# U.S. Fish and Wildlife Service

# Evaluation of Pesticide Use on U.S. Fish and Wildlife Service Lands

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## ABSTRACT

The U.S. Fish and Wildlife Service (Service) applies pesticides on Service lands (Figure 1) as one tool in an integrated pest management approach to manage pest species that interfere with desired resource management objectives. Most of this pesticide use occurs on National Wildlife Refuges for the management of non-native invasive weed species, such as Canada thistle (*Cirsium arvense*), johnson grass (*Sorghum halapense*), and phragmites (*Phragmites australis*). However, we also use pesticides to manage for disease vectors, like mosquitoes, or to create habitat for wildlife. Due to the somewhat delicate nature of the habitat where we apply these chemicals, all proposed pesticide uses are subjected to a site-specific evaluation of pesticide fate and effects designed to capture any potential risk to fish and wildlife trust resources. Our pesticide use proposal process is a conservative, tiered approach based on analysis of factors such as:

- pesticide toxicity,
- pesticide persistence,
- adjuvant toxicity,
- application distance from water,
- application method, and
- probability of leaching.

Our evaluation may corroborate risks to wildlife identified in the pesticide registration process or incorporate new data which may be specific to the species present in the application area, the proposed pattern of use, or other characteristics of the natural habitat.

Figure 1. U.S. Fish and Wildlife Service regions. Every region uses pesticides as one tool to manage pest species.


Caribou from Kenai National Wildlife Refuge, Alaska.

James E. Frater/USFWS

## INTRODUCTION

***What is the Pesticide Use Proposal (PUP) Process?***

- An informational gathering process before application of a pesticide on Service lands, like National Wildlife Refuges.
- Primary management tool the Service uses to discern and mitigate pesticide risks from pesticides used by the Service on Service properties.
- Protective measure to ensure the proper use of pesticides.

***What does the PUP process identify?***

Potential pesticides risks such as:

- Pesticides that have the potential to contaminate groundwater,
- Pesticides that may be of higher risk to fish and wildlife and their habitats,
- Pesticides that may persist in the environment.

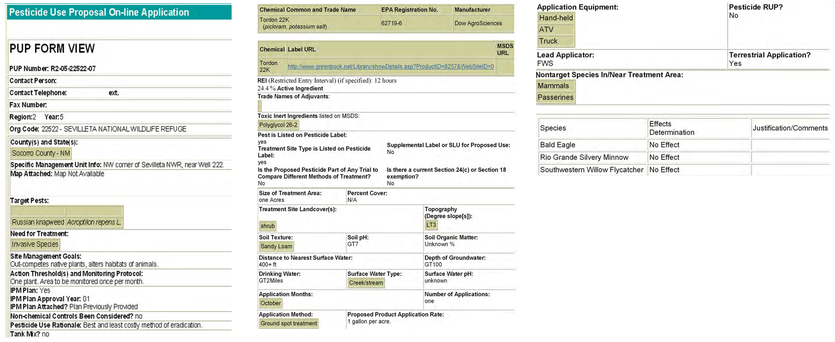
*Through our pesticide use proposal process and pesticide analysis, we can better assess risks and potential impacts to nontarget habitats and organisms to ensure protection of our trust resources.*

## MATERIALS AND METHODS

- **PUP form and online PUP database:**
  - Each pesticide use must have a completed PUP form (Figure 2).
  - PUPs generally submitted by Refuges and then are approved at either the field, regional, or Washington Office level, depending on the proposed pesticide. PUPs needing higher level review are those that are:
    - A risk to the applicator, wildlife, wildlife habitat, surface water or groundwater,
      - Restricted Use Products,
      - Being applied aerially,
      - Organophosphate, carbamate, and organochlorine pesticides,
      - Highly likely to leach or runoff or which have been frequently found in surface or groundwater,
  - We encourage the use of low risk pesticides and each Station to write an integrated pest management (IPM) plan, which is a detailed site specific pest management plan reviewing pest management options for each pest species.
  - Personnel approving PUPs are technical experts with backgrounds in pest management and/or toxicology.
  - In 2006, the Service will enter all PUPs into an online database.

## MATERIALS AND METHODS (cont.)

Figure 2. Example PUP form.



**Pesticide Use Proposal On-line Application**

**PUP FORM VIEW**

**PUP Number: R2-05-22522-07**
**Contact Person:**
**Contact Telephone:** **ext.**
**Fax Number:**
**Region:**2 **Year:**5
**Org Code:** 22522 - SEVILLETA NATIONAL WILDLIFE REFUGE
**County(s) and State(s):** Socorro County - NM
**Specific Management Unit Info:** NW corner of Sevilleta NWR, near Well 222.
**Map Attached:** Map Not Available
**Target Pests:** Russian knapweed *Acroptilon repens L.*
**Need for Treatment:** Invasive Species
**Site Management Goals:** Out-competes native plants, alters habitats of animals.
**Action Threshold(s) and Monitoring Protocol:** One plant. Area to be monitored once per month.
**IPM Plan:** Yes
**IPM Plan Approval Year:** 01
**IPM Plan Attached?** Plan Previously Provided
**Non-chemical Controls Been Considered?** no
**Pesticide Use Rationale:** Best and least costly method of eradication.
**Tank Mix?** no

| Chemical Common and Trade Name | EPA Registration No. | Manufacturer |
|---|---|---|
| Tordon 22K (picloram, potassium salt) | 62719-6 | Dow AgroSciences |

**Chemical Label URL:** Tordon 22K http://www.greenbook.net/Library/showDetails.asp?ProductID=62573 (WebSiteID=0) — MSDS URL

**REI** (Restricted Entry Interval) (if specified): 12 hours
24.4 % **Active Ingredient**
**Trade Names of Adjuvants:**
**Toxic Inert Ingredients** listed on MSDS:
Polyglycol 26-2
**Pest is Listed on Pesticide Label:** yes
**Treatment Site Type is Listed on Pesticide Label:** yes
**Supplemental Label or SLU for Proposed Use:** No
**Is the Proposed Pesticide Part of Any Trial to Compare Different Methods of Treatment?** No
**Is there a current Section 24(c) or Section 18 exemption?** No
**Size of Treatment Area:** one Acres
**Percent Cover:** N/A
**Treatment Site Landcover(s):** shrub
**Topography (Degree slope[s]):** LT3
**Soil Texture:** Sandy Loam
**Soil pH:** GT7
**Soil Organic Matter:** Unknown %
**Distance to Nearest Surface Water:** 400+ ft
**Depth of Groundwater:** GT100
**Drinking Water:** GT2Miles
**Surface Water Type:** Creek/stream
**Surface Water pH:** unknown
**Application Months:** October
**Number of Applications:** one
**Application Method:** Ground spot treatment
**Proposed Product Application Rate:** 1 gallon per acre.

**Application Equipment:** Hand-held, ATV, Truck
**Pesticide RUP?** No
**Lead Applicator:** FWS
**Terrestrial Application?** Yes
**Nontarget Species In/Near Treatment Area:** Mammals, Passerines

| Species | Effects Determination | Justification/Comments |
|---|---|---|
| Bald Eagle | No Effect | |
| Rio Grande Silvery Minnow | No Effect | |
| Southwestern Willow Flycatcher | No Effect | |

- **Conduct a site specific qualitative and/or quantitative assessment of each proposed pesticide:**
- **Qualitative assessment:**
  - Assess pesticide and its characteristics, such as: pH, solubility in water, vapor pressure, Kd, Koc, Kow, half-life
  - Evaluate pesticide's toxicological profile - acute, and if available, chronic toxicity data
  - Evaluate application scenario - rainfall, soil texture, pH of soil and water, proximity to surface water
  - Use these measures to determine any possible impacts to nontargets; implement integrated pest management and best management practices and if needed, other mitigation measures
  - Ensure compliance with applicable authorities, such as the National Environmental Policy Act, Endangered Species Act, and the Federal Insecticide, Fungicide, and Rodenticide Act
- **Quantitative Assessment:**
  - Conduct qualitative assessment and then use EPA's Quantitative Ecological Risk Assessment Process - Risk Quotients (RQs), modeling such as Kenaga Nomogram, Geneec (Generic Estimated Environmental Concentration), and AgDrift
  - Compare RQ to EPA's Level of Concern (Table 1)

*Estimated Environmental Concentration (EEC) / Toxicological Endpoint = Risk Quotient (RQ)*

Table 1. Presumption of unacceptable risk for birds, fish and mammals, EPA.

| Risk Presumption | Level of Concern Endangered , Threatened or Candidate Species | Level of Concern All Other Species |
|---|---|---|
| Acute Birds | 0.1 | 0.5 |
| Acute Fish | 0.05 | 0.5 |
| Acute Mammals | 0.1 | 0.5 |
| Acute Plants | 1.0 | 1.0 |
| Chronic Birds | 1.0 | 1.0 |
| Chronic Fish | 1.0 | 1.0 |
| Chronic Mammals | 1.0 | 1.0 |
| Chronic Plants | 1.0 | 1.0 |

## RESULTS AND DISCUSSION

**Assessments for effects to fish and wildlife may be conservative in nature due to uncertainties introduced by data limitations. This may lead to requirements that are more restrictive than allowed label use.**

1) For many pesticides, only acute toxicity (i.e., mortality) is available. Sublethal endpoints such as movement, feeding, growth, and reproduction, may be more sensitive and occur at lower concentrations of chemical.
2) Species on which toxicity testing is conducted may not represent the most sensitive species of that taxonomic group (e.g., bobwhite quail and mallard duck for all bird species). Also some taxa are not represented in toxicity testing (e.g., reptiles, amphibians, mussels) and toxicity must be extrapolated from the most closely related taxonomic group (e.g., birds for reptiles).
3) There is a lack of stringent testing and regulation of the manufacture and use of adjuvants; some are more toxic than the active ingredient.
4) Most toxicity testing is performed on active ingredients only and may not fully reflect the actual toxicity of the final formulated product used in practice.
5) Actual application areas may contain unique site-specific characteristics that have not been accounted for in the national registration.
6) Toxicity of degradates is often unknown or fully considered when assessing environmental risks of a pesticide.

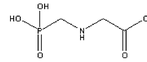
*The Refuge System's approximately 100 million acres are home to 700 species of birds, 220 species of mammals, and more than 1,000 species of fish, and countless invertebrates, plants, reptiles and amphibians.*

*How many PUPs does the Service review each year?*

- In 2005, the Service reviewed over 1,000 PUPs.

*How many pounds of active ingredient does the Service apply each year?*

- These data have not been closely tracked in the past, but will be available with the implementation of a new online database. Examples of regional totals are presented in Table 2.



Glyphosate

Table 2. Pesticide use data from 2004.

| Region | Total Pounds a.i. | % Glyphosate Use |
|---|---|---|
| 3 | 29,064 | 85.3 |
| 5 | 17,202 | 54.2 |
| 6 | 27,861 | 35.4 |
| 7 | 35 | 0 |

*Why does the Service use pesticides?*

- Primarily for invasive weed management and agricultural pests.

*What are the main pesticides the Service uses each year?*

- Glyphosate is the main pesticide used in several regions (Table 2).

*How many IPM plans does the Service have?*

- Between 30 and 50

## CONCLUSIONS

The PUP process is an invaluable tool for assessing potential pesticide risks to Service lands and resources. As pest managers, we actively promote and educate about pest management tools and options, including a week long course on pesticides and a week long course on integrated pest management.

**The benefits the Service gains from PUPs are:**

1) Pesticides are used safely and effectively,
2) The lowest risk products are selected,
3) Pesticide label instructions are followed,
4) The best products are selected for the target pest,
5) Adequate pesticide application buffers are maintained,
6) Protection of groundwater and surface water,
7) Compliance with the ESA and other applicable laws and regulations,
8) Reductions or eliminations of unnecessary pesticide use.

**Goals for the Future:**

- Keep educating about low risk products and methods for pest management,
- Adoption of the online database for PUP entry and pesticide usage data.

Julie Thompson/USFWS

Phragmites (Phragmites australis) management using glyphosate at Horsehead Wetland Center, Maryland. Some of the common herbicides the Service uses for invasive weed management include glyphosate, imazapyr, triclopyr, and clopyralid.