

Using Interactive Maps to Analyze USDA Food Assistance Programs

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Paper Abstract

USDA's Economic Research Service (ERS) provides research in five emphasis areas--a competitive agricultural system, a safe food supply, a healthy well-nourished population, harmony between agriculture and the environment, and an enhanced quality of life for rural Americans. The ERS GIS team had been tasked to provide a method for interactive mapping to leverage analysis of two USDA food and nutrition assistance programs to Web users by ERS' Food Assistance and Nutrition Program Analysis staff. In response, the GIS team has created two interactive mapping applications, the Summer Food Service Program and the Food Stamp Program Map Machines, both of which use ArcIMS to give users interactive tools to explore data from both programs as well as related data.



Introduction – About ERS

- USDA's Economic Research Service (ERS) provides research in five emphasis areas--a competitive agricultural system, a safe food supply, a healthy well-nourished population, harmony between agriculture and the environment, and an enhanced quality of life for rural Americans.
- ERS is staffed with economists and demographers who are now taking advantage of the benefit of using GIS for data dissemination and analysis.
- In general, ERS is not a big generator of geographic data, but integrates data from disparate sources in analyses.



Introduction – GIS at ERS

- GIS staff members have grown from two to nine in the past four years.
- GIS staff perform spatial analyses for the Agency's economists and demographers, as well as day-to-day mapping and GIS database support activities.
- In-house ArcView training and support are offered at ERS.
- The ERS website currently contains five ArcIMS-based applications served to the public.
- ERS participates in the USDA bulk purchase agreement of ESRI software.



Introduction – FANRP Programs

- FANRP (Food and Nutrition Research Program) staff are a group of researchers that analyze USDA food assistance programs such as the School Lunch Program, Summer Food Service Program, Food Stamp Program, and WIC.
- FANRP staff approached GIS staff to provide a Web-based dynamic analysis tool for the 2001 Summer Food Service Program.
- GIS staff also worked with FANRP staff to collect county-level Food Stamp Program data and decided to publish it through an interactive application on the Web.
- Result: two applications – the Summer Food Service Program Map Machine and the Food Stamp Program Map Machine



Application Development

- Both applications were developed with ASP through the ArcIMS ActiveX Connector.
- Completely developed from the ground up due to ERS branding and website guidelines.
- Both contain shapefiles to render the features on the maps, but, contain an Access backend to access tabular data associated with the programs.



Application Development - Issues

- Loss of “real estate” normally associated with GIS applications because of Agency web standards. Printable map functionality circumvented this problem.
- Could not develop an “out of the box” application because of the Agency web standards.
- FANRP staff did not like the grainy legend images, so GIS staff custom-built the legends in both applications.
- Buffering was a problem in the SFSP application, so pre-built shapefiles were used instead.



Summer Food Service Program Map Machine

- Uses 2001 SFSP participation records, Census poverty data, and DOE Common Core Data to describe SFSP accessibility and coverage.
- Visually displays SFSP sponsors and sites in geographic relation to concentrated areas of child poverty
- Provides information in tabular format to permit methodical examination of results
- Profiles SFSP sites by detailing demographic characteristics of the census tract in which they exist



Summer Food Service Program Map Machine

- Only 14 percent of children who receive free or reduced price school lunches participate in the SFSP; thus, increasing participation in the SFSP and assessing the extent to which the SFSP is reaching low-income neighborhoods is crucial.
- The application sought to find what portion is not served of the areas that are qualified to have an SFSP site, and how many children from low-income families live in areas that are not eligible for SFSP sites.
- Target audiences include:
 - USDA to analyze the characteristics of areas served and not served in the entire country.
 - States can view data for their state to see if there are any eligible areas where children are not being served.
 - Current sponsors to view areas where they support the program to determine if children's needs are being met.
 - Prospective sponsors can view an area where they might want to start a program to see if there is a need.



SFSP Map Machine - Features

The screenshot displays the SFSP Map Machine interface. At the top left is the ERS logo (Economic Research Service, U.S. Department of Agriculture). A navigation bar includes links for home, research emphases, key topics, briefing rooms, publications, data, and site map. The current page is titled "summer food service program map machine".

The main interface features a map of the District of Columbia with green dots representing SFSP sites. A search bar at the top right contains the text "search" and a "go" button. Below the map, there are controls for "Click map to: Zoom In, Zoom Out, Pan, Identify" and a dropdown menu set to "Sites".

On the right side, there is a "Draw Layers" section with a "go" button. It includes several layers with checkboxes and legends:

- BFSP Sponsors (Include labels)
- BFSP Sites (Include labels)
- Schools (Include labels)
- Major Roads**
- Limited Access
- Primary
- Secondary
- Block Groups**
- Zip Codes**
- Number of Children Under 185% Poverty Line**
 - Fewer than 100
 - 100 - 250
 - 250 - 500
 - 500 - 1000
 - Greater than 1000
- Percent of Children Under 185% Poverty Line**
 - Less than 50%
 - 50% - 60%
 - 60% - 75%
 - Greater than 75%

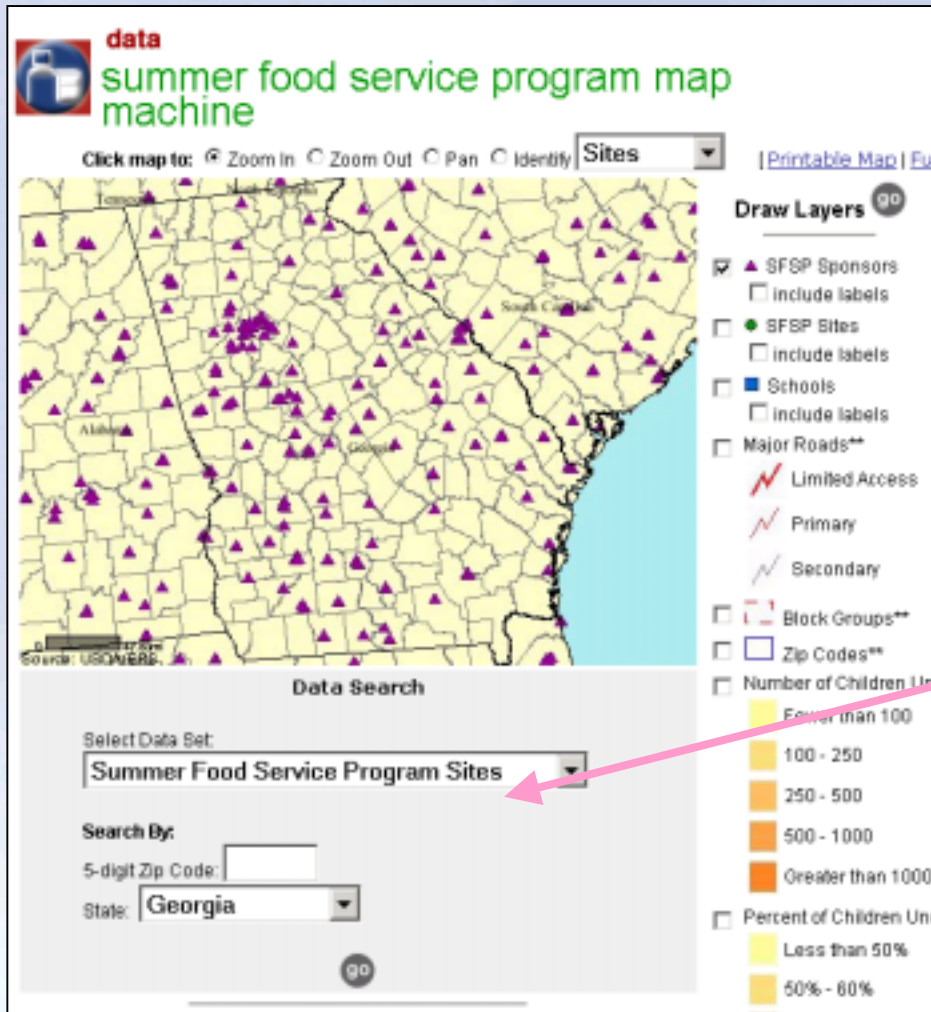
At the bottom left, there is a "Data Search" section with a "Select Data Set" dropdown menu set to "Summer Food Service Program Sites". Below it are fields for "Search by:", "5-digit Zip Code", and "state: Dist. Columbia", with a "go" button.

At the bottom, there is an "Analysis Tools" section with checkboxes for "Draw 1-mile buffer around Sites" and "Highlight schools with 50 percent or more of students eligible for free". A note states: "** these layers only draw below the state level".

Interface and
user functions



SFSP Map Machine - Features



**All SFSP Sponsors
in the State of
Georgia**

Data search tool
allows the user to
zoom in to State or
zip code level data.



SFSP Map Machine - Features

Names, addresses, and meal counts for all sponsors the State of Georgia

By State - Georgia: Type: g=Government, s=School, n=Non-profit, ny=NYSFP, c=Camp/Upward Bound

Sponsor Name	Address	City	State	Zip	Breakfast	Lunch	Dinner	Snack	Sponsor Type	Operation Dates
Abraham Baldwin College Prep	2802 Moore Highway Abac 21	Tifton	GA	31794	369	369	410		r	05/27/01 - 06/08/01
Abraham Baldwin College Upward Bound	Abac 26 2802 Moore Highway	Tifton	GA	31794	1157	1458	1453		r	06/11/01 - 07/20/01
Albany State University Nysp	504 Collega Drive	Albany	GA	31705	10215	10562			y	06/01/01 - 06/30/01
Athens Housing Authority	284 Rocksprings Home	Athens	GA	30601		41187			g	06/11/01 - 07/27/01
Baker County Board Of Education	400 Hillcrest Drive	Newton	GA	31770	114920	132283			s	06/01/01 - 07/27/01
Berrien County Council On Child Abuse	301 S Jefferson Street	Nashville	GA	31639		4398		4043	n	06/04/01 - 08/03/01
Bibb County Board Of Commissioners	661 Mulberry Street	Macon	GA	31201		66672			g	06/11/01 - 07/20/01
Boys And Girls Of Metro Atlanta	100 Edgewood Avenue Ste 700	Atlanta	GA	30303	472	590	472	236	r	06/18/01 - 08/10/01
Boys And Girls Club Of Northeast Georgia	410 South Broad Street	Toccoa	GA	30577	5580	11780			n	05/29/01 - 08/10/01
Boys And Girls Club Of Northwest Georgia	100 Gadson Street	Rome	GA	30165	3728	9386			n	05/29/01 - 08/10/01
Boys And Girls Club Of Columbus And Phenix City	1700 Buena Vista Road	Columbus	GA	31906		3167			n	05/29/01 - 08/03/01
Bryan County Board Of Commissioners	306 Lanier Street	Pembroke	GA	31321		18240			g	06/11/01 - 08/03/01
Bulloch County Board Of Education	500 Northside Drive East Boe	Statesboro	GA	30458	6717	22426			s	05/29/01 - 07/13/01
Burke County Board Of Commissioners	465 Perimeter Road	Waynesboro	GA	30830		29184			g	06/04/01 - 07/27/01
Calvary Missionary Baptist Church Inc	1702 West Cleveland Ave	East Point	GA	30344	3563	3643			n	06/04/01 - 08/24/01
Camp Relitso Inc	3947 Williams School Road	Valdosta	GA	31601	3414	3912			n	06/04/01 - 08/03/01
Candler County Board Of Education	210 S College Street	Metter	GA	30439	2351	5678			s	06/06/01 - 07/01/01

Data search allows users to view all information in the database in tabular format.



SFSP Map Machine – Customized Analysis

1. Select a State
2. Zoom In to Area of Interest
3. Add the Target Population Layer
4. Add Reference Layers



SFSP Map Machine – Customized Analysis

The screenshot displays the 'SFSP Map Machine' interface. At the top left, there is a 'data' logo and the title 'summer food service program map machine'. Below the title, there are navigation controls: 'Click map to: Zoom In, Zoom Out, Pan, Identify' and a dropdown menu set to 'Sites'. To the right of the map are links for 'Printable Map', 'Full Extent', and 'Help'. The map itself shows Delaware with various colored markers representing SFSP sites and sponsors. A legend on the right side, titled 'Draw Layers', lists several layers with checkboxes and options to 'include labels'. The 'Data Search' section at the bottom left includes a 'Select Data Set' dropdown menu set to 'Summer Food Service Program Sites', a 'Search By:' section with a '5-digit Zip Code' input field, and a 'State:' dropdown menu set to 'Delaware'. A 'go' button is located at the bottom of the search section. The legend includes layers for 'SFSP Sponsors', 'SFSP Sites', 'Schools', 'Major Roads**', 'Limited Access', 'Primary', 'Secondary', 'Block Groups**', 'Zip Codes**', 'Number of Children Under 185% Poverty Line**' (with a color scale from yellow to orange), and 'Percent of Children Under 185% Poverty Line**' (with a color scale from yellow to orange).

1. Data search for all sites in Delaware, with sponsors layer visible.



SFSP Map Machine – Customized Analysis

The screenshot displays the 'data summer food service program map machine' interface. At the top left, there is a logo and the title. Below it, navigation controls include 'Click map to: Zoom In, Zoom Out, Pan, Identify' and a dropdown menu set to 'Sites'. A 'home' link is in the top right. The main map area shows Delaware and parts of Pennsylvania, Maryland, and New Jersey, with green dots representing SFSP sites and purple triangles representing SFSP sponsors. A 'Data Search' panel at the bottom left allows selecting the data set as 'Summer Food Service Program Sites', with fields for '6-digit Zip Code' and 'State'. A 'Draw Layers' panel on the right lists various layers with checkboxes: SFSP Sponsors (checked), SFSP Sites (checked), Schools, Major Roads (with sub-options for Limited Access, Primary, and Secondary), Block Groups, Zip Codes, Number of Children Under 185% Poverty Line (with a color-coded legend), and Percent of Children Under 185% Poverty Line (with a color-coded legend). A 'go' button is located at the bottom of the layers panel.

2. Zoom in on all sponsors and sites in the Wilmington, Delaware area.



SFSP Map Machine – Customized Analysis

data
summer food service program map machine

Click map to: Zoom In Zoom Out Pan Identify [\[Printable Map | Full Extent | Help\]](#)

Draw Layers

- SFSP Sponsors
 include labels
- SFSP Sites
 include labels
- Schools
 include labels
- Major Roads**
 - Limited Access
 - Primary
 - Secondary
- Block Groups**
- Zip Codes**
- Number of Children Under 185% Poverty Line**
 - Fewer than 100
 - 100 - 250
 - 250 - 500
 - 500 - 1000
 - Greater than 1000
- Percent of Children Under 185% Poverty Line**
 - Less than 50%
 - 50% - 60%
 - 60% - 75%
 - Greater than 75%

Data Search

Select Data Set:

Search By:
5-digit Zip Code:
State:

Analysis Tools

- Draw 1-mile buffer around
- Highlight schools with 50 percent or more of students eligible for free or reduced-price lunch

** these layers only draw below the state level

3. Add target population layers--

Percent of children in poverty


4. Add reference layers--

Zip codes

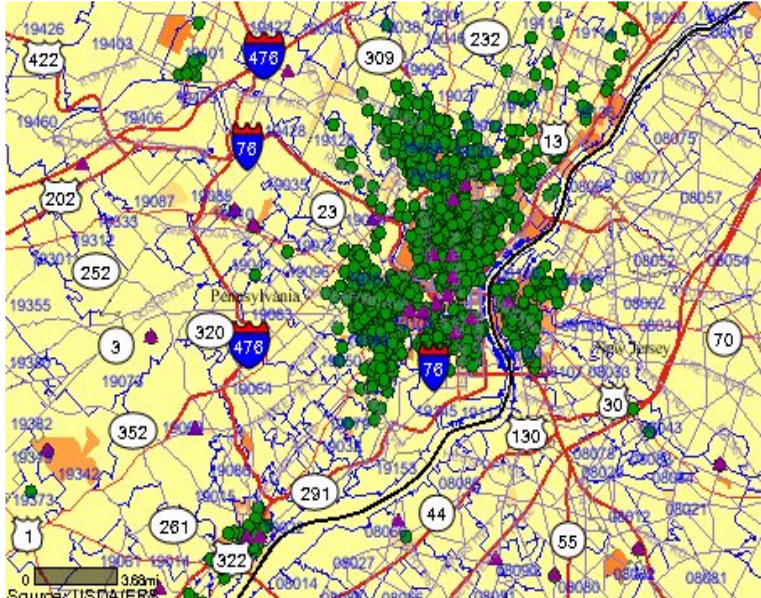
Interstates



SFSP Map Machine – Customized Analysis

 **data**
summer food service program map machine

Click map to: Zoom In Zoom Out Pan Identify [Printable Map | Full Extent | Help]



Draw Layers

- SFSP Sponsors
 include labels
- SFSP Sites
 include labels
- Schools
 include labels
- Major Roads**
 - Limited Access
 - Primary
 - Secondary
- Block Groups**
- Zip Codes**

Source: USDAVERS

To extend the analysis--
Zoom out to compare
Wilmington with
neighboring areas like
Philadelphia.

Pan up to the
Philadelphia area.



SFSP Map Machine – Customized Analysis

data
summer food service program map machine

Click map to: Zoom In Zoom Out Pan Identify | [Printable Map](#) | [Full Extent](#) | [Help](#)

Draw Layers

- SFSP Sponsors
 include labels
- SFSP Sites
 include labels
- Schools
 include labels
- Major Roads**
 - Limited Access
 - Primary
 - Secondary
- Block Groups**
- Zip Codes**
- Number of Children Under 185% Poverty Line**
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 - Greater than 1000
- Percent of Children Under 185% Poverty Line**
 - Less than 50%
 - 50% - 60%
 - 60% - 75%
 - Greater than 75%

Data Search

Select Data Set:

Search By:
5-digit Zip Code:
State:

Analysis Tools

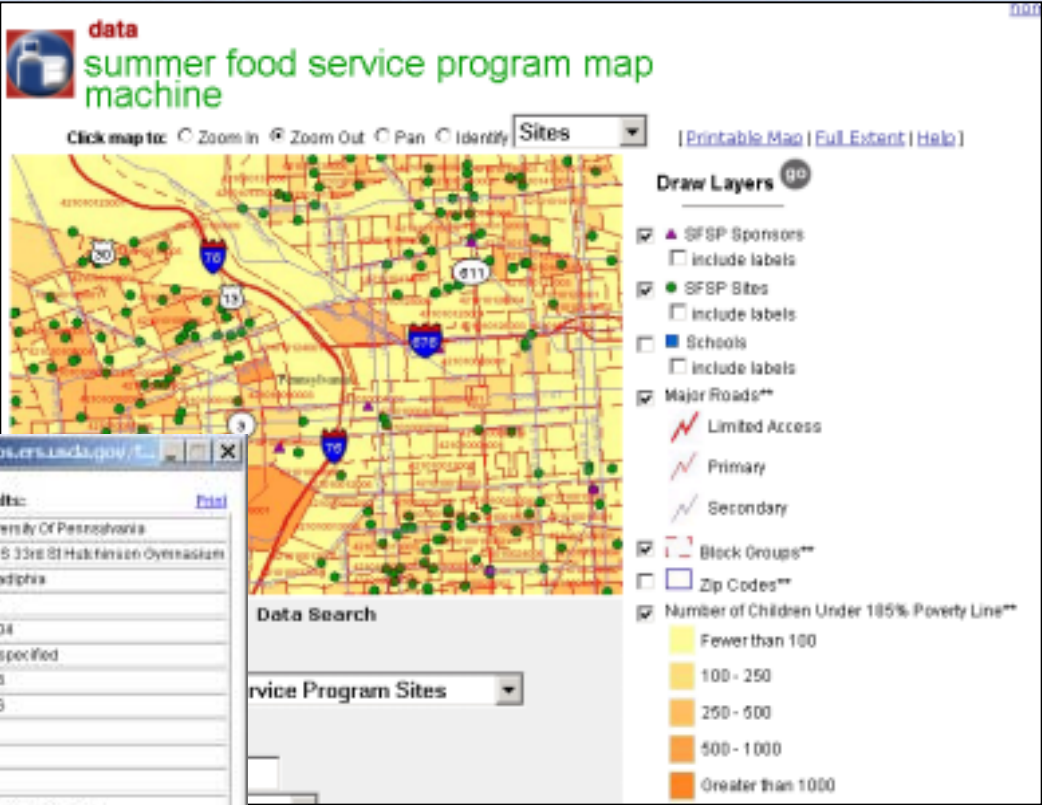
- Draw 1-mile buffer around
- Highlight schools with 50 percent or more of students eligible for free or reduced-price lunch

** these layers only draw below the state level

Zoom in to Philadelphia with reference layers for zip codes, block groups, and percent of children in poverty.



SFSP Map Machine – Customized Analysis



Change the reference layer from the percent of children in poverty to the number of children in poverty to compare meal counts per site with number of children in poverty in that area.



SFSP Map Machine – Customized Analysis

data
summer food service program map machine

Click map to: Zoom In Zoom Out Pan Identify [Printable Map](#) [Full Extent](#) [Help](#)

Draw Layers GO

- SFSP Sponsors
 Include labels
- SFSP Sites
 Include labels
- Schools
 Include labels
- Major Roads**
 - Limited Access
 - Primary
 - Secondary
- Block Groups**
- Zip Codes**
- Number of Children Under 185% Poverty Line**
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- Percent of Children Under 185% Poverty Line**
 - Less than 50%
 - 50% - 60%
 - 60% - 75%
 - Greater than 75%

** these layers only draw below the state level

Data Search

Select Data Set:

Search By:
5-digit Zip Code:
State:

GO

Analysis Tools

Draw 1-mile buffer around

Highlight schools with 50 percent or more of students eligible for free or reduced-price lunch

GO

Use the buffer functionality to see whether the target population is within a mile of a site



SFSP Map Machine – Customized Analysis



Select printable map link to get a 8 ½ by 11 page-friendly map in a separate browser.



Food Stamp Program Map Machine

- An interactive mapping application that incorporates county-level Food Stamp Program data.
- Dynamic (rather than static) maps allow user to investigate spatial and temporal trends in Food Stamp Program data.
- Seeks to illustrate how the Food Stamp Program's coverage differs by region and how changes in the caseload differ over time.
- Data sources include:
 - Benefits: Regional Economic Information System (REIS)
 - Participants: Small Area Income and Poverty Estimates (SAIPE)
 - Participants, categorized by public assistance status: FNS-388a.



FSP Map Machine - Features

ERS
ECONOMIC RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE

search
[input field] go

home research emphases key topics briefing rooms publications data site map about ERS
[home](#) > [data](#) > [food stamp program map machine](#)

data
food stamp program map machine

Select a Data Set
Per Capita FSP Participation, 1999

Include
 County boundaries
 County names

Zoom To
Select a State... go

Click map to:
 Zoom In Zoom Out Pan Identify

[[Full Extent](#) | [National Statistics](#) | [Instructions](#)]

Legend
Per Capita FSP Participation, 1999

- Less than 4.8%
- 4.8% - 8.7%
- 8.7% - 14.3%
- 14.3% - 23.1%
- Greater than 23.1%

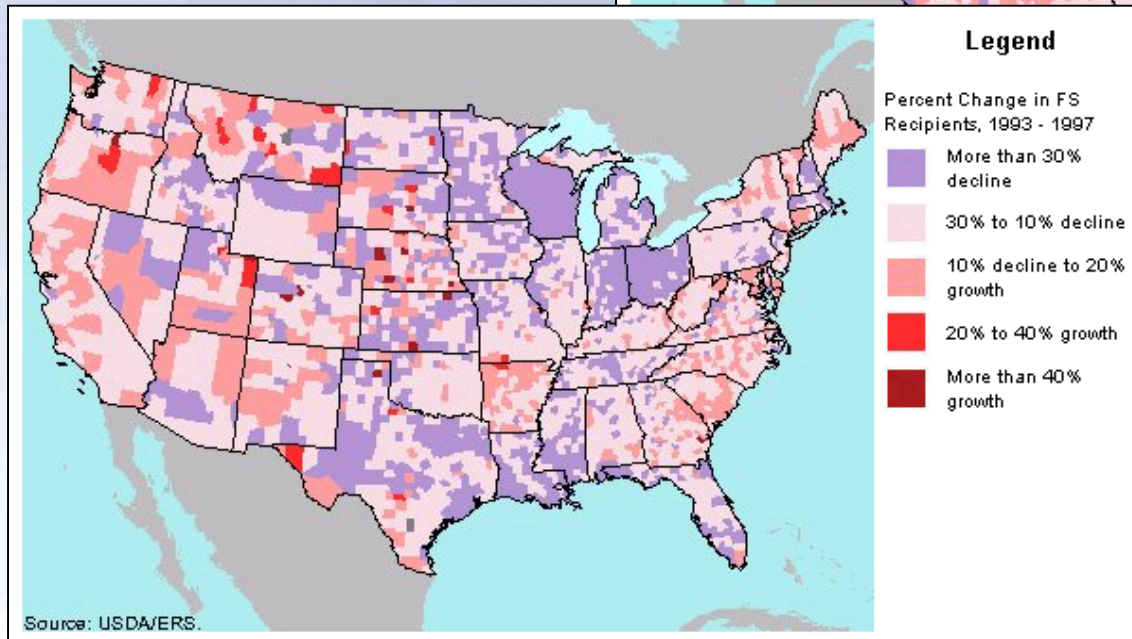
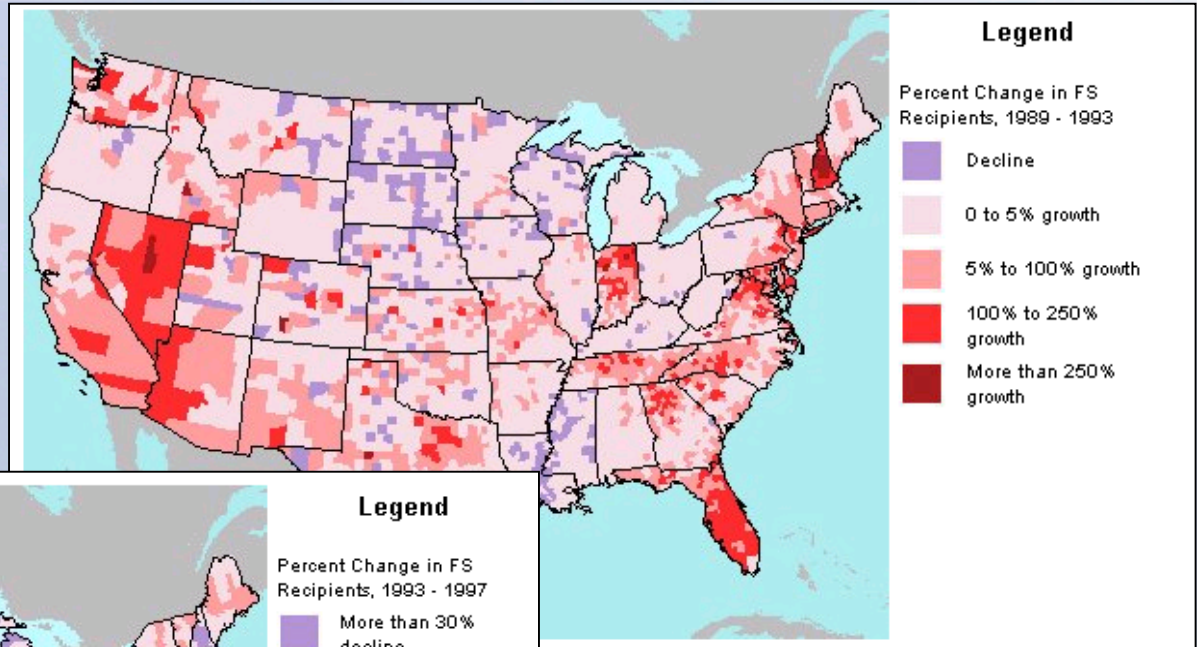
Source: USDA/ERS.

Interface and user functions




FSP Map Machine - Features

Temporal data sets are included to analyze the increase and decrease in participants.



FSP Map Machine - Features

[home](#) > [data](#) > [food_stamp_program_map_machine](#)

 **data**
food stamp program map machine

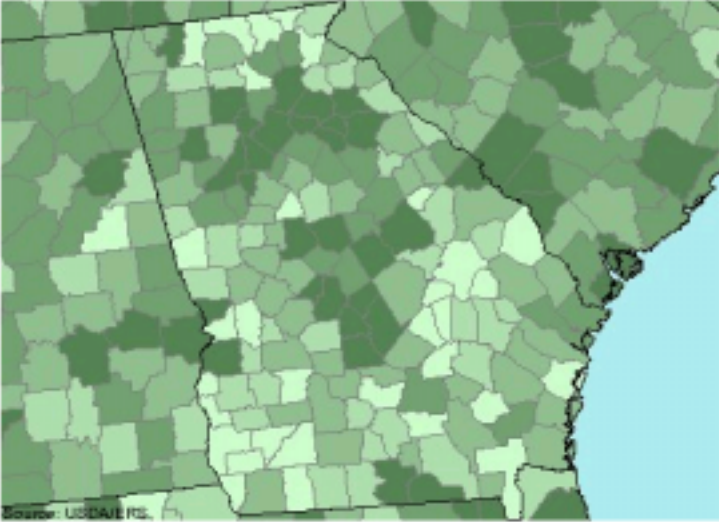
Select a Data Set:

Include: County boundaries County names

Zoom To:

Click map to: Zoom In Zoom Out Pan Identify

[\[Full Extent\]](#) | [National Statistics](#) | [Instructions](#)



Legend

Average Benefit Per FS Recipient, 1999

- Less than \$750
- \$750 - \$800
- \$800 - \$850
- \$850 - \$900
- Greater than \$900

Source: USDA/ERS

Zoom To State
Feature

<http://maps.ers.usda.gov/fsp/index.as...>

Georgia-wide Statistics: [Print](#)

FSP Participation, 1999:	585,318
Amount of FSP Benefits, 1999:	\$504,874,000
Amount of TANF Benefits, 1999:	\$259,633,000
Per Capita Poverty, 1999:	18.38%
Per Capita FSP Participation, 1999:	9.85%
FSP Participation Per Poor Person, 1999:	57.65%
FSP Benefits Per Poor Person, 1999:	\$473
TANF Benefits Per Poor Person, 2000:	\$245
Per Capita FSP Benefits, 1999:	\$80
Per Capita TANF Benefits, 2000:	\$44
Percent Change in FS Recipients, 1989 - 1993:	60.51%
Percent Change in FS Recipients, 1993 - 1997:	-10.21%
Average FS Benefits Per Participant, 1999:	\$822



FSP Map Machine - Features



data

food stamp program map machine

[home](#) > [data](#) > [food stamp program map machine](#)

Select a Data Set

Average Benefit Per FS Recipient, 1999

Include

- County boundaries
 County names

Zoom To

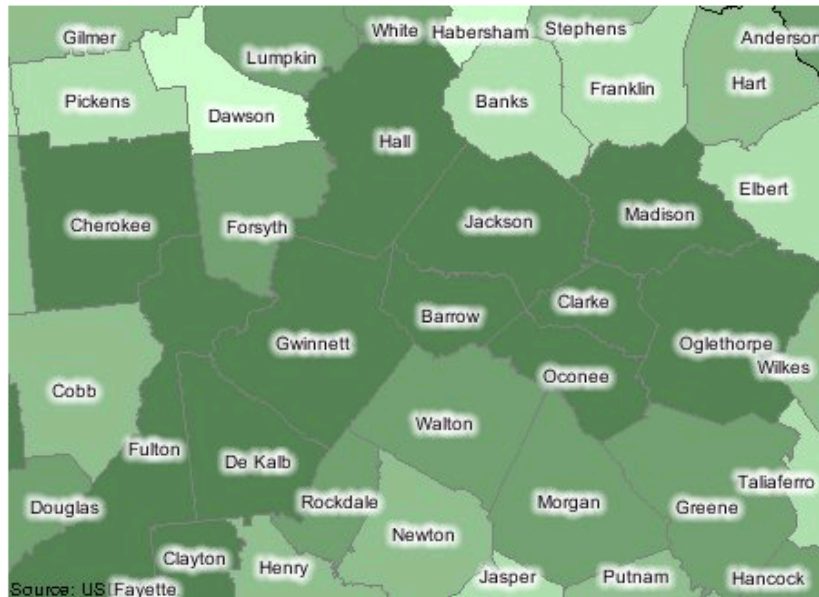
Select a State...



Click map to:

- Zoom In Zoom Out Pan Identify

[\[Full Extent\]](#) | [National Statistics](#) | [Instruction](#)



Legend

- Average Benefit Per FS Recipient, 1999
- Less than \$750
 - \$750 - \$800
 - \$800 - \$850
 - \$850 - \$900
 - Greater than \$900

Source: US Fayette

Identify Tool

<http://maps.ers.usda.gov/fsp/index.as...>

Identify Results:

[Print](#)

County:	Jackson
State:	Georgia
FSP Participation, 1999:	2,401
Amount of FSP Benefits, 1999:	\$2,340,000
Amount of TANF Benefits, 1999:	\$714,000
Per Capita Poverty, 1999:	11.73%
Per Capita FSP Participation, 1999:	5.92%
FSP Participation Per Poor Person, 1999:	50.45%
FSP Benefits Per Poor Person, 1999:	\$480
TANF Benefits Per Poor Person, 2000:	\$140
Per Capita FSP Benefits, 1999:	\$58
Per Capita TANF Benefits, 2000:	\$17
Percent Change in FS Recipients, 1999 - 1993:	122.78%
Percent Change in FS Recipients, 1993 - 1997:	-18.60%
Metropolitan Counties:	0
Average FS Benefits Per Participant, 1999:	\$950

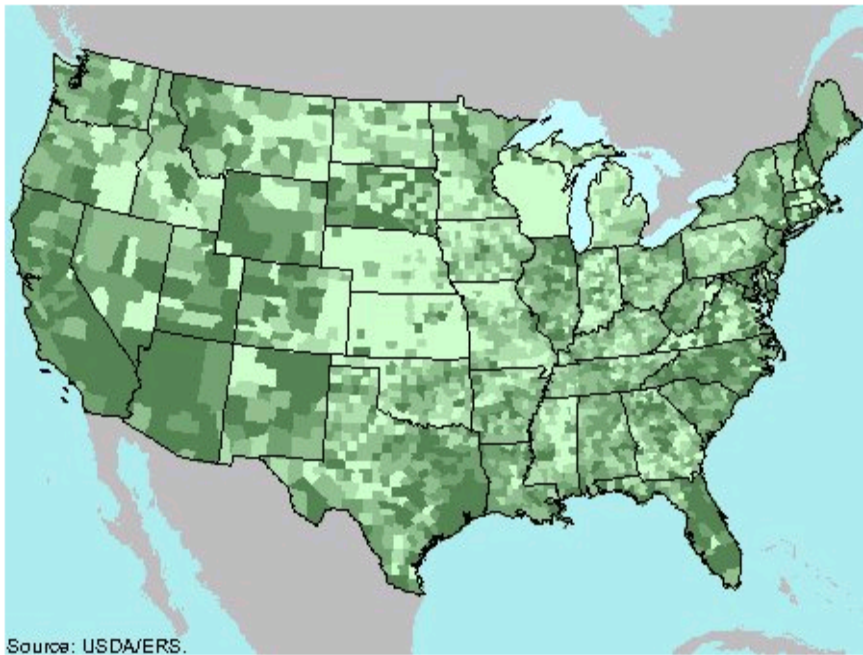


FSP Map Machine - Features

Click map to:

Zoom In Zoom Out Pan Identify

[[Full Extent](#) | [National Statistics](#) | [Instructions](#)]



Legend

Average Benefit Per FS Recipient, 1999

-  Less than \$750
-  \$750 - \$800
-  \$800 - \$850
-  \$850 - \$900
-  Greater than \$900

National Statistics

<http://maps.ers.usda.gov/fsp/index.as...>

National Statistics: [Print](#)

FSP Participation, 1999:	17,307,135
Amount of FSP Benefits, 1999:	\$15,597,328,000
Amount of TANF Benefits, 1999:	\$17,755,236,000
Per Capita Poverty, 1999:	13.67%
Per Capita FSP Participation, 1999:	7.23%
FSP Participation Per Poor Person, 1999:	49.75%
FSP Benefits Per Poor Person, 1999:	\$510
TANF Benefits Per Poor Person, 2000:	\$347
Per Capita FSP Benefits, 1999:	\$92
Per Capita TANF Benefits, 2000:	\$63
Percent Change in FS Recipients, 1989 - 1993:	-43.68%
Percent Change in FS Recipients, 1993 - 1997:	-20.45%
Average FS Benefits Per Participant, 1999:	\$1,020



Websites and Contact Information

- Summer Food Service Program Map Machine:

<http://www.ers.usda.gov/sfsp>

- Food Stamp Program Map Machine:

<http://www.ers.usda.gov/foodstamps>

- For more information, contact Chris Dicken at cdicken@ers.usda.gov

