# Deployment Guide - Water Level Visualizer

## 🚀 Deploying to Netlify

This guide walks you through deploying the Water Level Visualizer mobile app to your Netlify account.

## Prerequisites

Before deploying, ensure you have:

* A [Netlify](https://netlify.com) account
* Node.js 18+ installed locally
* Netlify CLI installed: npm install -g netlify-cli

## Quick Deploy with Netlify CLI (Recommended)

### Step 1: Login to Netlify

netlify login

This will open your browser to authenticate with your Netlify account.

### Step 2: Navigate to the Project

cd tools/MobileVisualizer

### Step 3: Initialize the Site

netlify init

Follow the prompts to create a new site or link to an existing one.

### Step 4: Deploy

netlify deploy --build --prod

Your app will be deployed and you'll get a live URL! 🎉

## Alternative: Git Integration

1. **Push to Git Repository**

# If not already done, initialize git and push to your repository

cd tools/MobileVisualizer

git add .

git commit -m "Add water level visualizer mobile app"

git push origin main

1. **Connect to Netlify**
   * Log into your [Netlify dashboard](https://app.netlify.com)
   * Click "Add new site" → "Import an existing project"
   * Choose your Git provider (GitHub/GitLab/Bitbucket)
   * Select your repository containing the water level monitoring code
   * Set the base directory to: tools/MobileVisualizer
2. **Configure Build Settings**

Base directory: tools/MobileVisualizer

Build command: npm run build

Publish directory: tools/MobileVisualizer/.next

1. **Deploy**
   * Click "Deploy site"
   * Netlify will automatically build and deploy your app
   * You'll get a random URL like https://amazing-name-123456.netlify.app

### Option 2: Manual Upload

If you prefer to build locally and upload:

1. **Build the App**

cd tools/Visualizer

npm install

npm run deploy

1. **Upload to Netlify**
   * In Netlify dashboard, drag and drop the out folder to deploy
   * Or use Netlify CLI: netlify deploy --prod --dir=out

## 📱 Mobile Optimization Features

The app includes several mobile optimizations:

### **Touch Interface**

* 44px minimum touch targets
* Touch-friendly dropdowns and menus
* Gesture-based chart interactions (pan, zoom, tap)
* Optimized button spacing and sizing

### **Responsive Design**

* Mobile-first CSS with Tailwind breakpoints
* Adaptive layouts for phone/tablet/desktop
* Collapsible navigation and controls
* Touch-optimized data tables

### **Performance**

* Lazy loading of chart components
* Data downsampling for large datasets
* Efficient caching strategies
* Optimized bundle sizes

### **Offline Capability**

* Local database storage using IndexedDB/localStorage
* Service worker for caching (ready for PWA upgrade)
* Offline-first data access

## 🔧 Configuration Options

### Environment Variables (Optional)

You can set these in Netlify's environment variables section:

# App Configuration

NEXT\_PUBLIC\_APP\_NAME="Water Level Visualizer"

NEXT\_PUBLIC\_MAX\_FILE\_SIZE="104857600" # 100MB

# Analytics (optional)

NEXT\_PUBLIC\_GA\_ID="your-google-analytics-id"

# Custom Branding (optional)

NEXT\_PUBLIC\_ORGANIZATION\_NAME="Your Organization"

NEXT\_PUBLIC\_SUPPORT\_EMAIL="support@yourorg.com"

### Custom Domain (Optional)

1. In Netlify dashboard, go to "Site settings" → "Domain management"
2. Click "Add custom domain"
3. Follow instructions to configure DNS
4. Netlify will automatically provision SSL certificate

## 📊 Post-Deployment

### Testing Your Deployment

1. **Basic Functionality**
   * Upload a test database file
   * Browse wells and view data
   * Test chart interactions on mobile device
   * Try export functionality
2. **Mobile Testing**
   * Test on actual mobile devices
   * Check touch interactions work properly
   * Verify responsive design at different screen sizes
   * Test file upload on mobile browsers
3. **Performance Testing**
   * Use browser dev tools to check loading times
   * Test with large database files
   * Verify memory usage stays reasonable

### Monitoring

* Monitor site analytics in Netlify dashboard
* Check error logs in "Functions" → "Function logs"
* Use browser console to debug any client-side issues

## 🔒 Security Considerations

The app includes several security headers (configured in netlify.toml):

* X-Frame-Options: DENY
* X-Content-Type-Options: nosniff
* Referrer-Policy: strict-origin-when-cross-origin

All processing happens client-side - no data is sent to servers.

## 🐛 Troubleshooting

### Common Issues

**Build Fails**

* Check that Node.js version is 18+
* Verify all dependencies are in package.json
* Check build logs in Netlify dashboard

**App Won't Load**

* Check browser console for JavaScript errors
* Verify sql.js WASM files are loading correctly
* Try clearing browser cache

**File Upload Issues**

* Check file size limits (100MB default)
* Verify file is valid SQLite database
* Test with different browsers

**Charts Not Rendering**

* Check if device supports WebGL
* Try reducing data points in large datasets
* Verify Recharts is loading properly

### Getting Help

1. Check browser console for error messages
2. Review Netlify build logs
3. Test locally with npm run dev to isolate issues
4. Check GitHub issues for similar problems

## 🚀 Next Steps

After successful deployment:

1. **Share the URL** with your team
2. **Add to mobile home screens** for app-like experience
3. **Consider PWA features** for offline capabilities
4. **Monitor usage** and gather feedback
5. **Plan updates** based on user needs

## Quick Deploy Checklist

* Repository pushed to Git
* Netlify account created
* Repository connected to Netlify
* Build settings configured
* Deployment successful
* Mobile testing completed
* Custom domain configured (optional)
* Team access shared

Your Water Level Visualizer is now ready for field use! 📱💧