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Forest Service

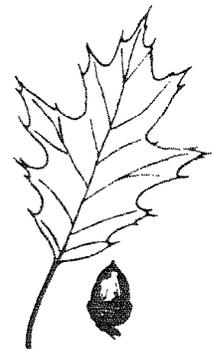
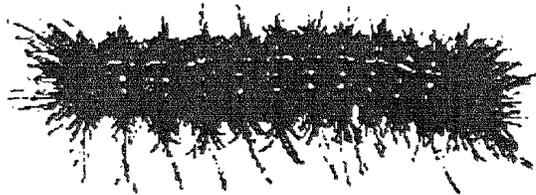
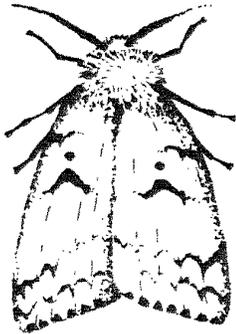
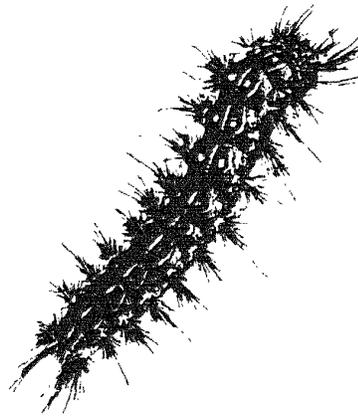
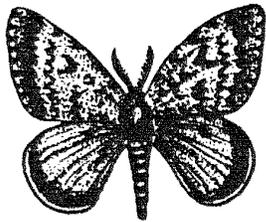
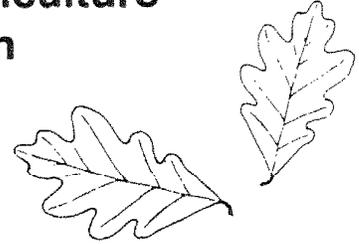
Northeastern Forest
Experiment Station

General Technical
Report NE-213



PROCEEDINGS

U. S. Department of Agriculture Interagency Gypsy Moth Research Forum 1995



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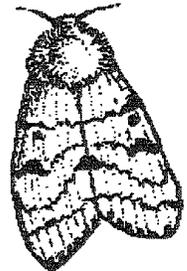
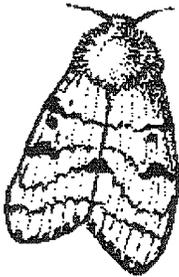
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Proceedings
U.S. Department of Agriculture
Interagency Gypsy Moth Research Forum
1995



January 17-20, 1995
Loews Annapolis Hotel
Annapolis, Maryland

Edited by
Sandra L. C. Fosbroke and Kurt W. Gottschalk

Sponsored by:

Forest Service Research

Forest Service State and Private Forestry

Agricultural Research Service

Animal and Plant Health Inspection Service

Cooperative State Research Service



FOREWORD

This meeting was the sixth in a series of annual USDA Interagency Gypsy Moth Research Forums that are sponsored by the USDA Gypsy Moth Research and Development Coordinating Group. The Committee's original goal of fostering communication and an overview of ongoing research has been continued and accomplished in this meeting.

The proceedings document the efforts of many individuals: those who made the meeting possible, those who made presentations, and those who compiled and edited the proceedings. But more than that, the proceedings illustrate the depth and breadth of studies being supported by the agencies and it is satisfying, indeed, that all of this can be accomplished in a cooperative spirit.

USDA Gypsy Moth Research and Development Coordinating Group

R. Faust, Agricultural Research Service (ARS)
N. Leppla, Animal and Plant Health Inspection Service (APHIS)
R. Riley, Cooperative State Research Service (CSRS)
T. Hofacker, Forest Service-State and Private Forestry (FS-S&PF)
M. McFadden, Forest Service-Research (FS-R), Chairperson

USDA Interagency Gypsy Moth Research Forum
January 17-20, 1995
Loews Annapolis Hotel
Annapolis, Maryland

AGENDA

Tuesday Afternoon, January 17

REGISTRATION
POSTER DISPLAY SESSION I
WELCOME MIXER

Wednesday Morning, January 18

PLENARY SESSION Moderator: M. McFadden, USDA-FS

Changes in Funding and Direction of Science

Welcome
Michael McManus, USDA-FS

Research and Service Programs of the USDA-ARS European Biological Control Laboratory in
Montpellier, France
Lloyd Knutson, USDA-ARS

Agricultural Research Service Program Strategies and Priorities
Edward Knipling, USDA-ARS

Inside the Animal and Plant Health Inspection Service
Charles Schwalbe, USDA-APHIS

Changes in Forest Service Research: What Lies Ahead?
Robert Lewis, Jr., USDA-FS

Wednesday Afternoon, January 18

CONCURRENT SESSION A Moderator: E. Delfosse, USDA-APHIS

Concerns About Biological Control Agents and Non-Target Lepidoptera
Presenters: A. Hajek, Cornell University; L. Solter, Illinois Natural History Survey; J. M.
Scriber, Michigan State University; J. Miller, Oregon State University; J. Maddox, Illinois
Natural History Survey

CONCURRENT SESSION B Moderator: R.M. Muzika, USDA-FS

Potpourri

Presenters: D. Leonard, USDA-FS and A. Sharov, Virginia Polytechnic Institute & State University; R. Hicks, Jr., West Virginia University; D. Gray, Virginia Polytechnic Institute & State University; A. Liebhold, USDA-FS; R. Whitmore, West Virginia University; R. A. Smith, Abbott Laboratories

POSTER DISPLAY SESSION II

Thursday Morning, January 19

GENERAL SESSION Moderator: V. Mastro, USDA-APHIS

Asian Gypsy Moth

Presenters: K. Garner, D. Schreiber and J. Slavicek, USDA-FS; D. Prasher, USDA-APHIS; M. Keena, USDA-FS; R. Cardé, University of Massachusetts; W. Wallner, USDA-FS; P. Schaefer, USDA-ARS; T. McGovern, USDA-APHIS

Thursday Afternoon, January 19

GENERAL SESSION Moderator: K. Thorpe, USDA-ARS

Entomophaga maimaiga: A Fungus Among Us

Presenters: A. Hajek, Cornell University; R. Weseloh, Connecticut Agricultural Experiment Station; J. Elkinton, University of Massachusetts; L. Bauer, USDA-FS; S. Walsh, University of Toronto

GENERAL SESSION Moderator: R. Fuester, USDA-ARS

Gypsy Moth Biological Control Activities in Europe

Presenters: E. A. Cameron, Pennsylvania State University; J. Novotný, Forest Research Institute, Slovak Republic; M. McManus, USDA-FS

Friday Morning, January 20

GENERAL SESSION Moderator: N. Leppla, USDA-APHIS

The Increasing Significance of Biological Control and an Overview of Regulations Governing Biological Control Organisms

Presenters: E. Delfosse, USDA-APHIS; K. Lakin, USDA-APHIS; L. Turner, US-EPA; J. Brooks, USFWS

GENERAL SESSION Moderator: R. Reardon, USDA-FS

Future Directions in Virus Research

Presenters: V. D'Amico, University of Massachusetts; J. Podgwaite, USDA-FS; J. Slavicek, USDA-FS; M. McFadden, USDA-FS

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PROGRAMS OF THE EUROPEAN BIOLOGICAL CONTROL LABORATORY,
USDA/ARS, MONTPELLIER, FRANCE

Lloyd Knutson

USDA, ARS, European Biocontrol Laboratory, c/o Amembassy Paris
PSC 116 (EBCL) APO AE 09777

The Biological Control of Weeds Laboratory - Europe, established in Italy in 1958 and the European Parasite Laboratory, established in France in 1919, were combined in 1991 as the European Biological Control Laboratory in Montpellier, France. This laboratory is one of three overseas biological control laboratories in the Office of International Research Programs of the Agricultural Research Service (ARS), United States Department of Agriculture, R. S. Soper, Assistant Administrator.

ARS is a mission-oriented agency responsible for developing new knowledge and technology to meet the needs of American agriculture. Research on biological control systems, the complex of pest/natural enemy interactions that can be manipulated for practical, economical, effective, energy-conservant, and safe, environmentally sound pest management is a prime priority of the Agency.

Many of the insect pests and weeds in the United States are of Eurasian origin, and most were accidentally introduced free of the natural enemies that control them in their homeland. Many have become problems of national importance, insect pests attacking many crops, ornamentals, forests, and domestic animals, and weeds infesting millions of acres of range, pasture, crop lands and natural areas. Millions of dollars of losses, annually, are caused by immigrant pests.

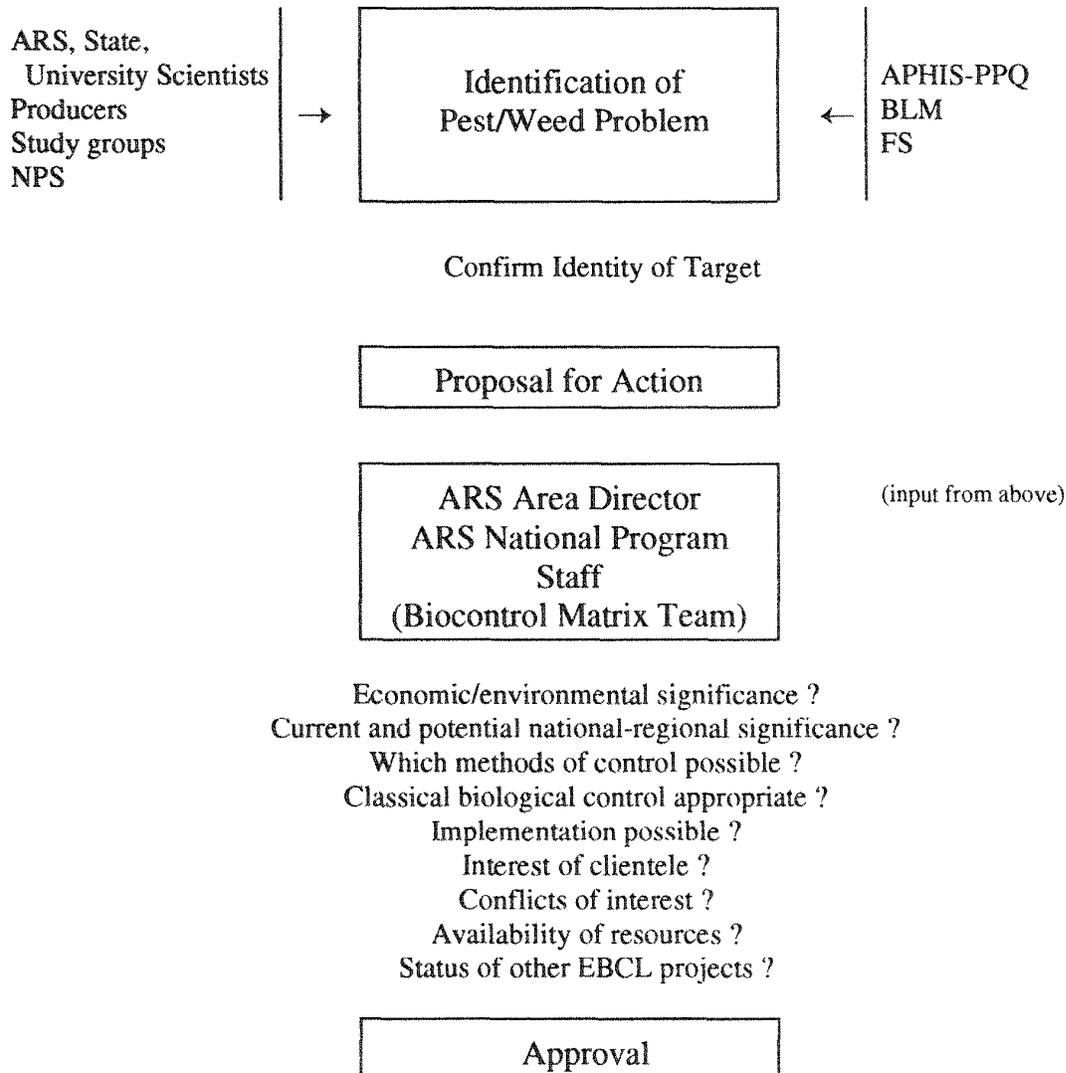
The mission of the Laboratory is to discover, conduct research on, and introduce safe natural enemies (insects, mites and pathogens) into the United States to abate these insect pests and weeds.

The Laboratory's research and service program is in support of state-side ARS and university laboratories and state and federal agencies such as the Forest Service, Animal and Plant Health Inspection Service, Bureau of Land Management, etc. The laboratory cooperates extensively with biological control specialists in state agencies and universities throughout the United States, and with other biological control workers throughout the world. The Laboratory serves as the focal point of ARS exploration in Eurasia, the Middle East, and North Africa, and as a source of information on biological control activities.

Protocol for Establishment of EBCL Projects

EBCL research and technology transfer ("collect-and-ship") projects are carried out in close collaboration with U.S. stateside scientists. The general procedure for establishing a new project in EBCL is described in the flowchart, below.

Phase 1: Target Proposal - Approval - Planning (year 1)



Office of International Research Programs
European Biological Control Laboratory

1. Re-confirm identity of target
2. What is needed ? Collection of known natural enemies, exploration for new natural enemies, research
3. Time - frame for project ?
4. Priority relative to current EBCL projects ?
5. Resources available ?
6. Stateside research and implementation cooperator(s) available ?
7. Nature of cooperation ?
8. Quarantine available ?
9. Integration with other control methods ?
10. Taxonomic support available ?
11. Value as a basic research - learning subject ?
12. Relationship to EBCL long-term research objectives ?
13. Cooperation with other European labs useful (IIBC, CSIRO, ENEA, Montpellier, etc.) ?

Research plan developed with stateside cooperators

(Weeds)

TAG BCW

Research and Technology Transfer Program

Our research approaches are basic biology; host specificity testing; biotype, microhabitat, and host characterization; laboratory and field evaluation of efficacy; population dynamics; and pathogen, parasitoid, predator interactions. Future research at EBCL will include: competition among natural enemies, computerized climate matching, habitat and microhabitat matching, and quality control of natural enemies. The current research and service projects, with indication of the lead scientist for each and year the project was initiated, is shown below.

Weed research targets include: CRIS 1- **Leafy Spurge** (*Euphorbia esula*) (Campobasso, Fornasari, Kashefi, Sobhian, 1980). CRIS 2 - **Saltcedar** (*Tamarix ramosissima*) (Fornasari, Sobhian 1991-); **Common Crupina** (*Crupina vulgaris*) (Sobhian, Knutson 1992-); **Hawkweed** (*Pilosella pratense*) (Fornasari, 1993-); **Russian Thistle** (*Salsola kali*) (Knutson, 1994-).

Weed research has been completed on the following and we are collecting and shipping natural enemies of these weeds to U.S. collaborators for establishment : - **Yellow Starthistle** (*Centaurea solstitialis*) (Kashefi); **Diffuse and Spotted Knapweeds** (*Centaurea diffusa*, *C. maculosa*) (Campobasso, Kashefi); **Musk Thistle** (*Carduus nutans*) (Campobasso); **Field Bindweed** (*Convolvulus arvensis*) (Campobasso, Kashefi, Sobhian); **Puncture Vine** (*Tribulus terrestris*) (Campobasso); and **Common Toadflax** (*Linaria vulgaris*) (Campobasso).

Target insect pests include: CRIS 3 - **SWEETPOTATO AND SILVERLEAF WHITEFLIES** (*Bemisia tabaci* and *B. argentifolii*) (Kirk, Lacey 1991-). CRIS 4 - **INSECT PESTS OF CEREALS AND OTHER CROPS** including: **Cereal Leaf Beetle** (*Oulema melanopus*) (Dysart et al. 1993-); **Russian Wheat Aphid** (*Diuraphis noxia*) (Lacey 1991-); **Pine Shoot Beetle** (*Tomicus piniperda*) (Dysart 1995 -); **Wheat-Stem Sawfly** (*Cephus cinctus*) (Dysart 1995-). CRIS 5 - **ORCHARD/URBAN TREES PESTS** including: **Gypsy Moth** (*Lymantria dispar*) (Hérard & Lacey 1992-).

Visiting Scientists

The Laboratory welcomes visiting scientists: a brief sketch of the current facilities follows.

1. Montpellier

The environment around Montpellier is very diverse, from coastal marshes to mesic forests at elevations to 1,300 m about 50 km north of the lab, and is a rich resource for exploration for natural enemies. The lab is currently situated in the Parc Scientifique, village of Montferrier, 10 minutes north of downtown Montpellier, near CIRAD (Centre Cooperative International de Recherche Agronomique pour Développement), ORSTOM (Institut Français de la Recherche Scientifique pour le Développement et Coopération), ENSA (Ecole Nationale Supérieure Agronomique) and other scientific organizations. With CSIRO and INRA biological control laboratories, EBCL is a member of the Centre International Lutte Biologique, AGROPOLIS.

The lab is well equipped for work on arthropod and pathogen natural enemies of insects and weeds, although space is limited.

Most of the Rome and Behoust staff moved into the current rented facilities in Science Park, Montpellier during September, 1991. These consist of 400 sq. m. in the main building, including 49 sq. m. of quarantine space; 140 sq. m. in a nearby building (insect pathology lab, library, visitor and student offices), and 32 sq. m. in another building. A quarantine module is situated at the nearby ORSTOM lab; greenhouses, quarantine garden, storage, and a shop are situated at the Lavalette Campus, nearby. (Please communicate with us in advance if you will need quarantine space.) The laboratory maintains a library of specialized books and reprints, extensive map collections, and insect and herbarium collections. A new laboratory of about 1,000 sq. m. will be constructed in 1995-96 on a 2-hectare plot next to the CSIRO laboratory at the Baillarguet Science Park, a few kilometers north of Montpellier.

Address: AmeEmbassy Paris
PSC 116 (EBCL)
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Tel: (33)-67-04-56-00. fax: (33)-67-04-56-20

2. Thessaloniki

Beginning in 1981, the work in Thermi, near Thessaloniki, northern Greece, was carried out in the Plant Protection Institute for two years and then in facilities of the University of Thessaloniki Farm Campus. In 1989, a 40 sq. m. building was constructed on the farm campus. The facility, consisting of one large lab and two small offices is fairly well equipped and is the base of operations for J. Kashefi. It is used extensively during the field season by the EBCL staff and visiting scientists.

Address: 59 Nikis Avenue
54622 Thessaloniki
Greece
Tel. and fax: (30)-31-473-272

3. Rome

Since many biocontrol of weeds projects were in midstream when the laboratories were consolidated in 1991, and since Italy is a rich resource for natural enemies of many of the EBCL targets, the decision was made to maintain a one-man capability in Rome. An excellent, fully equipped laboratory was developed. Gaetano Campobasso, who is a permanent, full-time employee of EBCL is in charge. The laboratory is used extensively by other EBCL staff and visiting scientists.

Address: Via Colle Trugli No. 9
00132 Rome
Italy
Tel.: (39)-6-2060-93-46, fax: (39)-6-207-90-86

Types of Cooperation. Cooperative activities range from long-term projects with mission (TDY) researchers from ARS and other stateside laboratories and universities and from other countries, to brief research visits. Although we must give priority to scientists cooperating on lab targets and USDA supported projects, our interest is to host everyone we can. Depending on prior commitments and resources, the laboratory also is pleased to be of assistance to scientists working in biological control and related areas who are passing through the area and need assistance.

ARS has an established procedure for initiating cooperative research projects and for requesting collection and shipment of natural enemies from its overseas laboratories. Further information in this regard should be requested from Dr. R. S. Soper or the ARS National Program Leader for Pest Management Systems.

Contacts. Depending on the nature of the visit, initial contact is usually made with the ARS National Program Staff Leader for Pest Management Systems, Assistant Administrator for International Research Programs (Dr. R. S. Soper), or the Director of the European Biological Control Laboratory (Dr. L. Knutson). Subsequently, the visitor is usually in communication with the appropriate laboratory scientist to make arrangements, but the Laboratory Director should be kept informed of planning for the visit. The laboratory does not charge "bench " fees. Budgets for long-term cooperative work are established in advance of the work. Visitors should communicate in advance about their needs for space, supplies, and equipment. The cheapest way to ship material to EBCL is by our APO address.

Students:

With the consolidation in Montpellier, EBCL is in a much better position to have students work in the laboratory. Emphasis is on Master's and Ph. D. level students working on specific aspects of EBCL CRIS projects. The EBCL project supervisor serves on the student's official University Committee. Individual and/or joint publications with the EBCL project supervisor is an expected result. The laboratory appreciates the opportunity to contribute to the Montpellier scientific/academic community in this manner. We expect training/cooperative research to be a continuing strong element in the EBCL program, and specific allowance is being made for space for students in the new facilities. The laboratory recently developed an International Internship program for U.S. college students to work for 3-month periods with EBCL scientists.

Research and Service Activities on Gypsy Moth

Research on and technology transfer of parasitoids and predators of gypsy moth is led by Dr. Franck Hérard, and on pathogens is led by Dr. Lerry Lacey. Following is a brief description of their research program on gypsy moth.

Parasitoids and Predators

(F. Hérard)

1994 - Corsica

- A study of population dynamics to identify promising natural enemies, by contrasting high density and low density host populations, was made in cork oak stands near Porto Vecchio, (Corsica) France.
- To increase knowledge of alternate host utilization by gypsy moth parasitoids, we determined the temporal pattern of oviposition by its parasitoids by exposing laboratory reared larvae for 5-day periods during April through September.
- Data analysis is in progress. The species and numbers of parasitoids reared from the collected hosts were recorded for each time period, age class, host density, and tree. Possible effects/comparisons include: differences among age classes, low versus high host density, and differences among sites.
- Shipments were made to the U.S. of braconids (*Glyptapanteles porthetriae*, *Glyptapanteles liparidis*, *Cotesia melanoscela*, *Meteorus pulchricornis*) and tachinids (*Blepharipa pratensis* and *Parasetigena silvestris*) attacking, respectively, early and late instar gypsy moth larvae in Corsica.

1995 - Alsace

Objectives:

- Study gypsy moth population dynamics to identify promising natural enemies, by contrasting non-outbreak and outbreak populations in stands of mixed oaks, beeches, and hornbeams in Alsace (northeastern France).
- Examine factors that influence effectiveness of natural enemies (biology, behavior, hyperparasitoids, interspecific competition, host range, host quality, and habitat preference association).
- Investigate host-parasitoid relationships between *L. dispar* and the two tachinids, *Blepharipa schineri* and *Ceranthia samarensis*, because introduction into the U.S. of highly specific

univoltine parasitoids, effective at low levels of population density, are needed to slow the spread of the pest on its leading edge.

- Ship to the U.S. the two above mentioned tachinids.
- Establish a colony of *B. schineri* at the laboratory to ultimately study its host foraging behavior and fecundity, during 1996.

Pathogens

(L. Lacey)

1994 - Corsica

- Surveys for patently diseased larvae conducted in June. Diseased larvae were very few in the high density host populations of this region and were infected with virus. Diseased larvae from Alsace were infected with Hyphomycetes. An unidentified fungus was also isolated from egg masses in Alsace. Several shipments were made to the ARS microbial germplasm repository in Ithaca, NY.

1995 - Alsace

Objectives:

- Survey and collection of diseased gypsy moth eggs and larvae, to inventory the native pathogens with emphasis on fungi occurring in the Alsace area.
- Investigate potential for using pheromone traps for contaminating adult male gypsy moth with spores of various fungi.
- In conjunction with A. Hajek and F. Hérard, study the effects of *Entomophthora maimaiga* on gypsy moth and its natural enemies (contingent upon funding).
- With summer student (Ms. Franklin) assay of several Hyphomycetes against *L. dispar* larvae.

INTRODUCTION TO THE SESSION: "THE INCREASING SIGNIFICANCE OF
BIOLOGICAL CONTROL AND AN OVERVIEW OF REGULATIONS GOVERNING
BIOLOGICAL CONTROL ORGANISMS"

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Advancement of Biological Control

National and local commitments to increasing the use of biological control, the use of live natural enemies to reduce populations of pest species to levels below which would occur in the absence of the natural enemies, in integrated pest management are codified in official policy statements (Table 1), as exemplified by the following policy statement from Robert Melland, former Administrator, United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS): "APHIS believes that modern biological control, appropriately applied and monitored, is an environmentally safe and desirable form of long-term management of pest species. It is neither a panacea nor a solution for all pest problems. APHIS believes that biological control is preferable when applicable; however, we also recognize that biological control has limited application to emergency eradication programs. Wherever possible, biological control should replace chemical control as the base strategy for integrated pest management. In support of this philosophy, APHIS will develop regulations that facilitate the release of safe biological control agents, while maintaining adequate protection for American agriculture and the environment. The regulations will give clear and appropriate guidance to permit applicants, including specific types of data needed for review and environmental analysis and specific time limits for Agency review. They will be updated as the science progresses. APHIS believes that public input on procedures to approve the release of biological control agents is a desirable and necessary step, and will strive to gather input from scientists, industry, and the public."

The development of new biological control technologies is justified by the multi-billion dollar costs of damage caused by pests and their control (Schwartz and Klassan 1991; U.S. Congress, OTA 1993; Cate and Hinkle 1993). The total preharvest losses of food to pests in the U.S. is about 37%, 12% being due to weeds (Pimentel 1991). These losses occur consistently each year despite the widespread use of modern pest control technologies and application of about 500 million kilograms of pesticides. Pesticide use in the U.S. has been essentially stable during the past 17 years, with atrazine and metolachlor being the most widely used; both are herbicides (Anonymous 1995). The estimated average annual loss due to weeds from 1975 to 1979 in field crops, vegetables, fruits and nuts, forage seed crops, hay, and pasture and rangelands was \$9 billion (Chandler 1991).

Table 1. Important Recent Developments in Policy for Biological Control and Integrated Pest Management.

- o U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) announces a “Biological Control Philosophy” (August 1992) and initiates policy changes now being implemented.
- o USDA Forest Service (FS) and Department of Interior announce major policy changes to “ecosystem management” (1992-3).
- o USDA FS establishes the “National Center for Forest Health Management” in Morgantown, WV (April 1993).
- o Major pest management policy change announced by Clinton Administration: U.S. will reduce pesticides by increasing biological and cultural control (USDA, Environmental Protection Agency and Food and Drug Administration, June 1993).
- o *Pesticides in the Diets of Infants and Children* report released by National Research Council (National Academy Press, Washington, D.C., 386 p., August 1993).
- o Office of Technology Assessment (OTA), the research arm of Congress, releases a major report on *Harmful Non-Indigenous Species in the United States* (September 1993).
- o Charge given to OTA by the House Committee on Agriculture to investigate biological pest control and suggest policy options (September 1993).
- o USDA Cooperative State Research Service announces a biological control section of the National Research Initiative (1994).
- o National Academy of Science conducting a major study into biologically-based pest management in natural systems (report due mid-1994).
- o Department of Defense (DoD) issues pest management standards for DoD installations.
- o North American Plant Protection Organization announces a “Biological Control Philosophy” (October 1994) based on APHIS’ philosophy.

Combining the cost of losses with expenditures for control, the total cost per year was about \$15.1 billion. Biological control, particularly the classical approach, can reduce these losses with returns sometimes in excess of 100 times the cost of their development (Tisdell 1990, Williams and Leppla 1992, Leppla *et al.* 1995). Moreover, there is very minimal risk in the use of relatively host-specific natural enemies that have passed the regulatory scrutiny required for their release into the environment (Bruzese 1990, Harris 1990 and 1993, Hill 1990, Laird *et al.* 1990, Lima 1990, Hopper 1995, Storey 1992, Wapshere *et al.* 1989).

The USDA maintains a substantial biological control program, including overseas laboratories in France, Argentina and Australia, to discover new natural enemies, gain firsthand understanding of the ecological context in which they operate, and selectively ship potentially useful species to the U.S. For this purpose, efforts are being made to improve both domestic and foreign laboratories of the USDA. Specifically targeted pests currently include Russian wheat aphid, *Diuraphis noxia* (Mordvilko); codling moth, *Cydia pomonella* (L.); salt cedar, *Tamarix* sp.; melaleuca, *Melaleuca quinquenervia* (Cav.) S. T. Blake; European corn borer, *Ostrinia nubilalis* (Hubner); sweetpotato whitefly, *Bemisia tabaci* (Gennadius); brown citrus aphid, *Toxoptera citricida* (Kirkaldy); Japanese beetle, *Popillia japonica* Newman; gypsy moth, *Lymantria dispar* (L.); hydrilla, *Hydrilla verticillata* (L. F.) Royle; common crupina, *Cuprina vulgaris* Cassini; diffuse knapweed, *Centaurea diffusa* Lam.; spotted knapweed, *C. maculosa* Lam.; leafy spurge, *Euphorbia esula* L. and purple loostripe, *Lythrum salicaria* L.. Natural enemies are collected overseas, shipped under permit to one of about 40 USDA certified containment facilities in the U.S., screened for identity and purity, moved to the receiving states and released under conditions specified on another federal permit (Coulson and Soper 1989, Coulson *et al.* 1991, Van Driesche and Bellows 1993). USDA biological control projects are conducted by APHIS; the Agricultural Research Service; Cooperative State Research, Education and Extension Service; and Forest Service with a combined departmental investment of about \$60 million per year (Anonymous 1992a). The U.S. Army Corps of Engineers and U.S. Department of Interior, Bureau of Land Management, Bureau of Reclamation and National Park Service, and about 14 state departments of agriculture also conduct biological control programs.

Biological control will progress at a reasonable pace and its potential will be realized only if pest management needs are accurately assessed relative to biological control options. International, national and regional partnerships, involving a wide variety of private and public institutions, can then be formed to establish common target systems, set priorities and measure success (Klassan 1993). Funding and personnel will be increased to conduct interdisciplinary research and form "implementation teams". Emphasis will be on applied projects that solve or prevent pest populations from expanding to outbreak levels, particularly pilot testing potential biological control technologies (Knipling 1992, Klassan 1993). This approach incorporates ecosystem-based management with its integration of research, consultation, planning, implementation and monitoring of all the social, economic and environmental factors that are of concern over large geographical areas (Slocombe 1993, Gregory *et al.* 1995).

Regulation of Biological Control

APHIS, the U.S. Environmental Protection Agency (EPA) and U.S. Department of Interior, Fish and Wildlife Service (FWS) are the primary U.S. federal agencies involved in issuing permits for the importation, interstate movement, and release into the environment of biological control agents (Abrams 1990, Charudattan and Browning 1992, Delfosse 1994, Mendelsohn *et al.* 1995) (Figure 1). Regulatory authorities of the federal and state institutions are coordinated through a process of independently reviewing the same permit applications and any cooperating state institution can also deny a permit. Federal approval of a permit is an action that usually does not “trigger” the National Environmental Policy Act, 1969 (NEPA). NEPA can be triggered by an unprecedented release into the environment of a non-indigenous organism. In the absence of an existing environmental assessment that addresses the release, a new one must be prepared or a more rigorous environmental impact statement substituted. Implementation of NEPA is costly and time-consuming, particularly because there is a wide range of interpretations as to what constitutes compliance.

The major goal of NEPA is “to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.” It “endeavors to secure that goal through integrating the entire range of environmental values meaningfully into society’s pursuit of other important policies and values in a variety of ways, including open, thought-provoking governmental decisionmaking procedures, education, research, and data gathering.” Its purpose is to prevent damage to the environment and associated human health risks, and to mediate the inevitable conflicts of interest that arise from any significant federal action (Bausch 1991a, b). NEPA thus establishes a fair means of arbitration that encourages wide input and assures that their interests are protected by monitoring pest control practices for efficacy and environmental safety (Miller and Aplet 1993, Aplet 1994, Maddox 1994, Reagan *et al.* 1994).

If an organism is regulated as a direct or “indirect” (a legal, not biological, term) plant pest, or a Federal Noxious Weed, a permit application is submitted by the importer to the regulatory officials of the state that is the intended destination and, after it is reviewed at that level, it is forwarded to the USDA, APHIS, Plant Protection and Quarantine, Organism Permitting and Risk Analysis group to assure compliance with federal regulations. APHIS grants or denies permits for the importation, interstate movement and release into the environment of biological control agents, and microbial and multicellular organisms. Importation of a biological control agent into a certified containment facility is considered to be essentially risk-free; however, interstate movement requires additional pest risk analysis and state approval. Policies and procedures for assuring adequate regulation of biological control agents by APHIS have evolved case-by-case as needs occurred. Biological control containment facilities are certified by APHIS and operated according to local requirements, although uniform specifications and standards have been developed. APHIS regularly convenes a Technical Advisory Group to review permit applications for weed biological control agents and a similar peer review procedure has been considered for entomophages. Release into the environment triggers the NEPA process, specifying either an environmental assessment or a full environmental impact statement (Klingman and Coulson 1983, Anonymous 1992b, Delfosse 1993).

National Environmental Policy Act

EPA	USDA, APHIS	DOI, FWS
Chemical pesticides	Non-indigenous species	Threatened and endangered species
Microbial pesticides	Biological control agents	
FIFRA	PQA FPPA FNWA	ESA Lacey Act

Figure 1. Principal federal agencies responsible for implementing biological control regulations, policies and procedures in the United States. The U.S. Environmental Protection Agency (EPA); U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS); and U.S. Department of Interior (DOI), Fish and Wildlife Service (FWS) regulate the indicated aspects of biological control by using corresponding legislative authorities and associated regulations. Acronyms: FIFRA, 1947 (Federal Insecticide, Fungicide and Rodenticide Act); PQA, 1912 (Plant Quarantine Act); FPPA, 1957 (Federal Plant Pest Act); FNWA, 1974 (Federal Noxious Weed Act); and ESA, 1973 (Endangered Species Act). The Lacey Act was enacted in 1900 and amended in 1981 (from Leppla *et al.* 1995).

This procedure is considerably less rigorous for precedented organisms, those that already exist in the release environment, or for organisms included in an existing environmental assessment.

An organism to be used as a pesticide, under the definition of the Federal Insecticide, Fungicide, and Rodenticide Act, must be registered and granted a label by the EPA. The EPA was created in 1970 to protect and preserve the quality of the environment, in order to protect human health and the productivity of natural resources. Consequently, the EPA regulates certain microbial entities such as bacteria, fungi, viruses, and protozoans as "microbial" pesticides. Potential non-target environmental effects are of concern, particularly toxicity and host-specificity. Once an organism is classified as a pesticide, use becomes an issue. For example, urban and industrial pest control uses are under the jurisdiction of the U.S. Food and Drug Administration, and vectors of human and animal diseases are regulated by the Public Health Service, U.S. Department of Health and Human Services.

Additionally, the FWS requires documentation from the country of origin indicating that an organism is not a threatened or endangered species and that approval has been granted for its collection and export. The FWS is charged with enforcing the Endangered Species Act, 1973 and Lacey Act, 1900 and 1981 amendments, the latter being legislation to support CITES, the Convention on the International Trade in Endangered Species. Regulations based on the Lacey Act are currently being revised and the scientific leadership in systematics and biological control is attempting to have most research activities exempted. They are arguing that biological control, especially host-specificity testing, is adequately regulated by the USDA, APHIS with authority from the Federal Plant Pest Act and Plant Quarantine Act, and by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (Anonymous 1991). Moreover, scientists operating in affiliation with "bona fide" research institutions are easily identified and do not require federal regulation. It has never been the intention of FWS to impede scientific research in the enforcement of legislation designed to protect biodiversity. FWS regulators and scientists worldwide have the same goal: protecting the world's flora and fauna.

Significant progress has been made within the allied U.S. federal agencies in implementing workable procedures for regulating biological control but there is no formal structure for harmonizing their actions. Consequently, someone attempting to develop, implement and especially market a biological control technology must work with several agencies independently, often requiring duplicate information and providing somewhat different guidance (Harris 1993). This can impede investment by both the private and public sectors in alternatives to chemical pesticides for managing pests and leads to a continuation of the curative rather than preventative approach. However, due largely to the traditional, informal networking of the biological control community, and to the diligence of the federal agencies involved, the field has advanced safely and at a reasonable pace (Hopper 1995, Maddox 1994).

The goal of this session was to inform an audience that is not familiar with federal regulations that affect biological control about procedures that must be followed to obtain permits. Therefore, we asked knowledgeable representatives from APHIS, EPA and FWS to briefly describe the federal regulations that provide regulatory authority to their respective agencies, diagram and explain the

process for granting permits under these regulations, and discuss the procedures for assuring that these regulations are implemented. Related information was also requested, along with pertinent literature. We hope to provide an efficient and uniform means of obtaining and sharing information, assuring a systematic and expeditious review of applications, enhancing the scientific basis for decision-making, establishing consistent risk assessment protocols, and specifying uniform data and review standards. Additionally, science-based enabling legislation for biological control has been proposed to ensure that safe and effective agents are approved and released efficiently (Delfosse 1992). We are moving toward a coordinated permitting and approval system that incorporates all of the federal regulatory requirements into an efficient process that works for our customers.

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GUIDELINES FOR OBTAINING A PLANT PEST PERMIT
FROM THE U.S. DEPARTMENT OF AGRICULTURE

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Introduction

Three Federal statutes, the Plant Quarantine Act of 1912, the Federal Plant Pest Act (FPPA) of 1957, and the Federal Noxious Weed Act (FNWA) of 1974, provide authority for the Animal and Plant Health Inspection Service (APHIS) to regulate the movement of live plant pests into and through the United States.

The U.S. Department of Agriculture (USDA) is also required to comply with the regulations of other Federal Agencies. The Endangered Species Act of 1973 requires "consultation with Fish and Wildlife Service when a federal action may affect endangered or threatened species." Applicants should repeatedly consider throughout their projects potential impacts on non-target species, especially endangered and threatened species, when the proposed action is to release an organism into the environment. This consideration must address the eventual spread of the organism throughout the environment.

The National Environmental Policy Act (NEPA) of 1970 requires Federal Agencies to prepare a "detailed statement by the responsible official" on the environmental impact of every major Federal action significantly affecting the quality of the human environment, i.e. an environmental impact statement. To determine whether or not the issuance of a permit by APHIS for the release of plant pests or potential plant pests into the environment constitutes a major Federal action for the purpose of NEPA, an environmental assessment (EA) must be prepared. However, the importation and containment of plant pests are not subject to NEPA.

General Steps for a Permit Application

The following six steps are the same whether the permit application is for importing organisms into containment, moving them interstate between containment facilities, or releasing them into the environment:

1. Apply for a separate permit in each category.
 - a. Import a plant pest into the U.S.
 - b. Movement of a plant pest between States.
 - c. Release a plant pest into the environment.
2. Obtain a PPQ Form 526. The application form and instructions on its completion can be either mailed or sent by facsimile.
 - a. Telephone Barbara Jenkins, Permit Assistant at (301) 734-5609, or
 - b. Download from the World Wide Web @ <http://www.aphis.usda.gov/ppq/bats/permits.html>
 - c. Write to Deborah Knott, USDA-APHIS-PPQ-BATS-OPRA, 4700 River Rd., Unit 133, Riverdale, MD 20737-1236.
3. Complete Section A of Form 526, and submit a signed copy to the appropriate regulatory official for each affected State. The names and addresses of these State Plant Regulatory Officials (SPRO's), available on the World Wide Web @ <http://www.aphis.usda.gov/ppq/bats/permits.html>, will be supplied along with Form 526, if the request is made in writing or by telephone.
4. The SPRO will review and approve or deny the permit application and forward it to BATS. Once BATS receives it from the State official, a notification card will be sent. Almost invariably, if a State regulatory official denies an application, BATS will concur (Fig. 1).
5. BATS will evaluate the application to determine whether it falls under its regulatory authority. For organisms within BATS' authority, the evaluation will include an assessment of risk associated with the action requested on the permit application.

HOW TO APPLY FOR A PPQ PLANT PEST PERMIT

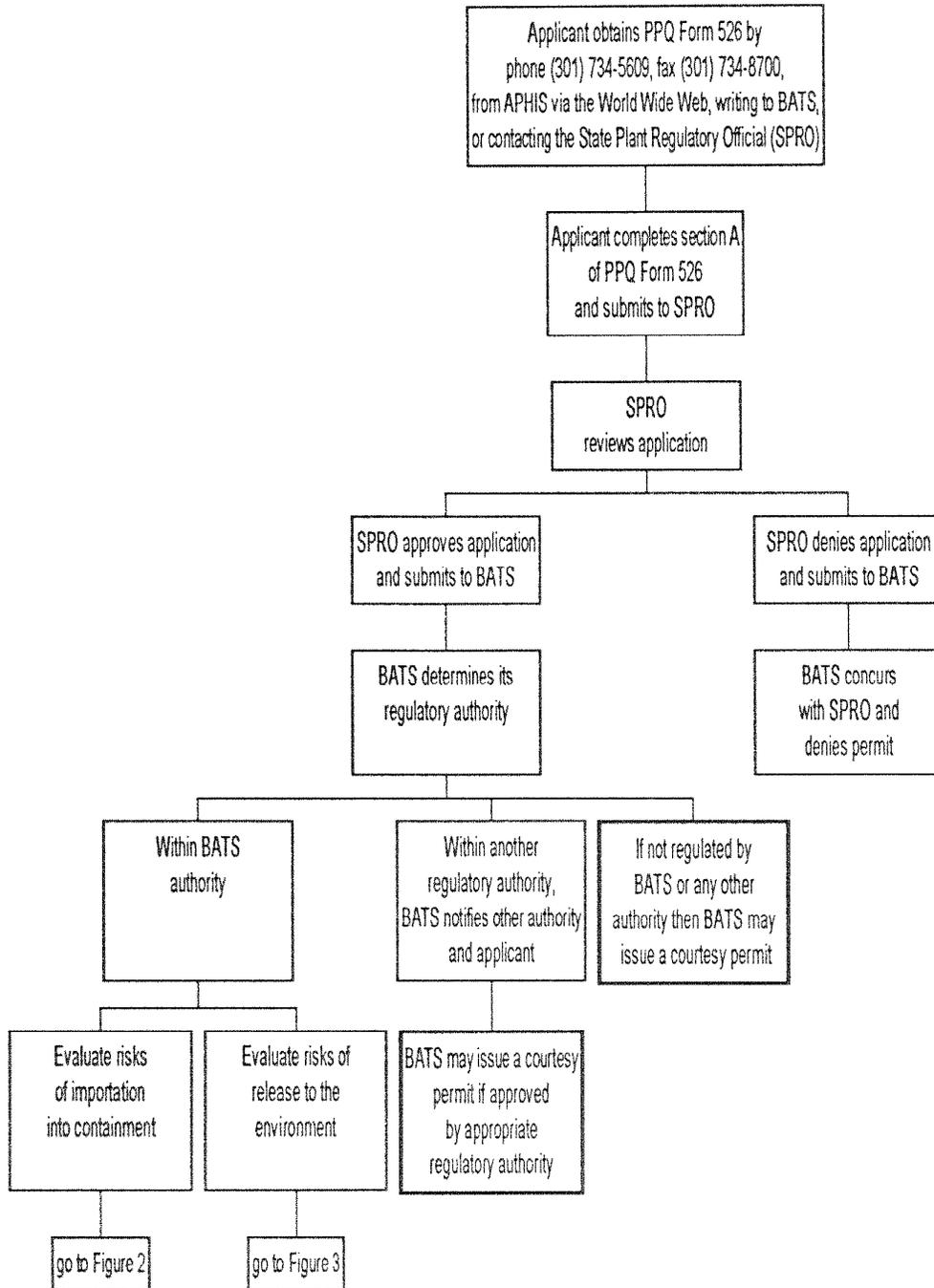


FIGURE 1.

6. If the application does not fall within APHIS' authority, BATS may:
 - a. Forward the application to the appropriate regulatory authority, such as the APHIS-Biotechnology Permit Unit of Biotechnology, Biologics, and Environmental Protection; APHIS-PPQ Port Operations Permit Unit; APHIS Veterinary Services; National Center for Import-Export (Animal Program, and Products Service); Food and Drug Administration; etc., and provide notification to the applicant that this action was taken.
 - b. In some instances BATS may issue a courtesy permit to facilitate movement when movement might otherwise be impeded because of the similarity of the organisms to others regulated under the FPPA.

PERMITS TO IMPORT ORGANISMS INTO CONTAINMENT FACILITIES OR TO MOVE ORGANISMS INTERSTATE BETWEEN CONTAINMENT FACILITIES

Applications for movement of organisms between containment facilities do not involve the preparation of EA's. BATS will evaluate the risks and the physical and operating features of the containment facility where organisms are to be housed, if they have not been inspected and approved for this purpose (Fig 2). BATS will initiate a facility inspection and provide the PPQ officer with guidelines for conducting it. The officer will report the inspection findings to BATS which will either approve the facility and issue a permit or not. If BATS determines the facility is inadequate, the reasons will be communicated to the applicant and mitigative measures may be undertaken. An applicant may either comply with the measures specified by BATS and request another inspection or withdraw the application.

An application for study of an organism in a containment facility will be reviewed initially to determine whether or not the facility has been pre-approved by BATS. The containment capabilities of a pre-approved facility will be evaluated to ascertain whether the facility design and operating procedures can reliably contain the requested organism. Permits will be granted for facilities that are secured appropriately. If facilities are not secure, they can be remodeled in consultation with BATS. Approval of a new or remodeled facility will enable the applicant to be granted a permit by BATS-OPRA for containment of the organism for which the facility was constructed.

PERMITS FOR RELEASE TO THE ENVIRONMENT

Permits will be issued (1) for organisms previously reviewed and determined not to present a risk, or (2) for organisms having an existing EA that resulted in a Finding Of No Significant Impact (FONSI). The permits will be accompanied by lists of conditions designated to mitigate pest risk to plants and the environment.

If it is necessary to prepare an EA prior to the issuance of a permit, then applicants will be encouraged to expedite the application process by preparing a draft EA and submitting it to BATS for finalization and scientific review (Fig. 3). Upon receiving a phoned or written request, BATS

IMPORTATION OF ORGANISM INTO A CONTAINMENT FACILITY

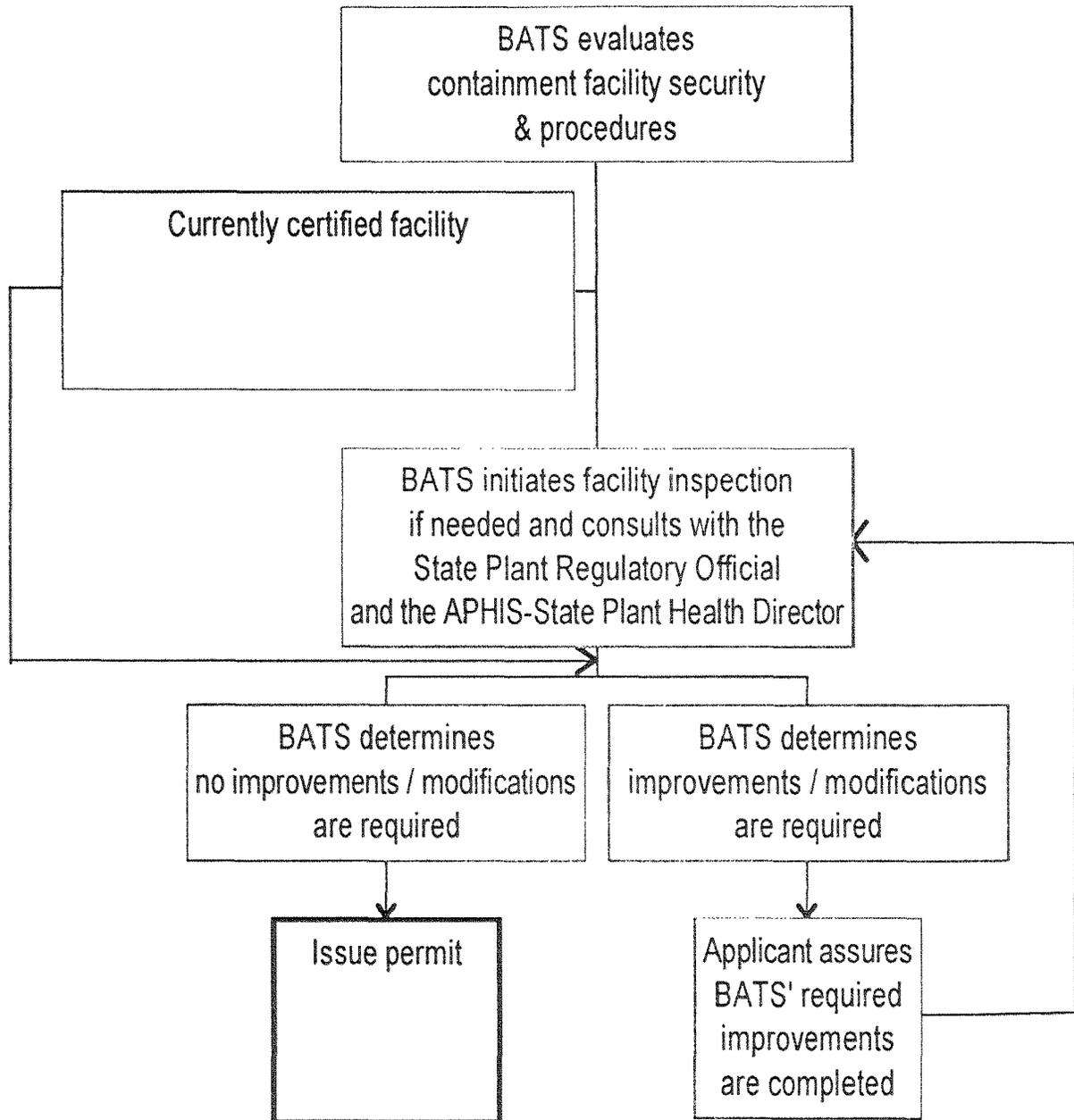


FIGURE 2.

RELEASE OF ORGANISMS TO THE ENVIRONMENT

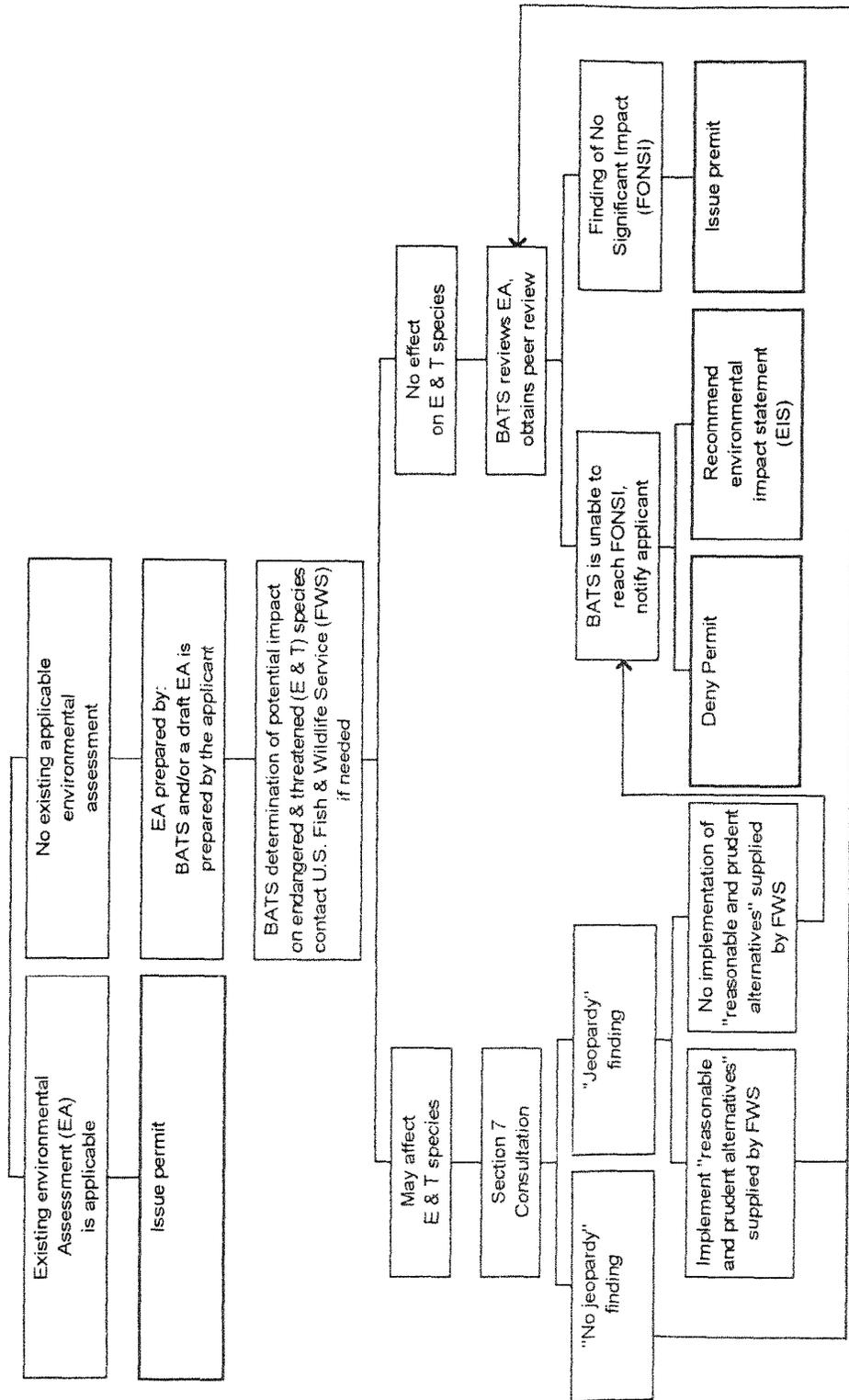


FIGURE 3.

will provide a template EA and example EA's, *both of which are soon to be available on the APHIS GOPHER*. Also, applicants must consider endangered and threatened species at an early stage in the preparation of an EA. The applicant should contact: Division of Endangered Species (ARLSQ452), U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, Arlington, VA 22203, telephone: 703-358-2106. BATS-OPRA will evaluate the EA for areas of concern such as potential effects on endangered and threatened species (E & T) and potential impacts on the environment.

In the event that BATS-OPRA determines that a proposed permitted action may affect an E & T species, consultation with FWS will be initiated. In addition to the EA, the FWS may request additional information to assist them in determining whether the proposed action would be likely to jeopardize the continued existence of the species of concern. A "jeopardy" finding would be accompanied by "reasonable and prudent alternatives" supplied by FWS which would be required of the applicant to avoid jeopardizing the E & T species of concern. A finding of "no jeopardy" or a finding of "jeopardy" followed by implementation of the "reasonable and prudent alternatives" (50 CFR 402.02) would be followed by BATS' sending the EA for scientific review (Figure 3).

If BATS' evaluation of the EA results in a FONSI, APHIS will publish a notice of availability of the EA in the Federal Register and issue a permit for the application. If BATS-OPRA determines that there is a potentially significant impact of the proposed release that cannot be mitigated, they will notify the applicant of the denial and provide the reasons for the denial. The applicant may appeal the denial, either in person or in writing, to the Deputy Administrator of APHIS, PPQ. The applicant may also supply additional information in support of the original application. Alternatively, BATS-OPRA may retain the application until an EIS has been completed.

Definitions

Containment Facility: A structure where physical and operational characteristics are designed so that the risk of the enclosed organisms' escaping to the environment is minimized.

Movement: "Moved" and "movement" mean ship, deposit for transmission in the mail, otherwise offer for shipment, offer for entry, import, receive for transportation, carry or otherwise transport or move, or allow to be moved, by mail or otherwise (FPPA).

Plant Pest: Any insects, mites, nematodes, slugs, snails, protozoa, or other invertebrate animals, bacteria, fungi, other parasitic plants or reproductive parts thereof, viruses, or any organisms similar to or allied with any of the foregoing, or any infectious substances of the aforementioned which are not genetically engineered as defined in 7 CFR 340.1 which can directly or indirectly injure or cause disease or damage in any plants or parts thereof or any processed, manufactured or other products of plants (FPPA).

Biological Assessment and Taxonomic Support (BATS) recognizes that a vast majority of plant pests cause direct injury to plants through their phytophagous or disease-causing nature. However, instances may occur in which an organism may be considered a pest through indirect action, *e.g.* a hyperparasitoid of an established and successful biological control agent. BATS evaluates

non-target effects of potential plant pests, especially effects on plants and organisms listed as endangered or threatened by the FWS.

Noxious Weed: Any living stage, including but not limited to, seeds and reproductive parts, of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to or not widely prevalent in the United States, and can directly or indirectly injure crops, other useful plants, livestock, or poultry or other interests of agriculture, including irrigation, or navigation or the fish or wildlife resources of the United States or the public health (FNWA).

References

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- Coulson, J. R., R. S. Soper, and D. W. Williams. 1991. Biological Control Quarantine: Needs and Procedures. USDA, ARS, ARS-99.
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- Lima, P. J. 1989. United States Department of Agriculture (USDA) Safeguards for Introducing Natural Enemies for Biological Control of Weeds. pp. 109-115 *In*: E. S. Delfosse, Ed., Proc. VII Int. Symp. Biol. Contr. Weeds, Rome, Italy.

OBTAINING EPA APPROVAL TO TEST OR COMMERCIALIZE MICROBIAL
AND/OR BIOCHEMICAL PESTICIDES

Michael L. Mendelsohn and Phillip O. Hutton

Biopesticides and Pollution Prevention Division,
Office of Pesticide Programs, U.S. Environmental Protection Agency,
401 M Street S.W., Washington, DC 20460

Introduction

U.S. Environmental Protection Agency (EPA) approval is required prior to full commercial and certain experimental use of most pesticides. Pesticides are defined in § 2(u) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) as “(1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest and (2) any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant” except those articles considered to be new animal drugs or animal feeds bearing or containing a new animal drug.

Among the various types of pesticides currently regulated by EPA are the microbial and biochemical pesticides. Microbial pesticides include the following microorganisms when they act as pesticides per FIFRA § 2(u): protozoa, algae, fungi, bacteria, and viruses. Biochemical pesticides are distinguished from conventional chemical pesticides by their nontoxic or indirect mode of action toward target organisms and by their natural occurrence or structural similarity and functional equivalence to naturally occurring compounds, e.g., insect pheromones and certain growth regulators.

EPA is committed to encouraging the development and use of environmentally acceptable biological pesticides as alternatives to more toxic conventional chemical pesticides. The Agency recognizes that these pesticides are often different in their mode of action and has employed numerous measures to facilitate the application process. These include distinct data requirements, consolidation of biological pesticide application processing within a single group, [Biopesticides and Pollution Prevention Division (BPPD)], a soon to be available “Guide to the Registration of Biological Pesticides”, and regulatory relief activities in the area of lepidopteran pheromones.

EPA Contact Points

Inquiries regarding biochemical and microbial pesticides should be directed to the following individuals:

Phil Hutton
Regulatory Action Team Leader
Microbial and Plant Pesticides
Phone: (703) 308-8260
Fax: (703) 308-7026
email: Hutton.Phil@epamail.epa.gov.

Robert Torla
Regulatory Action Team Leader
Biochemical Pesticides
Phone: (703) 308-8098
Fax: (703) 308-7026
email: Torla.Robert@epamail.epa.gov.

For information on joining BPPD's Pesticide Environmental Stewardship Program (a voluntary public/private partnership dedicated to protecting human health and preserving the environment by reducing the use of pesticides and the risks associated with pesticide use), interested parties should call 1-800-972-7717.

Approvals Needed for Experimental Work

I. Experimental use permits are required for all field testing of pesticides except for the following:

A) A small-scale test involving use of a particular pesticide that is conducted on a cumulative total of no more than 10 acres of land or 1 surface acre of water per pest, provided that: 1) when testing for more than one target pest occurs at the same time and in the same locality, the appropriate 10 or 1 acre limitations shall encompass all of the target pests, 2) any food or feed crops involved in, or affected by such tests shall be destroyed or consumed by experimental animals unless an appropriate tolerance or exemption from a tolerance has been established under the Federal Food, Drug, and Cosmetic Act (FFDCA) for residues of the pesticide, 3) waters which are involved in or affected by such aquatic tests are not used for irrigation purposes, drinking water supplies, or body contact recreational activities, and 4) aquatic testing shall not be conducted in any waters which contain or affect fish, shellfish, plants or animals taken for recreational or commercial purposes and used for food or feed, unless an appropriate tolerance or exemption from a tolerance has been established under the FFDCA for residues of the pesticide.

B) For certain microbial pesticides, a notification to the EPA for a determination as to whether testing requires an experimental use permit is needed before any small-scale testing in the environment takes place. These microbial pesticides include: 1) microbial pesticides whose pesticidal properties have been imparted or enhanced by the introduction of genetic material that has been deliberately modified (except microbial pesticides resulting from deletions or rearrangements within a single genome that are brought about by the introduction of genetic material that has been deliberately modified), and 2) nonindigenous microbial pesticides that have not been acted upon by the USDA.

C) Non-aquatic experimental use (including food and feed use) of lepidopteran pheromones, regardless of formulation, when applied at a maximum use rate of 150 grams active ingredient per acre per year do not require an experimental use permit when tested up to 250 acres. However, all inert ingredients in these product formulations must be exempt from the requirement of a tolerance under the FFDCA.

II. Food or feed items treated in experimental testing require a tolerance or exemption from the requirement of a tolerance under the FFDCA. Certain generic tolerance exemptions exist for biochemical pesticides, including the following:

A) 40 CFR Part 180.1122 exempts inert ingredients in semiochemical dispensers.

B) 40 CFR Part 180.1153 exempts lepidopteran pheromones applied to growing crops at a rate not exceeding 150 grams per acre per year from the requirement of a tolerance.

Approvals Needed for Full Commercial Use

I. Registration of the pesticide product under FIFRA.

II. Establishment of a tolerance or exemption from tolerance under the FFDCA for uses involving food or feed. The generic tolerances mentioned above also apply here.

U.S. FISH AND WILDLIFE SERVICE REGULATIONS GOVERNING THE COLLECTION,
POSSESSION, AND TRANSPORTATION OF WILDLIFE AND PLANTS, AS RELATED
TO THE SCIENTIFIC COMMUNITY¹

United States Department of the Interior, Fish and Wildlife Service, Division of
Law Enforcement, P. O. Box 3247, Arlington, VA 22203-3247

I. Introduction - Those individuals or institutions who have dealings with "fish or wildlife" as defined by the Lacey Act Amendments of 1981 and Title 50, Code of Federal Regulations (CFR), part 10, must be aware of the pertinent Statues and Regulations with which they are required to comply.

A. Laws and Regulations

1. 16 USC 1531, Endangered Species Act of 1973(ESA) and 50 CFR 17.
2. 16 USC 1538(c), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and 50 CFR 23.
3. 16 USC 1361, Marine Mammal Protection Act(MMA) and 50 CFR 18.
4. 16 USC 703, Migratory Bird Treaty Act(MBTA) and 50 CFR 10 and 21.
5. 16 USC 668, Bald and Golden Eagle Protection Act (EPA) and 50 CFR 22.
6. 18 USC 42, Lacey Act (Injurious Wildlife) and 50 CFR 16.
7. 16 USC 3371, Lacey Act Amendments of 1981.
8. 16 USC 4901, Wild Bird Conservation Act of 1992 (WBCA) and 50 CFR 15.
9. 16 USC 4201, African Elephant Conservation Act (AEC).

¹For further information, please contact Sheila Einsweiler at 703-358-1949.

- B. Problems involving scientific collecting, possession, and transportation.
1. The collection by individuals and/or institutions, of wildlife and plants regulated by any of the above cited laws, without the required permits authorizing such taking.
 2. The possession by individuals and/or institutions, of wildlife and plants regulated by any of the above cited laws, without the required permits authorizing such possession.
 3. The receiving by individuals and/or institutions, of wildlife and plants regulated by any of the above cited laws, when such wildlife or plants were not legally acquired/possessed by the individual or institution from whom they are being received.
 4. The importation, exportation, and interstate transportation by individuals and/or scientific institutions, of wildlife and plants, contrary to any of the above cited laws and regulations.
 5. The activities conducted by individuals and/or institutions, related to regulated wildlife and plants, that is not authorized, or is contrary to, the conditions set forth on their Service permit.

C. General Importation and Exportation Requirements:

1. All wildlife shipments must leave and enter this country through Customs ports designated by the U.S. Fish and Wildlife Service (50 CFR 14.12). Currently there are twelve designated ports : New York, NY; Miami, FL; Baltimore, MD; Boston, MA; New Orleans, LA; Dallas/Ft.Worth, TX; Los Angeles, and San Francisco, CA; Chicago, IL; Portland, OR; Seattle, WA, and Honolulu, HI. If there are special circumstances that preclude the importer or exporter from using one of these designated ports, an Exception to Designated Port permit is required and must be obtained from the Regional Director's office. In addition, there are several border and special ports through which wildlife may be imported or exported (50 CFR 14.16 and 14.19).
2. All plant shipments must be made through ports designated by U.S. Department of Agriculture (50 CFR 24.12) and must comply with other USDA requirements.
3. Special port exemption permits may be issued for scientific purposes (50 CFR 14.31), to minimize deterioration or loss (50 CFR 14.32) or for economic hardship (50 CFR 14.33). These permits are obtained from the Regional Director's Office.

4. Inspection and clearance requirements including declaration (Form 3-177) requirements are found in 50 CFR 14. Section 14.62 (c) provides an extension period for the filing of an amended declaration form to scientific specimens imported for scientific institutions. Public museums and scientific or educational institutions are exempted from the import/export licensing requirements.
5. Prior notice (72 hours recommended) to the FWS inspection office of all wildlife imports, exports and re-exports is strongly recommended, particularly in the case of live wildlife. Be prepared to provide both the common and scientific name, as inspectors may not be familiar with every species of wildlife.

II. Definitions

- A. All definitions under this section must be understood to have a full comprehension of the Laws and Regulations.
- B. Definitions under the Endangered Species Act (16 USC 1532), and CITES (50 CFR 23.3), that are of particular importance to the scientific community:
 1. The term "fish or wildlife" means any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg, or offspring thereof, or the dead body or parts thereof.
 2. The term "plant" means any member of the plant kingdom, including seeds, roots, and other parts thereof.
 3. The term "commercial activity" means all activities of industry and trade, including, but not limited to, the buying or selling of commodities and activities conducted for the purpose of facilitating such buying and selling: Provided, however, that it does not include exhibition of commodities by museums or similar cultural or historical organizations.
 4. The term "import" means to land on, bring into, or introduce into, or attempt to land on, bring into, or introduce into, any place subject to the jurisdiction of the United States, whether or not such landing, bringing, or introduction constitutes an importation within the meaning of the customs laws of the United States.
 5. The term "re-export" means to export wildlife or plants that have previously been imported.

6. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.
- C. Definitions under the Marine Mammal Protection Act (16 USC 1362), that are of particular importance to the scientific community:
1. The term "Marine Mammal" means any mammal which (A) is morphologically adapted to the marine environment (including sea otters and members of the orders Sirenia, Pinnipedia and Cetacea), or (B) primarily inhabits the marine environment (such as the polar bear); and, for the purpose of this Act, includes any part of any such marine mammal, including its raw, dressed, or dyed fur or skin.
 2. The term "moratorium" means a complete cessation of the taking of marine mammals and a complete ban on the importation into the United States of marine mammals and marine mammal products, except as provided in this Act.
 3. The term "take" means to harass, hunt, capture, or kill, or to attempt to harass, hunt, capture, or kill any marine mammal.
- D. Definitions under the Migratory Bird Treaty Act (16 USC 703), 50 CFR 10.12 and 50 CFR 20.11, that are of particular importance to the scientific community:
1. The term "migratory bird" means any bird, whatever its origin and whether or not raised in captivity, which belongs to a species listed in 50 CFR 10.13, or which is a mutation or a hybrid of any such species, including any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof.
 2. The term "migratory game bird" means those migratory birds included in the terms of conventions between the United States and any foreign country for the protection of migratory birds, for which open seasons are prescribed in 50 CFR part 20, and belong to the following families:
 - a. Anatidae (ducks, geese [including brant], and swans);
 - b. Columbidae (doves and pigeons);
 - c. Gruidae (cranes);
 - d. Rallidae (rails, coots, and gallinules); and
 - e. Scolopacidae (woodcock and snipes).
 3. The term "take" means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.

4. The term "transportation" means to ship, convey, carry or transport by any means whatever, and deliver or receive for such shipment, conveyance, carriage, or transportation.
- E. Definitions under the Eagle Protection Act (16 USC 668c), that are of particular importance to the scientific community:
1. The term "take" includes also pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.
 2. The term "transport" includes also ship, convey, carry, or transport by any means whatever, and deliver or receive or cause to be delivered or received for such shipment, conveyance, carriage, or transportation.
- F. Definitions under the Lacey Act Amendments of 1981 (16 USC 3371), that are of particular importance to the scientific community:
1. The term "taken" means captured, killed, or collected.
 2. The term "transport" means to move, convey, carry, or ship by any means, or to deliver or receive for the purpose of movement, conveyance, carriage, or shipment.
 3. The term "fish or wildlife" means any wild animal, whether alive or dead, including without limitation any wild mammal, bird, reptile, amphibian, fish, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, whether or not bred, hatched, or born in captivity, and includes any part, product, egg, or offspring thereof.
- G. Definitions under the Wild Exotic Bird Conservation Act (WBCA) of 1992 (50 CFR 15) that are of particular importance to the scientific community:
1. The term "exotic bird" means (a) any live or dead member of the class Aves that is not indigenous to the 50 States or the District of Columbia, including any egg or offspring thereof; and (b) does not include domestic poultry, dead sport-hunted birds, dead museum specimens, dead scientific specimens, or products manufactured from such birds; and birds in the following families: Phasianidae, Numididae, Cracidae, Meleagrididae, Megapodiidae, Anatidae, Struthionidae, Rheidae, Dromaiinae, and Gruidae.
 2. The term "qualifying facility" means an exotic bird breeding facility that is included in a list published by the Secretary of Interior.

III. Prohibited Acts/Penalties

A. Statutory Prohibitions and Penalties under the Endangered Species Act, 16 USC 1538:

1. Importation or exportation of endangered species of fish, wildlife or plants.
2. Taking endangered species of fish or wildlife within the United States or the territorial sea of the United States; including endangered species of plants if removed and reduced to possession from areas under Federal jurisdiction.
3. Possession, sale, delivery, transportation, carriage, or shipment of illegally taken endangered species of fish, wildlife or plants.
4. Delivery, receipt, carriage, transportation, or shipment of endangered species of fish, wildlife or plants, in interstate or foreign commerce in the course of a commercial activity.
5. Sale or offer for sale of endangered species of fish, wildlife or plants, in interstate or foreign commerce.
6. Violation of any regulation pertaining to endangered or threatened species of fish, wildlife or plants.
7. Violation of the terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). (1538[c])
8. Engaging in business of importing or exporting fish, wildlife or plants, without permission of the Secretary. (1538[d])
9. Failure to file the proper declaration upon importing or exporting fish, wildlife or plants. Note: The U.S. Fish & Wildlife Service is not currently requiring a 3-177 declaration form for plants. However, the U.S. Department of Agriculture requires all plants to be declared via the U.S. Customs form, and the applicable CITES permits are required.
10. Importation or exportation of fish, wildlife or plants at a non-designated port.
11. Attempting to commit, soliciting another to commit, or causing an offense defined in this section to be committed.
12. There are no criminal felony provisions under the Endangered Species Act. Criminal misdemeanor charges may be assessed up to \$100,000 and one year imprisonment for an individual (or \$200,000 for an organization) who knowingly violates the Act, including any provision of any permit or

certificate. Civil penalties of not more than \$10,000 can be assessed, and forfeiture of all fish, wildlife or plants may be required.

The list of endangered and threatened wildlife and plants can be found in 50 CFR 17.11 and 17.12. The list of wildlife and plants covered by the Convention on International Trade in Endangered Species (CITES) can be found in 50 CFR 23.23.

B. Statutory Prohibitions and Penalties under the Marine Mammal Protection Act, 16 USC 1372:

1. Take of a marine mammal:
 - a. It is unlawful for any person, vessel or other conveyance subject to U.S. jurisdiction take any marine mammal on the high seas.
 - b. It is unlawful for any person, vessel or other conveyance to take any marine mammal in waters or on lands under U.S. jurisdiction.
 - c. It is unlawful for any person to use any port, harbor, or other place under U.S. jurisdiction to take or import marine mammals or marine mammal products.
2. To possess any marine mammal or product which has been taken in violation of the Act.
3. To transport, purchase, sell, export, or offer to purchase, sell, or export any marine mammal or marine mammal product.
4. To import into the United States, any marine mammal or marine mammal product. Note: While this prohibition is not found in 16 USC 1372, it is expressly stated in 16 USC 1371.
5. There are no criminal felony provisions under the Marine Mammal Protection Act. Misdemeanor charges may be assessed up to \$100,000 for an individual (\$200,000 for an organization) and up to one year imprisonment for knowingly violating the Act including any provisions of any permit or certificate. Civil penalties of up to \$25,000 can be assessed and forfeiture of all marine mammals or products may be required.

C. Statutory Prohibitions and Penalties under the Migratory Bird Treaty Act, 16 USC 703 and 705:

1. It is unlawful at any time, by any means or in any manner, to [pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment,

ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export], any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof, included in the terms of the conventions between the United States and Great Britain, the United Mexican States, the Government of Japan and the Union of Soviet Socialist Republics.

2. To ship, transport, or carry, by any means whatever, from one State, Territory, or district to or through another State, Territory, or district, or to or through a foreign country, any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried at any time contrary to the laws of the State, Territory, or district in which it was captured, killed, or taken, or from which it was shipped, transported, or carried.
3. To import any bird, or any part, nest, or egg thereof, captured, killed, taken, shipped, transported, or carried contrary to the laws of any Province of the Dominion of Canada in which the same was captured, killed, or taken, or from which it was shipped, transported, or carried.
4. Criminal felony charges for sale or barter may be assessed up to \$250,000 for an individual (\$500,000 for an organization) and up to two years imprisonment. Criminal misdemeanor charges may be assessed up to \$5,000 for an individual (\$10,000 for an organization) and not more than 6 months imprisonment for knowingly violating the Act including any provisions of any certificates or permits. There are no civil penalties under the Migratory Bird Treaty Act. Forfeiture of equipment and vehicles/transportation may be required.

D. Statutory Prohibitions and Penalties under the Eagle Protection Act, 16 USC 668:

1. It is unlawful for any person within U.S. jurisdiction to take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner, any bald eagle (*Haliaeetus leucocephalus*), or any golden eagle (*Aquila chrysaetos*), alive or dead, or any parts, nests, or eggs of such birds.
2. Criminal felony charges of not more than two years and \$250,000 for an individual (\$500,000 for an organization) will be assessed for a second conviction. Criminal misdemeanor charges of up to one year and \$100,000 for an individual (\$200,000 for an organization) may be assessed for knowingly violating the Act, including any permit provisions.

- E. Statutory Prohibitions and Penalties under the Lacey Act Amendments of 1981, 16 USC 3372:
1. To import, export, transport, sell, receive, acquire, or purchase any fish, wildlife or plant taken or possessed in violation of any law, treaty, or regulation of the United States, or in violation of any Indian tribal law.
 2. To import, export, transport, sell, receive, or purchase in interstate or foreign commerce (a) any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any state or in violation of any foreign law, or (b) any plant taken, possessed, transported, or sold in violation of any law or regulation of any state.
 3. Within the special maritime and territorial jurisdiction of the United States to possess (a) any fish or wildlife taken, possessed, transported, or sold in violation of any law or regulation of any state or in violation of any foreign law or Indian tribal law, or (b) any plant taken, possessed, transported, or sold in violation of any law or regulation of any state.
 4. To make or submit any false record, account, label, or identification.
 5. To attempt to commit any of these prohibitions.
 6. To import, export, or transport in interstate or foreign commerce any container or package containing any fish or wildlife unless the container or package has previously been plainly marked, labelled, or tagged in accordance with specific regulations.
 7. To cause or permit any wild animal or bird to be transported to the U.S. under inhumane or unhealthful conditions.
 8. Criminal felony charges for sale or purchase may be assessed up to \$250,000 for an individual (\$500,000 for an organization) and up to five years imprisonment. Criminal misdemeanor charges of up to \$100,000 for an individual (\$200,000 for an organization) and up to one year imprisonment may be assessed for knowingly violating the Act. Criminal convictions may require forfeiture of equipment and vehicles. Civil penalties of up to \$10,000 may be assessed and forfeiture of all fish, wildlife or plants may be required.
- F. Statutory Prohibitions and Penalties under the Wild Bird Conservation Act (16 USC 4901):
1. To import any exotic bird in violation of any prohibition, suspension, or quota on importation.

2. To import any exotic bird listed in the Appendices of CITES that is not part of an approved list, if the bird was not bred at a qualifying facility.
3. To violate any provision of any permit issued.
4. Criminal felony charges may be assessed up to \$250,000 for an individual (\$500,000 for an organization) and up to two years imprisonment. Criminal misdemeanor charges may be assessed up to \$5,000 for an individual (\$10,000 for an organization) and not more than six months imprisonment for knowingly violating the Act including any provisions of any certificate or permit. Civil penalties of up to \$25,000 may be assessed.

G. Statutory Prohibitions and Penalties under the African Elephant Conservation Act (16 USC 4201):

1. To import raw ivory from any country other than an ivory producing country.
2. To export raw ivory from the United States.
3. To export raw or worked ivory that was exported from an ivory producing country in violation of that country's laws or of the CITES Ivory Control System.
4. To import worked ivory, other than personal effects, from any country unless that country has certified that such ivory was derived from legal sources.
5. To import raw or worked ivory from a country for which a moratorium is in effect.
6. There are no criminal felony provisions under the African Elephant Conservation Act. Misdemeanor charges may be assessed up to \$100,000 for an individual (\$200,000 for an organization) and up to one year imprisonment for knowingly violating the Act including any provisions or any permit or certificate. Civil penalties of up to \$5,000 can be assessed.

IV. Exceptions/Permits - Those individuals or institutions related to the scientific community, may qualify for exceptions and/or permits to conduct activities contrary to pertinent Statutes and Regulations.

A. Statutory exceptions under the Endangered Species Act, 16 USC 1539:

1. Permits may be issued for scientific purposes or to enhance the propagation or survival of the affected species.

2. Pre-Act endangered species parts consisting of any sperm whale oil, including derivatives, or any finished scrimshaw product (any art form which involves the substantial etching or engraving of designs upon, or the substantial carving of figures, patterns, or designs from, any bone or tooth of any marine mammal of the order Cetacea), may be exempted from the prohibition, (if such exemption is not in violation of the Convention,) involving:
 - a. Importation or exportation [1538 (a)(1)(A)]
 - b. Transportation in interstate or foreign commerce, and sale or offer for sale in interstate or foreign commerce; provided, they were lawfully held within the United States on December 28, 1973, in the course of a commercial activity [1538 (E)or(F)].

3. Certain Antique Articles shall not be in violation of protective regulations for threatened species [1533(d)], general prohibitions for endangered species [1538(a)] or violations of CITES if the article [1538(c)]:
 - a. is 100 years of age; or
 - b. is composed in whole or in part of any endangered species or threatened species listed under Section 1533; or
 - c. has not been repaired or modified with any part of any such species on or after November 10, 1978;
 - d. is entered at a designated customs port (19 CFR 12).

Note: Pre-Convention Certificates are required for CITES listed wildlife.

B. Exceptions by Permit for Endangered and Threatened Wildlife and Plants under the Endangered Species Act (50 CFR 17):

Permits may be issued for scientific purposes related to endangered or threatened wildlife or plants.

Each application (Form 3-200) must be submitted to the permit office located in Arlington, Virginia. The following summarized information regarding wildlife is required in addition to the standard application form:

1. The common/scientific name of the species, including number, age and sex, and the activity to be conducted.
2. Information as to whether the species is still in the wild, already removed, or was born in captivity including country and place.
3. Information on any attempts to obtain the wildlife in a manner which would not cause death or removal from the wild.

4. A description and address where the wildlife will be used, displayed or maintained.
5. For live wildlife, a complete description of the facilities, and experience of caretakers.
6. Complete justification as to why a permit should be issued.
7. For propagation enhancement, a statement of willingness to participate in breeding programs and maintain or contribute to studbook data.

Refer to 50 CFR 17.22, 17.32, and 17.62, or contact the Office of Management Authority, (1-800-358-2104) for more detailed permit application information on plants and wildlife.

C. Scientific Exceptions under CITES (50 CFR 23):

1. The prohibitions concerning import, export, and re-exportation shall not apply to herbarium specimens, other preserved, dried or embedded museum specimens, and live plant material when they are imported, exported or re-exported as a non-commercial loan, donation or exchange between scientists or scientific institutions that have been registered by a management authority of their country, and when a label issued or approved by such management authority is clearly affixed to the package or container [50 CFR 23.13(g)]. The Office of Management Authority maintains a current list of registered institutions.

D. Permit requirements under CITES (50 CFR 23):

1. Permits or certificates to import, export or re-export wildlife or plants listed in Appendix I, II, or III are required. Appendix I requires both an import and export (re-export) permit. Appendix II requires an export (re-export) permit. Appendix III requires an export (re-export) permit if it is from the country that listed the wildlife or plant, or a certificate of origin if it is from a country that did not list it. All living or dead animals and plants and all readily recognizable parts and derivatives are subject to the regulations. Note that there are some exceptions for plant parts and derivatives. Also note that tissues, blood, blood products and DNA are regulated by CITES. Synthetic DNA, however, does not require any permit.
2. To import, export, or re-export wildlife or plants listed in Appendix I, II, or III, that are also listed as endangered or threatened under the Endangered Species regulations (50 CFR 17), requirements under both 50 CFR 17 and 23 must be met.
3. To import wildlife in Appendix I, II, or III that are marine mammals listed in

the Marine Mammal Protection Act, the requirements in both 50 CFR 18 and 23 must be met.

4. Shipments of CITES live wildlife must be shipped in accordance with the International Airline Transport Association (IATA) regulations. The requirements can be obtained from the Office of Management Authority or any wildlife inspection office.

Applications (Form 3-200) for CITES permits are generally submitted to the Management Authority in Arlington, Virginia. In addition to the general application requirements, the following summarized information is required:

1. The scientific/common name of species, number, and activity (import/export/re-export).
2. Information as to whether the species is living in the wild, living but not in the wild, or is dead.
3. Description of the species including size, sex, and type of goods for parts and derivatives.
4. Container description and care arrangements during transport for live species.
5. Name/Address of persons involved in U.S. and foreign country.
6. Country and place where species is to be taken from the wild.
7. For Appendix I species- the purpose and details of the activity, expertise of caregivers, facility description, mortality information at facility involving same species (or genus or family).
8. All documentation showing:
 - a. Pre-convention
 - b. Captive-bred or Artificially Propagated
 - c. Scientific loan/donation/exchange of herbarium/museum specimens between scientists or scientific institutions.

Refer to 50 CFR 23.15 or the Office of Management Authority for more detailed application requirements.

- E. Statutory exceptions under the Marine Mammal Protection Act, 16 USC 1371 and 1372:

1. Permits may be issued for scientific research or display purposes related to taking or importation.
2. The Marine Mammal Protection Act shall not apply to any marine mammal taken prior to December 21, 1972, or to any marine mammal product consisting of, or composed in whole or in part of, any marine mammal taken

before such date. Requires the submission of an affidavit to the Director prior to, or at the time of importation.

- F. Permit/Registration requirements under the Marine Mammal Protection Act (50 CFR 18):
1. The collection of certain dead marine mammal parts may be authorized, provided the following conditions are met:
 - a. The bones, teeth, or ivory of any dead marine mammal may only be collected from a beach or from land within 1/4 mile of the ocean - includes bays and estuaries.
 - b. Parts so collected may be retained if registered within 30 days with an agent of the National Marine Fisheries Service or the U.S. Fish and Wildlife Service.
 - c. Registration information shall be supplied.
 - d. Title to any marine mammal parts collected under this section shall not be transferred, unless consented to in writing by the agent referred to in this section.
 2. Permits for scientific research and public display, may be issued by the Director for the taking and importing of marine mammals. In addition to the general permit application requirements (Form 3-200), the following additional summarized information is required:
 - a. The purpose, date, location and manner of taking or importation.
 - b. Description including species/subspecies, population stock, number and anticipated age, size, sex, condition of animals involved.
 - c. Description of transport, care and maintenance including qualifications of personnel involved and veterinary approval.
 - d. Detailed description of scientific research project including copy of proposal with names/addresses of those involved.
 - e. Justification of scientific need and possible alternatives for endangered or threatened species.
 - f. Detailed description of proposed use for public display, including information on enterprise seeking permit.

All applications for marine mammal permits are reviewed by the Commission and Committee of Scientific Advisors on Marine Mammals, and the Office of Management Authority.

G. Exceptions under the Migratory Bird Treaty Act (50 CFR 21):

1. Public museums, public zoological parks, accredited members of (AZA), and public scientific or educational institutions may acquire by gift or purchase, possess, transport, and by gift or sale dispose of lawfully acquired migratory birds or their progeny, parts, nests, or eggs without a permit. Conditions that must be met in order to qualify for this exemption are summarized as follows:

Birds may be acquired only from persons authorized in 50 CFR 21.12 including those mentioned above; by a issued possession or disposal permit; or from Federal/State Game Authorities. Detailed records must be kept and maintained for five years. Any such birds or their progeny may be disposed of only to persons authorized to acquire birds without a permit. Refer to 50 CFR 21.12 for more detailed information regarding these exceptions.

H. Permit requirements under the Migratory Bird Treaty Act (50 CFR 21):

1. Permits to import and export migratory birds, their parts, nests, or eggs, are required. This does not include migratory game birds (Doves, pigeons, waterfowl). 50 CFR 20 Subpart G details import exceptions relating to migratory game birds including importation limits, and requirements for species identification, foreign permits, processing, and marking. In addition this subpart does not allow the import of migratory game birds belonging to another.
2. A banding or marking permit is required before any person may capture migratory birds for banding or marking purposes.
3. A scientific collecting permit is required before any person may take, transport, or possess migratory birds, their parts, nests, or eggs for scientific research or educational purposes. Scientific collecting permits are also subject to additional permit conditions. Refer to 50 CFR 21.23 for detailed application information and additional permit conditions. Migratory bird permit applications, other than banding, shall be submitted to the Regional Director's office in the region where the applicant resides. Banding permits shall be submitted to the Bird Banding Laboratory in Laurel, Maryland.

I. Statutory exceptions under the Eagle Protection Act, 16 USC 668a:

1. Authorization may be given for the taking, possession, and transportation of specimens for scientific or exhibition purposes of public museums, scientific societies and zoological parks.

- J. Permit requirements under Eagle Protection Act (50 CFR 22):
1. Permits to take, possess, or transport bald or golden eagles, their parts, nests, or eggs for scientific or exhibition purposes, may be issued. Application should be submitted to the Regional Director's office in the region where the applicant resides.
- K. The Lacey Act prohibits the importation or transportation of injurious wildlife. The restrictions apply to:
1. Live mammal specimens of fruit bat (*Pteropus*), mongoose or meerkat (*Atilax*, *Cynictis*, *Helogale*, *Herpestes*, *Ichneumia*, *Mungos*, *Suricata*), European rabbit (*Oryctolagus*), Indian wild dog (*Cuon*), multimammate rat or mouse (*Mastomys*), or raccoon dog (*Nyctereutes*);
 2. Live bird specimen or egg of starling (*Sturnus roseus*), dioch (*Quelea quelea*), java sparrow (*Padda oryzivora*), or bul-bul (*Pycnonotus jocosus*);
 3. Live or viable eggs of Family Clariidae, mitten crabs (*Eriocheir*), or zebra mussels (*Dreissema*);
 4. In addition all live or dead fish or eggs of salmonids (Salmonidae) are prohibited entry unless under direct shipment with disease certificates (refer to 50 CFR 16.12 for more specific disease certificate requirements).
- L. Exceptions for Injurious Wildlife (50 CFR 16):
1. Nothing shall restrict the importation and transportation, without a permit, of dead natural-history specimens of wildlife or their eggs for museum or scientific collection purposes: Provided that the provisions of this section shall not apply to dead migratory birds (50 CFR 20 & 21); to dead game mammals from Mexico (50 CFR 14); or to dead bald or golden eagles or their eggs (50 CFR 22).
- M. Permit requirements for Injurious Wildlife (50 CFR 16):
1. Permits to import or ship injurious wildlife for zoological, educational, medical, or scientific purposes may be issued by the permit office in Arlington, Virginia. Injurious wildlife permits are also subject to additional permit conditions[16.22(b)]. In addition to the general application (Form 3-200) the following summarized information is required:

The number and common/scientific name of the wildlife; the purpose for the activity; address of the premises; and the qualifications/experience in care/handling.

Refer to 50 CFR 16.22 for additional special permit conditions.

N. Exceptions by permit under the Wild Bird Conservation Act (16 USC 4901) pertaining to the scientific community:

1. Permits may be issued if the importation is not detrimental to the survival of the species and if it is for (a) scientific research, (b) zoological breeding or display programs, or (c) cooperative breeding programs that meet all criteria. Refer to 50 CFR 15 Subpart C, and contact the Office of Management Authority for further details.

Permit applications are submitted to the Office of Management Authority in Arlington, Virginia.

O. Exceptions for the importation and exportation of African elephant ivory under the African Elephant Conservation Act, Endangered Species Act, CITES, and current Service policy that pertain to the scientific community:

1. Worked ivory may be imported for non-commercial purposes if the item was acquired prior to the date the Convention applied to the African elephant (Feb. 4, 1977), and is accompanied by a valid pre-CITES certificate.
2. Worked ivory may be imported as "personal effects" if the worked ivory was legally acquired/possessed in the U.S. for non-commercial purposes and was legally exported.
3. Worked ivory may be imported or exported for non-commercial purposes and for commercial purposes if the item is at least 100 years old. Proof of antiquity must be provided, the item must be composed of elephant ivory and the item cannot have been repaired or modified with elephant ivory after the date of listing (Feb.4, 1977 for African elephant and July 1, 1975 for Asian elephant).