US Army Corps of Engineers ®
Norfolk District

June 19, 2007

CENAO-REG

FEDERAL PUBLIC NOTICE

The Norfolk District Army Corps of Engineers (Corps), in conjunction with the Virginia Department of Environmental Quality (DEQ), announce the availability of joint revised Subdivision Recommendations. These principles are applicable to any commercial or residential subdivision work on properties containing wetlands or waters regulated by the Corps and/or DEQ. Please contact Robert Berg of my staff at (757) 201-7793 with any questions regarding this matter.

FOR THE DISTRICT COMMANDER:

J. Robert Hume, III
Chief, Regulatory Office

SUBDIVISION RECOMMENDATIONS:

I. Purpose and Need

These subdivision recommendations are based on and update previous procedures for the review of subdivision proposals and treatment of residual aquatic resources within those developments. The objectives of these guidelines are to ensure that:

1) Staff fully considers the potential impacts to aquatic resources posed by a development;
2) A consistent and logical framework is established for considering any residual aquatic resources (wetlands, streams, and open water areas for which impacts are not authorized) as well as upland areas and/or buffer areas within a subdivision;
3) The likelihood of additional and unpermitted impacts to any residual aquatic resource areas within a permitted subdivision is minimized;
4) Any residual aquatic resources within a permitted development retain their integrity and predevelopment functions and values after completion of the development;
5) Cumulative impacts associated with subdivisions are fully considered; and
6) Requirements for future regulatory compliance efforts associated with residual aquatic resources within a development are minimized;

II. Authority

The Norfolk District of the US Army Corps of Engineers (the Corps) issues permits under the authority of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 for regulated activities proposed in waters of the United States, including wetlands, throughout the state of Virginia. The Department of Environmental Quality (DEQ) and its Virginia Water Protection (VWP) Permit Program derives regulatory authority from both the Clean Water Act (§ 401) and the State Water Control Law (SWCL) for regulated activities proposed in surface waters, including wetlands. Virginia Water Protection Permit (VWPP) regulations incorporate, by reference, the mitigation sequencing guidelines from the Clean Water Act, also known as the Section 404(b)(1) guidelines (reference 9 VAC 25-210-115A).

III. Background

In accordance with the §404(b) (1) Guidelines of the Clean Water Act, applicants applying for authorization to impact waters and wetlands within the jurisdiction of DEQ and/or the Corps must demonstrate that impacts to aquatic resources have been avoided and minimized to the maximum extent practicable. As a result there are often residual aquatic resources that have been avoided in the permit process. These areas may be located in close proximity to impacted aquatic resources and are likely located adjacent to land that is permitted for construction.

Due to the nature of residential subdivisions, individual property owners are often not educated about the presence of a deed restriction on portions of their property, the location of aquatic resources remaining on their property, or activities in these areas that require permits or agency approval to conduct. Degradation of residual aquatic resources commonly occurs through landscaping, drainage improvements (complaints about standing water and mosquitoes), placement of fill material, disposal of lawn debris, and rubbish. In some cases, permit conditions requiring the protection of residual aquatic resource within lots conflict with some requirements of local governments. Regulatory agencies have had to expend substantial effort to ensure compliance with restrictive covenants recorded over residual aquatic resources in lots within subdivisions. Subsequently, the regulatory agencies realized the need to prevent future (and often unauthorized) cumulative impacts to these remaining aquatic resources within the proposed development.

In addition, large scale subdivisions are commonly developed in phases and the agencies are asked to provide authorization for portions of the overall project at a given time. The practice of permitting portions of a single and complete project under separate permits is commonly referred to as ‘piece-mealing.’

Commercial developments, such as industrial or business parks, have similar permit review and residual aquatic resource issues as residential subdivisions. As the size of the parcels making up these developments can vary widely, these developments are best examined on a case by case basis, however, portions of this document would be applicable to the review of such proposals.

These revised guidelines were developed in an effort to learn from earlier successes and failures. The following sections provide guidance on determining impacts to aquatic resources, protection of residual aquatic resources and upland buffers (where applicable) and permitting and evaluation procedures for phased developments.

III. Definitions

The definitions in this section are a combination of federal and state regulations and guidance are meant to provide clarification for this document. To the extent these definitions conflict with definitions in the regulations, the definitions in the regulations control.

Independent utility A test to determine what constitutes a single and complete project. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a phased development project that depend upon other phases of the development project do not have independent utility. Portions of a phased development project that would be constructed even if the other phases are not built can be considered as separate single complete projects with independent utility. The independent utility test includes physical features (infrastructure) and economic factors.

Phased Subdivisions: A residential, commercial, industrial, or mixed-use/master-planned development in which the plan of development (POD) is broken into smaller units or phases of construction. Phased developments may be located on a single piece of land or an assemblage of contiguous properties and are proposed by the same entity or by related entities. Phases of a development may be considered "single and complete" despite the possibility that the phase under consideration may share or depend on common infrastructure, financing, ownership, etc. associated with the earlier phases. The phase will be considered to be "single and complete" if it can "stand alone" from subsequent phases due to its independent utility. However, impacts in a phased development will be considered cumulatively.

Proffers: During the local approval process for projects, a developer may dedicate land for public use or construct a certain amount of infrastructure in order to proceed with his project (zoning proffers). Due to the requirement of localities, project proponents often include proffers (e.g., school sites, stormwater management facilities, sewage pump station sites, roads, sewer lines, drainage improvements, etc.) as part of their proposals. The key to determining whether any impacts associated with these proffers are considered part of the development will depend on whether or not the proffers involve providing land or actual development. If a proffer is limited to providing land, the locality will be responsible for obtaining a permit for any impacts to aquatic resources not the developer. However, if a proffer involves providing land and constructing a facility, any impacts to aquatic resources will be considered as part of the developer's project.

Real Estate Subdivision: The division of parcels into smaller parcels or the combination of 2 or more parcels into a larger parcel for the purpose of selling, conveying, transferring, leasing, or developing the resulting parcel(s). This includes the entire area of a residential, commercial, or industrial subdivision or a mixed-use or master-planned development divided or combined after October 5, 1984.

Residual Aquatic Resource A whole or portions of surface waters**,** including wetlands and streams, located within a project boundary that has not received authorization to be filled or otherwise impacted in accordance with State or Federal law.

Shared Infrastructure Those roads, utilities, and other infrastructure that are jointly owned, constructed, and/or used by more than one residential, commercial, municipal, or industrial development.

Single and Complete Project: The total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers which also has independent utility. A project may be considered to be "single and complete" if it can be constructed independent of any reliance on subsequent or previous permit authorizations for additional regulated activities (e.g., activities preceding or following those under the current authorization).

Unencumbered Land: Land within a residential lot or commercial project that is free of legal or environmental constraints that would prevent the construction of structures or removal of vegetation. Land located within a residential lot that does not contain aquatic resources or their associated protected buffers; unless authorized for impact. This land does not contain areas that are protected as required by other entities such as Resource Protection Areas (RPAs) or buffers to aquatic resources required by localities.

IV. Permitting Subdivisions and Phased Developments

When evaluating land development projects, we defer to the localities on many land use and project design issues. A land development project usually receives preliminary approval(s) at the local level (zoning, conditional use, conditional, tentative or preliminary subdivision approval, etc.) prior to detailed design, final locality approval. It is important to consider what has been preliminarily approved by the locality when determining potential individual and cumulative impacts to aquatic resources. In order to obtain preliminary approval, a developer must demonstrate that the project complies with local ordinances and, at a minimum; the project can be accessed with adequate roads, sewer and water connections, either by public or private means.

During the local approval process for projects, a developer may be required to dedicate land for parks, schools, roads, or to construct a certain amount of infrastructure in order to proceed with their project (proffers). All aspects of the development project must be considered in order to evaluate individual and cumulative impacts to aquatic resources. When determining if a project is single and complete, we must identify whether the developer would ***build*** certain land improvements if they were not required for their project. For example, if a locality will not allow a developer to sell residential lots in a proposed subdivision until they ***build*** one mile of sanitary sewer trunkline that will serve the proposed subdivision and other developments, the subdivision is not feasible without the sanitary sewer trunkline. The subdivision cannot be constructed but for the sewer; therefore the subdivision is not a single and complete project. In other words, the subdivision is not separate from the sewer; the subdivision and the sewer are part of a single project. All impacts from both activities would need to be considered cumulatively but could be permitted separately.

If a zoning proffer is limited to providing land (i.e., for a school or a road), and the developer is not undertaking any construction on the dedicated land, any potential impacts resulting from the development of the dedicated land are considered separate from the developer's project.

Applicants should submit an application for all aspects of the single and complete project, including any impacts associated with proffers or related phases. It may be possible to phase the permitting of a phased development in accordance with agency regulation.

V. Residual Aquatic Resource Considerations

When permitting a project with residual aquatic resources, the agency personnel should consider the location and the best manner to protect those remaining resources. This section presents a tiered approach of agency preference in dealing with residual aquatic resources.

Previous guidance required that all residual aquatic resources remaining on lots of 15,000 square feet or less (with sewer/water service) be considered impacted even if the applicant was not proposing to physically fill these areas. For lots without sewer/water (septic service), the minimum lot size was raised to

30,000 square feet or less to account for the area required for septic tanks and drain fields. This guidance generally required deed restrictions for all residual aquatic resources in subdivisions to protect them. These guidelines did not prevent additional impacts to residual aquatic resources, typically due to property owner misunderstanding/noncompliance with the deed restrictions.

The primary solution is to avoid having any residual aquatic resources and their associated protected buffers within individual residential lots regardless of recordation of a deed restriction. Preferred alternatives for dealing with residual aquatic resources are listed below in order of preference. These alternatives should be considered during avoidance and minimization review.

1. All residual aquatic resources and their associated protected buffers should be located outside of individual lot lines, in the following order of preference:

    a. All residual aquatic resources should be preserved in an easement to be held by a third party or public entity (TNC, VOF, state or locality)

    b. All areas of concern preserved in an easement held by a viable Home Owners Association.

2. If residual aquatic resources/buffers must be located within lots, in the following order of preference:

    a. All residual aquatic resources should be located within one or two large lots and preserved with an approved deed restriction. The lots must be of adequate size as indicated below.

    b. If residual aquatic resources/buffers must be distributed among and within several individual residential lots, all residual aquatic resources/buffers must be preserved within lots of adequate size (see below) and located in the back of lots. Where there is an obvious demarcation of aquatic resources (i.e., swamps, marshes, severe topographic change leading to aquatic resource) which would inhibit impact from future homeowner activity, the project manager has the discretion to consider the resource as unimpacted, provided they are protected by a deed restriction. Landowners may not be able to readily identify aquatic resources where there is no such demarcation.

    c. If residual aquatic resources/buffers must be distributed within several individual residential lots, the lots must be of adequate size to lower the risk of additional impacts from future homeowner activity. Adequate lot size is based on the type of sewer utility involved.

        i. Where public sewer is available and where a lot contains less than ½ acre of unencumbered land, all waters should be considered impacted.

        ii. Where public sewer is not available, and where waters are located within lots that do not contain ½ acre of unencumbered land in addition to the minimum needed for the septic system drain field, and the area effectively drained by any associated perimeter ditching, all waters will be considered impacted. The area effectively drained for septic purposes is typically 1 acre.

VII. Compliance

As with all projects, when permit compliance issues or enforcement cases are found or reported, agency staff must proceed with actions to bring the project into compliance. Commonly, noncompliance issues will typically include impacting more onsite wetlands or streams than permitted; poor or failing erosion control measures; no evidence of deed restriction recordation; or encroachment into buffers. Each agency

must follow their own process and procedure to resolve compliance and enforcement cases. However, DEQ and COE staff should coordinate compliance and enforcement activities when possible to reduce duplication of effort and increase consistency in resolution of compliance issues. When a project has received both state and federal permits, agency staff should coordinate all compliance efforts. When only one agency is responsible for issuing a permit, notification is encouraged to occur when circumstances merit the involvement and assistance of the other agency by aiding the resolution (for instance, additional impacts resulting in a change in the permit required). Enforcement cases where no permit has been issued should be pursued by each agency, particularly for larger cases, in accordance with agency processes and procedures.

In some cases, the landowner can resolve compliance or enforcement issues by permitting the project to allow the completion in a manner that avoids further damage to a wetland or watercourse and that is agreeable to the agencies. The practice of issuing an after-the-fact permit, particularly for relatively minor impact situations, should be limited as it has the consequence of removing the deterrent to acting without a permit.

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
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CENAO-WRR

REGIONAL PROGRAMATIC GENERAL PERMIT 12-SPGP-01

Effective Date: May 31, 2012 **Expiration Date: May 31, 2017**

I. AUTHORITIES: 12-SPGP-01 authorizes the discharge of dredged or fill material in nontidal waters, of the United States, including wetlands, associated with certain residential, commercial, and institutional developments and linear transportation projects within the geographical limits of the Commonwealth of Virginia and under the regulatory jurisdiction of the U.S. Army Corps of Engineers, Norfolk District (Corps or Norfolk District). These projects must have no more than minimal individual and cumulative impacts and must meet all the terms and conditions outlined herein. The use of 12-SPGP-01 is restricted to those projects that have avoided and minimized impacts to waters of the U.S., including wetlands, to the maximum extent practicable.

The people of the Commonwealth of Virginia (Virginia or "the Commonwealth") are hereby authorized by the Secretary of the Army and the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) and Section 404 of the CWA (33 U.S.C. § 1344), to perform the aforementioned work in nontidal waters and wetlands of the Commonwealth as described herein. The Corps' authority and guidance to develop general permits is contained in 33 U.S.C. § 1344(e) and 33 C.F.R. § 325.2(e)(2), 33 C.F.R. § 325.3(b), and Corps Regulatory Guidance Letter 83-7.

II. PROCEDURES:

A. Delineation Confirmations: Prior to the submission of an application for any Residential, Commercial, or Institutional Development Activity or Linear Transportation Activity covered by 12-SPGP-01, a proponent must first obtain a confirmed delineation of all waters of the U.S., including wetlands, and Virginia state surface waters on the property. The applicant will contact the Corps to obtain a delineation confirmation. A confirmed delineation is not required for Virginia Department of Transportation (VDOT) linear transportation projects (these projects must adhere to separate, but similar, procedures). When appropriate a delineation confirmation may also be required from the Environmental Protection Agency (EPA).

B. Application: Applicants must use the newest version of Joint Permit Applications (JPAs) and submit these applications to the Virginia Marine Resources Commission (VMRC). The applicable Virginia Water Protection (VWP) permit regulations define the information required for a complete VWP permit application (see 9 VAC 25-210-80, 9 VAC 25-660-50, 9 VAC 25-670-50, 9 VAC 25-680-50, and 9 VAC 25-690-50). This information, plus a confirmed

delineation from the Corps with associated map(s) and data sheets, will be required to render an application complete for 12-SPGP-01 purposes. VDOT will submit the Inter-Agency Coordination Meeting JPA or the VDOT Reporting Only Spreadsheet. A joint permit application may be obtained through the following link:
http://www.nao.usace.army.mil/Regulatory_Branch/JPA.asp

C. State Approvals: In order for 12-SPGP-01 to be valid, permittees must obtain the following state approvals prior to commencement of work in waters of the U.S.:

1. Virginia Department of Environmental Quality (VDEQ) VWP permit and
2. VMRC permit, when required

For the purpose of resolving non-compliance and/or enforcement actions the 12-SPGP-01 may be issued or modified in conjunction with a VDEQ informal resolution, letter of agreement, executive compliance agreement or consent order. Authorizations under 12-SPGP-01 also require that permittees ensure that their projects are designed and constructed in a manner consistent with all state and local requirements pursuant to the Chesapeake Bay Preservation Act (Virginia Code 10.1-2100 *et seq.*) and the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 10-20-10 *et seq.*), the Virginia Erosion and Sediment Control Regulations (4 VAC 30-50-10 *et seq.*), and the Virginia Stormwater Management Program (VSMP) Permit Regulation (4 VAC 50-60-10 *et seq.*). Authorizations under 12-SPGP-01 do not supersede state or local government authority or responsibilities pursuant to the Act.

D. Definitions:

a. For purposes of 12-SPGP-01, "loss" of waters of the U.S., including wetlands, shall be defined as filling (including placement of pipes or other water conveyances in waters) and other permanent adverse effects, including mechanized landclearing, permanent conversion, excavation (including channelization), flooding, draining, etc. The acreage/linear footage of loss of waters of the U.S. is the threshold measurement of the impact to existing waters, including wetlands, for determining whether a project may qualify for 12-SPGP-01; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and values.

b. For purposes of 12-SPGP-01, "natural stream design" means that the channel should mimic the dimension, pattern, and profile of a representative reference stream reach.

c. For purposes of 12-SPGP-01, VDEQ is the state agency responsible for ensuring permit applications meet the informational and technical requirements of the 12-SPGP-01 and for issuance of 12-SPGP-01 authorizations for qualifying Residential, Commercial, Institutional and Linear Transportation projects.

d. For purposes of 12-SPGP-01, the "permittee" will be the responsible party in receipt of the 12-SPGP-01 authorization from the VDEQ. The permittee will be the responsible party for complying with all 12-SPGP-01 general conditions as well as any additional special conditions required of each project.

e. For purposes of 12-SPGP-01, "lateral encroachment" is when a road, utility or other project encroaches into waters of the U.S., including wetlands, but does not cross the resource perpendicularly or diagonally.

III. AUTHORIZED ACTIVITIES

A. Residential, Commercial, and Institutional Development Activities:

a. **Eligibility Criteria:**

i. Activities are subject to Corps jurisdiction;

ii. Activity involves the discharge of dredged or fill material associated with residential, commercial, and institutional projects causing the permanent loss of not more than one acre of nontidal wetlands or open waters or the permanent loss of not more than 2,000 linear feet of stream channel, unless otherwise excluded by 12-SPGP-01;

iii. Activity meets the general conditions of 12-SPGP-01 listed on pages 7-14 and any special conditions required of each project-specific authorization;

iv. Compensatory mitigation is provided in accordance with the mitigation standards and general conditions on pages 10 -11; and

v. Discharges associated with residential, commercial, and institutional development activities include those outlined in the VDEQ's General Permits (see 9 VAC 25-660 *et seq.*, 9 VAC 25-670 *et seq.*, 9 VAC 25-680 *et seq.*, and 9 VAC 25-690 *et seq.)* and are associated with the construction or expansion of residential, commercial, or institutional building foundations, building pads, and attendant features that are necessary for the use and maintenance of the structures. Attendant features may include, but are not limited to, roads, parking lots, garages, yards, utility lines, stormwater management facilities, and recreational facilities such as playgrounds, playing fields, and golf courses (provided the golf course is an integral part of the residential development). Residential developments include multiple and single unit developments. Commercial developments include retail stores, industrial facilities, restaurants, business parks, and shopping centers. Institutional developments include schools, fire stations, government office buildings, judicial buildings, public works buildings, libraries, hospitals, and places of worship. For residential, commercial, and institutional developments, the aggregate permanent loss of waters of the U.S. cannot exceed one acre of nontidal wetlands or open water; or 2,000 linear feet of stream.

vi. Residential, commercial, or institutional developments are consistent with the Corps' subdivision guidance dated March 15, 1993 and June 2, 1999, the Corps' and VDEQs' joint subdivision guidance dated June, 2007 and/or any subsequent guidance that supersedes or supplements those documents.

b. **Federal Screening Procedures:**

i. All residential, commercial, and institutional development activities that will cause or result in impacts to tidal waters, including wetlands, and/or permanent impacts that exceed ½ acre of non-tidal wetlands or open waters and/or exceed 300 linear feet of stream channel will be coordinated with the Corps, the U.S. Environmental Protection Agency (EPA), and the U.S. Fish and Wildlife Service (FWS) for federal review.

ii. If EPA or FWS determines that there are project-specific concerns regarding avoidance and/or minimization of impacts to the aquatic environment or concerns regarding the amount and/or type of compensatory mitigation being proposed, the applicant will be required to address those concerns. If the concerns are not addressed to the satisfaction of the objecting agency(ies), the Corps District Commander may exert his/her discretionary authority to require the project to be processed under the Corps' individual permit process.

iii. Any Corps' concerns shall be relayed to the VDEQ and addressed during the VDEQ permitting process. If concerns are not satisfied through that process, the Corps District Commander may exert his/her discretionary authority to require the project to be processed under an alternate Corps permitting process, possibly as an individual permit.

B. **Linear Transportation Activities:**

a. **<u>Eligibility Criteria</u>:**

i. Activities are subject to Corps jurisdiction;

ii. Activities involve the discharge of dredged or fill material associated with the construction, expansion, modification, or improvement of linear transportation projects not causing the permanent loss of more than 1/3 acre of waters of the U.S., including wetlands, at any single impact site with independent utility, unless otherwise excluded by 12-SPGP-01;

iii. Activity meets all general conditions of 12-SPGP-01 listed on pages 7-14 and any special conditions required of each project-specific authorization;

iv. Compensatory mitigation is provided for all unavoidable impacts to wetlands;

v. Compensatory mitigation is provided for all unavoidable stream impacts where total permanent impacts exceed 300 linear feet of stream channel (or mitigation for any lower level of impact if it is determined that it is necessary to ensure that a project's impacts are minimal in nature) in accordance with the mitigation standards general condition on pages 10-11. Stream relocation using natural stream design may be considered self-mitigating, as determined on a case-by-case basis;

vi. Lateral encroachments may be authorized by the 12-SPGP-01 if the project meets the following criteria:

1. Impacts due to all project lateral encroachments, including stream relocations, do not exceed 1/3 acre of waters of the United States or 2,000 linear feet of stream channel;

2. Total project lateral encroachments do not cause the permanent loss of more than 300 linear feet of stream channel due to the installation of piping, riprap, concrete, etc;

3. All project lateral encroachments exceeding 300 linear feet of stream channel are performed using natural stream design (unless waived in writing); and

4. Impacts due to lateral encroachment(s), new alignment projects and/or projects that impact the same aquatic resources multiple times will be considered cumulative for the entire project regardless of whether segments of that project may have independent utility;

vii. Discharges associated with linear transportation projects include the construction, expansion, modification, or improvement of highways, roads, railways, trails, and airport runways and taxiways. Construction and/or relocation of utility lines within the right-of-way/easements of the project and performed in direct relation with the project are covered under this activity, with impacts counting toward permit thresholds.

b. **Federal Screening Procedures:**

i. All linear transportation activities involving permanent impacts that exceed 300 linear feet of stream channel at any single impact area OR containing multiple single and complete impact areas on the same project that additively exceed 1/3 acre of impact to waters of the United States, including wetlands and/or exceed 300 linear feet of stream channel (lateral or crossing impact) will be reviewed by the Corps, the EPA, and the FWS.

ii. If EPA or FWS determines that there are project specific concerns regarding avoidance and/or minimization of impacts to the aquatic environment or the amount and/or type of compensatory mitigation being proposed, the applicant will be required to address those concerns. If the concerns are not addressed to the satisfaction of the objecting agency(ies), the Corps District Commander may exert his/her discretionary authority to require the project to be processed under the Corps' individual permit process.

iii. Any Corps' concerns shall be relayed to the VDEQ and addressed during the VDEQ permitting process. If concerns are not satisfied through that process, the Corps District Commander may exert his/her discretionary authority to require the project to be processed under an alternate Corps permitting process.

c. **VDOT Reporting-Only Procedures:** VDOT may report by spreadsheet on a monthly basis to the VDEQ those VDOT projects meeting the following eligibility criteria:

i. Permanent impacts do not exceed 1/10 acre of waters of the United States, including wetlands; the definition of independent utility must be applied when determining permanent impact totals;

ii. Section 7 – Endangered Species Act Review has been completed, includes FWS concurrence with findings, if needed;

iii. Section 106 finding of "No Effect" has been reviewed and approved by the VDEQ-Cultural Resource Specialist; and

iv. For projects with cumulative impacts exceeding 300 linear feet of stream channel, a pre-coordination email will be sent to the Corps with a project description, impacts, topographic quadrangle and photos. The VDEQ and VDOT Central Office will be copied on the email. If the Corps **concurs** that project can be included on the spreadsheet, VDOT will include the Corps concurrence email with the spreadsheet submittal. No additional Norfolk District review will be required. If the Corps **does not concur** that project can be included on the spreadsheet, VDOT will submit a JPA through its interagency coordination meeting and will include the Corps' response email in the application.

C. **Exclusions from Coverage:** The following activities and resources areas are excluded from coverage by 12-SPGP-01 and require different types of Corps permits:

a. Conversion of waters and/or wetlands for agricultural production and agriculture-related activities (crop fields or pasture); farm buildings; grain storage facilities; grassed waterways; low water crossings; impoundments for irrigation, livestock watering, and fire prevention purposes; animal feeding operations; waste storage facilities; and farm access roads;

b. Wetland areas composed of 10% or more of the following species (singly or in combination) in any stratum: Atlantic white cedar (*Chamaecyparis thyoides*), bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquatica*), or overcup oak (*Quercus lyrata*) (Percentages may be based on stem counts, basal area, or percent aerial cover);

c. Wetland areas underlain by histosols (Histosols are organic soils that are often called mucks, peats, or mucky peats. The list of histosols includes, but is not limited to, the following soil series: Back Bay, Belhaven, Dorovan, Lanexa, Mattamuskeet, Mattan, Palms, Pamlico, Pungo, Pocaty, and Rappahannock;

d. Placement of septic tanks (does not include alternate onsite sewer systems);

e. Residential gardening, lawn maintenance and landscaping;

f. Construction of extended-detention basins and enhanced extended-detention basins designed, constructed, and maintained to function in accordance with the current Virginia Department of Conservation and Recreation (DCR) standards for such facilities or local standards that, at a minimum meet the DCR standards, unless the following requirements are met:

i. The area within the entire basin and back-flooding limits are considered as permanent impacts. For the purposes of the 12-SPGP-01, back-flooding limits are defined as

back-flooding that will not be released within 24 hours if the activity is east of I-95, or back-flooding that will not be released within 48 hours if the activity is west of I-95.

ii. The proposed basins are attendant features associated with a "single and complete" residential, commercial, institutional or linear transportation project;

g. Construction or maintenance of farm or stock ponds that do not fall under the authority of the Virginia Soil and Water Conservation Board pursuant to Article 2 (§10.1-604 *et seq.*) of Chapter 6 pursuant to normal agricultural or silvicultural activities; and

h. Discharges of dredged or fill material associated with residential, commercial, and institutional activities causing the permanent loss of more than one acre of nontidal wetlands or open waters or waters or over 2,000 linear feet of stream channel.

IV. GENERAL CONDITIONS: The following conditions apply to all activities authorized under 12-SPGP-01. Work that does not meet one or more of the terms and general conditions of 12-SPGP-01, including work that has been determined to be more than minimal in nature (at any impact level), will require consideration under a different type of Corps permit.

1. **Other permits.** Authorization does not obviate the need to obtain other Federal, state, or local authorizations required by law or to comply with all Federal, state, or local laws.

2. **Minimal effects.** Projects authorized shall have no more than minimal individual or cumulative adverse environmental impacts, as determined by the Corps.

3. **Discretionary authority.** The Corps District Commander retains discretionary authority to require processing of an individual permit based on concerns for the aquatic environment or for any other factor of the public interest (33 C.F.R. § 320.4(a)). This authority is exercised on a case-by-case basis.

4. **Single and complete projects.** 12-SPGP-01 shall only be applied to single and complete projects. For purposes of 12-SPGP-01, a single and complete project means the total project proposed or accomplished by one owner/developer or partnership and which has independent utility. For linear transportation projects with multiple crossings or encroachments a determination of "single and complete" will typically apply to each crossing of waters that occurs (i.e., single waterbody and/or wetlands) at separate and distinct locations and with independent utility. However, in cases where there are many crossings in close proximity, numerous crossings of the same waterbody, multiple crossings, or multiple encroachments that otherwise may have more than minimal individual or cumulative impacts; the Corps has the discretion to consider all the crossings cumulatively as one single and complete project.

5. **Independent utility.** A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as a separate, single and complete project with independent utility. For a linear transportation project,

separate impact areas on a new location roadway are not considered to have independent utility thus impacts would be considered cumulatively and eligible for a single 12-SPGP-01 authorization. However, separate impact areas on a roadway that is being widened or where pipes are being replaced at multiple crossings are considered to have independent utility, and each crossing would be considered eligible for a separate 12-SPGP-01 authorization (impacts are not considered cumulatively for permitting, but are considered cumulatively when assessing the need for federal review).

6. **Multiple general permit authorizations.** The 12-SPGP-01 may be combined with other Corps general permits (including Nationwide, Regional or Letters of Permission) as long as the impacts are considered cumulatively and do not exceed the acreage limit or linear foot limits of the 12-SPGP-01. Two separate activities (e.g., Activity A and B), within 12-SPGP-01, may be combined as long as they do not exceed the acreage or linear footage threshold of the activity with the highest specified acreage or linear footage threshold.

7. Permit on-site. The permittee shall ensure that a copy of 12-SPGP-01 and the accompanying authorization letter are at the work site at all times. These copies must be made available to any regulatory representative upon request. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be expected to comply with all conditions of any 12-SPGP-01 authorization.

General Conditions Related to other federal laws or programs:

8. Historic Properties. Any activity authorized shall comply with Section 106 of the National Historic Preservation Act. If the permittee, during construction or work authorized herein, encounters a previously unidentified archaeological or other cultural resource, he/she must immediately stop work and notify the Corps and the VDEQ of what has been found. Coordination with the Virginia Department of Historic Resources will commence and the permittee will subsequently be advised when he/she may recommence work.

9. Tribal Rights. No activity authorized may impair reserved tribal rights, including, but not limited to, reserved water rights, treaty fishing and hunting rights.

10. Federal Lands. Authorized activities shall not impinge upon the value of any National Wildlife Refuge, National Forest, National Park, or any other area administered by the FWS, U.S. Forest Service, or National Park Service unless approval from the applicable land management agency is provided with the permit application.

11. Endangered Species. No activity is authorized under this 12-SPGP-01which may affect a proposed/listed threatened or endangered species or proposed/listed critical habitat (as identified under the Federal Endangered Species Act (ESA)), is likely to jeopardize the continued existence of such species or which will destroy or adversely modify the critical habitat of such species unless Section 7 consultation addressing the effects of the proposed activity has been completed.

a. Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the VDEQ and Corps with the appropriate documentation to demonstrate compliance with those requirements.

b. Non-federal permittees shall notify the VDEQ and Corps if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the VDEQ or Corps that the requirements of the ESA have been satisfied and that the activity is authorized. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the USFWS at: http://www.fws.gov/northeast/virginiafield/endspecies/Project_Reviews.html and/or NOAA Fisheries Habitat Conservation Division, P.O. Box 1346, 7580 Spencer Road, Gloucester Point, VA 23062.

c. Section 7 coordination will be performed in accordance with the NAO ESA Review Process. The applicant may not begin work until the VDEQ or Corps has notified them that the Section 7 consultation has been completed.

d. As a result of formal or informal consultation with the FWS or NOAA Fisheries the Corps District Commander may add species-specific regional endangered species conditions to the 12-SPGP-01.

e. Authorization of an activity by 12-SPGP-01 does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the FWS or the NOAA Fisheries, both lethal and non-lethal "takes" of protected species are in violation of the ESA.

12. Bald and Golden Eagle Protection Act. The bald eagle (*Haliaeetus leucocephalus*) is no longer a federally listed threatened or endangered species; therefore, the Endangered Species Act provisions are not applicable to this species. The Bald and Golden Eagle Protection Act (BGEPA) does not require that a federal agency involved in permitting the proposed action conduct coordination. The coordination under the BGEPA is the responsibility of the applicant. The applicant should either obtain a FWS bald eagle take permit or a letter of concurrence from FWS indicating that a permit is not necessary prior to initiating construction activities. You should contact FWS concerning this matter at U.S. Fish and Wildlife Service, Virginia Field Office, ATTN: Kim Smith, 6669 Short Lane, Gloucester, VA 23061. Information on active bald eagle nests in the project area can be obtained via The Center for Conservation Biology (CCB) Virginia Eagles Nest Locator: http://www.ccb-wm.org/virginiaeagles/index.htm.

13. Wild and Scenic Rivers. Currently, there are no designated Wild and Scenic Rivers in the Commonwealth of Virginia; however, the portion of the Upper New River from Glen Lyn, Virginia to the West Virginia/Virginia state line was designated a "study river" by Congress on October 26, 1992. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status, unless the appropriate Federal agency

with direct management responsibility for such river has determined, in writing, that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Impacts that occur in these resource areas will require coordination with the appropriate Federal agency.

14. Department of Defense (DOD) Siting Clearinghouse Coordination. For all commercial and institutional development projects that include the construction of wind energy generating structures, solar towers, or overhead powerlines the VDEQ must coordinate the project with the DOD Clearinghouse. The VDEQ will send a copy of the joint permit application and SPGP authorization to the following address: Department of Defense Clearinghouse, Attn: Mr. Marshal Williams and Mr. Davis Blalock, 101 Marietta St., NW, Suite 3120, Atlanta, George 30303 or via email to: Frederick.m.williams28.civ@mail.mil and David.c.blalock2.civ@mail.mil.

15. Federal navigation projects. Authorized activities may not interfere with any existing or proposed Federal navigation projects.

16. Navigation. (a) No authorized activity may cause more than a minimal adverse effect on navigation. (b) The permittee understands and agrees that if future operations by the United States require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his/her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

17. Floodplains. All practicable efforts shall be made to conduct the work authorized by 12-SPGP-01 in a manner so as to avoid any adverse impact on the Federal Emergency Management Agency (FEMA) designated 100-year floodplain.

18. Real estate. Activities authorized under 12-SPGP-01 do not grant any Corps or Federal real estate rights. If real estate rights are needed from the Corps, you must contact the Corps Real Estate Office at (757) 201-7735 or at the address listed on the front page of this permit.

19. Environmental justice. Activities authorized under 12-SPGP-01 must comply with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations".

20. Federal liability. In issuing 12-SPGP-01, the Federal government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest; (c) damages to persons, property, or to other permitted or

unpermitted activities or structures caused by the activity authorized by 12-SPGP-01; (d) design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

General Conditions Related to Minimizing Environmental Impacts:

21. Avoidance and minimization. Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.(40 CFR 230.10(a) Section 404 (b)(1) Guidelines).

22. Mitigation standards.

a. Wetland mitigation will generally be required for all residential, commercial, and institutional development projects where the total permanent impacts exceed 1/10 acre **AND** for all impacts on linear transportation projects. Generally, the minimum required wetland mitigation ratios will be as follows: 2:1 for forested wetlands, 1.5:1 for scrub-shrub wetlands, 1:1 for herbaceous emergent wetlands, and 1:1 for conversion of forested wetlands to herbaceous emergent wetlands. Mitigation for open waters impacts will be determined by the project manager on a case-by-case basis. All wetland mitigation will comply with the Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources dated April 10, 2008 (33 CFR 325 and 332/40 CFR 230).

b. Stream mitigation will generally be required for all residential, commercial, institutional developments AND linear transportation projects where the total permanent stream channel impacts exceed 300 linear feet. Minimum stream mitigation requirements will be determined using the current Corps and the VDEQ endorsed assessment methodology. All stream mitigation will comply with Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources dated April 10, 2008 (33 CFR 325 and 332; 40 CFR 230).

c. For the purposes of the 12-SPGP-01, definitions for enhancement, establishment (creation), preservation, and re-establishment will be consistent with the definitions listed in the Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources dated April 10, 2008 (33 CFR 325 and 332; 40 CFR 230).

d. Where local zoning ordinances provide for riparian and floodplain protection pursuant to the Chesapeake Bay Preservation Act (Virginia Code 10.1-2100 *et seq.*) and the Chesapeake Bay Preservation Area Designation and Management Regulations(9 VAC 1-20 *et seq.*), the use of buffers as a form of compensatory mitigation shall be allowed only (a) where the extent of the buffer exceeds the lateral extent already required by local ordinances pursuant to the Act and the regulations or (b) where the quality of the existing protected buffer *area* is enhanced to provide greater water quality protection benefits.

23. Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

24. Temporary fills. All temporarily disturbed waters and wetlands must be restored to their pre-construction contours within 6 months of commencing the temporary impact's construction. Impacts that will not be restored within 6 months (calculated from the start of the temporary impacts construction) will be considered permanent unless otherwise approved by the 12-SPGP-01. Once restored to their natural contours, soil in these areas must be mechanically loosened to a depth of 12 inches and wetland areas must be seeded or sprigged with appropriate native vegetation.

25. Sedimentation and erosion control. Appropriate erosion and sediment controls must be employed and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark, must be permanently stabilized at the earliest practicable date.

26. Aquatic life movements. Following consultation with the Virginia Department of Game and Inland Fisheries (DGIF), the Norfolk District has determined that fish and other aquatic organisms are most likely present in any stream being crossed, in the absence of site-specific evidence to the contrary. Although prospective permittees have the option of providing such evidence, extensive efforts to collect such information is not encouraged, since countersinking will in most cases be required with some exceptions as outlined below:

a. Pipes should be adequately sized to allow for the passage of ordinary high water with the countersinking and invert restrictions taken into account.

b. All pipes and culverts placed in streams will be countersunk at both the inlet and outlet ends, unless indicated otherwise by the Norfolk District on a case-by-case basis (see below). Pipes that are 24" or less in diameter shall be countersunk 3" below the natural stream bottom. Pipes that are greater than 24" in diameter shall be countersunk 6" below the natural stream bottom. The countersinking requirement does not apply to bottomless pipes/culverts or pipe arches. All single pipes or culverts (with bottoms) shall be depressed (countersunk) below the natural streambed at both the inlet and outlet of the structure. In sets of multiple pipes or culverts (with bottoms) at least one pipe or culvert shall be depressed (countersunk) at both the inlet and outlet to convey low flows.

c. Extensions and certain maintenance: The requirement to countersink does not apply to extensions of existing pipes or culverts that are not countersunk, or to maintenance to pipes/culverts that does not involve replacing the pipe/culvert (such as repairing cracks, adding material to prevent/correct scour, etc.).

d. Floodplain pipes: The requirement to countersink does not apply to pipes or culverts that are being placed above ordinary high water, such as those placed to allow for floodplain flows. The placement of pipes above ordinary high water is not jurisdictional (provided no fill is discharged into wetlands).

e. Pipes on bedrock or above existing utility lines: Different procedures will be followed for pipes or culverts to be placed on bedrock or above existing buried utility lines where it is not

practicable to relocate the lines, depending on whether the work is for replacement of an existing pipe/culvert or a new pipe/culvert:

i. Replacement of an existing pipe/culvert: Countersinking is not required provided the elevations of the inlet and outlet ends of the replacement pipe/culvert are no higher above the stream bottom than those of the existing pipe/culvert. Documentation (photographic or other evidence) must be maintained in the permittee's records showing the bedrock condition and the existing inlet and outlet elevations. That documentation will be available to the Norfolk District upon request, but notification or coordination with the Norfolk District is not otherwise required.

ii. Replacement in a new location: If the prospective permittee determines that bedrock or an existing buried utility line that is not practicable to relocate prevents countersinking, he/she should evaluate the use of a bottomless pipe/culvert, bottomless utility vault, span (bridge) or other bottomless structure to cross the waterway, and also evaluate alternative locations for the new pipe/culvert that will allow for countersinking. If the prospective permittee determines that neither a bottomless structure nor an alternative location is practicable, then he/she must submit a pre-construction notification (PCN) to the Norfolk District in accordance with General Condition 31 of the NWPs. In addition to the information required by General Condition 31, the prospective permittee must provide documentation of measures evaluated to minimize disruption of the movement of aquatic life as well as documentation of the cost, engineering factors, and site conditions that prohibit countersinking the pipe/culvert. Options that must be considered include partial countersinking (such as less than 3" of countersinking, or countersinking of one end of the pipe), and constructing stone step pools, low rock weirs downstream, or other measures to provide for the movement of aquatic organisms. The PCN must also include photographs documenting site conditions. The prospective permittee may find it helpful to contact his/her regional fishery biologist for the Virginia Department of Game and Inland Fisheries (VDGIF), for recommendations about the measures to be taken to allow for fish movements. When seeking advice from VDGIF, the prospective permittee should provide the VDGIF biologist with all available information such as location, flow rates, stream bottom features, description of proposed pipe(s), slopes, etc. Any recommendations from VDGIF should be included in the PCN. The Norfolk District will notify the prospective permittee whether the proposed work qualifies for the nationwide permit within 45 days of receipt of a complete PCN. NOTE: Blasting of stream bottoms through the use of explosives is not acceptable as a means of providing for countersinking of pipes on bedrock.

f. Pipes on steep terrain: Pipes being placed on steep terrain (slope of 5% or greater) must be countersunk in accordance with the conditions above and will in most cases be non-reporting. It is recommended that on slopes greater than 5%, a larger pipe than required be installed to allow for the passage of ordinary high water in order to increase the likelihood that natural velocities can be maintained. There may be situations where countersinking both the inlet and outlet may result in a slope in the pipe that results in flow velocities that cause excessive scour at the outlet and/or prohibit some fish movement. This type of situation could occur on the side of a mountain where falls and drop pools occur along a stream. Should this be the case, or should the prospective permittee not want to countersink the pipe/culvert for other reasons, he/she must submit a Pre-Construction Notification to the Norfolk District in accordance with General Condition 31 of the Nationwide Permits. In addition to the information required by General

Condition 31, the prospective permittee must provide documentation of measures evaluated to minimize disruption of the movement of aquatic life as well as documentation of the cost, engineering factors, and site conditions that prohibit countersinking the pipe/culvert. The prospective permittee should design the pipe to be placed at a slope as steep as stream characteristics allow, countersink the inlet 3-6", and implement measures to minimize any disruption of fish movement. These measures can include constructing a stone step/pool structure, preferably using river rock/native stone rather than riprap, constructing low rock weirs to create a pool or pools, or other structures to allow for fish movements in both directions. Stone structures should be designed with sufficient-sized stone to prevent erosion or washout and should include keying-in as appropriate. These structures should be designed both to allow for fish passage and to minimize scour at the outlet. The quantities of fill discharged below ordinary high water necessary to comply with these requirements (i.e., the cubic yards of stone, riprap or other fill placed below the plane of ordinary high water) must be included in project totals. The prospective permittee may find it helpful to contact his/her regional fishery biologist for the Virginia Department of Game and Inland Fisheries (DGIF), for recommendations about the measures to be taken to allow for fish movements. When seeking advice from DGIF, the prospective permittee should provide the DGIF biologist with all available information such as location, flow rates, stream bottom features, description of proposed pipe(s), slopes, etc. Any recommendations from DGIF should be included in the PCN. The Norfolk District will notify the prospective permittee whether the proposed work qualifies for the nationwide permit within 45 days of receipt of a complete PCN.

g. Problems encountered during construction: When a pipe/culvert is being replaced, and the design calls for countersinking at both ends of the pipe/culvert, and during construction it is found that the streambed/banks are on bedrock, then the permittee must stop work and contact the Norfolk District (contact by telephone and/or email is acceptable). The permittee must provide the Norfolk District with specific information concerning site conditions and limitations on countersinking. The Norfolk District will work with the permittee to determine an acceptable plan, taking into consideration the information provided by the permittee, but the permittee should recognize that the Norfolk District could determine that the work will not qualify for a nationwide permit.

h. Emergency pipe replacements: In the case of an emergency situation, such as when a pipe/culvert washes out during a flood, a permittee is encouraged to countersink the replacement pipe at the time of replacement, in accordance with the conditions above. However, if conditions or timeframes do not allow for countersinking, then the pipe can be replaced as it was before the washout, but the permittee will have to come back and replace the pipe/culvert and countersink it in accordance with the guidance above. In other words, the replacement of the washed out pipe is viewed as a temporary repair, and a countersunk replacement should be made at the earliest possible date. The Norfolk District must be notified of all pipes/culverts that are replaced without countersinking at the time that it occurs, even if it is an otherwise non-reporting activity, and must provide the permittee's planned schedule for installing a countersunk replacement (it is acceptable to submit such notification by email). The permittee should anticipate whether bedrock or steep terrain will limit countersinking, and if so, should follow the procedures outlined in (f) and/or (g) above.

27. Discharge of pollutants. All authorized activities involving any discharge of pollutants into waters of the United States shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. § 1251 *et seq.*) and applicable state and local laws. No discharge of dredged or fill material in association with this authorization may consist of unsuitable material such as trash, debris, car bodies, asphalt, etc.

28. Obstruction of high flows. Discharges of dredged or fill material must not permanently restrict or impede the passage of normal or expected high flows.

29. Waterbird breeding areas. Discharges of dredged or fill material into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

30. Native trout and anadromous fishes. Authorizations for discharges of dredged or fill material into native trout waters or anadromous fish spawning areas are conditioned to limit in-stream work within the timeframes recommended by the DGIF.

31. Water supply intakes. No discharge of dredged or fill material may occur in proximity of a public water supply intake.

32. Invasive Species. Plant species on the most current *Virginia Department of Conservation and Recreation's Invasive Alien Plant List* shall not be used for replanting activities authorized by the SPGP. The list of invasive plants in Virginia may be found at: http://www.dcr.virginia.gov/natural_heritage/documents/invlist.pdf.

General Procedural Conditions:

33. Inspections. The permittee understands and agrees that the Corps and/or the VDEQ are permitted and allowed to make periodic inspections at any time the Corps or VDEQ deems necessary in order to assure that the activities being performed under authority of this permit are in accordance with the terms and conditions prescribed herein. The Corps reserves the right to require post-construction engineering drawings and/or surveys of any work authorized under12-SPGP-01, as deemed necessary on a case-by-case basis.

34. Maintenance. The permittee shall maintain the work authorized herein in good condition and in conformance with all terms and conditions of this permit. All fills shall be properly maintained to ensure public safety.

35. Property rights.12-SPGP-01 does not convey any property rights, either in real estate or material, or convey any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of Federal, state, or local laws or regulations.

36. Modification, suspension, and revocation.12-SPGP-01 and individual verificationsunder12-SPGP-01 maybe either modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 C.F.R. § 325.7. Any such action shall notbe the basis for any claim for damages against the United States.

37. Restoration directive. The permittee, upon receipt of a restoration directive, shall restore the waters of the United States to their former conditions without expense to the United States and as directed by the Secretary of the Army or his/her authorized representative. If the permittee fails to comply with such a directive, the Secretary or his/her designee, may restore the waters of the United States to their former conditions, by contract or otherwise, and recover the cost from the permittee.

38. Special conditions. The Corps may impose other special conditions on a project authorized pursuant to 12-SPGP-01 that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. Failure to comply with all conditions of the authorization, including special conditions, constitutes a permit violation and may subject the permittee, or his/her contractor, to criminal, civil, or administrative penalties and/or restoration.

39. False or incomplete information. In granting authorization pursuant to this permit, the Corps has relied upon information and data provided by the permittee. If, subsequent to notification by the Corps or the VDEQ that a project qualifies for this permit, such information and data prove to be materially false or materially incomplete, the Corps may suspend or revoke authorization, in whole or in part, and/or the United States or Corps may institute appropriate legal proceedings.

40. Abandonment. If the permittee decides to abandon the activity authorized under12-SPGP-01, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of the Corps.

41. Transfer of authorization. In order to transfer authorization under12-SPGP-01, the transferee and permittee must supply the Corps and the VDEQ with a written and signed, by all appropriate parties, request to make such a transfer. Such transfer is not effective until written approval has been granted by the Corps or the VDEQ.

42. Binding effect. The provisions of the permit authorization shall be binding on any assignee or successor in interest of the original permittee.

General Conditions Regarding Duration of Authorizations:

43. Duration of authorization. Activities authorized under12-SPGP-01 must be completed by May 31, 2017.

44. Time extensions. If a permittee is unable to complete the work authorized under12-SPGP-01 in the time limit provided in the initial authorization, he/she must submit a request for a time extension to the Corps and the VDEQ for consideration at least one month prior to the expiration of the permit authorization.

45. Expiration of12-SPGP-01. Unless further modified, suspended, or revoked, 12-SPGP-01 will be in effect until May 31, 2017.Upon expiration, it may be considered for revalidation. Activities which have commenced (i.e., are under construction) or are under contract to commence construction in reliance upon 12-SPGP-01 will remain authorized provided the activity is completed within twelve months of the date of this12-SPGP-01's expiration of May 31, 2017, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.7(a-e).

5/31/12
Date

PAUL B. OLSEN, P.E.
Colonel, Corps of Engineers
Commanding

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

CENAO-WRR STATE PROGRAMMATIC GENERAL PERMIT 17-SPGP-01

Effective Date: June 29, 2017 Expiration Date: May 31, 2022

I. **AUTHORITIES**:

A. 17-SPGP-01 authorizes the discharge of dredged or fill material in non-tidal waters, of the United States, including wetlands, associated with certain residential, commercial, and institutional developments and linear transportation projects within the geographical limits of the Commonwealth of Virginia and under the regulatory jurisdiction of the U.S. Army Corps of Engineers, Norfolk District (Corps or Norfolk District). These projects must have no more than minimal individual and cumulative impacts and must meet all the terms and conditions outlined herein. The use of 17-SPGP-01 is restricted to those projects that have avoided and minimized impacts to waters of the U.S., including wetlands, to the maximum extent practicable.

B. The people of the Commonwealth of Virginia (Virginia or "the Commonwealth") are hereby authorized by the Secretary of the Army and the Chief of Engineers, under Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344), to perform the aforementioned work in non-tidal waters and wetlands of the Commonwealth as described herein. The Corps' authority and guidance to develop general permits is contained in 33 U.S.C. § 1344(e), 33 C.F.R. § 325.2(e)(2), 33 C.F.R. § 325.3(b), and Corps Regulatory Guidance Letter (RGL) 83-7.

II. **PROCEDURES**:

A. Delineation Confirmations: Prior to the submission of an application for any Residential, Commercial, or Institutional Development Activity or Linear Transportation Activity covered by 17-SPGP-01, a proponent must first obtain a Corps confirmed delineation that is approved for use with a permit application (Preliminary JD) or a confirmed jurisdictional determination that includes the limits of all waters of the U.S., including wetlands that are located within the project boundaries (Approved JD). The applicant will contact the Corps to obtain a delineation confirmation/jurisdictional determination. When appropriate, a separate delineation confirmation may also be required from the Environmental Protection Agency (EPA).

B. Application: The application must be submitted to the Virginia Marine Resource Commission (VMRC) and clearly marked 17-SPGP-01. The following information must be submitted as part of the complete application package:
   1) A completed and signed Standard Joint Permit Application (JPA). The applicant must utilize the most recent version.

http://www.nao.usace.army.mil/Missions/Regulatory/

2) A completed SPGP Complete Application Checklist. The applicant must utilize the most recent version.
3) A Corps confirmed delineation that is approved for use with a permit application OR a confirmed jurisdictional determination that includes the limits of all waters of the U.S., including wetlands that are located within the project boundaries.

This information listed above will be required to render an application complete for 17-SPGP-01 purposes. The application package must be submitted to the Virginia Marine Resource Commission (VMRC) and clearly marked 17-SPGP-01. The VMRC will forward a copy of the application to the applicable VDEQ office. Once the VDEQ has deemed the application complete the VDEQ will forward the complete application to the appropriate federal agency when coordination is required.

For purposes of 17-SPGP-01, the VDEQ is the agency responsible for ensuring permit applications meet the informational and technical requirements of 17-SPGP-01 and for issuance of 17-SPGP-01 verification letters for qualifying Residential, Commercial, and Institutional and Linear Transportation projects.

C. State Approvals: In order for 17-SPGP-01 to be valid, permittees must obtain the following state approvals prior to commencement of work in waters of the U.S.:

1) Virginia Department of Environmental Quality (VDEQ) Virginia Water Protection (VWP) permit
2) VMRC permit, when required
3) VDEQ informal resolution, letter of agreement, executive compliance agreement or consent order when the 17-SPGP-01 is utilized for resolution of non-compliance and/or enforcement (at Corps discretion).

The 17-SPGP-01 may also be used for activities excluded from State VWP permitting when those activities are associated with a larger residential, commercial, institutional development and/or linear transportation project that requires state approval..

III. **DEFINITIONS**:

A. Loss of waters of the United States: Waters of the United States (WOUS), including wetlands that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage/linear footage of the loss of WOUS is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for 17-SPGP-01; it is not a net threshold that is

calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services.

1) The loss of stream bed includes the linear feet of stream bed that is filled or excavated. WOUS temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of WOUS. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of WOUS.
2) Per Norfolk District Pipe Repair Guidelines: pipe repair and replacement is considered a permanent impact
3) The length of any box culvert, pipe, or bridge that is being removed and replaced, whether in the same location or not, is considered a permanent impact. However, if a pipe/culvert/bridge is left in place and is extended or rip-rapped, then only the length and area of the extension or rip-rap is considered a permanent impact. [Based on Norfolk District letter guidance May 5, 2009 to VDOT]

B. Natural stream design: a stream channel design that mimics the dimension, pattern, and profile of a representative reference stream reach.

C. Permittee: the responsible party in receipt of the 17-SPGP-01 verification from the VDEQ. The permittee will be the responsible party for complying with all 17-SPGP-01 general conditions as well as any additional special conditions required of each project.

D. Residential developments: construction or expansion of a multiple unit residential development or a residential subdivision including the construction of building foundations, building pads and attendant features that are necessary for the use of the residence or residential development. Attendant features may include but are not limited to roads, parking lots, garages, yards, utility lines, storm water management facilities, septic fields, and recreation facilities such as playgrounds, playing fields, and golf courses (provided the golf course is an integral part of the residential development).

E. Commercial and Institutional Developments: construction or expansion of commercial and institutional building foundations, building pads, and attendant features that are necessary for the use and maintenance of the structures. Attendant features may include, but are not limited to, roads, parking lots, garages, yards, utility lines, storm water management facilities, and recreation facilities such as playgrounds and playing fields. Examples of commercial developments include retail stores, industrial facilities, restaurants, business parks, and shopping centers. Examples of institutional developments include schools, fire stations, government office buildings, judicial buildings, public works buildings, libraries, hospitals, and places of worship.

F. Linear transportation: the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxi ways).

IV. AUTHORIZED ACTIVITIES

A. Residential, Commercial, and Institutional Development Activities Eligibility Criteria:

1) Activities are subject to Corps regulations;

2) Activities involve the discharge of dredged/fill material associated with residential, commercial, and institutional projects and propose:
   a. the TOTAL permanent loss of not more than 1 acre of non-tidal waters of the US, to include stream channel, wetlands and open waters.
      AND
   b. the permanent loss of not more than 2,000 linear feet of stream channel;

3) Activities meet the general and special conditions of 17-SPGP-01 listed in this document and any special conditions required of each project-specific verification;

4) Compensatory mitigation is provided in accordance with the mitigation standards and general conditions listed in this document.

5) Activities have received and completed all applicable federal review as listed in the general conditions of this document.

****The following activities are NOT authorized under the 17-SPGP-01:**

- The Construction of one stand-alone single family home and/or its attendant features.
- Golf courses that are not an integral part of a residential development.
- The construction of new ski areas.

B. Linear Transportation Activities Eligibility Criteria:

1) Activities are subject to Corps regulations;

2) Activities involve the discharge of dredged/ fill material associated with the construction, expansion, modification, or improvement of linear transportation projects that are single and complete with independent utility and propose:

a. the TOTAL permanent loss of not more than ½ acre of non-tidal waters of the US, to include stream channel, wetlands and open waters
AND
b. the permanent loss of not more than 1,000 linear feet of stream channel at any single impact site with independent utility.

3) Activities meet all general conditions of 17-SPGP-01 listed in this document and any special conditions required of each project-specific verification;

4) Compensatory mitigation is provided in accordance with the mitigation standards and general conditions listed in this document.

5) Activities have received and completed all applicable federal review as listed in the general conditions of this document.

6) Construction and/or relocation of utility lines by the applicant and within the right-of- way/easements of the project and performed in direct relation with the project are included in the project impact totals.

V. GENERAL CONDITIONS:

The following conditions apply to all activities authorized under 17-SPGP-01. Work that does not meet one or more of the terms or general conditions of 17-SPGP-01, including work that has been determined to be more than minimal in nature (at any impact level), will require consideration under a different type of Corps permit.

1) Other permits: Authorization does not obviate the need to obtain other Federal, state, or local authorizations required by law or to comply with all Federal, state, or local laws.

2) Minimal effects: Projects authorized shall have no more than minimal individual or cumulative adverse environmental impacts.

3) Discretionary authority: The Corps District Commander retains discretionary authority to require processing of an individual permit based on concerns for the aquatic environment or for any other factor of the public interest (33 C.F.R. § 320.4(a)). This authority is exercised on a case-by-case basis.

4) Single and complete projects: The activity must be a single and complete project.
   a. For non-linear projects: the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other

association of owners/developers. A single and complete non-linear project must have independent utility (see "independent utility" as defined in these general conditions). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in a17-SPGP-01 authorization.

b. For linear transportation: For projects with multiple crossings or encroachments a determination of "single and complete" will typically apply to each crossing or encroachment of waters that occurs (i.e., single waterbody and/or wetlands) at separate and distinct locations and with independent utility. However, in cases where there are many crossings in close proximity, numerous crossings of the same waterbody, multiple crossings, or multiple encroachments that otherwise may have more than minimal individual or cumulative impacts; the Corps has the discretion to consider all the crossings cumulatively as one single and complete project.

5) Independent utility: A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. A phase of a project that would be constructed even if the other phases were not built can be considered as a separate, single and complete project with independent utility. For a linear transportation project, separate impact areas on a new location roadway are not considered to have independent utility and thus impacts would be considered cumulatively and eligible for a single 17-SPGP-01 verification. However, separate impact areas on a roadway that is being widened or where pipes are being replaced at multiple crossings are considered to have independent utility, and each crossing would be considered eligible for a separate 17-SPGP-01 verification. Although such impacts are not considered cumulatively for permitting purposes, they are considered cumulatively when assessing the need for federal review.

6) Multiple general permit authorizations.: The 17-SPGP-01 may be combined with other Corps general permits (including Nationwide, Regional or Letters of Permission) as long as the impacts are considered cumulatively and do not exceed the acreage limit or linear footage limits of the 17-SPGP-01. Two separate activities (e.g. Residential and Linear, within 17-SPGP-01, may be combined as long as they do not exceed the acreage or linear footage threshold of the activity with the highest specified acreage or linear footage threshold).

7) Permit on-site: The permittee shall ensure that a copy of 17-SPGP-01 and the accompanying authorization letter are at the work site at all times. These copies must be made available to any regulatory representative upon request. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be expected to comply with all conditions of any 17-SPGP-01 verification.

8) Historic Properties: In cases where the Corps determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements. The District Engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the 17-SPGP-01 activity or whether additional section 106 consultation is necessary.

Non-federal permittees shall not begin work on the activity until Section 106 review and/or coordination has been completed AND they have received their 17-SPGP verification letter from the VDEQ.

Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such permit or assistance despite the adverse effect created or allowed by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

Discovery of Previously Unknown Remains and Artifacts: If a permittee discovers any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, the permittee must immediately notify the District Engineer of what has been found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The District Engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Tribal Rights: No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

9) Federal Lands: Authorized activities shall not impinge upon the value of any National Wildlife Refuge, National Forest, National Park, or any other area administered by the United States Fish and Wildlife Service (USFWS), U.S. Forest Service, or National Park Service unless approval from the applicable land management agency is provided with the permit application.

10) Endangered Species: No activity is authorized under any 17-SPGP-01 which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any 17-SPGP-01 which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

    Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements. The District Engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the 17-SPGP-01 activity, or whether additional ESA consultation is necessary.

    Non-federal permittees shall not begin work on the activity until Section 7 review and/or consultation has been completed AND they have received their 17-SPGP verification letter from the VDEQ.

    Authorization of an activity by a 17-SPGP-01 does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the National Marine Fisheries Service (NMFS), The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their World Wide Web

pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

11) Migratory Birds and Bald and Golden Eagles: The permittee is responsible for obtaining any "take" permits required under the USFWS regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such "take" permits are required for a particular activity. As of the issuance date of the 17-SPGP the current contact, concerning this matter, is at the U.S. Fish and Wildlife Service, Thomas Wittig at 413-253-8577 or Thomas_wittig@fws.gov. Information on active bald eagle nests in the project area can be obtained via The Center for Conservation Biology (CCB) Virginia Eagles Nest Locator: http://www.ccb-wm.org/virginiaeagles/index.htm.

12) Wild and Scenic Rivers: Currently, there are no designated Wild and Scenic Rivers in Virginia. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river has determined, in writing, that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service (NPS), U.S. Forest Service (USFS), Bureau of Land Management (BLM), USFWS). Impacts that occur in these resource areas will require coordination with the appropriate Federal agency.

13) Department of Defense (DOD) Siting Clearinghouse Coordination: For all commercial and institutional development projects that include the construction of wind energy generating structures, solar towers, or overhead powerlines the VDEQ must notify the DOD Clearinghouse of the permitted project. The VDEQ will send a copy of the joint permit application and SPGP verification letter to the following address: DoD Clearinghouse, Attn: David Blalock, 101 Marietta St. NW, Suite 3120, Atlanta, Georgia 30303 or david.c.blalock2.civ@mail.mil

14) Navigation: No authorized activity may cause more than a minimal adverse effect on navigation.

The permittee understands and agrees that if future operations by the United States require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his/her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United

States. No claim shall be made against the United States on account of any such removal or alteration.

15) Floodplains: The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

16) 408 Certification: Under 33 USC 408, no activity may temporarily or permanently alter or make use of a U.S. Army Corps of Engineers civil works project unless reviewed and permitted by the Secretary of the Army. The Corps may grant this permission if the work does not impair the usefulness of the project and is not injurious to the public interest.

17) Environmental justice: Activities authorized under 17-SPGP-01 must comply with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations".

18) Federal liability: In issuing 17-SPGP-01, the Federal government does not assume any liability for the following: (a) damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; (b) damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest; (c) damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by 17-SPGP-01; (d) design or construction deficiencies associated with the permitted work; (e) damage claims associated with any future modification, suspension, or revocation of this permit.

19) Avoidance and minimization: Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.(40 CFR 230.l0(a)-(d) Section 404 (b)(l) Guidelines).

20) Compensatory Mitigation: Mitigation will be required for all permanent impacts, on a project site, once the compensatory mitigation threshold has been exceeded for waters OR wetland impacts.

    a. Wetland mitigation: will generally be required for all residential, commercial, and institutional development projects where the total permanent impacts exceed 1/10 acre AND for all wetland impacts on linear transportation projects that are funded in part or in total by local, state or federal funds.

Generally, the minimum required wetland mitigation ratios will be as follows:

- 2:1 for forested wetlands
- 1.5:1 for scrub-shrub wetlands
- 1:1 for herbaceous emergent wetlands
- 0.5:1 for permanent loss of open waters
- 1:1 for conversion of forested wetlands to herbaceous emergent wetlands.

Compensatory mitigation may be required on a case-by-case basis to ensure impacts are minimal for:

- permanent or temporary conversion of one wetland type to another
- wetland impacts totaling less than 1/10 acre
- at mitigation ratios beyond the generally recommend ratios

All wetland mitigation will comply with the Mitigation Rule [Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources, dated April 10, 2008, 33 CFR 325 and 332/40 CFR 230].

b. Stream mitigation: will generally be required for all residential, commercial, institutional developments AND linear transportation projects where the total permanent stream channel impacts exceed 300 linear feet.

Minimum stream mitigation requirements will be determined using the current Corps and VDEQ endorsed assessment methodology.

Stream mitigation that exceeds the assessment methodology recommendation and mitigation for impacts totaling less the 300 linear feet may be required on a case-by-case basis to ensure impacts are minimal.

All stream mitigation will comply with Mitigation Rule [Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources dated April 10, 2008 33 CFR 325 and 332; 40 CFR 230].

Where local zoning ordinances provide for riparian and floodplain protection pursuant to the Chesapeake Bay Preservation Act (Virginia Code 10.1-2100 et seq.) and the Chesapeake Bay Preservation Area Designation and Management Regulations (9 VAC 1-20 et seq.), the use of buffers as a form of compensatory mitigation shall be allowed only:

- where the extent of the buffer exceeds the lateral extent already required by local ordinances pursuant to the Act and the regulations
- where the quality of the existing protected buffer area is enhanced to provide greater water quality protection benefits
- where the proposed compensatory mitigation is undertaken in

compliance with the Mitigation Rule [Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources: Final Rule dated April 10, 2008 33 CFR 332.4(c)(2)-(14) and 33 CFR 332.3(h)]

21) Heavy Equipment: Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

22) Temporary fills: All temporarily disturbed waters and wetlands must be restored to their pre-construction contours within 12 months of commencing the temporary impact's construction. Impacts that will not be restored within 12 months (calculated from the start of the temporary impacts construction) will be considered permanent unless otherwise approved by the Corps, and compensatory mitigation may be required. Once restored to their natural contours, soil in these temporarily disturbed areas must be mechanically loosened to a depth of 12 inches and wetland areas must be seeded or sprigged with appropriate native vegetation.

23) Sedimentation and erosion control: Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

24) Countersinking of Pipes and Culverts: Following consultation with the Virginia Department of Game and Inland Fisheries (VDGIF), the Norfolk District assumes there are fish and other aquatic organisms present in any stream being crossed, in the absence of site-specific evidence to the contrary. Although prospective permittees have the option of providing such evidence, extensive efforts to collect such information is not encouraged, since countersinking will in most cases be required except as outlined in the conditions below:

   a. All pipes and culverts placed in streams will be countersunk at both the inlet and outlet ends, unless indicated otherwise by the VDEQ on a case-by-case basis (see below). Pipes that are 24" or less in diameter shall be countersunk 3" below the natural stream bottom. Pipes that are greater than 24" in diameter shall be countersunk at least 6" below the natural stream bottom. The countersinking requirement does not apply to bottomless pipes/culverts or pipe arches. All single pipes or culverts (with bottoms) shall be depressed (countersunk) below the natural streambed at both the inlet and outlet of the structure. In sets of multiple pipes or culverts (with bottoms) at least one pipe or culvert shall be depressed (countersunk) at both the inlet and outlet to convey low flows.
   b. When countersinking culverts, permittees must ensure reestablishment of a surface water channel (within 15 days post

construction) that allows for the movement of aquatic organisms and maintains the same hydrologic regime that was present pre-construction (i.e. the depth of surface water through the permit area should match the upstream and downstream depths). This may require the addition of finer materials to choke the larger stone and/or placement of riprap to allow for a low flow channel.

c. Exemption for extensions and certain maintenance: The requirement to countersink does not apply to extensions of existing pipes or culverts that are not countersunk, or to maintenance to pipes/culverts that does not involve replacing the pipe/culvert (such as repairing cracks, adding material to prevent/correct scour, etc.).

d. Floodplain pipes: The placement of pipes/culverts above ordinary high water, such as those placed to allow for flood plain flows, is not jurisdictional (provided no fill is discharged into wetlands).

e. Hydraulic opening: Pipes should be adequately sized to allow for the passage of ordinary high water with the countersinking and invert restrictions taken into account.

f. Pipes on bedrock or above existing utility lines: Different procedures will be followed for pipes or culverts to be placed on bedrock or above existing buried utility lines where it is not practicable to relocate the lines, depending on whether the work is for replacement of an existing pipe/culvert or a new pipe/culvert:

    i. Replacement of an existing pipe/culvert: Countersinking is not required provided the elevations of the inlet and outlet ends of the replacement pipe/culvert are no higher above the stream bottom than those of the existing pipe/culvert. Documentation (photographic or other evidence) must be maintained in the permittee's records showing the bedrock condition and the existing inlet and outlet elevations. That documentation will be available to the Norfolk District upon request, but notification or coordination with the Norfolk District is not otherwise required.

    ii. A pipe/culvert is being placed in a new location: If the prospective permittee determines that bedrock or an existing buried utility line that is not practicable to relocate prevents countersinking, they should evaluate the use of a bottomless pipe/culvert, bottomless utility vault, span (bridge) or other bottomless structure to cross the waterway, and also evaluate alternative locations for the new pipe/culvert that will allow for countersinking. If the prospective permittee determines that neither a bottomless structure nor an alternative location is practicable, then they must submit supporting documentation in the JPA. The prospective permittee must provide documentation of measures evaluated to minimize disruption of the movement of aquatic

life as well as documentation of the cost, engineering factors, and site conditions that prohibit countersinking the pipe/culvert. Options that must be considered include partial countersinking (such as less than 3" of countersinking, or countersinking of one end of the pipe), and constructing stone step pools, low rock weirs downstream, or other measures to provide for the movement of aquatic organisms. The permit application must also include photographs documenting site conditions. The prospective permittee may find it helpful to contact his/her regional fishery biologist for the VDGIF, for recommendations about the measures to be taken to allow for fish movements. When seeking advice from VDGIF, the prospective permittee should provide the VDGIF biologist with all available information such as location, flow rates, stream bottom features, description of proposed pipe(s), slopes, etc. Any recommendations from VDGIF should be included in the JPA. The VDEQ will notify the prospective permittee whether the proposed work qualifies for the 17-SPGP-01. NOTE: Blasting of stream bottoms through the use of explosives is not acceptable as a means of providing for countersinking of pipes on bedrock.

g. Pipes on steep terrain: Pipes being placed on steep terrain (slope of 5% or greater) must be countersunk in accordance with the conditions above. It is recommended that on slopes greater than 5%, a larger pipe than required be installed to allow for the passage of ordinary high water in order to increase the likelihood that natural velocities can be maintained. There may be situations where countersinking both the inlet and outlet may result in a slope in the pipe that results in flow velocities that cause excessive scour at the outlet and/or prohibit some fish movement. This type of situation could occur on the side of a mountain where falls and drop pools occur along a stream. Should this be the case, or should the prospective permittee not want to countersink the pipe/culvert for other reasons, they must provide documentation of measures evaluated to minimize disruption of the movement of aquatic life as well as documentation of the cost, engineering factors, and site conditions that prohibit countersinking the pipe/culvert. The prospective permittee should design the pipe to be placed at a slope as steep as stream characteristics allow, countersink the inlet 3-6", and implement measures to minimize any disruption of fish movement. These measures can include constructing a stone step/pool structure, preferably using river rock/native stone rather than riprap, constructing low rock weirs to create a pool or pools, or other structures to allow for fish movements in both directions. Stone structures should be designed with sufficient-sized stone to prevent

erosion or washout and should include keying-in as appropriate. These structures should be designed both to allow for fish passage and to minimize scour at the outlet. The quantities of fill discharged below ordinary high water necessary to comply with these requirements (i.e., the cubic yards of stone, riprap or other fill placed below the plane of ordinary high water) must be included in project totals. The prospective permittee may find it helpful to contact the regional fishery biologist for the VDGIF, for recommendations about the measures to be taken to allow for fish movements. When seeking advice from VDGIF, the applicant should provide the VDGIF biologist with all available information such as location, flow rates, stream bottom features, description of proposed pipe(s), slopes, etc. Any recommendations from DGIF should be included in the permit application. The VDEQ will notify the prospective permittee whether the proposed work qualifies for the 17-SPGP-01.

h. Problems encountered during construction: When a pipe/culvert is being replaced, and the design calls for countersinking at both ends of the pipe/culvert, and during construction it is found that the streambed/banks are on bedrock, a utility line, or other documentable obstacle, then the permittee must stop work and contact the VDEQ (contact by telephone and/or email is acceptable). The permittee must provide the VDEQ with specific information concerning site conditions and limitations on countersinking. The VDEQ will work with the permittee to determine an acceptable plan, taking into consideration the information provided by the permittee, but the permittee should recognize that the VDEQ and/or Corps could determine that the work will not qualify for a 17-SPGP-01 authorization.

i. Emergency pipe replacements: In the case of an emergency situation, such as when a pipe/culvert washes out during a flood, a permittee is encouraged to countersink the replacement pipe at the time of replacement, in accordance with the conditions above. However, if conditions or timeframes do not allow for countersinking, then the pipe can be replaced as it was before the washout, but the permittee will have to come back and replace the pipe/culvert and countersink it in accordance with the guidance above. In other words, the replacement of the washed out pipe is viewed as a temporary repair, and a countersunk replacement should be made at the earliest possible date. The VDEQ must be notified of all pipes/culverts that are replaced without countersinking at the time that it occurs, and must provide the permittee's planned schedule for installing a countersunk replacement (it is acceptable to submit such notification by email). The permittee should anticipate whether bedrock or steep terrain will limit countersinking and, if so, should follow the procedures outlined in (g) and/or (h) above.

25) Discharge of pollutants: All authorized activities involving any discharge of pollutants into waters of the United States shall be consistent with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. § 1251 et seq.) and applicable state and local laws.

26) Suitable Material: No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

27) Obstruction of high flows: Discharges of dredged or fill material must not permanently restrict or impede the passage of normal or expected high flows.

28) Aquatic Life Movements: No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

29) Spawning Areas: Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

30) Migratory Bird Breeding Areas: Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

31) Native trout and anadromous fishes: Authorizations for discharges of dredged or fill material into native trout waters or anadromous fish spawning areas are conditioned to limit in-stream work within the timeframes recommended by the DGIF. http://206.16.194.16/environmental-programs/files/VDGIF-Time-of-Year-Restrictions-Table.pdf

32) Water supply intakes: No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization

33) Invasive Species: Plant species on the most current Virginia Department of Conservation and Recreation's Invasive Plant Species List shall not be used for replanting activities authorized by the SPGP. The list of invasive plants in Virginia

may be found at: http://www.dcr.virginia.gov/natural-heritage/document/nh-invasive-plant-list-2014.pdf

34) Inspections: The permittee understands and agrees that the Corps and/or the VDEQ are permitted and allowed to make periodic inspections at any time the Corps or VDEQ deems necessary in order to assure that the activities being performed under authority of this permit are in accordance with the terms and conditions prescribed herein. The Corps reserves the right to require post-construction engineering drawings and/or surveys of any work authorized under 17- SPGP-01, as deemed necessary on a case-by-case basis.

35) Maintenance: The permittee shall maintain the work authorized herein in good condition and in conformance with all terms and conditions of this permit. All fills shall be properly maintained to ensure public safety.

36) Property rights: 17-SPGP-01 does not convey any property rights, either in real estate or material, or convey any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of Federal, state, or local laws or regulations. If real estate rights are needed from the Corps, you must contact the Corps Real Estate Office at (757) 201-7735 or at the address listed on the front page of this permit.

37) Suspension and revocation: 17-SPGP-01 and individual verifications under 17-SPGP-01 maybe either suspended or revoked in whole or in part pursuant to the policies and procedures of 33 C.F.R. § 325.7. Any such action shall not be the basis for any claim for damages against the United States.

38) Restoration directive: The permittee, upon receipt of a restoration directive, shall restore the waters of the United States to their former conditions without expense to the United States and as directed by the Secretary of the Army or his/her authorized representative. If the permittee fails to comply with such a directive, the Secretary or his/her designee, may restore the waters of the United States to their former conditions, by contract or otherwise, and recover the cost from the permittee.

39) Special conditions: The Corps may impose other special conditions on a project verified pursuant to 17-SPGP-01 that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. Failure to comply with all conditions of the authorization/verification, including special conditions, constitutes a permit violation and may subject the permittee, or his/her contractor, to criminal, civil, or administrative penalties and/or restoration.

40) False or incomplete information: In granting authorization pursuant to this permit, the Corps has relied upon information and data provided by the permittee. If,

subsequent to notification by the Corps or the VDEQ that a project qualifies for this permit, such information and data prove to be materially false or materially incomplete, the Corps may suspend or revoke authorization, in whole or in part, and/or the United States or Corps may institute appropriate legal proceedings.

41) Abandonment: If the permittee decides to abandon the activity authorized under I7-SPGP-01, unless such abandonment is merely the transfer of property to a third party, they may be required to restore the area to the satisfaction of the Corps.

42) Transfer of verification: In order to transfer verification under 17-SPGP-01, the transferee and permittee must supply the Corps and the VDEQ with a written and signed, by all appropriate parties, request to make such a transfer. Such transfer is not effective until written approval has been granted by the Corps or the VDEQ.

43) Binding effect. The provisions of the permit authorization shall be binding on any assignee or successor in interest of the original permittee.

44) Expiration of 17-SPGP-01: Unless further suspended or revoked the 17-SPGP-01 will be in effect until May 31, 2022. Activities which have commenced (i.e., are under construction) or are under contract to commence construction in reliance upon 17-SPGP-01 will remain authorized provided the activity is completed within twelve months of the date of this 17-SPGP-01's expiration of May 31, 2022, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.7(a-e).

Jason E. Kelly, PMP
Colonel, U.S. Army
Commanding

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

May 5, 2009

Eastern Virginia Regulatory Section

Virginia Department of Transportation
ATTN: Mr. Richard T. Woody, II
Environmental Division
1401 East Broad Street
Richmond, VA 23219

Dear Mr. Woody:

This letter concerns requirements for calculating stream impacts when applying for authorization from the Norfolk District Corps of Engineers to perform work in waters of the United States. It has recently come to our attention that the Virginia Department of Transportation may in some cases be estimating impacts to streams using a methodology different from that which the Corps uses. Please adhere to the following guidance in reporting stream impacts in all future applications for Department of the Army permits, and when using non-reporting Department of the Army permits.

When calculating stream impacts, an applicant should include the length of any box culvert, pipe, or bridge that is being removed and replaced, even if the new culvert/pipe/bridge is going back in the same location (bridges are a special case in determining impacts; see example 2 below). If a pipe is being extended, and the existing pipe is being left in place and not moved, then only the length and area of the new work is included in stream impact numbers. Similarly, if riprap is being added at the inlet and/or outlet of an existing pipe, and the pipe is being left in place, only the length of stream under the riprap is included in the length of impacts.

Typically, when stream impacts exceed 300 linear feet, stream compensation is required. Stream compensation requirements are determined by the Corps project manager. However, if stream mitigation is required for a project, compensation will typically not be required for the length of stream impacted by the original pipe, even though the length of the original pipe is included in the stream length impact total.

This guidance is consistent with the Unified Stream Methodology (USM), prepared jointly by the Corps and the Virginia Department of Environmental Quality, which states in part "Jurisdictional streams that are entirely contained within concrete, gabion-lined, or riprap channels and do not have normal stream features (sedimentation, vegetation) will be reviewed on a case-by-case basis. Compensation for impacts to these stream channels will generally not be required.

However, impacts to these streams will still need to be included in the impact area for permitting purposes."

The following examples should be helpful in understanding how this guidance should be applied:

Example 1:

A road is being widened. There is an existing 100'-long pipe with no riprap at the outlets. The pipe is being replaced with a 230' pipe, with 15' of riprap at each outlet. The total length of stream being impacted is 260'. Since under 300' length, stream mitigation not anticipated.

Example 2:

A bridge is being replaced. The existing bridge abutments and piers are 150' wide with 20' of riprap at either end. The old abutments and piers will be pulled out in their entirety. The new bridge abutments are 275' wide, and there will be 25' of riprap at either end of the abutments. Neither the base of the abutments nor the bottom of the stream under the bridge is being riprapped, just the banks at the wingwalls. Total length of stream impacts is 325'. Since the project is a bridge, and the stream bottom is being left intact under the bridge, stream mitigation is not typically required, even though over 300' of stream is being impacted. However, in some circumstances, depending on the width of the stream and other factors, stream mitigation may be required for bridge projects. [The USM contains the option of requiring mitigation in such cases, at the project manager's discretion, but at a lesser ratio than for a full impact. For example, the USM "Impact Factor" is 1.0 for pipes, fills, impoundments, etc., but it is 0.75 for hardening of stream banks (i.e., concrete, gabions, concrete blocks, riprap, bottomless culverts and other similar structures), and it is 0.50 for bridges with piers in the stream channel.]

Example 3:

A road is being widened, and the 250'-long box culvert is being extended 50', with 25' of riprap placed at the new outlet. The existing culvert will be left in place, with the extension on one end. The total length of stream impacts is 75'. No stream mitigation is required.

Example 4:

A road is being widened. The existing 150' pipe will be removed, and a new 275' box culvert with 25' of riprap at each outlet will be constructed just east of the existing pipe, resulting in a minor realignment of the stream. The total length of stream impacts will be the distance from the edge of riprap upstream to the edge of riprap downstream, measured along the length of the stream *at its preconstruction location* (rather than along the location of the new

culvert, which is actually being placed in upland, and into which the stream will be diverted). The total length when measured is 330′ (somewhat longer than the new box plus riprap, because of the meanders of the preconstruction stream). Mitigation is required, because total impacts exceed 300′. However, the Corps will typically not require mitigation for the length of the existing pipe. Therefore, mitigation would be required for 330 - 150 = 180′, and credits required will be determined using the USM. See the attached illustration.

We hope that this guidance clarifies the methodology the Corps uses to calculate stream impacts for all types of permits. If you have any questions, you may contact Alice Allen-Grimes at (757) 201-7219 or alice.w.allen-grimes@usace.army.mil.

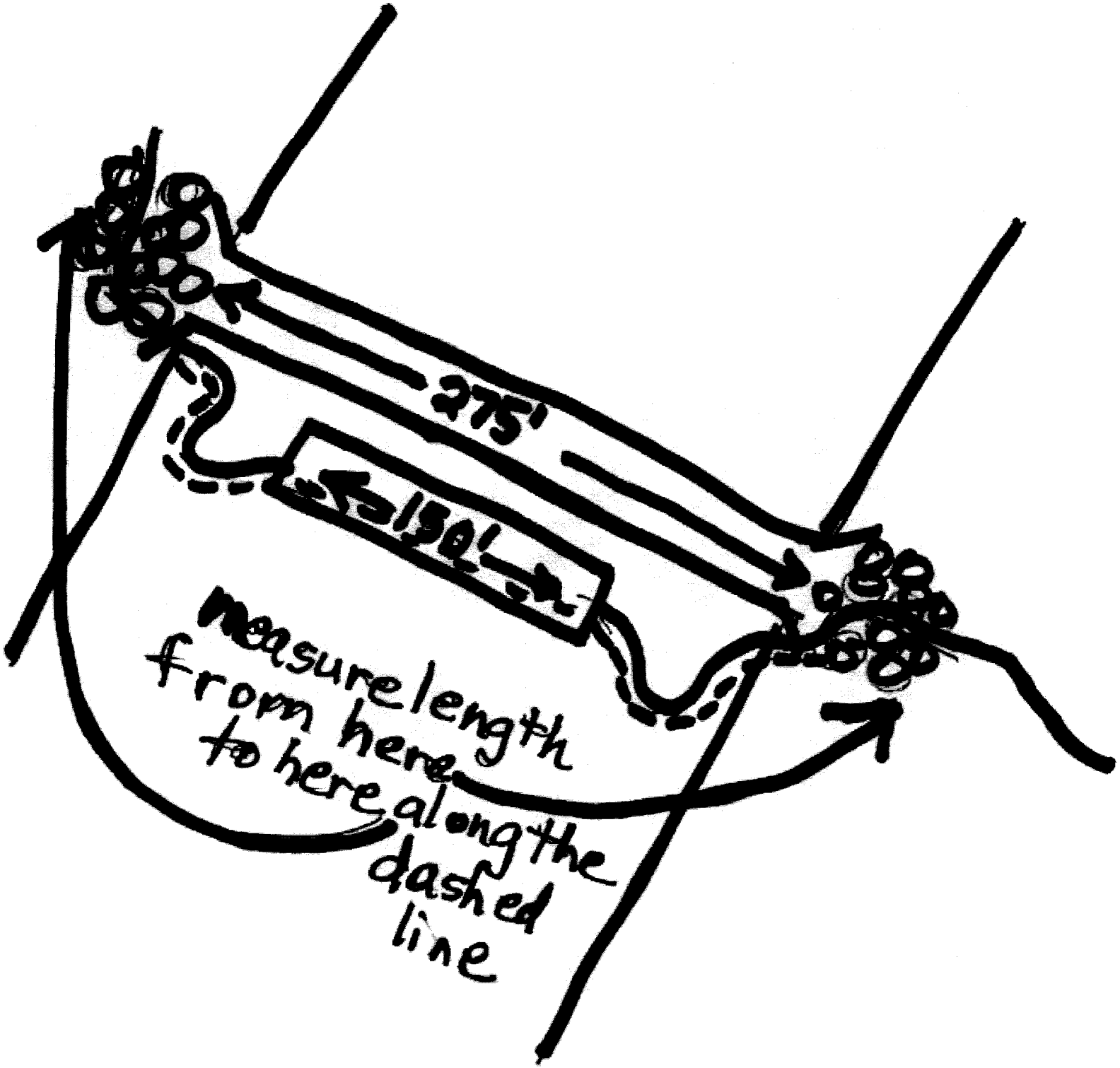
Sincerely,

J. Robert Hume, III
Chief, Regulatory Office

Enclosure

Copies Furnished (w/encl.):

Virginia Department of Environmental Quality, Richmond
Virginia Marine Resources Commission, Newport News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150'
measure length from here to here along the dashed line

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT, CORPS OF ENGINEERS
FORT NORFOLK, 803 FRONT STREET
NORFOLK, VIRGINIA 23510-1096

REPLY TO
ATTENTION OF:

May 5, 2009

Eastern Virginia Regulatory Section

Virginia Department of Transportation
ATTN: Mr. Richard T. Woody, II
Environmental Division
1401 East Broad Street
Richmond, VA 23219

Dear Mr. Woody:

This letter concerns requirements for calculating stream impacts when applying for authorization from the Norfolk District Corps of Engineers to perform work in waters of the United States. It has recently come to our attention that the Virginia Department of Transportation may in some cases be estimating impacts to streams using a methodology different from that which the Corps uses. Please adhere to the following guidance in reporting stream impacts in all future applications for Department of the Army permits, and when using non-reporting Department of the Army permits.

When calculating stream impacts, an applicant should include the length of any box culvert, pipe, or bridge that is being removed and replaced, even if the new culvert/pipe/bridge is going back in the same location (bridges are a special case in determining impacts; see example 2 below). If a pipe is being extended, and the existing pipe is being left in place and not moved, then only the length and area of the new work is included in stream impact numbers. Similarly, if riprap is being added at the inlet and/or outlet of an existing pipe, and the pipe is being left in place, only the length of stream under the riprap is included in the length of impacts.

Typically, when stream impacts exceed 300 linear feet, stream compensation is required. Stream compensation requirements are determined by the Corps project manager. However, if stream mitigation is required for a project, compensation will typically not be required for the length of stream impacted by the original pipe, even though the length of the original pipe is included in the stream length impact total.

This guidance is consistent with the Unified Stream Methodology (USM), prepared jointly by the Corps and the Virginia Department of Environmental Quality, which states in part "Jurisdictional streams that are entirely contained within concrete, gabion-lined, or riprap channels and do not have normal stream features (sedimentation, vegetation) will be reviewed on a case-by-case basis. Compensation for impacts to these stream channels will generally not be required.

However, impacts to these streams will still need to be included in the impact area for permitting purposes."

The following examples should be helpful in understanding how this guidance should be applied:

Example 1:

A road is being widened. There is an existing 100'-long pipe with no riprap at the outlets. The pipe is being replaced with a 230' pipe, with 15' of riprap at each outlet. The total length of stream being impacted is 260'. Since under 300' length, stream mitigation not anticipated.

Example 2:

A bridge is being replaced. The existing bridge abutments and piers are 150' wide with 20' of riprap at either end. The old abutments and piers will be pulled out in their entirety. The new bridge abutments are 275' wide, and there will be 25' of riprap at either end of the abutments. Neither the base of the abutments nor the bottom of the stream under the bridge is being riprapped, just the banks at the wingwalls. Total length of stream impacts is 325'. Since the project is a bridge, and the stream bottom is being left intact under the bridge, stream mitigation is not typically required, even though over 300' of stream is being impacted. However, in some circumstances, depending on the width of the stream and other factors, stream mitigation may be required for bridge projects. [The USM contains the option of requiring mitigation in such cases, at the project manager's discretion, but at a lesser ratio than for a full impact. For example, the USM "Impact Factor" is 1.0 for pipes, fills, impoundments, etc., but it is 0.75 for hardening of stream banks (i.e., concrete, gabions, concrete blocks, riprap, bottomless culverts and other similar structures), and it is 0.50 for bridges with piers in the stream channel.]

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culvert, which is actually being placed in upland, and into which the stream will be diverted). The total length when measured is 330′ (somewhat longer than the new box plus riprap, because of the meanders of the preconstruction stream). Mitigation is required, because total impacts exceed 300′. However, the Corps will typically not require mitigation for the length of the existing pipe. Therefore, mitigation would be required for 330 - 150 = 180′, and credits required will be determined using the USM. See the attached illustration.

We hope that this guidance clarifies the methodology the Corps uses to calculate stream impacts for all types of permits. If you have any questions, you may contact Alice Allen-Grimes at (757) 201-7219 or alice.w.allen-grimes@usace.army.mil.

Sincerely,

J. Robert Hume, III
Chief, Regulatory Office

Enclosure

Copies Furnished (w/encl.):

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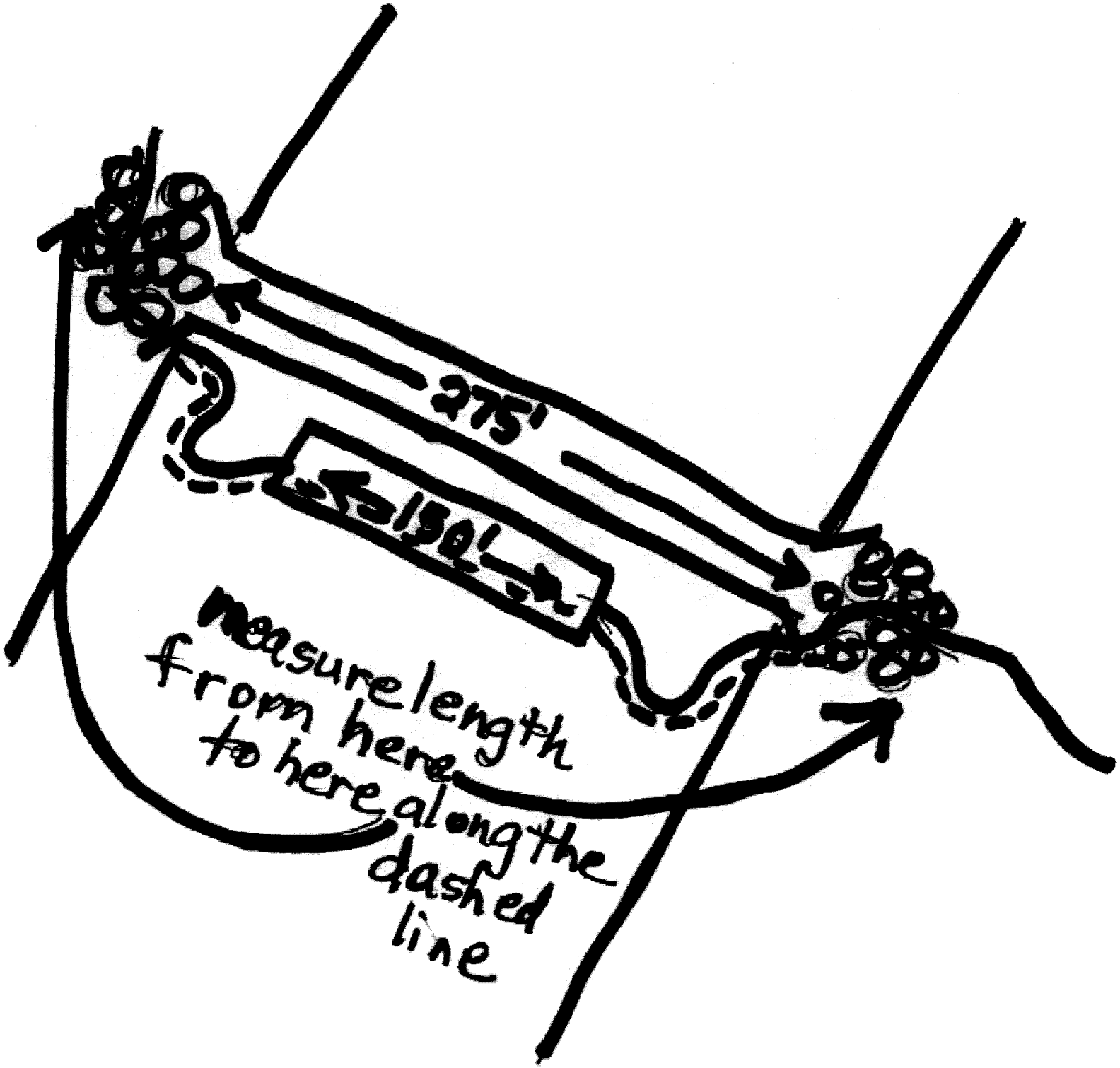
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17-SPGP-01 STANDARD OPERATING PROCEDURES

I. PURPOSE

17-SPGP-01 authorizes the discharge of dredged or fill material in nontidal waters of the United States, including wetlands, associated with certain residential, commercial, and institutional developments and linear transportation projects within the geographical limits of the Commonwealth of Virginia and under the regulatory jurisdiction of the US Army Corps of Engineers - Norfolk District (Corps). These projects must have minimal individual and cumulative impacts and meet the terms and conditions outlined herein.

The use of 17-SPGP-01 shall be restricted to those projects that have avoided and minimized impacts to waters of the United States, including wetlands, to the maximum extent practicable. The Clean Water Act (CWA) Section 404(b)(1) guidelines state that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.

The intent of this permit is to authorize residential, commercial and institutional developments, linear transportation and their associated infrastructure. Small standalone projects (such as utilities, substations, regional stormwater management, single family homes or single family home attendant features) that are not associated with a proposed larger-scale development project are not authorized by 17-SPGP-01.

II. PROCEDURES

A. **Confirmation of delineations:**

Prior to the submission of a permit application for 17-SPGP-01, and any subsequent modifications, a proponent must obtain a:

1) Corps confirmed delineation (Preliminary JD) that is approved for use with a permit application
   OR
2) Corps confirmed jurisdictional determination (Approved JD)

The confirmed delineation/determination must include the limits of all waters, including wetlands and open waters that are located within the project boundaries.

B. **Preapplication Consultations:**

Upon receipt of a preapplication meeting request the receiving agency will notify the requestor that they must:

1) Request a joint meeting with the appropriate representative from the Corps and the VDEQ via email
   AND
2) Provide the following information prior to the preapplication meeting:
   a. a conceptual development plan
   b. a vicinity map with the project boundaries clearly identified
   c. all known permitting history, if applicable, including any Corps jurisdictional determination.

Both the Corps and VDEQ should be in attendance for all 17-SPGP-01 preapplication meetings unless they have specifically declined attendance for that project.

III. APPLICATION

A. **Complete application:**

1) A completed and signed Standard Joint Permit Application (JPA). The applicant must utilize the most recent version.
   http://www.nao.usace.army.mil/Missions/Regulatory/
   AND
2) A completed SPGP Complete Application Checklist form. The applicant must utilize the most recent version.
   AND
3) A Preliminary JD or an Approved JD.

The application package must be submitted to the Virginia Marine Resource Commission (VMRC) and clearly marked 17-SPGP-01 by checking the SPGP box at the top of the JPA. The VMRC will forward a copy of the application to the applicable VDEQ office. Once the VDEQ has deemed the application complete the VDEQ will forward the complete application to the appropriate federal agency when coordination is required.

Processing of the application will not commence until the project has been issued a VMRC project number and the appropriate VDEQ office has received a complete application. The required components of a complete application are listed in the SPGP Complete Application Checklist Form.

B. **Incomplete Application:**

1) The VDEQ is the state agency responsible for ensuring permit applications meet the informational and technical requirements of the 17-SPGP-01 and for issuance of 17-SPGP-01 verifications for qualifying

Residential, Commercial, and Institutional and Linear Transportation projects.

2) If the VDEQ determines the application is incomplete, the VDEQ will send the applicant a copy of the SPGP Complete Application Checklist with the missing items highlighted.
    - If the applicant does not respond within the 60 days the VDEQ will administratively withdraw the application and notify the applicant.

IV. COORDINATION PROCEDURES

- Processing and coordination of the application **will not** commence until the project has been issued a VMRC project number and the appropriate VDEQ office has received a complete application.
- The Corps project review timeframe begins when the Corps receives a complete application from the VDEQ.
- All federal agency responses to VDEQ coordination will be provided in writing via email or letter.
- The VDEQ should send all coordination concurrently using the same 17-SPGP Federal Coordination Form.
- For all projects where another federal agency is the lead (e.g FHWA) the DEQ will request Section 7 and Section 106 determinations and concurrences from the lead federal agency or their designated representative (e.g. VDOT).
- The VDEQ must review avoidance and minimization and onsite alternatives for all projects regardless of impact totals.

A. RESIDENTIAL, COMMERCIAL, INSTITUTIONAL PROJECTS:

1) **Section 106 coordination:**

a. The VDEQ will send the Corps a completed 17-SPGP Federal Coordination Form and a copy of the JPA

b. The Corps will complete Section 106 review in accordance with internal procedures. The Corps PM will notify the VDEQ, within 15 calendar days, if coordination with SHPO and/or other agencies is required.

c. Upon completion of the Section 106 review, and any required coordination, the Corps will:
    i. notify the VDEQ PM that Section 106 has been completed
    ii. provide all supporting documentation that documents the Corps decision

iii. provide the VDEQ with any special conditions, if required

d. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
e. A 17-SPGP verification **CAN NOT** be issued until the VDEQ has received notification in writing that the Section 106 process has been completed (regardless of the 15 day notification date)

2) **Section 408 coordination:**

a. The VDEQ will review the Norfolk District "RP-17 Corps Project Maps": http://www.nao.usace.army.mil/Missions/Regulatory/RBregional.aspx.
b. If the project does not intersect any Corps civil works projects then the VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
c. The VDEQ will send the Corps a completed 17-SPGP Federal Coordination Form and a copy of the JPA if any civil works project will be affected including the following:
    - The project is located within the boundaries of a Flood Risk Management project
    - The project is located within a waterway that contains a federal navigation channel
    - The project intersects an environmental restoration project.
d. The Corps will complete Section 408 review in accordance with internal procedures. The Corps PM will notify the VDEQ, within 15 calendar days, if additional internal coordination is required.
e. Upon completion of the Section 408 review, and any required coordination, the Corps will:
    i. notify the VDEQ PM that Section 408 has been completed
    ii. provide all supporting documentation that documents the Corps decision
    iv. provide the VDEQ with any special conditions, if required
f. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
g. A 17-SPGP verification **CAN NOT** be issued until the VDEQ has received notification in writing that the Section 408 process has been completed (regardless of the 15 day notification date)

3) **Section 7 - INFORMAL screening and coordination:**

a. The VDEQ will determine whether federally proposed/listed species or federally proposed/designated critical habitat may occur in the project's action area. The action area is defined by regulation (50 C.F.R. § 402.02) as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For the purpose of the 17-SPGP-01 the VDEQ may utilize and coordinate the same action area that is used to meet the VDEQ state requirements.
b. The VDEQ will perform informal Section 7 coordination in accordance with the most current version of the "NAO ESA Project Review Process" document and will coordinate with the appropriate agencies using the 17-SPGP Federal Coordination Form.
c. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

4) **<u>Section 7 FORMAL consultation (when applicable):</u>**

a. The VDEQ will send the Corps:
    i. a completed 17-SPGP Federal Coordination Form
    ii. a copy of the JPA
    iii. the Official IPAC species list
    iv. a completed species conclusion table
    v. any previous correspondence with USFWS
b. The Corps will complete formal Section 7 consultation in accordance with internal procedures.
c. Upon completion of the Section 7 consultation, and any required coordination, the Corps will:
    i. notify the VDEQ PM that formal Section 7 consultation has been completed
    ii. provide all supporting documentation that documents the Corps decision
    iii. provide the VDEQ with any special conditions, if required
d. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
e. A 17-SPGP verification **<u>CAN NOT</u>** be issued until the VDEQ has received notification in writing that the Formal Section 7 process has been completed.

5) **<u>Federal coordination:</u>** for projects where permanent impacts

- exceed ½ acre of waters of the US, to include stream channel,

wetlands and open waters

OR

- exceed 300 linear feet of stream channel

a. The VDEQ will send the Corps, EPA and USFWS a:
   i. completed 17-SPGP Federal Coordination Form
   ii. copy of the JPA
   iii. copy of any additional information requests sent to the applicant
b. Within 15 calendar days of receipt the Corps, EPA and USFWS will provide any comments or objections regarding the project to the VDEQ
   - If no comments are received by close-of-business on the 15th calendar day then VDEQ can assume the agencies have no comments and will track the decision and completion date on the VDEQ Permit Summary Sheet.
c. if any agency responds with comments or objections the VDEQ will request that the applicant provide a response to the agency comments
   - If the applicant does not respond within the 60 days the VDEQ will administratively withdraw the application and notify the applicant.
d. The VDEQ will coordinate the applicant's response with the commenting agency for an additional 15 calendar day comment period.
   - If no comments are received by close-of-business on the 15th calendar day then VDEQ can assume the agencies have no comments and will track the decision and completion date on the VDEQ Permit Summary Sheet.
   - If the agency responds with no additional concerns the VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
e. If the agency still has additional comments or objections the VDEQ will elevate the project to the Corps for resolution
f. The Corps will complete processing in accordance with internal procedures.
g. Upon completion of the federal review, and any required coordination, the Corps will:
   i. notify the VDEQ PM that the Corps review has been completed
   ii. provide all supporting documentation that documents the Corps decision
   iii. provide the VDEQ with any special conditions, if required
      OR notification that the project will be processed under an alternative Corps review.
h. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

B. LINEAR TRANSPORTATION:

1) **Section 106 coordination:**

a. The VDEQ will send the Corps a completed 17-SPGP Federal Coordination Form and a copy of the JPA
b. The Corps will complete Section 106 review in accordance with internal procedures. The Corps PM will notify the VDEQ, within 15 calendar days, if coordination with SHPO and/or other agencies is required.
c. Upon completion of the Section 106 review, and any required coordination, the Corps will:
    i. notify the VDEQ PM that Section 106 has been completed
    ii. provide all supporting documentation that documents the Corps decision
    iii. provide the VDEQ with any special conditions, if required
d. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
e. A 17-SPGP verification **CAN NOT** be issued until the VDEQ has received notification in writing that the Section 106 process has been completed (regardless of the 15 calendar day notification date)

2) **Section 408 coordination:**

a. The VDEQ will review the Norfolk District "RP-17 Corps Project Maps": http://www.nao.usace.army.mil/Missions/Regulatory/RBregional.aspx.
b. If the project does not intersect any Corps civil works projects then the VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
c. The VDEQ will send the Corps a completed 17-SPGP Federal Coordination Form and a copy of the JPA if any civil works project will be affected including the following:
    - The project is located within the boundaries of a Flood Risk Management project
    - The project is located within a waterway that contains a federal navigation channel
    - The project intersects an environmental restoration project.
d. Upon completion of the Section 408 review, and any required coordination, the Corps will:

i. notify the VDEQ PM that Section 408 has been completed
ii. provide all supporting documentation that documents the Corps decision
iii. provide the VDEQ with any special conditions, if required

e. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.
f. A 17-SPGP verification **CAN NOT** be issued until the VDEQ has received notification in writing that the Section 408 process has been completed (regardless of the 15 calendar day notification date)

3) **Section 7 - INFORMAL screening and coordination:**

a. The VDEQ will determine whether federally proposed/listed species or federally proposed/designated critical habitat may occur in the project's action area. The action area is defined by regulation (50 C.F.R. § 402.02) as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For the purpose of the 17-SPGP-01 the VDEQ may utilize and coordinate the same action area that is used to meet the VDEQ state requirements.
b. The VDEQ will perform informal Section 7 coordination in accordance with the most current version of the "NAO ESA Project Review Process" document and will coordinate using the 17-SPGP Federal Coordination Form.
c. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

4) **Section 7 FORMAL consultation (when applicable):**

a. The VDEQ will send the Corps:
   i. a completed 17-SPGP Federal Coordination Form
   ii. a copy of the JPA
   iii. the Official IPAC species list
   iv. a completed Species Conclusion Table
   v. any previous correspondence with USFWS
b. The Corps will complete formal Section 7 consultation in accordance with internal procedures.
c. Upon completion of the Section 7 consultation, and any required coordination, the Corps will:
   i. notify the VDEQ PM that formal Section 7 consultation has been completed
   ii. provide all supporting documentation that documents the Corps

decision

iii. provide the VDEQ with any special conditions, if required

d. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

e. A 17-SPGP verification **CAN NOT** be issued until the VDEQ has received notification in writing that the Formal Section 7 process has been completed.

5) **Federal coordination:** for projects where permanent impacts

- exceed 300 liner feet at a single impact area

OR

- Cumulatively exceed 300 linear feet of stream channel AND/OR ½ acre of non-tidal water of the US, to include stream channel, wetlands and open waters. (Cumulative impact coordination is only applicable when multiple single and complete crossings are proposed).

a. The VDEQ will send the Corps, EPA and USFWS a:

i. completed 17-SPGP Federal Coordination Form

ii. copy of the JPA

iii. copy of any additional information requests sent to the applicant

b. Within 15 calendar days of receipt the Corps, EPA and USFWS will provide any comments or objections regarding the project to the VDEQ

- If no comments are received by close-of-business on the 15th calendar day then VDEQ can assume the agencies have no comments and will track the decision and completion date on the VDEQ Permit Summary Sheet.

c. if any agency responds with comments or objections the VDEQ will request that the applicant provide a response to the agency comments

- If the applicant does not respond within the 60 days the VDEQ will administratively withdraw the application and notify the applicant

d. The VDEQ will coordinate the applicant's response with the commenting agency for a 15 calendar day comment period.

- If no comments are received by close-of-business on the 15th calendar day then VDEQ can assume the agencies have no comments and will track the decision and completion date on the VDEQ Permit Summary Sheet.
- If the agency responds with no additional concerns the VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

e. If the agency still has additional comments or objections the VDEQ will elevate the project to the Corps for resolution
f. The Corps will complete processing in accordance with internal procedures.
g. Upon completion of the federal review, and any required coordination, the Corps will:
    i. notify the VDEQ PM that the Corps review has been completed
    ii. provide all supporting documentation that documents the Corps decision
    iii. provide the VDEQ with any special conditions, if required OR notification that the project will be processed under an alternative Corps review.
h. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

V. Permit Decisions

1) **Permit Issuance**: The VDEQ will determine, through the processes outlined above, whether the work proposed satisfies the terms and conditions of 17-SPGP-01. All 17- SPGP-01 verifications shall be written on attached 17-SPGP-01 Verification Letter.
2) **Denial**: The VDEQ PM should advise the applicant if the project does not qualify for a 17- SPGP-01 verification. In these situations, the VDEQ PM should send correspondence to the applicant notifying them to either:
    a. Revise their proposal so that it qualifies for a 17-SPGP verification

    OR

    b. Submit their application directly to the Corps for processing under a different Corps permit.

VI. Permit Re-verification

The following should apply to all re-verification requests for 17-SPGP-01 projects that were issued by the VDEQ:

1) All projects that have associated special conditions, an MOA regarding Section 106 of the NHPA and/or require formal consultation under Section 7 of the ESA must be coordinated with the Corps, or lead federal agency when applicable, regardless of the newly proposed impact totals.
2) All projects proposing additional temporary and/or permanent impacts will be processed in accordance with the coordination procedures listed in Section IV(A) and IV(B) of this SOP.

EXCEPTION: For projects where federal coordination (IV(A)(5) and IV(B)(5) has already occurred, Federal re-coordination is not required when the total of the additional permanent impacts are less than:

- ¼ acre of waters of the US, to include stream channel, wetlands and open waters

  OR
- 100 linear feet of stream channel

3) The following re-verifications do not require re-coordination but do require the issuance of a new 17-SPGP Verification Letter:
   a. change in ownership/project name
   b. decrease in impacts
   c. modification to the development plan but no additional impacts
   d. change in use of bank/in-lieu fee
   e. clerical revisions
4) If the proposed re-verification cumulatively exceeds the thresholds of the 17-SPGP the VDEQ PM should send correspondence to the applicant notifying them to either:
   a. Revise their proposal so that it qualifies for a 17-SPGP verification.

   OR
   b. Submit their application directly to the Corps for processing under a different Corps permit.

VII. Compliance and Resolution of Non-compliance for projects authorized by the 17-SPGP-01

The VDEQ will generally maintain the primary responsibility for performing compliance inspections and resolution of non-compliance for residential, commercial, and institutional developments or linear transportation projects authorized under the 17-SPGP-01. However, this does not prevent the Corps from inspecting these project sites independently or from exerting enforcement authority.

1) All projects that have associated special conditions, an MOA regarding Section 106 of the NHPA and/or require formal consultation under Section 7 of the ESA must be coordinated with the Corps regardless of their impact totals.
2) Resolution of noncompliance activities where final resolution includes an increase in temporary and/or permanent impacts will be treated and coordinated in the same manner as re-verification requests (Section VI of this SOP).

3) Non-compliance discovered by Corps PMs will be forwarded to the VDEQ for resolution. The Corps PM will include:
    a. Project name and number
    b. Dated discovered
    c. Brief description of the potential non-compliance.
    d. Notification that the Corps will/will not participate in resolution of the noncompliance.
4) For all 17-SPGP-01 non-compliance resolved by the VDEQ VWP staff the VDEQ will issue a new 17-SPGP-01 verification letter
5) For all non-compliance resolved by the VDEQ enforcement, the applicant will submit a new JPA to the VDEQ requesting a 17-SPGP verification for the project.

VIII. Dispute Resolution Process

1) A Joint Corps/VDEQ meeting will be scheduled between the applicable project managers to discuss project specific disputes.
2) A Joint Corps/VDEQ meeting will be scheduled between the Corps and VDEQ management to discuss programmatic differences.
3) Responsibility for the organizing the meeting shall lie with the requesting party.
4) When applicable, the Corps/VDEQ will invite any objecting/commenting agencies to attend the meeting.
5) A decision must be made at the meeting. The meeting and the decision should be documented in the project file.

IX. Training

A one day joint Corps/VDEQ training will be held once a calendar year. If additional training is needed it can be requested by either agency.

X. SPGP Annual Report Requirements

On an annual basis, the VDEQ will provide the Corps a report to assess the effectiveness of 17-SPGP-01 and evaluate the extent of its cumulative impacts.

The reports will be for the period of September 1 through August 31 of every year. This report will be advertised by public notice to provide an opportunity for the public, agencies, and interested organizations to submit comments.

The report will include the following information:

1) Average number of calendar days between initial receipt of application and final approval
2) Average number of calendar days between receipt of complete application and final approval
3) Total acres of wetland impacts requested
4) Total acres of wetland impacts authorized
5) Total wetland mitigation required, broken out into the following categories:
    a. Acres of wetland preservation required.
    b. Acres of wetland creation/restoration required.
    c. Wetland mitigation credits required to be purchased from a bank or in-lieu fee.
6) Linear feet of stream impacts requested
7) Linear feet of stream impacts authorized
8) Total stream mitigation required, broken out into the following categories:
    a. Linear feet of stream preservation required.
    b. Linear feet of stream enhancement/restoration required
    c. Stream mitigation credits required to be purchased from a bank or in-lieu fee.
9) Total number of projects authorized, organized by 8-digit hydrologic unit code (HUC) (HUC reviewable at http://cfpub.epa.gov/surf/locate/index.cfm)
10) Total acres of wetland impacts authorized, organized by 8-digit HUC
11) Total linear feet of stream impacts authorized, organized by 8-digit HUC
12) Total number of SPGP permit re-verifications performed within the reporting period
13) Total number of Compliance Inspections performed, broken out into the following categories:
    a. Number of projects found to be in compliance with permit conditions
    b. Number of projects found to be in non-compliance with permit conditions
    c. Number of non-compliance activities resolved within reporting period

PROJECT NAME

17-SPGP-01 COMPLETE APPLICATION CHECKLIST

* Please note that additional information may be required by the agency(ies) to complete project review.

	Submission Requirements	Material
1	Completed and signed JPA with SPGP box checked	
2	Any existing Corps project numbers and previous actions	
3	The applicant's name, contact person, mailing address, telephone number, email address	JPA Section 1
4	The authorized agent's name, contact person, mailing address, telephone number, email address	JPA Section 1
5	Project location information: address, city/county	JPA Section 2
6	Water body or water bodies or receiving stream, as applicable	JPA Section 2
7	Latitude and longitude (to the nearest second) from a central location within the project limits	JPA Section 2
8	The hydrologic unit code (HUC) for the project area	JPA Section 2
9	The name of the project, narrative description of project purpose, and a description of the proposed activities in waters, including wetlands	JPA Section 3
10	Permanent and temporary WOUS Impacts; to inlcude wetlands and open waters	JPA Section 8
11	All appropriate sections from the JPA, including signature pages: (a) Include Sections 1-9, and applicable Sections 10-27 for all General Permits (b) Check that all applicable requirements within individual sections (i.e. Appendices) of the JPA have been followed, such as road and utility crossing narratives	
12	A detailed location map (e.g., a United States Geologic Survey topographic quadrangle map, ADC road map) of the project area, including the project boundary. The map should be of sufficient detail such that the site may be easily located for site inspection	
13	Project plan view. All plan view sketches should include, at a minimum, north arrow, scale, existing structures, existing contours, proposed contours (if available), limit of waters, including wetlands, direction of flow, ordinary high water line, impact limits, and location and dimension of all proposed structures in impact areas. In addition, cross-sectional or profile sketches with the above information may be required to detail impact areas and those impacts associated with the installation of structures.	
14	Check that all informational requirements for drawings, listed in Appendix D of the JPA, have been followed	
15	Large-sized impact map (at a scale no smaller than 1" = 200'); use matchlines if the entire site cannot fit on one sheet at this scale and provide a cover page showing how all sheets relate.	
16	A description of the specific on-site measures considered and taken during project design and development both to avoid and minimize impacts to waters, including wetlands, to the maximum extent practicable. If applicable, submit alternative designs as well as an economic analysis	
17	Endangered and threatened species information and related correspondence	

18	Historic resources information and related correspondence, including a plan view depicting all historical resources located within the project boundaries.	
19	A conceptual mitigation plan that adheres to the mitigation requirements and preference hierarch of the Corps-EPA Compensatory Mitigation for Losses of Aquatic Resources Rule dated April 10, 2008 (33 CFR 325 and 332; 40 CFR 230)	
20	Applicants proposing compensation involving the purchase or use of mitigation banking or in-lieu fee credits shall include as their conceptual compensation plan: (a) The name of the proposed mitigation bank or in-lieu fee; (b) the HUC in which it is located; (c) the number of credit proposed to be purchases; (d) a letter of credit availability from the Sponsor (e) If applicable, a copy of the stream assessment report in the JPA	
21	WETLANDS: Applicants proposing onsite/offsite permittee responsible mitigation shall include as their conceptual compensation plan (33 CFR 332.4(c)(2)-(14)) : (a) Objectives; (b) site selection; (c) site protection instruments; (d) baseline information; (e) credit determination methodology (f) mitigation work plan including water budget; (g) maintenance plan; (h) ecological performance standards; (i) monitoring requirements; (j) long-term management; (k) adaptive management plan; (l) financial assurances;	
22	WATERS: Applicants proposing onsite/offsite permittee responsible mitigation shall include as their conceptual compensation plan (33 CFR 332.4(c)(2)-(14)) : (a) Objectives; (b) site selection; (c) site protection instruments; (d) baseline information; (e) credit determination methodology (f) mitigation work plan including water budget; (g) maintenance plan; (h) ecological performance standards; (i) monitoring requirements; (j) long-term management; (k) adaptive management plan; (l) financial assurances; (m) planform geometry (n) channel form (o) watershed size (p) design discharge (q) riparian area plantings (r) a reference reach (s) completed Natural Channel Design Review Checklist	
23	A Corps confirmed delineation map that is approved for use with a permit application or confirmed jurisdictional determination map that includes the limits of all waters, including wetlands that are located within the project boundaries.	

24	A written disclosure identifying all wetlands, open water, streams, and associated upland buffers within the proposed project or compensation areas that are under a deed restriction, conservation easement, restrictive covenant, or other land use protective instrument (protected areas). Such disclosure shall include the nature of the prohibited activities within the protected areas.	

VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT)

REPORTING PROCEDURES

VDOT 17-SPGP-01 projects will be submitted through either:

A. The VDOT Reporting-Only spreadsheet

OR

B. The VDOT Inter-agency Coordination Meeting (IACM) JPA

A. **Reporting Only:** VDOT may report by spreadsheet on a monthly basis to VDEQ for those VDOT projects meeting the following eligibility criteria. The Spreadsheet shall address the following federal requirements: Section 106, Section 7, and 408 Civil Works projects.

1) Permanent impacts do not exceed 1/10 acre or 300 linear feet at any single and complete crossing of waters of the United States, including wetlands; the definition of independent utility must be applied when determining permanent impact totals
2) VDOT complies with all general conditions of the 17-SPGP-01.
3) Section 7 -Endangered Species Act Review has been completed, including FWS concurrence with findings, if required the Corps and the Federal Highway Administration (FHWA) have designated VDOT to act on their behalf for informal Section 7 coordination with FWS).
4) VDOT provides to VDEQ a Section 106 finding of "No Effect" determined by VDOT in accordance with the "Programmatic Agreement Among the Federal Highway Administration, the U.S. Army Corps of Engineers, Norfolk District, the Tennessee Valley Authority, the Advisory Council on Historic Preservation Officer, and the Virginia Department of Transportation Regarding Transportation Undertakings Subject to Section 106 of the National Historic Preservation Act of 1966," finalized August 2016.
5) An application must be submitted (the project cannot be reporting only) if VDOT's proposed activity is located in the vicinity of a Norfolk District Civil Works project. For information on the location of Norfolk District projects, VDOT staff are directed to maps located at: http://www.nao.usace.army.mil/Missions/Regulatory/RBregional.aspx.

B. **IACM JPA (VDOT Form) Submittals:**

1) The JPA must include a Corps confirmed delineation (Preliminary JD) that is approved for use with a permit application or a Corps confirmed jurisdictional determination (Approved JD), OR a map/permit sketches showing VDOT's identification of waters of the US as well as data sheets as appropriate. For the

latter form of JD determination, the Corps will review the permit sketches and USGS map in the JPA and will indicate at the IACM their agreement or disagreement with the location of waters of the US as depicted by VDOT (which will be recorded in meeting comments). Any delineation/determination must include the limits of all waters, including wetlands that are located within the project boundaries.

2) Section 106 coordination: The JPA will include the effect determination made by VDOT in accordance with the "Programmatic Agreement Among the Federal Highway Administration, the U.S. Army Corps of Engineers, Norfolk District, the Tennessee Valley Authority, the Advisory Council on Historic Preservation Officer, and the Virginia Department of Transportation Regarding Transportation Undertakings Subject to Section 106 of the National Historic Preservation Act of 1966," (PA) finalized August 2016 and provided to VDEQ.

3) ESA coordination: Section 7 -Endangered Species Act Review must be completed, including FWS concurrence with findings, if required, and the documentation (including IPAC list, self-certification letter, and Species Conclusion Table) must be included in the JPA. (If the project is federally funded by the Federal Highway Administration, FHWA is the lead federal agency. FHWA has designated VDOT to act on their behalf for formal and informal Section 7 consultation with FWS. The JPA should include the same documentation whether the Corps or FHWA is the lead federal agency).

4) Section 408 coordination: Prior to submittal of an application, VDOT will review the Norfolk District ”RP-17 Corps Project Maps”: http://www.nao.usace.army.mil/Missions/Regulatory/RBregional.aspx.

a. If the project does not intersect any Corps civil works projects then the VDOT will include the determination in the JPA.
b. The VDOT will request Corps coordination, via the JPA, if the proposed project meets any of the following:
    - The project is located within the boundaries of a Flood Risk Management project
    - The project is located within a waterway that contains a federal navigation channel
    - The project intersects an environmental restoration project.
c. The Corps will complete Section 408 review in accordance with internal procedures. The Corps PM will notify the VDEQ, within 15 calendar days, if additional internal coordination is required.
d. Upon completion of the Section 408 review, and any required coordination, the Corps will:
    i. notify the VDEQ PM that Section 408 has been completed
    ii. provide all supporting documentation that documents the Corps decision

i. provide the VDEQ with any special conditions, if required

e. The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

f. A 17-SPGP verification **<u>CAN NOT</u>** be issued until the VDEQ has received notification in writing that the Section 408 process has been completed (regardless of the 15 day notification date)

5) **<u>Federal coordination:</u>** for projects where permanent impacts

- exceed 300 liner feet at a single impact area

OR

- Cumulatively exceed 300 linear feet of stream channel AND/OR ½ acre of non-tidal water of the US, to include stream channel, wetlands and open waters. (Cumulative impact coordination is only applicable when multiple single and complete crossings are proposed).

a. The VDEQ will send the Corps, EPA and USFWS a:
   i. completed 17-SPGP Federal Coordination Form
   ii. copy of the JPA
   iii. copy of any additional information requests sent to the applicant

b. Within 15 calendar days of receipt the Corps, EPA and USFWS will provide any comments or objections regarding the project to the VDEQ
   - If no comments are received by close-of-business on the 15th calendar day then VDEQ can assume the agencies have no comments and will track the decision and completion date on the VDEQ Permit Summary Sheet.

c. if any agency responds with comments or objections the VDEQ will request that the applicant provide a response to the agency comments
   - If the applicant does not respond within the 60 days the VDEQ will administratively withdraw the application and notify the applicant

d. The VDEQ will coordinate the applicant's response with the commenting agency for a 15 calendar day comment period.
   - If no comments are received by close-of-business on the 15th calendar day then VDEQ can assume the agencies have no comments and will track the decision and completion date on the VDEQ Permit Summary Sheet.
   - If the agency responds with no additional concerns the VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

e. If the agency still has additional comments or objections the VDEQ will elevate the project to the Corps for resolution

f. The Corps will complete processing in accordance with internal procedures.

g. Upon completion of the federal review, and any required coordination, the Corps will:
    i. notify the VDEQ PM that the Corps review has been completed
    ii. provide all supporting documentation that documents the Corps decision
    iii. provide the VDEQ with any special conditions, if required OR notification that the project will be processed under an alternative Corps review.

The VDEQ will track the decision and completion date on the VDEQ Permit Summary Sheet.

Project Name:

DEQ PM:

DEQ project number:

COE project number:

17-SPGP Federal Coordination Form

This form is to be used by the VDEQ for coordinating projects with the appropriate agencies.

Attachments included:

Item	**Provided**
Joint Permit Application	☐
Project Location Map	☐
Impact Map	☐
USFWS IPAC	☐
USFWS Species Conclusion Table	☐
DEQ Additional Information Request	☐
Other 1:	☐
Other 2:	☐

Reason For Coordination	**Being Requested**	**Response Required Date**
The Corps for a Section 106 determination and/or coordination:	☐	None
The USFWS for **informal** Section 7 consultation:	☐	
The Corps for 408 consultation	☐	None
Federal coordination per sections IV(A)(5) and IV(B)(5) of the SOP:	☐	
The Corps for **formal** Section 7 consultation:	☐	
DOD Clearinghouse:	☐	Response not required

INSERT REGIONAL LETTERHEAD

[Date]

[SPGP Permittee Contact's Name]
[Permittee Company Name]
[Permittee Address]
[City, State, Zip]

SENT VIA E-MAIL: [enter email address]
RECEIPT CONFIRMATION REQUESTED

RE: State Program General Permit (12-SPGP-01) Authorization
Permit Number: WPX-XX-XXXX
[Project Name], [County/City], Virginia

Dear [SPGP Permittee Contact's Name]:

The Virginia Department of Environmental Quality (DEQ) has received and completed technical review of your application/re-verification request [Dated] and received [Date]. Based on DEQ's technical review, DEQ has determined the proposed project satisfies the terms and conditions contained in the Corps of Engineers, Norfolk District State Program General Permit (17-SPGP-01). You are required to adhere to all terms and conditions contained within the attached 17-SPGP-01 and any Special Conditions listed below. Your 17-SPGP-01 verification is effective as of the date on this letter and remains effective until **May 31, 2022**.

The impacts are associated with the XXXXXXXXX (describe the type of work, e.g.construction of a residential community and associated infrastructure).\

The applicant is hereby authorized to impact DESCRIPTION OF SPGP IMPACTS:

The conceptual mitigation plan submitted with your application indicated that mitigation will include [list SPGP compensation]. This mitigation shall be completed and documentation shall be submitted to DEQ prior to commencement of project impacts.

SPECIAL CONDITIONS (List SPGP special conditions):

This letter shall serve as verification to proceed with the project as proposed. The permittee shall be responsible for contacting DEQ to revise this verification, including provisions for compensatory mitigation, if the location or amount of the impacts changes.

Please contact Permit Writer by phone at (XXX) XXX-XXXX or by email at XXXX@deq.virginia.gov if you have any questions or concerns regarding the information contained herein.

Respectfully,

Regional VWPP Program Manager

Attachments: 17-SPGP-01

Cc (via E-mail):
Agent, Company

Contact Name, U.S. Army Corps of Engineers,
Contact Name, Virginia Marine Resources Commission

17-SPGP Coordination Information to be include in the VDEQ Permit Summary Sheet

1) Section 106:
   - Date initiated:
   - Date Complete:
   - Section 106 Determination:
2) Informal Section 7 consultation:
   - USFWS Review Initiation Date:
   - USFWS Review Response Date:
   - Date Complete:
   - USFWS Determination:
3) 408 consultation
   - Date reviewed/initiated:
   - Date Complete:
   - 408 Determination:
4) Federal coordination per sections IV(A)(5) and IV(B)(5) of the SOP:
   - Date Initiated:
   - Agency response:
     - USACE:
     - EPA:
     - USFWS:

OTHER COORDINATION AS APPLICABLE:

5) Formal Section 7 consultation:
   - Corps Review Initiation Date:
   - Date Complete:
   - Corps Determination:
6) DOD Clearinghouse:
   - Date sent:

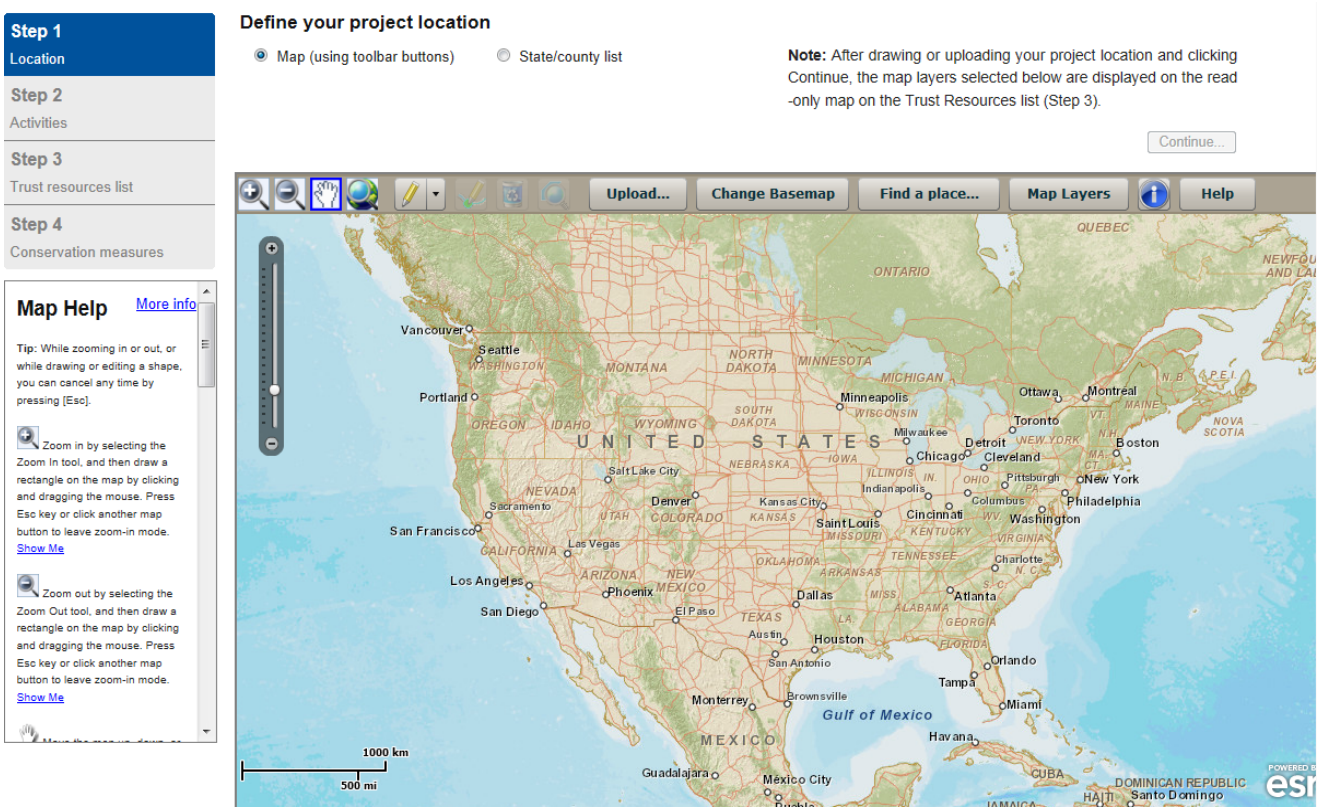
17-SPGP-01 ACRONYMS

ACHP – The Advisory Council on Historic Preservation
AJD/Approved JD – a confirmed jurisdictional determination that includes the limits of all waters of the U.S., including wetlands that are located within the project boundaries
CCB – The Center for Conservation Biology
Corps – United States Army Corps of Engineers
CWA – Clean Water Act
DCR – The Virginia Department of Conservation and Recreation
DGIF – The Virginia Department of Game and Inland Fisheries
DHR/VDHR – The Virginia Department of Historic Resources
DNH – Department of Natural Heritage
DOD – Department of Defense
EPA – The Environmental Protection Agency
ESA – The Endangered Species Act
FHWA – Federal Highway Administration
FWS/USFWS – The US Fish and Wildlife Service
HUC – Hydrologic Unit Code
JPA – Joint permit application
MOA – Memorandum of Agreement
NHPA – National Historic Preservation Act
NMFS – National marine Fisheries Service
NPS – The National Park Service
PJD/Preliminary JD - A Corps confirmed delineation that is approved for use with a permit application
PM – Project manager
POC – Point of Contact
RGL – Corps Regulatory Guidance Letter
SHPO – State Historic Preservation Officer
SPGP – State General Programmatic Permit
THPO – Tribal Historic Preservation Officer
VDEQ – The Virginia Department of Environmental Quality
VDGIF – Virginia Department of Game and Inland Fisheries
VDOT – The Virginia Department of Transportation
VMRC – The Virginia Marine Resource Commission
VWP – Virginia Water Protection
WOUS – Waters of the United States

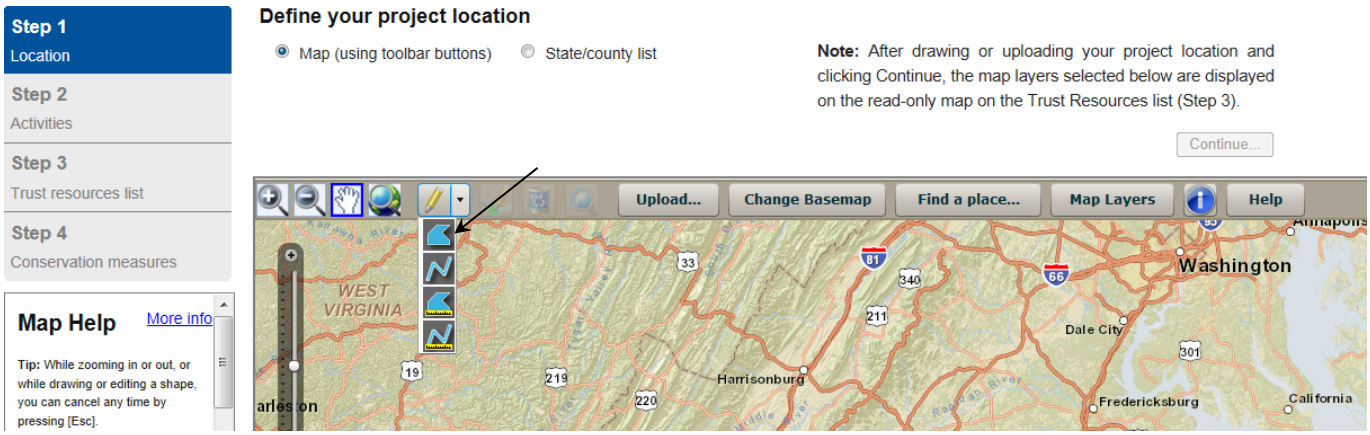
SPGP Section 7 Procedures

Step 1: Official Species List

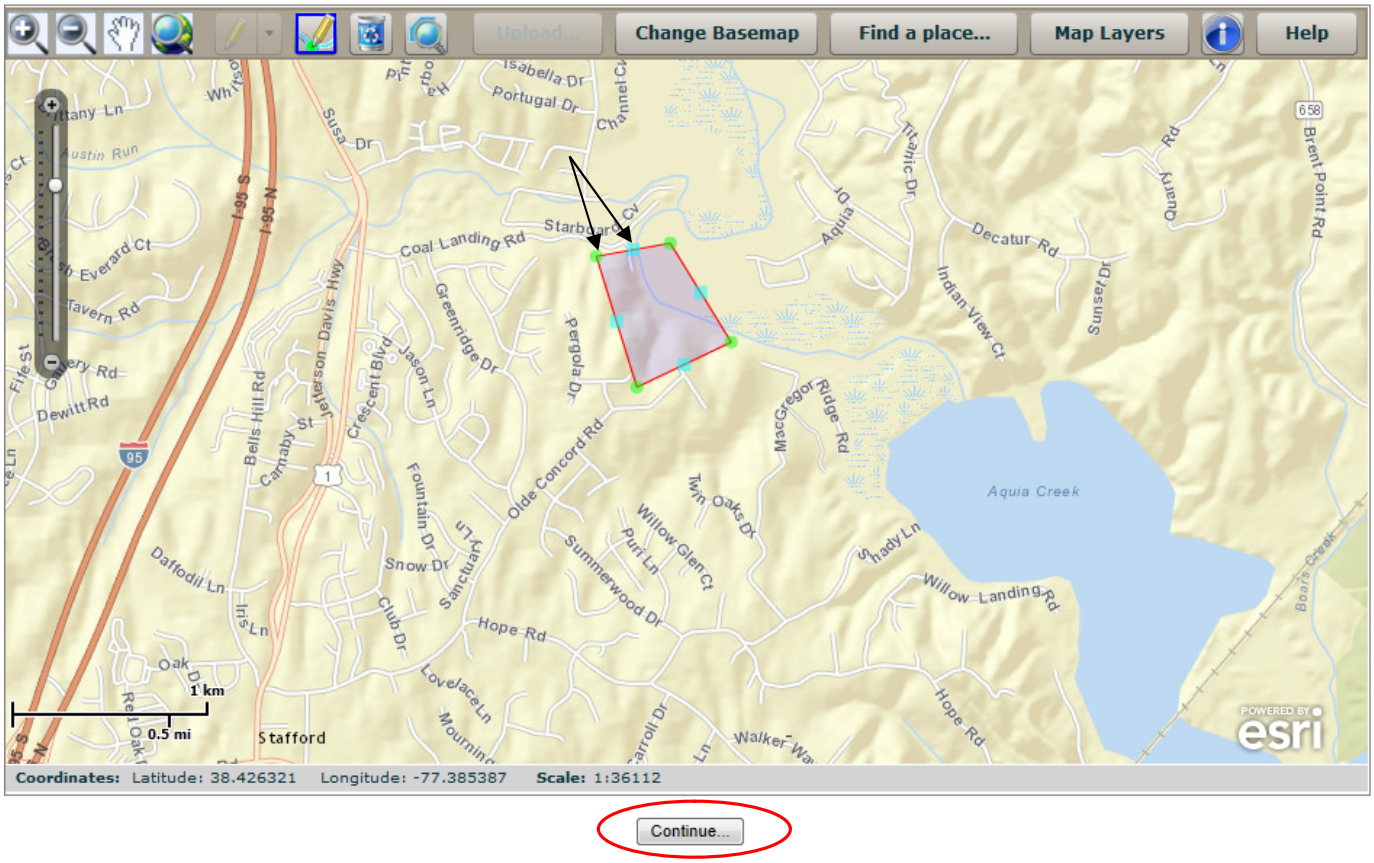
a. Obtain vicinity map of the project site and conduct DCR and DGIF database searches (see procedures for each).
b. Utilize the FWS Information, Planning, and Consultation System (IPaC) by clicking on the following link: http://ecos.fws.gov/ipac/
c. **"Click on initial Project Scoping**" along the left side of the page. This will take you to a map where you will locate your project site.
d. Finding your project site: You can do so by zooming in or by clicking on "**Find a place**" along the top portion of the map.



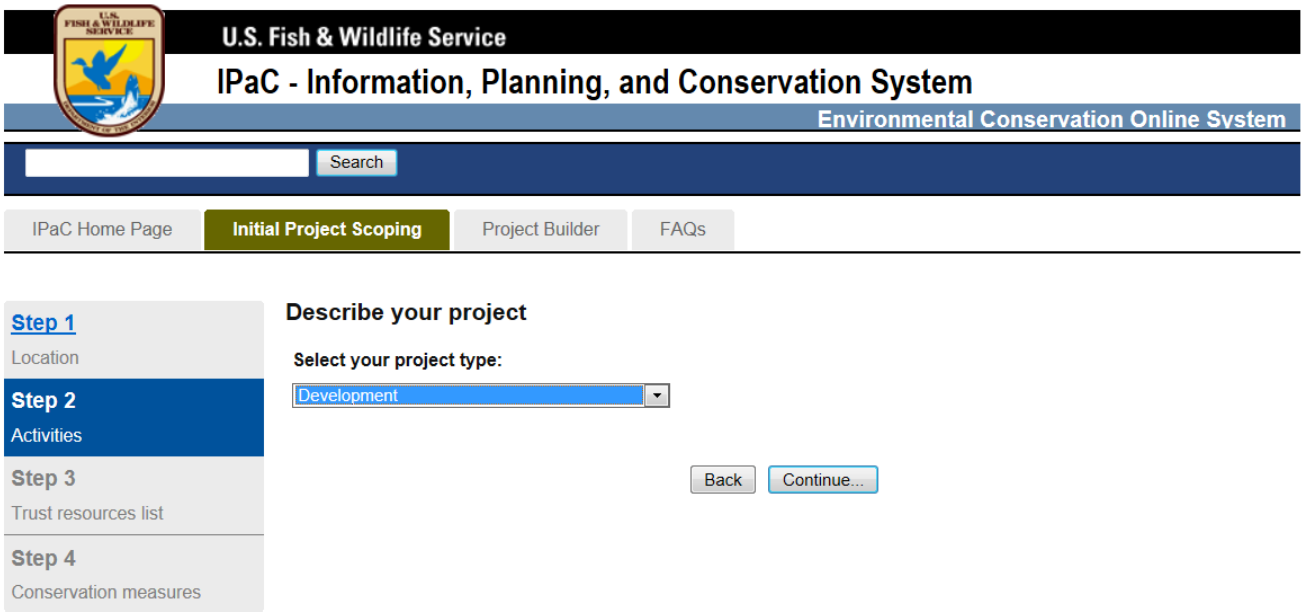
e. Draw your project boundary polygon. Once you have found your project site, click the dropdown menu with the pencil at the top of the map. Begin drawing your project boundary polygon by clicking on the map and continue until the entire boundary is drawn.



f. Double click on last point to set polygon. **Do not cross the line of the polygon.** You can also edit polygon by moving the aqua squares and green dots. Click the "**Continue**" button below the map.



g. Once you hit the "**Continue**" button from the map page, the below page appears. Select "**Development**" from the dropdown menu and hit the "**Continue**" button.



h. The page that appears after hitting the "**Continue**" button will have your informal information regarding your project site. However, an Official Species List must be obtained for Section 7. Click on the "**Request Official Species List**" and fill out the Project Name and Description information and click "**Request Official Species List**."

Step 1
Location

Step 2
Activities

Step 3
Trust resources list

Step 4
Conservation measures

Trust Resources List

Back | Continue...

An online Endangered Species Act species list IS available below for your project area, represented by the office(s) listed:

Virginia Ecological Services Field Office
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

The Endangered Species Act species list below is for planning purposes only -- it is not an official species list.

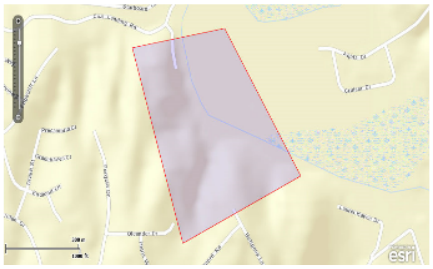
To save or print all Trust Resources lists on this page, click here:

Save or Print Trust Resources List

To request an official species list, click here:

Request an Official Species list

Project Location Map:



Note: The map reflects the map layers selected on the Step 1 Location page. To change what appears on this map, return to the Location page and adjust the map layers.

Project Counties:
Stafford, VA

Project type: Development

Endangered Species Act Species List (USFWS Endangered Species Program).

There are a total of 3 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fishes may appear on the species list because a project could cause downstream effects on the species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section below for critical habitat that lies within your project area. Please contact the designated FWS office if you have questions.

Species that should be considered in an effects analysis for your project:

Clams	Status		Has Critical Habitat	Contact
Dwarf wedgemussel (*Alasmidonta heterodon*) Population: Entire	Endangered	species info		Virginia Ecological Services Field Office
Flowering Plants				
harperella (*Ptilimnium nodosum*)	Endangered	species info		Virginia Ecological Services Field Office
sensitive joint-vetch (*Aeschynomene virginica*)	Threatened	species info		Virginia Ecological Services Field Office

Don't see a species you expect to see?

Critical habitats within your project area:
There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no National Wildlife Refuges found within the vicinity of your project.

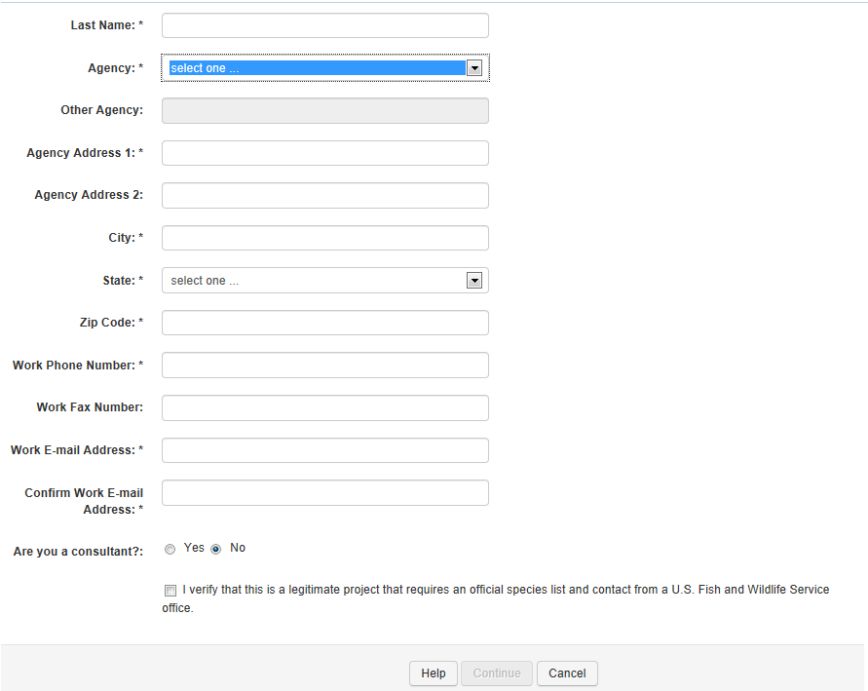
FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668 (a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

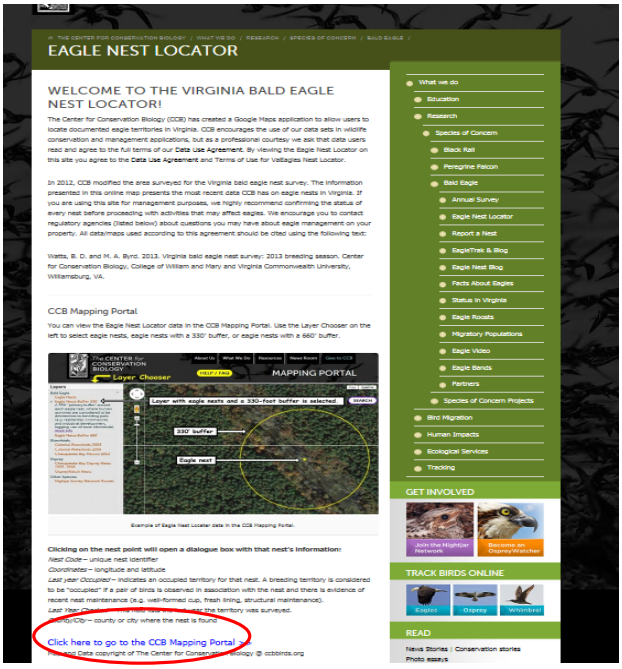
i. Fill out required (*) information in the pop up window. The agency would be at the bottom of the drop down menu under "**State of Virginia, Department of Environmental Quality**." Click "**No**" for the "**Are you a consultant**" and click the check box and hit "**Continue**" button. The button will not become available until all the required information is completed.



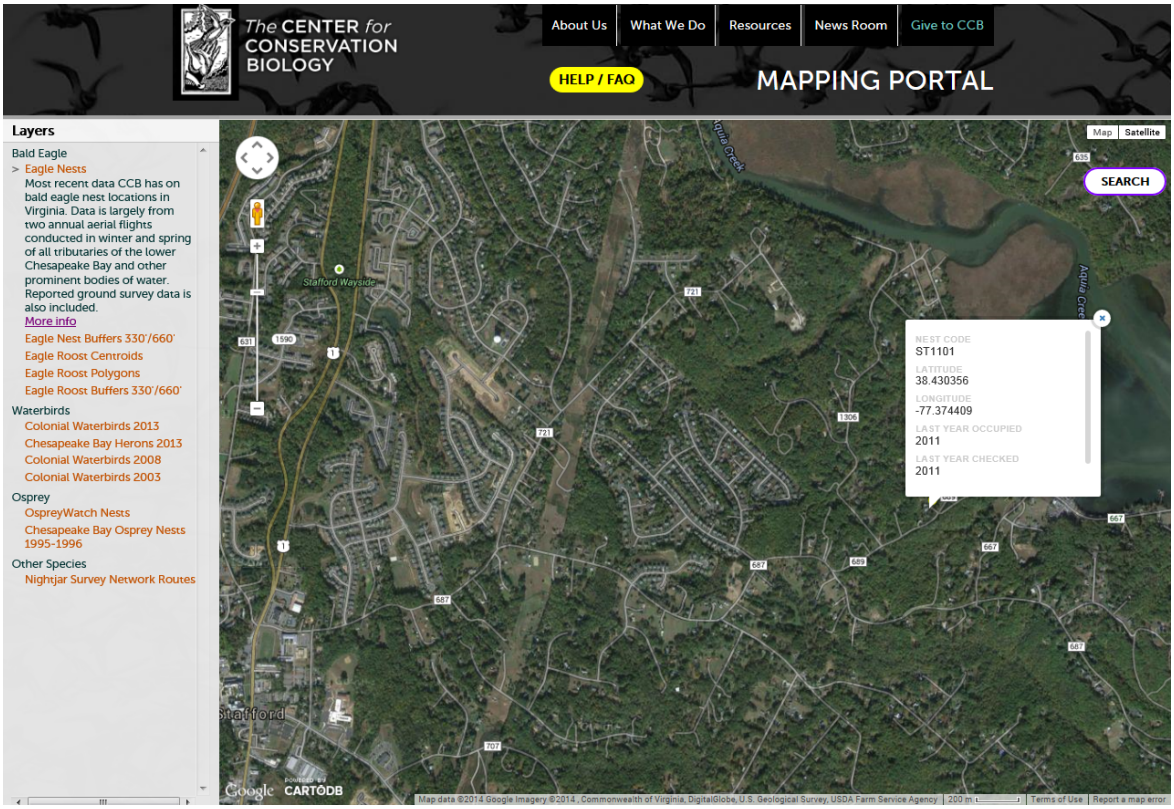
j. Once you hit "**Continue**" an email with a link will be sent to the email provided in the pop-up. Clicking that link will prompt the system to send an email with your official species list. Save email to the permit folder on the U drive.

<u>Step 2: Eagle Nest and Concentration</u>.

a. Find your project site on The Center for Conservation Biology Eagle Nest Locator Portal: http://www.ccbbirds.org/what-we-do/research/species-of-concern/virginia-eagles/nest-locator/. The mapping portal is located half way down the page.

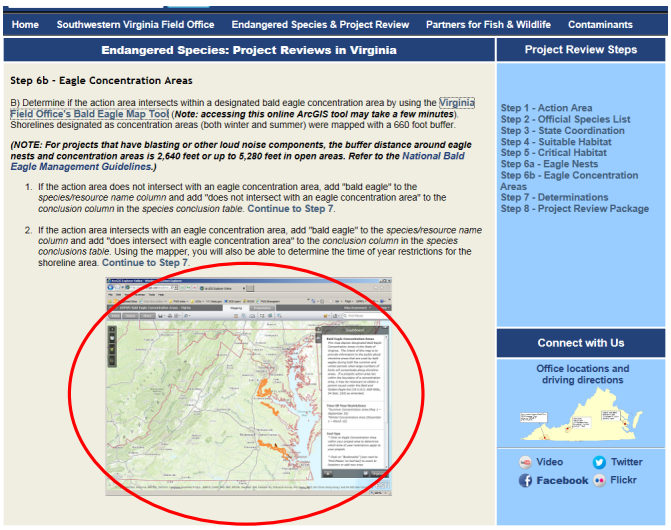


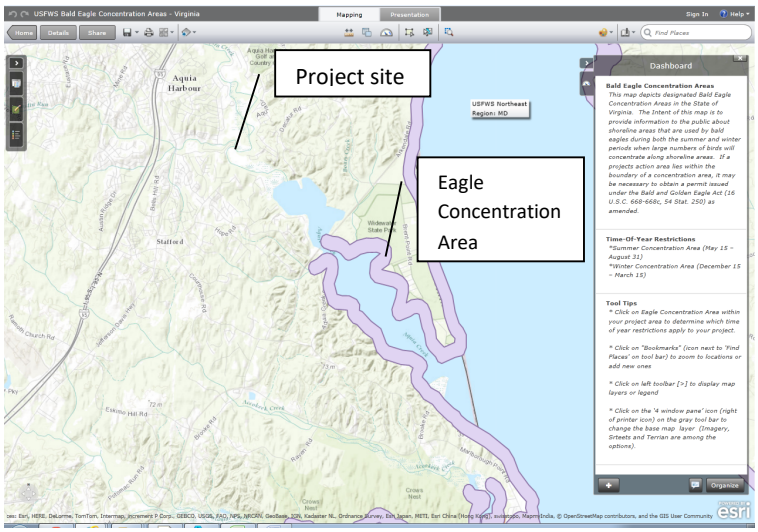
b. After locating your project site, determine if there are any nests located within 660 feet. The yellow dots on the map indicate eagle nests. Zoom down to 200m resolution and print screen to PDF or take a screen shot (push control, alternate, shift, and print screen keys all at the same time) and paste into a Word document. Save a PDF of the document to the permit folder on the U drive.



c. Eagle Concentration Areas Determination: Use the following link to determine if your project site is within an Eagle Concentration Area: http://www.fws.gov/northeast/virginiafield/endangered/projectreviews_step6b.html

d. Follow the steps located on the page. You will be utilizing the ArcGIS map to find your project and to determine if the site is within an established concentration area.





e. Print screen to PDF or take a screen shot (push control, alternate, shift, and print screen keys all at the same time) and paste into a Word document. Save a PDF of the document to the permit folder on the U drive.

Step 3: Species Conclusion Table.

a. Gather the DCR and DGIF reports and FWS Species List and any threatened and endangered species information in the JPA.

b. Open Species Conclusion Table. Find the species located on the Official Species List in the drop down menu of the Species Conclusion Table.

Endangered Species Act Species List

There are a total of 2 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Clams	Status	Has Critical Habitat	Condition(s)
Dwarf wedgemussel *(Alasmidonta heterodon)* Population: Entire	Endangered		
Flowering Plants			
harperella *(Ptilimnium nodosum)*	Endangered		

Species Conclusions Table

Project Name:

Date:

Auto populated once conclusion is selected

Auto populated once species is selected

Species/Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Species Info / Habitat Description	Notes / Determination
Dwarf wedgemussel (Alasmidonta heterodon)	No suitable bitat present	No effect	"Found in small creeks to deep rivers in stable habitat with substrates ranging from mixed sand, pebble and gravel, to clay and silty sand. In the southern portion of its range, it is often found buried under logs or root mats in shallow water, where in the northern portion of its range, it may be found in firm substrates of mixed sand, gravel or cobble, or embedded in clay banks in water depths of a few inches to greater than 20 feet."	
Dwarf wedgemussel(Alasmidon Eastern prairie fringed orchid(P Fanshell(Cyprogenia stegaria) Finback whale(Balaenoptera ph Finerayed pigtoe(Fusconaia cur Green blossom (pearlymussel)(E Green sea turtle(Chelonia myda Grey bat(Myotis grisescens)	suitable bitat present	No effect	"Harperella typically occurs in two habitat types: (1) rocky or gravel shoals and margins of clear, swift-flowing stream sections; and (2) edges of intermittent pineland ponds in the coastal plain."	
Eagles (Haliaeetus leucocephalus)				
Eagle Nests	nesting bald	No Eagle Act permit required		
Areas	with bald eagle	Eagle Act permit may be required		special condition added to SPGP SC Form
Critical Habitat				
Other (other species not listed above or required coordination for NOAA, DCR, & VDGIF)				

Auto populated once conclusion is selected

c. Once the species is selected, the **Species info/Habitat Description** column will auto populate. Use this information and information located in the JPA to determine if habitat is present. Use the dropdown menu in

the **Conclusion** column to select your determination. **Appendix C, NAO ESA Project Review Procedure** can be used to conclude your determination. The **ESA Section 7/Eagle Act Determination** column will auto populate once a conclusion is selected in the **Conclusion** column. Insert any supportive information for your determination in the **Notes/Determination** column.

d. Determine if the site will disturb an eagle nest or if in an eagle concentration area. The **ESA Section 7/Eagle Act Determination** column will auto populate once a conclusion is selected in the **Conclusion** column.

e. Add any federally listed and proposed species listed in the DCR and DGIF searches in the **Other** section of the form and determine conclusion and determination. This section will not auto populate and must be manually entered.

f. See **Appendix C**, **ESA Agency Coordination Procedures** and **NAO Fish and Wildlife Coordination Act Project Review Process** of the SPGP SOP to determine if further coordination is needed.

- If further coordination is required, include the following in the coordination package:
    1) Action area on USGS
    2) Official Species List from IPaC
    3) DCR and DGIF database search results
    4) Habitat Assessment or Species surveys (if applicable)
    5) Eagle nest area map
    6) Species Conclusion Table
    7) Completed Project Review Request Letter (see GP startup templates)
    8) Any other information that supports conclusions

SPGP Procedures/Coordination Outline

Step 1: Determine if the project qualifies for the SPGP using the most current SPGP SOP.

- Residential, commercial, and institutional development activities. Threshold is one acre and/or 2,000 lf of stream channel.

- Linear projects (roads, runways, etc). Threshold is 0.3 acre and/or 2,000 lf of stream channel unless otherwise indicated in SPGP SOP.

NOTE: An USACE Nationwide Permit authorization does not constitute as a valid approved jurisdictional determination for the entire project site on a SPGP application.

Step 2: Coordinate permit application.

- Residential, commercial, and institutional development activities.
    - Section 106 (Historic) – See SPGP SOP for appropriate coordination procedures.
    - Section 7 (T&E) – See SPGP SOP and Section 7 Procedures for coordination procedures.
    - Federal Coordination (impacts over 300 lf or 0.5 acre)

- Linear projects (roads, runways, etc).
    - Section 106 (Historic) – See SPGP SOP for appropriate coordination procedures.
    - Section 7 (T&E) – See SPGP SOP and Section 7 Procedures for coordination procedures.
    - Federal coordination (impacts over 300 lf at any single impact area or cumulatively exceed 0.3 acre and/or 300 linear feet)

    NOTE: For linear projects only, the USACE Program Manager (PM) for the project is determined based on project funding. If you do not know if there is federal funding, contact the agent or applicant to inquire.

        - Federal funding: Send appropriate coordination information to Ms. Regena at (regena.d.bronson@usace.army.mil). If she assigns the project to another PM, coordinate with the assigned USACE PM for subsequent coordination/information material.

        - Non-federal funding: Send appropriate coordination information to the USACE PM for that county.

Step 3: Draft permit. Either separate issuance or in conjunction with VWP permit. The SPGP does not have a mandated timeframe as to when it must be authorized.

- Follow permit templates located in templates folder.

NOTE: Culverts: Permitting scenarios regarding impacts associated with existing culverts:

Replacement of existing culvert: The existing culvert length is considered a permanent impact but compensation is typically not required. However, if the culvert is to be upgraded in size, compensation may be

required for impact to surface waters beyond the original culvert length/original structure impact if it exceeds the 300 lf threshold. The length of the proposed impact is measured along the length of the stream at its preconstruction location rather than along the location of the new culvert and includes any rip rap or stabilization measures within the surface water

Extension of existing culvert without replacement: The existing culvert proposed to be left in place but extended and/or stabilization measures implemented is not considered a permanent impact. The extension and any stabilization measures are considered permanent and included as proposed permanent impacts and compensation provided if the 300 lf threshold is exceeded.

Revised 09/30/14 TMB

Modification of the SPGP

Modifications of an authorized 12-SPGP-01 can occur in accordance with the 12-SPGP-01 the 12-SPGP-01 SOP. The below provides a summary of USACE coordination requirement but you must read the SOP and any reference emails in this procedures folder.

Permit Modifications that qualify for a Planned Change for the VWP permit without any previous Section 7 or Section 106 Special Conditions Form or MOA.	
Information from DEQ to USACE	**Information From USACE to DEQ**
None (No coordination Required)	None (No coordination Required)

Modifications to increase impacts that cause a project exceed the ½ or 300 lf thresholds that did not before. Any project that requires a termination and re-issuance for the VWP permit.	
Information from DEQ to USACE	**Information From USACE to DEQ**
* A copy of the JPA. * A copy of any additional information requests that the VDEQ has forwarded to the applicant. * A copy of the SPGP Initial Cultural Resources Screening Form if the VDEQ-CRS determines a Corps Section 106 determination is required in accordance with the SPGP PA. * A copy of the IPAC report, SCT and T/E surveys if formal Section 7 consultation is required	* Notification, in writing, that the Section 106 process has been fulfilled. This should occur only if the VDEQ-CRS has forwarded the project on for further coordination with the Corps. DEQ must receive this prior to authorization of SPGP. * Notification that formal Section 7 consultation has been completed (if applicable). * Any comments or objections regarding the project and compensation (if the VDEQ does not receive comments within the 15-day review period they can assume the Corps has no comments). * A signed Special Conditions Form when applicable **Notification, in writing, from the VDEQ-CRS or the Corps that the Section 106 process has been completed (regardless of the 15-day suspense date).**

Generally, there are no specific steps, beyond the coordination, to modify the SPGP authorization in conjunction with the VWPP Permit. If staff runs into a situation in which the SPGP is being modified but the VWP Permit is not they consult with the supervisor.

Extensions

The USACE PN dated May 31, 2012 provides information about transition from the 07-SPGP-01 to the 12-SPGP-01.

- Because the SPGP type is identified on the cover page of the permit, staff has to complete a Notice of Planned change to update the permit coverpage with a new SPGP reference.

  - The NOPC and SPGP Codes should be entered in CEDS in accordance with CEDs

  -Update Filelog

- Note: If the SPGP was issued in a separate letter from the VWP Permit then a NOPC is not necessary to update the SPGP and staff can mail an updated SPGP letter.

Request to extend an expired 07-SPGP-01 authorizations:

This will be new issuance of the SPGP and new permit application is required by the USACE, but typically the original JPA and previous permit documents are sufficient to serve as the "new" application and get the project reauthorized.

Staff does not get a new permit number if the VWP is still valid. You process everything under the current VWP CEDS record and permit file.

In these cases, staff should use the original JPA and re-coordinate the project as new SPGP application in accordance with the 12-SPGP-01 SOP for new applications; however, staff should note in the coordination emails that this is a project that was previously authorized under a SPGP that expired and staff should provide the status of the VWP Permit. In addition, staff should attach copies of any of the previous permits or any other significant information, pertaining to previous 106, FWS comments or EPA comments.

Once the SPGP is cleared for issuance in accordance with the SPGP SOP and out procedures, you will complete a VWP NOPC to update the coverpage to include the new SPGP.

Note: If the SPGP was issued in a separate letter from the VWP Permit then a NOPC is not necessary to update the SPGP and staff can mail an updated SPGP letter.

Calculating Length of Stream Impact

Written guidance to VDOT:

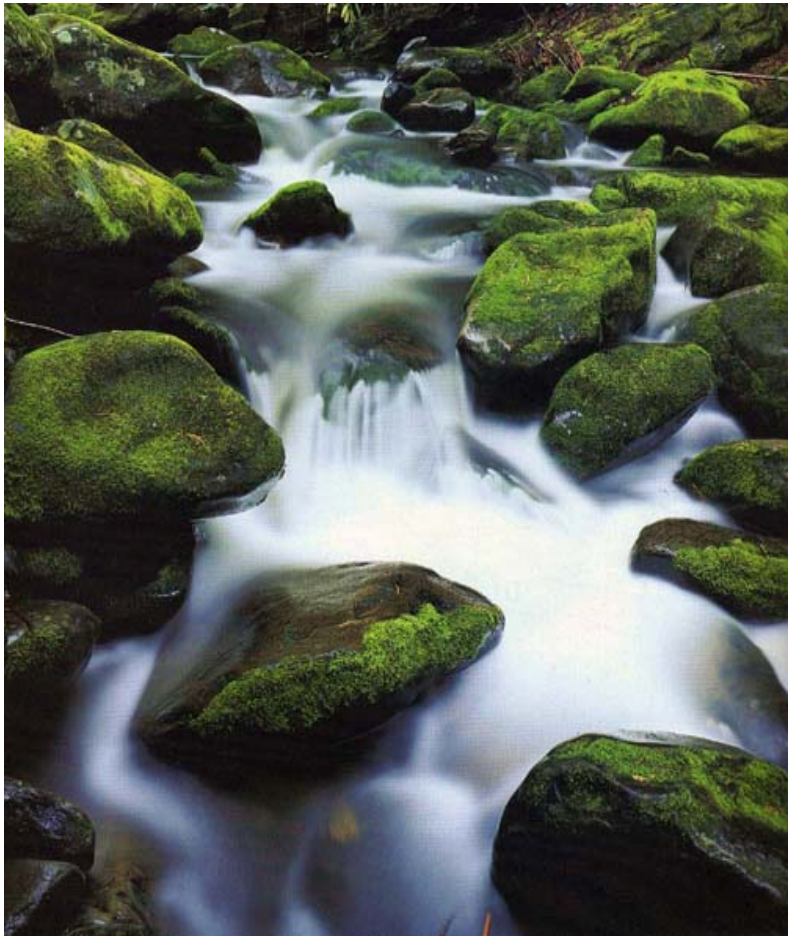
Include length of any box culvert, pipe, or bridge that is being removed and replaced,

even if the new culvert/pipe/bridge is going back in the same location .

Calculating Length of Stream Impact

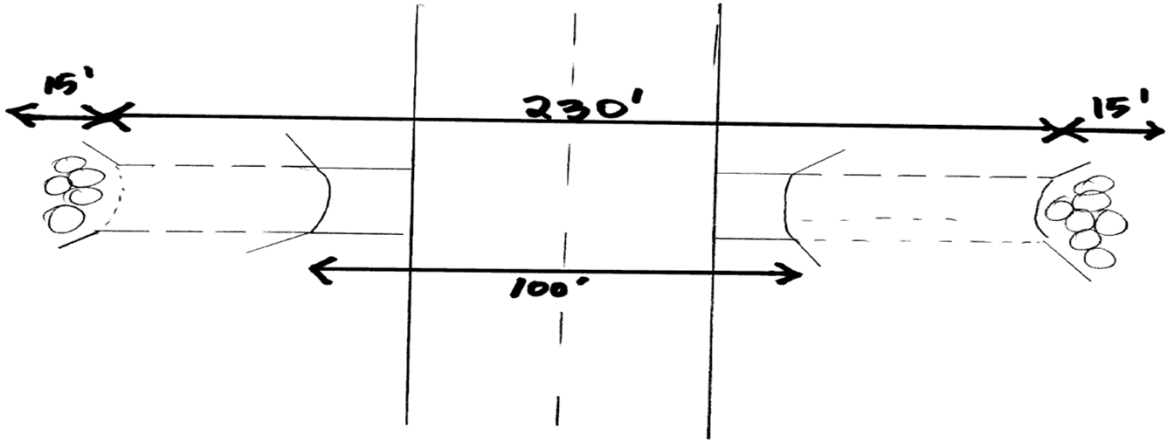
- If pipe is being ***extended*** and ***existing pipe left in place*** and not moved, then only the length and area of the new work is included in stream impact numbers.
- If riprap is being added at an existing pipe, and ***the pipe is being left in place***, only the length of stream under the riprap is included in the length of impacts.

Compensate?



- Compensation will typically not be required for the length of stream impacted by the original pipe, even though the length of the original pipe is included in the stream length impact total.

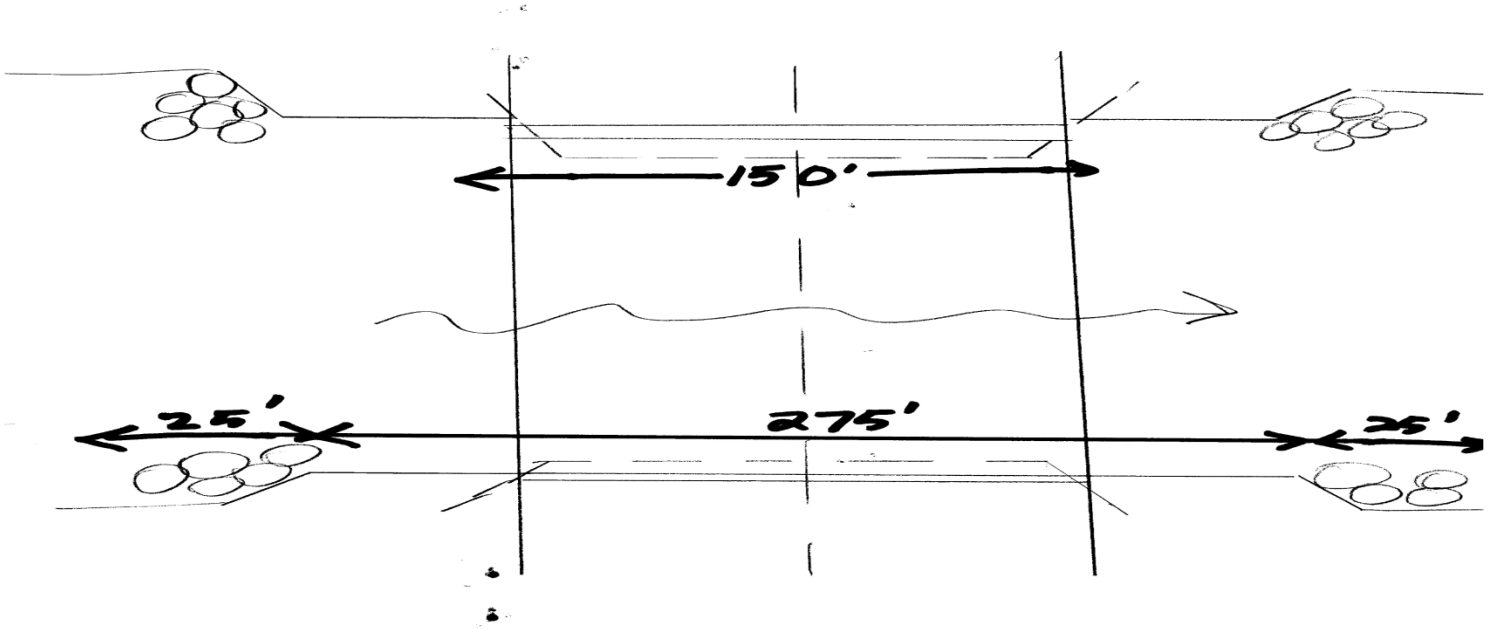
Examples



- **<u>Example 1</u>:**
  A road is being widened. Existing 100'-long pipe with no riprap at outlets being replaced with 230' pipe, with 15' of riprap at outlets. The total length of stream being impacted is 260'. Since under 300' length, stream mitigation not anticipated.

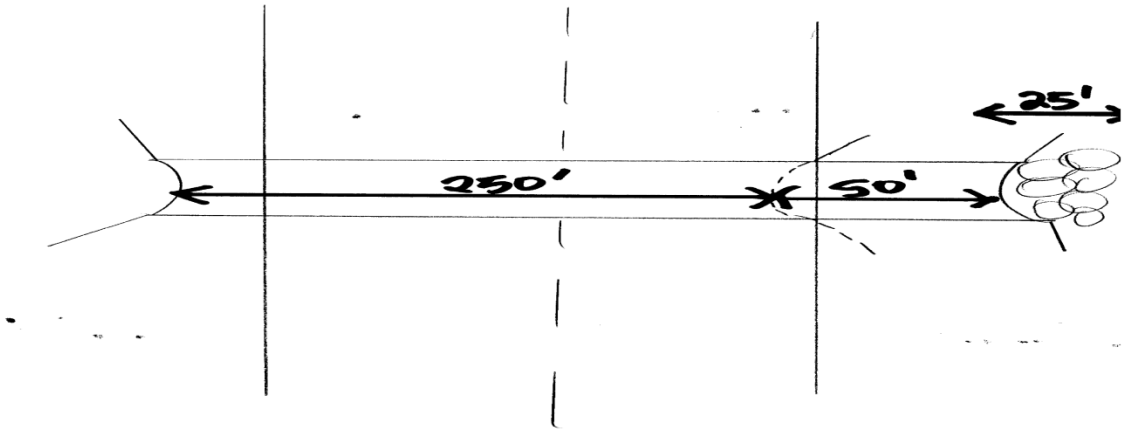
Example 2

Bridge Replacement. New abutments 275' wide w/25' of riprap at ends of abutments. Stream bottom NOT being riprapped, just the banks. Total length of stream bank impacts is 325'. Since project is a bridge, and stream bottom is being left intact under bridge, stream mitigation is not typically required, even though over 300' of stream is being impacted.

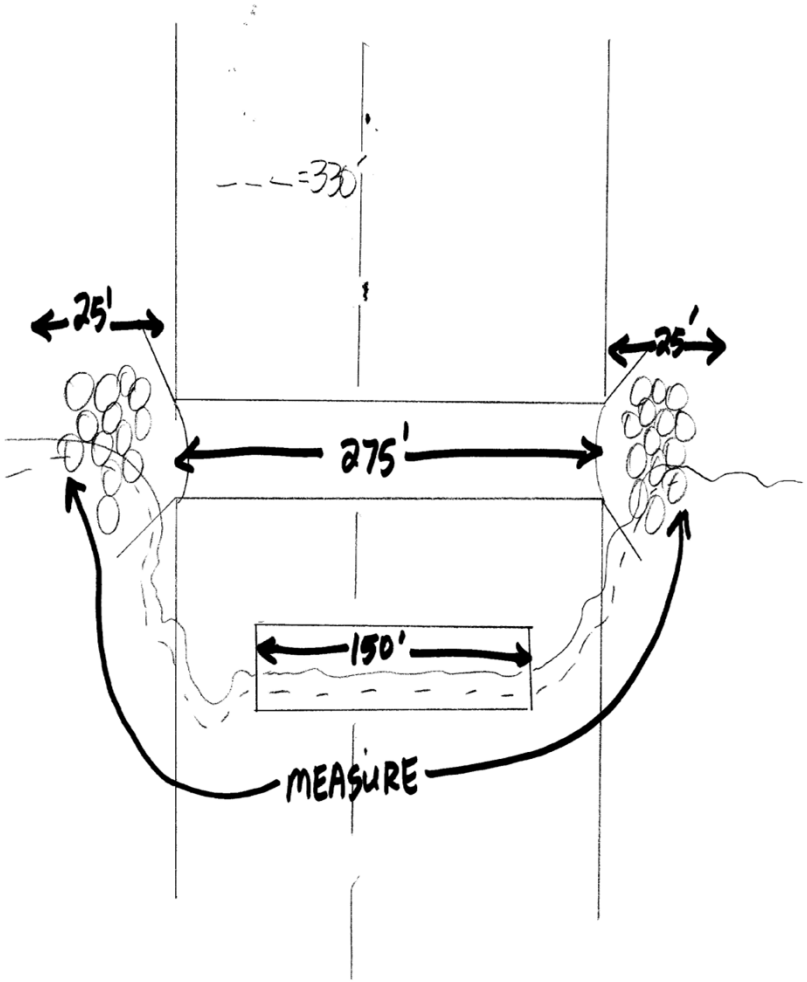


Example 3

- Road being widened. 250'-long box culvert being extended 50'; 25' of riprap at outlets. Existing culvert left in place, with extension on one end. Total length of stream impacts is 75'. No stream mitigation is required.



Example 4



New pipe + riprap = 325' but total length of impact = 330' due to meanders in stream.

Compensation not required for old pipe so 330 – 150 = 180 (and use USM)

Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions

U.S. Fish and Wildlife Service
Regions 2, 3, 4, 5, and 6

Prepared by:
U.S. Fish and Wildlife Service
Midwest Regional Office
Bloomington, Minnesota
January 5, 2016

Lynn Lewis

Lynn Lewis, Assistant Regional Director, R3

1/5/16

Date

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EXECUTIVE SUMMARY

This Endangered Species Act (Act) Biological Opinion (BO) addresses the effects to the northern long-eared bat (NLEB) resulting from the Service's finalization of a special rule under the authority of section 4(d) of the Act. It also evaluates activities that the Service proposes to prohibit and except from take prohibitions under the final 4(d) rule. In the request for intra-Service consultation, the Service proposes a framework for streamlined section 7 consultation for other federal actions that may affect the NLEB and are consistent with the provisions of the 4(d) rule. This is a programmatic intra-Service consultation, because it addresses multiple actions on a program basis conducted under the umbrella of the final 4(d) rule. The Service has not designated or proposed critical habitat for the NLEB; therefore, this BO does not address effects to critical habitat. Because we anticipate continued NLEB declines as white-nose syndrome (WNS) spreads, this BO will cover the next 7 years that the disease is minimally expected to spread and impact the NLEB throughout its entire range. The Service will reinitiate consultation by the end of 2022 or earlier if the standard reinitiation criteria are triggered.

The final rule addresses both purposeful take and incidental taking of the NLEB, with certain differences distinguished based on the occurrence of WNS as follows:

- The final 4(d) rule prohibits purposeful take of NLEBs throughout the species' range, except when (1) necessary to protect human health; (2) in instances of removal of NLEBs from human structures; or (3) the authorized capture and handling of NLEBs by individuals permitted to conduct these same activities for other bat species until May 3, 2016.
- The final 4(d) rule does not prohibit incidental take resulting from otherwise lawful activities in areas not yet affected by WNS (i.e., areas outside of the WNS zone).
- Within the WNS zone, the final 4(d) rule prohibits incidental take of NLEBs in their hibernacula, which may be caused by activities that disturb or disrupt hibernating individuals when they are present as well as the physical or other alteration of the hibernaculum's entrance or environment when bats are not present.
- Incidental take of NLEBs outside of hibernacula resulting from activities other than tree removal is not prohibited provided they do not result in the incidental take of NLEBs inside hibernacula.
- Incidental take resulting from tree removal is prohibited if it: (1) occurs within 0.25 miles (0.4 km) of known NLEB hibernacula; or (2) cuts or destroys known, occupied maternity roost trees or any other trees within a 150-foot (45-meter) radius around the known, occupied maternity tree during the pup season (June 1 to July 31).
- Removal of hazardous trees for the protection of human life and property is not prohibited.

Federal agencies can rely upon the finding of this BO to fulfill their project-specific section 7(a)(2) responsibilities if they utilize the optional framework as described. The framework requires prior notification of activities that may affect the NLEB, along with a determination that the action would not cause prohibited incidental take. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates project-level consultation for the NLEB is required. If the Service does not respond within 30 days, the action agency may consider its project responsibilities under section 7(a)(2) with respect to the NLEB fulfilled through this programmatic BO. Action agencies must also report if actions deviate from the determination, along with the surveys of any surveys.

The Action Area addressed in this BO includes the entire range of the NLEB within the United States, which includes all or portions of 37 States and the District of Columbia from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to South Carolina. Within the Action Area, the WNS zone currently includes all or most of the states within the species' range except North Dakota, Montana, South Dakota, and Wyoming.

Status of the NLEB

The disease WNS is the primary factor affecting the status of the NLEB, which has caused dramatic and rapid declines in abundance. Data support substantial declines in the Eastern range and portions of the Midwest range. We expect further declines as the disease continues to spread across the species' range. NLEBs continue to be distributed across much of the historical range, but there are many gaps where bats are no longer detected or captured, and in other areas, their occurrence is sparse given local declines and extirpations. Although significant NLEB population declines have only been documented due to the spread of WNS, other sources of mortality could further diminish the species' ability to persist as it experiences ongoing dramatic declines.

We estimate that the range-wide population of NLEBs is comprised of about 6.5 million adults. This population estimate was calculated for the purposes of assessing the potential relative impact of activities contemplated in this BO, and it has limitations and a substantial amount of uncertainty.

Effects of the Action

The NLEB is likely to be affected by many activities which are not prohibited in the final 4(d) rule. We address the general effects of different activities, which we categorized into 7 general groups: (1) capture and handling of NLEBs by individuals with section 10(a)(1)(A) permits for other listed bats or State permits until May 3, 2016; (2) removal from human structures; (3)

timber harvest; (4) prescribed fire; (5) forest conversion; (6) wind turbine operation; and (7) other activities that may affect the NLEB. The effects of category #1 are not addressed in this consultation.

Based on the available scientific literature, we identified various pathways by which environmental changes (stressors) caused by the Action may affect individual NLEB and the expected responses of individuals exposed to the stressors. General response categories include potentially increased fitness, reduced fitness, disturbance, and harm. We do not have enough information to quantify the effects of removal from human structures and the "other" category of activities that may affect the NLEB. For pathways associated with timber harvest, prescribed fire, and forest conversion, we estimate the number of NLEB individuals exposed by computing the expected overlap between the activities and NLEB-occupied habitats in each state. For wind turbine operation, we estimate the number of bats that could be killed using the current and projected amount of wind energy development and information on bat mortality rates.

Based on these estimations, we anticipate that up to 117,267 NLEB (1.2% of the total population) will be disturbed and 3,285 pups (0.1% of the total pup population) and 980 adults (less than 0.02% of the total adult population) will be harmed annually from timber harvest, prescribed fire, forest conversion, and wind turbine operation. We consider these numbers to be overestimates based on our methodology. Additional harm is anticipated for the unquantified effects from removal from human structures and "other" activities that may affect the NLEB; however, we do not expect the additional impacts to substantially change the total numbers estimated. In addition, we also expect that the numbers affected over time will be reduced as WNS continues to affect the range-wide population.

Although local populations could be affected by the implementation of the final 4(d) rule, most of the states have larger populations and more maternity colonies. In addition, less than 2.3% of NLEBs will be disturbed in all states, less than 1% of pups will be harmed in all states, and less than 1% of adults will be harmed in all states. Therefore, the vast majority of individuals and populations that survive WNS will be unaffected by these activities. Based on the relatively small numbers affected annually compared to the state population sizes, we conclude that adverse effects from timber harvest, prescribed fire, forest conversion, wind energy, and other activities will not lead to population-level declines in this species.

Conclusion

WNS is the primary factor affecting the status of the NLEB, which has caused dramatic and rapid declines in abundance, resulting in the local extirpation of the species in some areas. Our analysis of the effects of activities that may affect the NLEB, but do not cause prohibited take, indicates that the additional loss of individual NLEB resulting from these activities would not

exacerbate the effects of WNS at the scale of states within its range. Even if all anthropogenic activities that might adversely affect NLEB ceased, we do not believe that the resulting reduction in adverse effects would materially change the devastating impact WNS has had, and will continue to have, on NLEB at the local population level or at larger scales.

After reviewing the current status of the NLEB, environmental baseline, effects of the Action, and cumulative effects, it is the Service's biological opinion that the Action, as proposed, is not likely to jeopardize the continued existence of the NLEB.

This BO has evaluated major categories of actions that may affect the NLEB, but for which incidental take is not prohibited. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions. Federal agencies may rely on this BO to fulfill their project-specific section 7(a)(2) responsibilities under the framework specified in this BO. Prohibited incidental take requires either a separate consultation (federal actions) or an incidental take permit (non-federal actions).

BIOLOGICAL OPINION

A Biological Opinion (BO) is the document required under the Endangered Species Act of 1973 (Act), as amended, that states the opinion of the U.S. Fish and Wildlife Service (Service) as to whether a proposed federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat.

The action evaluated in this BO is the Service's finalization of a special rule under the authority of section 4(d) of the Act for the northern long-eared bat (*Myotis septentrionalis*) (NLEB). Section 9 of the Act generally prohibits the "take" of a species listed as endangered. The Act and its implementing regulations (50 CFR 17) define take as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. The Act does not specify particular prohibitions for threatened species. Instead, under section 4(d), the Secretary of the Interior has the discretion to issue such regulations to provide for the conservation of threatened species, which may include prohibitions under section 9. This BO also evaluates activities that the Service proposes to prohibit and except from take prohibitions under the final 4(d) rule. In the request for intra-Service consultation, the Service proposes a framework for streamlined section 7 consultation for other federal actions that may affect the NLEB and are consistent with the provisions of the 4(d) rule. This is a programmatic intra-Service consultation, because it addresses multiple actions on a program basis under the umbrella of activities excepted from take prohibitions in the Service's final 4(d) rule.

"To jeopardize the continued existence of a listed species" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species (50 CFR §402.02). This BO examines whether projects and activities implemented that are likely to adversely affect the NLEB, but would not cause take prohibited under the final 4(d) rule , are likely to jeopardize the continued existence of the NLEB.

The Service anticipates that white-nose syndrome (WNS), the disease causing the decline of the species, will spread throughout the range of the NLEB by 2023-2028 (Federal Register [FR]80[63]:17974). In listing rule, we determined that the NLEB is not currently in danger of extinction throughout all of its range, but if similar declines occur after WNS spreads throughout its entire range, the NLEB may be in danger of extinction. We expect that the status of the species will continue to decline as WNS reaches new areas; therefore, this BO will cover the next 7 years that the disease is minimally expected to spread and impact the NLEB throughout its entire range. The Service will reinitiate consultation by the end of 2022 or earlier if the reinitiation criteria described in Section 7 (Reinitiation Notice) of this BO are triggered. We believe this is a reasonable approach given that the range-wide decline of the NLEB due to WNS

may reveal that the action may affect the NLEB in a manner or to an extent not previously considered.

1 DESCRIPTION OF THE PROPOSED ACTION

1.1 BACKGROUND

The proposed action is the finalization of the interim 4(d) rule for the NLEB and evaluation of activities excepted from take prohibitions. This rule replaces an interim 4(d) rule established concurrently with the listing of the NLEB as a threatened species on April 2, 2015 (FR 80[63]:17974), under the Act. The interim 4(d) rule:

(1) prohibits purposeful take of NLEBs throughout the species' range, except in instances of removal of NLEBs from human structures;
(2) authorized capture and handling of NLEB by individuals permitted to conduct these same activities for other bats (for a period of 1 year after the effective date of the interim 4(d) rule);
(3) in areas not yet affected by white-nose syndrome (WNS), all incidental take resulting from any otherwise lawful activity is excepted from prohibition;
(4) in areas currently known to be affected by WNS, all incidental take prohibitions apply, except take attributable to forest management practices, maintenance and limited expansion of transportation and utility rights-of-way, prairie habitat management, and limited tree removal projects, provided these activities protect known maternity roosts and hibernacula; and
(5) removal of hazardous trees for the protection of human life or property is excepted from the take prohibition.

The listing and interim 4(d) rule went into effect on May 4, 2015, and the interim 4(d) rule remains in effect until a final 4(d) rule is published in the Federal Register.

1.2 U.S. FISH AND WILDLIFE SERVICE ACTION

The Service is finalizing the interim 4(d) rule for the NLEB. The final rule will address both purposeful take and incidental taking of the NLEB, with certain differences distinguished based on the occurrence of WNS. The final 4(d) rule prohibits purposeful take of NLEBs throughout the species' range, except when:

- necessary to protect human health;
- in instances of removal of NLEBs from human structures; or

- the authorized capture and handling of NLEBs by individuals permitted to conduct these same activities for other bat species until May 3, 2016.

After May 3, 2016, a permit pursuant to Section 10(a)(1)(A)[1] of the Act is required for the capture and handling of NLEBs outside of human structures. We define human structures as houses, garages, barns, sheds, and other buildings designed for human entry.

"Incidental taking" is defined at 50 CFR 17.3 as "any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, an otherwise lawful activity." Incidental take within the context of the final 4(d) rule is regulated in distinct and separate manners relative to the geographic location of the proposed activity and the occurrence of WNS. The WNS zone provides the boundary for implementation of the final rule. It is defined as the set of counties with confirmed evidence of the fungus causing the disease (*Pseudogymnoascus destructans*, or Pd) or WNS, plus a 150-mile (241 km) buffer from the Pd-positive county line to account for the spread of the fungus from one year to the next. In instances where the 150-mile (241 km) buffer line bisects a county, the entire county is included in the WNS zone. The final 4(d) rule does not prohibit incidental take resulting from otherwise lawful activities in areas not yet affected by WNS (i.e., areas outside of the WNS zone).

Within the WNS zone, the final 4(d) rule prohibits incidental take of NLEBs in their hibernacula (which includes caves, mines, and other locations where bats hibernate in winter). Take of NLEBs inside of hibernacula may be caused by activities that disturb or disrupt hibernating individuals when they are present as well as the physical or other alteration of the hibernaculum's entrance or environment when bats are not present, if the activity will impair essential behavioral patterns (e.g., sheltering) and cause harm. Known hibernacula are defined as locations where one or more NLEBs have been detected during hibernation or detected at the entrance during fall swarming or spring emergence. Any hibernaculum with NLEBs observed at least once is considered a known hibernaculum as long as it remains suitable for NLEB use. A hibernaculum remains suitable for NLEBs even when Pd or WNS has been detected.

For NLEBs outside of hibernacula within the WNS zone, the final 4(d) rule establishes separate incidental take prohibitions for activities involving tree removal and those that do not involve tree removal. Incidental take of NLEBs outside of hibernacula resulting from activities other than tree removal is not prohibited provided they do not result in the incidental take of NLEBs inside hibernacula or otherwise impair essential behavioral patterns at known hibernacula. Incidental take resulting from tree removal is prohibited if it: (1) occurs within 0.25 miles (0.4 km) of known NLEB hibernacula; or (2) cuts or destroys known, occupied maternity roost trees or any other trees within a 150-foot (45-meter) radius around the known, occupied maternity tree during the pup season (June 1 to July 31). Removal of hazardous trees for the protection of human life

[1] Section 10(a)(1)(A) describes recovery/scientific permits issued for the enhancement of the survival of the species.

and property is not prohibited. Known, occupied maternity roost trees are defined as trees that have had female NLEBs or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Known, occupied maternity roost trees are considered known roosts as long as the tree and surrounding habitat remain suitable for the NLEB.

The final 4(d) rule individually sets forth prohibitions on possession and other acts with unlawfully taken NLEBs, and on import and export of NLEBs. Under this rule, take of the NLEB is also not prohibited for the following: removal of hazardous trees for protection of human life and property; take in defense of life; and take by an employee or agent of the Service, of the National Marine Fisheries Service, or of a State conservation agency that is operating a conservation program pursuant to the terms of a cooperative agreement with the Service.

Section 4(d) of the Act states that the Secretary shall issue such regulations as she deems "necessary and advisable to provide for the conservation" of species listed as threatened species. The Service determined that the final 4(d) rule is necessary and advisable to provide for the conservation of the NLEB, because it provides for temporary protection of known maternity roost trees during the pup season and to known hibernacula within the WNS zone, and it prohibits most forms of purposeful take throughout the species range. The final rule describes how prohibiting certain types of take is not necessary for the long-term survival of the species, and it acknowledges the importance of addressing the threat of WNS as the primary measure to arrest and reverse the decline of the species.

1.3 OTHER FEDERAL AGENCY ACTIONS

Federal agency actions that involve activities that involve activities not prohibited under the final 4(d) rule may result in effects to the NLEB if the species is exposed to action-caused stressors. Incidental take resulting from these activities is not prohibited; however, the final 4(d) rule does not alter the requirements for consultation under section 7 of the Act, which apply to all federal actions that may affect listed species and designated critical habitat. Section 7(a)(2) of the Act, directs federal agencies, in consultation with the Secretary, to insure that their actions are not likely to jeopardize the continued existence of any listed species, or result in the destruction or adverse modification of designated critical habitat. Therefore, the purpose of section 7(a)(2) is broader than an evaluation of anticipated take and issuance of an Incidental Take Statement.

To address the broader purpose of 7(a)(2) for federal actions that may affect the NLEB but would not cause take prohibited under the final 4(d) rule, the Service's Headquarters Office has requested intra-agency formal consultation with the Service's Midwest Regional Office on the effects of all such federal actions. Because the Service has determined with the final 4(d) rule that regulating incidental take associated with the excepted activities is not necessary or advisable for the conservation of the NLEB, Service Headquarters proposes an optional

framework for subsequent federal agency reliance on the findings of an intra-Service consultation that would streamline section 7(a)(2) compliance for such activities. The primary objective of the framework is to provide an efficient means for Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in the intra-Service consultation and do not require an incidental take statement for the NLEB. Such verification is necessary because incidental take is prohibited in the vicinity of known hibernacula and known roosts, and these locations are continuously updated. We do not include specific action agencies or their specific actions in this BO; rather, we focus on the types of activities that may affect the NLEB and conduct our jeopardy analysis on these activities. Federal agencies may rely on this BO to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the NLEB, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the NLEB, but would not cause prohibited incidental take. This documentation must follow these procedures:

    a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. Activities that will occur within 0.25 mile of a known hibernacula or within 150 feet of known, occupied maternity roost trees during the pup season (June 1 to July 31) are not excepted pursuant to the final 4(d) rule. This determination must be updated annually for multi-year activities.
    b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
    c. For this determination, the action agency will rely on the definitions of prohibited activities provided in the final 4(d) rule and the activities considered in this consultation.
    d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
    e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
    f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the NLEB is required; i.e., where the proposed project includes an activity not covered by the 4(d) rule and thus not addressed in the Biological Opinion and is subject to additional consultation.
    g. If the Service does not respond within 30 days under (f) above, the action agency

may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the NLEB fulfilled through this programmatic Biological Opinion.

2. Reporting
    a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
    b. The action agency must provide the results of any surveys for the NLEB to the appropriate Service Field Office within their jurisdiction.
    c. Parties finding a dead, injured, or sick NLEB must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures to all Federal agencies whose actions may affect the NLEB:

1. Perform NLEB surveys according to the most recent Range-wide Indiana Bat/NLEB Summer Survey Guidelines. Benefits from agencies voluntarily performing NLEB surveys include:
    a. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. The Service and partners will use the survey data to better understand habitat use and distribution of NLEB, track the status of the species, evaluate threats and impacts, and develop effective conservation and recovery actions. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the NLEB.
    b. Should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could inform greater flexibility under section 7(a)(2) of the Act. Such information could facilitate an expedited consultation and incidental take statement that may, for example, exempt taking associated with tree removal during the active season, but outside of the pup season, in known occupied habitat.
2. Apply additional voluntary conservation measures, where appropriate, to reduce the

impacts of activities on NLEBs. Conservation measures include:

a. Conduct tree removal activities outside of the NLEB pup season (June 1 to July 31) and/or the active season (April 1 to October 31). This will minimize impacts to pups at roosts not yet identified.
b. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed NLEB hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).
c. Manage forests to ensure a continual supply of snags and other suitable maternity roost trees.
d. Conduct prescribed burns outside of the pup season (June 1 to July 31) and/or the active season (April 1 to October 31). Avoid high-intensity burns (causing tree scorch higher than NLEB roosting heights) during the summer maternity season to minimize direct impacts to NLEB.
e. Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the NLEB active season (April 1 to October 31) in areas where NLEB are known to roost on bridges or where such use is likely.
f. Do not use military smoke and obscurants within forested suitable NLEB habitat during the pup season (June 1 to July 31) and/or the active season (April 1 to October 31).
g. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
h. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
i. Participate in actions to manage and reduce the impacts of white-nose syndrome on NLEB. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal agencies (Service 2011).

1.4 ACTION AREA

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment.

The “Action Area” for this consultation includes the entire range of the NLEB within the United States, which includes all or portions of the following 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming. Within the Action Area, the WNS

zone currently includes all or most of the states within the species' range except North Dakota, Montana, South Dakota, and Wyoming (Figure 1.1) (note: tables and figures for each major section of this BO appear at the end of the section). The WNS zone map is updated on the first of every month (http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf).

1.5 ACTIVITIES NOT EVALUATED IN THIS BIOLOGICAL OPINION

The following general categories of activities are prohibited under the final 4(d) rule within the WNS zone:

1. Activities resulting in the disruption or disturbance of NLEBs in their hibernacula.
2. Activities resulting in the physical or other alteration of a hibernaculum's entrance or its environment at any time of year.
3. Tree clearing activities within 0.25 miles of a known NLEB hibernaculum.
4. Tree clearing activities that result in cutting or destroying known, occupied maternity roost trees or any other trees within a 150 ft radius around the roost tree during the pup season (June 1 – July 31).

Separate project-specific section 7 consultation is required for these activities; therefore, they are not addressed further in this consultation.

1.6 TABLES AND FIGURES FOR DESCRIPTION OF THE ACTION

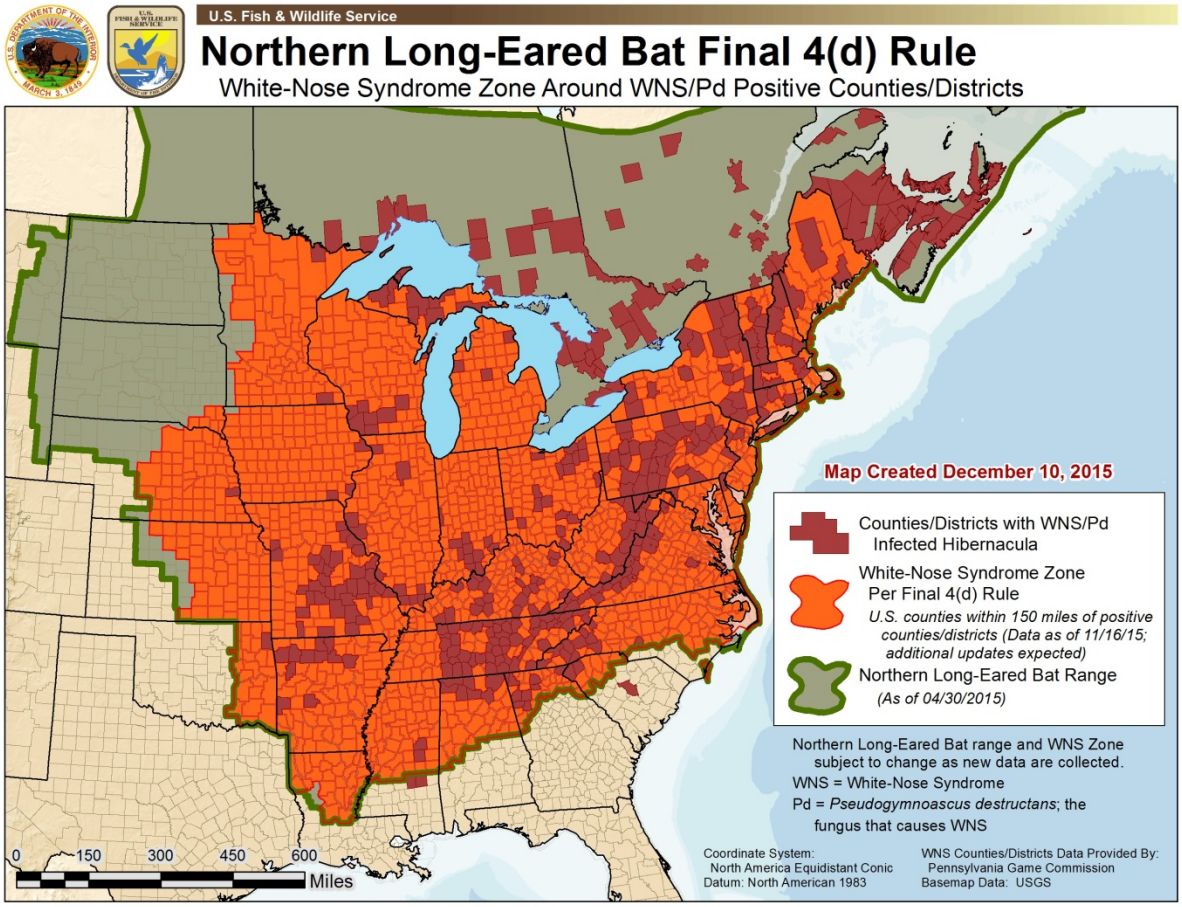

Figure 1.1. The NLEB WNS Zone around WNS/Pd positive counties or districts.

2 STATUS OF THE SPECIES/CRITICAL HABITAT

As described in Section 1, the Service listed the NLEB as a threatened species on April 2, 2015. The final rule determined that critical habitat designation for the NLEB was prudent, but not determinable at the time. The final listing rule describes the status of the species in detail and is hereby incorporated by reference. We summarize and paraphrase portions of the final rule in this section that are most relevant to an evaluation of the proposed Action. Additional information and citations can be found in the final listing rule.

2.1 SPECIES BACKGROUND & HABITAT

The NLEB is a temperate, insectivorous, migratory bat that hibernates in mines and caves in the winter and spends summers in wooded areas. The key stages in its annual cycle are: hibernation, spring staging and migration, pregnancy, lactation, volancy/weaning, fall migration and swarming. NLEB generally hibernate between mid-fall through mid-spring each year. The spring migration period likely runs from mid-March to mid-May each year, as females depart shortly after emerging from hibernation and are pregnant when they reach their summer area. Young are born between June and early July, with nursing continuing until weaning, which is shortly after young become volant (able to fly) in mid- to late-July. Fall migration likely occurs between mid-August and mid-October.

2.1.1 SUMMER HABITAT AND ECOLOGY

Suitable summer habitat for NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats. This includes forests and woodlots containing potential roosts, as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure.

After hibernation ends in late March or early April (as late as May in some northern areas), most NLEB migrate to summer roosts. For purposes of this BO, we define the NLEB active season as the period between emergence and hibernation from April 1 – October 31. We recognize that the active season is variable across the action area depending on latitude, elevation, and weather conditions; however, we believe this range captures most of the period throughout the range in most years. The spring migration period typically runs from mid-March to mid-May (Caire et al. 1979; Easterla 1968; Whitaker and Mumford 2009). The NLEB is not considered to be a long distance migrant (typically 40-50 miles). Males and non-reproductive females may summer near hibernacula, or migrate to summer habitat some distance from their hibernaculum.

After emergence, female NLEBs actively form colonies in the summer (Foster and Kurta 1999) and exhibit fission-fusion behavior (Garroway and Broders 2007), where members frequently coalesce to form a group, but composition of the group is in flux (Barclay and Kurta 2007). As part of this behavior, NLEBs switch tree roosts often (Sasse and Pekins 1996), typically every 2 to 3 days (Foster and Kurta 1999; Owen et al. 2002; Carter and Feldhamer 2005; Timpone et al. 2010). NLEB maternity colonies range widely in size (reported range of 7 to 100; Owen et al. 2002; Whitaker and Mumford 2009), although about 30-60 may be most common (Whitaker and Mumford 2009; Caceres and Barclay 2000; Service 2014).

NLEBs show interannual fidelity to roost trees and/or maternity areas. They use networks of roost trees often centered around one or more central-node roost trees (Johnson et al. 2012) with multiple alternate roost trees. NLEB roost in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically ≥3 inches dbh). NLEB are known to use a wide variety of roost types, using tree species based on presence of cavities or crevices or presence of peeling bark. NLEBs have also been occasionally found roosting in structures like buildings, barns, sheds, houses, and bridges (Benedict and Howell 2008; Krochmal and Sparks 2007; Timpone et al. 2010; Service 2014).

Summer home range includes both roosting and foraging areas, and range size may vary by sex. Maternity roosting areas have been reported to vary from mean of 21 to 179 acres (Owen et al. 2003; Broders et al. 2006; Lacki et al. 2009) to a high of 425 acres (Lacki et al. 2009). Foraging areas are six or more times larger (Broders et al. 2006; Henderson and Broders 2008). The distance traveled between consecutive roosts varies widely from 20 ft (Foster and Kurta 1999) to 2.4 miles (Timpone et al. 2010). Likewise, the distance traveled between roost trees and foraging areas in telemetry studies varies widely, e.g., a mean of 1,975 ft (Sasse and Perkins 1996) and a mean of 3,609 ft (Henderson and Broders 2008). Circles with a radius of these distances have an area of 281 and 939 acres. Based on reported maximum individual home range (425 acres) and travel distances between roosts and foraging areas described above (939 acres), we use 1,000 acres for purposes of this BO as the area a colony uses. An analysis of mist net survey data in Kentucky (Service 2014, unpublished data cited in the final listing rule) shows that most males and non-reproductive females are captured in the same locations as reproductively active females, suggesting substantial overlap in the summer home range of reproductive females and other individuals (94%).

NLEBs are typically born in late-May or early June, with females giving birth to a single offspring. Lactation then lasts 3 to 5 weeks, with pups becoming volant between early July and early August. For purposes of this BO and the final 4(d) rule, we define the pup season (i.e., the period of non-volancy) as June 1 – July 31.

2.1.2 WINTER HABITAT AND ECOLOGY

Suitable winter habitat (hibernacula) includes underground caves and cave-like structures (e.g. abandoned or active mines, railroad tunnels). There may be other landscape features being used by NLEB during the winter that have yet to be documented. Generally, NLEB hibernate from October to April depending on local climate (November-December through March in southern areas with emergence as late as mid-May in some northern areas).

Hibernacula for NLEB typically have significant cracks and crevices for roosting; relatively constant, cool temperatures (0-9 degrees Celsius) and with high humidity and minimal air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. Within hibernacula, surveyors find them in small crevices or cracks, often with only the nose and ears visible.

NLEB tend to roost singly or in small groups (Service 2014), with hibernating population sizes ranging from just a few individuals to around 1,000 (Service unpublished data). NLEB display more winter activity than other cave species, with individuals often moving between hibernacula throughout the winter (Griffin 1940; Whitaker and Rissler 1992; Caceres and Barclay 2000). NLEB have shown a high degree of philopatry (i.e., using the same site multiple years) to the hibernacula used, returning to the same hibernacula annually.

2.1.3 SPRING STAGING AND FALL SWARMING HABITAT AND ECOLOGY

Upon arrival at hibernacula in mid-August to mid-November, NLEB “swarm,” a behavior in which large numbers of bats fly in and out of cave entrances from dusk to dawn, while relatively few roost in caves during the day. Swarming continues for several weeks and mating occurs during the latter part of the period. After mating, females enter directly into hibernation but not necessarily at the same hibernaculum at which they had been mating. A majority of bats of both sexes hibernate by the end of November (by mid-October in northern areas).

Reproductively active females store sperm through the winter from autumn copulations. Ovulation takes place after the bats emerge from hibernation in spring. The period after hibernation and just before spring migration is typically referred to as “staging,” a time when bats forage and a limited amount of mating occurs. This period can be as short as a day for an individual, but not all bats emerge on the same day.

In general, NLEB use roosts in the spring and fall similar to those selected during the summer. Suitable spring staging/fall swarming habitat consists of the variety of forested/wooded habitats where they roost, forage, and travel, which is most typically within 5 miles of a hibernaculum.

2.2 DISTRIBUTION AND RANGE

The NLEB ranges across much of the eastern and north central United States, and all Canadian provinces west to the southern Yukon Territory and eastern British Columbia (Figure 2.1) (Nagorsen and Brigham 1993; Caceres and Pybus 1997; Environment Yukon 2011). In the United States, the species' range reaches 37 states from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to South Carolina (Whitaker and Hamilton 1998; Caceres and Barclay 2000; Amelon and Burhans 2006). Historically, the species has been most frequently observed in the northeastern United States and in Canadian Provinces, Quebec and Ontario. However, throughout the majority of the species' range it is patchily distributed, and historically was less common in the southern and western portions of the range than in the northern portion of the range (Amelon and Burhans 2006).

The U.S. portion of the NLEB's range is discussed in this BO in four parts: Eastern, Midwest, Southern, and Western. This is done solely for purposes of analysis and discussion; there is currently no indication that these are distinct populations. The Eastern range comprises Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. The Midwest range includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. The Southern range comprises Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, and Tennessee, and the Western range includes Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming.

Although NLEBs are typically found in low numbers in inconspicuous roosts, most records of NLEB are from winter hibernacula surveys (Caceres and Pybus 1997). There are currently 1,508 hibernacula known throughout the species' range in the United States (Table 2.1). The majority of the known hibernacula occur within the Eastern (39%) and the Midwest range (38), followed by 21 percent in the Southern range, and 2 percent in the Western range. Even prior to WNS, many hibernacula contained only a few (1 to 3) individuals (Whitaker and Hamilton 1998). There are likely many more unknown hibernacula.

There have also been many summer mist-net and acoustic surveys conducted within the range of the NLEB, but the surveys have not been complied into a central database across the species' range. The data is housed with the state natural resources programs, state natural heritage programs, or the local Service field offices. We are unable to report the total number of locations with NLEBs; however, we have compiled the total number of known maternity roost trees in each state (Table 2.1). There are 1,744 known maternity roost trees in 19 of 37 states, with 42% occurring in the Southern range, 30% in the Midwest, and 28% in the Eastern range. There are no known maternity roost trees in the Western range. There are limitations to these data because

most states and natural heritage programs have not been tracking NLEB occurrences or individual roosts.

The current range and distribution of NLEB must be described and understood within the context of the impacts of WNS. Prior to the onset of WNS, the best available information on NLEB came primarily from surveys (primarily focused on Indiana bat or other bat species) and some targeted research projects. In these efforts, NLEB was very frequently encountered and was considered the most common myotid bat in many areas. Overall, the species was considered to be widespread and abundant throughout its historic range (Caceres and Barclay 2000). NLEBs continue to be distributed across much of the historical range, but there are many gaps within the range where bats are no longer detected or captured, and in other areas, their occurrence is sparse given local declines and extirpations.

2.3 STATUS AND THREATS

2.3.1 WHITE-NOSE SYNDROME

WNS is an emerging infectious wildlife disease caused by a fungus of European origin, Pd, which poses a considerable threat to hibernating bat species throughout North America, including the NLEB (Service 2011). WNS is responsible for unprecedented mortality of insectivorous bats in eastern North America (Blehert et al. 2009; Turner et al. 2011). No other threat is as severe and immediate for the NLEB as the disease WNS. There is no doubt that NLEB populations would be declining so dramatically without the impact of WNS. Since the disease was first observed in New York in 2007 (later biologists found evidence from 2006 photographs), WNS has spread rapidly in bat populations from the East to the Midwest and the South. As of November 2015, WNS or Pd was confirmed in 30 of the 37 states within the species' range (Figure 1.1; Table 2.2). Data support substantial declines in the Eastern range and portions of the Midwest range. In addition, there are apparent population declines at most hibernacula with WNS in the Southern range. We expect further declines as the disease continues to spread across the species' range.

Post-WNS hibernacula counts available from the northeast U.S. show the most substantial population declines for the NLEB. Turner et al. (2011) compared the most recent pre-WNS count to the most recent post-WNS count for six cave bat species and reported a 98 percent total decline in the number of hibernating NLEB at 30 hibernacula in New York, Pennsylvania, Vermont, Virginia, and West Virginia through 2011. For the final listing rule, the Service conducted an analysis of additional survey information at 103 sites across 12 U.S. States and Canadian provinces (New York, Pennsylvania, Vermont, West Virginia, Virginia, New Hampshire, Maryland, Connecticut, Massachusetts, North Carolina, New Jersey, and Quebec)

and found comparable declines in winter colony size. At these sites, total NLEB counts declined by an average of 96 percent after the arrival of WNS; 68 percent of the sites declined to zero NLEB, and 92 percent of sites declined by more than 50 percent. Frick et al. (2015) consider the NLEB now extirpated from 69 percent of the hibernacula in Vermont, New York, Pennsylvania, Maryland, Virginia, and West Virginia that had colonies of NLEB prior to WNS. Langwig et al. (2012) reported that 14 populations of NLEB in New York, Vermont, and Connecticut became locally extinct within 2 years due to disease.

Long-term summer survey data (including pre- and post-WNS) for the NLEB, where available, corroborate the population decline evident in hibernacula survey data. For example, summer surveys from 2005 – 2011 near Surry Mountain Lake in New Hampshire showed a 98 percent decline in capture success of NLEB post-WNS, which is similar to the hibernacula data for the State (a 95 percent decline) (Moosman et al. 2013). Mist-netting data from Pennsylvania indicate that NLEB captures declined by 46 percent in 2011, 63 percent in 2012, 76 percent in 2013, and 94 percent in 2014, compared to the average pre-WNS capture rate between 2001 to 2007 (Butchkoski 2014; Pennsylvania Game Commission, unpublished data). The NLEB is more commonly encountered in summer mist-net surveys in the Midwest; however, similar rates of population decline are already occurring in Ohio and Illinois. Early reports also indicate declines in Missouri and Indiana (80 FR 17979-17980). Other data, much of it received as comments on the proposed listing rule from State wildlife agencies, demonstrate that various measures of summer NLEB abundance and relative abundance (mist net surveys, acoustic surveys) have declined following detection of WNS in the state.

Although the dispersal rate of Pd across the landscape and the onset of WNS after the fungus arrives at a new site are variable, it appears unlikely that any site within the range of the NLEB is not susceptible to WNS. Some evidence suggests that certain microclimatic conditions may hinder disease progression at some sites, but given sufficient exposure time, WNS has had similar impacts on NLEB everywhere the disease is documented. Absent direct evidence that some NLEB exposed to the fungus do not contract WNS, available information suggests that the disease will eventually spread throughout the species' range. As described in Section 1 of this BO, we anticipate that WNS will spread throughout the range of the NLEB by 2023-2028.

2.3.2 OTHER THREATS

Although significant NLEB population declines have only been documented due to the spread of WNS, other sources of mortality could further diminish the species' ability to persist as it experiences ongoing dramatic declines. The final listing rule for the NLEB describes known threats to the species under each of the five statutory factors for listing decisions, of which disease/predation, discussed above, is the dominant factor. We summarize here the findings of the final listing rule regarding the other four factors that are relevant to this consultation.

Human and non-human modification of hibernacula, particularly altering or closing hibernacula entrances, is considered the next greatest threat after WNS to the NLEB. Some modifications, e.g., closure of a cave entrance with structures/materials besides a bat-friendly gate, can cause a partial or complete loss of the utility of a site to serve as hibernaculum. Humans can also disturb hibernating bats, either directly or indirectly, resulting in an increase in energy-consuming arousal bouts during hibernation (Thomas 1995; Johnson et al. 1998).

During the summer, NLEB habitat loss is primarily due to forest conversion and forest management. Throughout the range of NLEB, forest conversion is expected to increase due to commercial and urban development, energy production and transmission, and natural changes. The 2010 Resources Planning Act Assessment projects forest losses of 16–34 million acres (or 4–8 percent of 2007 forest area) across the conterminous United States, and forest loss is expected to be concentrated in the southern United States, with losses of 9–21 million acres (USFS 2012). Forest conversion causes loss of potential habitat, fragmentation of remaining habitat, and if occupied at the time of the conversion, direct injury or mortality to individuals. Forest management activities, unlike forest conversion, typically result in temporary impacts to the habitat of NLEB, but like forest conversion, may also cause direct injury or mortality to individuals. The net effect of forest management may be positive, neutral, or negative, depending on the type, scale, and timing of various practices. The primary potential benefit of forest management to the species is perpetuating forests on the landscape that provide suitable roosting and foraging habitat.

Wind energy facilities are known to cause mortality of NLEB. While mortality estimates vary between sites and years, sustained mortality at particular facilities could cause declines in local populations. Wind energy development within portions of the species' range is projected to continue.

Climate change may also affect this species, as NLEB are particularly sensitive to changes in temperature, humidity, and precipitation. Climate change may indirectly affect the NLEB through changes in food availability and the timing of hibernation and reproductive cycles.

Environmental contaminants, in particular insecticides, other pesticides, and inorganic contaminants, such as mercury and lead, may also have detrimental effects on NLEB. Contaminants may bio-accumulate (become concentrated) in the tissues of bats, potentially leading to a myriad of sub-lethal and lethal effects. NLEBs may also be indirectly affected through a reduction in available insect prey.

Fire is one of the environmental stressors that contribute to the creation of snags and damaged trees on the landscape, which NLEB frequently use as summer roosts. Fire may also kill or injure

bats, especially flightless pups. Prescribed burning is a common tool for forest management in many parts of the species' range.

There is currently no evidence that the natural or manmade factors discussed above (hibernacula modification, forest conversion, forest management, wind energy, climate change, contaminants, fire) have separately or cumulatively contributed to significant range-wide population effects on the NLEB prior to the onset of WNS. However, declines due to WNS have significantly reduced the number and size of NLEB populations in some areas of its range. This has reduced these populations to the extent that they may be increasingly vulnerable to other stressors that they may have previously had the ability to withstand. These impacts could potentially be seen on two levels. First, individual NLEB sickened or struggling with infection by WNS may be less able to survive other stressors. Second, NLEB populations impacted by WNS, with smaller numbers and reduced fitness among individuals, may be less able to recover making them more prone to extirpation. The status and potential for these impacts will vary across the range of the species.

2.4 POPULATION DYNAMICS

Hibernacula counts are generally the best census method for most bats that hibernate, because individuals are concentrated and relatively stationary. However, because the NLEB is difficult to detect in hibernacula, moves between hibernacula during the winter, and many hibernacula are likely not known, a range-wide population estimate for the species is not available. The NLEB is most widely dispersed on the landscape during the summer where it is most likely exposed, directly or indirectly (i.e., later in time), to the widely dispersed (i.e., not concentrated in a given area) activities that are excepted from take prohibitions under the 4(d) rule.

For purposes of this BO, we estimate NLEB numbers based on total forested acres in each state and assumptions about:

- state-specific occupancy rates;
- forested acres in each state;
- maternity colony home-range size;
- number of adult females per colony;
- overlap between adult male home range and maternity colony home range;
- overlap between maternity colonies; and
- landscape-scale adult sex ratio (we assume 1:1).

We explain these data and assumptions in the following sub-sections.

2.4.1 OCCUPANCY RATES

We requested summer survey results from the three most recent years available from our field offices to provide an estimate of recent occupancy rates. Field offices provided the total number of survey sites (typically mist-net surveys), by state and by year, and the number of sites that captured at least one NLEB. Occupancy rates were calculated using the proportion of sites occupied with NLEB from the total number of sites sampled (Table 2.3). Where no data were available, we used the post-WNS survey data provided by the Forest Service for National Forests within the respective state (Table 2.3). Some states have only 1 or 2 years of data, and others have 8 or more consecutive years of data. In most cases, the numbers and locations of these survey sites do not constitute a representative sample of the available forest habitat in each state. Regardless, the alternative to using these data is to consider the NLEB ubiquitous within forested habitat in each state, which would greatly overestimate occupancy. Instead, we use these data as the best available information from which to make inferences about the extent of NLEB occupancy in each state[2].

Table 2.2 identifies the years in which WNS was detected in the state. We compute pre- and post-WNS occupancy rates as the number of net sites with NLEB divided by the total number of bat capture sites in each state. We applied the occupancy rate listed in Table 2.3 to each state.

2.4.2 TOTAL FORESTED ACRES IN EACH STATE

We compiled the total forested acres for each state from the U.S. Forest Service's 2015 State and Private Forestry Fact sheets (available at http://stateforesters.org/regional-state). We assumed that all forested acres within each state are suitable for the NLEB, which probably overestimates habitat availability but it is not unreasonable given the NLEB's ability to use very small trees (≥ 3 in dbh). We could have estimated the amount of forest in each state in more detail, but our analysis of other factors unrelated to forest cover was limited to statewide data, so we used statewide data throughout the analysis for all factors.

[2] The occupancy data used in this analysis has many limitations and a substantial amount of uncertainty. Occupancy as used here is the proportion of suitable habitat that is likely to have NLEB present. This is sensitive to the accuracy of the suitable habitat data, the accuracy of the survey data used to estimate the occupancy, and biases in the survey data collection methodology. The definition of suitable habitat used for this analysis is necessarily very general (forested areas) to be applicable across the entire species range. The surveys used to generate the occupancy data were often very sparse and not designed for this purpose. Repurposing of the data may increase the effects of bias in distribution of sample points (in relation to both suitable habitat and bat distributions), sampling methodologies, and sampling timing. We believe that because much of the sampling was not targeted specifically at NLEB and often involves surveys for development or construction projects, survey locations are unlikely to be closely correlated to NLEB distributions, which may minimize the influence of some biases. However, the limitations of the available data and its biases are potentially significant to the occupancy estimates, and this creates uncertainty that we acknowledge. Given these factors, our estimates of population are meant as tool for assessing potential relative impact by providing a scale for comparison, not as a precise estimate of the northern long-eared bat populations.

Not every state is wholly within the range of the NLEB (Figure 2.1), and including the total forested acreage from states not fully within the species' range could greatly overestimate the population size. Therefore, we excluded states with less than 50% of its area within the species range, which eliminated Montana, Wyoming, Oklahoma, Louisiana, Alabama, Georgia, and South Carolina. The inclusion of the full states of Nebraska, Kansas, Mississippi, and North Carolina should compensate for any individuals not included in the excluded states. The list of states included, along with the total forested acres are reported in Table 2.4.

2.4.3 COLONY SIZE (NUMBERS OF BATS AND OCCUPIED AREA)

In addition to the occupancy rates described above, we rely in this BO primarily on colony characteristics reported in the literature to estimate state-wide bat numbers. NLEB colonies are comprised of variable numbers of adult females. Two important studies give a range of 30–60 adult females per colony (see Section 2.1.1). Given the number of colonies that a state likely supports (see Section 2.4.4) (see Section 2.4.4), we then estimate total NLEB numbers in the occupied available habitat using the number of females per colony and assuming a 1:1 adult female/adult male ratio and a maximum of 1 pup per female.

While colony sizes of 30-60 bats may be typical in areas unaffected by WNS, in areas with clear declines in bat populations, these estimates may no longer be appropriate. Declines in total population appear to exceed what could be explained by declines in occupancy rates alone. The total reproductive female population can be described as the product of the average colony size in females and the number of colonies:

[Total female reproductive population = Number of colonies * Mean females per colony] OR
N=C*F

If the rate of total population decline exceeds the rate of decline in number of colonies (as described by declines in occupancy) there must also be an additional reduction in the average colony size as well.

Information about total population sizes or average colony sizes is not available on a wide scale. However, there are a few instances where we have obtained data that could be used to approximate rates of population decline without knowing the actual sizes of populations. In Pennsylvania, captures of bats per unit effort have been tracked for several years. Changes in this number of bats per unit effort captured across a wide area could be assumed to mirror changes in the total population for that area. So if the total population declined by 50%, we would expect to see a 50% decline in captures of bats per unit effort as well. The number of bats per unit effort in Pennsylvania declined to 22.3% of pre-WNS levels (averaging capture rates across 2012-2014). Over the same time period, occupancy declined 49.8%. Pre-WNS occupancy was 67.9% of

suitable habitat, while the last three years of data indicate an occupancy rate of 33.8% of suitable habitat (0.338/0.679=0.498).

The change over time of the total female population is going to be a function of the change in the number of colonies and the change in the mean number of females per colony. Or, put another way, the change in females per colony over time can be described by the change in the number of colonies in relation to the change in total female population. So:

$N_t/N_0 = (C_t*F_t)/(C_0*F_0)$ OR $C_t = (N_t/N_0)*(C_0*F_0)/ F_t$ OR $C_t = (N_t/N_0)*C_0/(F_t/ F_0)$

Assuming changes in captures per unit effort is a good approximation for changes in the proportion of remaining bats, and using the decline in occupancy to represent the decline in the number of colonies, with a decline in occupancy of 49.8%, the average colony size is likely to have declined by 55% to approximately 20 bats per colony. (((0.223/1)*45)/(0.498)=20.2)

Similarly, Ohio has seen declines in captures per mist net site to 91.2% of pre-WNS levels, using the average of 2012-2014 rates. While likely to be less accurate to represent population declines than captures per unit effort, captures per mist net site may be a reasonable approximation for total population changes as well. Occupancy rates have been relatively stable in Ohio, increasing slightly from 39.6% over 2007-2010 to 42.1% over 2012-2014 (although with a large drop in 2014). Assuming the captures per mist net site is also a reasonable estimate of the rate of total population decline, a slightly increasing occupancy indicates that declines must be occurring within colonies. The average colony is likely to have declined 14%, to about 39 bats. (((0.912/1)*45)/(1.06) = 38.7)

WNS was first documented in Pennsylvania in 2008-2009 and in Ohio in 2010-2011 (Table 2.2). For the purposes of this BO, we assume that colonies are comprised of 20 females in all states where WNS was documented prior to the winter of 2010-2011 (Table 2.4). Rhode Island does not have any hibernacula; therefore, WNS has not been confirmed in the state. We assume that bats in summer habitat in Rhode Island have been affected by WNS in the surrounding states, and colonies are comprised of 20 females. For all states with WNS documented during or after the winter of 2010-2011, we assume colonies are comprised of 39 females. For states that do not have WNS (including states that have only documented Pd), we use 45 females per colony (the mid-point of the 30–60 range) as the basis for estimating bat numbers. For each colony present in a state, we assume a NLEB population is comprised of 20, 39, or 45 adult females and the same number of sympatric adult males and juveniles following parturition, depending on the status of WNS (Table 2.4).

As described in Section 2.1.1, we use 1,000 acres for purposes of this BO as the area a colony uses. Within this area, one or more members of a colony and sympatric adult males would likely appear in mist net or acoustic surveys. Such appearance is the basis for the occupancy rates we

use to estimate the acreage of available forested habitat that NLEB may use during the active season in the states, which are given in Table 2.4.

Maternity roosting areas are a subset of the 1,000-acre colony size we use in this BO. As described above, Broders et al. (2006) and Henderson and Broders (2008) found that foraging areas were six or more times larger than maternity roosting areas. One sixth of our 1,000-acre colony size is 167 acres, which is within the range of other maternity roosting areas reported (Carter and Feldhamer 2005; Silvis et al. 2015). For purposes of this BO, we use a maternity roosting area of 167 acres. Table 2.5 shows our estimates of the percentage of each state that is used as maternity roost areas based on the number of expected colonies (Table 2.4) and 167 acres per colony.

2.4.4 OVERLAP

Lacking information about the degree of spatial overlap between NLEB maternity colonies, for this BO we assume that colonies do not overlap, e.g., we assume that 1,000 acres of occupied habitat supports one colony. Estimated or assumed occupancy rates in all of the states are all less than 70 percent (Table 2.3); therefore, it is unlikely that limited habitat availability would contribute to substantial colony-range overlap. If incorrect, the possible effect of this assumption is to underestimate the population size in each state (i.e., 1,000 acres supports more than 1 colony).

As described in Section 2.1.1, mist net survey data in Kentucky indicate substantial overlap in the summer home range of reproductive females and males and non-reproductive females (1,712 of 1,825 capture records, or 94 percent). The Service further analyzed this data to determine the percentage of capture locations for males and non-reproductive females that were not capture locations for reproductive female captures or within 3 miles of a reproductive female capture location (Service 2015b). Of 909 capture locations, 87 (9.57 percent) did not have reproductively active females and were more than 3 miles away from captures of reproductive females, suggesting a 100 – 9.57 = 90.43 percent overlap between the home range of individuals belonging to maternity colonies and other individuals. We lack state-specific information about the overlap between reproductively active females and other bats; therefore, for this BO, we assume the 90.43 percent overlap suggested by the Kentucky data. We multiply occupied forest acres by 0.9043 to compute the number of probable maternity colonies; e.g., 100,000 occupied acres × 0.9043 = 90,430 acres supporting 90,430 ÷ 1000 = 91 maternity colonies, rounding up any fractional remainder.

2.4.5 POPULATION ESTIMATES

Table 2.4 provides our estimates of the summer adult population size of NLEB in the 30 states included in the analysis. It relies on the total forested acres and the other assumptions described above; i.e., occupancy rates for each state in Table 2.3, 90.43 percent overlap between the range of males and maternity colonies, 1,000 acres per colony, no overlap between colonies, the number of adult females per colony (20, 39, or 45 depending on WNS), and a 1:1 male/female sex ratio. Here are example calculations for Iowa as reported in Table 2.4:

- 3,013,759 forested acres × 0.417 occupancy rate = 1,256,738 occupied acres;
- 1,256,738 occupied acres × 0.9043 overlap with males = 1,136,467 colony-occupied acres;
- 1,136,467 acres ÷ 1,000 acres per colony = 1,137 colonies;
- 1,137 colonies × 45 adult females per colony = 51,165 adult females; and
- 51,165 adult females + 1 adult male per female (or 51,165 adult males) = 102,330 total adults.

We estimate that the range-wide population of NLEBs is comprised of 6,546,718 adults based on these calculations and the assumption that the 30 states included in the analysis represent the range-wide population. Arkansas supports the largest population (863,850 adults; 13%), followed by Minnesota with 829,890 (13%). Delaware and Rhode Island support the smallest populations with 640 and 1,240 adults, respectively. Based on these estimates, the Midwest supports 43% of the total population followed by the Southern range (38%), the Eastern range (17%), and the Western range (2%).

It is likely that the state populations are overestimates in areas affected by WNS. We used the occupancy data from the last 3 years, but in nearly all WNS areas there is a clear downward trend and most data are at least a year old. Therefore, the occupation rates and resulting population estimates are likely lower in many areas.

2.5 ANALYSIS OF THE SPECIES/CRITICAL HABITAT LIKELY TO BE AFFECTED

As described in Section 1, the NLEB is likely to be adversely affected by the activities which are excepted from incidental take prohibitions in the final 4(d) rule. Many federally listed, proposed, and candidate species, and their designated or proposed critical habitats, occur within the Action Area for this consultation. However, the Service Headquarters has determined that the proposed action will have no effect on any other listed, proposed, or candidate species or designated or proposed critical habitats. The action is the Service’s finalization the 4(d) rule for the NLEB. It sets forth the prohibitions for take under section 9(a)(1) of the Act and the exceptions to those

prohibitions. It does not alter in any way the consultation requirements under section 7(a)(2) of the Act. Although this BO provides a framework for streamlined section 7 consultation for federal actions that are consistent with the provisions of the 4(d) rule, the framework only applies to the NLEB. Federal agencies will still be required to consult on activities that may affect other listed species within the Action Area. Therefore, only the NLEB will be considered further in this BO.

2.6 TABLES AND FIGURES FOR STATUS OF THE SPECIES

Table 2.1. Known NLEB hibernacula and known maternity roosts trees by state.

Range	State	Known Hibernacula	Known Occupied Maternity Roost Trees
Midwest	Iowa	2	14
Midwest	Illinois	44	39
Midwest	Indiana	69	193
Midwest	Michigan	77	25
Midwest	Minnesota	15	102
Midwest	Missouri	269	58
Midwest	Ohio	32	4
Midwest	Wisconsin	67	84
Eastern	Connecticut	8	0
Eastern	Delaware	2	0
Eastern	Maine	3	0
Eastern	Maryland	8	0
Eastern	Massachusetts	7	16
Eastern	New Hampshire	11	0
Eastern	New Jersey	9	47
Eastern	New York	90	27
Eastern	Pennsylvania	322	157
Eastern	Rhode Island	0	0
Eastern	Vermont	16	0
Eastern	Virginia	11	12
Eastern	West Virginia	104	231
Southern	Alabama	11	0
Southern	Arkansas	77	310
Southern	Georgia	6	20
Southern	Kentucky	122	254
Southern	Louisiana	0	0
Southern	Mississippi	0	0
Southern	North Carolina	29	101
Southern	Oklahoma	9	0
Southern	South Carolina	3	0
Southern	Tennessee	61	50
Western	Kansas	1	0
Western	Montana	0	0
Western	Nebraska	2	0
Western	North Dakota	0	0
Western	South Dakota	21	0
Western	Wyoming	0	0
	Total	1,508	1,744

Table 2.2. White-nose syndrome (WNS) and *Pseudogymnoascus destructans* (Pd) occurrence in the 37 States.

REGION	STATE	WNS or Pd Present?	First Winter WNS Confirmed	Documented WNS Mortality in Bats?
Midwest	Iowa	Pd	Pd only (2011-2012)	No
Midwest	Illinois	WNS	2012-2013	Yes
Midwest	Indiana	WNS	2010-2011	Yes
Midwest	Michigan	WNS	2014-2015	Yes
Midwest	Minnesota	Pd	Pd only (2011-2012)	No
Midwest	Missouri	WNS	2011-2012	Yes
Midwest	Ohio	WNS	2010-2011	Yes
Midwest	Wisconsin	WNS	2013-2014	Yes
Eastern	Connecticut	WNS	2008-2009	Yes
Eastern	Delaware	WNS	2009-2010	Yes
Eastern	Maine	WNS	2010-2011	Yes
Eastern	Maryland	WNS	2009-2010	Yes
Eastern	Massachusetts	WNS	2007-2008	Yes
Eastern	New Hampshire	WNS	2008-2009	Yes
Eastern	New Jersey	WNS	2008-2009	Yes
Eastern	New York	WNS	2006-2007	Yes
Eastern	Pennsylvania	WNS	2008-2009	Yes
Eastern	Rhode Island	No	NA	NA
Eastern	Vermont	WNS	2007-2008	Yes
Eastern	Virginia	WNS	2008-2009	Yes
Eastern	West Virginia	WNS	2008-2009	Yes
Southern	Alabama	WNS	2011-2012	Yes
Southern	Arkansas	WNS	2013-2014	Yes
Southern	Georgia	WNS	2012-2013	Yes
Southern	Kentucky	WNS	2010-2011	Yes
Southern	Louisiana	No	NA	NA
Southern	Mississippi	Pd	Pd only (2013-2014)	No
Southern	North Carolina	WNS	2010-2011	Yes
Southern	Oklahoma	Pd	Pd only (2014-2015)	No
Southern	South Carolina	WNS	2012-2013	Yes
Southern	Tennessee	WNS	2009-2010	Yes
Western	Kansas	No	NA	NA
Western	Montana	No	NA	NA
Western	Nebraska	Pd	Pd only (2014-2015)	No
Western	North Dakota	No	NA	NA
Western	South Dakota	No	NA	NA
Western	Wyoming	No	NA	NA

Table 2.3. NLEB summer state-wide occupancy estimates, based on summer survey results.

Range	State	Description	Pre-WNS Years (Combined)		Pre-WNS Occupancy Rate	Sum of 3 Most Recent WNS Years	WNS Impacted Occupancy Rate	Occupancy Rate Used
Midwest	IA	Total Mist Net Sites	2009-2011	24		0		
		Sites with NLEB Captures		10	41.7%	0	N/A	41.7%
	IL	Total Mist Net Sites	2009-2011	40		0		
		Sites with NLEB Captures		25	62.5%	0	N/A	62.5%
	IN	Total Mist Net Sites				283		
		Sites with NLEB Captures			N/A	106	37.5%	37.5%
	MI	Total Mist Net Sites	2004-2014	149		0		
		Sites with NLEB Captures		47	31.5%	0	N/A	31.5%
	MN	Total Mist Net Sites	2013-2014	121		0		
		Sites with NLEB Captures		71	58.7%	0	N/A	58.7%
	MO	Total Mist Net Sites				42		
		Sites with NLEB Captures			N/A	11	26.2%	26.2%
	OH	Total Mist Net Sites	2007-2010	733		2485		
		Sites with NLEB Captures		290	39.6%	1046	42.1%	42.1%
	WI	Total Mist Net Sites				78		
		Sites with NLEB Captures			N/A	35	44.9%	44.9%
Eastern	CT$	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	9.4%
	DE^	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	5.0%	5.0%
	ME*	Total Acoustic Sites				180		
		Sites with NLEB Captures			N/A	17	9.4%	9.4%
	MD^	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	5.0%	5.0%
	MA*	Total Acoustic Sites				132		
		Sites with NLEB Captures			N/A	9	6.8%	6.8%
	NH#	Total Mist Net Sites	2002-2004	13		173		
		Sites with NLEB Captures		12	92.3%	17	9.8%	9.8%
	NJ	Total Mist Net Sites	1995-2008	132		25		
		Sites with NLEB Captures		89	67.4%	8	32.0%	32.0%
	NY+#	Total Mist Net Sites	2000-2005	56		45		
		Sites with NLEB Captures		39	69.6%	15	33.3%	33.3%
	PA	Total Mist Net Sites	2001-2007	1069		1469		
		Sites with NLEB Captures		726	67.9%	497	33.8%	33.8%
	RI$	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	9.4%
	VT+#	Total Mist Net Sites	2000-2005			12		
		Sites with NLEB Captures			See NY	3	25.0%	9.8%
	VA#	Total Mist Net Sites	2010	27		60		
		Sites with NLEB Captures		27	100.0%	29	48.3%	48.3%
	WV	Total Mist Net Sites	1997-2008	508		97		
		Sites with NLEB Captures		401	78.9%	52	53.6%	53.6%

Table 3.1. Continued.

Range	State	Description	Pre-WNS Years (Combined)		Pre-WNS Occupancy Rate	Sum of 3 Most Recent WNS Years	WNS Impacted Occupancy Rate	Occupancy Rate Used
Southern	AL#	Total Mist Net Sites	2001-2011	179		38		
		Sites with NLEB Captures		48	26.8%	13	34.2%	34.2%
	AR#	Total Mist Net Sites	2009-2013	568		95		
		Sites with NLEB Captures		399	70.2%	62	65.3%	65.3%
	GA#	Total Mist Net Sites	2001-2011	62		18		
		Sites with NLEB Captures		37	59.7%	10	55.6%	55.6%
	KY	Total Mist Net Sites	2005-2010	503		305		
		Sites with NLEB Captures		263	52.3%	124	40.7%	40.7%
	LA$	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	34.2%
	MS$	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	34.2%
	NC#	Total Mist Net Sites	2000-2012	244		35		
		Sites with NLEB Captures		199	81.6%	14	40.0%	40.0%
	OK	Total Mist Net Sites	2013-2015	28		0		
		Sites with NLEB Captures		13	46.4%	0	N/A	46.4%
	SC$	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	34.2%
	TN#	Total Mist Net Sites	2000-2008	221		90		
		Sites with NLEB Captures		153	69.2%	37	41.1%	41.1%
Western	KS+	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	22.5%
	MT+	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	22.5%
	NE+	Total Mist Net Sites				0		
		Sites with NLEB Captures			N/A	0	N/A	22.5%
	ND+	Total Mist Net Sites	2009-2014	42		0		
		Sites with NLEB Captures		3	7.1%	0	N/A	22.5%
	SD+	Total Mist Net Sites	2003-2006	13		0		
		Sites with NLEB Captures		10	76.9%	0	N/A	22.5%
	WY+	Total Mist Net Sites	2010-2014	56		0		
		Sites with NLEB Captures		12	21.4%	0	N/A	22.5%

* Acoustic data used due to limited amount of mist net data

^ Statewide occupancy estimates from a more in-depth analysis used

Based on data from National Forests in the state

$ Data from nearby states used because statewide data was inadequate or unavailable

+ Data from multiple states were aggregated due to small datasets

Table 2.4. NLEB adult summer population estimates for the 30 states included in analysis.

Region	State	Forested Acres	Percent Occupancy	Occupied Acres	Maternity Colonies	Maternity Colony Size	Adult Females	Total Adults	Total Pups
Midwest	Iowa	3,013,759	41.7%	1,256,738	1,137	45	51,165	102,330	51,165
Midwest	Illinois	4,847,480	62.5%	3,029,675	2,740	39	106,860	213,720	106,860
Midwest	Indiana	4,830,395	37.5%	1,811,398	1,639	39	63,921	127,842	63,921
Midwest	Michigan	20,127,048	31.5%	6,340,020	5,734	39	223,626	447,252	223,626
Midwest	Minnesota	17,370,394	58.7%	10,196,421	9,221	45	414,945	829,890	414,945
Midwest	Missouri	15,471,982	26.2%	4,053,659	3,666	39	142,974	285,948	142,974
Midwest	Ohio	8,088,277	42.1%	3,405,165	3,080	39	120,120	240,240	120,120
Midwest	Wisconsin	16,980,084	44.9%	7,624,058	6,895	39	268,905	537,810	268,905
Eastern	Connecticut	1,711,749	9.4%	160,904	146	20	2,920	5,840	2,920
Eastern	Delaware	339,520	5.0%	16,976	16	20	320	640	320
Eastern	Maine	17,660,246	9.4%	1,660,063	1,502	39	58,578	117,156	58,578
Eastern	Maryland	2,460,652	5.0%	123,033	112	20	2,240	4,480	2,240
Eastern	Massachusetts	3,024,092	6.8%	205,638	186	20	3,720	7,440	3,720
Eastern	New Hampshire	4,832,408	9.8%	473,576	429	20	8,580	17,160	8,580
Eastern	New Jersey	1,963,561	32.0%	628,340	569	20	11,380	22,760	11,380
Eastern	New York	18,966,416	33.3%	6,315,817	5,712	20	114,240	228,480	114,240
Eastern	Pennsylvania	16,781,960	33.8%	5,672,302	5,130	20	102,600	205,200	102,600
Eastern	Rhode Island	359,519	9.4%	33,795	31	20	620	1,240	620
Eastern	Vermont	4,591,280	9.8%	449,945	407	20	8,140	16,280	8,140
Eastern	Virginia	15,907,041	48.3%	7,683,101	6,948	20	138,960	277,920	138,960
Eastern	West Virginia	12,154,471	53.6%	6,514,796	5,892	20	117,840	235,680	117,840
Southern	Arkansas	18,754,916	65.3%	12,246,960	11,075	39	431,925	863,850	431,925
Southern	Kentucky	12,471,762	40.7%	5,076,007	4,591	39	179,049	358,098	179,049
Southern	Mississippi	19,541,284	34.2%	6,683,119	6,044	45	271,980	543,960	271,980
Southern	North Carolina	18,587,540	40.0%	7,435,016	6,724	39	262,236	524,472	262,236
Southern	Tennessee	13,941,333	41.1%	5,729,888	5,182	20	103,640	207,280	103,640
Western	Kansas	2,502,434	22.5%	563,048	510	45	22,950	45,900	22,950
Western	Nebraska	1,576,174	22.5%	354,639	321	45	14,445	28,890	14,445
Western	North Dakota	759,998	22.5%	171,000	155	45	6,975	13,950	6,975
Western	South Dakota	1,910,934	22.5%	429,960	389	45	17,505	35,010	17,505
	Total	281,528,709	37.8%	106,345,057	96,183		3,273,359	6,546,718	3,273,359

Table 2.5. Estimated acreage of NLEB maternity roosting areas for the 30 states included in analysis.

Region	State	Forested Acres	Maternity Colonies[1]	Maternity Roost Area Acres (167 acres per Colony)	Percent of Forest Habitat Used as Maternity Roost Areas
Midwest	Iowa	3,013,759	1,137	189,879	6.30%
Midwest	Illinois	4,847,480	2,740	457,580	9.44%
Midwest	Indiana	4,830,395	1,639	273,713	5.67%
Midwest	Michigan	20,127,048	5,734	957,578	4.76%
Midwest	Minnesota	17,370,394	9,221	1,539,907	8.87%
Midwest	Missouri	15,471,982	3,666	612,222	3.96%
Midwest	Ohio	8,088,277	3,080	514,360	6.36%
Midwest	Wisconsin	16,980,084	6,895	1,151,465	6.78%
Eastern	Connecticut	1,711,749	146	24,382	1.42%
Eastern	Delaware	339,520	16	2,672	0.79%
Eastern	Maine	17,660,246	1,502	250,834	1.42%
Eastern	Maryland	2,460,652	112	18,704	0.76%
Eastern	Massachusetts	3,024,092	186	31,062	1.03%
Eastern	New Hampshire	4,832,408	429	71,643	1.48%
Eastern	New Jersey	1,963,561	569	95,023	4.84%
Eastern	New York	18,966,416	5,712	953,904	5.03%
Eastern	Pennsylvania	16,781,960	5,130	856,710	5.10%
Eastern	Rhode Island	359,519	31	5,177	1.44%
Eastern	Vermont	4,591,280	407	67,969	1.48%
Eastern	Virginia	15,907,041	6,948	1,160,316	7.29%
Eastern	West Virginia	12,154,471	5,892	983,964	8.10%
Southern	Arkansas	18,754,916	11,075	1,849,525	9.86%
Southern	Kentucky	12,471,762	4,591	766,697	6.15%
Southern	Mississippi	19,541,284	6,044	1,009,348	5.17%
Southern	North Carolina	18,587,540	6,724	1,122,908	6.04%
Southern	Tennessee	13,941,333	5,182	865,394	6.21%
Western	Kansas	2,502,434	510	85,170	3.40%
Western	Nebraska	1,576,174	321	53,607	3.40%
Western	North Dakota	759,998	155	25,885	3.41%
Western	South Dakota	1,910,934	389	64,963	3.40%
	Total	281,528,709	96,183	16,062,561	5.71%

[1] From Table 2.4

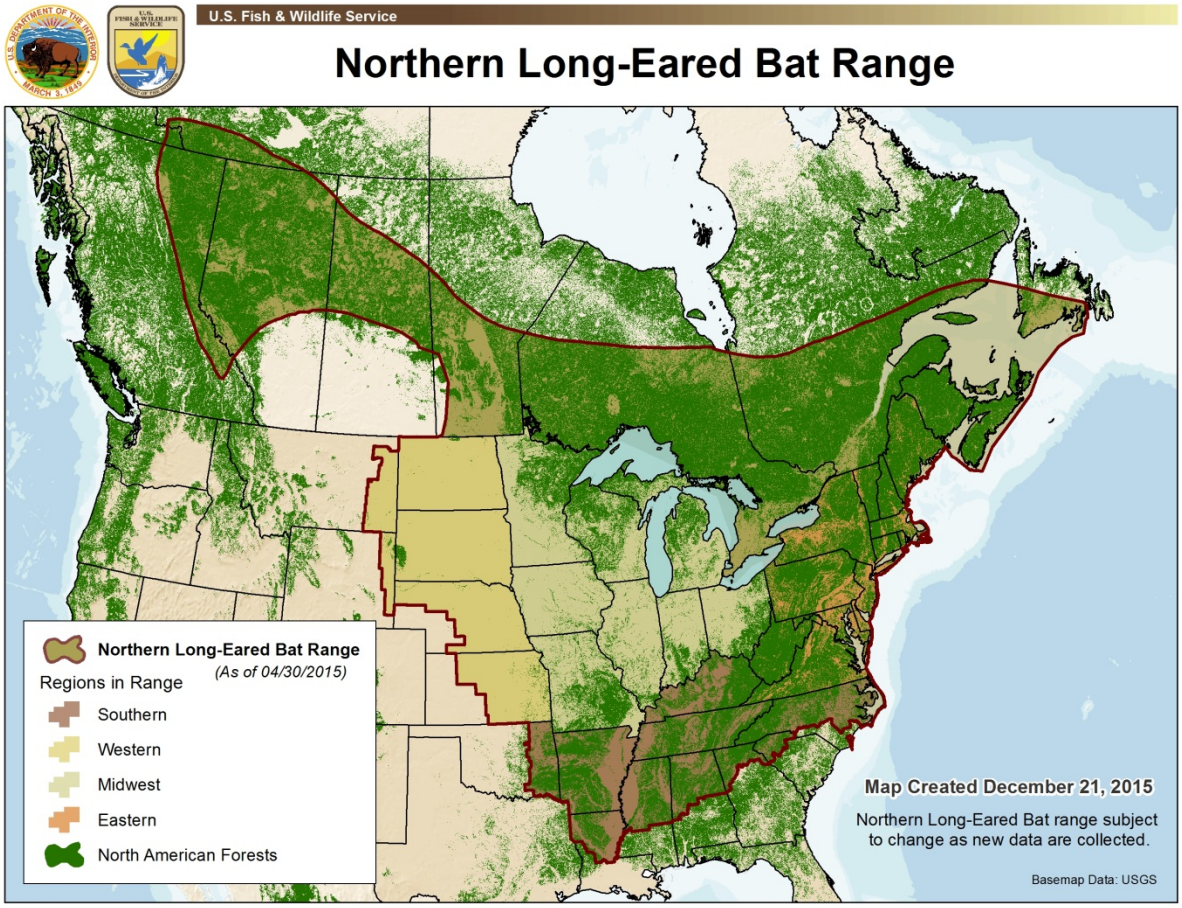

Figure 2.1. Range of the NLEB.

3 ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the Action Area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the Action Area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress. The environmental baseline is a "snapshot" of the species' health in the Action Area at the time of the consultation, and does not include the effects of the action under review.

Because the Action Area covers the entire range of the species within the United States, the environmental baseline is the same as the status of the species discussed in detail in Section 2. No further discussion is needed in this section.

4 EFFECTS OF THE ACTION

This section addresses the direct and indirect effects of the Action on the NLEB, including the effects of interrelated and interdependent activities. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the proposed action and are later in time but still are reasonably certain to occur.

The NLEB is likely to be affected by many activities which are excepted from incidental take prohibitions in the final 4(d) rule. Instead of describing all of the activities, we address the general effects of different activities, which we categorized into 7 general groups:

1. Capture and handling of NLEBs by individuals with section 10(a)(1)(A) permits for other listed bats or State permits until May 3, 2016
2. Removal from human structures
3. Timber harvest
4. Prescribed fire
5. Forest conversion
6. Wind turbine operation
7. Other activities that may affect the NLEB

The effects of category #1 are not addressed in this consultation because a separate section 10(a)(1)(A) permit and section 7 consultation will be required for those activities after May 3, 2016, as required by the final 4(d) rule. Until that time, we expect limited effects because NLEBs are currently hibernating and most surveys are conducted during the summer. Winter hibernacula surveys could affect the NLEB until May 3, 2016; however, researchers conducting winter surveys must have a section 10(a)(1)(A) permit for other listed bat species. The Service

completed three BOs for the effects of existing bat section 10(a)(1)(A) permits on the NLEB in the Midwest, Mountain/Prairie and Southeast Regions. The adverse effects from winter hibernacula surveys are addressed in those BOs, which were non-jeopardy opinions.

The final 4(d) rule does not prohibit incidental take outside of the WNS zone. This effects analysis does not address the differences in prohibitions outside of the WNS zone because current actions that may affect the NLEB have not been shown to have significant impacts on NLEBs before WNS was detected. We expect that the impacts will be further reduced in the areas outside of the WNS zone because less than 2% of the total estimated population of NLEB occurs in the areas outside of the WNS zone (Section 2.4.5), and the habitat is more sparse (Figure 2.1). In addition, we anticipate that the WNS zone will expand further into the western states fairly quickly. Therefore, we did not attempt to analyze the different prohibitions between the zones.

4.1 EFFECTS ANALYSIS METHODOLOGY

For each of the remaining six categories of activities described above, we apply the following steps to analyze effects at the programmatic level:

- **Effects of the Activity –** We review best available science and commercial information about how the activity may affect the NLEB. Based on the literature review, we identify the stressor(s) (alteration of the environment that is relevant to the species) that may result from the proposed activity. For each stressor, we identify the circumstances for an individual bat's exposure to the stressor (overlap in time and space between the stressor and a NLEB). Given exposure, we identify the likely individual response(s), both positive and negative. For this consultation, we group responses into one of four categories: (1) potentially increased fitness (e.g., increased access to, or availability of, prey organisms); (2) reduced fitness (e.g., reduced food resources, reduced suitable roosting sites); (3) disturbance (e.g., day-time disturbance in a maternity roosting area, causing bats to flee and increasing the likelihood of injury or predation); and (4) harm (e.g., harvesting a tree occupied by adults and flightless bat pups resulting in death or injury; predation resulting from disturbance). This analysis is captured in the Exposure-Response Table (Table 4.1). This table provides the complete record of the effects analysis for this species and is intended to be read in concert with and support this effects analysis section.
- **Quantifying Effects to Individuals –** Estimating the numbers of individuals of a species exposed to stressors in a programmatic consultation is difficult because programs do not usually specify with sufficient detail when and where projects will occur relative to the species' occurrence. For this consultation, we have very little site-specific data about NLEB distribution and abundance in the Action Area; however, we do not assume that the species is ubiquitous, which would grossly overestimate effects. We do not have

enough information to quantify the effects of the pathways associated with removal from human structures and the "other" category of activities that may affect the NLEB. These effects are discussed in general in the sections below. For pathways associated with timber harvest, prescribed fire, and forest conversion, we apply the annual average acreage of the activity, NLEB occupancy rates, and NLEB density within occupied areas to estimate individual-level effects (numbers of individual bats included in the pathway), which we describe in Section 4.1.2.2 below. For wind turbine operation, we estimate the number of bats that could be killed using the current and projected amount of wind energy development and information on bat mortality rates, which we describe in Section 4.1.5.2 below.

We then aggregate all of the effects to individuals and examine:

- **Population-level Effects** – We evaluate the aggregated consequences of the effects to individuals/habitat on the fitness of the population(s) to which those individuals belong. This step closes with our conclusions on the likely fate or ultimate response of the population(s) and is couched in terms of population fitness (i.e., persistence and reproductive potential, long and short-term).
- **Species Range-wide -** This step determines whether the anticipated reductions in population fitness will reduce the likelihood of survival and recovery of the species by reducing its range-wide reproduction, numbers, or distribution (RND). If the Service and other action agencies have insured that the population-level risks do not noticeably, detectably, or perceivably reduce the likelihood of progressing towards or maintaining the RND needs, then the action is not likely to appreciably reduce the likelihood of both survival and recovery of the species.

4.2 REMOVAL FROM HUMAN STRUCTURES

4.2.1 EFFECTS OF REMOVAL FROM HUMAN STRUCTURES

As described in Section 2.1.1., NLEBs have occasionally been found roosting in human structures such as barns, houses, and sheds. Humans and bats often conflict when bats roost in human structures. Public misconception and health concerns from rabies, bat droppings, and urine often result in the need to remove bats from human structures. Many techniques used to remove bats are harmful and may result in mortality, including poisoning, trapping (e.g., cages, sticky traps), exterminating, and translocating (WNS Conservation and Recovery Working Group 2015). Bats can also be removed through humane methods (if used during the proper time of year) such as eviction/venting and exclusion. Eviction/venting refers to the use of one-way doors and exits to remove bats from a structure by utilizing their natural tendency to leave the roost at night. Exclusion refers to closing gaps and sealing holes to prevent bats from entering or

re-entering a structure (WNS Conservation and Recovery Working Group 2015). Eviction and exclusion are widely-used, popular methods because poisons and traps are messy and might result in dead bats rotting in walls and attics.

Table 4.1 shows the four pathways we identified for NLEB responses to removal from human structures and the range of individual responses expected. The use of rodenticides and sticky traps to remove bats is likely to result in mortality. NLEBs may also be euthanized for rabies testing. Roost closure during the maternity season has been documented to result in lower reproductive success (Brigham and Fenton 1986). Attempts to evict or exclude bats at this time can result in the death of flightless young, as well as an increase in the number of adult bats and orphaned pups that enter the living space, potentially heightening the risk of human/bat contact (WNS Conservation and Recovery Working Group 2015). In addition, NLEBs can be indirectly affected through the loss of the roost by exclusion if additional energy is required during their search for a new roost site when NLEBs return to the site after hibernation.

The WNS Conservation and Recovery Group, in coordination with states and wildlife control operators, recently developed Best Management Practices (BMPs) for bat control activities in human structures (WNS Conservation and Recovery Working Group 2015) to ensure that adverse effects are minimized. The National Wildlife Control Operators Association recently released a new training on bat standards, affecting at least 48 wildlife control operators in 20 States within the NLEB range that are Certified Wildlife Control Professionals. This certification requires training, seminars, and continued education, and we anticipate that these professionals (and probably others) will follow the bat standards.

States within the range of the NLEB vary in requirements for removal of bats from human structures. States with state- or federally-listed bat species may require permits for bat removal or may require wildlife control operators to use BMPs when removing or excluding bats from houses or structures. Within the range of the NLEB, only Maine, Montana, and the Dakotas do not have another state- or federally-listed bat species, so it is likely that many of these states already have a program to recommend or require BMPs for bat removal prior to the NLEB listing in 2014. We surveyed states to determine if: (1) wildlife control operators are required to obtain authorization for bat removal or exclusions; (2) BMPs are required or recommended; and (3) exclusions and evictions are conducted outside of the NLEB maternity season.

We were able to speak with representatives from state natural resource programs in Illinois, Wisconsin, Michigan, Missouri, Minnesota, Ohio, Vermont, and South Carolina. Five of the eight states require authorization for wildlife control operators to remove or exclude bats from buildings. Of these five states, all but Michigan require that evictions and exclusion occur after NLEB pups are capable of flight, unless in the unusual case of a severe health hazard. Even though three states do not require authorization for wildlife control operators, only two states

(Missouri and Michigan) do not communicate or recommend BMPs for bat exclusion or removals.

We also obtained rabies testing data from the state health departments in New York and Missouri. If a single or pair of bats enter a household, wildlife control operators generally trap the bats and euthanize them for rabies testing. These data indicate that an average of 7 NLEBs were killed per year for rabies testing during the most recent three years. In both New York and Missouri, NLEB make up a small fraction (typically less than 2%) of the bats in houses.

Although removal from human structures can result in NLEB mortality, we anticipate that few bats are impacted per year in each state based on the relatively rare use of human structures, the implementation of bat removal BMPs (either required or recommended) throughout most of the range of the NLEB, and the relatively small amount of NLEBs killed for rabies testing.

4.3 TIMBER HARVEST

Timber harvest is one of two categories of forest management described in this BO. Unlike forest conversion, forest management maintains forest habitat on the landscape, and the impacts from management activities are for the most part considered temporary in nature. Impacts from forest management are expected to range from positive (e.g., maintaining or increasing suitable roosting and foraging habitat within NLEB home ranges) to neutral (e.g., minor amounts forest removal, areas outside NLEB summer home ranges or away from hibernacula) to negative (e.g., death of adult females or pups or both).

Timber harvest is the removal of trees associated with forest management. It includes a wide variety of practices from selected harvest of individual trees to clearcutting. Timber harvest is often partitioned according to the forest management treatment type used to accomplish the harvest: even-aged management; uneven-aged management; thinning; and salvage/sanitation. It is conducted for a variety of purposes including, but not limited to, harvests (commercial and non-commercial) for timber production and for ecosystem restoration, endangered/threatened/sensitive species conservation, stand regeneration for forest health, wildlife habitat improvement, insect and disease control, and fuel reduction. All of these activities are categorized under the general category of timber harvest for the purposes of this BO.

4.3.1 EFFECTS OF TIMBER HARVEST

<u>Literature Review</u>

The best available data indicate that the NLEB shows a varied degree of sensitivity to timber-harvesting practices. Menzel et al. (2002) found NLEB roosting in intensively managed stands in West Virginia. At the same study site, Owen et al. (2002) concluded that NLEB roosted in areas with abundant snags, and that in intensively managed forests of the central Appalachians, roost availability was not a limiting factor. Perry and Thill (2007) tracked NLEB in central Arkansas and found roosts in eight different forest classes, of which 89 percent were in three classes of mixed pine-hardwood forest. The mixed pine-hardwood forest stands that supported most of the roosts were partially harvested or thinned, unharvested (50–99 years old), or harvested by group selection.

Timber harvest accomplished through thinning, group selection, and individual selection may create canopy openings in an otherwise densely-forested setting, which may promote more rapid development of bat pups. In central Arkansas, Perry and Thill (2007) found female NLEB bat roosts were more often located in areas with partial harvesting than males, with more male roosts (42 percent) in un-harvested stands than female roosts (24 percent). They postulated that females roosted in relatively more open forest conditions because they may receive greater solar radiation, which may increase developmental rates of young or permit young bats a greater opportunity to conduct successful initial flights (Perry and Thill 2007). Cryan et al. (2001) found several reproductive and non-reproductive female NLEB roosts in recently harvested (less than 5 years) stands in the Black Hills of South Dakota where snags and small stems (dbh of 5 to 15 cm (2 to 6 inches)) were the only trees left standing. In this study, however, the largest colony (n=41) was found in a mature forest stand that had not been harvested in more than 50 years. Lacki and Schwierjohann (2001) stated that silvicultural practices could meet both male and female roosting requirements by maintaining large-diameter snags, while allowing for regeneration of forests.

Forest patch size and contiguity are factors that appear to influence habitat use by NLEB. Henderson et al. (2008) observed gender-based differences in mist-net capture rates of NLEB on Prince Edward Island related to forest patch size. The area of deciduous stands had a consistent positive relationship with the probability of presence of both males and females, but males were found more often in smaller stands than females. In southeastern Missouri, Yates and Muzika (2006) reported that NLEB showed a preference for contiguous tracts of forest cover (rather than fragmented or open landscapes) for foraging or traveling, and that different forest types interspersed on the landscape increased the likelihood of occupancy.

In West Virginia, Owen et al. (2003) radio-tracked nine female NLEB that spent their foraging and travelling time in the following habitat types (in descending order of use):

- 70–90-year-old stands without harvests in more than 10–15 years (“intact forest”) (mean use 52.4 percent);

- 70–90 year-old stands with 30–40 percent of basal area removed in the past 10 years ("diameter-limit harvests") (mean use 42.9 percent);
- open areas (clearcuts and roads) (clear cut = all trees > 2.5 cm (1.0 inch) dbh removed) (mean use 4.6 percent); and
- clearcuts with approximately 4.5 m^2/ha (19.6 ft^2/acre) tree basal area remaining ("deferment harvests") (mean use 0.03 percent).

Habitat selection differed significantly relative to habitat availability, with diameter-limit harvests ranking as the strongest habitat preference, where percent use exceeded percent availability for 7 of the 9 bats.

In Alberta, Canada, NLEB avoided the center of clearcuts and foraged more in intact forest than expected (Patriquin and Barclay 2003). On Prince Edward Island, Canada, female NLEB preferred to forage in areas centered along creeks running through forests (Henderson and Broders 2008). In mature forests on the Sumter National Forest in northwestern South Carolina, 10 of the 11 stands in which NLEB were detected were mature stands (Loeb and O'Keefe 2006). Within those mature stands, NLEB were recorded more often at points with sparse or medium-density vegetation than at points with dense vegetation, suggesting that small openings within forest stands facilitate commuting and/or provide suitable foraging habitat. However, in southwestern North Carolina, Loeb and O'Keefe (2011) found that NLEB rarely used forest openings, but often used roads.

At Fort Knox in Kentucky, Silvis et al. (2014) tracked three maternity colonies of NLEB to evaluate their social and resource networks, i.e., roost trees. Roost and social network structure differed between maternity colonies, and roost availability was not strongly related to network characteristics or space use. In model simulations based on the tracking data, removal of more than 20 percent of roosts initiated social network fragmentation, with greater loss causing more fragmentation. The authors suggested that flexible social dynamics and tolerance of roost loss are adaptive strategies for coping with ephemeral conditions in dynamic forest habitats. Sociality among bats may contribute to reproductive success, and fragmented colonies may experience reduced success.

In the same Fort Knox study area with the same three maternity colonies, Silvis et al. (2015) removed during winter a primary maternity roost tree from one colony, 24 percent of the secondary roosts from another colony, and none from the third. Neither removal treatment altered the number of roosts used by individual bats, but secondary roost removal doubled the distances moved between sequentially used roosts. Overall location and spatial size of colonies was similar pre- and post-treatment. Patterns of roost use before and after removal treatments also were similar. Roost height, diameter at breast height, percent canopy openness, and roost species composition were similar pre- and post-treatment. NLEB use a wide range of tree species and sizes as roosts, and potential roosts were not limited in the treatment areas.

Although the literature we reviewed contains no reports of NLEB mortality resulting from tree harvest, there have been three documented instances of Indiana bat adults and pups killed or injured when an occupied roost tree was felled. Indiana bats and NLEB are closely related and have similar behavior (i.e., forest-dwelling, forming maternity colonies, roosting in trees in the summer). Cope et al. (1974) reported the first felling of an occupied Indiana bat maternity roost tree in Wayne County, Indiana. The landowner observed bats exiting the tree when it was bulldozed down. The original account stated that eight bats (2 adult females and 6 juveniles) were "captured and identified as Indiana bats," and that about 50 bats flew from the tree. Although the original account did not specify how the eight bats were captured, J. Whitaker (Indiana State University, pers. comm., 2005) recounted that those bats were killed or disabled, retrieved by the landowner, and subsequently identified by a biologist. In another case, Belwood (2002) reported on the felling of a dead maple in a residential lawn in Ohio. One dead adult female and 33 non-volant young were retrieved by the researcher. Three of the young bats were already dead when they were picked up, and two more died subsequently. The rest were apparently retrieved by adult bats that had survived. In a third case, 11 dead adult female Indiana bats were retrieved (by people) when their roost was felled in Knox County, Indiana (J. Whitaker, pers. comm., 2005).

These accounts suggest that some individuals, including non-volant pups, can survive the felling of a maternity roost tree. It is not possible to infer injury rates from these studies. It is only possible to crudely estimate mortality rates from the Belwood case. If we assume that there were 66 individuals in the tree (the 33 pups observed plus 1 dead adult female and 32 presumed additional adult females who retrieved their pups), the overall survival rate was high at 91%. Only 1 adult bat was observed dead (about 3% of adults), and the juvenile mortality rate was about 15%. We acknowledge that timber harvest operations in a forest bear little resemblance to these three instances, but available evidence indicates that both adults and pups can be killed when an occupied roost tree is felled. For the purposes of this consultation, we assume that 15% of non-volant bats have the potential to be harmed, and 3% of adult bats could be killed or injured in a felled tree. Adults may be at greater risk during the spring during colder temperatures and increased use of torpor. It is also possible that trees felled adjacent to roost trees could strike roosting bats and result in injury or death.

Disturbance associated with harvest activity could cause NLEB to flee or abandon day-time roosts, which increases the likelihood of predation. This may also result in females aborting or not being impregnated depending on the time of year. Gardner et al. (1991) reported that Indiana bats continued to roost and forage in an area with active timber harvest, but this will depend on the scale of harvest and whether there is any remaining suitable habitat. Callahan (1993) attributed the abandonment of a primary maternity roost tree to disturbance from a bulldozer clearing brush adjacent to the tree.

Surface-disturbing activities in the vicinity of hibernacula may affect bat populations if those activities result in changes to the microclimate (temperature, humidity, and air flow) of the cave or mine (Ellison et al. 2003). Tree removal in karst areas can alter soil characteristics, water quality, local hydrology to the extent that it alters cave microclimates and affects bats (Bilecki 2003, Hamilton-Smith 2001). Bats in hibernation are susceptible to dehydration due to high evaporative loss from their naked wings and large lungs (Perry 2013). Richter et al. (1993) documented temperature increases resulting from structural modifications to a cave entrance that substantially reduced its suitability for bats. The creation of new openings or filling in existing openings could also result from obstructing cave entrances with dirt or logging slash.

Summary of Exposure-Response Table

Table 4.1 shows the five pathways we identified for NLEB responses to timber harvest and the range of individual responses expected. The primary alteration of the environment associated with timber harvest that is relevant to the NLEB is the removal of trees that provide roosts or serve as foraging, spring staging, or fall swarming habitat. Removing occupied trees is likely to kill or injure pups and adults. Loss of forest habitat decreases opportunities for growth and successful reproduction. Alteration of hibernacula can harm NLEBs. The disturbance (noise, exhaust from machinery, etc.) that accompanies harvest activities may result in disturbance because fleeing during daylight increases the likelihood of predation. A small subset of disturbed individuals may be harmed. Thinning mid-story clutter may have a beneficial effect on the suitability of adjacent maternity roost trees when done when bats are not present. The species' responses to these stressors depends on the type of harvest (e.g., thinning, salvage, even-aged management, clear cut, etc.) and the context of exposure, i.e., when and where it occurs.

4.3.2 METHODOLOGY FOR QUANTIFYING EFFECTS OF TIMBER HARVEST

To estimate the potential impacts of timber harvest through 2022, we calculated the average annual amount of timber harvest in states within the NLEB's range using data available through the USDA Forest Service's Forest Inventory Analysis (available only on internet: http://apps.fs.fed.us/Evalidator/evalidator.jsp; accessed November 2015). This database reports the total harvest (acres) of federal, state and local, and private entities by state for various combinations of years. We used the most recent combination of years available and calculated the mean annual harvest (Table 4.2). We assumed that the mean annual harvest from recent years will be consistent through the period of this consultation and recognize that many types of harvest leave a remaining forest that is available for NLEB use. The information in this database may be overestimated for certain states and underestimated for others. For instance, we estimated that 163,971 acres would be harvested on average in National Forests in South Dakota; however, the U.S. Forest Service is currently projecting up 35,000 acres of harvest annually. In Illinois, the

database reports 0 acres of harvest, but the Forest Service projects 1,300 acres of average annual harvest.

Similar to the population estimation methods in Section 2.4.2, we excluded a state from our analyses if less than 50% of it is within the NLEB range. These estimates are likely conservative and underestimate the number of acres harvested; however, some harvest reports may reflect a few tree removals and not necessarily a clear cut or selected harvest. We anticipate that 3,669,077 acres will be harvested annually through 2022, which is 1.3% of the available forested habitat, or 9.1% over seven years (Table 4.2). Timber harvest is expected to occur in similar proportions in the Midwest, Eastern, and Southern ranges (29, 35, and 34%, respectively), but only about 2% of the total harvest will occur in the Western range. We anticipate that habitat losses from timber harvest will be temporary.

We further analyzed these data by partitioning the average annual acreage expected during the NLEB active season and the pup season. Lacking a breakdown of the acres harvested during the active and non-volant seasons, we assume that timber harvest will occur with equal frequency throughout the year. The NLEB active season (April 1 – October 31) is 214 days, or 58.6% of the year. The NLEB non-volant season (June 1 – July 31) is 61 days, or 16.7% of the year. Therefore, the average annual acres of timber harvest during the active season is 58.6% of the total average annual acres, and 16.7% of the total timber harvest is estimated to occur in the non-volant season.

For spatial exposure to stressors, we must consider that timber harvest and NLEB-occupied areas may occur anywhere within the forested acreage of each state, but we recognize there are some forests in National or State Parks or Wilderness areas that may not be subject to harvest. NLEB occupancy estimates vary by state from about 9 to 60 percent (see section 2.4.1). It is possible for timber harvest, which annually affects about 1.3 percent of the available forested habitat, to occur entirely on the 5 to 65 percent of the habitat in each state that we consider occupied, or not at all, because we have no information indicating whether certain activities are more or less likely to occur in occupied areas. Therefore, our effects analyses compute the expected (probable) degree of spatial overlap between activities and occupied areas as the product of two independent probabilities, namely, the percentage of the forested habitat that is proposed for timber harvest multiplied by the percentage of the forested habitat that the NLEB occupies in a particular manner, e.g., for roosting or foraging.

The following example demonstrates our methodology for estimating individual-level direct effects corresponding to the stressor-exposure-response pathway for timber harvest during the non-volant season (June 1–July 31) within a maternity roost, which may kill or injure non-volant pups.

a. State A, with 500,000 acres of forested habitat, will annually harvest 2,500 acres (0.5 percent of the total habitat) during the non-volant season.
b. State A has a 30 percent occupancy rate for NLEB, i.e., 150,000 acres of State A are within the active-season home range of individuals of this species.
c. We assume that individuals belonging to maternity colonies collectively occupy 90 percent (co-capture rate of reproductive females with males and non-reproductive females; see section 2.4 for the basis of this and other NLEB distribution and abundance assumptions) of these 150,000 acres, or 0.90 × 150,000 = 135,000 acres.
d. We assume maternity colonies do not overlap and occupy 1,000 acres each; therefore State A supports 135,000 ÷ 1,000 = 135 colonies.
e. We assume that individuals in a maternity colony roost in trees within an area of 167 acres; therefore, the colonies of State A occupy 135 × 167 acres = 22,545 acres for roosting, which is 4.5 percent of State A.
f. State A has not yet been affected by WNS; therefore, each colony supports 45 non-volant pups during the harvest time frame (1 pup per adult female, section 2.4).

In this example, 2,500 acres (0.5 percent) of the forested acres in the state are proposed for harvest during the non-volant season, and 22,545 acres (4.5 percent) harbors non-volant pups. The mathematically expected (probable) degree of spatial overlap is the product of the two percentages, or 0.5 percent × 4.5 percent = 0.0225 percent, which is 112.7 acres of the 500,000 acres in State A. To estimate the number of bat pups affected, we multiply the density of bat pups in maternity roosting areas (45 pups per 167 acres) by the expected acreage of overlap: (45 ÷ 167) × 112.7 = 30.3, which we round up to 31 pups. We aggregate the results of this type of analysis for all timber harvest actions within a state and across all 30 states included in the analysis, which provides a basis for estimating the total expected effects of multiple project-level actions at a scale not exceeding the total amount of timber harvest estimated per year.

Consistent with the example above, our calculations for estimating the effects corresponding to each stressor-exposure-response pathway that we quantify are presented in tabular form in section 4.3. Each table lists the 30 states with the following six columns of data:

a. annual, active-season, or non-volant-season extent (acres) of timber harvest (or the proposed activity causing the stressor), depending on the pathway;
b. total forest habitat acres;
c. percent of the forest habitat receiving the activity (a ÷ b);
d. percent of the forest habitat that NLEB use at a time and in a manner (from section 2.4) that the stressor could affect causing a specific type of individual response;
e. expected overlap (acres) of the activity and the bat-occupied area (b × c × d); and
f. expected number of individuals affected (e × bat density in the occupied area).

In the final step of the calculations described above, the density we multiply by the expected area of overlap depends on the manner in which NLEB use the habitat exposed to the stressor. In the

preceding example, non-volant pups in maternity roosting areas are the individuals responding to the stressor, and the density is 45 pups per 167 acres (0.2695). Based on the data and assumptions identified in section 2.4 about NLEB populations in the Action Area, we use the following NLEB densities in computing column "e" of each effects estimation table:

Habitat	NLEB individuals	Density for 45 females per Maternity Colony	Density for 39 females per Maternity Colony	Density for 20 females per Maternity Colony
Summer home range	Adult females and sympatric adult males	0.0814	0.0362	0.0705
Maternity roosting areas	Non-volant pups	0.2695	0.1198	0.2335
Roosting areas	Adult females, volant juveniles, and sympatric adult males	0.8084	0.3593	0.7006

This methodology generates results in terms of numbers of individual NLEB affected, but we must acknowledge its inherent imprecision. It relies on assumptions about state-specific occupancy rates and applies values for colony size, sex ratios, etc., that we believe are reasonable and based on best available information, but which are either uncertain or variable across the Action Area. Although it is coarse, this methodology provides a transparent basis for quantifying effects for interpretation relative to the status of the species, which is the purpose of an effects analysis in a BO.

4.3.3 QUANTIFYING EFFECTS OF TIMBER HARVEST

We quantify the two pathways expected to result in direct effects to the NLEB: disturbance from fleeing human activity (Table 4.3), and harm from removing occupied roost trees (Table 4.4 for pups and Table 4.5 for adults). Human disturbance from timber harvest during the active season (April – October) within maternity roosting areas may disturb up to 76,846 volant NLEB annually (Table 4.3). A small subset of these disturbed individuals may be harmed. Timber harvests that remove occupied roost trees during the non-volant season may harm up to 1,109 pups annually (Table 4.4). Removal of occupied roost trees during the active season may harm up to 247 adults annually (Table 4.5).

In addition to these two pathways, timber harvest activities could alter the flow of air and water through unknown hibernacula which could also harm NLEBs. We do not have enough information to quantify the effects of this pathway because we do not know where projects will occur relative to the unknown hibernacula that are likely on the landscape. Although the alteration of unknown hibernacula is reasonably certain to occur, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed (i.e., not concentrated in a given area) nature of timber harvest activities. In addition, the hibernacula often selected by NLEB are "large, with large passages" (Raesly and Gates 1987), and may be less affected by relatively minor surficial micro-climatic changes that might result from timber

harvest around unknown roosts. Further, bats rarely hibernate near the entrances of structures (Grieneisen 2011). Davis et al (1999) reported that partial clearcutting "appears not to affect winter temperatures deep in caves."

We also do not quantify the potential reductions in fitness that may result as indirect effects from loss of habitat. We anticipate that 1.3% (3,669,077 acres) of available habitat will be harvested annually through 2022; however, we anticipate that habitat losses from timber harvest will be temporary. In addition, the NLEB does not appear to be limited by habitat, as demonstrated by a great deal of plasticity within its environment (e.g., living in highly fragmented forest habitats to contiguous forest blocks from the southern United States to Canada's Yukon Territory) in the absence of WNS. Therefore, reductions in fitness from habitat loss are anticipated to be small. Further, timber harvest practices that reduce mid-story clutter likely also benefit NLEB habitat and may increase fitness of local NLEB populations. We do not quantify the potential increases in fitness because we lack the scientific support to interpret the degree to which survival or reproductive success rates of local populations may be influenced; however, management of existing forests is likely to maintain roosting or foraging habitat.

4.4 PRESCRIBED FIRE

Prescribed fire is the other category of forest management described in this BO. Prescribed burning is deliberately burning wild-land fuels under specified environmental conditions in a predetermined area with a predetermined fire-line intensity and rate of movement in order to attain resource management objectives. It is typically classified as dormant-season and growing-season burning. The seasonality varies by latitude and elevation, but the dormant season is generally October –April and the growing season is April 15 – August 15. Dormant-season burning is primarily used to reduce the buildup of hazardous fuels and thereby reduce the likelihood of catastrophic wildfires or to achieve ecological stand objectives. Growing-season burning is used for site preparation, control of undesirable species, and restoration and maintenance of fire-dependent plant communities and associated wildlife. Most growing season burning takes place in the spring and fall; however, growing season burning occurs through the active and pup seasons in the rest of the range. For example, we recently completed programmatic consultations for the NLEB with the U.S. Forest Service on Forest Plans in their Southern and Eastern regions, which includes the Midwest, Southern, and Eastern ranges of the NLEB. Twenty-one and 16 percent of prescribed burning was projected to occur during the pup season (defined by the Forest Service as May 1 to July 30) in the Southern and Eastern regions, respectively.

4.4.1 EFFECTS OF PRESCRIBED FIRE

Literature Review

Perry (2012) provides a review of fire effects on bats in the eastern oak region of the U.S., and Carter et al. (2002) provides a similar review for bats in the southeastern and mid-Atlantic states. Forest-dwelling bats, including the wide-ranging NLEB, were presumably adapted to the fire-driven disturbance regime that preceded European settlement and fire suppression in many parts of the eastern U.S. Concurrent changes in habitat conditions preclude any reasonable inferences about the overall impact of fire suppression on populations of forest-dwelling bats. It is apparent that fire may affect individual bats directly (negatively) through exposure to heat, smoke, and carbon monoxide, and indirectly (both positively and negatively) through habitat modifications and resulting changes in their food base (Dickinson et al. 2009).

Direct Effects – Summer Roosting

Little is known about the direct effects of fire on cavity and bark roosting bats, such as the NLEB, and few studies have examined escape behaviors, direct mortality, or potential reductions in survival associated with effects of fire. Dickinson et al. (2009) monitored two NLEB (one male and one female) in roosts during a controlled summer burn. Within 10 minutes of ignition near their roosts, both bats flew to areas that were not burning. Among four bats they tracked before and after burning, all switched roosts during the fire, with no observed mortality. Rodrigue et al. (2001) reported flushing a *Myotis* bat from an ignited snag during an April controlled burn in West Virginia.

Carter et al. (2002) suggested that the risk of direct injury and mortality to southeastern forest-dwelling bats resulting from summer prescribed fire is generally low. During warm temperatures, bats are able to arouse from short-term torpor quickly. Most adult bats are quick, flying at speeds > 30 km/hour (Patterson and Hardin 1969), enabling escape to unburned areas. NLEB use multiple roosts, switching roost trees often (see *Summer Roosting Behavior* in Section 2.4.3), and could likely use alternative roosts in unburned areas, should fire destroy the current roost. Non-volant pups are likely the most vulnerable to death and injury from prescribed fire. Although most eastern bat species are able to carry their young for some time after they are born (Davis 1970), the degree to which this behavior would allow females to relocate their young if fire threatens the nursery roost is unknown.

Dickinson et al. (2010) used a fire plume model, field measurements, and models of carbon monoxide and heat effects on mammals to explore the risk to the Indiana bat and other tree-roosting bats during prescribed fires in mixed-oak forests of southeastern Ohio and eastern Kentucky. Carbon monoxide levels did not reach critical thresholds that could harm bats in low-

intensity burns at typical roosting heights for the Indiana bat (8.6 m) (28.2 ft). NLEB roost height selection is more variable, but on average lower (6.9 m) (22.8 ft) than the Indiana bat (Lacki et al. 2009b). In this range of heights, direct heat could cause injury to the thin tissue of bat ears. Such injury would occur at roughly the same height as tree foliage necrosis (death) or where temperatures reach 60 °C (140 °F). Most prescribed fires for forest management are planned to avoid significant tree scorch.

Direct and Indirect Effects – Winter Roosting

Little is known about the direct effects of fire on bats in adjacent caves and mines. Smoke and noxious gases could enter caves and mines, depending on airflow characteristics and weather conditions (Carter et al. 2002; Perry 2011). Although smoke from winter fires may not reach toxic levels in caves and mine, introduced gases could arouse bats from hibernation, causing energy expenditure and reduced fitness (Dickinson et al. 2009). Caviness (2003) observed smoke intrusion into hibernacula during winter burning in Missouri, but did not observe any bat arousal. Fire could alter vegetation surrounding the entrances to caves and mines, which could indirectly affect temperature and humidity regimes of hibernacula by modifying airflow (Carter et al. 2002, Richter et al. 1993).

Indirect Effects – Roost Availability/Suitability

Fire can affect the availability of roosting substrate (cavities, crevices, loose bark) by creating or consuming snags, which typically provide these features, or by creating these features in live trees. Although stand-replacing or intense wildfires may create large areas of snags, the effects of multiple, low-intensity prescribed burning on snag dynamics are less obvious, especially for forests consisting mostly of fire-adapted species. Low-intensity, ground-level fire may injure larger hardwood trees, creating avenues for pathogens such as fungi to enter and eventually form hollow cavities in otherwise healthy trees (Smith and Sutherland 2006). Fire may scar the base of trees, promoting the growth of basal cavities or hollowing of the bole in hardwoods (Nelson et al. 1933, Van Lear and Harlow 2002). Repeated burning could potentially create forest stands with abundant hollow trees. Trees located near down logs, snags, or slash may be more susceptible to damage or death, and aggregations of these fuels can create clusters of damaged trees or snags (Brose and Van Lear 1999, Smith and Sutherland 2006).

Bats are known to take advantage of fire-killed snags and continue roosting in burned areas. Boyles and Aubrey (2006) found that, after years of fire suppression, initial burning created abundant snags, which evening bats (*Nycticeius humeralis*) used extensively for roosting. Johnson et al. (2010) found that after burning, male Indiana bats roosted primarily in fire-killed maples. In the Daniel Boone National Forest, Lacki et al. (2009a) radio-tracked adult female NLEB before and after prescribed fire, finding more roosts (74.3 percent) in burned habitats than

in unburned habitats. Burning may create more suitable snags for roosting through exfoliation of bark (Johnson et al. 2009a), mimicking trees in the appropriate decay stage for roosting bats.

In addition to creating snags and live trees with roost features, prescribed fire may enhance the suitability of trees as roosts by reducing adjacent forest clutter (see *Canopy Cover/Closure* in Section 2.4.3). Perry et al. (2007) found that five of six species, including NLEB, roosted disproportionally in stands that were thinned and burned 1-4 years prior but that still retained large overstory trees. Boyles and Aubrey (2006) found evening bats used burned forest exclusively for roosting.

Indirect Effects – Summer Foraging

Adult insects are the predominant prey of NLEB (see Section 2.2.4 Foraging Behavior). On the Daniel Boone National Forest, Lacki et al. (2009a) found that abundance of coleopterans (beetles), dipterans (flies), and all insects combined captured in black-light traps increased following prescribed fires. The mechanism of this increase is presumably the new growth of ground vegetation that a burn stimulates. In fecal samples of NLEB, lepidopterans (moths), coleopterans, and dipterans were the three most important groups of insect prey, with dipteran consumption increasing after burning. NLEB appeared to track the observed changes in insect availability, i.e., home ranges were closer to burned habitats following fires than to unburned habitats, but home range size did not vary before and after fires.

Summary of Exposure-Response Table

Table 4.1 shows the eight pathways we identified for NLEB responses to prescribed fire and the range of individual responses expected. In general, exposure to prescribed burning can cause direct adverse responses (disturbance, injury, death) and indirect adverse and beneficial responses via changes to roosting and foraging resources and forest health maintenance. Stressors caused by burning include heat and smoke during the actual movement of a fire through forested areas and fire-induced changes in vegetation structure and composition. Bat exposure to these direct and indirect stressors depends on timing of the burn and how bats may use the burned area, e.g., for roosting, foraging, spring staging, fall swarming, or hibernation in a cave/mine where the entrance is within or near the burned area.

4.4.2 METHODOLOGY FOR QUANTIFYING EFFECTS OF PRESCRIBED FIRE

To estimate the potential impacts of prescribed fire through 2022, we compiled the mean, minimum, and maximum acres of prescribed burns in each state from 2002 to 2014 (Table 4.6) using data available through the National Interagency Fire Center (available on internet: https://www.nifc.gov/fireInfo/fireInfo_stats_prescribed.html; accessed November 2015). We

assumed the mean annual use of prescribed fire from 2002-2014 will be consistent through the period of this consultation. Similar to the population estimation methods in Section 2.4.2, we excluded a state from our analyses if less than 50% of it is within the NLEB range.

These data represent the total amount of prescribed burning in each state without regard to habitat type. We further parsed these data using information from the 2012 National Prescribed Fire Use Survey Report (Melvin 2012) to exclude burned grassland habitats as these are not relevant to the NLEB. The burn report estimated the percent of prescribed fire used to manage grassland or agriculture habitat and forested land in 2012. We recognize that this percentage likely varies to some degree every year, but we assume that the proportion of prescribed fire in forested habitat is similar. We use the mean annual acres of prescribed fire in forested habitat reported in Table 4.6 for the purposes of this BO. We anticipate that 648,908 acres will be burned annually through 2022, which is 0.2% of the available forested habitat (Table 4.2). The majority of prescribed burning is expected to occur in the Southern range (64%), followed by 29% in the Midwest, 4% and 3% in the Eastern and Western ranges, respectively.

Similar to timber harvest, we lack a breakdown of the acres burned during the active and non-volant seasons, and we assume that prescribed burning will occur with equal frequency throughout the year. Therefore, the average annual acres of prescribed burning during the active season are 58.6% of the total average annual acres, and 16.7% of the total is estimated to occur in the non-volant season. This estimate is similar to the recent estimates from programmatic consultations for the NLEB on U.S. Forest Service lands, where 21 and 16 percent of prescribed burning was projected to occur during the pup season (defined by the Forest Service as May 1 to July 30) in the Southern and Eastern regions, respectively. This may be an overestimate for the western range.

We use the same methods described for timber harvest (see Section 4.1.2.2) to estimate individual-level effects corresponding to the stressor-exposure-response pathways for prescribed burning. Our calculations for each pathway that we quantify are presented in tabular form in Section 4.3.

4.4.3 QUANTIFYING EFFECTS OF PRESCRIBED FIRE

We quantify the two pathways expected to disturb or harm the NLEB: disturbance from fleeing the fire (Table 4.7), and harm to pups from heat and smoke during the non-volant season (Table 4.8). Prescribed fires during the active season within maternity roosting areas may disturb up to 19,417 volant NLEB annually through fleeing and increased predation (Table 4.7). A small subset of disturbed individuals may be harmed. Prescribed burning during the non-volant season may harm up to 1,859 pups annually (Table 4.8).

In addition to these two pathways, prescribed burning could alter the flow of air and water through unknown hibernacula and also harm NLEBs. We do not have enough information to quantify the effects of this pathway because we do not know where projects will occur relative to the unknown hibernacula that are likely on the landscape. Although the alteration of unknown hibernacula may occur, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of prescribed burning. In addition, Caviness (2003) reported that prescribed burns were found to have no notable influence on bats hibernating in various caves in the Ozark National Forest. All bats present in caves at the beginning of the burn were still present and in "full hibernation" when the burn was completed, and bat numbers increased in the caves several days after the burn. There were minute changes in relative humidity and temperature during the burn and elevated short-term levels of some contaminants from smoke were noted.

We also do not quantify the potential reductions or increases in fitness that may result as indirect effects from the loss of roost trees (adverse) or the creation of roost trees, increased prey availability, or reduction of mid-story clutter (beneficial). We anticipate that only 0.2% of available habitat will be burned annually, and any habitat losses from prescribed fire will be temporary. In addition, the NLEB does not appear to be limited by roost trees, as demonstrated through a great deal of plasticity within its environment (e.g., roosting in a wide variety of trees and sizes). Therefore, reductions in fitness from habitat loss are anticipated to be small. Further, prescribed fire likely also benefits NLEB habitat and may increase fitness of local populations as described above. We do not quantify the potential increases in fitness because we lack the scientific support to interpret the degree to which survival or reproductive success rates of local populations may be influenced; however, management of existing forests is likely to maintain roosting or foraging habitat.

4.5 FOREST CONVERSION

Forest conversion is the loss of forest to another land cover type (e.g., grassland, cropland, development). For the purposes of this BO, we define forest conversion as any activity that removes forested habitat that is suitable for the NLEB. This includes, but is not limited to, tree removal from commercial or residential development, energy production and transmission (oil, gas, solar, wind), mining, agriculture, transportation, military training, and other ecosystem management. Unlike forest management, forest conversion permanently removes forested habitat on the landscape, or in some cases, there is no forest for decades as in the case of mining.

4.5.1 EFFECTS OF FOREST CONVERSION

In the final listing rule for the NLEB, we note that forest conversion could result in the following impacts: (1) loss of suitable roosting or foraging habitat; (2) fragmentation of remaining forest patches, leading to longer flights between suitable roosting and foraging habitat; (3) removal of (fragmenting colonies/networks) travel corridors; and (4) direct injury or mortality from the removal of occupied roosts during active season clearing. Forest conversion could also alter the flow of air and water through unknown hibernacula and impact NLEBs.

The literature review for timber harvest describes the loss of suitable roosting or foraging habitat, direct injury or mortality from removal of occupied roost, and alteration of hibernacula (see section 4.1.2.1). Fragmentation of forests patches and travel corridors may result in longer flights to find alternative suitable habitat and colonial disruption. NLEBs emerge from hibernation with their lowest annual fat reserves and return to their summer home ranges. Because NLEBs have summer home range fidelity (Foster and Kurta 1999; Patriquin et al. 2010; Broders et al. 2013), loss or alteration of forest habitat may put additional stress on females when returning to summer roost or foraging areas after hibernation. Females (often pregnant) have limited energy reserves available for use if forced to seek out new roosts or foraging areas. Hibernation and reproduction are the most energetically demanding periods for temperate-zone bats, including the NLEB (Broders et al. 2013). Bats may reduce metabolic costs of foraging by concentrating efforts in areas of known high prey profitability, a benefit that could result from the bat's local roosting and home range knowledge and site fidelity (Broders et al. 2013). Cool spring temperatures provide an additional energetic demand, as bats need to stay sufficiently warm or enter torpor. Entering torpor comes at a cost of delayed parturition; bats born earlier in the year have a greater chance of surviving their first winter and breeding in their first year of life (Frick et al. 2010). Delayed parturition may also be costly because young of the year and adult females would have less time to prepare for hibernation (Broders et al. 2013). Female NLEBs typically roost colonially, with their largest population counts occurring in the spring (Foster and Kurta 1999), presumably as one way to reduce thermal costs for individual bats (Foster and Kurta 1999). Therefore, similar to other temperate bats, NLEBs have multiple high metabolic demands (particularly in spring) and must have sufficient suitable roosting and foraging habitat available in relatively close proximity to allow for successful reproduction.

Table 4.1 shows the six pathways we identified for NLEB responses to forest conversion and the range of individual responses expected. The primary alteration of the environment associated with forest conversion that is relevant to the NLEB is the removal of trees that provide roosts or serve as foraging, spring staging, or fall swarming habitat. Removing occupied trees is likely to kill or injure pups and adults. Fragmentation and loss of forest habitat decreases opportunities for growth and successful reproduction. Alteration of hibernacula can harm NLEBs. The disturbance (noise, exhaust from machinery, etc.) that accompanies conversion activities may result in

disturbance because fleeing during daylight increases the likelihood of predation. A small subset of disturbed individuals may be harmed. The species' responses to these stressors depend on the timing, location, and extent of the removal. In areas with little forest or highly fragmented forests (e.g., western U.S. edge of the range, central Midwestern states; see Figure 1.1, above), impact of forest loss would be disproportionately greater than similar-sized losses in heavily forested areas (e.g., Appalachians and northern forests). Also, the impact of habitat loss within a NLEB's home range is expected to vary depending on the scope of removal.

4.5.2 METHODOLOGY FOR QUANTIFYING EFFECTS OF FOREST CONVERSION

To estimate the potential impacts of forest conversion through 2022, we examined the total forested acres in each state from 2001 to 2011 using the National Land Cover Datasets (Homer et al. 2015). We calculated the approximate acres of forest lost per state per year by subtracting the acres of total forest in 2011 from the forested acres in 2001 and calculating the annual loss over the 10 year period (Table 4.9). We assume that the mean annual forest conversion from 2001-2011 will be consistent through the period of this consultation. Similar to the population estimation methods in Section 2.4.2, we excluded a state from our analyses if less than 50% of it is within the NLEB range. We anticipate that 914,237 acres will be converted from forested habitat annually through 2022, which is 0.3% of the available forested habitat per year and 2.3% of the available habitat through 2022 (Table 4.2). The majority of the expected forest conversion will occur in the Southern range (53%), followed by the Eastern range (26%), Midwest (19%). Only about 2% of the total conversion will occur in the Western range.

Similar to timber harvest, we lack a breakdown of forest conversion during the active and non-volant seasons, and we assume that it will occur with equal frequency throughout the year. Therefore, the average annual acres of forest conversion during the active season are 58.6% of the total average annual acres, and 16.7% of the total is estimated to occur in the non-volant season.

We use the same methods described for timber harvest (see Section 4.1.2.2) to estimate individual-level effects corresponding to the stressor-exposure-response pathways for prescribed burning. Our calculations for each pathway that we quantify are presented in tabular form in Section 4.3.

4.5.3 QUANTIFYING EFFECTS OF FOREST CONVERSION

We quantify the two pathways expected to disturb or harm the NLEB: disturbance from fleeing human activity (Table 4.10), and harm from removing occupied roost trees (Table 4.11 for pups

and Table 4.12 for adults). Human disturbance from forest conversion during the active season (April – October) within maternity roosting areas may disturb up to 21,004 volant NLEB annually (Table 4.10). Forest conversion activities that remove occupied roost trees during the non-volant season may harm up to 317 pups annually (Table 4.11). Removal of occupied roost trees during the active season may harm up to 83 adults annually (Table 4.12).

In addition to these two pathways, forest conversion could alter the flow of air and water through unknown hibernacula and also harm NLEBs. We do not have enough information to quantify the effects of this pathway because we do not know where projects will occur relative to the unknown hibernacula that are likely on the landscape. Although the alteration of unknown hibernacula is reasonably certain to occur, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of forest conversion activities. In addition, the hibernacula often selected by NLEB are "large, with large passages" (Raesly and Gates 1987), and may be less affected by relatively minor surficial micro-climatic changes that might result from forest conversion around unknown roosts. Raesly and Gates (1987) evaluated external habitat characteristics of hibernacula and reported that for the NLEB the percentage of cultivated fields within 0.6 miles (1 km) the hibernacula was greater (52.6 percent) for those caves used by the species, than for those caves not used by the species (37.7 percent), suggesting that the removal of some forest around a hibernacula can be consistent with the species needs.

We also do not quantify the potential reductions in fitness that may result as indirect effects from loss of habitat. We anticipate that 0.3% (914,237 acres) of available habitat will be converted annually through 2022. We anticipate that habitat losses from forest conversion will be permanent. However, the NLEB does not appear to be limited by habitat, as demonstrated by a great deal of plasticity within its environment (e.g., living in highly fragmented forest habitats to contiguous forest blocks from the southern United States to Canada's Yukon Territory) in the absence of WNS. Therefore, reductions in fitness from habitat loss are anticipated to be small.

4.6 WIND TURBINE OPERATION

Wind energy development is rapidly increasing throughout the NLEB's range. Iowa, Illinois, Oklahoma, Minnesota, Kansas, and New York are within the top 10 States for wind energy capacity (installed megawatts) in the United States (AWEA 2013). There is a national movement towards a 20 percent wind energy sector in the U.S. market by 2030 (United States Department of Energy (US DOE) 2008). Through 2012, wind energy has achieved its goals in installation towards the targeted 20 percent by 2030 (AWEA 2015a). If the target is achieved, it would represent nearly a five-fold increase in wind energy capacity during the next 15 years (Loss et al. 2013). While locations of future wind energy projects are largely influenced by ever-changing economic factors and are difficult to predict, sufficient wind regimes exist to support wind power

development throughout the range of the NLEB (USDOE 2015a), and wind development can be expected to increase throughout the range in future years. Wind energy facilities have been constructed in areas within a large portion of the range of the NLEB.

4.6.1 EFFECTS OF WIND TURBINE OPERATION

Significant bat mortality has been witnessed associated with utility-scale (greater than or equal to 0.66 megawatt (MW)) wind turbines along forested ridge tops in the eastern and northeastern United States and in agricultural areas of the Midwest (Johnson 2005; Arnett et al. 2008; Cryan 2011; Arnett and Baerwald 2013; Hayes 2013; Smallwood 2013). Recent estimates of bat mortality from wind energy facilities vary considerably depending on the methodology used and species of bat. Arnett and Baerwald (2013) estimated that 650,104 to 1,308,378 bats had been killed at wind energy facilities in the United States and Canada as of 2011, and expected another 196,190 to 395,886 would be lost in 2012. Other bat mortality estimates range from "well over 600,000… in 2012" (Hayes 2013; [but see Huso and Dalthorp 2014]) to 888,000 bats per year (Smallwood 2013), and mortality can be expected to increase as more turbines are installed on the landscape. The majority of bats killed include migratory foliage-roosting species the hoary bat (*Lasiurus cinereus*) and eastern red bat, and the migratory, tree- and cavity-roosting silver-haired bat (Arnett et al. 2008; Cryan 2011; Arnett and Baerwald 2013). NLEBs are rarely detected as mortalities, even in areas where they are known to be common on the landscape.

The Service reviewed post-construction mortality monitoring studies at 62 unique operating wind energy facilities in the range of the NLEB in the United States and Canada. In these studies, 41 NLEB mortalities were documented, comprising less than 1 percent of all bat mortalities. Northern long-eared bat mortalities were detected throughout the study range at 29 percent of the facilities, including: Illinois, Indiana, Maryland, Michigan, Missouri, New York, Pennsylvania, West Virginia, and Ontario. There is a great deal of uncertainty related to extrapolating these numbers to generate an estimate of total NLEB mortality at wind energy facilities due to variability in post-construction survey effort and methodology (Huso and Dalthorp 2014). Bat mortality can vary between years and between sites, and detected carcasses are only a small percentage of total bat mortalities. Despite these limitations, Arnett and Baerwald (2013) estimated that wind energy facilities in the United States and Canada killed between 1,175 and 2,433 NLEBs from 2000 to 2011.

There are three impacts of wind turbines that may explain proximate causes of bat fatalities, which include: (1) bats collide with turbine towers; (2) bats collide with moving blades; or (3) bats suffer internal injuries (barotrauma) after being exposed to rapid pressure changes near the trailing edges and tips of moving blades (Cryan and Barclay 2009). Researchers have recently indicated that traumatic injury, including bone fractures and soft tissue trauma caused by collision with moving blades, is the major cause of bat mortality at wind energy facilities

(Rollins et al. 2012; Grodsky et al. 2011). Grodsky et al. (2011) suggested that these injuries can lead to an underestimation of bat mortality at wind energy facilities due to delayed lethal effects. However, the authors also noted that the surface and core pressure drops behind the spinning turbine blades are high enough (equivalent to sound levels that are 10,000 times higher in energy density than the threshold of pain in humans) to cause significant ear damage to bats flying near wind turbines (Grodsky et al. 2011). Bats suffering from ear damage would have a difficult time navigating and foraging, as both of these functions depend on the bats' ability to echolocate (Grodsky et al. 2011). While earlier papers indicated that barotrauma may also be responsible for a considerable portion of bat mortality at wind energy facilities (Baerwald et al. 2008), in a more recent study, researchers found only 6 percent of wind turbine killed bats at one site were possibly killed by barotrauma (Rollins et al. 2012). In a separate study, Grodsky et al. (2011) found that 74 percent of carcasses had bone fractures and more than half had mild to severe hemorrhaging in the middle or inner ears; thus it is difficult to attribute individual fatalities exclusively to either direct collision or barotrauma.

Table 4.1 shows the two pathways we identified for NLEB responses to wind turbine operation and the range of individual responses expected. The primary impact to bats from operation of wind facilities is death resulting from collision with operating turbines. It is also possible that NLEBs could be disturbed by sound from turbine operation; however, studies have found no evidence to suggest that bats are likely to be affected (Szewczak and Arnett 2006; Horn et al. 2008). We do not address sound from turbine operation further in this BO. We include the potential impacts from construction under forest conversion.

4.6.2 QUANTIFYING EFFECTS OF WIND TURBINE OPERATION

This section describes the approach for determining the current and future wind energy development conditions and the estimation of potential fatalities from wind energy through the duration of this consultation in 2022.

We compiled the installed wind power capacity (megawatts [MW]) as identified by the American Wind Energy Association (AWEA) for each state within the NLEB's range through 2014 (AWEA 2014). Similar to the population estimation methods in Section 2.4.2, we excluded a state from our analyses if less than 50% of it is within the NLEB range. There is currently no installed wind power capacity in the excluded states of Louisiana, Alabama, Georgia, and South Carolina, but there was 5,857 MW of installed capacity in Montana, Wyoming, and Oklahoma as of 2014. To determine if excluding these states was reasonable, we also examined a wind development pressure map (Figure 4.1) developed using the Federal Aviation Administration's wind turbine data (Service 2015a, unpublished data). We concluded that a small amount of potential wind energy development was within the species' range in Montana, Wyoming, and Oklahoma; however, the inclusion of the full states of Nebraska and Kansas should compensate

for any impacts not included in the excluded states. The total amount of installed wind capacity for the remaining states within the range of the NLEB was 28,294 MW at the end of 2014 (Table 4.13).

To estimate the potential impacts of future wind energy development through 2022, we used the Department of Energy's 2020 and 2030 build-out projections from the interactive map developed using data from with their 2015 Wind Vision Report (http://energy.gov/maps/map-projected-growth-wind-industry-now-until-2050; USDOE 2015b). The total amount of installed wind capacity by 2020 for states with more than 50% of their area within the NLEB range is projected to be 44,100 MW (Table 4.13). Lacking annual projections, we assumed that the annual build-out from 2014 to 2020 would be the mean of the total build-out over the six year period. We estimated build-out in 2021 and 2022 by taking the difference between the 2030 and 2020 projections and assuming the annual build-out in 2021 and 2022 would be the mean of the total build-out through 2030. The total amount of installed wind capacity by 2022 for states with more than 50% of their area within the NLEB range is projected to be 55,006 MW. The total capacity of wind energy is anticipated to nearly double in the next seven years.

The best source of information available to estimate anticipated future impacts to bats from collision with wind turbines is data from post-construction monitoring studies of existing wind facilities. Species composition data from these studies can be used to estimate the level of NLEB mortality by assuming the proportion of documented fatalities of NLEB, relative to the fatalities of all other bat species, represents the proportion of NLEB fatalities expected in other projects situated in similar geographic areas. It is important to use data that are as representative as possible of the conditions in the area for which mortality is being estimated because multiple variables are likely to influence mortality rates at wind energy facilities, including location relative to bat areas of activity, turbine height, rotor-swept area, turbine cut-in speed (i.e., the minimum speed required to produce energy), geographic location, elevation, topographic location, surrounding habitat types, time of year, and weather conditions. Uncertainty regarding variations in the relative densities of different species of bats across the landscape and over time are an additional source of error in this estimation. However, we used the data from the draft Midwest Wind Energy Habitat Conservation Plan (MWE HCP) as a surrogate for the full range of the species because the post construction mortality studies have not been compiled at the range-wide scale of the NLEB. The estimates from the MWE HCP represent the best available data for this consultation, but we acknowledge the uncertainty of these estimates for the Eastern, Southern, and Western portions of the species' range.

The number of NLEBs that may be impacted by wind development in each state was calculated following these steps[3]: (1) determine the anticipated bat fatality rate for the geographic area of

[3] The MWE HCP is currently in development with the Service, a coalition of eight Midwestern states, and representatives of the wind energy industry. Much of the following information in this section comes from the draft

interest based on the results of post-construction monitoring studies; (2) determine the proportion of the NLEB among fatalities in post-construction monitoring studies in the applicable range of the NLEB; and (3) multiply the proportion of the NLEB by the expected fatality rate to derive the expected number of total fatalities of the NLEB. For example, if the total estimated bat mortality from regional data is 12 bats/MW/year (or 1,200 bats/year for a 100 MW facility), and the number of NLEB fatalities among all bat fatalities was 1 out of 100 (or 1%), the total estimated mortality of the NLEB would be 12 fatalities/year.

1. *determine the anticipated bat fatality rate for the geographic area of interest based on the results of post-construction monitoring studies*

   The studies used to estimate all bat fatality rates for the MWE HCP were limited to those that were conducted in the eight Midwestern states within the range of the covered bat species in the MWE HCP (i.e., Indiana bat, NLEB, little brown bat). The following additional criteria were used to select post-construction monitoring studies: (1) the search interval had to be weekly or more frequent; (2) studies had to correct for carcass persistence and searcher efficiency using site-specific data; (3) the search interval had to be shorter than the mean carcass persistence rate; (4) only include the mortality rate for the most robust study method for studies that reported more than one mortality rate; and (5) only include the bat fatality estimates from control turbines for curtailment study projects. These studies were further modified to account for unsearched areas where bats were expected to fall by applying a correction factor (sensu Hull and Muir 2013) if the study included search areas smaller than 100 m search radii. Fatality rates must also be representative of the period over which future mortality is being estimated; therefore, rates were adjusted to account for bat mortality that occurred during from April 1 to October 31, which is inclusive of the time frame within which all NLEB mortalities have been documented.

   Based on these criteria, 17 fatality monitoring studies were selected to estimate fatality of all bats within the MWE HCP states. Of these 17 studies, two were conducted in Minnesota, three in Wisconsin, three in Iowa, four in Illinois, two in Indiana, and three in Ohio. Reported bat fatality rates (adjusted as described above) were variable across projects and ranged from a low of 1.42 bats/MW/study period at the Big Blue project in Minnesota (Fagen Engineering, LLC 2014), to 38.25 bats/MW/study period at the Cedar Ridge project in Wisconsin (BHE Environmental 2010). The mean bat fatality rate was 17.55 bats/MW/year. This estimate is similar to pre-WNS values surveys in Maryland (15.61 bats/MW; Young et al. 2011) and Pennsylvania (14.4 bats/MW; Taucher et al.

MWE HCP being written by Leidos, Inc. The analytical process used here was developed and approved by the Service; therefore, the data derived from this study currently represents the best available information to inform this analysis.

2012), which addresses some of the uncertainty of using Midwest estimates for the entire range.

2. *determine the proportion of the NLEB among fatalities in post-construction monitoring studies in the applicable range of the NLEB*

   The MWE HCP used 71 studies to estimate species composition for NLEBs. This was a larger pool than the more restrictive studies used to determine the all bat fatality rate because the purpose was to capture all available data on NLEB mortality in the Midwest. Of these 71 studies, three species of long-distance migrants made up the highest percentage of fatalities, totaling 88% of the 8,934 bat carcasses documented across all studies. Eastern red bats had the highest number of fatalities (3,893 bat carcasses or 44%), followed by hoary bats (2,328 bat carcasses or 26%), and silver-haired bats (1,621 bat carcasses or 18%). The next most common species found among fatalities were big brown bats (519 bat carcasses or 6%), followed by little brown bats (339 bat carcasses or 4%). NLEBs made up 0.09% (8 bat carcasses out of 8,934) of the fatality pool.

3. *multiply the proportion of the NLEB by the expected fatality rate to derive the expected number of total fatalities of the NLEB*

   Based on the estimated percentage of NLEBs (0.09%) among the mean bat fatality rate (17.55/MW/year), the mean estimated NLEB fatalities/MW/year was 0.0158. This NLEB fatality rate was then applied to the current installed wind capacity and projected build-out through 2022 to determine an estimated number of NLEB fatalities that would occur during each year over the term of this consultation assuming no avoidance and minimization measures would be in place. Based on these assumptions, we estimated that 5,654 NLEB fatalities could result from the projected wind capacity of 55,006 MW through 2022 (3,575 NLEBs from current facilities and 2,078 NLEBs from projected build-out; Table 4.13). There was an estimated 447 mortalities in 2014, and annual estimates increase every year by 42 individuals from 2015-2020 and 86 individuals in 2021 and 2022 for a total of 869 individuals in 2022. These are over-estimates because they do not account for avoidance and minimization measures that are currently applied at wind facilities, especially within the range of the endangered Indiana bat and it does not account for declines from WNS, especially in the Eastern range.

   Operational adjustments can be made to minimize mortality of bat species at wind facilities through two primary methods: (1) turbines are “feathered,” or rendered near motionless below the normal manufacturer’s cut-in speed, and (2) the cut-in speed is raised to a wind speed higher than the normal manufacturer’s cut-in speed during periods and in areas of greatest risk for bats. These adjustments have been found to significantly

reduce bat mortality because bat activity and mortality have been shown to have an inverse relationship with wind speed (Arnett et al. 2013). Some facilities within the range of the NLEB have already instituted these operational adjustments to avoid take of Indiana bats or as required by Indiana bat Habitat Conservation Plans. In addition, the wind industry has recently announced new best management practices establishing voluntary operating protocols, which they expect "to reduce impacts to bats from operating wind turbines by as much as 30 percent" (AWEA 2015b). According to AWEA, the agreement "involves wind operators' voluntarily limiting the operations of turbines in low-wind speed conditions during the fall bat migration season, when research has shown bats are most at risk of collision" (AWEA 2015b). Given the large numbers of other bat species impacted by wind energy (Hein et al 2013) and the economic importance of bats in controlling agricultural or forest pest species (Boyles et al 2011), we anticipate that these new standards will be adopted by most wind energy facilities and ultimately required by wind-energy-siting regulators at state and local levels. It is possible that total fatalities will be reduced by as much as 50% if we include the effects of additional curtailment that is ongoing at many projects and the effects of WNS on the overall population.

4.7 OTHER ACTIVITIES THAT MAY AFFECT THE NLEB

The NLEB is likely to be affected by a variety of other activities which are excepted from incidental take prohibitions in the final 4(d) rule that are not covered by the general categories for removal from human structures, forest management, forest conversion, and wind turbine operation. These activities include, but may not be limited to:

- Disturbance/noise from with human activities not associated with timber harvest or forest conversion
- Lighting
- Use of pesticides for pest and vegetation control
- Spills/chemical contamination
- Water quality alteration
- Collision
- Noise from munitions, detonations, and training vehicles/aircraft
- Use of military training smoke and obscurants
- Bridge maintenance, repair, or replacement
- Subsurface drilling or blasting for utility line and road installation
- Use of waste pits to store contaminated fluids

4.7.1 EFFECTS OF OTHER ACTIVITIES

Disturbance/Noise

Noise and vibration and general human disturbance are stressors that may disrupt normal feeding, sheltering, and breeding activities of the NLEB. Many activities may result in increased noise/vibration/disturbance that may result in effects to bats. Significant changes in noise levels in an area may result in temporary to permanent alteration of bat behaviors. The novelty of these noises and their relative volume levels will likely dictate the range of responses from individuals or colonies of bats. At low noise levels (or farther distances), bats initially may be startled, but they would likely habituate to the low background noise levels. At closer range and louder noise levels (particularly if accompanied by physical vibrations from heavy machinery and the crashing of falling trees) many bats would probably be startled to the point of fleeing from their day-time roosts and in a few cases may experience increased predation risk. For projects with noise levels greater than usually experienced by bats, and that continue for multiple days, the bats roosting within or close to these areas are likely to shift their focal roosting areas further away or may temporarily abandon these roosting areas completely.

There is limited literature available regarding impacts from noise (outside of road/traffic) on bats. Gardner et al. (1991) had evidence that an NLEB conspecific, Indiana bat, continued to roost and forage in an area with active timber harvest (see the timber harvest Section above regarding other similar studies for NLEB). They suggested that noise and exhaust emissions from machinery could possibly disturb colonies of roosting bats, but such disturbances would have to be severe to cause roost abandonment. Callahan (1993) noted that the likely cause of the bats in his study area abandoning a primary roost tree was disturbance from a bulldozer clearing brush adjacent to the tree.

Indiana bats have also been documented roosting within approximately 300 meters of a busy state route adjacent to Fort Drum Military Installation (Fort Drum) and immediately adjacent to housing areas and construction activities on Fort Drum (US Army 2014). Bats roosting or foraging in all of the examples above have likely become habituated to the noise/vibration/disturbance.
Table 4.1 shows the pathway we identified for NLEB responses to noise/disturbance, and it is possible that NLEBs will be disturbed by noise/disturbance. A small subset of disturbed individuals may be harmed. Although some adverse effects to NLEBs are reasonably certain to occur from noise or disturbance, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%.

Lighting

Bat behavior may be affected by lights when traveling between roosting and foraging areas. Foraging in lighted areas may increase risk of predation or it may deter bats from flying in those areas. Bats that significantly alter their foraging patterns may increase their energy expenditures resulting in reduced reproductive rates. This depends on the context (e.g., duration, location, extent, type) of the lighting.

Some bats seem to benefit from artificial lighting, taking advantage of high densities of insects attracted to light. For example, 18 species of bats in Panama frequently foraged around streetlights, including slow-flying edge foragers (Jung and Kalko 2010). However, seven species in the same study were not recorded foraging near streetlights. Bat activity differed among color of lights with higher activity at bluish-white and yellow-white lights than orange. Bat activity at streetlights varied for some species with season and moonlight (Jung and Kalko 2010). In summary, this study suggests highly variable responses among species to artificial lighting.

Some species appear to be adverse to lights. Downs et al. (2003) found that lighting of *Pipistrellus pygmaeus* roosts reduced the number of bats that emerged. In Canada and Sweden, *Myotis* spp. and *Plecotus auritus* were only recorded foraging away from street lights (Furlonger et al. 1987, Rydell 1992). Stone et al. (2009) found that commuting activity of lesser horseshoe bats (*Rhinolophus hipposideros*) in Britain and was reduced dramatically and the onset of commuting was delayed in the presence of high pressure sodium (HPS) lighting. Stone et al. (2012) also found that light-emitting diodes (LED) caused a reduction in *Rhinolophus hipposideros* and *Myotis* spp. activity. In contrast, there was no effect of lighting on *Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*, or *Nyctalus/Eptesicus* spp.

Although there is limited information regarding potential neutral, positive, or negative impacts to NLEB from increased light levels, slow-flying bats such as *Rhinolophus*, *Myotis*, and *Plecotus* species have echolocation and wing-morphology adapted for cluttered environments (Norberg and Rayner 1987), and emerge from roosts when light levels are low, probably to avoid predation by diurnal birds of prey (Jones and Rydell 1994). Therefore, we would generally expect that NLEB would avoid lit areas. In Indiana, Indiana bats avoided foraging in urban areas and Sparks et al. (2005) suggested that it may have been in part due to high light levels. Using captive bats, Alsheimer (2012) also found that the little brown bat (*M. lucifugus*), was more active in the dark than light.

Table 4.1 shows the pathway we identified for NLEB responses to lighting, and it is possible that NLEBs will experience reduced fitness from lighting. Although some adverse effects to NLEBs are reasonably certain to occur from lighting, we anticipate that relatively small numbers of bats

will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%.

Pesticides

Herbicides and other pesticides may be used to control pests and weed species including noxious or invasive plants. Treatments typically occur in spring, early summer, or fall. Treatments can be applied either by hand, from a truck mounted boom sprayer withspray heads designed to minimize drift, or aerially. Herbicide and other pesticide applications typically occur during the day when bats are roosting, and often in the morning to avoid and minimize wind-induced drift.

Long-term sublethal effects of environmental contaminants, such as herbicides and other pesticides, on bats are largely unknown; however, environmentally relevant exposure levels of various contaminants have been shown to impair nervous system, endocrine, and reproductive functioning in other wildlife (Yates et al. 2014, Köhler and Triebskorn 2013, Colborn et al. 1993). Moreover, bats' high metabolic rates, longevity, insectivorous diet, migration-hibernation patterns of fat deposition and depletion, and immune impairment during hibernation, along with potentially exacerbating effects of WNS, likely increase their risk of exposure to and accumulation of environmental toxins (Secord et al. 2015, Yates et al. 2014, Geluso et al. 1976, Quarles 2013, O'Shea and Clark 2002).

Table 4.1 shows the pathway we identified for NLEB responses to the use of herbicides and other pesticides, and it is possible that NLEBs will experience reduced fitness and harm depending on the specific circumstances. Bats may drink contaminated water or forage in affected or treated areas and thus may eat insects exposed to chemicals. Bats may also be directly exposed to herbicides or other pesticides sprayed in roosting areas. Although some adverse effects to NLEBs are reasonably certain to occur from herbicides and other pesticide use, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%. In addition, all herbicides and other pesticides must be used in accordance to their label instructions, which are designed to minimize water contamination and adverse effects to wildlife.

Spills/Chemical Contamination

Accidents during project operation could result in the leakage of hazardous chemicals into the environment which could affect water quality resulting in reduced densities of aquatic insects that bats consume. If an accident occurred and hazardous chemicals leaked into the environment, a rapid response from state and/or federal agencies would limit the size of the spill area. However, if chemicals did reach surface waters (streams and wetlands), a short-term reduction in both aquatic and terrestrial insects could occur, thus reducing the spring, summer, or autumn

prey base for foraging NLEB. If this occurred, it would be localized, thus allowing foraging NLEBs to move nearby and continue foraging.

Table 4.1 shows the pathway we identified for NLEB responses to spills and chemical contamination, and it is possible that NLEBs will experience reduced fitness and harm depending on the specific circumstances. Bats may drink contaminated water or forage in affected areas with the potential to eat insects exposed to chemicals. Although some adverse effects to NLEBs are reasonably certain to occur from spills and chemical contamination, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%. In addition, all projects are typically required to follow state and/or federal wetland permitting, stormwater management, and water quality standards.

Water Quality Alteration

Some projects may result in permanent loss from wetland and/or stream fill or temporarily reduce water quality from dust and sedimentation. Table 4.1 shows the pathway we identified for NLEB responses to water quality alteration. Activities that reduce quantity or quality of water sources and foraging habitat may impact bats, even if conducted while individuals are not present. Standard construction BMPs (e.g., silt fencing) will minimize erosion and subsequent sedimentation, thus reducing potential impacts on aquatic ecosystems. Since potential impacts from sedimentation are expected to be localized, foraging bats should have alternative drinking water and foraging locations. The surrounding landscape will continue to provide an abundant prey base of both terrestrial and aquatic insects during project construction, operation, and maintenance. Therefore, any potential direct effects to bats from a reduction in water quality are anticipated to be insignificant.

Collision

Collision has been documented for Indiana bats and other myotids. The Indiana bat recovery plan indicates that bats do not seem particularly susceptible to vehicle collisions, but it may threaten local populations in certain situations (Service 2007). Russell et al. (2009) assessed the level of mortality from road kills on a bat colony in Pennsylvania and collected 27 road-killed little brown bats and 1 Indiana bat. This study also cited unpublished data from the Penssylvania Game Commission documenting NLEB collision mortality. Curtis et al. (2014) indicates that a dead NLEB was found along a road in Kansas and was thought to have collided with a vehicle. Collision has been documented for other *Myotis* in Europe (Lesinski et al. 2011). Collision risk of bats varies depending on time of year, location of road in relation to roosting/foraging areas), the characteristics of their flight, traffic volume, and whether young bats are dispersing (Lesinski 2007, Lesinski 2008, Russell et al. 2009, Bennett et al. 2011).

It can be difficult to determine whether roads pose greater risk for bats colliding with vehicles or greater likelihood of deterring bat activity in the area (thus decreasing risk of collision). Many studies suggest that roads may serve as a barrier to bats (Bennett and Zurcher 2013, Bennett et al. 2013, Berthinussen and Altringham 2011, Wray et al. 2006). In most cases, we expect there will be a decreased likelihood of bats crossing roads (and therefore, reduced risk of collision) of increasing size (lanes).

Table 4.1 shows the pathway we identified for NLEB responses to collision, and we anticipated that NLEBs will be killed from collision with vehicles. Although some mortality is reasonably certain to occur, we anticipate that relatively small numbers of bats will be impacted per year in each state because of the decreased likelihood of bats crossing major roads. Also, we anticipate the likelihood of mortality will be reduced by the widely dispersed of new road construction and occupancy rates that are typically less than 50%.

Noise from Munitions, Detonations, and Training Vehicles, Aircraft

Recent studies have indicated that anthropogenic noise can alter foraging behavior and success of bats, including some gleaning species like the NLEB (Bunkley et al. 2015; Schaub et al. 2008; Siemers and Schaub 2011). Table 4.1 shows the pathway we identified for NLEB responses to noise from military training operations, and it is possible that NLEBs will be disturbed. A small subset of disturbed individuals may be harmed. However, studies indicate that indicate bats do not avoid active ranges or alter foraging behavior during night-time maneuvers, and NLEBs are expected to become habituated to noise disturbance (Whitaker & Gummer 2002; Service 2010; USFWS 2009). Although some adverse effects to NLEBs may occur from noise from military operations, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%.

Use of Military Training Smoke and Obscurants

Smoke/obscurants are used to conceal military movements and help protect troops and equipment in combat conditions. Although they would be primarily used during the day, smoke/obscurants may be deployed at night. Training on military installations may include, but is not limited to, smokes and obscurants such as fog oil, colored smoke grenades, white phosphorous, and graphite smoke. Research indicates that prolonged dermal and respiratory exposures to these items, except for the graphite smoke, could have adverse effects on roosting and foraging Indiana bats (Service 1998; Service 2012; Driver et al. 2002; USWFS 2009; NRC 1999). Given the similar roosting behavior and foraging locations of the NLEB, it is likely they will also be adversely affected by these smokes and obscurants.

Table 4.1 shows the pathway we identified for NLEB responses to the use of smokes and obscurants, and it is possible that NLEBs will be harmed depending on the specific circumstances. Although some adverse effects to NLEBs are reasonably certain to occur, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the limited use of these chemicals and occupancy rates that are typically less than 50%. In addition, many military installations already limit the use of smokes and obscurants in areas that may affect the Indiana bat, further reducing the impact to NLEBs.

Bridge Maintenance, Repair, or Replacement

NLEBs have been found using bridges for day and night roosts in Illinois, Louisiana, Iowa, and Missouri (Feldhamer et al. 2003; Ferrara and Leberg 2009; Kiser et al. 2002; Benedict and Howell 2008; Droppelman 2014). Altering or removing bridges when occupied by NLEBs is expected to result in adverse effects. Bridge alteration refers to any bridge repair, retrofit, maintenance, and/or rehabilitation work activities that modifies the bridge to the point that it is no longer suitable for roosting.

Table 4.1 shows the two pathways we identified for NLEB responses to bridge work and it is possible that NLEBs will experience reduced fitness and harm depending on the specific circumstances. We expect that NLEBs will be killed or injured bats during activities conducted while bats are present, and the removal of roosts can reduce fitness. Although some adverse effects to NLEBs are reasonably certain to occur from bridge maintenance, repair, or replacement, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%.

Subsurface Drilling or Blasting

Surface-disturbing activities (such as drilling or blasting) in the vicinity of hibernacula may affect bat populations if those activities result in changes to the microclimate (temperature, humidity, and air flow) of the cave or mine (Ellison et al. 2003).

Table 4.1 shows the two pathways we identified for NLEB responses to drilling and blasting, and it is possible that NLEBs will be harmed. These activities can alter the flow of air and water through unknown hibernacula. Although the alteration of unknown hibernacula is reasonably certain to occur, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of timber harvest activities.

Use of Waste Pits to Store Contaminated Fluids

The oil and gas industry (and possibly other industries) occasionally use of temporary waste pits to store materials removed from drilling, including sand used during hydraulic fracturing treatments, wellbore cuttings, bentonite drilling muds, and fluids. These waste pits have been documented to attract and entrap wildlife. Bats may drink contaminated water or become trapped in waste pits and die. Table 4.1 shows the pathway we identified for NLEB responses to waste pits, and it is possible that NLEBs will be harmed. Although some adverse effects to NLEBs are reasonably certain to occur from the use of waste pits, we anticipate that relatively small numbers of bats will be impacted per year in each state based on the widely dispersed nature of activities and occupancy rates that are typically less than 50%.

4.8 CONSERVATION MEASURES IN THE 4(D) RULE

In BOs, we consider how conservation measures included in the proposed action may reduce the severity of effects or the probability of exposure. Prohibitions adopted under the final 4(d) will reduce the severity of effects or the probability of exposure of NLEB to the full scope of activities that may affect the species through regulatory processes under section 7 and section 10 the Act. Under the final 4(d) rule, incidental take involving tree removal in the WNS zone is not prohibited if two conservation measures are followed. The first measure is the year-round application of a 0.25-mile radius buffer (which is equivalent to 125.7 acres) around known NLEB hibernacula. The second conservation measure involves the temporary protection of known, occupied maternity roost trees. Incidental take is prohibited if the activity cuts or destroys a known, occupied maternity roost tree and other trees within a 150-foot radius around the maternity roost tree (which is equivalent to 1.6 acres) during the pup season (June 1-July 31). The 150 ft buffer covers 1.6 acres around a known maternity roost tree. In addition, incidental take is prohibited in hibernacula within the WNS zone; therefore, regardless of the buffer size, NLEBs are protected from take while in known hibernacula when they are most vulnerable.

To determine how these conservation measures reduce the severity of effects or probability of exposure, we compared the acreages affected by the conservation measures to the total forested habitat within the range of the NLEB (Table 4.14). As described in section 2.2, there are currently 1,508 known hibernacula and 1,412 known maternity roost trees. The year-round protection of forested habitat around hibernacula results in a total of 189,556 acres (0.05% of the total forested habitat) in 31 of 37 states (84% of the range) where activities that may affect the NLEB are subject to regulatory processes under sections 7 and 10 of the Act. The temporary protection of known, occupied maternity roosts results in a total of 2,259 acres (<0.001% of the total forested habitat) in 17 of 37 states (46% of the range) where activities that may affect the NLEB are subject to the same regulatory processes.

These two conservation measures are beneficial in that they protect known hibernating populations from take and help protect known maternity colonies from direct harm by temporarily protecting known maternity roost trees during the pup season. However, because known maternity roost trees likely represent a small fraction of the total, the beneficial effect of this conservation measure, which reduces the severity of effects, does not significantly reduce the probability of exposure. Additionally, known roost trees may be cut either before June 1st or after July 31st in compliance with the 4(d) rule, or during that time period with either an incidental take permit under section 10, or an incidental take statement under section 7. The hibernacula conservation measure is more protective in scope (i.e., timing, location, and severity). The severity of the effects and probability of exposure are somewhat reduced, but this beneficial effect extends only to known hibernacula. Like known maternity roost trees, known hibernacula likely represent a small fraction of the total.

4.9 SUMMARY OF IMPACTS OF INDIVIDUALS

Table 4.15 combines the total annual estimated effects of the activities quantified for timber harvest, prescribed fire, forest conversion, and wind turbine operation. Because fatalities from wind turbine operation increase every year between 2015 and 2022, we report the average annual wind fatalities over the time-frame of this consultation. Based on these estimations, we anticipate that up to 117,267 NLEB will be disturbed and 3,285 pups and 980 adults will be harmed annually from timber harvest, prescribed fire, forest conversion, and wind turbine operation.

The disturbance associated with timber harvest, prescribed burning, and forest conversion within maternity roosting areas during the active season (April – October) can cause volant bats to flee their roosts and expend additional energy while exposed to day-time predators. Our methodology computes the number of NLEB affected annually as 117,267 bats (or 1.2% of the population) (Table 4.16). We recognize that not all of the NLEB roosting in an activity area will necessarily respond to disturbance by fleeing their roosts, likely depending on the disturbance intensity and proximity; therefore, we consider this to be an overestimate. Table 4.16 shows that 66 percent of the potential disturbance in maternity roosting areas is due to timber harvest, 18 percent to forest conversion, and 17% to prescribed burning. Disturbance that disrupts normal behavior patterns and creates the likelihood of injury to listed species (e.g., causing a nocturnal species to travel during daylight hours) may result in harm.

Timber harvest, prescribed burning, and forest conversion may also occur in maternity roosting areas during the non-volant season (June 1 – July 31). Heat and smoke from prescribed burning, and tree removal from the other activities, may kill or injure a non-volant pup, who cannot flee the threat unless carried by its mother, which we do not presume precludes this potential harm. We estimate that up to 3,285 NLEB pups (0.1 percent of the total pup population) are exposed to potentially lethal habitat modification annually (Table 4.17). Prescribed burning may affect 56.6

percent of the total pup population (Table 4.17). The potential for death or injury resulting from prescribed burning depends largely on site-specific circumstances, e.g., fire intensity near the maternity roost tree and the height above ground of pups in the maternity roost tree. Not all fires through maternity roosting areas will kill or injure all pups present, but our methodology in this BO estimates that all potentially vulnerable individuals within the expected area of activity/occupancy overlap are affected. We therefore consider this to be an overestimate. Timber harvest and forest conversion account for 33.8 and 9.6 percent of the estimated harm to non-volant pups, respectively (Table 4.17). Unlike prescribed burning, we did not assume that all potentially vulnerable individuals within the expected area of activity/occupancy overlap are affected. We assumed that 15 percent of pups would be injured or killed when their roost tree was felled.

Wind turbine operation and tree removal from timber harvest and forest conversion may also kill or injure adults when they are struck by turbines or when occupied roost trees are felled. We estimate that up to 980 NLEB adults (less than 0.02 percent of the total adult population) are exposed to potentially lethal wind turbines and habitat modification annually (Table 4.18). Wind turbine operation accounts for 66.3% of the adult mortality, followed by timber harvest (25.2%) and forest conversion (8.5%) (Table 4.18). As discussed in Section 4.1.5.2, we believe the wind fatalities may be overestimated by as much as 50% after accounting for population reductions from WNS and current and future curtailment. The adult mortality from tree removal is not as likely to be overestimated because we did not assume that all potentially vulnerable individuals within the expected area of activity/occupancy are affected.

Additional harm is anticipated for unquantified effects from removal from human structures and "other" activities that may affect the NLEB; however, we do not expect the additional impacts to substantially change the total numbers reported in Table 4.15 for reasons discussed above (see section 4.1). In addition, we consider some of the numbers for harm and disturbance in this section to be overestimates as discussed, and we also expect that the numbers affected over time will be reduced as WNS continues to affect the range-wide population. As populations decline as a result of WNS, the chances of any particular activity affecting northern long-eared bats becomes more remote.

4.10 IMPACTS TO POPULATIONS

As described above, individual NLEBs may experience decreased reproductive success and survival as a result of implementation of the final 4(d) rule. Of importance here though, is how these potential adverse effects to individual bats affect the overall health and viability of populations present within the action area. This is best done by looking at the maternity colony and hibernacula populations; however, we do not have enough information about local populations or when and where projects will occur relative to the species' occurrence.

The finest-scale of analysis we have to examine effects on local populations is at the state level. States vary greatly in the number of maternity colonies estimated per state (Table 2.5). States in the Eastern range generally have the lowest estimated number of maternity colonies, ranging from 16 maternity colonies in Delaware to 6,984 colonies in West Virginia. States with small numbers of maternity colonies are likely at greater risk of extirpation from impacts to individuals. For example, Delaware has 16 maternity colonies estimated to be comprised of 20 females each, for a total adult population size of 640 individuals. Activities implemented according to the final 4(d) rule could disturb 9 individuals in Delaware per year, along with harm to 3 pups and 2 adults per year. If all the annual impacts occurred within one maternity colony, it is possible that the colony would be reduced by at least 10% in one year (2 adults killed from a colony with 20 females = 10%), and potentially more if the 3 pups were also killed. Losses to very small populations may not be sustainable at the local-level. It is possible that the loss of 10% of the maternity colony could result in the loss of that colony, but it is unlikely that that level of impact would occur within a single maternity colony every year. However, areas hardest hit by WNS are likely at greatest risk (i.e., currently much of the Eastern range).

Although local populations could be affected by the implementation of the final 4(d) rule, most of the states have larger populations and more maternity colonies. In addition, less than 2.3% of NLEBs will be disturbed in all states (Table 4.16), less than 1% of pups will be harmed in all states (Table 4.17), and less than 1% of adults will be harmed in all states (Table 4.18). Therefore, the vast majority of individuals and populations that survive WNS will be unaffected by these activities.

Where the species has substantially declined as a result of WNS, the surviving members of the population may be resilient or resistant to WNS. These surviving populations are particularly important to the persistence of the populations. The individual effects analysis indicates that some additional impacts will occur as a result this action. We do not know at this time if the impacts from this action are additive; however, even if the potential mortality from these activities is additive to the impacts from WNS, it is likely that the species will persist in these states based on the number of maternity colonies and widely-dispersed nature of the activities.

Based on the relatively small numbers affected annually compared to the state population sizes, we do not anticipate population-level effects to the NLEB. We conclude that adverse effects from timber harvest, prescribed fire, forest conversion, wind energy, and other activities will not lead to population-level declines in this species. Because we do not anticipate population-level impacts from our action, our analysis of effects to the NLEB is complete.

4.11 INTERRELATED AND INTERDEPENDENT ACTIONS

An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. At this time, we are unaware of actions that are interrelated and interdependent with the final 4(d) rule that have not already been considered in this BO.

4.12 TABLES AND FIGURES FOR EFFECTS OF THE ACTION

Table 4.1. Exposure-response analysis for activities conducted in accordance with the final 4(d) rule that may affect the NLEB.

Activity	Subactivity	Stressor	Exposure (time)	Exposure (space)	Resource Affected	Individual Response	Interpretation
Removal from Human Structures	Exclusion	Using exclusion to make a known roost unsuitable	Year-round; indirect effect	All occupied areas except hibernacula	Adults	Reduced fitness	Loss of structures where bat colonies have demonstrated repeated could reduce fitness through additional energy expenditure while searching for a new roost site.
Removal from Human Structures	Rodenticides and sticky traps	Using rodenticides and sticky traps to remove bats	Active season, daytime; direct effect	Roosting areas (maternity and non-maternity)	Individuals	Injury, mortality; harm	Activities conducted while bats are present are likely to kill or injure individuals. We expect this threat to be reduced through the implementation of BMPs for bat removal.
Removal from Human Structures	Eviction Devices	Using eviction or exclusionary devices to remove bats	Active season, daytime; direct effect	Roosting areas (maternity and non-maternity)	Pups	Injury, mortality; harm	Use of exclusionary devices during the non-volant period is likely to result in the death of pups because females cannot return to take care of their young. However, many states require that exclusions be conducted outside of the non-volant period to minimize impacts.
Removal from Human Structures	Rabies testing	Euthanizing bats for rabies testing during removal	Active season, daytime; direct effect	Roosting areas (maternity and non-maternity)	Individuals	Injury, mortality; harm	Rabies testing will kill adults and volant juveniles. Data from MO and NY indicate that an average of 7 bats were killed bats per year during the most recent three years.
Forest Management	Timber Harvest	Reducing mid-story clutter adjacent to roost trees	Year-round; indirect effect	Maternity roosting areas	Vegetation near roost trees	Beneficial through maintenance or improvement of habitat	Beneficial through increased solar radiation on roosts; improved access to roosts; travel corridors to foraging areas; however, we are unable to quantify the degree of benefit in terms of increased survival or reproductive success.
Forest Management, Forest Conversion	Timber Harvest, Construction Activities	Removing unoccupied roost trees	Winter; indirect effect	Maternity roosting areas	Trees	Reduced fitness	Removal of roost trees where bat colonies have demonstrated repeated could reduce fitness through additional energy expenditure while searching for a new roost site.
Forest Management, Forest Conversion	Timber Harvest, Construction Activities	Removing trees that provide habitat used for foraging, swarming, or staging	Year-round; indirect effect	All occupied areas except hibernacula	Insect prey, forest cover that supports (shelters) bat activity	Reduced fitness; energy expenditure for relocating from traditional use areas to alternative habitat	Loss of forest habitat decreases opportunities for growth and successful reproduction. Depending on location and size of the harvest, forest cover removal in the summer home range may cause a shift in home range or relocation. Loss of habitat in staging/swarming areas near hibernacula may cause a similar shift in habitat use for larger numbers of individuals, due to their seasonal concentration in these areas, and may reduce fall mating success and/or reduced fitness in preparation for spring migration
Forest Management, Forest Conversion, Other	Timber Harvest, Construction Activities, Most other subactivities	Disturbance (noise, machinery exhaust, activity) associated with human activities	Active season, daytime; direct effect	Roosting areas (maternity and non-maternity)	Individuals	Disturbance (fleeing); harass	Fleeing disturbance during daylight hours increases the likelihood of predation
Forest Management, Forest Conversion, Other	Timber Harvest, Construction Activities	Altering the flow of air and water through hibernacula.	Winter (direct effect) and active season (indirect effect)	Near hibernacula	Individuals	Arousal from hibernation; reduced fitness, mortality; take in the form of harm.	Response depends on proximity of tree removal to hibernacula entrances, airflow patterns, and local hydrology. Sufficient modification may cause injury or mortality (take in the form of harm).
Forest Management, Forest Conversion	Timber Harvest, Construction Activities	Removing occupied roost trees	Active seasos; direct effect	Maternity roosting areas	Individuals	Injury, mortality; harm	Removing occupied trees is likely to kill or injure pups and adults. For the purposes of this consultation, we assume that 15% of non-volant bats and 3% of adults may be injured or killed.
Forest Conversion	Construction Activities	Removal of forested habitat	Year-round; indirect effect	All occupied areas except hibernacula	Trees	Reduced fitness	Fragmentation of forests patches and travel corridors may result in longer flights to find alternative suitable habitat and colonial disruption.
Forest Management	Prescribed Burning	Creating snags, creating roost features in live trees	Year-round; indirect effect	All occupied areas except hibernacula	Trees	Beneficial through maintenance or improvement of habitat	Beneficial through greater availability of suitable roosts increasing opportunities for successful reproduction, more efficient use of forest habitat however, we are unable to quantify the degree of benefit in terms of increased survival or reproductive success

Table 4.1. Continued.

Activity	Subactivity	Stressor	Exposure (time)	Exposure (space)	Resource Affected	Individual Response	Interpretation
Forest Management	Prescribed Burning	Stimulating growth of ground cover and insect populations	Growing-season following the burn; indirect effect	Foraging areas	Insect prey	Beneficial through maintenance or improvement of habitat	Beneficial through greater availability of insect prey increasing foraging efficiency; however, we are unable to quantify the degree of benefit in terms of increased survival or reproductive success
Forest Management	Prescribed Burning	Thinning mid-story clutter adjacent to roost trees	Growing-season following the burn; indirect effect	Maternity roosting areas	Vegetation near roost trees	Beneficial through maintenance or improvement of habitat	Beneficial through increased solar radiation on roosts; improved access to roosts however, we are unable to quantify the degree of benefit in terms of increased survival or reproductive success.
Forest Management	Prescribed Burning	Destroying existing snags and other trees suitable for roosting	Year-round; indirect effect	All occupied areas except hibernacula	Trees	Reduced fitness	Loss of suitable roosts decreases opportunities for successful reproduction, more efficient use of forest habitat
Forest Management	Prescribed Burning	Heat and smoke	Active season, day time; direct effect	Roosting areas (maternity and non-maternity)	Individuals; adults and volant juveniles	Disturbance (fleeing); harass	Fleeing the line of fire of a prescribed burn during daylight hours increases the likelihood of predation
Forest Management	Prescribed Burning	Heat and smoke	Active season, night time; direct effect	Foraging areas	Individuals; adults and volant juveniles	Disturbance (fleeing)	Fleeing the line of fire of a prescribed burn during night-time foraging is unlikely to cause injury
Forest Management	Prescribed Burning	Heat and smoke	Winter; direct effect	Near hibernacula	Individuals	Arousal from hibernation; reduced fitness, mortality; take in the form of harm	Response depends on proximity of fire to hibernacula entrances and airflow patterns. Sufficient smoke entering hibernacula may cause injury or mortality.
Forest Management	Prescribed Burning	Heat and smoke	Non-volant season; direct effect	Maternity roosting areas	Individuals; non-volant juveniles	Injury, mortality; harm	Response varies with fire intensity and roost height; a combination of high-intensity burns and/or low roosts is likely to cause injury or mortality
Wind Energy	Operation	Sound from Operating Turbines	Active season, day and night; direct effect	Active season; direct effect	Individuals	Disturbance (fleeing)	Studies (Szewczak and Arnett 2006, Horn et al. 2008) have found evidence to suggest that bats are not likely to be negatively affected by sound from operating turbines.
Wind Energy	Operation	Collision with Operating Turbines	Active season, direct effect	All occupied areas except hibernacula	Individuals	Mortality; harm	Collision with wind wind turbines is likely to kill bats
Other	Most subactivities	Lighting	Active season, night; direct effect	All occupied areas except hibernacula	Individuals	Disturbance (fleeing), increased risk of predation; increase energy expenditure; harass	Foraging in lighted areas may increase risk of predation (leading to death) or it may deter bats from flying in those areas. Bats that significantly alter their foraging patterns may increase their energy expenditures resulting in reduced reproductive rates. This depends on the context (e.g., duration, location, extent, type) of the lighting. Some studies also show a beneficial effect of concentrating prey.
Other	Most subactivities	Use of pesticides and herbicides for pest and vegetation control	Active season, direct and indirect effect	All occupied areas except hibernacula	Individuals; insect prey	lethal or sublethal exposure to toxins; reduction in prey availability; harm/harass	Bats may drink contaminated water or forage in affected areas with the potential to eat insects exposed to chemicals. Bats may also be directly exposed to herbicides sprayed in roosting areas. Effects are reduced because all herbidices and pesticides must be used in accordance with their label.
Other	Most subactivities	Chemical contamination from use or spills in/around bat habitat	Active season, direct and indirect effect	All occupied areas except hibernacula	Individuals; insect prey	lethal or sublethal exposure to toxins; reduction in prey availability; harm/harass	Bats may drink contaminated water or forage in affected areas with the potential to eat insects exposed to chemicals.
Other	Most subactivities	Water Quality Alteration; sedimentation	Active season, indirect effect	All occupied areas except hibernacula	Insect prey	Reduced fitness	Temporary effects on water quality could occur during construction, which could reduce local insect populations. Standard construction BMPs (e.g., silt fencing) will minimize erosion and subsequent sedimentation, thus reducing potential impacts on aquatic ecosystems.

Table 4.1. Continued.

Activity	Subactivity	Stressor	Exposure (time)	Exposure (space)	Resource Affected	Individual Response	Interpretation
Other	Military Operations	Noise from munitions, detonations, and training vehicles, including aircraft	Active season, direct effect	All occupied areas except hibernacula	Individuals	Disturbance (fleeing)	Fleeing disturbance increases the likelihood of predation. However, studies indicate bats do not avoid active ranges or alter foraging behavior during night-time maneuvers, and NLEBs are expected to become habituated to noise disturbance.
Other	Military Operations	Use of Military Training Smoke and Obscurants	Active season, direct effect	All occupied areas except hibernacula	Individuals	Injury, mortality; harm	Research indicates that prolonged dermal and respiratory exposures smokes and obsurants could have adverse effects on roosting and foraging bats.
Other	Bridge maintenance, repair, or replacement	Bridge work activities affect roosting bats	Active season, direct effect	Roosting areas (maternity and non-maternity)	Individuals	injury, mortality; harm	Bats may be injured or killed if they do not exit the bridge before it is either removed or the action results in effects to portion of the bridge where the bats are roosting.
Other	Bridge maintenance, repair, or replacement	Bridge work makes it unsuitable for roosting.	Inactive season, indirect effect	Roosting areas (maternity and non-maternity)	Individuals	Increased energy exposure; reduced fitness	Removal of bridges where bat colonies have demonstrated repeated could reduce fitness through additional energy expenditure while searching for a new roost site.
Other	Drilling	Subsurface drilling utility line and road installation	Winter (direct effect) and active season (indirect effect)	Near hibernacula	Individuals	Arousal from hibernation; reduced fitness, mortality; take in the form of harm.	Response depends on proximity of harvest to hibernacula entrances, airflow patterns, and local hydrology. Sufficient modification may cause injury or mortality (take in the form of harm).
Other	Blasting	Use of explosives to remove rocks for utility line and road installation	Winter (direct effect) and active season (indirect effect)	Near hibernacula	Individuals	Arousal from hibernation; reduced fitness, mortality; take in the form of harm.	Response depends on proximity of harvest to hibernacula entrances, airflow patterns, and local hydrology. Sufficient modification may cause injury or mortality (take in the form of harm).
Other	Storage Pits for oil and gas waste	Bats can become trapped in waste pits or drink contaminated water	Active season, direct effect	All occupied areas except hibernacula	Individuals	Injury, mortality; harm	Bats may drink contaminated water or become trapped in waste pits and die.

Table 4.2. Mean annual harvest (acres) for each state included in the analysis (Source: U.S. Forest Service's Forest Inventory EVALIDator web-application Version 1.6.0.03; Available only on internet: http://apps.fs.fed.us/Evalidator/evalidator.jsp).

					Harvest (acres)						
Region	State	Acres of Forested Land	Years	N (years)	National Forest	Other Federal	State & Local	Private	Total	Average (acre/year)	Percent of Annual Average Acres Harvested
Midwest	Iowa	3,013,759	2009-2014	6	0	0	6,290	118,105	124,395	20,733	0.7%
Midwest	Illinois	4,847,480	2009-2014	6	0	7,392	0	220,038	227,430	37,905	0.8%
Midwest	Indiana	4,830,395	2009-2014	6	2,924	3,500	12,114	292,650	311,189	51,865	1.1%
Midwest	Michigan	20,127,048	2009-2014	6	79,571	0	340,950	1,189,042	1,609,563	268,261	1.3%
Midwest	Minnesota	17,370,394	2010-2014	5	43,708	2,977	391,433	360,229	798,346	159,669	0.9%
Midwest	Missouri	15,471,982	2009-2014	6	66,135	0	45,879	933,470	1,045,484	174,247	1.1%
Midwest	Ohio	8,088,277	2009-2014	6	1,945	0	15,572	467,607	485,124	80,854	1.0%
Midwest	Wisconsin	16,980,084	2009-2014	6	75,449	4,738	390,366	1,144,172	1,614,726	269,121	1.6%
Eastern	Connecticut	1,711,749	2009-2014	6	0	0	14,622	44,924	59,546	9,924	0.6%
Eastern	Delaware	339,520	2009-2014	6	0	0	2,540	13,625	16,164	2,694	0.8%
Eastern	Maine	17,660,246	2010-2014	5	0	0	86,952	2,285,161	2,372,113	474,423	2.7%
Eastern	Maryland	2,460,652	2009-2014	6	0	0	11,192	76,740	87,931	14,655	0.6%
Eastern	Massachusetts	3,024,092	2009-2014	6	0	0	16,196	66,640	82,837	13,806	0.5%
Eastern	New Hampshire	4,832,408	2009-2014	6	14,502	7,118	35,153	355,549	412,332	68,722	1.4%
Eastern	New Jersey	1,963,561	2009-2014	6	0	0	0	21,442	21,442	3,574	0.2%
Eastern	New York	18,966,416	2009-2014	6	0	0	62,807	1,002,449	1,065,256	177,543	0.9%
Eastern	Pennsylvania	16,781,960	2009-2014	6	10,966	8,625	128,668	1,026,196	1,174,456	195,743	1.2%
Eastern	Rhode Island	359,519	2009-2014	6	0	0	0	0	0	0	0.0%
Eastern	Vermont	4,591,280	2010-2014	5	4,858	0	5,596	245,487	259,941	51,988	1.1%
Eastern	Virginia	15,907,041	2008-2013	6	2,606	9,518	20,195	1,125,092	1,157,410	192,902	1.2%
Eastern	West Virginia	12,154,471	2009-2014	6	0	0	0	463,133	463,133	77,189	0.6%
Southern	Arkansas	18,754,916	2009-2014	6	193,868	11,975	43,919	2,411,963	2,661,725	443,621	2.4%
Southern	Kentucky	12,471,762	2006-2013	8	17,706	8,644	4,873	847,274	878,496	109,812	0.9%
Southern	Mississippi	19,541,284	2006-2014	9	68,994	21,053	60,562	3,273,286	3,423,895	380,433	1.9%
Southern	North Carolina	18,587,540	2003-2014	12	0	29,351	60,638	2,276,778	2,366,767	197,231	1.1%
Southern	Tennessee	13,941,333	2005-2013	9	0	12,837	3,028	1,151,325	1,167,190	129,688	0.9%
Western	Kansas	2,502,434	2009-2014	6	0	6,205	0	57,781	63,985	10,664	0.4%
Western	Nebraska	1,576,174	2009-2014	6	0	0	1,221	91,823	93,044	15,507	1.0%
Western	North Dakota	759,998	2009-2014	6	0	0	0	0	0	0	0.0%
Western	South Dakota	1,910,934	2009-2014	6	163,971	0	1,489	52,375	217,834	36,306	1.9%
	Total	281,528,709			747,203	133,933	1,762,255	21,614,356	24,261,754	3,669,077	1.3%

Table 4.3. Estimated numbers of NLEB affected (disturbed) annually by human activity from active-season harvest in maternity roosting areas.

Region	State	A. Harvest, Bat Active Season (acres)[1]	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Bats Affected (FxE)
Midwest	Iowa	12,149	3,013,759	0.403%	6.3%	765	0.808	619
Midwest	Illinois	22,212	4,847,480	0.458%	9.4%	2,097	0.701	1,469
Midwest	Indiana	30,393	4,830,395	0.629%	5.7%	1,722	0.701	1,207
Midwest	Michigan	157,201	20,127,048	0.781%	4.8%	7,479	0.701	5,240
Midwest	Minnesota	93,566	17,370,394	0.539%	8.9%	8,295	0.808	6,706
Midwest	Missouri	102,109	15,471,982	0.660%	4.0%	4,040	0.701	2,831
Midwest	Ohio	47,380	8,088,277	0.586%	6.4%	3,013	0.701	2,111
Midwest	Wisconsin	157,705	16,980,084	0.929%	6.8%	10,694	0.701	7,493
Eastern	Connecticut	5,816	1,711,749	0.340%	1.4%	83	0.359	30
Eastern	Delaware	1,579	339,520	0.465%	0.8%	12	0.359	5
Eastern	Maine	278,012	17,660,246	1.574%	1.4%	3,949	0.701	2,767
Eastern	Maryland	8,588	2,460,652	0.349%	0.8%	65	0.359	24
Eastern	Massachusetts	8,090	3,024,092	0.268%	1.0%	83	0.359	30
Eastern	New Hampshire	40,271	4,832,408	0.833%	1.5%	597	0.359	215
Eastern	New Jersey	2,094	1,963,561	0.107%	4.8%	101	0.359	37
Eastern	New York	104,040	18,966,416	0.549%	5.0%	5,233	0.359	1,880
Eastern	Pennsylvania	114,705	16,781,960	0.684%	5.1%	5,856	0.359	2,104
Eastern	Rhode Island	0	359,519	0.000%	1.4%	0	0.359	0
Eastern	Vermont	30,465	4,591,280	0.664%	1.5%	451	0.359	163
Eastern	Virginia	113,040	15,907,041	0.711%	7.3%	8,246	0.359	2,963
Eastern	West Virginia	45,233	12,154,471	0.372%	8.1%	3,662	0.359	1,316
Southern	Arkansas	259,962	18,754,916	1.386%	9.9%	25,636	0.701	17,961
Southern	Kentucky	64,350	12,471,762	0.516%	6.1%	3,956	0.701	2,772
Southern	Mississippi	222,934	19,541,284	1.141%	5.2%	11,515	0.808	9,309
Southern	North Carolina	115,577	18,587,540	0.622%	6.0%	6,982	0.701	4,892
Southern	Tennessee	75,997	13,941,333	0.545%	6.2%	4,717	0.359	1,695
Western	Kansas	6,249	2,502,434	0.250%	3.4%	213	0.808	172
Western	Nebraska	9,087	1,576,174	0.577%	3.4%	309	0.808	250
Western	North Dakota	0	759,998	0.000%	3.4%	0	0.808	0
Western	South Dakota	21,275	1,910,934	1.113%	3.4%	723	0.808	585
	Total	2,150,079	281,528,709	0.764%		120,495		76,846

[1] We prorated the total annual harvest for activities occuring during the active season by using the annual percent of the active season (58.6%).

[2] From Table 2.5

Table 4.4. Estimated numbers of NLEB pups affected (harmed) annually by non-volant season harvest in maternity roosting areas.

Region	State	A. Havest, Non-Volant Season[1] (acres)	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Maternity Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Pups Affected (FxE)
Midwest	Iowa	3,462	3,013,759	0.115%	6.3%	218	0.269	9
Midwest	Illinois	6,330	4,847,480	0.131%	9.4%	598	0.234	21
Midwest	Indiana	8,661	4,830,395	0.179%	5.7%	491	0.234	18
Midwest	Michigan	44,800	20,127,048	0.223%	4.8%	2,131	0.234	75
Midwest	Minnesota	26,665	17,370,394	0.154%	8.9%	2,364	0.269	96
Midwest	Missouri	29,099	15,471,982	0.188%	4.0%	1,151	0.234	41
Midwest	Ohio	13,503	8,088,277	0.167%	6.4%	859	0.234	31
Midwest	Wisconsin	44,943	16,980,084	0.265%	6.8%	3,048	0.234	107
Eastern	Connecticut	1,657	1,711,749	0.097%	1.4%	24	0.120	1
Eastern	Delaware	450	339,520	0.133%	0.8%	4	0.120	1
Eastern	Maine	79,229	17,660,246	0.449%	1.4%	1,125	0.234	40
Eastern	Maryland	2,447	2,460,652	0.099%	0.8%	19	0.120	1
Eastern	Massachusetts	2,306	3,024,092	0.076%	1.0%	24	0.120	1
Eastern	New Hampshire	11,477	4,832,408	0.237%	1.5%	170	0.120	4
Eastern	New Jersey	597	1,963,561	0.030%	4.8%	29	0.120	1
Eastern	New York	29,650	18,966,416	0.156%	5.0%	1,491	0.120	27
Eastern	Pennsylvania	32,689	16,781,960	0.195%	5.1%	1,669	0.120	30
Eastern	Rhode Island	0	359,519	0.000%	1.4%	0	0.120	0
Eastern	Vermont	8,682	4,591,280	0.189%	1.5%	129	0.120	3
Eastern	Virginia	32,215	15,907,041	0.203%	7.3%	2,350	0.120	43
Eastern	West Virginia	12,891	12,154,471	0.106%	8.1%	1,044	0.120	19
Southern	Arkansas	74,085	18,754,916	0.395%	9.9%	7,306	0.234	256
Southern	Kentucky	18,339	12,471,762	0.147%	6.1%	1,127	0.234	40
Southern	Mississippi	63,532	19,541,284	0.325%	5.2%	3,282	0.269	133
Southern	North Carolina	32,938	18,587,540	0.177%	6.0%	1,990	0.234	70
Southern	Tennessee	21,658	13,941,333	0.155%	6.2%	1,344	0.120	25
Western	Kansas	1,781	2,502,434	0.071%	3.4%	61	0.269	3
Western	Nebraska	2,590	1,576,174	0.164%	3.4%	88	0.269	4
Western	North Dakota	0	759,998	0.000%	3.4%	0	0.269	0
Western	South Dakota	6,063	1,910,934	0.317%	3.4%	206	0.269	9
	Total	612,736	281,528,709	0.218%		34,339		1,109

[1] We prorated the total annual harvest for activities occuring during the non-volant season by using the annual percent of the non-volant season (16.7%).

[2] From Table 2.5

Table 4.5. Estimated numbers of NLEB adults affected (harmed) annually by active season harvest in maternity roosting areas.

Region	State	A. Havest, Active Season[1] (acres)	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Maternity Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Adults Affected (FxE)
Midwest	Iowa	12,149	3,013,759	0.403%	6.3%	765	0.081	2
Midwest	Illinois	22,212	4,847,480	0.458%	9.4%	2,097	0.071	5
Midwest	Indiana	30,393	4,830,395	0.629%	5.7%	1,722	0.071	4
Midwest	Michigan	157,201	20,127,048	0.781%	4.8%	7,479	0.071	16
Midwest	Minnesota	93,566	17,370,394	0.539%	8.9%	8,295	0.081	21
Midwest	Missouri	102,109	15,471,982	0.660%	4.0%	4,040	0.071	9
Midwest	Ohio	47,380	8,088,277	0.586%	6.4%	3,013	0.071	7
Midwest	Wisconsin	157,705	16,980,084	0.929%	6.8%	10,694	0.071	23
Eastern	Connecticut	5,816	1,711,749	0.340%	1.4%	83	0.036	1
Eastern	Delaware	1,579	339,520	0.465%	0.8%	12	0.036	1
Eastern	Maine	278,012	17,660,246	1.574%	1.4%	3,949	0.071	9
Eastern	Maryland	8,588	2,460,652	0.349%	0.8%	65	0.036	1
Eastern	Massachusetts	8,090	3,024,092	0.268%	1.0%	83	0.036	1
Eastern	New Hampshire	40,271	4,832,408	0.833%	1.5%	597	0.036	1
Eastern	New Jersey	2,094	1,963,561	0.107%	4.8%	101	0.036	1
Eastern	New York	104,040	18,966,416	0.549%	5.0%	5,233	0.036	6
Eastern	Pennsylvania	114,705	16,781,960	0.684%	5.1%	5,856	0.036	7
Eastern	Rhode Island	0	359,519	0.000%	1.4%	0	0.036	0
Eastern	Vermont	30,465	4,591,280	0.664%	1.5%	451	0.036	1
Eastern	Virginia	113,040	15,907,041	0.711%	7.3%	8,246	0.036	9
Eastern	West Virginia	45,233	12,154,471	0.372%	8.1%	3,662	0.036	4
Southern	Arkansas	259,962	18,754,916	1.386%	9.9%	25,636	0.071	55
Southern	Kentucky	64,350	12,471,762	0.516%	6.1%	3,956	0.071	9
Southern	Mississippi	222,934	19,541,284	1.141%	5.2%	11,515	0.081	29
Southern	North Carolina	115,577	18,587,540	0.622%	6.0%	6,982	0.071	15
Southern	Tennessee	75,997	13,941,333	0.545%	6.2%	4,717	0.036	6
Western	Kansas	6,249	2,502,434	0.250%	3.4%	213	0.081	1
Western	Nebraska	9,087	1,576,174	0.577%	3.4%	309	0.081	1
Western	North Dakota	0	759,998	0.000%	3.4%	0	0.081	0
Western	South Dakota	21,275	1,910,934	1.113%	3.4%	723	0.081	2
	Total	2,150,079	281,528,709	0.764%		120,495		247

[1] We prorated the total annual harvest for activities occuring during the active season by using the annual percent of the active season (58.6%).

[2] From Table 2.5

Table 4.6. Prescribed fire (acres) within forested lands from 2002-2014 for each state included in the analysis (Source: National Interagency Fire Center, modified using the percent of prescribed fire within forested lands in each state from the 2012 National Prescribed Fire Use Survey Report).

Region	State	Acres of Forested Land	Average Annual Acres of Forest Land Burned	Minimum Annual Acres of Forest Land Burned	Maximum Annual Acres of Forest Land Burned	Percent of Average Available Habitat Burned
Midwest	Iowa	3,013,759	10,365	251	26,741	0.3%
Midwest	Illinois	4,847,480	8,102	626	21,890	0.2%
Midwest	Indiana	4,830,395	6,385	1,962	12,600	0.1%
Midwest	Michigan	20,127,048	9,325	1,669	16,652	0.0%
Midwest	Minnesota	17,370,394	102,512	48,837	158,160	0.6%
Midwest	Missouri	15,471,982	35,419	-	95,268	0.2%
Midwest	Ohio	8,088,277	2,781	259	6,767	0.0%
Midwest	Wisconsin	16,980,084	15,831	2,836	25,495	0.1%
Eastern	Connecticut	1,711,749	53	-	113	0.0%
Eastern	Delaware	339,520	50	-	161	0.0%
Eastern	Maine	17,660,246	3	2	5	0.0%
Eastern	Maryland	2,460,652	2,631	524	11,823	0.1%
Eastern	Massachusetts	3,024,092	272	2	815	0.0%
Eastern	New Hampshire	4,832,408	103	35	209	0.0%
Eastern	New Jersey	1,963,561	7,115	-	14,549	0.4%
Eastern	New York	18,966,416	189	39	918	0.0%
Eastern	Pennsylvania	16,781,960	1,795	-	7,013	0.0%
Eastern	Rhode Island	359,519	19	-	97	0.0%
Eastern	Vermont	4,591,280	323	46	902	0.0%
Eastern	Virginia	15,907,041	13,570	5,768	20,546	0.1%
Eastern	West Virginia	12,154,471	718	87	2,950	0.0%
Southern	Arkansas	18,754,916	153,639	100,108	200,998	0.8%
Southern	Kentucky	12,471,762	8,207	3,495	12,097	0.1%
Southern	Mississippi	19,541,284	126,297	1,818	253,860	0.6%
Southern	North Carolina	18,587,540	109,273	38,869	170,668	0.6%
Southern	Tennessee	13,941,333	14,959	1,856	23,085	0.1%
Western	Kansas	2,502,434	77	7	134	0.0%
Western	Nebraska	1,576,174	7,432	2,883	17,339	0.5%
Western	North Dakota	759,998	6,291	1,413	8,464	0.8%
Western	South Dakota	1,910,934	5,171	383	9,291	0.3%
		281,528,709	648,908	213,775	1,119,611	0.2%

Table 4.7. Estimated numbers of NLEB affected (disturbed) annually by heat and smoke from active-season prescribed burning in maternity roosting areas.

Region	State	A. Active Season Burning (acres)[1]	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Bats Affected (FxE)
Midwest	Iowa	6,074	3,013,759	0.2%	6.3%	383	0.808	310
Midwest	Illinois	4,748	4,847,480	0.1%	9.4%	448	0.701	314
Midwest	Indiana	3,742	4,830,395	0.1%	5.7%	212	0.701	149
Midwest	Michigan	5,464	20,127,048	0.0%	4.8%	260	0.701	183
Midwest	Minnesota	60,072	17,370,394	0.3%	8.9%	5,325	0.808	4,306
Midwest	Missouri	20,755	15,471,982	0.1%	4.0%	821	0.701	576
Midwest	Ohio	1,630	8,088,277	0.0%	6.4%	104	0.701	73
Midwest	Wisconsin	9,277	16,980,084	0.1%	6.8%	629	0.701	441
Eastern	Connecticut	31	1,711,749	0.0%	1.4%	0	0.359	1
Eastern	Delaware	29	339,520	0.0%	0.8%	0	0.359	1
Eastern	Maine	2	17,660,246	0.0%	1.4%	0	0.701	1
Eastern	Maryland	1,542	2,460,652	0.1%	0.8%	12	0.359	5
Eastern	Massachusetts	159	3,024,092	0.0%	1.0%	2	0.359	1
Eastern	New Hampshire	60	4,832,408	0.0%	1.5%	1	0.359	1
Eastern	New Jersey	4,170	1,963,561	0.2%	4.8%	202	0.359	73
Eastern	New York	111	18,966,416	0.0%	5.0%	6	0.359	2
Eastern	Pennsylvania	1,052	16,781,960	0.0%	5.1%	54	0.359	20
Eastern	Rhode Island	11	359,519	0.0%	1.4%	0	0.359	1
Eastern	Vermont	189	4,591,280	0.0%	1.5%	3	0.359	2
Eastern	Virginia	7,952	15,907,041	0.0%	7.3%	580	0.359	209
Eastern	West Virginia	421	12,154,471	0.0%	8.1%	34	0.359	13
Southern	Arkansas	90,032	18,754,916	0.5%	9.9%	8,879	0.701	6,221
Southern	Kentucky	4,809	12,471,762	0.0%	6.1%	296	0.701	208
Southern	Mississippi	74,010	19,541,284	0.4%	5.2%	3,823	0.808	3,091
Southern	North Carolina	64,034	18,587,540	0.3%	6.0%	3,868	0.701	2,711
Southern	Tennessee	8,766	13,941,333	0.1%	6.2%	544	0.359	196
Western	Kansas	45	2,502,434	0.0%	3.4%	2	0.808	2
Western	Nebraska	4,355	1,576,174	0.3%	3.4%	148	0.808	120
Western	North Dakota	3,687	759,998	0.5%	3.4%	126	0.808	102
Western	South Dakota	3,030	1,910,934	0.2%	3.4%	103	0.808	84
	Total	380,260	281,528,709	0.1%		26,863		19,417

[1] We prorated the total annual burning for activities occuring during the active season by using the annual percent of the active season (58.6%).

[2] From Table 2.5

Table 4.8. Estimated numbers of NLEB pups affected (harmed) annually by heat and smoke from non-volant season prescribed burning in maternity roosting areas.

Region	State	A. Non-Volant Season[1] Burning (acres)	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Pups Affected (FxE)
Midwest	Iowa	1,731	3,013,759	0.1%	6.3%	109	0.269	30
Midwest	Illinois	1,353	4,847,480	0.0%	9.4%	128	0.234	30
Midwest	Indiana	1,066	4,830,395	0.0%	5.7%	60	0.234	15
Midwest	Michigan	1,557	20,127,048	0.0%	4.8%	74	0.234	18
Midwest	Minnesota	17,119	17,370,394	0.1%	8.9%	1,518	0.269	409
Midwest	Missouri	5,915	15,471,982	0.0%	4.0%	234	0.234	55
Midwest	Ohio	464	8,088,277	0.0%	6.4%	30	0.234	7
Midwest	Wisconsin	2,644	16,980,084	0.0%	6.8%	179	0.234	42
Eastern	Connecticut	9	1,711,749	0.0%	1.4%	0	0.120	1
Eastern	Delaware	8	339,520	0.0%	0.8%	0	0.120	1
Eastern	Maine	1	17,660,246	0.0%	1.4%	0	0.234	1
Eastern	Maryland	439	2,460,652	0.0%	0.8%	3	0.120	1
Eastern	Massachusetts	45	3,024,092	0.0%	1.0%	0	0.120	1
Eastern	New Hampshire	17	4,832,408	0.0%	1.5%	0	0.120	1
Eastern	New Jersey	1,188	1,963,561	0.1%	4.8%	58	0.120	7
Eastern	New York	32	18,966,416	0.0%	5.0%	2	0.120	1
Eastern	Pennsylvania	300	16,781,960	0.0%	5.1%	15	0.120	2
Eastern	Rhode Island	3	359,519	0.0%	1.4%	0	0.120	1
Eastern	Vermont	54	4,591,280	0.0%	1.5%	1	0.120	1
Eastern	Virginia	2,266	15,907,041	0.0%	7.3%	165	0.120	20
Eastern	West Virginia	120	12,154,471	0.0%	8.1%	10	0.120	2
Southern	Arkansas	25,658	18,754,916	0.1%	9.9%	2,530	0.234	591
Southern	Kentucky	1,371	12,471,762	0.0%	6.1%	84	0.234	20
Southern	Mississippi	21,092	19,541,284	0.1%	5.2%	1,089	0.269	294
Southern	North Carolina	18,249	18,587,540	0.1%	6.0%	1,102	0.234	258
Southern	Tennessee	2,498	13,941,333	0.0%	6.2%	155	0.120	19
Western	Kansas	13	2,502,434	0.0%	3.4%	0	0.269	1
Western	Nebraska	1,241	1,576,174	0.1%	3.4%	42	0.269	12
Western	North Dakota	1,051	759,998	0.1%	3.4%	36	0.269	10
Western	South Dakota	864	1,910,934	0.0%	3.4%	29	0.269	8
	Total	108,368	281,528,709	0.038%		7,656		1,859

[1] We prorated the total annual burning for activities occuring during the non-volant season by using the annual percent of the non-volant season (16.7%).

[2] From Table 2.5

Table 4.9. Mean annual acres of forest conversion harvest for each state included in the analysis.

REGION	STATE	Acres of Forested Land	Approximate Acres of Forest Lost per Year (NLCD change 2001 to 2011)	Percent of Habitat Lost Annually	Approximate Acres of Forest Lost by 2022	Percent of Habitat Lost by 2022
Midwest	Iowa	3,013,759	2,520	0.1%	17,641	0.6%
Midwest	Illinois	4,847,480	6,156	0.1%	43,092	0.9%
Midwest	Indiana	4,830,395	4,002	0.1%	28,011	0.6%
Midwest	Michigan	20,127,048	44,704	0.2%	312,930	1.6%
Midwest	Minnesota	17,370,394	52,135	0.3%	364,942	2.1%
Midwest	Missouri	15,471,982	16,968	0.1%	118,775	0.8%
Midwest	Ohio	8,088,277	13,522	0.2%	94,655	1.2%
Midwest	Wisconsin	16,980,084	30,191	0.2%	211,334	1.2%
Eastern	Connecticut	1,711,749	2,940	0.2%	20,577	1.2%
Eastern	Delaware	339,520	1,492	0.4%	10,444	3.1%
Eastern	Maine	17,660,246	52,154	0.3%	365,076	2.1%
Eastern	Maryland	2,460,652	6,286	0.3%	43,999	1.8%
Eastern	Massachusetts	3,024,092	7,075	0.2%	49,526	1.6%
Eastern	New Hampshire	4,832,408	12,002	0.2%	84,016	1.7%
Eastern	New Jersey	1,963,561	6,045	0.3%	42,318	2.2%
Eastern	New York	18,966,416	14,117	0.1%	98,822	0.5%
Eastern	Pennsylvania	16,781,960	22,638	0.1%	158,468	0.9%
Eastern	Rhode Island	359,519	715	0.2%	5,003	1.4%
Eastern	Vermont	4,591,280	3,858	0.1%	27,008	0.6%
Eastern	Virginia	15,907,041	95,261	0.6%	666,824	4.2%
Eastern	West Virginia	12,154,471	12,700	0.1%	88,899	0.7%
Southern	Arkansas	18,754,916	115,372	0.6%	807,604	4.3%
Southern	Kentucky	12,471,762	23,167	0.2%	162,169	1.3%
Southern	Mississippi	19,541,284	162,759	0.8%	1,139,312	5.8%
Southern	North Carolina	18,587,540	130,835	0.7%	915,845	4.9%
Southern	Tennessee	13,941,333	54,006	0.4%	378,039	2.7%
Western	Kansas	2,502,434	4,224	0.2%	29,567	1.2%
Western	Nebraska	1,576,174	4,036	0.3%	28,252	1.8%
Western	North Dakota	759,998	1,826	0.2%	12,785	1.7%
Western	South Dakota	1,910,934	10,532	0.6%	73,725	3.9%
	TOTALS	281,528,709	914,237	0.3%	6,399,657	2.3%

Table 4.10. Estimated numbers of NLEB affected (disturbed) annually by human activity from active-season forest conversion in maternity roosting areas.

Region	State	A. Forest Conversion, Bat Active Season (acres)[1]	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Bats Affected (FxE)
Midwest	Iowa	1,477	3,013,759	0.049%	6.3%	93	0.808	76
Midwest	Illinois	3,607	4,847,480	0.074%	9.4%	341	0.701	239
Midwest	Indiana	2,345	4,830,395	0.049%	5.7%	133	0.701	94
Midwest	Michigan	26,197	20,127,048	0.130%	4.8%	1,246	0.701	874
Midwest	Minnesota	30,551	17,370,394	0.176%	8.9%	2,708	0.808	2,190
Midwest	Missouri	9,943	15,471,982	0.064%	4.0%	393	0.701	276
Midwest	Ohio	7,924	8,088,277	0.098%	6.4%	504	0.701	354
Midwest	Wisconsin	17,692	16,980,084	0.104%	6.8%	1,200	0.701	841
Eastern	Connecticut	1,723	1,711,749	0.101%	1.4%	25	0.359	9
Eastern	Delaware	874	339,520	0.258%	0.8%	7	0.359	3
Eastern	Maine	30,562	17,660,246	0.173%	1.4%	434	0.701	305
Eastern	Maryland	3,683	2,460,652	0.150%	0.8%	28	0.359	11
Eastern	Massachusetts	4,146	3,024,092	0.137%	1.0%	43	0.359	16
Eastern	New Hampshire	7,033	4,832,408	0.146%	1.5%	104	0.359	38
Eastern	New Jersey	3,543	1,963,561	0.180%	4.8%	171	0.359	62
Eastern	New York	8,273	18,966,416	0.044%	5.0%	416	0.359	150
Eastern	Pennsylvania	13,266	16,781,960	0.079%	5.1%	677	0.359	244
Eastern	Rhode Island	419	359,519	0.116%	1.4%	6	0.359	3
Eastern	Vermont	2,261	4,591,280	0.049%	1.5%	33	0.359	13
Eastern	Virginia	55,823	15,907,041	0.351%	7.3%	4,072	0.359	1,463
Eastern	West Virginia	7,442	12,154,471	0.061%	8.1%	602	0.359	217
Southern	Arkansas	67,608	18,754,916	0.360%	9.9%	6,667	0.701	4,672
Southern	Kentucky	13,576	12,471,762	0.109%	6.1%	835	0.701	585
Southern	Mississippi	95,377	19,541,284	0.488%	5.2%	4,926	0.808	3,983
Southern	North Carolina	76,669	18,587,540	0.412%	6.0%	4,632	0.701	3,245
Southern	Tennessee	31,647	13,941,333	0.227%	6.2%	1,964	0.359	706
Western	Kansas	2,475	2,502,434	0.099%	3.4%	84	0.808	69
Western	Nebraska	2,365	1,576,174	0.150%	3.4%	80	0.808	66
Western	North Dakota	1,070	759,998	0.141%	3.4%	36	0.808	30
Western	South Dakota	6,172	1,910,934	0.323%	3.4%	210	0.808	170
	Total	535,743	281,528,709	0.190%		32,673		21,004

[1] We prorated the total annual conversion for activities occuring during the active season by using the annual percent of the active season (58.6%).

[2] From Table 2.5

Table 4.11. Estimated numbers of NLEB pups affected (harmed) annually by non-volant-season forest conversion in maternity roosting areas.

Region	State	A. Forest Conversion, Non-Volant Season[1] (acres)	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Maternity Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Pups Affected (FxE)
Midwest	Iowa	421	3,013,759	0.014%	6.3%	27	0.269	2
Midwest	Illinois	1,028	4,847,480	0.021%	9.4%	97	0.234	4
Midwest	Indiana	668	4,830,395	0.014%	5.7%	38	0.234	2
Midwest	Michigan	7,466	20,127,048	0.037%	4.8%	355	0.234	13
Midwest	Minnesota	8,706	17,370,394	0.050%	8.9%	772	0.269	32
Midwest	Missouri	2,834	15,471,982	0.018%	4.0%	112	0.234	4
Midwest	Ohio	2,258	8,088,277	0.028%	6.4%	144	0.234	6
Midwest	Wisconsin	5,042	16,980,084	0.030%	6.8%	342	0.234	12
Eastern	Connecticut	491	1,711,749	0.029%	1.4%	7	0.120	1
Eastern	Delaware	249	339,520	0.073%	0.8%	2	0.120	1
Eastern	Maine	8,710	17,660,246	0.049%	1.4%	124	0.234	5
Eastern	Maryland	1,050	2,460,652	0.043%	0.8%	8	0.120	1
Eastern	Massachusetts	1,182	3,024,092	0.039%	1.0%	12	0.120	1
Eastern	New Hampshire	2,004	4,832,408	0.041%	1.5%	30	0.120	1
Eastern	New Jersey	1,010	1,963,561	0.051%	4.8%	49	0.120	1
Eastern	New York	2,358	18,966,416	0.012%	5.0%	119	0.120	3
Eastern	Pennsylvania	3,781	16,781,960	0.023%	5.1%	193	0.120	4
Eastern	Rhode Island	119	359,519	0.033%	1.4%	2	0.120	1
Eastern	Vermont	644	4,591,280	0.014%	1.5%	10	0.120	1
Eastern	Virginia	15,909	15,907,041	0.100%	7.3%	1,160	0.120	21
Eastern	West Virginia	2,121	12,154,471	0.017%	8.1%	172	0.120	4
Southern	Arkansas	19,267	18,754,916	0.103%	9.9%	1,900	0.234	67
Southern	Kentucky	3,869	12,471,762	0.031%	6.1%	238	0.234	9
Southern	Mississippi	27,181	19,541,284	0.139%	5.2%	1,404	0.269	57
Southern	North Carolina	21,849	18,587,540	0.118%	6.0%	1,320	0.234	47
Southern	Tennessee	9,019	13,941,333	0.065%	6.2%	560	0.120	11
Western	Kansas	705	2,502,434	0.028%	3.4%	24	0.269	1
Western	Nebraska	674	1,576,174	0.043%	3.4%	23	0.269	1
Western	North Dakota	305	759,998	0.040%	3.4%	10	0.269	1
Western	South Dakota	1,759	1,910,934	0.092%	3.4%	60	0.269	3
	Total	152,678	281,528,709	0.054%		9,311		317

[1] We prorated the total annual conversion for activities occuring during the non-volant season by using the annual percent of the non-volant season (16.7%).

[2] From Table 2.5

Table 4.12. Estimated numbers of NLEB adults affected (harmed) annually by active-season forest conversion in maternity roosting areas.

Region	State	A. Forest Conversion, Active Season[1] (acres)	B. Forest Habitat (acres)	C. Percent of Forest Affected (A/B)	D. Percent of Forest Used as Maternity Roost Areas[2]	E. Expected Overlap (acres) (BxCxD)	F. Density	G. Number of Adults Affected (FxE)
Midwest	Iowa	1,477	3,013,759	0.049%	6.3%	93	0.081	1
Midwest	Illinois	3,607	4,847,480	0.074%	9.4%	341	0.071	1
Midwest	Indiana	2,345	4,830,395	0.049%	5.7%	133	0.071	1
Midwest	Michigan	26,197	20,127,048	0.130%	4.8%	1,246	0.071	3
Midwest	Minnesota	30,551	17,370,394	0.176%	8.9%	2,708	0.081	7
Midwest	Missouri	9,943	15,471,982	0.064%	4.0%	393	0.071	1
Midwest	Ohio	7,924	8,088,277	0.098%	6.4%	504	0.071	2
Midwest	Wisconsin	17,692	16,980,084	0.104%	6.8%	1,200	0.071	3
Eastern	Connecticut	1,723	1,711,749	0.101%	1.4%	25	0.036	1
Eastern	Delaware	874	339,520	0.258%	0.8%	7	0.036	1
Eastern	Maine	30,562	17,660,246	0.173%	1.4%	434	0.071	1
Eastern	Maryland	3,683	2,460,652	0.150%	0.8%	28	0.036	1
Eastern	Massachusetts	4,146	3,024,092	0.137%	1.0%	43	0.036	1
Eastern	New Hampshire	7,033	4,832,408	0.146%	1.5%	104	0.036	1
Eastern	New Jersey	3,543	1,963,561	0.180%	4.8%	171	0.036	1
Eastern	New York	8,273	18,966,416	0.044%	5.0%	416	0.036	1
Eastern	Pennsylvania	13,266	16,781,960	0.079%	5.1%	677	0.036	1
Eastern	Rhode Island	419	359,519	0.116%	1.4%	6	0.036	1
Eastern	Vermont	2,261	4,591,280	0.049%	1.5%	33	0.036	1
Eastern	Virginia	55,823	15,907,041	0.351%	7.3%	4,072	0.036	5
Eastern	West Virginia	7,442	12,154,471	0.061%	8.1%	602	0.036	1
Southern	Arkansas	67,608	18,754,916	0.360%	9.9%	6,667	0.071	15
Southern	Kentucky	13,576	12,471,762	0.109%	6.1%	835	0.071	2
Southern	Mississippi	95,377	19,541,284	0.488%	5.2%	4,926	0.081	13
Southern	North Carolina	76,669	18,587,540	0.412%	6.0%	4,632	0.071	10
Southern	Tennessee	31,647	13,941,333	0.227%	6.2%	1,964	0.036	3
Western	Kansas	2,475	2,502,434	0.099%	3.4%	84	0.081	1
Western	Nebraska	2,365	1,576,174	0.150%	3.4%	80	0.081	1
Western	North Dakota	1,070	759,998	0.141%	3.4%	36	0.081	1
Western	South Dakota	6,172	1,910,934	0.323%	3.4%	210	0.081	1
	Total	535,743	281,528,709	0.190%		32,673		83

[1] We prorated the total annual harvest for activities occuring during the active season by using the annual percent of the active season (58.6%).

[2] From Table 2.5

Table 4.13. Estimated NLEB fatalities from wind energy operation created using current and projected wind capacity through 2022.

REGION	STATE	Installed Wind Capacity in 2014 (MW)	Projected Wind Capacity in 2020 (MW)	Projected Wind Capacity in 2030 (MW)	Mean Annual Build-out 2014-2020 (MW)	Mean Annual Build-out 2021-2022 (MW)	Current Fatality through 2014	Annual Fatality 2015	Annual Fatality 2016	Annual Fatality 2017	Annual Fatality 2018	Annual Fatality 2019	Annual Fatality 2020	Annual Fatality 2021	Annual Fatality 2022	Total Fatality All Years
Midwest	Iowa	5688	6200	17300	85	1110	90	91	93	94	95	97	98	115	133	906
Midwest	Illinois	3568	3980	19490	69	1551	56	57	59	60	61	62	63	87	112	616
Midwest	Indiana	1745	2610	13500	144	1089	28	30	32	34	37	39	41	58	76	375
Midwest	Michigan[1]	1531	1531	1850	0	32	24	24	24	24	24	24	24	25	25	219
Midwest	Minnesota	3035	3470	3990	73	52	48	49	50	51	53	54	55	56	56	472
Midwest	Missouri	459	1280	4350	137	307	7	9	12	14	16	18	20	25	30	151
Midwest	Ohio	435	2990	5320	426	233	7	14	20	27	34	41	47	51	55	295
Midwest	Wisconsin	648	1320	1640	112	32	10	12	14	16	17	19	21	21	22	152
Eastern	Connecticut	0	130	130	22	0	0	0	1	1	1	2	2	2	2	11
Eastern	Delaware[2]	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Eastern	Maine	440	950	950	85	0	7	8	10	11	12	14	15	15	15	107
Eastern	Maryland	160	820	820	110	0	3	4	6	8	9	11	13	13	13	80
Eastern	Massachusetts	107	270	270	27	0	2	2	3	3	3	4	4	4	4	29
Eastern	New Hampshire	171	470	470	50	0	3	3	4	5	6	7	7	7	7	50
Eastern	New Jersey[2]	9	9	0	0	0	0	0	0	0	0	0	0	0	0	1
Eastern	New York	1748	1750	3860	0	0	28	28	28	28	28	28	28	28	28	249
Eastern	Pennsylvania[2]	1340	5580	5400	707	0	21	32	43	55	66	77	88	88	88	559
Eastern	Rhode Island[2]	9	9	0	0	0	0	0	0	0	0	0	0	0	0	1
Eastern	Vermont[2]	119	440	430	54	0	2	3	4	4	5	6	7	7	7	45
Eastern	Virginia	0	100	830	17	73	0	0	1	1	1	1	2	3	4	12
Eastern	West Virginia	583	600	2030	3	143	9	9	9	9	9	9	9	12	14	91
Southern	Arkansas	0	0	2550	0	255	0	0	0	0	0	0	0	4	8	12
Southern	Kentucky	0	0	950	0	95	0	0	0	0	0	0	0	2	3	5
Southern	Mississippi	0	0	450	0	45	0	0	0	0	0	0	0	1	1	2
Southern	North Carolina	0	750	750	125	0	0	2	4	6	8	10	12	12	12	65
Southern	Tennessee	29	29	1310	0	128	0	0	0	0	0	0	0	2	5	10
Western	Kansas[2]	2967	3420	3270	76	0	47	48	49	50	52	53	54	54	54	461
Western	Nebraska	812	1260	1360	75	10	13	14	15	16	18	19	20	20	20	155
Western	North Dakota	1886	2870	4710	164	184	30	32	35	38	40	43	45	48	51	362
Western	South Dakota	803	1260	2400	76	114	13	14	15	16	17	19	20	22	24	159
Totals		**28294**	**44100**	**100380**	**2634**	**5453**	**447**	**489**	**530**	**572**	**613**	**655**	**697**	**783**	**869**	**5654**

[1]Projections were held constant for Michigan between 2014 and 2020 because 2020 projections were already exceeded.

[2]Projections are expected to decline slightly between 2020-2030; however, we did not reduce capacity because we assume constructed facilities will continue to operate.

Table 4.14. Influence of conservation measures for tree removal activities included in the final 4(d) rule for the NLEB.

Range	State	Known Hibernacula	Known Occupied Maternity Roost Trees	Acres Covered by Hibernacula Conservation Measure[1]	Acres Covered by Maternity Roost Tree Conservation Measure[2]	Acres of Forested Land	Percent of Total Available Habitat Covered by Measures
Midwest	Iowa	2	14	251	22	3,013,759	0.01%
Midwest	Illinois	44	39	5,531	62	4,847,480	0.12%
Midwest	Indiana	69	193	8,673	309	4,830,395	0.19%
Midwest	Michigan	77	25	9,679	40	20,127,048	0.05%
Midwest	Minnesota	15	102	1,886	163	17,370,394	0.01%
Midwest	Missouri	269	58	33,813	93	15,471,982	0.22%
Midwest	Ohio	32	4	4,022	6	8,088,277	0.05%
Midwest	Wisconsin	67	84	8,422	134	16,980,084	0.05%
Eastern	Connecticut	8	0	1,006	0	1,711,749	0.06%
Eastern	Delaware	2	0	251	0	339,520	0.07%
Eastern	Maine	3	0	377	0	17,660,246	0.00%
Eastern	Maryland	8	0	1,006	0	2,460,652	0.04%
Eastern	Massachusetts	7	16	880	26	3,024,092	0.03%
Eastern	New Hampshire	11	0	1,383	0	4,832,408	0.03%
Eastern	New Jersey	9	47	1,131	75	1,963,561	0.06%
Eastern	New York	90	27	11,313	43	18,966,416	0.06%
Eastern	Pennsylvania	322	157	40,475	251	16,781,960	0.24%
Eastern	Rhode Island	0	0	0	0	359,519	0.00%
Eastern	Vermont	16	0	2,011	0	4,591,280	0.04%
Eastern	Virginia	11	12	1,383	19	15,907,041	0.01%
Eastern	West Virginia	104	231	13,073	370	12,154,471	0.11%
Southern	Alabama	11	0	1,383	0	22,876,792	0.01%
Southern	Arkansas	77	310	9,679	496	18,754,916	0.05%
Southern	Georgia	6	20	754	32	24,768,236	0.00%
Southern	Kentucky	122	254	15,335	406	12,471,762	0.13%
Southern	Louisiana	0	0	0	0	14,540,135	0.00%
Southern	Mississippi	0	0	0	0	19,541,284	0.00%
Southern	North Carolina	29	101	3,645	162	18,587,540	0.02%
Southern	Oklahoma	9	0	1,131	0	12,646,138	0.01%
Southern	South Carolina	3	0	377	0	13,120,509	0.00%
Southern	Tennessee	61	50	7,668	80	13,941,333	0.06%
Western	Kansas	1	0	126	0	2,502,434	0.01%
Western	Montana	0	0	0	0	25,573,200	0.00%
Western	Nebraska	2	0	251	0	759,998	0.03%
Western	North Dakota	0	0	0	0	1,576,174	0.00%
Western	South Dakota	21	0	2,640	0	1,910,934	0.14%
Western	Wyoming	0	0	0	0	11,448,541	0.00%
	Total	1,508	1,744	189,556	2,790	406,502,260	0.05%

[1]Hibernacula buffer circles have a radius of 0.25 mi, which is 125.7 acres

[2]Maternity roost trees have a temporary buffer circle with a 150 ft radius, which is 1.6 acres

Table 4.15. Summary of annual disturbance and harm estimates from timber harvest, prescribed fire, forest conversion, and wind[4].

Region	State	Harass Timber Harvest	Harass Prescribed Fire	Harass Forest Conversion	Harm (pups) Timber Harvest	Harm (pups) Prescribed Fire	Harm (pups) Forest Conversion	Harm (adults) Timber Harvest	Harm (adults) Forest Conversion	Harm (adults) Average Wind	Total Annual Harassment	Total Annual Harm (pups)	Total Annual Harm (adults)
Midwest	Iowa	619	310	76	9	30	2	2	1	102	1,005	41	105
Midwest	Illinois	1,469	314	239	21	30	4	5	1	70	2,022	55	76
Midwest	Indiana	1,207	149	94	18	15	2	4	1	43	1,450	35	48
Midwest	Michigan	5,240	183	874	75	18	13	16	3	24	6,297	106	43
Midwest	Minnesota	6,706	4,306	2,190	96	409	32	21	7	53	13,202	537	81
Midwest	Missouri	2,831	576	276	41	55	4	9	1	18	3,683	100	28
Midwest	Ohio	2,111	73	354	31	7	6	7	2	36	2,538	44	45
Midwest	Wisconsin	7,493	441	841	107	42	12	23	3	18	8,775	161	44
Eastern	Connecticut	30	1	9	1	1	1	1	1	1	40	3	3
Eastern	Delaware	5	1	3	1	1	1	1	1	0	9	3	2
Eastern	Maine	2,767	1	305	40	1	5	9	1	13	3,073	46	23
Eastern	Maryland	24	5	11	1	1	1	1	1	10	40	3	12
Eastern	Massachusetts	30	1	16	1	1	1	1	1	3	47	3	5
Eastern	New Hampshire	215	1	38	4	1	1	1	1	6	254	6	8
Eastern	New Jersey	37	73	62	1	7	1	1	1	0	172	9	2
Eastern	New York	1,880	2	150	27	1	3	6	1	28	2,032	31	35
Eastern	Pennsylvania	2,104	20	244	30	2	4	7	1	67	2,368	36	75
Eastern	Rhode Island	0	1	3	0	1	1	0	1	0	4	2	1
Eastern	Vermont	163	2	13	3	1	1	1	1	5	178	5	7
Eastern	Virginia	2,963	209	1,463	43	20	21	9	5	2	4,635	84	16
Eastern	West Virginia	1,316	13	217	19	2	4	4	1	10	1,546	25	15
Southern	Arkansas	17,961	6,221	4,672	256	591	67	55	15	2	28,854	914	72
Southern	Kentucky	2,772	208	585	40	20	9	9	2	1	3,565	69	12
Southern	Mississippi	9,309	3,091	3,983	133	294	57	29	13	0	16,383	484	42
Southern	North Carolina	4,892	2,711	3,245	70	258	47	15	10	8	10,848	375	33
Southern	Tennessee	1,695	196	706	25	19	11	6	3	1	2,597	55	10
Western	Kansas	172	2	69	3	1	1	1	1	52	243	5	54
Western	Nebraska	250	120	66	4	12	1	1	1	18	436	17	20
Western	North Dakota	0	102	30	0	10	1	0	1	42	132	11	43
Western	South Dakota	585	84	170	9	8	3	2	1	18	839	20	21
	Total	76,846	19,417	21,004	1,109	1,859	317	247	83	650	117,267	3,285	980

[4] Wind is the mean annual estimate from 2015 to 2022 reported in Table 4.13.

Table 4.16. Summary of the activities expected to disturb NLEB annually. The total number of bats per state includes adults and pups.

Region	State	Total # Bats Harassed per year	Percent Harass from Burning	Percent Harass from Harvest	Percent Harass from Conversion	Total # Bats per State	Percent Total Bats Affected
Midwest	Iowa	1,005	30.8%	61.6%	7.6%	153,495	0.7%
Midwest	Illinois	2,022	15.5%	72.7%	11.8%	320,580	0.6%
Midwest	Indiana	1,450	10.3%	83.2%	6.5%	191,763	0.8%
Midwest	Michigan	6,297	2.9%	83.2%	13.9%	670,878	0.9%
Midwest	Minnesota	13,202	32.6%	50.8%	16.6%	1,244,835	1.1%
Midwest	Missouri	3,683	15.6%	76.9%	7.5%	428,922	0.9%
Midwest	Ohio	2,538	2.9%	83.2%	13.9%	360,360	0.7%
Midwest	Wisconsin	8,775	5.0%	85.4%	9.6%	806,715	1.1%
Eastern	Connecticut	40	2.5%	75.0%	22.5%	8,760	0.5%
Eastern	Delaware	9	11.1%	55.6%	33.3%	960	0.9%
Eastern	Maine	3,073	0.0%	90.0%	9.9%	175,734	1.7%
Eastern	Maryland	40	12.5%	60.0%	27.5%	6,720	0.6%
Eastern	Massachusetts	47	2.1%	63.8%	34.0%	11,160	0.4%
Eastern	New Hampshire	254	0.4%	84.6%	15.0%	25,740	1.0%
Eastern	New Jersey	172	42.4%	21.5%	36.0%	34,140	0.5%
Eastern	New York	2,032	0.1%	92.5%	7.4%	342,720	0.6%
Eastern	Pennsylvania	2,368	0.8%	88.9%	10.3%	307,800	0.8%
Eastern	Rhode Island	4	25.0%	0.0%	75.0%	1,860	0.2%
Eastern	Vermont	178	1.1%	91.6%	7.3%	24,420	0.7%
Eastern	Virginia	4,635	4.5%	63.9%	31.6%	416,880	1.1%
Eastern	West Virginia	1,546	0.8%	85.1%	14.0%	353,520	0.4%
Southern	Arkansas	28,854	21.6%	62.2%	16.2%	1,295,775	2.2%
Southern	Kentucky	3,565	5.8%	77.8%	16.4%	537,147	0.7%
Southern	Mississippi	16,383	18.9%	56.8%	24.3%	815,940	2.0%
Southern	North Carolina	10,848	25.0%	45.1%	29.9%	786,708	1.4%
Southern	Tennessee	2,597	7.5%	65.3%	27.2%	310,920	0.8%
Western	Kansas	243	0.8%	70.8%	28.4%	68,850	0.4%
Western	Nebraska	436	27.5%	57.3%	15.1%	43,335	1.0%
Western	North Dakota	132	77.3%	0.0%	22.7%	20,925	0.6%
Western	South Dakota	839	10.0%	69.7%	20.3%	52,515	1.6%
	Total	117,267	16.6%	65.5%	17.9%	9,820,077	1.2%

Table 4.17. Summary of the activities expected to harm NLEB pups annually.

Region	State	Total # Pups Harmed per year	Percent Harm from Burning	Percent Harm from Harvest	Percent Harm from Conversion	Total # Pups per State	Percent Total Pups Affected
Midwest	Iowa	41	73.2%	22.0%	4.9%	51,165	0.1%
Midwest	Illinois	55	54.5%	38.2%	7.3%	106,860	0.1%
Midwest	Indiana	35	42.9%	51.4%	5.7%	63,921	0.1%
Midwest	Michigan	106	17.0%	70.8%	12.3%	223,626	0.0%
Midwest	Minnesota	537	76.2%	17.9%	6.0%	414,945	0.1%
Midwest	Missouri	100	55.0%	41.0%	4.0%	142,974	0.1%
Midwest	Ohio	44	15.9%	70.5%	13.6%	120,120	0.0%
Midwest	Wisconsin	161	26.1%	66.5%	7.5%	268,905	0.1%
Eastern	Connecticut	3	33.3%	33.3%	33.3%	2,920	0.1%
Eastern	Delaware	3	33.3%	33.3%	33.3%	320	0.9%
Eastern	Maine	46	2.2%	87.0%	10.9%	58,578	0.1%
Eastern	Maryland	3	33.3%	33.3%	33.3%	2,240	0.1%
Eastern	Massachusetts	3	33.3%	33.3%	33.3%	3,720	0.1%
Eastern	New Hampshire	6	16.7%	66.7%	16.7%	8,580	0.1%
Eastern	New Jersey	9	77.8%	11.1%	11.1%	11,380	0.1%
Eastern	New York	31	3.2%	87.1%	9.7%	114,240	0.0%
Eastern	Pennsylvania	36	5.6%	83.3%	11.1%	102,600	0.0%
Eastern	Rhode Island	2	50.0%	0.0%	50.0%	620	0.3%
Eastern	Vermont	5	20.0%	60.0%	20.0%	8,140	0.1%
Eastern	Virginia	84	23.8%	51.2%	25.0%	138,960	0.1%
Eastern	West Virginia	25	8.0%	76.0%	16.0%	117,840	0.0%
Southern	Arkansas	914	64.7%	28.0%	7.3%	431,925	0.2%
Southern	Kentucky	69	29.0%	58.0%	13.0%	179,049	0.0%
Southern	Mississippi	484	60.7%	27.5%	11.8%	271,980	0.2%
Southern	North Carolina	375	68.8%	18.7%	12.5%	262,236	0.1%
Southern	Tennessee	55	34.5%	45.5%	20.0%	103,640	0.1%
Western	Kansas	5	20.0%	60.0%	20.0%	22,950	0.0%
Western	Nebraska	17	70.6%	23.5%	5.9%	14,445	0.1%
Western	North Dakota	11	90.9%	0.0%	9.1%	6,975	0.2%
Western	South Dakota	20	40.0%	45.0%	15.0%	17,505	0.1%
	Total	3,285	56.6%	33.8%	9.6%	3,273,359	0.1%

Table 4.18. Summary of the activities expected to harm NLEB adults annually.

Region	State	Total # Adults Harmed per year	Percent Harm from Harvest	Percent Harm from Conversion	Percent Harm from Wind	Total # Adults per State	Percent Total Adults Affected
Midwest	Iowa	105	1.9%	1.0%	97.1%	102,330	0.10%
Midwest	Illinois	76	6.6%	1.3%	92.1%	213,720	0.04%
Midwest	Indiana	48	8.3%	2.1%	89.7%	127,842	0.04%
Midwest	Michigan	43	37.0%	6.9%	56.1%	447,252	0.01%
Midwest	Minnesota	81	25.9%	8.6%	65.4%	829,890	0.01%
Midwest	Missouri	28	32.1%	3.6%	64.3%	285,948	0.01%
Midwest	Ohio	45	15.5%	4.4%	80.1%	240,240	0.02%
Midwest	Wisconsin	44	52.6%	6.9%	40.6%	537,810	0.01%
Eastern	Connecticut	3	29.6%	29.6%	40.7%	5,840	0.06%
Eastern	Delaware	2	50.0%	50.0%	0.0%	640	0.31%
Eastern	Maine	23	40.0%	4.4%	55.6%	117,156	0.02%
Eastern	Maryland	12	8.6%	8.6%	82.8%	4,480	0.26%
Eastern	Massachusetts	5	18.6%	18.6%	62.8%	7,440	0.07%
Eastern	New Hampshire	8	12.9%	12.9%	74.2%	17,160	0.05%
Eastern	New Jersey	2	50.0%	50.0%	0.0%	22,760	0.01%
Eastern	New York	35	17.1%	2.9%	80.0%	228,480	0.02%
Eastern	Pennsylvania	75	9.3%	1.3%	89.4%	205,200	0.04%
Eastern	Rhode Island	1	0.0%	100.0%	0.0%	1,240	0.08%
Eastern	Vermont	7	13.6%	13.6%	72.9%	16,280	0.05%
Eastern	Virginia	16	57.6%	32.0%	10.4%	277,920	0.01%
Eastern	West Virginia	15	26.7%	6.7%	66.7%	235,680	0.01%
Southern	Arkansas	72	76.9%	21.0%	2.1%	863,850	0.01%
Southern	Kentucky	12	77.4%	17.2%	5.4%	358,098	0.00%
Southern	Mississippi	42	68.6%	30.8%	0.6%	543,960	0.01%
Southern	North Carolina	33	45.1%	30.1%	24.8%	524,472	0.01%
Southern	Tennessee	10	60.8%	30.4%	8.9%	207,280	0.00%
Western	Kansas	54	1.9%	1.9%	96.3%	45,900	0.12%
Western	Nebraska	20	5.1%	5.1%	89.9%	28,890	0.07%
Western	North Dakota	43	0.0%	2.4%	97.6%	13,950	0.30%
Western	South Dakota	21	9.4%	4.7%	86.0%	35,010	0.06%
	Total	980	25.2%	8.5%	66.3%	6,546,718	0.01%

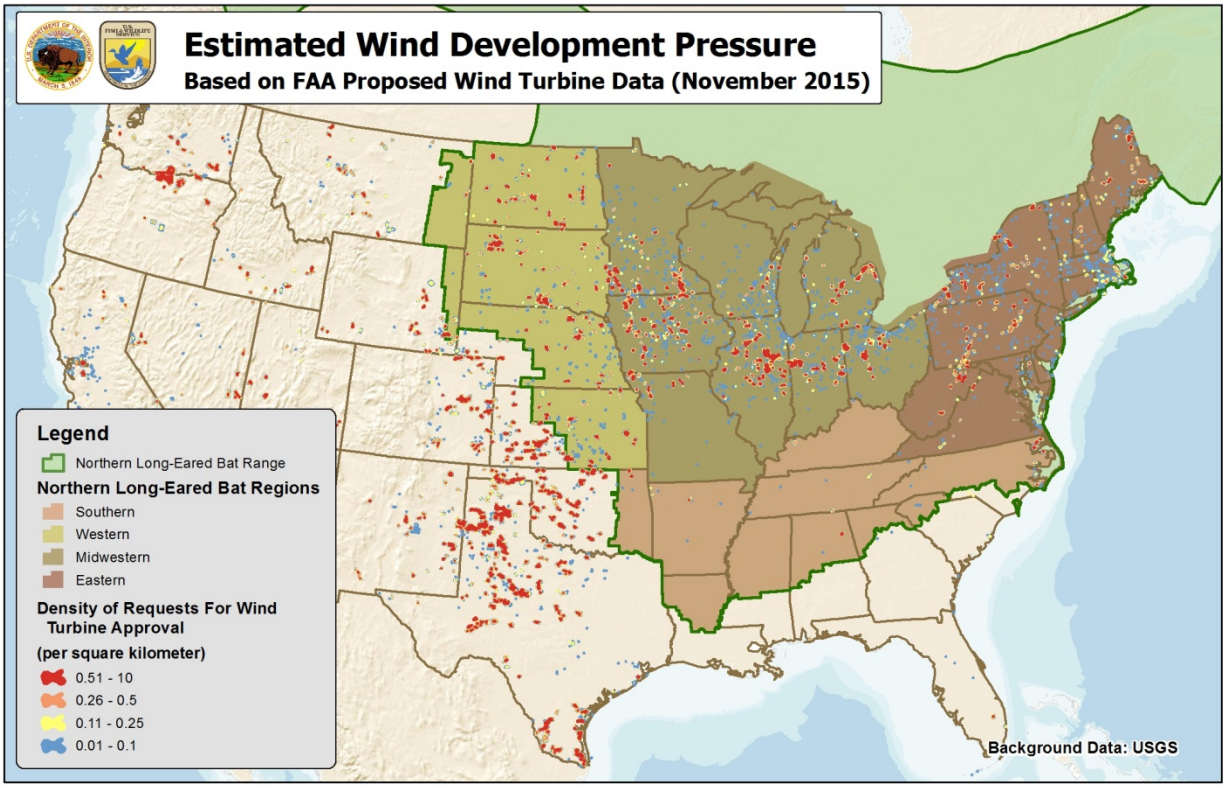

Figure 4.1. Estimated wind development pressure based on the Federal Aviation Administration's proposed wind turbine data.

5 CUMULATIVE EFFECTS

In the context of a consultation, cumulative effects are the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the Action Area. Future federal actions that are unrelated to the proposed action are not considered, because they require separate consultation under section 7 of the ESA.

Section 4 of this BO discusses all actions that may affect the NLEB associated with the implementation of the final 4(d) rule. These include effects of state, tribal, local and private actions. These actions are typically included in this section; however, the action evaluated in this BO is the finalization and implementation of the final 4(d) rule, which includes state, tribal, local, and private actions. We acknowledge that some of the activities included in the effects of the action are cumulative effects, but we do not separate them in this BO.

6 CONCLUSION

WNS is the primary factor affecting the status of the NLEB, which has caused dramatic and rapid declines in abundance, resulting in the local extirpation of the species in some areas. Although other factors, individually or in combination, are likely insignificant at the range-wide scale, they may exacerbate the effects of WNS at the local population scale, thereby accelerating declines and the likelihood of local extirpation due to the disease or reducing the population's ability to survive and potentially rebound. Our analysis of the effects of activities that may affect the NLEB, but do not cause prohibited take, indicates that the additional loss of individual NLEB resulting from these activities would not exacerbate the effects of WNS at the scale of states within its range. Even if all anthropogenic activities that might adversely affect NLEB ceased, we do not believe that the resulting reduction in adverse effects would materially change the devastating impact WNS has had, and will continue to have, on NLEB at the local population level or at larger scales.

The species' foremost conservation need is to reduce or eliminate the threat of WNS. In areas impacted by WNS, the next priorities are to protect NLEB in hibernacula and maternity roost trees, and to continue to monitor populations in summer habitats (e.g., identify where the species continues to survive after the detection of Pd or WNS and determine the factors influencing its resilience).

From our assessment of the species' status/environmental baseline, we have observed NLEB population declines within a few years following the arrival of WNS, and can expect further declines as the disease moves through the Action Area. Based on post-WNS occupancy rates inferred from summer survey data and assumptions about colony size and distribution in forested habitats, we estimate that the population of NLEB is currently about 6,546,700 adult NLEB.

Activities that may affect the NLEB, but will not cause prohibited take under the final 4(d) rule, primarily include timber harvest, prescribed fire, forest conversion, and wind turbine operation. We estimate that these activities will disturb up to 117,267 volant NLEB (both adults and juveniles) each year, all within roosting areas (both maternity and non-maternity), and mostly (65.5 percent) resulting from timber harvest. The Action is expected to harm up to 3,285 non-volant juvenile NLEB annually, all within maternity roosting areas, and mostly resulting from prescribed burning and tree clearing activities conducted during the active season. The Action is also expected to harm up to 980 adults annually, mostly from wind turbine operation and removal of undocumented occupied roosts.

The disturbance estimate amounts to 1.2 percent of the total NLEB population, including young-of-the-year (1 per adult female following parturition), and less than 2.3% of the total number of NLEBs in each individual state. We do not expect disturbance of less than 2.3% of a state's population to significantly affect the numbers or reproduction of the species in the states, as only a small fraction of those fleeing roosts due to disturbance are likely to suffer injury from day-time predators or other hazards encountered before roosting elsewhere. Further, we do not expect disturbance to significantly affect the distribution of the species on the Forests, as the disturbances causing it are temporary, ceasing when project-level activity ceases.

The harm estimate of 3,285 NLEB pups amounts to less than 0.1 percent of the total population of non-volant pups. Less than 1% of the total number of NLEB pups may be harmed in individual states. However, these numbers are overestimates. As noted above, most of this harm is caused by prescribed burning and tree clearing activities, where the potential for death or injury depends largely on site-specific circumstances, e.g., the likelihood of felling a tree containing a maternity colony. Not all tree clearing activities through maternity roosting areas will kill or injure all pups present, but our methodology in this BO estimates that all potentially vulnerable individuals within the expected area of activity/occupancy overlap are affected. The same is true for prescribed fire. We also estimated that 980 adults (less than 0.02% of the total population) may be affected by wind turbine operation and tree clearing activities. Less than 1% of the total number of NLEB adults may be affected in all individual states. These numbers are more realistic estimations because we did not assume that all potentially vulnerable individuals would be affected – we assumed that only 3% of adults would be impacted.

There are no additional interrelated and interdependent actions to the proposed Action or cumulative effects that are not included in the analysis of the proposed Action.

The final 4(d) rule determined that the conservation of the NLEB as a threatened species is best served by limiting the full suite of prohibitions applicable to endangered species under section 9 of the Act to its most vulnerable life stages, i.e., while in hibernacula or in maternity roost trees

within the WNS zone, and to activities, tree removal in particular, that are most likely to affect the species. Activities excepted from the requirements to obtain incidental take statements or incidental take permits will affect relatively small numbers of individuals, which is not anticipated to impair conservation efforts or the recovery potential of the species. The vast majority of individuals and populations that survive WNS are unaffected by these activities. It is likely that the species will persist in the individual states based on the number of maternity colonies and widely-dispersed nature of the activities. Based on the relatively small numbers affected annually compared to the state population sizes, we conclude that adverse effects from timber harvest, prescribed fire, forest conversion, wind energy, and other activities will not cause population-level declines in this species.

The Service defines "to jeopardize the continued existence of a listed species" as to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of the species. After reviewing the current status of the NLEB, environmental baseline, effects of the Action, and cumulative effects, it is the Service's biological opinion that the Action, as proposed, is not likely to jeopardize the continued existence of the NLEB. The Service has not proposed or designated critical habitat for this species; therefore, none is affected.

Incidental take that is not expressly prohibited under the final 4(d) rule does not require exception in an Incidental Take Statement. This BO has evaluated major categories of actions that may affect the NLEB, but for which incidental take is not prohibited. Accordingly, there are no reasonable and prudent measures or terms and conditions that are necessary and appropriate for these actions. Federal agencies may rely on this BO to fulfill their project-specific section 7(a)(2) responsibilities under the framework specified in section 1.3 of this BO, which provides a process by which agencies may verify that their proposed actions do not include activities that would cause prohibited incidental take. Prohibited incidental take requires either a separate consultation (federal actions) or an incidental take permit (non-federal actions).

7 REINITIATION NOTICE

Reinitiation of formal consultation is required and shall be requested by the Service, where discretionary federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (b) If the identified action is subsequently modified in a manner that has an effect to the listed species or critical habitat that was not considered in the biological opinion; or (c) If a new species is listed or critical habitat designated that may be affected by the identified action. The section 7 regulations also require that consultation be reinitiated if the amount or extent of taking specified in the incidental take

statement is exceeded (50 CFR 402.16); however, this condition does not apply to this consultation because all incidental take resulting from actions carried out in compliance with the final 4(d) rule is not prohibited.

LITERATURE CITED

Alsheimer, L.R. 2011. The effect of artificial night lighting on the little brown bat (*Myotis lucifugus*). M.S. Thesis, SUNY Fredonia, Fredonia, NY

American Wind Energy Association (AWEA). 2013. Available at: *http://www.awea.org/Resources/Content.aspx?ItemNumber=5059*. Accessed: 03/02/2015.

American Wind Energy Association (AWEA). 2014. Available at: *http://www.awea.org/AnnualMarketReport.aspx?ItemNumber=7419&RDtoken=20070&userID*=. Accessed: 11/2015.

American Wind Energy Association (AWEA). 2015a. Available at: *http://www.awea.org/Issues/Content.aspx?ItemNumber=4437*. Accessed: 03/02/2015.

American Wind Energy Association (AWEA). 2015b. Available at: *http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=7833*. Accessed 11/2015.

Amelon, S., and D. Burhans. 2006. Conservation assessment: *Myotis septentrionalis* (northern long-eared bat) in the eastern United States. Pages 69-82 *in* Conservation assessments for five forest bat species in the eastern United States, Thompson, F. R., III, editor. U.S. Department of Agriculture, Forest Service, North Central Research Station, General Technical Report NC-260. St. Paul, Minnesota. 82pp.

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J.K. Kerns, R.R. Koford, C.P. Nicholson, C.P. Nicholson, T.J. O'Connell, M.D. Piorkowski, and R.D. Tankersley Jr. 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America. Journal of Wildlife Management, 71(1): 61-78.

Arnett, E.B., and E.F. Baerwald. 2013. Impacts of wind energy development on bats: implications for conservation. Chapter 21: pp. 435-456 in Bat Evolution, Ecology, and Conservation, R. A. Adams and S. C. Pedersen, editors. Springer-Verlag New York, 547pp.

Arnett, E. B., C. D. Hein, M. R. Schirmacher, M.M.P. Huso, and J. M. Szeczak. 2013. Evaluating the Effectiveness of an Ultrasonic Acoustic Deterrent for Reducing Bat Fatalities at Wind Turbines. PLoS ONE 8(6): e65794. doi:10.1371/journal.pone.0065794

Baerwald, E.F, G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology, 18(16):R695-R696.

Barclay, R.M.R., and A. Kurta. 2007. Ecology and Behavior of Bats Roosting in Tree Cavities and Under Bark. Chapter 2: pp. 17-60 in Bats in Forests: Conservation and Management, M.J. Lacki, J.P. Hayes, and A. Kurta, editors. The Johns Hopkins University Press, Baltimore, Maryland, 352pp.

BHE Environmental, Inc., 2010, Post-construction bird and bat mortality study: Cedar Ridge

Wind Farm, Fond Du Lac County, Wisconsin: Interim report prepared for Wisconsin Power and Light, Madison, Wisc. [Prepared by BHE Environmental, Inc., Cincinnati, Ohio, February, 2010.]

Belwood, J.J. 2002. Endangered bats in suburbia: observations and concerns for the future. Pp. 193-198 in A. Kurta and J. Kennedy (eds.), The Indiana bat: biology and management of an endangered species. Bat Conservation International, Austin, TX.

Benedict, R.A. and D.L. Howell. 2008. Use of building and bridges by Indiana bats (*Myotis sodalis*) and other bats in Iowa 2005-2008. Report submitted to the U.S. Fish and Wildlife Service and the Iowa Department of Natural Resources.

Bennett, V. J., W. P. Smith, and M. G. Betts. 2011. Toward understanding the ecological impact of transportation corridors. General Technical Report. Pacific Northwest Research Station, USDA Forest Service.

Bennett, V.J., and A.A. Zurcher. 2013. When corridors collide: Road-related disturbance in commuting bats. The Journal of Wildlife Management 77(1):93-101.

Bennett, V.J., D.W. Sparks, and P.A. Zollner. 2013. Modeling the indirect effects of road networks on the foraging activities of an endangered bat. Landscape Ecology 28:979-991.

Berthinussen, A., and J. Altringham. 2012. The effect of a major road on bat activity and diversity. Journal of Applied Ecology 49:82–89.

Bilecki L. C. 2003. Bat hibernacula in the karst landscape of central Manitoba: protecting critical wildlife habitat while managing for resource development. Master's Thesis. Winnipeg: University of Manitoba, 132pp.

Blehert, D.S., A.C. Hicks, M. Behr, C.U. Meteyer, B.M. Berlowski-Zier, E.L. Buckles, J.T., H. Coleman, S.R. Darling, A. Gargas, R. Niver, J.C. Okoniewski, R.J. Rudd, and W.B. Stone. 2009. Bat White-Nose Syndrome: An Emerging Fungal Pathogen? Science 323: 227.

Boyles, J.G., and D.P. Aubrey. 2006. Managing forests with prescribed fire: Implications for a cavity-dwelling bat species. Forest Ecology and Management 222:108-115.

Boyles, J. G., P.M. Cryan, G.F. McCracken, and T.H. Kunz. 2011. Economic importance of bats in agriculture. Science 332(6025):41-42.

Brigham, R. M. and M. B. Fenton (1986). Canadian Journal of Zoology. The influence of roost closure on the roosting and foraging behaviour of Eptesicus fuscus (Chiroptera: Vespertilionidae), 64, 1128- 1133.

Broders, H.G., G.J. Forbes, S. Woodley, and I.D. Thompson. 2006. Range extent and stand selection for roosting and foraging in forest-dwelling northern long-eared bats and little brown bats in the Greater Fundy ecosystem, New Brunswick. J. Wildlife Management 70(5):1174-1184.

Broders, H.G., L.E. Burns, and S.C. McCarthy. 2013. First records of the northern myotis (*Myotis septentrionalis*) from Labrador and summer distribution records and biology of little brown bats (*Myotis lucifugus*) in Southern Labrador. The Canadian Field-Naturalist 127:266-269.

Brose, P., and D. Van Lear. 1999. Effects of seasonal prescribed fires on residual overstory trees

in oak-dominated shelterwood stands. Southern J. Applied Forestry 23: 88-93.

Bunkley, J.P., C.J.W. McClure, N.J. Kleist, C.D. Francis, and J.R. Barber. 2015.Anthropogenic noise alters bat activity levels and echolocation calls. Global Eco.and Conserv. 3 (2015) 62–71.

Butchkoski, C. M. 2014. Indiana Bat (Myotis sodalis) Summer Roost Investigations. Pennsylvania Game Commission Bureau Of Wildlife Management Project Annual Job Report. 15 pps.

Caceres, M.C. and M.J. Pybus. 1997. Status of the northern long-eared bat (*Myotis septentrionalis*) in Alberta. Alberta Environmental Protection, Wildlife Management Division, Wildlife Status Report No. 3, Edmonton, AB, 19pp.

Caceres, M.C. and R.M.R. Barclay. 2000. *Myotis septentrionalis*. Mammalian Species 634:1-4.

Caire, W., R.K. LaVal, M.L. LaVal, and R. Clawson. 1979. Notes on the ecology of *Myotis keenii* (Chiroptera, Vespertilionidae) in Eastern Missouri. American Midland Naturalist 102(2): 404-407.

Callahan, E.V. 1993. Indiana bat summer habitat requirements. M.S. Thesis, University of Missouri Columbia.

Carter, T.C., W.M. Ford, and M.A. Menzel. 2002. Fire and bats in the southeast and mid-Atlantic: more questions than answers? *In* Ford, W.M., Russell, K.R., and Moorman, C.E., eds. The role of fire in nongame wildlife management and community restoration: traditional uses and new directions: proceedings of a special workshop. Nashville, TN. USDA Forest Service, Northeastern Research Station, Newton Square, PA, p. 139-143, General Technical Report NE-288. http://www.fs.fed.us/ne.

Carter, T.C., and G. Feldhamer. 2005. Roost tree use by maternity colonies of Indiana bats and northern long-eared bats in southern Illinois. Forest Ecology and Management 219:259-268.

Caviness, M. 2003. Effects of prescribed fire on cave environment and bat inhabitants. Bat Research News 44:130.

Colborn, T., F.S. vom Saal, and A.M. Soto. 1993. Developmental effects of endocrine-disrupting chemicals in wildlife and humans. Environmental Health Perspectives 101(5): 378-384.

Cope, J. B., A. R. Richter and R. S. Mills. 1974. Concentrations of the Indiana bat, Myotis sodalis, in Wayne County, Indiana. Proc. Indiana Acad. Sci. 83:482-484.

Cryan, P.M., M.A. Bogan, and G.M. Yanega. 2001. Roosting habits of four bat species in the Black Hills of South Dakota. Acta Chiropterologica 3(1):43-52.

Cryan, P.M., and R.M.R. Barclay. 2009. Causes of bat fatalities at wind turbines: hypotheses and predictions. Journal of Mammalogy, 90(6):1330-1340.

Cryan P.M. 2011. Wind turbines as landscape impediments to the migratory connectivity of bats. Environmental Law, 41:355-370.

Curtis J. Schmidt, Travis W. Taggart, and Choate, Jerry R. 2014. Kansas Mammal Atlas: An Online Reference. Electronic Database accessible at http://webcat.fhsu.edu/ksfauna/mammal. Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas, USA.

Davis, R. 1970. Carrying of young by flying female North American bats. American Midland Naturalist. 83: 186-196.

Davis, M.J., A.D. Vanderberg, T.A. Chatwin, and M.H. Mather. 1999. Bat usage of the Weymer Creek cave systems on Northern Vancouver Island. Proceedings of a Conference on the Biology and Management of Species and Habitats at Risk, Kamloops, B.C., 15-19 February 1999:305-312.

Dickinson, M.B., J.C. Norris, A.S. Bova, R.L. Kremens, V. Young, and M.J. Lacki. 2010. Effects of wildland fire smoke on a tree-roosting bat: integrating a plume model, field measurements, and mammalian dose–response relationships. Canadian J. Forest Research 40:2187-2203.

Dickinson, M.B., M.J. Lacki, and D.R. Cox. 2009. Fire and the endangered Indiana bat. Proceedings of the 3rd Fire in Eastern Oak Forests Conference GTR-NRS-P-46, p. 51-75.

Downs, N.C., V. Beaton, J. Guest, J. Polanski, S.L. Robinson, and P.A. Racey. 2003. The effects of illuminating the roost entrance on the emergence behavior of *Pipistrellus pygmaeus*. Biological Conservation 111:247-252.

Driver, C. J., M. W. Ligotke, H. Galloway-Gorby, G. Dennis, K. A. Reinbold and H. E. Balbach. 2002. Acute Inhalation Toxicity of Fog Oil Smoke in the Red-winged Blackbird, a Size specific Inhalation Surrogate for the Red-cockaded Woodpecker. ERDC/CERL Technical Report, TR-02-6, Engineer Research and Development Center, U.S. Army Construction Engineering Research Laboratory, Champaign, Illinois. 48 pp.

Droppelman, P.L. 2014. Bat Survey Report Myotis sodalis Indiana bat, Myotis grisescens Gray Bat, Myotis septentrionalis Northern long-eared bat, Mine Tailings Impoundment Brushy Creek Mine Doe Run Company Reynolds County, Missouri. Eco-Tech Consultants, Inc. 73pp.

Easterla, D.A. 1968. Parturition of Keen's Myotis in southwestern Missouri. J. Mammalogy 49(4):770.

Ellison, L.E., M.B. Wunder, C.A. Jones, C. Mosch, K.W. Navo, K. Peckham, J.E. Burghardt, J. Annear, R. West, J. Siemers, R.A. Adams, and E. Brekke. 2003. Colorado bat conservation plan. Colorado Committee of the Western Bat Working Group. Available at http://www.cnhp.colostate.edu/teams/zoology/cbwg/pdfs/ColoradoBatConservationPlanFebruary2004.pdf

Environment Yukon. 2011. Yukon Bats. Government of Yukon, Environment Yukon, Whitehorse, Yukon. 22pp.

Fagan Engineering, LLC. 2014. 2014 Avian and Bat Monitoring Annual Report Big Blue Wind Farm, Blue Earth, Minnesota. Unpublished report. 16 pp.

Feldhamer, G.A., T.C. Carter, A.T. Morzillo, and E.H. Nicholson. 2003. Use of bridges as day roosts by bats in southern Illinois. Publications, Paper 45.

Ferrara, F.J. and P.L. Leberg. 2009. Characteristics of positions selected by day-roosting bats under bridges in Louisiana. Journal of Mammalogy 86(4):729-735.

Foster, R.W., and A. Kurta. 1999. Roosting ecology of the northern bat (Myotis septentrionalis)

and comparisons with the endangered Indiana bat (*Myotis sodalis*). J. Mammalogy 80(2):659-672.

Frick, W. F., D. S. Reynolds and T. H. Kunz. 2010. Influence of climate and reproductive timing on demography of little brown myotis *Myotis lucifugus*. Journal of Animal Ecology, 79:128–136.

Frick, W.F., S.J. Puechmaille, J.R. Hoyt, B.A. Nickel, K.E. Langwig, J.T. Foster, K.E. Barlow, T. Bartonicka, D. Feller, A.J. Haarsma, C. Herzog, I. Horacek, J. van der Kooij, B. Mulkens, B. Petrov, R. Reynolds, L. Rodrigues, C.W. Stihler, G.G. Turner, and A.M. Kilpatrick. 2015. Disease alters macro-ecological patterns of North American bats. Global Ecology and Biogeography, Published online:1-9. Gardner, J.E., J.D. Garner, and J. Hofmann. 1991. Summer roost selection and roosting behavior of *Myotis sodalis* (Indiana bat) in Illinois. Final Report.

Furlonger, C.L., H.J. Dewar, and M.B. Fenton. 1987. Habitat use by foraging insectivorous bats. Canadian Journal of Zoology 65:284-288.

Garroway, C.J., and H.G. Broders. 2007. Nonrandom association patterns at northern long-eared bat maternity roosts. Canadian J. Zoology 85:956-964.

Geluso, K.N., J.S. Altenbach, and D.E. Wilson. 1976. Bat mortality: pesticide poisoning and migratory stress. Science 194(4261):184-186.

Griensein, L. 2011. Hibernacula microclimate and white-nose syndrome susceptibility in the little brown myotis (*Myotis lucifugus*). M.S. Thesis. Bucknell University, PA. 100 pp.

Griffin, D.R. 1940. Reviewed notes on the life histories of New England cave bats. J. Mammalogy 21(2):181-187.

Grodsky, S.M., M.J. Behr, A. Gendler, D. Drake, B.D. Dieterle, R.J. Rudd, and N.L. Walrath. 2011. Investigating the causes of death for wind turbine-associated bat fatalities. Journal of Mammalogy, 92(5):917-925.

Hamilton-Smith, E. 2001: Current initiatives in the protection of karst biodiversity. Natura Croatica 10(3): 229-242.

Hayes, M.A. 2013. Bats killed in large numbers at United States wind energy facilities. Bioscience, 63:975-979.

Hein, C.D., J. Gruver, and E.B. Arnett. 2013. Relating pre-construction bat activity and post-construction bat fatality to predict risk at wind energy facilities: A synthesis. Report to the National Renewable Energy Laboratory. Bat Conservation International, Austin, TX. 21 pp.

Henderson, L.E., and H.G. Broders. 2008. Movements and resource selection of the northern long-eared myotis (*Myotis septentrionalis*) in a forest-agriculture landscape. J. Mammalogy 89(4):952-963.

Henderson, L.E., L.J. Farrow, and H.G. Broders. 2008. Intra-specific effects of forest loss on the distribution of the forest-dependent northern long-eared bat (*Myotis septentrionalis*). Biological Conservation 141:1819-1828.

Horn, J.W., E.B. Arnett, and T. Kunz. 2008. Behavioral Responses of Bats to Operating Wind Turbines. Journal of Wildlife Management 72(1): 123–132.

Hull, C.L. and S Muir 2010. Search Areas for Monitoring Bird and Bat Carcasses at Wind Farms Using a Monte Carlo Model. Australian Journal of Environmental Management 17:77-87.

Huso, M.M.P, and D. Dalthorp. 2014. A comment on "Bats Killed in Larger Numbers and United States Wind Energy Facilities." Bioscience, 64:546-547.

Johnson, G.D. 2005. A review of bat mortality at wind-energy developments in the United States. Bat Research News, 46(2):45-49.

Johnson, S.A., V. Brack, Jr., and R.E. Rolley. 1998. Overwinter weight loss of Indiana bats (Myotis sodalis) from hibernacula subject to human visitation. The American Midland Naturalist, 139(2):255-261.

Johnson, J.B, J.W. Edwards, W.M. Ford, and J.E. Gates. 2009a. Roost tree selection by northern myotis (*Myotis septentrionalis*) maternity colonies following prescribed fire in a Central Appalachian Mountains hardwood forest. Forest Ecology and Management 258:233– 242.

Johnson, J.B., W.M. Ford, and J.W. Edwards. 2012. Roost networks of northern myotis (*Myotis septentrionalis*) in a managed landscape. Forest Ecology and Management, 266:223-231. Johnson, J.B., W.M. Ford, J.L. Rodrigue, J.W. Edwards, and C.M. Johnson. 2010. Roost selection by male Indiana Myotis following forest fires in central Appalachian hardwoods forests. J. Fish and Wildlife Management 1(2):111-121.

Jones, G. and J. Rydell. 1994. Foraging strategy and predation risk as factors influencing emergence time in echolocating bats. Philosophical Transactions of the Royal Society of London Series B, Biological Sciences. 346:445-455.

Jung, K., and E.K.V. Kalko. 2010. Where forest meets urbanization: foraging plasticity of aerial insectivorous bats in an anthropogenically altered environment. Journal of Mammalogy 91(1):144-153.

Kiser, J.D., J.R. MacGregor, J.D. Bryan, and A. Howard. 2002. Use of concrete bridges as nightroosts in the Indiana Bat: biology and management of an endangered species. Bat Conservation International, Austin, Texas.

Köhler, H.R. and R. Triebskorn. 2013. Wildlife ecotoxicology of pesticides: can we track effects to the population level and beyond? Science 341(6147):759-765.

Krochmal, A.R., and D.W. Sparks. 2007. Timing of Birth and Estimation of Age of Juvenile *Myotis septentrionalis* and *Myotis lucifugus* in West-Central Indiana. J. Mammalogy 88(3):649-656.

Lacki, M.J., and J.H. Schwierjohann. 2001. Day-Roost Characteristics of Northern Bats in Mixed Mesophytic Forest. J. Wildlife Management 65(3):482-488.

Lacki, M.J., D.R. Cox, L.E. Dodd, and M.B. Dickinson. 2009a. Response of northern bats (*Myotis septentrionalis*) to prescribed fires in eastern Kentucky forests. J. Mammalogy 90(5):1165-1175

Lacki, M.J., D.R. Cox, and M.B. Dickinson. 2009b. Meta-analysis of summer roosting characteristics of two species of Myotis bats. American Midland Naturalist. 162: 318-326.

Langwig, K.E., W.F. Frick, J.T. Bried, A.C. Hicks, T.H. Kunz, and A.M. Kilpatrick. 2012. Sociality, density-dependence and microclimates determine the persistence of populations suffering from a novel fungal disease, white-nose syndrome. Ecology Letters, 15:1050-

1057.
Lesinski, G. 2007. Bat road casualties and factors determining their number. Mammalia, 71, 138–142.
Lesinski, G. 2008. Linear landscape elements and bat casualties on roads—an example. Annales Zoologici Fennici 45:277–280.
Lesinski, G., A. Sikora, and A. Olszewski. 2011. Bat casualties on a road crossing a mosaic landscape. European Journal of Wildlife Research 2010:1–7.
Loeb, S.C. and J.M. O'Keefe. 2006. Habitat Use by Forest Bats in South Carolina in Relation to Local, Stand, and Landscape Characteristics. J. Wildlife Management 70(5):1215-1217.
Loeb, S.C. and J.M. O'Keefe. 2011. Bats and Gaps: The Role of Early Successional Patches in the Roosting and Foraging Ecology of Bats. Chapter 10 pp. 167-189 in Sustaining Young Forest Communities, C. Greenberg, B. Collins, and F. Thompson III, editors. Springer-Verlag New York, 304pp.
Loss, S., T. Will, and P. Marra. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation, 168:201-209.
Melvin. 2012. 2012 National Prescribed Fire Use Survey Report. Technical Report 01-12 Coalition of Prescribed Fire Councils, Inc., 19 pp.
Menzel, M.A., S.F. Owen, W.M. Ford, J.W. Edwards, P.B. Wood, B.R. Chapman, and K.V. Miller. 2002. Roost tree selection by northern long-eared bat (*Myotis septentrionalis*) maternity colonies in an industrial forest of the central Appalachian mountains. Forest Ecology and Management 155:107-114.
Moosman, P.R., J.P. Veilleux, G.W. Pelton, and H.H. Thomas. 2013. Changes in capture rates in a community of bats in New Hampshire during the progression of white-nose syndrome. Northeastern Naturalist 20(4): 552-558.
Nagorsen, D.W. and R.M. Brigham. 1993. Bats of British Columbia.
National Research Council (NRC). 1999. Toxicity of Military Smokes and Obscurants. Volume 2.National Academy Press, Washington, D.C. 113 pp.
Nelson, R.M., Sims, I.H.; Abell, M.S. 1933. Basal fire wounds on some southern Appalachian hardwoods. Journal of Forestry. 31: 829-837.
Norberg and Rayner 1987. Ecological morphology and flight in bats (Mammalia; Chiroptera): wing adaptations, flight performance, foraging strategy and echolocation. Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences. 316 (1179):335-427.
O'Shea, T.J., and D.R. Clark, Jr. 2002. An overview of contaminants and bats, with special reference to insecticides and the Indiana bat. The Indiana bat: biology and management of an endangered species. Bat Conservation International, Austin, TX 237-253.
Owen, S.F., M.A. Menzel, W.M. Ford, B.R. Chapman, K.V. Miller, J.W. Edwards, and P.B. Wood. 2003. Home-range size and habitat used by the Northern Myotis (*Myotis septentrionalis*). American Midland Naturalist 150(2):352-359.
Owen, S.F., M.A. Menzel, W.M. Ford, J.W. Edwards, B.R. Chapman, K.V. Miller, and P.B. Wood. 2002. Roost tree selection by maternal colonies of Northern long-eared Myotis in

an intensively managed forest. USDA Forest Service. Newtown Square, Pennsylvania. 10 pp.

Patriquin, K.J. and R.M. Barclay. 2003. Foraging by bats in cleared, thinned and unharvested boreal forest. Journal of Applied Ecology, 40:646-657.

Patriquin, K.J., M.L. Leonard, H.G. Broders, and C.J. Garroway. 2010. Do social networks of female northern long-eared bats vary with reproductive period and age? Behavioral Ecology and Sociobiology, 84:899-913.

Patterson, A.P. and J.W. Hardin. 1969. Flight speeds of five species of Vespertilionid bats. J. Mammalogy. 50: 152-153.

Perry, R.W. 2011. Fidelity of Bats to Forest Sites Revealed From Mist-Netting Recaptures. J. Fish and Wildlife Management 2(1):112-116.

Perry, R.W. 2012. A review of fire effects on bats and bat habitat in the eastern oak region. USDA Forest Service. Proceedings of the 4th Fire in Eastern Oak Forests Conference, 170-191.

Perry, R.W. 2013. A review of factors affecting cave climates for hibernating bats in temperate North America. Environmental Reviews 21: 28-39.

Perry, R.W., and R.E. Thill. 2007. Roost selection by male and female northern long-eared bats in a pine-dominated landscape. Forest Ecology and Management 247:220-226.

Perry, R.W., R.E. Thill, and D.M. Leslie, Jr. 2007. Selection of roosting habitat by forest bats in a diverse forest landscape. Forest Ecology and Management 238:156-166.

Quarles, W. 2013. Bats, Pesticides and White-Nose Syndrome. The IPM Practitioner 33(9-10):2-6.

Raesly, R.L., and J.E. Gates. 1987. Winter habitat selection by north temperate cave bats. American Midland Naturalist 118(1):15-31.

Richter, A.R., S.R. Humphrey, J.B. Cope, V. Brack. 1993. Modified cave entrances: thermal effect on body mass and resulting decline of endangered Indiana bats (*Myotis sodalis*). Conservation Biology 7(2):407-415.

Rodrigue, J.L., T.M. Schuler, and M.A. Menzel. 2001. Observations of bat activity during prescribed burning in West Virginia. Bat Research News 42:48-49.

Rollins, K.E., D.K. Meyerholz, G.D. Johnson, A.P. Capparella and S.S. Loew. 2012. A Forensic Investigation into the Etiology of Bat Mortality at a Wind Farm: Barotrauma or Traumatic Injury? Veterinary Pathology, 49:362-371.

Russell, A.L., C.M. Butchkoski, L. Saidak, G.F. McCracken. 2009. Road-killed bats, highway design, and the commuting ecology of bats. Endang Species Res. Vol. 8: 49–60

Rydell, J. 1992. Exploitation of insects around streetlamps by bats in Sweden. Functional Ecology 6(6):744-750.

Sasse, D.B., and P.J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (*Myotis septentrionalis*) in the white mountain national forest. Bats and Forests Symposium October 1995, Victoria, British Columbia, Canada, pp.91-101.

Schaub, A., J. Ostwald, and B.M. Siemers. 2008. Foraging bats avoid noise. J. Exp. Biol. 211, 3174-3180.

Secord, A.L., K.A. Patnode, C. Carter, E. Redman, D.J. Gefell, A.R. Major and D.W. Sparks.

2015. Contaminants of Emerging Concern in Bats from the Northeastern United States. Archives of environmental contamination and toxicology 69(4):411-421.

Siemers, B.M., and A. Schaub. 2011. Hunting at the highway: Traffic noise reduces foraging efficiency in acoustic predators. Proceedings of the Royal Society B: Biological Sciences 278:1646–1652.

Silvis, A., Ford, W. M., & Britzke, E. R., 2015. Effects of Hierarchical Roost Removal on Northern Long-Eared Bat (*Myotis septentrionalis*) Maternity Colonies. PLoS ONE, 10(1):1-17.

Silvis, A., Ford, W. M., Britzke, E. R., & Johnson, J. B., 2014. Association, roost use and simulated disruption of *Myotis septentrionalis* maternity colonies. Behavioral processes, 103:283-290.

Smallwood, K.S. 2013. Comparing Bird and Bat Fatality-Rate Estimates Among North American Wind-Energy Projects. Wildlife Society Bulletin, 37(1):19–33.

Smith, K.T., and E.K. Sutherland. 2006. Resistance of eastern oak hardwood stems to fire injury and damage. *In* Dickinson, M.B., ed., Fire in eastern oak forests: delivering science to land managers; proceedings of a conference. 2005 November 15-17; Columbus, OH. Gen. Tech. Rep. NRSP-1. Newton Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 201-217.

Sparks, D.W., C.M. Ritzi, J.E. Duchamp, and J.O. Whitaker, Jr. 2005. Foraging habitat of the Indiana bat, (*Myotis sodalis*) at an urban-rural interface. Journal of Mammalogy 86:713-718.

Stone, E.L., G. Jones, and S. Harris. 2009. Street lighting disturbs commuting bats. Current Biology 19:1123-1127.

Szewczak, J.M., and E.B. Arnett 2006. Preliminary Field Test Results of an Acoustic Deterrent with the Potential to Reduce Bat Mortality from Wind Turbines. A report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA. < http://www.batsandwind.org/pdf/detfield2006.pdf>

Taucher, J., T.L. Mumma, and W. Capouillez. 2012. Pennsylvania Game Commission Wind Energy Voluntary Cooperation Agreement, Third Summary Report. Bureau of Wildlife Habitat Management, Dec 27, 2012. 72pp.

Thomas, D.W. 1995. Hibernating bats are sensitive to nontactile human disturbance. J. Mammalogy 76(3):940-946.

Timpone, J.C., J.G. Boyles, K.L. Murray, D.P. Aubrey, and L.W. Robbins. 2010. Overlap in roosting habits of Indiana Bats (*Myotis sodalis*) and northern bats (*Myotis septentrionalis*). American Midland Naturalist 163:115-123.

Turner, G.G., D.M. Reeder, and J.T.H. Coleman. 2011. A five-year assessment of mortality and geographic spread of white-nose syndrome in North American bats and a look to the future. Bat Research News, 52(2):13-27.

U.S. Army Garrison Fort Drum. 2014. Biological Assessment on the proposed activities on Fort Drum Military Installation, Fort Drum, New York (2015-2017) for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*).

U.S. Department of Energy (USDOE). 2008. 20% Wind energy by 2030: increasing wind energy's contribution to U.S. electricity supply. U.S. Department of Energy, Office of Scientific and Technical Information, Oak Ridge, Tennessee. Available at: *http://www.nrel.gov/docs/fy08osti/41869.pdf*, Accessed 02/01/2015.

U.S. Department of Energy (USDOE), 2015a. Department of Energy Efficiency and Renewable Energy. Available at: *http://energy.gov/eere/success-stories/articles/mapping-frontier-new-wind-power-potential*, Accessed: 03/02/2015.

U.S. Department of Energy (USDOE), 2015b. Available at: *http://energy.gov/maps/map-projected-growth-wind-industry-now-until-2050*; Accessed 11/ 2015.

U.S. Forest Service (USFS). 2012. 2010 Resources Planning Act Assessment. Gen. Tech. Rep. WO-87. Washington, D.C., 198pp.

U.S. Fish and Wildlife Service (Service). 1998. Biological Opinion on the Construction and Operation of the Multi-Purpose Training Range (MPTR) at the Camp Atterbury Army National Guard Training Site. U.S. Fish and Wildlife Service Bloomington Field Office, Bloomington, IN. 22 pp.

U.S. Fish and Wildlife Service (Service). 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota, 258 pp.

U.S. Fish and Wildlife Service. 2009. Biological Opinion on the Proposed Activites on the Fort Drum Military Installation (2009-2011) for the Federally-Endangered Indiana Bat (*Myotis Sodalis*) in the Towns of Antwerp, Champion, Leray, Philadelphia, and Wilna, Jefferson County and the Town of Diane, Lewis County, New York. U.S. Fish and Wildlife Service New York Field Office, Cortland, NY. 108 pp.

U.S. Fish and Wildlife Service. 2010. Programmatic Biological Opinion on the Effects of Ongoing and Future Military and Land Management Activities at ahe Camp Atterbury Joint Maneuver Training Center. U.S. Fish and Wildlife Service Bloomington Field Office, Bloomington, Indiana. 80 pp.

U.S. Fish and Wildlife Service (Service). 2011. A National Plan for Assisting States, Federal Agencies, and Tribes Managing White-Nose Syndrome in Bats. 21pp. Available at: https://www.whitenosesyndrome.org/sites/default/files/white-nose_syndrome_national_plan_may_2011.pdf, accessed 03/02/2015.

U.S. Fish and Wildlife Service. 2012. Biological Opinion on the Effect of Proposed Activities on the Fort Drum Military Installation (2012-2014) in the Towns of Antwerp, Champion, Leray, Philadelphia, and Wilna, Jefferson County and the Town of Diane, Lewis County, New York on the Federally-Endangered Indiana Bat (*Myotis Sodalis*). U.S. Fish and Wildlife Service New York Field Office, Cortland, NY. 80 pp w/o appendices.

U.S. Fish and Wildlife Service. 2014. Northern Long-eared Bat Interim Conference and Planning Guidance. USFWS Regions 2, 3, 4, 5, & 6. Available at http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/NLEBinterimGuidance6Jan2014.pdf.

U.S. Fish and Wildlife Service (Service). 2015b. Biological Opinion; Kentucky Field Office's Participation in Conservation Memoranda of Agreement for the Indiana Bat and/or

Northern Long-eared Bat; FWS Log # 04E00000-2015-F-0005. Southeast Regional Office, Atlanta, Georgia. 84pp.

Van Lear, D.H., and R.F. Harlow. 2002. Fire in the eastern United States: influence on wildlife habitat. *In* Ford, W.M., K.R. Russell, and C.E. Moorman, eds. The role of fire in nongame wildlife management and community restoration: traditional uses and new directions. Gen. Tech. Rep. NE-288. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station 2-10.

Whitaker, J.O., Jr. and C.L. Gummer. 2002. Bats of Camp Atterbury, with emphasis on roosting of Indiana Myotis and evening bats 2002. Report for the Military Department of Indiana. 51 pp. plus appendices.

Whitaker, J.O., and L.J. Rissler. 1992. Seasonal activity of bats at copperhead cave. Proceedings of the Indiana Academy of Science, 101:127-134.

Whitaker, J.O., and R.E. Mumford. 2009. Northern Myotis. pp. 207-214. In Mammals of Indiana. Indiana University Press, Bloomington, Indiana. 688pp.

Whitaker, J.O., and W.J. Hamilton. 1998. Order Chiroptera: Bats. Chapter 3: pp.89-102 in Mammals of the eastern United States, Third Edition, Comstock Publishing Associates, a Division of Cornell University Press, Ithaca, New York, 608pp.

White-nose Syndrome Conservation and Recovery Working Group. 2015. Acceptable Management Practices for Bat Control Activities in Structures -A Guide for Nuisance Wildlife Control Operators. U.S. Fish and Wildlife Service, Hadley, MA.

Wray S, Reason P, Wells D, Cresswell W and Walker H. 2006. Design, installation, and monitoring of safe crossing points for bats on a new highway scheme in Wales. IN: Proceedings of the 2005 International Conference on Ecology and Transportation, Eds. Irwin CL, Garrett P, McDermott KP. Center for Transportation and the Environment, North Carolina State University, Raleigh, NC: pp. 369-379.

Yates, M.D., and R.M. Muzika. 2006. Effect of forest structure and fragmentation on site occupancy of bat species in Missouri Ozark Forests. The J. Wildlife Management 70(5):1238-1248.

Yates, D. E., E. M. Adams, S. E. Angelo, D. C. Evers, J. Schmerfeld, M. S. Moore, T. H. Kunz, T. Divoll, S. T. Edmonds, C. Perkins, R. Taylor and N. J. O'Driscoll. 2014. Mercury in bats from the northeastern United States. Ecotoxicology, 23:45–55.

Young, D., M. Lout, Z. Courage, S. Nomani and K. Bay. 2012. 2011 Post-Construction Monitoring Study: Criterion Wind Project, Garrett County, Maryland, April 2011-November 2011. Prepared for: Criterion Power Partners, LLC, Oakland, Maryland. Prepared by: Western EcoSystems Technology, Inc. Cheyenne, Wyoming. 70pp.

Key to the Northern Long-Eared Bat 4(d) Rule
for Federal Actions that May Affect Northern Long-Eared Bats
A separate key is available for non-Federal Activities

Federal agency actions that involve incidental take not prohibited under the final 4(d) rule may result in effects to individual northern long-eared bats. Per section 7 of the Act, if a federal agency's action may affect a listed species, consultation with the Service is required. This requirement does not change when a 4(d) rule is implemented. However, for this 4(d) rule, the Service proposed a framework to streamline section 7 consultations when federal actions may affect the northern long-eared bat but will not cause prohibited take. Federal agencies have the option to rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities by using the framework. This key will help federal agencies determine if their actions may cause prohibited incidental take of northern long-eared bats as defined in the 4(d) rule under the Endangered Species Act and if separate section 7 consultation may be necessary. Also, the framework for streamlining northern long-eared bat section 7 consultation is provided.

1. Is the action area (i.e., the area affected by all direct and indirect project effects) located wholly **outside the White-nose Syndrome Zone?** For the most current version of the White-nose Syndrome Zone map, please see www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

> **Yes, the action area is located wholly outside the white-nose syndrome zone.**
> Incidental take (see Definitions below) of northern long-eared bats is not prohibited in areas outside the White-nose Syndrome Zone. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.
>
> **No, the action area is located partially or wholly inside the white-nose syndrome zone.**
> Continue to #2

2. Will the action take place **within a cave or mine where northern long-eared bats hibernate** (i.e., hibernaculum) **or could it alter the entrance or the environment (physical or other alteration)** of a hibernaculum?

> **Yes, the action will take place within a northern long-eared bat hibernaculum or it could alter the entrance or the environment (physical or other alteration) of a hibernaculum.**
> Take (see Definitions below) of northern long-eared bats within hibernacula is prohibited, including actions that may change the nature of the hibernaculum's environment or entrance to it, even when the bats are not present. If your activity includes work in a hibernaculum or it could alter its entrance or environment, please contact the Service's

Ecological Services Field Office located nearest to the project area. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices.

No, the action will not take place within a northern long-eared bat hibernaculum or alter its entrance or environment.
Continue to #3

3. Will the action involve **tree removal** (see definition below)?

No, the action does not include tree removal.
Incidental take (see Definitions below) from activities that do not involve tree removal and do not take place within hibernacula or would not alter the hibernaculum's entrance or environment (see Question #3), is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes - continue to #4

4. Is the action the **removal of hazardous trees** for protection of human life or property?

Yes, the action is removing hazardous trees.
Incidental take (see Definitions below) of northern long-eared bats as a result of hazardous tree removal is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

No, the action is not removing hazardous trees.
Continue to #5

5. Will the action include one or both of the following: **1) removing a northern long-eared bat known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or 2) removing any trees within 0.25 miles of a northern long-eared bat hibernaculum at any time of year?**

No
Incidental take (see Definitions below) from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or results from tree removal activities within 0.25 mile of a hibernaculum at any time. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal

agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes
Incidental take (see Definitions below) of northern long-eared bats is prohibited if it occurs as a result of removing a known occupied maternity roost tree or removing trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31 or as a result of removing trees from within 0.25 mile of a hibernaculum at any time of year. This does not mean that you cannot conduct your action; however, standard section 7 consultation procedures apply. Please contact your nearest Ecological Services Field Office. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices

How do I know if there is a maternity roost tree or hibernacula in the action area?
We acknowledge that it can be difficult to determine if a maternity roost tree or a hibernaculum is in your project area. Location information for both resources is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

When looking for information on the presence of maternity roost trees or hibernacula within your project area, our expectation is that the federal action agency will complete due diligence to determine if date is available. If information is not available, document your attempt to find the information and send it with your determination under step 1 of the framework (see below).

We do not require federal agencies to conduct surveys; however, we recommend that surveys be conducted whenever possible. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat. In addition, should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could have greater flexibility under section 7(a)(2) of the Act. Recommended survey methods are available at www.fws.gov/midwest/endangered/mammals/nleb.

Optional Framework to Streamline Section 7 Consultation for the Northern Long-Eared Bat:

The primary objective of the framework is to provide an efficient means for U.S. Fish and Wildlife Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in the programmatic intra-Service consultation for the final 4(d) rule and do not require separate consultation. Such verification is necessary because incidental take is prohibited in the vicinity of known hibernacula and known roosts, and these locations are continuously updated. Federal agencies may rely on this Biological Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the northern long-eared bat, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the northern long-eared bat, but would not cause prohibited incidental take. This documentation must follow these procedures:

    a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. Activities that will occur within 0.25 mile of a known hibernacula or within 150 feet of known, occupied maternity roost trees during the pup season (June 1 to July 31) are not excepted pursuant to the final 4(d) rule. This determination must be updated annually for multi-year activities.
    b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
    c. For this determination, the action agency will rely on the definitions of prohibited activities provided in the final 4(d) rule and the activities considered in this consultation.
    d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
    e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
    f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the northern long-eared bat is required; i.e., where the proposed project includes an activity not covered by the 4(d) rule and thus not addressed in the Biological Opinion and is subject to additional consultation.
    g. If the Service does not respond within 30 days under (f) above, the action agency may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the northern long-eared bat fulfilled through this programmatic Biological Opinion.

2. Reporting

    a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
    b. The action agency must provide the results of any surveys for the northern long-eared bat to the appropriate Service Field Office within their jurisdiction.
    c. Parties finding a dead, injured, or sick northern long-eared bat must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures to all Federal agencies whose actions may affect the northern long-eared bat:

1. Perform northern long-eared bat surveys according to the most recent Range-wide Indiana Bat/ northern long-eared bat Summer Survey Guidelines. Benefits from agencies voluntarily performing northern long-eared bat surveys include:

    a. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. The Service and partners will use the survey data to better understand habitat use and distribution of northern long-eared bats, track the status of the species, evaluate threats and impacts, and develop effective conservation and recovery actions. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat.
    b. Should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could inform greater flexibility under section 7(a)(2) of the Act. Such information could facilitate an expedited consultation and incidental take statement that may, for example, exempt taking associated with tree removal during the active season, but outside of the pup season, in known occupied habitat.

2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on northern long-eared bats. Conservation measures include:
    a. Conduct tree removal activities outside of the northern long-eared bat pup season (June 1 to July 31) and/or the active season (April 1 to October 31). This will minimize impacts to pups at roosts not yet identified.

b. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed northern long-eared bat hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).
c. Manage forests to ensure a continual supply of snags and other suitable maternity roost trees.
d. Conduct prescribed burns outside of the pup season (June 1 to July 31) and/or the active season (April 1 to October 31). Avoid high-intensity burns (causing tree scorch higher than northern long-eared bat roosting heights) during the summer maternity season to minimize direct impacts to northern long-eared bat.
e. Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the northern long-eared bat active season (April 1 to October 31) in areas where northern long-eared bats are known to roost on bridges or where such use is likely.
f. Do not use military smoke and obscurants within forested suitable northern long-eared bat habitat during the pup season (June 1 to July 31) and/or the active season (April 1 to October 31).
g. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
h. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
i. Participate in actions to manage and reduce the impacts of white-nose syndrome on northern long-eared bat. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal.

Definitions

"Incidental take" is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

"Known hibernacula" are defined as locations where one or more northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence. Given the challenges of surveying for northern long-eared bats in the winter, any hibernacula with northern long-eared bats observed at least once, will continue to be considered "known hibernacula" as long as the hibernacula remains suitable for northern long-eared bat.

"Known occupied maternity roost trees" is defined in the 4(d) rule as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Once documented, northern-long eared bats are known to continue to use the same roosting areas. Therefore, a tree will be considered to be a "known occupied maternity roost" as long as the tree and surrounding habitat remain suitable for northern long-eared bat. The incidental take prohibition for known occupied maternity roosts trees applies only during the during the pup season (June 1 through July 31).

"Take" is defined by the ESA as 'to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any endangered species. Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purpose*f*ul take.

"Tree removal" is defined in the 4(d) rule as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats.

Brenda Winn

Subject: Northern Long-Eared Bat Consultation
Attachments: online_project_review_certification_SIGNED.pdf

Dear Project Manager:

You are receiving this email as your 12-SPGP-01 permit application requires Section 7 coordination with the U.S. Fish and Wildlife Service (the Service) for the federally threatened northern long-eared Bat (NLEB). In accordance with the final 4(d) rule (81 Federal Register 1900-1922), published January 14, 2016, your project, if authorized, will require the implementation of a time of year restriction (TOYR) or 30 day consultation with the Service and adherence to the formal programmatic biological opinion for the final 4(d) rule. You may either choose to implement the TOYR (Option 1), or pursue coordination/ consultation (Option 2). Please let DEQ know how you would like to proceed.

Please inform DEQ as to which of the following two options you wish to pursue (choosing option 1 eliminates the need to pursue option 2):

Option 1: Time-of-Year Restriction

Complete the attached self-certification letter and a TOYR will be incorporated into the permit authorization as the following authorization note:

The permittee shall comply with the following Time-of-Year Restriction (TOYR): No tree clearing shall occur from April 15 – September 15 of any year, in order to protect the Northern Long-Eared Bat (Myotis septentrionalis), a species listed as Threatened under the Federal Endangered Species Act. The permittee may elect to perform a survey, in accordance with the survey guidelines at http://www.fws.gov/northeast/virginiafield/pdf/endspecies/2015IndianaBatSummerSurveyGuidelines01April2015.pdf, for the Northern Long-Eared Bat within the project boundary and coordinate results with the U.S. Fish and Wildlife Service (the Service). Should the survey document the absence of the species within the project boundary, this TOYR is removed.

Furthermore, permittees are encouraged to implement the voluntary conservation measures noted below.

Option 2: Consultation and Adherence to the Programmatic Biological Opinion

DEQ will initiate consultation with the Service once the applicant has provided DEQ ***written self-certification with the project name and date filled-out, confirmation of understanding of and adherence to the programmatic biological opinion for the final 4(d) rule, a request to temporarily suspend the application process and the number of acres of habitat impacted.*** The self-certification letter is attached. The Service has 30 days to review and respond to the consultation request. In the event that the Service requests additional information or specific permit conditions, further coordination may be necessary. If no response from the Service is received within 30 days, coordination is complete and DEQ will move forward with your permit application. Note that the applicant is responsible for implementing the programmatic biological opinion for the final 4(d) rule, as detailed below.

The Programmatic Biological Opinion is located here:
http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/BOnlebFinal4d.pdf

In Summary: The final rule addresses both purposeful take and incidental taking of the NLEB. Please be advised the Virginia is within the white nose syndrome zone and thus the NLEB in Virginia is subject to specific protections.

- The final 4(d) rule prohibits purposeful take of NLEBs throughout the species' range, except when (1) necessary to protect human health; (2) in instances of removal of NLEBs from human structures; or (3) the authorized capture and handling of NLEBs by individuals permitted to conduct these same activities for other bat species until May 3, 2016.
- Within the WNS zone, the final 4(d) rule prohibits incidental take of NLEBs in their hibernacula, which may be caused by activities that disturb or disrupt hibernating individuals when they are present as well as the physical or other alteration of the hibernaculum's entrance or environment when bats are not present.
- Incidental take of NLEBs outside of hibernacula resulting from activities other than tree removal is not prohibited provided they do not result in the incidental take of NLEBs inside hibernacula.
- Incidental take resulting from tree removal is prohibited if it: (1) occurs within 0.25 miles (0.4 km) of known NLEB hibernacula; or (2) cuts or destroys known, occupied maternity roost trees or any other trees within a 150-foot (45-meter) radius around the known, occupied maternity tree during the pup season (June 1 to July 31).
- Removal of hazardous trees for the protection of human life and property is not prohibited.

Voluntary Conservation Measures:

Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends implementation of the following conservation measures for the NLEB:

1. Perform NLEB surveys according to the most recent Range-wide Indiana Bat/NLEB Summer Survey Guidelines.
2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on NLEBs. Conservation measures include:
    i. Conduct tree removal activities outside of the NLEB pup season (June 1-July 31) and/or the active season (April 15-September 15).
    ii. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed NLEB hibernacula during the spring staging and fall swarming season (April 1-May 14 and August 16-November 15).
    iii. Manage forests to ensure a continual supply of snags and other suitable maternity roosts trees.
    iv. Conduct prescribed burns outside of the pup season (June 1-July 31) and/or the active season (April 1-October 31). Avoid high-intensity burns (causing tree scorch higher than NLEB roosting heights) during the summer maternity season to minimize direct impacts to NLEB.
    v. Perform bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the NLEB active season (April 15-September 15) in areas where NLEB are known to roost on bridges or where such use is likely.
    vi. Do not use military smoke and obscurants within forested suitable NLEB habitat during the pup season (June 1-July 31) and/or the active season (April 15-September 15).
    vii. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
    viii. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
    ix. Participate in actions to manage and reduce the impacts of WNS on NLEBs. Actions needed to investigate and manage WNS are described in a national plan the Service developed in coordination with other state and Federal agencies.

Please contact me if you have any questions or concerns.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Date:

Project Review Certification Letter

Project Name:

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Ecological Services online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the project named above in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. . 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in:

- "no effect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, not likely to adversely affect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, likely to adversely affect" determination for the Northern long-eared bat (*Myotis septentrionalis*) and relying on the findings of the January 5, 2016 Programmatic Biological Opinion for the Final 4(d) Rule on the Northern long-eared bat; and/or
- "no Eagle Act permit required" determinations for eagles.

We certify that use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the “no effect” or “not likely to adversely affect” determinations for proposed and listed species and proposed and designated critical habitat; the “may affect” determination for Northern long-eared bat; and/or the “no Eagle Act permit required” determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of proposed or listed species, proposed or designated critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for 1 year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Troy Andersen of this office at (804) 824-2428.

Sincerely,

Cindy Schulz
Field Supervisor
Virginia Ecological Services

Enclosures - project review package

Brenda Winn

Subject: WPX-XX-XXXX: Northern Long-Eared Bat Re-Coordination
Attachments: online_project_review_certification_SIGNED.PDF

Dear Project Manager:

You are receiving this email as your 12-SPGP-01 permit application requires Section 7 coordination with the U.S. Fish and Wildlife Service (the Service) for the federally threatened northern long-eared Bat (NLEB). In accordance with the final 4(d) rule (81 Federal Register 1900-1922), published January 14, 2016, your project, if authorized, will require the implementation of a time of year restriction (TOYR) or 30 day consultation with the Service and adherence to the formal programmatic biological opinion for the final 4(d) rule. Your application was previously coordinated with the Service for the NLEB on **Month DD, YYYY**; and as a result of that coordination the Service requested a TOYR. You may either choose to implement the TOYR as previously coordinated (Option 1), or pursue re-coordination (Option 2). Please let DEQ know how you would like to proceed.

Please inform DEQ as to which of the following two options you wish to pursue (choosing option 1 eliminates the need to pursue option 2):

Option 1: Time-of-Year Restriction

Complete the attached self-certification letter and a TOYR will be incorporated into the permit authorization as the following authorization note:

The permittee shall comply with the following Time-of-Year Restriction (TOYR): No tree clearing shall occur from April 15 – September 15 of any year, in order to protect the Northern Long-Eared Bat (Myotis septentrionalis), a species listed as Threatened under the Federal Endangered Species Act. The permittee may elect to perform a survey, in accordance with the survey guidelines at http://www.fws.gov/northeast/virginiafield/pdf/endspecies/2015IndianaBatSummerSurveyGuidelines01April2015.pdf, for the Northern Long-Eared Bat within the project boundary and coordinate results with the U.S. Fish and Wildlife Service (the Service). Should the survey document the absence of the species within the project boundary, this TOYR is removed.

Furthermore, permittees are encouraged to implement the voluntary conservation measures noted below.

Option 2: Consultation and Adherence to the Programmatic Biological Opinion

DEQ will initiate consultation with the Service once the applicant has provided DEQ ***written self-certification with the project name and date filled-out, confirmation of understanding of and adherence to the programmatic biological opinion for the final 4(d) rule, a request to temporarily suspend the application process and the number of acres of habitat impacted.*** The self-certification letter is attached. The Service has 30 days to review and respond to the consultation request. In the event that the Service requests additional information or specific permit conditions, further coordination may be necessary. If no response from the Service is received within 30 days, coordination is complete and DEQ will move forward with your permit application. Note that the applicant is responsible for implementing the programmatic biological opinion for the final 4(d) rule, as detailed below.

The Programmatic Biological Opinion is located here:
http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/BOnlebFinal4d.pdf

In Summary: The final rule addresses both purposeful take and incidental taking of the NLEB. Please be advised the Virginia is within the white nose syndrome zone and thus the NLEB in Virginia is subject to specific protections.

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- Removal of hazardous trees for the protection of human life and property is not prohibited.

Voluntary Conservation Measures:

Conservation recommendations are discretionary activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends implementation of the following conservation measures for the NLEB:

1. Perform NLEB surveys according to the most recent Range-wide Indiana Bat/NLEB Summer Survey Guidelines.
2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on NLEBs. Conservation measures include:
    i. Conduct tree removal activities outside of the NLEB pup season (June 1-July 31) and/or the active season (April 15-September 15).
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    v. Perform bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the NLEB active season (April 15-September 15) in areas where NLEB are known to roost on bridges or where such use is likely.
    vi. Do not use military smoke and obscurants within forested suitable NLEB habitat during the pup season (June 1-July 31) and/or the active season (April 15-September 15).
    vii. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
    viii. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
    ix. Participate in actions to manage and reduce the impacts of WNS on NLEBs. Actions needed to investigate and manage WNS are described in a national plan the Service developed in coordination with other state and Federal agencies.

Please contact me if you have any questions or concerns.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Date:

Project Review Certification Letter

Project Name:

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Ecological Services online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the project named above in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. . 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in:

- "no effect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, not likely to adversely affect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, likely to adversely affect" determination for the Northern long-eared bat (*Myotis septentrionalis*) and relying on the findings of the January 5, 2016 Programmatic Biological Opinion for the Final 4(d) Rule on the Northern long-eared bat; and/or
- "no Eagle Act permit required" determinations for eagles.

We certify that use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the “no effect” or “not likely to adversely affect” determinations for proposed and listed species and proposed and designated critical habitat; the “may affect” determination for Northern long-eared bat; and/or the “no Eagle Act permit required” determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of proposed or listed species, proposed or designated critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for 1 year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Troy Andersen of this office at (804) 824-2428.

Sincerely,

Cindy Schulz
Field Supervisor
Virginia Ecological Services

Enclosures - project review package

NAO ESA Project Review Process

For use by Corps projects managers and their non-federal representatives (VDEQ and VDOT)

This is a streamlined version of FWS's Online Review Process.

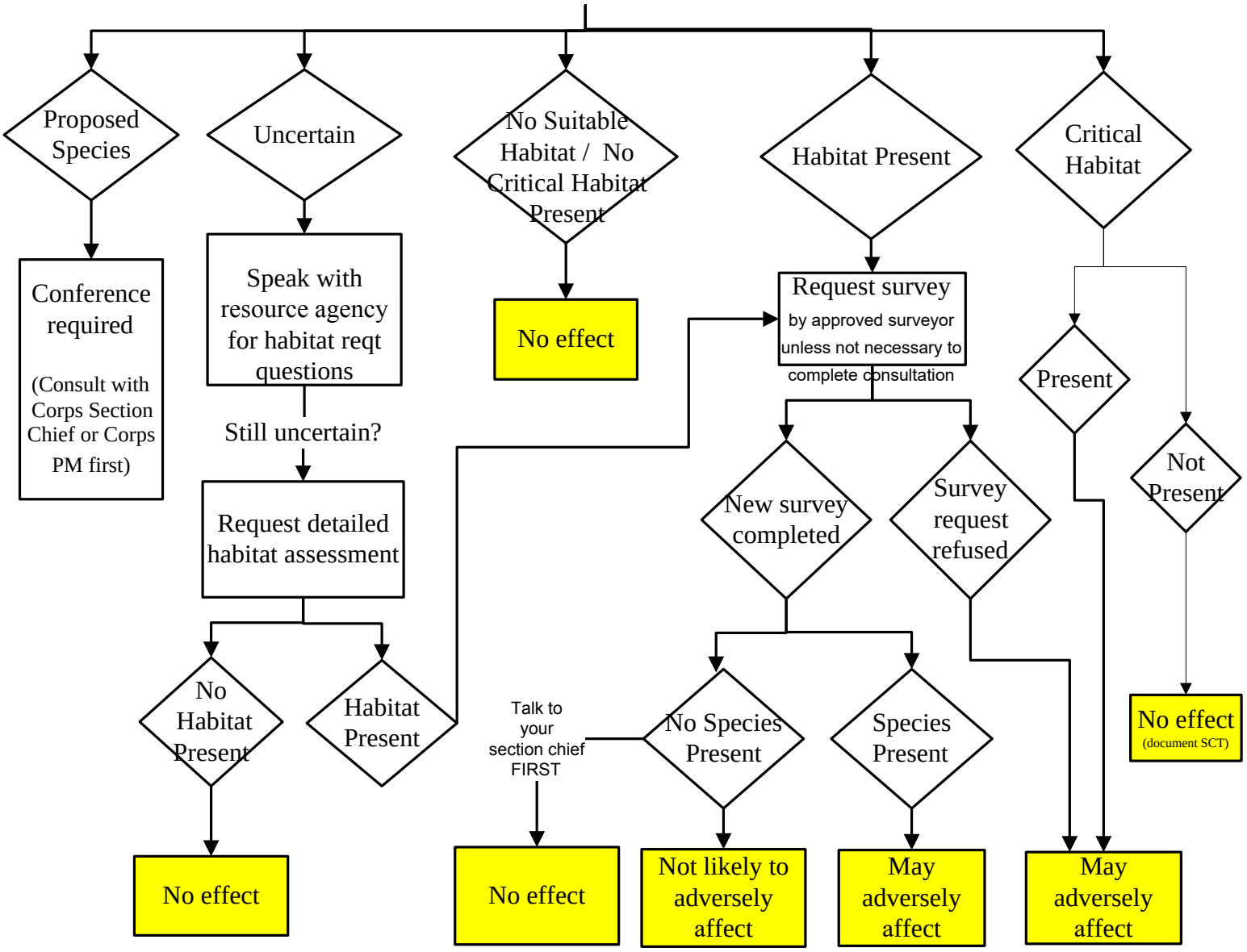
1.Determine your PERMIT AREA

2. Determine your ACTION AREA.
Consider the nature of the work and all project-specific effects that may extend outside of the permit area, such as light, sound, sedimentation, access, etc.

3. Draw your ACTION AREA in IPaC to get the FWS official species list (permits) or unofficial species list (pre-applications and JDs) and add all federally-listed and proposed species to the Species Conclusion Table (SCT). Also include any known NOAA species.

4. Pull a project report in NAO's CorpsMap (DEQ will use DCR and VDGIF datasets) and add all federally-listed and proposed species to the SCT with conclusion "Species Present"

5. Assess whether suitable habitat for each species listed on your SCT is found within the action area.



Note: A Corps permit cannot be issued until Section 7 coordination is complete. You cannot provisionally issue a permit before Section 7 coordination is complete.

ESA Agency Coordination Procedures

No effect →

Document file with SCT and move on with permit process
DO NOT COORDINATE NO EFFECTS W/USFWS or NOAA PRD ....USE NLAA DETERMINATION IF UNSURE!!

Not likely to adversely affect →

FWS (GPs): Email package (IPaC species list, CorpsMap report, SCT and self cert letter) to VirginiaFieldOffice@fws.gov with subject line "SELF-CERTIFICATION LETTER: Project X.". No waiting period.
FWS (IP): Include the package listed above in the Public Notice.

NOAA: PM must submit NLAA verification form and receive response before proceeding

SPGP: If the agency provides comments or recommends conditions, request that the applicant respond within 30 days. If coordination between the applicant and the FWS results in agreed upon conditions, a special conditions form will be attached to the SPGP permit. If an agreement can not be reached the project will be forwarded to the Corps for formal consultation.

May adversely affect →

Initiate Consultation with FWS or NOAA.

Most likely this will be formal consultation, unless the Corps can negotiate special conditions with FWS/NMFS to reduce the project to a "not likely to adversely affect."

Coordination must be performed by the lead agency, not a Federally-Designated Representative.

For SPGP applications, VDEQ shall forward to the Corps the necessary information for completing the coordination. Upon completion of the coordination, the Corps shall notify the VDEQ and provide the special conditions form to the VDEQ.

IPAC:

http://ecos.fws.gov/ipac/

Online Review Process:

http://www.fws.gov/northeast/virginiafield/endangered/projectreviews.html

NAO CorpsMap (Corps only):

https://corpsmap.usace.army.mil/nao_regulatory

VDGIF TOYR Table (for planning purposes only):

https://www.dgif.virginia.gov/wp-content/uploads/VDGIF-Time-of-Year-Restrictions-Table.pdf

DCR National Heritage Resource abbreviations:

http://www.dcr.virginia.gov/natural-heritage/help

NAO Fish and Wildlife Coordination Act Project Review Process

In addition to federally-listed species, the following species must also be considered:

If you get a hit for:	Coordinate with:
Bald Eagles (nests, concentration areas or buffer)	No coordination required - Applicant must obtain permit. Add this language to permit (not a special condition, though): "Please note that you should either obtain a U.S. Fish and Wildlife Service (FWS) bald eagle take permit or a letter of concurrence from FWS indicating that a permit is not necessary prior to initiating construction activities. You should contact Thomas Wittig concerning this matter at 413-253-8577 or Thomas_wittig@fws.gov ."
Cold Water Stream Trout	VDGIF Exception - VDOT only has to comply with Trout MOU
Shellfish - oyster beds (Corpsmap)	If existing (biologically-active) beds are known within or adjacent to the project, coordinate with NOAA and cc: VMRC
Migratory Birds	Add language to permit (not a special condition, though): "The USFWS has asked that we inform you of their authority under the Migratory Bird Treaty Act (16 USC 703). You should contact Thomas Wittig concerning this matter at 413-253-8577 or Thomas_wittig@fws.gov to determine if any restrictions apply to your project."

NOAA FISHERIES COORDINATION PROCEDURES (Per MSA and FWCA)

Revised AUGUST 2018

NO COORDINATION IS REQUIRED FOR EFH CORPSMAP HITS FOR:

18-RP-02 (unless adjacent to shellfish/SAV)** 18-RP-15 18-RP-17 18-RP-18 18-RP-19 (unless impacts > 0.5 acre)	**NOTE IN MFR:** The project area is within Essential Fish Habitat (EFH), however, NOAA Fisheries provided general concurrence for Regional Permit ***XX* (18-RP-XX)*** as reissued August 2018. Therefore, no further coordination with NOAA Fisheries is required.
17-NWP-1 17-NWP-2 17-NWP-3 17-NWP-4 17-NWP-5 17-NWP-6 17-NWP-7 17-NWP-8 17-NWP-9 17-NWP-10 17-NWP-11 17-NWP-12 17-NWP-13 17-NWP-14 17-NWP-15 17-NWP-16 17-NWP-17 17-NWP-18 17-NWP-19 17-NWP-20 17-NWP-22 17-NWP-23 17-NWP-25 17-NWP-27 17-NWP-28 17-NWP-31 17-NWP-32 17-NWP-33 17-NWP-35 17-NWP-36 17-NWP-37 17-NWP-47 17-NWP-48 17-NWP-54 (unless impacts > 0.5 acre)	**NOTE IN MFR:** The project area is within Essential Fish Habitat (EFH), however, NOAA Fisheries provided general concurrence for Nationwide Permit ***XX* (17-NWP-XX)*** as reissued March 2017. Therefore, no further coordination with NOAA Fisheries is required.

PM NOTE: A general concurrence identifies specific types of federal actions that may adversely affect EFH, but for which no further consultation is required because we have determined, through an analysis of that type of action, that the action will likely result in no more than minimal adverse effects both individually and cumulatively.

***** If using RP-2 and adjacent to shellfish beds or SAV, apply a TOYR and issue the permit: The TOYR for these resources are as follows:***
•Shellfish beds: March 1 through September 30
• Submerged Aquatic Vegetation: March 1 through October 31

CORPSMAP HIT FOR ANADROMOUS FISH USE WATERS	
Activity type	No anadromous fish TOYR is required and no coordination is required with NOAA Fisheries if:
SHORELINE & BANK STABILIZATION PROJECTS (Sections 10 & 404; tidal and non-tidal waters of the U.S.) Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, estuarine and ocean waters, and any other open waters. Includes bulkheads, seawalls, riprap, revetments or slope protection & similar structures as well as vegetative planting, soil bioengineering or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection.	The activity extends ≤48 feet channelward of MHW. **AND** The width of the waterway (measured from MLW to MLW) is ≥ 330 feet.
PILE-SUPPORTED STRUCTURES & FLOATS, INCLUDING BOAT LIFTS/HOISTS & OTHER MISCELLANEOUS STRUCTURES & WORK (Section 10; navigable waters of the U.S.) New, expansions, reconfigurations or modifications of structures for navigation access including floats, stairs, and boat/float lifts.	Piles are installed in the dry.
	Piles are timber and ≤14” in diameter, and installed with a cushioned impact hammer. **AND** The opposite shoreline (MLW) extends > 492 feet beyond the most channelward pile.
	Piles are timber and ≤20” in diameter, and installed with a vibratory hammer. **AND** The opposite shoreline (MLW) extends > 384 feet beyond the most channelward pile.
TEMPORARY OR PERMANENT MOORING OR SURVEY BUOYS (Section 10; navigable waters of the U.S.)	The mooring anchors and associated cable/chain are not placed in/on SAV, oyster reefs, shellfish beds or live hard bottom communities.
DREDGING (Section 10; navigable waters of the U.S.)	Extent of dredge impacts including turbidity plume (https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/turbiditytablenew.html) will not prohibit passage of anadromous fish.

CORPSMAP HIT FOR SAV	
Activity type	No SAV coordination is required if:
Piers	Terminus of pier head and all mooring structures (areas where boat traffic is anticipated) extend beyond limits of SAV mapped by VIMS' most recent survey year and 5 year composite (in CorpsMap).
Dredging	Extent of dredge impacts including turbidity plume (https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/turbiditytablenew.html) will not extend into SAV mapped by VIMS' most recent SAV survey year and 5 year composite (in CorpsMap).
Aquaculture	Placing on-bottom cages (≤ 12 inches above the bottom) where SAV has not been mapped by VIMS' most recent survey year and 5 year composite (in CorpsMap).
	Siting cages in deeper water (>1 m) as this generally avoids conflicts with SAV.

Notes on Aquaculture and SAV interaction:

NOAA recommends siting new aquaculture operations in areas where SAV has not been mapped by VIMS most recent survey year (2016, 2017 preliminary) or the current 5-year composite map (VIMS, 2011-2015 data). In general, areas of deeper water (>1 m) throughout the lower Chesapeake Bay and its tributaries typically do not support persistent SAV beds due to limited light availability on the bottom. The Virginia Institute of Marine Science (VIMS) submerged aquatic vegetation (SAV) monitoring program surveys can be found here: http://web.vims.edu/bio/sav/maps.html and in Corpsmaps.If siting additional oyster cages in deeper water to avoid SAV is not possible within the confines of an existing aquaculture lease, the cultivation and harvest of oysters employing specific off-bottom aquaculture technology, such as the SEAPA system that incorporates long-lines supported by poles to suspend oyster baskets 2-ft. off the bottom, may be determined by the Corps to be a compatible use of State-owned bottom and water column in areas which have been mapped by VIMS as supporting very sparse (0-10% cover) to sparse (10-40% cover) SAV coverage for the most recent survey year and 5-year composite. This variance should only be considered for off-bottom aquaculture technologies in areas where SAV is absent or density is characterized as very sparse or sparse and the proposed aquaculture operation is not anticipated to have a significant adverse effect on SAV. On-bottom, caged aquaculture in areas where SAV has been mapped as described above should continue to be avoided. Traditionally, commercial shellfish aquaculture in Virginia has utilized on-bottom cages (not to exceed 12-inches above the bottom) to grow oysters (Crassotrea virginica). The placement of on-bottom cages in areas of mapped SAV is not currently authorized by either Virginia Marine Resources Commission or the NAO District Corps.

http://www.mrc.virginia.gov/regulations/onbottom.shtm

http://www.nao.usace.army.mil/Portals/31/docs/regulatory/RPSPdocs/13-RP-19.pdf

However, certain species of SAV (e.g. Ruppia maritima) are known to be transient or ephemeral and typically lack the persistence and density of some other seagrass species (e.g. Zostera marina). VIMS survey data may provide useful information in making these types of on-bottom aquaculture permit decisions. The NAO Corps may determine that placement of on-bottom cages in areas supporting SAV is acceptable under certain situations provided these areas are mapped as SAV being absent or very sparse (0-10% cover) during the most recent VIMS survey and where 50% or more of the last 5-year composite (3 or more years) mapped SAV as either absent or very sparse (0-10% cover). Under these specific site conditions, NAO Corps may determine authorization of these projects provides valuable information over time regarding the interactions between aquaculture operations and SAV, such as the expansion, reduction or unchanged aerial extent or density of SAV which may then help inform future commercial aquaculture permit decisions. While NOAA typically prefers the exclusion of aquaculture operations from all areas supporting SAV, we recognize there are gaps in our current scientific understanding regarding the potential ecological benefits and detriments of commercial aquaculture on the establishment, growth and persistence of submerged aquatic vegetation. Much of the information regarding aquaculture-SAV interactions is anecdotal, and we encourage additional scientific study to increase our understanding of the biogeochemical interactions that occur between SAV and caged aquatic organisms grown in commercial aquaculture.

If your project does not meet the no coordination required thresholds of the above categories (general concurrence, Anadromous Fish or SAVs):

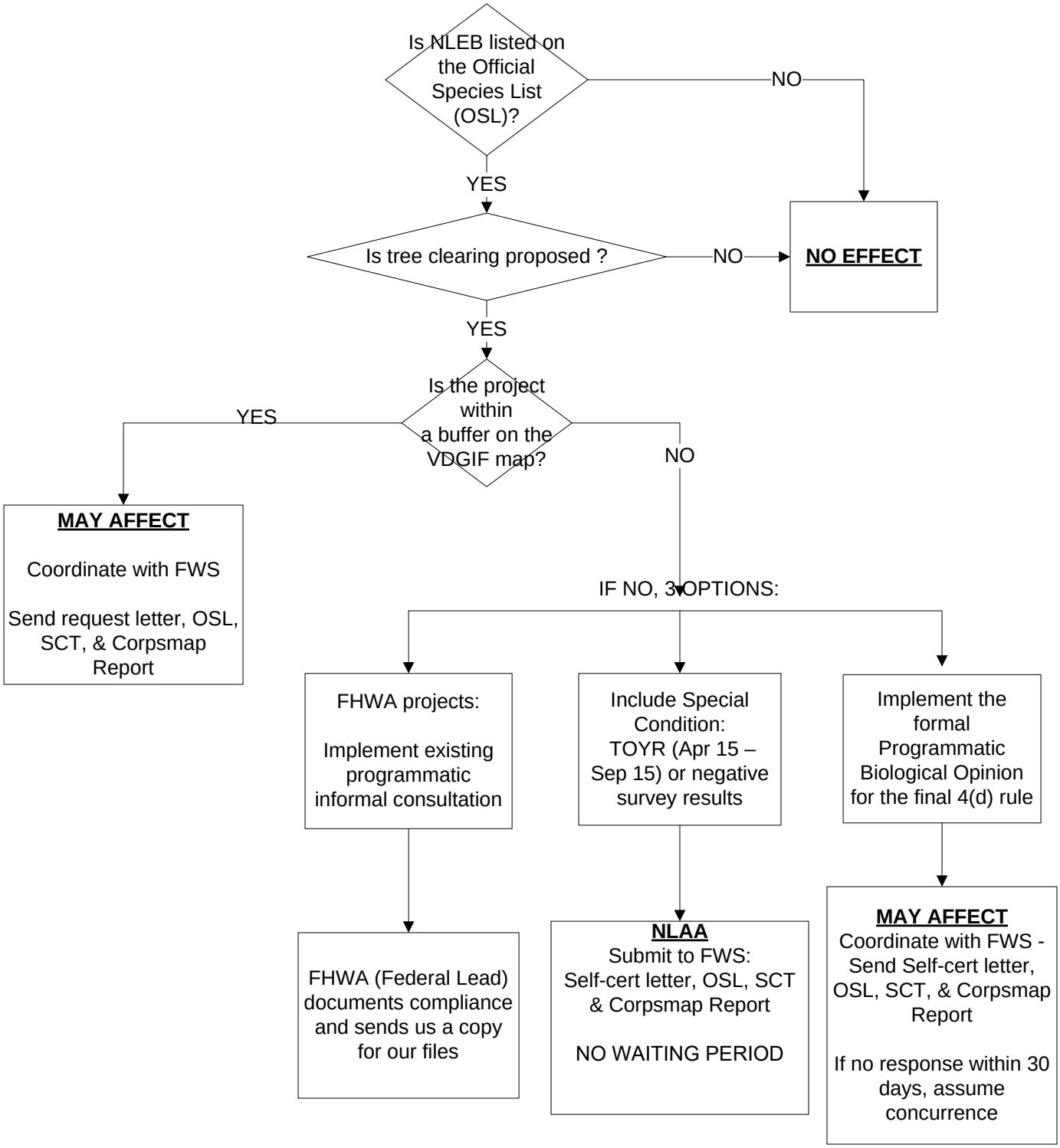
Then you will need to analyze the impacts of the project on anadromous fish and/or EFH as appropriate, including impacts from construction.

PMs should evaluate the impact of the project on EFH/anadromous fish/SAV resources in their decision document to include type, extent and degree of impact and their rationale for requesting either TOYR waiver or compensatory mitigation to offset SAV impacts. For anadromous fish consider type of activity, timing, materials, equipment, noise (ensonification), maximum channelward encroachment, width of water body, etc. For SAV consider type of activity, direct and secondary impacts, anticipated turbidity, species, and recent trends in density, aerial extent and persistence of SAV. Send analysis to David O'Brien, NOAA Fisheries Service (david.l.o'brien@noaa.gov) for review and concurrence.

In most cases where there is a hit for anadromous fish that does not meet the criteria above, a TOYR (February 15 – June 30) will be a special condition of the permit to protect the species. Should an applicant request that the TOYR be removed after you issue the verification, coordinate with NMFS and written concurrence from NMFS is required.

ESA Section 7 Process for Northern Long Eared Bat (NLEB)

Tuesday, March 08, 2016



Send coordination requests to: VirginiaFieldOffice@fws.gov
And include acreage of tree clearing (or number of trees being cleared if very small acreage).

VDGIF Map:
http://dgif-virginia.maps.arcgis.com/apps/webappviewer/index.html?id=32ea4ee4935942c092e41ddcd19e5ec5

NLEB SCT Tables

Species/Resource Name	Conclusion	ESA Section 7/Eagle Act Determination	Note/Documentation
Northern long-eared bat	A documented maternity colony or hibernacula may be in the action area	May affect	

Species/Resource Name	Conclusion	ESA Section 7/Eagle Act Determination	Note/Documentation
Northern long-eared bat	Suitable habitat present	No Effect/Not Likely to Adversely Affect	Implementing a TOYR on tree clearing from April 15 -Sept 15. **OR** Survey conducted and no bats were documented.

Species/Resource Name	Conclusion	ESA Section 7/Eagle Act Determination	Note/Documentation
Northern long-eared bat	Suitable habitat present	May affect	Relying upon the findings of the 1/5/2016 Programmatic Biological Opinion for Final 4(d) Rule on the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions to fulfill our project-specific section 7 responsibilities.

Review project to see if Voluntary Conservation Measures may apply. If so, suggest to applicant.

- NLEB surveys should be done according to the most recent summer survey guidelines.
- Manage forests to ensure a continual supply of snags and other suitable maternity roosts trees.
- Conduct prescribed burns outside of the pup season (June 1-July 31) and/or the active season (April 1-October 31). Avoid high-intensity burns (causing tree scorch higher than NLEB roosting heights) during the summer maternity season.
- Perform bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the NLEB active season (April 15-September 15) in areas where NLEB are known to roost on bridges or where such use is likely.
- Do not use military smoke and obscurants within forested suitable NLEB habitat during the pup season (June 1-July 31) and/or the active season (April 15-September 15).
- Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
- Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.

NMFS CONSULTATION DOCUMENTS

Activities that can be coordinated through this process:

1. Aquaculture (shellfish) and artificial reef creation
2. Routine maintenance dredging and disposal/beach nourishment
3. Piers, ramps, floats, and other structures
4. Transportation and development (e.g., culvert construction, bridge repair)
5. Mitigation (fish/wildlife enhancement or restoration)
6. Bank stabilization and dam maintenance

All other activities will need to be coordinated through the Expedited Review Process.

NOTE: NMFS defines maintenance dredging as any footprint that has been previously dredged, independant of any changes in depth.

NO EFFECT MATRIX REVISED 12 Oct 2017

Use this document as guidance to make a no effect determination for the activities authorized by GPs, LOPs & SPs.

AIDS TO NAVIGATION & TEMPORARY RECREATIONAL STRUCTURES (Section 10; navigable waters of the United States) The placement of aids to navigation and regulatory markers which are approved by and installed in accordance with the requirements of the U.S. Coast Guard (see 33 CFR, chapter I, subchapter C, part 66)

No effect: All GPs, LOPs & SP activities.

REPAIR OR MAINTENANCE OF EXISTING CURRENTLY SERVICEABLE, AUTHORIZED OR GRANDFATHERED STRUCTURES & FILLS, REMOVAL OF STRUCTURES (Section 10 & 404; tidal and non-tidal waters of the U.S.) Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Includes removal of structures and fill.

No effect:

For all SV activities; piles are non-steel and ≤12" in diameter; and work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

For PCN activities in critical habitat provided there is no direct or indirect effects of the action to the feature(s) in the area, ever; piles installed in the dry, or piles are non-steel and ≤12" in diameter; and work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

PMs, for PCN activities, also check ESA PC due to the listed various activities that may occur. When in doubt, use NLAA form.

MOORINGS (Section 10; navigable waters of the U. S.) New private, non-commercial, non-rental, single-boat moorings & temporary moorings including moorings to facilitate construction or dredging; minor relocation of previously authorized moorings and mooring field expansions, boundary reconfigurations or modifications of previously authorized mooring fields and maintenance and replacement of moorings.

No effect: All GPs, LOPs & SP activities except for mooring fields/expansions.

PILE-SUPPORTED STRUCTURES & FLOATS, INCLUDING BOAT LIFTS/HOISTS & OTHER MISCELLANEOUS STRUCTURES & WORK (Section 10; navigable waters of the U.S.) New, expansions, reconfigurations or modifications of structures for navigation access including floats, stairs, and boat/float lifts.

No effect:

1. For activities in critical habitat provided there is no direct or indirect effects of the action to the feature(s) in the area, ever.
2. Piles are installed in the dry or are non-steel and are ≤12" in diameter, and ≤25 piles installed below mean high water.
3. Work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

BOAT RAMPS & MARINE RAILWAYS (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities required for the construction of boat ramps and marine railways, including excavation and fill.

No effect for all SV activities.

UTILITY LINE ACTIVITIES (Sections 10 & 404; tidal & non-tidal waters of the U.S.) Activities required for (a) The construction, maintenance, relocation, repair, & removal of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for utility lines; (b) The construction, maintenance or expansion of utility line substation facilities associated with a power/utility line in non-tidal waters; and (c) The construction and maintenance of foundations for overhead utility line towers, poles, and anchors provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

No effect: Not applicable.

DREDGING (Section 10; navigable waters of the U.S.), TRANSPORT &DISPOSAL OF DREDGED MATERIAL (Sections 10, 404 &103; tidal waters of the U.S.), BEACH NOURISHMENT (Sections 10 & 404; tidal waters of the U.S.); ROCK REMOVAL (Section 10, navigable waters of the U.S.) &ROCK RELOCATION (Sections 10 & 404; tidal waters of the U.S.) New, improvement and maintenance dredging, including: (a) Disposal of dredged material at a confined aquatic disposal, beach nourishment, near shore, designated open water or ocean water disposal site, provided the Corps finds the dredged material to be suitable for such disposal; (b) Beach nourishment not associated with dredging; (c) Rock removal and relocation for navigation.

No effect: SVs not in critical habitat.

SHORELINE & BANK STABILIZATION PROJECTS (Sections 10 & 404; tidal and non-tidal waters of the U.S.) Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, estuarine and ocean waters, and any other open waters. Includes bulkheads, seawalls, riprap, revetments or slope protection & similar structures as well as vegetative planting, soil bioengineering or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection.

No effect:

1. For activities in critical habitat provided there is no direct or indirect effects of the action to the feature(s) in the area, ever.
2. Piles are installed in the dry or are non-steel, are ≤12" in diameter and ≤25 piles installed below mean high water
3. Work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

AQUATIC HABITAT RESTORATION, ESTABLISHMENT & ENHANCEMENT ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities in waters of the U.S. associated with the restoration, enhancement and establishment of non-tidal and tidal wetlands and riparian areas, including invasive, non-native or nuisance species control; the restoration and enhancement of non-tidal streams and other non-tidal open waters; the relocation of non-tidal waters, including non-tidal streams & associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; the restoration and enhancement of shellfish, finfish and wildlife; and the rehabilitation or enhancement of tidal streams, tidal wetlands and tidal open waters; provided those activities result in net increases in aquatic resource functions and services.

No effect:

1. For activities in critical habitat provided there is no direct or indirect effects of the action to the feature(s) in the area, ever.
2. Work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

FISH & WILDLIFE HARVESTING ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities in waters of the U.S. associated with fish and wildlife harvesting devices including pound nets, crab traps, crab dredging, eel pots, lobster traps, duck blinds, and clam and oyster digging, fish aggregating devices, and small fish attraction devices such as open water fish concentrators (sea kites, etc.).

No effect:

For all SV activities.

For PCN activities:

1. For activities in critical habitat provided there is no direct or indirect effects of the action to the feature(s) in the area, ever.
2. Work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

OIL SPILL & HAZARDOUS MATERIAL CLEANUP (Sections 10 and 404; tidal and non-tidal waters of the U.S.): a. Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided activities are done under either (i) The Spill Prevent, Control & Countermeasure Plan require by 40 CFR 112.3; (ii) The direction or oversight of the Federal on-site coordinator designated by 40 CFR 300; or (iii) Any approved existing State, regional or local contingency plan provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort. b. Activities required for the cleanup of oil releases in waters of the U.S. from electrical equipment that are governed by EPA's polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761. c. Booms placed in tidal waters. d. Use of structures & fills for spill response training exercises.

No effect: All SV activities.

NLAA Verification Form: Required for all PCN activities.

CLEANUP OF HAZARDOUS & TOXIC WASTE (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority. Special Aquatic Sites must be restored in place to pre-impact elevations.

No effect: All SV activities provided no work in proposed or designated critical habitat.

NLAA Verification Form: Required for all PCN activities.

SCIENTIFIC MEASUREMENT DEVICES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Scientific devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small temporary weirs and flumes constructed primarily to record water quantity and velocity provided the discharge is less than 25 cubic yards.

No effect: All SV activities.

NLAA Verification Form: Required for all PCN activities.

SURVEY ACTIVITIES (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes and other exploratory-type bore holes, exploratory trenching* and historic resources surveys.

No effect: All GP, LOP & SP activities except for exploratory trenching or seismic exploratory operations that occur when ESA-listed species may be present.

AQUACULTURE PROJECTS & FISHERIES (Sections 10 and 404; navigable waters of the U.S.) The installation of buoys, floats, racks, trays, nets, lines or other structures in navigable waters for the containment and cultivation of indigenous species of shellfish and seaweed/kelp. Also authorized are anchored upweller floats, small-scale shellfish hatchery seawater intake/discharge structures, and discharges of dredged or fill material associated with cultivation such as the placement of cultch or spatted-shell on bottom.

No effect:

1. Project meets all of the General Project Design Criteria (PDC)
2. Floating upweller docks in ≤10 feet MLLW with or without piles, provided piles are non-steel and ≤12”
3. Land-based hatchery intake provided pipe diameter ≤3”

LINEAR TRANSPORTATION PROJECTS (Sections 10 and 404; tidal and non-tidal waters of the U.S.) Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways) and attendant features.

No effect: Not applicable.

NLAA Verification Form: All GP, LOP & SP activities.

ENERGY GENERATION & RENEWABLE ENERGY GENERATION FACILITIES (Sections 10 and 404; tidal waters of the U.S.) & HYDROPOWER PROJECTS (Sections 10 and 404; tidal waters of the U.S.) Structures and work in navigable waters of the U.S. and discharges of dredged or fill material into tidal waters of the U.S. for the construction, expansion, modification or removal of: (a) Land-based renewable energy production facilities, including attendant features; (b) Water-based wind or hydrokinetic renewable energy generation pilot projects and their attendant features; and (c) Discharges of dredged or fill material associated with hydropower projects. Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in (b) above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable waters of the U.S

No effect: Not applicable.

NLAA Verification Form: All GP, LOP & SP activities.

TEMPORARY FILL NOT ASSOCIATED WITH ANY OTHER GP ACTIVITES (Sections 10 and 404; tidal waters of the U.S.) Temporary discharges, such as sandbag/earth cofferdams, access fills, etc., necessary for construction activities or dewatering of construction sites.

No effect:

1. For activities in critical habitat provided there is no direct or indirect effects of the action to the feature(s) in the area, ever.
2. Work behind cofferdams, turbidity curtains, or other methods to control turbidity when operationally feasible and ESA-listed species may be present.

Standard Operating Procedures (SOPs) for the NMFS GARFO PRD-USACE NAD 2017 NLAA Program

The 2017 NMFS GARFO PRD-USACE NAD 2017 NLAA Program ("2017 NLAA Program") represents an interagency effort to streamline ESA consultation for routine, non-controversial projects that are not likely to adversely affect (NLAA) ESA-listed species or critical habitat. The 2017 NLAA Program does not address whether or not certain activity categories or stressor levels will have no effect on listed species or critical habitat (this remains under the discretion of individual NAD Districts). The purpose of the 2017 NLAA Program is to determine which activity categories and associated stressor thresholds provide a project's eligibility for processing under the Program's streamlined verification form. Those which are ineligible require individual section 7 consultation (informal or formal, depending on whether the proposed work will likely adversely affect listed species or habitat).

I. Is my project eligible for review under the 2017 NLAA Program?

a. USACE project managers will screen applications for the potential presence of NMFS ESA-listed species and critical habitat in the project's **action area**. The best available information on the distribution (geographic and temporal), life stages, and behaviors of NMFS-ESA listed species, as well as the physical and biological features (PBFs) of critical habitat is found here (check both the maps and species tables):

https://www.greateratlantic.fisheries.noaa.gov/protected/section7/listing/index.html

As of March 2017, NMFS is in the process of creating new GIS-species and habitat layers that will be hosted on an online web portal. Once available, NMFS will alert USACE. If project managers are in doubt about whether or not ESA-listed species or critical habitat overlap with the action area, they will contact a NMFS Section 7 Biologist and request technical assistance (i.e., make a phone call, send an informal email).

https://www.greateratlantic.fisheries.noaa.gov/protected/section7/contactus/index.html

b. If the project manager determines that a project will have **no effect** on ESA-listed species or critical habitat, no ESA consultation is needed, and no documentation should be sent to NMFS.

c. If the project manager determines that a project may affect, but is not likely to adversely affect (**NLAA**) ESA-listed species or critical habitat (i.e., the project's effects are **insignificant**, **discountable**, or **wholly beneficial**), it may be eligible for review under the 2017 NLAA Program. To determine project eligibility, the project manager must check to see whether or not the application meets (or could meet with the appropriate permit conditions) all of the project design criteria (PDC) outlined in the 2017 NLAA Program. There are general PDC that apply to all NLAA projects, and there are "stressor specific" PDC, that apply to projects that have the potential to introduce those stressors into action

area.

The 2017 NLAA Program Verification Form lists all of the PDC and includes a table to show which stressors may apply to which activity types. If the project meets all of the applicable PDC, it is eligible for review under the 2017 NLAA Program. If the project does not meet all of the applicable PDC, but the project manager still believes the project should be eligible for review using the form (e.g., the project does not introduce any stressors outside of those considered in the 2017 NLAA Program, but it occurs during a time of year restriction), the project manager should indicate which PDC it violates, and then provide a justification for each violated PDC at the bottom of the form. Examples of acceptable justifications include additional permit conditions, such as observer coverage, or temperature/salinity monitoring.

If the project does not meet all of the PDC and either introduces a stressor not considered under the 2017 NLAA Program and/or the project manager cannot provide proper justification for why the project violates PDC but should still be reviewed under the program, the project manager must submit to NMFS a request for individual informal (or formal, if necessary) consultation following this guidance:

http://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/index.html

II. Interpreting the 2017 NLAA Program PDC

a. Connecting Activities to Stressors and Associated PDC:

On the Verification Form, project managers will find a total of 32 PDC. There are 11 General PDC, which apply to all projects, and then there are PDC for six stressor categories.

The 2017 NLAA Program identifies the following six activity categories and stressors (see table below). Project managers should use the table to decide which stressor specific PDC are applicable to their project in addition to the general PDC. For example, for a maintenance dredging project, the project manager would want to look at the following PDC categories: a) general; b) impingement/entrapment/capture; c) turbidity/sedimentation; d) vessel traffic; and e) habitat modification.

	Stressor Category					
Activity Category	Entanglement	Sound Pressure	Impingement/ Entrapment/ Capture	Turbidity/ Sedimentation	Vessel Traffic	Habitat Mod.
Aquaculture (shellfish) and	Y	N	N	Y	Y	Y

artificial reef creation						
Routine maintenance dredging and disposal/beach nourishment	N	N	Y	Y	Y	Y
Piers, ramps, floats, and other structures	N	Y	N	Y	Y	Y
Transportation and development (e.g., culvert construction, bridge repair)	N	Y	N	Y	Y	Y
Mitigation (fish/wildlife enhancement or restoration)	N	N	N	Y	Y	Y
Bank stabilization and dam maintenance	N	Y	N	Y	Y	Y

b. Guidance on General PDC

1. No work will individually or cumulatively have an adverse effect on ESA-listed species or designated critical habitat; no work will cause adverse modification or destruction to proposed critical habitat.
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation
2. No work will occur in the tidally influenced portion of rivers/streams where Atlantic salmon presence is possible from April 10–November 7.
    a. **Yes** – project is eligible. To determine if your project overlaps with possible Atlantic salmon presence in rivers/streams, see the NMFS maps/species tables. If the project is in coastal/marine waters (i.e., outside of a river/river estuary, this PDC does not apply.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
3. **No** work will occur in Atlantic or shortnose sturgeon spawning grounds during the time of year (TOY) restriction for your District:

a. **Yes** – project is eligible. To determine if your project overlaps with possible sturgeon spawning grounds, see the NMFS maps/species tables. If the project is in coastal/marine waters (i.e., outside of a river, this PDC does not apply.
b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

4. No work will occur in shortnose sturgeon overwintering grounds during the TOY restriction for your District.
    a. **Yes** – project is eligible. To determine if your project overlaps with possible shortnose sturgeon overwintering grounds, see the NMFS maps/species tables. If the project is in coastal/marine waters (i.e., outside of a river, this PDC does not apply.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
5. Within designated Atlantic salmon critical habitat, no work will effect spawning and rearing areas.
    a. **Yes** – project is eligible. To determine if your project has the potential to effect Atlantic salmon critical habitat, first look to see if your project is in Atlantic sturgeon critical habitat (check NMFS map). Next, review PBFs 1-7 in Table 4**Error! Reference source not found.**. If still uncertain, seek technical assistance from a NMFS Section 7 biologist. If the project is in coastal/marine waters (i.e., outside of a river, this PDC does not apply.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
6. Within proposed/designated Atlantic sturgeon critical habitat, no work will affect hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0-0.5 parts per thousand).
    a. **Yes** – project is eligible. To determine if your project has the potential to affect Atlantic sturgeon critical habitat, first look to see if your project is in Atlantic sturgeon critical habitat (check NMFS map). Next, review PBF 1 in Table 3**Error! Reference source not found.**. If still uncertain, seek technical assistance from a NMFS Section 7 biologist. If the project is in coastal/marine waters (i.e., outside of a river/estuary, this PDC does not apply.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
7. Work will not change temperature, water flow, salinity, or dissolved oxygen levels.
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

8. If it is possible for ESA-listed species to pass through the action area, a zone of passage with appropriate habitat for ESA-listed species (e.g., depth, water velocity, etc.) must be maintained (i.e., physical or biological stressors such as turbidity and sound pressure must not create barrier to passage).
    a. **Yes** – project is eligible. To determine if your project will maintain passage with appropriate habitat for ESA-listed species, consider the distance an animal would have to travel to avoid the sound pressure or turbidity plume associated with your project. After avoiding the sound pressure waves or turbidity plume, make sure there is still a zone of passage with suitable habitat (sufficient width, depth, water velocity, etc.) available for the species' passage. This is particularly important in rivers and streams. You may need to use the NMFS acoustic tool or reference the NMFS website for turbidity plume estimates (both found here: https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/index.html). If uncertain, seek technical assistance from NMFS Section 7 Biologist.

        Include support for your determination that passage is maintained on the verification form: provide the water body width and the max extent of the stressor (e.g., turbidity plume, sound pressure wave). See **PDC 14** & **20** for further guidance.

    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
9. Any work in designated North Atlantic right whale critical habitat must have no effect on the physical and biological features (PBFs).
    a. **Yes** – project is eligible. To determine if your project has the potential to affect any of the PBFs of North Atlantic right whale critical habitat, first look to see if your project is in critical habitat (check NMFS map). Next, see PBFs in Table 5**Error! Reference source not found.**. If still uncertain, seek technical assistance from a NMFS Section 7 biologist. If the project is in a river or stream, this PDC does not apply.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
10. The project will not adversely impact any submerged aquatic vegetation (SAV).
    a. **Yes** – project is eligible. You may need to provide documentation showing that **No** SAV is present.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
11. No blasting will occur.
    a. **Yes** – project is eligible.

b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

c. Guidance on Sound Pressure PDC

12. If the pile driving is occurring during a time of year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold of those species, a 20 minute "soft start" is required to allow for animals to leave the project vicinity before sound pressure increases.
    a. **Yes** – project is eligible. To determine if ESA-listed species may be present, refer to the NMFS maps/species tables.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
13. Any new pile supported structure must involve the installation of ≤ 50 piles (below MHW).
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
14. If the project involves steel piles, or non-steel piles greater than (>) 24-inches in diameter/width, or any other noise-producing mechanism, the expected underwater noise (pressure) must be below (<) the physiological/injury noise threshold for ESA-species in the action area.
    a. **Yes** – project is eligible.

    NON-STEEL or STEEL SHEET PILES
    ≤ 24" in DIAMETER/WIDTH:
    If your project only involves non-steel piles (or steel sheet piles) ≤ 24-inches in diameter/width, then your project meets this PDC (see Note below if your project's action area includes ESA-listed whales).

    Here are the estimated distances to sturgeon/salmon sea turtle injury and behavioral thresholds for piles in this category (to show compliance with **PDC 8**):

Table 1: Estimated Distances to Sturgeon/Salmon/Sea Turtle Injury & Behavioral Thresholds (non-steel piles and steel sheet piles ≤ 24")

Diameter and Type of Pile	Hammer Type	Sturgeon/Salmon Thresholds			Sea Turtle Thresholds	
		Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to sSEL of 150 dB (surrogate for 187 dBcSEL injury)	Distance (m) to 166 dBRMS (behavior)	Distance (m) to 180 dB RMS (injury)
16-20" Timber	Impact	40.0	NA	NA	NA	NA
16-20" Timber	Vibratory	20.0	NA	NA	NA	NA
24" Concrete	Impact	50.0	NA	30.0	NA	NA
24" Concrete	Vibratory	30.0	NA	10.0	18.0	NA
24" Steel Sheet	Impact	90.0	NA	70.0	58.0	30.0
24" Steel Sheet	Vibratory	40.0	NA	40.0	NA	NA

STEEL or NON-STEEL/STEEL SHEET PILES > 24" in DIAMETER/WIDTH:

If your project involves steel piles (any size), or non-steel piles/steel sheet piles > 24-inches in diameter/width, you must provide a sound pressure (noise) estimate for the installation of the piles. NMFS GARFO has an acoustics tool with noise estimates for a variety of pile types, sizes, and installation methods:

https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/index.html

You can use this or another credible noise estimate. If you can show that the underwater noise will be below (<) the physiological/injury noise threshold for ESA-species in the action area (thresholds are in the NMFS GARFO tool), your project meets **PDC 14**. You should submit documentation to support your findings (e.g., the completed tables from the NMFS GARFO acoustics tool) along with your verification form. Remember to also use the estimated distances to ESA-listed species behavior thresholds for **PDC 8**.

NOTE: If ESA-listed whales may be in your action area, you'll need to use two tools to estimate the impacts of underwater noise. Coordinating with a NMFS Section 7 biologist is recommended.

1) For Injury:
http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm
2) For Behavior:
https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/index.html

b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

d. Guidance on Impingement/Entrapment/Capture PDC

15. Only mechanical, cutterhead, and low volume hopper (e.g., CURRITUCK) dredges may be used. Check time of year windows for each District.
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification for the PDC violation on the form.
16. **No** new dredging in proposed or designated Atlantic sturgeon or Atlantic salmon critical habitat (maintenance dredging still must meet all other PDC). New dredging outside Atlantic sturgeon or salmon critical habitat is limited to one-time dredge events (e.g., burying a utility line) and minor (≤2 acres) expansions of areas already subject to maintenance dredging (e.g., marina/harbor expansion).
    a. **Yes** – project is eligible. To determine if your project overlaps with Atlantic sturgeon or salmon critical habitat, see the NMFS maps/species tables.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

17. Work behind cofferdams, turbidity curtains, and other methods to block access of animals to dredge footprint is required when operationally feasible and ESA-listed species may be present.
    a. **Yes** – project is eligible. If the project manager determines that cofferdams, turbidity curtains, and other methods to block access of animals from the dredge footprint are not operationally feasible, she/he should be prepared to submit a written justification along with the verification form.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
18. Temporary intakes related to construction must be equipped with appropriate sized mesh screening (as determined by NMFS Section 7 biologist) and must not have greater than 0.5 fps intake velocities, to prevent impingement or entrainment of any ESA-listed species life stage.
    a. **Yes** – project is eligible. Coordinate with a NMFS Section 7 biologist to determine appropriate size of mesh screening (depends on species/life stages present in the action area).
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
19. No new permanent intake structures related to cooling water, or any other inflow at facilities (e.g. water treatment plants, power plants, etc.).
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

e. Guidance on Turbidity/Water Quality PDC

20. Work behind cofferdams, turbidity curtains, or other methods to control turbidity are required when operationally feasible and ESA-listed species may be present.
    a. **Yes** – project is eligible. If the project manager determines that cofferdams, turbidity curtains, and other methods to block access of animals from the turbidity plume are not operationally feasible, she/he should be prepared to submit a written justification along with the verification form.

       For compliance with **PDC 8**, you must also provide an estimate for the max extent of the turbidity plume and show that there will still be a zone of passage through the water body where the action is taking place. Turbidity estimates can be found here: https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/consultation/index.html

b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

21. In-water offshore disposal may only occur at designated disposal sites that have already been consulted on with NMFS.
    a. **Yes** – project is eligible. If the project manager is uncertain whether or not the proposed offshore disposal site as an existing consultation with NMFS, contact a NMFS Section 7 biologist. If the project will dispose of dredged material at a site with an existing NMFS consultation, all of the permit conditions from that existing consultation must be used in the permit (e.g., observer/designated lookout, vessel speed limits, TOYs, etc.).
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
22. Any temporary discharges must meet state water quality standards; no discharges of toxic substances.
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
23. Only repair of existing discharge pipes allowed; no new construction.
    a. **Yes** – project is eligible. The completed repair/replacement of an existing discharge pipe must maintain or improve current water quality conditions around the pipe.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

f. Guidance on Entanglement PDC

24. Shell on bottom <50 acres with maximum of 4 corner marker buoys.
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
25. Cage on bottom with no loose floating lines <5 acres and minimal vertical lines (1 per string of cages).
    a. **Yes** – project is eligible. If the project manager is uncertain whether or not the project design meets the "no loose floating line" criteria, ask a NMFS Section 7 biologist for technical assistance. Generally, lines should be taught, or other methods should be promoted to achieve rigidity (e.g., sheathed or weighted line).
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
26. Floating cages <3 acres and in waters shallower than -10 feet MLLW with no loose lines and minimal vertical lines (1 per string of cages).

a. **Yes** – project is eligible. If the project manager is uncertain whether or not the project design meets the "no loose floating line" criteria, ask a NMFS Section 7 biologist for technical assistance.
b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

27. Floating upweller docks in >10 feet MLLW
    a. **Yes** – project is eligible.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

g. Guidance on Habitat Modification PDC

28. No conversion of habitat type (soft bottom to hard, or vice versa) for aquaculture or reef creation
    a. **Yes** – project is eligible. If the project manager is uncertain whether or not the proposed project constitutes a habitat conversion, ask a NMFS Section 7 biologist for technical assistance.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

h. Guidance on Vessel Traffic PDC

29. Speed limits below 10 knots for project vessels with buffers of 150 feet for all listed species (1,500 feet for right whales).
    a. **Yes** – project is eligible. If the project manager is uncertain whether or not ESA-listed whales will occur in the action area, review the NMFS maps/species tables. If whales will be present, a permit condition requiring observers or designated lookouts will be necessary to ensure this PDC is met.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
30. While dredging, dredge buffers of 300 feet in the vicinity of any listed species (1,500 feet for right whales), with speeds of 4 knots maximum.
    a. **Yes** – project is eligible. If the project manager is uncertain whether or not ESA-listed whales will occur in the action area, review the NMFS maps/species tables. If whales will be present, a permit condition requiring observers or designated lookouts will be necessary to ensure this PDC is met.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.
31. The number of project vessels must be limited to the greatest extent possible, as

appropriate to size and scale of project.

a. **Yes** – project is eligible. When reviewing projects, ensure that project vessels and the number of trips taken (e.g., dredged material disposal) are limited to the greatest extent possible.
b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

32. A project must not result in the permanent net increase of commercial vessels (e.g., a ferry terminal). The permanent net increase in vessels resulting from a residential project (e.g., dock/float/pier) must not exceed two vessels.
    a. **Yes** – project is eligible. The phrase "net increase" is key here. E.g., if the project involves the reconstruction of an existing pier with 12 slips, as long as the replacement pier has ≤ 14 slips, and no new commercial vessels will be using the pier, the project meets this PDC.
    b. **No** – project will require individual consultation unless the project manager can provide proper justification on the form.

III. Monitoring

As outlined in the 2017 NLAA Program (both in the USACE Biological Assessment and NMFS Programmatic Consultation), USACE will provide an annual monitoring report to NMFS by March 1 of each year. This report should capture all of the projects USACE submitted for ESA Section 7 review under the 2017 NLAA Program in the previous calendar year. A summary table within the report should show the number of projects, by NAD District, for each activity category. Additional data on cumulative effects (e.g., habitat modification, aquaculture leases, and vessel traffic) should be provided to the extent that this information is captured in ORM.

IV. ESA Glossary

Action area: "All areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50CFR§402.02). This includes the project's footprint as well as the area beyond it that may experience direct or indirect effects that would not occur but for the action. For more information on how to determine the scope of the action area, please consult the definition of "effects of the action" (50 CFR §402.02).

Discountable In order to determine that effects of a particular project will be "discountable," you must be able to demonstrate that the effects cannot be meaningfully detected, measured, or evaluated, and will never reach the scale where "take" will occur (i.e., insignificant effects relate to the magnitude of the impact).

Insignificant In order to determine that effects of a particular project will be "insignificant," you must be able to demonstrate that the effects are extremely unlikely to occur (i.e., discountable effects relate to the likelihood of the impact).

NLAA Informal consultation: the action agency determines that an action may affect, but is not likely to adversely affect listed species or critical habitat. A "May Affect, but Not Likely to Adversely Affect" (NLAA) determination is based on a determination that effects are insignificant, discountable, or wholly beneficial as those terms are defined in the FWS-NMFS Joint Section 7 Consultation Handbook.

No Effect There will be no direct or indirect effects to listed species or critical habitat from the proposed action. USACE does not need to contact NMFS for consultation.

Wholly Beneficial In order to determine that effects of a particular project will be "insignificant," you must be able to demonstrate that the effects are wholly positive, without any adverse effects, on a listed species or designated critical habitat.

V. Appendix: ESA-Listed Species and Critical Habitat

NOTE: the info below may be outdated. For the most up-to-date information, visit the NMFS GARFO website at:

https://www.greateratlantic.fisheries.noaa.gov/protected/section7/guidance/maps/index.html

Table 2: NMFS ESA-Listed Species and Critical Habitat in the Action Area

Species ES	A Status	Expected Life Stages	Expected Behaviors	Expected TOY	Listing Rule/Date	Most Recent recovery plan date	Affect determin ation
North Atlantic Right Whale	E	Adults; Juveniles	Foraging; Wintering; Migrating	Year round (greatest densities January to April)	73 FR 12024	NMFS 2005	NLAA
Fin Whale	E	Adults; Juveniles	Foraging; Wintering; Migrating; Calving	Year round	35 FR 18319	NMFS 2010	NLAA
Kemp's Ridley Sea Turtle	E	Juveniles	Foraging; Migrating	May to November	35 FR 18319	NMFS *et al.* 2011	NLAA
Leatherback Sea Turtle	E	Adults; Juveniles	Foraging; Migrating	May to November	35 FR 849	NMFS & USFWS 1992	NLAA
Loggerhead Sea Turtle; Northwest Atlantic DPS	T	Adults; Subdults; Pelagic/ benthic juveniles	Foraging; Migrating	May to November	76 FR 58868	NMFS & USFWS 2008	NLAA
Green Sea Turtle; North Atlantic DPS	T	Adults; Juveniles	Foraging; Migrating	May to November	81 FR 20057	NMFS & USFWS 1991	NLAA

Atlantic sturgeon (all 5 DPSs)	E (GOM) T (four others)	All life stages (eggs to adults)	Spawning and Rearing (specific rivers); Foraging; Overwintering; Migrating	Year round	77 FR 5880 and 77 FR 5914	N/A	NLAA
Shortnose sturgeon	E All	life stages (eggs to adults)	Spawning and Rearing (specific rivers);; Foraging; Overwintering; Migrating	Year round	32 FR 4001	NMFS 1998	NLAA
Atlantic salmon; Gulf of Maine DPS[1]	E All	life stages (eggs to adults)	Foraging, Migrating, Spawning, Rearing, Overwintering	April to November (marine/estuarine areas); Year round (freshwater areas)	74 FR 29344	NMFS & USFWS 2016	NLAA

Table 3: PBFs for Proposed Atlantic Sturgeon Critical Habitat

1.	Hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0-0.5 parts per thousand range) for settlement of fertilized eggs, refuge, growth, and development of early life stages;
2.	Aquatic habitat with a gradual downstream salinity gradient of 0.5-30 parts per thousand and soft substrate (e.g., sand, mud) downriver of spawning sites for juvenile foraging and physiological development.
3.	Water of appropriate depth absent physical barriers to passage (e.g., locks, dams, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support: (1) unimpeded movements of spawning adults to and from spawning sites; (2) as well as seasonal and physiologically-dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; (3) staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (e.g., ≥1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river;
4.	Water, especially in the bottom meter of the water column, with the temperature, salinity, and oxygen values that, combined, support: (1) spawning; (2) annual and interannual adult, subadult, larval, and juvenile survival; and (3) larval, juvenile, and subadult growth, development, and recruitment (e.g., 13°C to 26° C for spawning habitat and **No** more than 30° C for juvenile rearing habitat and 6 mg/L dissolved oxygen for juvenile rearing habitat)

[1] The U.S. Fish and Wildlife Service (USFWS) has jurisdiction of Atlantic salmon in the freshwater portion of its range (except for work on hydropower dams), while NMFS has jurisdiction of Atlantic salmon in tidal and marine portions of its range.

Table 4: PBFs for Atlantic Salmon (GOM DPS) Critical Habitat

	Spawning and Rearing Critical Habitat
1.	Deep, oxygenated pools and cover (e.g., boulders, woody debris, vegetation) near freshwater spawning sites necessary to support adult migrants during the summer while they await spawning in the fall.
2.	Freshwater spawning sites that contain clean, permeable gravel and cobble substrate with oxygenated water and cool water temperatures to support spawning activity, egg incubation, and larval development.
3.	Freshwater spawning and rearing sites with clean, permeable gravel and cobble substrate with oxygenated water and cool water temperatures to support emergence, territorial development, and feeding activities of Atlantic salmon fry.
4.	Freshwater rearing sites with space to accommodate growth and survival of Atlantic salmon parr.
5.	Freshwater rearing sites with a combination of river, stream, and lake habitats that accommodate Atlantic salmon parrs' ability to occupy many niches and maximize parr production.
6.	Freshwater rearing sites with cool, oxygenated water to support growth and survival of Atlantic salmon parr.
7.	Freshwater rearing sites with diverse food resources to support growth and survival of Atlantic salmon parr.
	Migration Critical Habitat
8.	Freshwater and estuary migratory sites free from physical and biological barriers that delay or prevent access of adult salmon seeking spawning grounds needed to support recovered populations;
9.	Freshwater and estuary migration sites with abundant, diverse native fish communities to serve as a protective buffer against predation; and
10.	Freshwater and estuary migration sites free from physical and biological barriers that delay or prevent emigration of smolts to the marine environment.

Table 5: PBFs for North Atlantic Right Whale Critical Habitat

1.	The physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate *Calanus finmarchicus* for right whale foraging, namely prevailing currents and circulation patterns, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes;
2.	Low flow velocities in Jordan, Wilkinson, and Georges Basins that allow diapausing *C. finmarchicus* to aggregate passively below the convective layer so that the copepods are retained in the basins;
3.	Late stage *C. finmarchicus* in dense aggregations in the Gulf of Maine and Georges Bank region;
4.	Diapausing *C. finmarchicus* in aggregations in the Gulf of Maine and Georges Bank region.

NOAA FISHERIES
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Greater Atlantic Region

US Army Corps of Engineers ®

GARFO ESA Section 7: 2017 NLAA Program Verification Form

Submit this verification form and supporting documents to nmfs.gar.esa.section7@noaa.gov. Please put 2017 NLAA Program, the permit number, and a brief project title in the subject line.

Section 1: General Project Details

Application Number:	
Applicant(s):	
Permit Type (e.g. NWP, LOP, RGP, IP, Permit Modification):	
Anticipated project duration (e.g., start/end date of construction/permit duration)	

Project Type/Category (check all that apply to entire action):

☐	Aquaculture (shellfish) and artificial reef creation	☐	Transportation and development (e.g., culvert construction, bridge repair)
☐	Routine maintenance dredging and disposal/beach nourishment	☐	Mitigation (fish/wildlife enhancement or restoration)
☐	Piers, ramps, floats, and other structures	☐	Bank stabilization and dam maintenance
☐	If other, describe project type/category:		

Project/Action Description and Purpose:

Total area of habitat modification (acres) by habitat type (e.g., 2.5 acres sand; 3 acres silt/mud, 0.25 acres cobble):	
Project Latitude (e.g., 42.625884)	

Project Longitude (e.g., -70.646114)	

Section 2: ESA-listed species and/or critical habitat in the action area:

☐	Atlantic sturgeon (all DPSs) If not all DPSs, list which here:	☐	Kemp's ridley sea turtle
☐	Atlantic sturgeon critical habitat (proposed or designated) (GOM, NYB, Chesapeake Bay DPSs)	☐	Loggerhead sea turtle (NW Atlantic DPS)
☐	Shortnose sturgeon	☐	Leatherback sea turtle
☐	Atlantic salmon (GOM DPS)	☐	Right whale (N. Atlantic DPS)
☐	Atlantic salmon critical habitat (GOM DPS)	☐	Right whale critical habitat (N. Atlantic DPS)
☐	Green sea turtle (N. Atlantic DPS)	☐	Fin whale

Section 3: NLAA Determination (check all applicable fields):

a) GENERAL PDC		
☐	Yes, my project meets all of the General PDC (justification for PDC 8, below) Width of water body in action area (m): Max extent (m) of activity stressor into water body: (e.g., turbidity plume, sound pressure wave)	
☐	No, my project does not meet all the General PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	
☐	1.	No work will individually or cumulatively have an adverse affect on ESA-listed species or designated critical habitat; no work will cause adverse modification or destruction to proposed critical habitat.
☐	2.	No work will occur in the tidally influenced portion of rivers/streams where Atlantic salmon presence is possible from April 10–November 7.
☐	3.	No work will occur in Atlantic or shortnose sturgeon spawning grounds as follows: i. New England: April 1–Aug. 31 ii. New York/Philadelphia: March 15–August 31 iii. Baltimore/Norfolk: March 15–July 1 and Sept. 15–Nov. 1
☐	4.	No work will occur in shortnose sturgeon overwintering grounds as follows: i. New England District: October 15–April 30 ii. New York/Philadelphia: Nov. 1–March 15

		iii. Baltimore: Nov. 1–March 15
☐	5.	Within designated Atlantic salmon critical habitat, no work will affect spawning and rearing areas (PBFs 1-7).
☐	6.	Within proposed/designated Atlantic sturgeon critical habitat, no work will affect hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0.0-0.5 parts per thousand) (PBF 1).
☐	7.	Work will not change temperature, water flow, salinity, or dissolved oxygen levels.
☐	8.	If it is possible for ESA-listed species to pass through the action area, a zone of passage with appropriate habitat for ESA-listed species (e.g., depth, water velocity, etc.) must be maintained (i.e., physical or biological stressors such as turbidity and sound pressure must not create barrier to passage).
☐	9.	Any work in designated North Atlantic right whale critical habitat must have no effect on the physical and biological features (PBFs).
☐	10.	The project will not adversely impact any submerged aquatic vegetation (SAV).
☐	11.	No blasting will occur.

b) The following stressors are applicable to the action (check all that apply—use table for guidance):	
☐	Sound Pressure
☐	Impingement/Entrapment/Capture
☐	Turbidity/Water Quality
☐	Entanglement
☐	Habitat Modification
☐	Vessel Traffic

	Stressor Category					
Activity Category	Entanglement	Sound Pressure	Impingement/ Entrapment/ Capture	Turbidity/ Sedimentation	Vessel Traffic	Habitat Mod.
Aquaculture (shellfish) and artificial reef creation	Y	N	N	Y	Y	Y
Routine maintenance dredging and disposal/beach nourishment	N	N	Y	Y	Y	Y
Piers, ramps, floats, and other	Y	Y	N	Y	Y	Y

structures						
Transportation and development (e.g., culvert construction, bridge repair)	N	Y	N	Y	Y	Y
Mitigation (fish/wildlife enhancement or restoration)	N	N	N	Y	Y	Y
Bank stabilization and dam maintenance	N	Y	N	Y	Y	Y

c) SOUND PRESSURE PDC		
☐	Yes, my project meets all of the Sound Pressure PDC below (attach analysis for PDC 14 if necessary). Please indicate the number, type(s), and diameter(s)/width(s) of all piles (e.g., 10-16" steel pipe piles; 20-14" timber piles): Please indicate the installation method (e.g., impact hammer, vibratory hammer):	
☐	No, my project does not meet all the Sound Pressure PDC as indicated below. (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	
☐	12.	If the pile driving is occurring during a time of year when ESA-listed species may be present, and the anticipated noise is above the behavioral noise threshold of those species (please see SOPs), a 20 minute "soft start" is required to allow for animals to leave the project vicinity before sound pressure increases.
☐	13.	Any new pile supported structure must involve the installation of ≤ 50 piles (below MHW).
☐	14.	The project involves non-steel piles (or steel sheet piles) less than (≤) 24-inches in diameter (or width) and all underwater noise (pressure) is below (<) the physiological/injury noise threshold for ESA-species in the action area.
d) IMPINGEMENT/ENTRAINMENT/CAPTURE PDC		
☐	Yes, my project meets all of the Impingement/Entrainment/Capture PDC below. Please indicate mesh size for PDC 18 here:	
☐	No, my project does not meet all the Impingement/Entrainment/Capture PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	

☐	15.	Only mechanical, cutterhead, and low volume hopper (e.g., CURRITUCK) dredges may be used.
☐	16.	No new dredging in proposed or designated Atlantic sturgeon or Atlantic salmon critical habitat (maintenance dredging still must meet all other PDCs). New dredging outside Atlantic sturgeon or salmon critical habitat is limited to one time dredge events (e.g., burying a utility line) and minor (≤ 2 acres) expansions of areas already subject to maintenance dredging (e.g., marina/harbor expansion).
☐	17.	Work behind cofferdams, turbidity curtains, and other methods to block access of animals to dredge footprint is required when operationally feasible and ESA-listed species may be present.
☐	18.	Temporary intakes related to construction must be equipped with appropriate sized mesh screening (as determined by GARFO section 7 biologist and/or according to Chapter 11 of the NOAA Fisheries Anadromous Salmonid Passage Facility Design) and must not have greater than 0.5 fps intake velocities, to prevent impingement or entrainment of any ESA-listed species life stage.
☐	19.	No new permanent intake structures related to cooling water, or any other inflow at facilities (e.g. water treatment plants, power plants, etc.).
e) TURBIDITY/WATER QUALITY PDC		
☐	Yes, my project meets all of the Turbidity/Water Quality PDC below.	
☐	No, my project does not meet all the Turbidity/Water Quality PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	
☐	20.	Work behind cofferdams, turbidity curtains, or other methods to control turbidity are required when operationally feasible and ESA-listed species may be present.
☐	21.	In-water offshore disposal may only occur at designated disposal sites that have already been consulted on with GARFO.
☐	22.	Any temporary discharges must meet state water quality standards; no discharges of toxic substances.
☐	23.	Only repair of existing discharge pipes allowed; no new construction.
f) ENTANGLEMENT PDC		
☐	Yes, my project meets all of the Entanglement PDC below. The aquaculture gear type (e.g., cage on bottom) is:	
☐	No, my project does not meet all the Entanglement PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	

☐	24.	Shell on bottom <50 acres with maximum of 4 corner marker buoys;
☐	25.	Cage on bottom with no loose floating lines <5 acres and minimal vertical lines (1 per string of cages, 4 corner marker buoys);
☐	26.	Floating cages in <3 acres in waters and shallower than -10 feet MLLW with no loose lines and minimal vertical lines (1 per string of cages, 4 corner marker buoys);
☐	27.	Floating upweller docks in >10 feet MLLW.
☐	28.	Any in-water lines, ropes, or chains must be made of materials and installed in a manner (properly spaced) to minimize the risk of entanglement by keeping lines taut or using methods to promote rigidity (e.g., sheathed or weighted lines that do not loop or entangle).
g) HABITAT MODIFICATION PDC		
☐	Yes, my project meets all of the Habitat Modification PDC below.	
☐	No, my project does not meet all the Habitat Modification PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	
☐	29.	No conversion of habitat type (soft bottom to hard, or vice versa) for aquaculture or reef creation.
h) VESSEL TRAFFIC PDC		
☐	Yes, my project meets all of the Vessel Traffic PDC below. Below, please list separately the number of temporary project/construction vessels and the net increase of permanent non-commercial vessels (must be ≤ 2 per PDC 32): Temporary project/construction vessels (# and type): Permanent net increase of non-commercial vessels (#):	
☐	No, my project does not meet all the Vessel Traffic PDC as indicated below (please check the PDC the action does NOT comply with below, and provide justification in Section 4 of this form):	
☐	30.	Speed limits below 10 knots for project vessels with buffers of 150 feet for all listed species (1,500 feet for right whales).
☐	31.	While dredging, dredge buffers of 300 feet in the vicinity of any listed species (1,500 feet for right whales), with speeds of 4 knots maximum.
☐	32.	The number of project vessels must be limited to the greatest extent possible, as appropriate to size and scale of project.
☐	33.	The permanent net increase in vessels resulting from a project (e.g., dock/float/pier/boating facility) must not exceed two non-commercial vessels. A project must not result in the permanent net increase of any commercial vessels (e.g., a ferry terminal).

Section 4: Justification for Review under the 2017 NLAA Program

If the action is not in compliance with all of the General PDC and appropriate stressor PDC, but you can provide justification and/or special conditions to demonstrate why the project still meets the NLAA determination (all effects are insignificant and/or discountable) and is consistent with the aggregate effects considered in the programmatic consultation, you may still certify your project through the NLAA program using this verification form. Please identify which PDC your project does not meet (e.g., PDC 9, PDC 15, PDC 22, etc.) and provide your rationale and justification for why the project is still eligible for the verification form:

PDC#	Justification

Section 5: USACE Verification of Determination

☐	In accordance with the 2017 NLAA Programmatic Consultation, the Corps has determined that the action complies with all applicable PDC and is not likely to adversely affect listed species.
☐	In accordance with the 2017 NLAA Programmatic Consultation, the Corps has determined that the action is not likely to adversely affect listed species per the justification and/or special conditions provided in Section 4.

USACE Signature:	Date:

Section 6: GARFO Concurrence

☐	In accordance with the 2017 NLAA Program, GARFO PRD concurs with USACE's determination that the action complies with all applicable PDC and is not likely to adversely affect listed species or critical habitat.
☐	In accordance with the 2017 NLAA Program, GARFO PRD concurs with USACE's determination that the action is not likely to adversely affect listed species or critical habitat per the justification and/or special conditions provided in Section 4.
☐	GARFO PRD does not concur with USACE's determination that the action complies with the applicable PDC (with or without justification), and recommends an individual Section 7 consultation to be completed independent from the 2017 NLAA Program.

GARFO Signature:	Date:

ORM Data Entry

ENDANGERED SPECIES ACT SUBACTION

Enter a subaction for all NLAA and MAY AFFECT determinations/coordinations for FWS & NMFS species

ESA (Formal):

Enter one ESA entry for each letter (or email equivalent) to FWS/NMFS to initiate formal consultation for adverse effects to listed species or designated critical habitat for the purpose of obtaining a Biological Opinion. There may be multiple species in the letter (or e-mail equivalent) but a single ESA entry. Do not add ESA entries for exchange of information during the consultation.

ESA (Informal):

Enter one ESA entry for each letter (or e-mail equivalent) to FWS/NMFS requesting written concurrence that the project is not likely to adversely affect listed species or designated critical habitat. There may be multiple species in the letter (or e-mail equivalent) but a single ESA entry. Do not add ESA entries for exchange of information during the consultation. For districts with established SLOPES agreements, this subaction should be used for situations that require additional correspondence/consultation above and beyond routine procedures.

ESA (Programmatic):

Enter when using the NMFS NLAA ESA Program Verification Form

OR the Tiger Beetle Programmatic BO

ESSENTIAL FISH HABITAT SUBACTION:

Enter SubAction for consultation for EFH, SAVs, HPCs, and Anadromous Fish Use Areas.

Enter if you receive recommendations from NMFS and you need to prepare response. Do not enter these if you only sent a public notice/LOP coordination or PCN, or made a no effect determination without official coordination. Create the SubAction if a dialog with NMFS on a project resulted in development of conservation recommendations or their stating satisfaction with the project in lieu of sending recommendations."

*** DO NOT use "EXETERNAL AGENCY COORDINATION" for ESA related coordination efforts

*** Add comments as needed to record timelines, revisions, or other helpful data.

*** DO NOT add a SubAction for NO EFFECT determinations

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Virginia Field Office
6669 Short Lane
Gloucester, VA 23061

Date:

Project Review Certification Letter

Project Name:

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Ecological Services online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the project named above in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. . 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in:

- "no effect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, not likely to adversely affect" determinations for proposed/listed species and/or proposed/designated critical habitat; and/or
- "may affect, likely to adversely affect" determination for the Northern long-eared bat (*Myotis septentrionalis*) and relying on the findings of the January 5, 2016 Programmatic Biological Opinion for the Final 4(d) Rule on the Northern long-eared bat; and/or
- "no Eagle Act permit required" determinations for eagles.

We certify that use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the “no effect” or “not likely to adversely affect” determinations for proposed and listed species and proposed and designated critical habitat; the “may affect” determination for Northern long-eared bat; and/or the “no Eagle Act permit required” determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of proposed or listed species, proposed or designated critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for 1 year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Troy Andersen of this office at (804) 824-2428.

Sincerely,

Cindy Schulz
Field Supervisor
Virginia Ecological Services

Enclosures - project review package

Species Conclusions Table

Click here to go to the Online Project Review Web Page

Project Name: **Enter Project Name**

Permit Number: **Enter Permit Number**

Date: **Enter Date**

Species / Resource Name	Conclusion *Select one of the following*	ESA Section 7 / Eagle Act Determination *Coordinate only if may affect/may require permit* *Select based on corresponding conclusion*	Notes / Documentation *Describe survey results, number of individuals, location, any proposed conservation measures, etc.* *If coordination is required, additional detail may be warranted*
Enter Species Name Ex: Small Whorled Pogonia	No Suitable Habitat Present	No Effect	*"Habitat assessment indicated no potential,, habitat present."*
	Suitable Habitat Present, Species Not Present	Not Likely to adversely affect	*"July 2012 survey by qualified surveyor indicated an absence of individuals but suitable habitat"*
Add rows as needed for additional species, *Include proposed and candidate species if directed after consulting with Corp.*	Potential Habitat Present, no survey conducted	May adversely affect	*"Applicant refused survey request"*
	Species Present	May adversely affect	*"July 2012 survey by qualified surveyor indicated presence of individuals as located on X map" Habitat will be preserved as indicated on X.*
EX: dwarf wedgemussel or harperella	No Suitable Habitat Present	No Effect/Not Likely to adversely affect	*"Project impacts are limited to small headwater streams that do not provide suitable habitat for these species."*
If no listed species ESA Listed Species	Species Not Present	No Effect	No listed species, including DGIF and DCR search results.
Critical Habitat	No Critical Habitat Present	No Effect	Project not located within Lee, Scott, Smyth, Russell, Tazewell, Washington or Wise County

Bald Eagle	Unlikely to disturb nesting Bald Eagles	No Eagle Act permit required	No nests within 660' of the project area, **OR** Nest (*enter nest ID # from* VaEagles Nest Locator website) located within 660', but implementing following in accordance with the Service's Region 5 bald eagle management guidelines and conservation measures: *(enter applicable recommendations, i.e. buffers, TOYR, etc.)*
	Does not intersect eagle concentration area	No Eagle Act permit required	Project Area not within a concentration area
	May disturb nesting Bald Eagles	Eagle Act permit may be required	Nest (*enter nest ID # from VaEagles website*) located within 660', and unable to implement bald eagle management guidelines and conservation measures.
	Intersects eagle concentration area	Eagle Act permit may be required	If coordination is not complete, can add special condition or Authorization Note to permit: *"The permittee shall either obtain a U.S. Fish and Wildlife Service (FWS) bald eagle take permit or a letter of concurrence from FWS indicating that a permit is not necessary prior to initiating construction activities. You should contact FWS concerning this matter at U.S. Fish and Wildlife Service, Virginia Field Office, ATTN: Kim Smith, 6669 Short Lane, Gloucester, Virginia 23061."*
Other Species/resources (as needed)			