

Results of the Twelfth Annual HerpBlitz: Hidden Valley Wildlife Management Area

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Abstract: Hidden Valley Wildlife Management Area was surveyed 9-11 June 2017 by up to seven volunteers (Table 1). Due to the limited roads, we were able to access only about 25% of the total area, on the western side of the WMA. During the survey, a total of 404 animals comprising fifteen species of amphibians (four anuran species and eleven species of salamanders), and five species of reptiles (all snakes) were documented. No new county records were found, however, a new locality for the green salamander is reported. Due to the high elevation of the WMA, the survey was heavily weighted towards amphibians, particularly salamanders.

Key words: Herpetological Survey, Hidden Valley WMA, Washington County, *Aneides aeneus*

INTRODUCTION

Hidden Valley Wildlife Management Area (HVWMA) is a large, 2590 hectare, high elevation property in the Valley and Ridge Physiographic Province. It is north of Abingdon, Virginia along the northern border of Washington County. The highest elevation exceeds 1280 m (4200 feet) along the ridge of Brumley Mountain at the western edge of the WMA. The 25 hectare (60 acre) Hidden Valley Lake lies in the valley north of Brumley Mountain (see Figure 1) at an elevation of about 1100 m (3600 feet). Due to its high elevation, HVWMA is cooler and wetter than surrounding regions, with an annual rainfall of 107 cm (42 inches). Hidden Valley Lake was formed by damming Brumley Creek, the major stream passing through the WMA. Brumley Creek originates near the lake and flows into the North Fork of the Holston River. The valley through which Brumley Creek flows is underlain by carbonate rocks which are easily eroded. The surrounding ridges, including Brumley Mountain, are composed of the more resistant sandstones and quartzites (Blevins et al., 2017).

The WMA has a steep topography which has severely limited the ability to build roads and make the area accessible. There is only one 3.5 km primary road (Co. Rt. 690) into the WMA and one 1 km secondary road (Skycraft Road) seasonally

open. The majority (94%) of the WMA is forested, with less than 40 ha consisting of open ground. HVWMA was purchased in 1961. The virgin forest was timbered in the late 1930s, so it now consists of 80-90 year old second growth hardwoods. The primary deciduous trees are Oaks, Hickories, Maples, Beech, Basswood, Tulip Poplar, Birches, Locust and Cherry. There are also some evergreen species, including Hemlock, Red Spruce and White Pine. There have been few surveys of any of the flora or fauna in HVWMA although a Forest Inventory is proposed to be completed by 2020. No tiered species have been confirmed within the WMA. There are some small-scale timbering operations planned, to increase early successional habitats needed for several birds. Finding any tiered species would influence future management plans, such as where the timbering operations would occur (Blevins et al., 2017).

HVWMA was surveyed 9-11 June 2017 by up to seven volunteers from the VHS. Due to the limited roads, we were able to access only about 25% of the total area, on the western side of the WMA. HVWMA is probably the most heavily used WMA any of the volunteers have ever visited. The lake is used for fishing and kayaking. There are also hunting and hiking opportunities, although we were not present during any of the hunting seasons. There is an adjacent rock cliff that is frequently

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used by the Hidden Valley Carolina Climbing Coalition for rock climbing. HVWMA is part of a string of public lands running along northern Washington County. The Jefferson National Forest lies to the west and Clinch Valley Wildlife Management Area is to the east.

Survey Sites

The following is a general description of the survey sites. GPS coordinates were provided either by direct measurement or from Google Earth. Refer to Figure 1 for a map of the WMA with the sites indicated.

Site 1: The top of Brimley Ridge at Microwave Towers, west of Skycraft Road. A hardwood forest composed mostly of Maple, Hickory, Scarlet Oak, Hemlock and Rhododendron. ($36^{\circ} 49' 14''$ N; $82^{\circ} 04' 38''$ W; approximate elevation 1200 m). Site 1 was surveyed on 9 June.

Site 2: The top of Brimley Ridge west of Skycraft Road. A hardwood forest composed mostly of Maple, Hickory, and Scarlet Oak. An understory consisted of Cinnamon Fern, Raspberry, Galax, Squaw Root and May Apple. ($36^{\circ} 50' 03.0''$ N; $82^{\circ} 04' 50.0''$ W). Site 2 was surveyed on 10 June.

Site 3: The eastern end of the Wildlife Management Area, known as "The Butt". A rocky slope leading to large relatively flat rock walls at least 20 m tall. A hardwood forest consisting of

Scarlet Oak, Sugar and Red Maple, and Hickory. The understory included Ferns, Sassafras and Green Brier. ($36^{\circ} 50' 01''$ N; $82^{\circ} 05' 23''$ W). Site 3a was surveyed at 1200 h on 10 June and at 2100 h for site 3b.

Site 4: The slope above Co. Rt. 690 near the western end of Hidden Valley Lake, following a small stream up the slope. A hardwood forest consisting of Scarlet Oak, Maple, and Hickory. ($36^{\circ} 50' 21.1''$ N; $82^{\circ} 05' 06.8''$ W). Site 4 was surveyed on 10 June.

Site 5: A forested slope at the eastern end of Hidden Valley Lake, following Long Arm Hollow, including several small streams. A hardwood forest including Tulip, Scarlet Oak, Maple, Hemlock and Hickory. The understory included Striped Maple and Squaw Root. ($36^{\circ} 50' 55.1''$ N; $82^{\circ} 04' 20.0''$ W). This was one of the lower elevation sites, starting at about 1100 m. Site 5 was surveyed on 10 June.

Site 6: Along the shore of Brumley Creek, which is dammed to form Hidden Valley Lake. We followed Brumley Creek to the west. A hardwood forest consisting of Maple, Hemlock, Scarlet Oak, Cucumber Magnolia, Tulip, and extensive Rhododendron thickets. The understory included Sassafras, Striped Maple, Squaw Root, Trillium, Christmas Ferns, Club Moss, and Indian Pipe. ($36^{\circ} 51' 04''$ N; $82^{\circ} 03' 55.7''$ W). Site 6 was surveyed on 11 June.

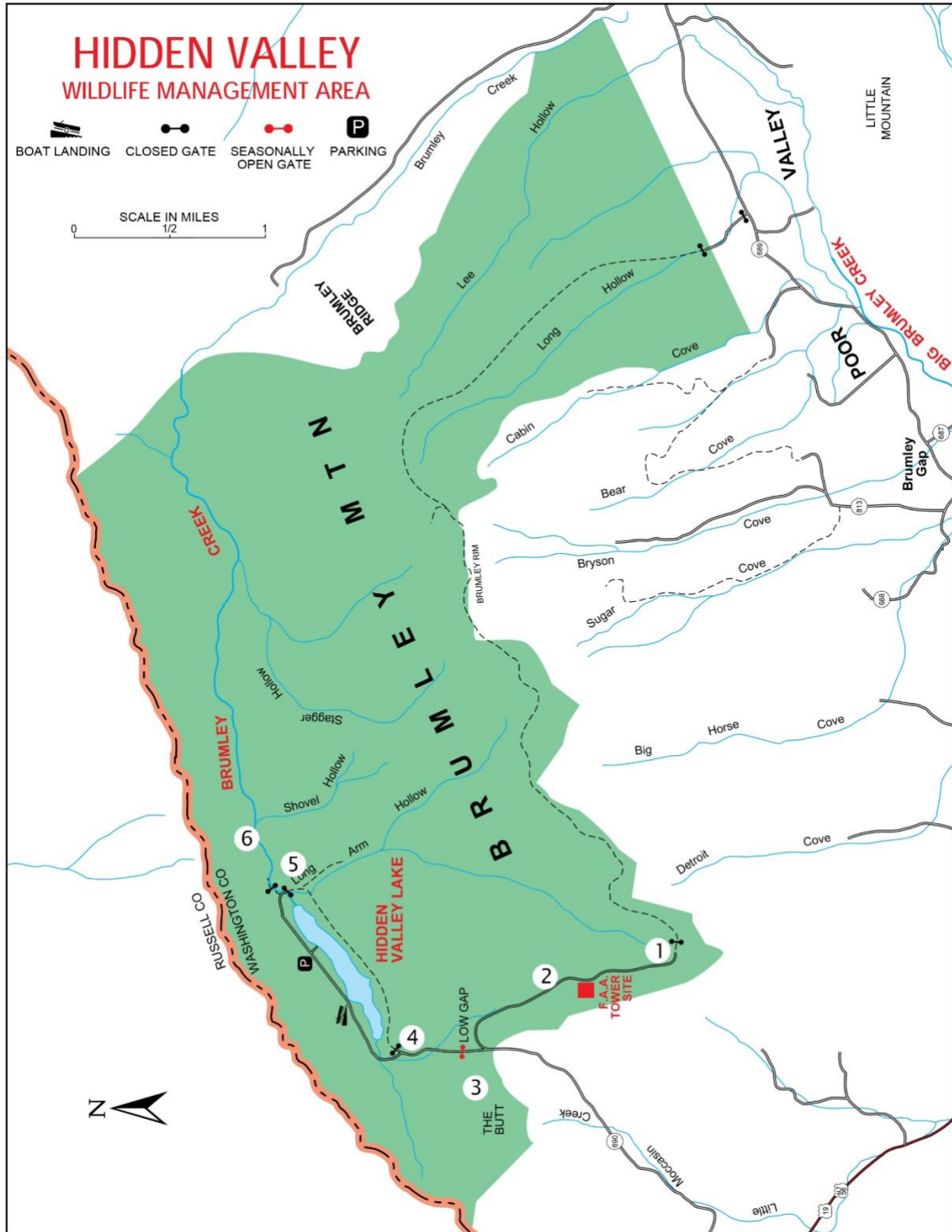


Figure 1. Hidden Valley Wildlife Management Area with six survey sites indicated.

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MATERIALS AND METHODS

The following techniques were used by surveyors during the weekend survey: hand capture, visual observations, turning but replacing cover objects such as logs and rocks, and listening for calling anurans, both at day and at night. Animals hand captured were examined visually for malformations, diseases, injury, and parasites. Animals were released at the site of capture. Digital photos were taken as vouchers for species. Data sheets were kept with information on each animal and the microhabitat where the animal was found. The data sheets were deposited in the VHS Archive. Table 1 below gives a summary of how much time was spent at each survey site. Five turtle hoop traps and two crayfish traps, baited with sardines, were set in the streams, beaver ponds and marshes on the western end of Hidden Valley Lake. The identity of several slimy salamanders (*Plethodon glutinosus* complex) were determined using protein electrophoresis following the methods of Highton et al. (1989).

Table 1. Summary of work effort at the different sites sampled during the Hidden Valley Wildlife Management Area Survey.

Site	No. Surveyors	Hours	Person Hours
1	2	0.75	1.5
2	6	0.83	5
3a	6	0.83	5
3b	4	2.0	8
4	6	0.67	4
5	6	1.25	7.5
6	4	2.17	8.7

RESULTS

During the survey, a total of 404 animals comprising fifteen species of amphibians (four anuran species and eleven species of salamanders), and five species of reptiles (all snakes) were documented. Table 2 below summarizes information from each of the surveyed sites.

Table 2. Amphibians and Reptiles observed at Hidden Valley WMA.

Species/Site	1	2	3a	3b	4	5	6	Misc.	Total
<u>Amphibians</u>									
<i>Lithobates catesbeianus</i>								1C	1
<i>Lithobates clamitans</i>								4C	4
<i>Lithobates palustris</i>								1	1
<i>Pseudacris crucifer</i>								10C	10
<i>Aneides aeneus</i>				3					3
<i>Desmognathus fuscus</i>					3	4	2		9
<i>Desmognathus monticola</i>						5			5
<i>Desmognathus ochrophaeus</i>	10	20	15	25	19	19	47		155
<i>Eurycea cirrigera</i>					1	1	1		3
<i>Gyrinophilus p. porphyriticus</i>					1				1
<i>Notophthalmus v. viridescens</i>								2	2
<i>Plethodon cinereus</i>	6	14	18	6		3	7		54
<i>Plethodon glutinosus</i>		2	7	26	3	3	2		43
<i>Plethodon montanus</i>	16	25	23	27	9		1		101
<i>Pseudotriton ruber</i>						1	2		3

<u>Reptiles</u>											
<i>Diadophus punctatus edwardsii</i>									1	1	
<i>Lampropeltis t. triangulum</i>									1	1	
<i>Nerodia s. sipedon</i>						3	2			5	
<i>Pantherophis alleghaniensis</i>									1DOR	1	
<i>Thamnophis s. sirtalis</i>									1DOR	1	
Total			32	61	36	88	63	39	64	21	404

ANNOTATED CHECKLIST

Amphibians

1. *Lithobates catesbeianus* (American Bullfrog)
A single adult male American Bullfrog was heard calling from Hidden Valley Lake on the morning of 11 June.

2. *Lithobates clamitans* (Green Frog)
A chorus of at least four Green Frogs was heard on the evening of 9 June from the marshy western end of Hidden Valley Lake.

3. *Lithobates palustris* (Pickerel Frog)
A single adult Pickerel Frog was seen on the marshy western end of Hidden Valley Lake while setting turtle hoop traps.

4. *Pseudacris crucifer* (Spring Peeper)
A large chorus of Spring Peepers was heard on the evening of 9 June from the marshy western end of Hidden Valley Lake. The chorus was continuous with overlapping calls.

5. *Aneides aeneus* (Green Salamander) Three Green Salamanders were seen on the evening of 10 June from the rocky cliffs at The Butt (site 3b). One was in a crevice of the rock. One was out on the rock surface; and a gravid female was in a small hole-like depression in the rock surface. There had not been rain for at least the past two days, however, at some places on the rock surface there was a small drip of water down the surface of the rock wall.

6. *Desmognathus fuscus* (Northern Dusky Salamander) A total of nine Northern Dusky Salamanders were found in several streams going into or flowing from Hidden Valley Lake (sites 4,

5 and 6). They were under rocks or logs very near, or in, the water.

7. *Desmognathus monticola* (Seal Salamander)
We saw three Seal Salamanders in a stream flowing into Hidden Valley Lake, quite near the entrance of the stream into the lake (site 5). Most were under rocks in the water.

8. *Desmognathus ochrophaeus* (Alleghany Mountain Dusky Salamander) This was the most commonly encountered salamander during the survey. They were found at every site examined. They were present under rocks, logs and loose bark on the ground. Some were found quite near streams. Others were found at high elevations on the ridges of Brumley Mountain, far from any source of water. Large adults were typically melanistic, or all black. Smaller individuals were quite varied in their coloration. Some had yellow, red-brown or red irregular marks on their back. One from site 3b had irregular yellow-green marks on the back, reminiscent of a Green Salamander.

9. *Eurycea cirrigera* (Southern Two-lined Salamander) Three Southern Two-lined Salamanders were found, one each at sites 4, 5 and 6. Two were at least 10 m from a stream, one was under the rock of a fire pit and one under a log. The third was closer to water, under a log.

10. *Gyrinophilus p. porphyriticus* (Northern Spring Salamander) A single large larval Spring Salamander was found under a rock in a stream at site 4.

11. *Notophthalmus v. viridescens* (Eastern Red-spotted Newt) Two adult Red-spotted Newts were observed incidentally. One was in one of the beaver ponds in the marshy western end of Hidden

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Valley Lake, seen while setting turtle hoop traps on 9 June. The other was seen in the lake itself near the shore while waiting for members to gather the morning of 10 June. No efts were seen in the woods surrounding the Lake.

12. *Plethodon cinereus* (Red-backed Salamander) The Red-backed Salamander was a commonly observed salamander at all sites except site 4. They were found under rocks, logs and loose bark. All but one was the red-backed color morph. Only a single “lead-back” was seen and confirmed by the ventral coloration.

13. *Plethodon glutinosus* (Northern Slimy Salamander) The Northern Slimy Salamander was found at all sites except site 1. They were found under rocks and logs on the forest floor.

14. *Plethodon montanus* (Northern Gray-cheeked Salamander) The Northern Gray-cheeked Salamander was the second most-commonly observed animal on the HerpBlitz. It was found at every site except site 5, which was the lowest elevation site visited. They were typically found under logs, but were also found under rocks, under loose bark on the ground, and loose bark on trees.

15. *Pseudotriton r. ruber* (Northern Red Salamander) Red Salamanders were found at two sites (5 and 6). The one from site 5 was a young adult found under a log, a considerable distance from the nearest stream. The second, from site 6, was a large larva found inside a sphagnum moss clump on the edge of a woodland vernal pool.

Reptiles

16. *Diadophis punctatus edwardsii* (Northern Ring-necked Snake) A single live, adult ring-necked snake was found, apparently foraging, on the evening of 10 June along the base of the cliffs at The Butt (site 3b). It had the complete neck band and the unspotted venter of the Northern Ring-necked Snake.

17. *Nerodia sipedon* (Northern Watersnake) Five watersnakes were seen at the north end of Hidden

Valley Lake. Specimens were observed but went into the water before they could be captured.

18. *Lampropeltis t. triangulum* (Eastern Milksnake) A young Eastern Milksnake was found several days prior to the HerpBlitz under a rock in a small rocky outcrop near the east end of Hidden Valley Lake.

19. *Pantherophis alleghaniensis* (Eastern Ratsnake) A large, adult Eastern Ratsnake was found dead on Alternate Route 58, 1.1 km south of Co. Rt. 690 on the afternoon of 9 June, near the entrance to the WMA.

20. *Thamnophis s. sirtalis* (Eastern Gartersnake) An adult Eastern Gartersnake was found dead on Co. Rt. 690, 0.33 km from the kiosk at the entrance to the WMA on the morning of 11 June.

DISCUSSION

Our survey of Hidden Valley Wildlife Management Area yielded fifteen species of amphibians (four anurans and eleven salamanders) and five species of reptiles, all being snakes. This number of species is less than what was reported at a survey of the nearby Clinch River Mountain Wildlife Management Area. Pinder and Greenlee (1999) report finding 18 amphibians and 10 reptiles. The difference in species counts between the properties could be due to differences in the number of survey volunteers, environmental conditions, and number of microhabitats found on each property. An interesting similarity of the two surveys was that neither survey produced any observations of lizards. *Plestiodon fasciatus* and *Sceloporus undulatus* are the only species of lizards documented for Washington County (VAFWIS database). Due to the elevation, some biogeographical barrier or poor survey weather, lizards have not been documented for either property. Pinder and Greenlee (op. cit.) did report finding four species of turtles. Two of the turtles they reported, *Chelydra serpentina* and *Terrapene c. carolina*, have a state-wide distribution but

Apalone s. spinifera and *Graptemys geographica* are turtle species specifically associated with the Tennessee River watershed. Hidden Valley WMA has flowing through it Brumley Creek which discharges into the North Fork Holston then the Tennessee River. Despite this fact we were unable to record any species of turtles despite many hours of visual surveys and trapping with baited hoop turtle traps. Besides the above-mentioned turtles *Chrysemys p. picta* is documented for Washington County and *Sternotherus odoratus* has a state-wide distribution and is found in surrounding counties. More intensive trapping of the lake and streams of Hidden Valley WMA and more searching of terrestrial habitat may yield records of turtles. We report five species of snakes, one less than reported by Pinder and Greenlee (op. cit.). They found one additional snake, *Agkistrodon contortrix*. *Crotalus horridus*, *Opheodrys aestivus*, and *Regina septemvittata* are documented for Washington County and *Carphophis a. amoenus* and *Coluber c. constrictor* are found in surrounding counties. With additional searching these snakes in addition to other smaller fossorial snakes may be found at this wildlife management area property.

The VHS survey of Clinch River WMA found the same species of salamanders as we report for Hidden Valley with the exception of three additional species not found at Hidden Valley including *Cryptobranchus a. alleganiensis*, *Eurycea l. longicauda* and *Plethodon richmondi*. Hellbenders may be found in Hidden Valley with more intensive surveys or eDNA sampling. Brumley Creek is a large stream and may support juvenile Hellbenders. *Necturus m. maculosus* is documented in counties to the east, north, and west, and with the right sampling techniques may be found at Hidden Valley. *Desmognathus quadramaculatus*, *Plethodon ventralis*, and *Pseudotriton montanus diastictus* are three species already documented for Washington County. *Eurycea lucifuga* may be added to the salamander list for this property if proper habitat can be located and surveyed. *Hemidactylium scutatum*, which

has a state-wide distribution, may also be found. Hidden Valley WMA has many wet areas supporting large growths of *Sphagnum sp.* moss, a preferred habitat of Four-toed Salamanders. Despite finding phenotypically varied slimy salamanders a small sampling of salamanders genetically tested were all found to be *Plethodon glutinosus* and not *Plethodon kentucki*. We were unable to find any vernal pools which would support Ambystomid salamanders.

Future surveys may find vernal pools and may add these species: *Ambystoma maculatum*, *Ambystoma opacum* and *Ambystoma jeffersonianum*. We did search the highest elevation spots on the property and did not find any of the high-altitude species such as *Plethodon yonahlossee* and *Desmognathus organi*, which can be found on White Top and Mount Rogers. The prospects of finding such species is probably remote since Hoffman (1992) indicated that the Clinch Mountains had been extensively surveyed for *Plethodon yonahlossee*. The low number of documented anurans for Hidden Valley is comparable to the Clinch Mountain WMA survey. The Clinch Mountain WMA survey reported five species of anurans compared to our four. We found the same species with the exception of *Anaxyrus a. americanus*. Surveys during optimal breeding times should be able to increase the count for this group. Hoffman (1981) reported *Pseudacris brachyphona* to be abundant along highway 689 which borders the southern part of this property. He indicated in his 1981 paper that in this area *Pseudacris brachyphona* calls and lays eggs strictly from February to mid-April. Common species such as *Hyla chrysoscelis*, *Lithobates sylvaticus*, and *Pseudacris feriarum* have been documented for the county and could be potentially found on Hidden Valley property. *Anaxyrus fowleri* has been documented in surrounding counties.

Hidden Valley WMA is found in an interesting biogeographical area. It is a large piece of property and we were only able to survey a small portion of

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it. Future surveys to this area are warranted and may yield many new records.

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