Developing the TMDL Land Use Layer

Tahoe TMDL Symposium

December 9, 2004

Presented by:

John Riverson

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Presentation Outline

- Critical role of GIS in TMDL watershed modeling
- GIS Layer Needs for TMDL
- Major contributions since the initial 2001 TRG attempt to consolidate
- Collective work of D-team to fill in gaps
- Current status of composite landuse layer used for TMDL
- Questions

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Critical Role of GIS for TMDL

- How GIS is being used
  - It's more than just creating maps
  - Perform spatial analysis and prepare model inputs
- Examples of important layers include:
  - Land use/land cover
  - Hydrography
  - Weather stations
  - Soils
  - Topography/elevation
  - Monitoring locations
- Examples of derived analysis include:
  - Subwatershed delineation
  - Land use-soil overlay
  - Degree of land disturbance
  - Weather patterns
  - Slope

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GIS Layer Needs for TMDL

- A comprehensive map of Tahoe Basin land uses from a water quality modeling perspective
- Greater detail supporting representation of land management practices in vegetated areas (Which comprise >80% of basin)
- Updated information on recent landuse changes

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Major Contributions since 2001 TRG Consolidation Effort

- TRPA/Lake Tahoe GIS Users Group
  - Ownership parcel delineation
  - IKONOS Impervious layer development
- Forest Service
  - Basin-wide roads and trails layers update
  - Vegetative cover updates
  - ERAs for burned and harvested lands

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D-Team Involvement & Contributors

- LRWQCB
  - Jack Landy
  - Dave Roberts
  - Tom Gavigan
- NDEP
  - Jason Kuchnicki
- Forest Service
  - Sue Norman
  - Denise Downie
  - Kurt Teuber
- DRI
  - Tim Minor
- TRPA
  - Larry Benoit
  - Sean Dougan
- CTC
  - Judy Clot
  - Dan Moses
  - Kim Carr
- UC Davis
  - John Reuter
- Tetra Tech, Inc.
  - John Riverson
  - Jeff Dorman
  - Patrick Solomon

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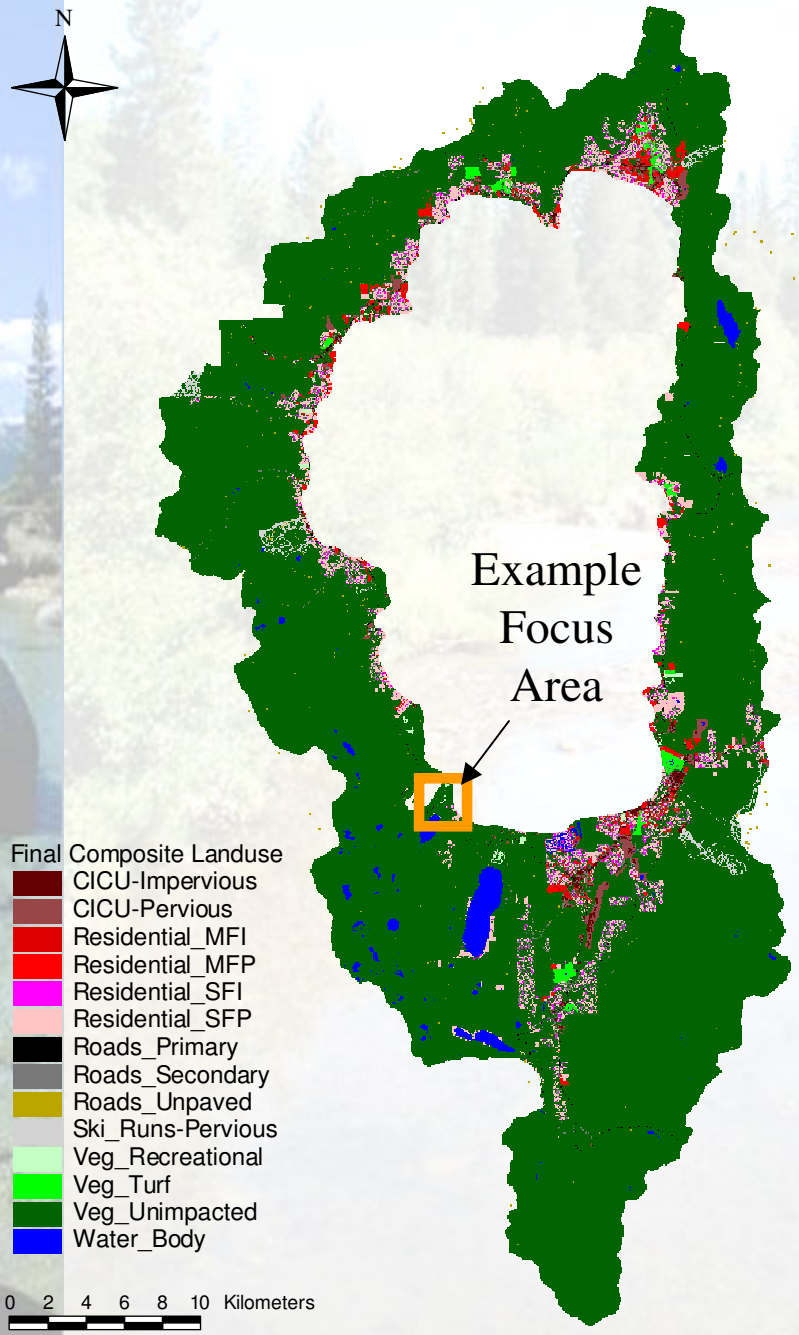

Individual layers used to create TMDL land use layer

1. TRPA land parcels
2. Ski run delineations
3. Delineated campgrounds
4. IKONOS hard-cover impervious grid
5. Roads and Trails
   - Forest Service roads and trails
   - CTC roads and trails
   - Nevada State Parks roads and trails
6. LTBMU Harvested Forest Boundaries
7. LTBMU & CTC forest fire boundaries (natural and prescribed)

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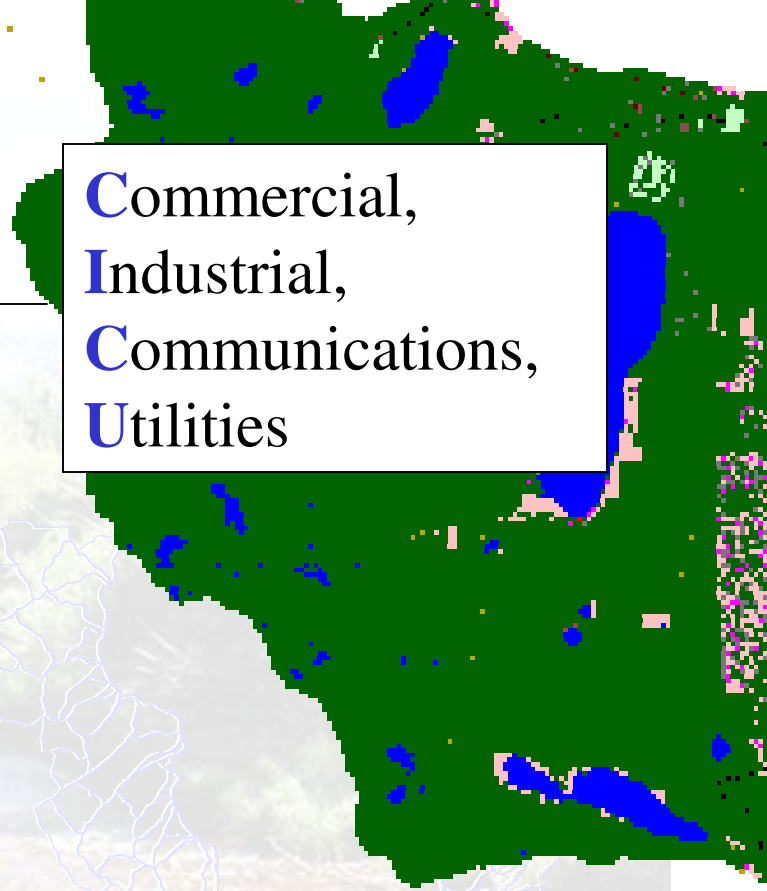
Final Composite Landuse

- CICU-Impervious
- CICU-Pervious
- Residential_MFI
- Residential_MFP
- Residential_SFI
- Residential_SFP
- Roads_Primary
- Roads_Secondary
- Roads_Unpaved
- Ski_Runs-Pervious
- Veg_Recreational
- Veg_Turf
- Veg_Unimpacted
- Water_Body

Commercial,
Industrial,
Communications,
Utilities



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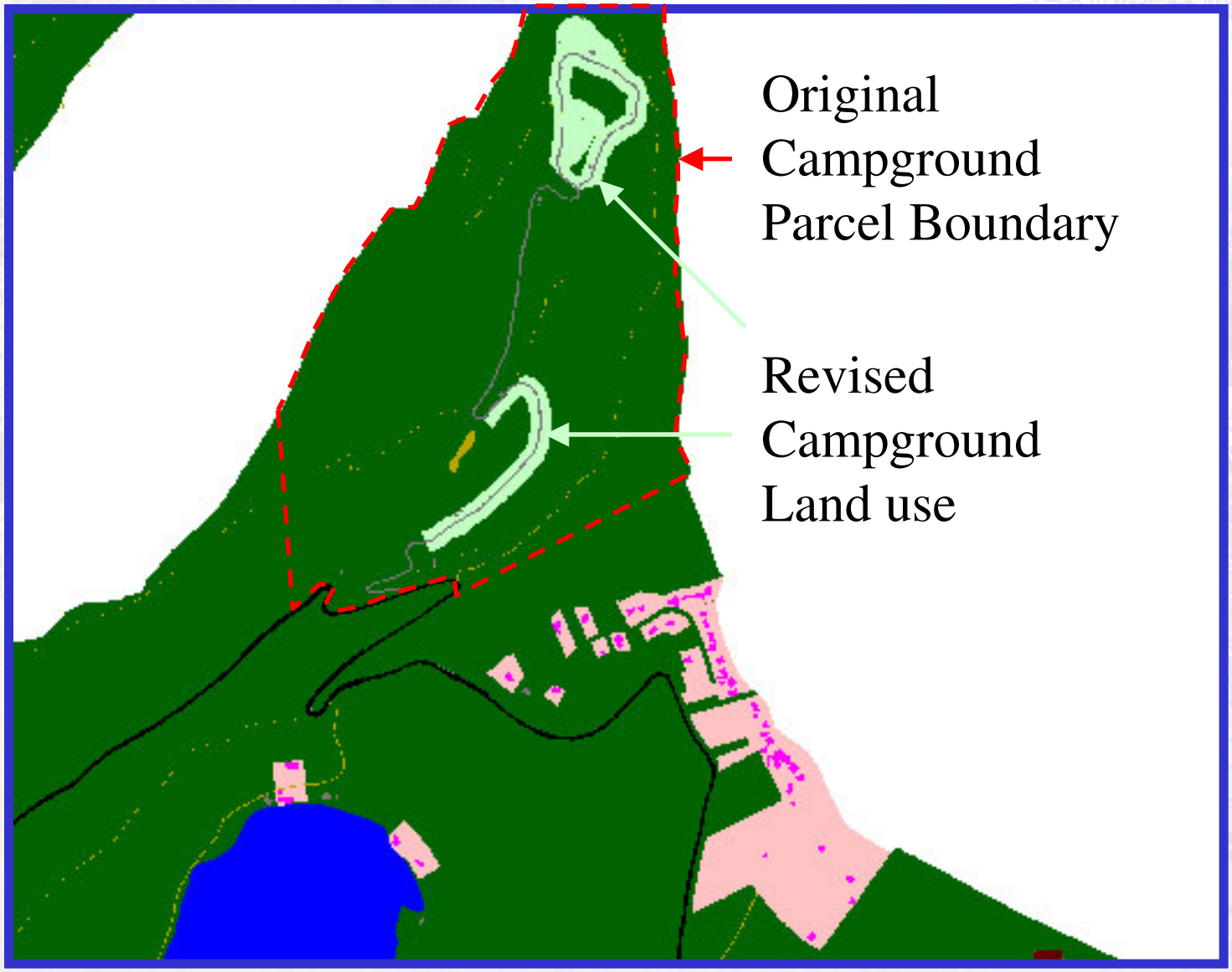
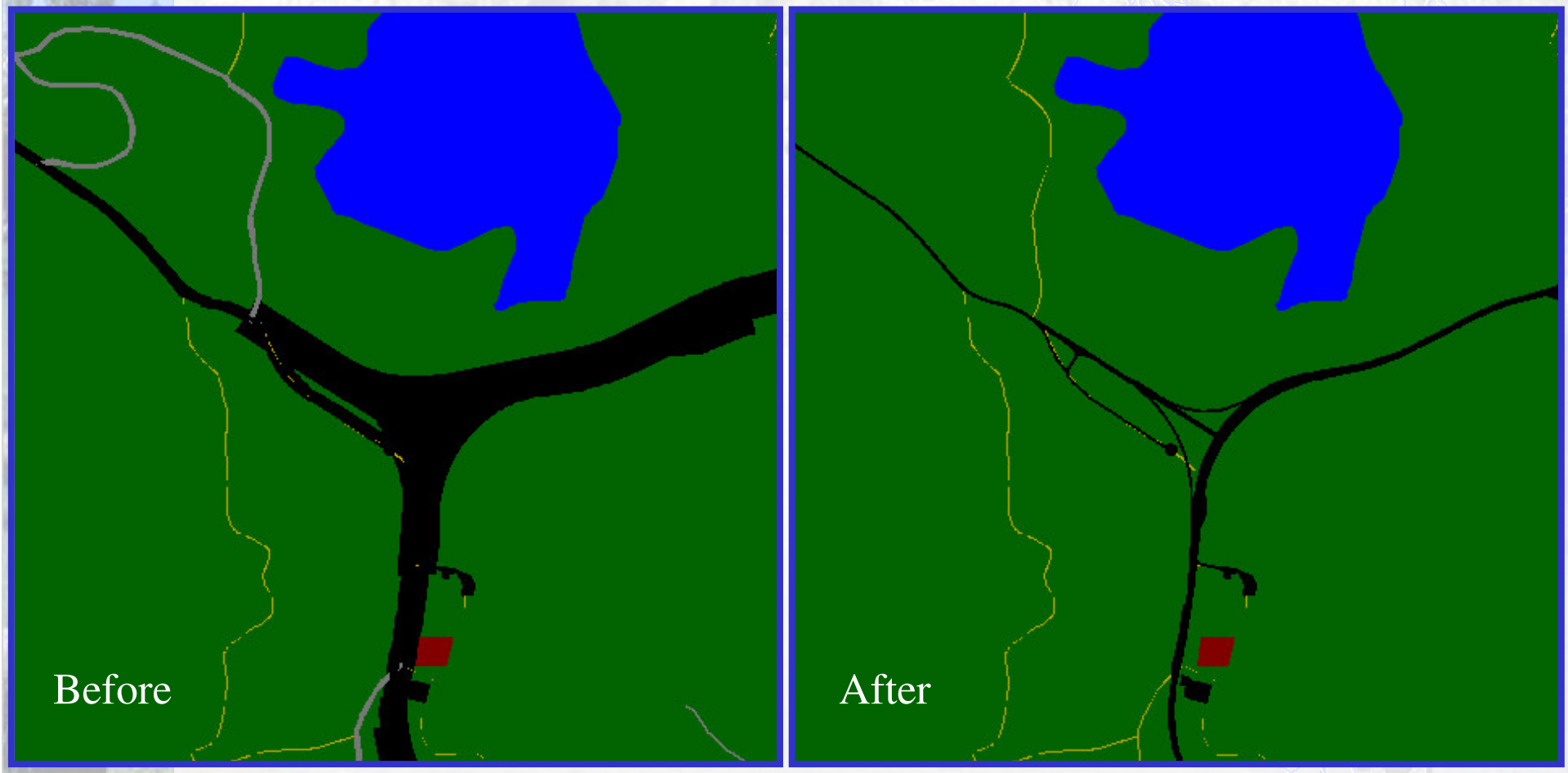
Parcel Boundary *vs.* Actual Land Use



Parcel Boundary *vs.* Actual Land Use



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How do we best represent Roads?

- Unpaved Roads & Trails
  - Surface cover and width information available from LTBMU's INFRA database
  - Basinwide average trail width (2 ft)
- Primary & Secondary Roads
  - Highways represented primary roads
  - IKONOS hard-cover grid generally gives best representation of secondary roads widths

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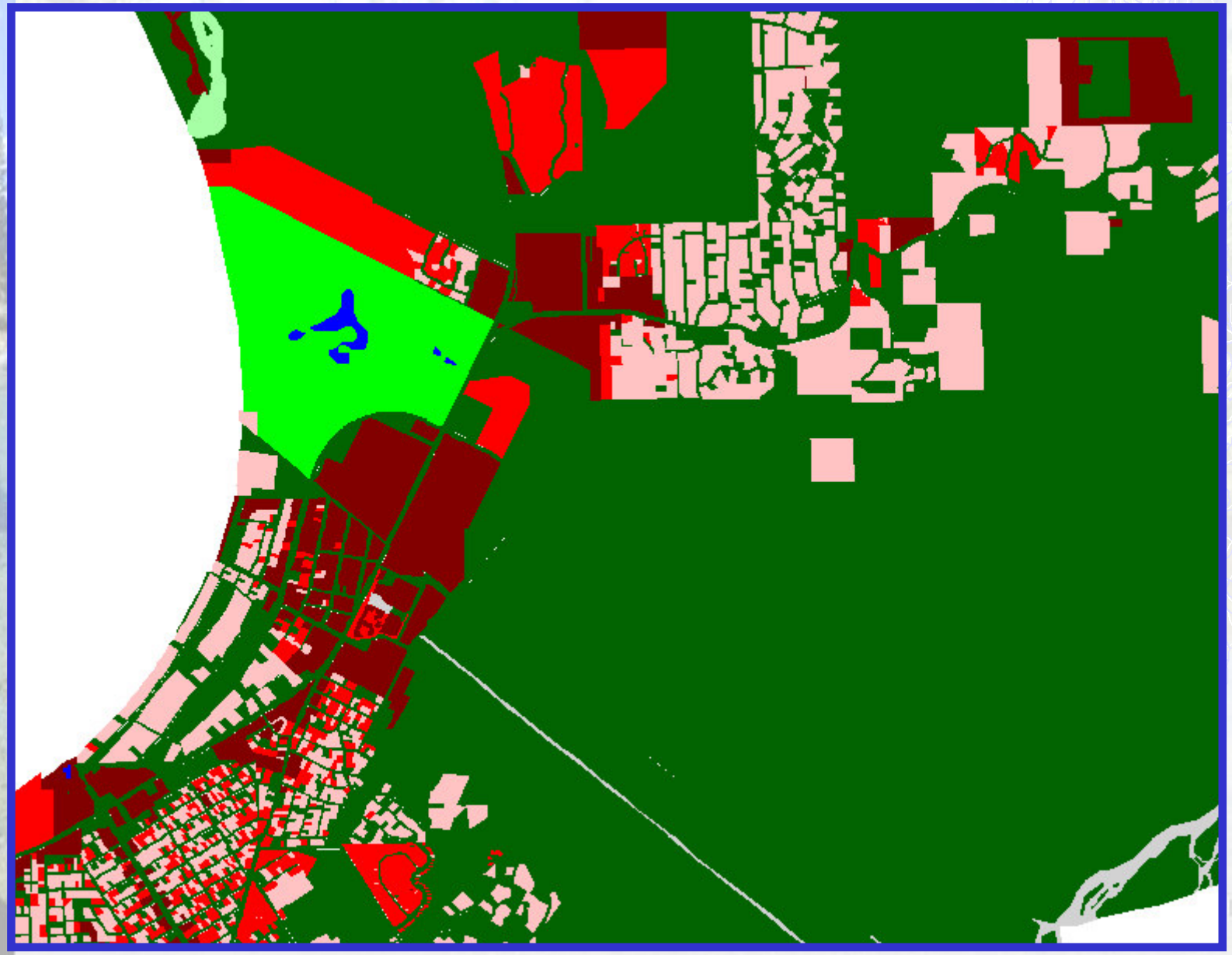
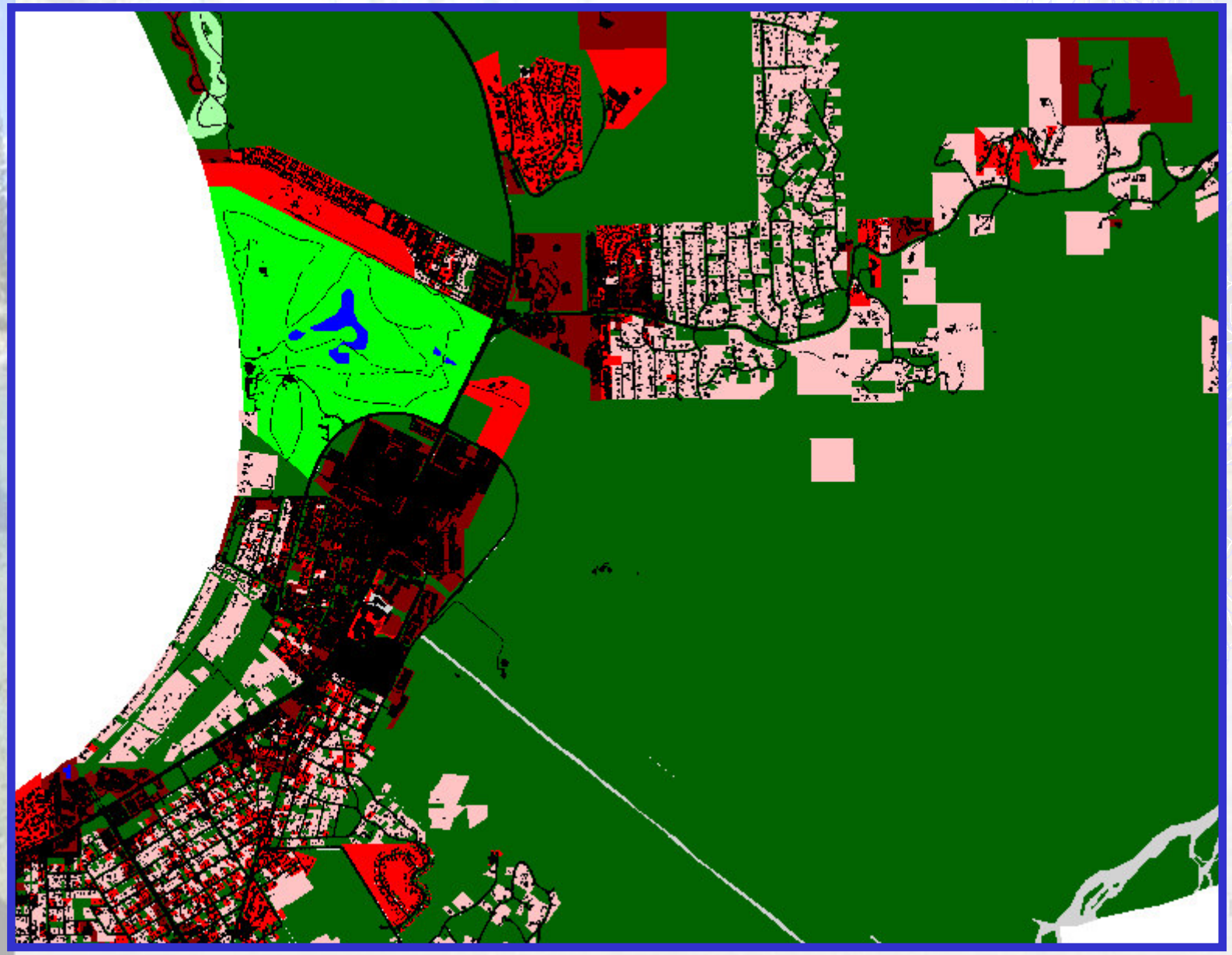
A little Closer-to-Home…

1. Edit parcel boundary layer

2. Superimpose campgrounds



3. Superimpose hard-cover layer

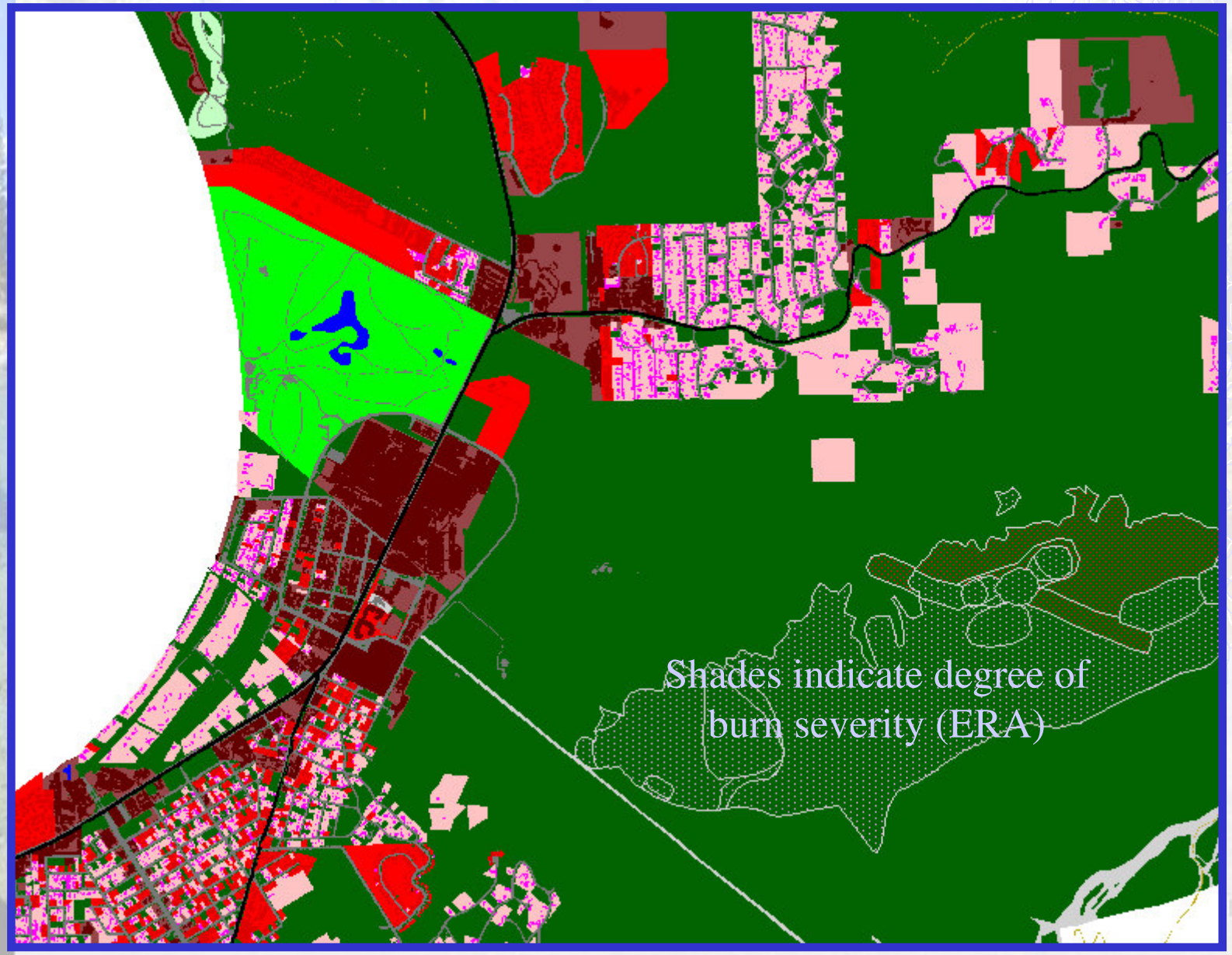


4. Differentiate hard-cover intersects

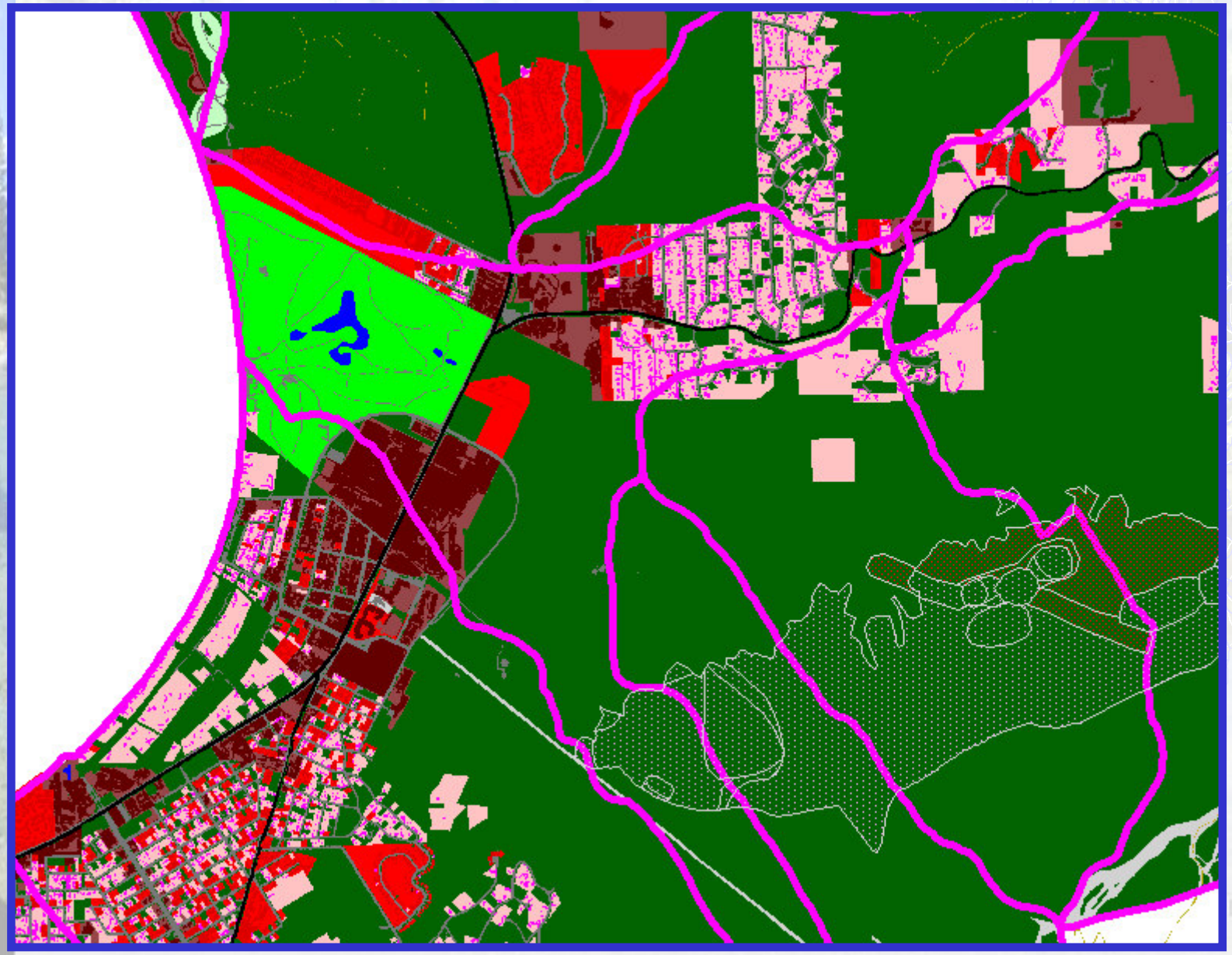
- Distinguish primary (highways) and secondary roads grid cells
- Impervious grids intersecting any urban category becomes impervious counterpart (*i.e.* Residential pervious & impervious)
- Any few remaining hard-cover in vegetated lands is considered *Secondary Road*

5. Overlay unpaved roads & trails

6. Overlay harvested & burned area



7. Tabulate land use area by subbasin



Current status of composite landuse layer used for TMDL

- Spatially consistent with previous land use layers

Thank you for the Tabulated SWM [landuse] areas. I am going to compare them to our old matrix - I bet there is great improvement!

– Andrea Parra, UC Davis TRG

The layer looks great! I was relieved to see how well this layer matched up with our… 2002. [The layer] is going to be really helpful in increasing our initial accuracy as well as speed-up the interpretation process.

– Christian Raumann (USGS)

- In many areas, higher level of detail and accuracy
- Identified selected items for refinement for next phase of the TMDL
  - Refine roads in selected areas
  - Revisit parcel boundary vs. actual land use for other categories (*i.e.* single & multi-family residential lots)

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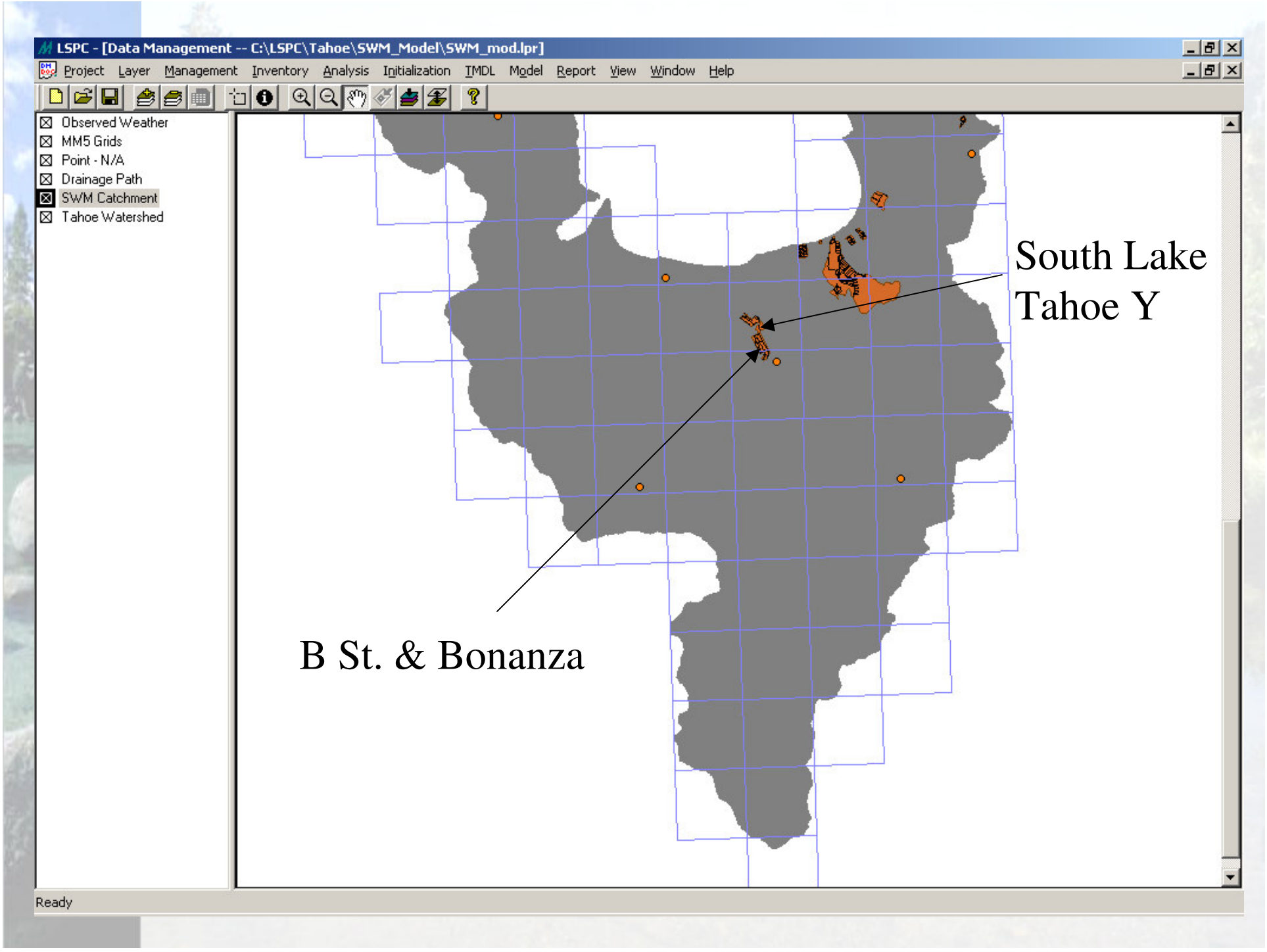
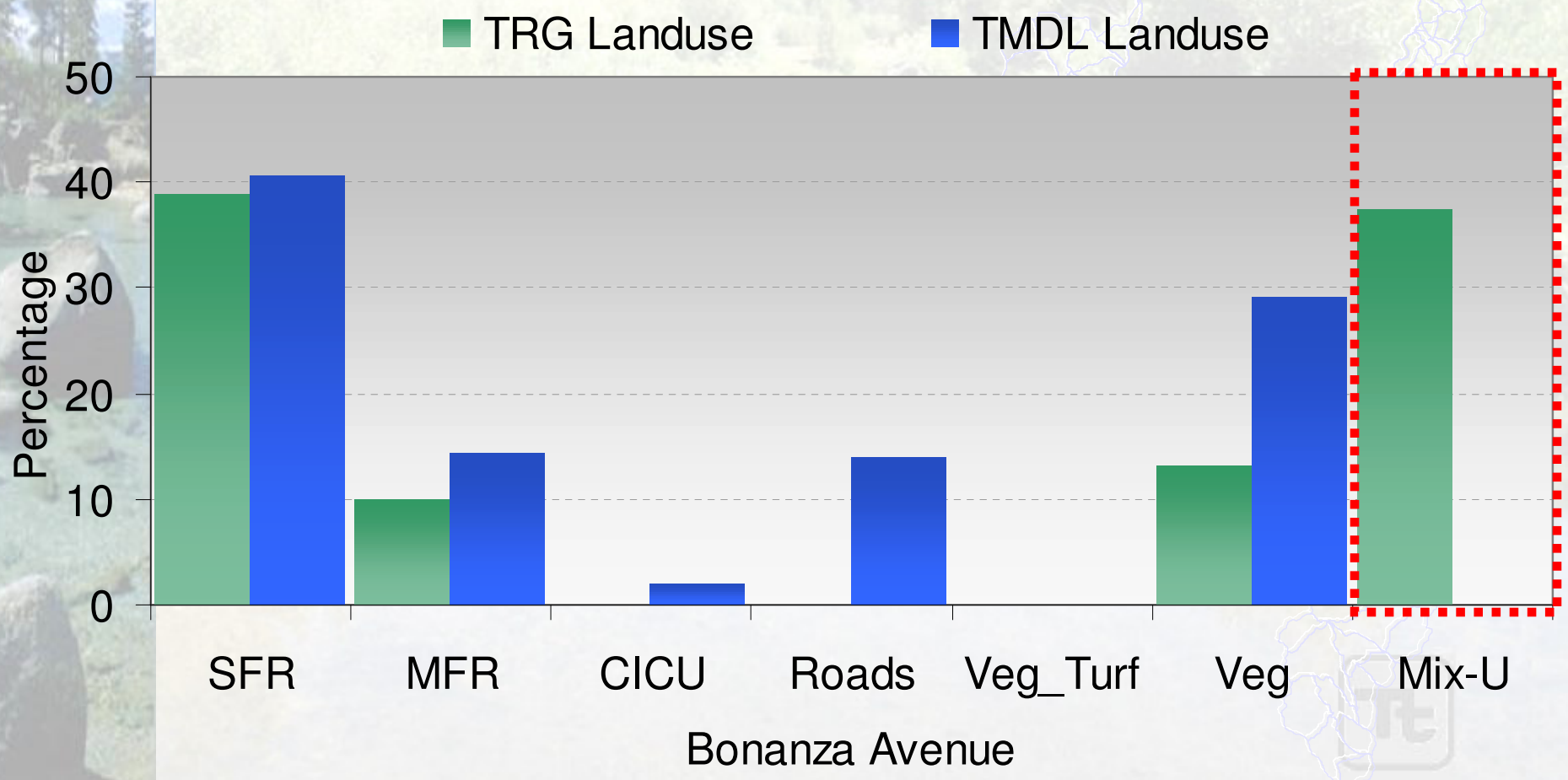

LSPC - [Data Management -- C:\LSPC\Tahoe\SWM_Model\SWM_mod.lpr]
Project Layer Management Inventory Analysis Initialization TMDL Model Report View Window Help
Observed Weather
MM5 Grids
Point - N/A
Drainage Path
SWM Catchment
Tahoe Watershed
South Lake Tahoe Y
B St. & Bonanza
Ready

Landuse – Bonanza Avenue

TMDL Layer

Previous Layer

Landuse Comparison
Bonanza Avenue



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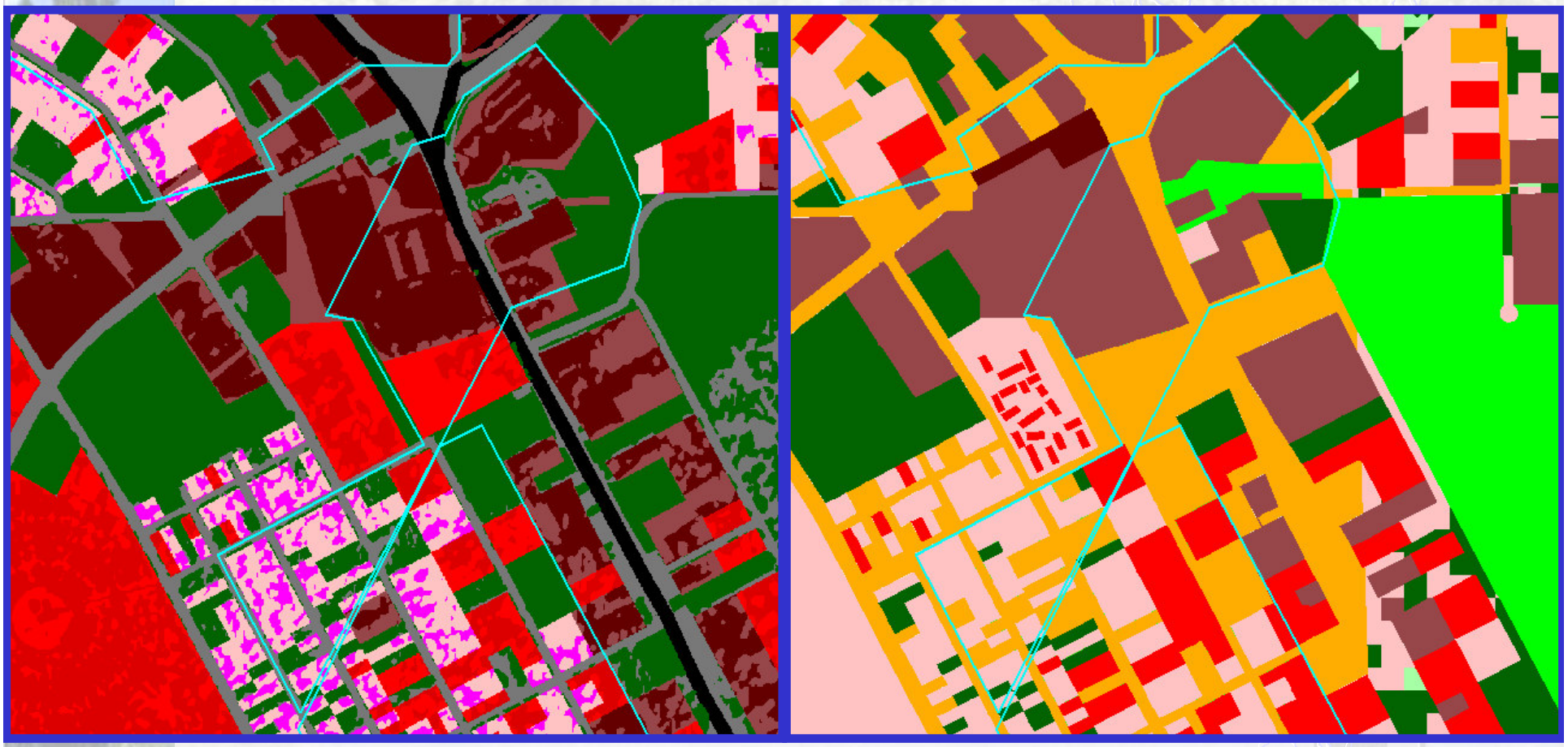
Landuse – South Lake Tahoe Y



TMDL Layer

Previous Layer

Thank You

Questions?

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