**20.FW.WB.1** **NCASI Funding Request:** Staff Time

**Title:** Technical support on biodiversity and species of concern

**Project Duration:** Ongoing

**Contact information:** Jake Verschuyl (jverschuyl@ncasi.org; 360-873-5012)

**Relevance/Value to Members:** Biodiversity-related issues have significant influence on land management and wood procurement nationwide. Federal agencies often have an incomplete understanding of relationships between forest management and biological diversity, and ENGOs often raise fears among the public and customers that management practices are not sustainable and threaten diversity. We provide provide technical support on quantitative and modeling components of NCASI studies investigating biological diversity, threatened/ endangered species, and watershed/landscape management.

**Objectives:**

1. Assess recent litigation and court settlements in regards to potential agency actions and regulatory protection (e.g., listing petitions)
2. Monitor agency publications (e.g., Federal Register) and key ENGO websites, interact with agency and company staff, participate on species status assessment and recovery teams, review and prepare technical comments on regulatory proposals, and support industry and landowner responses to proposed agency actions and other activities (e.g., ENGO market campaigns) as appropriate.

**Summary of Recent Accomplishments:**

- Provided comments to USFWS on proposed Critical Habitat for coastal martens
- Co-lead multi-stakeholder field trip on coastal marten habitat
- Participated in Oregon Carnivore Working Group
- Provided detailed data from ongoing research on red tree vole to USFWS for their Species Status Assessment request for information.
- Participated on Marbled Murrelet survey protocol revision team
- Participated in OSU Marbled Murrelet Project Stakeholder Advisory Group
- Participated on the OSU Institute for Working Forest Landscapes Board – Dean's Advisory Team
- Participated on the OSU Fish and Wildlife Habitats in Managed Forests Board
- Provided comments to USFS on the request for information to help define old-growth and mature forests on federal lands

**Recent Presentations of Results and Products:**

**23.FW.WB.3** **NCASI Funding Request:** $90,000 + staff time

**Title:** Retained structures experiment – bird community response

**Project Duration:** 2022-2025

**Collaborators:** Greenwood, Manulife, Starker and Weyerhaeuser. We will likely purse collaboration and a masters student through Cal Poly Humboldt (Humboldt State University)

**Contact:** Jake Verschuyl (jverschuyl@ncasi.org; 360-873-5012)

**External Funding:** External funding and/or tuition assistance will be sought after confirming collaboration.

**Relevance/Value to Members:**

Although research on the effectiveness of structural retention in clearcuts of the Pacific Northwest has been conducted, questions remain regarding retention patch size, slope position of patches, and how adjacent vegetation types influence patch functionality. This experimental study was designed to assess biodiversity responses to operational structural retention arrangements, initially using small mammal and carabid beetle occupancy and diversity to represent taxa that respond quickly to changes in condition on the forest floor. Sampling occurred in 5 treatments replicated in 10 blocks across WA and OR from 2017-2019. The original objectives for this work included a return to sample birds once mechanically created snags (in 2/5 treatments) had begun to decay – that time is now. Understanding bird responses to these retention treatments will provide an opportunity to maximize the value of our experimental design and assess the diversity of a larger and more mobile taxonomic group that uses the forest canopy as well as the understory. We will capture biodiversity, as well as species-level responses that will help describe overall bird use of managed forests in this region.

**Objectives and goals:**

1. Assess bird abundance and diversity response to 5 retention treatments across 8 remaining unburned blocks (40 stands)
2. Relate bird diversity and abundance to other measures of biodiversity across retention treatments.
3. Develop and disseminate information on which species utilize retention and which arrangements maximize that utilization.

**Summary of Recent Accomplishments:**

Pilot sampling for birds took place in 2022 to assess bird use of the retention patches and test a sampling protocol.

**Recent Presentations of Results and Products:**

3 publications are complete, summarizing the carabid beetle and small mammal sampling that took place in collaboration with Michigan State University from 2017-2019.

**20.FW.WB.5** **NCASI Funding Request:** Staff time

**Title:** NAFO Initiative – Collaborative at-risk species projects with USFWS

**Project Duration:** June 2020 - ongoing

**Collaborators:** US Fish and Wildlife Service, NAFO Member Companies in Oregon and California

**Contact information:** Jake Verschuyl (jverschuyl@ncasi.org; 360-873-5012)

**External Funding:** Wildlife Conservation Initiative – several individual grants.

**Relevance/Value to Members:** The National Alliance of Forest Owners has established an At-risk Species Initiative to promote improved understanding of the contributions that working forests make to conservation of at-risk species. Partners involved in the Initiative vary regionally but typically include NAFO-member companies, the U.S. Fish & Wildlife Service, other federal agencies, state wildlife agencies, conservation organizations, and others.

**Objectives:**

1. Work with partners to identify and implementing collaborative projects to address important questions about the value of working forest for selected species of conservation interest which will potentially lead to some species not being federally listed as threatened or endangered.
2. Participate in the design and implementation of selected cooperative research projects.
3. Support ongoing partnership efforts by NCASI member companies and the Service to document contributions of working forests to conservation of species proposed for listing as threatened or endangered

**Summary of Recent Accomplishments:**

- Designed and executed large scale forest pollinator study stratified by fire severity.
- Evaluated conspecific arboreal nest use as it relates to red tree voles.
- Provided novel metabarcoding data for both martens and pollinators from bees.

**Recent Presentations of Results and Products:**

**20.FW.WB.9** **NCASI Funding Request:** Staff Time

**Title:** Conservation value of slash piles for Pacific marten and fisher

**Project Duration:** June 2020 – June 2023

**Collaborators:** John Bailey. **Master's Student**: Jordan Ellison, Green Diamond Resources Company, Rayonier, USDI Bureau of Land Management, US Fish and Wildlife Service, Fisher Candidate Conservation Agreement with Assurances

**Contact information:** Katie Moriarty (kmoriarty@ncasi.org; 541-249-3987)

**External Funding:** OSU Fish and Wildlife Habitat in Managed Forests, Fisher Candidate Conservation Agreement with Assurances

**Relevance/Value to Members:** We designed this study to occur in proximity to coastal martens and fishers. Coastal martens were designated federally threatened (2020) and state endangered in California (2019). Fishers were designated state and federally endangered in the Southern Sierra Nevada. Fishers have been petitioned in the west; withdrawn in 2020 and under litigation. Supplemental introductions are being considered. This work is being requested by the USFWS, NRS, and landowners for restoration opportunities.

**Objectives:**

1. Document carnivores visiting slash piles. Establish whether martens or fishers enter clear cuts to visit slash piles, and whether pile/stand characteristics are associated with detections.
2. Estimate small mammal abundance & diversity at slash piles and the surrounding landscape. If small mammal populations increase with slash piles, this may represent a foraging resource.
3. Model surface fire behavior. We will assess the degree to which pile size, composition, and distribution influence risk of increasing wildfire severity while accounting for weather.

**Summary of Recent Accomplishments:**

- Field work completed November 2021. Over 2 million photos tagged and processed.
- Crews surveyed 69 stands for vegetation & woody debris sampling, remote camera monitoring, and slash pile measurements in northwest California. Teams completed intensive sampling (n = 10 stands in CA, n = 8 stands in OR) to generate fire behavior models

**Recent Presentations of Results and Products:**

Ellison, J., K. M. Moriarty, A. Larsen-Gray, L. Ellsworth, and J. D. Bailey. 2022. Conservation value of slash piles for Pacific martens and fishers, The Wildlife Society Annual Conference. Spokane, Washington.

Ellison, J., K. M. Moriarty, A. Larsen-Gray, and J. D. Bailey. 2022. Conservation value of slash piles for conserving rare carnivores, *abstract within:* Conference Oregon Chapter of the Wildlife Society Annual Conference. Newport, Oregon.

**21.FW.WB.1** **NCASI Funding Request:** Staff Time

**Title:** Pollinator Composition and Diversity Amongst Forested Stands and Watersheds that Differ in Age

**Project Duration:** 2020-2023

**Collaborators:** Oregon Bee Atlas, USDA Forest Service, Weyerhaeuser, Manulife, Hampton, Green Diamond Resources Company, Oregon Department of Forestry, Stimpson, Sierra Pacific Industries, Collins Pine, Avery Properties, University of Oregon

**Contact:** Katie Moriarty (kmoriarty@ncasi.org; 541-249-3987), Laura Six, Deanna Williams, Lincoln Best, Jake Verschuyl, AJ Kroll, Lauren Ponisio

**External Funding:** >$300,000 NCASI, USDA Forest Service, Wildlife Conservation Initiative, US Fish and Wildlife Service, Weyerhaeuser

**Relevance/Value to Members:**

Several bee species have been federally listed (Franklin's bumblebee) or are proposed for listing in Oregon and California. California is expected to propose listing up to 8 species in the coming year with September's upholding of bees being classified as "fish" under the CaESA. We are providing information as to the distribution of rare (and common) bees, sampling methods, and potential forest management activities that may promote high pollinator abundance or diversity. We also are evaluating bee occupancy and richness within a spatial scale that may be more relevant to public perception and policy (e.g., watershed). In the coming year, we expect to publish our results and provide the scientific community with several locations that will expand species' ranges.

**Objectives:**

1. Collect information on pollinator species richness within sub-basin watersheds that differ in average stand age as part of a landscape-scale replicated study.
2. Combine passive capture, net, and botanical surveys to identify specific plants that pollinators are using within stands that differ in age
3. Use DNA metabarcoding on pollen loads isolated from hand-netted bees to reveal a more detailed record of individual- and species-level foraging behavior.
4. Evaluate parasite content within bumble bees and honeybees in regions that differ in stand age.
5. Combine combination of hand-netted information and DNA metabarcoding to identify native plants correlated with bumble bee use. Identify floral mixes, including shrubs, that could be used for large scale restoration.

**Summary of Recent Accomplishments:**

- We finished our largest field season and are sorting/classifying >40,000 bees.

**Recent Presentations of Results and Products:**

- Ponisio presented at Wildlife in the Woods (NCASI BBQ) in July
- Dr. Larsen-Gray integrated this project within her talk at NCASI's conference on Sep 28
- We will present 2 posters and a full oral session including Dr. Moriarty's focus on this project within the international TWS conference in Spokane

**22.FW.WB.1** **NCASI Funding Request:** $41,000 + staff time

**Title:** Cumulative effects of post-fire riparian forest management on vegetation structure and diversity across fire severity and land ownership

**Project Duration:** 2021-2025

**Collaborators:** Weyerhaeuser, Giustina Land and Timber, BLM, Port Blakely

**Contact:** Laura Six (laura.six@weyerhaeuser.com), Jake Verschuyl (jverschuyl@ncasi.org)

**External Funding:** $16,000 Weyerhaeuser

**Relevance/Value to Members:** The results of this effort will provide NCASI Members the ability to evaluate how fire and post-fire forest management influences vegetation recovery and, when combined with 20.FW.WA.5, the effects of vegetation recovery and shading on aquatic ecosystem processes. These results will illustrate the complexity of vegetation response after mixed severity fire and its influence of stream temperature and shading, especially within forested buffers which are an ecologically critical area of importance.

**Objectives:**

1. Determine whether effects of fire and post-fire management on riparian vegetation are transient or whether they cause long-term shifts in the vegetation community.
2. Relate riparian vegetation community structure to aquatic ecosystem function – can the understory provide shade and decrease stream temperature while overstory vegetation remains limited?
3. Assess whether vegetation cover or species richness following disturbance varies with distance from the stream? Is there a threshold distance around which patterns of vegetation differ?

**Summary of Recent Accomplishments:**

Two years of field work have been completed. One draft manuscript has been submitted, and one presentation was given at the Ecological Society of America meeting in summer 2022.

**Recent Presentations of Results and Products:**

A draft manuscript on large wood density as it relates to fire and management intensity has been submitted to Fire Ecology using this data: lead author – Ashley Coble.

Six, L.J., A. Coble. J. Verschuyl. 2022. Riparian vegetation dynamics after mixed severity fire in the western Cascades, Oregon. Oral presentation at Ecological Society of America Annual meeting, Montreal, Canada.

**23.FW.WB.2** **NCASI Funding Request:** $21,000 + staff time

**Title:** Pollinator Pathways Across Landscapes (PPALs) – avian and bat diversity

**Project Duration:** 2022-2024

**Collaborators:** USDA Forest Service, Manulife, Stimpson, Weyerhaeuser, GreenWood (not sampled in 2022), Cal Poly Humboldt, University of Riverside, University of Oregon

**Contact:** Katie Moriarty (kmoriarty@ncasi.org; 541-249-3987)

**External Funding:** $611,757 from USDA Forest Service, Siuslaw National Forest and Rocky Mountain Research Station

**Relevance/Value to Members:**

This effort leverages work being supported by a large federal grant to demonstrate how private intensively managed forests contribute to biodiversity across mixed ownership landscapes. Here, we sampled insect pollinators and floral resources (see 21.FW.WB.1), hummingbird diet, avian and bat occurrence in watersheds that contain mid-seral thinning and forest gap treatments being conducted by the Forest Service. To add context to our data and value to our Member Companies, we surveyed private working forests in addition to these thinned and unthinned older stands within the Oregon Coast Range. A number of focal species, including the rufous hummingbird, hoary bat and silver-haired bat may be considered for listing (as soon as Nov 2022 for hoary bats in Canada under SARA). Having pilot data to better design projects may be helpful for assessing risk and planning directed research.

**Objectives:**

1. Quantify plant/pollinator interactions in areas that differ in forest cover and age
2. Use pollinator data to inform native species mixes for planting in the coast range specifically
3. Develop protocols for sampling hummingbird, avian, and bat communities in areas that differ in forest cover
4. Survey forested stands to summarize baseline diversity metrics and species occurrence data in preparation for comparison with future thinning (or clear cut) treatments with floral enhancements

**Summary of Recent Accomplishments:**

- We contracted University of Riverside (Dr. Rankin) to capture hummingbirds and collect diet samples in the coast range. We conducted point-count surveys for birds using similar protocols to IFM (May-August). We collected bat acoustic data in watersheds that differed in average age and stands that differed in age and composition.

**Recent Presentations of Results and Products:**

- Presentations outside of our task group will occur after our second year of data collection. A progress report will be delivered to USFS in December.

**24.FW.WB.2** **NCASI Funding Request:** $85,000 + staff time

**Title:** Fire Severity and Salvage – Comparing Pollinator Composition and Diversity Amongst Forested Stands that Differ in Fire Severity and Distance within High Severity Patches

**Project Duration:** 2022-2025

**Collaborators:** Oregon Bee Atlas, USDA Forest Service, Weyerhaeuser, Manulife, Oregon Department of Forestry, Stimpson, Sierra Pacific Industries, Collins Pine, Avery Properties, University of Oregon

**Contact:** Katie Moriarty (kmoriarty@ncasi.org; 541-249-3987)

**External Funding:** $175,000 Wildlife Conservation Initiative, Weyerhaeuser. Matching ask with WCI for 2023 field work. Dr. Ponisio has submitted 2 grants to work in the Holiday Farm fire.

**Relevance/Value to Members:** Fires during 2020 and 2021 were of the largest and most severe on record in the western United States as well as in many forests globally (e.g., Australia, Russia, Brazil). Insect pollinators may benefit from large openings when floral resources are abundant. Nonetheless, during the fires, most insect pollinators would have been killed and thus species would need to recolonize into high severity patches. Our data will inform distribution, richness, and opportunities following fires. Further, we aim to collect a time series of data both following high severity fire and salvage logging which is a gap in information overall (see paragraph, full proposal). Continued work is paramount as our first year (2022) will paint a picture of devastation. We expect floral (and thus bee) recovery to occur following 2-4 years post alteration (burn, salvage).

**Objectives:**

1. Collect information on pollinator distributions and species richness within stands that differ in age, fire severity, and distance within high severity fire.
2. Combine passive capture, net, and botanical surveys to identify specific plants that pollinators are using within stands that differ in fire severity and harvest intensity.
3. Use DNA metabarcoding on pollen loads isolated from hand-netted bees to reveal a more detailed record of individual- and species-level foraging behavior.
4. Evaluate parasite content within bumble bees and honeybees in different fires.
5. Assess the effect size on pollinators (abundance, diversity) following large scale native plant floral enhancements.

**Summary of Recent Accomplishments:**

- We finished our largest field season with no incidents and are sorting/classifying >40,000 bees.
- We surveyed the Beachie, Holiday Farm, Dixie, and Claremont Bear fires with repeated sampling in all areas surveyed in 2021.

**24.FW.WB.6** **NCASI Funding Request:** Staff time

**Title:** Environmental Responses to Post-Disturbance Management Interventions

**Project Duration:** 2023-2024

**Collaborators:** AJ Kroll, Weyerhaeuser

**Contact:** Jake Verschuyl (jverschuyl@ncasi.org; 360-873-5012)

**External Funding:**

**Relevance/Value to Members:**
Large-scale environmental disturbances such as floods, fires, and insect outbreaks can influence species distributions, community composition, and ecosystem processes. Management responses to environmental disturbances seek to maintain populations and communities of native organisms, control exotic organisms, and reduce the risk of further disturbances and potential environmental degradation. For example, forests disturbed by fire, extreme wind events, or insect infestations are often "salvaged" to capture remaining economic value of standing and down timber. Salvage-logging is a controversial conservation and management issue worldwide. Potential ecological effects of salvage logging include changes in vertebrate and invertebrate populations, stand regeneration rates, ecosystem processes, and landscape pattern. However, recovery of economic value in order to reduce detrimental societal impacts is often a primary consideration to motivate salvage activities. In so doing, management responses may exert additive or multiplicative effects on ecological processes beyond those caused by the disturbances themselves which, in turn, may have been influenced by previous anthropogenic activities. As human demand for ecosystem products increases, management interventions after disturbances may occur more frequently. In addition, increases in size and frequency of natural disturbances due to climate change are predicted. Finally, some ecosystems (e.g., moist forests west of the Cascades), characterized historically by prolonged periods without disturbance, have experienced several recent large-scale events. To provide managers with a contemporary perspective on post-disturbance options, we propose a structured evidence review of ecological responses to cumulative effects of anthropogenic and natural disturbances.

**Objectives and goals:**

1. Develop focal questions based on management objectives for east- and west-side forests
2. Conduct literature review and synthesize findings in SER format - Similar to Martin et al (2021)

**Summary of Recent Accomplishments:**

**Recent Presentations of Results and Products:**