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Determination of the systematic position and relationships of the lanceolate *Elliptio* complex (Mollusca: Bivalvia: Unionidae) from six river basins in Virginia.

By

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ABSTRACT

North America is home to the most diverse freshwater bivalve fauna in the world. However, it has the distinction of having lost more species, 35 species, to extinction than any other area in the world. Today, 75% of the native North American freshwater bivalve fauna (Unionoida) is imperiled. The most problematic or challenging genus on the South Atlantic Slope region of the Eastern United States is *Elliptio*. Johnson (1970) recognized a limited number of species, primarily three species complexes, *E. complanata*, *E. icterina* and *E. lanceolata* with a very large number of synonyms. There are suggestions that Johnson over-simplified the taxonomy and many of the recognizable shell shapes are actually closely related species. The greatest number of described taxa listed as synonyms of *Elliptio* were described from North and South Carolina. If coastal rivers are actually biogeographic islands, then many of the described taxa may represent endemic species. We attempted to extract and sequence the first subunit of the NADH dehydrogenase (ND1) gene and a section of the first subunit of cytochrome oxidase c gene (COI) from a sample of 241 specimens of lanceolate *Elliptio* from six river basins in Virginia. Specimens were identified as four species based on shell morphology. A combined total of 223 sequences from Virginia lanceolate specimens was compared as a combined dataset. The species *Elliptio lanceolata* is a monophyletic clade but in this analysis is not included in the *Elliptio* clade. In this analysis, the variously identified lanceolate taxa [*E. fisheriana*, *E. producta* and *E. angustata*] from Virginia represent a single clade and does not include topotypic *Elliptio producta* from the Savannah River. These data need to be included in a more complete framework including many additional taxa in *Elliptio*.

INTRODUCTION

North America supports the greatest diversity of freshwater bivalve fauna on the planet. Of these, unionids are the most imperiled. More than 75% are in decline, with the majority listed as endangered, threatened or of special concern by state and federal agencies. Their imperiled status requires that they receive special consideration when land development activities may affect surface waters or riparian buffers. Environmental assessments are required during project planning and accurate identification of species is imperative to ensure that imperiled species are protected. Correct visual identification of freshwater bivalves requires substantial taxonomic expertise. The most problematic or challenging genus on the South Atlantic Slope region of the Eastern United States is *Elliptio*.

Elliptio Rafinesque, 1819 was described without included species. Rafinesque (1820) used *Elliptio* as a subgenus of *Unio* Retzius, 1788 and included four new species. The type species was subsequently designated by Ortmann (1911) as *Unio crassidens* Lamarck, 1819. Simpson (1900, 1914) used *Elliptio* as a section of *Unio*. Ortmann (1911) elevated *Elliptio* back to generic level and included *Unio gibbosus* Barnes, 1823 (= *Unio dilatatus* Rafinesque, 1820), *Unio complanatus* Lightfoot, 1786, *Unio fisherianus* Lea, 1838 and *Unio productus* Conrad, 1836. Ortmann and Walker (1922) recognized *Elliptio* as a valid genus with *U. crassidens* as the type species and included *Unio nigra* Rafinesque, 1820 as a junior synonym. Frierson (1927) used the genus *Elliptio* and included 13 subgenera, 8 of which are from Central America. He used *U. nigra* as the type species, questioning the identification of *U. crassidens*. Frierson included in the nominative subgenus, 66 species level taxa and a number of subspecies. Matteson (1948) reviewed the taxonomic history of *Elliptio* and examined the distribution of *Elliptio complanata*.

Recently, three new species of *Elliptio* have been described from North Carolina. Fuller (1972) recognized a new species *Elliptio marsupiobesa* Fuller, 1972, within the complex of *Elliptio icterina* (Conrad, 1834) in the Cape Fear River. Johnson and Clarke (1983) split *Pleurobema collina* (Conrad, 1837), as recognized by Boss and Clench (1967), into two species, *P. collina* from the James River and described *Elliptio steinstansana* Johnson and Clarke, 1983, as the spined species from the Tar River Basin in North Carolina. More recently, Clarke (1986) described another new species of elongate *Elliptio* from the Neuse River in North Carolina, *Elliptio judithae* Clarke, 1986. This species is very similar in shell shape to small *Elliptio*

roanokensis (Lea, 1838) from the Roanoke River below the falls. Clarke (1992) raised the issue that the corrugations on the disk of the shell he had considered as the diagnostic character of *Elliptio judithae* were a common character of other species of *Elliptio* and that *E. judithae* was most likely a synonym of another described species of *Elliptio*.

The fossil history of *Elliptio* on the Atlantic Slope of the eastern United States is very limited. Kat (1983a) reviewed the freshwater bivalves recovered from the Pleistocene Fish House Clays along the Delaware River in New Jersey. Bogan et al. (1989) reexamined the collection of the Fish House Clay unionids in the Academy of Natural Sciences and added the specimens from the collections of the New Jersey State Museum, Trenton and the Wagner Free Institute of Science, Philadelphia. Bogan and Grady (1991) reported on an Early to Mid Pleistocene molluscan assemblage from the upper Potomac River drainage and it contained what was identified as *Elliptio complanata*, a part of a molluscan assemblage that was essentially modern in composition.

Davis et al. (1981) used allozyme data to assess the relationships among 11 species and five genera of North American genera of Unionidae. By comparing five species of *Elliptio*, they claimed the *E. complanata* group was a species group of recent origin and was still in the process of radiating and that shells of very different morphology actually showed very similar levels of divergence while the lanceolate species of *Elliptio* showed large amounts of genetic divergence.

Davis (1983) expanded on the initial results of Davis and Fuller (1981) examining the values of shell morphology, anatomical and allozyme data to look at relationships between six genera and eight species. The results mirrored those of Davis and Fuller (1981) for the generic relationships. These analyses placed *Elliptio complanata* closest to *Fusconaia* and pointed out the problems of trying to place shells in genera based solely on shell shapes.

Kat (1983b) expanded on the ideas presented in Davis et al. (1981) to examine patterns of local variation in the shell morphology and electrophoretic signal of *E. complanata* in the Maryland - Delaware area. As had been noted earlier, there were very slight differences in the genetic distances within the genus. He used conchiolin layer microstructure, stomach anatomy and three loci to compare populations from Nova Scotia to Maryland. He recognized two distinct races with a hybrid zone in the Delmarva Peninsula area based on three loci with the possession of unique alleles, unique characteristics of conchiolin layers microstructure and some unique features of stomach anatomy.

Davis (1984), using electrophoretic techniques, examined 14 loci in 25 species of unionids representing seven genera. He found that the lanceolate group of species are genetically separate including *E. shepardiana* (Lea, 1834), *E. fisheriana* and *E. folliculata* (Lea, 1838). He remarked that the number of recognized species in *Elliptio* is considerably underestimated and there is a large amount of shell shape convergence in this genus.

Kat and Davis (1984) examined peripheral populations of eight species of unionids from Nova Scotia, including *E. complanata*, to test peripheral population relationships. They found evidence of considerable electrophoretic variation in *E. complanata* and evidence of local groups invading different parts of Nova Scotia.

Wolfe (1984) reviewed the description of *Elliptio lanceolata* (Lea, 1828) and questioned the lumping of a series of different described taxa under this name by Johnson (1970). He based his questions on the shell morphology and the preliminary electrophoretic work of Davis et al. (1981).

Davis and Mulvey (1993) examined a suite of shell forms found in small streams on the Savannah River Plant Site, Savannah River, South Carolina. They once again found that shell shape was a better indicator of species than the electrophoretic data. The various shell forms were very similar based on the electrophoretic data. Shell shape has been used to diagnose lanceolate *Elliptios* described from the South Atlantic Slope Region (Figure 1).

Johnson (1970) provided the most recent review of freshwater mussels from the southern Atlantic Slope Region of eastern North America. He recognized 13 species of *Elliptio* within this region, synonymized down from 169 named taxa.

Materials and methods

Samples, DNA extraction and analyses:

This project focused on lanceolate shaped *Elliptio* from six river basins in Virginia [Potomac, York, Rappahannock, James, Chowan [including sites along the Blackwater, Meherrin and Nottoway rivers] and one site from the Roanoke River basin] (Figures 2, 3). Each of these river basins had been included because they hosted two or more of the lanceolate *Elliptio* taxa (Figure 1). The target number of specimens for this project was 250 specimens. These were to be five specimens of at least two species collected from five sites from the five main river basins [Potomac, Rappahannock, York, James and Chowan] (see Table 2).

There has been confusion as to the identification of which species are found in each of these six river basins in Virginia. All species identifications were based on shell morphology. Employing mitochondrial DNA sequences, we examine the phylogenetic relationships of these four named species to test if they are valid species, if a species is restricted to particular river basins or if these animals represent a single variable, widespread species. Phylogenetic relationships are examined to provide a framework to begin to understand the distribution of these four named taxa in Virginia. The relationships of these taxa will then be used to frame suggestions for their proper management.

Lanceolate *Elliptio* specimens were identified as four species from Virginia: *E. lanceolata*, *E. fisheriana*, *E. angustata* (Lea, 1831) and *E. producta* (Tables 1, 2). Other topotypic lanceolate taxa from the south Atlantic Slope drainages used in these analyses included: *E. emmonsii* (Lea, 1857), Roanoke River basin; *E. nasutilus* (Lea, 1863), Cape Fear River basin; *E. viridulus* (Lea, 1863), Neuse River basin. *Elliptio crassidens*, the type species of *Elliptio*, was added to clearly define the clade of *Elliptio* and outgroup species *Fusconaia masoni* (Conrad, 1834), *Lampsilis ornata* (Conrad, 1835), *Lasmigona subviridis* (Conrad, 1835) and *Quadrula pustulosa* (Lea, 1831) were included in this analysis (Figure 4).

Mantle tissue was collected from each specimen and total cellular DNA extracted using the ArchivePure DNA Tissue kit by 5Prime (formerly PureGene by Gentra Systems) following the manufacturer's recommendation. Integrity of the DNA was assessed visually on 2% agarose gels. PCR reactions were performed using primers developed by other labs (Folmer et al., 1994; Serb et al., 2003) but were optimized using either AmpliTaq Gold Mastermix (Applied Biosystems, Inc.) or GoTaq MasterMix (Promega, Corp.). Successful reactions were cleaned for sequencing using either Millipore μ 96 PCR plates or ExoSap-IT (USB Corp.) following the manufacturer's recommended protocol. Sequencing of DNA was performed using the same primers used for PCR following the recommended protocol with the ABI BigDye v. 3.1 sequencing kit (Applied Biosystems). Sequences were purified for sequencing following the manufacturer's recommendation and visualized using either an ABI 377 or ABI 3130 XL automated sequencer (Applied Biosystems). Outgroup sequences were obtained from GenBank (National Center for Biotechnology Information, National Institutes of Health; <http://www.ncbi.nlm.nih.gov>) or generated *de novo* (Raley and Bogan, unpublished data).

Sequence data was compiled using Sequencher™4.8. DNA sequences of Virginia lanceolate *Elliptio* generated for this project are summarized in Table 2. Some specimens did not yield any DNA or there was a problem and are being re-extracted and re-run. Sequences for some samples of ND1 were problematic and are being re-run. Phylogenetic analysis was conducted using GARLI (Zwickle, 2006) with ND1 and COI data combined into a single continuous data matrix.

Results and discussion:

DNA was extracted from 241 lanceolate specimens from Virginia and 44 animals did not work or produce DNA. It appears that 31 of the 44 specimens that did not work were old specimens from the Virginia Museum of Natural History. We were able to produce 151 COI and 72 ND1 sequences from Virginia specimens. However, there are 58 COI and 137 ND1 sequences that are being re-run that initially did not work (extracted from Table 2).

Elliptio lanceolata forms a very distinct clade, not placed with the rest of *Elliptio*, separated by *Fusconaia masoni* from the rest of *Elliptio* (Figure 4). A topotypic *Elliptio lanceolata* specimen from the Tar River in North Carolina is sister to the rest of the *E. lanceolata* samples (Figure 5). The four specimens from the Neuse River basin form a clade sister to the rest of the samples from Virginia (Tables 1, 2; Figure 5). There is very little separation of the Virginia *E. lanceolata* samples. The Chowan samples occur near the top and bottom of this clade, while James River basin specimens are in a small group with a specimen from the Rappahannock River basin, the rest of the Rappahannock River basin specimens form another minor group which includes the specimen from the York River basin (Figure 5). There are six specimens labeled as *E. lanceolata* that occur in the large clade of lanceolate *Elliptio*, catalog numbers NCSM 27794 (1); NCSM 30073 (5), (Figures 4, 6) which upon re-examination, represent misidentifications of the *E. fisheriana* group. A single topotypic specimen of *Elliptio viridulus* from the Neuse River basin is not placed in the lanceolate *Elliptio* group (Figure 4) but is sister to the *Elliptio lanceolata* clade. This needs further exploration.

Topotypic specimens of *Elliptio producta* were included from the Savannah River basin, Georgia/South Carolina, to test the identifications of specimens from Virginia. The topotypic specimens form a clade sister to *Elliptio crassidens*, the type species of *Elliptio*. Topotypic specimens of *E. producta* do not cluster with those specimens identified as *E. producta* from Virginia (Figures 4, 6). Sister to the clade containing *E. crassidens* and topotypic *E. producta* are

specimens identified as *Elliptio angustata* from the Altamaha River basin. Topotypic specimens of *Elliptio angustata* from the Cooper River, SC were not included in these analyses. These animals represent a lanceolate species separate from *E. producta* and different from specimens identified as *E. angustata* from Virginia. Altamaha River basin specimens of *E. angustata* need to be compared with topotypic *Elliptio angustata* from the Cooper River in South Carolina.

Two other specimens, NCSM 45507.1 from Terrapin Swamp, Blackwater River of the Chowan River basin, Virginia identified as *E. fisheriana* and NCSM 30556.1 from Lynches River, Pee Dee River Basin, South Carolina, identified as *E. producta*, are sister to the clade containing topotypic *E. producta*, *E. angustata* and *E. crassidens* (Figures 4, 6). These two specimens are not *E. fisheriana* or *E. producta* and need to be re-examined.

Specimens identified as *E. angustata*, *E. fisheriana*, *E. producta*, as well as six lots of misidentified *E. lanceolata*, all from Virginia, form a single large clade sister to the clade with *E. crassidens* (Figures 4, 6). The topotypes of *Elliptio fisheriana* from the Chester River, Maryland occur within the clade of lanceolate *Elliptio* as does *Elliptio nasutilus* from the Cape Fear River. Topotypic *Elliptio producta* from the Savannah River were included to provide clarification of what has been identified as *Elliptio producta* in Virginia. The large clade of variously identified Virginia lances are not *Elliptio producta* (Conrad, 1836) according to this analysis (Figures 4, 6). Currently, the earliest name for the Virginia lances would be *Elliptio fisheriana* (Lea, 1838). The earliest name for all lanceolate *Elliptio* found on the south Atlantic slope would be *Unio angustatus* Lea, 1831 but no topotypic specimens of this species were available for these analyses. Analysis of topotypic specimens of all of the lanceolate *Elliptio* taxa on the south Atlantic Slope Region is far from complete. This dataset needs to be added to a much larger dataset including most of the taxa currently included in *Elliptio*. These results are preliminary and the results may change as more data is added. The take home message from this work is that *Elliptio lanceolata* (Lea, 1828) is correctly identified as a distinct species, but its placement in *Elliptio* remains questionable. Other lanceolate shell forms in Virginia at this time appear to represent a single morphologically variable species and the earliest name for a species included in our analyses would be *Elliptio fisheriana* (Lea, 1838). This identification is preliminary at this time pending the inclusion of other topotypic lanceolate *Elliptio* taxa.

Specimens identified as *E. producta* from the Pee Dee River basin, South Carolina form a somewhat distinct clade with topotypic *E. nasutilus* from the Cape Fear River, North Carolina. A

quick scan of Figure 6 shows that there is very little variation across this whole group of animals except for the basal specimen of misidentified *E. lanceolata* (NCSM 27794.5) from the Little River of the Neuse River basin, North Carolina.

Recommendations:

These genetic analyses indicate *Elliptio lanceolata* should be considered a distinct species when developing nongame aquatic conservation strategies. Additional specimens should be collected and reexamined as the spatial diversity of collected specimens is broadened. The generic placement will become better understood when these data are put into the larger data framework of species included in the genus *Elliptio*. Based on our analyses, the Yellow Lance, *Elliptio lanceolata* is an un-rayed waxy yellow shell form that is found in the Chowan, James, York and Rappahannock River basins in Virginia. We did not have any specimens of this species from the Roanoke or Potomac River basins in this study. We especially need additional specimens from the Roanoke and Potomac River basins to better understand the distribution of this species. There appears to be some structure to the samples taken from the six river basins representing the known range of *Elliptio lanceolata*. The topotypic Tar River basin specimen is separate from the rest of the clade of *E. lanceolata* and sister to the Neuse and Chesapeake Bay basins. The specimens from the Neuse River basin in North Carolina is distinct from the Chesapeake Bay basin specimens. The animals from the Chesapeake Bay basins should be considered an ecological management unit as should those from the Neuse and the Tar River basins. Transplants should not be conducted between these basins as the three major groups are distinct and separate. Conservation of this declining and rapidly disappearing species should focus on improving the habitat of the species and any culturing and population supplementation should be done very carefully to avoid mixing of animals between river basins.

Systematics of lanceolate *Elliptio* of the middle and southern Atlantic Slope are still in a state of flux and will remain so until we are able to add the topotypic specimens of the remaining lanceolate taxa from South Carolina and Georgia. Virginia lanceolate *Elliptio* appear to be more morphologically plastic than first realized. Various lanceolate shell shapes in our analyses are not sorting out as separate species with the current DNA data. The lanceolate *Elliptio*, not including *E. lanceolata*, also do not sort out by river basin (Figures 4, 6). This may reflect ecological influences not here-to-fore recognized (e.g. Zieritz and Aldridge, 2009). At this time, all of the

black, shiny black, yellowish green with rays lanceolate *Elliptios* from Virginia with and without a sharp posterior ridge and with straight or curved ventral margins are all considered *Elliptio fisheriana* at this time pending addition of other topotypic lanceolate taxa from South Carolina and Georgia.

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Table 1. Museum specimens from Virginia used in these analyses.

Catalog Number	Scientific Name	Field Number	Date of Collection	State(s)	County	Basin	Locality	Collector(s)	Number of Specimens in Ethanol (95%)
26882	<i>Elliptio producta</i>	CES2001-16	04/22/2001	Georgia	Burke	Ogeechee	Rosemary Creek at Bonson Pond Road, just downstream from Bonson Mill), ca. 8 miles S of Waynesboro, [Perkins Quad]	CE Skelton	5
26884	<i>Elliptio producta</i>	INVERT05628	08/27/2001	South Carolina	Allendale	Savannah	Savannah River at River Mile 122.35, #42 Dykes, ANSP Station 6L	R. Bouchard, R. Thomas, P. Overbeck	5
27500	<i>Elliptio angustata</i>	JDW2002-140	08/13/2002	South Carolina	Richland	Santee	Congaree River, at 4 air miles W of US 601 bridge, point estimated 2 air miles NW center Fort Motte], [Waterce Quad]	JD Williams, R. Lewis	1
27501	<i>Elliptio angustata</i>	JDW2002-146	08/14/2002	South Carolina	Richland	Santee	Cedar Creek off Old Bluff Road at end of NPS Deep Trail in Congaree Swamp National Monument, [Goldsden Quad]	JD Williams, R. Lewis	1
27502	<i>Elliptio angustata</i>	INVERT05863	08/12/2002	South Carolina	Richland	Santee	Congaree River at 9 river miles above US 601 bridge, at 5 air miles W of US 601 bridge, point estimated 6.28 air miles SW center Waterce], [Waterce Quad]	JD Williams, R. Lewis	1
27696	<i>Elliptio fisheriana</i>	INVERT06080	08/03/1999	Maryland	Queen Annes	Chesapeake Bay	Red Lion Branch, about 75m upstream from Red Lion Lake (Millpond), [0.13 air miles W center] Unicorn, [Sudlersville Quad]	JM McCann	1
27697	<i>Elliptio fisheriana</i>	INVERT06081	07/26/1999	Maryland	Queen Annes	Chesapeake Bay	Unicorn Branch, 75 meters downstream from Unicorn Road, [1.9 air miles SSE Crumpton], [Church Hill Quad]	JM McCann	6
27698	<i>Elliptio fisheriana</i>	INVERT06082	07/26/1999	Maryland	Queen Annes	Chesapeake Bay	Unicorn Branch, 75m downstream from Hackett Corner Road, ca. 0.5 miles ENE Hackett Corners, [Sudlersville Quad]	JM McCann	1
27699	<i>Elliptio fisheriana</i>	INVERT06083	07/29/1999	Maryland	Queen Annes	Chesapeake Bay	Red Lion Branch, ca. 0.5 miles NE of Pondtown, 75m downstream from Pondtown Road, [Church Hill Quad]	JM McCann	2
27729	<i>Elliptio lanceolata</i>	INVERT06087	07/12/1998	Virginia	Lunenburg-Nottoway	Albemarle Sound	Nottoway River above Hwy 40 bridge, [point estimated 1.1 air mile SSW center Murdocks], [Blackstone West Quad]	SB Bogan, JB Bogan, CM Bogan, et al.	14
27732	<i>Elliptio lanceolata</i>	INVERT06085	07/12/1998	Virginia	Lunenburg-Nottoway	Albemarle Sound	Nottoway River 2/3 miles below The Falls, Highway 49 bridge, [5.38 air miles NE center of Victoria], [Rubermont Quad]	SB Bogan, JB Bogan, CM Bogan, et al.	4
27774	<i>Elliptio lanceolata</i>	INVERT06118	08/20/1999	North Carolina	Franklin-Vance	Pamlico Sound	Tar River at just below US 1 [Capital Boulevard] bridge, point estimated 3.76 air miles S center Kittrell], [Kittrell Quad]	TW Savidge	1
27794	<i>Elliptio lanceolata</i>	INVERT06129	09/18/1998	North Carolina	Johnston	Pamlico Sound	Little River at Main Street SR 2130 [Micro Road W], ca. 3 miles [NNW] of Micro, [Kamly West Quad]	AE Bogan, D Davenport, et al.	5
29141	<i>Elliptio angustata</i>	INVERT06519	11/01/2003	Georgia-South Carolina	Rabun-Oconee	Savannah	Chattooga River at crossing of US 76/[SR 2], [6.92 air miles SE center of Clayton], [Rainy Mountain Quad]	JM Alderman	3
29142	<i>Elliptio producta</i>	INVERT06519	11/01/2003	Georgia-South Carolina	Rabun-Oconee	Savannah	Chattooga River at crossing of US 76/[SR 2], [6.92 air miles SE center of Clayton], [Rainy Mountain Quad]	JM Alderman	6
29143	<i>Elliptio angustata</i>	INVERT06520	11/1/2003	Georgia-South Carolina	Oconee-Rabun	Savannah	North Fork Chattooga River and Highway 28 [SR 28], [Russell Bridge], [1.78 air miles SSW center Pine Mountain], [Satolah Quad]	JM Alderman	5
29144	<i>Elliptio lanceolata</i>	INVERT06521	07/01/2003	North Carolina	Nash	Pamlico Sound	Swift Creek [near] 195 Crossing, Gold Rock, [2.3 air miles NNW center Drake], [Drake Quad]	JM Alderman, GR Alderman, GA Alderman	2
29146	<i>Elliptio producta</i>	INVERT06522	11/17/2003	Virginia	Botetourt	Chesapeake Bay	Craig Creek off Route 615 [Craig Creek Road], ca. [0.78 km W] of Oriskany, [Oriskany Quad]	JM Alderman, TE Dickinson, JA Fridell, et al.	4
29147	<i>Elliptio angustata</i>	INVERT06522	11/17/2003	Virginia	Botetourt	Chesapeake Bay	Craig Creek off Route 615 [Craig Creek Road], ca. [0.78 km W] of Oriskany, [Oriskany Quad]	JM Alderman, TE Dickinson, JA Fridell, et al.	6

29150	<i>Elliptio angustata</i>	INVERT06523	11/18/2003	Virginia	Craig	Chesapeake Bay	Appomattox River upstream of Route 600 Bridge, [3.8 air miles N center Prospect], [Prospect Quad].	JM Alderman, TE Dickinson, JA Fridell, et al.	1
29153	<i>Elliptio lanceolata</i>	INVERT06524	11/17/2003	Virginia	Craig	Chesapeake Bay	Johns Creek upstream of Route 632 bridge, NE of the Route 632/FR 257 intersection, [5.6 air miles ESE center of Wanteville], [Craig Springs Quad].	JM Alderman, TE Dickinson, JA Fridell, et al.	4
29518	<i>Elliptio fisheriana</i>	INVERT06601	07/01/2003	West Virginia	Mineral	Chesapeake Bay	Patterson Creek at junction of CR 28-10 [Plum Run Road] and CR 28-3 [Patterson Creek], [3.19 air miles NNE Fort Ashby], [Patterson Creek Quad].	JL Clayton	2
29727	<i>Elliptio producta</i>	AEB2004-04	06/07/2004	South Carolina	Horry	Pee Dee	Waccamaw River above Lees Landing primarily LDB, a little on RDB, [ca. 2.08 air miles SSE of Lees Landing], [Nixonville Quad].	AE Bogan, M Caldwell, E Krueger, et al.	8
29728	<i>Elliptio angustata</i>	AEB2004-04	06/07/2004	South Carolina	Horry	Pee Dee	Waccamaw River above Lees Landing primarily LDB, a little on RDB, [ca. 2.08 air miles SSE of Lees Landing], [Nixonville Quad].	AE Bogan, M Caldwell, E Krueger, et al.	1
29740	<i>Elliptio producta</i>	AEB2004-05	06/04/2004	South Carolina	Horry	Pee Dee	Waccamaw River above Lees Landing, LDB, [point estimated 4.15 ENE air miles center of Conway], [Quad], [Nixonville Quad].	AE Bogan, M Caldwell, E Krueger, et al.	5
30013	<i>Elliptio producta</i>	CES2004-46	06/22/2004	Georgia	Wheeler	Altamaha	Abigator Creek at CR 197, ca. [11.5] air miles SSW of Glenwood, [Jordan Quad].	CE Skelton, CN Webb	4
30061	<i>Elliptio lanceolata</i>	JDW2002-169	09/06/2002	Georgia	Bulloch-Effingham	Ogeechee	Ogeechee River at State Rt. 119 bridge, at 5 air miles SSW of [Guyton Quad].	JD Williams, B Schilling	1
30062	<i>Elliptio lanceolata</i>	JDW2002-179	09/09/2002	Georgia	Effingham	Savannah	Savannah River at Ebenezer Creek Landing in Ebenezer, [point estimated 556 km N center Ebenezer], [Hardesville NW Quad].	JD Williams, B Schilling	1
30069	<i>Elliptio lanceolata</i>	JDW2002-173	09/07/2002	Georgia	Bulloch-Screven	Ogeechee	Ogeechee River on State Rt. 24, [2.4 air] miles SSW [center] Oliver, [Leefield Quad].	JD Williams, B Schilling	3
30073	<i>Elliptio lanceolata</i> group	ENH08182004.1	08/18/2004	Virginia	Fauquier-Rappahannock	Chesapeake Bay	Rappahannock River at SR 645 [Hackley Mill Road], 1 mile SE of Hackleys Crossroad, [Masses Corner Quad].	BT Watson, SL Huffer, AC Chazal, et al.	7
30212	<i>Elliptio fisheriana</i>	041026.3TWS	10/26/2004	Virginia	Prince William	Chesapeake Bay	Broad Run near [0.1 km S] VA 619 [Linton Hall Road], [1.6 km SE center of Linton Hall], Broad Run > Occoquan River > Potomac River, [Nokesville Quad].	TW Savidge, S Melin	2
30556	<i>Elliptio producta</i>	INVERT06792	04/26/2005	South Carolina	Lee	Pee Dee	Lynches River above SC 347/US 15, [3.86 air miles NNE center of Bishopville], [Ketytown Quad].	TW Savidge, TE Dickinson, E Krueger, et al.	2
30564	<i>Elliptio angustata</i>	INVERT06796	04/27/2005	South Carolina	Chesterfield	Pee Dee	Great Pee Dee River above US 1, [Horse Island], [4.36 air miles NW center of Wallace], [Morven East Quad].	TW Savidge, TE Dickinson, E Krueger, et al.	1
30652	<i>Elliptio angustata</i>	INVERT06653	06/01/2004	South Carolina	Chesterfield	Pee Dee	Thompson Creek near SSR 148 [Cash Road], Thompson Creek > Pee Dee River, [2.7 miles SSE of center of Cheraw], [Cheraw Quad].	TW Savidge, TE Dickinson	1
30737	<i>Elliptio lanceolata</i>	050812.1TWS	08/12/2005	Virginia	Louisa	Chesapeake Bay	South Anna River, below Lasley Creek confluence, South Anna River > Pamunkey River York River, [1.05 air miles ESE center Pointdexter], [Zion Crossroads Quad].	TW Savidge, TE Dickinson, K Monteth	1
30834	<i>Elliptio fisheriana</i>	INVERT06860	06/29/2005	Virginia	Prince George	Albemarle Sound	Cataul Creek, Lake Binford Spillway, [at center of Binford Store], [Disputanta North Quad].	MJ Pinder, SH Watson	2
30865	<i>Elliptio lanceolata</i>	BTW07152004.1	07/15/2004	Virginia	Craig	Chesapeake Bay	Johns Creek, [Craig Creek tributary], SR 632, 2 [air] miles NE Maggie, [Craig Springs Quad].	BT Watson, I Reedy	2
30866	<i>Elliptio producta</i>	BTW07152004.1	07/15/2004	Virginia	Craig	Chesapeake Bay	Johns Creek, [Craig Creek tributary], SR 632, 2 [air] miles NE Maggie, [Craig Springs Quad].	BT Watson, L Reedy	1
30867	<i>Elliptio producta</i>	JRT08042004.2	08/04/2004	Virginia	Bath	Chesapeake Bay	Cowpasture River, SR 652, [2.3 air] miles SW Nimrod Hall, [Nimrod Hall Quad].	C Kane, B Evans, F Huber, et al.	2
30868	<i>Elliptio angustata</i>	JMA11172003.1	11/17/2003	Virginia	Botetourt	Chesapeake Bay	Craig Creek, [along] SR 615 [Craig Creek Road], 0.5 [air] miles W Oriskany, [Oriskany Quad].	JM Alderman, BT Watson, JA Fridell, et al.	3

Lanceolate *Elliptio* of Virginia, Bogan et al. 2009

30869	<i>Elliptio fisheriana</i>	MAM03271994.1	03/27/1994	Virginia	Essex	Chesapeake Bay	Rappahannock River, SR 622 [Carter's Warr Road], [5.2 air] miles NNE Occopaca, [Champlain Quad]	MA McGregor	1
35090	<i>Elliptio angustata</i>	INVERT06918	07/17/2004	North Carolina	Richmond	Pee Dee	[Pee Dee River], Big Island shoal and side channel complex (NC waters 1.0 mile), [5.85 air miles WNW center Rockingham], Rockingham Quad.	KA Foley, VF Stancil, RW Smith, et al.	5
35169	<i>Elliptio fisheriana</i>	WRC031014.3AJR	10/14/2003	North Carolina	Hertford	Albemarle Sound	Moherrin River at Parker Ferry Road [SR 1306] crossing, [point estimated 3.1 air miles NNW center Winton], [Winton Quad]	AJ Rodgers, et al.	4
35198	<i>Elliptio producta</i>	INVERT06975	01/23/2006	South Carolina	Orangeburg	Santee	Big Poplar Creek below SSR 105, [near South Carolina Noname 38036 D-3743 Dam], [3.4 air miles ESE center Ellorces], [Ellorces Quad]	TW Savidge, TE Dickinson	1
40123	<i>Elliptio producta</i>	INVERT09000	07/02/2004	South Carolina	Georgetown	Pee Dee	Black River below SC 41 [County Line Road], [2.94 air miles NE Andrews], [Andrews Quad]	TW Savidge, TE Dickinson, JA Fridell, et al.	1
40128	<i>Elliptio producta</i>	040720.4TWS	07/20/2004	South Carolina	Williamsburg	Pee Dee	Black River above SC 41 [County Line Road], [3.4 air miles N Andrews], [Andrews Quad]	TW Savidge, TE Dickinson, JA Fridell, et al.	1
40133	<i>Elliptio producta</i>	INVERT09001	07/22/2004	South Carolina	Florence	Pee Dee	Lynches River at SC 41/51 [Kingsburg Highway], [1.57 air miles N Johnsonville], [Johnsonville Quad]	TW Savidge, TE Dickinson, JA Fridell, et al.	1
40144	<i>Elliptio producta</i>	INVERT09004	07/20/2004	South Carolina	Georgetown	Pee Dee	Black River below SC 41, Black River-Great Pee Dee River, [0.95 air miles SSW Warsaw], [Andrews Quad]	TW Savidge, TE Dickinson, JA Fridell, et al.	2
40150	<i>Elliptio angustata</i>	INVERT09006	07/21/2004	South Carolina	Williamsburg	Pee Dee	Black River above SC 52 [SR 261] [Williamsburg County Road], Black River-Great Pee Dee River, [2.11 air miles W Kingstree], [Kingstree Quad]	TW Savidge, TE Dickinson, JA Fridell, et al.	1
40160	<i>Elliptio angustata</i>	INVERT06722	11/03/2004	North Carolina	Orange	Cape Fear	New Hope Creek above SR 1730 (Turkey Farm Road), New Hope Creek > B. Everett Jordan Lake > [Haw River] > Cape Fear River, [2.27 air miles NE Eutambs], [Chapel Hill Quad]	TW Savidge, M Wood, TE Dickinson	2
40201	<i>Elliptio angustata</i>	040809.2TWS	08/05/2004	South Carolina	Chesterfield	Pee Dee	Great Pee Dee River below US1, [0.78 air miles NNE Cheraw], [Cheraw Quad]	TW Savidge, TE Dickinson, L Zimmerman, et al.	2
40354	<i>Elliptio lanceolata</i>	WRC040715.UJMA	07/15/2004	North Carolina	Nash	Pamlico Sound	Swift Creek at SR 1003 [Red Oak Road], Canoe trip for SR 1003 to NC 48, specimen collected at the Mann Farm, [2.3 air miles NNW center Drake], [Drake Quad]	AJ Rodgers, NP Banish, JM Alderman, et al.	1
40392	<i>Elliptio angustata</i>	INVERT06934	06/21/2004	North Carolina	Anson	Pee Dee	Pee Dee River, [2.61 air miles SSE center Ingram], shoal just above Blewett Falls Lake (17.0 miles) [13 miles], Mangum Quad.	RW Smith, VF Stancil, KA Foley, et al.	4
40398	<i>Elliptio angustata</i>	INVERT06933	07/18/2004	North Carolina	Anson	Pee Dee	Pee Dee River, [1.41 air miles SW center Old Smith Ferry], shoal with boulder outcrop just below NC Highway 109 bridge (12.2 miles), Mangum Quad.	RW Smith, VF Stancil, KA Foley, et al.	2
40418	<i>Elliptio angustata</i>	INVERT06926	07/25/2004	North Carolina	Anson	Pee Dee	Hitchcock Creek shoal and island complex just below US Highway 74 Bridge (NC waters-5.0 miles), [1.25 air miles ENE center Pee Dee], Rockingham Quad.	RW Smith, VF Stancil, KA Foley, et al.	5
40424	<i>Elliptio producta</i>	INVERT06933	07/18/2004	North Carolina	Anson	Pee Dee	Pee Dee River, [1.41 air miles SW center Old Smith Ferry], shoal with boulder outcrop just below NC Highway 109 bridge (12.2 miles), Mangum Quad.	RW Smith, VF Stancil, KA Foley, et al.	2
40430	<i>Elliptio angustata</i>	INVERT06937	06/13/2004	North Carolina	Montgomery	Pee Dee	[Pee Dee River], shoal/prehistoric weir just 0.6 river miles upstream Rocky River confluence, 4.0 river miles downstream of Hwy 731 bridge, [2.47 air miles ENE center Cedar Hill], Mount Glead West Quad.	VF Stancil, RW Smith, RB Nichols, et al.	3
40432	<i>Elliptio angustata</i>	INVERT06921	08/21/2004	North Carolina	Anson	Pee Dee	[Pee Dee River], Buzzard Island shoal and side channel complex (8.1 miles), [2.6 air miles ENE center Ansonville], Ansonville Quad.	RW Smith, VF Stancil, RJ Heise	2

40433	<i>Elliptio angustata</i>	INVERT06936	06/12/2004	North Carolina	Montgomery	Pee Dee	Pee Dee River, about below NC Highway 731 Bridge (0.5 mile), [0.51 air miles SSW center Hydro], Mount Gilthead West Quad.	KA Foley, RW Smith, RB Nichols, et al.	2
40453	<i>Elliptio angustata</i>	INVERT06923	07/19/2004	North Carolina	Anson	Pee Dee	Cedar Creek, [SR 1710 crossing], [3.78 air miles ENE center Pinkston], Ansonville Quad.	RW Smith, KA Foley, WN Jeffers	2
40467	<i>Elliptio angustata</i>	INVERT06919	07/24/2004	North Carolina	Anson	Pee Dee	[Pee Dee River], Big Island shoal and side channel complex (NC waters 1.0 mile), [5.6 air miles WNW center Rockingham], Rockingham Quad.	RW Smith, VF Stancil, KA Foley, et al.	6
40487	<i>Elliptio producta</i>	INVERT06930	08/28/2004	North Carolina	Anson-Richmond	Pee Dee	[Pee Dee River], Jones Creek shoal and island complex (NC waters 11.7 miles), [2.0 air miles NW center Diggs], [Morven East Quad].	VF Stancil, KA Foley, RB Nichols, et al.	3
40489	<i>Elliptio producta</i>	INVERT06921	08/21/2004	North Carolina	Anson	Pee Dee	[Pee Dee River], Buzzard Island shoal and side channel complex (8.1 miles), [2.6 air miles ENE center Ansonville], Ansonville Quad.	RW Smith, VF Stancil, RJ Heise	1
40743	<i>Elliptio angustata</i>	060418.1TWS	04/18/2006	South Carolina	York	Santee	Clark Fork below SC5 [Black Highway], [1.15 air miles NE center Snyrna], [Kings Creek Quad].	TW Savidge, TE Dickinson	1
40960	<i>Elliptio angustata</i>	060523.3TWS	05/23/2006	South Carolina	York	Santee	Clark Fork [Clark Creek], below SSR 11/[SSR 46-11] (Nimitz Road), approximately 4.5 miles SE of Kings Creek, [Kings Creek Quad].	TW Savidge, S Gartcock	2
41109	<i>Elliptio producta</i>	060802.1TWS	08/02/2006	South Carolina	Allendale	Savannah	Savannah River approximately [5.7 river] miles below US 301 [SR 70/Burtons Ferry Highway], [7.3 air miles SSW center Concord Crossroads], [Bull Pond Quad].	TW Savidge, TE Dickinson, C Sheats, et al.	2
41122	<i>Elliptio producta</i>	060801.3TWS	08/01/2006	Georgia	Richmond	Savannah	Savannah River in Augusta, [1.27 air miles ENE center Country Club Hills], [Augusta East Quad].	TW Savidge, TE Dickinson, C Sheats	1
41124	<i>Elliptio angustata</i>	060801.3TWS	08/01/2006	Georgia	Richmond	Savannah	Savannah River in Augusta, [1.27 air miles ENE center Country Club Hills], [Augusta East Quad].	TW Savidge, TE Dickinson, C Sheats	3
41127	<i>Elliptio producta</i>	060801.7TWS	08/01/2006	Georgia	Richmond	Savannah	Savannah River in Augusta, [1.24 air miles E center Country Club Hills], [Augusta East Quad].	TW Savidge, TE Dickinson, C Sheats	2
41135	<i>Elliptio producta</i>	060802.2TWS	08/02/2006	Georgia	Screven	Savannah	Savannah River approximately 10.5 miles below US 301, [10.52 air miles WSW center Barton], [Bull Pond Quad].	TW Savidge, TE Dickinson, C Sheats	5
41139	<i>Elliptio angustata</i>	060801.1TWS	08/01/2006	Georgia	Richmond	Savannah	Savannah River in Augusta, [1.48 air miles NE center Country Club Hills], [North Augusta Quad].	TW Savidge, TE Dickinson, C Sheats, et al.	1
41145	<i>Elliptio producta</i>	060801.1TWS	08/01/2006	Georgia	Richmond	Savannah	Savannah River in Augusta, [1.48 air miles NE center Country Club Hills], [North Augusta Quad].	TW Savidge, TE Dickinson, C Sheats, et al.	1
41146	<i>Elliptio angustata</i>	060802.5TWS	08/02/2006	Georgia	Screven	Savannah	Savannah River (Osbow) approximately 3 miles upstream of US 301, [5.6 air miles WSW center Concord Crossroads], [Burlington Ferry Landing Quad].	TW Savidge, TE Dickinson, C Sheats	2
41149	<i>Elliptio fisheriana</i>	060802.5TWS	08/02/2006	Georgia	Screven	Savannah	Savannah River (Osbow) approximately 3 miles upstream of US 301, [5.6 air miles WSW center Concord Crossroads], [Burlington Ferry Landing Quad].	TW Savidge, TE Dickinson, C Sheats	1
41150	<i>Elliptio producta</i>	060802.5TWS	08/02/2006	Georgia	Screven	Savannah	Savannah River (Osbow) approximately 3 miles upstream of US 301, [5.6 air miles WSW center Concord Crossroads], [Burlington Ferry Landing Quad].	TW Savidge, TE Dickinson, C Sheats	1
41163	<i>Elliptio producta</i>	060802.7TWS	08/02/2006	South Carolina	Allendale	Savannah	Savannah River, Johnsons Landing, [3.07 air miles ESE center Cains Store], [Bull Pond Quad].	TW Savidge, TE Dickinson, C Sheats, et al.	1
41333	<i>Elliptio angustata</i>	060914.1TWS	09/14/2006	South Carolina	Kershaw	Pee Dee	Red Oak Camp Creek (Jumping Gulley) below Raley Millpond [Horton's Millpond], [2.47 air miles E center Minion Mill], [Angelus Quad].	TW Savidge, TE Dickinson, C Sheats	13
43337	<i>Elliptio angustata</i>	INVERT15293	08/16/1998	Georgia	Jefferson	Ogeechee	Duhart Creek at Highway 88, [6.9 air miles SSW center Wrens], [Wrens Quad].	RB Nichols, MH Hughes, CJ Paxton, et al.	4

4338	<i>Elliptio angustata</i>	INVERT15294	08/17/1998	Georgia	Washington	Ogeechee	Williamson Swamp Creek, Ogeechee System, [point estimated 3.24 air miles S center Downs], Georgia Highway 88, [Downs Quad]	RB Evans, CJ Paxton, MH Hughes, et al.	6
4342	<i>Elliptio angustata</i>	JMW080617.2	06/06/2008	Georgia	Jasper	Alamaha	Ocmulgee River, ~5.0 km downstream of SR 16, ~14.1 km WSW of Monticello, [Lloyd Shoals Dam Quad]	JM Wisniewski, K Owers, W Pruitt	3
45087	<i>Elliptio fisheriana</i>	060710.ITWS	07/10/2006	Virginia	Richmond	Chesapeake Bay	James River [0.61 river miles] below Powhite Parkway (VA 76), approximately 2.4 [air] miles W [center] of Richmond, [Richmond Quad]	TW Savidge, TE Dickinson, S Garniock	2
45268	<i>Elliptio fisheriana</i>	WR060919.IREN	09/19/2006	North Carolina	Gates	Albemarle Sound	Bennetts Creek, Bennetts Mill Pond (SR 1400), [10.1 air miles NNE center Harrellsville], [Merchants Millpond Quad]	RB Nichols, C Wood	6
45410	<i>Elliptio producta</i>	BTW08022007.1	08/02/2007	Virginia	Halifax-Mecklenburg	Albemarle Sound	Aaron's Creek, SR 604 [Rip Rap Road], 2 miles S of Hitesburg, [1.72 to 2.00 air miles NNW center Nelson], [Nelson Quad]	BT Watson, ME Bradley, CM Kane	1
45411	<i>Elliptio producta</i>	BTW07202007.1	07/20/2007	Virginia	Halifax-Mecklenburg	Albemarle Sound	Aaron's Creek, [0.80 air miles E center] Hitesburg, Hites Mill Road [White House Road], SR 602, [Nelson Quad]	BT Watson, MB Stine, CM Kane, et al.	4
45412	<i>Elliptio producta</i>	BTW06222007.1	06/22/2007	Virginia	Fauquier	Chesapeake Bay	Cedar Run, VA 28 [Cattlet Road], ~0.5 miles SW of Cahlet, [Cattlet Quad]	BT Watson, MB Stine	8
45413	<i>Elliptio fisheriana</i>	BTW10282004.1	10/28/2004	Virginia	Southampton	Albemarle Sound	Three Creek, Fortsville Road (SR 659), 0.5 [air] miles NNW center Drexville, [Drexville Quad]	BT Watson, SL Huffer	1
45414	<i>Elliptio fisheriana</i>	BTW11032004.1	11/03/2004	Virginia	Dinwiddie	Albemarle Sound	Little Cattal Creek, Old Stage Road (SR 670), ~6 [air] miles E Dinwiddie, [5.33 to 5.37 air miles NW center Carson], Carson Quad	BT Watson, SL Huffer	1
45415	<i>Elliptio producta</i>	BTW06152007.2	06/15/2007	Virginia	Culpeper	Chesapeake Bay	Mountain Run, Stores Mill Road (SR 672), ~3 [air] miles WNW of Edwards Shop, Germanna Bridge Quad	BT Watson, MB Stine	5
45416	<i>Elliptio producta</i>	BTW06152007.1	06/15/2007	Virginia	Orange	Chesapeake Bay	Mountain Run, SR 611 [Raccoon Ford Road], 2 miles WNW of Burr Hill, [1.94 to 2.03 air miles WNW center Burr Hill], [Unionville Quad]	BT Watson, MB Stine	5
45417	<i>Elliptio producta</i>	MAA08282001.1	08/28/2001	Virginia	Rockbridge	Chesapeake Bay	James River, along 608, ~2 miles south Natural Bridge, ~0.5 [air] miles W Chimney Mills, Arnold Valley Quad	MA McGregor, J Baisden	7
45418	<i>Elliptio lanceolata</i>	BTW06142007.2	06/14/2007	North Carolina	Orange	Chesapeake Bay	Marsh Run, Scuffletown Road (SR 609), ~2.5 [air] miles SE of Scuffletown, [2.75 to 2.88 air miles NNW center Somerset], Barbourville Quad	BT Watson, MB Stine	5
45419	<i>Elliptio producta</i>	BTW06202007.3	06/20/2007	Virginia	Culpeper-Orange	Chesapeake Bay	Rapidan River, Willis Ford Road (SR 736), ~1.75 [air] miles ENE of Rapidan, [Rapidan Quad]	BT Watson, MB Stine	5
45420	<i>Elliptio producta</i>	BTW06202007.2	06/20/2007	Virginia	Culpeper-Orange	Chesapeake Bay	Rapidan River, Zachery Taylor Highway (US 522), 3 miles SE center Mitchell, [Unionville Quad]	BT Watson, MB Stine	5
45421	<i>Elliptio producta</i>	BTW06212007.2	06/21/2007	Virginia	Fauquier	Chesapeake Bay	Great Run, Opal Road (SR 687), [SE town of] Fauquier White Sulphur Springs, [3.01 to 3.06 air miles ENE center Jeffersonton], Warrenton Quad	BT Watson, MB Stine	8
45422	<i>Elliptio lanceolata</i>	BTW06212007.3	06/21/2007	Virginia	Fauquier	Chesapeake Bay	Thumb Run, Leeds Manor Road (SR 688), 1 mile NW of Orlean, [1.38 to 1.57 air miles NNW center Orlean], [Orlean Quad]	BT Watson, MB Stine	5
45423	<i>Elliptio lanceolata</i>	BTW06142007.1	06/14/2007	Virginia	Orange	Chesapeake Bay	Blue Run, Constitution Highway (VA 20), at Old Somerset, [1.12 to 0.8 air miles NNE center Somerset], Gordonsville Quad	BT Watson, MB Stine	5
45424	<i>Elliptio producta</i>	BTW06212007.1	06/21/2007	Virginia	Culpeper	Chesapeake Bay	Hazel River, [upstream and downstream of] Egghornsville Road (SR 729) [crossing], ~1 miles NNW of Egghornsville, [2.71 to 2.07 air miles ESE center Castleton], Castleton Quad	BT Watson, MB Stine	5
45425	<i>Elliptio producta</i>	BTW06212007.4	06/21/2007	Virginia	Fauquier	Chesapeake Bay	Carter Run, Leeds Manor Road (SR 688), just NW of Waterloo, [4.3 air miles N center Jeffersonton], [Jeffersonton Quad]	BT Watson, MB Stine	5
45426	<i>Elliptio lanceolata</i>	BTW06212007.2	06/21/2007	Virginia	Fauquier	Chesapeake Bay	Great Run, Opal Road (SR 687), [SE town of] Fauquier White Sulphur Springs, [3.01 to 3.06 air miles ENE center Jeffersonton], Warrenton Quad	BT Watson, MB Stine	1

45476	<i>Elliptio angustata</i>	INVERT09025	07/19/2008	South Carolina	Williamsburg	Santee	Santee River, approximately 1 mile upstream of SC 41 [US 17A] road crossing near Jamestown, [1.67 air miles NNE center Jamestown], [Jamestown Quad]	E Krueger, D Wilkins, T Churchill, et al.	1
45496	<i>Elliptio producta</i>	BTW09272007.2	09/27/2007	Virginia	Loudoun	Chesapeake Bay	North Fork Goose Creek, Potomac Drainage, SR 733 [Lime Hill Road], [4.92 air miles ESE center Philomont], [Lincoln Quad]	BT Watson, ME Bradley, CM Kane	2
45497	<i>Elliptio angustata</i>	BTW09272007.1	09/27/2007	Virginia	Loudoun	Chesapeake Bay	Little River, US 15 [James Monroe Highway], [2.2 air miles S of Overlands, [Leesburg Quad]	BT Watson, ME Bradley	1
45498	<i>Elliptio producta</i>	VT06232007.1	06/23/2007	Virginia	Calpeper	Chesapeake Bay	Negro Run, 2 [air] miles N of Jeffersonson, [Jeffersonson Quad]	B Osby	3
45499	<i>Elliptio fisheriana</i>	BTW10072004.3	10/07/2004	Virginia	Greenville-Sussex	Albemarle Sound	Three Creek, SR 61+ [Brickyard Road], 1 [air] mile SW of Grizzard, [Adams Grove Quad]	BT Watson, SL Huffer	3
45500	<i>Elliptio lanceolata</i>	BTW06292005.1	06/29/2005	Virginia	Prince William	Chesapeake Bay	Broad Run, 0.75 [air] miles NNW of Buckland, [Thoroughfare Gap Quad]	BT Watson, SL Huffer	1
45501	<i>Elliptio producta</i>	BTW09262007.4	09/26/2007	Virginia	Prince William	Chesapeake Bay	Broad Run, VA 28 [Nokesville Road], 1 mile [air] NE of Briatow, [Nokesville Quad]	BT Watson, ME Bradley	4
45502	<i>Elliptio fisheriana</i>	BTW10122007.3	10/12/2007	Virginia	Sussex	Albemarle Sound	Neblets Mill Run, VA 35 [Jerusalem Plank Road], 3.25 [air] miles NW of Homeville, [Littleton Quad]	BT Watson, ME Bradley	6
45503	<i>Elliptio producta</i>	BTW09242007.1	09/24/2007	Virginia	Amherst	Chesapeake Bay	James River, US 29 Business (Amherst Highway), Boat Ramp, [Carter Glass Bridge], [0.48 air miles ESE center Lynchburg], [Lynchburg Quad]	BT Watson, ME Bradley	5
45504	<i>Elliptio producta</i>	BTW06292005.1	06/29/2005	Virginia	Prince William	Chesapeake Bay	Broad Run, 0.75 [air] miles NNW of Buckland, [Thoroughfare Gap Quad]	BT Watson, SL Huffer	5
45505	<i>Elliptio producta</i>	BTW10032007.1	10/03/2007	Virginia	Fluvanna	Chesapeake Bay	Rivanna River, US 15 [James Madison Highway], 0.2 [air] miles SSW Palmyra, [Palmyra Quad]	BT Watson, ME Bradley	7
45506	<i>Elliptio producta</i>	BTW09262007.3	09/26/2007	Virginia	Prince William	Chesapeake Bay	Kettle Run, SR 656, 1 mile NNW of Nokesville, [Nokesville Quad]	BT Watson, ME Bradley	5
45507	<i>Elliptio fisheriana</i>	BTW10122007.1	10/12/2007	Virginia	Southampton	Albemarle Sound	Tarquin Swamp, SR 618 [Crumpier Road], 0.5 [air] miles NW of Johnson Center, [Ivor Quad]	BT Watson, ME Bradley	7
45508	<i>Elliptio lanceolata</i>	MAM07161999.2	07/16/1999	Virginia	Nottoway	Albemarle Sound	Nottoway River, VA 40, Highway 40 bridge [Blackstone Road], [1.18 air miles SSW center Murdocks], [Blackstone West Quad]	MA Gregor, R Steinher, J Baisden	7
45509	<i>Elliptio fisheriana</i>	BTW10112007.6	10/11/2007	Virginia	Prince George	Albemarle Sound	Cattail Creek, SR 703 [Rinford Drive], at center of town of Brinford Store, [Disputanta North Quad]	BT Watson, ME Bradley	3
45510	<i>Elliptio angustata</i>	MAM08201998.1	08/20/1998	Virginia	Fluvanna	Chesapeake Bay	Rivanna River at SR 600 (Campbell Road) at Crafton, at Department of Game and Inland Fisheries boat ramp, [ca. 4.4 air miles NNW Palmyra], [Boyd Tavern Quad]	MA McGregor, P Burgess, B Greenlee	2
45511	<i>Elliptio fisheriana</i>	BTW10112007.2	10/11/2007	Virginia	Dinwiddie	Chesapeake Bay	[Gravelly Run], [tributary to] Rowanty Creek, SR 670 (Old Stage Road), 4 miles WSW of Reams, [Carson Quad]	BT Watson, ME Bradley	3
45512	<i>Elliptio producta</i>	BTW10042007.1	10/04/2007	Virginia	Fluvanna	Chesapeake Bay	Mechunk Creek, US 230 (Richmond Road), 3 [air] miles [ENE] of Paynes Mill, [Boyd Tavern Quad]	BT Watson, ME Bradley	1
45513	<i>Elliptio fisheriana</i>	BTW10122007.2	10/12/2007	Virginia	Southampton	Albemarle Sound	Nottoway River, SR 653 (Pinopolis Road), Carey's Bridge, [2.37 air miles SW center Sobrell], [Sobrell Quad]	BT Watson, ME Bradley	1
45514	<i>Elliptio producta</i>	BTW09282007.3	09/28/2007	Virginia	Fairfax-Prince William	Chesapeake Bay	Bull Run, US 29 (Lee Highway), [Stone Bridge], National Battlefield, [2.18 air miles N center Sudley], [Gainsville Quad]	BT Watson, ME Bradley	1
45515	<i>Elliptio producta</i>	BTW09272007.4	09/27/2007	Virginia	Fairfax	Chesapeake Bay	Cub Run, SR 620+ (Bradlock Road), Schneider crossroads, [3.54 NNW center Centreville], [Herndon Quad]	BT Watson, ME Bradley	1
45516	<i>Elliptio producta</i>	BTW10052007.1	10/05/2007	Virginia	Hanover-Henrico	Chesapeake Bay	Chickahominy River, US 1 (Washington Highway/[BrookRoad]), 0.75 miles S French Hay, [Yellow Tavern Quad]	BT Watson, ME Bradley	5
45517	<i>Elliptio producta</i>	BTW10052007.2	10/05/2007	Virginia	Chesterfield	Chesapeake Bay	Swift Creek, SR 667 [Orrdale Road], 2.5 [air] miles SE of Hallshoro, [Hallshoro Quad]	BT Watson, ME Bradley	2

45518	<i>Elliptio fisheriana</i>	BTW10112007.3	10/11/2007	Virginia	Dinwiddie	Chesapeake Bay	Gravelly Run, SR 670 (Duncan Road), 4 [air] miles W Reams, [Carson Quad]	BT Watson, ME Bradley	5
45519	<i>Elliptio lanceolata</i>	BTW10082004.1	10/08/2004	Virginia	Greenville	Albemarle Sound	Three Creek, SR 610 (Allen Road), 1 mile NE Cowie Corner, [Purdy Quad]	BT Watson, SL Huffer	2
45520	<i>Elliptio fisheriana</i>	BTW10132004.1	10/13/2004	Virginia	Southampton	Albemarle Sound	Three Creek, SR 659 (Fortsville Road), 0.5 [air] miles N Drewryville, [Drewryville Quad]	BT Watson, SL Huffer	1
45521	<i>Elliptio producta</i>	BTW09262007.1	09/26/2007	Virginia	Fauquier	Chesapeake Bay	Licking Run, VA 28 (Caldett Road), 0.75 [air] miles NNE of Midland, [Midland Quad]	BT Watson, ME Bradley	8
45522	<i>Elliptio producta</i>	JRT09282005.2	09/28/2005	Virginia	Bath	Chesapeake Bay	Cowpasture River, VA 42 (SR 42), 2.75 miles NNW of Griffith, [Healing Springs Quad]	BT Watson, SL Huffer, CM Kane, et al.	2
45523	<i>Elliptio producta</i>	BTW09272007.3	09/27/2007	Virginia	Loudoun	Chesapeake Bay	Goose Creek, SR 733 (Lime Kin Road), [4.92 air miles ESE center Philmont], [Lincoln Quad]	BT Watson, ME Bradley	5
45524	<i>Elliptio fisheriana</i>	BTW10112007.1	10/11/2007	Virginia	Dinwiddie	Chesapeake Bay	Picture Branch, I-85, 1 [air] mile N of Burgess, [Sutherland Quad]	BT Watson, ME Bradley	5
45525	<i>Elliptio angustata</i>	MAM08191998.1	08/19/1998	Virginia	Fluvanna	Chesapeake Bay	Mechunk Creek, US 230+ [Richmond Road], 1.5 [air] miles [ESE] of Boyd Tavern, Boyd Tavern Quad	MA McGregor, P Burgess	2
45526	<i>Elliptio producta</i>	BTW10232007.3	10/23/2007	Virginia	Louisa	Chesapeake Bay	South Anna River, SR 649 (Byrd Mill Road), [at center of] Bird Mill [1.78 air miles N Belts Crossroads], [Femoliff Quad]	BT Watson, ME Bradley	2
45527	<i>Elliptio producta</i>	BTW09282007.1	09/28/2007	Virginia	Prince William	Chesapeake Bay	Little Bull Run, SR 234 [Sudley Road], [at town of] Sudley Springs [1.92 air miles SE center Catharpin], [Gainsville Quad]	BT Watson, ME Bradley	5
45528	<i>Elliptio producta</i>	BTW08262005.1	08/26/2005	Virginia	Prince William	Chesapeake Bay	Broad Run, US 29/15 (Lee Highway), [3.36 air miles WSW center Gainesville], [Thoroughfare Gap Quad]	BT Watson, SL Huffer	2
45529	<i>Elliptio fisheriana</i>	BTW11032004.2	11/03/2004	Virginia	Dinwiddie	Chesapeake Bay	[Gravelly Run], [tributary to] Rowanty Creek, SR 670 (Old Stage Road), 6 miles ENE of Dinwiddie, [Carson Quad]	BT Watson, SL Huffer	3
45545	<i>Elliptio fisheriana</i>	VMH04131990.2	04/13/1990	Virginia	Greensville	Albemarle Sound	Beaverpond Creek, SR 633 [Pine Log Road], [point estimated 0.36 air miles SSE center Gamers Mill], [Barley Quad]	RL Hoffman	1
45546	<i>Elliptio fisheriana</i>	VMH08201989.1	08/20/1989	Virginia	Greensville	Albemarle Sound	Beaverpond Creek, SR 633 [Pine Log Road], [0.36 air miles SSE center Gamers Mill], [Barley Quad]	RL Hoffman	1
45550	<i>Elliptio producta</i>	PHS07111991.4	07/11/1991	Virginia	Fauquier	Chesapeake Bay	Carter Run, SR 650 [Fletchers Mill Road], [point estimated 0.96 air miles NNE center Dudie], [Orlean Quad]	PH Stevenson	2
45551	<i>Elliptio lanceolata</i>	VMH07221989.2	07/22/1989	Virginia	Amelia	Chesapeake Bay	Beaverpond Creek, VA 153 (Military Road), [4.56 air miles NNW center Manboro], [Amelia Court House Quad]	RL Hoffman	1
45552	<i>Elliptio lanceolata</i>	VMH06261991	06/26/1991	Virginia	Fauquier	Chesapeake Bay	Carter Run, SR 622 (Old Bridge Road), [4.14 air miles N center Jeffersonton], [Jeffersonton Quad]	CA Pague	1
45554	<i>Elliptio lanceolata</i>	PHS00001991	1991	Virginia	Orange	Chesapeake Bay	Rapidan River, US 15 [James Madison Highway], [2.92 air miles NNW center Orange], [Madison Mills Quad]	PH Stevenson	1
45555	<i>Elliptio lanceolata</i>	PHS07111991.1	07/11/1991	Virginia	Fauquier	Chesapeake Bay	Carter Run, SR 650 [Fletchers Mill Road], [point estimated 0.96 air miles NNE center Dudie], [Orlean Quad]	PH Stevenson	3
45557	<i>Elliptio lanceolata</i>	PHS07191991.3	07/19/1991	Virginia	Orange	Chesapeake Bay	Rapidan River, US 231 (Blue Ridge Turnpike), [1.67 air miles N center Somerse], [Gordonsville Quad]	PH Stevenson	1
45558	<i>Elliptio fisheriana</i>	DGF05111991	05/11/1991	Virginia	Richmond	Chesapeake Bay	Muddy Run, SR 621- (Tailentown Road), [0.51 air miles NNE center Ethel], [Mountross Quad]	unknown	3
45559	<i>Elliptio lanceolata</i>	PHS08251992	08/25/1992	Virginia	Southampton	Albemarle Sound	Notoway River, [downstream confluence with Little Notoway River, [4.05 air miles S center Blackstone], [Blackstone West Quad]	PH Stevenson	1
45562	<i>Elliptio producta</i>	PHS08211991.3	08/21/1991	Virginia	Prince William	Chesapeake Bay	Cedar Run, SR 607 (Carriage Ford Road), [point estimated at center of Carriage Ford (town)], [Nokesville Quad]	PH Stevenson	1

45632	<i>Elliptio angustata</i>	JMW070627.1	06/27/2007	Georgia	Long	Altamaha	Altamaha	Altamaha River, ~1.4 km downstream of US 84 in Doctortown, ~10.8 km ENE of Jessup, [Doctortown Quad]	JM Wisniewski, JR, Mcador, ST Small	3
45636	<i>Elliptio angustata</i>	JMW070813.4	08/13/2007	Georgia	Polaski	Altamaha	Altamaha	Ocmulgee River, ~2.3 km upstream of US 341 bridge [US 129A/US 341/SR 26/SR 27/Commerce Street], ~1.9 km NE of Hawkinsville, [Hawkinsville Quad]	JM Wisniewski, ST Small	5
45648	<i>Elliptio angustata</i>	061018.2JMA	10/18/2006	North Carolina	Columbus	Pee Dee	Pee Dee	Waccamaw River at dam, [4.43 air miles SSW center Wannamish], [Lake Waccamaw West Quad]	JM Alderman, N Medlin, JW Mays	2
45650	<i>Elliptio producta</i>	060709.3JMA	07/09/2006	South Carolina	Saluda	Santee	Santee	Red Bank Creek, Pea Creek Road [SR S-41-107], [point estimated 1.41 air miles SSW center Saluda], [Saluda South Quad]	JM Alderman, JDA	1
45657	<i>Elliptio producta</i>	060408.2JMA	04/08/2006	South Carolina	Edgefield	Savannah	Savannah	Turkey Creek, S-39 (Old Chapel Ferry Road), [5.30 air miles NW center Johnston], [Edgefield Quad]	JM Alderman, J West	1
45664	<i>Elliptio producta</i>	050426.1JMA	04/26/2005	South Carolina	Aiken	Savannah	Savannah	Little Horse Creek, SC 421 (Augusta Road), [0.84 air miles NW center Johnston], [Augusta East Quad]	JM Alderman, J West	7
45668	<i>Elliptio angustata</i>	050503.10JMA	05/03/2005	North Carolina	Gaston-Mecklenburg	Santee	Santee	Carawha River below Mountain Island Lake Dam, Mountain Island Bypassed Reach, [1.01 air miles SE center town of Mountain Island], [Mountain Island Lake Quad]	JM Alderman, G Vaughan, TE Dickinson, et al.	4
45669	<i>Elliptio angustata</i>	060526.1JMA	05/26/2006	North Carolina	Moore	Cape Fear	Cape Fear	Cabin Creek, SR 1275 (Pine Grove Church Road), [4.51 air miles SE center Dover], [Spices Quad]	JM Alderman, JW Mays	1
45671	<i>Elliptio producta</i>	050613.10JMA	06/13/2005	South Carolina	Chesterfield-Lancaster	Pee Dee	Pee Dee	Lynches River, SC 265+- (Old Jefferson Highway), [0.72 air miles ENE center Birdtown], [Jefferson Quad]	JM Alderman, J West	1
45674	<i>Elliptio angustata</i>	050613.10JMA	06/13/2005	South Carolina	Chesterfield-Lancaster	Pee Dee	Pee Dee	Lynches River, SC 265+- (Old Jefferson Highway), [0.72 air miles ENE center Birdtown], [Jefferson Quad]	JM Alderman, J West	4
45676	<i>Elliptio producta</i>	060707.40JMA	07/07/2006	South Carolina	Saluda	Santee	Santee	Clouds Creek, SR 499+-, [6.43 air miles NE center Ward], [Emory Quad]	JM Alderman, JD Alderman	3
45677	<i>Elliptio producta</i>	060708.20JMA	07/08/2006	South Carolina	Lexington	Santee	Santee	Bear Creek, S-29+- (Saint Peters Church Road), [1.98 air miles SW center Chapin], [Little Mountain Quad]	JM Alderman, JD Alderman	4
45682	<i>Elliptio producta</i>	050503.1JMA	05/03/2005	North Carolina	Gaston-Mecklenburg	Santee	Santee	Carawha River below Mountain Island Lake Dam, [point estimated 1.01 air miles SE center town of Mountain Island], [Mountain Island Lake Quad]	JM Alderman, S Garrick, TE Dickinson, et al.	3
45683	<i>Elliptio angustata</i>	041102.10JMA	11/02/2004	South Carolina	York	Santee	Santee	Carawha River, [1.08 air miles S center Riverview], [Rock Hill East Quad]	unknown	5
45690	<i>Elliptio producta</i>	060524.10JMA	05/24/2006	South Carolina	Aiken	Savannah	Savannah	Horse Creek, US 278+- (SR 125/Atomic Road), [2.11 air miles SW center Johnston], [Augusta East Quad]	JM Alderman, J West	6
45692	<i>Elliptio producta</i>	060622.6JMA	06/22/2006	South Carolina	Lexington	Santee	Santee	Lake Murray, [3.96 air miles S center Chapin], [Lake Murray East Quad]	JM Alderman, JD Alderman	9
45695	<i>Elliptio producta</i>	050418.10JMA	04/18/2005	South Carolina	Kershaw	Santee	Santee	Sawneys Creek, SR-S 5+- (Longtown Road), [1.52 air miles SSE center Warren Crossroads], [Longtown Quad]	JM Alderman, J West	5
45696	<i>Elliptio fisheriana</i>	050407.JMA	04/07/2005	North Carolina	Hertford	Albemarle Sound	Albemarle Sound	Meherrin River at Ferry Crossing, SR 1175 [Parker Fishery Road], [0.60 air miles W center Flax Island], [Winton Quad]	JM Alderman, L Williams, K Lynch	2
45705	<i>Elliptio fisheriana</i>	051005.10JMA	10/05/2005	North Carolina	Columbus	Pee Dee	Pee Dee	Little Waccamaw, Champion boat ramp, [3.72 air miles S center Lake Waccamaw], [Lake Waccamaw East Quad]	JM Alderman, JA Fridell, L Williams, et al.	5
45718	<i>Elliptio angustata</i>	05102526.JMA	10/25-26/2005	South Carolina	Berkeley	Santee	Santee	Santee River, below Lake Moultrie Dam, [point estimated 1.5.5 air miles SE center Saint Stephen], [Jamestown Quad]	JM Alderman, J West	9
45720	<i>Elliptio angustata</i>	INVERT09036	2004	North Carolina	Burke	Santee	Santee	Johns River, [point estimated at beginning and end within Burke County], [Morganton North Quad]	JM Alderman, G Vaughan	7
45724	<i>Elliptio fisheriana</i>	INVERT09038	09/nA/2005	South Carolina	Clarendon	Santee	Santee	Lake Marion, [point estimated 4.96 air miles SSW center Saint Paul], [Saint Paul Quad]	JM Alderman, J West	5
45730	<i>Elliptio fisheriana</i>	INVERT09039	09/23/2005	South Carolina	Berkeley	Cooper	Cooper	Lake Moultrie, [point estimated at town of Cross], [Chicora Quad]	JM Alderman, J West	1

45711	<i>Elliptio angustata</i>	INVERT09039	09/23/2005	South Carolina	Berkeley	Cooper	Lake Meulbre, [point estimated at town of Cross], [Chitara Quad]	JM Alderman, J West	1
45924	<i>Elliptio fisheriana</i>	080326.4TWS	03/26/2008	South Carolina	Greenwood	Santee	Halfway Swamp below SC 246, [0.64 air miles NNW center Friendship], [Good Hope Quad]	TW Savidge, C Sheats, J Hartsell, et al.	1
45930	<i>Elliptio lanceolata</i>	070718.1TED	07/18/2007	Virginia	Lousia	Chesapeake Bay	South Anna River at Columbia Gas Pipeline corridor, accessed from Perkins property, [1.98 air miles SE center Poindester], [Pernett Quad]	TE Dickinson, C Sheats	1
45932	<i>Elliptio angustata</i>	080326.4TWS	03/26/2008	South Carolina	Greenwood	Santee	Halfway Swamp below SC 246, [0.64 air miles NNW center Friendship], [Good Hope Quad]	TW Savidge, C Sheats, J Hartsell, et al.	2
46008	<i>Elliptio producta</i>	10W2006-025	06/22/2006	Georgia-South Carolina	Effingham-Jasper	Savannah	Savannah River, Ebenezer Creek mouth, RM 44 8, Ebenezer Landing, [6.39 air miles NNE center Rincon, Georgia], [Hardeeville NW Quad]	JD Williams, L Zimmerman, AE Bogan, et al.	6
47085	<i>Elliptio producta</i>	EAE09112008.2	09/11/2008	Virginia	Fairfax	Chesapeake Bay	Cub Run, crossing number 4, downstream 400m, [6.07 to 6.41 air miles N center Manassas], [Manassas Quad]	C Bishop, J Matkowsky, B Rue	1
47086	<i>Elliptio producta</i>	EAE09152008.1	09/15/2008	Virginia	Fairfax	Chesapeake Bay	Cub Run, Crossing #7, [6.67 to 6.62 air miles N center Manassas], [Manassas Quad]	C Bishop, J Matkowsky, B Rue	2
47087	<i>Elliptio producta</i>	EAE09102008.1	09/10/2008	Virginia	Fairfax	Chesapeake Bay	Cub Run, Crossing #2, 400m, [5.54 to 5.73 air miles N center Manassas], [Manassas Quad]	C Bishop, J Matkowsky, B Rue	1
47088	<i>Elliptio fisheriana</i>	DGF05121991.1	05/12/1991	Virginia	Essex	Chesapeake Bay	Occupacia Creek, SR 657 [Occupacia Road], below Hunter's Millpond, [point estimated 3.4 air miles SSW center Loreto], [Loretto Quad]	S Bruenderman, RL Hoffman	3
47090	<i>Elliptio lanceolata</i>	PHS07101991.3	07/10/1991	Virginia	Culpeper-Fauquier	Chesapeake Bay	Rappahannock River, SR 621 [Lakota Road], at [center] Lakota, [Brandy Station Quad]	PH Stevenson	3
47091	<i>Elliptio fisheriana</i>	DGF05111991.2	05/11/1991	Virginia	King William	Chesapeake Bay	Monquin Creek, SR 618 [Acquinton Church Road], [point estimated 0.37 air miles ENE center Manquin], [Outfall of Basher's Millpond, [Manquin Quad]	S Bruenderman, RL Hoffman	3
47092	<i>Elliptio fisheriana</i>	PHS07251991.3	07/25/1991	Virginia	Suffolk City	Albemarle Sound	Somerton Creek, SR 686 [Gates Road], [point estimated 0.77 air miles S center Pittmantown], [Gates Quad]	PH Stevenson	3
47093	<i>Elliptio producta</i>	PHS07101991.3	07/10/1991	Virginia	Culpeper-Fauquier	Chesapeake Bay	Rappahannock River, SR 621 [Lakota Road], at [center] Lakota, [Brandy Station Quad]	PH Stevenson	3
47094	<i>Elliptio producta</i>	PHS07111991.3	07/11/1991	Virginia	Fauquier	Chesapeake Bay	Little River, SR 776 [Landmark School Road], [point estimated 1.5 air miles SSE center Middleburg], [Middleburg Quad]	PH Stevenson	5
47095	<i>Elliptio fisheriana</i>	VMH09241988.1	09/24/1988	Virginia	Southampton	Albemarle Sound	Norotway River, SR 671 [General Thomas Highway] and SR 650 [Shady Brook Trail], [at center Delaware], [Courtland Quad]	RL Hoffman	2
47096	<i>Elliptio lanceolata</i>	PHS07251991.1	07/25/1991	Virginia	Isle of Wight-Southampton	Albemarle Sound	Blackwater River, SR 611 [Joyner Bridge Road], [point estimated 3.87 air miles N center Franklin], [Franklin Quad]	PH Stevenson	3
48041	<i>Elliptio fisheriana</i>	BTW080275008.2	08/27/2008	Virginia	Southampton	Albemarle Sound	Norotway River, 1.75 miles E of Drakes Corner, [Riverdale Quad]	BT Watson, ME Bradley, RT Fernald	2

Table 2. List of Virginia lanceolate *Elliptio* from which DNA was sequenced.

NCSM Cat. No.	Genus		nd1	comments	River Basin
	species	coi			
27729.1	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27729.2	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27729.3	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27729.4	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27729.5	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27732.1	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27732.2	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27732.3	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27732.4	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27732.5	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Nottoway River, Chowan RB, VA
27767.1	<i>E. lanceolata</i>			being resequenced	Tar RB, NC
27767.2	<i>E. lanceolata</i>			being resequenced	Tar RB, NC
27774	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Tar RB, NC
27794.1	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	being resequenced	Neuse RB, NC
27794.2	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	being resequenced	Neuse RB, NC
27794.3	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Neuse RB, NC
27794.4	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Neuse RB, NC
27794.5	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Neuse RB, NC
29144.1	<i>E. lanceolata</i>			mis id is <i>E. fisheriana</i> being resequenced	Neuse RB, NC
29144.2	<i>E. lanceolata</i>			being resequenced	Tar RB, NC
29153.1	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		James RB, VA
29153.2	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		James RB, VA
29153.3	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		James RB, VA
29153.4	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		James RB, VA
30073.1	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	mis id is <i>E. fisheriana</i>	Rappahannock RB, VA
30073.2	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Rappahannock RB, VA
30073.3	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	<i>E. fisheriana</i> , being resequenced	Rappahannock RB, VA
30073.4	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	mis id is <i>E. fisheriana</i>	Rappahannock RB, VA
30073.5	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>		Rappahannock RB, VA
30073.6	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	mis id is <i>E. fisheriana</i>	Rappahannock RB, VA
30073.7	<i>E. lanceolata</i>	<input type="checkbox"/>	<input type="checkbox"/>	mis id is <i>E. fisheriana</i>	Rappahannock RB, VA

30737	<i>E. lanceolata</i>				being resequenced	York RB, VA
30865.1	<i>E. lanceolata</i>				being resequenced	James RB, VA
30865.2	<i>E. lanceolata</i>				being resequenced	James RB, VA
45418.1	<i>E. lanceolata</i>	0		0		Rappahannock RB, VA
45418.2	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45418.3	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45418.4	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45418.5	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45422.1	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45422.2	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45422.3	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45422.4	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45422.5	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45423.1	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45423.2	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45423.3	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45423.4	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45423.5	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45426	<i>E. lanceolata</i>	0		0	being resequenced	Rappahannock RB, VA
45500	<i>E. lanceolata</i>				being resequenced	Potomac RB,VA
45508.1	<i>E. lanceolata</i>				being resequenced	James RB, VA
45508.2	<i>E. lanceolata</i>	0		0	being resequenced	James RB, VA
45508.3	<i>E. lanceolata</i>	0		0	being resequenced	James RB, VA
45508.4	<i>E. lanceolata</i>				being resequenced	James RB, VA
45508.5	<i>E. lanceolata</i>				being resequenced	James RB, VA
45508.6	<i>E. lanceolata</i>				being resequenced	James RB, VA
45508.7	<i>E. lanceolata</i>				being resequenced	James RB, VA
45519.1	<i>E. lanceolata</i>	0		0	being resequenced	Nottoway R, Chowan RB,VA
45519.2	<i>E. lanceolata</i>	0		0	being resequenced	Nottoway R, Chowan RB,VA
45551	<i>E. lanceolata</i>				being resequenced	James RB, VA
45552	<i>E. lanceolata</i>				being resequenced	Rappahannock RB, VA
45554	<i>E. lanceolata</i>				being resequenced	Rappahannock RB, VA
45555.1	<i>E. lanceolata</i>	0	0	0	not work	Rappahannock RB, VA
45555.2	<i>E. lanceolata</i>	0	0	0	not work	Rappahannock RB, VA
45555.3	<i>E. lanceolata</i>	0	0	0	not work	Rappahannock RB, VA

45557	<i>E. lanceolata</i>				being resequenced	Rappahannock RB, VA
45559	<i>E. lanceolata</i>				being resequenced	Nottoway River, Chowan RB, VA
45930	<i>E. lanceolata</i>	<input type="checkbox"/>			being resequenced	York RB, VA
47090.1	<i>E. lanceolata</i>		0	<input type="checkbox"/>	not work	Rappahannock RB, VA
47090.2	<i>E. lanceolata</i>		0	<input type="checkbox"/>	not work	Rappahannock RB, VA
47090.3	<i>E. lanceolata</i>		0	<input type="checkbox"/>	not work	Rappahannock RB, VA
47096.1	<i>E. lanceolata</i>		0	<input type="checkbox"/>	not work	Blackwater River, Chowan RB, VA
47096.2	<i>E. lanceolata</i>		0	<input type="checkbox"/>	not work	Blackwater River, Chowan RB, VA
47096.3	<i>E. lanceolata</i>		0	<input type="checkbox"/>	not work	Blackwater River, Chowan RB, VA
29147.1	<i>E. angustata</i>	<input type="checkbox"/>		<input type="checkbox"/>		James RB, VA
29147.2	<i>E. angustata</i>	<input type="checkbox"/>		<input type="checkbox"/>		James RB, VA
29147.3	<i>E. angustata</i>			<input type="checkbox"/>	being resequenced	James RB, VA
29147.4	<i>E. angustata</i>	<input type="checkbox"/>			being resequenced	James RB, VA
29147.5	<i>E. angustata</i>	<input type="checkbox"/>			being resequenced	James RB, VA
29147.6	<i>E. angustata</i>	<input type="checkbox"/>			being resequenced	James RB, VA
29147.7	<i>E. angustata</i>		0	<input type="checkbox"/>	not work	James RB, VA
29150	<i>E. angustata</i>	<input type="checkbox"/>		<input type="checkbox"/>		James RB, VA
30868	<i>E. angustata</i>				being resequenced	James RB, VA
45497	<i>E. angustata</i>	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45510.1	<i>E. angustata</i>				being resequenced	James RB, VA
45510.2	<i>E. angustata</i>		0	<input type="checkbox"/>	not work	James RB, VA
45525.1	<i>E. angustata</i>		0	<input type="checkbox"/>	not work	James RB, VA
45525.2	<i>E. angustata</i>	<input type="checkbox"/>			being resequenced	James RB, VA
45632.1	<i>E. angustata</i>	<input type="checkbox"/>		<input type="checkbox"/>		Altamaha RB, GA
45632.2	<i>E. angustata</i>	<input type="checkbox"/>		<input type="checkbox"/>		Altamaha RB, GA
45632.3	<i>E. angustata</i>	<input type="checkbox"/>		<input type="checkbox"/>		Altamaha RB, GA
27696	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27697.1	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27697.2	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27697.3	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes, being resequenced	Chester RB, MD
27697.4	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27697.5	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27697.6	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27698	<i>E. fisheriana</i>	<input type="checkbox"/>		<input type="checkbox"/>	Topotypes	Chester RB, MD
27699.1	<i>E. fisheriana</i>			<input type="checkbox"/>	Topotypes, being resequenced	Chester RB, MD

27699.2	<i>E. fisheriana</i>	<input type="checkbox"/>			Topotypes, being resequenced	Chester RB, MD
29518.1	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Potomac RB, VA
29518.2	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Potomac RB, VA
30212.1	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Potomac RB, VA
30212.2	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Potomac RB, VA
30804.1	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
30804.2	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45087.1	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	James RB, VA
45087.2	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	James RB, VA
45413	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45414	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45499.1	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45499.2	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45499.3	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45502.1	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45502.2	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45502.3	<i>E. fisheriana</i>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45502.4	<i>E. fisheriana</i>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45502.5	<i>E. fisheriana</i>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45502.6	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Nottoway River, Chowan RB, VA
45507.1	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced	Blackwater River, Chowan RB, VA
45507.2	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45507.3	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45507.4	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45507.5	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45507.6	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45507.7	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45509.1	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45509.2	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45509.3	<i>E. fisheriana</i>	<input type="checkbox"/>				Blackwater River, Chowan RB, VA
45511.1	<i>E. fisheriana</i>	<input type="checkbox"/>				James RB, VA
45511.2	<i>E. fisheriana</i>	<input type="checkbox"/>				James RB, VA
45511.3	<i>E. fisheriana</i>	<input type="checkbox"/>				James RB, VA
45513	<i>E. fisheriana</i>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45518.1	<i>E. fisheriana</i>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA

45518.2	<i>E. fisheriana</i>	<input type="checkbox"/>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45518.3	<i>E. fisheriana</i>	<input type="checkbox"/>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45518.4	<i>E. fisheriana</i>	<input type="checkbox"/>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45518.5	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced		Nottoway River, Chowan RB, VA
45520	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced		Nottoway River, Chowan RB, VA
45524.1	<i>E. fisheriana</i>	<input type="checkbox"/>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45524.2	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced		Nottoway River, Chowan RB, VA
45524.3	<i>E. fisheriana</i>	<input type="checkbox"/>	<input type="checkbox"/>				Nottoway River, Chowan RB, VA
45524.4	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced		Nottoway River, Chowan RB, VA
45524.5	<i>E. fisheriana</i>	<input type="checkbox"/>			being resequenced		Nottoway River, Chowan RB, VA
45529	<i>E. fisheriana</i>				being resequenced		Nottoway River, Chowan RB, VA
45545	<i>E. fisheriana</i>		0	0	not work		Meherrin River, Chowan RB, VA
45546	<i>E. fisheriana</i>		0	0	not work		Meherrin River, Chowan RB, VA
45558.1	<i>E. fisheriana</i>		0	0	not work		Rappahannock RB, VA
45558.2	<i>E. fisheriana</i>		0	0	not work		Rappahannock RB, VA
45558.3	<i>E. fisheriana</i>		0	0	not work		Rappahannock RB, VA
47088.1	<i>E. fisheriana</i>		0	0	not work		Rappahannock RB, VA
47088.2	<i>E. fisheriana</i>		0	0	not work		Rappahannock RB, VA
47088.3	<i>E. fisheriana</i>		0	0	not work		Rappahannock RB, VA
47091.1	<i>E. fisheriana</i>		0	0	not work		York RB, VA
47091.2	<i>E. fisheriana</i>		0	0	not work		York RB, VA
47091.3	<i>E. fisheriana</i>		0	0	not work		York RB, VA
47095.1	<i>E. fisheriana</i>		0	0	not work		Nottoway River, Chowan RB, VA
47095.2	<i>E. fisheriana</i>		0	0	not work		Nottoway River, Chowan RB, VA
29142.1	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29142.2	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29142.3	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29142.4	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29142.5	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29142.6	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29146.1	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Savannah RB, GA
29146.2	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		James RB, VA
29146.3	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		James RB, VA
29146.4	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		James RB, VA
29727.1	<i>E. producta</i>	<input type="checkbox"/>			being resequenced		Pee Dee RB, SC

29727.2	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
29727.3	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
29727.4	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
29727.5	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
29727.6	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
29727.7	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
29727.8	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
30556.1	E. producta	<input type="checkbox"/>		being resequenced	Pee Dee RB, SC
30556.2	E. producta	0	0	not work	Pee Dee RB, SC
30866	E. producta			being resequenced	James RB, VA
30867.1	E. producta			being resequenced	James RB, VA
30867.2	E. producta			being resequenced	James RB, VA
45410	E. producta			being resequenced	Roanoke RB, VA
45411	E. producta			being resequenced	Roanoke RB, VA
45412	E. producta			being resequenced	Potomac RB, VA
45415	E. producta	0	0	not work	Rappahannock RB, VA
45416.1	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45416.2	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45416.3	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45416.4	E. producta	0	0	not work	Rappahannock RB, VA
45416.5	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45419	E. producta	0	0	not work	Rappahannock RB, VA
45420.1	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45420.2	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45420.3	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45420.4	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45420.5	E. producta	<input type="checkbox"/>		being resequenced	Rappahannock RB, VA
45421	E. producta			being resequenced, 5	Rappahannock RB, VA
45424	E. producta			being resequenced, 5	Rappahannock RB, VA
45425	E. producta			being resequenced, 5	Rappahannock RB, VA
45496.1	E. producta	0	0	not work	Potomac RB, VA
45496.2	E. producta	<input type="checkbox"/>		being resequenced	Potomac RB, VA
45498.1	E. producta	0	0	not work	Rappahannock RB, VA
45498.2	E. producta	<input type="checkbox"/>			Rappahannock RB, VA
45498.3	E. producta			being resequenced	Rappahannock RB, VA

45501.1	E. producta				being resequenced	Potomac RB, VA
45501.2	E. producta				being resequenced	Potomac RB, VA
45501.3	E. producta				being resequenced	Potomac RB, VA
45501.4	E. producta				being resequenced	Potomac RB, VA
45503.1	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45503.2	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45503.3	E. producta	<input type="checkbox"/>	<input type="checkbox"/>			James RB, VA
45503.4	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45503.5	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45504.1	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45504.2	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45504.3	E. producta		0	0	not work	Potomac RB, VA
45504.4	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45504.5	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45505.1	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45505.2	E. producta		0	0	not work	James RB, VA
45505.3	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45505.4	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45505.5	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45505.6	E. producta	<input type="checkbox"/>		<input type="checkbox"/>		James RB, VA
45505.7	E. producta			<input type="checkbox"/>	being resequenced	James RB, VA
45506.1	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45506.2	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45506.3	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45506.4	E. producta	<input type="checkbox"/>		<input type="checkbox"/>		Potomac RB, VA
45506.5	E. producta	<input type="checkbox"/>		<input type="checkbox"/>		Potomac RB, VA
45512	E. producta	<input type="checkbox"/>		<input type="checkbox"/>		James RB, VA
45514	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45515	E. producta	<input type="checkbox"/>			being resequenced	Potomac RB, VA
45516.1	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45516.2	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45516.3	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45516.4	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45516.5	E. producta	<input type="checkbox"/>			being resequenced	James RB, VA
45517.1	E. producta		0	0	not work	James RB, VA

45517.2	E. producta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			James RB, VA
45521.1	E. producta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			Potomac RB, VA
45521.2	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45521.3	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45521.4	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45521.5	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45521.6	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45521.7	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45521.8	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45521.9	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45522.1	E. producta	<input type="checkbox"/>	0	0	not work		James RB, VA
45522.2	E. producta	<input type="checkbox"/>			being resequenced		James RB, VA
45523.1	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45523.2	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45523.3	E. producta	<input type="checkbox"/>	0	0	not work		Potomac RB, VA
45523.4	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45523.5	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45526.1	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				York RB, VA
45526.2	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				York RB, VA
45527.1	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45527.2	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45527.3	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45527.4	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45527.5	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45528.1	E. producta	<input type="checkbox"/>	<input type="checkbox"/>				Potomac RB, VA
45528.2	E. producta	<input type="checkbox"/>			being resequenced		Potomac RB, VA
45550.1	E. producta	<input type="checkbox"/>	0	0	not work		Rappahannock RB, VA
45550.2	E. producta	<input type="checkbox"/>	0	0	not work		Rappahannock RB, VA
45562	E. producta	<input type="checkbox"/>	0	0	not work		Rappahannock RB, VA
47085	E. producta				being resequenced		Potomac RB, VA
47086.1	E. producta				being resequenced		Potomac RB, VA
47086.2	E. producta				being resequenced		Potomac RB, VA
47087	E. producta				being resequenced		Potomac RB, VA
47093.1	E. producta	<input type="checkbox"/>	0	0	not work		Rappahannock RB, VA
47093.2	E. producta	<input type="checkbox"/>	0	0	not work		Rappahannock RB, VA

47093.3	E. producta	0	0	not work	Rappahannock RB, VA
47094.1	E. producta	0	0	not work	Potomac RB, VA
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47094.3	E. producta	0	0	not work	Potomac RB, VA

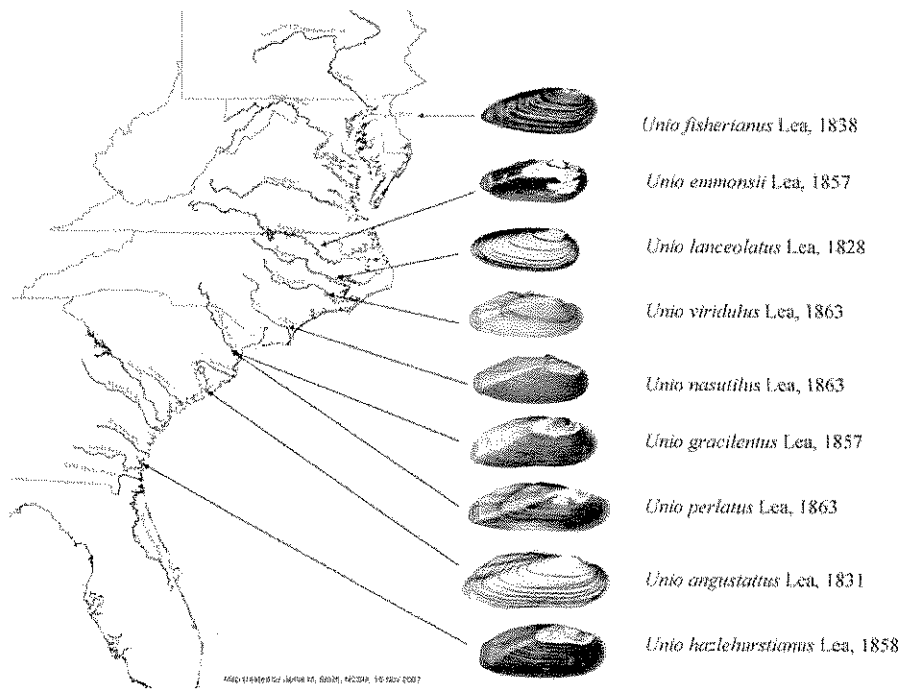


Figure 1. This is an illustration of the various named lanceolate forms on the Atlantic Slope, not including the Savannah and Altamaha River taxa. The figures are the lithographs provided at the time of description or shortly there after by the author.

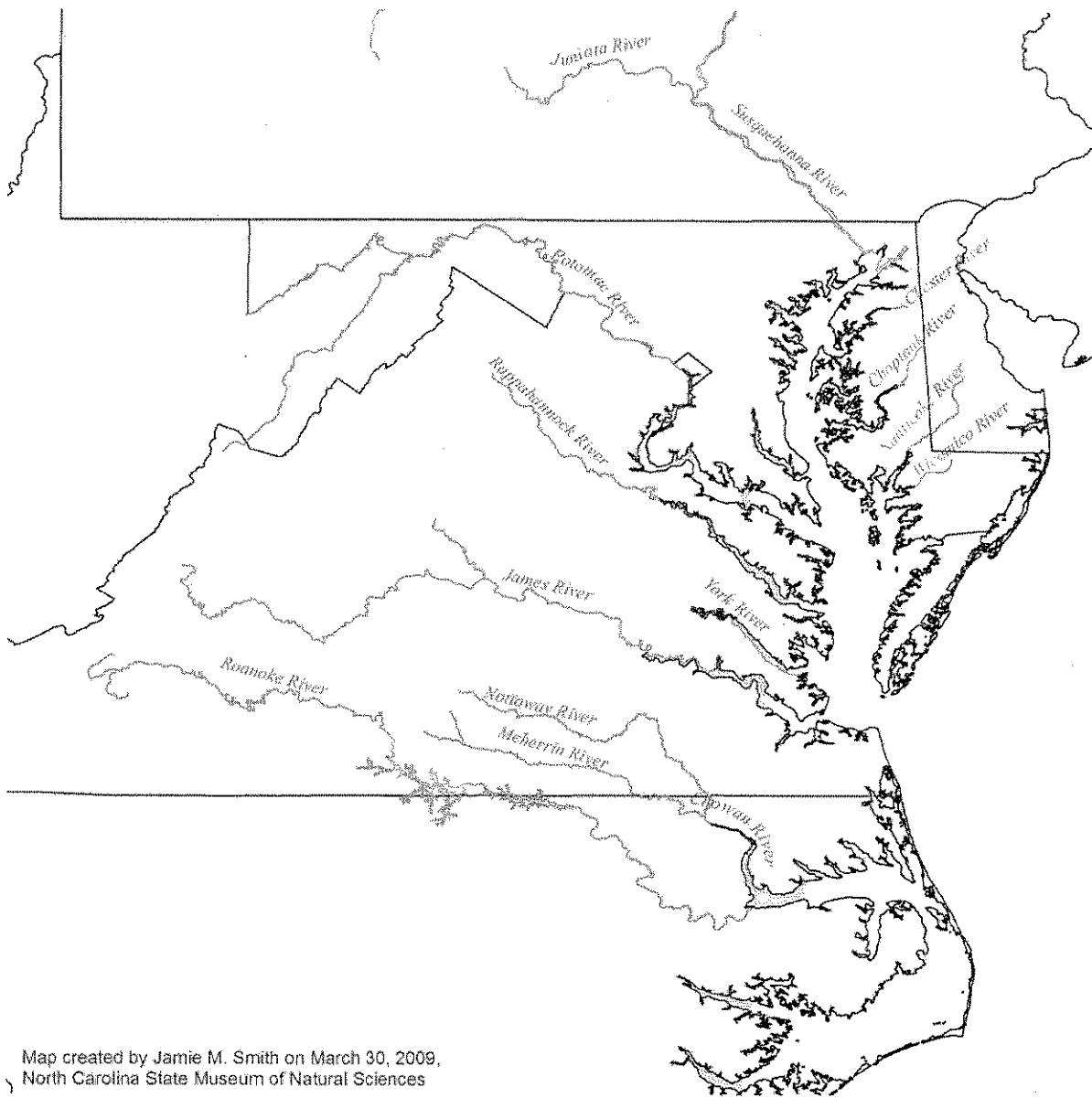


Figure 2. Major river basins of Virginia.

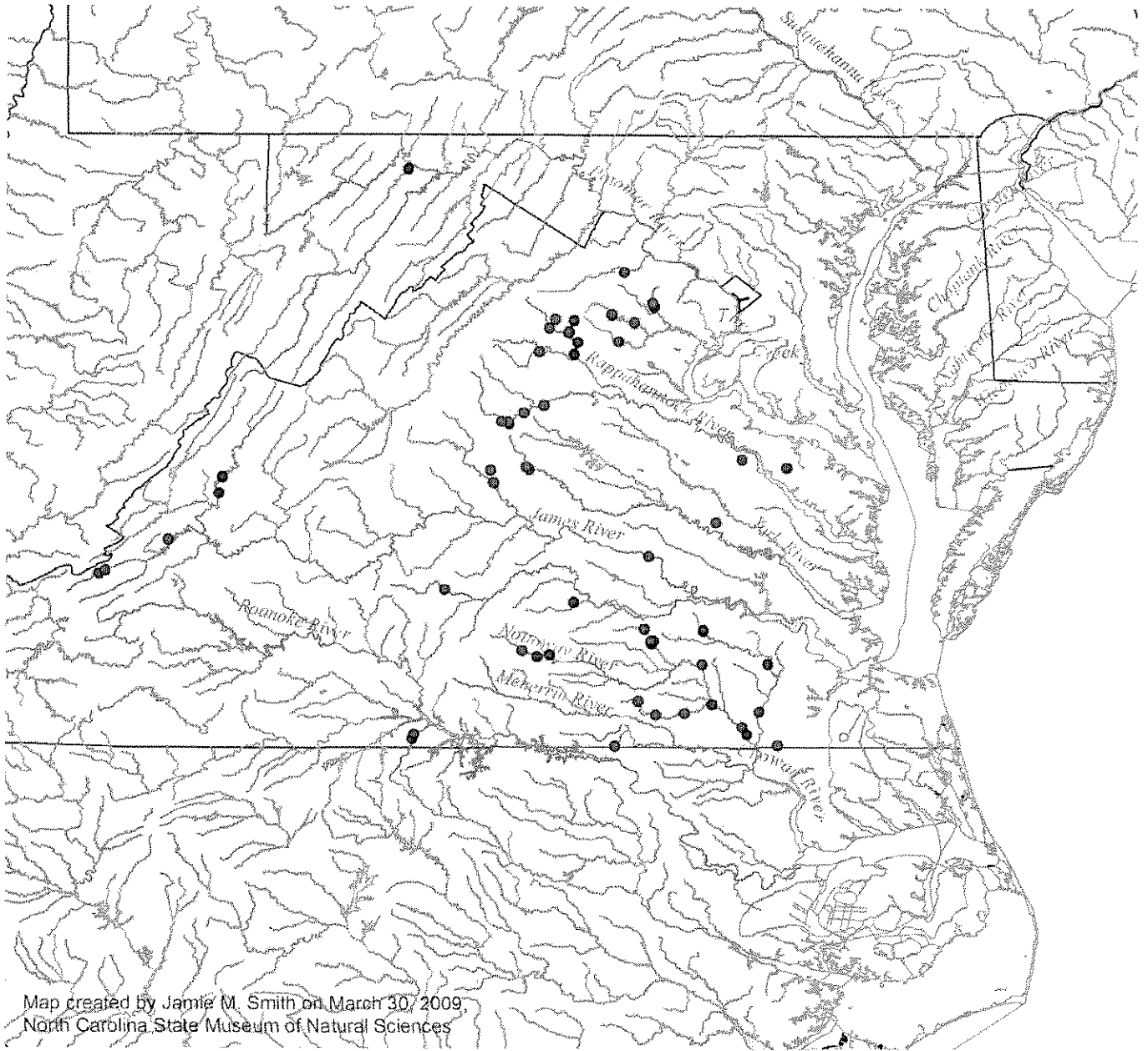


Figure 3. Distribution of collections from Virginia used in these analyses

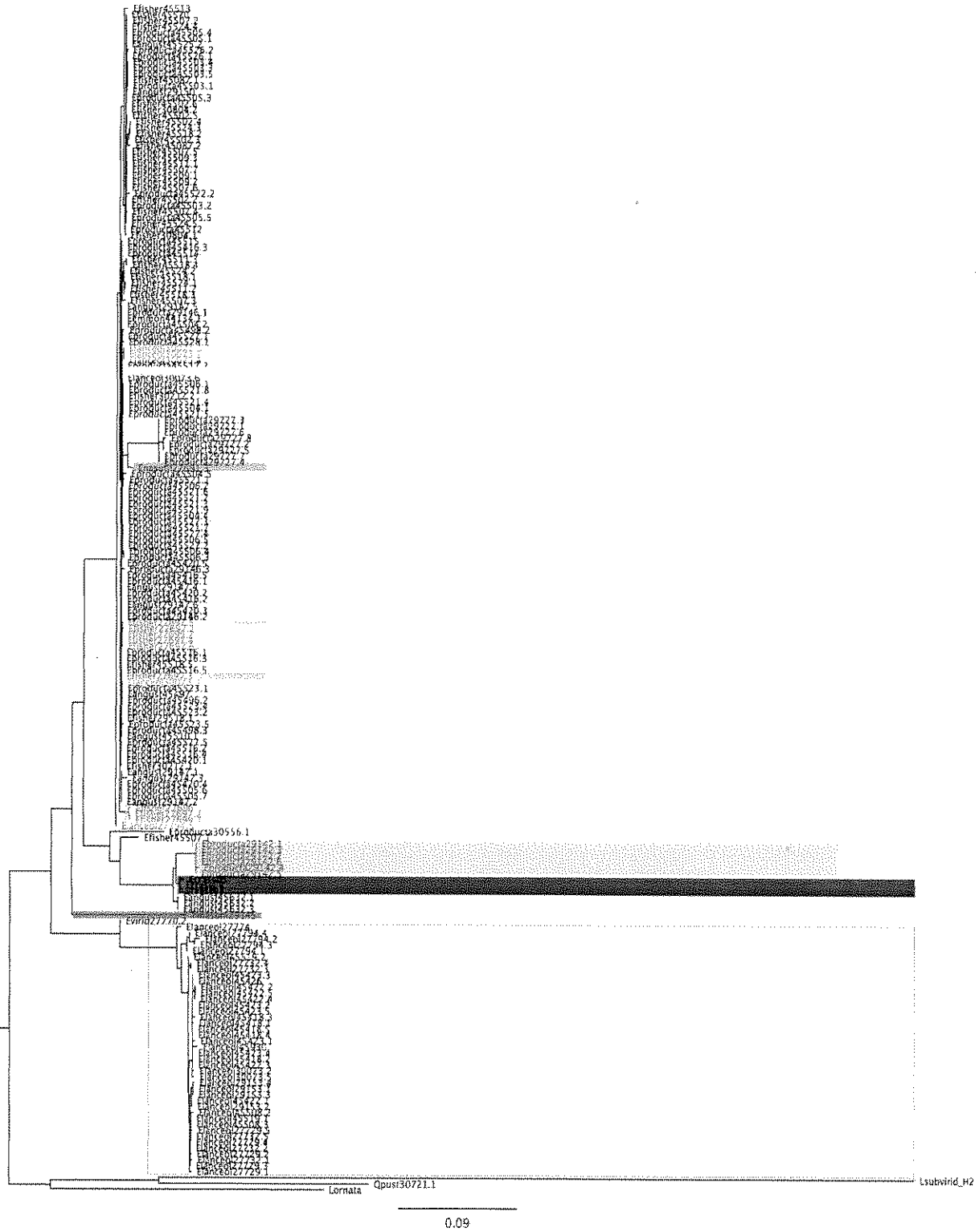


Figure 4. Combined COI and ND1 analyses of the lanceolate *Elliptio* in a framework of *Elliptio* species. Out group taxa include *Fusconaia masoni* [Fmasoni] in blue, *Lampsilis ornata* [Lornata], *Quadrula pustulosa* [Qpust], *Lasmigona subviridis* [L subvirid]. Ingroup taxa include: *Elliptio angustata* [Eangust] but not topotypic specimens, *Elliptio lanceolata* [Elanceol] are colored yellow, *Elliptio crassidens* [Ecrass] in purple, topotypic *Elliptio producta* [Eproducta] in orange, topotypic *Elliptio fisheriana* [Efisher] in green, topotypic *Elliptio nasutilus* [Enasutil] in red, topotypic *Elliptio viridulus* [Evirid].

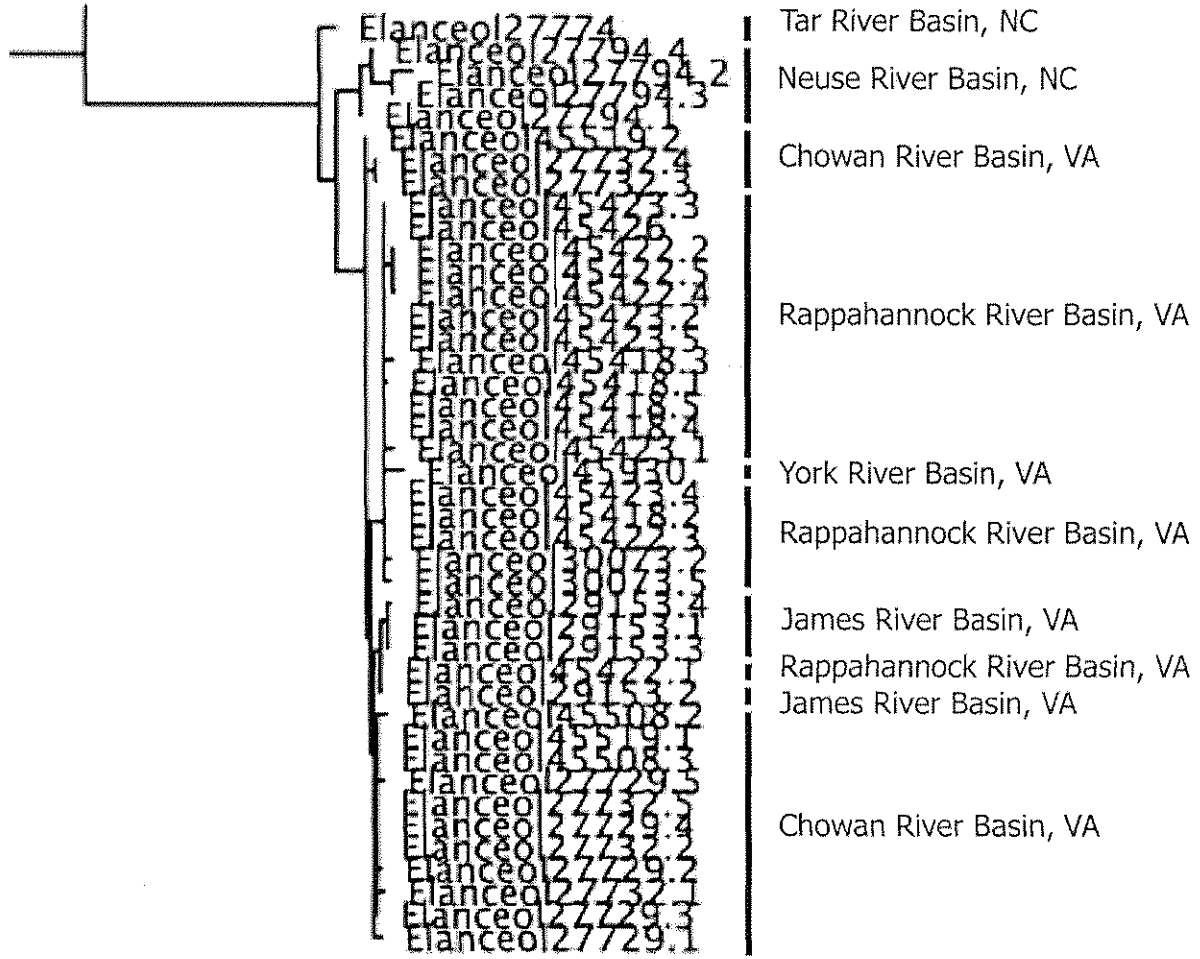


Figure 5. Expanded section of Figure 4 illustrating relationships of specimens from six river basins throughout the known range of *Elliptio lanceolata*.

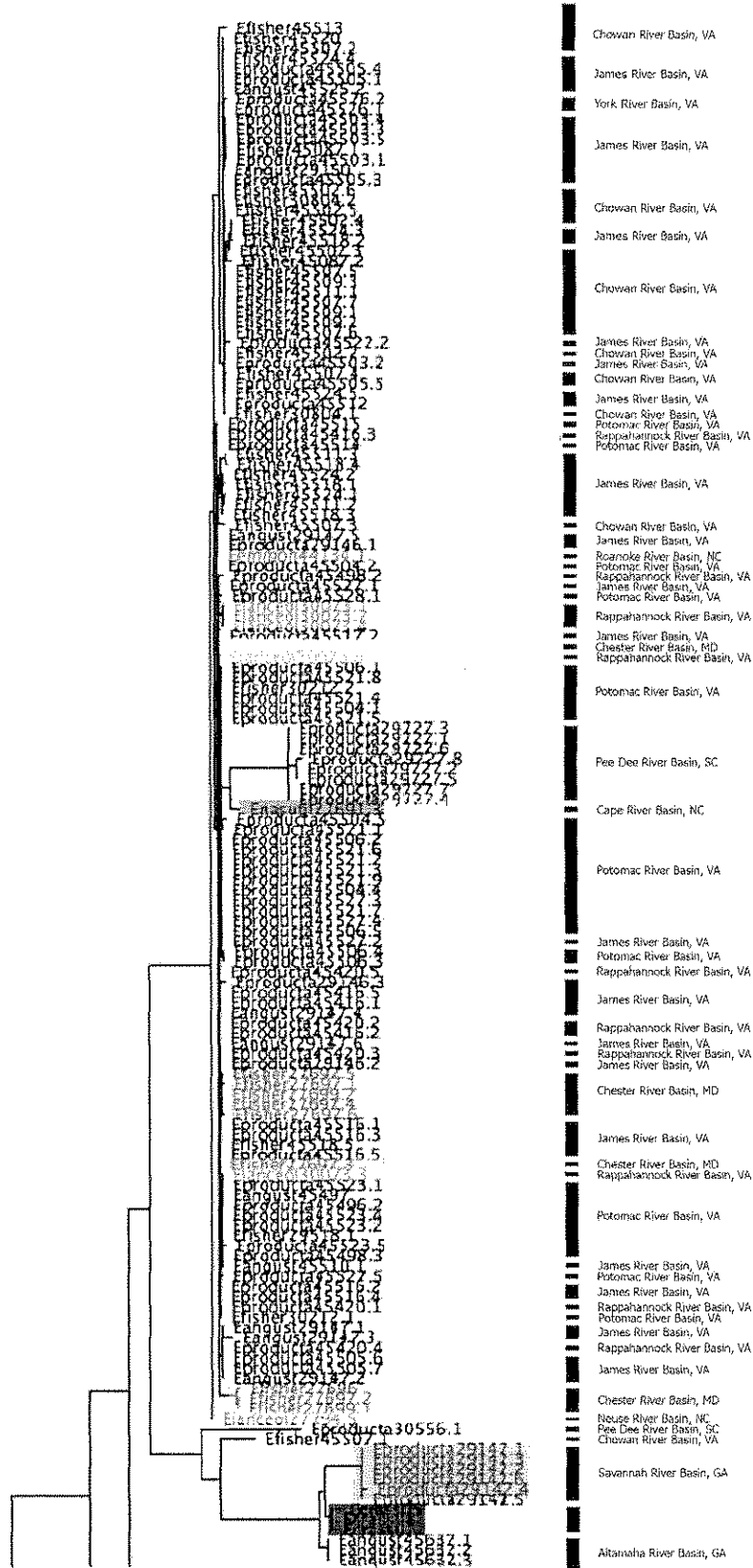


Figure 6. Expanded section of Figure 4 illustrating relationships of lanceolate *Elliptio* specimens from six river basins in Virginia, including topotypic specimens of *Elliptio emmonsi* [Emmon] in blue, *Elliptio producta* [Eproducta] in orange, topotypic *Elliptio fisheriana* [Efisher] in green, topotypic *Elliptio nasutillus* [Enasutill] in red, and identified specimens of *Elliptio angustata* [Eangust] from the Altamaha River, GA but did not include topotypic specimens from the Cooper River, SC,