

Firefly CSS Style System

Complete Documentation & Implementation Guide

Version 1.0 | August 2025

A CSS recreation of Esri's ArcGIS Firefly cartographic style

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Introduction

The Firefly CSS Style System is a complete recreation of Esri's popular Firefly cartographic style, implemented entirely in CSS. Originally designed for ArcGIS Pro as a .stylx file, this implementation brings the distinctive glowing aesthetic to any web mapping application.

Key Features

- **20-Color Spectral Palette:** Full recreation of the original Firefly color wheel
- **Multiple Symbol Types:** Points, polygons, and lines with authentic glow effects
- **Animation Support:** Shimmer and twinkle effects for enhanced visibility
- **Library Agnostic:** Works with Leaflet, Mapbox, OpenLayers, and custom solutions
- **Performance Optimized:** Hardware-accelerated CSS with minimal overhead
- **Accessible:** Color-blind friendly options and high contrast support

What Makes Firefly Special

The Firefly style honors Tobler's First Law of Geography: *"everything is related to everything else, but near things are more related than distant things."* The radial glow effect visually represents this concept by showing influence areas around geographic features.

Quick Start

1. Include the CSS

/ Copy the complete CSS from the implementation section below */*

2. Basic Usage

```
<!-- Point -->
<div class="firefly-point firefly-point-standard firefly-point-md firefly-color-8"></div>

<!-- Polygon -->
<div class="firefly-polygon firefly-polygon-standard firefly-color-11">Content</div>

<!-- Line -->
<div class="firefly-line firefly-color-15"></div>
```

3. Essential Requirements

- **Dark Background:** Use backgrounds darker than #333333 for optimal visibility
 - **Modern Browser:** Supports CSS custom properties and multiple box shadows
 - **Performance:** Limit animated elements for better performance
-

Color Palette Reference

The Firefly palette consists of 20 carefully chosen colors distributed across the visible spectrum:

Complete Color List

#	Color Name	Hex Code	RGB Values
1	Deep Pink	#ff0040	rgb(255, 0, 64)

2	Hot Pink	#ff0080	rgb(255, 0, 128)
3	Magenta	#ff00bf	rgb(255, 0, 191)
4	Fuchsia	#ff00ff	rgb(255, 0, 255)
5	Purple	#bf00ff	rgb(191, 0, 255)
6	Blue Violet	#8000ff	rgb(128, 0, 255)
7	Indigo	#4000ff	rgb(64, 0, 255)
8	Blue	#0040ff	rgb(0, 64, 255)
9	Dodger Blue	#0080ff	rgb(0, 128, 255)
10	Deep Sky Blue	#00bfff	rgb(0, 191, 255)
11	Cyan	#00ffff	rgb(0, 255, 255)
12	Spring Green	#00ffbf	rgb(0, 255, 191)
13	Bright Green	#00ff80	rgb(0, 255, 128)
14	Lime Green	#00ff40	rgb(0, 255, 64)
15	Chartreuse	#40ff00	rgb(64, 255, 0)
16	Yellow Green	#80ff00	rgb(128, 255, 0)
17	Light Yellow	#bfff00	rgb(191, 255, 0)
18	Yellow	#ffff00	rgb(255, 255, 0)
19	Orange	#ffbf00	rgb(255, 191, 0)
20	Dark Orange	#ff8000	rgb(255, 128, 0)

Neutral Option

- **Neutral:** #ffffff (White) - For monochromatic displays

CSS Implementation

Core CSS Variables

```

:root {
  /* 20 Firefly colors based on spectral distribution */
  --firefly-1: #ff0040; /* Deep Pink/Red */
  --firefly-2: #ff0080; /* Hot Pink */
  --firefly-3: #ff00bf; /* Magenta */
  --firefly-4: #ff00ff; /* Fuchsia */
  --firefly-5: #bf00ff; /* Purple */
  --firefly-6: #8000ff; /* Blue Violet */
  --firefly-7: #4000ff; /* Indigo */
  --firefly-8: #0040ff; /* Blue */
  --firefly-9: #0080ff; /* Dodger Blue */
  --firefly-10: #00bfff; /* Deep Sky Blue */
  --firefly-11: #00ffff; /* Cyan */
  --firefly-12: #00ffbf; /* Spring Green */
  --firefly-13: #00ff80; /* Bright Green */
  --firefly-14: #00ff40; /* Lime Green */
  --firefly-15: #40ff00; /* Chartreuse */
  --firefly-16: #80ff00; /* Yellow Green */
  --firefly-17: #bfff00; /* Light Yellow */
  --firefly-18: #ffff00; /* Yellow */
  --firefly-19: #ffbf00; /* Orange */
  --firefly-20: #ff8000; /* Dark Orange */

  /* Neutral/No-color option */
  --firefly-neutral: #ffffff;
}

```

Base Classes

```

.firefly-point {
  position: relative;
  border-radius: 50%;
  z-index: 10;
  transition: all 0.3s ease;
}

```

```

.firefly-polygon {
  position: relative;
  z-index: 5;
  transition: all 0.3s ease;
}

```

```

/* Color application classes */
.firefly-color-1 { color: var(--firefly-1); }

```

```
.firefly-color-2 { color: var(--firefly-2); }
.firefly-color-3 { color: var(--firefly-3); }
.firefly-color-4 { color: var(--firefly-4); }
.firefly-color-5 { color: var(--firefly-5); }
.firefly-color-6 { color: var(--firefly-6); }
.firefly-color-7 { color: var(--firefly-7); }
.firefly-color-8 { color: var(--firefly-8); }
.firefly-color-9 { color: var(--firefly-9); }
.firefly-color-10 { color: var(--firefly-10); }
.firefly-color-11 { color: var(--firefly-11); }
.firefly-color-12 { color: var(--firefly-12); }
.firefly-color-13 { color: var(--firefly-13); }
.firefly-color-14 { color: var(--firefly-14); }
.firefly-color-15 { color: var(--firefly-15); }
.firefly-color-16 { color: var(--firefly-16); }
.firefly-color-17 { color: var(--firefly-17); }
.firefly-color-18 { color: var(--firefly-18); }
.firefly-color-19 { color: var(--firefly-19); }
.firefly-color-20 { color: var(--firefly-20); }
.firefly-color-neutral { color: var(--firefly-neutral); }
```

Point Symbols

Standard Points

```
.firefly-point-standard {
  background: radial-gradient(circle, currentColor 0%, currentColor 40%, transparent 70%);
  box-shadow:
    0 0 10px currentColor,
    0 0 20px currentColor,
    0 0 40px currentColor,
    inset 0 0 10px rgba(255, 255, 255, 0.2);
}
```

Shimmer/Twinkle Points

```
.firefly-point-shimmer {
  background: radial-gradient(circle, currentColor 0%, currentColor 30%, transparent 60%);
  box-shadow:
    0 0 5px currentColor,
    0 0 15px currentColor,
    0 0 30px currentColor,
```

```

    0 0 60px currentColor,
    inset 0 0 15px rgba(255, 255, 255, 0.4);
    animation: firefly-twinkle 2s ease-in-out infinite alternate;
}

@keyframes firefly-twinkle {
  0% {
    box-shadow:
      0 0 5px currentColor,
      0 0 15px currentColor,
      0 0 30px currentColor,
      0 0 60px currentColor,
      inset 0 0 15px rgba(255, 255, 255, 0.4);
    transform: scale(1);
  }
  100% {
    box-shadow:
      0 0 10px currentColor,
      0 0 25px currentColor,
      0 0 50px currentColor,
      0 0 100px currentColor,
      inset 0 0 20px rgba(255, 255, 255, 0.6);
    transform: scale(1.1);
  }
}

```

Point Sizes

```

.firefly-point-xs { width: 4px; height: 4px; } /* Very small */
.firefly-point-sm { width: 8px; height: 8px; } /* Small */
.firefly-point-md { width: 12px; height: 12px; } /* Medium */
.firefly-point-lg { width: 20px; height: 20px; } /* Large */
.firefly-point-xl { width: 32px; height: 32px; } /* Extra large */

```

Usage Examples

```

<!-- Basic point -->
<div class="firefly-point firefly-point-standard firefly-point-md firefly-color-8"></div>

<!-- Animated shimmer point -->
<div class="firefly-point firefly-point-shimmer firefly-point-lg firefly-color-11"></div>

<!-- Large emphasis point -->

```

```
<div class="firefly-point firefly-point-standard firefly-point-xl firefly-color-1"></div>
```

Polygon Symbols

Standard Polygons (Outer Glow)

```
.firefly-polygon-standard {  
  background: rgba(0, 0, 0, 0.1);  
  border: 2px solid currentColor;  
  box-shadow:  
    0 0 10px currentColor,  
    0 0 20px currentColor,  
    inset 0 0 10px rgba(255, 255, 255, 0.05);  
}
```

Best for: Isolated features, administrative boundaries, geographic regions

Inner Glow Polygons

```
.firefly-polygon-inner {  
  background: linear-gradient(  
    45deg,  
    transparent 0%,  
    rgba(255, 255, 255, 0.05) 50%,  
    transparent 100%  
  );  
  border: 1px solid currentColor;  
  box-shadow:  
    inset 0 0 15px currentColor,  
    inset 0 0 30px currentColor;  
}
```

Best for: Choropleth maps, adjacent areas, hexbin visualizations

Usage Examples

```
<!-- Standard polygon -->  
<div class="firefly-polygon firefly-polygon-standard firefly-color-15">  
  <!-- Your polygon content -->  
</div>
```

```
<!-- Inner glow for adjacent polygons -->
<div class="firefly-polygon firefly-polygon-inner firefly-color-3">
  <!-- Your polygon content -->
</div>
```

Line Symbols

Solid Lines

```
.firefly-line {
  position: relative;
  height: 2px;
  background: currentColor;
  box-shadow:
    0 0 5px currentColor,
    0 0 10px currentColor,
    0 0 20px currentColor;
}
```

Dashed Lines

```
.firefly-line-dashed {
  position: relative;
  height: 2px;
  background: repeating-linear-gradient(
    to right,
    currentColor 0px,
    currentColor 10px,
    transparent 10px,
    transparent 20px
  );
  box-shadow:
    0 0 5px currentColor,
    0 0 10px currentColor,
    0 0 20px currentColor;
}
```

Usage Examples

```
<!-- Solid glowing line -->
<div class="firefly-line firefly-color-12"></div>
```



```
<!-- Dashed glowing line -->
<div class="firefly-line-dashed firefly-color-18"></div>
```

Map Library Integration

Leaflet

```
// Point markers
const marker = L.marker([lat, lng], {
  icon: L.divIcon({
    html: '<div class="firefly-point firefly-point-standard firefly-point-md firefly-color-8"></div>',
    className: 'firefly-marker',
    iconSize: [20, 20],
    iconAnchor: [10, 10]
  })
});

// Polygon styling
const polygon = L.polygon(coordinates, {
  className: 'firefly-polygon firefly-polygon-standard firefly-color-11',
  fillOpacity: 0,
  weight: 0
});

// Polyline styling
const polyline = L.polyline(coordinates, {
  className: 'firefly-line firefly-color-15',
  weight: 2,
  opacity: 1
});
```

Mapbox GL JS

```
// HTML markers for points
const el = document.createElement('div');
el.className = 'firefly-point firefly-point-shimmer firefly-point-lg firefly-color-15';
new mapboxgl.Marker(el)
  .setLngLat([lng, lat])
  .addTo(map);

// Layer styling for polygons
```

```

map.addLayer({
  'id': 'firefly-polygons',
  'type': 'fill',
  'source': 'polygon-source',
  'paint': {
    'fill-color': '#00ffff', // firefly-color-11
    'fill-opacity': 0.1,
    'fill-outline-color': '#00ffff'
  }
});

```

// Add glow effect via separate layer

```

map.addLayer({
  'id': 'firefly-polygon-glow',
  'type': 'line',
  'source': 'polygon-source',
  'paint': {
    'line-color': '#00ffff',
    'line-width': 3,
    'line-blur': 10
  }
});

```

OpenLayers

// Point overlays

```

const element = document.createElement('div');
element.className = 'firefly-point firefly-point-standard firefly-point-md firefly-color-12';
const overlay = new ol.Overlay({
  element: element,
  position: ol.proj.fromLonLat([lng, lat]),
  positioning: 'center-center'
});
map.addOverlay(overlay);

```

// Vector styling

```

const style = new ol.style.Style({
  image: new ol.style.Circle({
    radius: 6,
    fill: new ol.style.Fill({color: '#00ff80'}),
    stroke: new ol.style.Stroke({color: '#00ff80', width: 2})
  })
});

```

Performance & Best Practices

Performance Optimization

Hardware Acceleration

```
.firefly-point, .firefly-polygon {  
  transform: translateZ(0); /* Forces hardware acceleration */  
  will-change: transform; /* Hint to browser for optimization */  
}
```

Memory Management

- **Limit animations:** Use shimmer effects sparingly (<50 elements)
- **Viewport culling:** Hide off-screen elements
- **CSS containment:** Use `contain: layout style` for isolated elements

Large Dataset Optimization

```
/* Optimize for large datasets */
```

```
.firefly-optimized {  
  contain: layout style;  
  transform: translateZ(0);  
  backface-visibility: hidden;  
}
```

```
/* Disable animations on low-end devices */
```

```
@media (prefers-reduced-motion: reduce) {  
  .firefly-point-shimmer {  
    animation: none;  
  }  
}
```

Visual Design Guidelines

Background Requirements

- **Optimal:** #1a1a1a to #2a2a2a (very dark gray)
- **Acceptable:** #333333 to #444444 (medium dark)
- **Avoid:** Light backgrounds (>#666666)

Color Selection Rules

Thematic Mapping:

- Use maximum 6 consecutive colors
- Avoid spanning multiple hues
- Example: Colors 8-13 for blue-green range

Categorical Data:

- Use opposite colors for contrast
 - Example: Color 8 (blue) + Color 18 (yellow)
 - Test with color blindness simulators
-

Accessibility Guidelines

Color Blindness Considerations

Vision Type	Affected Colors	Safe Alternatives
Protanopia (Red-blind)	Colors 1-5, 18-20	Colors 6-17 (Blue-Green)
Deuteranopia (Green-blind)	Colors 12-17	Colors 1-11, 18-20
Tritanopia (Blue-blind)	Colors 6-11	Colors 1-5, 12-20

High Contrast Support

```
/* High contrast support */
@media (prefers-contrast: high) {
  .firefly-point, .firefly-polygon {
    filter: contrast(1.5) brightness(1.2);
  }
}

/* Windows High Contrast Mode */
@media (prefers-contrast: high) and (-ms-high-contrast: active) {
  .firefly-point {
    background: ButtonText !important;
    color: ButtonText !important;
  }
}
```

Motion Sensitivity

```
/* Respect user motion preferences */
@media (prefers-reduced-motion: reduce) {
  .firefly-point-shimmer {
    animation: none;
  }

  .firefly-point, .firefly-polygon {
    transition: none;
  }
}
```

Troubleshooting

Common Issues

Glow effects not visible

Symptoms: Points appear as solid circles without glow **Solutions:**

- Ensure dark background (#1a1a1a or darker)
- Verify color class is applied: `firefly-color-X`
- Check CSS custom properties are defined in `:root`

Poor performance with many elements

Symptoms: Laggy scrolling, high CPU usage **Solutions:**

- Limit shimmer animations to <50 elements
- Implement viewport culling
- Use `transform: translateZ(0)` for hardware acceleration
- Consider canvas rendering for >1000 points

Colors appear wrong or inconsistent

Symptoms: Colors don't match expected Firefly palette **Solutions:**

- Verify CSS custom properties are properly defined
- Check for CSS specificity conflicts
- Ensure `currentColor` is being used correctly
- Test in different browsers for color profile differences

Browser Compatibility

Feature	Chrome	Firefox	Safari	Edge
CSS Custom Properties	49+	31+	9.1+	16+
Box Shadow Multiple	10+	4+	5.1+	12+
Radial Gradients	26+	16+	7+	12+
CSS Animations	43+	16+	9+	12+

Debugging Tools

```
/* Debug helper classes */
.firefly-debug {
  outline: 1px solid red !important;
  outline-offset: 2px;
}

.firefly-debug::after {
  content: attr(class);
  position: absolute;
  top: -20px;
  left: 0;
  font-size: 10px;
  color: yellow;
  background: rgba(0,0,0,0.8);
  padding: 2px 4px;
  white-space: nowrap;
}
```

Complete CSS File

Here's the complete CSS implementation ready to use:

```
/* ===== FIREFLY COLOR PALETTE ===== */
:root {
  /* 20 Firefly colors based on spectral distribution */
  --firefly-1: #ff0040; /* Deep Pink/Red */
  --firefly-2: #ff0080; /* Hot Pink */
  --firefly-3: #ff00bf; /* Magenta */
  --firefly-4: #ff00ff; /* Fuchsia */
  --firefly-5: #bf00ff; /* Purple */
}
```

```

--firefly-6: #8000ff; /* Blue Violet */
--firefly-7: #4000ff; /* Indigo */
--firefly-8: #0040ff; /* Blue */
--firefly-9: #0080ff; /* Dodger Blue */
--firefly-10: #00bfff; /* Deep Sky Blue */
--firefly-11: #00ffff; /* Cyan */
--firefly-12: #00ffbf; /* Spring Green */
--firefly-13: #00ff80; /* Bright Green */
--firefly-14: #00ff40; /* Lime Green */
--firefly-15: #40ff00; /* Chartreuse */
--firefly-16: #80ff00; /* Yellow Green */
--firefly-17: #bfff00; /* Light Yellow */
--firefly-18: #ffff00; /* Yellow */
--firefly-19: #ffbf00; /* Orange */
--firefly-20: #ff8000; /* Dark Orange */

/* Neutral/No-color option */
--firefly-neutral: #ffffff;
}

/* ===== BASE FIREFLY STYLES ===== */
.firefly-point {
    position: relative;
    border-radius: 50%;
    z-index: 10;
    transition: all 0.3s ease;
}

.firefly-polygon {
    position: relative;
    z-index: 5;
    transition: all 0.3s ease;
}

/* ===== POINT STYLES ===== */
.firefly-point-standard {
    background: radial-gradient(circle, currentColor 0%, currentColor 40%, transparent 70%);
    box-shadow:
        0 0 10px currentColor,
        0 0 20px currentColor,
        0 0 40px currentColor,
        inset 0 0 10px rgba(255, 255, 255, 0.2);
}

```

```
.firefly-point-shimmer {
  background: radial-gradient(circle, currentColor 0%, currentColor 30%, transparent 60%);
  box-shadow:
    0 0 5px currentColor,
    0 0 15px currentColor,
    0 0 30px currentColor,
    0 0 60px currentColor,
    inset 0 0 15px rgba(255, 255, 255, 0.4);
  animation: firefly-twinkle 2s ease-in-out infinite alternate;
}
```

```
@keyframes firefly-twinkle {
  0% {
    box-shadow:
      0 0 5px currentColor,
      0 0 15px currentColor,
      0 0 30px currentColor,
      0 0 60px currentColor,
      inset 0 0 15px rgba(255, 255, 255, 0.4);
    transform: scale(1);
  }
  100% {
    box-shadow:
      0 0 10px currentColor,
      0 0 25px currentColor,
      0 0 50px currentColor,
      0 0 100px currentColor,
      inset 0 0 20px rgba(255, 255, 255, 0.6);
    transform: scale(1.1);
  }
}
```

/* Point sizes */

```
.firefly-point-xs { width: 4px; height: 4px; }
.firefly-point-sm { width: 8px; height: 8px; }
.firefly-point-md { width: 12px; height: 12px; }
.firefly-point-lg { width: 20px; height: 20px; }
.firefly-point-xl { width: 32px; height: 32px; }
```

/* ===== POLYGON STYLES ===== */

```
.firefly-polygon-standard {
  background: rgba(0, 0, 0, 0.1);
  border: 2px solid currentColor;
  box-shadow:
```



```
    0 0 10px currentColor,  
    0 0 20px currentColor,  
    inset 0 0 10px rgba(255, 255, 255, 0.05);  
}
```

```
.firefly-polygon-inner {  
    background: linear-gradient(  
        45deg,  
        transparent 0%,  
        rgba(255, 255, 255, 0.05) 50%,  
        transparent 100%  
    );  
    border: 1px solid currentColor;  
    box-shadow:  
        inset 0 0 15px currentColor,  
        inset 0 0 30px currentColor;  
}
```

```
/* ===== LINE STYLES ===== */
```

```
.firefly-line {  
    position: relative;  
    height: 2px;  
    background: currentColor;  
    box-shadow:  
        0 0 5px currentColor,  
        0 0 10px currentColor,  
        0 0 20px currentColor;  
}
```

```
.firefly-line-dashed {  
    position: relative;  
    height: 2px;  
    background: repeating-linear-gradient(  
        to right,  
        currentColor 0px,  
        currentColor 10px,  
        transparent 10px,  
        transparent 20px  
    );  
    box-shadow:  
        0 0 5px currentColor,  
        0 0 10px currentColor,  
        0 0 20px currentColor;  
}
```

```

/* ===== COLOR CLASSES ===== */
.firefly-color-1 { color: var(--firefly-1); }
.firefly-color-2 { color: var(--firefly-2); }
.firefly-color-3 { color: var(--firefly-3); }
.firefly-color-4 { color: var(--firefly-4); }
.firefly-color-5 { color: var(--firefly-5); }
.firefly-color-6 { color: var(--firefly-6); }
.firefly-color-7 { color: var(--firefly-7); }
.firefly-color-8 { color: var(--firefly-8); }
.firefly-color-9 { color: var(--firefly-9); }
.firefly-color-10 { color: var(--firefly-10); }
.firefly-color-11 { color: var(--firefly-11); }
.firefly-color-12 { color: var(--firefly-12); }
.firefly-color-13 { color: var(--firefly-13); }
.firefly-color-14 { color: var(--firefly-14); }
.firefly-color-15 { color: var(--firefly-15); }
.firefly-color-16 { color: var(--firefly-16); }
.firefly-color-17 { color: var(--firefly-17); }
.firefly-color-18 { color: var(--firefly-18); }
.firefly-color-19 { color: var(--firefly-19); }
.firefly-color-20 { color: var(--firefly-20); }
.firefly-color-neutral { color: var(--firefly-neutral); }

/* ===== PERFORMANCE OPTIMIZATIONS ===== */
.firefly-point, .firefly-polygon {
  transform: translateZ(0);
  will-change: transform;
}

/* ===== ACCESSIBILITY ===== */
@media (prefers-reduced-motion: reduce) {
  .firefly-point-shimmer {
    animation: none;
  }

  .firefly-point, .firefly-polygon {
    transition: none;
  }
}

@media (prefers-contrast: high) {
  .firefly-point, .firefly-polygon {
    filter: contrast(1.5) brightness(1.2);
  }
}

```

```
}  
}
```

License & Credits

This implementation is inspired by Esri's original Firefly style for ArcGIS Pro. Created as an open-source CSS recreation for use with any mapping library.

Version: 1.0

Last Updated: August 2025

Compatibility: Modern browsers supporting CSS custom properties

For questions, updates, or contributions, please visit the project repository.