Creating a Vision for the lower Poudre River: Back to Native or Forward to a Modern Alternative?

Jen Shanahan, Environmental Planner

City of Fort Collins Natural Areas Progam

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Where is the lower Poudre River?

- Northern Front Range
- Approx 30 miles
- From its exit from the mountain (canyon mouth) through Fort Collins to Windsor

Jurisdictional Context

- Larimer County, LaPorte, Fort Collins, Timnath, Windsor
- Agriculture, urban, minimal industry

- City of Fort Collins Natural Areas Program (NAP)
- NAP owns large portion of the floodplain within the city


Canyon mouth
Fort Collins
Windsor
HIGHWAY 14
RIST CANYON
HIGHWAY 287
SHIELDS
COLLEGE
RIVERSIDE
MULBERRY
PROSPECT
TIMBERLINE
HORSETOOTH
HARMONY
INTERSTATE 25
COUNTY ROAD 32
MAIN

A little background- the beginning

- Field work conducted to understand current conditions for a Natural Areas Management Plan for properties along the Poudre
- Data indicated plains cottonwood regenerating by single stems, spotty fashion. The few patches of dense young stands occurred where river moved to new channel 20 years ago
  - This reach is a transition zone- narrowleaf cottonwood to plains cottonwood

Riparian forest themes

- Forests are relics of earlier conditions
- Missing elements:
  - Topography
  - Younger age classes lacking for important native trees (specifically plains cottonwood)
  - Lack of scouring (anywhere)
- Urban context
  - Competition from landscape plants

My initial thoughts…

- Plains cottonwood is the keystone species,
  - Plains cottonwoods depend on 1. high flows and 2. lateral river channel movement
    - We need to move beyond our jurisdictional comfort zone and enter broader discussions

- Hhhmmmmmm…..

What about the urban reality? Its confined.

- Everyone wants to stabilize the banks… without lateral channel movement plains cottonwood is unlikely to reproduce in quantities large pulses.

- “Maybe we need to let go of the keystone species?”
- “Let go of plains cottonwood???”

- For what? Towards what?

Stop looking back, look only forward

- Management of urban rivers requires a novel creative approach.
- Let's be proactive and develop a vision.
- Let's figure out what we can do with what we've got and make the most of it-
- Bring in the scientists, make a model to predict probable future states.

Creating a vision for the Poudre River

1. What does the city want for the river?
2. What does the river need to maintain ecological health?
3. To continue to be a community asset?

Inputs to the Poudre River are changing

- Which way will it change? This is the question we want to answer.

- Several inputs/influences are changing, so there are a variety of ways the Poudre River ecosystem could go.

Evolution…

- Ecosystems are always changing, but today's river systems are being asked to change at lightening speed (relatively speaking)
- The Poudre River is susceptible to losing complexity, ability to be resilient, maintain some resemblance to native condition.
- If we can predict the future, and chose the most resilient option, we can work to nudge it gently in that direction.

Close the door -this is only step 1…

- Let the ecologists and engineers work- most effective use of their time, creative and productive.
- Organisms and ecosystems are going to have a certain response regardless of the cause for the conditions.
- This conversation is limited to ecology. We acknowledge we are working in a bubble by (for the moment) excluding politics, water law, water resources, and diverse group of stakeholders in the Poudre basin.. Acknowledge all of this is fundamental to the future of the Poudre.
- Afterwards (step 2), bring in the human reality and start piecing together a solution by identifying low hanging fruit and biggest hurdles.

Applications

- Provide the City with a decision making tool based on science to help navigate the plethora of projects (local and regional) as they come to the table.
- Unite the various city departments under a vision that *we want,* instead of always talking about *what we don't want.*
- Have a template to be able to quickly use, understand and respond to new studies and new data.
- Sensible planning with in-stream flow acquisition.
- Specific management of conserved land in the floodplain.

Developing the team

- 8 highly recognized expert river scientists

- CSU
- USFS
- USGS

Photo by Aran Meyer

Building a model- Concerns

- Riparian processes not working to sustain native forest
- Aquatic habitat is increasingly degraded downstream
- Diversions, river is split, extremely low levels and volatility of flows downstream
- Changes (reductions) to flows coming

Building a model- Opportunities

- We already own much of the floodplain
- Heightened focus on the river
- Valued by the community
- Expectations are high (kayak, recreational corridor, max ecological health)

Floodplain ponds

- Providing elements missing in riparian forest ponds
- Alluvial groundwater critical
- Extensive wildlife habitat

Lots of young plains cottonwood around ponds

Low benches do exist

Bayesian model

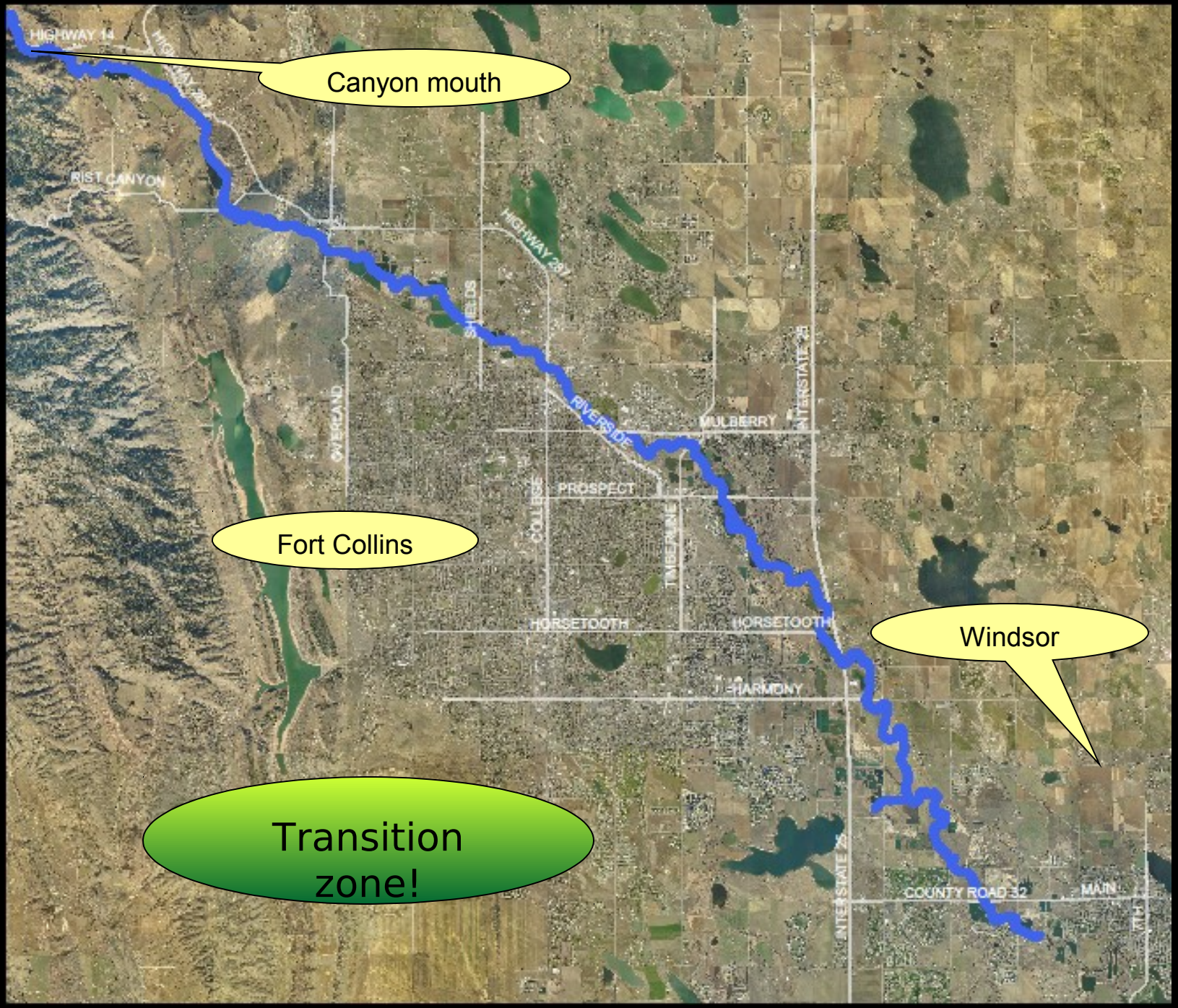
- Allows for combination of data and expert opinion for the development of probabilities

1. Conceptual model
2. Fill with probabilities and get outputs for biota we care about
3. Package into descriptions/images of a handful of futures and present to Council
4. Unite City departments behind a common vision
5. Iterative- improve model as new data is available

Important pieces of the story

- Hydrology
- Geomorphic context
- Channel morphology
- Water Quality
- Aquatic Habitat and biota (algae, insects, fish)
- Floodplain (riparian forest, floodplain ponds, wildlife corridor)

- Existing conditions in the study reach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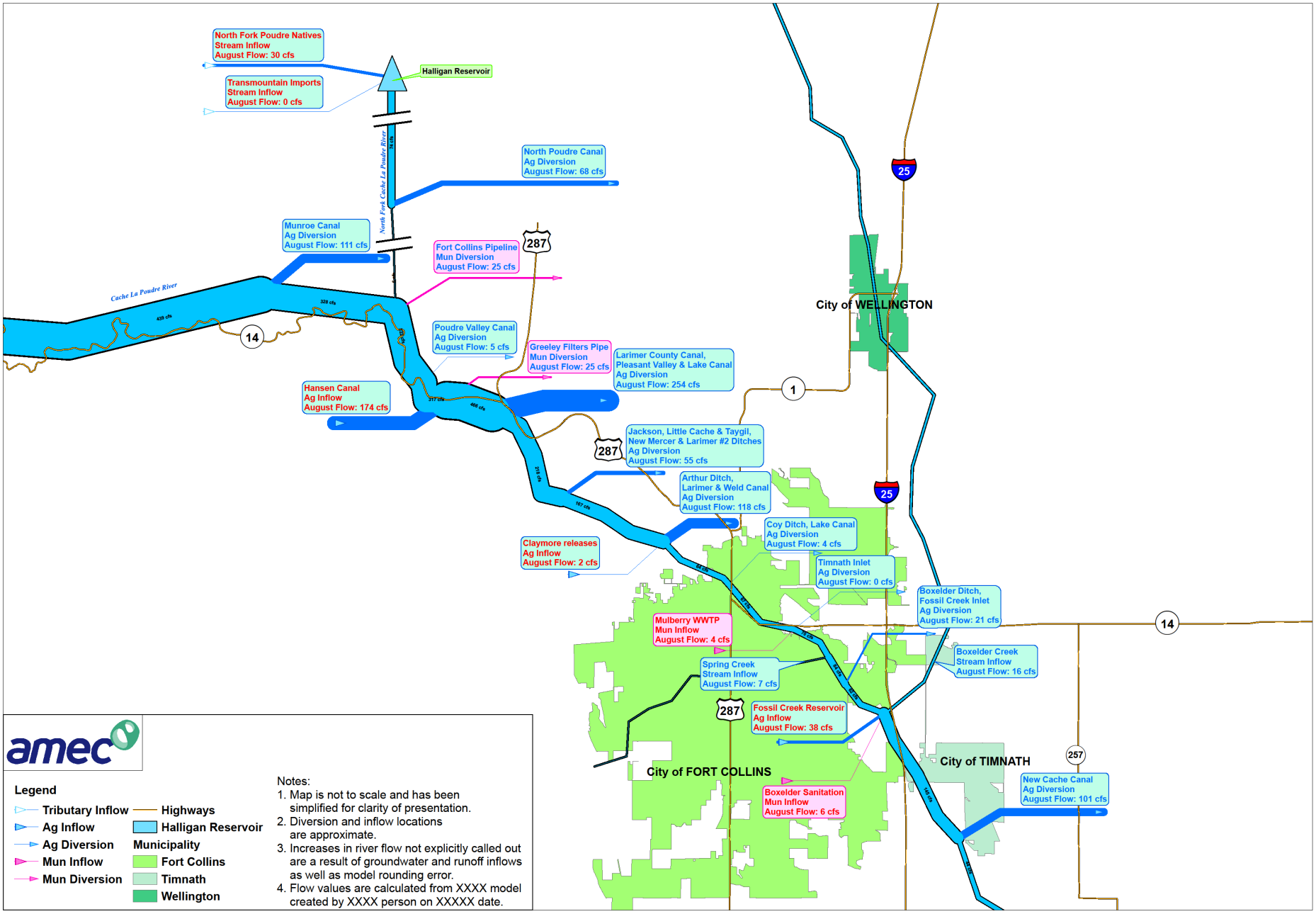
Transition zone

Reach	Slope*	Bankfull* (cfs)	Riparian	Fish
LaPorte	0.0047	7561	Narrowleaf cottonwood	Cold water, trout
Fort Collins	decreasing	decreasing and highly variable	Transition and non-natives	Shifting spp. decreasing water quality, increasing temps
Windsor	0.0013	2358	Plains cottonwood	Plains fish, non-natives

* Geomorphology Technical Report for Northern Integrated Supply Project draft Environmental Impact Statement by Anderson Engineers

Conceptual Flow Diagram of the Cache La Poudre River in August



Assessing and modeling the river by meaningful reaches

How do we analyze and modeling a complex river by meaningful reaches

A. Flows and diversions

B. Channel geomorphic characteristics

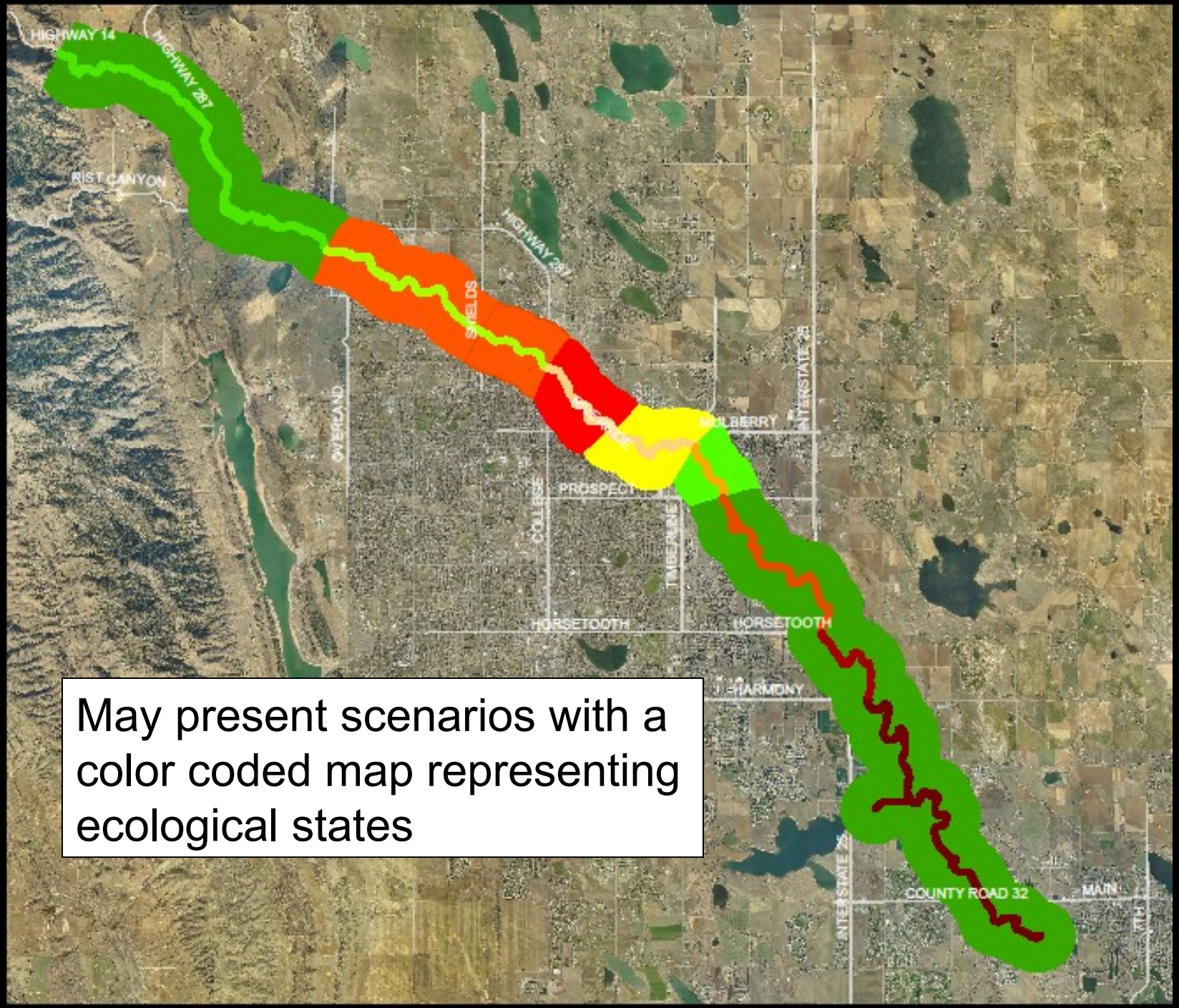
A. Current conditions of habitat and biota
   1. Aquatic
   2. Riparian

A. A * B * C = overall ecosystem condition and potential

Modeling vs ecological design vs management recommendations

- The model is necessary to see into the future
- Ecological design may add meaning at reach specific issues
- Management recommendations by expert group will bolster value of project when additive effects result in worst case scenario

- The riparian question: We may not have scour, deposition, etc. So what type of forest is desirable?
  - Platter of options and associated benefits-not simply a better same worse analysis



May present scenarios with a color coded map representing ecological states

If the City Council asks for a recommendation?



- Resilient? Higher diversity.
- Sustainable? Limited management.
- Native? Mimicry of native?
- Good fishing and boating?
- Forest canopy for birding and biking?
- Looks clean, smells even better…
- Safe for swimming

Wildlife

If you build it, will they come?

How does the area function as habitat and as a wildlife corridor?