Golden Chinquapin Element Occurrence Survey Report  
Gifford Pinchot National Forest  
2008  

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Introduction

Chrysolepis chrysophylla (golden chinquapin) is an evergreen member of the oak family (Fagaceae), and reaches the northern edge of its range in Washington State (Kruckeberg, 1980), where it is found in two disjunct clusters in Mason Co. (Olympic National Forest), and Skamania Co. (Gifford Pinchot National Forest: see Figure 1). This species is shade intolerant, and can easily be overtopped in growth by conifers, though after fire or logging, golden chinquapin is reported to compete well with the young regrowth of conifers for a time (Kruckeberg, 1980). Kruckeberg notes that peripheral populations of this species (such as those populations in Washington State) are likely to have different genetic resources and environmental tolerances than those of populations in the heart of a species’ range. He further states that “in our judgment . . . the fortuitous thinning of conifers at this locality [referring to a Hood Canal colony, Mason Co.] will improve the growth and longevity of the younger chinquapins . . . . But given the more rapid growth
rate of the conifers, the chinquapin is sure to become suppressed in growth beneath the canopy of dominant needle-leaved evergreens”. According to this report, and work by Raven (1995), threats to the species are considered to be overtopping by conifers, exposure of plants to windthrow (through adjacent timber harvest), fungal parasites, and inadvertent destruction of plants through project activities. Selective logging or pre-commercial thinning around golden chinquapin is considered by most to be of potential benefit to the species, where it is found in Washington State, as these activities may prevent associated conifers and deciduous hardwoods from suppression of the slower growing chinquapin. (Kruckeberg 1980, Salstrom, 1992). Golden chinquapin reportedly fruits sparingly, and sets few seeds with low germinability (Kruckeberg 1980).

In 1995, the Berry Botanic Garden participated in a survey of the Gifford Pinchot National Forest for golden chinquapin (Raven, 1995). This was the last detailed survey of occurrences completed. A 2003 species summary report produced in cooperation between the Washington Department of Natural Resources, the Washington Natural Heritage Program, and the U.S.D.I Bureau of Land Management recommends that documented occurrences should be re-visited, and surveys for additional occurrences need to be conducted (http://www.dnr.wa.gov/nhp/refdesk/fguide/pdf/chrchr.pdf).

Project Results
The last comprehensive survey of golden chinquapin on the Gifford Pinchot National Forest occurred in 1995 (Raven 1995). In 1995, the Washington Natural Heritage Program (WNHP) listed 25 golden chinquapin occurrences on or near the Gifford Pinchot National Forest; an additional 4 were known but not yet entered in the database (Raven 1995). Since that time, WNHP has consolidated element occurrences, resulting in 9 recognized element occurrences on the Gifford Pinchot National Forest, including Element Occurrence (EO) numbers *001, *004, *007, *022, *023, *033, *036, *037, and *048 (WNHP 2007). In 2008, detailed demographic data was collected for 77 individuals within one of the largest and most complex EOs: *004 (Figure 2). This occurrence contains hundreds of plants, within what used to be considered 8 separate occurrences, prior to WNHP consolidation. Because the WNHP consolidated occurrences are not as useful from a monitoring and/or restoration perspective (since the data collected and documented is generalized over a large area), the goal of the Gifford Pinchot National Forest is to transition back to tracking a greater number of occurrences as the data is transferred to NRIS TESP. We will utilize the data set generated from this project to help determine the best scale at which to parse out EO *004. Demographic data was collected for the purpose of qualitatively describing the current status of plants, and by extension the EO, and to allow for prioritization of occurrences or portions of occurrences for restoration. One of the main objectives of the 2008 project, as originally proposed, was to re-visit all golden chinquapin occurrences on the Gifford Pinchot National Forest. Because the consolidated EO’s are so complex, however, doing so would have precluded collecting data detailed enough to contribute to conservation and restoration planning. In effect, this objective was too ambitious for a single field season. For this reason, the decision was made to alter the objectives of the project by collecting more detailed data on fewer occurrences; the focus of the 2008 surveys and data collection focused primarily on the large, multi-part occurrence *004. It is within EO
that the chinquapin hairstreak butterfly was located during 2008 (Figure 3). Note that data collection was not randomized; an attempt was made to measure representative individuals within the occurrence, and to define and map the geographic extent of the occurrence.

Of the 77 chinquapin individuals for which demographic data was collected, the following observations were made (note that the following observations were derived from a single, large EO, with widely distributed plants). Observations are considered suggestive, but other element occurrences may show different patterns and trends. Monitoring of golden chinquapin occurrences will continue in FY 2009, as part of a Gifford Pinchot National Forest restoration planning effort.

General observations

- 44% of plants (33) are in poor to poor-fair condition
- 58% of plants (37) are in decline or in unstable situations
- 32% of plants (23) are currently experiencing high intensity competition
- 67% (46) face increasing competition
- 72% of plants are affected by overtopping or encroachment at moderate to high intensity.
- The majority of all individuals were found on convex slopes (61%); a relatively small proportion of individuals sampled were found on planar or concave slopes (18%).
- The majority of individuals were located on lower-mid slope (52%), rather than on upper slopes, in valleys, or on ridges (36%).
- Growth habit (tree, shrub or tree/shrub) was fairly evenly split among sampled individuals; large trees tended to be found in stands that had been thinned, and where there appears to have been an effort made to protect plants.

Sexually reproductive plants

- Of 77 plants sampled, 14 were sexually reproductive.
- Of 14 sexually reproductive plants, 4 were rated in poor-fair condition, 3 in fair-good condition, and 7 in good condition (29% in poor-fair condition, and 71% in fair-good to good condition).
- Fewer than half of these plants (6 out of 14) were rated as being in stable situations; 7 of 14 plants were rated as in unstable or declining situations.
- Half of these plants (7) were growing in young, open conifer plantations (i.e. stands that had been previously clearcut).
- Most plants (11 of 14) were within early successional stands (with either Douglas-fir or Ponderosa pine as the overstory dominant).
- Those plants not within early successional stands (4 of 14) were growing within late successional stands that had been thinned; half of these (2 of 4) were positioned at the edge of these stands.
• The growth habit of sexually reproductive plants was nearly evenly distributed between trees (5), shrubs (5) and tree/shrubs (4). The height range of plants was approximately 5-45 ft, with an average height of 17 ft.
• Of the 14 sexually reproductive plants, 8 showed evidence of having re-sprouted from a stump, while 2 showed no sign of re-sprouting (no data was collected for 4 individuals).
• Of the 8 re-sprouted plants, 7 were within young plantations, and one within a thinned, late successional stand.
• Average canopy cover for sexually reproductive plants was 29%, and ranged from 0-65%. This was measured within the direct proximity of the plant, and doesn’t reflect the canopy cover at the stand level.

Non-sexually reproductive plants

• Of the non-sexually reproductive plants, 65% (41 of 63 individuals) were in poor to fair condition, while only 32% (20 of 63 individuals) were in fair-good or good condition (Figure 4).
• Average canopy cover for non-sexually reproductive plants was 52%, with a range of 0-90%.
• Slightly less than 50% (30 of 63 plants) were considered to be in a declining condition trend, while 20 of 63 (32%) were judged to be stable.

Conclusions
Overall, this large EO is in decline, based on plant condition, and level of competition from competing vegetation. We believe this provides a strong argument for beginning active restoration efforts.

It appears that sexually reproductive plants are most often in better condition and located in better habitat (less competition and encroachment occurring; lower canopy cover), than non-reproductive plants.

In addition, it appears that aggressive timber harvest (i.e. clear cutting) in the past has not eliminated golden chinquapin from stands; the plant has re-sprouted from stumps, and recovered, at least to some extent, in these stands. In fact, the majority of sexually reproductive plants were found in young plantations or thinned stands.

Observations made regarding what may be interpreted as the “best” habitat for chinquapin: convex, lower to mid-slopes (Figure 4), in areas dominated by an overstory of Douglas-fir or Ponderosa pine (more detailed plant community data has been collected, but has not yet been analyzed) help shape our ideas of potential future habitat for golden chinquapin, and will contribute to the development of a restoration plan. However, we recognize that these inferences are anecdotal, and based on certain assumptions. The existing data needs to be more closely analyzed, and additional data needs to be collected from other EOs’ before stronger inferences may be made.
During 2008 surveys, the golden hairstreak butterfly was found associated with flowering golden chinquapin individuals. According to personal communications with butterfly experts, this is not necessarily generally the case (Wainwright 2008). However, since flowering appears to indicate plants that are in better condition, and located in better habitat, the presence of flowering plants may act as a surrogate measure of areas where the butterfly has had, and will have, a better chance of persisting over time.

**Restoration opportunities**

The data resulting from this study will be used to help design a Gifford Pinchot National Forest golden chinquapin restoration project during FY 2009. The restoration proposal may include the selective thinning of conifers adjacent to golden chinquapin individuals in a manner designed to minimize windthrow danger, while protecting trees from mechanical damage and soil compaction. The proposal may also include selective pruning of certain individuals that lack vigor, or that have become unstable in their structure, due to vegetative competition, with the goal of improving vigor, structure and stability in the new growth. Project planning will also address protection and/or promotion of nectar sources for adult golden hairstreak butterflies in the vicinity of the chinquapin trees.

Since individuals in good or fair-good condition are rare, and a greater proportion of flowering trees were judged to be within these condition classes, areas currently hosting flowering trees may be a priority for restoration, in terms of maintaining or improving current conditions over time (i.e. keep our healthy sites healthy).

On the other hand, more aggressive silvicultural treatments may be indicated in areas with trees that are in poor condition, or in rapidly declining habitat; these areas should be prioritized for treatment in the near future, since persistence of golden chinquapin is at stake. It is within these areas where selective pruning of golden chinquapin individuals may be considered.
Figure 1:

Golden chinquapin occurrences on the Gifford Pinchot National Forest
Golden chinquapin occurrences monitored in 2008 on the Gifford Pinchot National Forest
Golden chinquapin occurrences on the Gifford Pinchot National Forest revisited during 2008, with verified chinquapin hairstreak butterfly occurrence
References


