United States Department of the Interior

FISH AND WILDLIFE SERVICE

International Affairs
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SEP 26 2018

To: Chief, Branch of Permits, Division of Management Authority

From: Chief, Branch of Monitoring and Consultation,
Division of Scientific Authority

Subject: General Advice for the export of wild and wild-simulated American ginseng (*Panax quinquefolius*) legally harvested during the 2018 harvest season in 19 States and one Tribe with a CITES Export Program for American ginseng

Advice: The Division of Scientific Authority (DSA) finds that the export of roots of wild and wild-simulated American ginseng legally harvested during the 2018 harvest season in: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kentucky, Maryland, Minnesota, Missouri, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and the Menominee Indian Tribe of Wisconsin is not detrimental to the survival of the species, provided the following CONDITION is implemented:

> All wild and wild-simulated American ginseng roots intended for export must be from plants that are 5-years of age or older (i.e., the rhizome must have 4 or more visible stem scars).

The age of an American ginseng plant can be determined by counting the stem scars present on the rhizome (also called 'root neck') that is connected to the root. A stem scar is formed from the abscission of the plant stem. A plant with 3 palmately-compound leaves, each leaf comprised of 3 to 5 leaflets, is most likely to be 5-years of age or older.

This General Advice is valid for the export of wild and wild-simulated ginseng roots legally harvested during the 2018 harvest season in the aforementioned States and Tribe, unless the DSA receives new or additional information regarding the status of this species or management that indicate this finding should be rescinded.*

The American ginseng management programs in the aforementioned States and Tribe are approved under the U.S. Fish and Wildlife Service (Service) CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) Export Program (CEP) for this species (Service regulation 50 C.F.R. 23.68).

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* Since this finding was signed on August 30, 2018, we have received updated 2017 harvest data from two CEPs for American ginseng. The 2017 harvest data reported in this finding has been updated as appropriate. This finding rescinds the previous finding dated August 30, 2018.

Basis for advice:

To ensure that the export of American ginseng (henceforth ginseng) will not be detrimental to the survival of the species, the DSA annually reviews available information from the State and Tribal agencies and other Federal agencies, published peer-reviewed literature, and other information about the status and trade of this species in making this finding.

International Trade and CITES Regulation

The harvest of wild ginseng roots for international trade began in the early 18th century in North America, and has continued for nearly 300 years with nearly all wild ginseng roots exported to Asia for their reported health-related properties. The harvest of the root kills the plant. Due to concerns of over-harvest of ginseng roots for international trade, the species was included in Appendix II of the CITES in 1975. The Appendix-II listing covers whole and sliced roots, and parts of roots (including root fibers and hairs), but excludes manufactured parts or derivatives such as powders, pills, extracts, tonics, teas, and confectionary. Ginseng is the most economically important wild-harvested native medicinal plant in the United States.

Biological Information and the Conservation Status of American ginseng

Ginseng is a slow-growing, long-lived herbaceous perennial plant that occurs in deciduous forests of eastern United States and Canada (Anderson et al. 1993; McGraw et al. 2003). The range of ginseng extends north into the provinces of Ontario and Quebec, west to Minnesota, south to Oklahoma and east to Maine (Gleason and Cronquist 1991). In the United States, the species' core range is considered the southern Appalachian region (Lockstadt 2012).

Ginseng occurs in closed canopy mature deciduous forests that maintain heterogeneous light environment (Fournier et al. 2004). Seedlings emerge in early spring with a single trifoliate leaf; juvenile plants produce 2–palmately compound leaves; and adult plants produce 3–to 4–palmately-compound leaves (infrequently 5 leaves) (McGraw et al. 2013). A compound leaf is comprised of 3 to 5 leaflets. The leaves radiate from a single stem in a whorled arrangement (Radford et al. 1981). The colloquial term for a ginseng leaf or plant is "prong" (e.g., 1-prong; juvenile plants are 2-prong; adult plants are 3-prong and 4-prong). If the leaves or stem are damaged, the plant does not produce a new stem or leaves during the growing season. The life stage transition of ginseng was originally described as a linear progression (Lewis and Zenger 1982; Anderson et al. 1993). That is, from a smaller size or stage class (seedling) to the next larger size-class (2-leaf plant) (Anderson et al. 1993). More recently, the life stages of ginseng are considered to be much more dynamic (McGraw et al. 2013). For example, a plant may remain in the 1-leaf stage for several years before it produces 2-leaves; at the juvenile stage a plant may produce 2-leaves for a number of years before it produces 3-leaves; which may subsequently produce 2-leaves; or grow from a seedling to a 2-leaf plant, and so forth (McGraw et al. 2013). Consequently, plants with the same number of leaves may vary in age (Anderson et al. 2002; Mooney and McGraw 2009).

The plant's stem dies in late autumn, which marks a permanent scar on the underground rhizome (commonly referred to as the 'root neck') where it was attached. The rhizome is connected to the taproot. The age of the plant can be determined by counting the number of stem scars on the

rhizome (Lewis and Zenger 1982; Anderson et al. 1993). Although long-lived plants have been reported, research suggests that plants typically live approximately 25 years (Mooney and McGraw 2009).

The size of a plant is a good predictor of its capacity to survive and reproduce (Lewis and Zenger 1982; Anderson et al. 1993; Mooney and McGraw 2009). Although 2-leaf plants can produce flowers, seed production is intermittent and much lower than plants with three or more leaves (Lewis and Zenger 1982; Schlessman 1985; McGraw et al. 2013).

The inflorescence is a single umbel with flowers blooming from mid-June to mid-July. Ginseng is considered to be a mixed-mating species (self-pollination and cross-pollination) (Carpenter and Cottam 1982; Lewis and Zenger 1982; Schlessman 1985; Mooney and McGraw 2007). The two know pollinators of ginseng are syrihid flies and halictid bees (Lewis and Zenger 1982; Schlessman 1985). Research shows that populations are more likely to be self-pollinating, and that the species' genetic profile is more consistent with a predominant life-history strategy of self-pollination (Cruse-Sanders and Hamrick 2004; Grubbs and Case 2004). Low fecundity and high seed or seedling mortality has been reported in wild populations (Carpenter and Cottam 1982; Lewis and Zenger 1982; Schlessman 1985; Schluter and Punja 2000).

Ginseng fruits typically contain 1-2 seeds (occasionally 3 seeds), gradually turn from green to bright red when mature, and generally fall within 2 meters (6.5 feet) of the parent plant (McGraw et al. 2005). Fruits are susceptible to predation by white-tailed deer and small mammals (Furedi and McGraw 2004). Thrush birds (*Hylocichla* spp.), particularly the wood thrush (*H. mustelina*), are the primary vectors for dispersing seeds over longer distances (< 100 meters (328 feet)) (Hruska et al. 2014).

Ginseng seeds are classified as having morphophysiological dormancy, which require 18-21 months of cool-warm-cool temperature sequence before germination of seeds can occur (Stoltz and Snyder 1985). Seeds from mature red fruits are more likely to germinate than seeds from green fruits (McGraw et al. 2005). Harvesters that plant ginseng seeds 2 cm. (ca. 1 in.) deep can increase germination success over natural seed dispersal (McGraw et al. 2005). Research shows that seeds can remain viable for up to four years in the soil (Souther and McGraw 2011).

Since 2005, NatureServe has ranked the national conservation status of ginseng in the United States as vulnerable/apparently secure (N3N4) (NatureServe 2018). NatureServe defines vulnerable (N3) as a species at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors; and apparently secure (N4) as a species uncommon but not rare; some cause for long-term concern due to declines or other factors (NatureServe 2018).

There are no range-wide census data of this species in the United States. Populations are widely distributed and variable in size, from small populations of a few dozen plants to populations of 200 plants (McGraw et al. 2013; Young et al. 2013). A population can cover 0.04 to 4 hectares (1 to 9.8 acres) with smaller patches ("clusters") of plants ranging from 1 plant to more than 100 plants/1m^2 (1 m^2 =10 ft^2) (McGraw et al. 2013; Wagner and McGraw 2013). Field research has shown that populations on lands where harvest is prohibited (e.g., public lands, private conservation lands) have more adult plants (3- and 4-leaf plants) compared to populations where

harvest occurs which have more 1- and 2-leaf plants (Cruse-Sanders and Hamrick 2004; Young et al. 2013; McGraw et al. 2013).

Research has shown that more genetic diversity is among ginseng populations than within populations as populations are limited by gene flow (Cruse-Sanders and Hamrick 2004; Grubbs and Case 2004). Genetic diversity is gradually lost in small widely dispersed populations of self-pollinating plants as a result of genetic drift, a random process resulting in inbreeding (the mating of related inividuals) (Cruse-Sanders and Hamrick 2004; Grubbs and Case 2004). Small populations are more likely to have higher rates of inbreeding, which can lead to the loss of fitness in offspring (Cruse-Sanders and Hamrick 2004; Grubbs and Case 2004; Mooney and McGraw 2009; Souther and McGraw 2011; Schlag and McIntosh 2012). The concern is that small populations tend to lose genetic diversity by genetic drift much more quickly than larger populations (Ellstrand and Elam 1993). The loss of genetic diversity can influence the ability of a population to adapt to changes in the environment over time (Cruse-Sanders and Hamrick 2004; Souther and McGraw 2014).

Genetic research has shown that cultivated plants are genetically distinct from wild plants and are genetically more similar to each other than to wild plants (Boehm et al. 1999; Schluter and Punja 2002; Grubbs and Case 2004). Evidence of plants derived from cultivated-sourced seeds in wild populations has been documented (Grubbs and Case 2004; Schlag and McIntosh 2012; Young et al. 2012). Mating of wild plants with plants derived from cultivated-sourced seeds may produce offspring with traits more similar to cultivated plants than wild plants (Mooney and McGraw 2007). Offspring from non-wild plants may also introduce non-local genes (i.e., maladaptive genes) into wild populations (Mooney and McGraw 2007; Young et al. 2012), which may reduce fitness of offspring, affect locally-adapted gene complexes, and the ability of populations to adapt to changing forest conditions (Grubbs and Case 2004).

Threats to ginseng populations include illegal and unsustainable harvest (Van der Voort and McGraw 2006; McGraw et al. 2010), browse by white tail deer (*Odocoileus virginianus*) (McGraw and Furedi 2005; Farrington et al. 2008), and habitat destruction (McGraw et al. 2013).

The life history traits of ginseng, including low fecundity, slow plant growth, and long pre-reproductive period before plants mature and produce seeds, influence the species' survival and reproduction, which can be exacerbated by over-harvest, high deer densities, and other threats.

Documented effects of long-term harvest include:

- Smaller plants as a result of harvest pressure (McGraw 2001; Mooney and McGraw 2009)
- Lower seed production resulting from removal of larger older plants (Hackney and McGraw 2001);
- Lower genetic diversity (Cruse-Sanders and Hamrick 2004);
- Lower fitness due to inbreeding (Mooney and McGraw 2007); and
- Altered age structure by removal of adult plants (Cruse-Sanders and Hamrick 2004; Mooney and McGraw 2009).
- A shift from mixed-mating breeding towards self-pollinating due to smaller populations widely dispersed (McGraw et al. 2013).

States and Tribe regulations of ginseng

The 19 CEP States and Tribe regulate the harvest, selling, and certification of wild ginseng roots within their borders. State and Tribal regulations are designed to support sustainable harvest and regeneration of ginseng by designating the harvest season, a minimum harvest size (i.e., 3–leaf or 4–leaf plants) and/or minimum age of plants (i.e., 5-years or 10-years of age), and by requiring diggers to plant the seeds of harvested plants at the site, as well as other related requirements. Harvested roots must be inspected and certified by State or Tribal officials, as appropriate, prior to interstate transport, and roots with the accompanied certificate must be presented to the USDA Animal Plant Health Inspection Service inspection officials at the time of export.

The harvest season start date is September 1st or later for all 19 States and the Tribe. The harmonized start date helps to discourage illegal harvest and transport of ginseng roots across neighboring borders. Seventeen States prohibit the harvest of ginseng on State lands (e.g., State parks, forests, natural areas, wildlife management areas), that provide refugia for population growth and the long-term conservation of this species. Two States (Minnesota and Tennessee) allow harvest in certain State forests, for which one State (Minnesota) issues harvest permits that diggers must have in their possession to harvest on State-owned lands.

Most States require diggers to obtain landowners' permission to harvest ginseng on land not their own, and six States (Alabama, Illinois, Iowa, Maryland, Vermont and Wisconsin) and the Tribe require diggers to obtain a license or permit to harvest ginseng within their jurisdictions. The Tribe further prohibits the planting of seeds from external sources to prevent the introduction of genotypes into populations on their land. Several States and the Tribe have established permanent plots for monitoring.

The State programs provide outreach information (e.g., web pages, pamphlets) about ginseng, and the laws and regulations relating to the harvest, selling, and buying of ginseng. Most States' web sites provide a link to the American Herbal Products Association's (AHPA) web site, where the informational pamphlet titled "*Good Stewardship Harvesting of Wild American Ginseng*" can be downloaded for each of the 19 States. The individual pamphlets provide the States' ginseng regulations and stewardship harvest practices for wild ginseng, and were developed by AHPA, the Service, and other partners. In addition, States' web sites include information about the Service's role in the international export of ginseng as a CITES-listed species, and link to the Service's ginseng web pages.

In July 2017, the Service met with officials of 16 CEP States and the Tribe for a one-day meeting to discuss the management and conservation of wild ginseng, and steps to improve the long-term sustainability of ginseng. An outcome of the meeting was the formation of four issue-focused (enforcement, regulatory, biology, and outreach) working groups composed of representatives of the States, Tribe, and the Service. For the past year, the Working Groups have discussed the issues and have developed recommendations designed to improve the legal and sustainable harvest of ginseng. At this time, the Working Groups have not yet reported out their findings to each other and with the CEP States and Tribe.

USDA Forest Service management of ginseng

The USDA Forest Service (FS) is responsible for the conservation and management of ginseng and its habitat in the National Forests where it occurs, and is required to set sustainable harvest levels for ginseng (36 CFR 223.219; FSH 2409.18_87.1). There are National Forests located within 18 CEP States, but only National Forests in five States (Georgia, North Carolina, Tennessee, Ohio, and West Virginia) allow ginseng harvest.

The FS Eastern Region includes 13 National Forests in 12 States (Illinois, Indiana, Maine, Michigan, Missouri, New Hampshire, New York, Ohio, Pennsylvania, Vermont, West Virginia, and Wisconsin). Since 2000, the species has been listed on the Region's Sensitive Species List in 10 of the 13 National Forests. Species designated as "sensitive" are considered rare and the harvest of plants/roots is prohibited except for research purposes and tribal agreements. Harvest is allowed in the Monongahela National Forest (in West Virginia) and the Wayne National Forest (in Ohio). Both Forests limit the number of permits issued and harvest amount based on the estimated population size within the respective Forest. Both Forests have established long-term monitoring plots to assess the status of ginseng; however, not all plots are monitored annually due to budgetary and resource constraints.

The FS Southern Region includes National Forests in 10 States (Alabama, Arkansas, Georgia, Kentucky, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Virginia). The species is not listed as "sensitive" in the Region; however, harvest is prohibited in the National Forests in Alabama, Arkansas, South Carolina, and Virginia due to concerns about the status of the species (Kauffman 2006). Since 2016, the Daniel Boone National Forest in Kentucky has not issued permits due to declining populations on the Forest (DBNF 2018).

Ginseng harvest is only allowed in four National Forests in three States (Georgia, North Carolina, and Tennessee). Since 2013, due to concern about the status of ginseng populations in those National Forests, the number of permits issued, the harvest amount, and the length of the harvest season have been reduced. The Cherokee National Forest in Tennessee has implemented harvest-rotation zones to improve ginseng regeneration and population growth. The Nantahala and Pisgah National Forests in North Carolina and the Cherokee NF have established long-term monitoring plots; however, not all plots are monitored annually due to budgetary and resource constraints.

In 2016, a conservation assessment of the status of ginseng was completed for the National Forests in Georgia, Kentucky, and Tennessee. The U.S. Geological Survey also completed a multi-year demographic and genetic study of ginseng populations in the National Forests in North Carolina, Ohio, and West Virginia. To date, the Forest Service has not released the results of the two studies.

Refugia on State, Federal, and other forest lands

Ginseng harvest is not allowed on National Park Service and Department of Defense lands, most Forest Service lands and State forest lands, and private conservation lands (e.g., The Nature Conservancy), as well as many private forest lands. Forest lands where harvest is prohibited provide necessary refugia for population growth and serve to maintain genetic diversity for this species (Cruse-Sanders and Hamrick 2004).

Results of field surveys and genetic analysis of ginseng populations on public lands and protected lands that prohibit harvest, found populations have more adult plants (3-and 4-leaf), and higher overall genetic diversity on protected lands than public lands that allow harvest (Cruse-Sanders and Hamrick 2004; Young et al. 2013).

Law enforcement efforts

State, Tribe, and Federal law enforcement officials enforce the laws designed to protect wild ginseng, and thus play a critical role in the conservation and management of this species. The Service relies on those entities, as well as other sources, to provide information on illegal ginseng activities. Reported illegal activities include poaching on private and public lands, out-of-season harvest, harvest of under-aged roots, and harvest without a license or permit.

Illegal harvest of wild ginseng roots directly undermines the efforts of the State and Federal agencies to conserve and manage ginseng in a sustainable manner. Ginseng roots harvested out of season prevent plants from producing seeds necessary for regeneration and population growth. Ginseng poaching on State and Federal (e.g., National Park Service, Forest Service) lands, and private conservation lands, where harvest is prohibited is of particular concern as these lands provide critical refugia that is essential for the long-term conservation of this species.

Wild-simulated American ginseng

Wild-simulated ginseng is the planting of cultivated-sourced seeds in a forest with little to no manipulation of the existing vegetation and environment, so that resulting plants' roots develop wild-like characteristics (Beyfuss 1999; Persons and Davis 2005). Wild-simulated ginseng roots can be physically indistinguishable from roots of wild plants.

There is interest in growing wild-simulated ginseng as an alternative forest farming income opportunity (Persons and Davis 2005; Burkhart and Jacobson 2008). Wild-simulated ginseng grown on private lands can reduce the harvest pressure on wild populations by providing and increasing the supply of forest-grown roots for international trade, and improve local livelihoods.

We are concerned, however, about planting non-local, cultivated-sourced seeds on State and Federal lands and private conservation lands because introduced non-local seeds pose a risk to wild populations by introducing non-local genotypes, which may affect population resilience and long-term sustainability. We are also concerned that most States do not track and report the harvest amounts of wild-simulated roots separate from wild roots in their annual reports to the Service. This practice may lead to misleading conclusions about the sustainability of wild populations due to harvest pressure due. We encourage new management strategies to track and report wild-simulated ginseng, and efforts to provide locally sourced genotype seeds for cultivation and to expand ginseng populations on private lands. We will work to address these concerns with the CEP States.

Annual harvest and export of ginseng

According to the State and Tribe harvest data reported for the 2017 ginseng harvest season, 41,811 dried pounds (lbs.) of wild ginseng roots were harvested; representing approximately 8,445,822 plants plants with 3 leaves or more (based on 202 dried roots/lb. average). The 2017

harvest was slightly less (455 lbs.) than the 2016 harvest (42,266 lbs.). The 2016 and 2017 harvests were the smallest harvests reported by the States and Tribe since 1999, when the 5-year age restriction became a condition of finding no detriment to the survival of ginseng for the export of wild ginseng roots. Dealer prices paid for roots during the 2017 harvest season were comparable to the four previous seasons (Persons 2018). The total exports of wild ginseng in 2017 and 2016 were 50,574 lbs. and 28,501 lbs., respectively (Division of Management Authority export data 2018). The 2016 export total was the smallest amount since the economic recession in 2008. Reportedly, dealers held on to some of their inventory which was sold in 2017, resulting in more exports in 2017 than in 2016 (Persons 2018). See Figure 1: Harvest, export, and price data for wild ginseng roots.

The 2017 harvest was 34% less than the 10-year average harvest (63,743 lbs.). All States except Minnesota reported lower harvest amounts in 2017 compared to each States' 10-year average harvest amounts (Figure 2). The top five States continue to be: Kentucky (20%), West Virginia (14.4%), North Carolina (14%), Tennessee (13.7%), and Indiana (7.8%) of total 2017 harvest amount. Of these States, only North Carolina and Tennessee reported larger harvests in 2017 compared to its 2016 harvest amount reported.

The average number of dried roots per pound was 202, indicating fewer roots per pound than the amounts reported in the past 10 years. Fewer roots per pound indicates that the roots were larger in size, which may suggest that some portion of the roots reported as wild may have been wild-simulated roots. According to Persons (2018), buyers in China have become increasingly interested in bigger wild roots, particularly high quality large wild roots. Five States reported harvest amounts of wild-simulated roots in 2017: Indiana (50 lbs.), Iowa (14 lbs.), Maryland (33 lbs.), North Carolina (9 lbs.), and West Virginia (10 lbs.), for a total of 116 lbs. of wild-simulated ginseng roots.

Over the past several years, States have reported an increase in the amount of fresh (green) roots reported harvested and certified (as wet weight) by those States. A shift in the ginseng market has shown an increase in the amount of fresh roots reported and subsequently certified. Green roots are sold after the opening of the harvest season and fetch much lower prices per pound compared to dried roots.

Fresh roots have a moisture content that is approximately 70% (Jones and Szymanski, n.d.). The amount of moisture in a fresh root is variable due to environmental factors (e.g., temperature, humidity, soil moisture), the post-harvest handling of roots, and the length of time from harvest to when the roots are weighed. Roots harvested in the beginning of the open season in September have higher moisture content (higher root weight) than roots harvested later in the season (lower root weight). There is a range of conversion factors used to convert fresh weight to dry weight (e.g., 3.0-3.2). Therefore, to ensure consistency and to monitor trends over time, we will continue to ask that the States and Tribe report the total weight of dry and fresh (green) roots separately in their annual reports to the Service. By doing so, we can apply the same conversion factor to all States and Tribe.

Summary

All of the CEP States and the Tribe have regulations that restrict the harvest size of plants and/or age of plant, require harvesters to plant the seeds of harvested plants at the site, and have

mandatory reporting, inspection, and certification of harvested roots. The harvest season in all States and the Tribe starts in September to ensure that ginseng fruits are ripe at the time of harvest, which can increase germination success for planted seeds. Population data has shown that 3-leaf plants are reproductive and are usually older than 5 years of age.

The State and the Tribe regulations support the sustainable harvest of ginseng. The National Forests that allow harvest have additional restrictions that further limit the harvest amount and harvest season, as well as other measures to support regeneration of ginseng. The Service relies on the 19 CEP States and Tribe, as well as other Federal agencies, to provide information on legal and illegal harvest of ginseng, and the status of the species in the wild.

Harvest is prohibited on National Park Service lands, most State-owned lands, and most Forest Service lands, as well as private conservation lands within the range of ginseng. These lands provided refugia to ensure that viable ginseng populations persist over time, and provide relief from harvest pressure on wild ginseng.

We continue to request that the States and Tribe report the number of roots per pound because the data is used to calculate the number of plants annually harvested, and it provides trend information that we monitor in order to be aware of any irregularities that would be of concern. We support States efforts to work towards finding a means to track and report wild-simulated roots separately from wild roots. Not reporting wild-simulated roots separate from wild roots impacts our ability to fully assess harvest effect on wild populations.

Although the 2016 and 2017 total harvest amounts were low, we recognize that the amount of ginseng annually harvested is influenced by local environmental conditions, unemployment factors, and prices paid by dealers, as well as the Asian economy. We will continue to monitor the annual harvest levels.

We find that the export of wild and wild-simulated ginseng roots legally harvested from plants that are 5-year of age or older during the 2018 harvest season will not be detrimental to the species. The 5-year of age requirement for roots intended for export supports the existing harvest regulations of the CEP States and Tribe and discourages the harvest of juvenile plants.

Future actions

We will continue to monitor the harvest and export of ginseng and work closely with State, Tribe, and Federal officials, as well as the ginseng industry, to ensure the long-term sustainable harvest of American ginseng, including the following actions:

Monitor the status of wild ginseng and assess further progress relating to the harvest and management of ginseng at the State and Federal level in our finding for 2019.

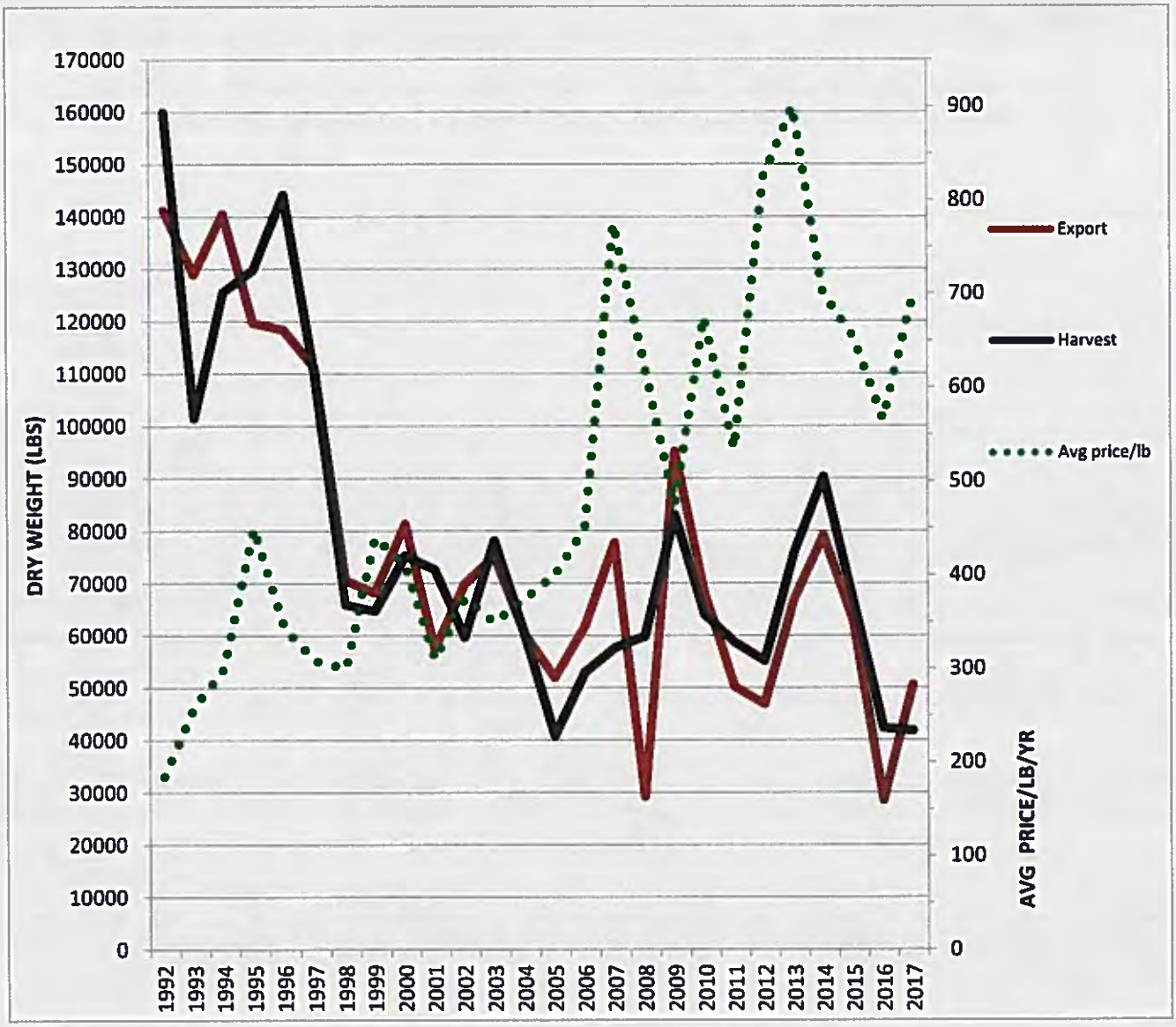
Continue to participate with the State and Tribe representatives in the FWS-State-Tribe working groups to improve the sustainable harvest and management of ginseng.

Explore with the States, and the ginseng industry, including the American Herbal Products Association, the possibility of increasing the minimum export age of ginseng roots to minimize possible impacts to wild populations.

Engage with the ginseng industry concerning additional education and outreach opportunities to ensure that all harvesters know and follow stewardship practices that contribute to the sustainability of ginseng.

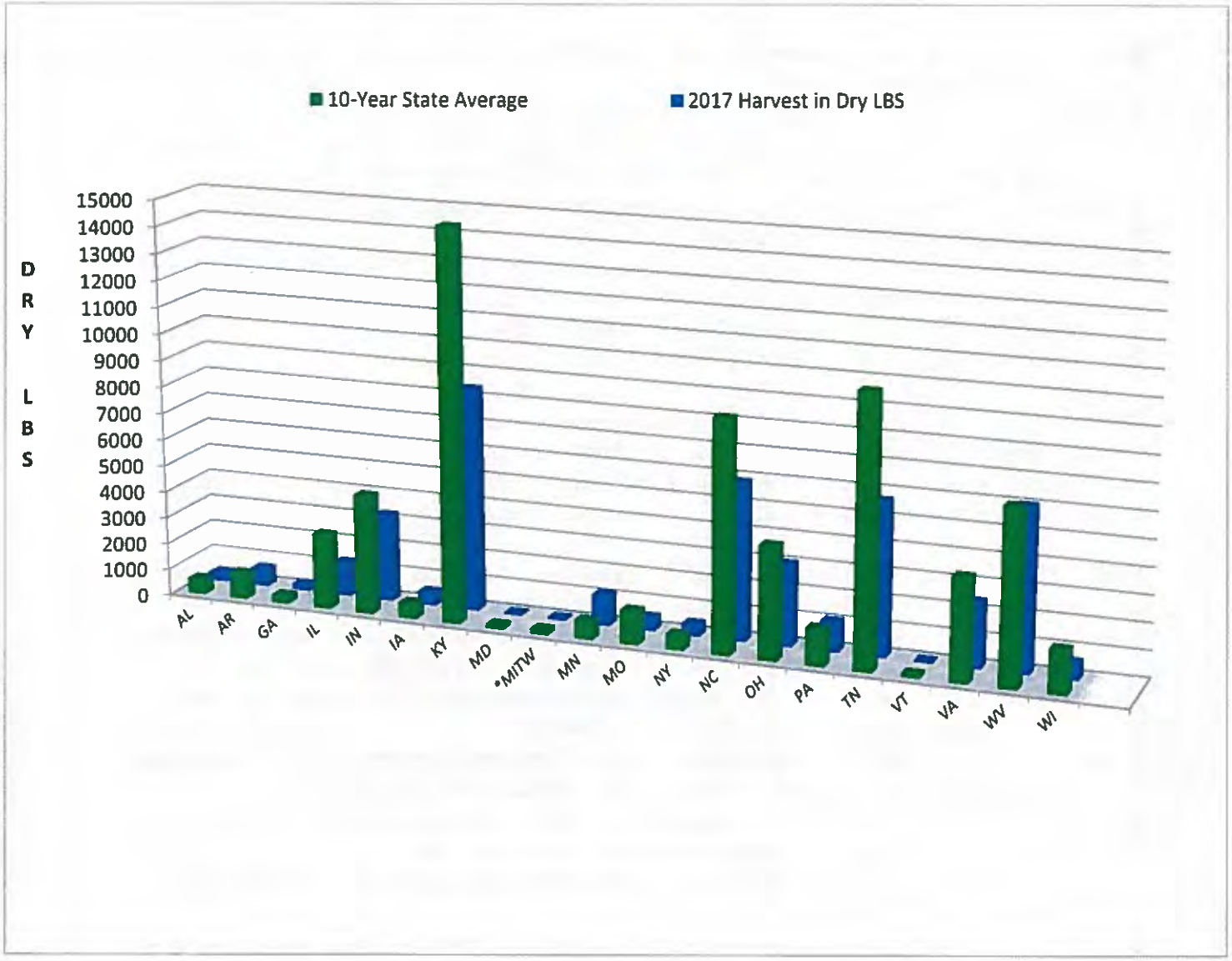
Engage with the ginseng industry, States and other Federal agencies, and other interested stakeholders the development of local provenance seeds for growers and harvesters.

Figure 1: 1992-2017: Wild American ginseng roots harvest, export, and price data.



Price data provided by W. S. Persons.
DMA export data.

Figure 2: 2017 harvest amounts and the 10-year average harvest amount by State; and the 6-year average harvest amount for the Tribe.*



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