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Water-Quality and Amphibian Population Data for Maryland, Washington, D.C., and Virginia, 2001-2004

Open-File Report 2004-1401

U.S. Department of the Interior
U.S. Geological Survey

Water-Quality and Amphibian Population Data for Maryland, Washington, D.C., and Virginia, 2001-2004

By Karen C. Rice and Robin E. Jung

Prepared in cooperation with
U.S. Fish and Wildlife Service (Patuxent Research Refuge)
U.S. Department of Agriculture (Beltsville Agricultural Research Center)
National Park Service (Rock Creek Park, Shenandoah National Park)

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Multiply	By	To obtain
Length		
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
Area		
square meter (m^2)	0.0002471	acre
hectare (ha)	2.471	acre
hectare (ha)	0.003861	square mile (mi^2)
square kilometer (km^2)	0.3861	square mile (mi^2)
Volume		
liter (L)	0.2642	gallon (gal)
cubic meter (m^3)	264.2	gallon (gal)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (ºF) as follows:
ºF = (1.8 x ºC) + 32

Vertical coordinate information is referenced to the North American Vertical Datum of 1929 (NAVD 29).

Abbreviated water-quality units: Chemical concentration is reported in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the concentration of chemical constituents in solution as weight (milligrams) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter. For concentrations less than 7,000 mg/L, the numerical value is the same as for concentrations in parts per million. Specific electrical conductance of water is reported in microsiemens per centimeter at 25 degrees Celsius (µS/cm).

Water-Quality and Amphibian Population Data for Maryland, Washington, D.C., and Virginia, 2001-2004

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Abstract

Data on the chemical composition of water and on amphibian populations were collected at least annually from vernal pool and stream sites in Maryland, Washington, D.C., and Virginia, from 2001 through 2004. The data were collected as part of long-term monitoring projects of the Northeast Region of the Amphibian Research and Monitoring Initiative (ARMI) of the U.S. Geological Survey. Water samples were analyzed for temperature, specific conductance, pH, dissolved-oxygen concentration, acid-neutralizing capacity, and concentrations of total Kjeldahl nitrogen and total phosphorus; in 2004, samples also were analyzed for nitrite plus nitrate concentrations and total nitrogen concentrations. Field and laboratory analytical results of water samples and quality-assurance information are presented. Amphibian population data include the presence of amphibian species and the maximum number of egg masses of wood frogs and spotted salamanders at vernal pools, and counts of amphibians made during stream transect and stream quadrat surveys.

Introduction

Data on water quality and amphibian populations at sampling sites in Maryland, Washington, D.C., and Virginia were collected at least once per year from 2001 through 2004. The data were collected by scientists with the Northeast Region of the Amphibian Research and Monitoring Initiative (ARMI) of the U.S. Geological Survey (USGS). ARMI was established in Federal fiscal year 2000 to (1) establish a network of Department of Interior (DOI) lands on which to monitor the status of and changes in the distribution and abundance of amphibian species and communities in the United States; (2) gather information about environmental conditions likely to affect amphibians; (3) document the scope and severity of amphibian declines throughout the United States; (4) identify possible causes of observed amphibian declines, population changes, malformations, and diseases; and (5) provide scientific information to support management actions to arrest and/or reverse declines, malformations, and diseases in amphibian populations.

Water-quality and amphibian-population data were collected at two types of sites—vernal pools and streams. Water-quality data collected at both types of sites included field measurements of water temperature, specific conductance, pH, and dissolved-oxygen concentration, and laboratory analyses of acid-neutralizing capacity (ANC), total Kjeldahl nitrogen (ammonium plus organic nitrogen), and total phosphorus. Beginning in 2004, water samples also were analyzed for nitrite plus nitrate concentrations and total nitrogen concentrations. At vernal pool sites, amphibian data included frog, toad, and salamander species presence and egg-mass counts of wood frogs and spotted salamanders; at stream sites, amphibian data included counts of salamanders during stream transect and quadrat surveys.

Purpose and Scope

This report presents data on the chemical composition of water samples and on amphibian populations. The methods used to collect water samples and amphibian population data are described, as are laboratory methods and quality-assurance protocols. Locations of sample sites, analytical results for the water-quality samples, amphibian population data, and amphibian scientific and common names and acronyms are presented in tables.

Description of Study Areas

In Maryland, samples were collected at the U.S. Fish and Wildlife Service Patuxent Research Refuge and the U.S. Department of Agriculture (USDA) Beltsville Agricultural Research Center (fig. 1). These U.S. Government properties are in the Coastal Plain Physiographic Province, approximately 17 km northeast of Washington, D.C., and 25 km southwest of Baltimore, Md.

In Washington, D.C., samples were collected within the National Park Service's Rock Creek Park (fig. 1). The Park is in the Piedmont Physiographic Province, within the city limits, extending from the northern corner of the District of Columbia southward approximately 11 km to the Potomac River.

In Virginia, samples were collected within the National Park Service's Shenandoah National Park (fig. 1) in the Blue Ridge Physiographic Province in north-central Virginia. Shenandoah National Park straddles the crest of the Blue Ridge Mountains along a 112-km segment from Front Royal in the north to Waynesboro in the south.

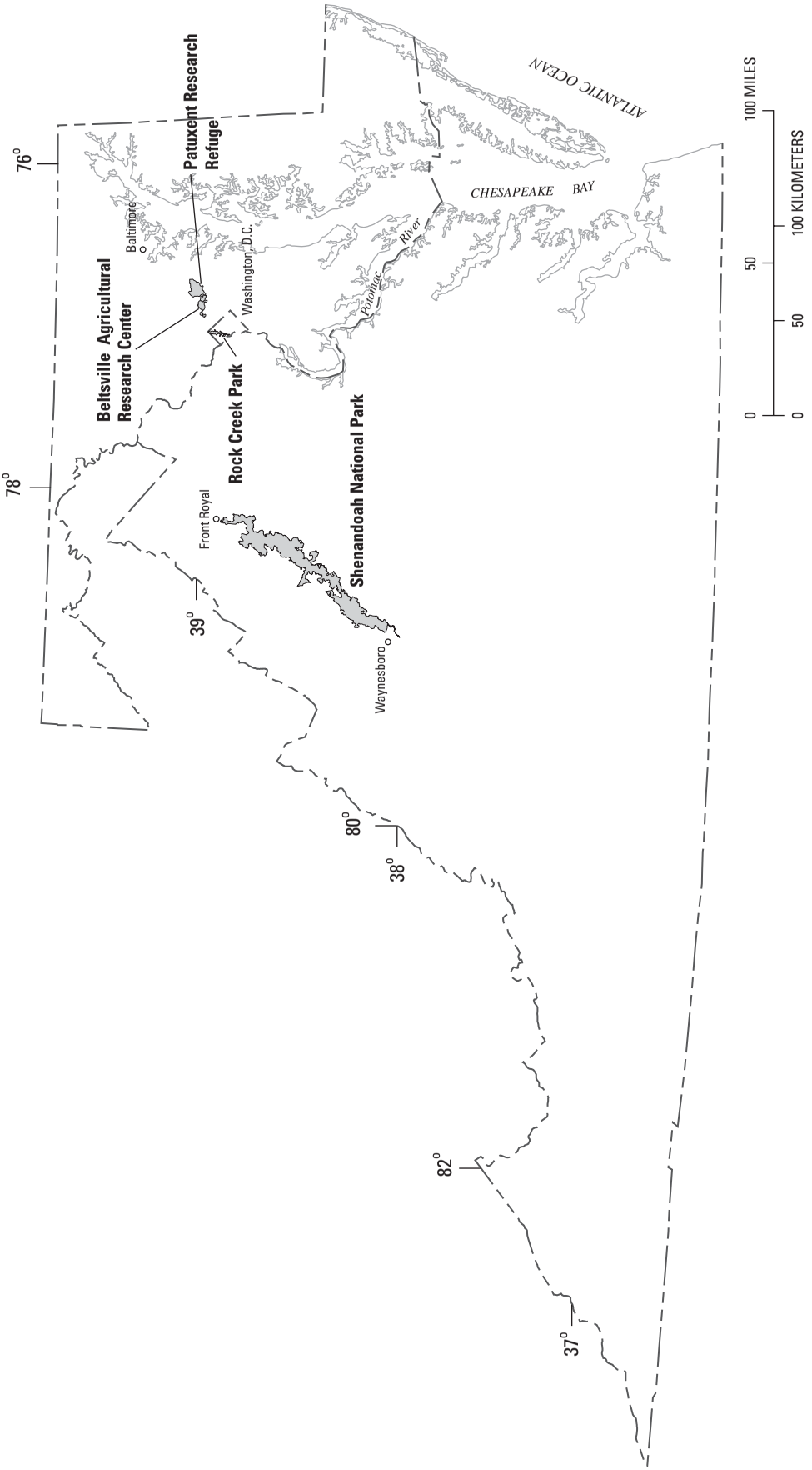

Figure 1. Locations of study areas in Maryland, Washington, D.C., and Virginia.

Collection and Analysis of Samples

Water temperature, specific conductance, pH, and dissolved-oxygen concentration were measured in the field. Water samples were collected and analyzed for ANC and concentrations of total Kjeldahl nitrogen (ammonium plus organic nitrogen) and total phosphorus in the laboratory. Beginning in 2004, water samples also were analyzed for nitrite plus nitrate concentrations and total nitrogen concentrations. At vernal pools, the presence of frog, toad, and salamander species and counts of the egg masses of wood frogs and spotted salamanders were recorded. At streams, counts of salamanders from stream transect and quadrat surveys were recorded.

Field Data-Collection Methods

Data collected in the field consisted of water-quality samples and surveys of amphibian populations. Latitude and longitude coordinates of sampling sites were determined using a Garmin® GPS III Plus Personal Navigator™ receiver.

Water Quality

During the site visit, water was analyzed for temperature, specific conductance, pH, and in some cases, dissolved-oxygen concentration. These properties were measured with a Multiline P4 Universal Pocket Meter made by WTW (Wissenshaftlich-Technische Werkstatten GmbH). Before measuring samples, the pH electrode was calibrated using pH buffers of 4.0 and 7.0 pH units, and the dissolved-oxygen probe also was calibrated. The probes of the meter were placed directly into the body of water by reaching over the surface of the water from the bank. At sites where this method was not practical because of access, water was collected as a grab sample in a wide-mouth polyethylene bottle and the probes were placed in the bottle. All field analyses were made using unfiltered (whole) water.

Samples for laboratory analyses were collected as grab samples. At vernal pools, samples were collected approximately 2 m from the bank, avoiding water that contained sediment stirred up from the pool bottom. At streams, samples were collected from an area of maximum discharge, that is, generally near the center of the stream channel.

All samples were collected in polyethylene bottles and caps, which were rinsed three times with sample water before collecting the sample. At both vernal pools and streams, samples for analysis of ANC and of concentrations of total Kjeldahl nitrogen and total phosphorus were collected by holding the sample bottle opening below the surface of the water and allowing the bottle to fill. For samples for analysis of ANC, the 250-mL clear sample bottle was filled to the brim. For samples for analysis of concentrations of total Kjeldahl nitrogen and total phosphorus, the 125-mL clear sample bottle was filled to the shoulder, and 1.0 mL of Baker 4.5-normal (N) (1:7) H_2SO_4 was added as a preservative. For samples for analysis of concentrations of nitrite plus nitrate and total nitrogen, sample water was collected using a disposable two-piece Norm-Ject 20-mL syringe manufactured by Henke Sass Wolf. Each syringe was rinsed three times prior to sample collection. Sample water was filtered through a Whatman 0.45-μm PES 25-mm diameter PP filter into a 125-mL amber sample bottle. Samples were shipped to the laboratories in coolers with ice, usually on the same day of collection.

Amphibian Populations—Vernal Pools

Vernal pools, also known as ephemeral ponds, seasonal forest ponds, and temporary ponds, typically fill with water from ground-water discharge and precipitation in the autumn or winter and remain ponded through the spring and into summer (Kenney and Burne, 2001; Calhoun, 2003). Occasional drying prevents fish from establishing permanent populations. Vernal pools are unique wildlife habitats used by indicator species such as wood frogs, ambystomatid salamanders, and fairy shrimp for breeding. Definitions of vernal pools vary, but vernal pools typically have the following characteristics: (1) contain water for approximately two months during the growing season; (2) occur within a confined depression or basin that lacks a permanent outlet stream; (3) lack any fish population; and (4) dry out most years, usually by late summer.

At least four vernal pools were monitored at each DOI or USDA property. Pools were identified by examining USGS color-infrared digital ortho-photo quarter quadrangle (DOQQ) maps (1:24,000 scale) using ArcView (Version 3.2, Environmental Systems Research Institute) and by ground-truthing in the field. Some vernal pools at the Patuxent Research Refuge and the USDA property have been monitored for amphibian populations in the past, and these pools were selected for this data-collection effort to maintain continuity. The vernal pools monitored at Rock Creek Park and Shenandoah National Park are the only vernal pools currently known to support amphibian populations in these parks.

Vernal pools were visited at least twice from February to May, 2001-2004, and all amphibian species detected were recorded. Amphibians were detected using egg-mass counts, visual encounter surveys (walking the perimeter of the pool looking for eggs, spermatophores, larvae, and adults), and calling surveys (recording amphibian vocalizations during the day while conducting the egg-mass counts and visual encounter surveys). Sampling procedures were consistent among different sites and among different teams.

In the mid-Atlantic region, wood frogs (*Rana sylvatica*) typically deposit their eggs from mid-February through March (Wright and Wright, 1949) and spotted salamanders (*Ambystoma maculatum*) from March to April (Petranka, 1998). Both species' egg masses overlapped in most pools during at least one survey. Breeding phenologies of both species can vary from year to year depending on the weather and also can differ by a week or two among pools within the same county (Crouch and Paton, 2000).

The sampling window for egg-mass surveys is constrained by the developmental rate of the embryos. Wood frog egg masses hatch after 1 to 4 weeks; spotted salamander egg masses hatch after 4 to 7 weeks. Egg masses were counted at each of the pools multiple times over the breeding season to obtain counts when the maximum number of egg masses for each species was present. Observers surveyed the pools during the day (0900–1500 hours) using polarized sunglasses to reduce solar glare reflected off the water's surface. All areas within pools less than 1.5 m in depth were surveyed.

In 2001, a double-observer independent technique (Nichols and others, 1986) was used, in which observers independently searched for egg masses either sequentially (the second observer beginning after the first observer finished) or at the same time, starting at opposite ends of the pool and circumnavigating the entire pool. All aggregations of egg masses and their locations were recorded separately by observers on copies of the same map of the pool. Clusters of egg masses at or more than 1 m apart were considered separate aggregations. Observers counted the total number of egg masses of wood frogs and spotted salamanders within each aggregation. At the completion of each survey, observers compared maps to determine the total number of egg-mass aggregations of each species that was found or missed and the numbers of egg masses within all egg-mass aggregations.

During 2002-2004, a double-observer dependent technique (Cook and Jacobson, 1979; Nichols and others, 2000) was used, in which observer 1 points to and counts out egg masses to observer 2. Observer 2 records what observer 1 reports, but also records in a separate column any additional egg masses that observer 1 missed (withholding any comments to observer 1). Halfway through the survey of the vernal pool, the observers switch roles, and observer 2 now initiates the counts and observer 1 records the number of egg masses detected by observer 2 and any additional egg masses that observer 2 may have missed.

Amphibian Populations—Streams

Five or more streams were surveyed at each DOI property; one stream was surveyed on the USDA property. A stream is defined as a "surface watercourse having a channel with well defined bed and banks, either natural or artificial, which confines and conducts continuous or periodical flowing water" (Davic, 2002). First- and second-order streams were located using 7.5-minute series USGS topographic maps and by ground-truthing in the field. Surveying was done along portions of the streams with substrates composed of rocks that could be turned over, avoiding stretches with primarily sandy substrates, boulders, or waterfalls.

At each stream, two transects and two quadrats were surveyed (pairing one transect with one quadrat) once per year in June, July, or August in 2001-2004. In general, the first transect-quadrat pair was at or near the headwaters of the stream or immediately upstream of a source of contamination (for example, a stormwater pipe). The other transect-quadrat pair was at least 50 m downstream or directly below the source of contamination (if one existed) from the first transect-quadrat pair.

Transects measuring 15 m by 2 m were located along either the right or left side of the stream (determined by coin toss). Beginning at the downstream end of the transect, searches were conducted within 1 m of the water's edge along the bank and within 1 m of the water's edge in the stream channel. The surface layer of cover objects (for example, rocks and logs) greater than 6.4 cm maximum length or width was overturned. Clicker counters were used to count the number of overturned cover objects in the stream, and the objects were returned to their original positions to minimize habitat disturbance. Aquarium dip nets placed firmly against the bottom substrate just downstream of the cover objects captured any salamanders that were dislodged as the objects were overturned. Captured salamanders were placed in re-sealable bags with water, identified to species, aged (larva or adult), and measured for snout-vent length and total length. Any salamanders that escaped capture were noted, and their species identification recorded when possible.

Removal sampling, based on two or three removal passes (Bruce, 1995; Rexstad and Burnham, 1992; Salvidio, 1998), was conducted at most transects to estimate stream salamander populations. To increase efficiency, at some sites only one pass was made at one of the two transects, and multiple passes at the other transect. All salamanders were returned to the stream after the final pass.

Two 4-m^2 quadrats (a square formed by 2 m on the bank and 2 m in the water) were sampled close to but on the opposite bank from the paired transect (Rocco and Brooks, 2000). Quadrat corners were marked with wire flags and perimeters were bounded by 50-m tape, without physical barriers. Quadrats were searched intensively, removing as many cover objects as practicable. Quadrats represent destructive sampling, such that all rocks and gravel and debris within the quadrat are temporarily removed with only the underlying sand or bedrock remaining. The goal is to ensure that no salamanders escape detection, although without the use of physical barriers, there is no assurance that every amphibian within the quadrat was captured. For both transects and quadrats, the begin and end search times were recorded for each transect pass or quadrat to document the time spent searching for amphibians.

Laboratory Analysis Methods

ANC was determined in the USGS Water, Energy, and Biogeochemical Budgets (WEBB) Project Laboratory in Lakewood, Colo., using automated Gran titration (U.S. Environmental Protection Agency test method number AERP 05). Because the method is designed to report negative values (that is, net acidity), there is no detection limit.

Concentrations of total Kjeldahl nitrogen, nitrite plus nitrate, total nitrogen, and total phosphorus were determined in

the USGS National Water-Quality Laboratory in Lakewood, Colo. Samples for total Kjeldahl nitrogen were analyzed using Kjeldahl digestion methods, yielding a concentration of ammonium plus organic nitrogen. The method detection limit for the total Kjeldahl nitrogen method is approximately 0.05 mg/L as N. Samples for nitrite plus nitrate concentration and total nitrogen concentration were analyzed using alkaline persulfate digestion (Patton and Kryskalla, 2003). The estimated method detection limit for total nitrogen is 0.015 mg/L as N, and the analytical range is 0.03 to 5.00 mg/L as N. During 2001-2003, total phosphorus was determined using a Kjeldahl digestion, and the method detection limit was approximately 0.002 mg/L as P. During 2004, total phosphorus was determined using an alkaline persulfate digestion; the estimated method detection limit is 0.007 mg/L as P, and the analytical range is 0.01 to 2.00 mg/L as P (Patton and Kryskalla, 2003).

Quality Assurance and Quality Control

All laboratories providing water-quality data for the USGS must participate in the Standard Reference Water Sample (SRWS) Program, a continuing quality-assurance program. A major-ion constituent, a trace-metal constituent, a nutrient sample, and a precipitation sample are prepared by the USGS Branch of Quality Assurance and distributed to participating laboratories twice a year. Natural waters are used to prepare these samples and might be spiked with certain analytes to increase the range in concentration.

In addition to the SRWS Program, the USGS WEBB project laboratory voluntarily participates in an ongoing laboratory intercomparison study conducted by Environment Canada. Ten samples of natural waters are sent to participating laboratories twice each year by Environment Canada. Samples are analyzed for concentrations of major cations and anions, silica, dissolved-organic carbon, and alkalinity, and for values of pH and specific conductance. Results are reported by Environment Canada (2003) in annual reports (available online at *http://www.nwri.ca/nlet/prof-e.html)*.

At random sites during each sampling trip, two sequential water-quality samples were collected, the second of which is termed a “replicate” sample. Replicate samples were collected immediately after the first sample was collected. The purpose of replicate samples is to evaluate the variability in sampling and analysis processes. Results of laboratory analyses of replicate samples are reported in the water-quality data tables.

Water-Quality and Amphibian Population Data

Sampling site locations and water-quality and amphibian population data for vernal pools are in tables 1-4. Sampling site locations and water-quality and amphibian population data for streams are in tables 5-8. Common and scientific names and acronyms for amphibian species presented in the tables, and Taxonomic Serial Numbers (see *http://www.itis.usda.gov/)*, are in table 9.

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Tables 1-9

Table 1. Station identification (ID) numbers, latitude, longitude, and county locations of vernal pool sampling sites in Maryland, Washington, D.C., and Virginia.

[Latitude and longitude are given in degrees, minutes, seconds; n.a., not applicable]

Station ID	Vernal pool name	Latitude	Longitude	County
		Maryland		
390138076522001	Powerline Site Back Pond 84-134	39 01 42.3	76 52 25.3	Prince George's
390138076522003	Powerline Site 80-83	39 01 42.1	76 52 23.0	Prince George's
390138076522004	Powerline Site 69-72	39 01 41.6	76 52 22.6	Prince George's
390138076522005	Powerline Site Front Pond 1-36	39 01 39.6	76 52 19.1	Prince George's
390138076522006	Powerline Site 37-40	39 01 38.9	76 52 21.7	Prince George's
390138076522007	Powerline Site 57-68	39 01 42.0	76 52 22.6	Prince George's
390201076512901	Shumate Site	39 02 00.9	76 51 27.9	Prince George's
390206076483501	Sam's Pond	39 01 55.2	76 48 34.2	Prince George's
390156076482401	Robin's Pond	39 01 55.1	76 48 23.7	Prince George's
390211076521401	Entomology Boards 20-85	39 02 09.2	76 52 12.6	Prince George's
390211076521402	Entomology Back Pond 1	39 02 08.4	76 52 10.0	Prince George's
390211076521403	Entomology Back Pond 2	39 02 08.1	76 52 10.6	Prince George's
390211076521404	Entomology Boards 91-113	39 02 08.9	76 52 13.5	Prince George's
390211076521405	Entomology Boards 1-19	39 02 11.6	76 52 13.8	Prince George's
390224076520401	Laura's Pond	39 02 26.3	76 51 59.3	Prince George's
390230076512201	Beltsville 1	39 02 31.3	76 51 20.1	Prince George's
390230076512202	Beltsville 2	39 02 31.3	76 51 21.7	Prince George's
390429076472001	Blue Road	39 04 27.7	76 47 28.2	Anne Arundel
390440076482401	Red Road	39 04 49.7	76 48 22.3	Anne Arundel
390219076485101	EVAC Pond	39 02 19.9	76 48 51.1	Anne Arundel
390252076483401	Cabin Pond	39 02 52.1	76 48 34.1	Anne Arundel
		Washington, D.C.		
385841077023501	Riley Springs	38 58 41.8	77 02 33.0	n.a.
385906077025801	Weir Pond	38 59 06.0	77 02 57.4	n.a.
385907077024901	Parkside Pool	38 59 07.3	77 02 49.1	n.a.
385903077024101	West Beach	38 59 03.6	77 02 41.1	n.a.
		Virginia		
166578010	Big Meadows	38 31 00.5	78 26 26.5	Madison
166578040	Hogcamp Swamp	38 31 25.5	78 26 03.3	Madison
203143670	Pond Ridge	38 09 48.4	78 48 28.4	Albemarle
166578036	Swamp Island	38 31 31.6	78 26 15.0	Madison
166578037	Rocky Creek	38 31 31.5	78 26 12.3	Madison

Table 2. Water-quality data collected from vernal pools in Maryland, Washington, D.C., and Virginia, 2001-2004.

[ºC, degrees Celsius; µS/cm, microsiemens per centimeter at 25 ºC; DO, dissolved oxygen; ANC, acid-neutralizing capacity; TKN, total Kjeldahl nitrogen; $NO_2 + NO_3$, nitrite plus nitrate; N, nitrogen; P, phosphorus; mg/L, milligrams per liter; µeq/L, microequivalents per liter; –, no data; <, less than; E, estimated; *, replicate sample]

Vernal pool name	Date	Time	Water temperature (ºC)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	$NO_2 + NO_3$ (mg/L as N)	Total N (mg/L)	Total P (mg/L)
Maryland											
Powerline Site Back Pond 84-134	3/8/2001	1450	9.0	98	5.93	2.4	–	–	–	–	–
	5/8/2001	1420	13.5	–	6.28	–	2,486	33.657	–	–	3.511
	3/26/2002	1445	8.6	66	5.95	5.3	404	1.193	–	–	0.137
	5/21/2002	1315	10.8	68	6.19	1.9	–	–	–	–	–
	3/25/2003	1428	16.0	50	5.19	2.7	177	7.299	–	–	0.637
Powerline Site 80-83	3/8/2001	1515	9.5	47	5.59	1.9	–	–	–	–	–
	5/8/2001	1445	15.7	–	5.25	–	217	4.974	–	–	0.496
Powerline Site 69-72	3/8/2001	1520	11.0	76	5.82	2.4	17.6	–	–	–	–
Powerline Site Front Pond 1-36	3/8/2001	1545	8.0	101	6.66	5.0	–	–	–	–	–
	5/8/2001	1400	26.0	–	5.90	–	444	3.315	–	–	0.421
	3/26/2002	1440	9.2	74	6.10	7.1	565	1.125	–	–	0.078
	5/21/2002	1217	17.0	61	5.92	3.3	–	–	–	–	–
	3/25/2003	1548	13.1	73	4.76	2.9	267	1.052	–	–	0.198
Powerline Site 37-40	5/8/2001	1500	14.8	–	5.63	–	1,367	10.472	–	–	1.215
Powerline Site 57-68	3/26/2002	1450	8.7	90	5.89	4.5	431	5.595	–	–	0.447
	5/21/2002	1300	14.1	57	5.64	–	–	–	–	–	–
	3/25/2003	1530	13.1	43	5.14	3.5	197	1.128	–	–	0.152
	4/5/2004	1317	8.8	51	6.25	–	207	1.777	<0.060	1.908	0.161
Shumate Site	3/8/2001	1615	9.0	135	5.31	2.2	–	–	–	–	–
	5/8/2001	1150	14.2	–	5.86	–	187	3.88	–	–	0.180
	3/26/2002	1345	8.3	108	4.74	5.4	116	2.279	–	–	0.159
	3/26/2002*	1350	–	–	–	–	112	2.445	–	–	0.178
	5/21/2002	1400	11.0	74	5.74	1.9	–	–	–	–	–
	3/24/2003	1420	18.3	139	4.63	4.6	4.9	0.618	–	–	0.029
	3/24/2003*	1430	–	–	–	–	–	0.604	–	–	0.026
	4/5/2004	1247	8.9	125	5.56	–	31.9	0.612	<0.060	0.644	0.017

Table 2. Continued.

Vernal pool name	Date	Time	Water temperature (ºC)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	$NO_2 + NO_3$ (mg/L as N)	Total N (mg/L)	Total P (mg/L)
Sam's Pond	3/8/2001	1715	8.5	83	4.73	3.1	–	–	–	–	–
	5/8/2001	1705	17.1	–	4.63	–	123	4.375	–	–	0.536
	3/26/2002	1130	9.2	89	4.10	3.9	-27.4	1.024	–	–	0.074
	5/22/2002	1646	14.7	46	4.60	2.8	–	–	–	–	–
	4/9/2003	1400	6.7	39	4.27	7.8	-3.5	0.603	–	–	0.036
	4/5/2004	1417	10.3	33	4.69	–	-8.9	0.619	<0.060	0.596	0.026
Robin's Pond	3/26/2002	1210	8.5	99	4.10	4.7	-90.3	0.689	–	–	0.034
	5/22/2002	1633	16.0	38	4.39	3.4	–	–	–	–	–
	4/9/2003	1412	6.0	53	3.90	2.6	-105	0.439	–	–	0.051
	4/8/2004	0930	10.5	46	4.32	–	–	–	–	–	–
Entomology Boards 20-85	3/8/2001	1415	6.5	407	7.01	4.3	–	–	–	–	–
	5/8/2001	1540	16.9	–	7.12	–	3,996	8.525	–	–	1.127
Entomology Back Pond 1	5/8/2001	1605	17.3	–	6.39	–	330	22.628	–	–	3.539
	3/26/2002	1530	9.0	81	5.80	4.5	163	1.624	–	–	0.176
	5/21/2002	1500	12.4	49	5.76	6.0	–	–	–	–	–
	3/28/2003	1230	11.0	69	5.81	5.5	105	1.211	–	–	0.158
	4/7/2004	1149	15.1	86	6.05	–	65.3	0.832	<0.060	1.009	0.078
Entomology Back Pond 2	3/26/2002	1530	8.7	114	5.41	2.3	242	2.767	–	–	0.248
	5/22/2002	1430	15.4	68	5.30	3.3	–	–	–	–	–
	3/28/2003	1300	10.2	45	5.45	4.4	184	1.732	–	–	0.243
Entomology Boards 91-113	3/26/2002	1530	8.5	483	6.77	3.7	3,841	0.812	–	–	0.059
	5/21/2002	1530	10.9	111	6.79	1.1	–	–	–	–	–
	3/28/2003	1215	9.9	248	6.29	3.9	1,639	1.411	–	–	0.282
Entomology Boards 1-19	3/26/2002	1525	9.1	236	5.79	3.3	428	1.759	–	–	0.174
	5/21/2002	1430	13.6	138	6.07	1.8	–	–	–	–	–
	3/28/2003	1156	11.1	405	6.30	5.4	1,387	0.759	–	–	0.079
	4/5/2004	1347	10.8	307	6.94	–	–	1.088	<0.060	0.953	0.072
Laura's Pond	3/8/2001	1345	9.0	76	4.60	1.4	–	–	–	–	–
	5/8/2001	1245	18.6	–	5.96	–	269	2.866	–	–	0.332
	3/26/2002	1610	9.4	126	5.25	3.1	75.9	1.273	–	–	0.067
	5/22/2002	1400	12.8	95	5.43	2.3	–	–	–	–	–
	3/27/2003	1753	12.5	101	5.35	–	133	0.39	–	–	0.033
	3/27/2003*	1756	–	–	–	–	138	1.199	–	–	0.169
	4/5/2004	1034	4.2	90	6.70	–	54.0	0.409	0.03 E	0.420	0.019
	4/5/2004*	1036	–	–	–	–	47.1	0.417	<0.060	0.420	0.021

Table 2. Continued.

Vernal pool name	Date	Time	Water temperature (ºC)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	$NO_2 + NO_3$ (mg/L as N)	Total N (mg/L)	Total P (mg/L)
Beltsville 1	5/8/2001	1125	13.4	–	5.03	–	89	1.568	–	–	0.203
	3/26/2002	1255	8.9	93	4.76	3.2	17	1.112	–	–	0.113
	5/22/2002	1510	14.8	43	4.97	–	–	–	–	–	–
	3/24/2003	1020	12.1	38	4.29	7.2	11.9	0.531	–	–	0.054
	3/24/2003*	1030	–	–	–	–	–	0.476	–	–	0.046
	4/5/2004	1204	8.2	36	5.01	–	10.3	0.513	0.064	0.559	0.024
Beltsville 2	3/26/2002	1305	8.9	67	4.88	2.6	0.3	1.358	–	–	0.132
	5/22/2002	1537	17.1	35	4.62	5.5	–	–	–	–	–
	3/24/2003	1100	13.4	34	4.24	4.2	9.5	0.824	–	–	0.089
	3/24/2003*	1110	–	–	–	–	–	0.703	–	–	0.097
Blue Road	3/9/2001	1115	8.0	42	5.40	1.6	–	–	–	–	–
	5/8/2001	1815	19.0	–	5.47	–	132	1.353	–	–	0.172
	3/24/2003	1605	16.5	40	4.80	5.0	37.8	0.605	–	–	0.064
	4/5/2004	1548	9.8	38	5.65	–	40.2	0.475	<0.060	0.474	0.029
Red Road	3/9/2001	1130	7.0	76	4.60	2.1	–	–	–	–	–
	5/8/2001	1835	18.6	–	4.56	–	1,014	12.27	–	–	0.848
	5/8/2001*	1840	–	–	–	–	156	8.000	–	–	1.263
	5/22/2002	1045	12.8	19	5.03	4.1	–	–	–	–	–
	3/24/2003	1612	18.8	44	3.84	5.3	-51.5	0.475	–	–	0.044
	4/5/2004	1612	15.9	28	4.58	–	-41.9	0.725	<0.060	0.511	0.050
EVAC Pond	4/9/2003	1440	6.7	72	3.71	5.5	-113	0.458	–	–	0.019
	4/8/2004	1030	9.6	40	4.26	–	–	–	–	–	–
Cabin Pond	4/9/2003	1455	7.2	66	3.85	4.8	-79.9	0.276	–	–	0.007
	4/8/2004	1100	9.7	149	6.46	–	–	–	–	–	–
Washington, D.C.											
Riley Springs	3/9/2001	1415	12.5	135	6.53	1.7	–	–	–	–	–
	5/9/2001	1120	17.0	–	7.01	–	1,040	2.126	–	–	0.234
	4/2/2002	1324	25.9	118	6.26	–	1,002	1.172	–	–	0.240
	5/23/2002	1040	12.7	213	6.68	4.3	–	–	–	–	–
	3/27/2003	1600	19.8	206	6.13	4.9	625	0.846	–	–	0.114

Table 2. Continued.

Vernal pool name	Date	Time	Water temperature (°C)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	$NO_2 + NO_3$ (mg/L as N)	Total N (mg/L)	Total P (mg/L)
	3/9/2001	1430	6.7	533	6.38	1.2	–	–	–	–	–
	5/9/2001	1140	15.6	–	6.39	–	493	2.37	–	–	0.355
	4/2/2002	1515	18.1	347	5.94	–	602	0.358	–	–	0.038
Weir Pond	4/2/2002*	1518	–	–	–	–	586	0.309	–	–	0.036
	3/27/2003	1010	9.5	482	6.00	3.5	558	0.44	–	–	0.056
	3/27/2003*	1015	–	–	–	–	550	0.427	–	–	0.048
	4/6/2004	1321	12.2	346	6.80	–	812	0.175	0.237	0.386	0.015
Parkside Pool	3/27/2003	1339	15.8	324	5.76	7.5	369	0.502	–	–	0.047
	4/6/2004	1141	8.5	360	6.31	–	493	0.447	<0.060	0.458	0.045
West Beach	3/27/2003	1215	15.5	115	5.67	3.0	602	0.727	–	–	0.142
Virginia											
	4/10/2001	1630	22.0	23	5.40	2.1	–	–	–	–	–
Big Meadows	4/4/2003	1845	16.0	15	5.28	7.3	60.0	0.616 E	–	–	0.049 E
	4/4/2003*	1850	–	–	–	–	42.1	0.529 E	–	–	0.058 E
	4/10/2001	1700	17.0	16	5.39	1.5	–	–	–	–	–
	5/14/2001	1810	18.0	99	6.43	2.0	423	5.378	–	–	0.520
	4/4/2002	1545	–	18	5.36	–	65.9	0.344	–	–	0.037
Hogcamp Swamp	4/4/2002*	1550	–	–	–	–	62.4	0.479	–	–	0.043
	3/31/2003	1220	7.5	20	5.32	–	70.4	0.147	–	–	0.008
	3/30/2004	1308	9.3	20	5.95	–	55.8	0.184	<0.060	0.135	<0.010
	3/30/2004*	1313	–	–	–	–	–	0.139	<0.060	0.118	0.011
	4/10/2001	1330	21.6	29	5.20	1.2	–	–	–	–	–
Pond Ridge	5/14/2001	1125	13.3	49	6.02	2.7	139	3.37	–	–	0.442
	4/9/2002	1200	13.6	35	5.98	–	164	2.86	–	–	0.265
	3/30/2004	1600	7.6	16	6.09	–	143	4.901	<0.060	6.533	0.415
Swamp Island	4/9/2002	1500	12.4	30	5.94	7.8	142	1.788	–	–	0.353
	3/31/2003	1318	6.3	25	5.15	8.3	165	0.206	–	–	0.053
Rocky Creek	4/9/2002	1505	11.8	25	5.65	9.0	136	0.222	–	–	0.011
	3/31/2003	1345	6.4	18	5.10	8.1	85.7	1.114	–	–	0.125

Table 3. Amphibian species data from multiple visits to vernal pools in Maryland, Washington, D.C., and Virginia, 2001-2004.

[If only one visit was made in a particular year or if pool was dry, no data are presented. See table 9 for definitions of species acronyms. (0), not present; (1), present; an empty cell in the species column means no species were encountered that year; in the visit number column, an empty cell means no visit]

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Maryland														
Powerline Site Back Pond 84-134	2001	ACRE	0	0	0	1							3/13	5/8
		AMAC	0	1	1	0								
		PCRU	0	0	0	1								
		RCAT	0	1	0	0								
		RSYL	1	1	0	0								
	2002	AMAC	1	1	1	0							3/21	5/21
		HVER	0	1	0	0								
		PCRU	1	0	1	0								
		RCAT	0	0	0	0								
		RCLA	0	0	1	0								
		RPAL	0	0	0	0								
		RSYL	1	0	0	0								
	2003	ACRE	0	1									3/25	4/29
		AMAC	1	0										
		PCIN	1	0										
		PCRU	1	0										
		RCAT	1	0										
		RCLA	1	0										
		RPAL	1	1										
		RSYL	1	0										
Powerline Site 80-83	2001	ACRE	0	0	0	0	1						3/8	5/8
		AMAC	0	0	1	1	1							
		PCRU	0	0	0	0	1							
		RSYL	1	1	0	0	0							
Powerline Site 69-72	2001		0	0	0	0	0						3/8	5/8
	2003	ACRE	0	1									3/25	4/29

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Powerline Site Front Pond 1-36	2001	ACRE	0	0	0	0	1						3/8	5/8
		AMAC	0	0	1	0	0							
		BAME	0	0	0	1	0							
		PCRU	0	1	0	0	1							
		RCAT	0	1	0	1	1							
		RCLA	0	0	0	0	1							
		RSYL	1	1	1	0	0							
	2002	ACRE	1	0	0	1							3/21	5/21
		AMAC	1	1	0	0								
		BAME	0	0	1	0								
		PCRU	1	1	0	0								
		RCAT	0	0	0	1								
		RCLA	0	0	1	1								
	2003	AMAC	1	0									3/25	4/29
		HVER	0	1										
		NVIR	1	0										
		PCRU	1	0										
		RCAT	1	0										
		RCLA	1	1										
		RPAL	1	0										
		RSYL	1	1										
Powerline Site 37-40	2001	AMAC	0	0	1								3/8	5/8
	2003		0	0									3/25	4/29
Powerline Site 57-68	2001	AMAC	0	0	1	1	0						3/8	5/8
		PCRU	0	0	0	0	1							
		RSYL	1	1	1	0	0							
	2002	ACRE	0	0	1	0							3/18	5/21
		AMAC	0	1	0	1								
		PCRU	0	1	0	0								
		RSYL	1	0	1	0								
	2003	ACRE	0	1									3/25	4/29
		AMAC	1	0										
		PCRU	1	0										
		RSYL	1	0										
	2004	AMAC	1	1									3/11	3/29
		RSYL	1	1										
		RCLA	1	0										

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Shumate Site	2001	AMAC	0	0	0	1	1	1	1	1			2/21	5/8
		PCIN	1	0	0	1	0	1	1	0				
		PCRU	0	0	0	0	0	0	0	1				
		RSYL	0	1	1	1	1	1	1	1				
	2002	AMAC	0	1	0	1	0						3/7	5/21
		PCIN	0	1	0	1	1							
		RSYL	1	1	1	0	0							
	2003	AMAC	0	1	1								3/12	5/1
		PCIN	0	1	0									
		PCRU	0	1	0									
		RCAT	1	0	0									
		RCLA	1	0	0									
		RPAL	1	0	0									
		RSYL	0	1	1									
	2004	AMAC	1	1	1								3/10	4/5
		RSYL	1	1	0									
		PCIN	0	1	0									
Sam's Pond	2001	ACRE	0	0	0	0	0	0	0	0	0	1	2/14	5/8
		AMAC	0	0	0	0	0	0	1	1	0	1		
		PCIN	0	0	0	0	0	1	0	0	0	0		
		PCRU	0	0	0	0	0	0	0	0	0	1		
		RSYL	1	1	1	1	1	1	1	1	1	1		
	2002	ACRE	0	0	0	1	0	1	0				1/24	5/22
		PCIN	1	0	0	0	0	0	0					
		PCRU	0	0	0	0	1	1	0					
		RCAT	0	0	1	0	0	0	1					
		RSYL	0	1	1	1	1	0	1					
	2003	ACRE	0	0	0	0	0	0	1				3/5	5/5
		AMAC	0	0	0	0	1	1	1					
		PCIN	0	0	1	1	0	0	1					
		PCRU	0	0	0	0	1	0	0					
		RSYL	0	0	0	0	1	1	1					
	2004	AMAC	1	1	1								3/9	3/26
		RSYL	1	1	1									
		PCIN	1	1	0									
		RCLA	0	1	0									
		PCRU	0	0	1									

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Robin's Pond	2002	ACRE	0	0	0	1	0						3/6	5/22
		RSYL	1	1	1	0	0							
	2003	AMAC	0	1	0								3/13	5/5
		BAME	0	0	0									
		PCRU	0	1	0									
		RSYL	0	1	1									
	2004	AMAC	1	1									3/9	3/17
		RSYL	1	1										
Entomology Boards 20-85	2001	AMAC	0	0	1	1	0	0	0				2/21	5/8
		PCRU	0	0	1	0	1	0	1					
		RCLA	0	0	0	0	0	0	1					
		RSYL	0	0	0	1	0	0	0					
	2002	AMAC	0	1									3/19	3/21
	2003	AMAC	1	0									3/28	4/28
		RCLA	1	0										
		RPAL	1	0										
Entomology Back Pond 1	2001	AMAC	0	1	0	1	1						2/21	5/8
		PCRU	0	0	0	0	1							
		RSYL	0	1	0	1	0							
	2002	AMAC	1	1	0	1							3/19	5/21
		PCRU	0	1	0	0								
		RSYL	1	1	1	0								
	2003	ACRE	0	0	1								3/28	4/28
		AMAC	1	1	1									
		RSYL	1	1	1									
	2004	AMAC	1	1									3/10	3/26
		RSYL	1	1										
Entomology Back Pond 2	2001	AMAC	0	0	0	1	0						2/21	5/8
		PCRU	0	0	0	0	1							
		RSYL	0	1	0	1	0							
	2002	AMAC	1	0	1	1	0						3/19	5/22
		PCRU	0	0	1	0	0							
		RSYL	1	0	1	0	0							
	2003	AMAC	1	1	1								3/28	4/28
		PCRU	1	0	0									
		RSYL	1	1	0									

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Entomology Boards 91-113	2001	AMAC	0	1	1	1	1	1	0				2/21	5/8
		RCLA	0	0	0	0	0	0	1					
		RPAL	0	0	0	0	0	0	1					
		RSYL	1	1	0	1	0	0	0					
	2002	AMAC	1	1	1	0							3/19	5/21
		PCRU	0	0	1	0								
		RCAT	1	0	0	0								
		RCLA	1	0	1	1								
		RSYL	0	0	0	0								
	2003	AMAC	1	1	0								3/28	4/28
		PCRU	0	0	1									
		RSYL	0	1	0									
Entomology Boards 1-19	2001	AMAC	0	1	1	1	0	0	1				2/21	5/8
		PCRU	0	0	0	0	1	0	0					
		RCLA	0	0	0	0	0	0	1					
		RSYL	0	1	0	1	0	0	0					
	2002	AMAC	1	1	0	1							3/19	5/21
		RSYL	0	0	0	1								
	2003	AMAC	1	1	0								3/28	4/28
		RCLA	1	0	0									
		RSYL	0	1	0									
	2004	AMAC	1	1									3/10	3/26
		RCAT	1	0										
		PCRU	0	1										

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Laura's Pond	2001	AMAC	1	1									3/8	3/23
		RCAT	1	0										
		RSYL	1	1										
	2002	AMAC	1	1									3/22	4/1
		HVER	0	1										
		PCRU	0	1										
		RCAT	0	1										
		RSYL	1	1										
	2003	AMAC	1	1									3/26	4/8
		BAME	0	1										
		NVIR	1	0										
		PCRU	1	0										
		RCAT	1	0										
		RPAL	1	1										
		RSPH	1	0										
		RSYL	1	0										
	2004	AMAC	1	1									3/11	4/6
		RSYL	1	0										
		PCRU	1	0										
		RCAT	1	0										
		RCLA	1	0										
		NVIR	0	1										
		RPAL	0	1										

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Beltsville 1	2001	AMAC	1	1	1								3/15	5/8
		PCRU	0	0	1									
		RSYL	1	1	1									
	2002	AMAC	1	0	0	1	1	1	1	1	1		3/3	5/22
		BAME	0	0	0	1	0	0	0	0	0			
		NVIR	0	0	0	0	1	0	0	0	0			
		PCIN	1	0	0	1	0	0	0	0	0			
		PCRU	0	0	0	1	0	0	0	0	0			
		RCAT	0	0	0	1	0	0	0	0	0			
		RSYL	1	1	1	1	1	1	1	1	1			
	2003	AMAC	1	1									3/24	5/1
		HVER	0	1										
		PCRU	1	0										
		RSYL	1	1										
	2004	AMAC	1	1									3/11	4/6
		RSYL	1	1										
		BAME	1	0										
Beltsville 2	2002	AMAC	0	0	1	1	0	1					3/3	5/22
		PCRU	0	0	0	1	0	0						
		RPAL	0	0	0	1	0	0						
		RSYL	1	1	1	1	1	1						
	2003	AMAC	1	1									3/24	5/1
		RSYL	1	1										
	2004	AMAC	1	1									3/11	4/5
		RSYL	1	0										
		PCRU	1	1										

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Blue Road	2001	ACRE	0	0	0	1	1						3/9	5/8
		AMAC	0	1	1	1	1							
		PCRU	0	0	1	0	0							
		RCLA	0	0	0	0	1							
		RPAL	0	0	0	0	1							
		RSPH	0	0	0	0	1							
		RSYL	1	1	1	1	0							
	2002	ACRE	0	1	0								3/6	5/22
	2003	ACRE	0	0	1								3/24	5/5
		AMAC	1	1	1									
		PCRU	1	0	1									
		RSYL	1	1	1									
	2004	AMAC	1	1	1								3/9	4/5
		RSYL	1	1	1									
		PCRU	0	1	0									
		ACRE	0	1	1									
		BAME	0	1	0									
Red Road	2001	ACRE	0	0	0	0	1						3/9	5/8
		AMAC	1	1	1	1	1							
		PCRU	0	1	1	1	1							
		PFER	0	0	1	0	0							
		RSPH	0	0	0	1	0							
		RSYL	0	0	1	1	0							
	2002	ACRE	0	1	1								3/6	5/22
		AMAC	0	1	0									
	2003	ACRE	0	0	1								3/24	5/5
		AMAC	1	1	1									
		BAME	1	1	0									
		PCRU	1	0	0									
		RSYL	1	0	0									
	2004	AMAC	1	1									3/17	3/26
		RSYL	1	0										
		PCRU	0	1										
EVAC Pond	2003	ACRE	0	0	1								3/12	4/29
		PCRU	0	1	0									
		RSYL	0	1	1									
Cabin Pond	2003	AMAC	1	1									3/26	4/29
		HVER	0	1										
		RSYL	1	1										

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Washington, D.C.														
Riley Springs	2001	AMAC	0	0	0	0	1						2/27	5/16
		BAME	0	0	1	1	0							
		PCIN	1	1	0	0	1							
		RSYL	0	0	0	0	1							
	2002	BAME	0	1	1								4/2	5/23
		PCIN	1	0	0									
		RSYL	1	0	0									
	2003	AMAC	1	1									3/27	4/3
		BAME	1	1										
		PCIN	1	0										
		RSYL	1	1										
Weir Pond	2001	AMAC	0	0	0	1	1	1	1	1			2/27	5/16
		BAME	0	0	0	0	0	0	1	1				
		PCIN	1	0	1	0	0	0	0	0				
		RSYL	0	0	1	1	0	0	0	1				
	2002	EBIS	0	0	1								4/2	5/23
		PCIN	1	0	0									
	2003	AMAC	1	1	1								3/27	5/15
		BAME	0	1	0									
		PCIN	0	1	0									
		RSYL	1	1	0									
	2004	AMAC	1	0									3/9	3/26
		PCIN	0	1										
		PCRU	0	1										

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Parkside Pool	2001	AMAC	0	0	0	1	1	1	1	1			2/27	5/2
		BAME	0	0	0	0	1	1	1	0				
		PCRU	0	0	0	0	0	1	0	0				
		RSYL	0	0	0	0	1	0	1	0				
	2002	AMAC	1	1	1								4/2	5/23
		BAME	0	1	0									
		PCIN	0	0	0									
		PCRU	0	1	0									
	2003	AMAC	1	0	1	1	1						3/27	5/8
		BAME	0	1	1	0	0							
		RCAT	1	0	0	0	0							
		RCLA	0	0	0	0	1							
		RSYL	1	0	0	0	1							
	2004	AMAC	1	1	1								3/9	3/26
		RSYL	1	1	0									
		PCRU	0	1	0									
		BAME	0	0	1									
West Beach	2001	AMAC	0	0	1	1	1						2/27	4/25
	2002	AMAC	1	0	0								4/2	5/23
		BAME	0	0	0									
	2003	AMAC	1	0	1	0							3/27	5/8
		BAME	0	0	1	1								
		RCAT	1	0	0	0								
	2004	AMAC	0	1									3/9	3/24
		RSYL	1	1										
Virginia														
Big Meadows	2001	BAME	1	1	1								4/10	5/14
		RSYL	1	1	0									
	2002	BAME	0	1									4/4	4/23
		PCRU	0	1										
		RSYL	1	0										
	2003	BAME	0	1	1								3/31	4/24
		PCRU	0	1	1									
		RSYL	1	1	1									

Table 3. Continued.

Vernal pool name	Year	Species	Nondetection/Detection on visit number										Day and month of visit	
			1	2	3	4	5	6	7	8	9	10	First	Last
Hogcamp Swamp	2001	AMAC	0	0	1	1	1	0					2/12	5/14
		BAME	0	0	0	0	0	1						
		RSYL	0	1	1	1	1	1						
	2002	AMAC	1	0									4/4	4/23
		PCRU	0	1										
		RSYL	1	1										
	2003	AMAC	0	1									3/31	4/24
		PCIN	0	1										
		RSYL	1	1										
	2004	RSYL	1	1									3/22	3/30
Pond Ridge	2001	BAME	0	1	1	1							3/22	5/14
		NVIR	0	1	0	0								
		PCIN	0	0	1	0								
		RCLA	1	1	0	1								
		RSYL	1	1	1	1								
	2002	AMAC	1										4/9	4/9
		PCIN	1											
		RCLA	1											
		RSYL	1											
	2004	RSYL	1	0									3/23	3/30
Swamp Island	2002	RSYL	1										4/9	4/9
	2003	RSYL	1	1									3/31	4/24
Rocky Creek	2002	RSYL	1										4/9	4/9
	2003	PCRU	0	1									3/31	4/24
		RSYL	1	1										

Table 4. Maximum number of egg masses of spotted salamanders (*Ambystoma maculatum*; AMAC) and wood frogs (*Rana sylvatica*; RSYL) counted at vernal pools in Maryland, Washington, D.C., and Virginia using independent (2001) and dependent (2002-2004) double-observer methods.

[*, single observer count. Blue Road and Red Road pools were dry in 2002, West Beach was dry in 2001 and 2002, and Riley Springs and Big Meadows were dry in 2004. In other cases in which no data are presented (for example, no data for a particular year), no counts were made at that vernal pool; >, greater than]

Vernal pool name	Date	Species	1st Observer count	2nd Observer count
Maryland				
Powerline Site Back Pond 84-134	3/27/2001	AMAC	42	45
		RSYL	191	349
	3/21/2002	AMAC	9	9
		RSYL	89	89
	3/25/2003	AMAC	44	44
		RSYL	47	47
	3/15/2004	AMAC	0*	
		RSYL	137*	
Powerline Site 80-83	3/27/2001	AMAC	9	7
		RSYL	6	5
	3/15/2004	AMAC	4*	
		RSYL	1*	
Powerline Site Front Pond 1-36	3/27/2001	AMAC	73	59
		RSYL	107	159
	3/21/2002	AMAC	13	13
		RSYL	0	0
	3/25/2003	AMAC	22	23
		RSYL	6	8
	3/11/2004	AMAC	3*	
		RSYL	46*	
Powerline Site 57-68	3/27/2001	AMAC	38	17
		RSYL	49	10
	3/18/2002	RSYL	2	2
	4/2/2002	AMAC	15	15
	3/25/2003	AMAC	32	32
		RSYL	2	2
	3/29/2004	AMAC	22	24
		RSYL	2	3

Table 4. Continued.

Vernal pool name	Date	Species	1st Observer count	2nd Observer count
Shumate Site	3/26/2001	AMAC	24	9
		RSYL	42	36
	3/18/2002	AMAC	2	2
		RSYL	15	15
	3/24/2003	AMAC	16	17
		RSYL	5	5
	3/10/2004	AMAC	24	24
		RSYL	4	4
Sam's Pond	3/28/2001	AMAC	59	54
		RSYL	477	358
	3/13/2002	RSYL	371	360
	3/27/2002	AMAC	0	0
	3/22/2003	RSYL	221	256
	4/8/2003	AMAC	66	66
	3/9/2004	AMAC	160	160
		RSYL	85	85
Robin's Pond	3/13/2002	RSYL	135	144
	3/27/2002	AMAC	0	0
	3/22/2003	AMAC	0	0
		RSYL	81	81
	3/17/2004	AMAC	4*	
		RSYL	139*	
Entomology Boards 20-85	3/29/2001	AMAC	51	54
		RSYL	0	1
	3/11/2004	AMAC	60*	
		RSYL	2*	
Entomology Back Pond 1	3/29/2001	AMAC	43	52
		RSYL	98	130
	3/19/2002	RSYL	109	111
	4/1/2002	AMAC	32	34
	4/1/2003	AMAC	34	38
		RSYL	18	18
	3/10/2004	AMAC	117	122
		RSYL	31	31

Table 4. Continued.

Vernal pool name	Date	Species	1st Observer count	2nd Observer count
Entomology Back Pond 2	3/29/2001	AMAC	103	169
		RSYL	90	149
	3/19/02	AMAC	25	25
		RSYL	11	11
	4/1/03	AMAC	94	96
		RSYL	25	25
	3/11/04	AMAC	91*	
		RSYL	24*	
Entomology Boards 91-113	3/29/01	AMAC	33	35
		RSYL	24	22
	3/27/02	AMAC	38	38
		RSYL	0	0
	4/1/03	AMAC	46	46
		RSYL	1	1
	3/11/04	AMAC	44*	
		RSYL	0*	
Entomology Boards 1-19	3/29/01	AMAC	104	112
		RSYL	27	30
	3/19/02	RSYL	0	0
	3/27/02	AMAC	30	30
	4/1/03	AMAC	83	82
		RSYL	0	1
	3/10/04	RSYL	0	0
	3/26/04	AMAC	115	121
Laura's Pond	3/23/01	AMAC	241	346
		RSYL	193	161
	3/22/02	RSYL	5	5
	4/1/02	AMAC	549	549
	3/26/03	AMAC	390	390
		RSYL	52	54
	3/11/04	RSYL	77	77
	4/6/04	AMAC	774	845
Beltsville 1	3/15/01	RSYL	283	224
	3/27/01	AMAC	229	147
	3/14/02	RSYL	102	109
	4/3/02	AMAC	65	65
	3/24/03	AMAC	232	233
		RSYL	222	222
	3/11/04	AMAC	434	442
		RSYL	266	267

Table 4. Continued.

Vernal pool name	Date	Species	1st Observer count	2nd Observer count
Beltsville 2	3/7/02	RSYL	406	399
	4/3/02	AMAC	79	85
	3/24/03	AMAC	458	465
		RSYL	197	184
	3/11/04	AMAC	447*	
		RSYL	31*	
Blue Road	3/20/01	RSYL	74	92
	4/5/01	AMAC	254	230
	3/24/03	RSYL	5	5
	4/8/03	AMAC	76	79
	3/9/04	RSYL	60	64
	3/26/04	AMAC	105	121
Red Road	3/20/01	RSYL	57	39
	4/5/01	AMAC	38	40
	3/24/03	AMAC	47	44
		RSYL	1	1
	3/17/04	AMAC	63	73
		RSYL	12	12
EVAC Pond	3/27/03	AMAC	0	0
		RSYL	10	10
	3/18/04	AMAC	0	0
		RSYL	0	0
Cabin Pond	3/26/03	AMAC	18	18
		RSYL	7	7
	3/11/04	AMAC	8*	
		RSYL	0*	
	Washington, D.C.			
Riley Springs	4/2/02	AMAC	0	0
		RSYL	1	1
	3/27/03	AMAC	5	5
		RSYL	2	2
Weir Pond	4/9/01	AMAC	26*	
		RSYL	6*	
	3/27/03	AMAC	20	23
		RSYL	0	0
	3/9/04	RSYL	0	0
	3/26/04	AMAC	0	0

Table 4. Continued.

Vernal pool name	Date	Species	1st Observer count	2nd Observer count
Parkside Pool	4/9/01	AMAC	252*	
		RSYL	15*	
	3/27/03	AMAC	384	384
		RSYL	11	11
	3/9/04	RSYL	9	10
	3/24/04	AMAC	247	260
West Beach	3/27/03	AMAC	40	37
		RSYL	0	0
	3/9/04	RSYL	4	4
	3/24/04	AMAC	3	3
Virginia				
Big Meadows	4/10/01	AMAC	0	0
		RSYL	97	101
	4/4/02	AMAC	0	0
		RSYL	4	4
	4/4/03	AMAC	0	0
		RSYL	11	11
Hogcamp Swamp	4/10/01	AMAC	2	1
		RSYL	270	320
	4/4/02	AMAC	1	1
		RSYL	147	147
	3/31/03	AMAC	0	0
		RSYL	159	159
	3/30/04	AMAC	0	0
		RSYL	253	257
Pond Ridge	4/10/01	AMAC	0	0
		RSYL	1	3
	3/23/04	AMAC	0	0
		RSYL	>200*	
Swamp Island	4/4/02	AMAC	0	0
		RSYL	4	4
	3/31/03	AMAC	0	0
		RSYL	82	80
Rocky Creek	4/4/02	AMAC	0	0
		RSYL	40	40
	3/31/03	AMAC	0	0
		RSYL	33	33

Table 5. Station identification (ID) numbers, latitude, longitude, and county locations of stream sampling sites in Maryland, Washington, D.C., and Virginia.

[Latitude and longitude are given in degrees, minutes, seconds; n.a., not applicable]

Station ID	Stream name	Latitude	Longitude	County
	Maryland			
390304076491301	American Holly Stream	39 03 04.6	76 49 12.1	Prince George's
390446076464101	Cemetery Stream	39 04 48.4	76 46 31.7	Anne Arundel
3903100076484500	Snowden Stream	39 03 10.1	76 48 41.3	Prince George's
390234076511701	Gill's Stream	39 02 35.2	76 51 15.7	Prince George's
390330076492901	PWRC Maintenance Seep	39 03 29.6	76 49 29.3	Prince George's
390323076493601	Northwest Border Stream	39 03 22.9	76 49 35.6	Prince George's
	Washington, D.C.			
385718077030101	Maintenance Yard Stream	38 57 20.6	77 03 01.5	n.a.
385716077031201	West Spring	38 57 16.1	77 03 10.2	n.a.
385836077031501	Beech/Oregon	38 58 36.1	77 03 11.1	n.a.
385813077030801	Bingham/Oregon	38 58 12.5	77 03 08.5	n.a.
385846077021601	16th Street (Holly)	38 58 46.4	77 02 12.6	n.a.
385759077024301	Golf Course I	38 58 00.9	77 02 45.6	n.a.
385901077030101	Deerprint Run	38 58 53.5	77 03 02.5	n.a.
385817077021301	Whittier	38 58 17.5	77 02 12.7	n.a.
	Virginia			
1627395	Paine Run	38 11 53.3	78 47 30.7	Augusta
166526910	Staunton River	38 26 47.7	78 22 36.0	Madison
1662367	Piney River	38 41 53.0	78 15 36.2	Rappahannock
203210510	SRP35 (Doyle's River)	38 14 38.7	78 41 13.0	Albemarle
203254350	SRP71 (Ivy Creek Tributary)	38 16 03.8	78 39 32.0	Albemarle
1628850	SRP42 (Hawksbill Creek Tributary)	38 18 49.5	78 36 31.1	Rockingham
163054325	Shenk's Hollow	38 39 47.9	78 21 32.7	Page
1662358	SRP28 (Piney River Tributary)	38 45 33.4	78 16 20.4	Rappahannock
1630565	SRP10 (Jeremy's Run)	38 45 31.6	78 18 02.8	Page
2032589	Swift Run	38 20 31.7	78 30 40.4	Greene
1628700	Two-Mile Run	38 20 08.7	78 40 26.3	Rockingham
203254425	Simmons Gap	38 18 01.6	78 37 15.7	Greene
1630542	Jewell Hollow	38 39 05.5	78 21 13.2	Page
1662159	Brokenback Run	38 34 14.1	78 18 03.7	Madison
1662190	Ragged Run	38 31 55.7	78 17 41.0	Madison
1662350	North Fork Thornton	38 41 35.3	78 16 29.6	Rappahannock

Table 6. Water-quality data collected from stream sampling sites in Maryland, Washington, D.C., and Virginia, 2001-2004.

[ºC, degrees Celsius; µS/cm, microsiemens per centimeter at 25 ºC; DO, dissolved oxygen; ANC, acid-neutralizing capacity; TKN, total Kjeldahl nitrogen; $NO_2 + NO_3$, nitrite plus nitrate; N, nitrogen; P, phosphorus; mg/L, milligrams per liter; µeq/L, microequivalents per liter; –, no data; <, less than; E, estimated; *, replicate sample; when water temperature was measured on a different day than the water samples were collected, the day of water temperature measurement is in parentheses]

Stream Name	Date	Time	Water temperature (ºC)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	NO_2+NO_3 (mg/L as N)	Total N (mg/L)	Total P (mg/L)
				Maryland							
American Holly Stream	8/22/2001	1050	19.6	134	6.89	11.1	709	0.529	–	–	0.074
	8/22/2001*	1055	–	–	–	–	–	0.476	–	–	0.070
	6/5/2002	1455	18.8	169	6.50	4.3	986	–	–	–	–
	6/12/2002	1100	19.8	154	6.14	4.7	–	0.625	–	–	0.052
	6/2/2003	1142	13.8	104	5.22	–	247	–	–	–	–
	6/12/2003	1558	19.6	98	6.38	6.6	–	0.554	–	–	0.041
	6/9/2004	1632	20.1	115	6.73	–	347	0.431	0.370	0.713	0.025
Cemetery Stream	8/22/2001	1000	18.4	45	5.69	8.4	16.1	0.247	–	–	0.011
	6/6/2002	1030	19.0	49	5.14	5.3	58.7	–	–	–	–
	6/6/2002*	1035	–	–	–	–	57.6	–	–	–	–
	6/12/2002	1130	19.5	49	5.50	1.1	–	0.488	–	–	0.014
	6/12/2002*	1135	–	–	–	–	–	0.420	–	–	0.014
	6/5/2003	1329	14.9	47	4.61	–	-1.6	–	–	–	–
	6/5/2003*	1334	–	–	–	–	0.6	–	–	–	–
	6/12/2003	1400	18.1	43	4.54	7.7	–	0.358	–	–	0.015
	6/12/2003*	1401	–	–	–	–	–	0.335	–	–	0.016
	6/9/2004	1301	20.1	48	5.50	–	10.6	0.274	0.273	0.539	0.014
	6/9/2004*	1302	–	–	–	–	8.9	0.274	0.273	0.470	<0.010
Snowden Stream	8/22/2001	1030	22.4	125	6.66	7.0	405	0.531	–	–	0.016
	6/5/2002	1530	19.5	152	5.94	1.1	468	–	–	–	–
	6/12/2002	1045	21.1	192	6.10	2.5	–	0.688	–	–	0.022
	6/2/2003	1614	21.3	129	5.90	–	194	–	–	–	–
	6/12/2003	1434	28.1	111	5.38	5.3	–	0.639	–	–	0.030
	6/9/2004	1614	24.6	139	6.52	–	217	0.396	0.113	0.579	0.012
Gill's Stream	8/22/2001	1120	19.5	264	7.30	9.6	1,074	0.218	–	–	0.010
	6/6/2002	1340	20.8	270	6.64	5.8	270	–	–	–	–
	6/12/2002	1210	20.9	270	6.51	6.7	–	0.374	–	–	0.007
	6/3/2003	1443	14.4	27.1	6.18	–	704	–	–	–	–
	6/12/2003	1538	21.0	228	6.34	7.0	–	0.441	–	–	0.018
	6/9/2004	1135	19.1	279	7.08	–	741	0.384	0.793	1.045	<0.010
PWRC Maintenance Seep	6/3/2003	1249	12.6	58	3.86	–	-36.8	–	–	–	–
	6/12/2003	1632	17.2	58	4.57	3.7	–	0.376	–	–	0.005
Northwest Border Stream	6/4/2003	1201	13.9	138	6.37	–	597	–	–	–	–
	6/12/2003	1618	20.1	195	6.43	6.6	–	0.77	–	–	0.092

Table 6. Continued.

Stream Name	Date	Time	Water temperature (°C)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	NO_2+NO_3 (mg/L as N)	Total N (mg/L)	Total P (mg/L)
Washington, D.C.											
Maintenance Yard Stream	8/22/2001	1250	20.4	348	6.21	6.0	784	0.827	–	–	0.112
	6/11/2002	1455	19.4	405	5.70	–	679	0.378	–	–	0.044
	6/9/2003	1418	15.4	322	6.02	6.7	312	2.95	–	–	0.564
	6/15/2004	1028	–	–	–	–	167	0.083E	0.765	0.847	<0.010
West Spring	8/22/2001	1315	14.0	561	6.17	9.6	528	< 0.08	–	–	0.032
	7/1/2002	1115	14.1	618	5.73	–	589	0.261	–	–	0.038
	6/11/2003	1520	12.7	409	5.32	5.9	354	0.072E	–	–	0.028
	6/15/2004	1135	–	–	–	–	387	0.076E	0.697	0.685	0.021
	6/15/2004*	1140	–	–	–	–	382	<0.10	0.704	0.674	0.019
Beech/Oregon	8/22/2001	1400	21.4	485	7.53	8.0	2,213	0.212	–	–	0.143
	6/10/2002	1440	21.5	464	6.82	4.8	1,747	0.296	–	–	0.141
	6/10/2002*	1445	–	–	–	–	–	0.282	–	–	0.139
	6/9/2003	1650	17.6	482	6.86	7.0	2,080	0.274	–	–	0.065
	6/14/2004	0945	17.9	511	7.50	–	2,033	0.22	1.588	1.692	0.086
Bingham/Oregon	8/22/2001	1345	21.2	869	6.98	6.2	2,234	0.216	–	–	0.064
	6/11/2002	1357	22.5	591	6.69	5.4	1,890	0.978	–	–	1.452
	6/9/2003	1538	17.1	754	6.71	6.8	1,847	0.415	–	–	0.055
	6/14/2004	1420	20.5	1001	–	–	1,745	0.285	3.247	3.51	0.060
16th Street (Holly)	8/22/2001	1440	20.3	359	7.26	7.0	605	0.139	–	–	0.013
	6/11/2003	1106	17.9	498	6.10	6.1	466	0.452	–	–	0.048
	6/11/2003*	1107	–	–	–	–	445	0.743	–	–	0.083
	6/15/2004	1626	–	–	–	–	419	0.314	2.286	2.598	0.039
Golf Course I	8/22/2001	1510	18.9	105	7.60	8.0	648	0.125	–	–	0.050
	6/11/2002	1048	17.8	94	5.88	6.6	540	0.130	–	–	0.040
	6/11/2002*	1053	–	–	–	–	537	–	–	–	–
	6/9/2003	1110	15.1	177	6.02	5.8	1,100	0.575	–	–	0.072
	6/15/2004	1540	–	–	–	–	971	0.128	2.465	2.546	<0.010
Deerprint Run	8/22/2001	1415	20.0	485	7.35	4.0	1,420	0.133	–	–	0.037
	6/12/2002	1510	19.1	587	6.15	–	1,931	0.205	–	–	0.030
	6/11/2003	1245	15.5	378	5.71	5.5	574	0.797	–	–	0.135
	6/14/2004	1220	18.1	352	7.13	–	994	0.087E	0.417	0.499	0.023
Whittier	7/1/2002	1248	19.1	723	5.90	–	1,093	0.221	–	–	0.025
	7/1/2002*	1250	–	–	–	–	1,109	0.304	–	–	0.061
	6/11/2003	1650	18.8	1096	6.00	5.4	1,090	0.252	–	–	0.021
Virginia											
Paine Run	8/27/2001	1645	21.0	20	5.83	9.2	16.5	0.057E	–	–	0.003E
	5/31/2002	1300	19.5	20	5.54	8.9	4.1	–	–	–	–
	7/10/2002	0900	22.4	23	5.37	6.1	19.7	0.130	–	–	0.008
	6/17/2003	1233	13.8	19	5.50	–	2.2	0.106	–	–	0.004
	7/7/2004	0840	18.0	–	–	–	6.3	<0.10	0.073	0.093	<0.010
	7/7/2004*	0845	–	–	–	–	6.7	<0.10	0.073	0.107	<0.010

Table 6. Continued.

Stream Name	Date	Time	Water temperature (°C)	Specific conductance (µS/cm)	pH (units)	DO (mg/L)	ANC (µeq/L)	TKN (mg/L as N)	NO_2+NO_3 (mg/L as N)	Total N (mg/L)	Total P (mg/L)
Staunton River	8/26/2001	1915	20.3	21	6.18	7.6	113	0.270	–	–	0.026
	8/26/2001*	1920	–	–	–	–	115	<0.08	–	–	0.026
	7/16/2002	1600	15.0	–	–	–	109	0.109	–	–	0.039
	6/19/2003	1700	15.0	19	5.71	–	70.1	0.106	–	–	0.116
	7/9/2004	1450	–	–	–	–	87.1	0.061E	0.069	0.123	0.023
Piney River	8/21/2001	1830	18.7	56	6.52	7.3	330	0.067E	–	–	0.011
	5/30/2002	1010	14.5	36	5.55	9.1	225	–	–	–	–
	7/8/2002	1000	18.1	44	5.70	–	343	0.266	–	–	0.035
	7/8/2002*	1015	–	–	–	–	339	0.387	–	–	0.040
	6/18/2003	1101	14.0	36	5.35	–	227	0.2	–	–	0.024
	7/9/2004	1105	–	–	–	–	320	0.061E	0.108	0.158	<0.010
SRP35 (Doyle's River)	8/21/2001	1400	17.8 (7/25)	43	6.00	7.3	1485	0.084	–	–	0.057
	7/16/2002	1930	19.4	43	5.83	4.8	291	0.23	–	–	0.089
	6/17/2003	1633	12.3	32	5.77	–	159	0.128	–	–	0.030
	6/17/2003*	1636	–	–	–	–	158	0.122	–	–	0.030
	7/7/2004	1405	15.6	–	–	–	188	0.061E	0.295	0.367	0.029
SRP71 (Ivy Creek Tributary)	8/21/2001	1430	17.7 (7/25)	38	6.00	7.2	284	0.203	–	–	0.058
	7/9/2002	1600	18.7	44	6.09	5.5	354	0.127	–	–	0.041
	6/19/2003	1050	13.4	32	5.26	–	90.4	0.138	–	–	0.022
	7/7/2004	1735	17.1	–	–	–	229	0.169	0.460	0.684	0.038
SRP42 (Hawksbill Creek Tributary)	8/21/2001	1500	12.2 (7/25)	58	6.70	7.1	294	0.08	–	–	0.030
	7/9/2002	1320	12.8	42	5.94	–	266	0.17	–	–	0.036
	6/19/2003	1255	11.3	37	5.71	–	209	0.088E	–	–	0.027
	7/6/2004	1124	12.7	–	–	–	320	0.059E	0.828	0.658	0.023
Shenk's Hollow	8/21/2001	1630	20.9 (7/24)	99	6.33	7.0	491	0.059E	–	–	0.033
	5/30/2002	1845	16.1	86	6.18	7.1	372	–	–	–	–
	7/9/2002	0900	18.6	124	5.93	6.3	758	0.139	–	–	0.051
	6/18/2003	1853	15.2	74	6.45	–	349	0.235	–	–	0.036
	7/8/2004	0900	19.6	–	–	–	544	0.099E	0.172	0.276	0.023
SRP28 (Piney River Tributary)	8/21/2001	1700	13.6 (7/24)	19	6.94	7.4	59.8	0.064E	–	–	0.006
	7/8/2002	1640	15.4	14	5.92	–	73.8	1.127	–	–	0.173
	6/18/2003	1638	11.2	13	6.35	–	50.4	0.102	–	–	0.014
	7/8/2004	1743	–	–	–	–	47.5	0.068E	0.155	0.223	<0.010
SRP10 (Jeremy's Run)	8/21/2001	1730	16.7 (7/24)	54	6.08	7.5	367	0.055E	–	–	0.009
	8/21/2001*	1735	–	–	–	–	366	0.05 E	–	–	0.008
	5/30/2002	1600	17.0	41	5.85	8.3	210	–	–	–	–
	7/8/2002	1400	16.8	53	5.98	–	305	0.789	–	–	0.119
	6/18/2003	1322	13.0	43	5.89	–	252	0.079E	–	–	0.011
	7/8/2004	1317	17.8	–	–	–	339	0.236	0.419	0.890	0.055
Swift Run	5/31/2002	1500	18.2	62	6.00	7.4	62.0	–	–	–	–
Two-Mile Run	5/31/2002	1130	17.2	20	5.63	9.1	277	–	–	–	–
Simmons Gap	5/31/2002	1600	–	–	–	–	331	–	–	–	–
Jewell Hollow	5/31/2002	0910	15.5	73	6.04	7.7	304	–	–	–	–
Brokenback Run	5/29/2002	1538	16.0	21	5.67	8.4	99.5	–	–	–	–
Ragged Run	5/29/2002	1830	16.9	22	5.92	7.8	111	–	–	–	–
North Fork Thornton	5/30/2002	1400	16.9	45	5.80	7.9	300	–	–	–	–

Table 7. Amphibian species data from stream transect surveys of streams in Maryland, Washington, D.C., and Virginia, 2001-2004.

[Two transects were surveyed per stream with one to three removal passes per stream; species' counts represent the sum of captured larvae and adults plus escapes in each pass; total represents the sum of counts from the passes; species acronyms are defined in table 9; "none" in the species column means no species were encountered on that pass; in the counts column, an empty cell means no pass]

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
Maryland								
American Holly Stream	7/2/2001	1	10:15-11:09	EBIS	14	8		22
		2	11:02-11:10	EBIS	1	0		1
	6/5/2002	1	14:08-14:40	none	0	0	0	0
		2	14:08-14:35	none	0	0	0	0
	6/2/2003	1	12:07-12:46	none	0	0		0
		2	12:07-13:01	EBIS	1	2	0	3
	6/7/2004	1	11:47-12:05	EBIS	1	0		1
		2	12:07-12:29	EBIS	1	1	0	2
Cemetery Stream	6/25/2001	1	14:56-15:58	EBIS	11	12		23
		2	14:10-14:45	EBIS	1			1
	6/6/2002	1	10:40-11:20	none	0	0	0	0
		2	10:40-11:45	EBIS	11	1	2	14
	6/5/2003	1	13:48-14:25	EBIS	1	1	0	2
		2	13:38-14:15	EBIS	2	1		3
	6/7/2004	1	09:28-10:07	EBIS	1	0		1
		2	09:34-10:36	EBIS	1	0		1
Snowden Stream	7/3/2001	1	15:31-15:59	EBIS	1	1		2
		2	15:31-15:59	EBIS	1			1
	6/5/2002	1	15:35-16:00	none	0	0	0	0
		2	15:43-16:40	EBIS	0	0	1	1
	6/2/2003	1	16:28-17:26	none	0	0		0
		2	16:23-17:22	none	0	0		0
	6/7/2004	1	13:05-13:30	none	0	0		0
		2	13:06-13:33	none	0	0		0
Gill's Stream	7/9/2001	1	15:00-15:34	EBIS	1			1
		2	14:32-15:45	EBIS	5	2		7
	6/6/2002	1	13:52-14:50	none	0	0	0	0
		2	13:50-14:53	EBIS	4	7	2	13
	6/3/2003	1	14:54-15:03	none	0	0		0
		2	15:05-15:15	EBIS	2	0		2
	6/7/2004	1	14:28-15:18	EBIS	4	0		4
		2	14:22-15:36	EBIS	0	2	0	2
PWRC Maintenance Seep	6/3/2003	1	12:40-13:27	PCIN	2	0		2
Northwest Border Stream	6/4/2003	1	11:32-12:18	none	0	0		0
		2	11:35-12:03	none	0	0		0
Washington, D.C.								
Maintenance Yard Stream	7/10/2001	1	12:08-12:19	none	0			0
		2	12:26-12:42	none	0			0
	6/11/2002	1	14:55-15:14	none	0	0		0
		2	14:52-15:13	none	0	0		0
	6/9/2003	1	14:20-15:04	none	0	0		0
		2	14:20-14:53	none	0	0		0
	6/15/2004	1	10:28-10:43	none	0	0		0
		2	10:29-10:52	none	0	0		0

Table 7. Continued.

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
West Spring	7/10/2001	1	09:56-10:29	none	0			0
		2	10:24-11:26	DFUS	3	0		3
				EBIS	1	1		2
	7/1/2002	1	11:07-11:46	DFUS	2	0		2
		2	11:07-12:03	DFUS	3	0	1	4
				EBIS	1	1	0	2
	6/11/2003	1	15:25-16:13	DFUS	0	5	1	6
		2	15:22-16:06	DFUS	1	0		1
	6/15/2004	1	11:35-12:50	DFUS	3	1	0	4
		2	11:40-13:39	DFUS	5	2	0	7
				PRUB	2	1	0	3
Beech/Oregon	7/17/2001	1	16:10-16:28	EBIS	1			1
		2	16:20-17:40	EBIS	11	6		17
	6/10/2002	1	14:41-15:49	EBIS	1	0	0	1
		2	14:22-15:35	EBIS	0	0	1	1
	6/9/2003	1	16:45-17:30	EBIS	1	0		1
		2	16:46-17:39	EBIS	1	0		1
	6/14/2004	1	09:45-11:35	EBIS	2	0	1	3
		2	09:41-11:10	EBIS	1	1	1	3
Bingham/Oregon	7/18/2001	1	10:01-10:23	none	0			0
		2	10:27-10:46	none	0			0
	6/11/2002	1	13:51-14:21	none	0	0		0
		2	13:57-14:23	none	0	0		0
	6/9/2003	1	15:40-16:26	none	0	0		0
		2	15:40-16:25	none	0	0		0
	6/14/2004	1	14:21-15:07	none	0	0		0
		2	14:10-14:45	none	0	0	0	0
16th Street (Holly)	7/10/2001	1	14:41-15:59	DFUS	2	1	0	3
				EBIS	2	5	1	8
	7/11/2001	2	09:31-11:23	DFUS	13	2		15
				EBIS	33	12		45
	6/10/2002	1	11:23-12:31	DFUS	6	2	2	10
		2	11:25-13:08	DFUS	8	2	5	15
	6/11/2003	1	11:10-11:32	DFUS	3	1		4
		2	11:14-12:08	DFUS	5	1		6
				EBIS	6	1		7
	6/15/2004	1	16:26-17:17	DFUS	5	5	3	13
				PRUB	1	0	0	1
		2	16:22-18:20	DFUS	6	2	0	8
				EBIS	6	3	4	13
Golf Course I	7/17/2001	1	13:48-15:19	EBIS	10	7		17
		2	14:10-15:15	EBIS	11			11
	6/11/2002	1	10:48-12:45	EBIS	40	31	10	81
		2	10:48-11:46	EBIS	5	1	5	11
	6/9/2003	1	11:00-11:47	EBIS	3	2	1	6
		2	11:51-12:55	EBIS	20	19		39
	6/14/2004	1	15:37-16:42	EBIS	3	0	0	3
		2	15:40-17:12	EBIS	9	10	5	24

Table 7. Continued.

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
Deerprint Run	8/5/2001	1	13:20-13:45	DFUS	2			2
		2	13:20-13:55	EBIS	1	0		1
	6/12/2002	1	14:50-16:05	DFUS	3	3	2	8
				EBIS	1	0	2	3
				PRUB	0	0	1	1
		2	14:48-15:33	EBIS	0	1	0	1
	6/11/2003	1	12:40-13:20	DFUS	3	0		3
		2	12:40-13:27	none	0	0		0
	6/14/2004	1	12:16-13:00	none	0	0	0	0
		2	12:20-13:44	DFUS	1	0	0	1
				EBIS	3	3	0	6
Whittier	7/1/2002	1	12:43-13:00	DFUS	2	0	0	2
		2	12:48-13:02	none	0	0		0
	6/11/2003	1	16:45-17:17	none	0	0		0
		2	16:42-16:52	none	0			0
Virginia								
Paine Run	8/21/2001	1	08:24-10:57	DFUS/DMON	1	0		1
				EBIS	34	28		62
				GPOR/PRUB	1	6		7
		2	08:26-09:49	DFUS/DMON	1			1
				EBIS	14			14
				GPOR/PRUB	6			6
	7/10/2002	1	09:18-10:40	EBIS	18	9		27
				GPOR/PRUB	3	2		5
		2	09:18-12:37	DFUS/DMON	1	0		1
				EBIS	137	25		162
				GPOR/PRUB	1	2		3
	6/17/2003	1	12:40-14:10	EBIS	2	3	4	9
				GPOR/PRUB	1	0	1	2
		2	12:41-14:27	EBIS	21	9		30
				GPOR/PRUB	1	0		1
	7/7/2004	1	08:35-11:30	EBIS	5	1	0	6
				GPOR/PRUB	10	5	4	19
		2	08:45-11:10	DFUS/DMON	2	0	0	2
				EBIS	3	4	1	8
				GPOR/PRUB	4	2	0	6
Staunton River	8/20/2001	1	16:10-16:30	none	0			0
		2	16:10-16:30	none	0			0
	7/16/2002	1	16:44-17:16	none	0	0		0
		2	16:46-17:14	none	0	0		0
	6/19/2003	1	17:00-17:27	none	0	0		0
		2	17:00-17:23	none	0	0		0
	7/9/2004	1	14:56-15:07	none	0	0		0
		2	14:55-15:20	none	0	0		0

Table 7. Continued.

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
Piney River	8/21/2001	1	13:26-13:45	none	0			0
		2	13:34-14:47	DFUS/DMON	0	1		1
				EBIS	2	3		5
	7/8/2002	1	10:15-11:40	DFUS/DMON	1	0	1	2
				EBIS	6	2	6	14
		2	10:14-12:25	EBIS	13	8	2	23
				GPOR/PRUB	0	0	1	1
	6/18/2003	1	11:08-12:00	EBIS	1	0		1
		2	11:02-12:11	EBIS	1	1	0	2
	7/9/2004	1	11:02-12:58	DFUS/DMON	1	1	0	2
				EBIS	5	5	3	13
				GPOR/PRUB	0	0	1	1
		2	11:00-12:37	DFUS/DMON	3	1	0	4
				EBIS	7	2	3	12
SRP35 (Doyle's River)	7/25/2001	1	16:32-17:28	DFUS/DMON	8			8
				EBIS	7			7
				GPOR/PRUB	1			1
		2	16:30-18:30	DFUS/DMON	12	3		15
				EBIS	24	8		32
				GPOR/PRUB	2	0		2
	7/16/2002	1	10:18-11:26	DFUS/DMON	1	2	1	4
				GPOR/PRUB	7	9	4	20
		2	10:23-12:07	DFUS/DMON	9	5	0	14
				EBIS	11	16	18	45
				GPOR/PRUB	7	0	2	9
	6/17/2003	1	16:25-17:27	DFUS/DMON	2	0		2
				EBIS	4	2		6
				GPOR/PRUB	0	1		1
		2	16:10-17:13	DFUS/DMON	6	3		9
				EBIS	1	3		4
				PCIN	1	1		2
	7/7/2004	1	13:55-15:45	DFUS/DMON	5	1	3	9
				EBIS	6	3	1	9
				GPOR/PRUB	0	1	0	1
		2	14:00-15:55	DFUS/DMON	1	2	0	3
				EBIS	3	3	6	12
				GPOR/PRUB	2	0	0	2

Table 7. Continued.

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
SRP71 (Ivy Creek Tributary)	7/25/2001	1	13:07-14:40	DFUS/DMON	40	20		60
				EBIS	9	2		11
				GPOR/PRUB	5	0		5
		2	13:07-14:28	DFUS/DMON	34			34
				EBIS	3			3
	7/9/2002	1	16:27-17:45	DFUS/DMON	34	7		41
				GPOR	1	1		2
		2	16:27-18:08	DFUS/DMON	31	17		48
				EBIS	9	14		23
				GPOR/PRUB	4	2		6
	6/19/2003	1	10:50-12:13	DFUS/DMON	10	6		16
				EBIS	1	1		2
		2	10:50-12:17	DFUS/DMON	1	1	0	2
				EBIS	3	0	2	5
				GPOR/PRUB	0	1	1	2
	7/7/2004	1	17:19-18:22	DFUS/DMON	4	4	3	11
				EBIS	1	0	0	1
		2	17:30-18:48	DFUS/DMON	8	0	2	10
SRP42 (Hawksbill Creek Tributary)	7/25/2001	1	09:48-11:23	DFUS/DMON	27			27
				EBIS	13			13
				GPOR/PRUB	8			8
		2	09:48-11:58	DFUS/DMON	27	21		48
				EBIS	10	7		17
				GPOR/PRUB	2	5		7
	7/9/2002	1	13:15-14:58	DFUS/DMON	25	1		26
				EBIS	19	4		23
				GPOR/PRUB	4	0		4
		2	13:05-14:30	DFUS/DMON	3	4	8	15
				EBIS	6	6	11	23
				GPOR/PRUB	1	3	2	6
	6/19/2003	1	12:55-14:00	DFUS/DMON	1	1		2
				EBIS	4	2		6
		2	13:04-14:17	DFUS/DMON	2	4	0	6
				EBIS	0	2	2	4
	7/6/2004	1	11:27-13:38	DFUS/DMON	4	1	1	6
				EBIS	3	1	2	6
		2	11:30-15:45	DFUS/DMON	9	2	1	12
				EBIS	19	2	1	22
				GPOR/PRUB	13	0	0	13
				PSHE	2	0	0	2

Table 7. Continued.

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
Shenk's Hollow	7/24/2001	1	17:09-18:53	DFUS/DMON	8	1		9
				EBIS	14	7		21
				GPOR/PRUB	1	0		1
		2	17:13-18:25	DFUS/DMON	4			4
				EBIS	26			26
	7/9/2002	1	09:20-11:10	DFUS/DMON	0	0	1	1
				EBIS	10	2	22	34
				GPOR/PRUB	0	0	1	1
		2	09:21-11:18	DFUS/DMON	9	3	3	15
				EBIS	17	8	4	29
				GPOR/PRUB	0	0	1	1
	6/18/2003	1	18:55-19:52	DFUS/DMON	0	0	1	1
				EBIS	0	1	1	2
				GPOR/PRUB	0	1	5	6
				PCIN	0	0	1	1
		2	18:55-19:36	DFUS/DMON	2	0		2
				EBIS	6	0		6
				PCIN	0	1		1
	7/8/2004	1	08:55-10:50	DFUS/DMON	5	4	0	9
				EBIS	10	4	6	20
		2	08:50-11:47	DFUS/DMON	5	3	1	9
				EBIS	19	12	7	38
SRP28 (Piney River Tributary)	7/24/2001	1	11:33-12:20	DFUS/DMON	4			4
				EBIS	19			19
				GPOR/PRUB	2			2
		2	10:42-12:20	DFUS/DMON	7	0		7
				EBIS	15	7		22
				GPOR/PRUB	4	8		12
	7/8/2002	1	16:40-18:18	DFUS/DMON	3	0	1	4
				EBIS	15	2	18	35
				GPOR/PRUB	1	0	1	2
		2	16:40-18:12	DFUS/DMON	5	2	6	13
				EBIS	9	11	6	26
				GPOR/PRUB	1	0	3	4
	6/18/2003	1	16:25-17:36	DFUS/DMON	2	1		3
				EBIS	18	6		24
				GPOR/PRUB	3	5		8
		2	16:32-17:42	DFUS/DMON	1	0		1
				EBIS	12	7		19
				GPOR/PRUB	1	1		2
	7/8/2004	1	17:19-19:09	DFUS/DMON	4	1	0	5
				EBIS	11	1	2	14
				GPOR/PRUB	3	0	0	3
		2	17:20-18:30	DFUS/DMON	2	2	0	11
				EBIS	5	4	2	4
				GPOR/PRUB	1	0	1	2

Table 7. Continued.

Stream name	Date	Transect number	Time begin-end	Species	Counts			Total
					Pass 1	Pass 2	Pass 3	
SRP10 (Jeremy's Run)	7/24/2001	1	13:46-14:58	DFUS/DMON	19			19
				EBIS	13			13
				GPOR/PRUB	3			3
				PCYL	1			1
		2	13:55-15:52	DFUS/DMON	20	6		26
				EBIS	8	4		12
				GPOR/PRUB	1	1		2
	7/8/2002	1	14:05-15:47	DFUS/DMON	13	5	5	23
				EBIS	5	2	2	9
				GPOR/PRUB	0	1	2	3
		2	14:05-15:27	DFUS/DMON	5	2	0	7
				EBIS	3	4	6	13
	6/18/2003	1	13:26-14:45	DFUS/DMON	13	3		16
				EBIS	4	4		8
		2	13:18-14:10	DFUS/DMON	9	5		14
				EBIS	0	3		3
				GPOR/PRUB	2	0		2
	7/8/2004	1	13:17-16:20	DFUS/DMON	12	6	1	19
				EBIS	12	4	3	19
				GPOR/PRUB	2	2	0	4
		2	13:19-15:44	DFUS/DMON	10	3	1	14
				EBIS	6	2	0	8
Swift Run	7/30/2002	1	17:30-18:08	DFUS/DMON	2	0		2
				EBIS	3	0		3
Two-Mile Run	7/30/2002	1	11:23-13:37	DFUS/DMON	21	8		29
				EBIS	57	49		106
				GPOR/PRUB	5	3		8
Simmons Gap	7/30/2002	1	15:14-16:36	DFUS/DMON	15	2		17
				EBIS	20	12		32
Jewel Hollow	7/29/2002	1	13:38-14:13	DFUS/DMON	1	1	0	2
Brokenback Run	7/31/2002	1	10:52-11:34	DFUS/DMON	4	2		6
				EBIS	7	0		7
Ragged Run	7/31/2002	1	12:50-13:27	DFUS/DMON	8	2		10
				EBIS	1	1		2
North Fork Thornton	7/29/2002	1	10:17-11:15	DFUS/DMON	4	3	0	7
				EBIS	1	3	1	5

Table 8. Amphibian species data from stream quadrat surveys of streams in Maryland, Washington, D.C., and Virginia, 2001-2004.

[Two quadrats were surveyed per stream; species' total counts represent the sum of captured larvae and adults plus escapes; "none" in the species column means no species were encountered on that pass;species acronyms are defined in table 9]

Stream Name	Date	Quadrat number	Time begin-end	Species	Total count
		Maryland			
American Holly Stream	7/2/01	1	10:10-10:30	EBIS	15
		2	10:10-10:30	none	0
	6/5/02	1	14:08-14:30	none	0
		2	14:08-14:20	none	0
	6/2/03	1	12:48-13:20	EBIS	4
		2	13:10-13:27	none	0
	6/7/04	1	12:05-12:10	none	0
		2	12:10-12:15	none	0
Cemetery Stream	6/25/01	1	14:56-15:48	EBIS	11
		2	14:30-15:00	EBIS	3
	6/6/02	1	10:40-10:54	none	0
		2	10:36-11:00	none	0
	6/5/03	1	13:42-13:51	none	0
		2	13:54-14:10	none	0
	6/7/04	1	10:30-10:50	EBIS	1
		2	10:45-11:10	EBIS	1
Snowden Stream	7/3/01	1	15:31-15:49	EBIS	1
		2	16:13-16:31	none	0
	6/5/02	1	15:05-15:13	none	0
		2	15:44-16:22	EBIS	22
	6/2/03	1	17:35-17:48	none	0
		2	17:29-17:45	none	0
	6/7/04	1	13:08-13:16	none	0
		2	13:05-13:19	none	0
Gill's Stream	7/9/01	1	14:25-14:30	none	0
		2	14:31-14:39	none	0
	6/6/02	1	13:55-14:21	none	0
		2	13:55-14:12	EBIS	2
	6/3/03	1	14:56-15:15	none	0
		2	15:09-15:24	none	0
	6/7/04	1	14:20-14:43	EBIS	6
		2	14:21-14:31	none	0
PWRC Maintenance Seep	6/3/03	1	12:43-12:58	none	0
Northwest Border Stream	6/4/03	1	11:27-11:39	none	0
		2	11:42-11:56	none	0
		Washington, D.C.			
Maintenance Yard Stream	7/10/01	1	12:18-12:29	none	0
		2	12:34-12:39	none	0
	7/11/02	1	14:50-15:02	none	0
		2	15:04-15:15	none	0
	6/9/03	1	14:30-14:44	none	0
		2	14:45-15:00	none	0
	6/15/04	1	10:39-10:44	none	0
		2	10:44-10:55	none	0

Table 8. Continued.

Stream Name	Date	Quadrat number	Time begin-end	Species	Total count
West Spring	7/10/01	1	10:01-10:18	none	0
		2	10:41-10:53	none	0
	7/1/02	1	11:07-11:15	none	0
		2	11:07-11:15	none	0
	6/11/03	1	15:25-15:47	none	0
		2	15:38-15:55	none	0
	6/15/04	1	11:42-12:17	PRUB	6
		2	12:34-12:55	none	0
Beech/Oregon	7/17/01	1	16:33-16:45	none	0
		2	16:48-17:01	EBIS	2
	6/10/02	1	14:17-14:46	none	0
		2	14:21-14:39	none	0
	6/9/03	1	16:45-17:05	none	0
		2	17:10-17:41	none	0
	6/14/04	1	09:58-10:31	none	0
		2	09:45-10:10	EBIS	2
Bingham/Oregon	7/18/01	1	10:04-10:15	none	0
		2	10:31-10:42	none	0
	7/11/02	1	13:52-14:05	none	0
		2	13:50-14:08	none	0
	6/9/03	1	15:56-16:07	none	0
		2	15:40-15:51	none	0
	6/14/04	1	14:10-14:30	none	0
		2	14:10-14:28	none	0
16th Street (Holly)	7/10/01	1	14:40-15:01	DFUS	2
				EBIS	3
		2	12:00-12:19	DFUS	4
				EBIS	3
	6/10/02	1	11:23-11:38	none	0
		2	12:30-12:45	DFUS	2
	6/11/03	1	11:33-11:51	DFUS	4
		2	11:44-12:12	EBIS	2
	6/15/04	1	16:23-16:49	EBIS	1
				DFUS	1
				PRUB	1
		2	16:58-17:15	EBIS	1
				DFUS	1
Golf Course I	7/17/01	1	13:54-14:35	EBIS	8
		2	14:40-14:53	EBIS	1
	6/11/02	1	10:48-11:17	none	0
		2	10:48-11:09	none	0
	6/9/03	1	11:35-11:57	EBIS	2
		2	11:12-11:23	EBIS	4
				PCIN	1
	6/14/04	1	15:39-16:17	EBIS	2
		2	15:40-16:07	none	0

Table 8. Continued.

Stream Name	Date	Quadrat number	Time begin-end	Species	Total count
Deerprint Run	8/5/01	1	14:00-14:10	none	0
		2	14:00-14:13	EBIS	1
	6/12/02	1	14:44-15:00	EBIS	1
		2	14:45-15:00	none	0
	6/11/03	1	13:04-13:14	none	0
		2	13:24-13:29	none	0
	6/14/04	1	12:13-13:19	EBIS	1
		2	12:10-12:42	EBIS	1
Whittier	7/1/02	1	12:45-12:54	DFUS	1
		2	12:55-13:00	none	0
	6/11/03	1	17:08-17:15	none	0
		2	17:00-17:10	none	0
Virginia					
Paine Run	8/21/01	1	09:25-10:08	EBIS	18
				GPOR/PRUB	1
		2	08:15-09:06	EBIS	10
				GPOR/PRUB	3
	7/10/02	1	09:20-09:41	EBIS	6
		2	09:18-09:43	EBIS	4
	6/17/03	1	12:43-13:03	none	0
		2	13:12-13:42	EBIS	2
				GPOR/PRUB	1
	7/7/04	1	08:48-09:06	EBIS	1
		2	09:10-09:25	none	0
Staunton River	8/20/01	1	16:10-16:20	none	0
		2	16:26-16:31	none	0
	7/16/02	1	16:39-16:47	none	0
		2	16:42-16:52	none	0
	6/19/03	1	17:15-17:21	none	0
		2	17:23-17:30	none	0
	7/9/04	1	14:58-15:09	none	0
		2	15:15-15:25	none	0
Piney River	8/21/01	1	13:49-14:15	EBIS	11
		2	14:05-14:22	EBIS	2
	7/8/02	1	10:15-10:35	EBIS	3
		2	10:14-10:46	EBIS	2
	6/18/03	1	11:08-11:23	none	0
		2	11:35-11:48	none	0
	7/9/04	1	11:10-11:29	none	0
		2	11:43-11:55	none	0

Table 8. Continued.

Stream Name	Date	Quadrat number	Time begin-end	Species	Total count
SRP35 (Doyle's River)	7/25/01	1	16:35-17:10	DFUS/DMON	2
				EBIS	18
		2	17:28-18:00	DFUS/DMON	1
				EBIS	10
	7/16/02	1	11:26-11:42	DFUS/DMON	4
		2	11:32-11:37	DFUS/DMON	1
				EBIS	1
	6/17/03	1	16:50-17:20	DFUS/DMON	2
				EBIS	1
		2	17:48-18:00	DFUS/DMON	1
				EBIS	1
	7/7/04	1	15:25-15:55	DFUS/DMON	2
				EBIS	1
		2	14:25-15:00	DFUS/DMON	3
				EBIS	2
SRP71 (Ivy Creek Tributary)	7/25/01	1	13:18-13:41	DFUS/DMON	5
				EBIS	3
		2	14:02-14:17	DFUS/DMON	8
	7/9/02	1	16:30-16:48	DFUS/DMON	3
		2	16:27-16:37	none	0
	6/19/03	1	10:53-11:18	EBIS	2
		2	11:39-11:57	DFUS/DMON	1
				EBIS	1
				GPOR/PRUB	1
	7/7/04	1	17:45-18:10	DFUS/DMON	1
				EBIS	9
				GPOR/PRUB	1
		2	18:15-18:42	EBIS	2
				GPOR/PRUB	1
SRP42 (Hawksbill Creek Tributary)	7/25/01	1	09:50-10:28	DFUS/DMON	3
				EBIS	3
				GPOR/PRUB	1
		2	10:38-10:55	DFUS/DMON	3
				EBIS	2
	7/9/02	1	13:24-13:40	DFUS/DMON	2
		2	13:04-13:33	DFUS/DMON	2
				EBIS	7
				GPOR/PRUB	2
	6/19/03	1	13:14-13:34	EBIS	2
		2	13:50-14:15	DFUS/DMON	3
				PCIN	1
				PSHE	1
	7/6/04	1	14:25-14:55	DFUS/DMON	1
				EBIS	1
				GPOR/PRUB	1
		2	11:40-13:00	DFUS/DMON	3
				EBIS	36
				GPOR/PRUB	7

Table 8. Continued.

Stream Name	Date	Quadrat number	Time begin-end	Species	Total count
Shenk's Hollow	7/24/01	1	17:24-17:55	DFUS/DMON	3
				EBIS	8
		2	18:03-18:18	DFUS/DMON	1
				EBIS	3
	7/9/02	1	09:19-09:36	DFUS/DMON	2
				EBIS	3
		2	09:21-09:38	DFUS/DMON	1
				EBIS	2
	6/18/03	1	19:00-19:16	none	0
		2	19:17-19:32	EBIS	2
	7/8/04	1	09:05-09:54	EBIS	5
				DFUS/DMON	4
		2	10:52-11:10	EBIS	1
SRP28 (Piney River Tributary)	7/24/01	1	10:42-11:13	DFUS/DMON	3
				EBIS	4
				GPOR/PRUB	1
		2	11:30-11:50	DFUS/DMON	3
				EBIS	1
	7/8/02	1	16:40-16:47	DFUS/DMON	1
		2	16:40-16:48	none	0
	6/18/03	1	16:41-17:00	GPOR/PRUB	1
		2	17:10-17:26	EBIS	2
	7/8/04	1	17:25-17:48	EBIS	9
				GPOR/PRUB	1
		2	18:00-18:15	DFUS/DMON	1
				EBIS	3
				GPOR/PRUB	2
SRP10 (Jeremy's Run)	7/24/01	1	13:45-14:17	DFUS/DMON	8
				EBIS	5
		2	14:30-15:00	DFUS/DMON	5
				EBIS	6
	7/8/02	1	14:05-14:20	DFUS/DMON	1
				EBIS	1
		2	14:04-14:30	DFUS/DMON	5
				EBIS	6
	6/18/03	1	13:26-13:51	DFUS/DMON	4
		2	13:46-14:05	DFUS/DMON	1
	7/8/04	1	13:20-13:55	DFUS/DMON	3
				EBIS	4
				GPOR/PRUB	1
		2	14:12-14:45	DFUS/DMON	3
				EBIS	4
Swift Run	7/30/02	1	18:00-18:10	none	0
Two-Mile Run	7/30/02	1	12:06-12:26	EBIS	6
				GPOR/PRUB	1
Simmons Gap	7/30/02	1	15:58-16:11	DFUS/DMON	1
				EBIS	2
Jewell Hollow	7/29/02	1	13:35-13:41	EBIS	4
Brokenback Run	7/31/02	1	11:44-11:54	DFUS/DMON	2
				EBIS	1
Ragged Run	7/31/02	1	13:28-13:45	DFUS/DMON	3
				EBIS	1
North Fork Thornton	7/29/02	1	10:18-10:28	EBIS	3

Table 9. Amphibian family, genus, species, and subspecies scientific names, common names, and acronyms used throughout report.

[n.a., not applicable; TSN, taxonomic serial number]

Family name	Genus	Species	Subspecies	Common name	Acronym	TSN
Bufonidae	*Bufo*	*americanus*	*americanus*	Eastern American toad	BAME	173474
Hylidae	*Acris*	*crepitans*	*crepitans*	Eastern cricket frog	ACRE	173521
Hylidae	*Hyla*	*versicolor*	n.a.	Gray treefrog	HVER	173503
Hylidae	*Pseudacris*	*crucifer*	*crucifer*	Northern spring peeper	PCRU	207304
Ranidae	*Rana*	*catesbeiana*	n.a.	American bullfrog	RCAT	173441
Ranidae	*Rana*	*clamitans*	n.a.	Green frog	RCLA	173438
Ranidae	*Rana*	*palustris*	n.a.	Pickerel frog	RPAL	173435
Ranidae	*Rana*	*sphenocephala*	n.a.	Southern leopard frog	RSPH	173436
Ranidae	*Rana*	*sylvatica*	n.a.	Wood frog	RSYL	173440
Ambystomatidae	*Ambystoma*	*maculatum*	n.a.	Spotted salamander	AMAC	173590
Plethodontidae	*Desmognathus*	*fuscus*	n.a.	Northern dusky salamander	DFUS	173633
Plethodontidae	*Desmognathus*	*monticola*	n.a.	Seal salamander	DMON	173640
Plethodontidae	*Eurycea*	*bislineata*	n.a.	Northern two-lined salamander	EBIS	173685
Plethodontidae	*Eurycea*	*cirrigera*	n.a.	Southern two-lined salamander	ECIR	550246
Plethodontidae	*Gyrinophilus*	*porphyriticus*	*porphyriticus*	Northern spring salamander	GPOR	208355
Plethodontidae	*Plethodon*	*cinereus*	n.a.	Eastern red-backed salamander	PCIN	173649
Plethodontidae	*Plethodon*	*cylindraceus*	n.a.	White-spotted slimy salamander	PCYL	208283
Plethodontidae	*Plethodon*	*shenandoah*	n.a.	Shenandoah salamander	PSHE	173669
Plethodontidae	*Pseudotriton*	*ruber*	*ruber*	Northern red salamander	PRUB	173681
Salamandridae	*Notophthalmus*	*viridescens*	*viridescens*	Red-spotted newt	NVIR	173616