Site Reconnaissance

North Park
West Hunter Valley Road
Bloomington, Indiana 47408

Prepared for:
Mr. Jeff Cockerill – Attorney
Monroe County Board of Commissioners
100 West Kirkwood Avenue
Bloomington, Indiana 47404

Prepared by:

VET Environmental Engineering, LLC
2335 West Fountain Drive
Bloomington, Indiana 47404

Date:
April 29, 2024

Project Number:
24-62

Site Reconnaissance

North Park
West Hunter Valley Road
Bloomington, Indiana 47408

VET ENVIRONMENTAL ENGINEERING, LLC PROJECT NO. 24-62

LIST OF EXHIBITS

LIST OF TABLES IN NARRATIVE

LIST OF ATTACHMENTS

1.0 EXECUTIVE SUMMARY

VET Environmental Engineering, LLC (VET) was retained by Mr. Jeff Cockerill, representative of the Monroe County Board of Commissioners (Monroe County) to conduct a site reconnaissance of approximately 57.29 acres of land (Parcel Numbers 53-05-30-100-006.008-004, 53-05-30-100-006.000-004, and 53-05-19-300-006.098-004) located on West Hunter Valley Road in Bloomington, Indiana (Site). The purpose of the project was to identify potential environmental impacts and other obstacles to development of the Site. The Site is the proposed location of a new municipal development project for Monroe County. VET conducted both a desktop and field reconnaissance to identify potential obstacles to development.

2.0 SITE INFORMATION

The Site is located on three parcels of land located in Bloomington, Monroe County, Indiana. Parcel information is detailed in **Table A**. Parcels are classified as vacant land and are owned by Logan Land Development, LLC. The Site is largely a grassy field with limited wooded areas. A paved roadway travels north to south through the middle of the Site. A pond is located on the central portion of the Site's eastern boundary.

TABLE A. PARCEL INFORMATION

Parcel Number	Legal Description	Acreage
53-05-30-100-006.000-004	012-09850-00 North Park Tract A-7	15.45
53-05-30-100-006.008-004	012-09850-08 North Park Tract A-8 40.67 A (part in section 30 see 012-09850-98 for part in section 19)	40.68
53-05-19-300-006.098-004	012-09850-98 North Park Tract A-8 1.16 A (part in section 19 see 012-09850-08 for part in section 30)	1.16

3.0 DESKTOP RECONNAISSANCE

VET obtained and analyzed environmental and geographic data from IndianaMap. IndianaMap is a large collective public database for geographic information system (GIS) map data. The scope of the desktop reconnaissance is to identify items that may limit or restrict development or other proposed land uses on the Site by evaluating readily ascertainable records.

3.1 Soils

The United States Agricultural Department (USDA) Web Soil Survey (WSS) indicates that the Site is largely underlain by Crider Silt Loam (**Exhibit 3**). All soils present on the Site are included in **Table B**. Haymond Silt Loam, Frequently Flooded is classified as a hydric soil according to the 2016 National Resources Conservation Service (NRCS) Hydric Soils List for Monroe County, Indiana.

TABLE B. SOIL SURVEY SUMMARY		
Map Symbol	**Soil Type Name**	**Percent of Site (%)**
CrC	Crider Silt Loam, 6-12% Slopes	67.4
CaD	Caneyville Silt Loam, 12-18% Slopes	28.7
Hd	Haymond Silt Loam, Frequently Flooded	3.0
CrB	Crider Silt Loam, 2-6% Slopes	0.9

3.2 Waterways and Waterbodies

The desktop reconnaissance identified two intermittent streams and a perennial lake on-Site according to the United States Geological Survey's (USGS) National Hydrography Dataset (NHD). Stout Creek generally travels along the Site's southern and eastern boundaries. One NHD-mapped stream (Mapped Stream #1) travels west to east across the Site and connects to the mapped perennial lake located on the Site's eastern boundary and ultimately discharges to Stout Creek east of the Site. The second NHD-mapped stream (Mapped Stream #2) extends south from the Site's northern boundary and connects to Mapped Stream #1 in the north central portion of the Site. A perennial lake is mapped on the northeastern quadrant of the Site. Mapped waterbodies are displayed on **Exhibits 2** and **4**.

3.3 Floodplains

Floodplain data was obtained from the Federal Emergency Management Association (FEMA) Flood Rate Insurance Maps (FIRM). This data represents areas in Indiana that are located in a floodway or flood hazard zone. A floodway borders the southern and eastern boundaries of the Site with minor portions of the floodway mapped on the eastern portion of the Site (**Exhibits 2** and **4**).

3.4 Wetlands

No wetlands were identified on-Site by the National Wetlands Inventory (NWI).

3.5 Karst Features

Karst features were not identified on-Site during the desktop reconnaissance. A sinkhole area and distinct sinkholes are mapped off-Site to the west of State Road 46. The Site is in the Mitchell Plateau physiographic region of Indiana (IndianaMap, 2024). The presence of karst topography features (sinkholes, swallow holes, sinking streams, etc.) is documented within the Mitchell Plateau physiographic region (Gray, 2000, p.8). The Site is reportedly in an area where drainage is mostly through solution channels (Hartke and Gray, 1989, p.4). Bedrock is mapped as Mississippian Age, Blue River Group containing mostly micritic, skeletal, and oolitic limestone (IndianaMap, 2024). Bedrock is shallow in this area and expected to be less than 50 feet below ground surface (Fenelon and Bobay, 1994, p.142).

3.6 Endangered and Threatened Species

VET utilized the Information for Planning and Consultation (IPaC) web service developed by the USFWS to screen the Site for endangered species, critical habitats, and migratory birds. According to IPaC, the endangered Indiana Bat (*Myotis sodalis*), the endangered Northern Long-eared Bat (*Myotis septentrionalis*), and the proposed endangered Tricolored Bat (*Perimyotis subflavus*) were identified as potentially affected by the project area.. The Site overlaps with the critical habitat for the Indiana Bat according to the USFWS's Environmental Conservation Online System (ECOS).

The Monarch Butterfly (*Danaus plexippus*) was identified as potentially affected by the project area. The Monarch Butterfly was identified as a candidate for listing as a threatened or endangered species. There are generally no requirements under Section 7 of the Endangered Species Act (ESA) for candidate species, according to the USFWS.

The Whooping Crane (*Grus americana*) was identified as potentially affected by the project area. The Whooping Crane was identified as an Experimental Population, Non-essential (EXPN) by USFWS. The USFWS has determined that species categorized as EXPN are treated as "proposed" species on private land and do not require consultation under Section 7 of the ESA.

IPaC identified ten migratory Birds of Conservation Concern (BCC). The common name, scientific name, and category of concern for each species identified are detailed in **Table C**. Seven birds were identified as "BCC Rangewide". This status indicates that these species are a BCC throughout the entirety of their range in the United States. IPaC identified two "BCC – BCR" birds. This status indicates that these species are of concern only in particular Bird Conservation Ranges (BCRs) in the United States. One species, the Bald Eagle, was listed as "Non-BCC Vulnerable". This status indicates that the species is not specifically listed as a BCC, but is a species of concern due to requirements set forth by The Bald and Golden Eagle Protection Act (Eagle Act). The Eagle Act prohibits the take, possession, sale, or purchase of any dead or alive Bald Eagle (USFWS, 1940).

Due to the presence of several BCC species, VET recommends following the Nationwide Standard for Conservation Measures (**Attachment 4**), provided by the IPaC, to ensure minimal damage to potential habitats or breeding areas.

TABLE C. MIGRATORY BIRDS OF CONCERN

Common Name	Scientific Name	Category of Concern
Bald Eagle	*Haliaeetus leucocephalus*	Non-BCC Vulnerable
Black-billed Cuckoo	*Coccyzus erythropthalmus*	BCC Rangewide
Chimney Swift	*Chaetura pelagica*	BCC Rangewide
Eastern Whippoorwill	*Antrostomus vociferus*	BCC Rangewide
Field Sparrow	*Spizella pusilla*	BCC – BCR
Lesser Yellowlegs	*Tringa flavipes*	BCC Rangewide
Prothonotary Warbler	*Protonotaria citrea*	BCC Rangewide
Red-headed Woodpecker	*Melanerpes erythrocephalus*	BCC Rangewide
Rusty Blackbird	*Euphagus carolinus*	BCC – BCR

Wood Thrush	*Hylocichla mustelina*	BCC Rangewide

VET requested information on endangered and threatened species, high quality natural communities, and natural areas from the Indiana Department of Natural Resources (IDNR) Indiana Natural Heritage Data Center (INHDC) on April 1, 2024. VET received IDNR's response on April 4, 2024. The Heritage Data Review indicates that five threatened or endangered species are documented within a half-mile of the Site (**Table D**).

TABLE D. INDIANA HERITAGE DATA – ENDANGERED AND THREATENED SPECIES			
Common Name	**Scientific Name**	**State**	**Federal**
Silver-haired bat	*Lasionycteris noctivagans*	SSC	N/A
Red Bat	*Lasiurus borealis*	SSC	N/A
Least Weasel	*Mustela nivalis*	SSC	N/A
Little Brown Bat	*Myotis lucifugus*	SE	C
Northern Long-eared Bat	*Myotis septentrionalis*	SE	E
Indiana Bat	*Myotis sodalis*	SE	E
Tricolored Bat	*Perimyotis subflavus*	SE	N/A
Legend			
SE = State Endangered	SSC = State Species of Special Concern		
SR = State Rare	N/A = Not listed		

The Heritage Data Review specified that these findings do not preclude the requirement for formal consultation through the United States Fish and Wildlife Service (USFWS) under Section 7 of the ESA. A copy of the Heritage Data Review is included as **Attachment 2**. Due to the species potentially affected by the proposed project, a formal Section 7 ESA consultation may be required. VET recommends following the Nationwide Standard for Conservation Measures and minimizing disturbance to forested areas on-Site to ensure minimal damage to potential habitats or breeding grounds due to the species potentially affected by the proposed project.

3.7 Wells

The IDNR Water Well Survey identified no wells on-Site. The City of Bloomington Utilities Department (CBU) provides drinking water to the surrounding area. CBU obtains drinking water from Lake Monroe, a surface water reservoir located southeast of Bloomington, Indiana. Groundwater is not utilized for drinking water in this area of Bloomington. One well is reportedly located within a 0.25-mile radius of the Site (**Exhibit 1**).

VET queried the Site in the IDEM Wellhead Proximity Determinator database on March 26, 2024. The database indicated that the Site is not located within a Wellhead Protection Area. A copy of the output from the database query is included in **Attachment 3**.

3.8 Historical Aerial Photographs

VET examined historical aerial photographs. Select historical aerial photographs are included as **Attachment 5**.

TABLE E. AERIAL PHOTOGRAPH SUMMARY		
Year	Quality	Description
1939	Good	The Subject Property appears to be cleared of heavy vegetation, suggesting land use for agricultural purposes. Denser vegetation is apparent along apparent fence lines, one of which is north-south trending through the center of the Site, while the other perpendicularly intersects the first on the southwestern portion of the Site. An additional area of denser vegetation tapers towards the northwest, originating from where the eastern boundary folds west into the Site, suggesting an apparent stream feature. Two structures are apparent within the northwestern portion of the Site. Two structures are apparent along the northern boundary of the southern protruding lobe of the eastern boundary of the Site. Disrupted land within a rectangular area to the southwest of the structure may be surmised to be farming activities. The eastern and central portions of the northern border of the Site are bounded by an apparent unimproved roadway (Hunter Valley Road), made evident by the stressed vegetation. An apparent undeveloped roadway stems from Hunter Valley Road, leading southwest to intersect with the location of the apparent structure on the eastern boundary of the Site and continue to trend southwest across the Site to the southern boundary. The northern, western, and northwestern adjacent properties are cleared of vegetation and exhibit apparent fence lines, similar to those on the Site, suggesting their use as agricultural fields. Vegetation following an apparent stream channel is evident outside of the southeastern boundary of the Site. Roughly rectangular shaped depressions filled with a material that is consistent in color and texture, that may be assumed to be standing water, are apparent to the southeast of the Site, suggesting quarrying operations. A uniformly curving trail spanning roughly north-south is apparent to the east of the Site. This trail's proximity to the suspected quarrying operations suggests that it is an apparent railroad spur.
1946	Good	Erosional features on the western portion of the Site, apparent by stressed vegetation, lead towards the apparent stream feature. This suggests an elevation change synonymous with a channel valley surrounding the apparent stream as the land slopes to the southeast. An apparent fence line forms a rectangular boundary that surrounds the southeastern structure on the Site. The adjoining properties appear relatively unchanged.
1952	Poor	The poor quality of the Aerial Photograph obscures details of the Site and the adjoining properties. Quarry activities apparent to the northeast and southeast of the Site appear to have expanded.
1955	Good	Land disturbance activities are apparent surrounding the two structures on the northwestern portion and the two structures on the southeastern portion of the Site. To the southeast of the structures within the northwestern portion of the Site, areas of disturbance are apparent along the northern bank of the apparent stream feature. A retention pond is apparent outside of the Site boundary and to the northeast of the structures on the southeastern portion of the Site. Made apparent by stressed vegetation, a pathway leads from the structures on the southeast portion of the Site towards an area of land disturbance activity outside of the Site boundary and to the west of the apparent retention pond. The majority of the Site appears to exhibit signs of stressed vegetation, consistent with use as a livestock pasture.
1962	Good	The Site exhibits decreased signs of stressed vegetation and the areas of land disturbance activities surrounding the structures are no longer apparent. A rectangular structure is apparent between the two structures within the southeastern portion of the Site appears to be utilized as a barn or storage structure. Development and expansion of the apparent quarry mining activities is apparent along the southeastern border of the Site. A structure is apparent to the southeast of the Site, connected to the quarry mining activities via unimproved roadways.
1965	Good	Land disturbance activities stemming from the northern structures dominate the northwestern corner of the Site. Unimproved footpaths lead from the southern-most of the two structures along the northern boundary of the Site to the southeast and northwest. Outside of the western portion of the northern boundary of the Site, three rectangular temporary structures reside parallel to West Hunter Valley Road. Entrances from West Hunter Valley Road leading to these structures are apparent by stressed vegetation.

1977	Poor	The poor quality of the Aerial Photograph obscures details of the Site and the adjoining properties. Unimproved footpaths continue to be prominent, spanning to the northwest from the southern-most structure within the northern portion of the Site. While the rectangular structures noted outside of the northern boundary of the Site in the 1965 Aerial Photograph are no longer apparent, in their place is a roughly rectangular shaped area of cleared land, evident by the lighter shade of ground cover, is apparent.
1986	Good	Developmental activities surrounding the structures on the northern portion of the Site are apparent. Two small structures are apparent to the north of the Site and West Hunter Valley Road, in place of the rectangular shaped area of cleared land in the 1977 Aerial Photograph. Two east-west oriented rectangular structures are apparent within the dense vegetation to the north of the Site and the adjacent agricultural fields. Development of the structure to the southeast of the Site is apparent, along with the associated unimproved roadways and quarry mining activities.
1992	Poor	The poor quality of the Aerial Photograph creates difficulties in discerning details of the Site and the adjoining properties. The Site and adjoining properties appear relatively unchanged.
1998	Excellent	Developmental activities and evidence of livestock pasturing surrounding the structures on the northern portion of the Site are made evident by land clearing activities, unimproved foot paths, and debris across the northwestern corner of the Site. The southern extension of West Hunter Valley Road continues to project between the two apparent structures on the southeastern portion of the Site, runs parallel to the southwestern boundary, and exits the Site at the southernmost tip. Within the southern-most portion of the Site, the extension of West Hunter Valley Road is flanked by triangular shaped regions consisting of many circular-shaped areas of stressed vegetation, likely associated with livestock pasturing. A circular area of disturbance is evident to the west of the southern-most structures on the Site and the southern extension of West Hunter Valley Road. West Hunter Valley Road, while previously terminating at a similar longitude as the northern-most structures on the Site, instead projects and curves to the northwest. Land disturbance activities within a rectangular-shaped area continue to persist to the north of the Site and Hunter Valley Road, consistent with the 1977 Aerial Photograph.
2005	Fair	The structures on the northern portion of the Site and the land disturbance activities to the north of the Site are no longer apparent. The dense vegetation buffer surrounding the apparent stream feature on the Site only spans from the eastern boundary to the apparent fence line in the middle of the Site. The western portion of the stream feature on the Site is straightened. The western portion of the Site appears to covered with vegetation that is not dense, suggesting consistent use for agricultural purposes. The southern extension of West Hunter Valley and the associated triangular regions of stressed vegetation noted in the 1998 Aerial Photograph are no longer apparent. A north-south trending unimproved roadway (Stone Bridge Road) perpendicularly intersects West Hunter Valley Road, spanning from the densely vegetated area to the north of the Site and the northern adjacent agricultural property, to the south onto the Site, running parallel to the apparent fence line, and terminating at the apparent stream feature. The retention pond located to the west of the southern-most structures on the Site appears to be dry. Residential development is apparent to the north of the Site and the northern adjacent agricultural property. Quarry mining operations to the northeast of the Site continue to be apparent. An apparent state highway (State Road 46) runs parallel to the western boundary of the Site, wrapping around the southern border and continuing to the east. A culvert appears to be installed under State Road 46, allowing the suspected stream feature on the Site to flow to the western side of the state highway and deposit in an apparent retention basin. The projected portion of West Hunter Valley Road, noted in the 1998 Aerial Photograph, intersects State Road 46, and continues to the west. Developmental land clearing activities are apparent to the west of State Road 46.
2008	Good	The portion of Stone Bridge Road located on the Site appears developed into a paved roadway and extends to the southern boundary of the Site. Developments along Stone Bridge Road include curb cuts, street trees, road striping, and landscape islands. The

		apparent stream feature between Stone Bridge Road and the eastern boundary of the Site appears to have been dammed, generating a retention pond feature. The structures on the southern portion of the Site are no longer apparent. Quarry mining operations to the northeast of the Site continue to be apparent.
2012	Excellent	The Site and adjoining properties appear relatively unchanged.
2016	Excellent	Erosional features parallel to the apparent stream feature are evident along the banks of the western portion of the channel on the Site. Unimproved foot paths, stemming from the southern termination of Stone Bridge Road, appear to lead northwest and northeast on the Site. Disturbed vegetation marks additional unimproved foot paths leading from West Hunter Valley Road and onto the western portion of the northern boundary of the Site. The northern adjoining property appears to have been developed for agricultural purposes, indicated by the coloration of the field and the apparent bales of hay spread across the property.
2020	Excellent	Roughly circular areas of disturbed vegetation are apparent to the north and northeast of the retention pond feature on the Site, noted in the 2008 Aerial Photograph, indicative of livestock pasturing. At approximately the same latitude, similarly disturbed vegetation is apparent to the east of Stone Bridge Road. An unimproved foot path is apparent spanning from the northeastern corner of the Site, along the western edge of the retention pond feature, and terminating along the southwestern boundary. In place of the unimproved footpaths leading from West Hunter Valley Road onto the western portion of the northern boundary of the Site, noted in the 2016 Aerial Photograph, a large area of disturbed soil is apparent. In conjunction with observations from the Site site reconnaissance, this disturbed area is likely a soil stockpile. The northern adjoining property appears to have experienced vegetative recovery.

Aerial photographs indicate the presence of hydrologic features that may constitute jurisdictional waters. Evidence of limited development of the Site, primarily for residential and agricultural purposes, is evident in historical aerial photographs.

4.0 FIELD RECONNAISSANCE

VET representatives Ms. Sara Hamidovic, MS, PE, CHMM, CPESC and Mr. Daniel Elliott conducted a field reconnaissance on April 3, 2024. The purpose of the field investigation was to verify the accuracy of the information reviewed during the desktop reconnaissance and to identify features of concern that were not identified by the desktop reconnaissance. No formal wetlands or waters delineations were conducted. Select photos taken during the field reconnaissance are included as **Attachment 1**.

The Site is located south of West Hunter Valley Road. An access road extends south from West Hunter Valley Road and travels north to south across the Site. There are no structures located on the Site. VET was unable to conduct a detailed field reconnaissance of the southwestern portion of the Site due to presence of livestock. VET searched for obstacles to development, to the extent practicable, while avoiding disturbances to the livestock. A large soil stockpile is located on the northwestern portion of the Site. Silt fence was installed around the stockpile, but portions of the silt fence were damaged and/or installed incorrectly. Significant Site observations are displayed on **Exhibit 4**.

4.1 Soils

One Site soil, Haymond Silt Loam, Frequently Flooded, is included on the 2016 NRCS Hydric Soils List for Monroe County, Indiana. Hydric soils generally coincide with mapped streams or floodways identified during the desktop reconnaissance. Additionally, VET observed standing water during the field reconnaissance. This indicates that soils on-Site likely present conditions favorable to wetland development.

4.2 Waterways and Waterbodies

The desktop reconnaissance identified two intermittent streams on-Site (**Exhibit 4**). VET observed stream features consistent with the intermittent streams (Mapped Streams #1 and #2) mapped by NHD. VET also identified a swale that extends south from the approximate middle portion of Mapped Stream #1 (**Exhibit 4**). The United States Army Corps of Engineers (USACE) defines an intermittent stream as "*having flowing water during certain times of the year, when groundwater provides water for stream flow."* Based on experience, VET believes that the streams on-Site are likely classified as intermittent. VET recommends conducting a formal jurisdictional waters delineation to determine the regulatory status of all water features on-Site.

4.3 Wetlands

No mapped wetlands were identified on-Site by NWI. However, VET observed hydrophytic vegetation and wetland hydrology in several areas that could constitute regulated wetlands, indicated on **Exhibit 4**. A dominance of hydrophytic vegetation is indicative of presence of soil saturation at or near the surface during the growing season and is one of the three indicators of wetlands. Wetland hydrology refers to the timing and extent of flooding or soil saturation and is another of the three indicators of wetlands. Wetland hydrology characteristics observed at the Site included concave topographic depressions and standing water. Based on VET's experience, the field observed wetland features are likely classified as isolated wetlands.

Wetlands may be regulated by IDEM and the USACE as they provide filtration, flood storage, and habitat. Construction in wetlands is typically subject to permitting requirements and/or compensatory mitigation. In VET's experience, wetland area published by NWI is typically less extensive than wetlands identified by formal field delineation methodology. VET recommends conducting a formal wetland delineation of the Site during the growing season to determine the presence or absence of regulated wetlands.

4.4 Karst Features

VET observed a swallow hole and potential sinkhole on the Site as indicated on **Exhibit 4**. A formal karst survey was not performed as part of the field investigation. Monroe County Ordinance, Chapter 829: Karst and Sinkhole Development Standards contains detailed requirements regarding sinkhole evaluations and sinkhole conservation areas (SCAs). VET recommends performing a formal sinkhole evaluation in accordance with Monroe County Ordinance 829-4(A). A copy of the ordinance is included as **Attachment 6**. Additionally, VET

recommends having an environmental professional on-call for consultation during grading and construction in the event that karst features are identified.

4.5 Wells

No wells were identified on-Site during the desktop reconnaissance or the field reconnaissance. If a well is identified during development activities, it should be protected as a well can serve as a conduit to the subsurface water bearing zone. Subsequent to discovery, the well should be adequately restored or properly abandoned.

4.6 Archaeological and Historic Sites

No historical or archaeological sites are known to exist on-Site. However, VET observed remnants of a limestone foundation on the southeastern portion of the Site, possibly associated with a historic homestead. This observation coupled with the presence of nearby historical structures on Nelson Lane, Stoutes Creek Road, and Woodyard Road makes it is more likely that archaeological or historic sites are present on-Site. Various federal and state permits require an archaeological survey, depending on planned impacts to the Site. VET recommends consulting with an appropriately qualified professional to determine whether an archaeological study is required based on planned Site developments.

5.0 CONCLUSIONS

VET performed a desktop reconnaissance coupled with a field reconnaissance to identify obstacles that may impede development of the Site. VET identified potentially regulated wetlands and potentially jurisdictional streams on-Site. VET recommends conducting a formal wetland delineation and jurisdictional waterways determination prior to development of the Site as permitting and compensatory mitigation may be required through USACE and/or IDEM. VET recommends following the Nationwide Standard for Conservation Measures to ensure minimal damage to potential habitats or breeding grounds due to the species potentially affected by the proposed project. VET recommends conducting a Section 7 consultation and archaeological study, if required by development plans. VET recommends conducting a formal sinkhole evaluation and establishing SCAs as necessary to protect karst features.

If you have any questions or concerns regarding this report, please do not hesitate to contact VET at (812) 822-0400.

Respectfully submitted,

Sara R. Hamidovic, MS, PE, CHMM, CPESC
Principal Engineer, President/CEO

6.0 REFERENCES

Gray, H. Henry. (2000). *Physiographic Divisions of Indiana,* Bloomington, IN: Indiana Geological Survey

IndianaMAP. (2024). *IndianaMAP*. Retrieved March 25, 2024, from https://www.indianamap.org/

Natural Resources Conservation Service. (2024). *State Soil Data Access (SDA) Hydric Soils List*. Retrieved March 25, 2024, from https://nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric

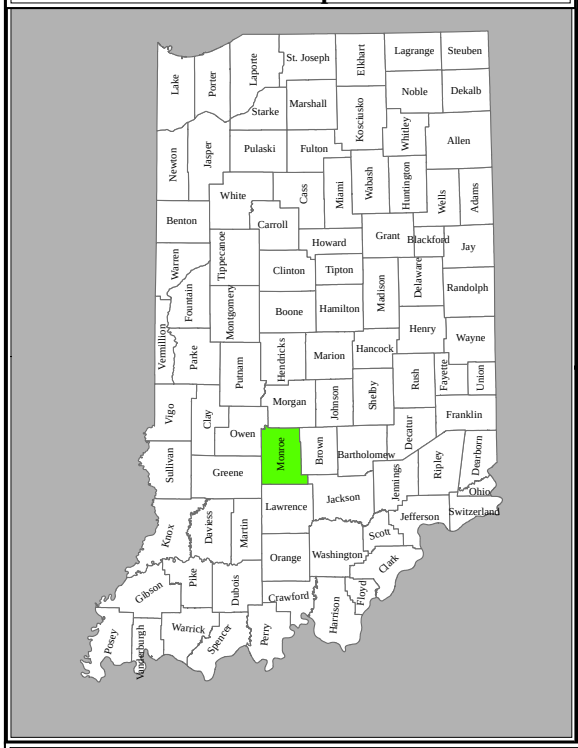
Natural Resource Conservation Service. (2024). *Web Soil Survey*. Retrieved March 25, 2024, from https://websoilsurvey.nrcs.usda.gov/app/WebSoilSUrvey.aspx

United States Fish and Wildlife Service. (2024). *Federal Laws that Protect Bald and Golden Eagles*. Retrieved March 25, 2024, from https://www.fws.gov/law/bald-and-golden-eagle-protection-act

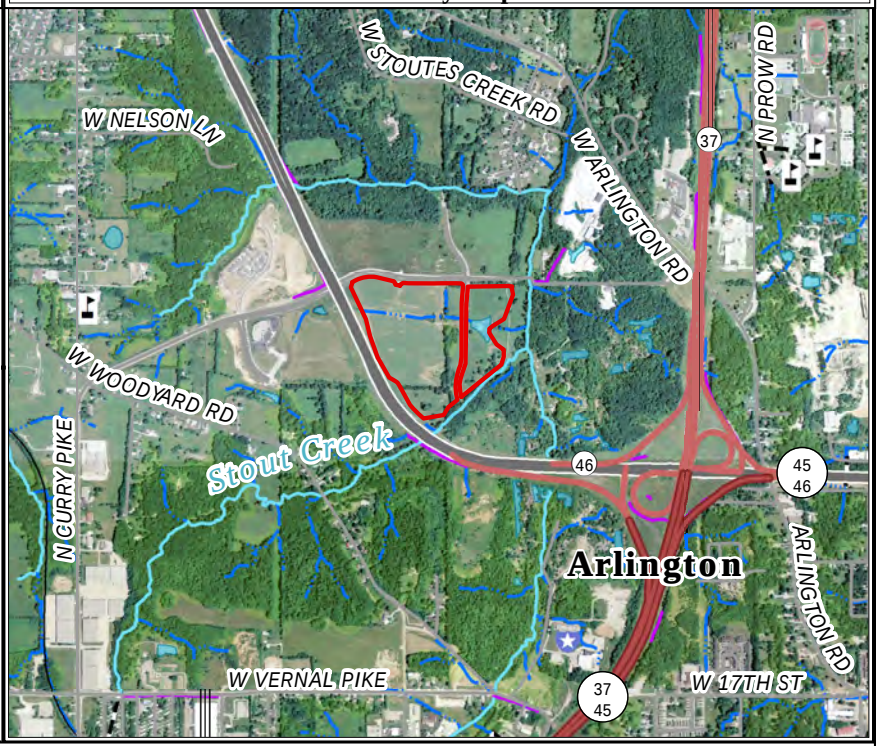
United States Geological Survey. (2023). Bloomington, IN, 1:24,000 Topographic Map. United States Geological Survey.

EXHIBITS

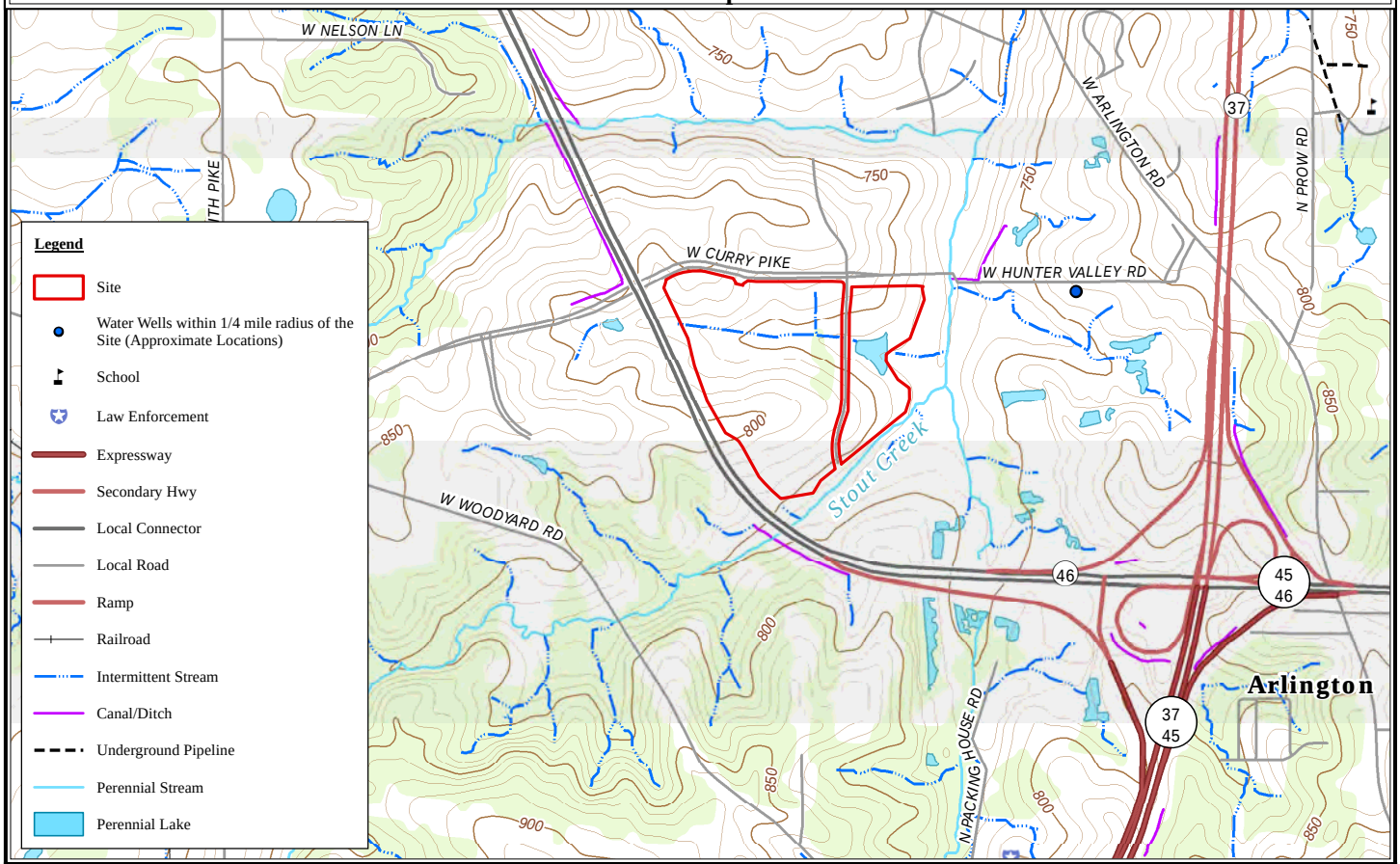
State Map



Vicinity Map



Site Map



VET Environmental Engineering, LLC

2335 W. Fountain Drive
Bloomington, IN 47404
Phone: (812) 822-0400
www.vet-env.com

N

1 " = 1,500 '

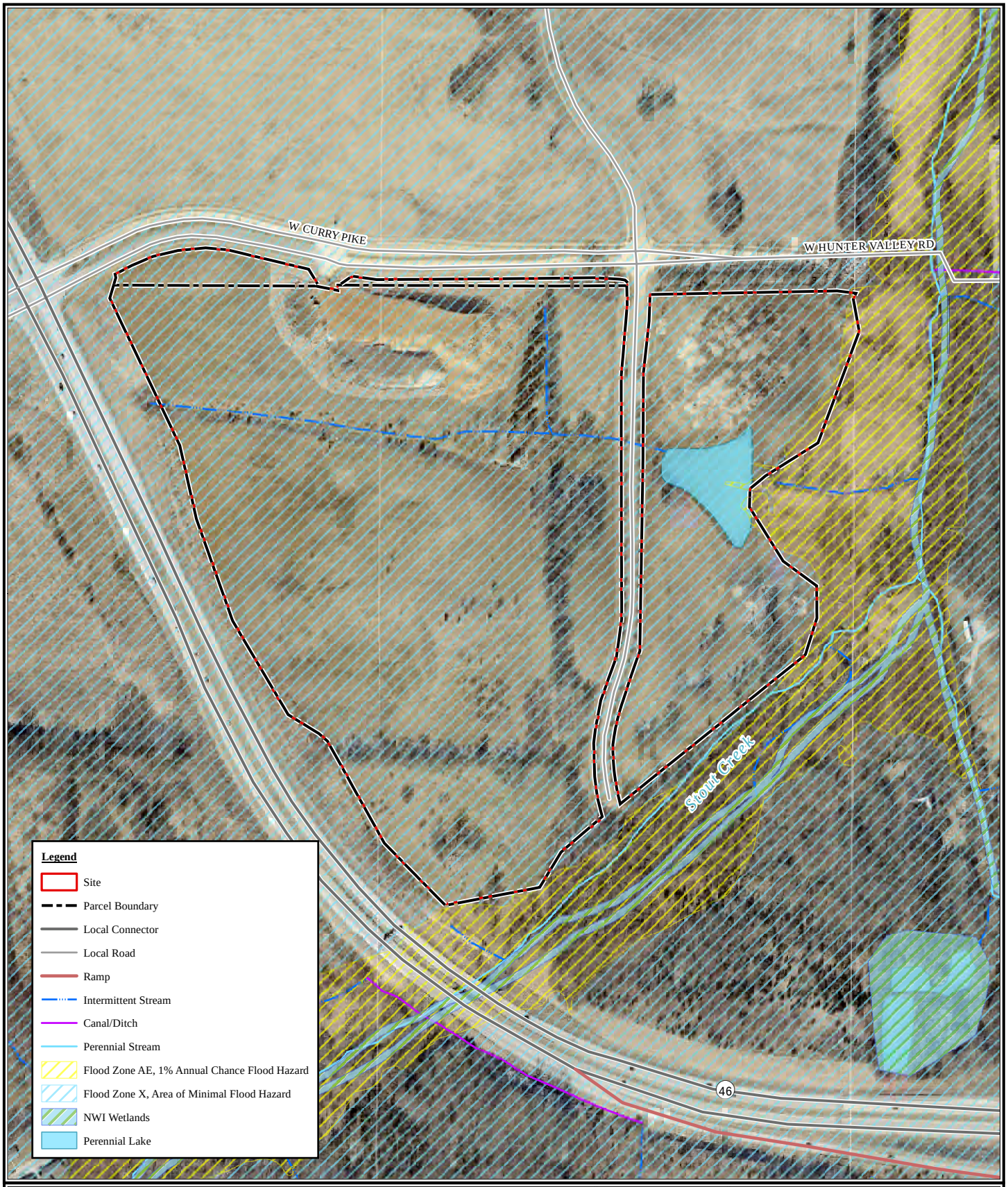
0 360 720 1,080 Feet

Project:	Monroe County Commissioners Hunter Valley - North Park Site Reconnaissance
VET Project No.:	24-62
NPDES Permit No.:	N/A
Date:	4/24/2024
Exhibit:	1
Drawn By:	EMT
Notes:	Water wells shown: 1 in 1/4 mile radius of Site

Title: Area Map

Location: West Hunter Valley Road
Bloomington, Indiana 47404
Monroe County

Data Sources: Indiana Census TIGER 2000 and IGS Counties, 2016 NAIP Imagery, 2019 USGS TNM Topo Indiana Bloomington 7.5'



VET Environmental Engineering, LLC

2335 W. Fountain Drive
Bloomington, IN 47404
Phone: (812) 822-0400
www.vet-env.com

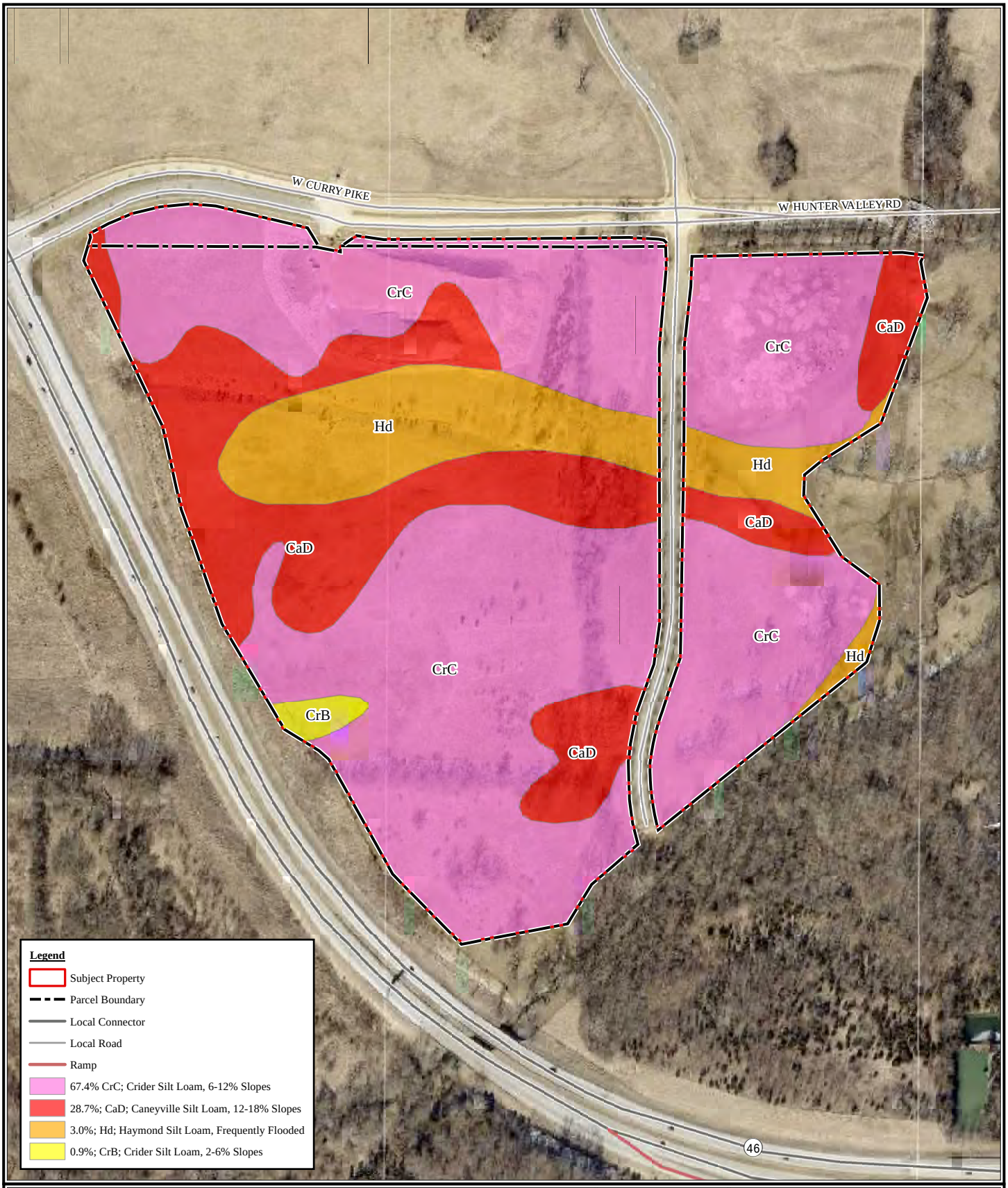
N

1 " = 375 '

0 80 160 240 Feet

Project:	Monroe County Commissioners Hunter Valley - North Park Site Reconnaissance
VET Project No.:	24-62
NPDES Permit No.:	N/A
Date:	4/24/2024
Exhibit:	2
Drawn By:	EMT
Notes:	Intermittent Stream, Perennial Lake, & FEMA Floodway Reported On Site

Title:	Parcel Map
Location:	West Hunter Valley Road Bloomington, Indiana 47404 Monroe County
Data Sources:	2022 Elevate Imagery, 2023 USGS TNM Topo Indiana Bloomington 7.5'



VET Environmental Engineering, LLC

2335 W. Fountain Drive
Bloomington, IN 47404
Phone: (812) 822-0400
www.vet-env.com

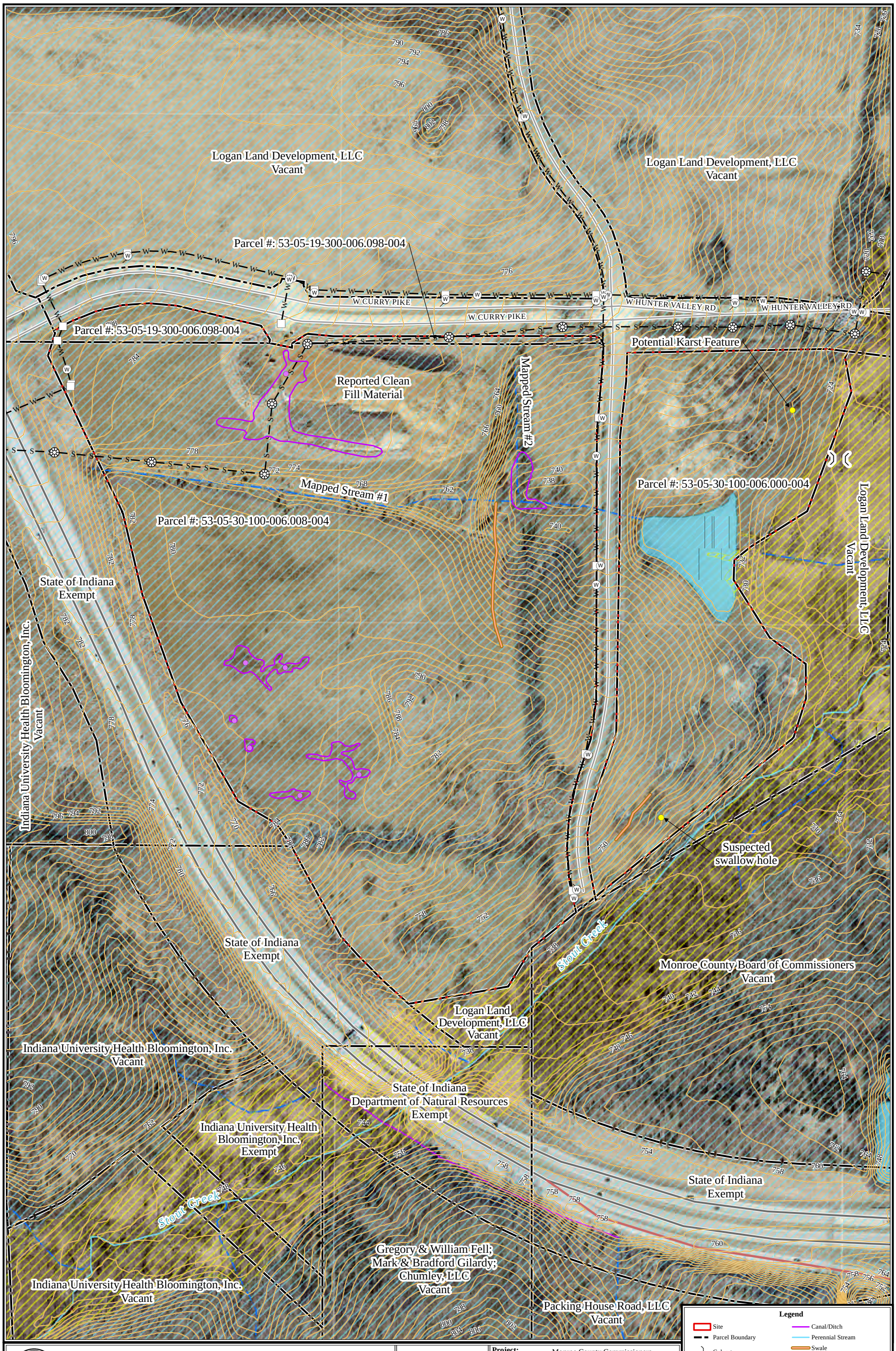
N

1 " = 333 '

0 80 160 240 Feet

Project:	Monroe County Commissioners Hunter Valley - North Park Site Reconnaissance
VET Project No.:	24-62
NPDES Permit No.:	N/A
Date:	4/24/2024
Exhibit:	3
Drawn By:	EMT
Notes:	Hydric Soils Hd Reported On Subject Property

Title:	Soils Map
Location:	West Hunter Valley Road Bloomington, Indiana 47404 Monroe County
Data Sources:	2022 Elevate Imagery, 2016 USDA WSS Soils, 2023 USGS TNM Topo Indiana Bloomington 7.5'



VET Environmental Engineering, LLC
2335 W. Fountain Drive
Bloomington, IN 47404
Phone: (812) 822-0400
www.vet-env.com

Title:	Site & Adjoining Properties Map
Location:	West Hunter Valley Road Bloomington, Indiana 47404 Monroe County
Data Sources:	2022 Elevate Imagery, 2024 Water and Sanitary Sewer City of Bloomington Data, 2023 USGS TNM Topo Indiana Bloomington 7.5'

N

1 " = 246 '

0 140 Feet

Project:	Monroe County Commissioners Hunter Valley Site Reconnaissance
VET Project No.:	24-62
NPDES Permit No.:	N/A
Date:	4/29/2024
Exhibit:	4
Drawn By:	EMT
Notes:	N/A

ATTACHMENT 1

Site Reconnaissance Photographs

Photo 1: Surface water impoundment/retention basin on eastern boundary; View to the west

Photo 2: Silt fencing and unnamed tributary to Stout Creek; View to the west

Photo 3: Soil stockpile on northern boundary; View to the south

Photo 4: Walking trail on northern adjacent parcel: View to the east

Phase I ESA Photographs

Photo 5: Evidence of historic structure foundation; View to the southeast

Photo 6: Fencing and hay associated with livestock pasturing; View to the southwest

Photo 7: Riprap and silt fencing in vicinity of soil stockpile; View to the south

Photo 8: Unnamed tributary to Stout Creek; View to the south

ATTACHMENT 2

Division of Nature Preserves
402 W. Washington St., Rm W267
Indianapolis, IN 46204-2739

April 4, 2024

Elizabeth Wallace
VET Environmental Engineering, LLC
2335 West Fountain Drive
Bloomington, IN 47404

Dear Elizabeth Wallace:

I am responding to your request for information on the threatened or endangered (T&E) species, high quality natural communities, and natural areas for the Monroe County Commissioners Hunter Valley Phase I Site located within Monroe County, Indiana. The Indiana Natural Heritage Data Center has been checked and included you will find a datasheet with information on the T&E species documented within 0.5 mile of the project area.

If you need a review of the impacts to the animal species mentioned or a general environmental review, you can submit the project information (description, location map, and copy of this letter) to the DNR Division of Fish and Wildlife Environmental Coordinator, at environmentalreview@dnr.in.gov (preferred), or send to the street address below.

Department of Natural Resources
Environmental Review
Division of Fish and Wildlife
402 W. Washington Street, Room W273
Indianapolis, IN 46204

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. If you have concerns about potential Endangered Species Act issues you should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service
620 South Walker Street
Bloomington, Indiana 47403-2121
(812)334-4261

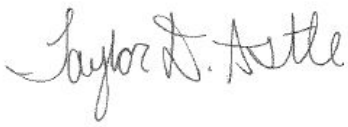
Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at

particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)233-2558 if you have any questions or need additional information.

Sincerely,



Taylor Davis Astle
Indiana Natural Heritage Data Center

Enclosure: datasheet

April 04, 2024

INDIANA HERITAGE DATA WITHIN 0.5 MILE OF:

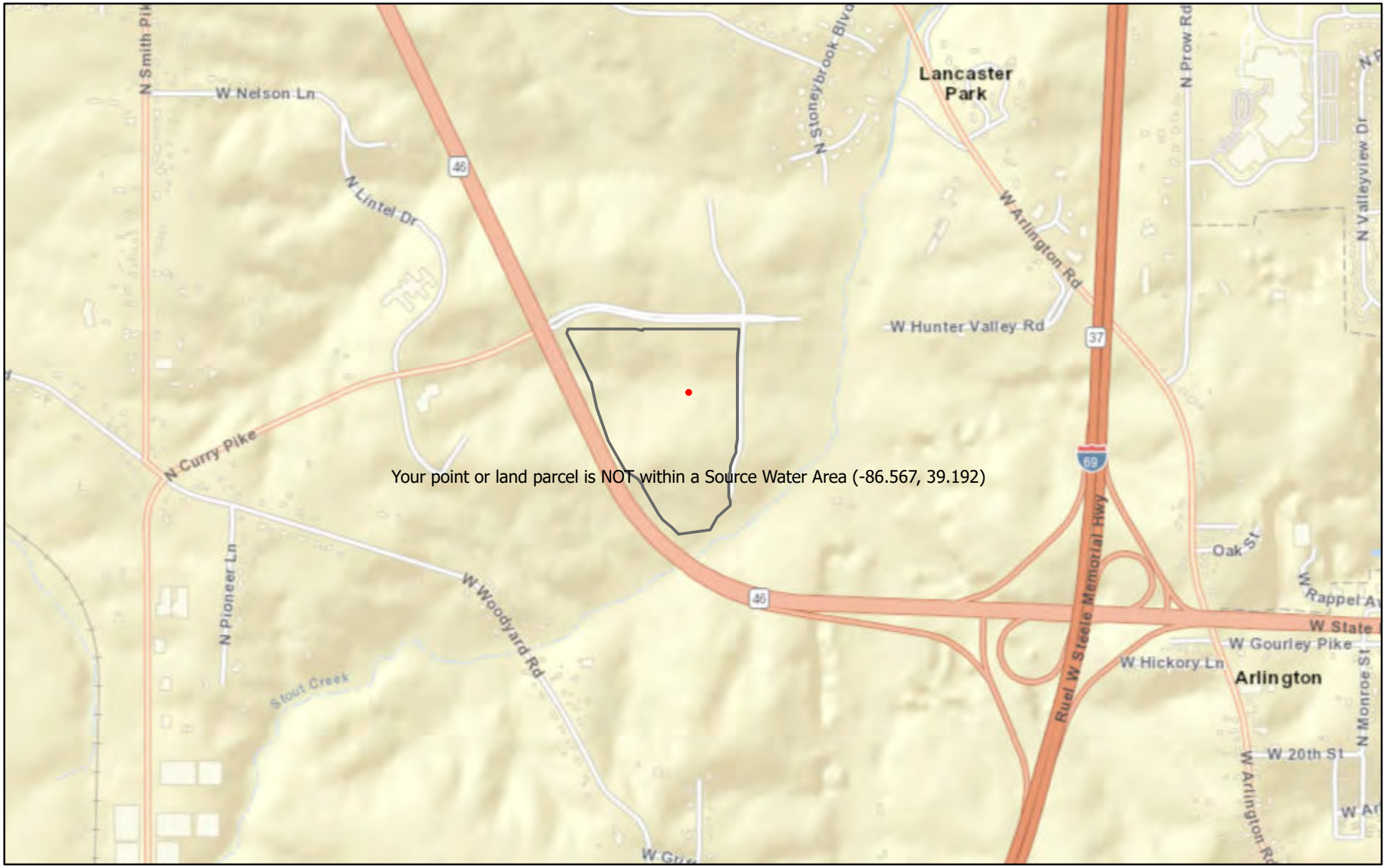
Monroe County Commissioners Hunter Valley Phase I Site, Monroe County

Sci. Name	Com. Name	State	Fed.	Date	Site	Comments
Mammal						
Lasionycteris noctivagans	silver-haired bat	SSC		2012	STOUT CREEK; I-69 SECTION 5; SITE 5 NET A	BAT SUMMER CAPTURE
Lasiurus borealis	red bat	SSC		2019	STOUT'S CREEK SOUTH	BAT SUMMER CAPTURE
Lasiurus borealis	red bat	SSC		2021	I-69 SECTION 5 - STOUTS CREEK SITE	BAT SUMMER CAPTURE
Lasiurus borealis	red bat	SSC		2021	I-69 SECTION 5 - STOUTS CREEK	BAT SUMMER CAPTURE
Mustela nivalis	least weasel	SSC		1998	NW OF BLOOMINGTON	
Myotis lucifugus	little brown myotis	SE	C	2004	STOUT'S CREEK SOUTH	BAT SUMMER CAPTURE
Myotis septentrionalis	northern long-eared myotis	SE	E	2004	STOUT'S CREEK SOUTH STOUT	BAT SUMMER CAPTURE
Myotis septentrionalis	northern long-eared myotis	SE	E	2004	STOUT'S CREEK NORTH	BAT SUMMER CAPTURE
Myotis septentrionalis	northern long-eared myotis	SE	E	2012	I-69 SECTION 5; SITE 2 NET A; SITE 3 NET C; SITE 2 NET B; SITE 4 NET A; SITE 4 NET B	BAT SUMMER CAPTURE
Myotis sodalis	Indiana myotis	SE	E	2004	STOUT'S CREEK SOUTH	BAT SUMMER CAPTURE
Perimyotis subflavus	tri-colored bat	SE		2012	STOUT'S CREEK SOUTH	BAT SUMMER CAPTURE

Fed: E = Federal endangered; T = Federal threatened; C = Federal candidate species
State: SE = State endangered; ST= State threatened; SR = State rare; SSC = State species of special concern; SG = State significant; no rank - not ranked but tracked to monitor status

ATTACHMENT 3

IDEM Source Water Proximity



March 26, 2024

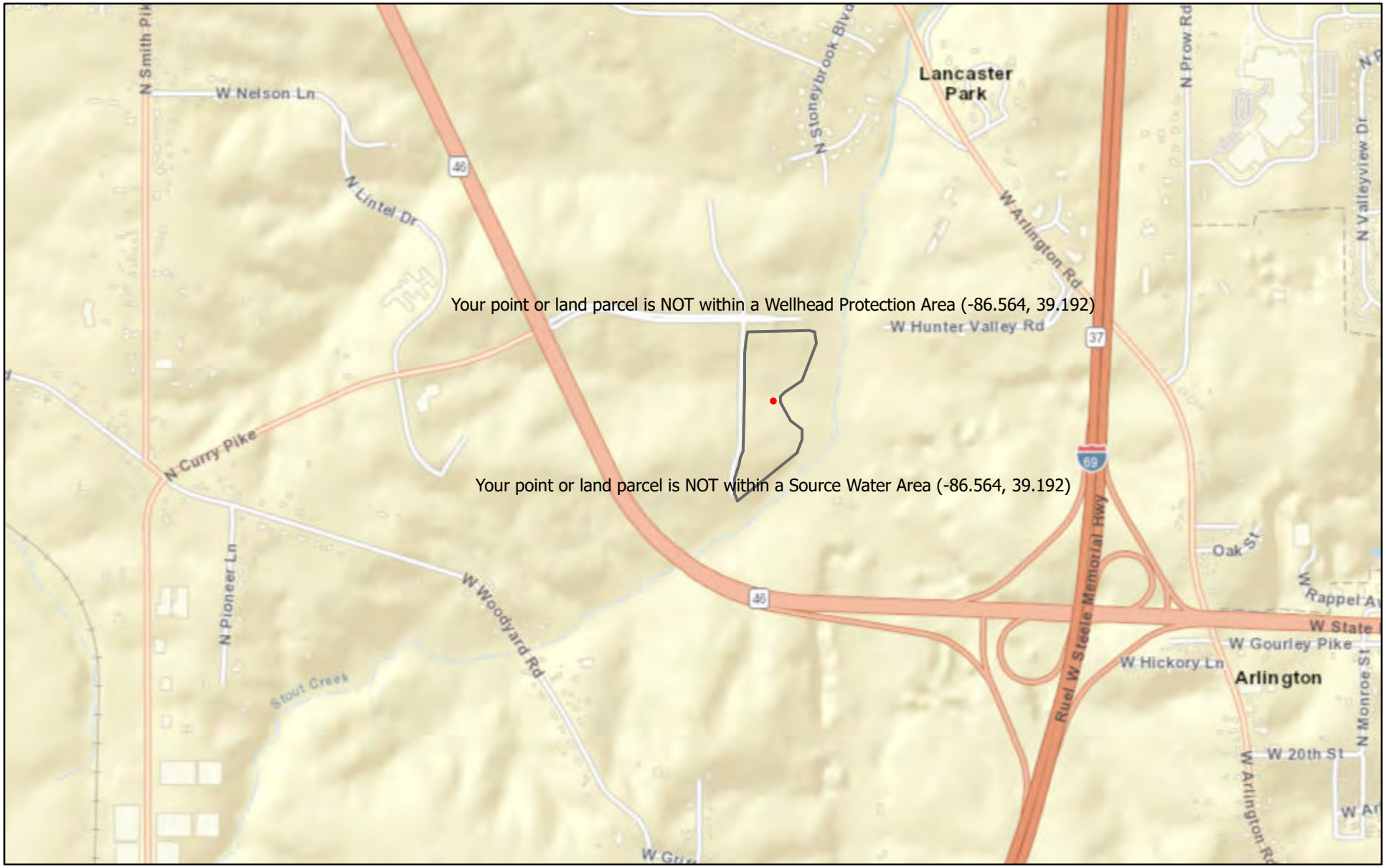
1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Esri, HERE, Garmin, INCREMENT P, NGA, USGS

IDEM Source Water Proximity



March 26, 2024

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Esri, HERE, Garmin, INCREMENT P, NGA, USGS

ATTACHMENT 4

NATIONWIDE STANDARD CONSERVATION MEASURES

Listed below are effective measures that should be employed at all project development sites nationwide with the goal of reducing impacts to birds and their habitats. These measures are grouped into three categories: General, Habitat Protection, and Stressor Management. These measures may be updated through time. We recommend checking the Conservation Measures website regularly for the most up-to-date list.

1. General Measures

a. Educate all employees, contractors, and/or site visitors of relevant rules and regulations that protect wildlife. See the Service webpage on Regulations and Policies for more information on regulations that protect migratory birds.

b. Prior to removal of an inactive nest, ensure that the nest is not protected under the Endangered Species Act (ESA) or the Bald and Golden Eagle Protection Act (BGEPA). Nests protected under ESA or BGEPA cannot be removed without a valid permit.
   i. See the Service Nest Destruction Policy

c. Do not collect birds (live or dead) or their parts (e.g., feathers) or nests without a valid permit. Please visit the Service permits page for more information on permits and permit applications.

d. Provide enclosed solid waste receptacles at all project areas. Non-hazardous solid waste (trash) would be collected and deposited in the on-site receptacles. Solid waste would be collected and disposed of by a local waste disposal contractor. For more information about solid waste and how to properly dispose of it, see the EPA Non-Hazardous Waste website.

e. Report any incidental take of a migratory bird, to the local Service Office of Law Enforcement.

f. Consult and follow applicable Service industry guidance.

2. Habitat Protection

a. Minimize project creep by clearly delineating and maintaining project boundaries (including staging areas).

b. Consult all local, State, and Federal regulations for the development of an appropriate buffer distance between development site and any wetland or waterway. For more information on wetland protection regulations see the Clean Water Act sections 401 and 404.

c. Maximize use of disturbed land for all project activities (i.e., siting, lay-down areas, and construction).

d. Implement standard soil erosion and dust control measures. For example:
   i. Establish vegetation cover to stabilize soil
   ii. Use erosion blankets to prevent soil loss
   iii. Water bare soil to prevent wind erosion and dust issues

3. Stressor Management

Stressor: Vegetation Removal

Conservation Goal: Avoid direct take of adults, chicks, or eggs.

Conservation Measure 1: Schedule all vegetation removal, trimming, and grading of vegetated areas outside of the peak bird breeding season to the maximum extent practicable. Use available resources, such as internet-based tools (e.g., the FWS's Information, Planning and Conservation system and Avian Knowledge Network) to identify peak breeding months for local bird species; or, contact local Service Migratory Bird Program Office for breeding bird information.

Conservation Measure 2: When project activities cannot occur outside the bird nesting season, conduct surveys prior to scheduled activity to determine if active nests are present within the area of impact and buffer any nesting locations found during surveys.

1) Generally, the surveys should be conducted no more than five days prior to scheduled activity.
2) Timing and dimensions of the area to be surveyed vary and will depend on the nature of the project, location, and expected level of vegetation disturbance.
3) If active nests or breeding behavior (e.g., courtship, nest building, territorial defense, etc.) are detected during these surveys, no vegetation removal activities should be conducted until nestlings have fledged or the nest fails or breeding behaviors are no longer observed. If the activity must occur, establish a buffer zone around the nest and no activities will occur within that zone until nestlings have fledged and left the nest area. The dimension of the buffer zone will depend on the proposed activity, habitat type, and species present and should be coordinated with the local or regional Service office.
4) When establishing a buffer zone, construct a barrier (e.g., plastic fencing) to protect the area. If the fence is knocked down or destroyed, work will suspend wholly, or in part, until the fence is satisfactorily repaired.
5) When establishing a buffer zone, a qualified biologist will be present onsite to serve as a biological monitor during vegetation clearing and grading activities to ensure no take of migratory birds occurs. Prior to vegetation clearing, the monitor will ensure that the limits of construction have been properly staked and are readily identifiable. Any associated project activities that are inconsistent with the applicable conservation measures, and activities that may result in the take of migratory birds will be immediately halted and reported to the appropriate Service office within 24 hours.
6) If establishing a buffer zone is not feasible, contact the Service for guidance to minimize impacts to migratory birds associated with the proposed project or removal of an active nest. Active nests may only be removed if you receive a permit from your local Migratory Bird Permit Office. A permit may authorize active nest removal by a qualified biologist with bird handling experience or by a permitted bird rehabilitator.

Conservation Measure 3: Prepare a vegetation maintenance plan that outlines vegetation maintenance activities and schedules so that direct bird impacts do not occur.

Stressor: Invasive Species Introduction
Conservation Goal: Prevent the introduction of invasive plants.

Conservation Measure 1: Prepare a weed abatement plan that outlines the areas where weed abatement is required and the schedule and method of activities to ensure bird impacts are avoided.

Conservation Measure 2: For temporary and permanent habitat restoration/enhancement, use only native and local (when possible) seed and plant stock.

Conservation Measure 3: Consider creating vehicle wash stations prior to entering sensitive habitat areas to prevent accidental introduction of non-native plants.

Conservation Measure 4: Remove invasive/exotic species that pose an attractive nuisance to migratory birds.

Stressor: Artificial Lighting
Conservation Goal: Prevent increase in lighting of native habitats during the bird breeding season.

Conservation Measure 1: To the maximum extent practicable, limit construction activities to the time between dawn and dusk to avoid the illumination of adjacent habitat areas.

Conservation Measure 2: If construction activity time restrictions are not possible, use down shielding or directional lighting to avoid light trespass into bird habitat (i.e., use a 'Cobra' style light rather than an omnidirectional light system to direct light down to the roadbed). To the maximum extent practicable, while allowing for public safety, low intensity energy saving lighting (e.g. low pressure sodium lamps) will be used.

Conservation Measure 3: Minimize illumination of lighting on associated construction or operation structures by using motion sensors or heat sensors.

Conservation Measure 5: Bright white light, such as metal halide, halogen, fluorescent, mercury vapor and incandescent lamps should *not* be used.

Stressor: Human Disturbance
Conservation Goal: Minimize prolonged human presence near nesting birds during construction and maintenance actions.

Conservation Measure 1: Restrict unauthorized access to natural areas adjacent to the project site by erecting a barrier and/or avoidance buffers (e.g., gate, fence, wall) to minimize foot traffic and off-road vehicle uses.

Stressor: Collision

Conservation Goal: Minimize collision risk with project infrastructure and vehicles.

Conservation Measure 1: Minimize collision risk with project infrastructure (e.g., temporary and permanent) by increasing visibility through appropriate marking and design features (e.g., lighting, wire marking, etc.).

Conservation Measure 2: On bridge crossing areas with adjacent riparian, beach, estuary, or other bird habitat, use fencing or metal bridge poles (Sebastian Poles) that extend to the height of the tallest vehicles that will use the structure.

Conservation Measure 3: Install wildlife friendly culverts so rodents and small mammals can travel under any new roadways instead of over them. This may help reduce raptor deaths associated with being struck while tracking prey or scavenging road kill on the roadway.

Conservation Measure 4: Remove road-kill carcasses regularly to prevent scavenging and bird congregations along roadways.

Conservation Measure 5: Avoid planting "desirable" fruited or preferred nesting vegetation in medians or Rights of Way.

Conservation Measure 6: Eliminate use of steady burning lights on tall structures (e.g., >200 ft).

Stressor: Entrapment

Conservation Goal: Prevent birds from becoming trapped in project structures or perching and nesting in project areas that may endanger them.

Conservation Measure 1: Minimize entrapment and entanglement hazards through project design measures that may include:

1. Installing anti-perching devices on facilities/equipment where birds may commonly nest or perch
2. Covering or enclosing all potential nesting surfaces on the structure with mesh netting, chicken wire fencing, or other suitable exclusion material prior to the nesting season to prevent birds from establishing new nests. The netting, fencing, or other material must have no opening or mesh size greater than 19 mm and must be maintained until the structure is removed.
3. Cap pipes and cover/seal all small dark spaces where birds may enter and become trapped.

Conservation Measure 2: Use the appropriate deterrents to prevent birds from nesting on structures where they cause conflicts, may endanger themselves, or create a human health and safety hazard.

1. During the time that the birds are trying to build or occupy their nests (generally , between April and August, depending on the geographic location), potential nesting

surfaces should be monitored at least once every three days for any nesting activity, especially where bird use of structures is likely to cause take. It is permissible to remove non-active nests (without birds or eggs), partially completed nests, or new nests as they are built (prior to occupation). If birds have started to build any nests, the nests shall be removed before they are completed. Water shall not be used to remove the nests if nests are located within 50 feet of any surface waters.

2. If an active nest becomes established (i.e., there are eggs or young in the nest), all work that could result in abandonment or destruction of the nest shall be avoided until the young have fledged or the nest is unoccupied. Construction activities that may displace birds after they have laid their eggs and before the young have fledged should not be permitted. If the project continues into the following spring, this cycle shall be repeated. When work on the structure is complete, all netting shall be removed and properly disposed of.

Stressor: Noise

Conservation Goal: Prevent the increase in noise above ambient levels during the nesting bird breeding season.

Conservation Measure 1: Minimize an increase in noise above ambient levels during project construction by installing temporary structural barriers such as sand bags

Conservation Measure 2: Avoid permanent additions to ambient noise levels from the proposed project by using baffle boxes or sound walls.

Stressor: Chemical Contamination

Conservation Goal: Prevent the introduction of chemicals contaminants into the environment.

Conservation Measure 1: Avoid chemical contamination of the project area by implementing a Hazardous Materials Plan. For more information on hazardous waste and how to properly manage hazardous waste, see the EPA Hazardous Waste website.

Conservation Measure 2: Avoid soil contamination by using drip pans underneath equipment and containment zones at construction sites and when refueling vehicles or equipment.

Conservation Measure 3: Avoid contaminating natural aquatic and wetland systems with runoff by limiting all equipment maintenance, staging laydown, and dispensing of fuel, oil, etc., to designated upland areas.

Conservation Measure 4: Any use of pesticides or rodenticides shall comply with the applicable Federal and State laws.

1. Choose non-chemical alternatives when appropriate
2. Pesticides shall be used only in accordance with their registered uses and in accordance with the manufacturer's instructions to limit access to non-target species.

3. For general measures to reducing wildlife exposure to pesticides, see EPA's Pesticides: Environmental Effects website.

Stressor: Fire

Conservation Goal: Minimize fire potential from project-related activities.

Conservation Measure 1: Reduce fire hazards from vehicles and human activities (e.g., use spark arrestors on power equipment, avoid driving vehicles off road).

Conservation Measure 2: Consider fire potential when developing vegetation management plans by planting temporary impact areas with a palate of low-growing, sparse, fire resistant native species that meet with the approval of the County Fire Department and local FWS Office.

U.S. Fish & Wildlife Service

Birds of Conservation Concern 2021

Migratory Bird Program

Table Of Contents

Cover: Baird's Sparrow, Rick Bohn/USFWS

Allen's Hummingbird, Brima Battle/USFWS

Executive Summary

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the U.S. Fish and Wildlife Service (USFWS) to identify species, subspecies and populations (hereafter taxa) of all migratory nongame birds that without additional conservation action are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973. The Birds of Conservation Concern 2021 (BCC 2021) is the most recent effort to carry out this mandate. The overall goal of this report is to identify those bird taxa (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS. The BCC 2021 is intended to stimulate coordinated, collaborative and proactive conservation actions among international, federal, state, tribal and private partners.

The geographic scope of this endeavor is the United States of America (USA) in its entirety, including island states, commonwealths and territories in the Pacific Ocean and Caribbean Sea and the marine areas delineated as territorial sea, contiguous zone and exclusive economic zone. The BCC 2021 encompasses four distinct geographic scales: 1) the Continental USA, including Alaska; 2) Pacific Ocean islands, including Hawaii; 3) Puerto Rico, the U.S. Virgin Islands and Navassa; and 4) continental Bird Conservation Regions (BCRs) and Marine Bird Conservation Regions (MBCRs), as defined by Bird Studies Canada and NABCI (2014). New to the BCC 2021 is the explicit inclusion of MBCRs.

Bird taxa considered for the BCC 2021 lists include nongame birds, gamebirds without hunting seasons or where harvest is minimal, and subsistence-hunted nongame birds in Alaska. Excluded from consideration for the BCC 2021 are bird species not protected under the Migratory Bird Treaties (Federal Register 2020a), taxa already listed as threatened or endangered under the ESA, or taxa that only occur irregularly or peripherally in the USA. Our conservation assessment was based on several factors, including population abundance and trends, threats on breeding and nonbreeding grounds, and size of breeding and nonbreeding ranges. The factor scores and associated thresholds used for identifying birds of conservation concern in the 2014 State of the Birds Watch List (Rosenberg et al. 2014) and the Avian Conservation Assessment Database (Partners in Flight 2019, Punjabi et al. 2019) served as the foundation on which we developed the BCC 2021 lists. Thus, we sought consistency of the BCC 2021 with priorities identified through these other efforts, noting that appropriate differences do occur due to the unique scope and mandate of the Birds of Conservation Concern. The BCC 2021 also represents the first time we tried to unify the assessment system among waterbirds, shorebirds and landbirds.

The BCC 2021 identifies 269 individual bird taxa of conservation concern. Of these, 135 taxa are of conservation concern at the Continental scale, 88 taxa at the BCR scale, 29 taxa on Puerto Rico and the Virgin Islands, and 35 taxa on Hawaii and the Pacific Islands; 18 taxa identified on the Continental/BCR lists are shared with either Puerto Rico and the Virgin Islands or Hawaii and the Pacific Islands. The number of taxa on the Hawaii/Pacific Island list appears deceptively low, because a high number of birds there are already listed under the ESA. The number of taxa listed within a BCR, which includes those identified as conservation concern at the Continental or BCR scales, ranges from 12 taxa in the Arctic Plains and Mountains to 49 taxa in Coastal California, with an average of 25.4 taxa per BCR. Among MBCRs, the number of taxa ranged from two taxa in the Chuckchi and Beaufort Seas to 13 taxa in the California Current, with an average of 7.4 taxa per MBCR.

Although the bird taxa included in the BCC 2021 are priorities for conservation action, this list makes no finding with regard to whether they warrant consideration for ESA listing. Our goal is to eliminate the need for additional ESA bird listings by implementing proactive management and conservation actions that sustain populations well above thresholds of endangerment. We recommend that these lists be consulted in accordance with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. Many of the taxa identified herein are targets of ongoing conservation attention by national and international initiatives (e.g., Partners in Flight, U.S. Shorebird Conservation Partnership), Migratory Bird Joint Ventures, state and federal natural resource agencies, non-governmental organizations, and other partnerships.

Acknowledgments

This document was the result of collaboration among past and present staff in all regions of the USFWS's Migratory Bird Program. The primary collaborators were Brad Andres, Roxanne Bogart, Bob Ford, Eric Kershner, Terry Rich, and Jennifer Wheeler (Headquarters); Mike Green, Vanessa Loverti, and Roberta Swift (Pacific Region); Carol Beardmore, Bill Howe, Dave Krueper and Bill Vermillion (Southwest Region); Steve Lewis, Bob Russell (deceased) and Tom Will (Midwest Region); Dean Demarest and Troy Wilson (Southeast Region); Randy Dettmers, Debra Reynolds and Caleb Spiegel (Northeast Region); Scott Somershoe (Mountain-Prairie Region); Jim Johnson, Rick Lanctot and Steve Matsuoka (Alaska Region); and Rob Doster and Thomas Leeman (Pacific Southwest Region).

Contributors to the assessments for landbirds and shorebirds beyond the USFWS Migratory Bird Program included Jim Giocomo, Casey Lott, Rebecca Keller, Anne Mini, Mike Parr, David Pashley (deceased), George Wallace, and David Wiedenfeld (American Bird Conservancy); Arvind Panjabi and Allison Shaw (Bird Conservancy of the Rockies); Andrew Couturier (Bird Studies Canada); Ken Rosenberg (Cornell Laboratory of Ornithology); Peter Blancher, Alaine Camfield, Wendy Easton, and Judith Kennedy (Environment and Climate Change Canada); Nancy Douglass (Florida Fish & Wildlife Conservation Commission); John Alexander (Klamath Bird Observatory); Lower Mississippi Valley Joint Venture Science Committee; Lindsay Tudor (Maine Department of Inland Fisheries and Wildlife); Stephen Brown, Rob Clay, and Brad Winn (Manomet); Sara Schweitzer (North Carolina Wildlife Resources Commission); Catherine Hickey (Point Blue Conservation Sciences); Felicia Sanders (South Carolina Department of Natural Resources); David Mehlman (The Nature Conservancy); Greg Butcher (USDA Forest Service); Chuck Hunter (USFWS National Wildlife Refuge System); Janet Ruth and Jessica Stanton (U.S. Geological Survey [USGS]); David Krementz (USGS Arkansas Cooperative Fish and Wildlife Research Unit); and Henning Stabins (Weyerhaeuser Company). Linda Wires (Consultant Biologist) and numerous other individuals contributed to the waterbird assessment.

This edition of the BCC 2021 is dedicated to the original USFWS "Nongame 7" who retired since the previous publication of the Birds of Conservation Concern: Tara Zimmerman (Pacific Region), Bill Howe (Southwest Region), Steve Lewis (Midwest Region), Stephanie Jones (Mountain-Prairie Region), and Kent Wohl (Alaska Region). They all contributed significantly to past versions of the Birds of Conservation Concern and thereby supported the development of this report.

Suggested Citation: U.S. Fish and Wildlife Service. 2021. Birds of Conservation Concern 2021. United States Department of the Interior, U.S. Fish and Wildlife Service, Migratory Birds, Falls Church, Virginia. http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

Reddish Egret, Keenan Adams/USFWS

Introduction

A Congressional amendment to the Fish and Wildlife Conservation Act (16 U.S.C. 2901–2912) in 1988 directed the Secretary of Interior, through the U.S. Fish and Wildlife Service (USFWS), to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543)". The intent of the legislation was to stimulate coordinated and proactive conservation actions among federal, state and tribal governments, non-governmental organizations (NGOs), and private partners in the United States (USA) before birds require protection under the ESA. Even prior to the passage of this amendment, the USFWS was providing periodic assessments of migratory birds that might become candidates for listing under the ESA, generating the first list of migratory nongame birds of management concern in 1982 (U.S. Fish and Wildlife Service 1982). Since that time, five additional lists have been published (U.S. Department of the Interior 1990; U.S. Fish and Wildlife Service 1987, 1995, 2002, 2008).

The Birds of Conservation Concern 2021 (BCC 2021) presented here is the most recent effort by the USFWS to carry out the Fish and Wildlife Conservation Act's proactive conservation mandate and updates the Birds of Conservation Concern (BCC) 2008 (U.S. Fish and Wildlife Service 2008). Development of the BCC 2021 aligns with the USFWS mission of "working with others to conserve, protect, and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people" and meets the current USFWS objective to "guide the conservation, development, and management of the Nation's fish and wildlife resources". The overall goal of the BCC 2021 is to identify, by geography, those nongame migratory birds (beyond those already federally listed as threatened or endangered) in greatest need of conservation attention.

The philosophy underlying the BCC reports is that proactive bird conservation is critical at a time when continued human impacts will be intensified by effects of a changing climate. By investing in actions for designated BCC taxa, we can prevent further degradation to environments that we all share, improve the odds for successful long-term conservation, and avoid the complexities associated with federal ESA listing. Proactive conservation is recognized as being more cost-effective than the recovery efforts required once a bird is listed under the ESA (e.g., Drechsler et al. 2011).

Because it is mandated by law and produced by the USFWS, federal agencies, international NGOs and foreign governments view the BCC list as the official USA Government position on migratory nongame birds of conservation concern. The BCC list is also used to identify priority wetland birds for evaluating North American Wetlands Conservation Act proposals, used in scoring of Neotropical Migratory Bird Conservation Act proposals, and referenced in Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. To promote more consistency among organizations developing various lists of birds of conservation concern, the BCC 2021 closely followed the methods used to generate the Watch List for the 2014 State of the Birds (Rosenberg et al. 2014), 2016 Partners in Flight Landbird Conservation Plan (Rosenberg et al. 2016) and Avian Conservation Assessment Database (Partners in Flight 2019). However, the BCC 2021 differs somewhat from these lists because of its unique scope and mandate.

Cerulean Warbler, Jerry Oldenettel CC BY 2.0

Methods

Geographic Scope

The geographic scope of the BCC 2021 consists of the entirety of the lands and waters of the USA, including states, commonwealths, territories and other affiliations in the Caribbean Sea and Pacific Ocean. Also included in the geographic scope are marine boundaries defined as the territorial sea, contiguous zone and exclusive economic zone (see https://www.nauticalcharts.noaa.gov/csdl/mbound.htm). To facilitate use and interpretation of the BCC 2021, we organized the presentation into four geo-political and ecoregional groupings: 1) Continental USA, including Alaska; 2) Puerto Rico and the U.S. Virgin Islands, 3) Hawaii and the Pacific Islands, and 4) continental Bird Conservation Regions (BCRs) and Marine Bird Conservation Regions (MBCRs). Offshore jurisdictional waters associated with Hawaii and the Pacific Islands and Puerto Rico and the U.S. Virgin Islands are included in their respective regions. We decided to treat states, commonwealths, territories and other affiliations in the Caribbean Sea and Pacific Ocean separately because of the high endemism and high vulnerability of island avifauna (Kier et al. 2009). Descriptions of states, commonwealths, territories and other affiliations in the Caribbean Sea and Pacific Ocean are provided in Table 1, and BCRs and MBCRs are described in Table 2 and illustrated in Figure 1. For details on BCRs and MBCRs, please see Bird Studies Canada and NABCI (2014).

Birds Considered

The taxonomic scope for the BCC 2021 is bounded by the Migratory Bird Treaties that the USA has with Canada (1916), Mexico (1936), Japan (1972) and Russia (1976). The USFWS periodically updates the list of migratory birds covered by these treaties, which usually results from changes in taxonomy, status or distribution. The most recent published list of migratory birds (Federal Register 2020b) was used as the basis for developing the BCC 2021. Within this list, birds considered for inclusion in the BCC 2021 either do not have sport-hunting seasons in the USA or have sporting-hunting seasons where little harvest occurs (e.g., rails). Birds that are not sport-hunted in the lower 48 states but are hunted for subsistence in Alaska are also considered. Because the intent of BCC is to highlight potential candidate birds where ESA listing could be averted through proactive conservation attention, the BCC 2021 further excludes any species, subspecies or population of bird already listed as threatened or endangered under ESA. We also eliminated from consideration any bird that currently occurs as an accidental species in the USA per the AOU Checklist (1983) and subsequent updates, or that was introduced into the USA by humans (Federal Register 2005). Although there is a conservation benefit to protecting accidental species that may potentially expand their regular range into the U.S. in the future, additional conservation actions are not currently necessary and would have little effect on the present status of those species. We use the term "taxon" or "taxa" to refer to species, subspecies and delineated populations of birds considered for the BCC 2021.

To present a more comprehensive perspective on the conservation status of birds within the jurisdictions of the USA, we provide additional information in Appendix 1 on taxa that do not fall within the scope of the BCC 2021 but were identified on the Watch Lists of the State of the Birds (Rosenberg et al. 2014) or in the Avian Conservation Assessment Database (Partners in Flight 2019); were listed as endangered or threatened under the ESA as of January 15, 2021; or are believed to be extinct. To our knowledge, a comprehensive presentation of all birds with an elevated conservation status within the USA was heretofore unavailable.

In general, common and scientific names of birds are presented at the species level, except where it is necessary to differentiate among taxa of a species that may occur in the USA but differ in their conservation status among geographic scales or populations (e.g., taxa listed under the ESA). Relevant taxa of island populations are also identified. Geographic and other modifiers are used throughout the tables to aid in identifying such differentiation, particularly at the BCR and MBCR scales. Species-level classification generally follows the American Ornithologists' Union's Checklist of North American Birds, 7th Edition (1983), including changes and supplements through the 61st supplement in 2020 (Chesser et al. 2020). Subspecies and population classification and species classification in the Pacific Islands generally follows Clements et al. (2019), with some exceptions for shorebirds (see Andres et al. 2012).

Assessing Conservation Status

The BCC 2021 represents the first application of a unified approach to evaluate the conservation status of landbirds, shorebirds and waterbirds for the BCC — an approach greatly facilitated through the efforts to promote consistency during the development of the State of the Birds Watch List in 2014 (Rosenberg et al. 2014). Although the overall approach to evaluate conservation status across all

bird groups for the BCC 2021 is now more consistent than previous BCC assessments, data availability and quality still vary widely among taxonomic groups.

Scoring factors and criteria developed by Partners in Flight (Rosenberg et al. 2016, Panjabi et al. 2019) were the primary means for evaluating conservation status of landbirds, shorebirds, and waterbirds. For areas or taxa where it was not possible to directly apply this evaluation approach, we consulted State Wildlife Action Plans for American Samoa (Department of Marine and Wildlife Resources 2006, 2015), Guam (Guam Division of Aquatic and Wildlife Resources 2006), Hawaii (Hawai'i Department of Land and Natural Resources 2015), the Northern Mariana Islands (Liske-Clark 2015), Puerto Rico (Puerto Rico Department of Natural and Environmental Resources 2015), and the U.S. Virgin Islands (Platenberg and Valiulis 2018). We also consulted the IUCN Red List of Threatened Species (2019), particularly for seabirds.

The intent of the assessment for landbirds, shorebirds and waterbirds is to emphasize their conservation status relative to the entire USA. The conservation status of many landbirds reflects their global status, in the case of entire species that breed in, migrate through or winter in the USA. In contrast, most waterbirds and shorebirds tend to have cosmopolitan distributions, and their conservation at the species level includes populations occurring outside of the USA; therefore, we evaluated several species of shorebirds and waterbirds at the North American population scale. At the BCR and MBCR scales, we evaluated the conservation status of taxa relative to each region, to the degree available data and current understanding allowed.

Scores ranging from one to five were assigned to each of six assessment factors, which are presented below along with scoring criteria (see Panjabi et al. 2019 for details). Data on these six factors were recently updated for shorebirds (U.S. Shorebird Conservation Partnership 2016), landbirds (Partners in Flight 2019) and waterbirds (BirdLife International 2015; Wetlands International 2015; Partners in Flight 2019; L. Wires, unpublished data).

Black-footed Albatross pair, Dan Clark/USFWS

Population Size (PS).
The current estimated number of individuals of a taxon. The factor generally refers to the number of breeding adults but varies somewhat among taxonomic groups due to differing biology and estimation methods.

Score	Criterion
1	≥50,000,000 individuals
2	≥5,000,000 and <50,000,000 individuals
3	≥500,000 and <5,000,000 individuals
4	≥50,000 and <500,000 individuals
5	<50,000 individuals

Breeding Distribution (BD) and Nonbreeding Distribution (ND).
This factor is generally derived from maps developed by NatureServe (2015) and Birdlife International (2015). All range sizes are derived from two-dimensional polygons. For island-breeding seabirds, the breeding distribution generally refers to the size of their nesting islands and does not include pelagic foraging areas, which are hard to delineate for many taxa.

Score	Criterion
1	≥4,000,000 km2
2	≥1,000,000 and <4,000,000 km2
3	≥300,000 and <1,000,000 km2
4	≥80,000 and <300,000 km2
5	<80,000 km2

Breeding Threats (TB) and Nonbreeding Threats (TN).
Threats were evaluated based on the cumulative level of significance to the future viability of a taxon within the geographic region of interest. For taxa that are widely dispersed during migration (e.g., landbirds), TN primarily reflects threats during the boreal winter; for groups that aggregate during migration (e.g., shorebirds), TN reflects migration and wintering threats.

Score	Criterion
1	Future conditions are expected to significantly improve for the majority of the taxon.
2	Future conditions are expected to remain stable; no significant threats.
3	Slight to moderate decline in the future suitability of conditions is expected for the majority of the taxon.
4	Severe deterioration in the future suitability of conditions is expected for the majority of the taxon.
5	Extreme deterioration in the future suitability of conditions is expected.

Population Trend (PT).
Forty-year trends from the Breeding Bird Survey (Criterion 1; see https://www.mbr-pwrc.usgs.gov/) provided information on the majority of landbirds. For waterbirds and shorebirds, information was used from a variety of sources and was less comprehensive and quantitative (Criterion 2).

Score	Criterion 1	Criterion 2
1	change ≥ 50%; P ≤ 0.1	significant large increase
2	change 0 to 50%; P ≤ 0.1 change > 0%; P ≤ 0.33 change > -15%; P ≤ 0.33; reliable	significant small increase possible increase stable
3	P >0.33; unreliable or change ≤ -15%; P > 0.33; reliable change -15% to 0%; 0.1 < P < 0.33 change -15% to 0%; P ≤ 0.1	uncertain population change possible small decrease significant small decrease
4	change -15% to -50%; 0.1 < P < 0.33 change -15% to -50%; P ≤ 0.1 change ≤ -50%; 0.1 < P < 0.33	moderate decrease possible large decrease
5	change ≤ -50%; P ≤ 0.1	significant large decrease

Relative Density (RD).
Relative Density is an additional factor assessed at the BCR/MBCR scale but not at the continental scale. RD scores reflect the mean density of a taxa within a BCR/MBCR relative to density in the single BCR/MBCR in which the taxa occurs in its highest density (Panjabi et al. 2019). Nonbreeding season scores and those for MBCRs were often generated using expert opinion).

	Quantitative Criterion		Qualitative Criterion
Score	**Relative abundance**	**Relative frequency**	
0		BCR relative frequency < 1.5% of the maximum relative frequency	has occurred only irregularly, or strong evidence of regular occurrence is lacking
1	BCR relative abundance < 1% of the maximum relative abundance	BCR relative frequency 1.5-3.6% of maximum relative frequency	occurs regularly but in very small numbers or in only a very small part of the region in question
2	BCR relative abundance 1-10% of maximum relative abundance	BCR relative frequency 3.6-21.7% of maximum relative frequency	occurs in low mean abundance relative to the region(s) in which the taxa occurs in maximum density
3	BCR relative abundance 10-25% of maximum relative abundance	BCR relative frequency 21.7-44.6% of maximum relative frequency	occurs in moderate mean abundance relative to the region(s) in which the taxa occurs in maximum density
4	BCR relative abundance 25-50% of maximum relative abundance	BCR relative frequency 44.6-68.1% of maximum relative frequency	occurs in moderately high mean abundance relative to the region(s) in which the taxa occurs in maximum density
5	BCR relative abundance > 50% of maximum relative abundance	BCR relative frequency > 68.1% of maximum relative frequency	occurs in high mean abundance, similar to the region(s) in which the taxa occurs in maximum density

Identifying Birds of Conservation Concern
The following Combined Continental Scores (CCS) of factors and scoring thresholds, based primarily on Panjabi et al. (2019), were used to identify taxa of elevated conservation concern:

CCS(max) ≥ 14 or
CCS(max) = 13 and PT = 5, where

CCS(max) is the maximum score of either CCS(B) or CCS(N),
CCS(B) is Combined Continental Score (Breeding) = PS + BD + TB + PT, and
CCS(N) is Combined Continental Score (Nonbreeding) = PS + ND + TN + PT.

The above criteria are consistent with a breeding season Watch List designation at a North American continental scale (USA and Canada) in the recently published version of the Avian Conservation Assessment Database (Panjabi et al. 2019).

To be included as a Bird of Conservation Concern at the BCR or MBCR scale, a taxon had to meet the Watch List criteria above and had to occur regularly within the region at a manageable level (RD ≥ 2). Taxa breeding in a BCR were generally assessed using the quantitative criteria, whereas nonbreeding taxa were most often assessed using the qualitative criteria.

At the BCR scale, we identified additional taxa that did not meet the criteria for the BCC 2021 Continental list (Watch List) but were nonetheless of elevated conservation concern regionally. Taxa included as birds of conservation concern at the BCR scale had RD ≥ 2 and met the following scoring thresholds, based on the Partners in Flight action codes (Panjabi et al. 2019) at the regional scale:

1) TB or TN = 5 (Critical Recovery); or
2) TB or TN = 4 and PT = 5 (Immediate Management); or
3) Combined Regional Breeding Score (CRBS) ≥17, and
    a) TB or TN = 3 and PT ≥ 4 or (Management Attention)
    b) TB or TN = 4 and PT < 5 (Management Attention).

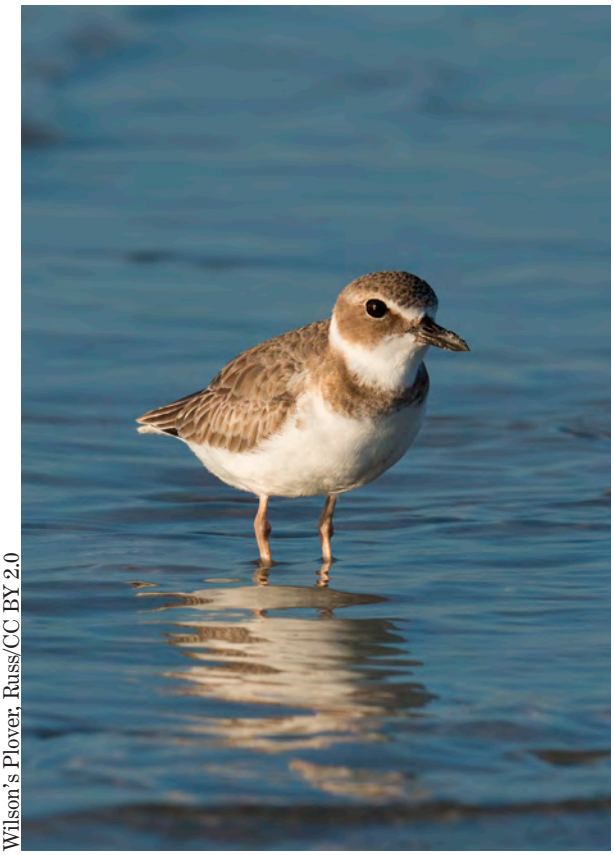
The CRBS is equivalent to the CCS(B) + RD. Inclusion of nonbreeding taxa at the BCR level was generally based on expert opinion, because BCR-scale nonbreeding scores are not yet incorporated into the Avian Conservation Assessment Database (Panjabi et al. 2019).

These regional criteria for the BCC 2021 were more stringent than the criteria used in the Avian Conservation Assessment Database to identify species of regional concern (Panjabi et al. 2019) but better address the overall mandate of the BCC. A few taxa below the species level were elevated to the Continental list due to continued concern expressed by partners or were subspecies unique to North America (e.g., Swallow-tailed Kite, Gray-headed Chickadee).

Results and Discussion

The BCC 2021 identifies 269 individual bird taxa of conservation concern (Appendix 1). Of these, 135 taxa are of conservation concern at the Continental scale, 88 taxa at the BCR scale, 29 taxa on Puerto Rico and the Virgin Islands and 35 taxa on Hawaii and the Pacific Islands; 18 taxa identified on the Continental/BCR lists are shared with either Puerto Rico and the Virgin Islands or Hawaii and the Pacific Islands (Table 3). The number of taxa on the Hawaii/Pacific Island list appears deceptively low, because a relatively high number of birds there are already listed under the ESA or are extinct (Appendix 2). A few of the taxa identified in the BCC 2021 are currently being considered for listing or de-listing under the ESA.

All major bird groups are represented in the BCC 2021, but shorebirds, seabirds and some landbirds have particularly high representation (Table 4). Of eligible taxa, 53% of shorebirds and 48% of seabirds met criteria for inclusion in the BCC 2021. Based on habitat designations of landbirds provided in Rosenberg et al. (2019), which apply to the Continental and BCR scales (Table 4), a high percentage of taxa inhabiting grasslands (54%) and aridlands (47%) were included in the BCC 2021, as were aerial insectivores (31%). Excluding aridland birds, the other groups experienced the greatest losses of individuals over the last fifty years (Rosenberg et al. 2019).



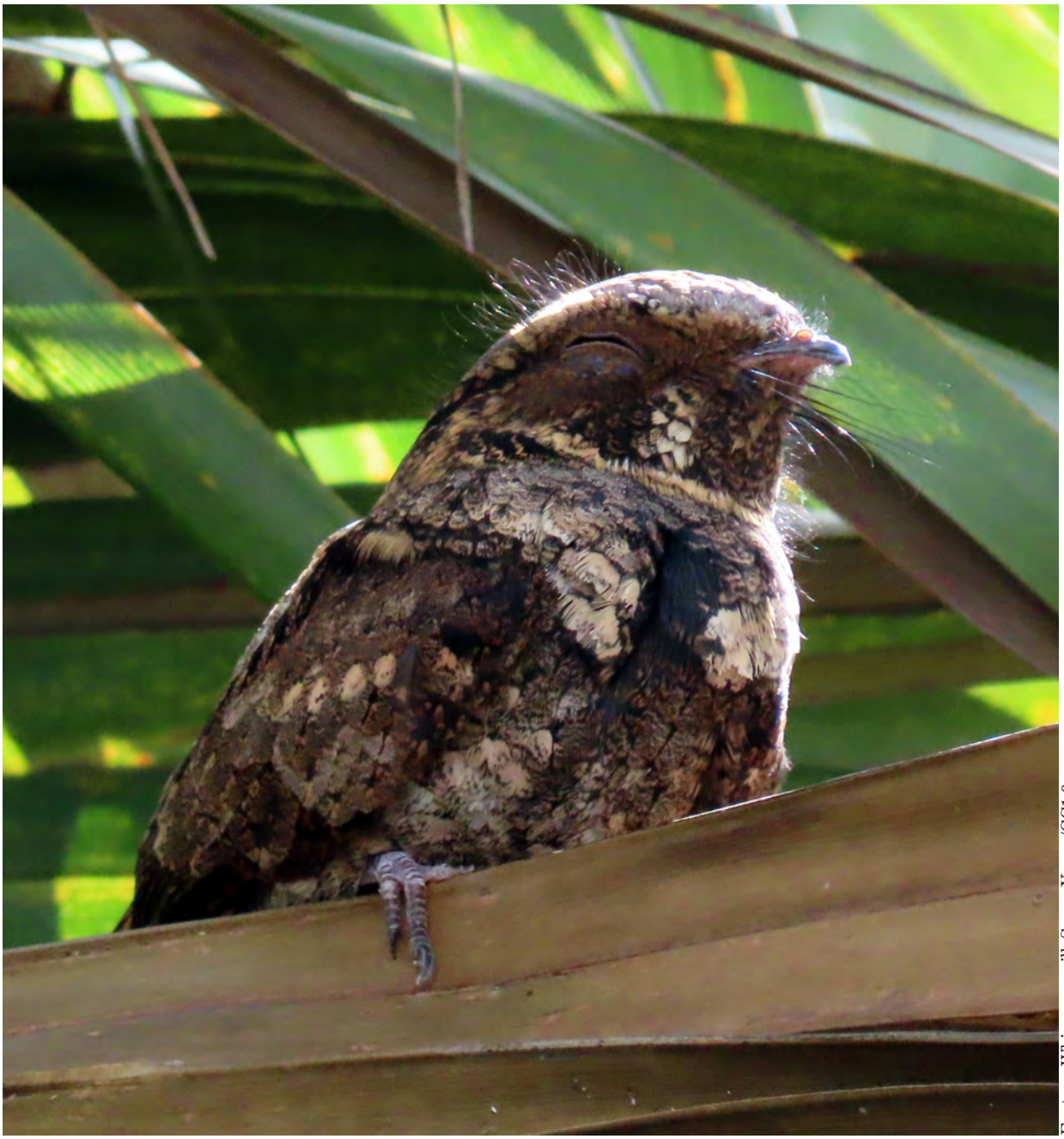
Wilson's Plover, Russ/CC BY 2.0

The BCR/MBCR lists incorporate the 135 taxa of Continental concern where they are considered to occur at manageable levels and include an additional 88 taxa of regional concern within specific BCRs or MBCRs. The number of taxa listed within a BCR ranges from 12 taxa in the Arctic Plains and Mountains to 49 taxa in Coastal California, with an average of 25.4 taxa per BCR (see Tables 5-10). Among MBCRs, the number of taxa ranged from two taxa in the Chuckchi and Beaufort Seas to 13 taxa in the California Current, with an average of 7.4 taxa per MBCR (see Tables 5, 6, 8 and 10).

The BCC 2021 is the latest update in a continuing effort to assess and prioritize migratory birds for conservation purposes (U.S. Department of the Interior 1990; U.S. Fish and Wildlife Service 1982, 1987, 1995, 2002, 2008). Overall, it is difficult to make meaningful comparisons among the lists over the years because of differences in the way each list was constructed. However, the 2021 and 2008 lists were most similar in the assessment approach, with the exception of inclusion of some taxa in 2008 not considered in 2021. Accounting for this difference, the number of taxa was essentially the same on the Continental list between years (133 versus 132 in 2008), had a small increase (8%) on Puerto Rico/Virgin Islands list (28 versus 26 in 2008), and a significant increase (52%) on the Hawaii/Pacific Islands list (35 versus 23 in 2008). Between years, nine taxa identified in the 2008 BCC were listed under the ESA in 2021, and three species de-listed during the period were included in BCC 2021. The increase in Hawaii and the Pacific Islands is attributed to a more thorough treatment of Pacific Islands beyond Hawaii and inclusion of more seabird taxa; additional nonbreeding seabird taxa occurring in continental USA waters were included on the Continental list. Similar numbers of taxa were identified at the BCR level in 2008 and 2021 (84 taxa versus 83). Notwithstanding these differences, a number of taxa identified in 2008 are not included in the BCC 2021, which reflects a real change in our understanding of current conservation status. We do not present USFWS Region lists in 2021 as we did in 2008 and recognize the current acceptance of BCRs and MBCRs as fundamental conservation planning and implementation units.

The State of the Birds produced in 2014 (North American Bird Conservation Initiative, U.S. Committee 2014) provides more details on how land-use change and other environmental threats affect birds in the major ecosystems in the USA, and a more recent analysis provides an overview of declines and losses of birds in North America (Rosenberg et al. 2019). As with the results presented in the BCC 2021, island birds, grassland birds, seabirds and shorebirds demonstrate the greatest conservation need. Although we did not build specific climate change scoring into the current assessment, the 2010 State of the Birds provided an overview of climate change effects on USA birds (North American Bird Conservation Initiative, U.S. Committee 2010). Future updates to the Birds of Conservation Concern might consider including measures of the potential effects of climate change.

Although all of the bird taxa included in the BCC 2021 are priorities for conservation action, this list makes no finding with regard to whether they warrant consideration for ESA listing. Our goal is to avert the need for additional ESA bird listings by implementing and coordinating implementation of proactive management and conservation actions. We recommend that these lists be consulted in accordance with Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. The BCC 2021 is intended to stimulate coordinated and collaborative proactive conservation actions among federal, state, tribal and private partners. Many of the taxa identified herein are targets of ongoing conservation attention by national and international initiatives (e.g., Partners in Flight, U.S. Shorebird Conservation Partnership), Migratory Bird Joint Ventures, state and federal natural resource agencies, NGOs, and other partnerships.



Eastern Whip-poor-will, Susan Young/CC1.0

Literature Cited

American Ornithologists' Union. 1983. Check-list of North American Birds, 7th edition. American Ornithologists' Union, Washington, D.C.

Andres, B. A., P. A. Smith, R. I. G. Morrison, C. L. Gratto-Trevor, S. C. Brown, and C. A. Friis. 2012. Population estimates of North American shorebirds, 2012. Wader Study Group Bulletin 119: 178–194.

BirdLife International. 2015. Data Zone. http://datazone.birdlife.org. Accessed on 6 October 2015.

Bird Studies Canada and NABCI. 2014. Bird Conservation Regions. http://www.birdscanada.org/research/gislab/index.jsp?targetpg=bcr.

Chesser, R. T., S. M. Billerman, K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, N. A. Mason, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, and K. Winker. 2020. Check-list of North American Birds (online). American Ornithological Society. http://checklist.americanornithology.org/taxa.

Clements, J. F., T. S. Schulenberg, M. J. Iliff, S. M. Billerman, T. A. Fredericks, B. L. Sullivan, and C. L. Wood. 2019. The eBird/Clements checklist of birds of the world, version 2019. http://www.birds.cornell.edu/clementschecklist/download/.

Department of Marine and Wildlife Resources. 2006. A comprehensive strategy for wildlife conservation in American Samoa (R. C. B. Utzurrum, J. O. Seamon, and K. Schletz Saili. Pago Pago, American Samoa. http://teaming.com/sites/default/files/American%20Samoa%20SWAP.pdf.

Department of Marine and Wildlife Resources. 2015. American Samoa 2015 State Wildlife Action Plan Species of Greatest Conservation Need. https://www.sciencebase.gov/catalog/item/5c9ce047e4b0b8a7f62e0634.

Drechsler, M., F. V. Eppink, and F. Wätzold. 2011. Does proactive biodiversity conservation save costs? Biodiversity and Conservation 20: 1045–1055.

Federal Register. 2005. General provisions: Final list of bird species to which the Migratory Bird Treaty Act does not apply. Federal Register 70 (49): 12710–12716.

Federal Register. 2020a. List of bird species to which the Migratory Bird Treaty Act does not apply. Notice of availability. Federal Register 85 (74): 21262–21264.

Federal Register. 2020b. General provisions: Revised list of migratory birds. Final rule. Federal Register 85 (74): 21282–21305.

Guam Division of Aquatic and Wildlife Resources. 2006. Guam Comprehensive Wildlife Conservation Strategy. Department of Agriculture, Mangilao.

Hawai'i Department of Land and Natural Resources. 2015. Hawai'i's State Wildlife Action Plan. H. T. Harvey and Associates, Honolulu.

IUCN 2019. The IUCN Red List of Threatened Species. Version 2019-2. http://www.iucnredlist.org. Accessed on 20 September 2019.

Kier, G., H. Kreft, T. Ming Lee, W. Jetz, P. L. Ibisch, C. Nowicki, J. Mutke, and W. Barthlott. 2009. A global assessment of endemism and species richness across island and mainland regions. PNAS 106 (23) 9322-9327; https://doi.org/10.1073/pnas.0810306106.

Liske-Clark, J. 2015. Wildlife Action Plan for the Commonwealth of the Northern Mariana Islands, 2015-2025. CNMI DLNR-Division of Fish and Wildlife, Saipan.

NatureServe. 2015. NatureServe Explorer: An online encyclopedia of life, version 7.1. NatureServe, Arlington, Virginia. http://explorer.natureserve.org. Accessed on 6 October 2015.

North American Bird Conservation Initiative, U.S. Committee. 2010. The State of the Birds 2010 report on climate change, United States of America. U.S. Department of the Interior: Washington, D.C. http://www.stateofthebirds.org/2010.

North American Bird Conservation Initiative, U.S. Committee. 2014. The State of the Birds 2014 report. U.S. Department of Interior, Washington, D.C. http://www.stateofthebirds.org/2014/.

Panjabi, A. O., W. E. Easton, P. J. Blancher, A. E. Shaw, B. A. Andres, C. J. Beardmore, A. F. Camfield, D. W. Demarest, R. Dettmers, R. H. Keller, K. V. Rosenberg, and T. Will. 2019. Avian Conservation Assessment Database handbook, version 2019. Partners in Flight Technical Series No. 8. http://www.rmbo.org/pubs/downloads/Handbook2012.pdf.

Partners in Flight. 2019. Avian Conservation Assessment Database, version 2019. http://pif.birdconservancy.org/ACAD.

Platenberg, R. J., and J. M. Valiulis (editors). 2018. United States Virgin Islands Wildlife Action Plan, volume 1: Management framework. Final report, USVI Department of Planning and Natural Resources, Division of Fish and Wildlife. University of the Virgin Islands and St. Croix Environmental Association.. https://www.fws.gov/pacific/images/feature/2017/highlights/CNMI%20SWAP%202015%20FINAL%20secured.pdf.

Puerto Rico Department of Natural and Environmental Resources. 2015. Puerto Rico State Wildlife Action Plan: Ten year review. San Juan. http://drna.pr.gov/historico/PRSWAP2015.pdf.

Rosenberg, K. V., A. M. Dokter, P. J. Blancher, J. R. Sauer, A. C. Smith, P. A. Smith, J. C. Stanton, A. Panjabi, L. Helft, M. Parr, and P. P. Mara. 2019. Decline of the North American avifauna. Science 10.1126/science.aaw1313.

Rosenberg, K. V., J. A. Kennedy, R. Dettmers, R. P. Ford, D. Reynolds, J. D. Alexander, C. J. Beardmore, P. J. Blancher, R. E. Bogart, G. S. Butcher, A. F. Camfield, A. Couturier, D. W. Demarest, W. E. Easton, J. J. Giocomo, R. H. Keller, A. E. Mini, A. O. Panjabi, D. N. Pashley, T. D. Rich, J. M. Ruth, H. Stabins, J. Stanton, and T. Will. 2016. Partners in Flight landbird conservation plan: 2016 revision for Canada and continental United States. Partners in Flight Science Committee. http://www.partnersinflight.org/plans/landbird-conservation-plan/.

Rosenberg, K. V., D. Pashley, B. Andres, P. J. Blancher, G. S. Butcher, W. C. Hunter, D. Mehlman, A. O. Panjabi, M. Parr, G. Wallace and D. Wiedenfeld. 2014. The State of the Birds 2014 Watch List. North American Bird Conservation Initiative, U.S. Committee, Washington, D.C.

U.S. Department of the Interior. 1990. Report of the Secretary of the Interior to the Congress of the United States on the federal conservation of migratory nongame birds pursuant to Section 13 of Public Law 96-366, the Fish and Wildlife Conservation Act of 1980, as revised. U.S. Fish and Wildlife Service, Washington, D.C.

U.S. Fish and Wildlife Service. 1982. Nongame migratory bird species with unstable or decreasing population trends in the United States. Office of Migratory Bird Management, Washington, D.C.

U.S. Fish and Wildlife Service. 1987. Migratory nongame birds of management concern in the United States: the 1987 list. Office of Migratory Bird Management, Washington, D.C.

U.S. Fish and Wildlife Service. 1995. Migratory nongame birds of management concern in the United States: the 1995 List. Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Arlington, Virginia.

U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia.

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia.

U.S. Shorebird Conservation Plan Partnership. 2016. U.S. Shorebirds of Conservation Concern 2016. http://www.shorebirdplan.org/science/assessment-conservation-status-shorebirds/.

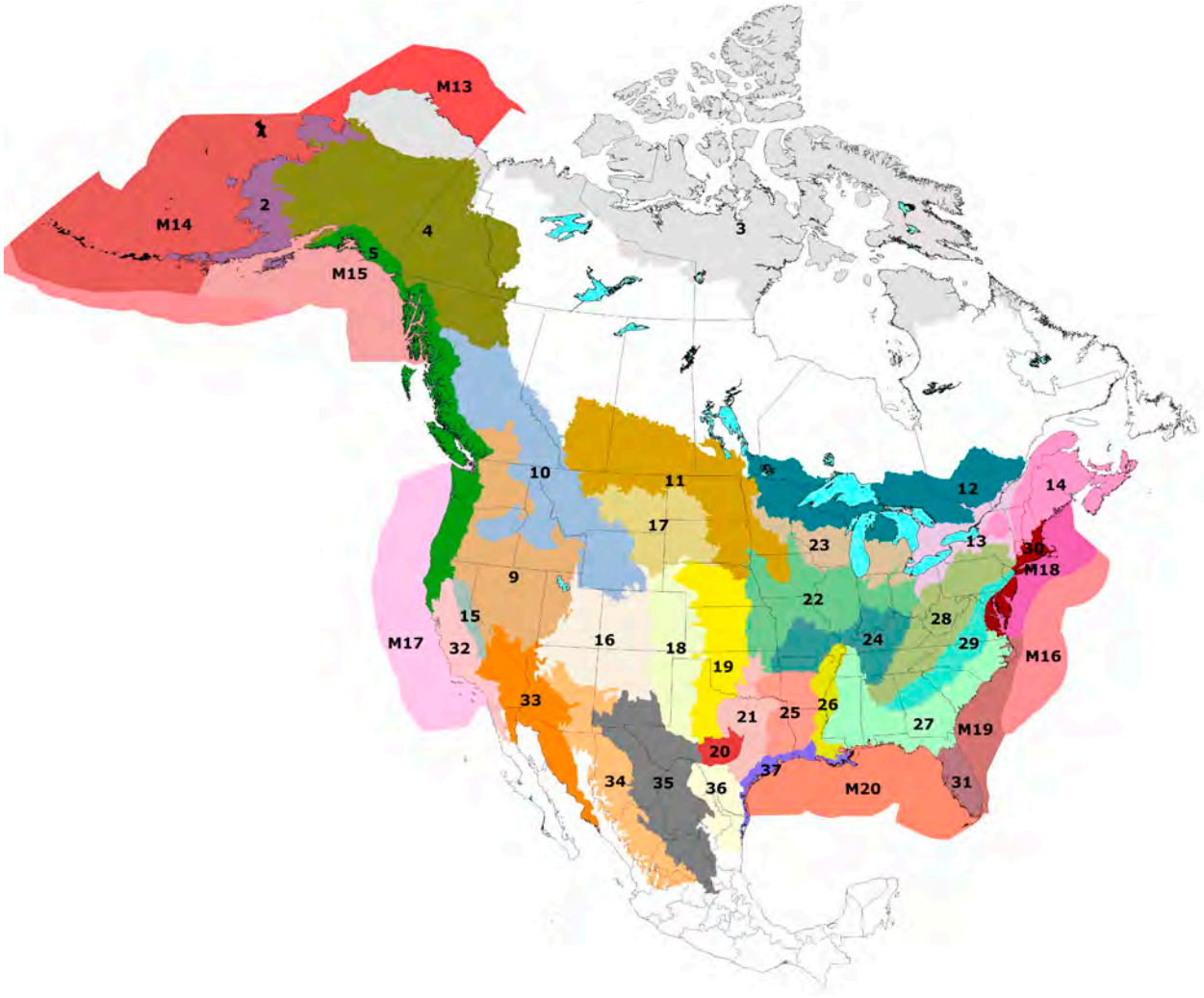
Wetlands International. 2015. Waterbird Population Estimates. http://www.wpe.wetlands.org. Accessed 6 October 2015.

Mariana Fruit-dove, Laura Wolf/CC BY 2.0

Figures

Figure 1.

Map of terrestrial Bird Conservation Regions (BCRs) Marine Bird Conservation Regions (MBCRs) of North America (Bird Studies Canada and NABCI 2014). See Table 2 for BCR and MBCR names.



Tables

Table 1.
Island states, commonwealths, territories and other affiliations of the United States (USA), including the USA territorial sea, contiguous zone and exclusive economic zone considered in the development of the Birds of Conservation Concern 2021.

Hawaii and Pacific Islands
State of Hawaii
American Samoa (unincorporated and unorganized territory)
Commonwealth of the Northern Marianas Islands (aligned through a covenant of "political union")
Guam (unincorporated organized territory)
Unincorporated territories administered by the U.S. Fish and Wildlife Service (USFWS) as National Wildlife Refuges (NWR) unless noted.
Howland Island
Jarvis Island
Johnston Atoll (joint control with the Department of Defense)
Kingman Reef
Midway Atoll
Palmyra Atoll (partially privately owned)
Wake Island (administered by the Department of the Interior)
Puerto Rico and U.S. Virgin Islands
Commonwealth of Puerto Rico (commonwealth)
U.S. Virgin Islands (unincorporated organized territory)
Navassa Island (administered by the USFWS as a NWR)

King Rail, Alan Schmierer/CC0 1.0

Table 2.
Terrestrial Bird Conservation Regions (BCR) and Marine Bird Conservation Regions (MBCR) either wholly or partially within the jurisdiction of the Continental USA, including Alaska, used in the Birds of Conservation Concern 2021.

BCR/ MBCR	BCR/MBCR Name
1	Aleutian/Bering Sea Islands
2	Western Alaska
3	Arctic Plains and Mountains
4	Northwestern Interior Forest
5	Northern Pacific Rainforest
9	Great Basin
10	Northern Rockies
11	Prairie Potholes
12	Boreal Hardwood Transition
13	Lower Great Lakes/St. Lawrence Plain
14	Atlantic Northern Forest
15	Sierra Nevada
16	Southern Rockies/Colorado Plateau
17	Badlands and Prairies
18	Shortgrass Prairie
19	Central Mixed-grass Prairie
20	Edwards Plateau
21	Oaks and Prairies
22	Eastern Tallgrass Prairie
23	Prairie Hardwood Transition
24	Central Hardwoods
25	West Gulf Coastal Plain/Ouachitas
26	Mississippi Alluvial Valley
27	Southeastern Coastal Plain
28	Appalachian Mountains
29	Piedmont
30	New England/Mid-Atlantic Coast
31	Peninsular Florida
32	Coastal California
33	Sonoran and Mohave Deserts
34	Sierra Madre Occidental
35	Chihuahuan Desert
36	Tamaulipan Brushlands
37	Gulf Coastal Prairie
M13	Chukchi and Beaufort Seas
M14	East Bering Sea
M15	Gulf of Alaska
M17	California Current
M18	Northeast U.S. Continental Shelf and U.S. waters (M16) beyond the shelf
M19	Southeast U.S. Continental Shelf and U.S. waters (M16) beyond the shelf
M20	Gulf of Mexico

Table 3.
Birds of Conservation Concern 2021 in the Continental USA (CON), continental Bird Conservation Regions (BCR), Puerto Rico and Virgin Islands (PRVI), and Hawaii and Pacific Islands (HAPI). Refer to Appendix 1 for scientific names of species, subspecies and populations. Breeding (X) and nonbreeding (nb) status are indicated for each geography. Parenthesized names indicate conservation concern only exists for a specific subspecies or population.

Common Name	CON	BCR	PRVI	HAPI
West Indian Whistling-Duck			X	
Pacific Black Duck (Palau)				X
White-cheeked Pintail (West Indies)			X	
Masked Duck			X	
Ruddy Duck (West Indies)			X	
Western Grebe	X			
Clark's Grebe	X			
White-crowned Pigeon	X		X	
White-throated Ground Dove				X
Bridled Quail-Dove			X	
Many-colored Fruit-Dove				X
Mariana Fruit-Dove				X
Pacific Imperial-Pigeon (Pacific)				X
Yellow-billed Cuckoo (Eastern)		X		
Mangrove Cuckoo		X		
Black-billed Cuckoo	X			
Common Nighthawk (Lesser)		X		
Common Nighthawk (Henry's)		X		
Chuck-will's Widow		X		
Eastern Whip-poor-will	X			
Mexican Whip-poor-will	X			
Black Swift	X		X	
Chimney Swift	X			
Vaux's Swift (Vaux's)		X		
Antillean Mango (Puerto Rican)			X	
Lucifer Hummingbird	X			
Costa's Hummingbird		X		
Calliope Hummingbird	X			
Rufous Hummingbird	X			
Allen's Hummingbird	X			
Broad-tailed Hummingbird	X			
King Rail	X			
American Coot (Caribbean)			X	
Australasian (Purple) Swamphen (Samoan)				X
Spotless Crake (Tongan)				X
Yellow Rail	X			
Yellow-breasted Crake (Henderson's)			X	
Limpkin (Puerto Rican/Hispaniolan)			X	
American Avocet		X		
American Oystercatcher	X		X	
Black Oystercatcher	X			

Common Name	CON	BCR	PRVI	HAPI
American Golden-Plover	X			
Wilson's Plover	X		X	
Mountain Plover	X			
Snowy Plover (Interior/Gulf Coast)	X			
Snowy Plover (Caribbean)			X	
Upland Sandpiper		X		
Bristle-thighed Curlew	X			nb
Whimbrel (Atlantic)		X		
Long-billed Curlew		X		
Bar-tailed Godwit	X			
Hudsonian Godwit	X			
Marbled Godwit	X			
Ruddy Turnstone (Atlantic)		X		
Black Turnstone	X			
Red Knot (Pacific)	X			
Dunlin (Northern Alaska)		X		
Dunlin (Hudson Bay)		X		
Rock Sandpiper (Pribilof)		X		
Purple Sandpiper	X			
Buff-breasted Sandpiper	X			
Pectoral Sandpiper	X			
Semipalmated Sandpiper (Eastern/Central)		X	nb	
Short-billed Dowitcher	X			
Solitary Sandpiper (Western)		X		
Wandering Tattler	X			nb
Lesser Yellowlegs	X		nb	
Willet	X		nb	
Marbled Murrelet (Alaska)	X			
Kittlitz's Murrelet	X			
Scripps's Murrelet	X			
Guadalupe Murrelet	nb			
Craveri's Murrelet	nb			
Ancient Murrelet	X			
Cassin's Auklet		X		
Whiskered Auklet	X			
Tufted Puffin		X		
Red-legged Kittiwake	X			
Ivory Gull	nb			
Ross's Gull	nb			
Franklin's Gull	X			
Heermann's Gull	X			
Western Gull	X			
Yellow-footed Gull	nb			
California Gull	X			
Black Noddy (Hawaiian)				X
Blue-gray Noddy (Hawaiian)				X

Common Name	CON	BCR	PRVI	HAPI
Gray-backed Tern				X
Aleutian Tern	X			
Least Tern (Atlantic/Interior)	X		X	
Gull-billed Tern	X			
Black Tern	X			
Common Tern		X		
Forster's Tern		X		
Sandwich Tern		X		
Elegant Tern	X			
Black Skimmer	X			
White-tailed Tropicbird (Atlantic)			X	
Red-billed Tropicbird (Caribbean)			X	
Red-tailed Tropicbird (Black-billed)				X
Yellow-billed Loon	X			
Laysan Albatross	nb			X
Black-footed Albatross	nb			X
Polynesian Storm-Petrel				nb
Ashy Storm-Petrel	X			
Band-rumped Storm-Petrel (Atlantic)	nb			
Black Storm-Petrel	X			
Tristram's Storm-Petrel				X
Murphy's Petrel	nb			
Mottled Petrel	nb			nb
Black-capped Petrel	nb			
Bonin Petrel				X
Fea's Petrel	nb			
Cook's Petrel	nb			nb
Tahiti Petrel				X
Bulwer's Petrel				X
Cory's Shearwater	nb			
Buller's Shearwater	nb			nb
Pink-footed Shearwater	nb			
Christmas Shearwater				X
Manx Shearwater	nb			
Black-vented Shearwater	nb			
Audubon's Shearwater	nb		X	
Magnificent Frigatebird		X	X	
Great Frigatebird (Central Pacific)				X
Masked Booby (Atlantic)			X	
Red-footed Booby (Atlantic)			X	
Brandt's Cormorant	X			
Red-faced Cormorant	X			
American White Pelican		X		
Brown Pelican (Caribbean)			X	
Great Blue Heron (Great White)		X		
Little Blue Heron		X		

Common Name	CON	BCR	PRVI	HAPI
Reddish Egret	X			
Swallow-tailed Kite	X			
Northern Harrier		X		
Harris's Hawk		X		
'lo				X
Ferruginous Hawk		X		
Flammulated Owl	X			
Puerto Rican Screech-Owl (Virgin Islands)			X	
Whiskered Screech-Owl	X			
Western Screech-Owl (Northern Pacific)		X		
Snowy Owl	X			
Burrowing Owl (Western)		X		
Burrowing Owl (Florida)		X		
Spotted Owl (California)	X			
Long-eared Owl	X			
Short-eared Owl	X			
Pueo				X
Northern Saw-whet Owl		X		
Elegant Trogon	X			
Mariana Kingfisher				X
Belted Kingfisher		X		
Lewis's Woodpecker	X			
Red-headed Woodpecker	X			
Gila Woodpecker		X		
Williamson's Sapsucker (Rocky Mountain)		X		
Nuttall's Woodpecker		X		
White-headed Woodpecker (California)		X		
Arizona Woodpecker	X			
Gilded Flicker	X			
American Kestrel (Southeast)		X		
Prairie Falcon		X		
Olive-sided Flycatcher	X			
Cordilleran Flycatcher		X		
Loggerhead Shrike (Eastern)		X		
Black-capped Vireo	X			
Puerto Rican Vireo			X	
Plumbeous Vireo		X		
Pinyon Jay	X			
Island Scrub-Jay	X			
Woodhouse's Scrub-Jay (Woodhouse's)		X		
Clark's Nutcracker		X		
Yellow-billed Magpie	X			
Chihuahuan Raven		X		
Black-capped Chickadee (Appalachian)		X		
Mexican Chickadee	X			
Chestnut-backed Chickadee (Northern)		X		

Common Name	CON	BCR	PRVI	HAPI
Gray-headed Chickadee (Alaska)	X			
Oak Titmouse	X			
Verdin (Southwest)		X		
White-breasted Nuthatch (Slender-billed)		X		
Brown-headed Nuthatch		X		
Marsh Wren (Worthington's)		X		
Bewick's Wren (Eastern)		X		
Cactus Wren (Speckled)		X		
American Dipper		X		
Wrentit	X			
'Ōma'o				X
Veery (Eastern)		X		
Bicknell's Thrush	X			
Wood Thrush	X			
Varied Thrush (Pacific)		X		
Curve-billed Thrasher (Brownsville)		X		
Curve-billed Thrasher (Palmer's)		X		
Bendire's Thrasher	X			
California Thrasher	X			
LeConte's Thrasher	X			
Sage Thrasher		X		
Phainopepla (Southwest)		X		
Sprague's Pipit	X			
Evening Grosbeak	X			
Maui 'Alauahio				X
'Apapane				X
Anianiau				X
Hawai'i 'Amakihi				X
O'ahu 'Amakihi				X
Kaua'i 'Amakihi				X
Black Rosy-Finch	X			
Brown-capped Rosy-Finch	X			
Cassin's Finch	X			
Cassia Crossbill	X			
Lawrence's Goldfinch	X			
Chestnut-collared Longspur	X			
Thick-billed Longspur	X			
McKay's Bunting	X			
Rufous-winged Sparrow	X			
Cassin's Sparrow		X		
Bachman's Sparrow	X			
Grasshopper Sparrow (Northern)		X		
Lark Bunting		X		
Black-chinned Sparrow	X			
Field Sparrow		X		
Vesper Sparrow (Oregon)		X		

Common Name	CON	BCR	PRVI	HAPI
LeConte's Sparrow	X			
Seaside Sparrow (Atlantic/Gulf)	X			
Saltmarsh Sparrow	X			
Baird's Sparrow	X			
Henslow's Sparrow	X			
Savannah Sparrow (Belding's)		X		
Song Sparrow (Alameda/Samuels)		X		
Song Sparrow (Channel Island)		X		
Rufous-crowned Sparrow (Rock)		X		
Yellow-breasted Chat (Eastern)		X		
Yellow-headed Blackbird		X		
Bobolink	X			
Eastern Meadowlark		X		
Puerto Rican Oriole			X	
Orchard Oriole		X		
Bullock's Oriole		X		
Scott's Oriole		X		
Tricolored Blackbird	X			
Rusty Blackbird		X		
Golden-winged Warbler	X			
Blue-winged Warbler		X		
Prothonotary Warbler	X			
Colima Warbler	X			
Virginia's Warbler	X			
Connecticut Warbler	X			
Kentucky Warbler	X			
Common Yellowthroat (San Francisco)		X		
Kirtland's Warbler	X			
Cape May Warbler		X		
Cerulean Warbler	X			
Bay-breasted Warbler		X		
Prairie Warbler	X		nb	
Grace's Warbler	X			
Black-throated Gray Warbler		X		
Hermit Warbler		X		
Black-throated Green Warbler (Wayne's)		X		
Canada Warbler	X			
Red-faced Warbler	X			
Scarlet Tanager		X		
Pyrrhuloxia	X			
Rose-breasted Grosbeak		X		
Varied Bunting	X			
Painted Bunting		X		
Dickcissel		X		
Totals	135	88	29	35

Table 4.
Numbers of taxa of Birds of Conservation Concern 2021 represented on the Continental USA (CON), continental Bird Conservation Region (BCR), Puerto Rico and Virgin Islands (PRVI), Hawaii and Pacific Islands (HAPI) lists by general taxonomic groups and by habitats within landbirds. Also presented are the unique taxa represented on all lists.

	CON	BCR	PRVI	HAPI	Unique Taxa
Landbirds[1]	71	69	8	14	159
aerial insectivores[2]	5	4	1		
grasslands	7	9			
forests	38	33	5	12	
aridlands	13	13			
wetlands	3	8			
other habitats	5	2	2	2	
Shorebirds[3]	19	10	6	2	30
Seabirds[4]	36	7	7	16	58
Waterbirds[5]	8	3	8	3	22
All Taxa	134	88	29	35	269

[1]Doves and pigeons; cuckoos; nightjars and allies; swifts; hummingbirds; eagles and hawks; owls; trogons; kingfishers; woodpeckers; falcons; songbirds (perching birds).

[2]Nightjars and allies; swifts; some flycatchers.

[3]Avocets; oystercatchers; plovers; and sandpipers and allies.

[4]Auks, murres and puffins; gulls, terns and skimmers; tropicbirds; albatrosses; shearwaters and petrels; storm-petrels; frigatebirds; and boobies.

[5]Ducks; grebes; rails, gallinules and coots; limpkins; cranes; loons; storks; cormorants; pelicans; and herons and egrets.

Flammulated Owl, Alan Schmierer/CC0 1.0

Table 5.
Birds of Conservation Concern 2021 designated within BCRs 1, 2, 3, 4 and MBCRs 13, 14, 15. See Table 2 for descriptions of BCRs and MBCRs, Scientific names of species, subspecies and populations are provided in Appendix 1. Breeding (X) and nonbreeding (nb) status are indicated for each BCR or MBCR; breeding BCRs may also support passage or wintering birds.

Taxon Common Name	BCR/MBCR						
	1	2	3	4	M13	M14	M15
Black Oystercatcher	X	X					
American Golden-Plover		X	X	X			
Bristle-thighed Curlew		X		X			
Bar-tailed Godwit		X	X				
Hudsonian Godwit		X		X			
Marbled Godwit		X					
Black Turnstone		X					
Red Knot (Pacific)		X	X				
Dunlin (Northern Alaska)		nb	X				
Rock Sandpiper (Pribilof)	X	nb		nb			
Buff-breasted Sandpiper			X				
Pectoral Sandpiper			X				
Short-billed Dowitcher		X		X			
Solitary Sandpiper (Western)				X			
Wandering Tattler		X	X	X			
Lesser Yellowlegs				X			
Marbled Murrelet (Alaska)	X	X		X		nb	nb
Kittlitz's Murrelet	X	X	X			nb	nb
Ancient Murrelet	X					nb	nb
Whiskered Auklet	X					nb	
Red-legged Kittiwake	X					nb	nb
Ivory Gull					nb	nb	
Ross's Gull					nb		
Aleutian Tern	X	X		X			
Yellow-billed Loon	nb	X	X				nb
Laysan Albatross							nb
Black-footed Albatross						nb	nb
Murphy's Petrel						nb	nb
Mottled Petrel						nb	nb
Buller's Shearwater							nb
Pink-footed Shearwater							nb
Red-faced Cormorant	X	X					
Snowy Owl	X	X	X				
Short-eared Owl	X	X	X	X			
Olive-sided Flycatcher		X		X			
Gray-headed Chickadee (Alaska)			X	X			
McKay's Bunting	X						
Totals	13	20	12	13	2	9	11

Table 6.
Birds of Conservation Concern 2021 designated within BCRs 5, 10, 15, 32 and MBCR 17. See Table 2 for descriptions of BCRs and MBCRs. Scientific names of species, subspecies and populations are provided in Appendix 1. Breeding (X) and nonbreeding (nb) status are indicated for each BCR or MBCR; breeding BCRs may also support passage or wintering birds.

Taxon Common Name	BCR/MBCR				
	5	10	15	32	M17
Western Grebe	X	X	X	X	
Clark's Grebe	X	X	X	X	
Black Swift	X	X	X	X	
Vaux's Swift	X				
Calliope Hummingbird		X	X		
Rufous Hummingbird	X	X			
Allen's Hummingbird	X			X	
Broad-tailed Hummingbird		X			
Yellow Rail		X		nb	
Black Oystercatcher	X			X	
Mountain Plover		X		nb	
Snowy Plover (Interior/Gulf Coast)				X	
Marbled Godwit	nb			nb	
Red Knot (Pacific)	nb			nb	
Rock Sandpiper (Pribilof)	nb				
Short-billed Dowitcher	X			nb	
Lesser Yellowlegs	nb	nb			
Willet	nb	X	X	nb	
Marbled Murrelet (Alaska)	X				
Kittlitz's Murrelet	X				
Scripps's Murrelet				X	nb
Guadalupe Murrelet					nb
Craveri's Murrelet					nb
Ancient Murrelet	X				
Cassin's Auklet	X				
Tufted Puffin	X				nb
Franklin's Gull		X			
Heermann's Gull				X	
Western Gull	X			X	
California Gull	X	X	X	X	
Aleutian Tern	X				
Gull-billed Tern				X	
Black Tern		X		X	
Elegant Tern				X	
Black Skimmer				X	
Laysan Albatross					nb
Black-footed Albatross					nb
Ashy Storm-Petrel				X	nb
Black Storm-Petrel				X	nb
Murphy's Petrel					nb
Cook's Petrel					nb

Taxon Common Name	BCR/MBCR				
	5	10	15	32	M17
Buller's Shearwater					nb
Pink-footed Shearwater					nb
Black-vented Shearwater					nb
Brandt's Cormorant	X			X	
Red-faced Cormorant	X				
Northern Harrier				X	
Flammulated Owl	X	X	X	X	
Western Screech-Owl (Northern Pacific)	X			X	
Burrowing Owl (Western)				X	
Spotted Owl (California)			X	X	
Long-eared Owl		X	X	X	
Short-eared Owl				X	
Lewis's Woodpecker		X	X		
Williamson's Sapsucker (Rocky Mountain)		X			
Nuttall's Woodpecker				X	
White-headed Woodpecker (California)				X	
Olive-sided Flycatcher	X	X	X	X	
Pinyon Jay		X	X	X	
Island Scrub-Jay				X	
Yellow-billed Magpie				X	
Chestnut-backed Chickadee (Northern)	X				
Oak Titmouse	X		X	X	
White-breasted Nuthatch (Slender-billed)	X				
American Dipper			X		
Wrentit	X		X	X	
Varied Thrush (Pacific)	X				
California Thrasher			X	X	
LeConte's Thrasher				X	
Evening Grosbeak	X	X	X		
Black Rosy-Finch		X			
Cassin's Finch	X	X	X	X	
Lawrence's Goldfinch			X	X	
Thick-billed Longspur		X			
Black-chinned Sparrow				X	
Vesper Sparrow (Oregon)	X				
Savannah Sparrow (Belding's)				X	
Song Sparrow (Alameda/Samuels)				X	
Song Sparrow (Channel Island)				X	
Bobolink		X			
Bullock's Oriole				X	
Tricolored Blackbird				X	
Common Yellowthroat (San Francisco)				X	
Black-throated Gray Warbler			X		
Hermit Warbler			X		
Totals	34	24	21	49	13

Table 7.
Birds of Conservation Concern 2021 designated within BCRs 9, 16, 33, 34, 35 and 36. See Table 2 for descriptions of BCRs. Scientific names of species, subspecies and populations are provided in Appendix 1. Breeding (X) and nonbreeding (nb) status are indicated for each BCR; breeding BCRs may also support passage or wintering birds.

Taxon Common Name	BCR/MBCR					
	9	16	33	34	35	36
Western Grebe	X	X	X	X		
Clark's Grebe	X	X	X		X	
Common Nighthawk (Henry's)					X	
Mexican Whip-poor-will				X	X	
Black Swift	X	X				
Chimney Swift						X
Lucifer Hummingbird					X	
Costa's Hummingbird			X			
Calliope Hummingbird	X					
Rufous Hummingbird	X					
Broad-tailed Hummingbird	X	X		X	X	
King Rail						X
Yellow Rail	X					
American Avocet	X		X			
American Golden-Plover						nb
Wilson's Plover						X
Mountain Plover		X	nb		nb	nb
Snowy Plover (Interior/Gulf Coast)	X	X	X		X	X
Long-billed Curlew					nb	nb
Marbled Godwit	nb		nb			
Red Knot (Pacific)	nb					
Buff-breasted Sandpiper						nb
Pectoral Sandpiper	nb	nb				nb
Lesser Yellowlegs	nb	nb				nb
Willet	X		nb			
Franklin's Gull	X					
Yellow-footed Gull			nb			
California Gull	X	X				
Gull-billed Tern			X			X
Black Tern	X					
Forster's Tern	X					
Black Skimmer			X			
American White Pelican	X					
Northern Harrier	X					
Harris's Hawk						X
Ferruginous Hawk					X	
Flammulated Owl	X	X		X	X	
Whiskered Screech-Owl				X		
Burrowing Owl (Western)			X		X	
Long-eared Owl	X	X	X	X		
Short-eared Owl	X	X				

Taxon Common Name	BCR/MBCR					
	9	16	33	34	35	36
Elegant Trogon				X		
Lewis's Woodpecker	X	X		X		
Gila Woodpecker			X			
Arizona Woodpecker				X		
Gilded Flicker			X	X		
Olive-sided Flycatcher	X	X		X		
Cordilleran Flycatcher				X		
Black-capped Vireo					X	
Plumbeous Vireo				X		
Pinyon Jay	X	X	X	X	X	
Woodhouse's Scrub-Jay (Woodhouse's)					X	
Clark's Nutcracker		X				
Chihuahuan Raven						X
Mexican Chickadee				X		
Verdin (Southwest)			X			
Cactus Wren (Speckled)					X	
Curve-billed Thrasher (Palmer's))			X			
Curve-billed Thrasher (Brownsville)						X
Bendire's Thrasher	X	X	X	X	X	
California Thrasher			X			
LeConte's Thrasher			X			
Sage Thrasher	X					
Phainopepla (Southwest)				X		
Sprague's Pipit				nb	nb	nb
Evening Grosbeak	X	X		X	X	
Black Rosy-Finch	X	X				
Brown-capped Rosy-Finch		X				
Cassin's Finch	X	X				
Cassia Crossbill	X					
Lawrence's Goldfinch			X			
Chestnut-collared Longspur				nb	nb	nb
Thick-billed Longspur					nb	
Rufous-winged Sparrow			X	X		
Cassin's Sparrow					X	
Black-chinned Sparrow		X	X	X	X	
Baird's Sparrow				nb	nb	
Yellow-headed Blackbird		X				
Bobolink	X					
Eastern Meadowlark					X	X
Orchard Oriole						X
Scott's Oriole				X	X	
Tricolored Blackbird			X			
Colima Warbler					X	
Virginia's Warbler	X	X		X	X	
Grace's Warbler		X	X	X	X	

Taxon Common Name	BCR/MBCR					
	9	16	33	34	35	36
Black-throated Gray Warbler				X		
Red-faced Warbler				X		
Pyrrhuloxia			X	X	X	X
Varied Bunting				X	X	
Painted Bunting						X
Totals	34	25	27	30	30	20

Table 8.
Birds of Conservation Concern 2021 designated within BCRs 11, 17, 18, 19, 20, 21, 37 and MBCR 20. See Table 2 for descriptions of BCRs and MBCRs. Scientific names of species, subspecies and populations are provided in Appendix 1. Breeding (X) and nonbreeding (nb) status are indicated for each BCR/MBCR; breeding BCRs may also support passage or wintering birds.

Taxon Common Name	BCR/MBCR							
	11	17	18	19	20	21	37	M20
Western Grebe	X	X		X				
Clark's Grebe	X		X					
Black-billed Cuckoo	X	X		X				
Eastern Whip-poor-will	X							
Chimney Swift	X		X	X	X	X	X	
Broad-tailed Hummingbird			X					
King Rail				X			X	
Yellow Rail	X						nb	
American Oystercatcher							X	
American Golden-Plover	nb			nb	nb	nb	nb	
Wilson's Plover							X	
Mountain Plover	X	X	X	nb	nb	nb	nb	
Snowy Plover (Interior/Gulf Coast)			X	X			X	
Whimbrel (Atlantic)			nb	nb			nb	
Long-billed Curlew	X		X		nb	nb	nb	
Hudsonian Godwit	nb		nb	nb			nb	
Marbled Godwit	X	X					nb	
Ruddy Turnstone (Atlantic)	nb						nb	
Red Knot (Pacific)							nb	
Dunlin (Hudson Bay)	nb						nb	
Buff-breasted Sandpiper	nb		nb	nb	nb	nb	nb	
Pectoral Sandpiper	nb		nb	nb	nb	nb	nb	
Short-billed Dowitcher	nb						nb	
Lesser Yellowlegs	nb	nb	nb	nb	nb	nb	nb	
Willet	X	X		X			X	
Franklin's Gull	X	X						
California Gull	X	X						
Least Tern (Atlantic/Interior)				X		X	X	
Gull-billed Tern							X	
Black Tern	X	X		X				
Forster's Tern							X	

Taxon Common Name	BCR/MBCR							
	11	17	18	19	20	21	37	M20
Sandwich Tern							X	
Black Skimmer							X	
Band-rumped Storm-Petrel (Atlantic)								nb
Black-capped Petrel								nb
Cory's Shearwater								nb
Audubon's Shearwater								nb
Magnificent Frigatebird								nb
Little Blue Heron						X		
Reddish Egret							X	
Swallow-tailed Kite							X	
Northern Harrier	X	X	X					
Ferruginous Hawk		X	X					
Burrowing Owl (Western)		X		X				
Long-eared Owl	X	X	X	X				
Short-eared Owl	X	X	nb	nb				
Lewis's Woodpecker		X	X					
Red-headed Woodpecker	X	X	X	X		X	X	
Prairie Falcon		X						
Loggerhead Shrike (Eastern)						X	X	
Black-capped Vireo				X	X			
Pinyon Jay		X	X					
American Dipper		X						
Sprague's Pipit	X	X	nb	nb		nb	nb	
Chestnut-collared Longspur	X	X	X	nb	nb			
Thick-billed Longspur	X	X	X	nb	nb			
Grasshopper Sparrow (Northern)	X	X	X		X			
Lark Bunting		X		X				
Field Sparrow					X			
LeConte's Sparrow	X						nb	
Seaside Sparrow (Atlantic/Gulf)							X	
Baird's Sparrow	X	X						
Henslow's Sparrow	X					X	X	
Rufous-crowned Sparrow (Rock)					X			
Bobolink	X	X		X				
Eastern Meadowlark					X			
Golden-winged Warbler	X							
Prothonotary Warbler						X	X	
Kentucky Warbler						X		
Pyrrhuloxia			X	X	X		X	
Painted Bunting					X		X	
Dicksissel							X	
Totals	33	26	22	27	16	15	36	5

Table 9.
Birds of Conservation Concern 2021 designated within BCRs 12, 13, 22, 23, 24, 25, 26, 28 and 29. See Table 2 for descriptions of BCRs. Scientific names of species, subspecies and populations are provided in Appendix 1. Breeding (X) and nonbreeding (nb) status are indicated for each BCR; breeding BCRs may also support passage or wintering birds.

Taxon Common Name	BCR/MBCR								
	12	13	22	23	24	25	26	28	29
Western Grebe				X					
Yellow-billed Cuckoo (Eastern)								X	
Black-billed Cuckoo	X	X	X	X	X			X	X
Common Nighthawk (Lesser)								X	
Chuck-will's Widow						X		X	X
Eastern Whip-poor-will	X	X	X	X	X	X	X	X	X
Chimney Swift	X	X	X	X	X	X	X	X	X
King Rail			X	X	X	X	X		X
Yellow Rail	X			X		nb	nb		
American Golden-Plover		nb	nb	nb		nb	nb		
Upland Sandpiper		X	X	X					
Whimbrel (Atlantic)	nb								
Hudsonian Godwit			nb						
Marbled Godwit				X					
Ruddy Turnstone (Atlantic)	nb	nb	nb	nb					
Dunlin (Hudson Bay)	nb	nb	nb	nb					
Buff-breasted Sandpiper		nb	nb	nb					
Pectoral Sandpiper	nb	nb	nb	nb		nb	nb		
Semipalmated Sandpiper (Eastern/Central)	nb	nb	nb	nb	nb		nb		
Short-billed Dowitcher		nb	nb	nb					
Lesser Yellowlegs	nb	nb	nb	nb	nb	nb	nb		
Least Tern (Atlantic/Interior)					X	X	X		
Black Tern	X			X					
Common Tern	X								
Little Blue Heron							X		
Swallow-tailed Kite						X	X		
Long-eared Owl	X	X		X					
Short-eared Owl		nb	nb	nb	nb				nb
Northern Saw-whet Owl								X	
Belted Kingfisher		X							
Red-headed Woodpecker		X	X	X	X	X	X	X	X
American Kestrel (Southeast)						X			
Olive-sided Flycatcher	X								
Loggerhead Shrike (Eastern)			X						
Black-capped Chickadee (Appalachian)								X	
Brown-headed Nuthatch					X	X			
Bewick's Wren (Eastern)					X	X			
Veery (Eastern)	X								
Bicknell's Thrush								X	

Taxon Common Name	BCR/MBCR								
	12	13	22	23	24	25	26	28	29
Wood Thrush	X	X	X	X	X	X	X	X	X
Sprague's Pipit						nb			
Evening Grosbeak	X	X							
Bachman's Sparrow					X	X			
Grasshopper Sparrow (Northern)			X	X	X				X
Field Sparrow					X				
LeConte's Sparrow	X			X	nb	nb	nb		
Henslow's Sparrow			X	X	X	nb	nb	X	
Bobolink	X	X	X	X	X			X	
Eastern Meadowlark		X							
Rusty Blackbird			nb	nb	nb		nb	nb	nb
Golden-winged Warbler	X	X		X				X	
Blue-winged Warbler		X							
Prothonotary Warbler			X		X	X	X	X	X
Connecticut Warbler	X								
Kentucky Warbler			X		X	X	X	X	X
Kirtland's Warbler	X			X					
Cerulean Warbler	X	X	X	X	X		X	X	X
Prairie Warbler		X			X	X	X	X	X
Canada Warbler	X	X		X				X	
Rose-breasted Grosbeak		X							
Totals	24	26	25	30	23	22	20	20	14

Bicknell's Thrush, Alan Schmierer/CC0 1.0

Table 10.
Birds of Conservation Concern 2021 designated within BCRs 14, 27, 30, 31 and MBCR 18, 19. See Table 2 for descriptions of BCRs and MBCRs. Scientific names of species, subspecies and populations are provided in Appendix 1. Breeding (X) and nonbreeding (nb) status are indicated for each BCR/MBCR; breeding BCRs may also support passage or wintering birds.

Taxon Common Name	BCR/MBCR					
	14	27	30	31	M18	M19
White-crowned Pigeon				X		
Mangrove Cuckoo				X		
Black-billed Cuckoo	X		X			
Chuck-will's Widow		X				
Eastern Whip-poor-will	X	X	X			
Chimney Swift	X	X	X	X		
King Rail		X	X	X		
Yellow Rail		nb		nb		
American Oystercatcher		X	X	X		
Wilson's Plover		X		X		
Snowy Plover (Interior/Gulf Coast)		X		X		
Whimbrel (Atlantic)	nb	nb	nb	nb		
Hudsonian Godwit	nb		nb			
Marbled Godwit		nb				
Ruddy Turnstone (Atlantic)		nb	nb	nb		
Dunlin (Hudson Bay)		nb	nb	nb		
Purple Sandpiper	nb	nb	nb			
Pectoral Sandpiper		nb	nb	nb		
Semipalmated Sandpiper (Eastern/ Central)	nb	nb	nb	nb		
Short-billed Dowitcher		nb	nb	nb		
Lesser Yellowlegs	nb	nb	nb	nb		
Willet	X	X	X	X		
Least Tern (Atlantic/Interior)		X	X	X		
Gull-billed Tern		X	X	X		
Black Skimmer		X	X	X		
Band-rumped Storm-Petrel (Atlantic)					nb	nb
Black-capped Petrel						nb
Fea's Petrel					nb	nb
Cory's Shearwater					nb	nb
Manx Shearwater					nb	nb
Audubon's Shearwater					nb	nb
Magnificent Frigatebird				X		nb
Great Blue Heron (Great White)				X		
Reddish Egret				X		
Swallow-tailed Kite		X		X		
Burrowing Owl (Florida)				X		
Long-eared Owl	X		X			
Short-eared Owl	nb		nb			
Red-headed Woodpecker		X	X	X		

Taxon Common Name	BCR/MBCR					
	14	27	30	31	M18	M19
American Kestrel (Southeast)		X		X		
Olive-sided Flycatcher	X					
Brown-headed Nuthatch		X				
Marsh Wren (Worthington's)				X		
Veery (Eastern)	X					
Bicknell's Thrush	X					
Wood Thrush	X	X	X			
Evening Grosbeak	X					
Bachman's Sparrow		X		X		
Grasshopper Sparrow (Northern)		X	X			
LeConte's Sparrow		nb				
Seaside Sparrow (Atlantic/Gulf)		X	X	X		
Saltmarsh Sparrow		nb	X	nb		
Henslow's Sparrow		nb		nb		
Yellow-breasted Chat (Eastern)			X			
Bobolink	X		X			
Rusty Blackbird		nb	nb			
Blue-winged Warbler			X			
Prothonotary Warbler		X	X			
Kentucky Warbler		X	X			
Cape May Warbler	X					
Cerulean Warbler		X	X			
Bay-breasted Warbler	X					
Prairie Warbler	X	X	X	X		
Black-throated Green Warbler (Wayne's)		X				
Canada Warbler	X		X			
Scarlet Tanager			X			
Rose-breasted Grosbeak	X					
Painted Bunting		X		X		
Totals	22	39	35	32	5	7

Yellow-billed Loon, Bob Wick/BLM

Appendices

Appendix 1.
Common and scientific names of species, subspecies, and populations designated as Birds of Conservation Concern 2021, listed as threatened or endangered under the USA Endangered Species Act, considered as extinct in the wild, or included as non-migratory birds on the Watch Lists of the State of the Birds (Rosenberg et al. 2014) or in the Avian Conservation Assessment Database (Partners in Flight 2019). Taxonomic sequence and nomenclature follow the American Ornithologists' Union Check-list of North American Birds, 7th Edition (1998), through the 60th supplement (2019). Subspecies and population nomenclature follow Andres et al. (2012) and Clements et al. (2019); nomenclature for Pacific island species follows Clements et al. (2019).

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
West Indian Whistling-Duck	Dendrocygna arborea		P			
Emperor Goose	Anser canagicus				W	C
Brant	Branta bernicla				W	C
Nēnē	Branta sandvicensis				E	H
Cinnamon Teal	Spatula cyanoptera				W	C
Pacific Black Duck (Palau)	Anas superciliosa pelewensis			H		
Laysan Duck	Anas laysanensis				E	H
Hawaiian Duck/Koloa	Anas wyvilliana				E	H
Mariana Mallard	Anas oustaleti (?)				X	H
Mottled Duck	Anas fulvigula				W	C
White-cheeked Pintail (West Indies)	Anas bahamensis bahamensis		P			
Steller's Eider	Polysticta stelleri				T	C
Spectacled Eider	Somateria fischeri				T	C
Labrador Duck	Camptorhynchus labradorius				X	C
Masked Duck	Nomonyx dominicus		P			
Ruddy Duck (West Indies)	Oxyura jamaicensis (West Indies)		P			
Micronesian Scrubfowl (Mariana)	Megapodius laperouse laperouse				E	H
Mountain Quail	Oreortyx pictus				W	C
Northern Bobwhite (Masked)	Colinus virginianus ridgwayi				E	C
Greater Sage-Grouse	Centrocercus urophasianus				W	C
Gunnison Sage-Grouse	Centrocercus minimus				T	C
Greater Prairie-Chicken	Tympanuchus cupido pinnatus				W	C
Greater Prairie-Chicken (Heath Hen)	Tympanuchus cupido cupido				X	C
Attwater's (Greater) Prairie-Chicken	Tympanuchus cupido attwateri				E	C
Lesser Prairie-Chicken	Tympanuchus pallidicinctus				W	C
Western Grebe	Aechmophorus occidentalis	C				
Clark's Grebe	Aechmophorus clarkii	C				
White-crowned Pigeon	Patagioenas leucocephala	C	P			

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Plain Pigeon (Puerto Rican)	Patagioenas inornata wetmorei				E	P
Passenger Pigeon	Ectopistes migratorius				X	C
Shy (Friendly) Ground Dove	Alopecoenas stairi				E	H
White-throated Ground Dove	Alopecoenas xanthonurus			H		
Bridled Quail-Dove	Geotrygon mystacea		P			
Many-colored Fruit-Dove	Ptilinopus perousii perousii			H		
Mariana Fruit-Dove	Ptilinopus roseicapilla			H		
Pacific Imperial-Pigeon (Pacific)	Ducula pacifica pacifica			H		
Yellow-billed Cuckoo (Western)	Coccyzus americanus (Western)				T	C
Yellow-billed Cuckoo (Eastern)	Coccyzus americanus (Eastern)	R				
Mangrove Cuckoo	Coccyzus minor	R				
Black-billed Cuckoo	Coccyzus erythropthalmus	C				
Common Nighthawk (Lesser)	Chordeiles minor minor	R				
Common Nighthawk (Henry's)	Chordeiles minor henryi	R				
Chuck-will's Widow	Antrostomus carolinensis	R				
Eastern Whip-poor-will	Antrostomus vociferus	C				
Mexican Whip-poor-will	Antrostomus arizonae	C				
Puerto Rican Nightjar	Antrostomus noctitherus				E	P
Black Swift	Cypseloides niger	C	P			
Chimney Swift	Chaetura pelagica	C				
Vaux's Swift (Vaux's)	Chaetura vauxi vauxi	R				
Mariana Swiftlet	Aerodramus bartschi				E	H
Antillean Mango (Puerto Rican)	Anthracothorax dominicus aurulentus		P			
Lucifer Hummingbird	Calothorax lucifer	C				
Costa's Hummingbird	Calypte costae	R				
Calliope Hummingbird	Selasphorus calliope	C				
Rufous Hummingbird	Selasphorus rufus	C				
Allen's Hummingbird	Selasphorus sasin	C				
Broad-tailed Hummingbird	Selasphorus platycercus	C				
Antillean Cave-Rail	Nesotrochis debooyi				X	P
Ridgway's Rail (California)	Rallus obsoletus obsoletus				E	C
Ridgway's Rail (Light-footed)	Rallus obsoletus levipes				E	C
Ridgway's Rail (Yuma)	Rallus obsoletus yumanensis				E	C
King Rail	Rallus elegans	C				
Guam Rail	Gallirallus owstoni				E	H
Wake Island Rail	Gallirallus wakensis				X	H
Common Gallinule (Hawaiian)	Gallinula galeta sandvicensis				E	H
Common Moorhen (Mariana)	Gallinula chloropus guami				E	H
Hawaiian Coot	Fulica alai				E	H
American Coot (Caribbean)	Fulica americana americana (Caribbean)		P			
Australasian (Purple) Swamphen (Samoan)	Porphyrio (porphyrio) melanotus samoensis			H		
Laysan Rail	Zapornia palmeri				X	H

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Hawaiian Rail	Zapornia sandwichensis				X	H
Spotless Crake (Tongan)	Zapornia tabuensis tabuensis			H		
Yellow Rail	Coturnicops noveboracensis	C				
Yellow-breasted Crake (Henderson's)	Hapalocrex flaviventer hendersoni		P			
Black Rail	Laterallus jamaicensis jamaicensis/ coturniculus				E	C,P
Limpkin (Puerto Rican/Hispaniolan)	Aramus guarauna elucus		P			
Sandhill Crane (Mississippi)	Antigone canadensis pulla				E	C
Whooping Crane	Grus americana				E	C
Black-necked Stilt (Hawaiian)	Himantopus mexicanus knudseni				E	H
American Avocet	Recurvirostra americana	R				
American Oystercatcher	Haematopus palliatus	C	P			
Black Oystercatcher	Haematopus bachmani	C				
American Golden-Plover	Pluvialis dominica	C				
Piping Plover (Atlantic)	Charadrius melodus melodus				T	C
Piping Plover (Great Lakes)	C. m. circumcinctus (Great Lakes)				E	C
Piping Plover (Great Plains)	C. m. circumcinctus (Great Plains)				T	C
Wilson's Plover	Charadrius wilsonia	C	P			
Mountain Plover	Charadrius montanus	C				
Snowy Plover (Pacific Coast)	Charadrius nivosus nivosus (Pacific Coast)				T	C
Snowy Plover (Interior/Gulf Coast)	C. n. nivosus (Interior/Gulf Coast)	C				
Snowy Plover (Caribbean)	C. n. tenuirostris		P			
Upland Sandpiper	Bartramia longicauda	R				
Bristle-thighed Curlew	Numenius tahitiensis	C		H		
Whimbrel (Atlantic)	Numenius phaeopus hudsonicus (Atlantic)	R				
Eskimo Curlew	Numenius borealis				E	C
Long-billed Curlew	Numenius americanus	R				
Bar-tailed Godwit	Limosa lapponica	C				
Hudsonian Godwit	Limosa haemastica	C				
Marbled Godwit	Limosa fedoa	C				
Ruddy Turnstone (Atlantic)	Arenaria interpres morinella	R				
Black Turnstone	Arenaria melanocephala	C				
Red Knot (Atlantic)	Calidris canutus rufa				T	C
Red Knot (Pacific)	Calidris canutus roselaari	C				
Dunlin (Northern Alaska)	Calidris alpina arcticola	R				
Dunlin (Hudson Bay)	Calidris alpina hudsonia	R				
Rock Sandpiper (Pribilof)	Calidris ptilocnemis ptilocnemis	R				
Purple Sandpiper	Calidris maritima	C				
Buff-breasted Sandpiper	Calidris subruficollis	C				
Pectoral Sandpiper	Calidris melanotos	C				
Semipalmated Sandpiper (Eastern/ Central)	Calidris pusilla (Eastern/Central)	R	P			
Short-billed Dowitcher	Limnodromus griseus	C				

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
American Woodcock	Scolopax minor				W	C
Solitary Sandpiper (Western)	Tringa solitaria cinnamomea	R				
Wandering Tattler	Tringa incana	C		H		
Lesser Yellowlegs	Tringa flavipes	C	P			
Willet	Tringa semipalmata	C	P			
Great Auk	Pinguinus impennis				X	C
Marbled Murrelet (CA/OR/WA)	Brachyramphus marmoratus (California/ Oregon/ Washington)				T	C
Marbled Murrelet (Alaska)	Brachyramphus marmoratus (Alaska)	C				
Kittlitz's Murrelet	Brachyramphus brevirostris	C				
Scripps's Murrelet	Synthliboramphus scrippsi	C				
Guadalupe Murrelet	Synthliboramphus hypoleucus	C				
Craveri's Murrelet	Synthliboramphus craveri	C				
Ancient Murrelet	Synthliboramphus antiquus	C				
Cassin's Auklet	Ptychoramphus aleuticus	R				
Whiskered Auklet	Aethia pygmaea	C				
Tufted Puffin	Fratercula cirrhata	R				
Red-legged Kittiwake	Rissa brevirostris	C				
Ivory Gull	Pagophila eburnea	C				
Ross's Gull	Rhodostethia rosea	C				
Franklin's Gull	Leucophaeus pipixcan	C				
Heermann's Gull	Larus heermanni	C				
Western Gull	Larus occidentalis	C				
Yellow-footed Gull	Larus livens	C				
California Gull	Larus californicus	C				
Black Noddy (Hawaiian)	Anous minutus melanogenys			H		
Blue-gray Noddy (Hawaiian)	Anous cerulea saxatilis			H		
Gray-backed Tern	Onychoprion lunata			H		
Aleutian Tern	Onychoprion aleuticus	C				
Least Tern (California)	Sternula antillarum brownii				E	C
Least Tern (Atlantic/Interior)	Sternula antillarum antillarum/ athalassos	C	P			
Gull-billed Tern	Gelochelidon nilotica	R				
Black Tern	Chlidonias niger surinamensis	C				
Roseate Tern	Sterna dougallii dougallii				E/T	C,P
Common Tern	Sterna hirundo	R				
Forster's Tern	Sterna forsteri	R				
Sandwich Tern	Thalasseus sandvicensis	R				
Elegant Tern	Thalasseus elegans	C				
Black Skimmer	Rynchops niger	C				
White-tailed Tropicbird (Atlantic)	Phaethon lepturus catesbyi		P			
Red-billed Tropicbird (Caribbean)	Phaethon aethereus mesonauta (Caribbean)		P			

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Red-tailed Tropicbird (Black-billed)	Phaethon rubricauda melanorhynchos			H		
Yellow-billed Loon	Gavia adamsii	C				
Laysan Albatross	Phoebastria immutabilis	C		H		
Black-footed Albatross	Phoebastria nigripes	C		H		
Short-tailed Albatross	Phoebastria albatrus				E	C,H
Polynesian Storm-Petrel	Nesofregetta fuliginosa			H		
Ashy Storm-Petrel	Hydrobates homochroa	C				
Band-rumped Storm-Petrel (Pacific)	Hydrobates castro (Pacific)				E	H
Band-rumped Storm-Petrel (Atlantic)	Hydrobates castro (Atlantic)	C				
Black Storm-Petrel	Hydrobates melania	C				
Tristram's Storm-Petrel	Hydrobates tristrami			H		
Murphy's Petrel	Pterodroma ultima	C				
Mottled Petrel	Pterodroma inexpectata	C		H		
Bermuda Petrel	Pterodroma cahow				E	C
Black-capped Petrel	Pterodroma hasitata	C				
Hawaiian Petrel	Pterodroma sandwichensis				E	H
Bonin Petrel	Pterodroma hypoleuca			H		
Fea's Petrel	Pterodroma feae	C				
Cook's Petrel	Pterodroma cookii	C		H		
Tahiti Petrel	Pseudobulweria rostrata			H		
Bulwer's Petrel	Bulweria bulwerii			H		
Cory's Shearwater	Calonectris diomedea	C				
Buller's Shearwater	Ardenna bulleri	C		H		
Pink-footed Shearwater	Ardenna creatopus	C				
Christmas Shearwater	Puffinus nativitatis			H		
Manx Shearwater	Puffinus puffinus	C				
Newell's Shearwater	Puffinus newelli				T	H
Black-vented Shearwater	Puffinus opisthomelas	C				
Audubon's Shearwater	Puffinus lherminieri	C	P			
Wood Stork (Southeast USA)	Mycteria americana (Southeast USA)				T	C
Magnificent Frigatebird	Fregata magnificens	R	P			
Great Frigatebird (Central Pacific)	Fregata minor palmerstoni			H		
Masked Booby (Atlantic)	Sula dactylatra dactylatra		P			
Red-footed Booby (Atlantic)	Sula sula sula		P			
Brandt's Cormorant	Phalacrocorax penicillatus	C				
Red-faced Cormorant	Phalacrocorax urile	C				
American White Pelican	Pelecanus erythrorhynchos	R				
Brown Pelican (Caribbean)	Pelecanus occidentalis occidentalis		P			
Great Blue Heron (Great White)	Ardea herodias occidentalis	R				
Little Blue Heron	Egretta caerulea	R				
Reddish Egret	Egretta rufescens	C				
California Condor	Gymnogyps californianus				E	C

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Swallow-tailed Kite	Elanoides forficatus	C				
Northern Harrier	Circus hudsonius	R				
Sharp-shinned Hawk (Puerto Rican)	Accipiter striatus venator				E	P
Snail Kite (Everglade)	Rostrhamus sociabilis plumbeus				E	C
Harris's Hawk	Parabuteo unicinctus harrisi	R				
Broad-winged Hawk (Puerto Rican)	Buteo platypterus brunnescens				E	P
'lo	Buteo solitarius			H		
Ferruginous Hawk	Buteo regalis	R				
Flammulated Owl	Psiloscops flammeolus	C				
Puerto Rican Screech-Owl (Virgin Islands)	Megascops nudipes newtoni		P			
Whiskered Screech-Owl	Megascops trichopsis	C				
Western Screech-Owl (Northern Pacific)	Megascops kennicottii kennicottii/ cardonensis	R				
Snowy Owl	Bubo scandiacus	C				
Burrowing Owl (Western)	Athene cunicularia hypugaea	R				
Burrowing Owl (Florida)	Athene cunicularia floridana	R				
Spotted Owl (California)	Strix occidentalis occidentalis	C				
Spotted Owl (Northern)	Strix occidentalis caurina				T	C
Spotted Owl (Mexican)	Strix occidentalis lucida				T	C
Long-eared Owl	Asio otus	C				
Short-eared Owl	Asio flammeus flammeus	C				
Pueo	Asio flammeus sandwichensis			H		
Northern Saw-whet Owl	Aegolius acadicus	R				
Elegant Trogon	Trogon elegans	C				
Guam Kingfisher	Todiramphus cinnamominus				E	H
Mariana Kingfisher	Todiramphus albicilla			H		
Belted Kingfisher	Megaceryle alcyon	R				
Lewis's Woodpecker	Melanerpes lewis	C				
Red-headed Woodpecker	Melanerpes erythrocephalus	C				
Gila Woodpecker	Melanerpes uropygialis	R				
Williamson's Sapsucker (Rocky Mountain)	Sphyrapicus thyroideus nataliae	R				
Nuttall's Woodpecker	Drybates nuttallii	R				
Red-cockaded Woodpecker	Drybates borealis				E	C
White-headed Woodpecker (California)	Drybates albolarvatus gravirostris	R				
Arizona Woodpecker	Drybates arizonae	C				
Gilded Flicker	Colaptes chrysoides	C				
Ivory-billed Woodpecker	Campephilus principalis				X	C
Crested Caracara (Audubon's)	Caracara cheriway audubonii				T	C
American Kestrel (Southeast)	Falco sparverius paulus	R				
Aplomado Falcon (Northern)	Falco femoralis septentrionalis				E	C
Prairie Falcon	Falco mexicanus	R				
Blue-crowned Lorikeet	Vini australis				W	H
Carolina Parakeet	Conuropsis carolinensis				X	C

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Green Parakeet	Psittacara holochlorus				W	C
Puerto Rican Parakeet	Psittacara maugei				X	P
Thick-billed Parrot	Rhynchopsitta pachyrhyncha				E	C
Puerto Rican Parrot	Amazona vittata				E	P
Red-crowned Parrot	Amazona viridigenalis				W	C
Olive-sided Flycatcher	Contopus cooperi	C				
Willow Flycatcher (Southwestern)	Empidonax traillii extimus				E	C
Cordilleran Flycatcher	Empidonax occidentalis	R				
Micronesian Myzomela	Myzomela rubratra saffordi				W	H
Mao	Gymnomyza samoensis				E	H
Loggerhead Shrike (San Clemente)	Lanius ludovicianus mearnsi				E	C
Loggerhead Shrike (Eastern)	Lanius ludovicianus excubitorides/ migrans	R				
Black-capped Vireo	Vireo atricapilla	C				
Puerto Rican Vireo	Vireo latimeri		P			
Bell's Vireo (Least)	Vireo bellii pusillus				E	C
Plumbeous Vireo	Vireo plumbeus	R				
Pinyon Jay	Gymnorhinus cyanocephalus	C				
Florida Scrub-Jay	Aphelocoma coerulescens				T	C
Island Scrub-Jay	Aphelocoma insularis	C				
Woodhouse's Scrub-Jay (Woodhouse's)	Aphelocoma woodhouseii woodhouseii	R				
Clark's Nutcracker	Nucifraga columbiana	R				
Yellow-billed Magpie	Pica nuttalli	C				
Mariana Crow	Corvus kubaryi				E	H
White-necked Crow	Corvus leucognaphalus				E	P
Hawaiian Crow/'Alalā	Corvus hawaiiensis				E	H
Chihuahuan Raven	Corvus cryptoleucus	R				
Rufous Fantail (Guam)	Rhipidura rufifrons uraniae				X	H
Rufous Fantail (Saipan)	Rhipidura rufifrons saipanensis				W	H
Rufous Fantail (Rota)	Rhipidura rufifrons mariae				W	H
Hawai'i ‘Elepaio	Chasiempis sandwichensis				W	H
Kaua'i ‘Elepaio	Chasiempis sclateri				W	H
O'ahu ‘Elepaio	Chasiempis ibidis				E	H
Fiji Shrikebill (Manua)	Clytorhynchus vitiensis powelli				W	H
Tinian Monarch	Monarcha takatsukasae				W	H
Guam Flycatcher	Myiagra freycineti				X	H
Horned Lark (Streaked)	Eremophila alpestris strigata				T	C
Black-capped Chickadee (Appalachian)	Poecile atricapillus practicus	R				
Mexican Chickadee	Poecile sclateri	C				
Chestnut-backed Chickadee (Northern)	Poecile rufescens rufescens	R				
Gray-headed Chickadee (Alaska)	Poecile cinctus lathami	C				
Oak Titmouse	Baeolophus inornatus	C				

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Verdin (Southwest)	Auriparus flaviceps acaciarum	R				
White-breasted Nuthatch (Slender-billed)	Sitta carolinensis aculeata	R				
Brown-headed Nuthatch	Sitta pusilla	R				
Marsh Wren (Worthington's)	Cistothorus palustris griseus	R				
Bewick's Wren (Eastern)	Thryomanes bewickii bewickii	R				
Cactus Wren (Speckled)	Campylorhynchus brunneicapillus guttatus	R				
California Gnatcatcher (Coastal)	Polioptila californica californica				T	C
American Dipper	Cinclus mexicanus	R				
Wrentit	Chamaea fasciata	C				
Golden White-eye	Cleptornis marchei				W	H
Bridled White-eye (Guam)	Zosterops conspicillatus conspicillatus				X	H
Bridled White-eye (Saipan)	Zosterops conspicillatus saypani				W	H
Rota White-eye	Zosterops rotensis				E	H
Nightingale Reed Warbler (Guam)	Acrocephalus luscinius				X	H
Nightingale (Saipan) Reed Warbler	Acrocephalus luscinius/hiwae				E	H
Aguiguan Reed Warbler	Acrocephalus nijoi				X	H
Pagan Reed Warbler	Acrocephalus yamashinae				X	H
Millerbird (Nihoa)	Acrocephalus familiaris kingi				E	H
Kāma'o	Myadestes myadestinus				X	H
Āmaui	Myadestes woahensis				X	H
Oloma‘o	Myadestes lanaiensis rutha				E	H
'Ōma'o	Myadestes obscurus			H		
Puaiohi	Myadestes palmeri				E	H
Veery (Eastern)	Catharus fuscescens fuscescens	R				
Bicknell's Thrush	Catharus bicknelli	C				
Wood Thrush	Hylocichla mustelina	C				
Varied Thrush (Pacific)	Ixoreus naevius naevius	R				
Curve-billed Thrasher (Brownsville)	Toxostoma curvirostre oberholseri	R				
Curve-billed Thrasher (Palmer's)	Toxostoma curvirostre palmeri	R				
Bendire's Thrasher	Toxostoma bendirei	C				
California Thrasher	Toxostoma redivivum	C				
LeConte's Thrasher	Toxostoma lecontei	C				
Sage Thrasher	Oreoscoptes montanus	R				
Polynesian Starling (Manua)	Aplonis tabuensis manuae				W	H
Polynesian Starling (Tutuila)	Aplonis tabuensis tutuilae				W	H
Samoan Starling	Aplonis atrifusca				W	H
Kaua'I Ō'Ō	Moho braccatus				X	H
O'ahu Ō'Ō	Moho apicalis				X	H
Bishop's Ō'Ō	Moho bishopi				X	H
Hawai'i Ō'Ō	Moho nobilis				X	H
Kioea	Chaetoptila angustipluma				X	H
Phainopepla (Southwest)	Phainopepla nitens lepida	R				

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Sprague's Pipit	Anthus spragueii	C				
Evening Grosbeak	Coccothraustes vespertinus	C				
Po`ouli	Melamprosops phaeosoma				X	H
'Akikiki	Oreomystis bairdi				E	H
O'ahu 'Alauahio	Paroreomyza maculata				E	H
Kākāwahie	Paroreomyza flammea				X	H
Maui 'Alauahio	Paroreomyza montana			H		
Palila	Loxioides bailleui				E	H
Laysan Finch	Telespyza cantans				E	H
Nihoa Finch	Telespyza ultima				E	H
Kona Grosbeak	Chloridops kona				X	H
Lesser Koa-Finch	Rhodacanthis flaviceps				X	H
Greater Koa-Finch	Rhodacanthis palmeri				X	H
'Ula-'ai-hawane	Ciridops anna				X	H
'Akohekohe	Palmeria dolei				E	H
Laysan Honeycreeper	Himatione fraithii				X	H
'Apapane	Himatione sanguinea			H		
'I'iwi	Drepanis coccinea				E	H
Hawai'i Mamo	Drepanis pacifica				X	H
Black Mamo	Drepanis funerea				X	H
`Ō`ū	Psittirostra psittacea				E	H
Lanai Hookbill	Dysmorodrepanis munroi				X	H
Maui Parrotbill	Pseudonestor xanthophrys				E	H
Kaua'i Nukupu'u	Hemignathus hanapepe				X	H
O'ahu Nukupu'u	Hemignathus lucidus				X	H
Maui Nukupu'u	Hemignathus affinis				X	H
'Akiapōlā'au	Hemignathus wilsoni				E	H
Lesser 'Akialoa	Akialoa obscura				X	H
Kaua'i 'Akialoa	Akialoa stejnegeri				X	H
O'ahu 'Akialoa	Akialoa ellisiana				X	H
Maui-nui 'Akialoa	Akialoa lanaiensis				X	H
'Anianiau	Magumma parva			H		
Hawai'i 'Amakihi	Chlorodrepanis virens			H		
O'ahu 'Amakihi	Chlorodrepanis flava			H		
Kaua'i 'Amakihi	Chlorodrepanis stejngeri			H		
Greater 'Amakihi	Viridonia sagittirostris				X	H
Hawai'i Creeper	Loxops mana				E	H
'Akeke'e	Loxops caeruleirostris				E	H
O'ahu 'Akepa	Loxops wolstenholmei				X	H
Maui 'Akepa	Loxops ochraceus				X	H
Hawai'i 'Akepa	Loxops coccineus				E	H
Black Rosy-Finch	Leucosticte atrata	C				
Brown-capped Rosy-Finch	Leucosticte australis	C				
Cassin's Finch	Haemorhous cassinii	C				
Cassia Crossbill	Loxia sinesciuris	C				

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Lawrence's Goldfinch	Spinus lawrencei	C				
Chestnut-collared Longspur	Calcarius ornatus	C				
Thick-billed Longspur	Rhynchophanes mccownii	C				
McKay's Bunting	Plectrophenax hyperboreus	C				
Rufous-winged Sparrow	Peucaea carpalis	C				
Cassin's Sparrow	Peucaea cassinii	R				
Bachman's Sparrow	Peucaea aestivalis	C				
Grasshopper Sparrow (Florida)	Ammodramus savannarum floridanus				E	C
Grasshopper Sparrow (Northern)	Ammodramus savannarum perpallidus/pratensis	R				
Lark Bunting	Calamospiza melanocorys	R				
Black-chinned Sparrow	Spizella atrogularis	C				
Field Sparrow	Spizella pusilla	R				
Bell's Sparrow (San Clemente)	Artemisiospiza belli clementeae				T	C
Vesper Sparrow (Oregon)	Pooecetes gramineus affinis	R				
LeConte's Sparrow	Ammodramus leconteii	C				
Dusky Seaside Sparrow	Ammospiza maritima nigrescens				X	C
Seaside Sparrow (Cape Sable)	Ammodramus maritimus mirabilis				E	C
Seaside Sparrow (Atlantic/Gulf)	Ammodramus maritima maritima/ pennisulae/ macgillivraii/ fisheri/sennetti	C				
Saltmarsh Sparrow	Ammodramus caudacuta	C				
Baird's Sparrow	Centronyx bairdii	C				
Henslow's Sparrow	Centronyx henslowii	C				
Savannah Sparrow (Belding's)	Passerculus sandwichensis beldingi	R				
Song Sparrow (Alameda/Samuels)	Melospiza melodia pusillula/ samuelis	R				
Song Sparrow (Channel Island)	Melospiza melodia graminea	R				
California Towhee (Inyo)	Melozone crissalis eremophilus				T	C
Rufous-crowned Sparrow (Rock)	Aimophila ruficeps eremoeca	R				
Yellow-breasted Chat (Eastern)	Icteria virens virens	R				
Yellow-headed Blackbird	Xanthocephalus xanthocephalus	R				
Bobolink	Dolichonyx oryzivorus	C				
Eastern Meadowlark	Sturnella magna	R				
Puerto Rican Oriole	Icterus portoricensis		P			
Orchard Oriole	Icterus spurius	R				
Bullock's Oriole	Icterus bullockii	R				
Scott's Oriole	Icterus parisorum	R				
Tricolored Blackbird	Agelaius tricolor	C				
Yellow-shouldered Blackbird	Agelaius xanthomus				E	P
Rusty Blackbird	Euphagus carolinus	R				
Bachman's Warbler	Vermivora bachmanii				X	C
Golden-winged Warbler	Vermivora chrysoptera	C				
Blue-winged Warbler	Vermivora cyanoptera	R				
Prothonotary Warbler	Protonotaria citrea	C				

Common Name	Scientific Name	BCC 2021[1]			ESA/WL[2]	
		CO	PV	HP	List	Area
Colima Warbler	Leiothlypis crissalis	C				
Virginia's Warbler	Leiothlypis virginiae	C				
Connecticut Warbler	Oporornis agilis	C				
Kentucky Warbler	Geothlypis formosa	C				
Common Yellowthroat (San Francisco)	Geothlypis trichas sinuosa	R				
Elfin-woods Warbler	Setophaga angelae				T	P
Kirtland's Warbler	Setophaga kirtlandii	C				
Cape May Warbler	Setophaga tigrina	R				
Cerulean Warbler	Setophaga cerulea	C				
Bay-breasted Warbler	Setophaga castanea	R				
Prairie Warbler	Setophaga discolor	C	P			
Grace's Warbler	Setophaga graciae	C				
Black-throated Gray Warbler	Setophaga nigrescens	R				
Hermit Warbler	Setophaga occidentalis	R				
Golden-cheeked Warbler	Dendroica chrysoparia				E	C
Black-throated Green Warbler (Wayne's)	Setophaga virens (Wayne's)	R				
Canada Warbler	Cardellina canadensis	C				
Red-faced Warbler	Cardellina rubrifrons	C				
Scarlet Tanager	Piranga olivacea	R				
Pyrrhuloxia	Cardinalis sinuatus	C				
Rose-breasted Grosbeak	Pheucticus ludovicianus	R				
Varied Bunting	Passerina versicolor	C				
Painted Bunting	Passerina ciris	R				
Dickcissel	Spiza americana	R				

[1]BCC = Birds of Conservation Concern 2021: CO (C) = Continental USA, R = continental Bird Conservation Region list (BCR); PV (P) = Puerto Rico and Virgin Islands; HP (H) = Hawaii and Pacific Islands.

[2]ESA/WL (List) = listed under the USA Endangered Species Act as endangered (E) or threatened (T); considered extinct in the wild (X); or on the Partners in Flight Watch List in 2014 or the Avian Conservation Assessment Database in 2019 and not defined as a Migratory Bird (W). Area = main occurrence region of ESA or Watch List taxa as described above (C, P, H).

Appendix 2.
Numbers of Birds of Conservation Concern 2021, non-migratory birds on the Watch Lists in the 2014 State of the Birds (Rosenberg et al. 2014) or Avian Conservation Assessment Database (Partners in Flight 2019), species or populations listed as threatened or endangered under the ESA, and extinct species or populations for the Continental USA, Puerto Rico and the Virgin Islands, and Hawaii and the Pacific Islands. Shared taxa assigned to breeding area list or by greatest abundance.

Region	BCC 2021	Watch List 2014/2019	ESA	Extinct
Continental USA[1]	129 (88)[1]	11	43	8
Puerto Rico/Virgin Islands	21	0	8	2
Hawaii/Pacific Islands	31	13	37	37

[1]Continental list and (additional BCR-scale taxa).

Least Tern, Joanna Gilkeson/USFWS

Follow Us
Facebook: USFWS_Migratory Birds
On Twitter: USFWSBirds

Jerome Ford, Assistant Director
U.S. Fish and Wildlife Service
Migratory Birds Program
www.fws.gov/birds

April 2021

ATTACHMENT 5

West Hunter Valley Road Phase I ESA

West Hunter Valley Road

Bloomington, IN 47404

Inquiry Number: 7604665.8

March 26, 2024

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

03/26/24

Site Name:

West Hunter Valley Road Phas
West Hunter Valley Road
Bloomington, IN 47404
EDR Inquiry # 7604665.8

Client Name:

VET Environmental Engineering, LLC
2335 W Fountain Drive
Bloomington, IN 47404
Contact: Rene Lloyd

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	*Scale*	*Details*	*Source*
2020	1"=500'	Flight Year: 2020	USDA/NAIP
2016	1"=500'	Flight Year: 2016	USDA/NAIP
2012	1"=500'	Flight Year: 2012	USDA/NAIP
2008	1"=500'	Flight Year: 2008	USDA/NAIP
2005	1"=500'	Flight Year: 2005	USDA/NAIP
1998	1"=500'	Acquisition Date: April 05, 1998	USGS/DOQQ
1992	1"=500'	Flight Date: March 16, 1992	USGS
1986	1"=500'	Flight Date: November 22, 1986	NHAP
1977	1"=500'	Flight Date: May 09, 1977	USGS
1965	1"=500'	Flight Date: April 29, 1965	USGS
1962	1"=500'	Flight Date: April 10, 1962	USGS
1955	1"=500'	Flight Date: March 01, 1955	USGS
1952	1"=500'	Flight Date: September 25, 1952	USGS
1946	1"=500'	Flight Date: October 27, 1946	USGS
1939	1"=500'	Flight Date: July 12, 1939	USDA

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

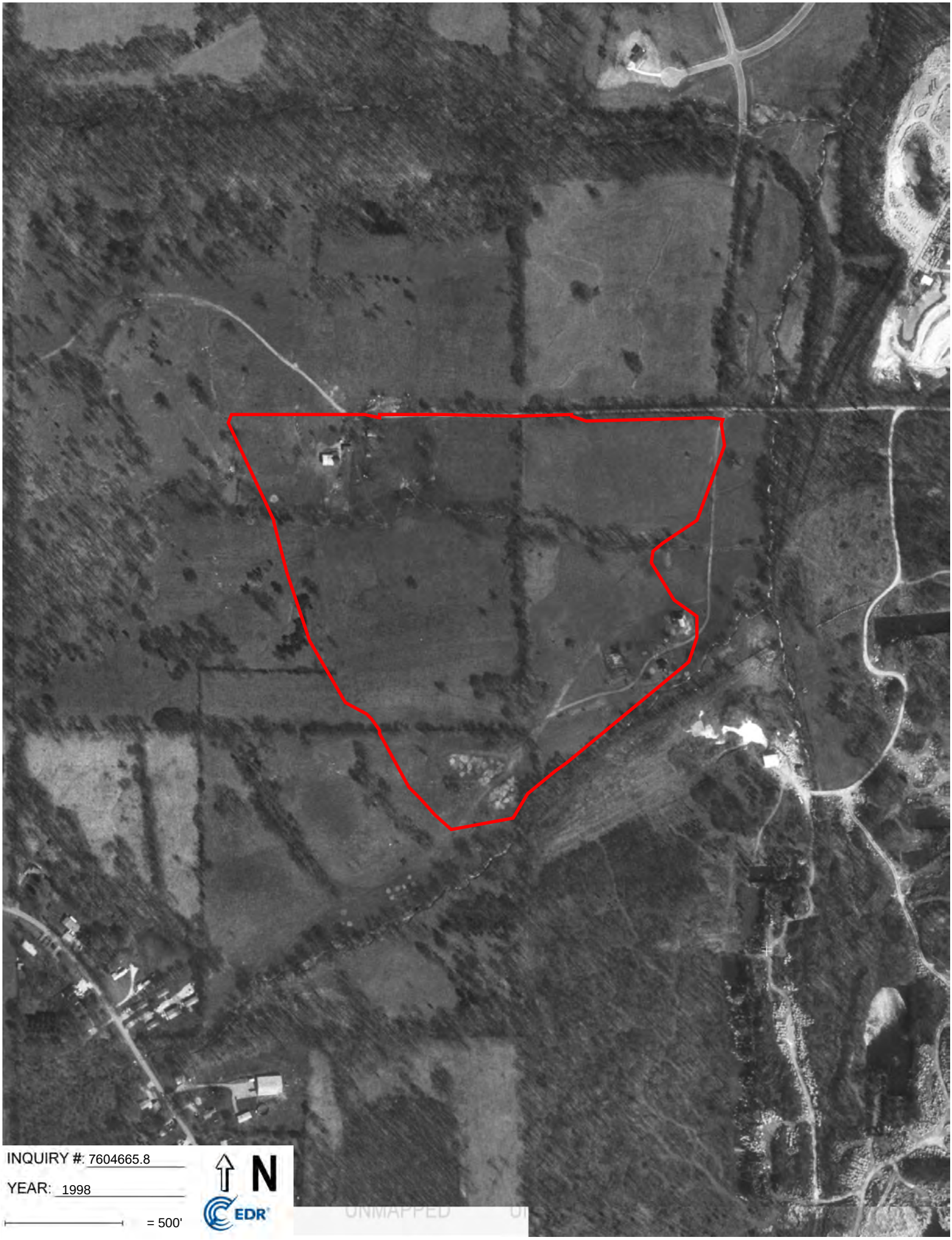

INQUIRY #: 7604665.8
YEAR: 2020
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 2016
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 2012
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 2005
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1998
= 500'
N
EDR
UNMAPPED

INQUIRY #: 7604665.8

YEAR: 1992

= 500'

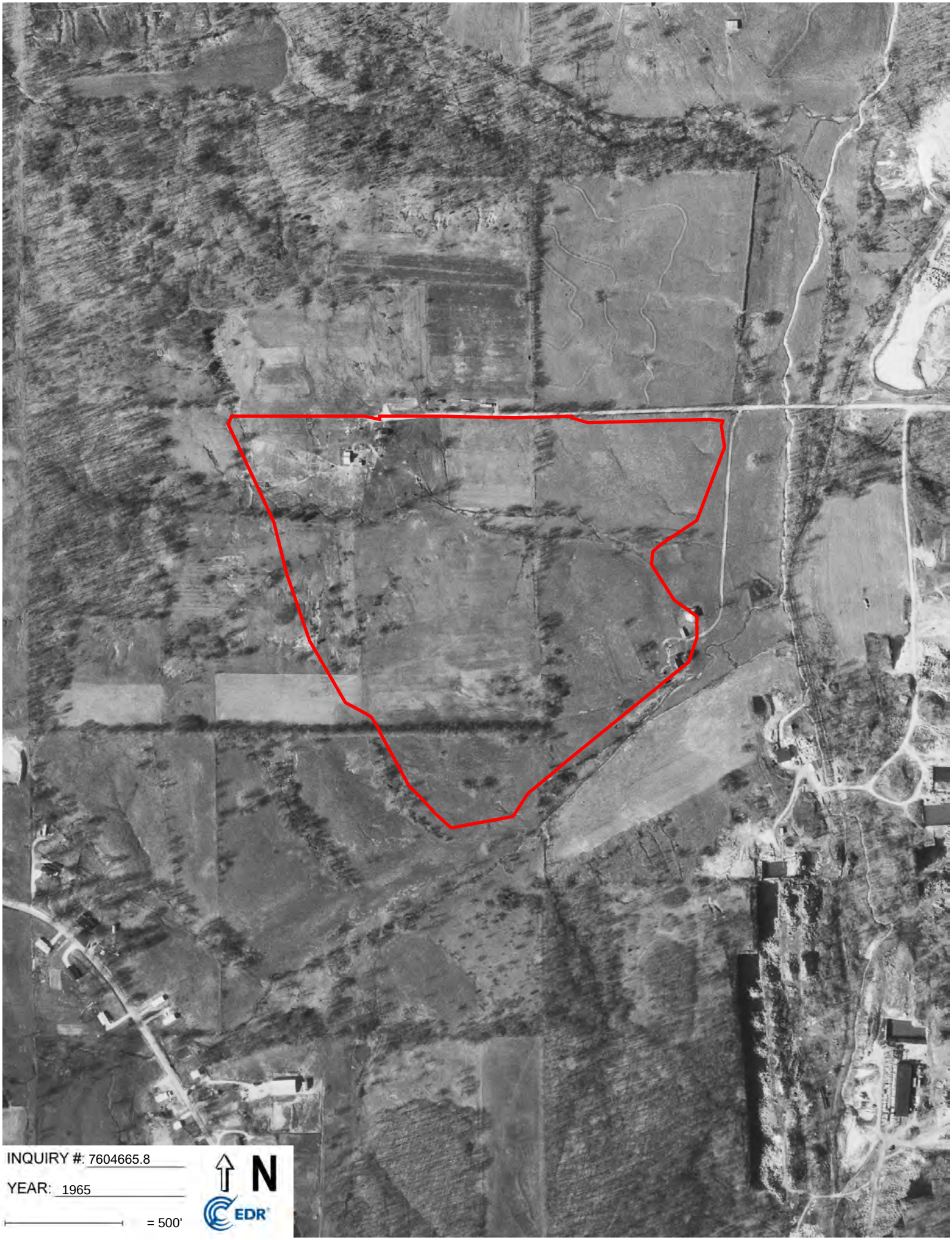
N

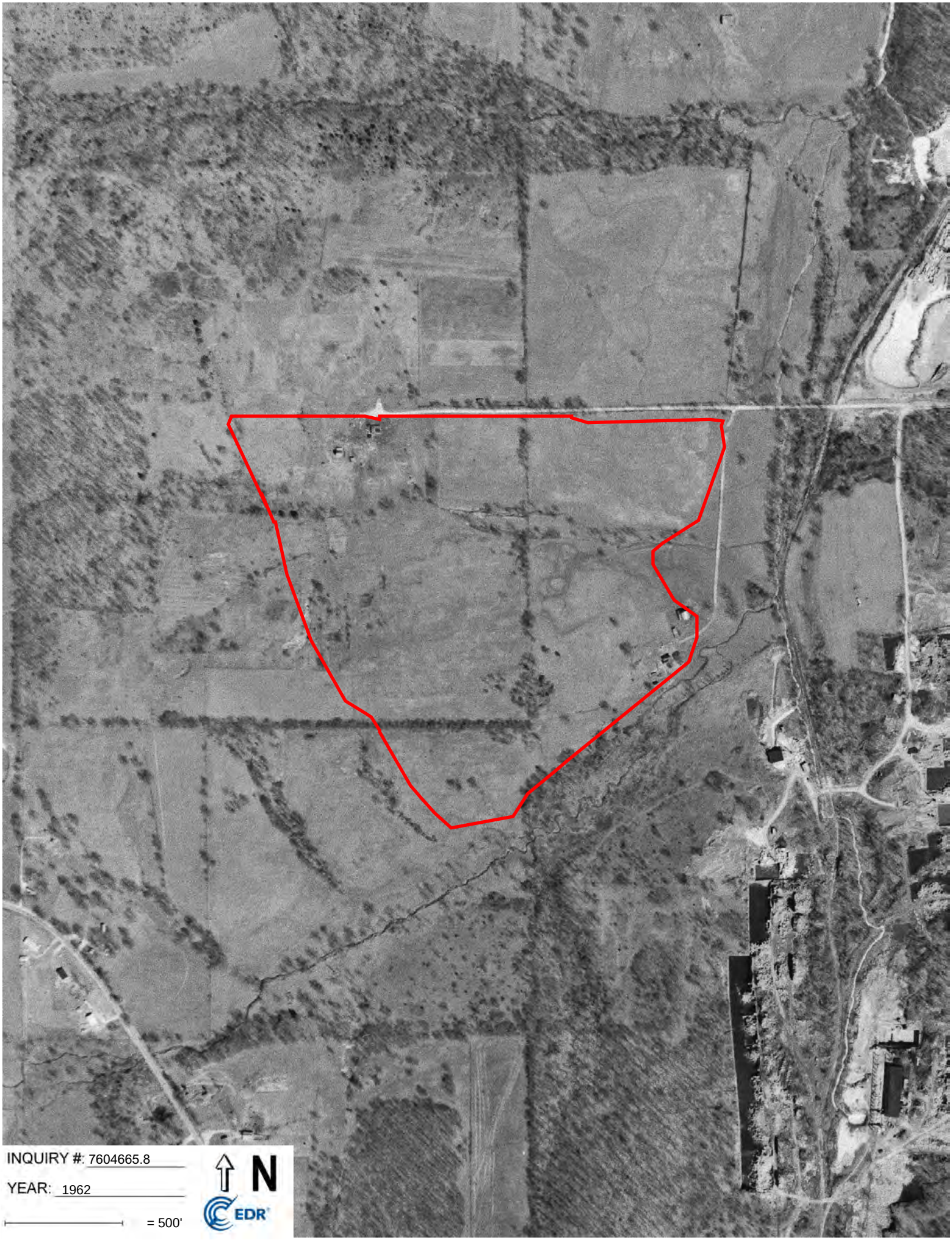
EDR

Subject boundary not shown because it exceeds image extent or image is not georeferenced.


INQUIRY #: 7604665.8
YEAR: 1986
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1977
= 500'
N
EDR
Subject boundary not shown because it exceeds image extent or image is not georeferenced.


INQUIRY #: 7604665.8
YEAR: 1965
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1962
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1955
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1952
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1946
= 500'
N
EDR


INQUIRY #: 7604665.8
YEAR: 1939
= 500'
N
EDR

ATTACHMENT 6

CHAPTER 829

ZONING ORDINANCE: KARST AND SINKHOLE DEVELOPMENT STANDARDS

829-1. Purpose and Intent

The purpose of this chapter is to establish review procedures, use limitations, design standards and performance standards applicable to site developments that encompass or affect sinkholes or other karst features. The intent of this chapter is to protect the public health, safety and welfare by requiring the development and use of environmentally constrained areas to proceed in a manner that promotes safe and appropriate storm water management and ground water quality.

829-2. Policy

Unless expressly stated otherwise or contrary to context, the provisions of this chapter shall be interpreted and applied in accordance with the following policies:

(A) Development in areas that encompass or affect sinkholes or other karst features (i.e., in "sinkhole areas") is prohibited unless expressly permitted by this chapter or until it is demonstrated that the development would have no significant detrimental impact on storm water management or ground water quality.

(B) Potential impacts on storm water management and ground water quality must be identified, assessed and addressed through written studies at the earliest stages of the development approval process (e.g., during the preliminary plat, development plan or site plan approval stages).

(C) The extent and sophistication of any required study should directly reflect the nature and complexity of the proposed development and of the development site (e.g., the more complex the karst features, the more extensive and sophisticated the study).

(D) All applicable Federal, State and Local permits shall be obtained prior to construction.

829-3. Development Requirements

(A) This chapter shall apply to all public, private and institutional land disturbing activities, with the following exception:

(1) Logging, mineral extraction, and agricultural uses.

(a) Accessory structures and roadways used for mineral extraction uses shall comply with the Ordinance if there is an anticipated impact on any adjacent property;

(b) Accessory structures and roadways used for logging and agricultural uses shall comply with the Ordinance; and,

(c) The above notwithstanding, the filling or plugging of a sinkhole with any material (e.g. earthen, manmade, animal or vegetable) in a way that adversely affects stormwater management or groundwater quality is prohibited.

(B) Any report, study, plan, calculation or proposal required by this chapter shall be provided by the petitioner at the petitioner's cost.

(C) Sinkhole conservancy areas (SCA) shall be established to the following minimum standards in all sinkhole areas subject to the sinkhole evaluation requirement of Section 829-4:

(1) For sinkholes less than or equal to one quarter (0.25) acre in area, the SCA shall, at a minimum, encompass the entire sinkhole and all of the area within twenty-five (25) feet of the sinkhole rim.

(2) For all sinkholes greater than one quarter (0.25) acre in size, the SCA shall, at a minimum, encompass all of the area within fifty (50) feet of the post-development sinkhole flooding area as determined in 829-6 or all of the area within twenty-five (25) feet of the sinkhole rim, whichever is less.

(3) For compound sinkholes, the SCA shall be established in accordance with parts (1) and (2) above for each component sinkhole and for the compound sinkhole. For example, if the compound sinkhole is greater than one quarter (0.25) acre in area, the SCA shall comply with part (2). The SCA for sinkholes that are less than one quarter (0.25) acre in area and that are within the compound sinkhole must comply with part (1). It is possible that areas within the rim of a compound sinkhole will not be subject to a SCA.

If a SCA is required to be established on a parcel that was not, or will not be created by recorded plat, a legal description of the SCA shall be included on the recorded deed of the parcel.

(D) Setbacks and Use Restrictions. The following setbacks and use restrictions are established.

(1) No new construction of any of the following shall be permitted within the SCA:

(a) Commercial or industrial structures;

(b) Private drives, streets, and highways unless the County Highway Engineer and Drainage Engineer conclude that traffic safety

considerations outweigh stormwater and water quality considerations;

(c) Storage yards or parking lots for materials, vehicles and equipment;

(d) Residential structures and accessory structures;

(e) Public, semi-public and office facilities;

(f) Swimming pools and other amusement and recreational services unless expressly permitted; and/or

(g) Stormwater detention features that have not been approved by the drainage board.

(2) Construction of the following shall not be permitted within twenty-five (25) feet of the sinkhole rim regardless of size of sinkhole:

(a) structures for storage of hazardous material(s); and/or

(b) any structure associated with a use allowed in Light Industrial (LI) or Heavy Industrial (HI) zones.

(3) Residential, commercial, and industrial structures and public, semi-public and office facilities shall not be constructed within the sinkhole rim unless the lowest floor elevation is a minimum of five (5) feet above the sinkhole flooding elevation, or one (1) foot above the lowest elevation on the sinkhole rim, whichever is less, and provided that a statement of a registered professional engineer or geologist is submitted to the Administrator (see definitions Chapter 801) indicating that foundation conditions are suitable for such structures.

(4) Individual Wastewater Systems

(a) Septic tanks shall not be located within the SCA.

(b) Septic Disposal Fields or wastewater stabilization ponds (lagoons) shall not be located within twenty-five (25) feet of the SCA.

(5) Pesticides and fertilizers may be used in sinkhole areas only in accordance with the rules and regulations of the State of Indiana Pesticide Review Board and with industry standards.

(6) Operation of heavy construction equipment is prohibited in the SCA unless:

(a) it is demonstrated to the Administrator that the operation of such equipment is necessary to prevent clear and imminent danger to persons and property;

(b) the operation of such equipment is necessary to implement a drainage and/or erosion control plan approved by the Drainage Board; and/or

(c) if the operation of such equipment is required for the removal of material from a previously filled sinkhole.

(7) Underground utility lines, equipment and facilities shall be installed in a manner that does not disturb a sinkhole eye or disrupt the natural pattern of storm runoff into the sinkhole. Sanitary sewer lines installed within a SCA shall be water grade pipe.

(8) Recreational facilities such as unpaved hiking, jogging, and bicycling trails, playgrounds, and exercise courses, are permitted within the SCA.

(9) Golf courses and grass playing fields are permitted within the SCA subject to approval of a Management Plan for use of pesticides and fertilizers by the Administrator.

(10) Clearing and pruning of trees as well as understory, and limited grubbing of roots is permitted within the SCA provided that equivalent or improved protective living vegetative ground cover is maintained.

(11) Landscaping and minor gardening is permitted in the SCA provided erosion and sediment discharge is limited through use of minimum tillage and mulches. Normal yard and landscaping maintenance is permitted.

(12) Construction of light incidental landscaping and recreational structures (such as gazebos, playground equipment, etc.), is permitted in the SCA but not within the sinkhole eye. Such structures may not be placed within a SCA on excavated foundations or concrete pads but may be placed on small concrete post-hole foundations.

The above notwithstanding, no land disturbing activity may occur within a SCA if that development, construction or use is determined by the Administrator to violate the intent of this chapter.

(E) Newly formed or pre-existing sinkholes that become active in a way that causes an immediate threat to nearby structures, roadways, persons, and/or property may be stabilized and filled provided existing drainage patterns are not changed. This subsection authorizes conditional, emergency action to remediate a hazardous condition. However, within thirty (30) days of the action, the person responsible for taking the action shall submit a report to the Administrator detailing the actions used to stabilize and/or fill the sinkhole. The report shall be reviewed by

the County Drainage Engineer and County Surveyor to determine whether existing drainage patterns were changed by the action. If the Engineer and Surveyor find that existing drainage patterns were changed, the person responsible for the action shall promptly take all measures necessary to restore the drainage patterns and to otherwise comply with this Chapter.

(F) Stormwater Detention in Sinkholes. The Administrator, upon the Drainage Board's recommendation, may waive detention requirements to allow increased runoff into sinkholes and may authorize excavation within a sinkhole flooding area in order to provide additional water detention storage, upon finding that:

(1) the flooding concerns expressed through Section 829-6 will be satisfactorily addressed;

(2) there are no other areas on the site suitable for detention; and

(3) there will be no significant impact on the karst system or upon water quality.

In cases where concentrated runoff is directed to sinkholes, temporary and permanent erosion control measures, as detailed in a plan approved by the Administrator shall be implemented to prevent channel erosion.

(G) Modification of Sinkholes to Increase Outflow Rates. Increasing outflow rates of sinkholes by excavating the sinkhole eye or installing disposal wells for diverting surface runoff to the groundwater system is prohibited, unless:

(1) it is demonstrated to the satisfaction of the Administrator and/or the Drainage Engineer that such an action is necessary to safeguard persons or property from clear and imminent danger; or

(2) such an action is required to implement a drainage and/or erosion control plan that was approved by the Administrator.

(H) Altered Sinkholes. Filling or altering of sinkholes without an improvement location permit constitutes a zoning violation. In the event, corrective measures must be taken. No corrective or remedial measures shall be undertaken until a remediation plan has been approved by all relevant County entities or representatives and the Administrator has issued an improvement location permit for the plan. No building permits will be issued, or zoning or subdivision approvals granted until the remedial measures specified in the improvement location permit have been completed and approved.

(I) Airport Evaluation. With respect to all land owned, used and/or held by the Monroe County Board of Aviation Commissioners (BAC) for airport purposes, a Section 829-4 sinkhole evaluation (Airport Evaluation) may be made for the entire property (Airport Property). If made for the entire Airport Property, the Airport Evaluation shall be submitted to the Administrator, the Monroe County Drainage Board and the Monroe County Plan Commission for their review.

Upon a finding of compliance with this chapter and with other relevant County Code chapters, the foregoing entities shall approve the Airport Evaluation.

(1) All future development, construction and land disturbing activities (Development Activities) at the Airport Property shall be:

(a) Consistent with the approved Airport Evaluation;

(b) Remedial actions suggested by the Airport Evaluation and required as a part of the Airport Evaluation approval may be implemented at one time or may be implemented in phases in conjunction with future Development Activities; and,

(c) For each proposed Development Activity, BAC shall seek site plan approval and, in connection with that process, shall submit for review and approval that portion of the Airport Evaluation relevant to the proposed Development Activities.

(2) The original Airport Evaluation shall remain in full force and effect for a period of five (5) years from the date it is approved by the County Planning Commission. During that period of time, Development Activities at the Airport Property are subject to the approved terms and provisions of the Airport Evaluation and to the zoning and drainage regulations in effect on the date the Airport Evaluation was approved.

(3) The Airport Evaluation shall be re-evaluated after a five (5) year period.

(a) The BAC may apply for additional five (5) year extensions without limitation;

(b) Each request for a re-evaluation of the Airport Evaluation shall be reviewed by the Administrator and may be approved administratively, subject to compliance with current law; and,

(c) If the Administrator finds that further extension of the Airport Evaluation is not possible under the Federal, State or County Code regulations in effect at the time of review, the BAC shall be promptly notified and shall be given a period or one (1) year beyond the expiration of the current five (5) year period to bring the Airport Evaluation into compliance with the relevant regulations.

(4) The Airport Evaluation shall be consistent with the Federal and State authorities with respect to Airport Property development requirements.

(a) Federal and State standards and requirements will supersede local standards in the event of a conflict or discrepancy; and

(b) In the event that Federal and/or State standards change during the period Airport Evaluation approval, activities may continue in accordance with such changes until the end of the period for which the Airport Evaluation was approved.

829-4. Sinkhole Evaluation and Plan Requirements

A Sinkhole Evaluation shall be performed for each site subject to this chapter (i.e., sites upon which sinkholes are fully or partially located and/or which drain to sinkholes). A Sinkhole Evaluation shall include the information set forth in subsections A through F of this section.

The following types of developments or sites may be excepted from full compliance with the Sinkhole Evaluation requirements upon the petitioner's request and a finding by the Administrator that significant drainage or water quality impacts will not result from the development or the use of the site:

(1) administrative and minor subdivisions;
(2) lots created greater than 10 acres for agricultural and residential uses; and
(3) existing lots of record for which single-family residential use is proposed.

The above notwithstanding, neither the Administrator nor the Drainage Board may except a development or a site from subsection 829-4 (E). The burden of proof for establishing that there will be no significant impacts shall rest with the petitioner.

(A) A plat or site plan for the proposed subdivision or development, setting forth the following information for each of the enumerated items:

(1) Sinkholes

(a) Location and limits of the area of the sinkhole depression as determined by field surveys or other reliable sources as may be approved by the Administrator. Location of sinkholes based solely upon USGS 7 ½ Minute Series Quadrangle Maps will not be considered sufficient unless field verified by a registered Indiana Surveyor, Engineer, or geologist.

(b) Location and elevation of the sinkhole eye or low point.

(c) Topographic contours at maximum intervals of two (2) feet, and spot elevations sufficient to determine the low point on the sinkhole rim and the profile of the potential overflow areas.

(d) Minimum floor elevations of any existing structures located within the sinkhole rim.

(e) Elevation of any public or private roadway or drive located within or adjacent to the sinkhole.

(2) Flooding limits as determined in Section 829-6.

(3) Water considerations specified in Section 829-7, including, without limitation:

(a) The approximate location of public or private water supply sources such as springs or wells within 500 feet of the site.

(b) Boundaries of any known recharge areas to wells or springs.

(4) Other geologic features: location of caves, springs, faults and fracture trends, geologic mapping units.

(5) Proposed discharge points: the location, type and size of all points at which concentrated discharges of stormwater into the sinkhole are proposed. The drainage area to each point of concentrated discharge shall be delineated on the plan and the size of the drainage area noted.

(6) Existing watercourses which drain into the sinkhole.

(7) All other information required to demonstrate or assess compliance with this chapter, as specified by the Administrator.

(8) The location of the foregoing items with respect to the location of the proposed or existing roads, detention ponds, significant landscaping features, property lines, underground utilities, and other structures.

(B) A drainage area map showing the sinkhole watershed area, and where the site is located in a sinkhole cluster area. This map shall be extended to include, in the watershed area, any sinkholes located downstream of the site which may receive overflow drainage from the site.

(C) Proposed SCA in accordance with Chapter 829-3 (C).

(D) An analysis of the orientation and flow of the sinkhole drainage system, as detailed on the subsection (B) map. The use of dye trace injection testing to produce an accurate mapping of the system may be required by the Administrator when the system drains towards an area that has known flooding problems and for which the flow pattern has not been established through previous dye testing, and when significant increases or decreases in the runoff to sinkholes is expected to result from the proposed development. Significant increases generally occur if the residential density is greater than one lot per two acres (or a commercial development with equivalent impervious surfaces).

(E) The approximate location of karst features must be shown on the final plat based on the best available mapping and/or noted on the deeds if no plat is recorded for the subdivision.

(F) All other information deemed necessary by the Administrator.

829-5. Permit Requirement

No person or persons shall engage in the grading of land or modification of a sinkhole within the SCA or the area that would be covered by a SCA as described in 829-3 (C) without first securing an improvement location permit from the Administrator .

(A) The owner of the property or person having an interest therein shall submit an application for a permit to the Administrator along with the sinkhole evaluation required by 829-4. The Administrator shall submit all applications to the County Drainage Engineer for review and comment and may, upon the Drainage Engineer's recommendation, submit an application to the Drainage Board for review and comment.

(B) Upon review of the information presented by the applicant, the site, and other information as may be available, the Administrator may issue a permit for work to be performed in the SCA.

(1) All work shall be performed in accordance with the requirements of the Zoning Ordinance and any conditions of permit approval; and,
(2) The Administrator may designate certain areas where grading or construction equipment is not permitted or is otherwise limited.

(C) Karst-Related Non-Buildable Areas. In addition to establishing a plan for grading and use of construction equipment, the Administrator may, based upon the topography, geology, soils, history of the sinkhole (such as past filling) and the developer's engineer's storm water analysis and plan, establish sinkhole-related non-buildable areas:

(1) No buildings, parking areas, grading or other structures shall be permitted within the sinkhole-related non-buildable area unless otherwise authorized by the Administrator; and

(2) No private drives, streets, and highways shall be permitted within the sinkhole-related non-buildable area unless the County Highway Engineer and Drainage Engineer conclude that traffic safety considerations outweigh stormwater and water quality considerations.

829-6. Flooding Considerations

(A) Sinkhole Flooding Area. Except in cases in which the annual exceedance probability (AEP) of 1% (100 year storm) has been determined in a published

flood insurance study, the sinkhole flooding area shall be determined for each sinkhole for both pre-development and post-development conditions, assuming no subsurface outflow from the sinkhole.

Where the estimated volume of runoff exceeds the volume of the sinkhole depression, the depth, spread and path of overflow shall be estimated using methods established by the Drainage Board and shown on the plan.

The overflow volume shall be included in determining the maximum estimated flooding elevations in the next downstream sinkhole. This analysis shall continue downstream until the lowest sinkhole of the sinkhole cluster is reached or overflow reaches a surface watercourse.

The volume of runoff considered shall be that which results from a rainstorm with a 1% AEP and a duration of forty-eight (48) hours. The runoff volume shall be determined by the method set forth in the Natural Resource Conservation Service's TR-55 Manual.

No further flooding analysis will be required provided that:

(1) The post-development flooding area of any sinkhole which receives drainage from the site is located entirely on the site.

(2) A drainage easement covering the post-development flooding area is provided for any off-site sinkhole or portion of a sinkhole which receives increased peak rates of runoff from the site. If the receiving sinkhole is not contiguous to the site, an easement must also be provided for the waterway which connects the site to the sinkhole.

(3) The minimum floor elevation of any existing structure is at least two (2) feet higher than the estimated flooding elevation from the 1% AEP 48-hour storm.

(4) The increase in volume of runoff from the site does not cause the flooding depth on any existing public road to exceed the maximum depth as determined by the Drainage Board.

(B) Detailed Flooding Analysis. In cases where the conditions set forth in (A) above cannot be met, a detailed flooding analysis will be required if any increase in runoff volume is proposed or expected. As part of the detailed flooding analysis, a runoff model must be made and a reservoir routing analysis performed for the sinkhole watershed using hydrograph techniques as established by the Drainage Board.

(C) The following alternative methods may be proposed and approved, singly or in combination, to keep flooding levels at pre-development levels:

(1) Diversion of Excess Runoff to Surface Watercourses. Where feasible, increased post-development runoff may be diverted to a surface watercourse, provided that

(a) Any increase in peak runoff rate in the receiving watercourse does not create or worsen existing flooding problems downstream; and

(b) The diverted storm water remains in the same surface watershed.

Storm sewers, open channels and other appurtenances provided for diversions shall be designed in accordance with applicable sections of these Design Criteria.

The effect of diverted water on downstream watercourses and developments, and requirements for additional detention facilities prior to release of runoff to the surface watercourse shall be determined as established by the Drainage Board.

(2) Storage of Excess Runoff within the Sinkhole Watershed. If consistent with the intent of this chapter, detention facilities may be constructed within the sinkhole watershed or the area of the sinkhole outside of the sinkhole flooding area as determined for post-development conditions.

(D) The flooding considerations set forth in this section are designed and are intended to ensure that:

(1) Inflow rates to the sinkhole are maintained at or below pre-development values; and

(2) Sediment and erosion control and water quality considerations set forth in this chapter can be satisfied.

829-7. Water Quality Considerations

Because sinkholes provide direct recharge routes to groundwater, water quality in wells, caves, and springs may be affected by discharge of runoff from developed sinkhole areas. Consequently, and as more fully specified in subsections A through D below, the Sinkhole Evaluation must address potential impacts of proposed development on receiving groundwaters and must propose water quality management measures to mitigate such impacts.

(A) Receiving Groundwater Use. The Sinkhole Evaluation Report shall identify whether the site lies within a critical area or a sensitive area based upon the following classifications.

(1) Critical Areas. The following areas are classified as critically sensitive to contamination from runoff and thus, are critical areas for purposes of this chapter:

(a) Areas within 100 feet of private water supply wells.

(b) Areas within 300 feet of public water supply wells.

(c) Areas within 500 feet of springs used for public or private water supply.

(d) Areas within 1000 feet of caves providing habitat to rare or endangered species.

The distances listed above may be extended by the Administrator where the recharge areas for a well, spring, or cave have been determined by studies by a qualified engineer or geologist. The length of the extension may be no greater than necessary to achieve the policies of this chapter.

(2) Sensitive Areas. Sinkhole areas that are not within critical areas are classified as sensitive for groundwater contamination for purposes of this chapter.

(B) Groundwater Contamination Hazard. The relative potential for groundwater contamination shall be classified as low, moderate, or high depending upon the nature of the proposed land use, development density and amount of directly connected impervious area. The Sinkhole Evaluation shall identify whether the proposed development poses a low, moderate, or high hazard to groundwater uses, as defined below:

(1) Low Hazard. The following land uses are classified as posing a relatively low hazard to groundwater contamination:

(a) Residential developments on sewer, provided directly connected impervious areas discharging to the sinkhole are less than or equal to one (1) acre in total area;

(b) Parks and recreation areas;

(c) Low density commercial and office developments, provided directly connected impervious areas discharging to the sinkhole are less than or equal to one (1) acre in total area; and

(d) Discharge from graded areas less than or equal to one (1) acre.

(2) Moderate Hazard. The following land uses are classified as posing a relatively moderate hazard to groundwater contamination:

(a) Concentrated discharge from streets, parking lots, roofs, and other directly connected impervious areas having an area greater than one (1) acre and less than or equal to five (5) acres;

(b) Multifamily residential developments and higher intensity office developments, provided the directly connected impervious areas discharging to the sinkhole are less than or equal to five (5) acres; and

(c) Discharge from graded areas greater than one (1) acre and less than or equal to five (5) acres.

(3) High Hazard. The following land uses are classified as posing a high hazard to groundwater contamination:

(a) Collector and arterial streets and highways;

(b) Railroads;

(c) Concentrated discharge from streets, parking lots, roofs, and other directly connected impervious areas having an area greater than five (5) acres;

(d) Commercial, industrial, and manufacturing areas;

(e) Individual wastewater treatment systems;

(f) Commercial feed lots or poultry operations; and

(g) Discharge from graded areas greater than five (5) acres.

(C) Water Quality Management Measures. The majority of sinkholes drain a limited watershed area. For sinkholes where the surrounding drainage area is small enough that the area draining to the sinkhole flows predominantly as sheet flow, potential impacts on water quality can be addressed in many cases by erecting and maintaining reliable silt control barriers around the sinkhole during construction and providing a vegetative buffer area around the sinkhole to filter out potential contaminants.

When the volume of runoff into the sinkhole increases to the point where flow becomes concentrated surface flow, the degree of effort required to capture and filter out contaminants increases significantly.

Concentrated surface flow occurs naturally when the sinkhole watershed area reaches a sufficient size for watercourses leading into the sinkhole to form. Concentrated surface flow results as urbanization occurs due to construction of roads, storm sewers, and drainage channels. Subsurface flows can become concentrated through utility trenches.

(D) Mitigation of Stormwater Runoff. The following water quality management measures may be used to mitigate the impact of storm water runoff quality. Temporary sediment controls are required for all sites. The other measures listed

may be used singly or in combination as needed based upon the potential groundwater contamination hazard of the proposed development.

(1) Sediment and Erosion Control

(a) Nonconcentrated (sheet) flow: existing ground cover shall not be removed within twenty-five (25) feet of the sinkhole flooding area and a temporary silt barrier shall be erected and maintained around the outer perimeter of the buffer area during the construction period. Vegetative cover must be of sufficient quality and density to provide desired filtration. If existing vegetative cover is sparse, it must be improved to sufficient quality and density to provide the desired filtration.

(b) Concentrated surface and subsurface flow: a sediment basin will be required at each point where concentrated flows are discharged into the sinkhole. Sediment basins shall be designed according to criteria set forth in the *Indiana Handbook for Erosion Control in Developing Areas.* A permanent sediment basin may be required by the Drainage Board in some cases. This requirement shall be based on the watershed area, the disturbance that the proposed project will create, and the availability of suitable sites for a sediment basin.

(2) Minimizing Directly Connected Impervious Area.

(a) The groundwater contamination hazard category for impervious areas may be reduced by reducing the amount of directly connected impervious area. This is the area of roofs, drives, streets, parking lots, etc., which are connected via paved gutters, channels, or storm sewers.

(b) Directly connected impervious areas can be reduced by providing sized grass swales, vegetative filter strips or other Best Management Practices to separate paved areas.

(3) Diversion of Runoff.

(a) Concentrated discharges to sinkholes can be reduced to manageable levels or avoided by diverting runoff from impervious areas away from sinkholes where possible.

(b) Diversions shall be done in a manner that does not increase flooding hazards on downstream properties and, generally, shall not be directed out of the surface watershed in which the sinkhole is located.

(4) Filtration Areas. For areas having a low groundwater contamination hazard and where flow into the sinkhole occurs as sheet flow, water quality requirements can be satisfied by maintaining a permanent

vegetative buffer area with a minimum width of twenty-five (25) feet around the sinkhole flooding area.

(5) Grassed Swales and Channels.

(a) For areas having a low groundwater contamination hazard, concentrated flows from directly connected impervious areas of less than one (1) acre may be discharged into the sinkhole through grassed swales and channels.

(b) Swales and channels shall be designed for non-erosive velocities and appropriate temporary erosion control measures such as sodding or erosion control blankets shall be provided.

(6) Storage and Infiltration. Storage and infiltration basins shall be designed to capture the first one-half (0.5) of an inch of runoff from the tributary drainage area and release the runoff over a minimum period of twenty-four (24) hours. Standard outlet structures for sedimentation and infiltration are shown in the *Indiana Handbook for Erosion Control in Developing Areas*. Storage and infiltration will be required in the following cases:

(a) All areas having a high groundwater contamination hazard.

(b) Areas having a moderate groundwater contamination hazard and where concentrated inflow occurs.

(7) Hazardous and Toxic Materials. Facilities which involve storage or handling of hazardous or toxic materials shall comply with the State of Indiana Department of Environmental Management.

[end of chapter]