

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
Entity Type	Data/testing standardization.	State-specific performance testing.	State-specific performance testing.	Data clearinghouse.	Performance testing.	State-specific performance verification.
Primary documents used to make this comparison:	The Technology Acceptance Reciprocity Partnership <i>Protocol for Stormwater Best Management Practice Demonstrations</i> , 7/2003 (Revised) http://www.dep.state.pa.us/deputate/pollprev/techservices/tarp/pdffiles/Tier2protocol.pdf	Guidance for Evaluating Emerging Stormwater Treatment Technologies, 2004 (revised) http://www.ecy.wa.gov/biblio/0210037.html . http://www.ecy.wa.gov/pubs/0210037.pdf	http://www.njcat.org/ewebeditpro/items/O56F8236.doc http://www.state.nj.us/dep/dsr/bcit/NJStormwater_TierII.pdf http://www.state.nj.us/dep/dsr/bcit/Documents.htm http://www.state.nj.us/dep/dsr/bcit/TestProcedure_Dec%2703_.pdf http://www.state.nj.us/dep/dsr/bcit/BMPManual.pdf http://www.njcat.org/verification/protocol.cfm	FAQ Background v1.pdf (updated October 14, 2007) http://www.asce.org/community/waterresources/nsbmqdb.cfm http://cedb.asce.org/cgi/WWWdisplay.cgi?9903169 -Verbal communication with Jane Clary from Wright Engineers. -Policy on Inclusion of Proprietary Device Data in the International Stormwater BMP Database1	http://www.nsf.org/business/water_quality_protection_center/index.asp?program=WaterQuaProCen ETV Verification Protocol Stormwater Source Area Treatment Technologies, V.4.1 3/2002 http://www.nsf.org/business/water_quality_protection_center/pdf/StormwaterProtocolDraft4-1.pdf -verbal communication with Jim Bachhuber of EarthTech Inc.	http://www.mastep.net http://www.mastep.net/documents/finalS319FY04.pdf
Year Established	2001	2001	1997	1996	1999-2007 (~20 BMPs tested until funds dried up.)	2004
Host(s) / Partners	Pennsylvania Dept of Environmental Protection; University of Massachusetts @ Amherst	Washington State University Dept. of Ecology (“Ecology”)	NJCAT is an independent non-profit, private-public collaboration. New Jersey Department of Environmental Protection (Commissioner serves as an <i>ex-officio</i> board member).	Started 1996: EPA, ASCE (asce.org). In 2004 added: WERF (werf.org); EWRI of ASCE (ewrinstitute.org); USDOT-FHA (fhwa.dot.gov); APWA (apwa.net); WWE (wrightwater.com); GEOSYNTEC (geosyntec.com).	The Wet Weather Flow Technologies Pilot is operated under the direction of the USEPA National Risk Management Research Laboratory, Urban Watershed Management Branch, Edison, NJ, and its verification partner, NSF International (NSF). EPA gave National Sanitation Foundation grant. NSF subcontracted EarthTech Inc. (developed field testing protocol, analyzed data and wrote report),	University of Massachusetts at Amherst with funding from an EPA s. 319 competitive grant to the MA Department of Environmental Protection (MADEP) ;http://www.mass.gov/de p/

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
					USGS did field monitoring and data collection.	
Endorsed by / Geographic Scope (*Note inclusion in more than one program)	*CA, *MA, MD, *NJ, PA, VA, IL.	WA, (*CA also, personal communication – Larry Kauffman of Filterra Inc.)	*NJ	Not geographically specific. Includes data from US, Canada and Sweden. Florida Department of Environmental Protection BMP Database Integrated into the Database.	Nation-wide/Not regional. Testing took place in GA, MI and WI.	*MA
Supporting URL(s)	http://www.dep.state.pa.us/deputate/pollprev/techservices/tarp/ (Searchable database)	http://www.ecy.wa.gov/biblio/0210037.html http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html	http://www.njcat.org	http://bmpdatabase.org/ or http://nswbmp.geosyntec.com/index.htm (website and database maintained by GeoSyntec and Wright Water Engineers)	http://www.epa.gov/etv/verifications/protocols-index.html	http://www.mastep.net/index.cfm
Reciprocity	Formalized via MOU between signatory states, (*CA, *MA, MD, *NJ, PA, VA, IL.) but each state has superseding state-specific requirements.	WA State only. However, laboratory and/or field performance data obtained in states using other protocols such as the ETV and TARP Protocols will be considered for PLD and GULD status within the constraints of TAPE.	N/A. NJCAT is NJ specific and performance verification is not collaborative across states. NJ uses TARP testing protocol with special requirements. (See below)	N/A. IBMPDB is not state or regionally specific. <ul style="list-style-type: none"> Data is solicited by IBMPDB from all sectors. Entity does NOT verify or approve. There is a standard reporting protocol. 	N/A. ETVP is not state or regionally specific. Not recommending BMPs. Just verifying vendor claims.	N/A. MA use only. However, MASTEP uses TARP Tier II verification and testing protocol.

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
				<ul style="list-style-type: none"> Data is quality controlled by partners and statistical analysis of data performed by partners. 		
Certification / Approval of a Specific BMP for use?	YES, but by states individually.	YES	YES	NO	NO	YES
Performance Verification?	YES, but by states individually.	YES	YES	NO	YES (as per project name)	YES
# of BMPs as of October 2008.	N/A – This is only a testing protocol.	30 See: http://www.ecy.wa.gov/program/s/wq/stormwater/newtech/technologies.html	12 See: http://www.state.nj.us/dep/dsr/bscit/CertifiedMain.htm	343 See: http://bmpdatabase.org/Docs/Summary%20of%20BMP%20Types%20by%20State.pdf	10 See: http://www.epa.gov/nrmrl/std/etv/vt-wqp.html#SWSATD http://www.epa.gov/nrmrl/std/etv/pubs/600s07003.pdf	45 proprietary devices or devices with proprietary components, but none have achieved “Category 1”. (see below) See: http://www.mastep.net/database/data.cfm
Purpose of Entity / Protocol	This stormwater protocol ensures that technologies are evaluated in a uniform manner assuring minimum standards for quality assurance and quality control (QA/QC). In addition, the protocol establishes an interstate reciprocity pathway for technology and regulatory acceptance. (NJ BMP	Characterize, with a reasonable level of statistical confidence, an emerging technology’s effectiveness in removing pollutants ... for an intended application and to compare test results with vendor’s claims (p.13). Program is not intended to be used for conducting research on	NJCAT’s environmental/energy technology program integrates education and training, develops testing protocols and verifies the performance of innovative technologies that improve protection of human health and the environment. NJCAT <u>verification</u> provides the regulators and the marketplace	The purpose of this project is to improve water quality nationwide by sharing consistent and transferable information on stormwater best management practices. The database will help water quality professionals across the U.S. learn about successful BMPs and apply proven	Verification of performance claims for air & water pollution control, recycling, and greenhouse gas technologies. Verification of a technology under the ETV program does not constitute “certification” or “approval” by NSF or EPA. Rather it means that the	The goal of this project is to provide technology transfer information via a searchable website, about innovative stormwater Best Management Practices (BMPs) to MADEP, conservation commissions, local officials, and other BMP users to help them make

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
	<p>Manual, 2004)</p> <p>Using the Tier guidance document will: 1) Reduce duplicative demonstration and testing of technologies; 2) Expedite multi-state technology acceptance; 3) Reduce cost for both vendors and state regulators.</p> <p>The TARP program does not specify target performance standards, only data collection and quality control standards.</p> <p>Use TARP to determine if product meets performance claims. First providing general guidance on data collection and evaluation (Tier 1); and eventually providing technology specific guidance for specific classes of technologies (Tier 2) followed by guidance for permitting and approvals of certain technologies (Tier 3).</p> <p>The Tier II protocol</p>	<p>experimental devices.</p> <p>Ecology will not consider an application for a Pilot Level Designation (PLD), Conditional Use Designation (CUD), or a General Use Level Designation (GULD) unless the application includes sufficient performance data that clearly demonstrates acceptable feasibility and the likelihood that it will achieve desired performance levels at actual full-scale field conditions.</p>	<p>with the assurance that environmental performance claims are valid, credible and supported by quality independent test data and information.</p> <p>The New Jersey Corporation of Advanced Technology (NJCAT) verifies laboratory and field performance claims and the NJDEP reviews and certifies the NJCAT verification. (J. Lenhart, 2007)</p>	<p>methods to local water quality projects.</p> <p>By adding individual BMP study findings to the database, users can enrich its usefulness for a national audience.</p> <p>1) Develop scientifically-based BMP performance monitoring and reporting protocols (GUIDANCE).</p> <p>2) Collect and evaluate existing BMP design and performance data for meeting the monitoring and reporting protocols, (PERFORMANCE ASSESSMENT) .</p> <p>3) Design, create, and populate a national stormwater BMP database with studies that meet the protocols, (DATABASE).</p> <p>4) Develop BMP performance evaluation protocols, and (MONITORING PROTOCOL).</p> <p>5) Evaluate the data collected</p>	<p>technology has been evaluated in accordance with a recognized ETV Protocol and that the results are available in an approved Verification Report and Verification Statement.</p> <p>This protocol describes the steps to be followed to ensure that verification activities are carried out in a consistent and objective manner that assesses the relevant performance characteristics of stormwater treatment technologies.</p> <p>It describes, in general terms, the process of selecting and documenting the verification tests to be conducted. The protocol also establishes requirements for sample collection and analysis and data reduction and reporting.</p> <p>The protocol provides guidelines for the preparation of verification test plans for specific technologies and test sites.</p>	<p>appropriate technology implementation decisions.</p> <p>Our objective is to assist communities to maximize environmental benefits of grant programs by focusing efforts on technologies that have the most promising potential to reach specific water quality objectives.</p> <p>A database/clearinghouse of stormwater treatment technologies has been created and information is being sought from product vendors.</p> <p>The searchable database includes a catalogue of various proprietary BMPs, their intended use <u>and most importantly the status of verification of their performance claims.</u></p> <p>Technologies submitted to MASTEP undergo a</p>

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
	document includes a section outlining specific requirements for participating states. However, even this summary does not address all of the additional requirements and modifications implemented by the individual TARP states. (Communication, Stephen George, GeoSyntec) A requirement of Conditional Interim Certification is the execution of field monitoring conducted in accordance with the Tier II Protocol to verify field performance claims relative to laboratory claims (TARP, 2003).			and report initial findings. Entity does NOT verify or approve BMPs.		performance data review process before being added to the database.
Stormwater Technological Scope	Structural and non-structural stormwater BMPs.	Structural and non-structural.	Proprietary, structural, only.	Structural and non-structural stormwater BMPs.	Proprietary, commercially-available, only. Only structural BMPs tested during program life.	Structural BMPs only; including pretreatment.
Stormwater Quality - Quantity Goals	1. Directing and distributing flows; 2. Reducing velocities; 3. Removing contaminants. Proponent must make a performance claim that	Performance claims may be; Qualitative (e.g., advantages over other technologies, Operations and Maintenance, etc.) and/or; Quantitative (e.g., load reductions and removal	NJCAT uses TARP testing protocol with special requirements for TSS regarding; 1) Site selection: TSS influent characteristics such as influent loading and particle size	Influent and effluent median concentrations need to be statistically significant.	Verification of performance claims. May relate to expected load reductions or removal efficiencies for specific pollutants or categories of pollutants.	Verification of performance claims. Studies are compared with the TARP Tier 2 Protocol to determine if study design and quality

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
	identifies the technology's intended use and predict the technology's capabilities to remove contaminants and/or control the quantity of stormwater runoff.	efficiencies for specific pollutants or categories of pollutants).	distribution will be the determining factors for site selection as follows: i. The mean influent concentration of the sediments must be in the range of 100-300 mg/L. ii. The mean particle size must not exceed 100 µm. 2) Stormwater Data Collection. <ul style="list-style-type: none"> At least three (3) influent samples from the overall 15 to 20 storms must be tested to establish the particle size distribution (PSD) for the site. ETC. See: http://www.state.nj.us/dep/dsr/bscit/NJStormwater_TierI.pdf 		But the pollutant reduction performance of a technology shall be evaluated in relation to one or more of the following pollutant categories: <ul style="list-style-type: none"> sediment / particulates; nutrients; heavy metals; petroleum hydrocarbons; bacteria. 	assurance/quality control measures are sufficient to produce a valid data set.
Data Gathered by...	By vendor.	By vendor.	By vendor.	By vendors BUT third-party data collection required. Data submitted must comply with relevant BMP Database QA/QC review procedures.	Field testing done by 3 rd party selected by NSF.	By the BMP manufacturers and others, including verification studies.
Field Testing Required?	Yes	Laboratory and/or field performance.	Yes.	Yes	Yes	Yes, as per TARP Tier II.
Pre-Treatment / Course	Only if necessary to support performance claim.	<ul style="list-style-type: none"> “PreTreatment”;50% removal of 50 micron-mean size OR 80% 125 micron-mean size TSS w/influent 	Only if necessary to support performance claim.	Only if necessary to support performance claim.	Only if necessary to support performance claim.	See TARP Tier II.

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
Materials		conc. >100 mg/L and < 200mg/L. For influent < 100 mg/L, effluent goal is 50mg/L and 20mg/L respectively. <ul style="list-style-type: none"> “Less than Basic Treatment/Retrofit/Train”; Course solids removal as part of pretreatment or treatment train (debris >500 microns) 				
TSS	Required. <ul style="list-style-type: none"> Requires particle size distribution analysis. 	“Basic Treatment”; TSS reduction of 80% when influent is 100-200 mg/L; If influent >200mg/L TSS, higher treatment goal “may be appropriate”. * Typical particle size distribution, *On annual average basis to the entire discharge volume (treated + bypassed).	<ul style="list-style-type: none"> See above. 	Parameters that are selected for evaluation must be present or consistently and reliably derivable from the data in the majority of BMP reports. (pg 29 of http://www.bmpdatabase.org/Docs/task3_1.pdf)	Only if necessary to support performance claim.	See TARP Tier II.
SSC	Required	N/A	Required	Same as above.	Only if necessary to support performance claim.	See TARP Tier II.
Nitrogen	Only if necessary to support performance claim.	Not included in TAPE.	Only if necessary to support performance claim.	Same as above.	Only if necessary to support performance claim.	See TARP Tier II.
Phosphorous	Only if necessary to support performance claim.	TP reduction of 50% when influent is 0.1-0.5 mg/L TP.	Only if necessary to support performance claim.	Same as above.	Only if necessary to support performance claim.	See TARP Tier II.
Metals	Only if necessary to support performance claim.	Optional. “Enhanced [metals] Treatment”; For enhanced heavy metal	Only if necessary to support performance claim.	Same as above.	Only if necessary to support performance claim.	See TARP Tier II.

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
		removal; Cu influent of 0.003-0.02 mg/L & Zn 0.02-0.3 mg/L.				
Bacteria	Only if necessary to support performance claim.	Not included in TAPE.	Only if necessary to support performance claim.	Same as above.	Only if necessary to support performance claim.	See TARP Tier II.
Hydrocarbons / petroleum products	Only if necessary to support performance claim.	Oil; goal of no ongoing or recurring visible sheen. Total max daily avg. conc. of 10mg/L AND max of 15 mg/L for discrete grab sample.	Only if necessary to support performance claim.	Same as above.	Only if necessary to support performance claim.	See TARP Tier II.
Certification and / or Verification Process	<p>Step 1: Technology specifications, performance claims, Test QA Plan scope (includes QAPP), performance claim data (if available, all validated by TARP.</p> <p>Step 2: Field Test</p> <p>Step 3: State Review / Acceptance</p> <p>Step 4: Verification / Certification.</p> <p>Varies by state specific state requirements.</p> <p>(See Appendix D, p. 21 from TARP)</p>	<p>1-Sponsor implements QAPP</p> <p>2-Sponsor submits TEER (Tech Evaluation Engineering Report) to Ecology and TRC (Tech Review Committee)</p> <p>3-Ecology and TRC review QAPP and TEER</p> <p>4-Ecology publish pertinent info and determination at (p. 2): http://www.ecy.wa.gov/programs/wq/stormwater/newtech/index.html</p> <p>Note: Data accepted from TAPE, ETV, & TARP.</p>	<p>Two Step Verification / Certification Process:</p> <ol style="list-style-type: none"> 1) Verification based on laboratory data leading to Interim Certification; 2) Verification field testing (TARP- Tier II) leading to Final Certification. <p>Verification Team consisting of NJCAT staff, private sector, and academics, does verification.</p>	N/A, not purpose of IBMPDB	<p>Performance *verification* consists of 3 Phases:</p> <p>1. Planning – involves establishing and documenting the procedures to be followed during the verification of a specific technology. This includes identifying a field testing organization and personnel responsible for performance and oversight of the testing.</p> <p>2. Verification Testing – This phase involves establishing the required test conditions, conducting the required tests, and the collection of the relevant data.</p> <p>3. Data Assessment and Reporting – This last phase</p>	<p>Initially, all technologies are considered unrated with regards to existence of reliable performance data.</p> <p>Once information from verification studies is reviewed, a technology is rated as explained below.</p>

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
					includes all data analysis and the preparation and dissemination of a Verification Report and Verification Statement.	
Evaluation Determination “System” / Nomenclature	Meets / Does Not Meet Performance Claims.	Use-level designations for each BMP; 1- GULD confers a general acceptance. 2- CUD are allowed for use while field and lab testing occurs; testing not necessary at all installations. 3- PLD allows limited use for field testing; sponsor agrees to conduct field testing based on TAPE at all installations (p. 6-9).	Performance claims agreed upon by vendor and NJCAT. NJCAT determines whether the technology performs as claimed.	Influent and effluent median concentrations need to be statistical significant.	A Verification Statement is generated that provides a brief description of the testing conducted and a synopsis of the performance results. The Verification Statement is intended to provide verified vendors a tool by which to promote the strengths and benefits of their product.	Meets / Does Not Meet Performance Claims. See TARP Tier II. Category 0: Unrated. Data review not yet conducted by MASTEP Category 1: There is sufficient TARP-compliant or similar reliable data on this technology to be able to evaluate pollution removal efficiency claims Category 2: Studies are underway that offer promise for reliable data in the near future Category 3: There is at present insufficient reliable data to evaluate claims
Third Party	Not required for data	<u>Require:</u> 3 rd party complete data	• Require: Third party data	Required.	Requires 3 rd party for all facets of	See TARP Tier II.

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
Involvement	gathering.	validation report, TEER summary, and make recommendations on technology use level, info for posting on website, and additional testing (if needed), etc. <u>Recommends:</u> 3 rd party, 1) oversee QAPP prep and implementation, 2) prepare data validation report, 3) prepare TEER. Verification by ETV depends on third party testing.	collection. <ul style="list-style-type: none"> Allowed (i.e., organizations like NSF), provided that such verification is conducted in accordance with the Tier II Protocol. Allowed to be done by signatory states using Tier II protocol. Other testing protocols may be considered if it is determined by the NJDEP to be equivalent to the Tier II Protocol. 	<ul style="list-style-type: none"> Performance data must be collected by a third party and not by staff of the manufacturer or distributor / sellers of the device. 	protocol, including but not limited to staff from EPA and NSF International.	
Strengths	<ul style="list-style-type: none"> The only multi-state BMP verification protocol. Allows for data sharing across states and as such addresses technology review and approval barriers in policy and regulations. De facto cost sharing mechanism, since states can share results of individual monitoring efforts. Requires 3rd party data collection. 	<ul style="list-style-type: none"> Actually certifies specific BMPs for use in WA. Allows pilot and conditional use applications of BMPs which allows vendors to more easily pay for field testing requirement. Requires individual storm reports (total precipitation, influent peak flow, effluent peak flow, bypass peak flow, total volume, influent volume, effluent volume, bypass volume, etc.). Has specific WA standards for petroleum, metals and phosphorous. 	<ul style="list-style-type: none"> Actually certifies specific BMPs for use in NJ. Allows “interim conditional certification” for implementation on case-by-case basis, NJCAT is quasi-governmental and has a mandate beyond just BMP performance validation; including education/training, outreach., identifying alternative funding sources (such as state/federal grants or loans), sponsoring technology forums, exchange programs and 	<ul style="list-style-type: none"> Contains information on 340+ BMPs. Not geographically limited. Public-private partnership. Requires 3rd party data collection. Federal Partnership (EPA and ASCE) 	<ul style="list-style-type: none"> Not geographically limited. Federal government leadership in testing and verification of performance claims. Requires 3rd party involvement in all aspects of verification process. 	<ul style="list-style-type: none"> User-friendly description of BMP technologies and related performance analyses which uses TARP Tier II protocol. Is a “quality of performance data” screening tool. Will screen technologies based on availability of performance data. <p>Searchable by ;</p> <ul style="list-style-type: none"> BMP Type, Cost (per unit, per

Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
		<ul style="list-style-type: none"> Requires 3rd party data validation report, Submission of TEER, Makes recommendations on technology use level, Posts relevant info on website, Accepts data from—TAPE, ETV, and TARP. 	<ul style="list-style-type: none"> seminars, and assisting in patenting, licensing, or other technology protection and transfer arrangements. Provides guidance for experimental technologies for \$1000 fee. 			<ul style="list-style-type: none"> CFS, and cost per pound of pollutant treated); Design considerations; Site and Environmental Consideration; Performance evaluation.
Weaknesses	<ul style="list-style-type: none"> Does not certify technologies for use across states, only for acceptance of monitoring data for evaluation across member states. Each state still has specific performance goals/expectations. States, like MD, are allowing data submissions which are “weaker” / different than TARP standards (as per communication with Stewart Comstock, MDE and http://www.mde.state.md.us/assets/document/Proprietary%202005.pdf) Does not test or provide 	<ul style="list-style-type: none"> Limited to WA State only. Does not test or provide support for experimental systems. Only ~13 certified for general use (GULD). Not accepting new applications for emerging technologies as of 2008. 	<ul style="list-style-type: none"> Has only certified 10 proprietary BMPs in 10 years. Limited only to NJ only. Less stringent than TARP for TSS and storm water data collection. Different standards across NJ’s 3 regulatory program (See Appendix B, TARP, pg. 24) with SW oversight. Cost of verification. 	<ul style="list-style-type: none"> Does not verify/certify BMPs These testing protocols not agreed upon by potential implementing actors, such as state regulatory agencies. Does not test or provide support for experimental systems. Private sector does quality control. (Wright Engineers and GeoSyntec), which could create perceived conflict of interest. 	<ul style="list-style-type: none"> Only ~20 BMPs verified. Short duration of ETV program before funding dried-up. Does not test or provide support for experimental systems. Non-structural systems never tested under this program. 	<ul style="list-style-type: none"> Out of 34 BMPs submitted for review, only 5 have studies that are underway that offer promise for reliable data in the near future. No BMP has reached “Category 1” status. Does not test or provide support for experimental systems.



Major Stormwater BMP Evaluation Protocols & Testing Bodies

January 2008	TARP (Technology Acceptance Reciprocity Partnership)	TAPE (Technology Assessment Protocol – Ecology, WA)	NJCAT (New Jersey Corporation for Advanced Technology)	International BMP Database (ASCE BMP Database)	ETVP (Envir. Tech. Verification Program)	MASTEP (MA - Stormwater Evaluation Project)
	support for experimental systems.					

Major Stormwater BMP Evaluation Protocols & Testing Bodies

Abbreviations

APHA: American Public Health Association
ASCE: American Society of Civil Engineers
ASTM: American Society for Testing and Materials
AWWA: American Water Works Association
b/c: because
BMP: best management practice
CA: California
cfs: cubic feet per second
COV: coefficient of variance
Cu: copper
CUD: Conditional Use Designation
Ecology: Washington State Department of Ecology
EPA: U.S. Environmental Protection Agency
ETV: Environmental Technology Verification
EvTEC: Environmental Technology Evaluation Center
GULD: General Use Level Designation
hr: hour
HSPF: Hydrological Simulation Program--Fortran
MA: Massachusetts
MD: Maryland
Min: minute
MQO: Method Quality Objectives
NELAC: National Environmental Laboratory Accreditation Conference
NJ: New Jersey
NSF: NSF International
NWS: national weather station
ortho-P: orthophosphate
P: phosphorus
PA: Pennsylvania
ppt: precipitation
PSD: Particle Size Distribution



Major Stormwater BMP Evaluation Protocols & Testing Bodies

PLD: Pilot Level Designation

QA: quality assurance

QAPP: quality assurance project plan

QC: quality control

SD: standard deviation

SM: Standard Methods

SOP: standard operating procedure

TAPE: Technology Assessment Protocol - Ecology

TARP: Technology Acceptance and Reciprocity Partnership

TEER: technology evaluation engineering report

TRC: Technical Review Committee

TP: total phosphorus

TSS: total suspended solids

VA: Virginia

WA: Washington

Zn: zinc

Citations

Lenhart, James H. Evaluating BMP's Programs, Successes and Issues. CONTECH Stormwater Solutions, Portland OR, USA. 2007.