

Migrating Delaware's Official Transportation Map from CADD to GIS



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GIS Initiatives at DeIDOT

- **Statewide GIS Portal Development**
 - Shared repository of map and image services
 - A collaboration with other state agencies
- **Enterprise GIS Server Implementation**
 - ArcGIS Server 10.1
 - Set up of a public environment
- **INFORM 2.0 Project**
 - Development of a public web map gallery
- **Production Mapping Project**
 - Reproduction of all cartographic products in GIS formats

Introduction to Production Mapping Project

- DeIDOT's Principal Cartographer of 44 years has retired!
 - What is our long-term plan for mapping at DeIDOT?
 - How do we continue to produce map products with cartographic integrity while embracing GIS technology?
 - How can we maintain a high level of service to our citizens?
- The Production Mapping Project will transition all of DeIDOT's map products from CADD to GIS format over a few years.
 - A completely in-house effort using staff expertise
 - It began with our Official Transportation & Tourism Map
 - It is an ongoing project...

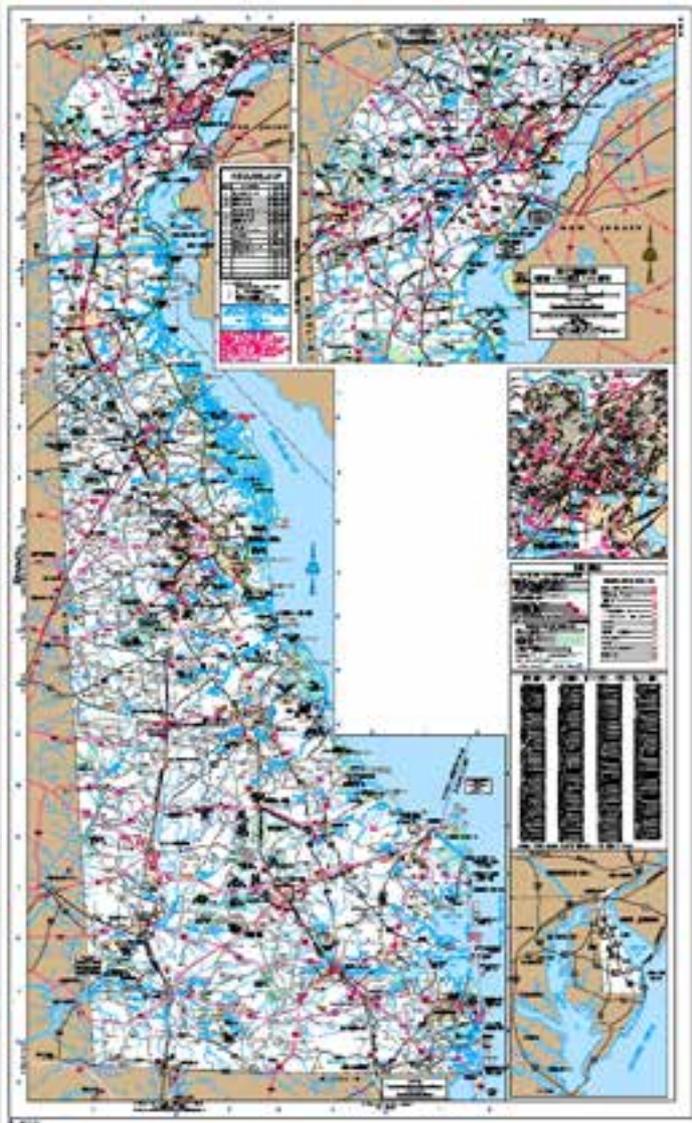
Introduction to Production Mapping Project

- **Goals:**
 - Replicate our cartographic products in GIS
 - Utilize shared data and map services from authoritative sources
 - Stop working with static copies of data where possible
 - Merge the Cartography staff and the GIS staff for efficiency
 - Improve the integrity of our data through QA/QC
- **Current Status of Transportation & Tourism Map:**
 - Majority of data has been compiled and first draft of statewide map is nearly complete
 - We are in a fine-tuning stage
 - Actively seeking feedback from other cartographers

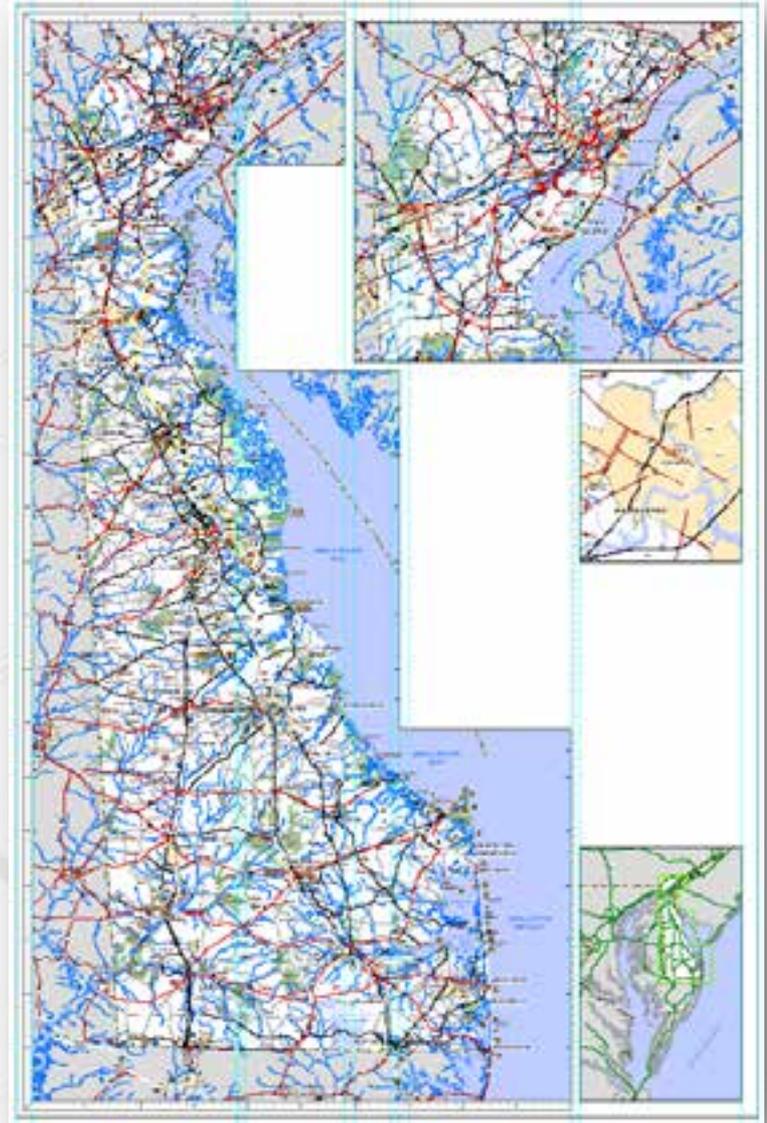
Project Kickoff

- Studied current Microstation map to identify data layers
 - Roads, RRs, municipalities, emergency services, water, protected lands, points of interest, recreational activities, etc.
- Used ArcMap to mimic the layout of current Microstation map
 - Created data frames for statewide map and insets
 - Incorporated space for ancillary content
- Geo-referenced our current map for use as a reference layer
- Examined our current GIS data for accuracy and completeness
 - Identified GIS layers that need to be updated
- Identified several ArcGIS tools useful for cartography

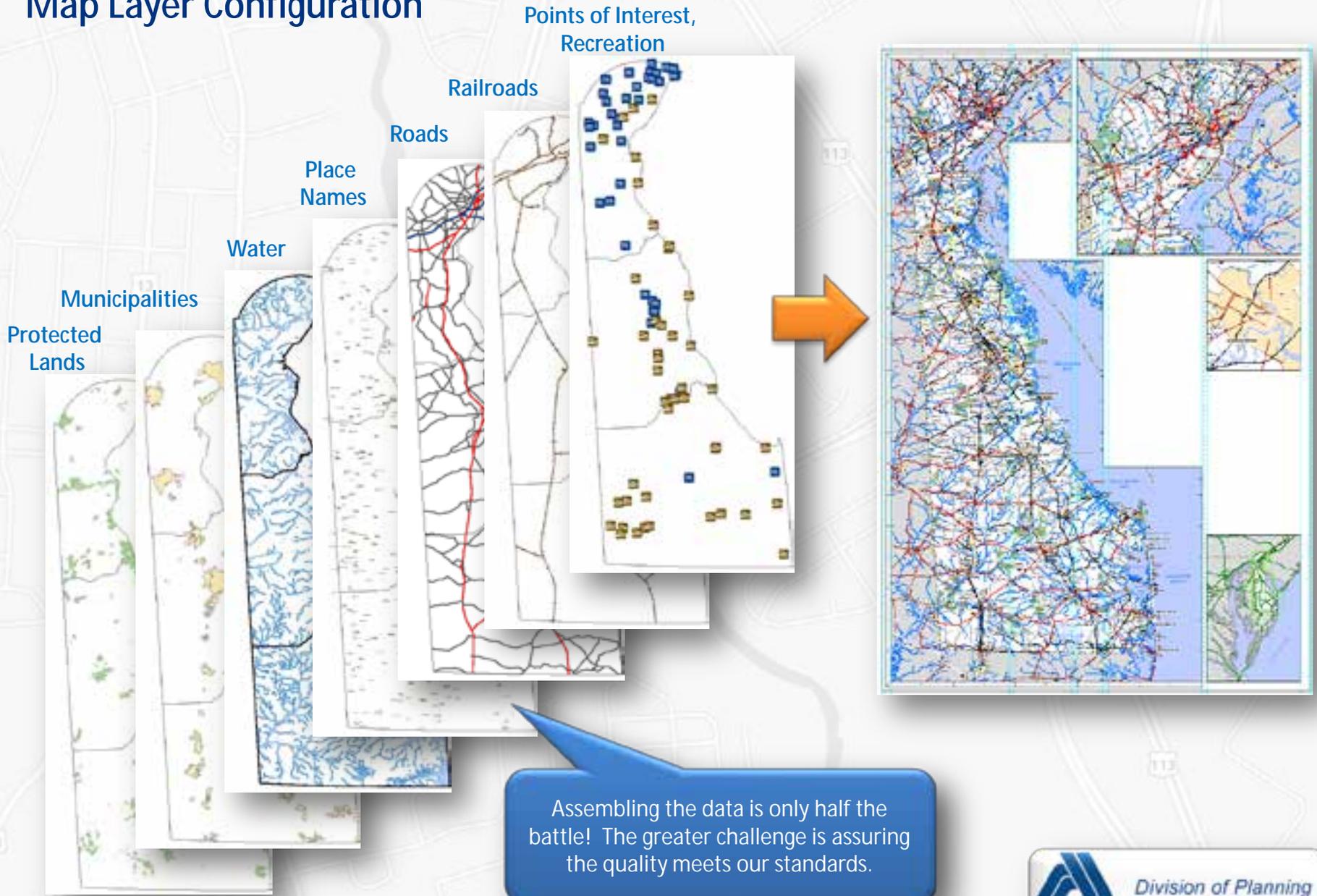
Microstation



ArcMap



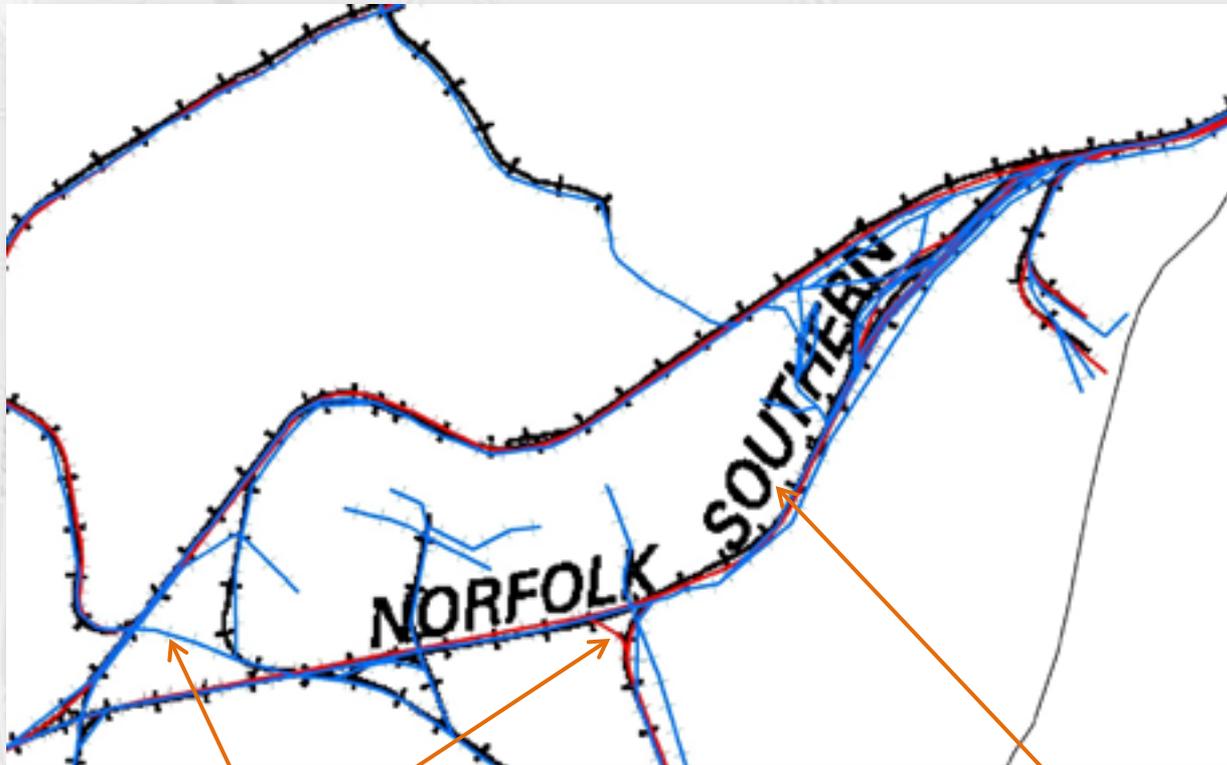
Map Layer Configuration



Assembling the data is only half the battle! The greater challenge is assuring the quality meets our standards.

Map Layer Configuration - Challenges

Example: Railroad data



- Multiple data sources
- Varying extent of feature detail
- Varying geographical accuracy

Reference - Overlay of
railroads from current map

Cartographic Refinement

Development of New Style Files



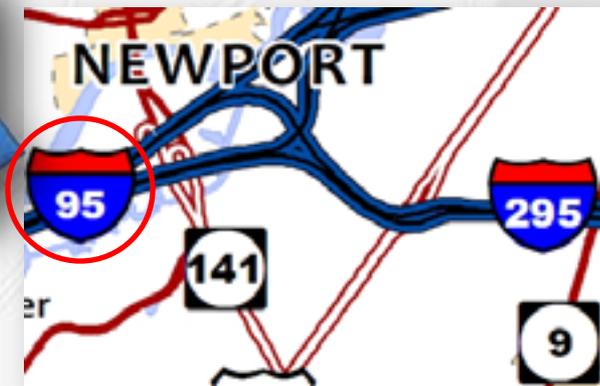
Original interstate shield symbols



A lofty goal: state specific road shields!

DeIDOT's new shield style: bitmap images as picture marker symbols

Default ArcMap interstate shield



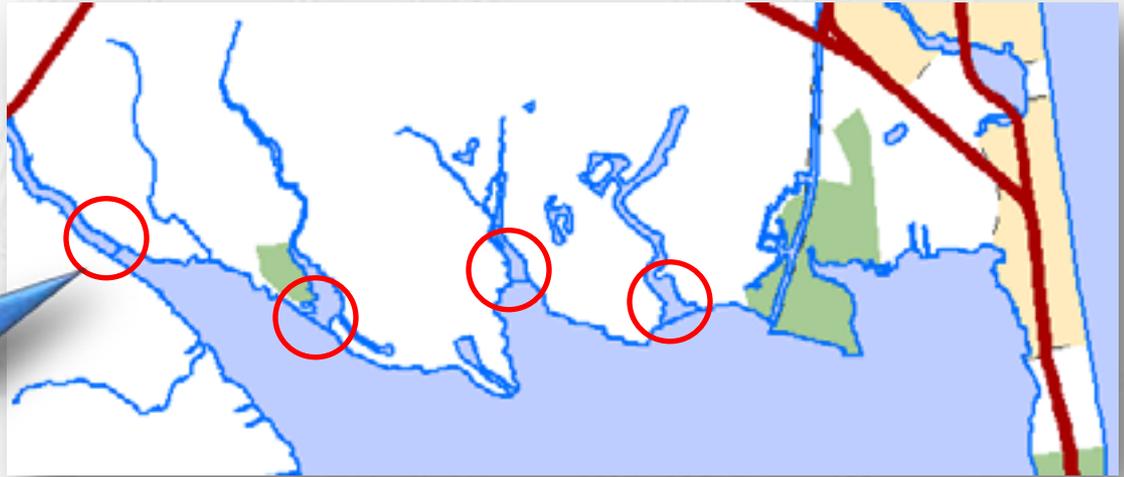
Cartographic Refinement

Use of Complex Layer Symbolology

It's difficult to symbolize water polygons with both fills and outlines. To achieve the proper look, it's necessary to mask inner lines but keep outer lines.

Solution: create a group layer with stacked layers

- multiple layer instances (with different settings)
- custom masking layers
- representations for individual problem areas
- link to attributes is not broken (for labeling)



Cartographic Refinement

Use of Representation Tools

Original symbol arrangement on CADD map



GIS symbols draw on actual geographic XY locations



Symbols neatly arranged using representation dispersion tools

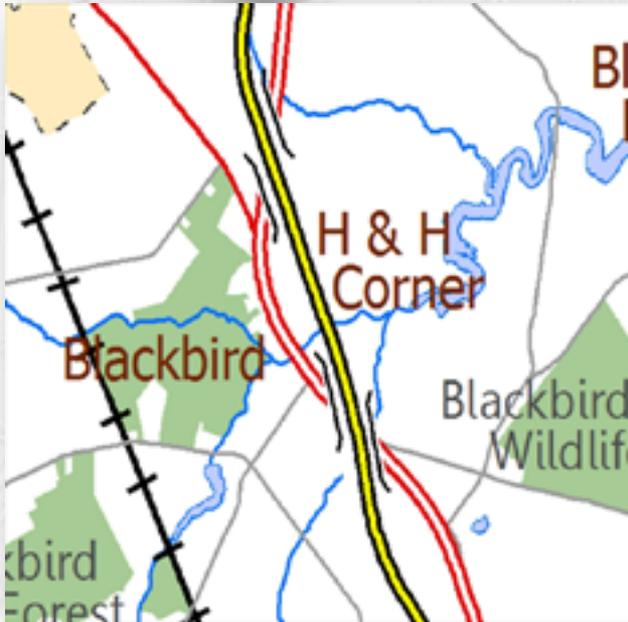
Underlying locations remain unchanged; only the symbols move



Cartographic Refinement

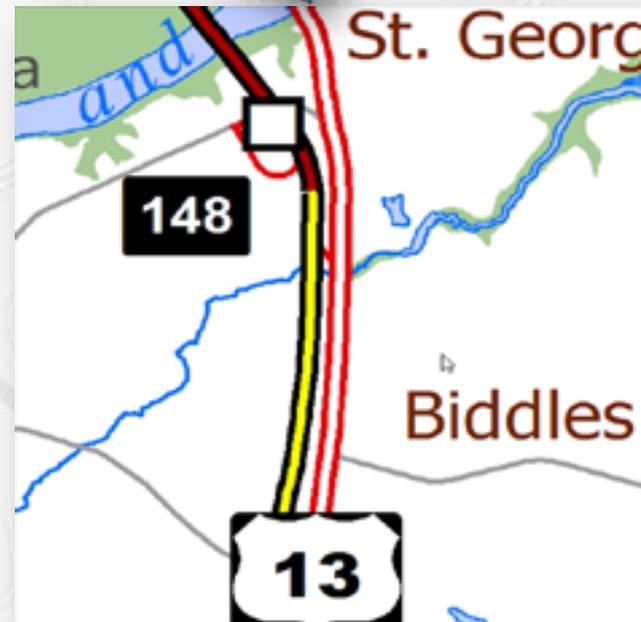
Use of Representation Tools

Overpass symbology created with multiple representations – angled side sections, centerlines, background masks

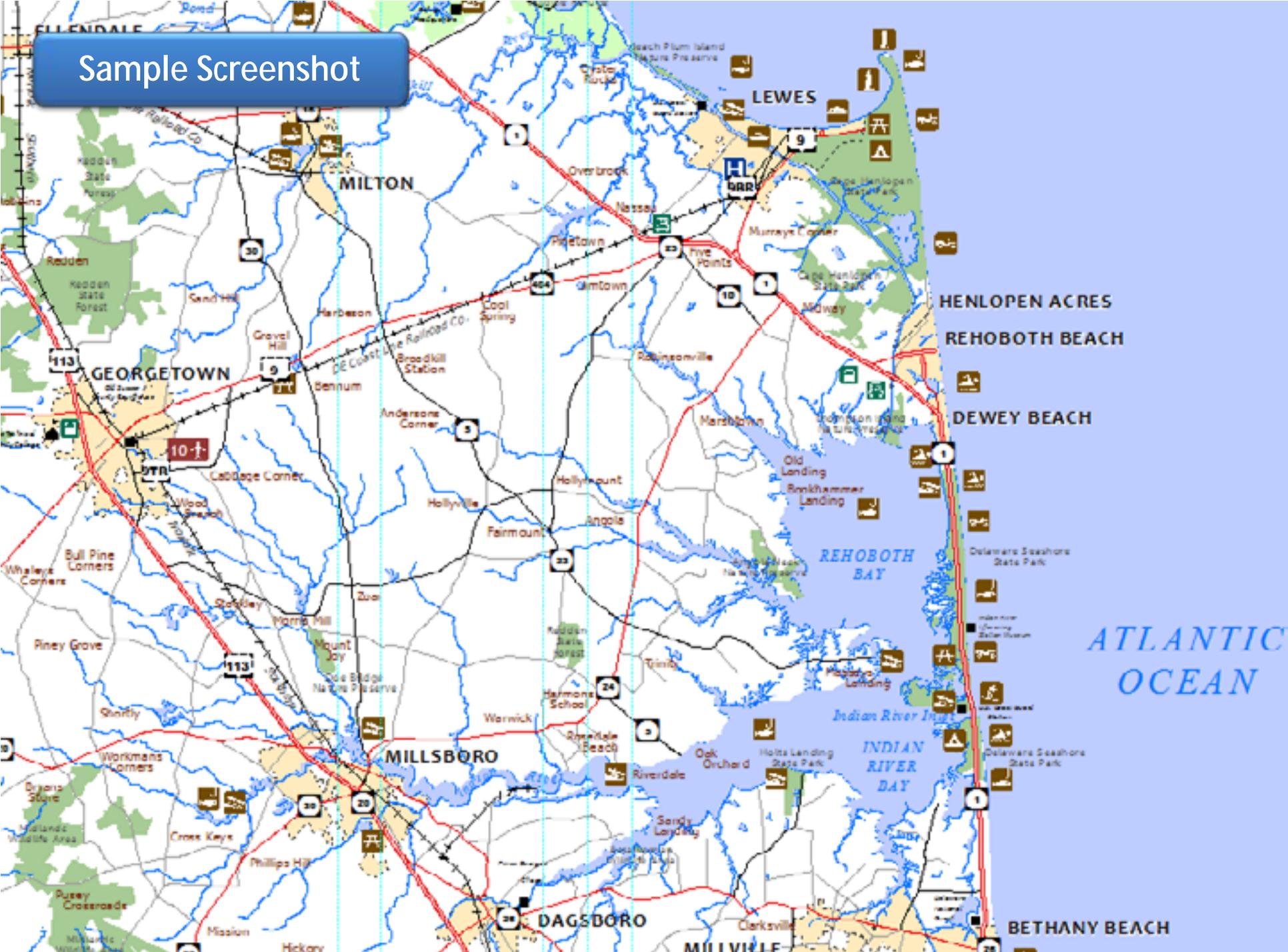


Some parallel roads appear too close together to symbolize properly.

Road symbology spread apart using representation tools; underlying road data remain unchanged.



Sample Screenshot



Next Steps

Continue Data Configuration

- Maintain current data quality and make necessary improvements
- Edit advanced symbology and labeling
 - Continue development of annotation for selected layers
- Shift data into enterprise geodatabase

Finalize Page Layout

- Integrate map output with design software
- Incorporate ancillary tables, indexes and graphics
- Coordinate with Tourism Office for photo content

Develop Transition Plan

- Create timeline for phase-out of CADD products
- Renegotiate printing contracts
- Finalize Production Date

Future Benefits to Delaware

- Better quality data will be provided to our customers.
- State agency users will have more complete base data for projects.
- Symbology style files will be created for use by the GIS community.
- Project data will be published as map services.
 - The Official Transportation Map will become a cached base map service.
 - A series of theme-specific tiled base maps will be produced.
(i.e. environmental, transportation, recreational)
- Our customers will have improved access to travel information.

Questions/Comments?

Please contact us to share information about your experience with cartography in ArcGIS. We are interested in your challenges, solutions, discoveries and any best practices that have helped your organization.

Also, we are willing to share our experience with other organizations that are working on similar projects.

Contact Information:

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