

BEAD Permitting Analysis

Analysis Summary	1
Overview	1
National results	2
Permits by level of government	4
Methodology	4
Data and scope	4
Unit of analysis	5
Measuring a trigger	5
Permit events and authorities	6
Coverage and limitations	6
Appendix: Layer inventory	6

Analysis Summary

6,933

Project areas

86,402

Permit events

11

Events / project area (median)

8

 Authorities / project area
(median)

BEAD-funded broadband builds face a broad, multi-jurisdictional permitting burden. Across the 6,933 project areas (each a single project's footprint within one county), the analysis identifies 86,402 distinct permitting triggers, a median of 11 per project area, with each area engaging a median of 8 separate authorities. Every project area involves county permitting; 95.2% trigger federal environmental review, 75.5% state-level permitting (chiefly highway right-of-way), and 61.7% municipal permitting. These figures are a lower bound: each triggered requirement is counted only once per project area, even though in many cases it may involve multiple permits, and, due to data limitations, the analysis does not include permits necessary for infrastructure that is not physically close to a served household.

Overview

The Broadband Equity, Access, and Deployment (BEAD) program will fund construction of broadband infrastructure to unserved and underserved locations across the United States. Before construction can begin, a build must clear a stacked set of environmental, cultural, land-use, and jurisdictional permitting requirements: federal environmental review of wetland and floodplain crossings, historic-preservation and air-quality clearances, authorization to cross or attach to federal, state, and tribal land, and county- and municipal-level construction permitting. Each requirement carries its own authority, process, and timeline.

This report quantifies the breadth of that permitting exposure across the BEAD footprint. It overlays 2,942,440 funded locations across 3,783 projects and the 50 states against 126 federal, state, and local feature layers, and records, for every location, which permitting triggers it sits inside or near. The layers span the environmental, cultural, land-ownership, and infrastructure features that most commonly require a permit, clearance, or crossing agreement before fiber can be built.

This analysis is a high level estimate of permitting exposure, not an engineering permitting plan. It counts the permitting triggers a build is likely to encounter; it does not estimate the cost, duration, or outcome of any individual permit, and it is best read as a minimum. The purpose of this analysis is to characterize the scale and composition of the permitting burden the program faces as a whole, and to show how broadly it is distributed across levels of government and categories of regulation.

National results

A permitting event is one project area triggering one permitting layer. Every project area faces at least the county permit; the median faces 11, over half face more than 10, and about 1 in 7 face more than 20 (Figure 3).

Figure 1 ranks the layers that trigger the most project areas. County permitting applies to all 6,933 by construction. Among environmental and infrastructure triggers, water-related features lead: USFWS wetlands are within reach of 6,197 project areas (89.4%) and FEMA flood hazard zones of 5,033 (72.6%). Interstate, US, and state highways run within reach of 4,964 (71.6%), impaired-water assessment segments of 4,482 (64.6%), municipal permitting 4,275 (61.7%), and electric transmission lines 4,008 (57.8%). The bar colors mark how each layer is scored: proximity to a permit-sensitive feature, overlap with a land-ownership boundary, and jurisdictional containment (county and municipal). The three methods are defined in the Methodology.

Figure 1. Top permit triggers, by project areas

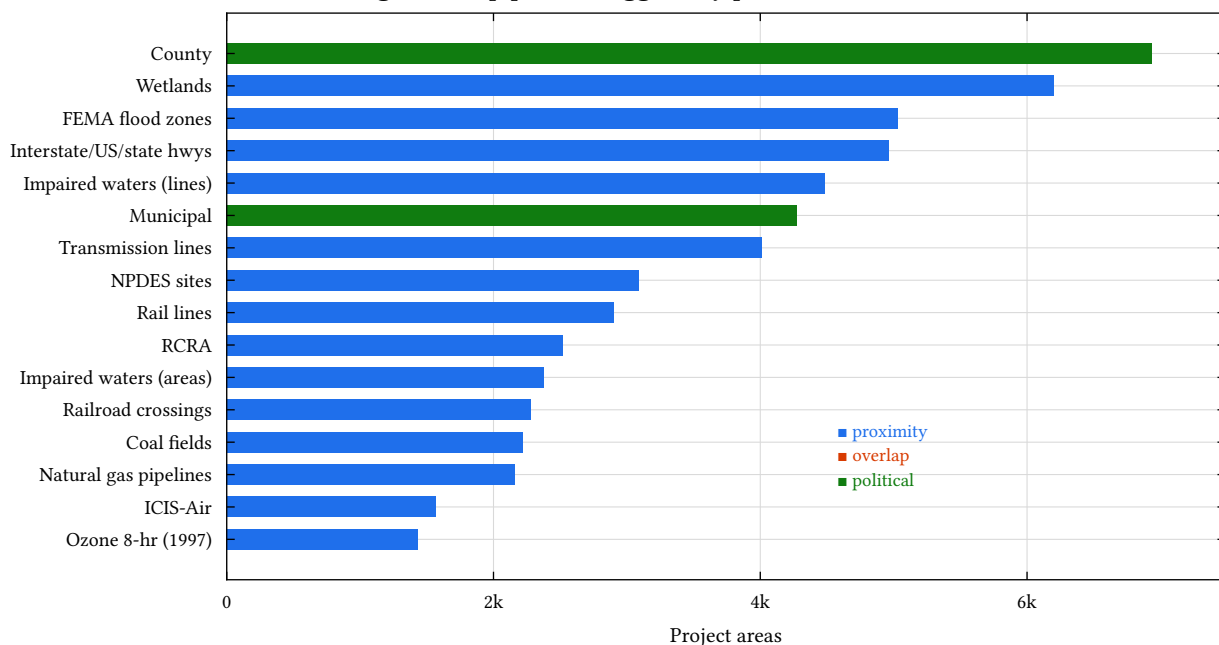


Figure 2 groups the triggers into thematic categories by the number of project areas each reaches, and Figure 3 shows how events concentrate across project areas. Beyond the universal county permit, water features are the most widespread theme (6,380 project areas, 92%), followed by energy infrastructure (5,336, 77%) and the interstate, US, and state highways that 71.6% of project areas run near. Municipal permitting (4,275, 61.7%) and contamination and compliance sites (3,922, 56.6%) follow, and railroads reach 44.3% of areas.

Figure 2. Project areas reached, by theme

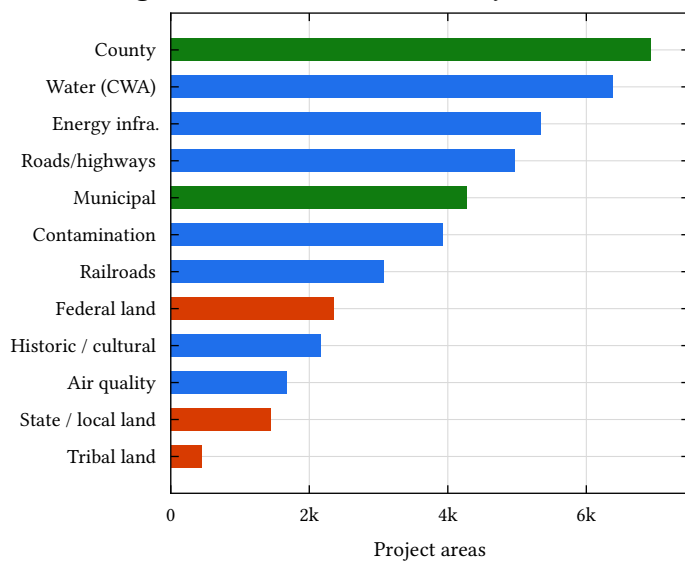


Figure 3. Project areas by event count

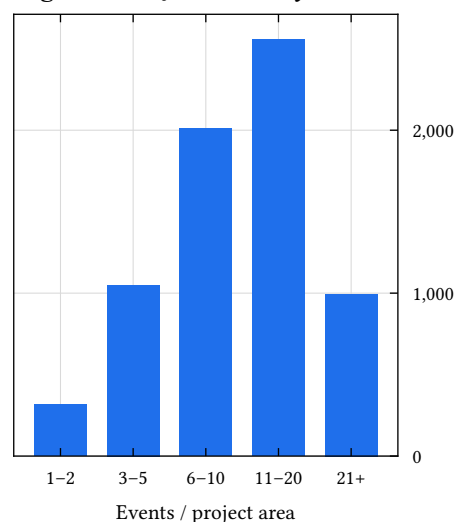
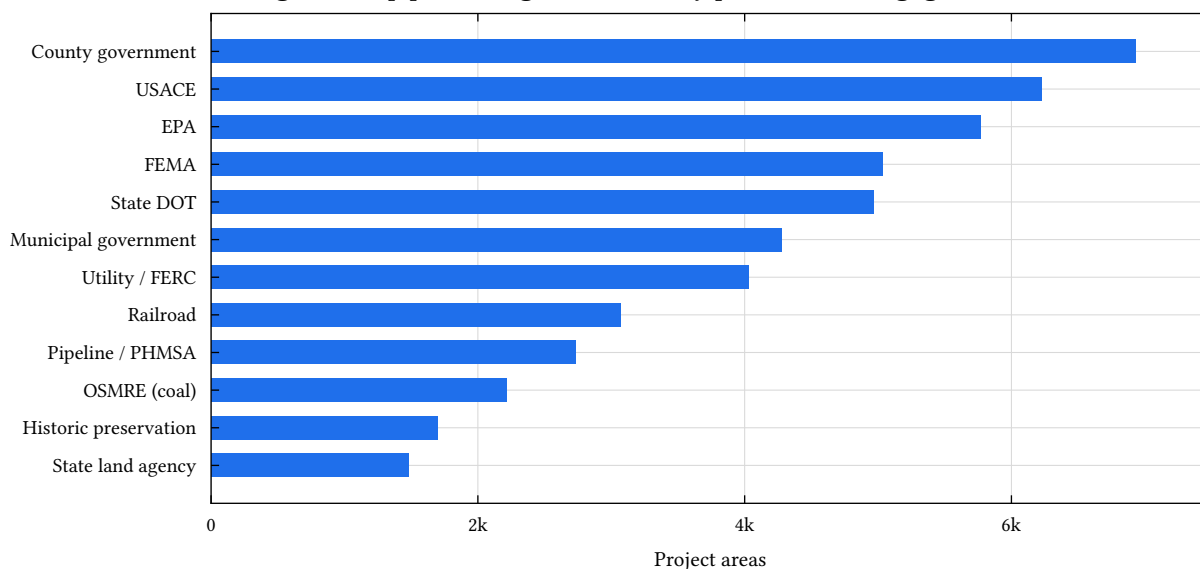


Figure 4 counts the distinct permitting authorities behind those layers rather than the layers themselves. Many layers collapse to a single authority (the nine air-quality standards all route to the EPA, for example), so a typical project area engages a median of 8 distinct authorities. County government is universal; the U.S. Army Corps of Engineers reaches 6,223 project areas (89.8%), the EPA 5,770 (83.2%), and FEMA 5,033 (72.6%). State departments of transportation follow at 4,964 (71.6%), then municipal governments at 4,275 (61.7%), ahead of the private crossing counterparties (electric utilities, railroads, and pipeline operators) that the next section separates out.

Figure 4. Top permitting authorities, by project areas engaged



Permits by level of government

Table 1. Project areas and permit events by level of government.

Level of government	Project areas	% of project areas	Permit events	% of permit events
Federal	6,598	95.2%	41,617	48.2%
State	5,237	75.5%	8,705	10.1%
Local (county)	6,933	100%	6,933	8%
Local (municipal)	4,275	61.7%	15,560	18%
Private / third-party	4,934	71.2%	13,587	15.7%
All levels	—	—	86,402	100%

Table 1 reorganizes the same 86,402 events by the level of government, or private party, that administers each permit.¹

Federal authorities are the largest source: 95.2% of project areas engage at least one, and federal permits are 48.2% of all events, reflecting the nationwide reach of the delegated environmental programs (Clean Water Act review by the Army Corps and the EPA, Clean Air Act conformity, and FEMA floodplain management). Level of government here follows the statutory source of each permit, not the office that processes it: EPA-delegated water and air programs and FEMA floodplain rules are counted as federal even where a state or local agency administers them.²

State authorities reach 75.5% of project areas, driven by state departments of transportation. They administer the encroachment and right-of-way permits required along the interstate, US, and state highways that 71.6% of project areas run near. Highways are the fourth most widespread trigger overall, behind only county permitting and the two federal water layers (wetlands and floodplains).

County and municipal permitting is local: the county permit applies to every project area by construction, and municipal permitting to 61.7%. The private / third-party row captures crossing and attachment arrangements with railroads, pipeline operators, and electric utilities. 71.2% of project areas engage at least one.

The rows above count each project area's engagement with a level of government. Tallied instead as distinct governments, BEAD projects overlap the counties and municipalities in Table 2.

Table 2. Distinct counties and municipalities overlapped by BEAD projects.

Local government	Distinct governments overlapped
Counties	2,449
Municipalities	12,146

Methodology

Data and scope

BEAD-funded locations come from compiled state Final Proposal data (a mix of draft, submitted, and approved proposals); each location's coordinates come from the FCC Broadband Serviceable Location Fabric (version 8). Satellite-served locations (BDC technology codes 60 and 61) are excluded from every calculation, because we assume they require no physical plant and therefore no construction permits. This leaves 2,942,440 terrestrial funded locations across 3,783 projects in the

¹ Area counts are not additive across rows: a project area usually engages several levels at once. Event counts are additive.

² The one deliberate exception is the State Historic Preservation Office, counted as state because it is a state office carrying out federal Section 106 review.

50 states. Of these, 2,844,960 (96.7%) match the Fabric by location ID and are included in our calculation.

Unit of analysis

BEAD projects are defined differently from state to state. Some states file one project per county or sub-area; others bundle a provider's entire statewide award under a single identifier, so one project can span dozens of counties. Per-project metrics therefore mix small single-county builds with statewide aggregates. Figure 5 shows the spread: most projects touch a single county, but some span many, and Figure 6 shows that a state's average counties-per-project (from 1.0 in Alabama to 8.5 in Ohio) is unrelated to how many projects it files.

To make exposure comparable across states, the analysis divides each project by county and reports on the resulting **project area**, a project's footprint within one county. This yields 6,933 project areas, the unit used throughout this report.

Figure 5. Counties spanned by BEAD projects

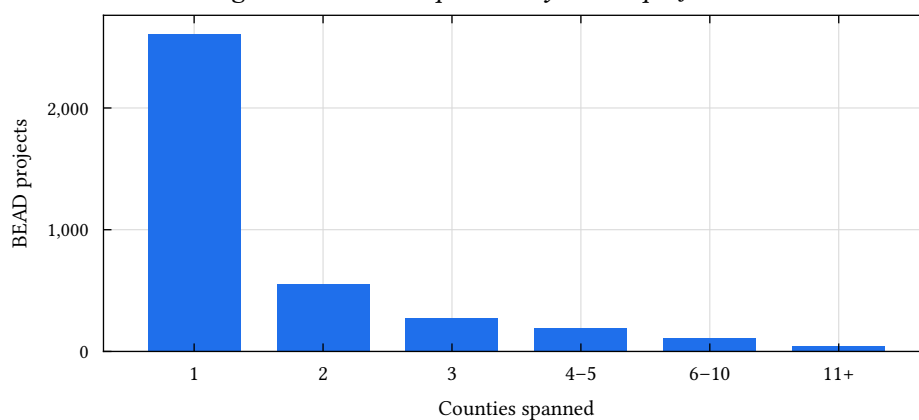
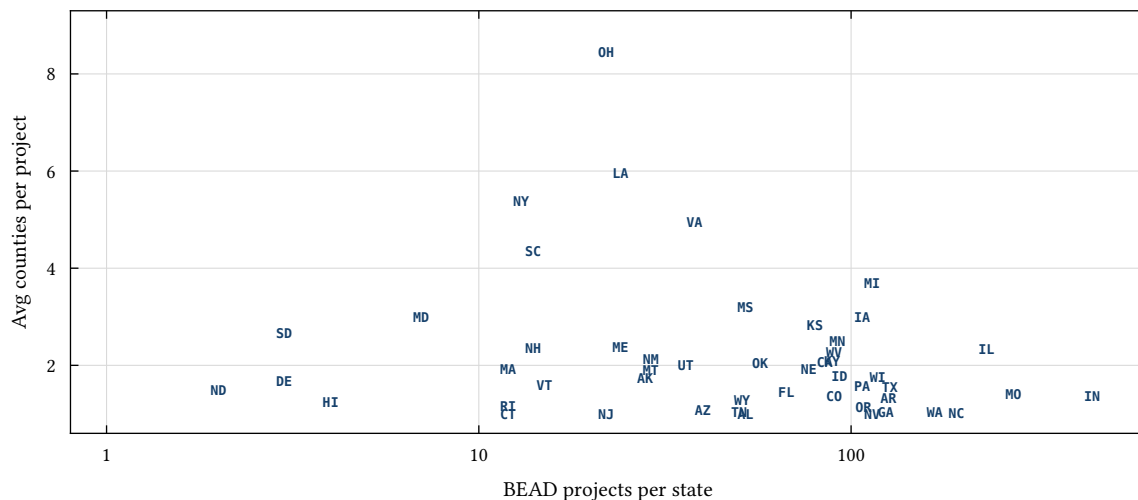


Figure 6. Average counties per project, by state



Measuring a trigger

Each location is treated as a point at its Fabric coordinates; the analysis does not construct fiber routes or project polygons. A location triggers a layer when a feature in that layer lies within the layer's buffer, measured as geodesic distance. Layers fall into two types. Ownership layers (federal, state, tribal, and other public land) use a 30-meter containment tolerance, so a trigger means the location sits inside or at the edge of the holding. Proximity-sensitive layers (wetlands, floodplains, historic places, air-quality nonattainment areas, interstate, US, and state highways, railroads, and

other energy infrastructure) use a 100-meter buffer, because a feature near a build, not only under it, can pull the work into review or require a crossing agreement. County and municipal permitting is assigned by which jurisdiction a location falls in, not by distance.

Permit events and authorities

A permit event is one project area triggering one layer, and marks at least one permit: a single county or municipality usually issues several distinct approvals for one build (road-opening, right-of-way, and construction permits, for example), so the county and municipal counts in particular understate the true permit workload. Federal environmental review under NEPA is not tallied as a separate trigger; it is reflected in the federal environmental layers (wetlands, floodplains, and the like) whose presence prompts that review. County permitting is counted once for every project area; municipal permitting is determined by a point-in-polygon test of each location against Census municipal boundaries.³ Each layer is mapped to the authority that administers its permit through an auditable crosswalk. Because many layers share one authority (the nine air-quality standards all route to the EPA), a project area engages fewer distinct authorities (a median of 8) than layers. Authorities are then grouped into levels of government by the statutory source of the permit, as described above.

Coverage and limitations

The layer inventory is built on NTIA's national permitting layer catalog (APPEIT), supplemented with several additional federal and state sources such as Census TIGER/Line highways; grounding the set in NTIA's own inventory guards against inflating counts with arbitrarily added layers. Of the 126 layers screened, 112 registered at least one trigger. Coverage is national wherever the source data allow; layers for which one or more states' data could not be retrieved are marked in Table 3, and data availability issues affect under 1% of the state-by-layer fetches. A small number of state land-ownership layers were unavailable from their host agencies and were backfilled from the national USGS Protected Areas Database. Two features of the method make the totals conservative. First, each triggered layer is counted once even though a single jurisdiction, especially a county or municipality, usually requires more than one permit for a build. Second, because premises are points rather than routes, features crossed only by fiber or other infrastructure running between premises are not counted. The analysis is best read as a lower bound on permitting exposure.

Appendix: Layer inventory

Overlap = location inside the feature, or within the listed containment tolerance (30 m) of it. *Proximity* = location within the listed buffer (100 m) of the feature. † = partial coverage (one or more states failed). Satellite-served locations excluded throughout. *Interstate, US & State Highways* = Census TIGER/Line primary + secondary roads (interstates, US, and state routes); local roads excluded.

Table 3. Permitting layers screened, with calculation type and buffer.

Layer	Calculation	Buffer
Political subdivision (2)		
County	Overlap	—
Municipal	Overlap	—
Federal land (13)		
BLM Lands	Overlap	30 m
Critical Habitat - Polygon Features - Final †	Overlap	30 m
Critical Habitat - Polygon Features - Proposed †	Overlap	30 m
DoD Lands for Permitting	Overlap	30 m
GSA Federal Real Property	Overlap	30 m
NPS Land	Overlap	30 m
USACE Land Parcel Area	Overlap	30 m
USACE Lands for Permitting	Overlap	30 m

³Municipality is defined per state: county subdivisions (towns and townships) unioned with incorporated places in the twelve strong-township states, and incorporated places elsewhere. Connecticut's 169 towns hold all land-use authority; Hawaii has no incorporated municipalities.

Layer	Calculation	Buffer
USFS Surface Ownership Parcels †	Overlap	30 m
USFWS National Realty Boundaries	Overlap	30 m
WA Major Public Lands Non DNR	Overlap	30 m
WY Public Access Areas	Overlap	30 m
USBR Land	Proximity	100 m
State / local land (61)		
AK DNR State Lands	Overlap	30 m
AK Legislative Designated Area	Overlap	30 m
AK Mental Health Trust Land	Overlap	30 m
AK State Forests	Overlap	30 m
AK State Parks	Overlap	30 m
AK University of Alaska Lands †	Overlap	30 m
AL Alabama State Lands	Overlap	30 m
AR Arkansas - Public Lands	Overlap	30 m
AZ Arizona - State Trust Parcels	Overlap	30 m
CA California - Land Ownership	Overlap	30 m
CO Colorado - Parks and Wildfire Managed Properties	Overlap	30 m
CO Colorado State Land Board Lands	Overlap	30 m
CT Connecticut -Dept. of Energy and Environmental Protection Property	Overlap	30 m
DC District of Columbia - Government Land	Overlap	30 m
DE Delaware - Public Protected Lands	Overlap	30 m
DE Delaware Protected Natural Resources - Natural Areas	Overlap	30 m
DE Delaware Protected Natural Resources - Nature Preserves	Overlap	30 m
FL Florida - State Owned Lands	Overlap	30 m
GA Georgia DNR Lands	Overlap	30 m
HI Hawaii - Government Lands	Overlap	30 m
IA Iowa - Public Lands	Overlap	30 m
ID Idaho State Lands †	Overlap	30 m
IN Indiana State Lands †	Overlap	30 m
KS Kansas - Public Wildlife Areas	Overlap	30 m
KY Public Hunting Areas	Overlap	30 m
KY State Forests †	Overlap	30 m
KY State Natural Areas †	Overlap	30 m
KY State Nature Preserves †	Overlap	30 m
KY State Park Boundaries †	Overlap	30 m
LA Louisiana - State Lands	Overlap	30 m
MA Massachusetts - Public Open Space	Overlap	30 m
MD DNR Owned Lands and Conservation Easements	Overlap	30 m
ME Maine - Wildlife Management Areas †	Overlap	30 m
MN Minnesota - State Administered Lands	Overlap	30 m
MO Missouri State Lands †	Overlap	30 m
MS State Parks	Overlap	30 m
MS Wildlife Management Areas	Overlap	30 m
MT Montana Public Lands	Overlap	30 m
NC North Carolina - State Owned Lands	Overlap	30 m
ND State Forest	Overlap	30 m
ND State Parks	Overlap	30 m
NE Nebraska - Game and Parks Commission Property †	Overlap	30 m
NH New Hampshire - Conservation/Public Lands	Overlap	30 m
NJ New Jersey - Open Space and Recreation Areas	Overlap	30 m
NM New Mexico - State Trust Land †	Overlap	30 m
NY Adirondack Park Boundary	Overlap	30 m
NY State Owned Parcels	Overlap	30 m
NY State Parks	Overlap	30 m
OH Ohio - DNR Lands	Overlap	30 m
OR Dept. of Forestry Managed Lands	Overlap	30 m
OR Oregon State Parks	Overlap	30 m
RI Rhode Island - State Conservation Lands	Overlap	30 m
SC South Carolina - DNR Public Properties	Overlap	30 m
TN Tennessee - Public Access Lands	Overlap	30 m
TX Texas State Agency Lands	Overlap	30 m
UT Utah Land Ownership	Overlap	30 m
VA Virginia Conservation Lands	Overlap	30 m
VT Vermont - Agency of Natural Resources Land	Overlap	30 m
WA DNR Managed Land Parcels	Overlap	30 m
WI Wisconsin - DNR Managed Land	Overlap	30 m
WY State Lands	Overlap	30 m
Tribal land (4)		
Alaska Native, and Native Hawaiian Areas	Overlap	30 m
BIA AIAN LAR Supplemental	Overlap	30 m
BIA AIAN National LAR	Overlap	30 m
BIA AIAN Tribal Statistical Areas	Overlap	30 m
Water & flood (11)		
Coastal Zone Management Act	Proximity	100 m

Layer	Calculation	Buffer
FEMA Flood Hazard Zones	Proximity	100 m
Impaired Waters - Assessment Areas †	Proximity	100 m
Impaired Waters - Assessment Lines	Proximity	100 m
Impaired Waters - Assessment Points	Proximity	100 m
NOAA - Coral Reef Habitat Combined	Proximity	100 m
National Levee Database - Leveed Areas	Proximity	100 m
Sole Source Aquifers	Proximity	100 m
USACE Navigable Waterway Network	Proximity	100 m
USFWS Wetlands	Proximity	100 m
Wild and Scenic Rivers	Proximity	100 m
Air quality (9)		
Lead (2008 standard)	Proximity	100 m
Ozone 8-hr (1997 standard)	Proximity	100 m
Ozone 8-hr (2008 standard)	Proximity	100 m
Ozone 8-hr (2015 Standard)	Proximity	100 m
PM10 (1987 standard)	Proximity	100 m
PM2.5 24hr (2006 standard)	Proximity	100 m
PM2.5 Annual (1997 standard)	Proximity	100 m
PM2.5 Annual (2012 standard)	Proximity	100 m
SO2 1-hr (2010 standard)	Proximity	100 m
Contamination / compliance (7)		
Assessment Cleanup and Redevelopment Exchange System (ACRES)	Proximity	100 m
Integrated Compliance Information System for Air (AIR)	Proximity	100 m
Major National Pollutant Discharge Elimination System Facilities (NPDES_MAJOR)	Proximity	100 m
National Pollutant Discharge Elimination System Sites (NPDES)	Proximity	100 m
Resource Conservation and Recovery Act (RCRA)	Proximity	100 m
Superfund Nation Priorities List (SEMS_NPL)	Proximity	100 m
Toxic Release Inventory (TRI)	Proximity	100 m
Historic / cultural (5)		
Historical Trails - Lines	Proximity	100 m
Historical Trails - Polygons	Proximity	100 m
National Register of Historic Places - Points	Proximity	100 m
National Register of Historic Places - Polygons	Proximity	100 m
National Scenic Byways	Proximity	100 m
Roads & highways (1)		
Interstate, US & State Highways	Proximity	100 m
Railroads (2)		
Rail Lines	Proximity	100 m
Railroad Crossings	Proximity	100 m
Energy infrastructure (11)		
EIA - Crude Oil Trunk Pipelines	Proximity	100 m
EIA - Hydrocarbon Gas Liquids Pipelines	Proximity	100 m
EIA - Natural Gas Interstate and Intrastate Pipelines	Proximity	100 m
EIA - Petroleum Products Pipelines	Proximity	100 m
EIA - Power Plants	Proximity	100 m
Electric Power Transmission Lines	Proximity	100 m
Surface and Underground Coal Mines	Proximity	100 m
USACE Project (Points)	Proximity	100 m
USFS - Right of Way	Proximity	100 m
USFS Special Uses Communications Sites	Proximity	100 m
USGS - Coal Fields	Proximity	100 m