

Study Documents Plant Poaching In Great Smokies

By Susan Power Bratton

National Park Service managers frequently complain about people who trample, pick or dig up showy wildflowers and rare plants. Desert parks report difficulties with cactus fanciers who check out the park during the day, then sneak out into the desert at night and remove unusual or especially attractive species of cacti. The sub-tropical parks, such as Everglades, find orchid enthusiasts can not resist removing epiphytic orchids and other "air plants". In many cases, a park may have both amateur plant poachers, (the people who dig plants for their own home gardens or casually pick a few flowers), and the professional poachers, (those who gather large numbers of plants for sale).

In the Great Smoky Mountains NP, plant poachers are known to harvest medicinal plants, especially ginseng (*Panax quinquefolium*), an herb supposed to increase one's life span and virility. Poachers also dig up showy flowering plants, such as azaleas, rhododendrons, and orchids, and strip off moss mats that can be used to decorate terrariums. Some species can be sold to dealers who specialize in wild plants. Dried ginseng root will bring up to \$140 a pound, azaleas a few dollars each, and woodland orchids a dollar or two for each flowering shoot.

Since some endangered species may be subject to poaching, and poachers may be harming the experience of park visitors by removing the best populations of showy flowering species, plant poaching has received increasing attention as a resource management and law enforcement concern.

Unfortunately most of the information on plant poaching is anecdotal. Rare plant monitoring is a relatively new activity in most parks, so long term data on possible population declines, due to poaching and other factors, are uncommon. Poaching is difficult to study because poachers usually know what they are doing is against the law and try to avoid being seen. Since one or two diggers can remove over a hundred shoots of an herbaceous plant in a few hours, a very low number of poaching incidents could greatly deplete a local population of plants. Once the plants have disappeared, there is no way of to quantify population changes and poaching impacts.

In Great Smoky Mountains NP, two projects are attempting to determine the magnitude of the poaching problem. First, Peter White, of Uplands Field Research Library in the Great Smokies has been cooperating with Rob Sutter from the North Carolina Department of Agriculture,

Pesticides and Plant Protection Division, in establishing a ginseng monitoring program. The original idea was to find "pristine" or "undisturbed" populations in the park to use as controls for populations outside the park. Due to the large percentage of small or immature plants, however, it is now thought even Smokies ginseng populations several miles from the nearest trail are subject to at least some digging. The plant is so valued by poachers that it almost never is seen near park roads or trails, even where there is good habitat.

The ginseng monitoring was initiated by locating populations in remote watersheds, including "virgin" forest, then marking each study site with metal stakes and aluminum tree tags. The investigators sample a strip heading upslope. Individual shoots are censused, the number of "prongs" (leaves) is counted, and the presence and number of flowers is recorded. Botanists can return late to these sites and determine if the populations are increasing or decreasing and if their structure has changed.

The second project was a field survey of two species of woodland orchids known to be favored by wildflower gardeners. One of



Showy orchis, a small, spring, forest floor herb known to be harvested by wildflower gardeners in the Great Smoky Mountains NP.

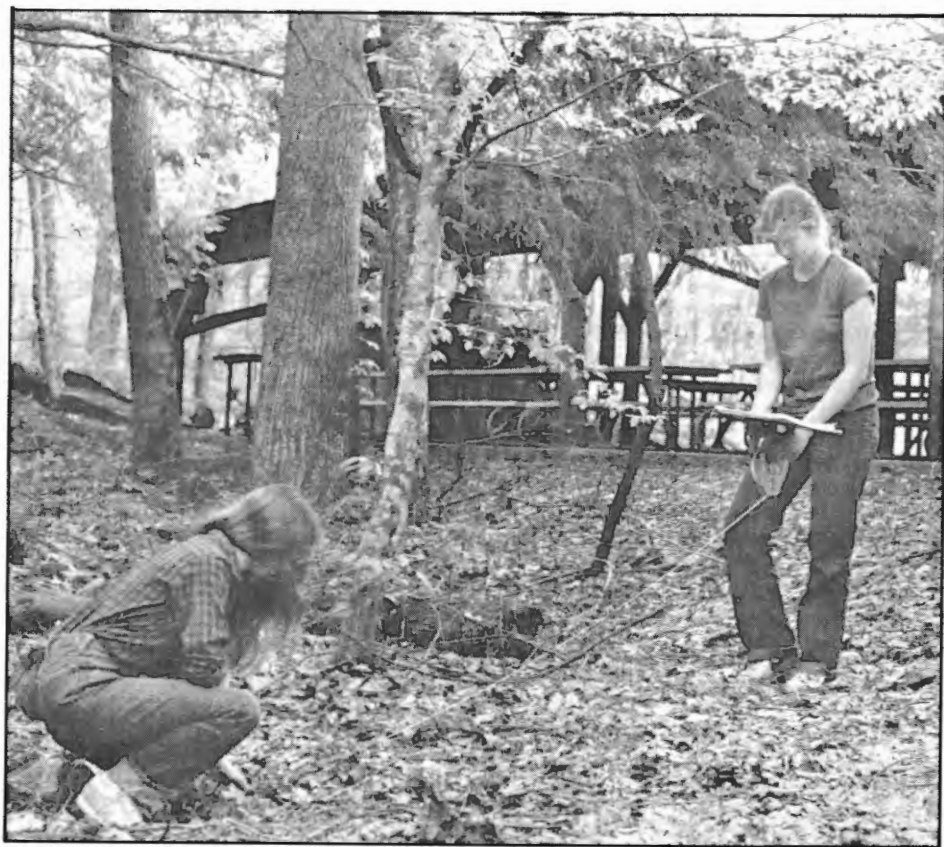
the species, showy orchis (*Orchis spectabilis*), occurs at scattered locations in low elevation stream valleys. A small plant, usually less than eight inches tall, it produces sprays of delicate lavender and white flowers from mid-April to early May. The second species, pink lady slipper (*Cypripedium acaule*), prefers pine and oak forests. Often over a foot tall and easy to locate, it produces a single large pink flower from late April to early June.

Research teams, including volunteers from EARTHWATCH sampled orchid populations in four types of areas: 1) vehicular access or very easy access, such as nature trails, 2) moderate access, foot and horse trails, 3) difficult access, trails more than 5 km from the nearest vehicle road, and 4) cross-country access, site without maintained trails.

The teams sampled a 50 m wide swath along a road or trail (or in the case of cross-country routes along a stream or ridge line) and attempted to locate all the orchids over a distance of 1 km or more. Each team recorded a series of environmental variables, such as slope and forest type, both every 200 m and every time they encountered a new population of orchids. For each individual shoot the investigators recorded length of longest leaf, number of leaves per shoot, presence or absence of flowers, distance from nearest automobile road, distance from nearest trail, and visibility from nearest road or trail. Information also was collected on distance to the next nearest shoot of the same species.

Preliminary data analysis has shown, first, that the showy orchis responds favorably to disturbances along roads and trails. Along routes most heavily used by visitors, 1245 showy orchis plants were found within 0 to 9 m of the trail edge, 983 from 10 to 19 m, and only 362 from 40 to 49 m. The percentage of plants blooming was only slightly higher for the distant individuals: 26 percent of the plants 40 m or more away from the trail were blooming as opposed to 23 percent of the plants within 0 to 9 m of the trail. Further, the population structure in the high visitor access sites was very similar to that in the remote off-trail populations. The mean length of the longest leaf for the high access was 7.49 cm, while it was 7.46 cm for the off-trail samples. The average percentage of plants blooming along easy access trails was 25 percent, 21 percent for remote areas. There was thus very little evidence that plant poaching or the presence of developments such as trails was harming the populations of this species.

The pink lady slipper situation was quite different. Lady slipper populations along automobile roads and nature trails had smaller plants and fewer flowering individuals than those in remote, backcountry areas. The average length of the longest leaf was 7.29 cm, 10.57 cm, 11.08 cm and 14.61 cm for vehicle roads, nature trails, moderate access sites and remote sites respectively. The percentage of plants with flowers was only 3 to 4 percent for the roads and nature trails, while it was 11 percent for moderate access, and 24 percent for remote sites. Ironically, in one of the most heavily visited areas of the Smokies, Cades Cove Loop Road, over 1200 lady slipper shoots were located with in 50 m of the road, but only 3 of these plants were found to be blooming. (Over grazing by deer may be contributing to the small



EARTHWATCH volunteers taking basic environmental measurements and determining the distance to the nearest road and trail for population of showy orchis growing in a park picnic area.

size and lack of mature orchids, in this case). The three nature trails sampled had 347 plants total, about 10 of which were blooming. The data showed that only the larger lady slippers bloomed, and that once the plants reached about 26 cm leaf length, they almost always bloomed. If poachers were removing primarily flowering individuals they also would be removing the largest plants, perhaps accounting for the smaller size of the orchids in the high use areas. Grazing or trampling could also, by reducing leaf size and plant productivity, inhibit blooming.

Although there are still numerous healthy lady slipper populations in the Great Smoky Mountains NP, and the existence of the species is not critically threatened by human activities, densely flowering populations of lady slippers are not present in sites with easy visitor access. Since lady slippers have a favorable response to disturbances, such as canopy opening, there is little reason to believe the presence of roads and trails is causing difficulties. These openings appear in some cases to stimulate the pop-

ulations. It is more likely that direct disturbance by people, including digging, flower picking and trampling while viewing flowers is depleting the number of blooming plants. Evidence of digging was noted during this survey.

The data indicate that plant poaching should be a concern for park management in the Great Smokies, but that further information is needed. Monitoring of ginseng and of lady slippers should continue and park botanists should attempt to determine if any other species populations are presently subject to significant impact. Yellow lady slippers, which are much rarer in the park than the pink, should certainly be censused and monitored as should all the threatened or endangered orchids and lilies. Law enforcement and interpretive staff can assist in the effort by providing data on poaching incidents and by making visitors more aware of the damage caused by poaching.

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Measuring the length of the longest leaf of a pink lady slipper. Aside from counting individual plants in the sampling areas, a series of morphological measures were taken including number of leaves, length of longest leaf, presence of flowers, and distance to the next nearest plant of the same species.



A road side in Great Smokies. Such sites are good wildflower habitat, but are heavily used by visitors and are easily accessible to plant poachers.