

Integration of Local & Forest Service Roadway Data into CDOT's GIS Database

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CDOT's Local Road Mileage Certification Program

- CDOT annually updates a local roads GIS layer and road characteristics database.
- Used to allocate \$250M/year of Gas Tax \$ to local governments for road maintenance.
- Local agencies have a strong incentive to report new roads – \$1,500/mile/year!

“Traditional” Update Method

- CDOT annually gathers change data on local roads:
 - Maps and reports are sent to 331 local govts. for review.
 - Local staff write on reports, draw on maps, fill out forms, gather plats and return it all to CDOT for processing.
- Then CDOT updates the tabular DB and GIS layers:
 - New roads are digitized by CDOT staff from plat maps.
 - Attributes for new roads and attribute changes for existing roads are key-entered to a tabular database.

Local Government Responsibilities

- Review existing road inventory & GIS data
- Provide information on system changes:
 - Jurisdiction changes (e.g. Annexations)
 - Condition changes (e.g. Good to Fair)
 - Characteristic changes (e.g. widened, resurfaced)
 - New facilities and abandonments
- Certify system as of 12/31 of each year – must be signed by Mayor or Chair of BOCC

The Vision

- A single shared GIS local roads layer, cooperatively maintained by CDOT & Colorado local jurisdictions, including participating National Forests.
- Local agencies and NF GIS staff:
 - Update GIS and attribute data for their area;
 - As part of their normal business processes.
- CDOT:
 - Integrates local data into a seamless statewide layer;
 - Produces data where there is no local partner;
 - Reconciles mismatches between jurisdictions; and,
 - Publish statewide transportation data products.

Past, Present and Future Directions

- An intergovernmental information system:
 - Automated on CDOT's end– GIS and DBMS
 - Paper-based on the local end.
- Transitioning to a fully automated system:
 - Electronic reporting of characteristic changes
 - GIS-based reporting of new centerlines.
- Whose goal is a fully-integrated database:
 - GIS Layers;
 - Tabular Databases; and,
 - Pavement Management Systems.

Levels of Integration

- 1) None. Separate databases, no data sharing.
- 2) Local data provided to CDOT & Snapped.
- 3) A single, shared GIS layer linked to the road characteristics database.

Separate GIS Databases Maintained

- Local govt. provides GIS data in known datum, projection and coordinate system.
- CDOT snaps our GIS layers to local data and copies in new features.
- CDOT Attributes and segmentation are preserved.
- 50 jurisdictions have shared centerlines or boundaries with CDOT to date.

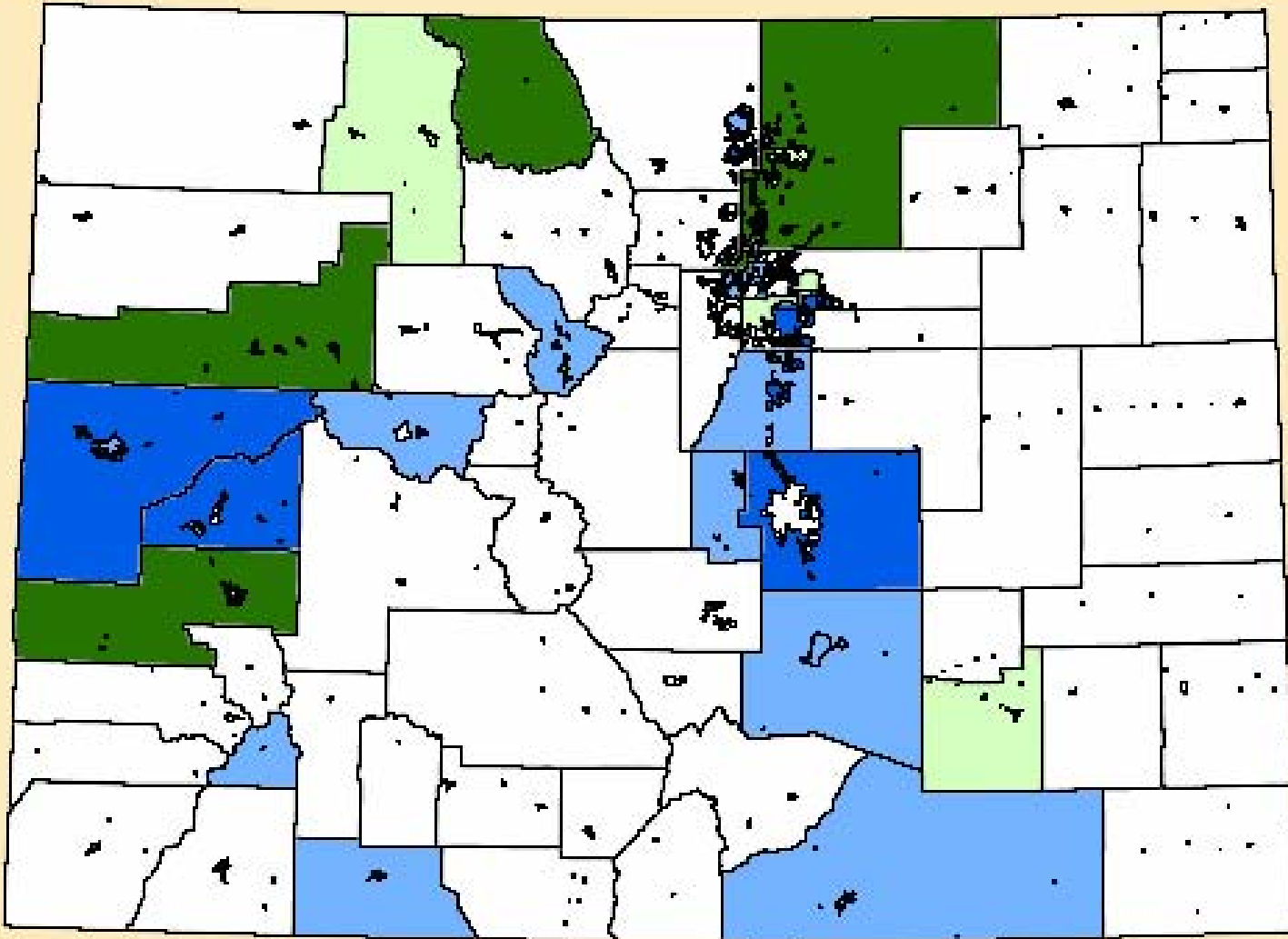
Integrated/shared State/local/USFS DB and GIS layers

- Many variations are possible, depending on:
 - local data availability,
 - system compatibility,
 - local capabilities, etc.
- **Completed:** 4 Counties and 4 Cities.
- **In Planning:** 2 Counties and 6 Cities.

Benefits of developing an **Integrated *State/Local DB and GIS***

- Most reporting requirements can be met as *byproducts* of ongoing local activities.
- Improved accuracy of inventory information.
- Inventory data available for GIS applications.
- Reduced workload for local agencies & CDOT.
- Local GIS data sharing via CDOT website.
- Better product freely available to the public.

Status of Local Centerline Data Integration



Legend

-  County
-  City
-  Linked
-  Link In Progress
-  Link Planned
-  Snapped
-  Awaiting Snap



Integration of Forest Highways into CDOT's database (Phase 1)

- CDOT staff have added a “For_Hwy_Num” event to the highways and local roads layers.
- Linear referencing measures are included.
- CDOT centerlines will be snapped to FHWA GPS data for Forest Highways after clean up.
- FHWA staff will use CDOT GIS Layers for data gathering and reporting applications.
- FHWA Public lands wishes to develop similar approaches in 10 states in the western region.

Phase 2: Inclusion of All Forest Routes into CDOT's GIS database

- National Forests will be invited to provide Forest Route data to the roads GIS layer.
- A shared GIS layer will be supported where NF's provide ongoing stewardship.
- Annual updates for Forest Routes will be done along with road certification process

Proposed Roles as per the NSDI - National Spatial Data Infrastructure

- Local Governments and National Forests:
 - “Data Producer” and “Data Steward”.
 - “Data Distributor”, if desired.
- CDOT:
 - “Area Integrator”, collating and homogenizing local layers into a seamless, statewide coverage.
 - “Producer of Last Resort” where no local producer
 - “Data Distributor” via the CDOT web site.

CO Local Roads Data Committee:

*A community-based initiative
to facilitate the use
of GIS in Transportation*

GIS Colorado:

*A grass-roots, professional
organization of GIS users*

Colorado Local Roads Data Committee

- Sponsored by GIS Colorado.
- NF Staff will be invited to participate.
- Potential roles for COLRDC:
 - Developing Standards.
 - Designing data transfer methods.
 - Providing technical assistance.

Local Roads Data Standards

- Content
- Structure
- Coding
- Accuracy
- Currency
- Completeness
- *A variety of approaches for different situations.*

Conclusion

- CDOT has successfully run a centralized program for 20 years.
- Higher accuracy local and FS data is becoming increasingly available.
- Pilot projects have shown that a shared GIS layer is feasible and beneficial.
- With the help of local partners, we are ready to go fully operational!