

Tyler Fritz

GEOG 483: Lesson 3

GIS and Emergency/Disaster Management

Lesson Goals

This lesson aims to educate students on how to implement buffer zones and perform other overlay analysis operations. Some actions required in this lesson include: attribute table manipulations, implementing buffers around line and polygon features, performing attribute and spatial queries, performing spatial overlay operations, and creating summary thematic maps.

Project Summary

This lesson's goals are taught through further manipulation of the tornado data provided in Lesson 2. The GIS operations taught in this lesson are used to manipulate and analyze this data in an effort to produce informational thematic maps which would assist in identifying high-priority areas for emergency disaster relief in Alabama as well as identifying candidate sites for relief coordination within those areas.

Two questions to be answered in this project are:

- 1) Which public facilities near the affected areas represent candidate emergency relief sites?
- 2) Which of the affected areas are likely to have the greatest need for emergency relief?

Discussion

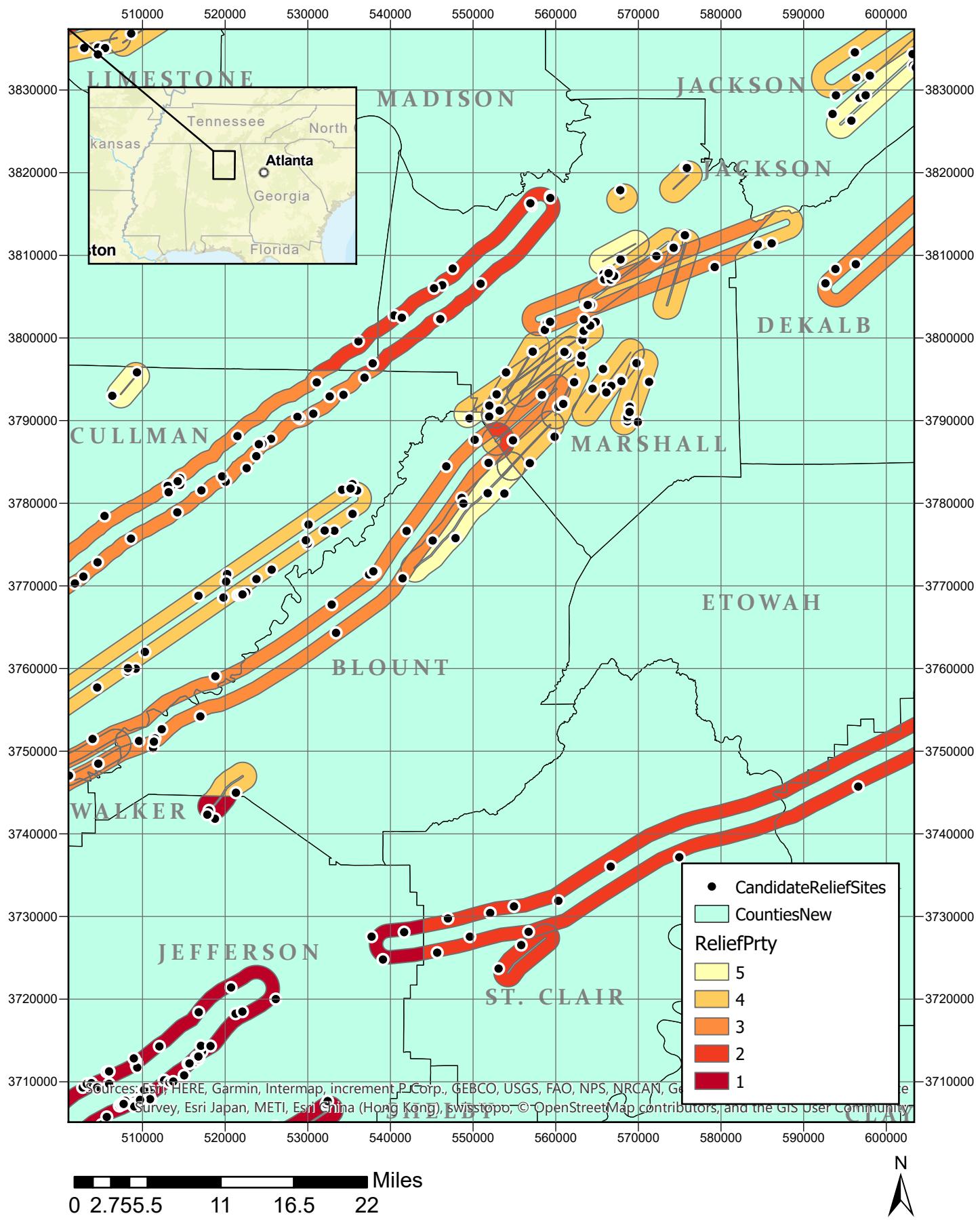
The thematic maps in this lesson are produced by first determining relief zones based upon a one mile buffer area that follows the paths of each tornado that passed through Alabama. These relief zones were then divided by either county or census tract subdivisions which we're then graded into priority levels based upon the tornado Fujita Scale and the population density of that subdivision. In each Map, candidate relief sites were identified within these buffer zones by a query selecting churches, schools, and hospitals within this zone from a layer of various places of interest in Alabama.

Map 1 indicates the thematic map produced when dividing relief areas into various priorities based upon the population density of counties. One limitation of this method of determining priority relief zones is that it assumes that population density is constant throughout the county, when in fact there will locations within the county (urbanized areas) which are population centers. Identifying relief priority zones would be much more effective if there was a greater resolution in determining areas of population density. Fortunately, this data has been provided in previous lessons as census tract data, which when utilized produced the Try This! Map 2. This greater resolution will particularly help in coordinating relief within high population density counties like Jefferson County. Map 1 shows that the entire relief zone swath through this county is highest priority, while Map 2 indicates that in actuality there are specific areas within Jefferson county that need emergency relief the most.

Other considerations in these analyses revolve around how relief priority is calculated. There could be further factors accounted for such as building types or availability of nearby tornado shelters to help better classify relief priority. Also, there is not a factor accounting for the cumulate effect of tornados in a single area. Should an area hit by three F3's need more aid than an area hit by a single F4? Also, factors should be added to update the map temporally as aid is deployed so that resources are spread out most effectively and not just dumped in excess to areas identified as highest priority at the beginning of the assessment.

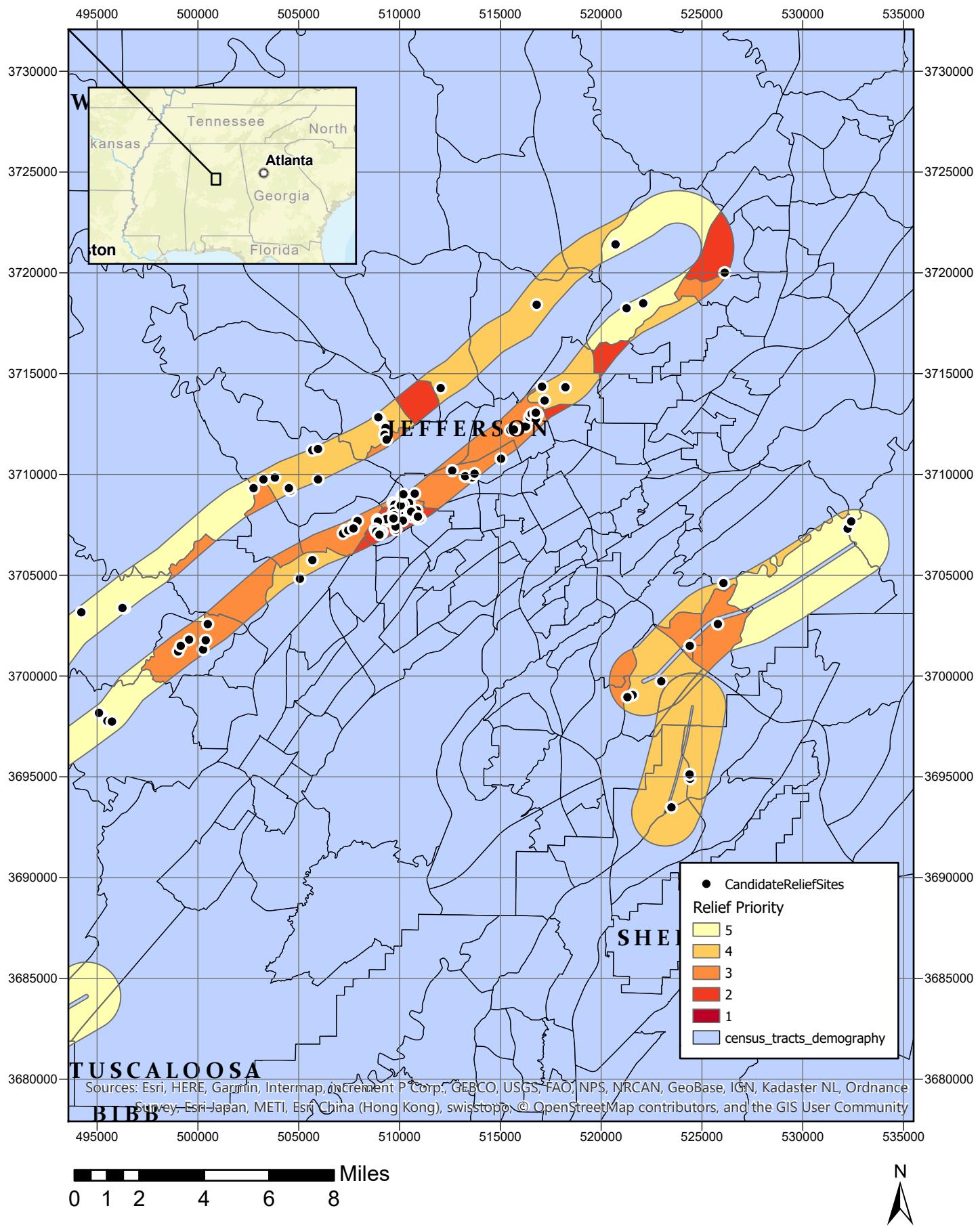
Map 1

Description: Candidate relief sites within relief priority zones determined by county demographics in northeast Alabama



Map 2 - Try This!

Description: Candidate relief sites within relief priority zones determined by census tracts in Jefferson County



CandidateReliefSites																				
Field:		Add	Delete	Calculate	Selection:															
		Zoom To	Switch	Clear	Delete	Copy														
OBJECTID	Shape	FEATURE_ID	FEATURE_NA	FTYPE	State_Fips	Cnty_Fips	STATE_ALPH	STATE_NUME	COUNTY_NAM	COUNTY_NUM	PRIM_LAT_D	PRIM_LONG1	ELEV_IN_M	ELEV_IN_FT	MAP_NAME	DATE_CREAT	DATE_EDITE			
1	Point	112922	Adams Memorial Ch...	Church	01	059	AL	1	Franklin	59	34.331764	-87.795031	287	942	Hackleburg	12/1/2003	12/30/1899			
2	Point	112966	Elvester Baptist Church	Church	01	009	AL	1	Blount	9	33.844823	-86.769717	167	548	Warrior	12/1/2003	12/30/1899			
3	Point	113112	Antioch Baptist Chur...	Church	01	125	AL	1	Tuscaloosa	125	33.281781	-87.104717	193	633	McCalla	12/1/2003	12/30/1899			
4	Point	113153	Antioch Church	Church	01	107	AL	1	Pickens	107	33.001516	-88.246698	62	203	Aliceville South	9/4/1980	12/30/1899			
5	Point	113163	Antioch Missionary B...	Church	01	043	AL	1	Cullman	43	33.940381	-87.032781	204	669	Cold Springs	12/1/2003	12/30/1899			
6	Point	113168	Antioch Baptist Chur...	Church	01	009	AL	1	Blount	9	34.119263	-86.510822	269	883	Blountsville	12/1/2003	12/30/1899			
7	Point	113170	Antioch Freewill Bapt...	Church	01	093	AL	1	Marion	93	34.211211	-87.907532	232	761	Hamilton	9/4/1980	11/27/2006			
8	Point	113177	Antioch Baptist Chur...	Church	01	089	AL	1	Madison	89	34.829534	-86.570549	234	768	Meridianville	12/1/2003	12/30/1899			
9	Point	113199	Arbor Springs Baptist...	Church	01	125	AL	1	Tuscaloosa	125	33.418726	-87.601674	121	397	Lake Tuscaloosa North	12/1/2003	12/30/1899			
10	Point	113210	Arkwright Church	Church	01	117	AL	1	Shelby	117	33.353166	-86.388868	129	423	Harpersville	9/4/1980	12/30/1899			
11	Point	113319	Azbeth Church	Church	01	073	AL	1	Jefferson	73	33.825657	-86.804995	189	620	Warrior	9/4/1980	12/30/1899			
12	Point	113385	Baker Grove Church	Church	01	117	AL	1	Shelby	117	33.348722	-86.383312	128	420	Harpersville	9/4/1980	12/30/1899			
13	Point	113454	Baptist Retreat Church	Church	01	065	AL	1	Hale	65	32.790685	-87.701954	63	207	Sawyerville	9/4/1980	12/30/1899			
14	Point	113529	Barton Grove Church	Church	01	127	AL	1	Walker	127	33.828995	-87.14528	128	420	Cordova	9/4/1980	12/30/1899			
15	Point	113534	Bartons Chapel	Church	01	127	AL	1	Walker	127	33.773717	-87.150001	94	308	Cordova	9/4/1980	12/30/1899			
16	Point	113817	Beech Grove Church	Church	01	133	AL	1	Winston	133	34.202044	-87.608912	229	751	Haleyville East	9/4/1980	12/30/1899			
17	Point	113943	Berea Church of Christ	Church	01	057	AL	1	Fayette	57	33.849272	-87.727519	129	423	Hubbertville	9/4/1980	1/19/2007			
18	Point	113945	Berea Church	Church	01	089	AL	1	Madison	89	34.750646	-86.74222	239	784	Jeff	9/4/1980	12/30/1899			
19	Point	113983	Bethabara Baptist Ch...	Church	01	125	AL	1	Tuscaloosa	125	33.376227	-87.705011	146	479	Gin Creek	12/1/2003	12/30/1899			
20	Point	113984	Bethabara Church	Church	01	057	AL	1	Fayette	57	33.691222	-87.576398	178	584	Berry	9/4/1980	12/30/1899			
21	Point	113994	Bethany Church	Church	01	107	AL	1	Pickens	107	33.048736	-88.126137	43	141	Aliceville South	9/4/1980	12/30/1899			
22	Point	114065	Bethel Church	Church	01	127	AL	1	Walker	127	33.643444	-87.409171	171	561	Oakman	9/4/1980	12/30/1899			
23	Point	114072	Bethel Church of God	Church	01	043	AL	1	Cullman	43	33.876769	-86.949722	113	371	Arkadelphia	12/1/2003	12/30/1899			
24	Point	114084	Bethel Church of Chr...	Church	01	083	AL	1	Limestone	83	34.765368	-86.873059	209	686	Capshaw	9/4/1980	7/31/2006			
25	Point	114712	Bond Chapel	Church	01	095	AL	1	Marshall	95	34.264539	-86.344705	299	981	Guntersville	9/4/1980	12/30/1899			
26	Point	114780	Bowman's Chapel M...	Church	01	043	AL	1	Cullman	43	34.080934	-86.969171	165	541	Trimble	12/1/2003	12/30/1899			
27	Point	114912	Brier Fork Church	Church	01	089	AL	1	Madison	89	34.820368	-86.491379	229	751	Maysville	9/4/1980	12/30/1899			
28	Point	115066	Brushy Creek Church...	Church	01	043	AL	1	Cullman	43	34.073435	-86.980282	156	512	Trimble	9/4/1980	1/19/2007			
29	Point	115076	Bryan Presbyterian M...	Church	01	117	AL	1	Shelby	117	33.380387	-86.747488	164	538	Cahaba Heights	9/4/1980	1/19/2007			
30	Point	115416	Calvary Church	Church	01	073	AL	1	Jefferson	73	33.422055	-87.051661	159	522	Concord	9/4/1980	12/30/1899			
31	Point	115425	Cambell Chapel	Church	01	071	AL	1	Jackson	71	34.834527	-85.877477	187	614	Wannville	9/4/1980	12/30/1899			
32	Point	115526	Canaan United Meth...	Church	01	077	AL	1	Lauderdale	77	34.830644	-87.869199	153	502	Sinking Creek	9/4/1980	1/19/2007			
33	Point	115792	Cedar Grove Church	Church	01	009	AL	1	Blount	9	34.228428	-86.45332	220	722	Brooksville	9/4/1980	12/30/1899			
34	Point	115795	Cedar Grove Church	Church	01	071	AL	1	Jackson	71	34.881193	-85.816919	187	614	Doran Cove	9/4/1980	12/30/1899			
35	Point	115871	Center Star Missionar...	Church	01	071	AL	1	Jackson	71	34.870638	-85.823586	185	607	Stevenson	9/4/1980	11/27/2006			
36	Point	115874	Center Hill Methodis...	Church	01	043	AL	1	Cullman	43	34.122322	-86.906669	177	581	Trimble	12/1/2003	12/30/1899			
37	Point	115890	Central Church	Church	01	095	AL	1	Marshall	95	34.247316	-86.240534	315	1033	Boaz	9/4/1980	12/30/1899			
38	Point	115920	Chalybeate Springs C...	Church	01	079	AL	1	Lawrence	79	34.549538	-87.244186	214	702	Caddo	9/4/1980	12/30/1899			
39	Point	115946	Chaney Chapel Chur...	Church	01	071	AL	1	Jackson	71	34.622863	-85.930809	422	1384	Dutton	9/4/1980	12/30/1899			
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