constant 2. Widening 3. Mild constrictions 4. Sharp constriction</p> <p>For Wadable Streams:</p> <p>Stream Width average _____ (ft)</p>
Stream Velocity		Velocity average in feet per second (divide 10 (D) by the average time (T) ; $V = D/T$)
Stream Depth / Velocity Combinations		1. Slow, deep 2. Fast, deep 3. Fast, shallow 4. Slow, shallow
Stream Sinuosity		1. Straight – natural 2. Straight – channelized 3. Slight bends 4. Moderate bends 5. Sharp bends (oxbows)
Stream Flows		1. Slow 2. Moderate 3. Swift 4. Combination
Pools & Riffles		1. Frequent occurrence 2. Infrequent occurrence 3. Occasional occurrence 4. Flat water
Pool Variability		1. Even mix of large-shallow, large-deep, small-shallow, small-deep pools present. 2. Majority of pools large-deep; very few shallow 3. Shallow pools much more prevalent than deep pools 4. Majority of pools small-shallow or pool absent
Channel Flow Status		1. Base of both lower banks 2. Water fills greater than 75% 3. Water fills 25-75% 4. Very little water
Stream Substrate		1. Fine particles (silt, clay, mud) 2. Sand 3. Gravel 4. Cobble 5. Boulder 6. Bedrock 7. Other
Stream Substrate		1. Loose 2. Stable
Embeddedness (Gravel, Cobble, & Boulders)		1. 0 – 25% surrounded by fine sediment 2. 26 – 50% surrounded by fine sediment 3. 51 – 75% surrounded by fine sediment 4. Greater than 75% surrounded by fine sediment
Sediment on Stream Bottom		1. Little deposit 2. Some deposit 3. Moderate deposit 4. Heavy deposits

Epifaunal Substrate Available Cover		High gradient Stream: <ol style="list-style-type: none"> Greater than 70% stable habitat 40-70% stable habitat 20-40% stable habitat less than 20% stable habitat Low Gradient Stream: <ol style="list-style-type: none"> greater than 50% stable habitat 30-50% stable habitat 10-30% stable habitat 10% or less stable habitat 		
Bank Stability	Right Bank	1. Stable, evidence of erosion or bank failure absent or minimal; <5% of bank affected 2. Moderately Stable, small areas of erosion, mostly healed over; <5 – 30% of bank in reach has areas of erosion		
	Left Bank	3. Moderately Unstable; 31 – 60% of bank in reach has areas of erosion, high erosion potential during flooding 4. Unstable, many eroded areas, "raw" areas frequent; obvious bank sloughing; 60% or > of bank erosional scars		
% of Tree Canopy Above Stream		1. 0 – 25% 2. 26 – 50% 3. 51 – 75% 4. 76 – 100%		
Riparian Vegetation	Right Bank	1. > 50 ft. width 2. 35 – 50 ft. width 3. 15 – 35 ft. width 4. < 15 ft. width		
	Left Bank			
Woody Debris		1. None 2. In spots 3. Heavy throughout reach		
Woody Debris		1. Free floating 2. Attached		
Predominant Aquatic Vegetation		1. Rooted emergent 2. Rooted submergent 3. Rooted floating 4. Free floating		
Algae Location		1. None 2. On streambed 3. On surface 4. Both		
Algae Color		1. Light green 2. Dark green 3. Brown 4. Other		
Channel Alteration		1. Stream with normal pattern 2. Some channelization present, usually in areas of bridges, etc... 3. Channelization extensive, 40 – 80% of the stream reach 4. Over 80% of the stream channelized, gabion baskets and/or riprap, and/or concert present		
Structures	Bridges	Culverts	Dams	Other

Water Conditions		
Odor:		1. Normal 2. Sewage 3. Petroleum 4. Chemical 5. Anaerobic 6. Other
Color:		1. Clear 2. Tea 3. Milky 4. Muddy 5. Other
Surface Coating		1. None 2. Oily 3. Foam 4. Scum 5. Other

Observations: (indicate locations on map, including left or right bank)

Photo Reference #'s

GPS Reference #'s

VISUAL ASSESSMENT PROJECT PLAN

#3 Assessment Sheet

Streamside Land Use				
	Within 50 ft. of top of bank		Within ¼ mile of site May be coordinated with GIS aerial views	
	Left Bank	Right Bank	Left Bank	Right Bank
Residential single-family housing				
Residential multifamily housing				
Residential Lawns				
Residential Pets				
Commercial / Institutional				
Commercial / Institutional Lawns				
Roads Paved				
Roads Unpaved				
Construction Underway For: Housing Development				
Commercial				
Road / Bridge: Construction Repair				
Agricultural Grazing Land				
Agricultural Feed Lots / Animal Holding Areas				
Agricultural Cropland				
Inactive Agricultural Land / Fields				
Recreational Power Boating				
Recreational Golfing				
Recreational Camping				

Recreational Swimming / Fishing / Canoeing				
Recreational Hiking / Paths				
Recreational Athletic Fields				
Waterfowl (with approximate #)				
Pet Waste				
Preserved Open Space				
Woodland				
Wetlands				
Cemetery				
Recycling/Waste Facility				
Industrial				
Other				

Observations: (indicate locations on map)

Photo Reference #'s

GPS Reference #'s

VISUAL ASSESSMENT PROJECT PLAN

#4 Pipe & Drainage Ditch Inventory Sheet
(fill out one sheet for each one)

Outfall Pipe Reference # _____ Pipe Diameter: _____ (in. or ft) _____

Type: _____ 1. Storm drain 2. Residential discharge 3. Industrial Discharge (NJPDES# _____)

4. Combined sewer overflow 5. Other

Pipe Material: _____ 1. Concrete 2. Steel 3. PVC 4. Clay 5. Other _____

Pipe Location: _____ 1. In stream 2. In stream bank 3. Near stream

Pipe Flow/Appearance: _____ 1. None 2. Trickle 3. Intermittent 4. Steady 5. Heavy

Flow Color: _____

Is streambank at outfall eroded? _____

Stream channel downstream: _____ 1. Stable 2. Eroded

Drainage Ditch # _____ 1. Unknown 2. Outfall pipe 3. Parking Lot 4. Settlement Basin / Pond
5. Agricultural field 6. Livestock Operation

Begins At: _____

Ditch Lining: _____ 1. Stone 2. Vegetation 3. Concrete 4. Mud Ditch Is: _____ 1. Stable 2. Eroding

Ditch Flow: _____ 1. None 2. Intermittent 3. Steady

Flow Appearance: _____ 1. Clear 2. Turbid 3. Oily 4. Foamy 5. Colored _____

Stream channel downstream: _____ 1. Stable 2. Eroded

Observations: (indicate locations on map)

GPS Reference #'s

VISUAL ASSESSMENT PROJECT PLAN

#5 Invasive Plant Survey Sheet

Date (mm/dd/yy): _____ Stream ID: _____ Reach No: _____

Time: _____ Observer Name(s): _____

If there are invasive species present on the site, approximately what percentage of the plant community is made up of invasives? _____

If invasive plant species are present, specify below the type and degree of dominance throughout the reach. *For degree of dominance in community indicate if the species has low (L), medium (M) or high (H) dominance. This is not a comprehensive list. See resources below for other invaders.

** S= shrub; V= vine; H= herbaceous; T= tree

Invasive Plant**	Species Dominance (L, M, or H)*
Canada thistle (H) (<i>Cirsium arvense</i>)	
Spotted Knapweed (H) (<i>Centaurea maculosa</i>)	
Common reed (H) (<i>Phragmites australis</i>)	
Curly Leaf Pondweed (H) (<i>Potamogeton crispus</i>)	
Cut leaved Teasel (H) (<i>Dispacus laciniatus</i>)	
Eurasian Water-milfoil (H) (<i>Myriophyllum spicatum</i>)	
Garlic mustard (H) (<i>Alliaria petiolata</i>)	
Japanese knotweed (H) (<i>Polygonum cuspidatum</i>)	
Japanese Stilt Grass (H) (<i>Microstegium vimineum</i>)	
Lesser celandine (H) (<i>Ranunculus ficaria</i>)	
Purple loosestrife (H) (<i>Lythrum salicaria</i>)	
Reed Canary Grass (H) (<i>Phalaris arundinacea</i>)	
Wild Teasel (H) (<i>Dispacus fullonum</i>)	

Invasive Plant**	Species Dominance (L, M or H)*
Autumn olive (S/T) (<i>Elaeagnus umbellata</i>)	
Japanese barberry (S) (<i>Berberis thunbergii</i>)	
Japanese honeysuckles (<i>Lonicera</i>) (V/S)	
Japanese Hops (V) (<i>Humulus japonicus</i>)	
Mile-a-Minute (V) (<i>Polygonum perfoliatum</i>)	
Multiflora rose (S) (<i>Rosa multiflora</i>)	
Oriental bittersweet (V) (<i>Celastrus orbiculatus</i>)	
Tree of Heaven (T) (<i>Ailanthus altissima</i>)	
Winged burning bush (S) (<i>Euonymus alata</i>)	
Other:	

Comments: _____

Resources:

- An overview of nonindigenous plant species in New Jersey. NJDEP, Natural Heritage Program www.state.nj.us/dep/parksandforests/natural/heritage/InvasiveReport.pdf
- Plant Invaders of Mid-Atlantic Natural Areas. National Park Service US Fish and Wildlife Service <http://www.nps.gov/plants/alien/pubs/midatlantic/>
- Pennsylvania Field Guide- Common Invasive Plants in Riparian Areas www.acb-online.org/pubs/projects/deliverables-145-1-2004.pdf
- Mid-Atlantic Exotic Pest Council www.ma-eppc.org/

VISUAL ASSESSMENT PROJECT PLAN

Watershed Maps

