National Ecological Framework

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NEF

- Auxiliary Connections
- Hubs
- Background - Not NEF
- Corridors

PEAs

PEA

- Not PEA
- PEA
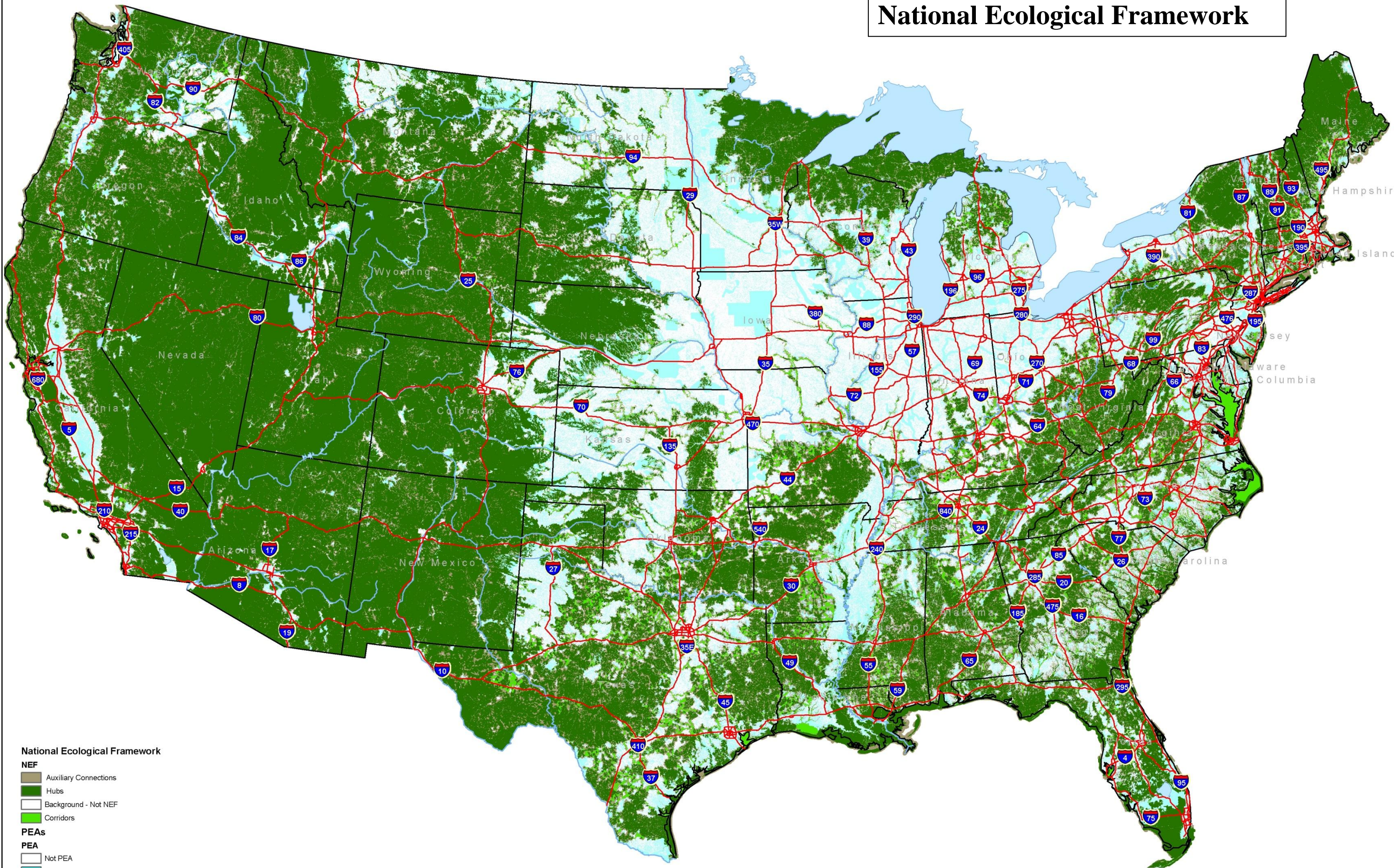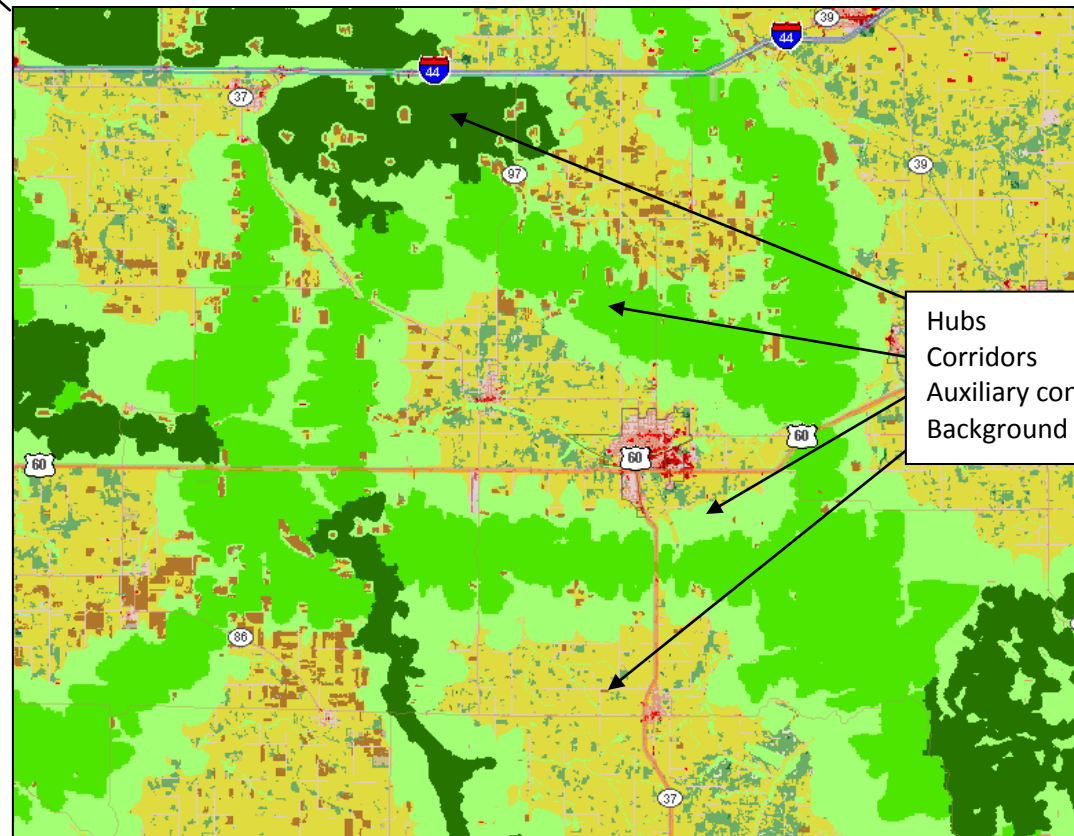
National Ecological Framework

Joplin

Hubs
Corridors
Auxiliary connections
Background NLCD

Zoomed in area from southwest Missouri, near Joplin, showing higher detail with NCLD 2001 background

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The National Ecological Framework is a geographical information system (GIS) based model of the connectivity of natural landscapes in the lower 48 United States. It was developed to provide a guide for the protection of the natural ecosystem processes that give us clean air, pure water and protected lands that are part of EPA's mission to protect. It is an update to the Southeastern Ecological Framework from 2001.

The original Southeastern Ecological Framework (SEF) was developed for Region 4 by the University of Florida between 1998 and 2001. The purpose of the SEF was to develop a mapped data set of ecologically important areas that could be connected with a hub/corridor model.

The SEF was created with data and information from the 1992 National Land Cover Database (NLCD) at a scale of 90 meters. The current National Ecological Framework (NEF) began as an update to the SEF with newer data (2001 through 2010). Due to increases in technology and data sources, it was feasible to increase the resolution from 90 meter resolution (SEF) to 30 meters. Modeling on a national scale was possible with little more overhead than doing it for Region 4. The NEF aligns with the efforts of the Office of Research and Development (ORD) Ecosystems Services Research Project (ESRP) for protection of ecosystem services.

The methodology for the SEF is based on a hub-connector/corridor approach originally developed by Larry Harris, Reed Noss, and Tom Hoctor at the University of Florida. The methodology for the NEF follows closely that developed for the SEF.

The first step was to define areas of the landscape that are priority ecological areas (PEAs). These were combined and modified to give the hub structure. The hubs were then linked with corridors that were defined using a least cost path analysis. A cost surface was developed using energy accounting as an approximation of the human disturbance on the landscape. This was done by assigning the total non-renewable accumulated energy flow through the various landuse types of the 2001 NLCD. The least cost path (determined by the least human disturbance) between hubs was used to define the corridors that connect the hubs.

The scheme of the modeling process was to:

1) Combine Priority Ecological Areas (PEAS) from a variety of sources including USGS Protected Areas Database, The Nature Conservancy Ecoregional Portfolio Core Data Set, Fish and Wildlife Service Strategic Habitat Conservation Areas, roadless areas, first order stream reach catchments, mature forest patches, wetlands and several other data sources.
2) Exclude areas of high road density high urban or agriculture density, nearness to urban or agriculture and inappropriate land use type.
3) Develop hub structures for areas greater than 5000 acres by excluding smaller unconnected areas. (Hubs - 3734 areas greater than 5000 acres)
4) Develop connectivity between the hubs in appropriate natural areas utilizing computer based connectivity links and user identified linkages. (Total of ~12,000 total links) Widen the single line connections to include appropriate land use for corridors.
5) Combine the Hubs and Corridors to give the National Ecological Framework (NEF)
6) Optimization of the NEF by developing connectivity to the NEF in both terrestrial and hydrologic connected areas. These are called auxiliary connections to the NEF
7) Determine areas that may be restored to a more natural setting that are contiguous with the hub/corridor framework.
8) *Categorize the National Ecological Framework by type and ecosystem. (still under way)*

Potential uses for the NEF

- Highway planning to minimize ecological disturbance
- Wetlands mitigation to maximize ecological connectivity
- Protection of sole source surface water areas.
- Integration of habitat protection plans for local, state, and regional agencies
- Create greenways to link local efforts with larger scale programs
- Provide connectivity to help mitigate ecosystem changes due to climate change
- Create innovative residential developments through conservation design and open space protection
- Reduce urban encroachment by creating buffers around wildlife refuges, national parks, state and local parks, and private wilderness areas

Additional data from the National Conservation Easement Database (NCED) became available after the NEF draft was completed. The NCED data was merged with the NEF and provides additional information. Approximately 85% of the NCED is accounted for by the NEF and the auxiliary connections to the NEF