2024 Taylor's Checkerspot Butterfly Working Group

UPDATES & MEETING MINUTES – DAY 1

Date:	13 November 2024
Location:	The Evergreen State College (Olympia, WA)
Notetaker:	Anita Michalak, Ecostudies Institute

Text in boxes was provided as a written update.

ATTENDEES

BC Ministry of Water, Land, and Resource Stewardship: Jennifer Heron, Kihan Yoon-Henderson
Center for Natural Lands Management (CNLM): Anika Goldner
Ecostudies Institute (ESI): Anita Michalak, Adam Martin, Cindy Nguyen, Sarah Hamman, Elspeth Kim, Mollie Steele, Sam Bussan
Institute of Applied Ecology (IAE): Jessica Ruff, Denise Giles, Andrew Esterson, Karen Hall, Annie Lamas, Tyler Roberts, Laura Estrada
JBLM Fish and Wildlife: Gina Smith, Tim Leque, Jim Lynch
JBLM ITAM: Leif Wefferling
National Park Service (NPS): Miranda Terwilliger
Pacific Rim Institute (PRI): Mosa Neis
Sustainability in Prisons Project (SPP): Xitlali Herrera, Mariana Cervantes, Michael Zirpoli, Jennifer Teitzel, Shelly Lagroone, Vickie Phillips, Kennie Calvert, Trista Egli
Washington Department of Fish and Wildlife (WDFW): Julia Smith, Eszter Munes, Erica Henry, Andy Dechaine, Melinda Vickers, Julia Trautmann, Abby Sage, Bill Kronland, Shelly Ament, Allison Leipold
Washington Department of Natural Resources (WNDR): Brian Turner, Ben Stein, Noelle Nordstrom, Heather McPherson, Regina Johnson
US Fish and Wildlife Service (USFWS): Rose Agbalog, Michelle Cliff, Zachary Radmer, Erin Gray, Dan Grosboll, Mikki Collins, Kelsey King, Adam Gilles, Lorenz Sollmann, Tyler Porter
US Forest Service (USFS): Karen Holtrop

REGULATORY, RESEARCH & RANGEWIDE UPDATES

Federal Updates (US) – Dan Grosboll (USFWS)

The USFWS announced the availability of the recovery plan for Taylor's checkerspot butterfly on August 29, 2024. The recovery strategy seeks to improve: (1) resiliency by building and managing habitat sufficient for large, self-sustaining population complexes that are capable of withstanding stochastic events; (2) redundancy by maintaining and reintroducing multiple population complexes within and across recovery regions to withstand catastrophic events; and (3) representation by maintaining genetic diversity and expanding ecological diversity. The Recovery Implementation Strategy and the Species Biological Report that support the recovery plan are also posted on the ECOS USFWS website.

- Recovery Plan has been completed, with specific targets as well as downlisting and delisting criteria.
    - Species Biological Report and RIS underneath the Plan and are changeable (though the goals can be changed to reach long-term objective).
- The Action Plan is developed to complement RIS and intended to be reviewed every year to determine how we're progressing to conserve/recover the species.

Federal Update (Canada; see slides) – Jennifer Heron (BC MWLRS)

- Species in Canada are assessed federally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).
    - TCB listed under the Species at Risk Act (SARA) as endangered in 2003.
- Federal (provincial) recovery strategy was completed in 2006, with the most recent COSEWIC assessment completed in 2011 (species still endangered).
- Next COSEWIC reassessment in 2022 (overdue) but the species retains endangered status until reassessed.

Funding Update (Recovery Challenge) – Andrew Esterson (IAE)

- OR Watershed Enhancement Board Restoration Grant: restoration at 9 sites, CALE seed production, TCB captive rearing at OSU.
- TCB Recovery Challenge Grant: not just for OR, can be implemented rangewide.

Editha Checkerspot Workshop Recap – Elspeth Kim (ESI)

- Workshop focusing on the Taylor's, Bay, Quino, and Sacramento Mountains subspecies; held in Feb 2024.
- Notes will be uploaded to CPOP soon.
- Highlights included a tour of the lab and the Quino release site as well as insight into the reinforcement project.

Enclosure Pilot Project (see slide) – Melinda Vickers & Erica Henry (WDFW)

- Extended proof of concept study because all individuals died last year; all spots planted for enclosure looked nibbled.
- Tried another enclosure in Scatter Creek South in similar conditions; one larva was found outside the enclosure.
- Project will be continued next spring with the following goals:
    - Attempt to keep the caterpillars in (12 larvae in each enclosure)
    - Examine how much variability there is within and among sites
    - Target more questions once survival has been established
- The purpose of the enclosures is to understand survival rates post-release. We are targeting plantago for now, but the hope is that other species and objectives can also be tested.
- Question from Jenny: Was there any ripple effect of the heat dome from a couple years ago?
    - Very possible, but can't tell for sure.

Host Plant Resiliency Project Updates (see slides) – Sarah Hamman, Adam Martin (ESI); Scott Harris, Denise Giles (IAE)

Project title: Evaluating microsite conditions and seed provenance to support climate-resilient populations of Taylor's checkerspot oviposition and larval host plants

Project summary: There is strong evidence that Taylor's checkerspot butterfly (TCB) population numbers are dramatically declining across many sites, particularly in the center of its range. While this decline may be due in part to direct impacts of extreme weather events (extended spring-summer drought, late winter freeze events, the 2021 'heat dome', etc.), it is also hypothesized that a large contributing factor is a concurrent decline in oviposition and larval host plant abundance in occupied sites due to the same extreme weather events. Very little information exists around the microsite conditions needed to support the primary host plant species throughout the different life stages of the butterfly. In addition to identifying and creating supportive microsite conditions, we also need to select the genetics that will thrive in the range of conditions expected in the future. Testing seeds sourced from different local and regional sites will provide the information needed to create resilient populations of host plants going forward. This project will focus on four objectives: 1) identify the microsite conditions that lead to *P. lanceolata* and *Castilleja sp.* patch persistence and density that meet Taylor's checkerspot butterfly oviposition habitat requirements, 2) evaluate the effects of microsite conditions on the phenology of *Castilleja sp.* and *P. lanceolata* that maximize both pre- and post-diapause larval food resources, 3) evaluate the effects of seed provenance on P. *lanceolata* establishment, growth and reproduction within different microsites, and 4) communicate project progress and outcomes to local and regional partners, researchers and practitioners through reports, regional and national conferences and peer-reviewed publications. These objectives will be addressed through a combination of monitoring of long-term plots, instrumentation of occupied microsites with soil moisture and temperature

dataloggers along with phenological monitoring of host plants, and a common garden trial crossing seed source by microsite. Activities will take place at three sites occupied by host plants (and in many cases, TCB) in each of three regions that span the U.S. distribution of TCB: the North Puget Sound, South Puget Sound (including on JBLM) in Washington, and the Willamette Valley in Oregon.

Update: Year 1 of this project has been funded by DOD-USFWS funds. Currently submitting proposals for years 2-4. We have identified sites for project implementation (listed below) and will be establishing and instrumenting plots this fall. We hope to align this project with the WDFW-led TCB enclosure study and a (yet-to-be-funded) larger UW-led microclimate study on JBLM to maximize our learning and application.

North Sound: Ellis Preserve, Shaw Island – San Juan Preservation Trust; Pacific Rim Institute, Whidbey Island – Pacific Rim Institute; Pratt Preserve, Whidbey Island – TNC
South Sound: Tenalquot – CNLM; Scatter Creek South – WDFW; TA15-JBLM – JBLM
Willamette Valley: Beazell Memorial Forest – Benton County; Fitton Green – Benton County; Crisp – Benton County

- Project initially introduced last year.
- PRI and Pratt both have golden paintbrush, Ellis will have it reintroduced.
- None of the northern sites currently have TCBs, but hopeful that they can.
- Ideally hoping to layer enclosure project with microsite project.
- Main objectives:
    - Persistence (what are the microsite conditions that lead to Castilleja and P. lanceolata persistence)
        - Hoping to use previously collected data in reach region from 2016-2024
        - Collect both abiotic and biotic data from monitoring plots
    - Phenology (how do microsites support early season growth for post-diapause larvae)
        - Looking at spring emergence in Jan/Feb and senescence in the summer
        - C. Murphy determined a senescence guide for golden paintbrush
        - Chemistry component: do microsites effect iridoid glycoside content?
    - Adaptation (evaluate the effects of seed provenance and microsites on P. lanceolata)
        - Putting together a common garden experiment at each site
- Some deer problems, especially at the north sites; using existing fencing to combat some issues.

RECOVERY REGION UPDATES

WILLAMETTE VALLEY RECOVERY REGION

2024 Habitat Surveys (Oregon)

In Oregon, there are only two remaining extant populations of TCB (Beazell Memorial Forest and Crestmont-Cardwell). USFWS is reintroducing TCB at Bald Hill. Active restoration (see details below) is now being started at 7 sites (Harris, Crisp, Pearcy, Echo Hills, Fitton Green, Bald Hill, Rung Meadows). In 2024 we conducted habitat surveys at these 7 sites. We used the same grid-based rapid habitat assessments used by Washington DNR and by the 2016 and 2023 Oregon surveys. Surveys will be used to assess habitat conditions suitable for larval introduction, and to assess the effectiveness of restoration actions. Funding for this project was provided by OWEB. Contact: scottharris@appliedeco.org

2024 Research & Monitoring Activities (Oregon) – Laura Estrada (IAE)

In 2024, the USFWS conducted a pilot study to assess larval reintroduction success at Beazell Memorial Forest. Larvae were placed within netted enclosures and monitored through subsequent life stages. IAE will continue this study at Beazell and eventually other sites as introductions occur.

With USFWS and other partners, IAE will assess candidate sites for future reintroductions. The Oregon TCB workgroup that met in October 2024 started this process by brainstorming candidate sites and regions for an

additional Oregon population complex. IAE will now begin visiting these sites and conduct more detailed habitat surveys (aka the RHA grid method) at the most promising locations.

We are partnering with Ecostudies for the TCB microhabitat study (funded via USFWS). IAE will conduct the study at 3 Oregon sites: Beazell Memorial Forest, Fitton Green, and Crisp. All these sites are managed by Benton County. Ecostudies will be coordinating and/or conducting the study at 6 sites in Washington. This is a multi-year study with the initial objectives to understand how micro-site conditions (slope, aspect, soil temp and moisture) affect the establishment, growth, and phenology of *Castilleja sp* and *Plantago lanceolata*.

- 2023-24 TCB habitat monitoring at 9 sites pre-TCB habitat restoration (2 sites with existing TCB and 7 potential reintroduction sites)
    - Implemented the RHA (rapid habitat assessment) grid monitoring method
- Within each cell, conducted RHA and categorized by different habitat variables; looked at habitat structure, invasive species, shrub/tree cover
    - Can create heat maps from this data
- Will be revisiting these sites in 2026 to get a status check on all the grids
- Future projects: TCB microsite project and TCB recovery challenge

2024 Captive Rearing: Coffee Creek Correctional Facility and USFWS – Annie Lamas and Andew Esterson (IAE)

In 2023, IAE took responsibility for the TCB lab at CCCF which had previously been funded by USFWS and continues to be so. Since that time, most procedures have remained consistent and no large maintenance changes have occurred. IAE visits once a week to work with crews at CCCF. Here are some updates for the 2024-2025 season:

Adults, Eggs, and Pre-Diapause: The lab received a smaller amount of Taylor's Checkerspot butterflies this year than years prior with eight butterflies in total, seven females and one male. Of those seven females, all were productive and laid a total of 1,122 eggs. Based on the number of eggs laid and data from past seasons, this total amount isn't abnormal, though slightly lower than usual. The male was paired with one female butterfly for a day who successfully laid eggs. The next day, it was paired with a different female to see if they would copulate, but this did not occur and the male died shortly after.

All butterflies were captured from Beazell Memorial Forest. The decision to collect only from this site was due to the steady decline in the population at the Cardwell Complex for the last few years. The first hatch was on May 25th with the first 2nd instar occurring on June 1st, followed by the first 3rd instar occurring on June 7th, and the first 4th instar occurring on June 13th. With the new addition of the Hood River TCB lab, 373 larvae from CCCF were transferred there, leaving 749 at CCCF. The official first larva count, which occurs at 3rd instar, was 713 larvae. Between the first count and cold diapause, only eight larvae had died - an incredibly low number compared to previous seasons. The survival rate from egg to diapause is 94%.

This year, we introduced amino acids to give to the adult females in addition to their honey mixture. Nectar naturally contains amino acids, so the thought was that the adult females and later their larvae would benefit from the introduced amino acids to supplement what would be available in the wild. Based on technician reports, the butterflies appeared lethargic and listless after being given the amino acids, so the technicians reduced and then ultimately stopped administering them once the behavior continued. Shortly after giving them the amino acids, the technicians saw four butterflies die in one day, something they have not experienced in previous years. They theorized that they may have experienced a less than average lifespan in captivity because of the amino acids, but a necropsy report done by Kelsey King showed that the butterflies were older than usual and some had mostly infertile eggs in their system. It was also noted in the report that the spermatophore pouch in three of the butterflies was yellow, possibly indicating that the females had not been mated with or the spermatophore was not digested. We're continuing to discuss the possibility of using amino acids again next year and either significantly adjusting the amount or only administering them to a small portion of butterflies. We are also discussing the possibility of including more than one Plantago plant in the oviposition chambers to encourage more egg laying, switching plants out after 24 hours, and possibly including nectar plants in the chambers.

Diapause: In September 2024, there were 705 larvae put in outdoor diapause sheds. As of October 15th, all 705 larvae are alive and remain in diapause.

Plantago availability for 2024: Because of the smaller number of larvae this year, Plantago availability was not an issue. After the redesign in October of 2023, the Plantago yard started experiencing an incredible growth period from late March through April. Early in April, we purchased a variety of native plants from a local nursery, including meadow checkermallow, Western columbine, Douglas wallflower, and many more. With the establishment of the natives, the diversity in the yard significantly increased, increasing the overall health of the growing area.

Around mid-June, the Plantago yard had more of a lime green color overall rather than a rich green, so we had one soil sample sent to OSU and another to Earthfort, as well as some leaf and root samples to OSU's plant clinic. In the meantime, the crew increased their watering efforts and the yard improved dramatically with those few small changes. After discussion with Kelsey, we applied a solid crab meal fertilizer from Down to Earth on September 19th. The hope is that since the solid fertilizer is more long-lasting in the soil than liquid, the yard will continue to utilize the nutrients through the winter and take them up more rapidly in early spring. An additional order of native plants was put into the yard in mid-October, further increasing the diversity of the growing area.

- CCCF captive rearing program was started in 2017; had a plantago crash in 2023 (attributed to a combination of heat stress, under or over-watering resulting in a fungal issue, flea beetles).
- New "keyhole design" implemented in 2024 and yard is now doing much better.
- Summary:
    - Captive rearing: 8 adults, 7 females and 1 male
        - Successful with one pairing but died soon after
        - 1/3 of larvae transferred from Coffee Creek to Hood River
    - Amino acids introduced for the first time with varying results.
        - Females lived 8-10 days (shorter than expected)
- Changes to implement in 2025:
    - Switching out the plantago in the oviposition chamber if a butterfly has not laid in 24 hours instead of 3 days
    - Add nectar species to oviposition chamber to supplement use of amino acids

2024 Captive Rearing: Mid-Columbia Agriculture Research and Extension Center (OSU) – Chris Adams and Kelley Asselin (OSU), presented by Andrew Esterson (IAE)

In 2024, IAE collaborated with Oregon State University to create a new rearing site for TCB funded through OWEB. The new site is located at the Mid-Columbia Agriculture Research and Extension Center (MCAREC) in Hood River, OR. As outlined in the rearing permit, OSU followed husbandry procedures from CCCF for the rearing process. Here are some updates from the 2024-2025 season:

In September 2024, 39 larvae will be put in the outdoor diapause shed. Variable weather in Hood River delayed the expected cold-diapause start date, however recently temperatures have remained constant and low enough to transfer the larvae into the overwintering shed.

Adults, Eggs, and Pre-Diapause: In May 2024, CCCF received seven butterflies for rearing, which is a smaller number of Taylor's Checkerspots than previous years. All butterflies were captured from Beazell Memorial Forest. Of those seven, six laid a total of 1,122 eggs. Of these eggs, 390 were transported by USFW from CCCF to Hood River to be reared. Initially, the TCB were going to be reared in our greenhouse, however extreme summer heat overwhelmed the current cooling system, and the larvae had to be moved to our secondary location until we can improve the cooling system. The eggs were brought to our secondary location, our insectary. The first hatch occurred on May 26th with the first 2nd instar occurring on May 31st. The first 3rd instar occurred on June 6th and the first 4th instar occurred on June 12th. Larval growth was slow, and we began to see mortality after the first transition from 2nd to 3rd instar. Despite temperature and humidity ranges matching optimal requirements, 60% of the population died. We have several ideas why this happened but no concrete evidence to draw conclusions at this time. We believe the humidity was too low despite temperature logger readings that put us within the target humidity range.

Additionally, the health of the egg clutches has been questioned due to physiologic malformations observed by Kelsey King (USFW) in certain butterflies, which was discovered after their death and dissection. Some butterflies showed undissolved spermatophores and plugged abdomens which could have impacted the number of eggs lain and egg health. Young larvae continued to struggle in their development despite a change in our effort to increase humidity.

Diapause: Diapause has been uneventful. As of today, September 16th, we are still waiting to transfer the larvae into cold diapause. The high, variable temperatures and smoke in Hood River have delayed the transfer to cold diapause. The larvae are checked bi-weekly, and all appear to be healthy. We expect the cold temperatures in Hood River to prolong our cold diapause longer than CCCF, which will be monitored to ensure wake-up occurs at an optimal time in accordance with the expected release date.

Plantago: The Plantago patch is healthy with room to expand. The first generation planted in July 2023 repopulated throughout the plot creating an ample source of plantain for the larvae during the 2024 season. This fall, we are focused on mowing the patch and weeding. We expect the Plantago to remain healthy throughout the winter. Additionally, there is room to expand the patch and add native plants to ensure nutrient availability.

Future Plans: Caterpillars will be monitored throughout the winter until 'Wake-Up', estimated around mid-February. Following this emergence, larvae at MCAREC will be reared through adulthood or transferred to protected habitat through coordination with IAE. Under the guidance of USFW, for Kelley's Master's project she will be conducting an oviposition preference experiment in the Spring of 2025. Remaining larvae reared at the Hood River lab through adulthood will be used for breeding. We will conduct the oviposition experiment using different plant species advised by USFW; Plantago (*Plantago lanceolata*), Hairy paintbrush (*Castilleja tenuis*), Penstemon cardwellii, and Rosy owl-clover (*Orthocarpus bracteosus*). We plan to grow the additional native species next to our Plantago Patch. In early spring, temperatures are still low, and our greenhouse provides a safe environment for this experiment. Gravid females can be double contained in a large enough cage for the comparison and observations. The results from this experiment will be used to determine if there are additional hosts plants suitable for TCB in environments where their native host does not thrive. Egg clutches produced from breeding will be kept at MCAREC and reared for the next year until release in Spring 2026.

- MCAREC (Mid-Columbia Agriculture Research and Extension Center) specializes in integrated pest management strategies for fruit trees and began collaborating with IAE in 2022-23.
    - Huge mortality of larvae (60%-ish)
    - Challenges:
        - Humidity issues, concerns about mold and moisture
    - Spring 2025: oviposition project and community engagement (incorporating a master's project)
- Q&A:
    - 4 pretty common plants in WV (the ones to be used for experimental design)
        - Chosen based on past info and abundance in the WV, as well as what seed could be collected with short notice
    - Is the phenology appropriate for them to oviposit on?
        - Yes, but will see if the timing actually works; if not, they're probably still supplemental and then can ultimately move back to plantago
    - Not yet committed to any particular method of placement
    - Are those species readily available?
        - Penstemon is sold commercially, other two species are produced by BLM
    - Is the plan to do a larval feeding/survival study?
        - Currently more interested in finding primary hosts than secondary hosts

2024 Population Monitoring in Benton County, OR: Fitton Green and Beazell Memorial Forest – Kelsey King (USFWS) and Dana Ross

2024 update will be provided by Dana Ross through the USFWS (Kelsey King). In 2024, the USFWS coordinated and funded population monitoring. In 2025 and subsequent years, population monitoring will be conducted by Dana, coordinated by IAE, and funded via the USFWS Recovery Challenge Grant.

Captive reared post-diapause larvae (351) and pupae (773) were released into enclosures, and an additional 231 larvae and 2 pupae were released into the prairie at Bald Hill Farm on March 8th, 2024. Butterflies began eclosing in enclosures March 29th, 2024, and that ended on April 24th, 2024. Butterflies eclosed when temperatures were above 50˚F regardless of cloud cover, but rarely flew when the temperature was <60˚F. Captively reared butterflies were observed mating at Bald Hill Farm multiple times, but no nests were found in two days of walking transects for larvae. Butterflies were marked before release from enclosures, and standard mark-recapture analysis estimated a 2-6 day residence time for butterflies (in which both death and emigration is possible). Survival of all life stages appears to be lower on the south-facing slope with lots of bare ground, but adults may have also abandoned the area at a higher rate than the gentle slope of the open prairie area. Marked butterflies mostly moved less than 250 meters per hour, but one individual was observed travelling 1500 meters per hour. However, dispersal to other areas was not detected.

Surveys were also performed at Beazell Memorial Forest in the two meadows where golden paintbrush (*Castilleja levisecta*) is present to evaluate density of larvae and usage of the two primary host species present there. Larvae were about ten times more dense in Middle Meadow than North Meadow, where more plantain (*Plantago lanceolata*) and more golden paintbrush were present. In Middle Meadow 30% of larvae were feeding golden paintbrush, 70% feeding on plantain aand 1% on both; whereas in North Meadow 82% were feeding on golden paintbrush, 14.5% feeding on plantain, and 3.5% on both. We did not observe early senescence of golden paintbrush relative to plantain.

- North, Middle, and Summit are the occupied meadows (South has not been occupied since the 2010s)
- 2024 reintroduction at Bald Hill Farm
    - 1x1 m enclosures, with 12 larvae and up to 90 pupae put in each enclosure
    - Enclosure placed in two different habitats: slope with lots of oak litter and fescue prairie
    - Adult mark-recapture after butterflies came out (flight period started at the end of March)
- Survival was similar across locations (results from enclosures)
    - Crab spider was trapped in one enclosure, started finding and caching the pupae casings; killed the pupae, then started attacking butterflies
- Larval density/host use
    - Conducted distance sampling to count larva; walking transects searching for hosts with damage
    - Most interested in nest density (had 10x the number of nests)
- Observations:
    - Beazell butterflies still laying eggs on GPB
    - GPB was not senescing before plantago

2024 Restoration Update (Benton County) – Tyler Roberts (IAE)

In 2024, IAE was awarded a Recovery Challenge grant from the USFWS to support range wide TCB restoration with partners that include WDFW/Mission Creek, OSU/Hood River Captive Rearing, and Ecostudies. The grant covers restoration actions at 11 Oregon sites covering 287 acres. Maintaining and expanding core habitat at Beazell Memorial Forest and Cardwell Complex (the two sites with extant TCB) remains a priority for the project. This project also adds two new sites (J2E and Fort Hoskins) to the restoration plan for the planned population complex once TCB is introduced. Site specific actions are listed below.

In addition to implementing restoration work, IAE partnered with Oregon State University professor Chris Adams to initiate a new captive rearing program. The captive rearing lab is based at the Mid-Columbia Agriculture Research & Extension Center located in Hood River, OR. The lab is now fully operational and received its first TCBs in spring 2024.

Site specific restoration actions

Fitton Green Natural Area (Benton Co. Natural Areas and Parks Dept.): In collaboration with Benton County Natural Areas and Parks Department and USFWS in 2024, IAE seeded and planted six plots following 2 years of chemical fallow, totaling 0.8 acres. These areas will receive a second year of seeding and planting this fall/winter. When plots are revegetated TCB is planned to be introduced. Restoration actions will continue in 2025.

Beazell Memorial Forest (Benton County Natural Areas and Parks): With funding from OWEB, and in collaboration with Benton County Natural Areas and Parks Department and USFWS, IAE continued restoration of TCB habitat at Beazell Memorial Forest in 2024. Areas in and around TCB habitat in the North, Middle, and Summit meadows were spot sprayed with glyphosate to control invading weeds, including thistles (*Cirsium arvense* and *C. vulgare*), false brome (*Brachypodium sylvaticum*), Scotch broom (*Cytisus scoparius*), and meadow knapweed (*Centaurea x moncktonii*). IAE staff and an AmeriCorps team hand pulled two acres of Scotch broom in North meadow and removed approximately 300 conifer saplings encroaching into meadow habitat. Five acres adjacent to core TCB areas were treated with Fusilade DX in the spring to control invasive grasses and will receive another treatment this fall. A new meadow is being established between North and Middle meadows following logging operations by Benton County in 2021. This new meadow has been maintained in fallow by Benton County since the logging and will be seeded this fall.

Echo Hills: Spot spray treatments and hand pulling targeting invasive weeds across the site. Broadcast seeding from fall 2023 has had poor establishment. A second year of seeding this fall will use an ATV towed seed drill and raking to reduce predating and increase seed-soil contact. IAE staff will continue to plant bulbs and bare root nectar plants throughout the meadows in key habitat areas this fall.

Harris: Solarization fabric was installed in spring 2023 and has required minimal maintenance. Removal of fabric and planting is planned for fall 2025.

Crisp: Spot spray treatments across the site targeting invasive weeds. Ten acres of habitat were treated with grass specific herbicide in the spring and will receive another fall treatment. IAE staff and an AmeriCorps team hand pulled Scotch broom across the site in the summer. IAE staff will continue to seed and plant bulbs and bare root nectar plants throughout the site in key habitat areas this fall.

Pearcy: Spot spray treatments and hand pulling targeting invasive weeds across the site. A 4.5 acre TCB focal area was identified and within that 2.5 acres were put in fallow with plans to seed in Fall 2025. Three acres of invasive grass dominated habitat was treated with grass specific herbicide in the spring, but was replaced mainly by bachelors button and other invasive plants. The plan is now to chemically fallow this section before for planting and seeding in fall 2026. IAE staff will continue to seed and plant bulbs and bare root nectar plants throughout the site in key habitat areas this fall. A corridor connecting Echo Hills and Pearcy was expanded though small conifer removal and herbicide treatments of weeds such as false brome (*Brachypodium sylvaticum*) and Scotch broom (*Cytisus scoparius*).

Cardwell Complex (Cardwell Hill and Rung Meadows): broadcast grass specific herbicide at Cardwell and Rung meadows in the spring. Spot sprayed invasive species, primarily focusing on false brome, knapweed, blackberry, and woody shrubs after the TCB flight season. Limbed surrounding conifers in Rung meadows. IAE staff will continue to seed and plant bulbs and bare root nectar plants throughout the site in key habitat areas this fall.

J2E: The landowner has been completing general restoration actions for a few years. IAE will begin restoration this fall.

Fort Hoskins: Site assessments and restoration plans are being developed to begin this fall.

- Recovery approach:
    - Habitat restoration
    - Captive rearing and introduction

    - Plant materials production
    - Research and monitoring
- Restoration sites:
    - 2 extant populations
    - 1 current larva release site
    - 8 additional sites for future larvae releases
- Incorporating lots of different restoration methods depending on the season
    - Lot of positive effects from grass-specific herbicide
    - Putting down lots of seed to fill the space as it opens up (total of 270 lbs of native seed put out this year)
    - Habitat patches are a nice focus way to put a good chunk of change in one space without negatively impacting other surrounding areas
- Aiming to increase host plant abundance and density, as well as increasing connectivity between meadows
- Q&A:
    - Using fusilade as the grass-specific chemical because it's less negatively impactful on the larvae
        - Probably good reason to use clethodim (might use it for unoccupied sites in the future)
    - What do the good/bad/fair categories in the restoration chart mean?
        - Mostly subjective, to Tyler's knowledge of the sites
        - Poor/fair site has declining population (Cardwell Complex)
        - Fair is ok but needs some form of treatment before being considered as a reintroduction site
    - Not using a glyphosate spray because there's other good stuff out there (and also other sensitive species); don't want to impact them negatively
    - Herbicide is the main form of site prep (not a lot of burning, can't really count on it)

2024 Restoration Update: Bald Hill Farm and Mulkey Ridge – Andy Neill (Greenbelt Land Trust)

Introductions: Greenbelt Land Trust (Greenbelt) continued its partnership with USFWS by releasing pupae and larvae in remnant and restored prairie at Bald Hill Farm in March 2024. Monitoring of TCB and release of additional pupae and larvae are planned in 2025.

Restoration: In 2024, Greenbelt will continue restoration efforts in the "ButterflyWay" at Bald Hill Farm by controlling weeds and woody vegetation, seeding prepared areas, and maintaining prairie habitat. In collaboration with IAE and funded by the Oregon Watershed Enhancement Board and USFWS, Greenbelt also contracted to do brush and weed management in TCB introduction areas. In particular, Greenbelt prepared ~3 acres of upland prairie/oak savannah using a skid steer and multiple herbicide treatments for seeding with natives in fall 2024. The native seed includes TCB nectar and host species as well as Kincaid's lupine, a host for Fender's blue butterfly. Within the ButterflyWay, over 4,000 nectar plants will be planted this fall to benefit TCB and potential future Fender's blue introductions. Greenbelt will use propane torches to prepare small areas near previous TCB release sits to introduce golden paintbrush as second TCB host plant. A seed mix of golden paintbrush and Oregon sunshine will be broadcast to the prepared areas. In the long term, Greenbelt is working with USFWS to plan a prescribed burn of restored prairie at Bald Hill Farm that could take place as early as fall 2025.

SOUTH PUGET SOUND RECOVERY REGION

Table 1. Captive Rearing (Washington) and Release
Prediapause larvae release; Postdiapause larvae released; pupa released; adults released.
Data from 2014-2019 can be found in meeting materials from prior years.

Facility	*2020*	*2021*	*2022*	*2023*	*2024*	*Notes*
Mission Creek	0; 5934; 0; 0	0; 3788; 0; 0	0; 6683; 0; 0	3672; 2568; 410; 324	0; 7797; 0; 289	

Table 2. 2023-2024 number and survival by life stage and location for Taylor's checkerspots reared at the Mission Creek Corrections Center for Women (MC), Belfair, Washington.				
	Raven		***Turtle***	
Life stage	***#***	***Survival***	***#***	***Survival***
# larvae hatched	6259	NA	7167	NA
Prediapause release	1567	NA	2087	NA
Hatch to diapause	4553	0.970	4502	0.886
Diapause to release	4506	0.990	4496	0.999

2024 Captive Rearing (Washington): Sustainability in Prisons Project (SPP) at Mission Creek Corrections Center for Women (MCCCW) – Kelli Bush, Xitlali Herrera, Courtney Murphy, Mariana Cervantes, Mission Creek Butterfly Technicians

The SPP captive rearing program at Mission Creek includes two custom built rearing structures: Turtle (older lab) and Raven (newer lab). In 2023, 22 out of 30 wild females were productive. Approximately 3,600 prediapause larvae were released to Scatter Creek and R76 on 12 and 13 June 2023. Out of the estimated 12,000 eggs laid at MCCCW during oviposition, about 9,000 larvae were moved to the shed for diapause on 25 August 2023. Survival was very high through diapause (Table 2) and about 9,000 larvae came out of diapause and approximately 7,800 post-diapause larvae from Mission Creek were released in March 2024. Additionally, about 75 pupae were released to hone our methods for supporting release of different life stages.

As for our 2024-25 cohort, we received 20 wild gravid females from WDFW in May of 2024 and had a successful oviposition period. By June 2024, approximately 6,700 3rd instar larvae were counted and allocated into their husbandry cups for development. Around 1 July, half of the cups in greenhouse Raven had come down with an unknown illness that caused the larvae to secret bodily fluids and exhibit lethargic behavior. This illness only seemed to have affected our wild matrilines in 3rd and 4th instar. We promptly isolated the sick cups from the healthy cups, monitored their symptoms, and implemented sanitary protocols. From 9-11 July, about 850 sick larvae were morgued. We are working with WDFW to review and update our sanitary protocols and develop procedures for sample collection and pathological assessment should this happen in the future. This unfortunate event took a toll on the crew and to this day we are not sure what caused this incident. We suspected it may have had to do with something that had been introduced from the plantain we fed them. Ultimately, close to 5,100 larvae were moved into diapause on 28 August 2024.

- Pupation and eclosion went smoothly
    - Tried pupae release for the first time and developed a proactive system to maintain optimal temperature and humidity
    - Overall, 485 adult enclosures
- Challenges: mystery illness in early July
- Diapause 2024; decided not to do a pre-diapause release because of the amount of larvae lost to illness
- Lessons learned: QC data after each life stage
- Rollercoaster for plantago production this year, including some problems with deer
- SPP received the Recovery Champion award from USFWS
- Q&A:
    - Has anyone investigated butterfly diseases to see what the illness might have been? (working on it)
    - Hand pairing was attempted this year and wasn't successful

2024 Translocation: South Puget Sound, Washington – Andy Dechaine (WDFW)

Recognizing the lack of adequate release ready habitat in 2023 and anticipating the need to release thousands of postdiapause larvae in spring 2024, WDFW rallied partners to help plant approximately 15,000 *Plantago* plants between SCS, TA15, and TNQ prairies. Participating partners included staff from JBLM, CNLM, ESI, TESC-SPP, WDFW, students from Avanti High School (Olympia), and many volunteers. The transplants were complimented by the

gradual fall return of wild *Plantago* at all our release sites and contributed significantly to a successful postdiapause release.

In 2024 postdiapause releases occurred at TA15, SCS1, and TNQ, to augment and establish populations consistent with our existing strategy. Release plots were planted with *Plantago* and positioned on the landscape after considering associated nectar and vegetation structure to accommodate all life stages of the butterfly in the vicinity of release.

Approximately 7,800 post-diapause larvae from Mission Creek were released in March 2024. On 5 March 2024, about 1,500 larvae were released at TA15, and 1,500 larvae were released for the first time at TA15 Triangle. On 6 March, just over 3,100 larvae were released at SCS. On 7 March, about 1,500 larvae were released at TNQ.

A total of 20 gravid wild females were collected from the northwest corner of the AIA (MP1&2) on 8 May 2024 at JBLM. WDFW and TESC-SPP will continue to captively rear and breed checkerspots.

Captive breeding continues at MCCCW to maximize genetic diversity, buffer the population from loss in the wild, and to increase the number of animals available for release. About 290 adults no longer needed for captive breeding were released at SCS1 on 10, 16, and 18 May. Butterfly technicians at MCCCW did an excellent job breeding and rearing checkerspots in 2024. No prediapause releases occurred in 2024.

Distance sampling was used to estimate daily population density, daily population size, and to map the distribution of adults at occupied and release sites (TNQ, TA15, SCS1, R76). Peak counts appear in Table 3. Access to the AIA on JBLM was limited due to hazardous UXO that was uncovered during 2023 wildfires and Range 50 was not surveyed by WDFW this year. After dramatic declines that were recorded from 2021-2023, successful postdiapause releases contributed to an uptick in the number of observed checkerspots at all survey sites, but populations are still vulnerable to extirpation.

> For all survey results in this document – comparisons are only appropriate across lines, not across tables or sites. **<**

Table 3. 2024 South Sound Survey Results (Distance estimation - peak single day count and associated single abundance estimate). *Transect spacing is 25 m at all sites except R76, where a 50 m spacing is used.* (Data from 2014-2019 is available in prior meeting minutes).

Site, Landowner	***Alias***	***2020***[1]	***2021***[2]	***2022***[3]	***2023***[2]	***2024***
Range 76, JBLM	R76	1004; 5725	NA	15; NA	6	21; NA
Range 50, JBLM	R50	1972; 5633	NA	36; NA	8	NA
Scatter Crk So. 1, WDFW	SCS1	930; 3741	568	140; 345	39	157; 414
Scatter Crk So. 2, WDFW	SCS2	297; 1101	162	4; NA	2	NA
Training Area 15, JBLM	TA15	1073; 2867	398	30; 81	1	68; 137
Training Area 15 Triangle, JBLM	TA15 Tri	NA	NA	NA	NA	129; 261
Tenalquot Prairie, CNLM	TNQ	16	9	3	1	90; 130

[1] Fewer surveys conducted due to Covid-19 restrictions and poor weather; may not have captured peak flight.
[2] Only count data are presented.
[3] Transect spacing was 50 m at R50 in 2022.

- Q&A:
  - Only putting butterflies in places we know are ready to sustain them
  - Have not tracked survival of release as pre vs post diapause

2024 Rapid Habitat Assessment (South Puget Sound) – Andy Dechaine (WDFW)

WDFW conducted TCB host plant Rapid Habitat Assessment with help from interns and volunteers from JBLM. Though we observed a slight rebound of Plantago beginning in the fall of 2023, it appears host plant density is still lacking across all reintroduction sites in the South Puget Lowlands. Maintaining and enhancing high quality TCB habitat is a top priority outlined in the USFWS Recovery Implementation Strategy.

2024 Distribution Surveys Details and Fire (JBLM) – Mollie Steele and Sam Bussan (ESI)

In 2024, we conducted Pollard walk surveys to understand TCB distribution on JBLM. We surveyed 3997.3 acres on transects spaced 100 meters apart across the AIA, SIA, and TAs 3, 4, 5, 6, 14, 15, 18, and 23. We detected 657 TCBs, the majority of which were in the northwest corner of the Artillery Impact Area (Range 57/ Mortar Point 2). We had access to a smaller portion of this area than we had in 2023 due to UXO concerns. There were other detections in the AIA and Training Areas 3, 4, 6, 14, and 15 (see table below).

- Goal of surveys is to understand distribution to guide management and restoration
    - Min one survey in all potential habitat areas; aim for 3 surveys
- Most individuals found in NW corner of AIA
    - Last year was the first time we surveyed there in 3 years
- Lost access to a chunk of the NW corner due to UXO concerns
- Numbers in plots are not meant to estimate totals in the population
    - Highest density at Range 57
- Total # seen was 657 (including incidental sightings)
- Q&A:
    - Total surveyed acreage? Ballpark thousands of acres
    - When excluded from an area, how soon until you can get back in?
        - Very unknown/depends/sometimes forever

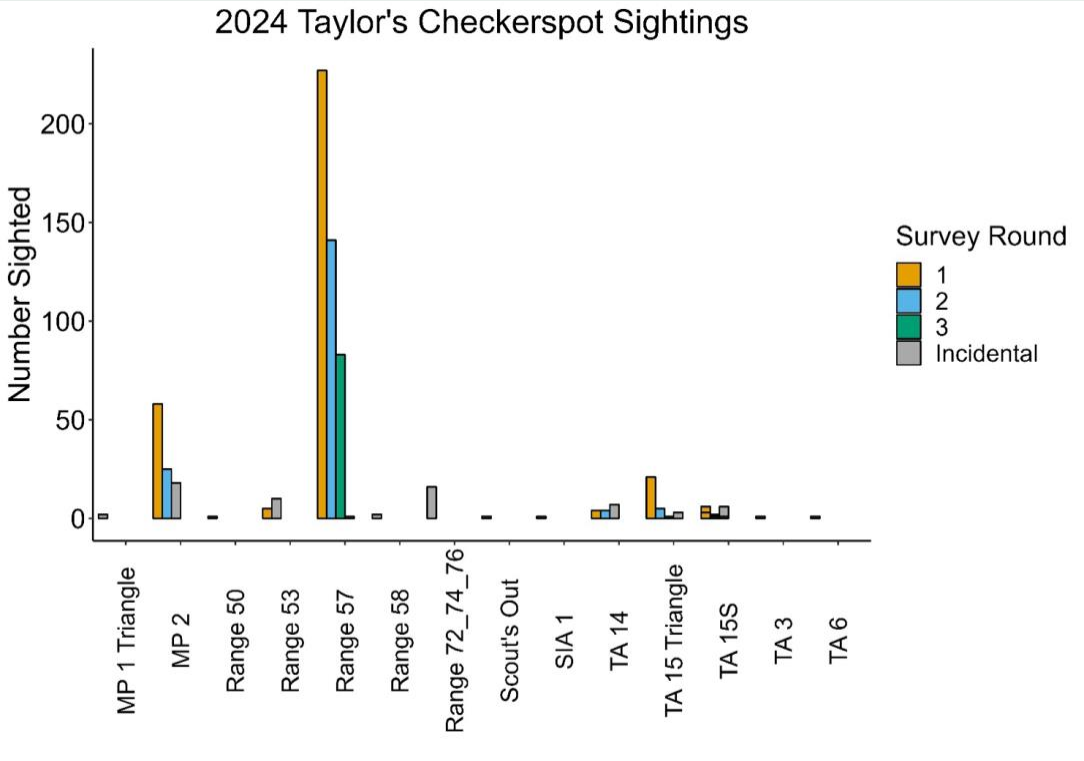

Figure 1. Number of TCB individuals by location and survey round.
Only positive detections included. Days and sites with no detections omitted (e.g. no TCBs were seen at South Weir or Marion Prairie).

Table 4. Number of TCB individuals detected per day per location.

Only positive detections included. Days and sites with no detections omitted (e.g. no TCBs were seen at South Weir or Marion Prairie). NA in Survey Round indicates an incidental sighting.

Date	Site	Survey Round	TCB Detections
2024-04-22	Range 72_74_76	NA	1
2024-04-22	TA 14	1	4
2024-04-22	TA 14	NA	1
2024-04-23	Range 72_74_76	NA	3
2024-05-01	TA 14	NA	1
2024-05-01	TA 15S3	1	4
2024-05-01	TA 15S3	NA	3
2024-05-01	TA 15S4	1	2
2024-05-01	TA 15S4	NA	1
2024-05-02	MP 2	1	58
2024-05-02	MP 2	NA	10
2024-05-02	Range 53	1	5
2024-05-02	Range 53	NA	10
2024-05-02	Range 57	1	226
2024-05-02	Range 57	NA	1
2024-05-02	TA 14	2	4
2024-05-02	TA 14	NA	2
2024-05-02	TA 15 Triangle	1	21
2024-05-02	TA 15S3	1	2
2024-05-02	TA 15S4	1	1
2024-05-02	TA 3	1	1
2024-05-02	TA 6	2	1
2024-05-03	Range 72_74_76	NA	3
2024-05-03	TA 14	NA	1
2024-05-08	Range 57	1	1
2024-05-08	Range 57	2	141
2024-05-08	Range 72_74_76	NA	1
2024-05-08	TA 14	NA	1
2024-05-08	TA 15S3	NA	2
2024-05-09	Range 72_74_76	NA	8
2024-05-09	TA 14	NA	1
2024-05-10	TA 15 Triangle	2	5
2024-05-10	TA 15 Triangle	NA	3
2024-05-10	TA 15S3	3	2
2024-05-10	TA 15S3	NA	1
2024-05-10	TA 15S7	3	1
2024-05-12	MP 1 Triangle	NA	2
2024-05-12	MP 2	2	25
2024-05-12	MP 2	NA	8
2024-05-12	Range 50	1	1
2024-05-12	Range 57	3	83
2024-05-12	Range 58	NA	2
2024-05-12	Scout's Out	NA	1
2024-05-13	SIA 1	1	1
2024-05-14	TA 15 Triangle	3	1

Habitat Quality (Vegetation Monitoring) – Adam Martin (ESI)

- Prairie vegetation monitoring
- Most sites have pretty good native plant cover
- Plantago and GPB present at all sites, but host density continues to be an issue (CASLEV not evaluated)
- Prairies have remnant native cover that's under a lot of nonnative cover
- Q&A:
    - Measuring plant cover height using "really cool rod"
    - Won't remonitor too soon after most recent survey

2024 Restoration (South Puget Sound): WDNR Sites – Dave Wilderman (WDNR)

Bald Hill NAP – In 2024 we continued habitat enhancement efforts at this site, including invasive plant control (primarily grasses & Scot's broom), identifying and preparing locations for TCB food plant augmentation, and treatment of encroaching conifers and shrubs. Food plant augmentation typically includes burning, seeding, and planting 10-20 selected locations between 50 and 100 sq ft in size, where soil is suitable and there is little vegetation. In some years, we have selected spots where non-native species are dominant, and applied glyphosate followed by burning, seeding and planting. In the last few years, we've also begun returning to previous augmentation patches and either burning or brushcutting to reduce competing vegetation and re-invigorate host plants (primarily *Castilleja hispida*). Primary species for seeding and planting include *Castilleja hispida, Collinsia grandiflora, Collinsia parviflora, Plectritis congesta, Festuca roemeri*, and *Eriophyllum lanatum*.

Vulpia myuros patches treated with Esplanade herbicide in 2022 continue to show minimal if any germination; however this species has spread into other areas. 2023 Envoy treatments were only moderately successful. Esplanade was applied in September 2024 to as many areas as could be treated before plants started germinating.

11 augmentation patches were prepared, burned and seeded in October 2024. Most of these were locations that had been identified in 2023 but were not burned then due to weather conditions and equipment issues. *Plectritis congesta, Collinsia spp*, and *Balsamorhiza deltoidea* seed were collected from the seed beds that we maintain for Bald Hill-source seed, and *Castilleja hispida* was wild collected from on site. Production beds for *Castilleja hispida* will soon be replanted and potentially produce seed in 2025.

2024 monitoring indicates that *Castilleja hispida* continues to slowly rebound from the large decline observed over the past few years, presumably related to the extreme heat event in June 2021. Numbers increased at most locations by an additional 10-20% but the site-wide population remains lower by an estimated 60% compared to 2020.

Mima Mounds NAP - This site has not been identified for near-term re-introduction but is being managed to improve and maintain high quality prairie 'matrix' habitat for TCB and to enhance select areas with TCB food plants. In 2024, we completed tall oatgrass treatments (319 acres) and Scot's broom treatments (130 acres) across most of the preserve. Two prescribed burns totaling 32 acres were conducted and have been seeded and planted with a mix of prairie species, including TCB food plants. This site supports a significant population of golden paintbrush, precluding the establishment of *Castilleja his*pida, but the golden paintbrush could potentially serve as a TCB food plant in the future.

Habitat Management Notable Observations: WDFW Sites – Bill Kronland (WDFW)

- Burn ban at Scatter Creek
- Otherwise working to expand toolbox and get more species that can be put out there

Habitat Management Notable Observations: CNLM Sites – Sanders Freed (CNLM)

- 4 acres burned and seeded at Wolfhaven
    - Some Vulpia problems
- Otherwise, continuing management at Glacial Heritage, Cavness Ranch, Violet Preserve, Deschutes Preserve, Tenalquot Preserve

Habitat Management Notable Observations: JBLM Sites – Gina Smith (JBLM); Mollie Steele (ESI)

- Green up happened sooner because of the August rain; crews were on standby waiting to spray the grasses that hadn't shown up yet
- Otherwise, 2024 was a good restoration year
- A few wildfires (one in TA15 that got close to a release site but ultimately didn't make it there)
- 3k acres burned in the AIA (expected amount); seeded about 260 acres with fescue and forb mix in select areas
- Treated about 90 acres of grass and over 300 acres of shrubs
- TA15 release site has been the primary focus of restoration at JBLM

JBLM/Army REPI Update – Zach Radmer (USFWS); Dan Calvert (Sentinel Landscapes)

- DoD has a program called REPI; point of this money is to support off-base things to make life better on-base
- Targets can be achieved on or off base
- Sentinel Landscapes is a partnership between DoD, NRCS, and USFWS
- JBLM has targets for TCB: 3 population complexes, 1 must be on the AIA
- REPI isn't a major opportunity for folks outside of SPS

NORTH SALISH SEA RECOVERY REGION

Table 5. Clallam County Survey Results (High Counts)

High counts of adult TCB in the Olympic National Forest, Clallam County.
Data from 2014-2019 can be found in materials from prior years.

	2019	*2020*	*2021*	*2022*	*2023*	*2024*	*Notes*
Bear Mountain, USFS	**96**	**64**	**62**	**48**	**55**	**47**	3 visits; high count 5/15
Gray Wolf, USFS	**3**	**--**	**11**	**1**	**0**	**0**	3 visits
Three O'clock Ridge (TOR) total	**105**	**251**	**221**	**126**	**56**	**107**	2 complete visits; high 6/8; 8 visits along road
TOR road	17	45	18	20	13	31	
TOR clearcut openings	29	101	98	22	5	27	
TOR balds	55	102	97	72	36	38	
TOR N.	4	3	8	12	2	11	
Upper Dungeness (UD) total	**290**	**203**	**274**	**165**	**80**	**147**	2 complete visits; high 6/7; 8 visits along roads
UD Road	67	61	87	40	19	48	
UD clearcut openings	198	125	162	77	33	59	
UD Silver Creek	25	17	9	10	2	11	
UD Maynard Burn Trail	--	--	16	38	26	29	
USFS ONF Sites **total**	**491**	**518**	**557**	**339**	**191**	**301**	
Clallam County WDNR Sites – Monitored by WDFW and DNR (peak single day **adult** counts *with dates*)							
Eden Valley	194 *May 12*	223 *May 9*	63 *May 19*	34 *May 20*	30 *May 12*	49 *May 10*	
Dan Kelly Ridge	162 *May 11*	204 *May 7-9*	160 *May 19*	27 *May 20-21*	12 *May 10-14*	30 *May 8-9*	
Clallam County CNLM Site – Monitored by WDFW and DNR (peak single day **adult** counts *with dates*)							
Dan Kelly Ridge – CNLM West	338 *May 7*	65 *May 28*	121 *May 20*	28 *May 20*	29 *May 19*	88 *May 2,8*	

2024 Survey Details: Clallam County DNR/CNLM/ONP, Elwha Valley & Vicinity – Shelly Ament (WDFW)

TCB sites located west of the Elwha River were monitored again in 2024. The survey effort was like that in previous years, focused on the DNR & CNLM ownerships. The Griff Creek Trail site, located within Olympic National Park (ONP) has not been surveyed in the past four years. Fortunately, extra surveyors from both WDFW and DNR were recruited to assist with surveys at the Dan Kelly and Eden Valley survey routes this season. Prior to completing surveys, various field work tasks were completed. DNR staff focused efforts on making sure that all access roads to all parking locations for each route were clear of any downed trees. WDFW staff spent time walking each survey route. Station signs were re-inked or were replaced if missing. Some extra attention was devoted to clearing brushy areas along survey routes to minimize contact with ticks. Since there were new surveyors this season, some flagging was installed along areas of routes that may have been difficult to follow. Having suitable weather to meet survey protocols can be challenging at these sites. The survey team was grateful to have a season with better weather than many previous years. The goal of completing at least three surveys to protocol of key survey routes during the peak flight period was completed. A total of 7 surveys were conducted at the Eden Valley site and a total of 19 surveys were conducted at Dan Kelly Ridge. The survey results are provided in Table 5 and Table 6 below. The TCB numbers at key surveys routes at both Eden Valley and Dan Kelly were higher than numbers from the past two survey seasons. This is most likely due to the recent reintroduction effort completed (see below) and less extreme weather events this past year. Two survey routes at Dan Kelly, where TCBs were observed during previous years, had zero TCB's observations during the 2024 surveys. Surveys were initiated on April 4 and the last survey was conducted on May 22. In 2024, the peak TCB flight period at the WADNR and CNLM sites was slightly earlier than the past three seasons.

Table 6. Clallam County Survey Results (All Surveys)

Clallam County WDNR and CNLM Sites – Monitored by WDFW and DNR (total **adult** counts with dates for survey routes at Eden Valley and Dan Kelly)

Taylor's Checkerspot Survey	Eden Valley Site TOTAL	EV-Upper	EV- U2s	EV-Lower	DK - CNLM West	DK - Jenny	DK - Parallel	DK - Ridge Road TOTAL	Ridge Road - A1	Ridge Road - B	Ridge Road - C	Ridge Road - D	DK - Lower East Road	DK - Lower East F Route
# Points	89	41	5	38	55	36	20	51	16	16	20	9	23	7
Date														
4/23/2024		22(14)												
5/1/2024		7(5) NP												
5/2/2024			0	6(2)	88(52)	11(2)	4(0)	2(0)	1(0)	1(0)	0	0	0	
5/8/2024					88(24)	20(6)	7(1)		0					
5/9/2024	36(14)	27(11)	1(0)	8(3)			5(4)	3(1)	2(1)	1(0)	0	0	0	0
5/10/2024	49(23)	42(17)	1(1)	6(5)	54(46)		4(4)							
5/14/2024						14(5)								
5/15/2024					50(21)									
5/17/2024	25(15)	21(12)	0	4(3)			5(8)	7(2)	2(1)	3(1)	1(0)	1(0)		
5/20/2024					20(16)									
5/22/2024		14(8)												
Count-color indicates surveyor	Gary	Shelly	Bryan	Noelle	Ben	Ross	Erica							
NP =Survey Not to Protocol														
( ) = Incidental TCB Observed														

2024 Survey Details: Clallam County USFS Sites (see slides) – Karen Holtrop (USFS)

Adult Surveys

USFS sites (Bear Mountain, Three O'clock Ridge (TOCR), Upper Dungeness (UD), and Gray Wolf) were monitored in 2024. The effort and methods were the same as prior years (since 2009): modified Pollard style counts which involve traversing roads and habitat openings during the flight season and appropriate weather conditions.

The counts were higher than last year (with the exception of Bear Mountain) but not as high as some prior years (Table 5). The total count from all Olympic National Forest sites was 301. We continue to be concerned about Gray Wolf site where no checkerspots were observed.

Flight season: adults were observed between April 23rd and July 9th. The high counts were in June except Bear Mountain, which is typically earlier, was mid-May.

Larvae Surveys (pre-diapause)

Searches via people/visual: Larvae surveys were done in portions of the Bear Mtn, UD (north end), and TOCR sites. A total of 25 larval nests were found at UD over about 1.7 acre (July 25), 16 at Bear Mountain over 2 acres (July 22), and 5 larval nests at TOCR (July 29) habitat openings. In addition, we found 15 larval nests at the TOCR road site, including instars 1 to 4, as well as eggs and 2 adults at the same time (July 8-9). This road site was the training area for the dog team. The ONF programmatic Biological Opinion covers monitoring; thank you Michelle Cliff for help extending that consultation. Thank you to Ross Winton and Melinda Vickers for helping with larvae surveys at the UD site.

Searches via scent-detection dog team: A team from Rogue Detection Teams surveyed in at TOCR, UD, Gray Wolf, and Bear Mountain vicinity. This technique was first done on ONF in 2020-21. In 2024, they found 10 larval nests total, 5 at UD and 5 at TOCR (not including the training road ones). Unfortunately, they did not find any at Gray Wolf. The dog team will also do surveys in 2025 since it is a two-year contract. We will be comparing the time effort between visual and scent-dog surveys. Preliminarily, the dog does not find as many larvae as people/ visual, but a scent dog is many times faster, indicating an efficient way to determine oviposition occupancy at a site.

2024 Survey Details: Clallam County WDFW Sites – Shelly Ament (WDFW)

In 2018, WDFW initiated new protocols for adult Taylor's Checkerspot Butterfly (TCB) surveys at Eden Valley and Dan Kelly to increase the safety of surveyors and the rigor of survey results. The new protocols were based on distance abundance estimation methods for point surveys as generally described by Henry et al. (2015). In 2018, we used the previously established survey transects as the basis for the initial surveys, using the beginning of each line segment as our survey point at which butterflies observed and their distances were recorded. No data was recorded while walking between points. From 2018 – 2022 some refinements to survey routes were completed. These included eliminating points and adding new ones to increase sample size. No modifications to surveys routes were completed in the past two survey seasons. Survey results indicate that point-based methods are safer and more efficient than were the previous line surveys. However, there remain several challenges that affect data analyses including sample size, allocation of effort among observers, and matching observer availability with appropriate survey conditions during key stages of the flight season. Point-based surveys were completed again during the 2024 survey season. Due to population concerns, surveyors did make note of all incidental TCBs they observed as they walked from one point station to the next. They were careful not to include any TCB's previously counted from the point location. These numbers will not be used for abundance estimation. WDFW staff will be reviewing all past survey data and will likely continue to use the point-based surveys with the goal of counting enough butterflies for this method. Apparently, over 60 individuals need to be counted for the analysis.

2024 Captive Rearing: Clallam County (Dan Kelly & Eden Valley) – Andy Dechaine and Shelly Ament (WDFW)

In May 2023, the U.S. Fish and Wildlife Service (USFWS) reported disturbingly low numbers (peak of 5 adults) of Taylor's checkerspots at Graysmarsh in Sequim, WA. In response, the USFWS recommended initiating captive rearing to preserve the genetic diversity this population represents. Unfortunately, the Graysmarsh population was too small to be viable for captive rearing, but they had secured a rearing lab in the meantime.

Alternatively, WDFW proposed emergency collection as a temporary measure for the Dan Kelly/Eden Valley populations, each of which peaked around 25 adults. On June 2, 2023, a team of WDFW biologists collected a total of two females, eight egg masses, and five larval clusters from Dan Kelly Ridge and Eden Valley combined. Specimens were transported to Julia Low in Hillsboro, OR, an experienced animal husbandry expert with a background in rearing Taylor's checkerspot butterflies at the Oregon Zoo. Additionally, the collection team provided 60 potted *Plantago lanceolata* plants as a food source for the larvae. On 15 March 2024, all 600 postdiapause larvae were released back into their site of origin. This captive rearing effort was intended as a short-term stop-gap solution to the immediate challenges facing these Taylor's checkerspot populations. Plans for habitat assessment, restoration, and monitoring are ongoing. Based on 2024 counts, there was no demonstrated need to continue captive rearing to supplement the 2025 wild population.

2024 Restoration Summary (Clallam County): USFS Sites – Karen Holtrop (USFS)

Site restoration activities continued in 2024. With help from the Washington Conservation Corps (WCC) crew, we girdled trees along the lower boundaries of Bear Mountain and Three O'clock Ridge sites to improve the open habitat conditions. In addition, they cleared some extensive snowberry at Three O'clock Ridge. We also spread local native plant seed of *Eriophyllum lanatum* (Oregon Sunshine) and *Castilleja hispida* (harsh paintbrush). We continued invasive weed control along the roads at/near the sites. Thank you to Dan Grosboll and Ben Stein for the visit and input about the sites.

2024 Restoration Update (Clallam County): Collaborative Efforts at Eden Valley, Dan Kelly Ridge, and Striped Peak – Ben Stein and Noelle Nordstrom (WNDR)

For the WDFW/WDNR collaborative efforts at these sites:

Eden Valley: In December of 2023, several DNR staff people, along with a WCC crew, spent a week planting year-old native plant plugs at the Eden Valley site. Plugs were produced at a local nursery with seed purchased from The Center for Natural Lands Management (CNLM). The 11,000 plants contained a mix of paintbrush, biscuit root, Oregon sunshine, and others. Site prep and plugs were made possible through USFWS Coastal funds. Most were installed in the newly cleared areas, with a plot of Oregon sunshine and Castilleja planted within the core habitat area to improve the density of larval host plants there.

On November 5, 2024, slash piles at Eden Valley were burned within the 6 acres of habitat and buffer that were within the "Flutterby" timber sale. Grass seed from BFI native seeds and wildflowers from CNLM arrived last week for seeding the areas where piles were burned. Seed was purchased for us directly by USFWS.

Dan Kelly: Activity within the DNR lands in the core area at the Dan Kelly site was limited to opportunistic weed pulling. Slash piles in the adjacent "Flutterby" timber sale, which overlaps portions of the buffer to the north of the site, were burned in January of 2024.

Striped Peak: In January 2024, slash piles were burned at the historically occupied Striped Peak site, and the area was seeded with native grasses. Native flowers present on site, including blue eyed Mary, sea blush, and Castilleja, continue to respond to the area being cleared. Weeds such as Scott's broom and thistle have also rebounded and will require ongoing control. Future native plant seeding and plugs are planned for this site once the grasses are established.

Additional broadcast burns are being considered for 5 acres within the TCB buffer area on Kelly Ridge, and possibly small patches at the Eden Valley site.

North Salish Sea Upcoming Meetings – Elspeth Kim (ESI)

- Recovery goals that are specific to each region (3 meetings, 1 for each region)
- Priorities:
    - Make a site list for reintroduction sites
    - Brainstorm the timeline and trajectory for each of these subregions
    - Top priority sites based on feasibility

BC Population Status & Captive Rearing (see slides) – Jenny Heron (BC MWLRS)

- Population status and captive rearing project objectives:
  - Establish a self-sustaining subpopulation within Helliwell Provincial Park
  - Reduce threats within known TCB habitats
  - Survey potential habitats on Vancouver Island and adjacent Gulf Islands
- General timeline:
  - Release captive bred post-diapause larvae in March
  - Adult surveys in May and June
  - Pre-diapause larval cluster surveys in June
  - Vegetation removal, planting, and seeding Sept-Feb
  - Post-diapause larval surveys the following March
- Helliwell is a public park so we aren't allowed to supplement with plantain; however, we can weed and seed with native plants
- Flora Islet and East Beach were the larval release sites for 2024
  - Conducted adult mark-recapture surveys in May
  - Surveys for pre-diapause larval clusters: found a total of 88 this year
  - Also focused on vegetation removal (from small weeds to trees)
- Surveys on Vancouver Island
  - Adult surveys conducted in May; pre-diapause larval surveys conducted in June
- Q&A:
  - Are the sites on Vancouver Island are recent clearcuts? (Yes)
    - Denman site is also a recent clearcut but has since grown in. It also has a large wetland complex that runs right down the middle
  - Hosting and ovipositing on Veronica sp.
    - Mostly found on dry coastal meadow on Helliwell rather than smaller vernal pools
  - Has anyone looked at plantago maritina as a host plant? (Sarah)
    - Grows on rocks with salt spray; has a very limited distribution
  - What was the historical disturbance regime?
    - Combination of fire and mix of dry/wet seasons

2024 Taylor's Checkerspot Butterfly Working Group

MEETING MINUTES – DAY 2

Date:	14 November 2024
Location:	The Evergreen State College (Olympia, WA)
Notetaker:	Anita Michalak, Ecostudies Institute

ATTENDEES

ESI: Elspeth Kim, Anita Michalak, Sam Bussan
USFWS: Rebecca Currin, Mikki Collins, Kelsey King, Dan Grosboll
WDFW: Erica Henry, Ross Winton, Andy Dechaine

ACTION PLAN REVIEW | SECTIONS IN GRAY NOT ACTIVELY DISCUSSED DURING MEETING

Recovery Action 1. Maintain and Increase Suitable Habitat and Connectivity

Top priorities within Action 1: plant production and host plants need to be higher priority.

1.1 Identify and prioritize sites with ecological resources to support suitable habitat and improve connectivity within and between population complexes.

- Sam: need more research to determine what the actual numbers are
- Dan: incorporate better definitions supplied by research?
- Add 1.1: see Elspeth's document
- Elspeth: idea to tie in research goals that are being driven by the needs of these other categories and then use Action 5 to discuss the leftover research tasks
- Rebecca: need to be able to perform tasks without waiting on research
    - Erica: ideal scenario is that they happen at the same time (adaptive management)

1.2 Establish and implement standardized habitat assessment (by region) to evaluate habitat suitability and determine habitat management needs.

- RHAs are conducted in OR
    - Kelsey: might need to update to match the current definition of suitable habitat
- South Sound primarily relies on PHM; North Sound doesn't really have anything
- Elspeth: create a broad landscape scale not specific to checkerspot?
- Andy: RHA take ~10-12 min per 25x25 grid
- Rebecca: put something in writing about how to differentiate between different types of sites
    - What is needed at one type of site vs another might vary? (Dan: not sure that it does vary, as resources should be more or less the same)
- Erica: suggestion to do an RHA in Clallam County and see how it goes

1.3 Control undesirable native and non-native species in currently occupied habitats and suitable habitat including, but not limited to, encroachment by woody species.

- Looks good/no comments

1.4 Augment and enhance larval food and adult nectar plants in currently occupied habitat and suitable habitat.

- Dan: not currently in progress

- Rebecca: rather than saying ongoing, provide summaries about where it's happening and/or add notes that provide more info
- Contact Mikki/talk to Cindy about what is in production
    - Anika suggested as a contact for plant production in the North Sound
- Kelsey: should this be another task (e.g., catalogue where and what production is occurring)?
- Potentially add a task to identify best seed sources for plantago

1.5 Support recruitment and abundance of host plants and early seral habitat through managed disturbance regimes such as prescribed fire, mowing, and other interventions.

- Currently happening
- Kelsey: add a task about increasing fire crew capacity?
    - Mikki: having this as a task could help secure more funding

1.6 Develop Best Management Practices (BMPs) to address cumulative impacts from overlapping management actions by settling targets for the maximum amount of annual disturbance depending on the type of action (e.g. prescribed fire, herbicide, vehicular).

- Rebecca: this is getting at the issue of having multiple things going on at the same time and not having thresholds to track them
    - What does having this successfully completed look like? Dan: ultimately, the answer is site-specific
- Sam: research on synergistic burn effects?
- Dan: need to determine how we get the most habitat uplift with the least damage to the population when burning
    - Sam: deliberate mosaic effect with exclusion patches
- No major concern of cumulative impacts of fire, overall
- Move 1.6.2 to 1.3.2

1.7 Develop site-specific long-term management plans and/or management agreements for all population complexes.

- Kelsey: OR finished BPM consultation (5 years of regular mowing)
- Note for Elspeth: habitat/vegetation management specialist is appropriate for REPI funds
- Mikki: would it be appropriate to put the CBA here?
- Rebecca: for each site, have something in writing that mentions "the prescriptions for early seral habitat management" so that we have something to reference when current site managers eventually retire
    - Erica: WDFW currently working on site plans for Scatter Creek
- Consider add a 1.7.2 about developing management plans for CBA sites
    - Another one could be to identify which TCB sites currently have management plans (not a small task)
    - Even on JBLM, having a document to guide decision making would be helpful (Bill might know something about it this—for Sam to follow up)

Recovery Action 2. Reintroduce and Reinforce Populations

2.1 Continue or expand captive rearing and reintroduction by developing new facilities or additional capacity as necessary.

- Kelsey: there are not enough butterflies with which to fill the facilities
- Rebecca: captive rearing will obviously be necessary before introduction to new sites
    - Some considerations: Do these populations become self-sustaining? Would we still have butterflies if we didn't introduce them from those that were captively reared?
    - Kelsey: min of 2 years will be needed to get enough genetic source
- Erica: it's also important to consider how the arrangement of habitat would influence population resilience vs a potential crash
- Rebecca: need to think about the risk of both stopping and continuing business as usual (opportunities lost, etc.)
- Adam: need to consider new sites as well
    - Utilize the habitat that has had lots of money and work put into restoration efforts (e.g. Cavness, Glacial)
    - Big successes occur when you stop doing the same thing over and over again

- Need to let go of the idea that we can't use C. levisecta as a host plant
- Erica: trying to get money to do experimental releases on GPB
    - Putting together a proposal to work with Cheryl Schulz and a grad student
    - Green light to test out new things, but also design some form of info gathering to gauge success/efforts
- Dan: goal to try a release on C. levisecta by Spring 2026
- Suggestion to schedule a meeting to talk reintroduction sites (what's at each site, what everyone's open to, what would need to happen this spring for a 2026 release)
    - Mikki: permitting needs to happen ASAP
    - USFWS will work on setting up a meeting (plan to use Cavness as a placeholder as a new intro site)
    - Folks that need be present at this meeting: Bill Kronland, Dave Wilderman, Sanders Freed, Jesse Miller, someone from JBLM
- Shared resources folks can be trained for RHA
- ESI will schedule a meeting to talk about monitoring data monitoring plans for this upcoming year

2.2 Develop a rangewide reintroduction and reinforcement plan.

- Currently have an SPS reintroduction plan draft; Ross and Andy will edit and share
    - Dan: this document is more history than plan; needs some reassessment
- Rebecca: some things would be consistent rangewide, others would be specific to each region
    - Rebecca/USFWS will take point and circulate to folks for feedback

2.3 Select and prioritize reintroduction and reinforcement sites across the species' range to increase the number and distribution of population complexes.

- Addressed in previous discussion points/no additional comments

2.4 Evaluate potential for direct translocation (i.e. moving individuals directly from a donor site to a recipient site) during peak-abundance years.

- Dan: given the history, this upcoming year could be a peak
- Erica: there are lots of different ways to conduct a release
- Otherwise, tasks in this section are covered

2.5 Reinforce existing or establish new population complexes using approved reintroduction and reinforcement translocation methods.

- 2.5.2 needs to be put elsewhere; currently in the wrong section
- Need to develop a CBA for potential translocation sites

Recovery Action 3. Pursue Acquisitions, Easements, and Agreements

3.1 Identify and prioritize available parcels within suitable and potentially suitable habitat to increase connectivity and distribution of population complexes across the species' range.

- Rebecca: what's for sale and where we have money varies
- Otherwise, this activity is in progress
- For N Salish Sea, need to determine suitable habitat and criteria
    - Rebecca: consider adding a task specific for N Salish Sea because the habitat is significantly different
- Elspeth: TCB are mechanism to protect land that benefits both them and other species

3.2 Identify potential funding strategies for procurement and protection of acquisitions and/or conservation easements.

- REPI is the primary funding strategy right now; otherwise the task is ongoing
- Dan: are the ranks necessary if we already have RIS priority numbers?
    - Ultimately, the ranks shouldn't affect funding decisions
    - Consider removing the ranking column and instead documenting timeline/year

3.3 Pursue acquisition of conservation easements with willing sellers.

- Rebecca: any private site should have an easement on it

- Check in with Jenny around Denman Island (and where in the plan this belongs)
- Adam: should be talking to the Land Bank and preservation trusts as the focus moves up north

3.4 Develop management plans and conservation agreements for newly acquired sites and/or sites with conservation easements.

- Looks good/no comments

Recovery Action 4. Determine Population Metrics and Assess Threats

4.1 Develop and implement scalable, standardized survey and monitoring protocols to evaluate progress toward recovery which may include occupancy, trends, distribution, and abundance.

- Ross: will be doing some tweaking of monitoring methods for the Olympic Peninsula
- Dan: is our metric population numbers and general occupancy?
- Kelsey: how do we keep consistency in monitoring after Dana Ross retires?
    - Elspeth: do we start from scratch knowing we can't replicate ~30 years of consistency?
- Rebecca: do all populations need to be monitored annually?
    - Depends/not necessarily
    - Monitoring is always hard to get the resources for
    - Erica: part of this depends on how you define a population complex and its resilience over time
    - Dan: would be great to have the exact same currency (population numbers) everywhere, but not sure if it would be feasible to get meaningful population estimates for all sites (e.g., those with cliffs)
        - A population index could be acceptable (not feasible for the AIA, but could be for other sites)
- Add a task about documenting rangewide monitoring protocols currently in use
- Ross: is a population index enough to determine resiliency at a site? (TBD, will need to act accordingly)
- Remove the AIA from 4.1.2 and remove the "and/or expansion" language

4.2 Assess the levels of currently known threats and identify potential new threats to the species and its habitat.

- See Elspeth's notes on Action Plan document

4.3 Develop and maintain a database to manage and provide access to data associated with but not limited to demographics, habitat quality, threats, management needs, and other site-specific information.

- In progress in both the South Sound and WV; unknown if happening in the N Salish Sea
- Rebecca: would be ideal to have a state-wide TCB database

Recovery Action 5. Conduct Scientific Research

- Do we want to reassess current research tasks and identify the top three currently needed?
- Erica: unless we have lots of sites, years, and data, we just can't know everything
    - There are fundamentals of butterfly ecology we need to know better to make decisions, but there are also things will always be unknowable
- Kelsey: need to consider how we get sites to persist when they inevitably crash (e.g., planning for a crash and studying it)
    - Erica: we should create a framework around which to do research to attain resiliency
- Adam: create research placeholders (until Erica/others write up research priorities at upcoming Feb meeting?)
    - Movement/spatial ecology
    - Larval survival/recruitment
    - Host plant phenology (aka the microsite study)
- Ross: the first question is knowing what we're talking about (e.g., taxonomy/genomics/defining what a checkerspot is)
    - Kelsey: once a species is listed, it's hard to fund genetic work
    - Taxonomic clarity can redefine the status of a species
    - Rebecca: USFWS can't prioritize/fund taxonomy because the recovery plan needs to follow the current definition of what a checkerspot is
- Andy: WDFW has weather stations that aren't currently installed; hoping to do so this year

- Task for everyone: look through research tasks and see what could be deleted/kept/moved

5.1 Identify knowledge gaps and whether they can be addressed through analysis of existing data and/or new research.

5.2 Rank analysis and research needs for addressing individual knowledge gaps in order of importance toward advancing species' recovery.

5.3 Develop and implement research studies in accordance with prioritization toward advancing species' recovery.

5.4 Identify and develop recommendations for application of research results to recovery actions and activities (e.g. genetics/genomics guidelines for reintroductions).

- Dan: from a population persistence perspective, better to diversify populations, but there's also the concern of things being TCB vs not TCB
    - Limited genetic info we have doesn't inform levels of genetic differentiation

Recovery Action 6. Promote Partnerships and Outreach

- Even though language will be repeated, rank the white tasks rather than purple activities.

6.1 Share information between entities, establish partnerships, and maintain working groups.

- Done/remove current 6.1.1 about biannual workshop
- Add a new 6.1.1 task to "maintain a rangewide working group" and add the rank
- WDFW and USFWS are in discussion about research needs and priorities (covered under "information needs")
    - Movement study potentially coming up in the spring
    - Rebecca: from a regulatory perspective, research means info needed to progress the recovery plan
    - Can be difficult for big groups to create a list of ideas/top research needs
- Kelsey: would be beneficial to hold a small research symposium at some point (could be virtual)
    - Not enough time in the annual WG meetings for folks to summarize, review, and discuss their research (especially with all the new rangewide projects folks are working on)
- Elspeth: annual high-level rangewide meetings are still essential
    - Ross: alternatively, folks can provide high-level updates in written form every year with meetings occurring every other year might be better. Could supplement with a research workshop, symposium, etc.
    - Elspeth: not necessarily a good substitute; folks don't provide all their verbal updates in the written updates (and not everyone reads them…)
    - Dan: some things come up anecdotally at meetings and wouldn't be communicated as easily in written reports
- OR also has annual regional meetings
- Elspeth: with REPI funds, there is lots of discussion around land acquisition
    - Kelsey: could be helpful to have a WA/South Sound working group meeting
    - Elspeth: there used to be lots of South Sound meetings/discussions, which don't happen as often anymore but are still needed
    - Kelsey: in-person rangewide meeting every year, with a virtual research symposium every other year?
- Dan: would be great to have a template for written updates
    - Anita will reach out to folks about templates for providing updates for each category
    - Ross: makes sense that data gets reported out the same way/ultimately data standardization is key
- Rebecca: there's a difference between a research symposium vs a research prioritization meeting; need to schedule both

6.2 Establish a transnational North Salish Sea Recovery working group.

- Completed task?
- Replace with/add a white task to "maintain the transnational North Salish Sea Recovery working group"
- Elspeth: could be another mix of virtual vs in-person meetings

    - December meetings will provide a lot of info about how to proceed/what meetings need to happen to move things forward
- Elspeth: is there a better way to see international sites (e.g., take Jenny up on offers to visit BC)?
    - Rebecca: upcoming travel budget will be cut in half for USFWS; ideally would be great to have a field trip, but the reality is that it would have to be opportunistic

6.3 Identify opportunities to conduct public outreach and education, including opportunities to share information about listing and conservation to landowners that may have occupied or potential suitable habitat.

- Not exactly ongoing
- Kelsey and Mikki in the process of creating SHA agreement for TCB based on fender's document
- Rebecca: USFWS partners program folks talk to landowners
    - Sam: more outreach to and support for landowners is necessary
    - Erica: there's a lack of outreach to landowners for TCB relative to a species like gophers
- Dan: there is some outreach in the San Juan Islands, mostly about GPB involving the conservation district
- Rebecca: consider adding an action for prioritizing targeted outreach
    - See Elspeth's edits on Action Plan document for proposed language
- Send the revised Action Plan out to folks to edit the language

6.4 Utilize synergistic restoration efforts with complementary species-at-risk to support a larger distribution of healthy functioning ecosystems.