Potential Conservation Measures

Conservation measures (CMs) are actions included in the project description that the action agency or the applicant commits to implementing to avoid or minimize impacts to federally threatened or endangered species from their actions. CMs are a part of the proposed action and their implementation is required under the terms of an Endangered Species Act Section 7 consultation. Ultimately, the lead federal action agency (project funder, permitter, or implementer) commits to CMs, however, implementation may be passed to the applicant via permit conditions. CMs demonstrate the action agency's commitment to imperiled species conservation and have the potential to expedite project review under the Endangered Species Act by eliminating or decreasing adverse impacts that would otherwise result from project implementation.

Listed below are potential CMs you may want to incorporate into your project, depending on your situation. This list is not exhaustive, but rather simply provides suggestions and examples – an action agency is free to use different CMs, additional CMs, or modifications of these CMs. Nor is this list prescriptive – the decision to incorporate CMs, and what CMs to incorporate, is the discretion of the action agency, not the US Fish and Wildlife Service (Service) - we simply provide this list as a resource. In general, a well-written CM is specific, with detailed information on: what will be done, where it will be done, when it will be done, and who will do it.

These CMs may be updated over time. We recommend checking the CMs regularly for the most up-to-date list.

Coordination

These CMs address how the action agency coordinates with involved parties to ensure all are aware of commitments and responsibilities related to listed species and designated critical habitat.

- The action agency or its designee will conduct a preconstruction meeting with the action agency's project manager and on-site construction manager to review CMs for this project. An invitation will be extended to the Service.
- The action agency or its designee will ensure all operators, employees, and contractors working in the proposed action area are aware of environmental commitments associated with the project including all applicable impact avoidance and minimization measures.

Individual Avoidance and Protection

These CMs address protecting individuals of a species as opposed to addressing impacts to habitat.

Aquatic species

- See "Stressor: Aquatic and wetland sedimentation", Stressor: "Aquatic and wetland contamination", and "Stressor: Stormwater" below.

Bats

- Timing of tree removal will abide by applicable dates in Appendix L of the most recent Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines.
- Prior to any structure maintenance or demolition between March 15 and November 15, a qualified biologist will inspect structures for evidence of bat use within 30 days of structure work, preferably, within 14 days. If bats are present, then the USFWS will be consulted regarding how to proceed. No work will begin at the structure location until discussions with the Service have concluded.
- If bat evidence or bat sightings are unexpectedly made during structure maintenance or demolition, the contractor will stop work and the Service will be notified immediately. No work will resume at the structure location until discussions with the Service have concluded.
- Structures will be demolished during the winter, outside the bat active season.

- Culverts equal to and greater than the listed diameters in Appendix K, Table 5 of the most recent Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines will be re-surveyed for bats and signs of bat use within 30 days prior to work that will impact those structures.
- *Prescribed burning*
    - Prescribed burns will be complete by April 1 if possible and will not occur later than May 15. Between April 1 and May 15, burning will only occur when temperatures are above 50 degrees Fahrenheit.
    - To protect non-volant pups, no burning will occur during the pup season (see Appendix L of the most recent Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines for pup season dates in the action area).

Bog turtle

- If possible, conduct work adjacent to/within bog turtle wetlands during the bog turtle hibernation period, November 1 to February 28/29.
- Where road work bisects known bog turtle habitat, include bog turtle passageways or retrofit existing culverts in a manner that will allow for bog turtle passage to connect habitat and reduce road mortality. The Service can provide BMPs for turtle passageways.

Carolina northern flying squirrel

- All trees proposed for cutting or trimming will be marked by the contractor and inspected by a qualified biologist. The biologist will:
    - Inspect marked trees to determine species and suitability for dreys and/or denning.
    - If suitable trees are identified and cannot be avoided, the biologist will inspect accessible cavities visually and with a peeper scope for evidence of CNFS use. Any trees containing evidence of use will not be removed.
- Direct contractors to avoid cutting: trees with cavities (e.g., old gnarly trees, snags, trees with woodpecker holes or rotted knotholes) or dreys; cutting yellow birch (*Betula alleghaniensis*) greater than eight inches in diameter at breast height when possible, especially in mixed stands where yellow birch is limited; cutting red spruce (*Picea rubens*), Fraser fir (*Abies fraseri*), and hemlock (*Tsuga* spp.); cutting trees that would create large canopy gaps along a road.
- If gaps greater than 40 feet wide are created, retain one or more large, tall tree on one or both sides of the opening to serve as launch/landing points so flying squirrels can still glide across the opening.
- Tree removal will occur outside of the Carolina northern flying squirrel maternity season (March 15 – August 31) when they could have pups.
- Contractors will be informed of the potential presence of Carolina northern flying squirrel. If flying squirrels of any type are observed by the contractor, all work in the area will stop and the contractor will immediately contact the action agency and Service for further guidance. No work will begin at the structure location until discussions with the Service have concluded.

Plants

- High-visibility fencing will be placed around listed plant sites to ensure there will be no accidental encroachment.
- No access or staging areas will be permitted within listed plant sites.
- The project will be designed to leave listed plants within the project footprint undisturbed.
- Any listed plants in the project footprint that cannot be avoided will be relocated, during the dormant season, to suitable habitat outside the project footprint.
    - Relocation will be considered only after avoidance and minimization of impacts has occurred. Please coordinate relocation plans with the Service to ensure the plan, after-care, and monitoring are sufficient.
- A permanent conservation easement will be established to protect listed plants in perpetuity.

- Non-native, invasive plant species across the site will be monitored post-construction for five years, especially along the interface between construction activities and protected plant populations. If any non-native plant species start spreading into the protected plant populations, they will be removed or treated. If herbicide is used to control non-native invasive plants, a barrier (such as cardboard or plastic) will be used to protect any listed plants adjacent to treatment areas. Herbicides will not be used on days with high winds.
- No broadcast spraying of herbicides will occur. Spot herbicide treatment can be used as needed with protection of the listed plants to prohibit off-target impacts.
- *Prescribed burning*
    - Prescribed burns will occur during the dormant season.
    - A botanist or qualified individual who can identify the listed plant will join the fire crew when the crew is burning in the vicinity of listed plants to: flag the listed plants prior to the burn; direct the fire crew to rake around listed plants and cut back large, overtopping vegetation; stay present until active fire moves away from the plants.
    - The minimum number of fire specialists needed for safety will enter the vicinity of the listed plants.

Habitat Protection

These CMs address protecting habitat against physical destruction or encroachment.

General

- The action agency or its designee will minimize project creep by clearly delineating and maintaining project boundaries (including staging areas).
- The action agency or its designee will maximize use of disturbed land for all project activities (i.e., siting, lay-down areas, and construction).
- The action agency or its designee will restrict unauthorized access to natural areas adjacent to the project site by erecting a barrier and/or avoidance buffers (e.g., gate, fence, wall) to minimize foot traffic and off-road vehicle uses.

Wetlands

- Avoid soil disturbance, excavation, or other activities that could impact wetland hydrology adjacent to and within wetlands.
- Use best management practices to avoid the spread of invasive plants into wetlands.

Stressor Management

These CMs address protecting individuals from stressors associated with habitat degradation.

Stressor: Aquatic and wetland sedimentation

Soil eroding from upland areas into wetlands and waterways is a significant pollutant and a concern anytime earth is disturbed. It can have myriad impacts, including smothering individuals like freshwater mussels, smothering habitat such as fish spawning areas, decreasing light penetration which in turn impacts aquatic vegetation, decreasing underwater visibility for aquatic species, altering soil nutrient levels in wetlands, etc. These impacts affect not only aquatic or wetland species, but species that depend on those plants and animals, like bats that feed on emerging aquatic insects. Any measures taken to minimize erosion and prevent sedimentation are helpful.

- An erosion and sediment control plan for the project will be prepared and submitted to the North Carolina Department of Environmental Quality, or appropriate regulatory agency, for review and approval.
- The Service will be notified in writing within 24 hours of any erosion control failures throughout the construction phase of the project.
- Trees in all riparian buffers (at least 50 feet and up to 200 feet as practicable) and wetlands within the project area will be preserved where practicable.
- When clearing and grubbing within 50-feet of a stream (measured from top of stream bank) or wetland, perform grubbing immediately prior to beginning grading operations.

- Erosion control devices shall be installed immediately following clearing within 50-feet of a stream (measured from top of stream bank) or wetland.
- Once grading operations begin within 50-feet of a stream (measured from top of stream bank) or wetland, work shall progress in a continuous manner until complete.
- Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment.
- Establish a 50-foot and up to 200-foot, as practicable, forested riparian buffer along each streambank and delineated wetland within the project footprint.
- Any necessary vegetation removal along streambanks shall be cleared by hand with vegetation cut at the base to retain bank-stabilizing root masses.
- Temporary bank stabilization materials used during construction (e.g. rip rap, concrete blocks, or gabions), shall be removed after construction and replaced using permanent natural bank stabilization techniques that employ bioengineering and natural channel design methods. Permanent bank stabilization design shall be developed and approved in coordination with the Service and applicable state agencies.
- Erosion controls will be audited with regular surveys by inspection and erosion control compliance staff to ensure issues are quickly resolved. The Service will be notified in writing within 24 hours of any erosion control failures throughout the construction phase of the project.

Stressor: Aquatic and wetland contamination

Contaminants in a waterbody or wetland can alter the chemical environment in ways that may disrupt a plant or animal's basic functions or be fatally toxic. This can impact listed species directly, or indirectly if these impacts are felt by plants or animals (e.g. prey) on which the protected species depends.

- No in-water work will occur.
- Debris will be contained/secured until removal. Debris will be removed at the end of each workday.
- For bridge maintenance or demolition, 100% containment for all bridge deck and bent material removed during the project will be required to prevent any materials from entering bodies of water. Environmental personnel will inspect the operations weekly for compliance with this provision.
- All construction equipment shall be refueled outside the 100-year floodplain or at least 200 feet from all water bodies (whichever distance is greater) and wetlands and be protected with secondary containment.
- Hazardous materials, fuel, lubricating oils, or other chemicals will be stored outside the 100-year floodplain or at least 200 feet from all water bodies (whichever distance is greater) and wetlands.

Stressor: Stormwater

Poorly managed or unmanaged stormwater can overwhelm a stream channel's natural capacity to carry water, resulting erosion of stream bed and banks, which can eliminate or degrade aquatic habitat; lead to increased flooding; and has the potential to elevate stream temperature if stormwater flows from a hot surface. Any measures taken to minimize stormwater runoff are helpful.

- A project-specific stormwater management plan will be developed to address and treat stormwater runoff at the site.
- Grassed swales shall be included throughout the project at all practical locations to maximize treatment through infiltration, and runoff attenuation through low discharge velocities.
- Stormwater diversion and outlet pipe slopes will be minimized to reduce discharge velocities.
- Runoff from impervious surfaces will be discharged at least 150 feet away from stream or wetland edges in topographically flat areas that promote infiltration and ultimately drain away from the river.

Stressor: Light pollution

Some species, including bats and migrating birds, are negatively impacted by artificial light. For example, some species of bats avoid lit areas and may be deterred from using important commuting, roosting, and foraging habitats. To the extent possible, keeping light at natural levels is desirable.

- For temporary work lighting, minimize illumination to the maximum extent practicable while maintaining sufficient levels for safety and avoid direct illumination of adjacent forests, waterways, and riparian areas.
- A qualified biologist will attend the first night of night work to verify that light minimization measures are in place.
- Any night work will use shielded, down-facing lights.
- No permanent lighting will be added over streams or to adjacent riparian areas.
- Permanent lighting will be minimized to the extent practicable.
- Permanent lighting will be warm white in temperature, not to exceed 3000K.
- Permanent exterior lighting associated with the project shall be shielded, down-facing and of a low intensity.

Stressor: Noise pollution

Excessive sound can cause animals to flee or avoid areas and can hinder an animal's ability to sense their environment – temporarily or even permanently. This can impair their ability to feed, find mates, or roost/find shelter.

- Minimize percussive activities, including intermittent jackhammering.
- Use blast mats or other barriers when blasting.
- Avoid loud activities during critical bat foraging times, especially at dusk and dawn when they are most active.

Stressor: Invasive species competition

Invasive species may impact native species in two ways – through direct harm, such as hemlock woolly adelgids killing hemlock trees; or by outcompeting native species for key resources such as space, nutrients, water, etc. Efforts to minimize or eliminate the introduction of invasive species can benefit not only imperiled species, but all native species.

- Cleared areas will be replanted with native vegetation once construction is complete.
- Non-native invasive plants will not be used in erosion control seed mixes.
- Native seed mixes for erosion control will be used to the extent practicable.
- Wash vehicles and equipment prior to entering sensitive habitat areas to prevent accidental introduction of non-native plants.
- Best management practices (BMPs) will be used to avoid the spread of invasive species.
    - https://www.forestasyst.org/invasive_species.cfm