BIOLOGICAL ASSESSMENTS FOR 2003 GRASSHOPPER PROGRAMS IN OREGON

BACKGROUND

The USDA Animal and Plant Health Inspection Service (APHIS), in conjunction with federal agencies, state departments of agriculture, Native American tribes, and private individuals is planning to conduct grasshopper/Mormon cricket control programs, in the year 2003, to protect rangeland from economic infestations. APHIS' authority for carrying out control programs is found in the Plant Protection Act (PPA), Title IV, Agricultural Risk Protection Act of 2000, Section 417. The PPA mandates that APHIS control economic infestations of grasshoppers/Mormon crickets in order to protect rangeland, when requested, and provided funding is available.

Many species listed in the Endangered Species Act occur in counties where the potential exists for APHIS Rangeland Grasshopper Suppression Program activities. Some of these listed species fall under the jurisdiction of National Marine Fisheries Services (NMFS), now known as NOAA Fisheries.

In anticipation of possible control activities in the year 2003 there is a need for consultation with NOAA Fisheries to determine protective measures which will allow APHIS to conduct grasshopper control programs while assuring that the programs will not cause an adverse effect to any listed species. APHIS is beginning Section 7 consultation with NOAA Fisheries on a national level. However, a nationwide biological assessment (BA) and biological opinion (BO) will not be issued in time for grasshopper/Mormon cricket programs in 2003. It was decided by the agency, to take the unusual step for this program, to consult on a state by state basis for those states where the potential exists for grasshopper/Mormon cricket control programs. APHIS will prepare local BA's in consultation with the local NOAA Fisheries to assist in the determination of protective measures.

PURPOSE

This biological assessment is for grasshopper/Mormon cricket suppression activities in the state of Oregon. Activities for 2003 will be limited to rangeland in Baker, Crook, Deschutes, Gilliam, Grant, Harney, Hood River, Jefferson, Lake, Klamath, Malheur, Morrow, Sherman, Umatilla, Union, Wallowa, Wasco, and, Wheeler counties. APHIS has requested Endangered Species Act, section 7, informal consultation for federally listed or proposed species regulated by NOAA Fisheries. The agreements reached for Oregon, between APHIS and NOAA Fisheries, will be in effect for 2003, or until a BO for the entire Rangeland Grasshopper Suppression Program is issued and the nationwide, formal

consultation process is completed. APHIS may request local consultation annually if the national consultation is not completed.

This biological assessment will address the following five species (ten subspecies): chinook salmon (*Oncorhynchus tshawytscha,* lower, upper Columbia R. and Snake R.); chum salmon (*Oncorhynchus keta*, Columbia R.); coho salmon (*Oncorhynchus kisutch*, OR pop.); sockeye salmon (*Oncorhynchus nerka*, Snake R.); steelhead (*Oncorhynchus mykiss*, lower, middle, upper Columbia R., Snake R.).

APHIS respectfully requests informal ESA, section 7, consultation on the five listed species in the grasshopper program area of Oregon. There are no proposed species in Oregon. A written response from NOAA Fisheries is requested should NOAA Fisheries concur with the "not likely to adversely affect" determinations in this biological assessment, for listed species on their critical habitat.

DESCRIPTION OF ACTION

This document incorporates by reference portions of the Rangeland Grasshopper and Mormon Cricket Suppression Program Final Environmental Impact Statement (2002 APHIS FEIS) which discusses the purpose and needs, alternative strategies, affected environments, environmental consequences, and other environmental considerations of the APHIS grasshopper suppression program. This 2002 FEIS updates alternatives available to APHIS from the previous 1987 FEIS.

More detailed site-specific environmental assessments (EA's), tiered to the 2002 APHIS FEIS, are prepared to better describe the local site characteristics. Grasshopper suppression program decisions are then based on the conclusions reached in the site-specific EA's. Only the program alternatives found in the 2002 APHIS FEIS are available to APHIS for use in any site-specific treatment. When a treatment becomes imminent, a preferred alternative will be chosen, and APHIS will prepare a Finding of No Significant Impact (FONSI) based on that alternative.

An EA has been prepared to cover Oregon Rangeland Grasshopper and Mormon Cricket Suppression Programs, OR-03-01 (Oregon EA) and is incorporated in this BA by reference.

The chemical control methods available include the use of ULV sprays of carbaryl, diflubenzuron, and malathion, and carbaryl bait applied at conventional rates. Also considered is the application of these same chemicals at reduced rates, and where untreated swaths (refuges) are alternated with treated swaths. This method is known as Reduced Agent Area Treatments (RAATs).

Conventional rates of carbaryl (.5 lb a.i. / acre) and malathion (. 62 lb a.i. / acre) are the same as those in the 1987 APHIS FEIS. Conventional rates for diflubenzuron are .016 lb a.i. / acre. The RAATs system uses approximately half the concentration of each chemical as conventional rate applications, and is applied to 33-60% of the total area. (FEIS page 18-22)

Diflubenzuron

Diflubenzuron is a new chemical that has been labeled since the 1987 APHIS FEIS. It is classified as an insect growth regulator that affects the formation and/or deposition of chitin in an insect's exoskeleton. An insect larva/nymph exposed to diflubenzuron is unable to successfully molt and thus dies. APHIS completed a risk assessment for the use of diflubenzuron in grasshopper suppression in March 2000. This report, "Chemical Risk Assessment for Diflubenzuron Use in Grasshopper Cooperative Control Program", was provided during consultation, and is considered incorporated in this BA by reference.

Because of its mode of action and low toxicity, diflubenzuron would not be toxic to, or directly affect, humans, terrestrial wildlife, plants, or fish at the applications rates proposed. Diflubenzuron is considered much less toxic, to most groups of organisms, than either carbaryl or malathion. However, all three chemicals are highly toxic to aquatic invertebrates. Diflubenzuron has slight toxicity to fish, but if it found its way into water, it could cause an indirect effect by temporarily reducing a food source for juvenile fish. Any reduction in the food base would be temporary, and would likely be compensated for by other food items. Protective measures are used to prevent chemicals from contaminating water. (Oregon EA II.D.1, and Appendix 1)

Diflubenzuron is highly toxic to aquatic invertebrates. The Dimilin 2L label instructions require it not be applied within 25feet by ground or 150 feet by air of any body of water. Increased buffers are proposed to protect listed species or areas of concern.

Carbaryl

Carbaryl's mode of toxic action occurs through inhibition of acetylcholinesterase (AChE) function in the nervous system. This inhibition reverses over time when exposure ceases. Carbaryl is not subject to significant bioaccumulation.

At program rates carbaryl is unlikely to be directly toxic to birds, mammals, or reptiles. It will most likely affect insects exposed to ULV spray or that consume carbaryl bait. Field studies have shown that affected insect populations recover rapidly and generally do not suffer long term effects. The use of carbaryl in bait

form has considerable environmental advantages over liquid sprays. Bait is easier to direct towards the target area and affects fewer notargets than sprays.

Should carbaryl enter water, there is the potential to effect aquatic invertebrates, especially amphipods. Field studies have concluded that there is no biologically significant effect on aquatic resources, although invertebrate downstream drift increased for a short period after treatment due to toxic effects. Carbaryl is moderately toxic to fish. Buffers and other protective measures are included in the guidelines to prevent the chemical from entering water. (Oregon EA II.D.1, and Appendix 1)

Malathion

Malathion is also a AChE inhibitor. Unlike carbaryl, AChE inhibition from malathion is not readily reversible if exposure ceases.

At program rates, there is little possibility malathion will to be directly toxic to birds, mammals, or reptiles. No direct toxic effects have been observed in field trials. It will most likely affect insects exposed to ULV spray. While the number of insects in the treated area would diminish, there would be insects remaining. The remaining insects, and those migrating in from outside the treated area would be available prey for insectivors. Those insects with short generations would soon increase in number.

Malathion is highly toxic to some fish and aquatic invertebrates. However, buffers and other protective measures are included in the guidelines to prevent the chemical from entering water. (Oregon EA II.D.1, and Appendix 1)

RAATs

RAATs technology is a product of the IPM alternative in the 1987 FEIS. This strategy combines insect suppression and conservation biological control. Grasshoppers are controlled by chemicals in the treated areas. The untreated swaths provide a refuge for naturally occurring grasshopper parasites and predators, as well as other non-target insects. Even those organisms that move into the treated swaths will be largely unaffected unless they feed on treated foliage or bait, which would contribute to additional grasshopper mortality. The RAATs system puts less insecticide into the environment and lowers the risk to non-target species, water quality, and humans. The goal of the RAATs alternative is to provide a more economical and environmentally friendly method to suppress grasshopper populations rather than reduce those populations to the greatest extent possible.

A full description of the environmental consequences, environmental fate, and risk evaluation of the chemical alternatives is found in the FEIS chapter V and Appendices B and C.

SPECIES ACCOUNTS AND ASSESSMENTS

Chinook salmon (*Oncorhynchus tshawytscha,* lower Columbia R. and Snake R.)

Chinook salmon are members of the trout family (Salmonidae), and are one of eight species of Pacific salmonids in the genus *Oncorhynchus*. These Pacific salmon are anadromous, spending their adult life in the ocean and traveling into fresh water to spawn and complete their early life histories. Chinook salmon grow larger than the other Pacific salmons, up to 38 inches and 30-40 pounds. Two populations of Chinook occur in the grasshopper program area of Oregon, lower Columbia River, and Snake River.

There are different seasonal runs, spring, summer, fall, or winter in the migration of Chinook salmon from the ocean to fresh water. These runs are identified on the basis of when the adults enter freshwater to begin their spawning migration. Distinct runs differ in the degree of maturation at the time of river entry, the thermal regime and flow characteristics of their spawning site, and their actual time of spawning.

From the Pacific Ocean, Snake River fall, spring, and summer chinook salmon enter the Columbia River and travel upstream about 324 miles (520 kilometers) to the Snake River. The Snake River contains five principle sub-basins that currently provide habitat for these chinooks. Three of the five sub-basins, the Clearwater, Grande Ronde, and Salmon Rivers, are large, complex systems. The Tucannon and Imnaha Rivers are small systems in which the majority of salmon production is in the mainstream rivers. The Asotin, Granite, and Sheep Creeks are small streams that enter the Snake River and provide small spawning and rearing areas.

Snake River fall chinooks enter the Columbia River in July and reach the Snake River from mid-August through October. Their eggs are deposited over gravelly substrate in October and November. The fry emerge from the gravel in March and April. Downstream migration to the ocean begins within a few weeks of emergence. Fall chinook subyearlings are present in the Columbia River estuary from June to October.

Spring/summer run chinook lay eggs, over gravelly substrate, in the spring or summer months. Fry remain in their freshwater habitat for one year. The yearling smolts migrate seaward from early April through June.

Lower Columbia River chinooks spawn in the Columbia River and its tributaries from the mouth to a point just east of Hood River and White Salmon River.

Upper Columbia River chinooks include those populations that spawn in Columbia River tributaries upstream of the Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River. Although they do not spawn in the proposed suppression area of Oregon, they migrate through areas that may be exposed to suppression programs.

In freshwater, juvenile chinook feed opportunistically on terrestrial and aquatic insects. In salt water they eat crustaceans as well as other bottom invertebrates. Adults eat mostly fish. Most chinook return to the spawning grounds after two to three years in the ocean. After spawning, the female chinook guards the nest as long as she is able. The adults usually die within a few days to two weeks after spawning.

For grasshopper suppression programs in 2003, APHIS proposes that no ULV (spray) treatments would occur within 0.5 miles and no carbaryl bait treatments (air or ground) within 500 feet of occupied habitat. Known migratory habitats will be treated as occupied habitat unless otherwise directed by NOAA Fisheries personnel prior to treatments. These protective measures should assure that the Grasshopper Suppression Program will not likely adversely affect chinook salmon (*Oncorhynchus tshawytscha,* lower and upper Columbia River and Snake River).

Chum salmon (*Oncorhynchus keta*, Columbia R.)

Chum salmon are members of the trout family (Salmonidae). These Pacific salmon are anadromous, spending their adult life in the ocean and traveling into fresh water to spawn and complete their early life histories.

In the Columbia River, chum salmon occupy a small remnant of their historic range. Critical habitat encompasses accessible reaches of the Columbia, including estuarine areas and tributaries, downstream from the Bonneville Dam. Historically, chum may have spawned as far upstream as the Umatilla River.

During spawning migration, adult chum salmon enter natal rivers from June to March. Spawning typically is in the lower reaches of rivers, with redds dug in the main stem or in side channels from just above tidal influence to 16km from the river mouths. After hatching, juvenile chum salmon spend a very limited amount of time in fresh water and typical migrate to estuarine and marine areas soon after emergence. This contrasts with other species of *Oncorhynchus* which usually migrate to the sea at a larger size, after months or years of freshwater rearing.

In freshwater, juvenile chum feed on *Diptera* larvae, diatoms, and cyclops. In salt water they feed on a variety of zoo-plankton. Adults feed on polychaetes, pteropods, squid, crustaceans, copepods, amphipods, and fish. Most chum return to the spawning grounds after three to four years in the ocean. Adults usually die within a few days to two weeks after spawning.

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Coho salmon (*Oncorhynchus kisutch*, OR pop.)

Coho salmon are members of the trout family (Salmonidae). These Pacific salmon are anadromous, spending their adult life in the ocean and traveling into fresh water to spawn and complete their early life histories.

Historically, Columbia River coho habitat included all tributaries below the Klickitat and Deschutes Rivers. Coho salmon stocks have been compromised by extensive transfers between genetic groups, and heavy hatchery production. Although several tributaries of the upper Columbia River Basin, including the Snake River, once supported coho, there is no known production above the Deschutes River today.

Adult coho typically begin their freshwater spawning migration in August through December. They spawn by mid-winter, and then die. The young spend a few weeks to 15 months in fresh water before migrating to the sea. Juveniles prefer pools at least one meter deep with good overhead cover and temperatures of 10-15°C. Coho typically spend two growing seasons in the ocean before returning to their natal streams to spawn as three year olds.

Fry feed on a variety of small invertebrates. Parr feed on terrestrial and aquatic insects, and some small fishes. In the ocean they feed primarily other fishes.

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Sockeye salmon (*Oncorhynchus nerka*, Snake R.)

Sockeye salmon are members of the trout family (Salmonidae). These Pacific salmon are anadromous, spending their adult life in the ocean and traveling into fresh water to spawn and complete their early life histories. Some sockeye mature in lakes rather than the ocean and are known as Kokanee. Redfish Lake in Custer County, Idaho supports the only remaining run of Snake River sockeye salmon.

Adult Snake River sockeye salmon usually enter Redfish Lake in August, and spawning occurs near shoreline shoals in October. Eggs hatch in the spring, and the juveniles remain in Redfish Lake normally for two years before migrating to the ocean. The migrants leave Redfish Lake from late April through May. The smolts migrate almost 900 miles through the Salmon, Snake, and Columbia Rivers to the ocean where they usually spend two years. The adult sockeye begin their return migration to Redfish Lake in June or July at four or five years of age.

In fresh water, young sockeye eat primarily planktonic crustaceans. At sea, young sockeye feed on zooplankton, small fish and insects. As they mature they eat more fish. Young sockeye feed heaviest in the afternoon, lightest at night and early morning.

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Steelhead (*Oncorhynchus mykiss*, lower, middle Columbia R., Snake R.)

Steelhead are members of the trout family (Salmonidae). They exhibit one of the most complex life history traits of any salominid species. They may be anadromous, spending their adult life in the ocean and traveling into fresh water to spawn, or reside their entire life in fresh water. Resident forms are called rainbow or redband trout, while anadromous forms are termed steelhead.

Steelhead typically migrate to the sea after spending two years in freshwater. They generally reside in the ocean for two to three years prior to returning to their natal streams to spawn as four or five year olds. Unlike pacific salmon, steelhead are iteroparous, meaning they are capable of spawning more than once before

dying. However it is rare for steelhead to spawn more than twice. Most that do so are female.

Steelhead typically spawn between December and June. The eggs incubate in the redds for 1.5-4 months, depending on water temperature. Juveniles rear in fresh water from one to four years, and then migrate to the ocean as smolts. Biologically, steelhead can be divided into two reproductive ecotypes, based on their sexual maturity at the time of river entry and the duration of their migration. Stream maturing steelhead enter fresh water in a sexually immature condition and require several months to mature and spawn. Ocean maturing steelhead are ready to spawn shortly after river entry. These two ecotypes are commonly referred to by their season of freshwater entry, summer and winter steelhead respectively.

In streams steelhead feed primarily on drift organisms, but may ingest aquatic vegetation, probably for attached invertebrates. Diet changes seasonally. In the ocean, their diet consists of fishes and crustaceans. Steelhead may feed at any time, but usually are most active around dusk.

Genetic information indicates a differentiation between coastal and inland populations of steelhead. In the Columbia River, the geographic boundary of these subspecies is the Cascade crest. The rangeland areas of Oregon where grasshopper programs may take place serve as habitat for three distinct populations of steelhead, lower Columbia, middle Columbia, and Snake River.

The lower Columbia River population belongs to the coastal subspecies of steelhead, and includes both summer and winter runs. It occupies tributaries of the Columbia River between the Cowlitz and Hood Rivers.

Middle Columbia steelhead occupy the Columbia basin from Mosier Creek upstream to the Yakima River, including the Deschutes and John Day Rivers. Upper Columbia steelhead are those that spawn in the Columbia River upstream from the Yakima River, Washington, to the US-Canada border. Although they do not spawn in the proposed suppression area of Oregon, they migrate through areas that may be exposed to suppression programs. All steelhead found upstream of the Dalles Dam are summer run, inland steelhead. Most of these fish smolt at two years and spend one or two years at sea prior to re-entering freshwater, where they may remain up to a year before spawning.

Snake River steelhead are inland steelhead that occupy the Snake River Basin of southeast Washington, northeast Oregon, and Idaho. They are summer steelhead and comprise two groups, A-run and B-run, based on migration timing, ocean age, and adult size. A-run steelhead typically spend one year in the ocean, while B-run spend two years. Snake River steelhead usually smolt at age two or three.

Historically steelhead likely inhabited most coastal streams in California, Oregon, and Washington as well as many inland streams in these states and Idaho. As many as 23 stocks have been extripated, and many more are in decline and at moderate to high risk of extinction.

For grasshopper suppression programs in 2003, APHIS proposes that no ULV (spray) treatments would occur within 0.5 miles and no carbaryl bait treatments (air or ground) within 500 feet of occupied habitat. Known migratory habitats will be treated as occupied habitat unless otherwise directed by NOAA Fisheries personnel prior to treatments. These protective measures should assure that the Grasshopper Suppression Program will not likely adversely affect steelhead (*Oncorhynchus mykiss*, lower, middle, and upper Columbia River, Snake River).

SUMMARY

This biological assessment addresses the possible effects of grasshopper suppression program activities on five species of federally listed fish that could be affected by a grasshopper suppression program in Oregon. Information is provided on the biology and ecology of those species. Protective measures are suggested because program activities may affect those species or their habitats.

There may also be species in the affected areas that have not been addressed in this assessment, because the species have been newly listed, newly proposed, or otherwise not mentioned in previous biological opinions. For those species APHIS will adhere to buffers and other protective measures specified in previous biological opinions for similar species. This will ensure that grasshopper suppression program activities will not likely jeopardize the continued existence of listed species or species proposed for listing, nor adversely modify critical habitat for those species.

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