EXECUTIVE SUMMARY

This document explains the concept of integrated pest management (IPM) and how it can be applied to the Tule Lake and Lower Klamath national wildlife refuges (NWRs). It is Department of the Interior policy to implement IPM plans on all wildlife refuges in the United States, and this IPM Plan was, in part, prepared to satisfy that requirement. Another purpose of this Plan is to balance pest control practices with the goals of agriculture production and profitability, consistent with wildlife management as called for in the Kuchel Act.

SCOPE

The IPM Plan describes current agricultural practices, pest management and pesticide use on the Tule Lake and Lower Klamath NWRs, and provides an on-the-ground, how-to IPM manual for growers and refuge managers specific to the refuges. *This is not an enforcement document.* However, guidance provided by this Plan may influence the content of leases and pesticide use proposals written for leased lands on Tule Lake and Lower Klamath NWRs. This IPM Plan covers all federal lands (22,600 acres) that are leased for agriculture purposes in 1996 on the Tule Lake and Lower Klamath NWRs.

The Plan addresses terrestrial pests found on Refuge lands that are leased for agriculture purposes and also addresses pests found on bank-tops associated with the refuges' extensive water delivery system, roadsides, and grasslands. Pests are identified as all organisms that negatively impact agriculture operations and/or wildlife habitats, including plants, noxious weeds, insects, fungi, bacteria, and rodents.

IPM PLAN

The Plan is organized in three sections. The first describes the scope of the Plan, background and history of the refuges, principal authorities and policies that guide the Agencies (U.S. Fish and Wildlife Service and U.S. Bureau of Reclamation), public involvement activities of the project, the IPM Plan goals and current terrestrial and aquatic habitat conditions, and agriculture conditions on the refuges.

The second section is an IPM Workbook. It begins by presenting information on the role of IPM on the refuges, provides a working definition of IPM, discusses general IPM techniques (such as crop scouting and field trials) and explains general approaches to cultural, biological, and chemical control methods. The next part of the IPM workbook contains sections on weeds and refuge grown crops (potatoes, small grains, sugar beets, onions and alfalfa, and their pests). Each crop section is organized in the following way: crop overview, monitoring, invertebrate pests, diseases, field trial recommendations, useful contacts and resources and literature cited. This section is the heart of the IPM Plan because it offers crop and pest-specific IPM options for use by growers on Refuge lands. The last part of the IPM Workbook provides information on IPM methods to combat vertebrate pests (voles).

The third section of the Plan presents final recommendations that would result in some immediate changes in lease agreement conditions, as well as longer-term changes as IPM methods are phased in on Refuge lands. The section also provides an implementation plan and a process for reviewing and updating the Plan.

FINAL RECOMMENDATIONS

A brief listing of the *final recommendations* follows:

Administrative Recommendations:

- Funding to implement the IPM Plan must be obtained
- An IPM coordinator will be hired and given authority to carry out the IPM Plan
- An ongoing IPM Coordination Group will be established
- A berm management subcommittee of the Coordination Group will be formed
- A pesticide subcommittee of the Coordination Group will be formed
- Lease incentives will be offered for field testing IPM techniques
- PUP-approved pesticide labels will be filed at Agency offices
- Row crops grown for certified seeds will be subject to the same pest control thresholds as commercial crops
- The IPM coordinator will maintain data files on field trials
- Beneficial aspects of sump rotation will be incorporated into the IPM Plan as results become available
- Baseline physical, biological, and wildlife data should be compiled
- Alternative pesticides should be explored by the Agencies/Growers to help prevent pest resistance problems
- IPM outreach activities should be developed
- Private/public partnerships will be pursued to carry out IPM
- The IPM Plan will be reviewed annually
- A comprehensive IPM Plan review will occur every 5 years

Field Recommendations:

- Crop scouting will be required as part of new lease agreements
- Field trials will be used to test and demonstrate IPM techniques
- Within 5 to 10 years, growers can expect new IPM requirements in lease agreements
- Alternative crops need to be field-tested in the Klamath basin
- Cover crops will be encouraged to reduce erosion
- If vole control is needed, only nonchemical methods will be used
- When action thresholds are known for specific crop/pests, they must be the primary determinant when deciding whether ground or aerial pesticide spraying will be allowed

TABLE 1
Recommended Implementation Schedule

Note: Bolded text in the 'Who's Responsible' column denotes primary responsibility.

ADMINISTRATIVE RECOMMENDATIONS

Task	Who's Responsible	Estimated Amount of Funding	Start Date*	Remarks
1. Fund the IPM Plan	**Service, Reclamation,** Congressional delegation, with support from ag. service agencies, growers, and interested public	$250,000 total annually; individual cost breakdowns listed separately below	As soon as IPM Plan is adopted	Funding options need to be explored by the agencies as soon as possible due to the time it takes to resolve these kinds of issues. **Essential**
2. IPM Coordinator will ge Given Authority to Cary Out IPM Plan	**Klamath Refuge Manager**	Cost: $110,000/year/total: Coordinator $58-$65,000, technician $28,000, overhead $18,000. Equipment $38,000.	October 1997	Critical to IPM Plan implementation **Essential** $38,000 for equipment is a one-time capital cost
3. Establish IPM Coordination Group	**IPM Coordinator**	Staff time	Year 1	IPM Coordinator will consult with growers, Agency staff, conservation groups in establishing this group.
4. Berm Management Subcommittee	**IPM Coordinator**, IPM Coordination Group, TID, Reclamation	$80,000/year/total: four, 6-month seasonal employees $60,000, equipment & supplies $20,000	Year 1	IPM Coordinator will work closely with growers, ag researchers and others interested in solving the berm problems.
5. Pesticide Subcommittee	**IPM Coordinator** IPM Coordination Group, PUP Review Team	Staff time	On an as-needed basis but no less than twice a year	
6. Offer Lease Incentives for IPM Implementation	**Reclamation** with cooperation from growers	Variable, lease-fee incentives	Year 1	This will help pass techniques on to growers
7. File PUP-Approved Pesticide Labels	**IPM Coordinator**	staff time	Year 1	**Essential**

Task	Who's Responsible	Estimated Amount of Funding	Start Date*	Remarks
8. Allow Certified Seed Crops on Refuges if Subject to Same Thresholds as Commercial Crops	**Reclamation**	Minimal	Year 1	**Essential**
9. Maintain field trial data files	**IPM Coordinator**	Staff time	Year 1	
10. Implement Sump Rotation Elements as Research Results Becomes Available	**Service and Reclamation**	Multimillion dollar project	Annual review of sump rotation studies to determine whether research has proven beneficial to IPM and wildlife.	**Essential**
11. Baseline data Program	**Special research teams**, refuge biologists**,** UC Davis	$20,000/year/total: for soil, water quality, wildlife, fisheries monitoring. Two seasonal biological technicians.	Year 1	This will provide baseline data for long-term management and evaluation; data will be filed at Service headquarters at Tule Lake. Data should be scientific quality and publishable.
12. Provide Alternative Pesticides for Rotations	**PUP Review Committee**, growers	Staff time	Annually	Field trials will be used to assess effectiveness of alternative pesticides and biologicals.
13. IPM Outreach Activities	**Reclamation, Service**, agriculture service agencies, volunteers	Staff time	Year 2	
14. Private/Public Partnerships	**Refuge and Reclamation Managers,** organization volunteers	Staff time	Year 2	
15. Review IPM Plan	**Service,** Reclamation, IPM Coordination Group	Staff and volunteer time	Annually	
16. Comprehensive IPM Plan Review	**Service,** Reclamation, IPM Coordination Group	Staff and volunteer time	Every five years	

FIELD RECOMMENDATIONS

Task	Who's Responsible	Estimated Amount of Funding	Start Date*	Remarks
17. Require Crop Scouting	**Service and Reclamation** in leases	Staff time to set up new lease clauses	Year 1	**Essential**
18. Conduct Field Trials to Test IPM	**Agriculture researchers, growers,** IPM Coordinator, IPM Coordination Group	$40,000year/total: Agriculture Experiment Station salaries and equipment	Year 1	Prioritize trials within 6 months of IPM start date. Establish scientific protocols and requirements for different levels of field trials. **Essential**
19. IPM Requirements in Lease Agreements	**Reclamation,** in leases	Staff time	No later than 5 to 10 years	Field tested locally and found appropriate for lease lands **Essential**
20. Testing of alternative crops	**Agriculture researchers, growers, ag. extension, IPM Coordinator**	growers' labor and equipment, lease fees if incentives provided, grants	Year 2	
21. Encourage Cover Crops	**Reclamation** in leases**,** in cooperation with growers	Leased-land fees, Natural Resource Conservation Service shelter belt program, growers	Year 2	Soil cover requirements could be included in leases. Incentives could be given for windbreaks.
22. Nonchemical control methods for voles	**Reclamation**/ Growers	Staff time	Year 1	**Essential**
23. Action Thresholds must be the primary determinate before spraying decision is made.	**Reclamation**/ Growers/ IPM Coordinator	Staff time	Year 1	For known interim thresholds, add to lease requirements as they come up for bid. As new, local thresholds are established, these will also be added to lease requirements. **Essential**

* Start Date -- date when Agencies complete required administrative process (including NEPA Process) and begin the Plan implementation. Some elements of the Plan will be implemented sooner than others.

Due to copyright restrictions, the following figures, tables, and attachments can only be found in

the hard copy form. Please refer to the final Integrated Pest Management Plan for Leased Lands at Lower Klamath and Tule Lake National Wildlife Refuges Oregon/California and the final Environmental Assessment for National Wildlife Refuges Oregon/California or contact Klamath Basin National Wildlife Refuge Complex, RT 1, Box 74, Tulelake, California 96134 (541) 667-2231.

List of Tables and Figures Missing From
The Integrated Pest Management Plan For Leased Lands at Lower Klamath and Tule Lake NWR's Oregon/California

Chapter	Page	Figure/Table #	Title
IPM			
Workbook Introduction	2		Beneficial Organisms Associated with Pacific Northwest Crops
Small Grains	41		Sampling Russian Wheat Aphid in the Western Great Plains
Onions	57	App. O-1	New York's Food and Life Sciences Bulletin No. 106.
Alfalfa	2	Table 1	Fall dormancy and pest resistance ratings for alfalfa varieties
Appendix C	C10-11	Tables C6-C12, Figures C4 & C5	
EA			
Chapter 1	1-1	Figure 1	Bureau of Reclamation, Completed or Authorized Works - Klamath Project Oregon-California
Chapter 3	3-22	Figures 2 and 3	Lower Klamath NWR, Area K Leased Lands Tule Lake NWR, Leased Lands