

Integration and Synthesis Summary for Plants, CONUS
Conifers and Cycads: Assessment Group 3

The tables below contain summaries of the information and data we used to determine the ranking (high, medium, low) for vulnerability, risk and usage indicators. Information in most of the columns was used directly in the ranking determination (green fill). Where indicated, information in other columns was not used directly in the ranking calculation, but provided additional information about the species that fed into one of the ranking metrics or was used to make the draft determination when relevant. The summary for this assessment group also includes new conservation measures¹ that have been incorporated into the Action since the draft biological opinion was released. The measures and our related assumptions are incorporated into our analysis (immediately above Table 4), and also factor into the rationales for our conclusions for each species, as described below.

Conifers and cycads are gymnosperms; vascular plants, usually trees or shrubs, that reproduce by means of an exposed seed, or ovule. Gymnosperms do not produce flowers and their pollen is dispersed by wind. With the exception of whitebark pine, all species have very restricted ranges and limited dispersal capabilities. Santa Cruz cypress and Florida torreya rely on squirrels for seed dispersal and whitebark pine on the Clark’s nutcracker (*Nucifraga columbiana*). The whitebark pine’s cones will not open on their own and are completely dependent upon the nutcracker to break apart their cones and disperse the seeds.

Table 1: Summarizing Data and Information for Vulnerability Ranking and Draft Determination
Data Sources: Status of the Species (SOS) accounts updated as of November 2019 (Appendix C); NA=Not Applicable

Scientific Name	Common Name	Status	Population Level Trends	Species Level Trends	Number of Populations	Distribution	Number of Individuals*	Pesticides Listed as a Threat	Pollinator Loss listed as a Threat	Vulnerability Ranking
<i>Cupressus goveniana ssp. goveniana</i>	Gowen cypress	Threatened	Not Available	Stable (NatureServe, 2015)	2 (NatureServe, 2015)	Restricted to two sites approximately 6.4 km apart on the Monterey Peninsula, coastal Monterey County, California. Suitable habitat for this species is very limited in extent (USFWS 2008) (NatureServe, 2015).	Not Available	No Mention	No Mention	High
<i>Hesperocyparis abramsiana</i> (= <i>Cupressus abramsiana</i>)	Santa Cruz cypress	Threatened	Not Available	Not Available	5 (USFWS, 1998)	Five populations of Santa Cruz cypress are known, all of them in the Santa Cruz Mountains. No historical distribution beyond these five sites is known. The Butano Ridge population is in San Mateo County and the Eagle Rock, Bonny Doon, Bracken Brae, and Majors Creek populations are in Santa Cruz County (Lyons 1988). These five relatively isolated populations range over a distance of 24.2 kilometers (15 miles) from the northernmost population at Butano Ridge to the southernmost at Majors Creek (USFWS, 1998).	> 5,100 (USFWS, 1998)	No Mention	No Mention	High
<i>Pinus albicaulis</i>	Whitebark pine	Proposed threatened	Declining	Declining	Not available	Whitebark pine is typically found in cold, windy, high elevation or high latitude sites in western North America and as a result, many stands are geographically isolated. It is a stress-tolerant pine and its hardiness allows it to grow where other	Not available	No Mention	No Mention	Medium

¹ Additional information on these new conservation measures can be found in the Description of the Action section of this biological opinion.

Scientific Name	Common Name	Status	Population Level Trends	Species Level Trends	Number of Populations	Distribution	Number of Individuals*	Pesticides Listed as a Threat	Pollinator Loss listed as a Threat	Vulnerability Ranking
						conifer species cannot. Whitebark pine is considered a keystone species because it regulates runoff by slowing the progress of snowmelt, reduces soil erosion by initiating early succession after fires and other disturbances, and provides seeds that are a high-energy food source for some birds and mammals. The species is distributed in Coastal Mountain Ranges (from British Columbia, Washington, Oregon, down to east-central California) and Rocky Mountain Ranges (from northern British Columbia and Alberta to Idaho, Montana, Wyoming, and Nevada). Whitebark pine is ecologically very significant in maintaining snow pack and regulating runoff, initiating succession after fire or other disturbance events, and providing seeds that are a high-energy food source for many species of wildlife.				
<i>Torreya taxifolia</i>	Florida torreya	Endangered	Decline of >90% (NatureServe, 2015)	Decreasing (USFWS, 2010)	31 (NatureServe, 2015)	Very narrow endemic, known only from ravines along east bank of the Apalachicola river in the Florida panhandle (Liberty and Gadsden Counties) and adjacent southwestern most Georgia (Seminole and Decatur Counties). Kral reports for Jackson County, Florida but basis unclear; the Florida Natural Areas Inventory has mapped one occurrence in Jackson County, but it is believed extirpated. (NatureServe, 2015)	500 - 600 individuals (USFWS, 2010)	No Mention	No Mention	High

*Information in this column was used to inform the ranking metrics or the draft determination when relevant.

Table 2: Summarizing Data and Information for Risk Ranking

Data Sources: SOS accounts (Appendix C); R Plot Appendices; NA=Not Applicable

Risk to Individuals and Pollinators if exposed: The individual plants in this assessment group are estimated to experience up to a 12% decrease in dry weight if exposed to malathion on the following use sites, based on labeled application rates: orchards and vineyards, developed, nurseries, open space developed and Christmas trees. No effects are expected on other use sites. Conifers do not rely on animal species for pollination, thus no effects are expected to these plants from loss in pollinator populations from malathion exposure across use sites within their ranges.

Mortality is expected for insect seed dispersers exposed to malathion on use sites or via spray drift, and from mosquito control applications. Because terrestrial invertebrates exhibit a range of sensitivities to malathion, insect abundance is expected to be reduced where exposure occurs, but not completely eliminated. However, some species are likely to incur greater levels of mortality than others based on their sensitivity. As plants often have unknown seed dispersers for which

toxicity data is unavailable, we assume insects that disperse the seeds of listed plants are sensitive to malathion, and that exposure will cause mortality. In field studies, reductions of common insect species following pesticide exposure are often temporary with recovery over a short period of time. However, since listed plants may be reliant on insect seed dispersers that are limited in range or abundance, these insect species may be less likely to recover following pesticide exposure.

Some avian seed dispersers exposed to malathion on use sites may experience mortality or sublethal effects, depending on the site of exposure and size of the bird. Smaller birds exposed on use sites with higher allowable use rates (e.g., developed, open space developed, orchards and vineyards) have a greater chance of being affected. Exposure to spray drift is not expected to result in effects to bird seed dispersers. No mortality or sublethal effects are expected for mammalian seed dispersers from malathion exposure either on use sites or from spray drift.

Scientific Name	Common Name	Direct Effects to Mortality or Growth Expected (yes or no; reduction in dry weight when exposed in use areas that may have effects)	Effects to Pollinators, % insect pollinator mortality (% bird pollinator mortality)	Method of Reproduction (risk modifier)	Seed Dispersal Vector (risk modifier)	Obligate or Specific Pollinator (risk modifier)	Pollination Vector*	Risk Ranking
<i>Cupressus goveniana ssp. goveniana</i>	Gowen cypress	Yes (12%)	NA	Non-flowering	Abiotic, Biotic (Unknown)	NA	Abiotic	Low
<i>Hesperocyparis abramsiana</i> (= <i>Cupressus abramsiana</i>)	Santa Cruz cypress	Yes (12%)	NA	Non-flowering	Abiotic, Biotic (Mammal)	NA	Abiotic	Low
<i>Pinus albicaulis</i>	Whitebark pine	Yes (12%)	NA	Non-flowering	Abiotic, Biotic (Bird)	NA	Abiotic	Low
<i>Torreya taxifolia</i>	Florida torreya	Yes (12%)	NA	Non-flowering	Abiotic, Mammal	NA	Abiotic	Low

*Information in this column was used to inform the ranking metrics or the draft determination when relevant.

Volatilization: We do not expect transport from volatilization to be an appreciable source of exposure for most or all species in this assessment group. For species that occur at high elevations, we expect additional exposure to malathion that may vaporize from application sites. However, the magnitude of increased exposure is uncertain due to the unpredictability of weather events, along with variability of the geographical features across the landscapes that influence transport and deposition, though the information available does not allow us to conclude that concentrations from this route alone will rise to the level where effects are expected.

Table 3: Summarizing Data and Information for Usage Ranking

Data Sources: R Plot Appendices for individual plant species; Federal lands overlap analysis; California (CA); NA=Not Applicable

Scientific Name	Common Name	Acres in Species Range*	% Range Overlap with Federal Lands*	% Range in CA*	Comments for % Range in CA*	Total Overlap % (All Agricultural and Residential Uses)*	Total Overlap % (Mosquito Adulticide)*	Anticipated Usage within Range (agricultural data based on SUUM): total % of range for all uses	Anticipated Usage within Range (agricultural data based on CalPUR): total % of range for all uses	Ranking: Confidence Level	Usage Ranking
<i>Cupressus goveniana ssp. goveniana</i>	Gowen cypress	20,857.82	2.89	100	None	48.03	15.55	2.63	No usage overlap	CalPUR	Low
<i>Hesperocyparis abramsiana</i> (=Cupressus abramsiana)	Santa Cruz cypress	145,424.01	0.02	100	None	10.02	100.20	0.57	0.050	CalPUR	Low
<i>Pinus albicaulis</i>	Whitebark pine	4,695,8615.23	75.23	94	Other portions of the range occur in ID, MT, NV, OR, WA, WY. This % skewed due to high numbers of Fed lands in other states.	8.54	19.92	1.14	0.224	CalPUR	Low
<i>Torreya taxifolia</i>	Florida torrey	2052085.69	13.80	0	NA	25.04	78.35	5.80		Standard	Medium

*Information in this column was used to inform the ranking metrics or the draft determination when relevant.

Cumulative Effects and Environmental Baseline: Please refer to the Status of the Species accounts (Appendix C) and overarching Environmental Baseline and Cumulative Effects sections of this Opinion.

Additional Conservation Measures:

Additional information on these new conservation measures can be found in the *Description of the Action* section and Appendix A-2 of this biological opinion, and further information on the anticipated impacts of each measure in the *Effects of the Action* section.

General Conservation Measures:

Several additional conservation measures have been recently provided by EPA and will be implemented as part of the Action. These measures will apply to all species in this assessment group with corresponding use type overlap and usage (i.e., mosquito adulticide, agricultural and residential uses, see Table 3). All measures are anticipated to limit the exposure of pollinators and seed dispersers to malathion in the described use area where it occurs in or around the range of the species, thus reducing the risk of reproductive effects to the species.

Reduced application number and rate: New restrictions on corn, cotton, orchards and vineyards, pasture, other crops, and vegetables and groundfruit lower the maximum allowable number of applications (previously ranging from 3-13 applications per year, depending on the specific crop) to 2-4 per year, as described in the *Description of the Action* of this Opinion. This is anticipated to reduce the amount of malathion used and decrease exposure to these plant species, thus decreasing the risk of direct sub-lethal impacts to the plant itself.

Residential use label changes: New restrictions to the method and frequency of application for residential use of malathion are anticipated to substantially reduce exposure to species and their pollinators/seed dispersers that overlap with developed and open space developed areas. Label changes will ensure that residential use is limited to spot treatments only (rendering spray drift offsite unlikely) and reducing the extent of area which can be treated in the developed and open space developed areas by as much as 75% or more from modeled values. In addition, we expect the frequency of exposure to decrease as the number of allowable applications is reduced from “repeat as necessary” to a maximum of 2–4 applications per year (depending on the specific residential use). Retreatment intervals of 7-10 days between any repeated applications are expected to reduce environmental

concentrations by allowing initial residues to degrade prior to the next application. We anticipate this measure will further reduce exposure to these plant species, thus decreasing the risk of sub-lethal impacts to the plant itself.

Table 4: Summary of Conclusions

Scientific Name	Common Name	Vulnerability Ranking	Risk Ranking	Usage Ranking	Species Conclusion (J, NJ)*
<i>Cupressus goveniana ssp. goveniana</i>	Gowen cypress	High	Low	Low	NJ
<i>Hesperocyparis abramsiana</i> (= <i>Cupressus abramsiana</i>)	Santa Cruz cypress	High	Low	Low	NJ
<i>Pinus albicaulis</i>	Whitebark pine	Medium	Low	Low	NJ - conference
<i>Torreya taxifolia</i>	Florida torreya	High	Low	Medium	NJ

*NJ = No Jeopardy; J = Jeopardy

Rationale for Species Conclusions

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed registration of malathion, and the cumulative effects, it is the Service’s biological opinion that the registration of malathion, as proposed, is not likely to jeopardize the continued existence of the four plant species in this assessment group.

While the species in this assessment group have either high or medium vulnerabilities based on their status, distribution, and trends, the risk to all species in this group posed by labeled uses across the range is low. The estimated usage within the range for all species in this group is anticipated to be low or medium, as described above, except for the Gowan cypress, where we do not expect usage is likely to occur. Pollinating animals do not play a role in the life cycle of conifers and cycads, as these species use wind to transport pollen between individuals and populations. As a result, we do not anticipate there will be effects to the reproduction and survival of these species via pollinators from malathion exposure in the plants’ range.

We do anticipate impacts to seed dispersers for one species in this group. The whitebark pine relies on birds (Clark’s nutcracker) for seed dispersal. Avian seed dispersers may experience some effects (mortality and sub-lethal) on certain use sites. However, we do not anticipate the loss of small numbers of birds from the low anticipated usage of malathion with the species range would measurably reduce reproduction for the whitebark pine. Furthermore, the primary seed disperser is a relatively large passerine, and would be expected to be less vulnerable to the effects of malathion than smaller avian seed dispersers.

Santa Cruz cypress and Florida torreya rely on mammals (squirrels) for some portion of their seed dispersal. No mortality or sublethal effects are expected for mammalian seed dispersers from malathion exposure either on use sites or from spray drift, thus we do not anticipate reproductive effects to these species from loss of seed dispersers. The Gowen cypress relies on both abiotic (wind) and unknown biotic seed dispersers. Since there is no malathion usage anticipated within the range of this species, we do not expect there to be a loss of seed dispersers within the Gowen cypress’ range.

While we expect some individual plants of Santa Cruz cypress, white bark pine, and Florida torreya will experience reduced growth due to direct exposure to malathion, we do not anticipate this reduction in growth would cause species-level effects. We expect that the additional conservation measures described above, such as spot treatments only (rendering spray drift offsite unlikely) and reducing the extent of area which can be treated in the developed and open space developed areas, will further decrease the exposure and resultant sub-lethal effects of these species to malathion. We do not anticipate any effects to the Gowan cypress, as we do not expect exposure for this species. Therefore, we do not anticipate that the proposed action would appreciably reduce survival and recovery of these species in the wild.