United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Eradication Program for Onionweed in Arizona

Environmental Assessment, March 2008

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Table of Contents

I. Introduction

A. Background

Onionweed (*Asphodelus fistulosus)* is an herbaceous perennial belonging to the Lily family (Liliaceae) which grows to about a foot tall and almost as wide. The leaves are tapering and round giving it the appearance of chives or scallions and is sometimes mistaken for native onions (*Allium* spp.). Leaves sprout after winter rains with flowers appearing in the spring. The flowers are approximately ½-inch in diameter and are white with a pink center line on each petal. They are carried on branched spikes approaching 2 feet in height. Fruits are ⅛-inch round capsules. Plants die back to the ground during the dry season. The plant has a tuberous root system (ADOT, 2008; Arizona-Sonoran Desert Museum, 2008).

Onionweed is native to southern Europe, Mediterranean Africa, and western Asia, but has become widely naturalized in Australia, New Zealand and Mexico (eFloras.org, 2008). Because of its attractive appearance and flowers, it is sometimes planted as an ornamental. It easily escapes cultivation because it seeds prolifically and can easily establish large populations. It is unpalatable to cattle and apparently wildlife. It tends to invade disturbed land leaving its potential threat to natural areas unclear. In the Sonoran Desert region, it seems to do best at altitudes above the desert floor that receive moderate rainfall during the winter. In Arizona, plants have been found from about 2,000 feet to over 4,500 feet in elevation (ADOT, 2008; Arizona-Sonoran Desert Museum, 2008).

Onionweed was documented as a naturalized population near Coahuila, Mexico, in 1930. In the United States, it was sold in Alpine, Texas, and Phoenix, Arizona, as early as 1984 from plants that originated from the Coahuila naturalized population (ADOT, 2008; Arizona-Sonoran Desert Museum, 2008). There are populations of onionweed in California, Texas, New Mexico, and Arizona (eFlores.org Web site; ADOT, 2008; Arizona-Sonoran Desert Museum, 2008). After studying temperature and photoperiod effects on onionweed and reviewing its pattern of distribution in Australia, where it is widespread, Patterson (1996) concluded that the southwestern region of the United States is vulnerable to invasion by onionweed, but that it probably is not a serious threat to agricultural production outside this region.

In Arizona, onionweed is known in the five southeastern counties (Pima, Pinal, Santa Cruz, Cochise, and Greenlee) and in an area near Sedona in Yavapai County (USDA, APHIS, 2007a).

B. Purpose and Need

APHIS is responsible for taking actions to exclude, eradicate, and/or control plant pests under the Plant Protection Act (7 United States Code (U.S.C.) 7701). Onionweed is a federally listed noxious weed (USDA, APHIS, 2008) that has recently been found in Arizona. Therefore, the U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), is proposing a treatment program to eradicate onionweed from the locations where it is currently found in Arizona. At this time, populations of the plant are small and found in scattered locations. The potential for its spread in Arizona is substantial.

In recent years, onionweed has been removed by hand, but this is very time consuming. While hand removal will likely always remain as an option, it is important to adopt additional tools, such as herbicide applications, to increase the efficiency and effectiveness of eradication efforts.

This environmental assessment (EA) has been prepared consistent with the National Environmental Policy Act of 1969 (NEPA) and APHIS' NEPA implementing procedures (7 Code of Federal Regulations (CFR) part 372) for the purpose of evaluating how the proposed action, if implemented, may affect the quality of the human environment. A 30-day public comment period is being provided with this EA.

C. Affected Environment

The affected environment includes any area in Cochise, Santa Cruz, Greenlee, Pinal, Pima, or Yavapai County, Arizona, where onionweed is found. The Arizona Onionweed Survey for 2007 identified 331 sites within these 6 counties (see appendix A) (USDA, APHIS, 2007a). These sites included 259 residential sites, 21 commercial sites, 4 municipal sites, 49 roadside sites, and 4 other sites which included the Empire Cienega Ranch, Audubon Research Ranch, Oracle State Park, and the Botanical Garden in Midtown Tucson.

The sites for 2008 are expected to be similar to the sites in which onionweed occurred in 2007. The majority of the 2007 sites were residential. Roadside sites were the most next abundant, followed by commercial, municipal, and other sites. Most of the 2007 sites were within Cochise County (238), followed by Pima County (53), Pinal County (24), Santa Cruz (10), Yavapai County (3), and Greenlee County (3).

1. Cochise County

Cochise County is 6,219-square miles. The 2006 population was 135,150 with a population density of 21 people per square mile. Private ownership accounts for 40 percent of the land. The State of Arizona owns 35 percent of the land. The U.S. Forest Service (USFS), Bureau of Land Management

(BLM), and other public lands comprise the remaining 25 percent. It is one of only three counties in Arizona without an Indian reservation. Specialty crops and livestock play an important role in the local economy, as well as mining (ADC, 2007a).

2. Pima County

Pima County covers 9,184-square miles. The population, as of 2006, was 981,280 with a population density of 1,088 people per square mile since most of the people live within and surrounding the city of Tucson with the remaining of the county having a very low population density. The San Xavier, Pascua Yaqui and Tohono O'odham reservations account for 42.1 percent of the land in Pima County. The State of Arizona owns 14.9 percent; BLM, 12.1 percent; other public lands constitute 17.1 percent, and the remaining 13.8 percent is individual and corporate ownership. The local economy relies on manufacturing, trade, and services (ADC, 2007b).

3. Pinal County

Pinal County is 5,374-square miles. The population of Pinal County, as of 2006, was 299,875, with a population density of 55 people per square mile. There are two distinct regions within Pinal County—the eastern portion is characterized by mountains and copper mining, and the western area is primarily low desert valleys and irrigated agriculture. The State of Arizona is the county's largest landholder with 35 percent. Individuals and corporations own 22 percent. Indian reservations own 23 percent of the land and BLM and other public land accounts for ownership of the remaining 20 percent (ADC, 2008a).

4. Santa Cruz County

Santa Cruz County is Arizona's smallest county encompassing only 1,236-square miles. The population, as of 2006, was 45,245 with a population density of 31 people per square mile. Given its border location, tourism, international trade, manufacturing, and services are the county's principal industries. The Santa Cruz region is an internationally recognized bird watching area for migratory birds. BLM owns 54.7 percent of the land; individual and corporate ownership consists of 37.5 percent of the land, with the remaining 7.8 percent owned by the State of Arizona (ADC, 2007c).

5. Yavapai County

Yavapai County consists of 8,125-square miles. The population of the county, in 2006, was 213,285 with a population density of 21 people per square mile. Yavapai offers many local attractions ranging from natural to cultural to educational. Scenic pine forests provide year-round recreational opportunities, and museums, monuments, and rodeos reflect Arizona's tribal and territorial past. This county has experienced tremendous growth in recent years, with the population up by more than 30 percent since 1990. USFS owns 38 percent of the land, including portions of Prescott, Tonto, and Coconino National Forests. The State of Arizona owns 24.6 percent of the land. Individuals and corporations own 25 percent of the land. BLM owns 11.6 percent. The remaining 0.8 percent is split between the Yavapai

Indian Reservation and other public lands, each occupying less than 0.5 percent of the county lands (ADC, 2008b).

6. Greenlee County

Greenlee County covers 1,837-square miles and is only one of three counties in Arizona without an Indian reservation. The population, as of 2006, was 8,300 with a population density of 5 people per square mile. Copper mining is a major industry in Greenlee along with ranching, agriculture, and tourism. Hannagan Meadow and the Blue Range Primitive Area are popular for hunters and campers. The vast majority of land is Government owned (USFS, 63.5 percent; BLM, 15 percent; State of Arizona, 14.8 percent). The remainind land is under individual and corporate ownership (ADC, 2007d).

II. Alternatives

A. No Action

Under the no action alternative, APHIS would continue to remove onionweed by hand. Concerned volunteers and Government personnel logged 640 hours of removal of onionweed by hand last year. Hand pulling of onionweed is a questionable practice since the leaf and stem portion of the plant can break off at the soil surface and leave the tuberous roots in the soil, allowing them to grow again during the next growing season. To guarantee that the onionweed is completely removed, the plant should be dug up to ensure the root system has been expelled from the ground. In 2007, there were 331 sites within 6 counties where onionweed was found and removed by hand.

B. Preferred Action

Under the preferred alternative, APHIS would apply spot treatments of the herbicide Escort® XP, at a rate of 2 ounces (oz) of formulated product per acre or 1.2 oz active ingredient per acre, together with methylated seed oil, at a 12 percent concentration per acre. Application would occur to any onionweed plants found in commercial, municipal, roadside, and other localities described in the affected environment section of this document in Cochise, Santa Cruz, Pima, Pinal, Greenlee, and Yavapai Counties in Arizona. The proposed application method includes spot treatments of individual onionweed plants utilizing a hand-held sprayer. Private residences would not be treated with Escort® XP and will continue to rely on removal of individual plants by hand. Hand removal of onionweed on private lands will continue to be coordinated through the public outreach efforts that have been well-received and resulted in removal of considerable amounts of onionweed over the last several years. In addition, no herbicide treatments are anticipated to occur on tribal lands this year. If onionweed treatments on tribal lands are anticipated in the future, tribal consultation

will be conducted under Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments).

APHIS personnel conducting herbicide treatments and hand removal of onionweed will receive necessary training to identify federally listed plants that may co-occur in treatment areas. Staff will be required to keep in their possession at all times species identification cards that include photographs of listed plants and descriptions of their habitat requirements in order to aid in the identification of any potentially co-occurring affected species. APHIS program staff will conduct visual inspections of treatment areas to ensure no listed species are present prior to any treatment or removal of onionweed plants. In the event a federally listed plant is co-located with an onionweed location, APHIS program staff will establish and maintain a 20-foot buffer around the known listed plant location to avoid any potential impacts; individual onionweeds located within that 20-foot buffer will be removed by hand.

III. Environmental Consequences

A. No Action

Under the no action alternative, APHIS would continue to control onionweed by removing by hand any onionweed that is found. The removal by hand of onionweed has minimal impact, if any, to insects, animals, and humans. Onionweed by its nature is not a source of food for animals and competes with indigenous plants encroaching on natural food and shelter for animals when left untreated.

Although removal of onionweed by hand has been effective (as long as the tuberous roots are removed along with the vegetative portion of the plant) in eradication efforts of onionweed, it is time-consuming and costly as compared to the preferred alternative. In 2007, the program spent nearly 640 hours and removed approximately 4,000 pounds of onionweed. In addition, cooperators spent additional time and removed much more onionweed that was not logged. This alternative does not meet the need for the program to add more tools to the eradication efforts for onionweed.

B. Preferred Action

The sulfonylurea herbicide, metsulfuron-methyl, will be used to provide control of onionweed. Sulfonylurea herbicides are used as pre- and postemergent herbicides in a variety of agricultural and nonagricultural uses. More specifically, metsulfuron-methyl is used to control a variety of annual and perennial weeds, as well as woody plants. For this program, the herbicide will be applied in the formulation, Escort® XP, at a rate of 2 oz of formulated product per acre or 1.2 oz active ingredient per acre. In addition,

methylated seed oil will be used at a 12 percent concentration per acre. The use of seed oil will reduce droplet evaporation rates in low humidity environments similar to that which occurs in southern Arizona. Methylated seed oil is a common carrier that has a toxicity profile indicating that its risk to humans and the environment is negligible. An efficiacy study conducted by APHIS in 2007 indicated that Escort® XP was highly effective for onionweed control (USDA, APHIS, 2007b).

1. Toxicity

Based on the available mammalian toxicity data, metsulfuron-methyl has low acute oral, dermal, and inhalation toxicity (SERA, 2004) (appendix B). Toxicity values in these studies are typically above the highest concentration tested suggesting toxicity through these routes of exposure could not occur under typical use scenarios. Chronic toxicity to mammals is also considered low with no observable effect levels (NOEL) ranging from 100 to 5,000 parts per million (ppm) based on 90-day and greater test durations. Metsulfuron-methyl is not considered to be carcinogenic or mutagenic (SERA, 2004).

Toxicity to other nontarget organisms, such as birds, pollinators, and aquatic organisms, is also low based on available toxicity data. The bird median lethal dose required to cause 50 percent mortality (LD_{50}) and median lethal concentration required to cause 50 percent mortality (LC_{50}) are greater than the highest concentration tested (appendix B). Chronic toxicity to birds is also low with reported NOEL values of 1000 ppm (EPA, OPP, 2008).

Available toxicity data for honeybees demonstrates that metsulfuron-methyl is practically nontoxic to honey bees with LD_{50} values greater than the highest test concentration (SERA, 2004).

Acute toxicity to fish and aquatic invertebrates is also considered to be very low with all toxicity values reported as practically nontoxic to fish and aquatic invertebrates (appendix B) (EPA, OPP, 2008; SERA, 2004). Chronic toxicity to fish and aquatic invertebrates is also low based on the available data.

As would be expected, plants are the most sensitive taxa when assessing the available toxicity data for nontarget organisms. Aquatic vascular plants are much more sensitive to metsulfuron-methyl when compared to algae and freshwater and marine diatoms (appendix B). Toxicity to terrestrial plants is variable depending on the species and the type of test but the reported 16-day effective concentration needed to cause a 25 percent effect in the measured endpoint (EC_{25}) ranges from 0.000009 to 0.015 pounds of active ingredient per acre (appendix B) (SERA, 2004; EPA, OPP, 2008).

2. Exposure and Risk

The persistence of metsulfuron-methyl is variable based on climatic and soil conditions. Reported half lives in soil can range from one week to 56 weeks and tend to be shorter when applied in the spring and to soils that are acidic.

Metsulfuron-methyl is considered soluble in water and does not bind strongly to soils suggesting it is mobile. Due to the method of application and the low use rates potential concentrations in soil are expected to be extremely low.

Use rates for this program are low when compared to other herbicide applications. For this program only one application will be made at a rate of 1.2 oz ai/acre or approximately 0.075 lb ai/acre. Dietary human exposure is not expected since the proposed applications are for a noxious weed that will not be harvested for human consumption. Dermal and inhalation exposure is also low for applicators based on label recommendations for personal protective equipment.

Based on the low reported toxicity values for mammals, birds and aquatic invertebrates and fish, exposure to direct applications of metsulfuron-methyl will result in negligible risk for these taxa. Direct applications to shallow bodies of water could impact aquatic vascular plants; however, applications will not be made to water since onionweed is not an aquatic species and these types of applications would be inconsistent with label directions. Based on the available toxicity data for terrestrial plants and the proposed application rates, there is a risk of metsulfuron-methyl to nontarget terrestrial plants. This risk is greatly reduced by the method of application proposed for this program. Applications will be made to individual onionweed plants and will not be applied using broadcast methods which will reduce the total amount of material applied over a given area. This application method also minimizes pesticide loading and will largely reduce the potential for off-site deposition through runoff and drift.

3. Summary

Risk to human health from applications of metsulfuron-methyl is expected to be extremely low based on the low mammalian toxicity and lack of exposure. Risk of exposure is highest for applicators but will be mitigated by following label recommendations using personal protective equipment.

Metsulfuron-methyl has a favorable toxicity profile for mammals, birds, fish, and aquatic invertebrates, and combined with its low exposure potential, results in negligible risk to these groups of organisms. There is a risk of adverse effects to terrestrial plants; however this risk is reduced by the direct application of herbicide to individual onionweed plants which reduces exposure and the potential for off-site transport. Methylated seed oil is a commonly used carrier that has a history indicating a lack of risk, therefore, any risk to human health and the environment from its use is expected to be negligible.

C. Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) and its implementing regulations require Federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat. APHIS has prepared a biological assessment that considers the effects of the eradication of onionweed on all federally listed species and designated critical habitat in Cochise, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties, Arizona.

APHIS has determined that, with the implementation of program protection measures, the proposed action may affect, but is not likely to adversely affect, the Arizona cliffrose, Huachuca water umbel (and designated critical habitat), and the Pima pineapple cactus.

Measures necessary to protect listed species and critical habitat as a result of this and/or future consultations with the U.S. Fish and Wildlife Service (FWS) will be adhered to by all APHIS program implementation staff to ensure compliance with the ESA. The measures include—

- training of APHIS personnel conducting the program in the identification of federally listed plants that may occur in the program area;

- staff will have identification cards that include photos and descriptions of listed plants and their habitat requirements in order to aid in their identification;

- staff will conduct visual inspection of the treatment areas; and,

- if any listed plant is found within the treatment area, APHIS will establish a 20-foot no-herbicide buffer around each individual listed plant. Any onionweed found within such a buffer will be removed by hand.

In accordance with the Section 7 consultation process, APHIS has provided the biological assessment to FWS for their review and has requested concurrence with its effect determinations. No treatments will be conducted until APHIS has completed consultation with FWS.

IV. Listing of Agencies and Persons Contacted

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Services
4700 River Road, Unit 149
Riverdale, MD 20737–1238

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Environmental Compliance
4700 River Road, Unit 150
Riverdale, MD 20737–1229

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
State Operational Support
3658 E Chipman Road
Phoenix, AZ 85040

U.S. Fish and Wildlife Service
Arizona Ecological Services
Tucson Suboffice
201 North Bonita Suite 141
Tucson, AZ 84745

V. References

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ADOT—See Arizona Department of Transportation

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Appendix A. 2007 Arizona Onionweed Report

Onionweed Annual Report

Asphodelus fistulosus

2007 Fiscal Year

USDA APHIS PPQ

Contributors:
Jeff Conn, Katie Hough, Gary Russell, Jolanta Sokol, Ernie Storm

Introduction:

The Onionweed eradication program has completed its fourth year and has accomplishments in many areas. Fist discovered in 2004 and what started as a minor infestation of a single community has cumulated into many hours spent removing this plant from around the state by concerned volunteers and government personnel. The following tables provide a view of the size of the current program, the known locations and the effects we are having on the Onionweed population.

Locations:

Cochise County

Bisbee

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	21	19	1		18
Commercial	1	2			1
Municipal	2	2			2
Roadside	7	7		4	3
Other					
Total	27	30	1	4	24

Highlights: Visited local farmer's market on two separate occasions and had negative finds for vendors selling Onionweed.

Cooperators: City of Bisbee Community Development Department, Phelps Dodge, Bisbee Fire Department and 21 Homeowners.

Ft Huachuca

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence					
Commercial					
Municipal					
Roadside	1	1			1
Other					
Total	1	1			1

Highlights: The Military Base personnel continue to remove the plants.

Cooperators: US Army Ecologist, Bob Bridges, Fort Huachuca

Hereford

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	43	37	12	4	21
Commercial					
Municipal					
Roadside	6	5			5
Other					
Total	49	42	12	4	26

Highlights: Although there was an increase in locations we have made headway in this area. Homeowner involvement in this area was higher this year than last. New subdivision find accounts for the higher numbers.

Cooperators: Cochise County Highway Department (Spray roadsides when requested) and 43 Homeowners.

Interstate 10

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence					
Commercial					
Municipal					
Roadside	1				
Other					
Total	1				

Highlights: New find for 2007.

Cooperators: Arizona Department of Transportation

Portal

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	2	1		1	
Commercial	0	1		1	
Municipal	1	1			1
Roadside	1	1	1		
Other					
Total	4	4	1	2	1

Highlights: Posted flyers at Post Office and Library. There is a lot of local interest in controlling Onionweed. New Mexico USDA, APHIS, PPQ is interested in this area because of its proximity to another known location in Rodeo, NM. We keep each other informed of activity in this area.

Cooperators: 2 Homeowners, Portal Library, New Mexico PPQ

Sierra Vista

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	86	68	20	8	40
Commercial	6	6	1	2	3
Municipal					
Roadside	11	11		4	7
Other					
Total	103	85	21	14	50

Highlights: Pueblo Del Sol put a copy of the PPQ flyer in their Home Owners Association Newsletter informing residents on how to identify and control Onionweed. Cochise County Master Gardeners sponsored a two day High Desert Conference where USDA had a booth on Noxious Weeds which focused on Onionweed. USDA surveyed the farmers markets in Sierra Vista with negative results for vendors selling Onionweed. A group of homeowners got together and helped others in their neighborhood pull Onionweed on their property.

Cooperators: Sierra Vista Public Works, Sierra Vista Parks Department, Master Gardeners of Cochise County. Pueblo del Sol Homeowners Association, 86 Homeowners.

Tombstone

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	32	29	6	8	15
Commercial	4	4		1	3
Municipal	1	1		1	
Roadside	16	6		2	4
Other					
Total	53	40	6	12	22

Highlights: We continue to have great cooperation from the Tombstone Materials, which this is the main site for the Ad Hoc study that is being conducted.

Cooperators: City of Tombstone Public Works Department, Tombstone Materials and 52 Homeowners.

Greenlee County

Duncan

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	2	1		1	
Commercial					
Municipal	1	1	1		
Roadside					
Other					
Total	3	2	1	1	

Highlights: Because of the efforts at Duncan Elementary School we only found a few plants this year.
Cooperators: Duncan Elementary School, Southeast Arizona Weed Management Area.

Pima County

Ajo
Historical records indicated a location in Ajo with Onionweed. PHSS have surveyed the community for the last four years and have not found any Onionweed present.

Green Valley

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	15	15	12	3	
Commercial	2	2		2	
Municipal					
Roadside	3	3		2	1
Other					
Total	20	20	12	7	1

Highlights: This area was found in 2005 and we have received great cooperation from the Home Owners Association who is actively removing the plants.

Cooperators: Continental Vista Homeowners Association, The Greenbelt Nursery, Pima County Highway Department and 15 Homeowners.

Interstate 10

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence					
Commercial					
Municipal					
Roadside	1	1		1	
Other					
Total	1	1		1	

Highlights: PPQ will need to obtain a right of way permit to work on onionweed removal. The Arizona Department of Transportation has said they will maintain the site but are unable to visit the site the required amount to ensure onionweed removal. This site will need to be monitored over the upcoming year.

Cooperators: Arizona Department of Transportation

New Development: Onionweed was found in the town of Oro Valley

Oro Valley

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease	Sites with Same or Increase
Residence					
Commercial	1	0			
Municipal					
Roadside					
Other					
Total	1	0			

Highlights: New Site this year. Groundskeepers for Rancho Vistoso community have been removing all Onionweed as it emerges.

Cooperators: Rancho Vistoso

Tucson Neighborhoods

West Camino Del Cerro

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	4	4	4		
Commercial					
Municipal					
Roadside					
Other					
Total	4	4	4		

Highlights: No onionweed was seen this year!

Cooperators: Four homeowners.

West University

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	8	7	2	5	
Commercial	1	1		1	
Municipal					
Roadside					
Other					
Total	9	8	2	6	

Highlights: Two locations had no onionweed this year and six others had a decrease in the number of plants. One new location was found in the area.

Cooperators: Seven Homeowners and the First Christian Church.

Midtown (Grant/Alvernon)

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence					
Commercial					
Municipal					
Roadside					
Other	1	1	1		
Total	1	1	1		

Highlights: Botanical Garden's groundskeepers have been monitoring for onionweed and have not found any this year.

Cooperators: Tucson Botanical Gardens

South Tucson

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	2	2	1	1	
Commercial					
Municipal					
Roadside					
Other					
Total	2	2	1	1	

Highlights: No onionweed was found at one of the locations this year. The second homeowner does not want to remove all of her onionweed but has reduced the amount in her yard and has agreed to make sure it doesn't spread to neighboring properties.

Cooperators: Two homeowners.

Sam Hughes (E. University)

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	12	12	7	5	
Commercial	1	1		1	
Municipal					
Roadside					
Other					
Total	13	13	7	6	

Highlights: We continue having very good success here. Most of these locations did not have Onionweed this year and there have been no plants that have gone to seed.

Cooperators: Twelve homeowners. Brewster Center.

La Madera (Ft Lowell/Tucson Blvd)

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	2	2		2	
Commercial					
Municipal					
Roadside					
Other					
Total	2	2		2	

Highlights: Active removal by PPQ and local business owner resulted in a dramatic decrease in the number of plants which germinated this year. All plants have removed prior to going to seed.

Cooperators: Dr. Love Chiropractic. Total Look Interiors.

Pinal County

New county find this year.

Oracle

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	19				
Commercial					
Municipal					
Roadside					
Other	1				
Total	20	0	NA	NA	NA

Highlights: An Onionweed location in Oracle State Park was reported by the cooperator from the Audubon Society Research Ranch in April 2007. This was the first time Onionweed was reported to be in Pinal County. During the survey conducted afterward in Oracle City PPQ found 19 sites with Onionweed infestations. We posted and/or left informational fliers at the Oracle State Park, Oracle Fire Department, Oracle Public Library, Pinal County Justice Building, and the Highway Department. We distributed about 60 informational fliers to homeowners.
PPQ received excellent response from the Oracle residents, outstanding help and support from the Oracle Fire Department and other entities. The Oracle Fire Department helped to deliver Onionweed informational materials to a broader audience through their internet emergency network. Onionweed plants removed by the people were collected by the Fire Department and burned.
The Oracle Garden Club organized a meeting exclusively dedicated to the Onionweed problem. All of the locations were cleaned by the property owners themselves with only 2 exceptions. PPQ was granted permission to clean these 2 remaining sites. PPQ removed approximately 115 lbs of Onionweed from those 2 sites. All homeowners committed to continue the removal of plants from their properties.

Cooperators: Homeowners, Oracle State Park, Arizona State Parks, Oracle Fire Department, Oracle Garden Club, Desert Oasis Garden Services.

San Manuel

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	4				
Commercial					
Municipal					
Roadside					
Other					
Total	4				

Highlights: Onionweed survey in San Manual was conducted at the end of August 2007 as a follow up on information received from the Oracle Garden Club. We left informational fliers at the sites and will follow up. This is the first time find in the San Manual area.

Santa Cruz County

Nogales

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	3	3		2	1
Commercial					
Municipal					
Roadside					
Other					
Total	3	3		2	1

Highlights: One residence continued to have a high number of plants germinate. The other two residences had fewer plants this year.

Cooperators: Three homeowners.

Patagonia

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease	Sites with Same or Increase
Residence	2	2	1	1	
Commercial	1				1
Municipal	1	1		1	
Roadside					
Other					
Total	4	3	1	2	1

Highlights: One site continues to have no onionweed. Another residence which had been unoccupied for over a year has new owners who have been very active and cooperative in their Onionweed removal. The Pony Tail Hair Salon has had an explosion of onionweed this year and the owner currently does not want it all removed from the property. The Patagonia Butterfly Garden continues to have an occasional onionweed plant emerge.

Cooperators: Patagonia Town Government, Pony Tail Hair Salon, two homeowners.

Sonoita – Elgin

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease	Sites with Same or Increase
Residence					
Commercial					
Municipal					
Roadside					
Other	2	2		2	
Total	2	2		2	

General Comments: The Empire Cienega Ranch (BLM) continues to have a large number of plants germinate but all appear to be removed before they go to seed. The Audubon Research Ranch continues to remove any onionweed that emerges.

Cooperators: Bureau of Land Management. Audubon Society

Tubac

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence					
Commercial	1	1		1	
Municipal					
Roadside					
Other					
Total	1	1		1	

Highlights: Owners have been very active in removing onionweed.

Cooperators: Tubac Country Inn

Yavapai County
Sedona

	End of Year # of Sites		Beginning of Season Population		
Site Description	2007	2006	Sites with no Plants Found	Sites with Decrease in # of Plants	Sites with Same or Increase
Residence	1	1			
Commercial					
Municipal					
Roadside	2	1`		1	1
Other					
Total	3	2		1	1

Highlights: Members of the Sedona Street Department notified PPQ of a new roadside location this year on the west end of Sedona along the north side of Highway 89A. Two weed pulling trips were made to this site in 2007. The first trip we pulled mostly mature plants but apparently many had gone to seed as the second trip yielded hundreds of new seedlings. Hopefully we made a dent in them this time but it's likely many got by us. We'll know in the spring.
The previous roadside location continues to improve. The only Onionweed found were a few plants at the south end. However, the residence at the north end has reseeded. I have notified the City of Sedona of this problem and in the past they have had good cooperation from the property owners in getting the Onionweed removed.

Cooperators: Sedona Department of Community Development, Homeowner

Outreach:

- There is a new dedicated email address for the public to use to report Federal Noxious Weed locations in Arizona. The address is AZFedWeed@aphis.usda.gov. The new email address is placed on the information flyers we have produced for distribution to homeowners.
- PHSS manned a booth at two different venues located in the heart of Onionweed country. At the High on the Desert Conference sponsored by the Cochise County Master Gardeners in February the booth had over a 100 visitors. This resulted in a higher rate of email response from the interested public.
- During the Earth Day celebration in April PHSS manned another booth. The booth focused on Onionweed and also provided information on other PPQ programs.
- The Forest Service is assisting by handing out Onionweed flyers at their Coronado National Forest office.
- Interviews with LPA approval were granted to local newspapers resulting in media coverage.
- PHSS involvement in Cooperative Weed Management Groups that includes:
  - Central Arizona Weed Management Area
  - Pima-Santa Cruz County Weed Management Area
  - San Francisco Peaks Weed Management Area
  - Southeast Arizona Weed Management Area
  - Southwest Vegetative Management Association
- The PHSS provide the homeowners management associations with presentations on the Onionweed eradication program and solicit their voluntary assistance in survey and removal.
- PHSS conduct numerous personal visits with homeowners and businesses. Mailing out notices and distributing flyers.
- PHSS have developed two different Onionweed Power Point presentations for informational/educational purposes.
- The PSS is engaging the Phoenix Parks and Recreation Department to provide them with identification materials and to solicit their assistance in survey.
- Onionweed identification and removal information was published in the Sierra Vista Connections which goes to 14,000 homes in Cochise County

Data Management:

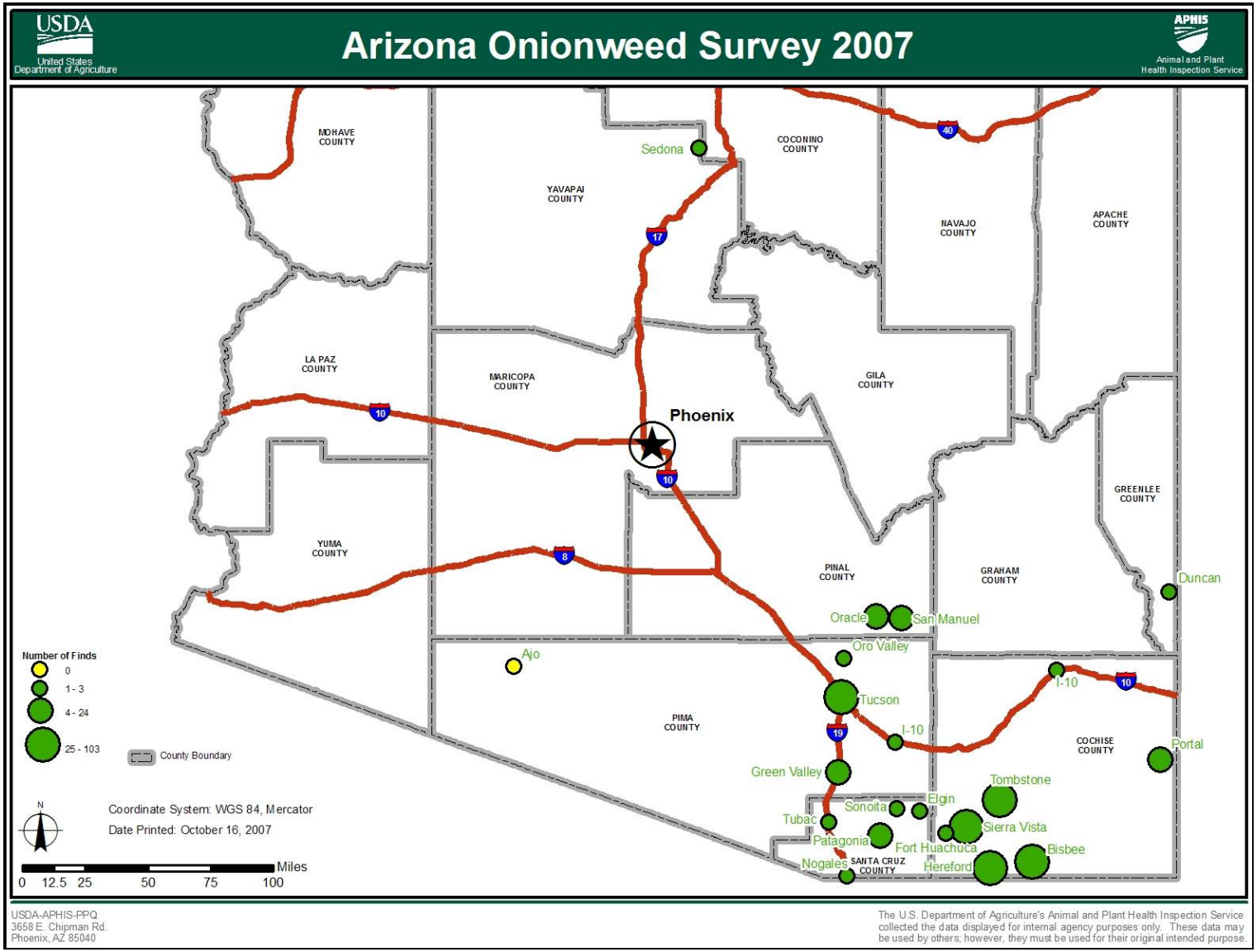
We are now utilizing the ISIS survey and database tool to record the locations of Onionweed and the activity at each site. We designed the survey template to fit our program needs and it can be used for all noxious and invasive weeds. The Plant Safeguarding Specialists are recording the status of Onionweed and our activity at each location when they are visited. The information is then downloaded into the database from the PDA. This will assist in mapping, tracking and managing the surveys and eradication efforts for the program.

CPHST Ad Hoc Study:
The purpose of the study is to determine the herbicide and herbicide rate efficacy on Onionweed cover and plant density. It also will determine the effect methylated seed oil will have on herbicide efficacy. The Ad Hoc study started this year with chemical applications being conducted at two different test sites. There are thirteen different chemical combinations being evaluated in total. Evaluation of the spray control will be completed in late October. The CPHST scientist is submitting a continuation proposal to make this a two year study.

Program Support:
The seasonal position is an integral part of the Onionweed eradication program. The position not only provides for mechanical removal of the plant but has considerable outreach responsibilities with the general public. He is required to initiate contact at new locations to gain the cooperation of the landowner. At existing locations he establishes a cooperative relationship with the land owner and asks for the voluntary removal of the plants on the property. With the large number of locations being monitored for the presence and removal of Onionweed the seasonal position has earned a high level of importance to the success of the program.

Conclusion:
The 2007 Onionweed eradication program had many significant events this year. Through our tremendous outreach efforts we are gaining many new cooperators to assist in the survey and to remove this plant from the Arizona landscape. New locations are being reported by our cooperators and citizens that we would have never otherwise known of. We have made application to the Arizona State Agriculture Department to have Onionweed added to the state's Regulated Restricted Noxious Weed and the Prohibited Noxious Weed lists. The Onionweed plant is very tenacious and in this state has two growing seasons. All the plants can be removed in the spring but a return trip is always needed after the summer monsoons arrive and provide moisture for new germination. There are now 311 known locations that are being monitored for Onionweed presence and removal.

Hydrilla (Hydrilla verticillata)**:**
Hydrilla is on the Arizona Department of Agriculture Noxious Weed list and they have increased their presence in the eradication of this FNW. The eradication program has endured many setbacks but this year the Hydrilla eradication program in Arizona has seen great success. The Tucson museum has used a chemical treatment, Sonar®, for the past two years and no Hydrilla have been visible throughout the year. The Sonar® treatments will continue. The two golf course locations have also had great success this year. Early this spring a fish kill of unknown origin took out all of the large grass carp in one of the golf courses. Later, both golf courses agree to the Arizona Department of Agriculture treatment plan. More grass carp were added and the golf courses treated with Aquathol®, a contact aquatic herbicide safe for use with fish, to reduce biomass. At the present there are no new signs of Hydrilla growth and the Triploid grass carp should consume any new plant growth. These locations will remain under observation for the next eleven years.


USDA
United States
Department of Agriculture
Arizona Onionweed Survey 2007
APHIS
Animal and Plant
Health Inspection Service
MOHAVE COUNTY
COCONINO COUNTY
YAVAPAI COUNTY
NAVAJO COUNTY
APACHE COUNTY
LA PAZ COUNTY
MARICOPA COUNTY
GILA COUNTY
GREENLEE COUNTY
YUMA COUNTY
PINAL COUNTY
GRAHAM COUNTY
PIMA COUNTY
COCHISE COUNTY
SANTA CRUZ COUNTY
Sedona
Phoenix
Duncan
Oracle
San Manuel
Oro Valley
Ajo
Tucson
I-10
Portal
Green Valley
Tombstone
Elgin
Sonoita
Tubac
Sierra Vista
Patagonia
Fort Huachuca
Bisbee
Nogales
Hereford
Number of Finds
0
1 - 3
4 - 24
25 - 103
County Boundary
N
Coordinate System: WGS 84, Mercator
Date Printed: October 16, 2007
Miles
0 12.5 25 50 75 100
USDA-APHIS-PPQ
3658 E. Chipman Rd.
Phoenix, AZ 85040
The U.S. Department of Agriculture's Animal and Plant Health Inspection Service collected the data displayed for internal agency purposes only. These data may be used by others; however, they must be used for their original intended purpose.

Appendix B. Toxicity Profile for Metsulfuron-methyl

Test Species Common Name	Scientific Name	Test Type	Reported Toxicity Value
Rat	Not Reported	Oral LD_{50}	> 5000 mg/kg
Rat	Not Reported	Dermal LD_{50}	> 2000 mg/kg
Rat	Not Reported	Inhalation LC_{50}	> 5.0 mg/L
Bobwhite	*Colinus virginianus*	Oral LD_{50}	> 2250 mg/kg
Bobwhite	*Colinus virginianus*	Oral LD_{50}	> 2250 mg/kg
Mallard	*Anas platyrynchos*	5 day Dietary LC_{50}	> 5620 ppm
Mallard	*Anas platyrynchos*	5 day Dietary LC_{50}	> 5620 ppm
Bobwhite	*Colinus virginianus*	23 week NOEL	1000 ppm
Mallard	*Anas platyrynchos*	24 week NOEL	1000 ppm
Honeybee	*Apis mellifera*	48 hour LD_{50}	> 25 µg/bee
Cladoceran	*Daphnia magna*	48 hour EC_{50}	> 150 mg/L
Cladoceran	*Daphnia magna*	21 day NOEC	> 100 mg/L
Rainbow Trout	*Oncorrynchus mykiss*	96 hour LC_{50}	> 150 mg/L
Rainbow Trout	*Oncorrynchus mykiss*	90 day NOEC	4.5 mg/L
Bluegill Sunfish	*Lepomis macrochirus*	96 hour LC_{50}	> 150 mg/L
Common carp	*Cyprinus carpio*	96 hour LC_{50}	3320 mg/L
Blue Green Algae	*Anabaena flos-aquae*	96 hour EC_{50}	95 µg/L
Green Algae	*Selenastrum capricornutum*	5 day EC_{50}	285.6 µg/L
Green Algae	*Pseudokirchneriella sp.*	96 hour EC_{50}	130 µg/L
Aquatic Vascular Plant	*Lemna minor*	14 day EC_{50}	0.63 µg/L
Aquatic Vascular Plant	*Lemma gibba*	7 day EC_{50}	0.41 µg/L
Freshwater Diatom	*Naviculla pelliculosa*	96 hour EC_{50}	> 92.8 mg/L
Marine Diatom	*Skeletonema costatum*	5 day EC50	> 93.6 µg/L
Barnyard Grass	*Echinochlua crusgalli*	16 day EC_{25} (SE/VV)[A]	0.00187/0.00034 lb ai/ac
Buckwheat	*Polygonum convolvulus*	16 day EC_{25} (SE/VV)	0.0035/>0.001 lb ai/ac
Cocklebur	*Xanthium pensylvanicum*	16 day EC_{25} (SE/VV)	0.0012/0.00048 lb ai/ac
Corn	*Zea mays*	16 day EC_{25} (SE/VV)	0.0009/0.003 lb ai/ac
Cotton	*Gossypium sp.*	16 day EC_{25} (SE/VV)	0.00036/0.00054 lb ai/ac
Morning glory	*Ipomoea sp.*	16 day EC_{25} (SE/VV)	0.000009/0.0032 lb ai/ac
Purple Nutsedge	*Cyperus rotundus*	16 day EC_{25} (VV)	0.0025 lb ai/ac
Rice	*Oryza sativa*	16 day EC_{25} (SE/VV)	0.00071/0.015 lb ai/ac
Soybean	*Glycine max*	16 day EC_{25} (SE/VV)	0.00041/.000018 lb ai/ac
Sugar Beet	*Beta vulgaris*	16 day EC_{25} (SE/VV)	0.000045/0.001 lb ai/ac

[A] SE = seedling emergence study; VV = vegetative vigor study