Guidelines for Section 7 Consultation Application Requirements for Certificate of Inclusion Applicants

Intent

In accordance with the USFWS Conference Opinion prepared for the *Nationwide Candidate Conservation Agreement for Monarch Butterfly for Energy and Transportation Lands*, Applicants are expected to provide documentation to allow USFWS to ensure that actions carried out under the Agreement will not jeopardize any listed or proposed species or destroy or adversely modify designated or proposed critical habitat. Below is a step-by-step guide to help the Applicant provide sufficient documentation to satisfy the application requirements as it relates to the Service's verification of its compliance with Section 7.

Step-by-Step Guidelines

Submission of a full species and critical habitat list – and a list of avoidance and minimization measures for plants and critical habitat – is required as part of the application process. We provide advice below on how to prepare this material, but Applicants may use whatever methods produce similar information.

1. Generate a full list of the endangered, threatened, and proposed species that may occur within the extent of enrolled lands and of any designated or proposed critical habitats that overlap with those lands. USFWS will review list submitted. A more complete list will result in a more expedited review. If needed, explain how you developed the list. ***Avoidance and minimization measures (AMMs) must only be developed for plant species and critical habitats that potentially overlap areas of suitable monarch habitat that will be affected by conservation measures or covered activities.*** *An AMM does not need to be developed for plants or critical habitats that do not overlap with monarch habitat, but providing a full list of Federal-listed species potentially located within enrolled lands will help paint a clear picture for the Section 7 review process and may result in a quicker turn around*.

   Options include querying IPaC, State list(s), or Natural Heritage database information. Note that exclusive reliance on State lists or Natural Heritage data could miss one or more species that may be present and would likely miss any proposed or designated critical habitat. Therefore, we recommend their use only to supplement the results of an IPaC query.

2. Describe AMMs that are currently used, or proposed for use, by the Applicant for each individual listed or proposed plant species and designated or proposed critical habitats that overlap with areas of potential monarch habitat identified in Step 1 (see example table below). The selected AMMs would be implemented in conjunction with covered activities and conservation measures outlined in the Certificate of Inclusion application, as necessary to avoid and minimize impacts to the relevant species and critical habitats within areas of potential monarch habitat.

a. As you prepare your AMM's, important considerations include:

i. **Preferred Format.** The applicant can decide how to best provide the AMMs in their application, but it must be provided in a Microsoft Word document to facilitate the review and comment by the USFWS.

ii. **AMM Sources**. Briefly explain who developed the selected AMMs, or its source(s), and whether this person coordinated with a USFWS field office when developing the AMMs.

iii. **Effects from Adjacent Activities**. When developing the AMMs, consider how CCAA activities could affect habitats outside of the enrolled lands. If any CCAA activities are likely to affect surface runoff or sediment transport, for example, consider the potential for species to be affected that are not likely to occur in the ROWs themselves. See the example AMMs provided below for measures than can be implemented to avoid affecting habitats outside of enrolled lands.

iv. **Essential Habitat Features**. iv. Essential Habitat Features. For critical habitats, review the essential physical and biological features (PBFs) of the critical habitat and use them as a guide to develop AMMs for critical habitat. The final or proposed rules for a critical habitat contain the PBFs. In prior critical habitat rules, they were referred to as "primary constituent elements". Older rules may not have PBFs or PCEs. Contact Phil Delphey (phil_delphey@fws.gov) if assistance is needed finding PBFs for critical habitat. You can access the PBFs for critical habitat in the Service's Great Lakes Region here.

v. **Provide Sufficient Detail**. The AMMs should specify clearly for which species they are relevant and when/where they will be applied. Avoid vague terms like "limit disturbance' or "to the extent practicable", which make it difficult to understand how effects will be avoided and minimized to the relevant species. Describe the BMPs or time of year restrictions within the description of the AMMs. The USFWS requires this information to evaluate how the measures will minimize and/or avoid adverse effects to the plants and critical habitats.

vi. **Avoid Making Determinations**. Avoid including a determination regarding jeopardy (species) or adverse modification (critical habitat) as the USFWS will make this determination.

b. Existing AMM's may be obtained from:

i. Local USFWS Ecological Services field offices or their websites.

ii. Previous USFWS Section 7 consultations or coordination, from past projects. (Biological opinions – especially recent ones – can be obtained from USFWS Species Profile pages – see below).

iii. Species guidelines accessible through the IPaC Resources List (see Fig. 1-3, below) or, for the Midwest, here - Species Specific Section 7 Guidance and Conservation Measures.

iv. Other resources such as other conservation plans, State AMM's, etc.

3. If no existing AMM exists for the species, propose a suitable set of AMMs (e.g., adapted from AMMs developed for similar species). USFWS will review and consult with local Service field offices during application review to determine sufficiency of AMMs. To expedite review of these other resources, the Applicant should, to the best of their ability, provide draft AMMs based on a review of the following documents:

a. The USFWS species profile (Fig. 2).

i. In the Recovery section (see the link at the top of the page; Fig. 3), look for any Five Year Reviews completed for the species. These often contain information useful for developing AMMs.

ii. Other documents in the Species Profile, including biological opinions, critical habitat designations, and listing rules, may also be helpful for drafting AMMs.

b. Review the attached conservation measures master list (Figure 4), which includes conservation measures that the Service has developed for use in its Effects Pathway Manager program. The list includes general measures and some examples of how they have been adapted for individual species. In the table below, we provide examples of AMMs based on information in the respective USFWS five-year reviews and supplemented with measures adapted from the conservation measures master list.

c. Search the Internet for other relevant AMM resources.

i. Try the following searches – try these in the full Internet and also in Google Scholar:

ii. "[species name] best management practices."

iii. "[species name] avoidance minimization measures."

iv. "[species name] conservation measures."

v. "[species name] critical habitat"

4. Include the proposed information with your Certificate of Inclusion application, or as an attachment.

Listed Resource Summary Table (Example)

Applicants enrolling in the CCAA/CCA should include a list of all Federal-listed and proposed species that may be present within the extent of the enrolled lands and of any designated or proposed critical habitat that overlaps with those lands.

Tables 1 and 2 demonstrate the type of information that should be included when summarizing the listed resources within the Applicant's enrolled lands. Data shown below is provided for demonstration purposes, and does not include all of the listed plant and animal species within Wisconsin. This example can provide a template for the Applicant to follow as they gather appropriate data for their application. You can develop a table like the one below by using the USFWS IPaC website.

Table 1. Applicability of AMMs for Federal-listed fish, wildlife, plant, and critical habitat within the enrolled lands that may overlap with suitable monarch habitat.

Species	Taxa	Federal Status	Monarch Habitat Overlap?	AMMs Required?
Canada lynx (*Lynx canadensis*)	Mammals	THR	No	N/A
Northern long-eared bat *(Myotis septentrionalis)*	Mammals	THR	No	N/A
Eastern massasauga *(Sistrurus catenatus)*	Reptiles	THR	Yes	N/A
Piping plover *(Charadrius melodus)*	Birds	END	No	N/A
Higgins eye pearlymussel *(Lampsilis higginsii)*	Mussels	END	No	N/A
Snuffbox (*Epioblasma triquetra*)	Mussels	END	No	N/A
Hine's emerald dragonfly *(Somatochlora hineana)*	Insects	END	Yes	N/A
Rusty patched bumble bee *(Bombus affinis)*	Insects	END	Yes	N/A
Eastern prairie fringed orchid (*Platanthera leucophaea*)	Plants	THR	Yes	Yes
Fassett's locoweed (*Oxytropis campestris var. chartaceae*)	Plants	THR	Yes	Yes
Hine's emerald dragonfly *(Somatochlora hineana)*	Critical Habitat		Yes	Yes
Piping plover *(Charadrius melodus)*	Critical Habitat		No	No

Avoidance and Minimization Measures Summary (Example)

Once the list of species and potential overlap has been identified, an AMM must be for provided for each of the Federal-listed plants and critical habitats that were identified in Table 1 as having the potential to overlap in areas of suitable monarch habitat on enrolled lands. The following AMM's are an example of what can be provided for applicable Federal-listed plant species within the Partner's enrolled lands that may overlap with suitable monarch habitat:

In addition to the AMM's that are specific to the listed species in Table 2,

1. Coordinate with USFWS, when needed, to ensure that activities avoid affecting any area where protected plant species may be present. See individual species for habitat requirements. This may include desktop measures to screen projects in combination with onsite surveys when available data are insufficient to ensure that a project can avoid effects to these species.
2. Ensure that the appropriate personnel are trained to ensure a sufficient understanding of the AMM's, as well as information about potential habitat, or any protected plant species in the project area.
3. Design project or implement measures to reduce or prevent surface runoff and flooding of terrestrial habitats in order to avoid impacts to the species.
4. Ensure materials used (e.g. soil, gravel, rock) at project sites are free of invasive species before placement on-site. Implement prevention and control measures to reduce the presence of invasive species onsite. All vehicles, machinery, and equipment, including technical gear and personal protective equipment, must be clean and free of invasive species before use at the project site.
5. In areas containing known populations, herbicide applications will be applied locally, to individual plants or stands of target species.
6. Disturbed areas of potential habitat will be restored using native, non-invasive seed mixes.
7. Institute timing restrictions designed to minimize or avoid the effects of certain activities. These avoidance periods typically overlap with important life history functions for a species (e.g., flowering). Any seasonal restrictions would be developed in coordination with the USFWS field office. See individual species for requirements.
8. Avoid known individual plant locations and conduct operations elsewhere when they are least likely to cause damage. Ideally, this would involve frozen, snow-covered ground. However, in areas of the state where frozen conditions are unreliable, very dry soils late in the growing season might be the best available alternative. Consult with a biologist, if needed.

Table 2. Species Specific AMM's For Federal-listed Plant and Critical Habitats within the Enrolled Lands

Species	Federal Status	Habitat and Related Information (Optional)	Species-specific AMM	Source(s)
Plants				
Eastern prairie fringed orchid *(Platanthera leucophaea)*	THR	Grows in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, and bogs. Some of the biggest threats to this species are encroachment of wood vegetation, changes in hydrology, and competition from invasive species. Prescribed burning increases population survival and does not affect the number of flowering plants or pods.	**Species specific AMM's to be implemented in addition to above measures listed for all plant species:** 1. When initiating construction activities near or within locations of known *P. leucophaea* populations, preconstruction hydrological conditions will be maintained throughout the duration of construction activities and in post construction. 2. We will filter runoff and discharge to ensure removal of any substances introduced by project activities. Water discharged into habitat where *P. leucophaea* is known or assumed will be a similar temperature and stream flow rate to existing water bodies. 3. If woody vegetation removal activities are implemented near known populations of *P. leucophaea,* we will maintain and restore open habitat through selective clearing and brushing and the remaining stumps will be treated with herbicide to prevent regrowth. 4. When implementing activities near any area where *P. leucophaea* may be present, we will ensure that activities do not introduce or facilitate the expansion of aggressive competing plant species. When possible, invasive species will be targeted for herbicide spot treatment. 5. Controlled burns or mowing will take place outside of the growing season (typically early to mid-April to mid to late November) for locations within known *P. leucophaea* populations.	USFWS. 2016. Eastern Prairie Fringed Orchid (*Platanthera leucophaea)*. 5-Year Review: Summary and Evaluation. USFWS Chicago Illinois Field Office, Barrington, IL. https://www.fws.gov/midwest/endangered/recovery/pdf/EasternPrairireFringedOrchid081610.pdf Bowles, L. Marlin. 1999. Eastern Prairie Fringed Orchid *Platanthera leucophaea* (Nuttall) Lindley. Recovery Plan. USFWS Region 3, Fort Snelling, MN. https://ecos.fws.gov/docs/recovery_plan/990929.pdf Wisconsin DNR - https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMORC1Y0F0

Species	Federal Status	Habitat and Related Information (Optional)	Species-specific AMM	Source(s)
			6. We will implement erosion control measures (e.g., silt fencing, hay bales, soil stabilization matting) to avoid increased erosion that could directly or indirectly impact P. *leucophaea.*	
Fassett's locoweed *(Oxytropis campestris var. chartaceae)*	THR	This perennial grows on gentle slopes in sand-gravel shorelines around shallow lakes which are subject to water level fluctuations. The plant depends on the open habitat (above the water line) provided when lake levels are low and a large seed bank that germinates in this open habitat for long-term population maintenance.	**Species specific AMM's to be implemented in addition to above AMM's listed for all plant species:** 1. We will coordinate with USFWS to identify the known locations of *O. campestris var. chartaceae* and disturbance in these areas to the shorelines and the forest-beach interface will be avoided. 2. For projects in Bayfield, Portage and Waushara, WI, areas of suitable habitat will be avoided when possible. If work must occur within suitable habitat, trained botanists will conduct a survey to determine *O. campestris var. chartaceae* is present in the project area. If present, impacts to this species will be avoided. 3. Construction projects will be designed so as to not impact the short or long-term natural fluctuations of surface water levels of the water bodies which have *O. campestris var. chartaceae* populations on their shorelines. Any dewatering activities will return the treated water within watershed as near as possible to its source. 4. Erosion and sediment control measures will strictly adhere to State and Federal guidance that has been provided for the project area and project type. 5. We will inspect erosion and sediment control devices regularly during construction to ensure efficacy and prevent failure of devices. Ensure removal of all materials after the construction activity ends.	USFWS. 2013. Fassett's Locoweed (*Oxytropis campestris var. chartaceae*) 5-Year Review: Summary and Evaluation. USFWS Wisconsin Ecological Services Field Office. New Franken, WI. https://www.fws.gov/midwest/endangered/plants/pdf/FassetsLocoweed5YrReview19June2013.pdf Wisconsin DNR - https://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PDFAB2X041

Species	Federal Status	Habitat and Related Information (Optional)	Species-specific AMM	Source(s)
			6. If discharging water into areas of potential habitat, we will filter runoff and discharge to ensure removal of any substances introduced by project activities. Water discharged into habitat where presence of listed species is known or assumed is at a similar temperature and stream flow rate to existing water bodies. 7. To preclude adverse effects to *O. campestris var. chartaceae* no herbicides will be used within 15 feet of known locoweed plants. Between 15 and 50 feet of known locoweed sites, herbicides will be applied via glove, brush, wick, or sponge application. Backpack spraying of herbicides will only occur beyond 50 feet of a locoweed site when wind conditions are low (less than 5 mph). 8. Mowing within know locations of *O. campestris var. chartaceae* will only occur outside of the growing season and during conditions for when the soil is stable (i.e. frozen).	
Critical Habitats				
Hine's emerald dragonfly *(Somatochlora hineana)*	Critical habitat	Habitat occurs in spring fed wetlands, wet meadows and marshes; calcareous streams and associated wetlands overlying dolomite bedrock. Wetlands that are essential for *S. hineana* egg laying and larval development have shallow calcareous water from intermittent seeps and springs, emergent herbaceous and woody vegetation, crayfish burrows	1. For projects that occur within critical habitat, we will not harm or alter channels within wetlands by all-terrain vehicle use, channelization, impoundment, road and bridge construction, mining, the removal of emergent vegetation, or any other such activity. These activities may lead to changes in water flow velocity, temperature, and quantity which could negatively affect *S. hineana* breeding habitat. 2. We will filter runoff and discharge to ensure removal of any substances introduced by project activities and ensure that water discharged into a critical habitat occurs is at a similar temperature and stream flow rate to existing water bodies.	USFWS. 2019. Summary of the Hine's Emerald Dragonfly Critical Habitat Designation. USFWS Chicago Illinois Field Office, Barrington, IL. https://www.fws.gov/midwest/endangered/insects/hed/hedfchsummary.html USFWS. 2013. Best Management Practices to Protect Groundwater at Hine's Emerald Dragonfly Larval Sites in Door County, Wisconsin. USFWS and The Ridges Sanctuary. Baileys Harbor, WI. https://www.fws.gov/midwest/endangere

Species	Federal Status	Habitat and Related Information (Optional)	Species-specific AMM	Source(s)
		(that provide refuges for larva), and a sufficient prey base of aquatic insects and other invertebrates.	3. We will ensure that all discharge, runoff and/or harmful materials will be appropriately controlled to prevent entry into the project site with particular attention to sensitive habitats, including karst areas, water bodies and riparian zones. 4. Erosion and sediment control measures will strictly adhere to State and Federal guidance that has been provided for the project area and project type. 5. We will inspect erosion and sediment control devices regularly during construction to ensure efficacy and prevent failure of devices. Ensure removal of all materials after the construction activity ends. 6. Chemical use in or near critical habitat will be avoided. We will ensure appropriate methods are applied to avoid drifting or runoff of chemicals into critical habitats Chemicals will be applied only by trained and/or licensed individuals in accordance with State and Federal regulations, and only as directed on the manufacturer's label.	d/insects/hed/pdf/HEDBMPFinalReportFeb2013.pdf
Piping plover *(Charadrius melodus)*	Critical habitat	*Charadrius melodus* typically uses wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands. During breeding season they prefer open sandy beaches along the Great Lakes.	1. We will coordinate with USFWS staff to determine if a project will occur within *C. melodus* critical habitat. 2. Any work or staging of project materials within the critical habitat will be prohibited between May 15 to July 15 to avoid impacts to potential nest sites. 3. Between May 15 to July 15, a biological monitor will mark the edge of the critical habitat area to prevent project impacts occurring with the critical habitat. Examples may include signs, mapped boundaries, or rebar posts. All materials will be removed after activities are completed.	USFWS. 2019. Piping Plover Fact Sheet. USFWS Midwest Region Bloomington, MN. https://www.fws.gov/midwest/endangered/pipingplover/pipingpl.html Wisconsin DNR - https://dnr.wi.gov/topic/EndangeredResources/Animals.asp?mode=detail&SpecCode=ABNNB03070

Species	Federal Status	Habitat and Related Information (Optional)	Species-specific AMM	Source(s)
			4. All vehicles, machinery, and equipment, including technical gear and personal protective equipment, scheduled to work within the critical habitat will be cleaned, free of invasive species (e.g. plants, invertebrates, fungus), free of leaks, and in good working condition. 5. Projects will be designed to avoid siting permanent or temporary components and their associated infrastructure in or within close proximity to the critical habitat. All activities will be avoided that could result in the alteration of the sandy beaches or any other habitat types within the boundaries of the critical habitat. 6. We will implement erosion control measures (e.g., silt fencing, hay bales, soil stabilization matting) to avoid increased erosion that could directly or indirectly impact or alter the areas within the critical habitat. 7. Erosion and sediment control measures will strictly adhere to State and Federal guidance that has been provided for our project area and project type. 8. We will inspect erosion and sediment control devices regularly during construction to ensure efficacy and prevent failure of devices. After the construction activity ends all materials will be removed. 9. Vehicle use off-road will be restricted within the critical habitat. Use of heavy equipment/vehicles on sandy beaches within the critical habitat will be avoided all times of year. 10. Removal of vegetation through mowing or prescribed fire within critical habitats will restricted to occur outside of the growing season so as not to impact active breeding or feeding locations of *C. melodus*.	

How to Access Species Guidelines through the IPaC Resources List

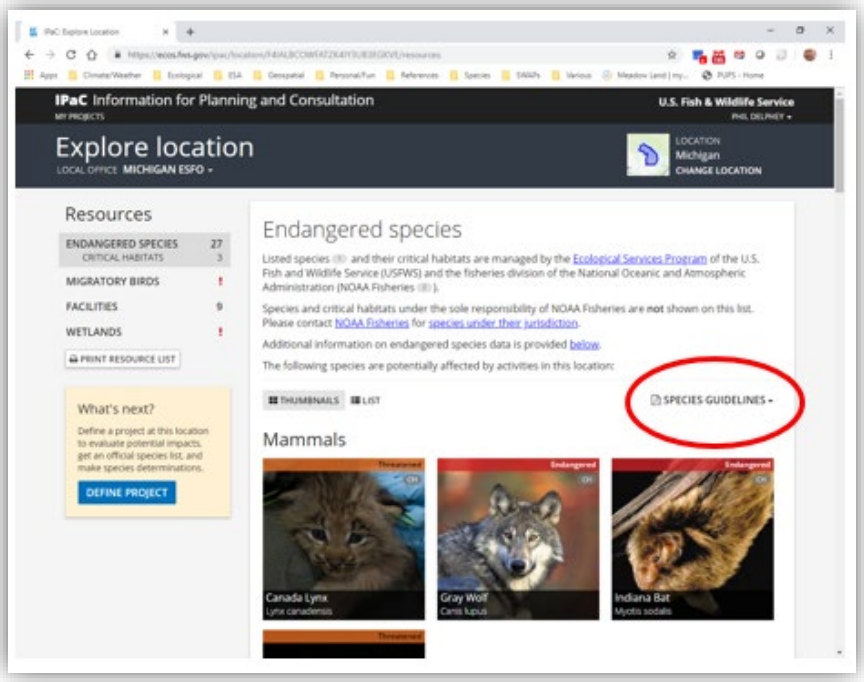

Figure 1. Click on the Species Guidelines link from within IPaC to obtain species-specific survey and project design guidelines, if available for the species and the project's geographic area.

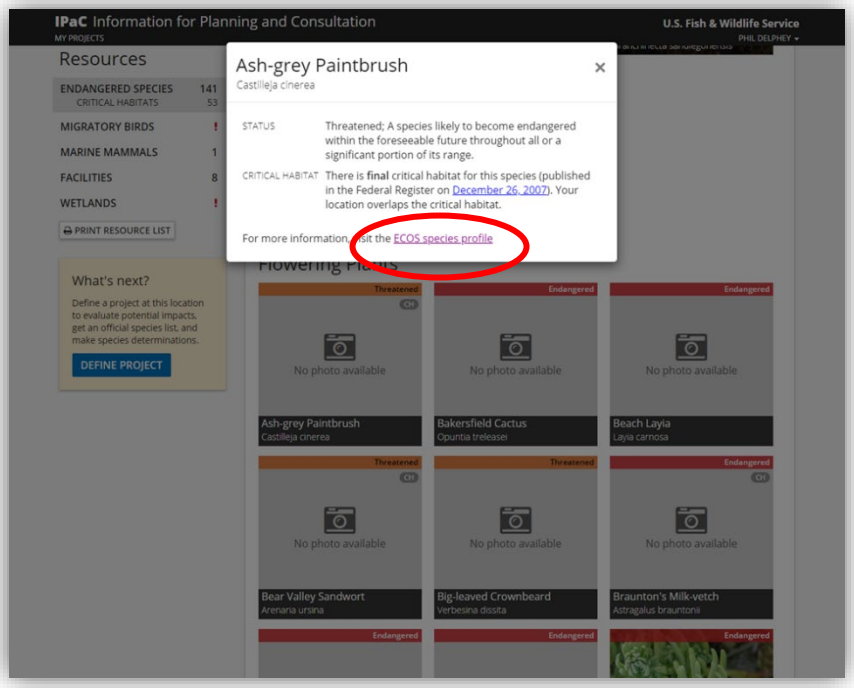

Figure 1. To access the species profile from IPaC, click on the species on the Resources page (Fig. 1) and then click on "ECOS species profile."

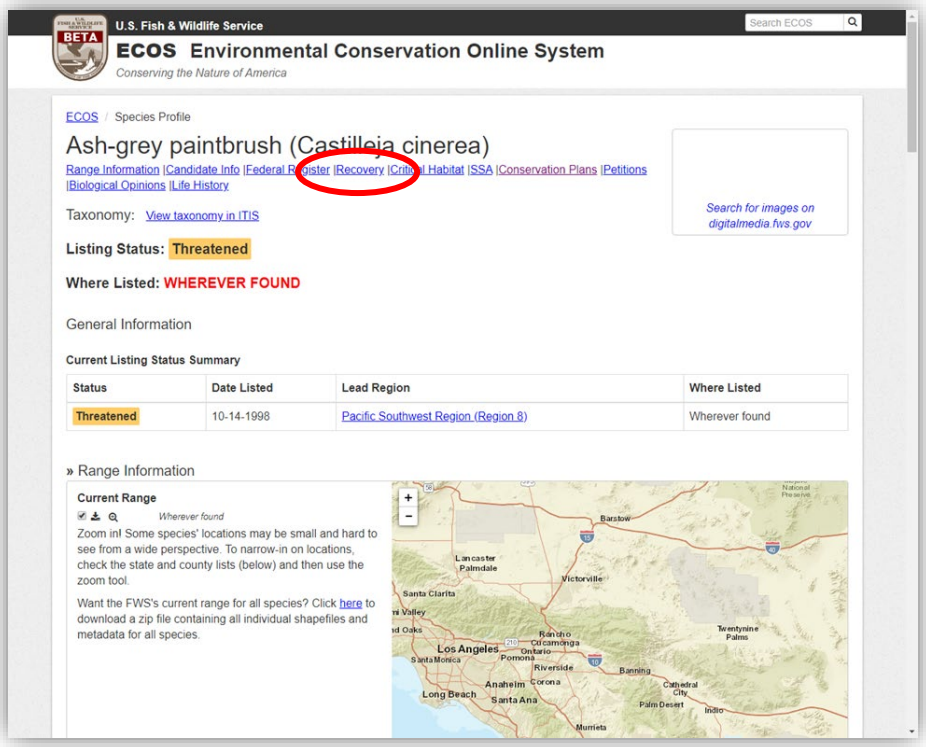

Figure 2. Click on "Recovery" in the species profile to jump down to recovery plans and five year reviews. Note that USFWS has not yet completed five-year reviews for some species.

Figure 4. Master List of Potential Avoidance and Minimization Measures

Please note, the following list of standard avoidance and minimization measures (AMM's) are provided for reference purposes. These measures, where appropriate, can be used to provide conservation measures where no other measures are currently identified for listed or proposed plants and critical habitats. Additional details (such as avoidance timing, activity buffer distances, or other implementation details) may be needed in addition to the below list when creating species specific AMM.

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Cleaning and Disposal Measures

Number	Name	Description	Key Words	Narrative
1	Clean and Maintain Equipment	Conduct measures to clean and maintain vehicles and equipment to minimize the risk of spilling contaminants and/or spreading invasive species (e.g., seeds, materials, eggs).	Fuel, Oil, Lubricants, Wash, Vehicles, Invasive Species	5. All vehicles, machinery, and equipment, including technical gear and personal protective equipment, scheduled to work within the project site must be clean, free of invasive species (e.g. plants, invertebrates, fungus), free of leaks, and in good working condition. 6. Clean and disinfect equipment before use at the project site. 7. Inspect all vehicles for leaks immediately prior to in-water or cofferdam work. Repair any leaks and clean construction vehicles thoroughly to remove any residual dirt, mud, debris, grease, motor oil, hydraulic fluid, coolant, or other hazardous substances. 8. Inspections, repairs, cleaning, and/or servicing will be conducted either before the vehicle, equipment, or machinery is transported into the field or at the work site within the staging area. 9. Inspect structures and equipment on a regular basis. Ensure that all structures and equipment are in good working order, replace parts and perform updates and maintenance on a proactive schedule in order to prevent failure of components. 10. Ensure that all discharge, runoff and/or harmful materials will be appropriately controlled to prevent entry into the project site with particular attention to sensitive habitats, including karst areas, water bodies and riparian zones. 11. Clean, disinfect, or replace personal protective equipment as directed by appropriate agency guidelines in order to prevent the spread of contaminants and/or wildlife disease.
2	Dispose of Trash	Remove and dispose of trash on a regular basis.	Trash	1. Dispose of construction debris and trash in appropriate containers and secure such containers to prevent accidental release/spill. 2. All trash should be removed from project site at regular intervals to avoid attracting wildlife. Upon completion of the project, ensure that all debris, trash and containers have been removed from the site.

Structural Restriction Measures

Number	Name	Description	Key Words	Narrative
3	Restrict Artificial Lighting	Avoid, remove or retrofit artificial lighting to be compatible with wildlife.	Artificial Lighting, Lighting	1. Restrict the use of artificial lighting to only the minimum required for safety. 2. Ensure that lighting does not increase illumination above ambient conditions and incorporate full cut-off, downward facing lights directed away from forested areas during the active season.
4	Restrict Structure Maintenance	Avoid working in locations when structures are used for active roosting or nesting.	Roosting, Nesting	1. If structures may serve as a roosting site for bats, perform any removal, replacement, or maintenance work during the winter hibernation period, unless a hibernating colony of bats is present. 2. If structures may serve as a nesting site for birds, perform any removal, replacement, or maintenance work outside of the active nesting period, unless nesting birds present.
5	Restrict Siting of Project Components	Design projects to avoid or minimize siting permanent or temporary components (e.g., buildings, stockpiles, refueling locations, work zones) and their associated infrastructure (e.g., roads, utilities) in or within close proximity to rare species habitats to reduce the likelihood of impacting those species.	Placement, Location, Utilities, Access Road, Buildings, Work Space	1. Restrict siting of project components near known or assumed occupied habitat for listed species. Design project to avoid siting permanent or temporary components and their associated infrastructure in or within close proximity to listed species or their habitats to reduce the likelihood of impacting those species. 2. Avoid all activities that could result in alteration of suitable habitat or direct harm to listed species. 3. Apply appropriate time of year restrictions and buffer zones between project activities and known or assumed current species records. Contact appropriate State and Federal agencies to determine the time of year restrictions and size of buffers to be applied. 4. Surveys should be conducted in suitable habitat in order to determine species presence or probable absence. Avoid all activities that may remove, displace, injure or kill listed species, as well as the physical alteration of suitable habitat if the species are not present if the result of the activity will impair essential behavioral patterns.

Construction and Maintenance Related Measures

Number	Name	Description	Key Words	Narrative
6	Restrict noise and Percussives	Restrict activities that would increase noise and vibrations beyond the background levels in areas sensitive to listed species.	Noise, Vibration	1. Limit all in-stream work that includes increasing percussives or noise levels above levels likely to modify behavior or injure bird, fish, or other wildlife sensitive to excessive noise. 2. Attenuation devices, such as a bubble curtain, will be used to dampen percussives and limit noise associated with activities. 3. For activities involving the use of a hoe-ram/hydraulic hammer, the equipment operator will incorporate a "soft start" when using the equipment to break ledge or bedrock.
7	Restrict Water Extraction	Wells or piping may alter the amount of water available to aquatic or semi-aquatic species. Aquatic individuals may also be directly disturbed during the installation or use of these structures. Measures designed to reduce the amount of water extracted from surface or ground water resources may include restricting the amount of withdrawals or location of activities.	Water, Extraction, Withdrawal, Instream Flow, Wells	1. Whenever possible, use water brought onsite from municipal sources for all required project activities. Validate water withdrawal locations with appropriate State and Federal agencies to ensure that there are no listed species located within groundwater sources or downstream from withdrawal sites. Ensure that no more than 10% of the total water flow is removed at any time to ensure that aquatic species are not impacted by water withdrawal.

Number	Name	Description	Key Words	Narrative
8	Implement Discharge Control Measures	Design project or implement measures to reduce or prevent surface runoff and discharge into aquatic systems or habitat for listed species.	Stormwater, Discharges	1. Design project or implement measures to reduce or prevent surface runoff and discharge into aquatic systems and flooding of terrestrial habitats in order to avoid impacts to listed species. 2. Avoid siting project components in sensitive habitats where presence of listed species is known or assumed. Implement preventative measures to ensure that runoff and discharge do not introduce listed or characteristic hazardous waste, chemicals, oil, saline, industrial by-products or excessive nutrients to aquatic and terrestrial systems. 3. Filter runoff and discharge to ensure removal of any substances introduced by project activities. Ensure that water discharged into habitat where presence of listed species is known or assumed is at a similar temperature and stream flow rate to existing water bodies. 4. Ensure that runoff and discharge are of adequate water quality, defined as the quality necessary for normal behavior, growth, reproduction, and viability of all life stages of any listed species present or assumed to be present. 5. Ensure that any substances present in runoff or discharge are at levels low enough to be conducive to the continued health and survival of the species.
9	Implement Erosion Control Measures	Measures designed to slow the flow of water across the surface and minimize erosion. Erosion of rare species habitat is possible.	Erosion, Erosion Control	1. Implement erosion control measures (e.g., silt fencing, hay bales, soil stabilization matting) to avoid increased erosion that could directly or indirectly impact endangered species. 2. Erosion and Sediment Control measures must strictly adhere to State and Federal guidance that has been provided for your project area and project type. 3. Inspect Erosion and Sediment Control devices regularly during construction to ensure efficacy and prevent failure of devices. Inspect devices prior to expected high rainfall occurrences. Ensure removal of all materials after the construction activity ends.

Number	Name	Description	Key Words	Narrative
10	Implement Sedimentation Control Measures	A wide range of measures designed to slow sedimentation in aquatic systems and minimize water turbidity. Erosion may increase sedimentation or material (e.g., rock, soil, vegetation) deposition into rare species habitat.	Sedimentation	1. Design project or implement measures to reduce or prevent sedimentation into aquatic systems in order to reduce or eliminate additional water turbidity. 2. Avoid siting project components in sensitive and/or highly erosive habitats where erosion of stream banks is likely. 3. Implement preventative measures to ensure that project activities do not increase sedimentation into aquatic systems, or filter and/or remove any additional sediment introduced by project activities.
11	Sign or Mark Sensitive Habitat	Have a biological monitor mark all sensitive areas where construction personnel should not enter. Examples may include brightly colored flagging or snow fencing, temporary fencing, signs, barriers. Ensure removal of all materials after activities are completed.	Sensitive Habitat, Approved Work Area, Avoid Impacts	1. Have a biological monitor mark the edge of the approved work area to avoid impacts to listed species present. If suitable habitat or presence of listed species has been determined through surveys, mark sensitive areas in order to exclude project activities and avoid impacts to listed species. Examples may include signs or rebar posts. Ensure removal of all materials after activities are completed.
12	Implement Spill Protection Plan	Design, implement, and train staff on a spill prevention plan to respond immediately to any contaminants. Measures may include ensuring spill kits are always onsite, informing agencies of spills, and cleaning and containing spills.	Contaminant, Toxin, Hazardous Chemical, Spill	1. Implement a Spill Prevention Plan that is consistent with any state or federal guidance provided for your project area. 2. Submit the proposed plan to the Service for review prior to the initiation of construction. 3. Retain the plan on-site at all times. Review the plan with each on-site construction worker prior to their initial entry onto the site. Post the plan in a prominent, on-site location for easy reference. 4. Report any spills of motor oil, hydraulic fluid, coolant, or similar fluids to the National Response Center (800-424-8802) immediately and to the appropriate Service office within 48 hours. If a spill occurs near known or assumed listed species habitat, clean any fuel or oil spills immediately using approved protocols.

Number	Name	Description	Key Words	Narrative
13	Implement Burn Restrictions	Fires (e.g., prescribed burns, or burning of vegetative debris piles) may impact rare species by killing or injuring individuals (heat, smoke) or damaging their habitat. Burns may also be beneficial for some species habitat conditions.	Prescribed Burn, Burning, Fire	1. Do not burn vegetation in or within 300 feet of a known listed species occurrence. 2. Implement appropriate time of year restrictions if listed species are not present on the landscape year-round. 3. Contact the appropriate Service Field Office to determine the appropriate time of year restrictions for your project area. 4. Do not burn listed plants, whether dormant or non-dormant, or seed capsules. 5. After burns, assess sites for increased growth of herbaceous and invasive plants, and conduct invasive species control measures if needed to reduce competition with listed species or provide appropriate food sources.
14	Install and Use Livestock Fencing	The use of fencing to either confine livestock to a certain area or to exclude them from another.	Livestock, Livestock Grazing	1. Install livestock fencing to confine livestock in areas outside of the habitat for listed species. Inspect and maintain fencing on a regular basis to ensure that it remains intact and effective.
15	Install Surface Runoff Structures	Install structures intended to capture and/or filter surface runoff in order to reduce potential flooding and runoff toxicity.	Runoff	1. Design and install structures that will capture surface runoff and filter runoff toxicity before it enters habitats with known or assumed presence of listed species. Design of structures should be suitable for the habitat and the types of substances expected to be present based on activities that are located in proximity to the structures.

Planning and Design Measures

Number	Name	Description	Key Words	Narrative
16	Design Projects to Reduce Impacts to Habitat	Place structures and design the layout and grade of the project area in such a way as to avoid impacts to natural habitats.	Impacts, Natural Habitat, Design, Sedimentation Rates, Physical Alterations	1. Place structures and design the layout and grade of the project area in such a way as to avoid impacts as a result of increased human presence, and the facilities and structures associated, that will impact natural conditions associated with habitats of listed species. 2. Engineer projects to mimic or restore natural environments in order to avoid impacts to sensitive habitats that could change sedimentation rates, surface runoff, or micro-climate associated with these habitats by creating a physical alteration in the species habitat. Include educational signage to enhance education and understanding of listed species and how human interactions may impact local populations. For species at risk of collection, provide educational information discouraging removal of species and avoid providing information that would identify locations of protected species.
17	Design Culverts	Design and install culverts using the stream simulation approach, to the maximum extent practicable.	Culverts, Stream Simulation, Design	1. Design and install culverts using the stream simulation approach, to the maximum extent practicable. The US Forest Service Stream Simulation guidance states, "Stream simulation is an approach to designing crossing structures (usually culverts), that creates a structure that is as similar as possible to the natural channel. When channel dimensions, slope, and streambed structure are similar, water velocities and depths also will be similar. Thus, the simulated channel should present no more of an obstacle to aquatic animals than the natural channel" (USFS https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm91_054564.pdf).

Number	Name	Description	Key Words	Narrative
18	Design Project for Fish Passage	Design project to account for upstream and downstream passage of fish and aquatic organisms.	Fish, Passage	1. If an aquatic barrier cannot be removed or prevented, then design and install structures that will ensure safe, timely, and effective upstream and downstream passage of fish species and other aquatic organisms, necessary to maintain all life stages of these species. While fish passage structures should be designed to provide passage for a variety of species, focus on providing passage for listed or sensitive species, as well as species known or hypothesized to be hosts for listed or sensitive freshwater mussel species. If host species are unknown, design structures that are broadly effective for a variety of species, including those that are host species for mussels that are closely related or have similar life histories. Coordinate with appropriate State and Federal agencies to determine the appropriate type of structure and design.
19	Engineer Projects to Mimic Natural Grade	Designing a project in such a way as it mimics the natural grade and surface flow regime of a terrestrial system. This measure can be achieved using either natural methods (preferable) or engineered solutions.	Natural Grade, Surface Flow Regime, Terrestrial System	1. Place structures and design the layout and grade of the project area in such a way as to avoid impacts to habitat that will change surface flow patterns or impact natural conditions. 2. Engineer projects to mimic or restore natural environments in order to avoid impacts to sensitive habitats that could change erosion, sedimentation rates, surface runoff, or micro-climate associated with these habitats by creating a physical alteration in the species habitat. Incorporate measures to ensure that sensitive habitats are protected from erosion and toxicity as a result of changes to surface flow patterns.
20	Engineer Projects to Mimic Natural Stream Flow Conditions	Designing a project in such a way as it mimics the natural flow regime of a stream or river system. This measure can be achieved using either natural methods (preferable) or engineered solutions.	Flow, Water Flow, Flow Regime	1. Design projects to account for, mimic or restore natural stream flow conditions and stream functionality. Place materials in such a way as to avoid impacts to water flow, depth, or turbidity that could impact listed species or their habitat. Use natural stream design practices to reduce erosion and the potential for displacement of listed species as a result of changes in water flow.

Access Restriction Measures

Number	Name	Description	Key Words	Narrative
21	Restrict Off-road Activities	Avoid driving heavy equipment/vehicles in sensitive areas (e.g., wetlands, streams, rare plant locations, nesting areas) whenever possible. For some species, human activity (e.g., foot traffic by pedestrians or construction workers) may also be of concern and measures may be necessary to avoid or minimize when and where this occurs.	Vehicles, Pedestrian, Access Road, Path, Off-Road Vehicles, Heavy Equipment	1. Restrict use of vehicles off-road in locations where presence of species is known or assumed. Avoid driving heavy equipment/vehicles in sensitive habitats (e.g., wetlands, streams, karst). Avoid use of vehicles in areas where soil disturbance would result in increased sedimentation or decreased water quality. Only use vehicles on already-established roads or paths. Mark sensitive habitats within the project area in order to exclude project activities and avoid impacts to listed species. Refuel vehicles only in the project specific staging areas.
22	Restrict Road Travel	Rare species may be at risk of disturbance, collision or crushing from vehicles. To minimize these risks a variety of conservation measures may be used such as reducing speed through speed limits or barriers (speed bumps). In some cases, it may be appropriate to temporarily or permanently close certain roads.	Roadkill, Road, Speed, Closure	1. Reduce use of roads and access roads within 300 feet of known or assumed listed species locations. If access can be controlled, limit use to the minimum number of vehicles necessary for the project to be completed. 2. Whenever possible, gate access roads to prevent unnecessary use. 3. Deploy speed limit signs or speed bumps to limit speeds along roadways where listed species may be present to avoid injury or death, and to reduce noise associated with vehicle traffic.

Vegetation Management Measures

Number	Name	Description	Key Words	Narrative
23	Restrict the Use of Chemicals	Avoid use of chemicals in or near habitats known or assumed to be occupied by listed species.	Chemicals, Chemical, Drifting, Runoff, Occupied	1. Avoid use of chemicals in or near habitats known or assumed to be occupied by listed species. Ensure appropriate methods are applied to avoid drifting or runoff of chemicals into habitats known or assumed to be occupied by listed species. Chemicals should be applied only by trained and/or licensed individuals in accordance with State and Federal regulations, and only as directed on the manufacturer's label.
24	Restrict the Use of Herbicides	Some chemicals may negatively impact rare species or their habitats. However, they may also be an important tool for managing or protecting these same species. Measures to avoid or minimize potential adverse effects may include timing and frequency restrictions, application methods, application locations, recommended chemicals/concentrations, and storage methods. For many species we may recommend preparing a habitat restoration/management plan that provides details on all of the above measures.	Herbicides, Herbicide, Chemicals, Chemical, Application, Negatively Impact	1. Limit use of herbicides in order to maintain healthy vegetation communities. 2. If the project includes planting or seeding, ensure that plant materials are free of herbicides or fungicides and use local native, non-invasive species when planting local areas. 3. Avoid the use of plants treated with pesticides or herbicides. Limit use of herbicides to that needed in order to maintain or restore natural plant vegetation communities that contain a high abundance and diversity of native plant species. 4. Only apply herbicide locally, to individual plants or stands of target species. Only use herbicides as directed on the manufacturer's label. Restrict use of chemicals to control weeds only in suitable habitat for listed species. 5. No aerial application of chemicals used for rodent or weed control will occur. Hand-pull weeds if necessary.

Number	Name	Description	Key Words	Narrative
25	Restrict the Use of Pesticides	Avoid the use of pesticides.	Pesticides, Target Species, Applications	1. Avoid use of pesticides, insecticides and surfactants at a location where application or runoff would result in these chemicals contacting listed species or their habitat. 2. No aerial applications of pesticides, insecticides or surfactants will occur. 3. Always have a licensed applicator present on site during application of pesticides. Only use pesticides as directed on the manufacturer's label.
26	Restrict Vegetation Removal	Vegetation removal can result in an adverse or beneficial impact to rare species, depending on the situation. Measures may include limiting the: timing, vegetation species or types of species, methods, extent/amount of removal, or location of removal.	Vegetation Removal, Adverse, Beneficial Impact	4. Restrict removal of vegetation in habitats known or assumed to be used by listed species. Modify all phases/aspects of the project (e.g. temporary work areas, alignments) to avoid tree removal in excess of what is required to implement the project safely. 5. Conduct surveys to determine the presence or probable absence of species in the project area. 6. Avoid tree removal during the active season, which may vary from state to state. Contact the appropriate Field Office(s) for your project area to determine specific dates for time of year restrictions. If removal must occur, ensure removal and/or disposal is conducted outside of any time of year restrictions put in place to protect species. 7. Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked. Install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits.

Training and Habitat Management Measures

Number	Name	Description	Key Words	Narrative
27	Attend Training	Attend training to ensure a sufficient understanding of the proposed project activities, Best Management Practices (BMPs), and/or avoidance, minimization, and mitigation measures, as well as information about rare species that may be present in the project area.	Training, Avoidance, Minimization, Endangered Species	1. Seining, electrofishing, trapping, or any other aquatic survey activity should only be conducted by individuals properly trained in fish identification, appropriate surveying techniques, and proper fish handling. Conducting these activities within occupied or suitable listed species habitat may only be done by individuals using approved survey protocols, holding all applicable federal and state permits, and in coordination with the U.S. Fish and Wildlife Service. Contact the appropriate Field Office for additional information.
28	Conduct Habitat Management Activities	Mark plants with flagging or use metal cages to protect plants to avoid trampling or damage.	Remove, Control, Habitat Management, Girdle	2. Mark plants with flagging or use metal cages to protect plants to avoid trampling or damage. Remove/control competing under- and mid-story vegetation that becomes re-established. When thinning out the forest it is important to leave tree debris. It is recommended to girdle trees so that they die in place, and decomposing roots allows for more soil nutrients.
29	Conduct Habitat Restoration	Broadly defined as the act, process, or result of returning a degraded or former habitat to a healthy, self-sustaining condition that resembles as closely as possible its pre-disturbed state.	Riparian, Restore	3. Restore riparian buffer to original or ecologically improved condition. Plant area with native non-invasive plants, include established plants whenever possible. Seed exposed soil in all disturbed areas with native plant mixes as soon as final grade is completed. Mulch seeded areas until vegetation is established. Stabilize areas with erosion control matting if weather prevents vegetation establishment.

Number	Name	Description	Key Words	Narrative
30	Conduct Surveys	Conduct an investigation with the intent to identify the location or probable presence/absence of a species or their habitat. Note: for any listed species (federal or state), ensure appropriate permitting/authorization is completed prior to conducting surveys.	Presence-Absence Data, Investigation, Presence, Absence	1. Conduct surveys to determine the presence or probable-absence of a species, or habitat features. Prior to conducting surveys, search Natural Heritage Databases or contact appropriate State or Federal sources to obtain information on known or historical species records. 2. If presence has already been documented within the project area within a species-relevant time frame, additional presence/probable absence surveys may be unnecessary. 3. If there are no prior records of listed species, you may assume presence of listed species and avoid all impacts to those species, conduct a habitat assessment, or conduct presence/probable absence surveys. 4. If surveys for species presence in a work area are proposed, use Service-approved protocols and conduct surveys before any construction activities begin. Submit survey plan to Service and appropriate State agency(ies) for approval prior to conducting surveys. 5. All surveys for listed species should be conducted by an approved or permitted biological monitor (depending on the type of survey) who is trained to use safe practices to identify species of interest in the state where surveys will be conducted. Some states require prior site specific authorizations, and/or addition to an approved surveyor list. New surveyors can be added to the approved surveyor list after review of biological monitor credentials. Check with appropriate field offices for specific recommendations and survey guidance.
31	Employ Wildlife Exclusion Techniques	Employ technology to prevent or minimize entrainment of listed species in water intake equipment.	Exclusion, Technology, Water Intake, Entrainment	6. Employ technology to prevent or minimize entrainment of listed species in water intake equipment. Install screens over water intake structures in order to ensure that listed aquatic species are not entrained or injured by equipment. Screens should be of an adequate size to prevent entrainment of most life stages of listed species.
32	Institute Biological Monitoring	A monitor with biological expertise would help prevent harm to species during project activities.	Biological Expertise, Monitor	7. The presence of a monitor with biological expertise on-site during project activities would ensure that potential harm to the species is minimized and potential benefits to the species are maximized.

Number	Name	Description	Key Words	Narrative
33	Institute Seasonal Avoidance	Measures designed to minimize or avoid the effects of certain activities by restricting the time in which they can be conducted. These avoidance periods typically overlap with important life history functions for a species (e.g., spawning).	Seasonal Avoidance, Minimize, Foraging	1. Seasonal avoidance measures are designed to minimize or avoid the effects of certain activities by restricting the time in which they can be conducted. 2. Identify portions of the project area where species activity may be highest and determine whether activities may be avoided in and around those areas during periods of peak activity.
34	Maintain Habitat Buffer	For many species it is important to avoid disturbing individuals or their habitat. By avoiding or minimizing various activities in the vicinity of rare species, many types of adverse impacts can be completely avoided. Each buffer distance may differ depending on the species needs and sensitivity to certain activities.	Habitat, Buffer	1. Project activities that may impact listed species must be conducted outside of a buffer distance from any known or assumed occupied sites. Habitat buffer must be sufficient to provide protection from outside disturbance, including human generated disturbance. 2. Avoid the use of chemicals, fertilizers, herbicides, or pesticides on or near the habitat of listed species. 3. Sign or mark buffer zone to ensure that it is visible to those conducting project activities for the duration of the project. 4. Ensure that all identifying materials are removed after the completion of the project.

Number	Name	Description	Key Words	Narrative
35	Relocate Species	Relocating a species from one area to another that is protected or that will not be subject to impact by a given project. Note: for any listed species (federal or state), ensure appropriate permitting/authorization is completed prior to any relocation.	Relocation, Remove, Move	1. If the activity could directly impact listed species through desiccation, burial, crushing, or dislodgement, ensure any listed species present are relocated to an unimpacted, suitable section of stream before construction activities begin. 2. Ensure appropriate permitting/authorization is completed prior to any relocation. 3. Provide a draft relocation plan to the appropriate State and Federal agencies for approval. 4. Relocation must be conducted by individuals who are trained and permitted to handle the species involved and included on the approved surveyor list for the state in question. 5. Relocated species should be monitored following relocation to assess mortality, movement and growth as part of an approved relocation plan.